



2020 Air Quality Annual Status Report (ASR)

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

September 2021

South Gloucestershire Council

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Executive Summary: Air Quality in Our Area

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

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

Air pollution can arise from many sources, including transport, industry and commercial and domestic heating, in particular solid fuel burning. Pollutant levels are assessed against national air quality objectives and where the objectives are not met, Air Quality Management Areas (AQMAs) must be declared and an Action Plan put in place to improve the air quality.

Please note this report does not cover the impacts of the Covid-19 pandemic on air quality as this will be fully covered in the 2021 Annual Status Report which will include the 2020 monitoring data.

Air Quality in South Gloucestershire

South Gloucestershire lies to the north and east of the city of Bristol with the River Severn forming the western boundary and the Cotswold Escarpment to the eastern edge. The area is a diverse mix of urban and rural areas, including major residential, industrial and commercial developments. The major junction of the M4 and M5 motorways is within South Gloucestershire.

The 2019 mid-year population estimate for South Gloucestershire is 285,093⁴ which represents a 16% increase since the 2001 census (245,600). The majority of people live in 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

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

⁴ Source: Office for National Statistics (ONS) Mid-year estimates 2019 (published June 2020) <https://www.southglos.gov.uk/council-and-democracy/census/population-and-demographics/>

South Gloucestershire. The total population is projected to increase to 354,300 in 2043⁵. With the population projected to continue rising, managing future development and providing vital transport infrastructure is a key challenge.

The main air pollutant of concern locally is nitrogen dioxide (NO₂), which mostly arises from road traffic (34%, rising to 80% near roadsides)⁶. Particulate matter is also a pollutant of concern. Sources of particulate matter (PM₁₀ and PM_{2.5} which are described by the particle size) include domestic wood and coal burning (38%), industrial combustion (16%) and road transport (12%)⁷.

While the air quality in South Gloucestershire mostly complies with the national objectives, in some places the air quality does not meet, or is close to, the annual mean objective for nitrogen dioxide (40 µg/m³). However, evidence shows that there are health impacts from air pollution at levels below the current national objectives, so it is important to further reduce people's exposure to air pollution across the whole district⁸.

Air Quality Management Areas

There are two AQMAs currently declared in South Gloucestershire in relation to the annual mean objective for nitrogen dioxide (40 µg/m³):

- 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.
- Kingswood – Warmley – from the Bristol/ South Gloucestershire boundary in Kingswood along the A420 to the junction with Goldney Avenue in Warmley.

Full details of the current AQMAs are included in Table 2.1 of this report and maps are available in Appendix E. Further information on the AQMAs are available on the Council website at www.southglos.gov.uk/airquality and on the Defra website at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=238.

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

⁵ Source: ONS 2020 Sub-national population projections (2018-based) <https://www.southglos.gov.uk/council-and-democracy/census/population-and-demographics/>

⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770715/clean-air-strategy-2019.pdf

⁸ <https://laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf>

have consistently been below the annual mean objective since 2010. Further information is provided in Section 2.1 and Appendix D of the report.

Trends in monitored concentrations

In 2019, South Gloucestershire Council had 102 nitrogen dioxide monitoring sites, including the Yate automatic site, which also monitors particulate matter (PM₁₀).

The key outcomes from the monitoring are:

- Nitrogen dioxide levels decreased across 67% of monitoring sites in comparison to 2018, including at the Yate automatic station, although it was a more mixed picture in the Kingswood – Warmley and Staple Hill AQMAs with decreases at 71% of sites within the Kingswood – Warmley AQMA but only at 32% of sites in the Staple Hill AQMA. Pollutant concentrations can vary significantly from year to year due to a number of factors, in particular the meteorological conditions, which can affect pollutant dispersion, but it is not clear why there is this difference between the AQMAs other than possible localised changes in traffic patterns and volumes.
- However, there was only one location in South Gloucestershire in 2019 where the nitrogen dioxide annual mean objective was not met (i.e. exceeded), the same as in 2018, in comparison to three exceedances in 2017 and eleven in 2016 across the district.
- The single exceedance in 2019 (and 2018) was in the Kingswood – Warmley AQMA at Site 146 Kingswood - Hill Street (42.3 µg/m³). In comparison, there were two exceedances in 2017 and five in 2016 within this AQMA.
- There were no exceedances of the nitrogen dioxide annual mean objective in the Staple Hill AQMA, which was also the case in 2018. In comparison, there was one exceeding site in 2017 and five in 2016.
- There were no exceedances of the nitrogen dioxide annual mean objective outside of the AQMAs where there is relevant exposure (i.e. public exposure for the averaging period of the objective, so in this case, a calendar year).
- At the Yate automatic monitoring site, nitrogen dioxide concentrations were well below the annual mean objective with a decrease from 20 µg/m³ in 2018 to 19 µg/m³ in 2019, continuing the overall declining trend at this site. There were also

no exceedances of the 1-hour mean ($200 \mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year), continuing compliance with this objective.

- Particulate matter (PM_{10}) is also monitored at the Yate Automatic site and in 2019, the annual mean PM_{10} was $13 \mu\text{g}/\text{m}^3$; the same as in 2018. Overall, the trends in annual mean PM_{10} concentrations at Yate have been slowly declining since 2010 when the monitored concentration was $20 \mu\text{g}/\text{m}^3$. The 24-hour mean objective ($50 \mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times a year) was also not exceeded.

The monitoring results and trends in the data are discussed fully in Chapter 3 of the report and trend graphs are available in Appendix A.

How the Council works to manage local air quality

South Gloucestershire Council is a unitary authority and Planning, Transport and Environmental Health are all within the same Directorate (Environment and Community Services) enabling close working between these teams. There is also a close working relationship with the Public Health Team, and their work on the built environment recognises the importance of aligning spatial planning and transport work with its associated impacts on air quality and health.

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, Environmental Policy, 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 Director of Environment and Community Services and the Director of Public Health and also covers the Council's work on 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 existing Climate Change Strategy⁹.

Public Health led on the development of a South Gloucestershire Clean Air Strategy which was approved in July 2020. This commits the Council to the production of an air quality action plan, which will be developed within existing statutory requirements. The action plan will incorporate a public consultation phase to seek the views of the

⁹ <https://www.southglos.gov.uk/documents/Climate-Change-Strategy-201823-Final-sgc-signed-v1.pdf>

public and businesses to help inform and develop the actions. The actions will seek to support the priorities set out in the Council Plan 2020 -2024¹⁰ and build on the co-benefits realised as a result of Covid-19 restrictions, such as the “Making Public Places Safer”¹¹ schemes, which includes the trialling of “School Streets”¹² at selected schools. A decision was made to create and recruit to a limited term post for a period of at least 12 months to drive this work forward, with funding for the post provided jointly by the Directors of Environment and Community Services and Public Health reflecting their ongoing commitment to this work.

South Gloucestershire works closely with other neighbouring authorities in the West of England (Bath and North East Somerset, Bristol City and North Somerset Councils), particularly with regard to regional strategic work areas such as transport and planning, for example on Joint Local Transport Plans (JLTP4¹³) and the Travel West¹⁴ brand which acknowledges commuters do not think in terms of Council boundaries.

The West of England Combined Authority (WECA) was established in 2017, with its constituent councils being Bath and North East Somerset, Bristol and South Gloucestershire. Its aim is to deliver economic growth for the region and address some of the challenges, such as transport, housing, productivity and skills. Crucially, WECA have powers over spending, previously held by central government, to improve the region’s transport, housing, adult education and skills. WECA continue to also work closely with North Somerset Council.

Actions to Improve Air Quality

Key completed measures to improve air quality are:

- As part of the Council response to Covid-19, new walking and cycling measures have been implemented through the DfT Active Travel Fund¹⁵, to enable social distancing and encourage more journeys by active modes. This includes the Thornbury High Street pedestrianisation scheme and new cycle routes in Yate (Station Road) and Filton (Southmead Road).

¹⁰ <https://beta.southglos.gov.uk/publications/council-plan-2020-2024/>

¹¹ <https://beta.southglos.gov.uk/making-public-places-safer/>

¹² <https://www.southglos.gov.uk/transport-and-streets/transport/road-safety-transport/road-safety/active-travel-planning-for-schools/>

¹³ <https://travelwest.info/projects/joint-local-transport-plan>

¹⁴ <https://travelwest.info/>

¹⁵ <https://beta.southglos.gov.uk/making-public-places-safer/>

- Under the second round of the Clean Bus Technology Fund, First Bus and CT Plus have retrofitted 119 buses with emissions-reducing technology. A further 30 vehicles are to be retrofitted by the end of 2020.
- A £4.79m Office for Low Emission Vehicles (OLEV) funding grant was awarded to the four West of England local authorities and First Bus in August 2017. This funding has enabled the delivery of 98 bio-methane buses and 2 re-fuelling stations in the area. The new buses will contribute to reducing air pollution levels across the West of England area, including the Staple Hill AQMA
- Entire fleet of Council pool cars switched to electric in 2017, with OLEV funding secured to switch 20% of other fleet vehicles to electric in 2021.
- Access funding secured to 2021, to enable the continuation of school, business and community travel planning measures to promote sustainable travel choices.

Full details of progress in implementing the existing Air Quality Action Plan for Kingswood and Staple Hill are contained in Section 2.2 of this report.

Other actions being progressed on a wider West of England basis aimed at reducing traffic congestion and improving air quality include:

- Metrobus¹⁶ - a new express bus service which began operating in 2018
- Cribbs Patchway Metrobus Extension¹⁷ - an extension of the Metrobus network in South Gloucestershire
- MetroWest¹⁸ – improved rail services and infrastructure
- Cribbs Patchway New Neighbourhood Cycle Links – delivery of walking and cycling schemes to encourage more people to choose a sustainable travel mode from the outset
- GoUltraLowWest¹⁹ - a grant funded project by Office for Low Emission Vehicles (OLEV) to accelerate the purchase of electric vehicles and provision of charge points

¹⁶ <https://travelwest.info/metrobus>

¹⁷ <https://beta.southglos.gov.uk/cribbs-patchway-metrobus-extension/>

¹⁸ <https://travelwest.info/projects/metrowest>

¹⁹ <https://travelwest.info/drive/electric-vehicles/go-ultra-low-west>

- A new Joint Local Transport Plan (JLTP4)²⁰ has been adopted to take strategic transport planning through to 2036, placing a greater emphasis on air quality and climate change

Further information on these wider actions is provided in Section 2.2 of this report.

South Gloucestershire Council also continues to engage with Bristol City Council and Bath and North East Somerset Council on their Clean Air Plans, through meetings organised by the West of England Combined Authority (WECA). Further information about the Bristol Clean Air Plan is available on the [Clean Air for Bristol](https://www.cleanairforbristol.org/) website²¹ and for the Bath Clean Air Plan, on the [Bath Breathes](http://www.bathnes.gov.uk/bath-breathes-2021) website²².

Hambrook Air Quality Action

Following the Government's UK Air Quality Plan²³ for nitrogen dioxide published in July 2017, the Council was mandated by the Government in February 2018 to undertake a Targeted Feasibility Study. The study was required to identify possible actions that could be taken to reduce roadside nitrogen dioxide levels to meet the annual mean EU limit value of 40 µg/m³ on the A4174 Ring Road between the Bromley Heath and M32 Junction 1 roundabouts in the shortest time possible.

The study concluded 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 A4174 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).

The Council was then legally directed to implement the identified measures with full funding provided by JAQU. The following measures were implemented through an Experimental Traffic Order (ETO) in August 2019:

- Removal of the right turn facility onto the B4058 from the westbound carriageway of the A4174 ring road
- Removal of the straight on movement for the B4058 northbound from Frenchay

²⁰ <https://travelwest.info/projects/joint-local-transport-plan>

²¹ <https://www.cleanairforbristol.org/>

²² <http://www.bathnes.gov.uk/bath-breathes-2021>

²³ <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>

- Removal of the right turn facility from the B4058 from Frenchay onto the A4174
- Removal of the westbound bus lane on the A4174 through the junction to the M32 traffic signals

An ETO allows a trial for up to 18 months so that the effectiveness of the measures can be considered before a decision is taken on whether to implement them permanently. Orders are subject to a statutory process which allows the public to comment formally and provide feedback. The consultation ran until 11 February 2020 on the Council website²⁴.

Additional monitoring was set up at the roadside for the purposes of the trial to monitor the impact of the traffic restrictions at the junction. This is because the EU limit value applies where there is public access (with some exceptions), so includes pedestrian and cycle paths, whereas the national (UK) air quality objectives apply where there is “relevant exposure”, i.e. where the public are present for the averaging period of the objective, so in the case of an annual mean, a calendar year, which usually means where people live.

Unfortunately, we have been unable to assess the effectiveness of the scheme during the trial period because of the impact of the Covid-19 pandemic restrictions on traffic levels which were much reduced during 2020, and are therefore not representative of “normal” traffic conditions. Consequently, the Council has not been released from the Ministerial Direction to reduce roadside nitrogen dioxide levels at this location and have recently been instructed to continue monitoring as we return to more normal traffic and transport conditions.

Further information about the scheme now this position has been clarified and consultation on its possible future format will be available on the Council’s website at <https://www.southglos.gov.uk/transport-and-streets/streets/roads-road-works/major-roadworks/hambrook-air-quality-action/> in due course.

Conclusions and Priorities

In 2019, annual mean nitrogen dioxide concentrations decreased from 2018 levels across 67% of the monitoring sites in South Gloucestershire, including at the Yate

²⁴ https://consultations.southglos.gov.uk/consult/ti/PT.6296_Hambrook_E.T.O/consultationHome

automatic station, and although increases were also monitored at 29% of sites and concentrations remained stable at 4% of sites, the longer-term trend overall is one of gradual declining concentrations across the district. This includes in the AQMAs, as while concentrations have fluctuated over the past decade, a gradual downward trend can be seen overall.

The only exceedance of the nitrogen dioxide annual mean objective was within the Kingswood – Warmley AQMA, indicating that the AQMA is still required. While there were no exceedances within the Staple Hill AQMA, two sites were “borderline” (within 10% of the annual mean objective i.e. greater than 36 $\mu\text{g}/\text{m}^3$). Defra advice is that AQMAs should remain in place until several years of data below 10% of the objective (36 $\mu\text{g}/\text{m}^3$) is collected to support revocation, as annual mean pollutant concentrations can vary from year to year due to a number of factors, most notably meteorological conditions.

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

- Continue to monitor and assess the effectiveness of the JAQU directed scheme on the A4174 at Hambrook in achieving compliance with the annual mean NO_2 limit value, as traffic conditions return to “normal”.
- Progress the new South Gloucestershire Air Quality Action Plan, which will incorporate updated actions for Kingswood and Staple Hill, the Warmley extension of the Kingswood AQMA and wider actions to improve air quality across South Gloucestershire as a whole. Progress on this has been limited due to the resource impact of work on the Covid-19 response and the continued work on the JAQU mandated A4174 Hambrook Air Quality Action scheme, but the approval of a new post to lead on the Action Plan work should ensure there is good progress in the coming year.
- Deliver Covid-19 response walking and cycling schemes funded by the DfT Active Travel Fund, and seek additional investment from the West of England Combined Authority and the DfT to enable the development and delivery of further measures to encourage more people to walk and cycle more often.

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

- Continued significant pressure on local government funding, exacerbated by the Covid-19 pandemic, which could impact on delivering air quality improvements.
- The transport system within South Gloucestershire under normal circumstances is under pressure, due to the travel demand generated by the current population and by people coming into the area on a daily basis to work, shop and for leisure reasons, which is shown through traffic congestion on the road network and capacity problems on local rail services. The uncertainties arising from the Covid-19 pandemic has altered travel patterns and traffic volumes, future vehicle fleet compositions and public transport usage and the knock-on impacts on air quality will be difficult to predict going forward.

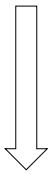
Local Engagement and How to get Involved

What you can do to reduce air pollution

There are lots of steps that everyone can take to improve air quality. 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.

To reduce pollution when travelling:

- Swap some trips in the car for walking, cycling or taking a bus or train, this not only reduces air pollution but also 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. The following hierarchy can be used as a general rule:

○ Electric vehicles	Lowest emissions
○ Petrol hybrid	
○ Gas or petrol	
○ Diesel hybrid	
○ Diesel	Highest Emissions

Emissions can vary depending on make and model and some perform better than others when the emissions in real world driving conditions are compared to the required Euro standards for vehicles. To check the emissions of your vehicle or a vehicle that you are considering purchasing, there is an [online vehicle checker](#)²⁵ on the Mayor of London/ London Assembly website.

- Visit the [Travel West](#)²⁶ and [Better by Bike](#)²⁷ websites for live information on public transport, traffic reports, routes and journey planning for walkers and cyclists, electric vehicle charge points and other information that simplifies travel choices.

To help reduce pollution from domestic heating:

- Consider a boiler upgrade to the newest and most efficient gas condensing boiler with lowest NO_x (and carbon) emissions, especially if the boiler is more than 10 years old. In many cases, the long-term savings made with a more efficient boiler will cover the outlay.
- Switch energy supplier to a renewable energy supplier. They sometimes work out cheaper and the way the energy is generated is less polluting.
- Consider installing “clean” renewable energy generation, for example via solar photovoltaics.
- Avoid solid fuel burners, such as stoves or fireplaces. If you already own one and choose to use it, make sure you follow the “[Open fires and wood-burning stoves](#)” advice leaflet²⁸ by using the right fuel on an efficient and well-

²⁵ <https://www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/cleaning-londons-vehicles>

²⁶ <https://travelwest.info/>

²⁷ <https://betterbybike.info/>

²⁸ https://consult.defra.gov.uk/airquality/domestic-burning-of-wood-and-coal/supporting_documents/open%20fires%20wood%20burning%20stoves%20%20guideA4update12Oct.pdf

maintained appliance. Some of South Gloucestershire is covered by a [Smoke Control Area](#)²⁹ which allows only approved appliances and fuels to be used.

- However, should you still plan to install a stove, then the lowest emission stoves currently on the market are those that are 'Ecodesign Ready'. These will meet the future EU standards for all new stoves in the UK set to be introduced in 2022.

There are decisions we can all make to reduce air pollution. Relatively small changes all add up, and if everyone contributes, it can make a big difference overall.

Further information is available on our website www.southglos.gov.uk/airquality.

²⁹ <https://www.southglos.gov.uk/environment-and-planning/pollution/pollution-control-clean-air-act-approval/smoke-control-areas/>

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1 Local Air Quality Management

This report provides an overview of air quality in South Gloucestershire during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

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 and the Council produced an Action Plan 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 in 2014 which had identified new locations on this corridor where the nitrogen dioxide annual mean objective was being exceeded.

Work has continued to update and expand the 2012 Air Quality Action Plan for Kingswood and Staple Hill to incorporate actions that cover the extension of the Kingswood AQMA to Warmley and include a wider range of actions to improve air quality in the AQMAs, although progress during 2020 has been delayed due to the impacts of the Covid-19 pandemic on available resources.

A local Clean Air Strategy has also been developed and commits the Council to the production of the action plan to improve air quality across South Gloucestershire, as well as in the AQMAs. Further information is provided in Section 2.2.

Since the declaration of the Cribbs Causeway AQMA in 2010, the nitrogen dioxide concentrations at the façade of the single residential property within the AQMA have been below the annual mean objective (40 µg/m³) and also the precautionary “borderline” level (36 µg/m³).

Following Defra recommendation to revoke the AQMA, a consultation³⁰ was undertaken in 2019. While more respondents to the consultation objected to the revocation than supported it, mainly due to the anticipated future increase in traffic

³⁰ https://consultations.southglos.gov.uk/consult/ti/Cribbs_AQMA/consultationHome

due to planned development in the area and overall concern about air quality, the monitoring results provided the fundamental evidence that there was no valid reason to retain the AQMA.

The Cribbs Causeway AQMA was subsequently revoked by a legal order on 22 July 2020 and the Revocation Order was submitted to Defra.

This report confirms the nitrogen dioxide concentrations in 2019 remained below the objective within this AQMA, demonstrating ongoing compliance. Monitoring will continue at this location to assess the impact of the new developments in the vicinity. Further information on the revocation of the Cribbs Causeway AQMA is available in Appendix D.

A summary of the two current AQMAs declared by South Gloucestershire Council can be found in Table 2.1. The levels of exceedance at the declaration of the AQMAs in 2010 and in 2019 are also compared in Table 2.1, however the monitoring undertaken within the AQMAs has changed during this timeframe to reflect extensions to the AQMAs and also to better represent relevant exposure. Consequently, the monitoring locations in 2019 are not necessarily directly comparable to those in 2010 and comparison between the exceedance levels may not provide a true reflection of trends in nitrogen dioxide levels over that timeframe.

The trends in annual mean nitrogen dioxide concentrations in the Kingswood – Warmley and Staple Hill AQMAs are shown in Figure A.3 to Figure A.5 and are discussed in Section 3.2.1. Distance adjusted monitoring data has also been provided in Table B.1 in Appendix B.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online on the Council website at www.southglos.gov.uk/airquality and on the Defra website at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=238.

Alternatively, in Appendix E, maps of the current AQMAs and the recently revoked Cribbs Causeway AQMA are available in Figure E.1 to Figure E.3. Maps of the air quality monitoring locations in relation to the current AQMAs are also available in Figure E.10 (Staple Hill AQMA) and Figure E.11 to Figure E.13 (Kingswood – Warmley AQMA) and for the revoked Cribbs Causeway AQMA in Figure E.8.

Table 2.1 Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (including name, date of publication and link)
						At Declaration (2010)	Now (2019)	
AQMA 2 Kingswood – Warmley	Declared 14 April 2010 Amended 25 May 2012 Amended 16 December 2015	NO ₂ Annual Mean (40 µg/m ³)	Bristol (East fringe) Kingswood & Warmley	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)	42.3 µg/m ³ (Site 146 at façade in Kingswood – Warmley AQMA) 36.5 µg/m ³ (Site 68 at façade for comparison in former Kingswood AQMA. NB: no ground floor exposure)	2012 Air Quality Action Plan for Kingswood and Staple Hill (published March 2012) http://www.southglos.gov.uk/documents/cos120094.pdf (The AQAP is currently being updated to include the extension to Warmley in Dec 2015 and a wider range of actions)

South Gloucestershire Council

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan (including name, date of publication and link)
						At Declaration (2010)	Now (2019)	
AQMA 3 Staple Hill	Declared 14 April 2010 Amended 25 May 2012	NO ₂ Annual Mean (40 µg/m ³)	Bristol (East fringe) Staple Hill	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 no's 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)	39.2 µg/m ³ (Site 165 at façade in Staple Hill AQMA. NB: no ground floor exposure) 36.0 µg/m ³ (Site 73 for comparison. NB: Distance adjusted result 31.1 µg/m ³ , no ground floor exposure)	2012 Air Quality Action Plan for Kingswood and Staple Hill (published March 2012) http://www.southglos.gov.uk/documents/cos120094.pdf (The AQAP is currently being updated as above)

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

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

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

On the basis of the evidence provided by the local authority the conclusions reached are acceptable for all sources and pollutants, with the provisos listed in the commentary below.

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. This is an excellent report and provides a level of detail and discussion typically not seen in most ASRs. It is clearly presented, with discussions/data/AQAP measures divided by AQMA status. It acts as an exceptional first point of reference for concerned members of the public (or interested stakeholders); and clearly communicates the hard work the Council are undertaking to improve local air quality.*
- 2. Example calculations have been provided for all data corrections which are useful and encouraged in all future reports.*
- 3. The Council provide good commentary on the progress and status of their AQAP measures and the progress they have made during the last reporting period. For further guidance please refer to LAQM Technical Guidance 16 (TG16).*
- 4. The Council provides a good level of discussion regarding developments and planning controls, and pollution sources.*
- 5. The Council provides good discussion of PM_{2.5} issues and the measures they have in place to address this harmful pollutant.*
- 6. The Council recently revised their monitoring programme to include one new site. This is supported and as far as possible the Council should actively identify sites not fit for purpose and reutilise these resources elsewhere.*
- 7. The Council are currently revoking AQMA 1 Cribbs Causeway. In line with previous year's recommendations and supporting evidence this decision is still supported. The remaining AQMAs should remain in place until several years of data, below 10% of the AQO, is collected and can support revocation.*

8. *Maps provided are clear and identify all monitoring sites as referenced in data tables.*

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

More detail on these measures can be found in the 2012 Air Quality Action Plan for Kingswood and Staple Hill³¹ and also in related plans and strategies, such as the new West of England Joint Local Transport Plan 4 (JLTP4) 2020– 2036³², which is supported by various strategies on public transport, smarter travel choices, cycling and walking and aims to address strategic transport planning in the region. One of the five key objectives within the JLTP4 is to “Take action against climate change and address poor air quality”.

Key completed measures are:

- As part of the Council response to Covid-19, new walking and cycling measures have been implemented through the DfT Active Travel Fund³³, to enable social distancing and encourage more journeys by active modes. This includes the trial pedestrianisation of Thornbury High Street, new cycle routes in Yate (Station Road) and Filton (Southmead Road).
- Under the second round of the Clean Bus Technology Fund, First Bus and CT Plus have retrofitted 119 buses with emissions-reducing technology. A further 30 vehicles are due to be retrofitted by the end of 2020.
- A £4.79m Office for Low Emission Vehicles (OLEV) funding grant was awarded to the four West of England local authorities and First Bus in August 2017. This funding has enabled the delivery of 98 bio-methane buses and 2 re-fuelling stations in the area. The new buses will contribute to reducing air pollution levels across the West of England area, including the Staple Hill AQMA.
- Entire fleet of Council pool cars switched to electric in 2017, with OLEV funding secured to switch 20% of other fleet vehicles to electric in 2021.

³¹ <http://www.southglos.gov.uk/documents/cos120094.pdf>

³² <https://travelwest.info/projects/joint-local-transport-plan>

³³ <https://beta.southglos.gov.uk/making-public-places-safer/>

- Access funding secured to 2021, to enable the continuation of school, business and community travel planning measures to promote sustainable travel choices.
- Lighting installed along the Bristol/Bath railway cycle path during 2014/15 and 2015/16. These works will significantly improve conditions for cyclists along this major cycling corridor which also serves the Staple Hill AQMA.
- Local Pinch Point Funding has enabled improvements to the M5 motorway junctions 16 and 17, in order to manage the impact of anticipated development and reduce congestion. Works were completed during 2015/16 and have contributed to reduced nitrogen dioxide concentrations within the former Cribbs Causeway AQMA and should help maintain concentrations below the air quality objective.

Other actions being progressed on a wider West of England regional basis aimed at reducing traffic congestion and improving air quality include:

- Metrobus - a new express bus service, which began operating in 2018, aims to speed up journey times, relieve congestion, reduce pollution and give people improved access to key employment, education and leisure destinations³⁴. Proposed additional Metrobus routes are set out within the new JLTP4.
- Cribbs Patchway Metrobus Extension³⁵ - this extension of the Metrobus network in South Gloucestershire will provide an alternative, fast and direct route between Bristol Parkway railway station and The Mall bus station, and will also benefit communities in Stoke Gifford, Patchway and the forthcoming Cribbs Patchway New Neighbourhood on the former Filton Airfield site.
- MetroWest³⁶ – 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 proposes to re-open the Portishead rail line and to enhance local passenger train services on the Bath to Bristol lines and on the Severn Beach/Avonmouth line, with a planned extension of this line to Bath and Westbury. Phase 2 proposes to re-open the Henbury Line

³⁴ <https://travelwest.info/metrobus>

³⁵ <https://beta.southglos.gov.uk/cribbs-patchway-metrobus-extension/>

³⁶ <https://travelwest.info/projects/metrowest>

to an hourly spur passenger service and increase train services to Yate to a half-hourly service and includes plans for new rail stations at Henbury, North Filton and Ashley Down.

- Cribbs Patchway New Neighbourhood Cycle Links – a £3.125m package of walking and cycling schemes is currently being delivered. The aim of this project is to provide walking and cycling infrastructure links to the Cribbs Patchway New Neighbourhood development site ahead of the completion of the first phase of the development, to encourage more people to choose a sustainable travel mode from the outset.
- GoUltraLowWest³⁷ - a £7m project grant funded by Office for Low Emission Vehicles (OLEV) that aims to accelerate the purchase of electric vehicles across Bristol, South Gloucestershire, North Somerset and Bath & North East Somerset, and includes doubling the existing provision of public charge points and the introduction of four new Rapid Electric Vehicle Charging Hubs.
- A new Joint Local Transport Plan (JLTP4) has been adopted to take strategic transport planning through to 2036, placing a greater emphasis on air quality and climate change.

South Gloucestershire Council will also continue to engage with Bristol City Council and Bath and North East Somerset Council on their Clean Air Plans, through meetings organised by the West of England Combined Authority (WECA). Further information about the Bristol Clean Air Plan is available on the Clean Air for Bristol website³⁸ and for the Bath Clean Air Plan, on the Bath Breathes website³⁹.

A4174 Hambrook Air Quality Action Update

Further to the Government's UK Air Quality Plan⁴⁰ for nitrogen dioxide published in July 2017, South Gloucestershire Council was mandated by the Government in February 2018 to undertake a Targeted Feasibility Study. The study was required to identify possible actions that could be taken to reduce roadside nitrogen dioxide levels to meet the annual mean EU limit value of 40 µg/m³ on the A4174 Ring Road

³⁷ <https://travelwest.info/drive/electric-vehicles/go-ultra-low-west>

³⁸ <https://www.cleanairforbristol.org/>

³⁹ <http://www.bathnes.gov.uk/bath-breathes-2021>

⁴⁰ <https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>

between the A4017 Bromley Heath and M32 Junction 1 roundabouts 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 A4174 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). The feasibility studies of all 33 mandated authorities in the “third wave” of Government air quality action were used to develop the supplement⁴¹ to the 2017 UK Air Quality Plan and were also published separately by Defra⁴².

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 on a trial basis through an Experimental Traffic Order (ETO) on 11 August 2019:

- Removal of the right turn facility 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 facility from the B4058 from Frenchay onto the A4174
- Removal of the westbound bus lane on the A4174 through the junction to the M32 traffic signals

An ETO allows a trial for a period up to 18 months so that the effectiveness of the measures can be considered before a decision is taken on whether to implement them permanently. Orders are subject to a statutory process which allows the public to comment formally and provide feedback. The consultation ran until 11 February 2020 on the Council website⁴³.

⁴¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746100/air-quality-no2-plan-supplement.pdf

⁴² <https://uk-air.defra.gov.uk/library/no2ten/2018-la-tfs-documents>

⁴³ https://consultations.southglos.gov.uk/consult/ti/PT.6296_Hambrook_E.T.O/consultationHome

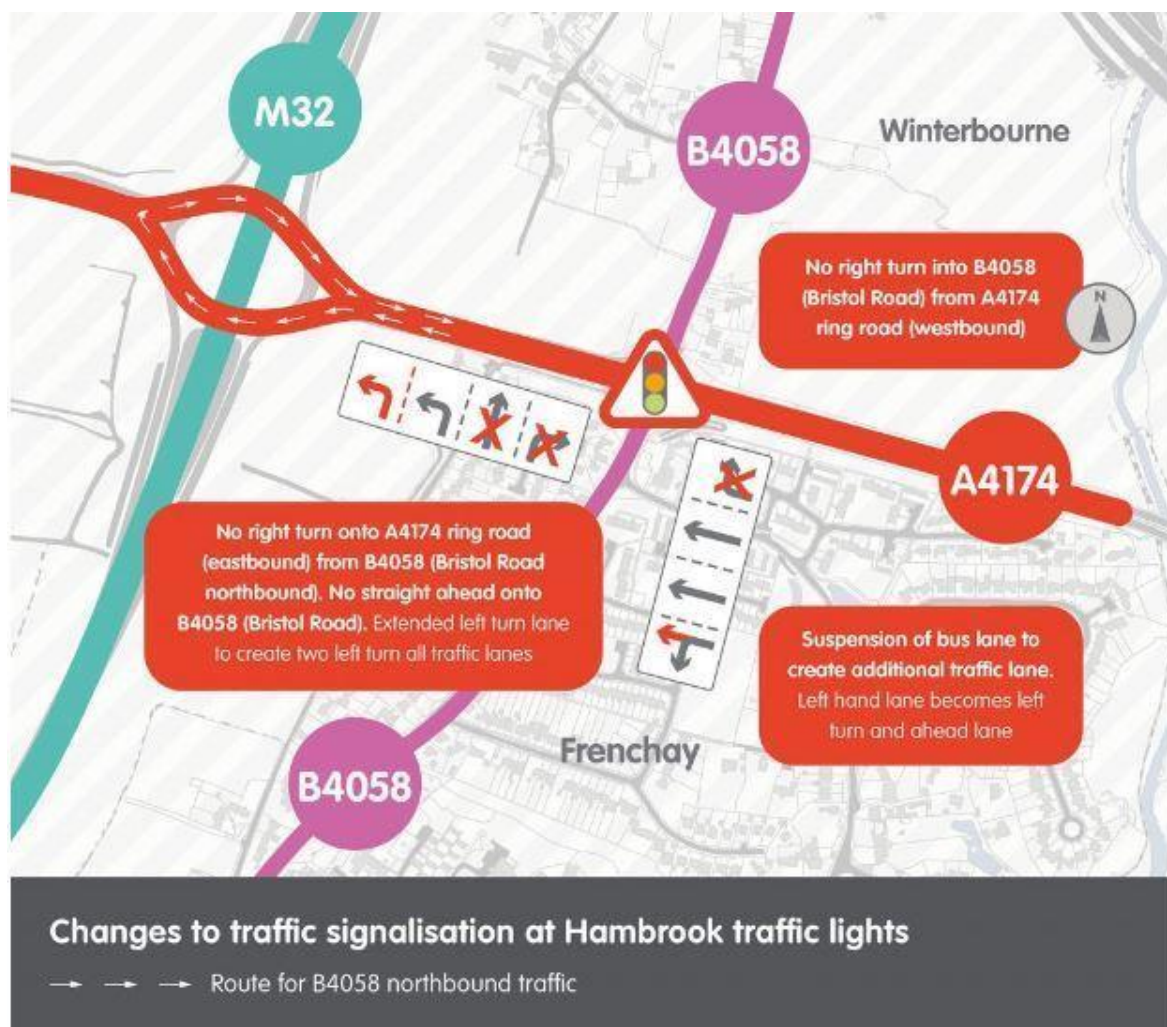


Figure 2.1 Traffic measures at A4174 Hambrook junction

Additional monitoring was set up at the roadside for the purposes of the trial to monitor the impact of the traffic restrictions at the junction. This is because the EU limit value applies where there is public access (with some exceptions), so includes pedestrian and cycle paths. 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.

The Council has been monitoring nitrogen dioxide levels where people live near this junction for some years in line with LAQM requirements. The 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.

Unfortunately, we have not been able to assess the effectiveness of the scheme during the trial period because of the impact of the Covid-19 pandemic restrictions on traffic levels which were much reduced during 2020, and are therefore not representative of “normal” traffic conditions. Consequently, the Council has not been released from the Ministerial Direction to reduce roadside nitrogen dioxide levels at this location and have recently been instructed to continue monitoring as we return to more normal traffic and transport conditions.

Further information about the scheme now this position has been clarified and consultation on its possible future format will be available on the Council’s website at <https://www.southglos.gov.uk/transport-and-streets/streets/roads-road-works/major-roadworks/hambrook-air-quality-action/> in due course.

Air Quality and Public Health Progress

The alignment of the air quality agenda and public health outcomes continued to be a focus during 2019 and to date.

The Joint Strategic Needs Assessment (JSNA) completed in 2016 recognised the close links between spatial planning, transport and air quality. The South Gloucestershire Joint Health and Wellbeing Strategy 2017- 2021⁴⁴ was approved by the Health and Wellbeing Board in early 2018. The document contains four priority areas 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 Joint Health and Wellbeing Strategy highlights that poor air quality exacerbates heart and lung conditions, such as asthma and chronic obstructive pulmonary disease, and can contribute to premature death. It calls for the health impacts from poor air quality to be reduced through lower emissions and reduced exposure to pollutants. The Health and Wellbeing Board agreed to raise awareness of the impacts of air pollution on health and work with partners to promote a consistent approach. Progress on this objective is reported twice yearly and an awareness raising event for members of the Health and Wellbeing Board took place in September 2019.

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

⁴⁴ <http://www.southglos.gov.uk/health-and-social-care/staying-healthy/health-strategies/joint-health-and-wellbeing-strategy-jhws/>

public health. The Public Health team has entered into a partnership with the University of the West of England to provide placements for Public Health Registrars specialising in health and the built environment.

The first registrar began the placement in January 2019 and led on the development of a council-wide approach to air quality. This brought together services which had an interest and/or impact on air quality, including Environmental Health, Transport Policy, Environmental Policy, Spatial Planning, Development Control, Street Care and Highways and Strategic Communications, into a Board. The Clean Air and Climate Change Board is co-chaired by the Director of Environment and Community Services and the Director of Public Health and also covers the Council's work on 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 existing Climate Change Strategy⁴⁵.

A succession of public health registrars have led on the development of a South Gloucestershire Clean Air Strategy which was approved by Cabinet in July 2020. The Strategy was considered by the Scrutiny Commission prior to approval and was amended immediately prior to Cabinet to take account of the Covid-19 pandemic.

The Strategy commits the Council to the production of an action plan, which will be developed within existing statutory requirements. The action plan will incorporate a public consultation phase to seek the views of the public and businesses who may be affected by the actions and incorporate their views where appropriate to help inform and develop the actions. The actions will seek to support the priorities set out in the Council Plan 2020 -2024⁴⁶ and build on the co-benefits realised as a result of Covid-19 restrictions, such as the "Making Public Places Safer"⁴⁷ schemes, which includes the trialling of "School Streets"⁴⁸ at selected schools.

The Clean Air and Climate Change Board will oversee both the strategy and action plan. As highlighted above, the Clean Air work area falls across several South Gloucestershire Council teams so a decision was made to create and recruit to a limited term post for a period of at least 12 months to drive this commitment forward. The funding for the post has been provided jointly by the Directors of Environment

⁴⁵ <https://www.southglos.gov.uk/documents/Climate-Change-Strategy-201823-Final-sgc-signed-v1.pdf>

⁴⁶ <https://beta.southglos.gov.uk/publications/council-plan-2020-2024/>

⁴⁷ <https://beta.southglos.gov.uk/making-public-places-safer/>

⁴⁸ <https://www.southglos.gov.uk/transport-and-streets/transport/road-safety-transport/road-safety/active-travel-planning-for-schools/>

and Community Services and Public Health, which reflects their ongoing commitment to this work.

Officers within the public health team retain links to a wider West of England group to ensure that public health issues, including air quality, continue to be considered during the development of strategic plans such as the emerging West of England Combined Authority Spatial Development Strategy⁴⁹. This strategy will be underpinned by the emerging South Gloucestershire Council Local Plan⁵⁰ which will provide further opportunity to recommend policies to improve air quality.

The Council has received funding to investigate the redevelopment potential of Kingswood High Street⁵¹, including the possibility of re-routing parts of the transport network in this area. This work has the potential to improve air quality issues in Kingswood town centre. Consequently, officers from public health and environmental health are working closely with colleagues in planning to ensure that air quality considerations are given appropriate priority.

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

- Continue to monitor and assess the effectiveness of the JAQU directed scheme on the A4174 at Hambrook in achieving compliance with the annual mean NO₂ limit value, as traffic conditions return to "normal".
- Progress the new South Gloucestershire Air Quality Action Plan, which will incorporate updated actions for Kingswood and Staple Hill, the Warmley extension of the Kingswood AQMA and wider actions to improve air quality across South Gloucestershire as a whole. Progress on this has been limited due to the resource impact of work on the Covid-19 response and the continued work on the JAQU mandated A4174 Hambrook Air Quality Action scheme, but the approval of a new post to lead on the Action Plan work should ensure there is good progress in the coming year.
- Deliver Covid-19 response walking and cycling schemes funded by the DfT Active Travel Fund, and seek additional investment from the West of England

⁴⁹ <https://www.westofengland-ca.gov.uk/west-of-england-strategic-planning/>

⁵⁰ <https://beta.southglos.gov.uk/new-local-plan/>

⁵¹ <https://www.southglos.gov.uk/business/regeneration/love-high-streets-kingswood/>

Combined Authority and the DfT to enable the development and delivery of further measures to encourage more people to walk and cycle more often.

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

- Continued significant pressure on local government funding, which could impact on delivering air quality improvements.
- The transport system within South Gloucestershire under normal circumstances is under pressure, due to the travel demand generated by the current population and by people coming into the area on a daily basis to work, shop and for leisure reasons, which is shown through traffic congestion on the road network and capacity problems on local rail services. The uncertainties arising from the Covid-19 pandemic has altered travel patterns and traffic volumes, future vehicle fleet compositions and public transport usage and the knock-on impacts on air quality will be difficult to predict going forward.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, South Gloucestershire Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Kingswood - Warmley and Staple Hill AQMAs.

Table 2.2 Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Kingswood Action Plan											
KS1	Travel Plan for Kingswood Civic Centre	Promoting Travel Alternatives	Workplace Travel Planning	2012	South Gloucestershire Council	Local Transport Capital Programme (LTCP)	<ul style="list-style-type: none"> • Reduction in solo occupancy vehicles • Increased cycling levels • Increased walking levels 	No specific target emissions reduction.	Action complete. Implementation of travel plan is continuous process.	Completed	
KS2	Parking review (Kingswood)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2015/16	South Gloucestershire Council	LTCP	<ul style="list-style-type: none"> • Road safety benefits • Reduced congestion 	None, impact considered too small to be measurable.	<p>Initial parking review implemented in 2015/16. 3 additional measures are planned from the 2nd phase of the review, but have been delayed due to the impact of Covid-19, implementation date currently unknown.</p> <p>A new electric vehicle charging point with 2 vehicle capacity has been installed at Cecil Road car park in Kingswood.</p>	Estimated 2021	
KS3	Ensure air quality is a priority in development of transport schemes (Kingswood)	Transport Planning and Infrastructure	Other	2013/14	South Gloucestershire Council	LTCP	Number of actions taken forward within Capital Programme	No specific target emissions reduction.	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.	Action completed 2013	
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	Number of buses replaced for lower emission vehicles	No specific target emissions reduction.	<p>The £4.79m OLEV funding for bio-methane buses has enabled the delivery of 98 buses and 2 re-fuelling stations in the area.</p> <p>The latest round of Clean Bus Technology Fund (CBTF) has enabled 119 buses to be retrofitted with cleaner engines, with a further 30 to be fitted, most of which will be done by December 2020.</p>	Continuous process	
KS5	Review of Council Fleet to ensure lowest emission vehicles (Kingswood)	Vehicle Fleet Efficiency	Other	2016	South Gloucestershire Council	OLEV Grant	Reduction in vehicle emissions	No specific target emissions reduction.	<p>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 CO2 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.</p>	Continuous process	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
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)	Number of bus/taxi operators signed up to programme	No specific target emissions reduction.	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.	Continuous process	
KS7	Ensure adequate landscaping is considered within new planning applications and urban designs (Kingswood)	Policy Guidance and Development Control	Other policy	2013	South Gloucestershire Council	Council Funds	Number of new trees planted. NB: Data relating to the indicator for this measure is not currently available.	No specific target emissions reduction.	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.	Action completed 2013	
KS8	Promotion of VOSA Smoky Vehicle Hotline (Kingswood)	Public Information	Via the Internet	2013	South Gloucestershire Council	n/a	Number of vehicles reported to VOSA (data not currently available).	No specific target emissions reduction.	Information added to the Council's website on the Exhaust emissions testing and Improving air quality webpages.	Action completed 2013	
KM1	School travel planning (Kingswood)	Promoting Travel Alternatives	School Travel Plans	2013	South Gloucestershire Council in conjunction with local schools	DfT Grant Funding	'Hands up' surveys within participating schools indicate mode share for pupils arriving at school.	No specific target emissions reduction.	A series of interventions undertaken annually with LSTF, STTY and Access West funding since 2013 to promote sustainable travel in schools. Currently working with 1 secondary and 2 primary schools in Kingswood, implementing school streets and temporary social distancing measures in addition to the usual active travel work.	Continuous process	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	Measured by increased: • Cycling levels • Bus patronage • Walking levels	No specific target emissions reduction.	Measures to encourage sustainable travel were previously delivered through LSTF and STTY projects and continue with Access West. In March 2020, the DfT confirmed funding to March 2021 to continue to work with Businesses, Schools and Communities to promote and support sustainable and active travel choices, funding beyond March 2021 is currently unconfirmed.	Continuous process	Further progress subject to funding availability
KM3	Review bus terminals and timing points (Kingswood)	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2014/15	South Gloucestershire Council in conjunction with bus operators	Undertaken by operators	Reduction in number of buses idling at bus stops	No specific target emissions reduction.	Review of bus network to reduce no. of services terminating in AQMA. Bus stop infrastructure and parking review schemes to improve traffic flow.	Action completed 2014/15	
KM4	Smarter Choices promotions/ roadshows (Kingswood)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2014	South Gloucestershire Council	DfT Grant Funding	Measured by increased: • Cycling levels • Bus patronage • Walking levels Also measure by number of proactive events	No specific target emissions reduction.	Access West continues to build on the work delivered through LSTF and STTY, working with Businesses, Schools and Communities across South Gloucestershire to promote and support sustainable and active travel choices. The funding for the Access West work programme will continue to March 2021.	Continuous process	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
KM5	Cycling infrastructure (Kingswood)	Transport Planning and Infrastructure	Cycle network	2015	South Gloucestershire Council	LTCP and DfT Grant Funding	Increases in numbers of cyclists.	No specific target emissions reduction	Recently priority routes in the area have been identified through the Local Cycling and Walking Infrastructure Plan (LCWIP) adopted by WECA in 2020.	Continuous process	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	Membership numbers.	No specific target emissions reduction	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 AQMA extension review.	Unknown at present	Resource availability currently prevents implementation
KL2	Car club (Kingswood)	Alternatives to private vehicle use	Car Clubs	n/a	South Gloucestershire Council	Unknown at Present	Car club membership	No specific target emissions reduction	Long term action - discussions have been held with car club operators, but have yet to result in a firm commitment to install one in this location. Progress likely to be dependent on results seen from the Car Clubs being established elsewhere in the Council area.	Unknown at present	
KL3	Restrict traffic turning movements onto A420 (Kingswood)	Traffic Management	UTC, Congestion management, traffic reduction	n/a	South Gloucestershire Council	LTCP	Reduction in volume of traffic travelling towards and along A420	No specific target emissions reduction	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	Action closed	
KL4	Review traffic signal numbers and operations (Kingswood)	Traffic Management	UTC, Congestion management, traffic reduction	2014	South Gloucestershire Council	LTCP	Improved traffic speeds and reduced congestion	No specific target emissions reduction	MOVA signalling system has been installed at 3 junctions in the AQMA to improve traffic flow. A review of mid-block pedestrian signals within the AQMA was undertaken in 2014 and recommends the removal of 1 or 2 pedestrian crossings from Kingswood High Street. This scheme is subject to future funding bids.	Review completed. Implementation on unknown	Implementation dependant on securing funding
KL5	Review of delivery bays (Kingswood)	Freight and Delivery Management	Delivery and Service plans	2016/17	South Gloucestershire Council	LTCP	<ul style="list-style-type: none"> • Number of reported issues with delivery bays • Reduced congestion 	No specific target emissions reduction	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.	Action completed 2013/14	
KL6	Controlled deliveries/collections (Kingswood)	Freight and Delivery Management	Freight Consolidation Centre	n/a	South Gloucestershire Council	Unknown at Present	Number of delivery & collection agreements made with businesses	No specific target emissions reduction	This action will be reviewed as part of work to update the action plan, and will either be included within the new plan, or closed if considered no longer appropriate	Unknown at present	
KL7	Reclassify strategic routes and signing strategy (Kingswood)	Traffic Management	Other	n/a	South Gloucestershire Council	Unknown at Present	Reduction in traffic volumes on and travelling towards A420	No specific target emissions reduction	This action will be reviewed as part of work to update the action plan, and will either be included within the new plan, or closed if considered no longer appropriate	Unknown at present	
KL8	Taxi ranks (Kingswood)	Promoting Low Emission Transport	Taxi emission incentives	n/a	South Gloucestershire Council in conjunction with taxi operators	Unknown at Present	Production of review report	No specific target emissions reduction	This action will be reviewed as part of work to update the action plan, and will either be included within the new plan, or closed if considered no longer appropriate	Unknown at present	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
CR39/2013	Improved pedestrian crossing facilities at High St/ Alma Rd	Promoting Travel Alternatives	Promotion of walking	2015/16	South Gloucestershire Council	LTCP	Implement infrastructure improvements to promote walking	No specific target emissions reduction	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 15/16.	Action completed 2015/16	
Staple Hill Action Plan											
SS1	Ensure air quality is a priority in development of transport schemes (Staple Hill)	Transport Planning and Infrastructure	Other	2013	South Gloucestershire Council	LTCP	Number of actions taken forward within Capital Programme	No specific target emissions reduction	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.	Action completed 2013	
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	Number of buses replaced for lower emission vehicles.	No specific target emissions reduction	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) has enabled 119 buses to be retrofitted with cleaner engines, with a further 30 to be fitted, most of which will be done by December 2020.	Continuous process	
SS3	Review of Council Fleet to ensure lowest emission vehicles (Staple Hill)	Vehicle Fleet Efficiency	Other	2016	South Gloucestershire Council	OLEV Grant	Reduction in vehicle emissions	No specific target emissions reduction	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 CO2 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.	Continuous process	
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	Number of bus/taxi operators signed up to programme	No specific target emissions reduction	The parking review as part of SM4 is complete and any subsequent issues have been addressed. 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.	Continuous process	
SS5	Ensure adequate landscaping is considered within new planning applications and urban designs (Staple Hill)	Policy Guidance and Development Control	Other policy	2013	South Gloucestershire Council	Council Funds	Number of new trees planted. NB: Data relating to the indicator for this measure is not currently available.	No specific target emissions reduction	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.	Action completed 2013	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
SS6	Promotion of VOSA Smoky Vehicle Hotline (Staple Hill)	Public Information	Via the Internet	2013	South Gloucestershire Council	n/a	Number of vehicles reported to VOSA (data not currently available).	No specific target emissions reduction	Information added to the Council's website on the Exhaust emissions testing and Improving air quality webpages.	Action completed 2013	
SM1	School travel planning (Staple Hill)	Promoting Travel Alternatives	School Travel Plans	2013	South Gloucestershire Council in conjunction with local schools	DfT Grant funding	'Hands up' surveys within participating schools indicate mode share for pupils arriving at school.	No specific target emissions reduction	A series of interventions undertaken annually with LSTF, STTY and Access West funding since 2013 to promote sustainable travel in schools. Currently working with 1 primary school in Staple Hill, implementing temporary social distancing measures in addition to the usual active travel work.	Continuous process	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	Measured by increased: • Cycling levels • Bus patronage • Walking levels	No specific target emissions reduction	Measures to encourage sustainable travel were previously delivered through LSTF and STTY projects and continue with Access West. In March 2020, the DfT confirmed funding to March 2021 to continue to work with Businesses, Schools and Communities to promote and support sustainable and active travel choices, funding beyond March 2021 is currently unconfirmed.	Continuous process	Further progress subject to funding availability
SM3	Relocation of bus stops on Soundwell Road (Staple Hill)	Traffic Management	UTC, Congestion management, traffic reduction	n/a	South Gloucestershire Council	LTCP	Measured by relocation of bus stop	No specific target emissions reduction	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.	Action closed	
SM4	Parking Review (Staple Hill)	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2014/15	South Gloucestershire Council	LTCP	Measured by: • Road safety benefits • Reduced congestion	Impact of action considered too small to be measurable	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.	Action completed 2014/15	
SM5	Smarter Choices promotions /roadshows (Staple Hill)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2014	South Gloucestershire Council	DfT Grant Funding	Measured by increased: • Cycling levels • Bus patronage • Walking levels Also measure by number of proactive events	No specific target emissions reduction	Access West continues to build on the work delivered through LSTF and STTY, working with Businesses, Schools and Communities across South Gloucestershire to promote and support sustainable and active travel choices. The funding for the Access West work programme will continue to March 2021.	Continuous process	
SM6	Cycling infrastructure (Staple Hill)	Transport Planning and Infrastructure	Cycle network	2014-16	South Gloucestershire Council	DfT Grant funding	Increases in numbers of cyclists	No specific target emissions reduction	Two grant funded cycle route lighting schemes were implemented nearby between 2014 and 2016. More recently priority routes in the area have been identified through the Local Cycling and Walking Infrastructure Plan (LCWIP) adopted by WECA in 2020.	Continuous process	Further progress subject to funding availability

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
SL1	ECO Stars Fleet Recognition Scheme (Staple Hill)	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	n/a	South Gloucestershire Council	Unknown at Present	Membership numbers.	No specific target emissions reduction	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 AQMA extension review.	Unknown at present	Resource availability currently prevents implementation
SL2	Car club (Staple Hill)	Alternatives to private vehicle use	Car Clubs	n/a	South Gloucestershire Council	Unknown at Present	Car club membership	No specific target emissions reduction	Long term action - discussions have been held with car club operators, but have yet to result in a firm commitment to install one in this location. Progress likely to be dependent on results seen from the Car Clubs being established elsewhere in the Council area.	Unknown at present	
SL3	Review traffic signal numbers and operations (Staple Hill)	Traffic Management	UTC, Congestion management, traffic reduction	2012-13	South Gloucestershire Council	Defra Air Quality Grant funding/ LTCP	Improved traffic speeds and reduced congestion	No specific target emissions reduction	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 grant.	Action completed and closed 2013/14	
SL4	Review of delivery bays (Staple Hill)	Freight and Delivery Management	Delivery and Service plans	2013/14	South Gloucestershire Council	LTCP	Measured by • number of reported issues with delivery bays • Reduced congestion	No specific target emissions reduction	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.	Action completed 2013/14	
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	Measured by reduction in traffic volumes at A4017 junction	No specific target emissions reduction	This action will be reviewed as part of work to update the action plan, and will either be included within the new plan, or closed if considered no longer appropriate	Unknown at present	
SL6	Controlled deliveries/collections (Staple Hill)	Freight and Delivery Management	Freight Consolidation Centre	n/a	South Gloucestershire Council	Unknown at Present	Measured by number of delivery & collection agreements made with businesses	No specific target emissions reduction	This action will be reviewed as part of work to update the action plan, and will either be included within the new plan, or closed if considered no longer appropriate	Unknown at present	
SL7	Reclassify strategic routes and signing strategy (Staple Hill)	Traffic Management	Other	n/a	South Gloucestershire Council	Unknown at Present	Measured by reduction in traffic volumes on and travelling towards A4017.	No specific target emissions reduction	This action will be reviewed as part of work to update the action plan, and will either be included within the new plan, or closed if considered no longer appropriate	Unknown at present	

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

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

This specific role within local air quality management supports efforts to reduce exposure at national level and also links strongly to the public health agenda, in particular the Public Health Outcome Framework (PHOF)⁵² and specifically, the following indicator:

- PHOF Indicator D01: Fraction of all cause adult mortality attributable to anthropogenic (originating from human activity) particulate air pollution (measured as fine particulate matter PM_{2.5}).

Estimates of mortality burden are based on modelled annual average concentrations of fine particulate matter (PM_{2.5}) originating from human activities in each local authority area. The estimates of the fraction of mortality attributable to long-term exposure to particulate air pollution range from 2.4% in the lowest local authority area (Isles of Scilly) to 7.1% in City of London.

In 2018, the most recent year for which data is available, the estimated fraction of mortality in South Gloucestershire was 5.2%. This is in line with England as a whole (5.2%), but higher than the South West region average (4.4%). The other West of England unitary authorities were; Bristol (5.4%), Bath and North East Somerset (4.7%) and North Somerset (4.4%). The estimated fractions of mortality have slightly increased across most of the West of England region compared to the previously reported 2017 data for South Gloucestershire (5.1%), Bristol (5.1%) and North Somerset (4.3%), although Bath and North East Somerset remained the same (4.7%).

The Council's Joint Strategic Needs Assessment (JSNA)⁵³ contains information on air quality impacts on the South Gloucestershire population, including data for

⁵² [Public Health Profiles - PHE](#)

⁵³ [Joint Strategic Needs Assessment](#)

attributable deaths and associated life years lost. The associated Joint Health and Wellbeing Strategy 2017-21⁵⁴ has included as one of its four priorities:

“Maximise the potential of our built and natural environment to enable healthy lifestyles and prevent disease”

The Joint Health and Wellbeing Strategy recognises that poor air quality exacerbates heart and lung conditions such as asthma and chronic obstructive pulmonary disease and that the effect of air pollution can contribute to the premature death of people who already have serious illnesses. Within the strategy, the Health and Wellbeing Board pledge to:

“Raise awareness of the impacts of air pollution and poor air quality on health, and work with partners in South Gloucestershire and more widely to promote a consistent and unified approach to improve air quality and reduce health impacts associated with air pollution”.

The PHOF indicator discussed above has been adopted within the Health and Wellbeing Board’s own suite of performance indicators, which are reported annually to senior Elected Members. This recognition of air pollution politically and at senior levels within the Council is necessary to move this agenda forward and provides evidence that South Gloucestershire Council recognises it is expected to work towards reducing emissions and concentrations of PM_{2.5} in its area.

South Gloucestershire Council is also 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 also contribute to reducing emissions and concentrations of PM_{2.5}. 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.
- The wider regional transport initiatives, such as Metrobus⁵⁵ and the Cribbs Patchway Metrobus Extension⁵⁶, will contribute to reducing emissions and concentrations of PM_{2.5}. In addition to reduced exhaust emissions, by making

⁵⁴ <http://www.southglos.gov.uk/health-and-social-care/staying-healthy/health-strategies/joint-health-and-wellbeing-strategy-jhws/>

⁵⁵ <https://travelwest.info/metrobus>

⁵⁶ <https://beta.southglos.gov.uk/cribbs-patchway-metrobus-extension/>

traffic flows smoother, these schemes will reduce non-exhaust emissions from brake and tyre wear.

- 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}, 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}.
- Alongside measures to tackle nitrogen dioxide in the updated Action Plan, consideration will also be given to reducing emissions and concentrations of PM_{2.5}. The Council is mindful of the potential co-benefits of action plan measures on multiple pollutants of concern and will follow appropriate guidance, such as the LAQM Action Toolbox in Annex A of the Defra LAQM Technical Guidance (TG16), which indicates measures that will likely be beneficial to reducing PM_{2.5} levels (in addition to other pollutants).
- Some of South Gloucestershire is covered by a Smoke Control Area⁵⁷ which allows only approved fuels and appliances to be used. Further extension of the smoke control area is being considered as a possible area for action under the local South Gloucestershire Clean Air Strategy and the wider action plan being developed to better control particulate (and NO_x) emissions from open fires and wood-burning stoves. The Council's Environmental Health team has produced an information sheet on Solid Fuel Appliances Smoke Control⁵⁸ and will investigate smoke complaints. Non-compliance with smoke control legislation can result in a fine of up to £1000.
- The Council will also continue to promote initiatives such as the "Ready to burn" scheme. Understanding the right fuels and the right way to use them is explained within the "[Open fires and wood-burning stoves](#)" guidance leaflet⁵⁹ issued by Defra. The measures outlined for reducing emissions include:
 - Choosing the right stove

⁵⁷<https://www.southglos.gov.uk/environment-and-planning/pollution/pollution-control-clean-air-act-approval/smoke-control-areas/>

⁵⁸<http://www.southglos.gov.uk/documents/Solid-Fuel-Appliances.pdf>

⁵⁹https://consult.defra.gov.uk/airquality/domestic-burning-of-wood-and-coal/supporting_documents/open%20fires%20wood%20burning%20stoves%20%20guideA4update12Oct.pdf

- Considering burning less
- Buying 'Ready to Burn' fuel
- Season freshly chopped wood before use
- Do not burn treated waste wood (e.g. old furniture) or household rubbish
- Regularly service and maintain your stove (annually)
- Get your chimney swept regularly (up to twice a year)

In terms of the current situation with regard to PM_{2.5} concentrations locally, while there is no regulatory standard applied to the PM_{2.5} role for local authorities, the EU Ambient Air Quality Directive⁶⁰ does however set out air quality standards for PM_{2.5}, which can act as a guide:

- Annual average EU limit value of 25 µg/m³ by 2020.
- EU target value of 15% reduction in concentrations at urban background locations between 2010 and 2020.

As advised in previous annual status reports, a public health business case was successful in obtaining funding for the purchase of three "AQ Mesh" monitoring units. These are small outdoor air quality monitors, which are configured to deliver localised, real-time indicative readings of a variety of pollutants, including PM_{2.5}. The units were purchased in 2017 and installed early in 2018 at sites within the Kingswood-Warmley and Staple Hill AQMAs and also adjacent to the A4174 at Hambrook.

The setting of the units in 'worst-case' locations was intended to provide a level of indicative monitoring data for PM_{2.5}. Unfortunately, issues with the reliability of the instrument sensors have not been resolved and the dataset remains incomplete. For this reason, the 2019 data is not considered sufficiently robust to report under the LAQM framework.

However, the local PM_{2.5} concentrations have been estimated from the PM₁₀ concentrations measured by the reference equivalent Beta Attenuation Monitor (BAM) at the Yate automatic monitoring site, using the method specified in Technical Guidance LAQM TG16 Box 7.7. The results of this are provided in Table A.9. The

⁶⁰ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:152:0001:0044:EN:PDF>

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estimated local PM_{2.5} concentrations of 9.1 µg/m³ are below the annual average EU limit value and a greater % reduction (35%) than the EU target value of 15% can be seen in the concentrations between 2010 and 2019.

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

3.1 Summary of Monitoring Undertaken

This section sets out what monitoring has taken place and how it compares with objectives. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available on the Defra UK-AIR (Air Information Resource) website⁶¹.

3.1.1 Automatic Monitoring Sites

South Gloucestershire Council undertook automatic (continuous) monitoring at one site in Yate during 2019. Nitrogen dioxide (NO₂) is monitored using an API Model 200A chemiluminescent analyser and particulate matter (PM₁₀) is monitored using a Met One BAM 1020 Beta-Attenuated Mass (BAM) Monitor (unheated). Table A.1 in Appendix A shows the details of the Yate automatic monitoring site.

Maps showing the location of the monitoring site are provided in Figure E.4 and Figure E.5 in Appendix E. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

South Gloucestershire Council undertook non- automatic (passive) monitoring of NO₂ at 102 sites during 2019. Table A.2 in Appendix A shows the details of the sites.

Triplicate monitoring (using three diffusion tubes) is undertaken at three of the monitoring locations to ensure robust monitoring datasets:

- Yate, Station Road, where the tubes are co-located with the automatic monitoring station (sites 4A, B and C - these sites were previously numbered 4, 5 and 6).
- At the façade of the single property in the now revoked Cribbs Causeway AQMA, Hollywood Cottage (sites 87A, B and C).
- In Soundwell at the façade of 264 Soundwell Road located adjacent to the busy junction of Soundwell Road, Siston Way and Downend Road, where

⁶¹ <https://uk-air.defra.gov.uk/>

concentrations have previously been borderline with the annual mean objective (sites 147A, B and C).

The monitoring results are reported for 108 diffusion tubes in total.

In 2019, two new diffusion tube monitoring sites were set up; one in Wick (site 180) at a worst case location on the A420 (High Street) in response to local concerns about air quality; and a further site within the Kingswood –Warmley AQMA at an additional worse case location on the A420 London Road, Warmley (site 181).

The following five diffusion tube sites ceased operation towards the end of 2018 or early in 2019:

- Site 22 Hanham - 44 High Street Lloyds Bank as the signpost it was located on was removed. However, the monitored concentrations have been consistently below the annual mean objective and the site is not representative of relevant exposure.
- Site 42 Little Stoke – 21 Braydon Avenue because monitored concentrations have been consistently well below the annual mean objective.
- Site 58 Longwell Green – Kingsfield Lane/Aspects Leisure site because monitored concentrations have been consistently well below the annual mean objective.
- Site 118 Filton Northville - 19 Gloucester Rd Nth Dental Lab because monitored concentrations have been consistently below the annual mean objective and there is no relevant exposure at ground floor.
- Site 123 Filton - 542 Filton Avenue Spar because monitored concentrations have been consistently below the annual mean objective and there is no relevant exposure at ground floor.

Maps showing the location of the diffusion tube monitoring sites are provided in Appendix E. 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 adjusted for bias⁶² and annualised (where the data capture falls below 75%), where relevant. Distance corrected⁶³ results are reported in Table B.1 (in Appendix B). Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations from the automatic and non-automatic (diffusion tube) monitoring sites for the past 5 years with the air quality objective of 40µg/m³.

Note that the concentration data presented in Table A.3 for the non-automatic (diffusion tube) sites 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 Yate automatic monitoring site results show the NO₂ concentrations are well below the annual mean objective in 2019 and all other reported years (Table A.3, Appendix A). The trend data presented in Figure A.1 (Appendix A) shows an overall continuing decline in annual mean nitrogen dioxide concentrations. In 2019, there was a decrease to 19 µg/m³ from 20 µg/m³ in 2018.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200 µg/m³, not to be exceeded more than 18 times per year. There were no exceedances of the 1-hour mean (200 µg/m³) recorded at the Yate automatic monitoring site during 2019 and the site has been below the hourly mean objective in all reported years.

Non-Automatic (Diffusion Tube) Monitoring Data

The NO₂ annual mean concentrations from the diffusion tube monitoring sites are provided in Table A.3 (Appendix A). The data reported in Table A.3 has been bias adjusted and annualised.

⁶² <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

⁶³ Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

Bias adjusted, annualised and distance corrected diffusion tube monitoring data, including the full 2019 dataset of monthly mean values, is provided in Table B.1 (Appendix B). Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Discussion of 2019 Diffusion Tube Monitoring Results

Exceeding Sites

In 2019, an exceedance of the annual mean objective was measured at one monitoring site in South Gloucestershire, as was also the case in 2018, compared to three exceedances in 2017 and eleven in 2016.

The single exceeding site in 2019 (and 2018) was Site 146 Kingswood - 34 Hill Street which is within the Kingswood – Warmley AQMA. The site is at façade with relevant residential exposure. To compare, there were two exceeding sites in 2017 and five in 2016 in this AQMA.

There were no exceeding sites within the Staple Hill AQMA in 2019, which was also the case in 2018. In comparison, there was one exceeding site in 2017 and five in 2016 in this AQMA.

There were no exceedances outside of the AQMAs where there is relevant exposure.

No annual means greater than $60 \mu\text{g}/\text{m}^3$ were recorded at any of the diffusion tube monitoring sites, so exceedances of the 1-hour mean objective are considered unlikely.

Borderline Exceedances

There were a total of eight sites approaching the objective i.e. within 10% of the objective at $36 \mu\text{g}/\text{m}^3$ or above in 2019, compared to nine in 2018 and thirteen in 2017. Of these, two sites are within the Kingswood – Warmley AQMA (sites 68 and 95), compared to five sites in 2018 in this AQMA (sites 68, 95, 116, 137 and 139); five sites are within the Staple Hill AQMA (sites 61, 62, 73, 75 and 165), compared to three in 2018 (sites 61, 75 and 165); and one (site 147B as part of a triplicate site) is outside of the AQMAs (the same site as in 2018).

All of the borderline sites are at façade, apart from sites 61, 73 and 75 in the Staple Hill AQMA. Distance adjustment of the results of these three sites to the nearest

façade using the “Nitrogen dioxide fall off with distance” calculator⁶⁴, reduces the annual mean concentrations below the borderline level of 36.0 µg/m³ as shown in Table C.2 (Appendix C). This leaves two remaining borderline sites in the Staple Hill AQMA (sites 62 and 165).

It should be noted there is no relevant exposure at ground floor level in relation to any of the borderline sites in either the Staple Hill AQMA or Kingswood - Warmley AQMA, although there is ground floor exposure at an adjoining property to site 165 and also first floor exposure at most of these sites, or at first floor in adjoining properties. However, the concentrations at first floor, or any higher floors, would be further reduced due to the increase in height from the road.

The final borderline result in 2019 was for one of the tubes (147B) in the triplicate site located in Soundwell - 264 Soundwell Rd, outside of the AQMAs. The monitoring is at façade and is representative of relevant exposure. Triplicate diffusion tube monitoring (147A, B and C) was set up in 2016 to ensure more robust monitoring at this location as the site had previously hovered around the annual mean objective, marginally exceeding it in 2014 (40.6 µg/m³).

The triplicate monitoring results have shown good precision since 2016 when checked using the precision and accuracy LAQM spreadsheet tool⁶⁵. In 2017, the triplicate average annual mean (38.1 µg/m³) was below the objective but still borderline. In 2018, the triplicate average annual mean (35.3 µg/m³) was below the precautionary level of 36 µg/m³ so was no longer considered to be borderline.

In 2019, a borderline result was recorded at 147B (36.2 µg/m³), along with lower results for 147A (33.8 µg/m³) and 147C (35.9 µg/m³) and the triplicate average annual mean was 35.3 µg/m³; the same as in 2018, so is again not considered borderline. This site will continue to be kept under review to check compliance is sustained.

All the borderline sites will continue to be closely observed, especially with regard to planning or transport developments that may affect future nitrogen dioxide concentrations.

⁶⁴ <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

⁶⁵ <http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html>

Trends in Annual Mean Nitrogen Dioxide Concentrations

In 2019, decreases in annual mean nitrogen dioxide concentrations were observed across 67% of the monitoring sites in South Gloucestershire, including at the Yate automatic station, although increases were monitored at 29% of sites, and at 4% of sites, concentrations remained stable when compared to 2018.

The trends in annual mean nitrogen dioxide concentrations measured at the diffusion tube monitoring sites in the Kingswood - Warmley and Staple Hill Air Quality Management Areas are shown in graphs in Appendix A. The trends in the Kingswood – Warmley AQMA are shown in Figure A.3 (Kingswood section) and Figure A.4 (Warmley section) and the trends in the Staple Hill AQMA in Figure A.5. For ease of reference, the diffusion tube monitoring results within the Kingswood – Warmley and Staple Hill AQMAs can be found in Table A.7 and Table A.8 respectively.

In the Kingswood – Warmley AQMA, there was only one site (146) that exceeded the annual mean objective in 2019 ($42.3 \mu\text{g}/\text{m}^3$). The same site exceeded the annual mean objective in 2018 ($40.8 \mu\text{g}/\text{m}^3$) so in 2019 the extent of the exceedance increased. In comparison, in 2017, there were two exceeding sites (139 and 146), with the highest exceedance at site 146 ($46.3 \mu\text{g}/\text{m}^3$), so the number of exceeding sites has decreased, as has the extent of the exceedance since then.

Site 146 has consistently exceeded the annual mean objective since 2014, the first full year of the site's operation. The site was set up as part of the monitoring for the detailed assessment of air quality on the A420 in Warmley. The exceedances at site 146 are likely to be due to the property fronting directly onto the pavement and the façade being very close to the road at approximately 1.6m from the kerb. It is also located on an uphill section of the A420 so vehicles are having to work harder to travel up the hill and producing more emissions. While the annual mean nitrogen dioxide concentrations have fluctuated at this site, from 2014 an overall declining trend can be observed in Figure A.3.

There were decreases in annual mean concentrations in 2019 compared to 2018 at fifteen (71%) of the monitoring sites in the Kingswood – Warmley AQMA but increases at five monitoring sites (24%) and the concentration remained the same at one site (5%). Concentrations at all nine sites in the Warmley section of the AQMA decreased (with an average decrease of $1.7 \mu\text{g}/\text{m}^3$), while in the Kingswood section, there were decreases at six sites (with average decrease $0.9 \mu\text{g}/\text{m}^3$), increases at

five sites (average increase $0.7 \mu\text{g}/\text{m}^3$) and one site stayed the same. It is not clear as to why there are these differences within the AQMA other than possible localised changes in traffic patterns.

In the Staple Hill AQMA, there were no exceedances at any of the monitoring sites in 2019, as in 2018. In comparison, there was one (marginal) exceedance in 2017 at site 75 ($40.3 \mu\text{g}/\text{m}^3$), although the estimated concentration following distance adjustment was below the annual mean objective and there is also only first floor exposure at an adjoining property in relation to this site.

There were decreases in annual mean concentrations in 2019 from 2018 at six (32%) of the monitoring sites in the Staple Hill AQMA (with average decrease $0.8 \mu\text{g}/\text{m}^3$), however, there were increases at eleven (58%) monitoring sites (average increase $1.3 \mu\text{g}/\text{m}^3$) and the concentrations remained the same at two sites (10%). Again it is not clear as to why more sites experienced increases than decreases in 2019 other than possible localised changes in traffic patterns and volumes.

The monitoring site locations within the Staple Hill AQMA were reviewed in 2017 and additional monitoring was set up at façade to better represent relevant exposure, where this was possible, and existing monitoring sites were retained for initial comparison. This allows for a more robust assessment of whether concentrations are below the objective where there is relevant exposure and therefore, whether the AQMA is still required. However, there were two borderline sites (62 and 165) in the Staple Hill AQMA in 2019 and Defra advise that AQMAs should remain in place until several years of data below 10% of the objective ($36 \mu\text{g}/\text{m}^3$) is collected to support revocation. The monitoring results are further discussed in Appendix D.

Generally, while the nitrogen dioxide concentrations in the Kingswood – Warmley and Staple Hill AQMAs have fluctuated over the past decade, a gradual downward trend can be seen overall. Annual mean pollutant concentrations can vary from year to year due to a number of factors, most notably meteorological conditions. Day-to-day changes in weather have a great influence on air quality. Levels of pollutants that are relatively high on a still day when dispersion is limited can be much lower the next day or even the next hour if wind direction changes or wind speeds increase.

Revocation of the Cribbs Causeway AQMA

There were again no exceedances of the nitrogen dioxide annual mean objective in the now revoked Cribbs Causeway AQMA, with monitored concentrations well below the objective ($25.3 \mu\text{g}/\text{m}^3$) at the façade of the single residential property within the AQMA. There has been sustained compliance with the objective where there is relevant exposure for ten years (2010 -2019 inclusive) which continues to justify the formal revocation of the AQMA on 22 July 2020.

The revocation and the trends in annual mean nitrogen dioxide concentrations within this AQMA, are further discussed in Appendix D.

3.2.2 Particulate Matter (PM_{10})

The PM_{10} monitoring data from the Yate automatic site has been adjusted to gravimetric equivalent with the BAM data corrected for slope (see Appendix C).

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of $40 \mu\text{g}/\text{m}^3$.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily (24-hour) mean concentrations for the past 5 years with the air quality objective of $50 \mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times per year.

The PM_{10} concentrations measured at the Yate automatic site are well below the annual mean and 24-hour mean objectives in 2019 and all other reported years. In 2019, the annual mean was $13 \mu\text{g}/\text{m}^3$, the same as in 2018. The trend data presented in Figure A.2 (Appendix A) shows that overall, the annual mean PM_{10} concentrations at Yate have been slowly declining since 2010 when the monitored concentration was $20 \mu\text{g}/\text{m}^3$. The maximum 24-hour mean was $46 \mu\text{g}/\text{m}^3$ so the 24-hour mean objective was not exceeded.

Appendices

Appendix A: Monitoring Results

Appendix B: Full Monthly Diffusion Tube Results for 2019

Appendix C: Air Quality Monitoring Data QA/QC

Appendix D: Supporting Technical Information

Appendix E: Maps

Appendix F: Summary of Air Quality Objectives in England

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?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
	Yate Station Road	Roadside	370418	182525	NO ₂ PM ₁₀	NO	Chemiluminescent Gravimetric (BAM)	N/A	6	NO ₂ 1.6 PM ₁₀ 1.8

Notes:

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

(2) N/A if not applicable

Table A.2 Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
1	Yate - 88 Station Road The Candle	Roadside	370692	182499	NO ₂	NO	4.6	2.5	NO	2.7
4A	Yate - Station Road Co-location 1	Roadside	370418	182525	NO ₂	NO	N/A	6	YES	2.4
4B	Yate - Station Road Co-location 2	Roadside	370418	182525	NO ₂	NO	N/A	6	YES	2.4
4C	Yate - Station Road Co-location 3	Roadside	370418	182525	NO ₂	NO	N/A	6	YES	2.4
10	Filton - 152 Gloucester Road North Pizza Bello façade	Roadside	360266	179136	NO ₂	NO	0	3.5	NO	2.3
11	Thornbury – 48 High Street Uniq Family Wealth	Roadside	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	N/A	1	NO	2.6
13	Filton - MOD Roundabout	Roadside	361523	178732	NO ₂	NO	N/A	1	NO	2.3
21	Downend – Boscombe Crescent St Augustines Church	Urban Background	365673	177475	NO ₂	NO	N/A	1.5	NO	2.5
27	Kingswood - 90 Regent Street Nat West façade	Roadside	364866	173835	NO ₂	YES (Kingswood - Warmley)	0	2	NO	2.8
29	Staple Hill - 123 High Street Backhouse Bet	Roadside	364822	175932	NO ₂	YES (Staple Hill)	2	1	NO	2.7

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
34	Bradley Stoke – 109 Ormonds Close M4 East of Almondsbury Interchange	Roadside	362395	182544	NO ₂	NO	11	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
36	Hambrook – Whiteshill M4 East of M32 Fairwater	Roadside	364544	178855	NO ₂	NO	9.6*	30 (M4)	NO	2.2
37	Almondsbury - Old Aust Road M4 West of Almondsbury Interchange	Roadside	361147	184846	NO ₂	NO	N/A	7 (M4)	NO	2.3
38	Severn Beach – Ableton Lane Severn Beach Primary School façade	Urban Background	354282	184653	NO ₂	NO	0	49	NO	2.3
44	Stoke Gifford - Hatchet Road	Roadside	362061	180025	NO ₂	NO	14	4	NO	2.8
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	6.5	NO	1.9
54	Longwell Green - A431 / Aldermoor Way	Roadside	365256	171656	NO ₂	NO	N/A	1.5	NO	2.7

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
57	Coalpit Heath - 225 Badminton Road GT Plumbing	Roadside	367742	181160	NO ₂	NO	12	2	NO	2.5
60	Downend - North Street Kustom Floors & Furniture	Roadside	365101	176688	NO ₂	NO	4	0.5	NO	2.4
61	Staple Hill Crossroads - 1 Broad Street William Hill	Roadside	364926	175926	NO ₂	YES (Staple Hill)	0.95	2.3	NO	2.5
62	Staple Hill Crossroads - 2 Broad Street 501 Bar façade	Roadside	364909	175908	NO ₂	YES (Staple Hill)	0	1.5	NO	2.4
63	Patchway – 28 Park Leaze	Roadside	359487	182479	NO ₂	NO	8	1.5	NO	2.5
67	Kingswood - 40 Regent Street Thomas Cook façade	Roadside	364671	173877	NO ₂	YES (Kingswood - Warmley)	0	2.5	NO	2.8
68	Kingswood - 26-32 Regent Street Store Twenty One façade	Roadside	364631	173886	NO ₂	YES (Kingswood - Warmley)	0	2.5	NO	2.6
69	Kingswood - 12 Regent Street Domino's Pizza façade	Roadside	364597	173892	NO ₂	YES (Kingswood - Warmley)	0	2.5	NO	2.6
70	Kingswood - Two Mile Hill Road Job Centre Plus façade	Roadside	364533	173896	NO ₂	YES (Kingswood - Warmley)	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	2.7

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
72	Staple Hill - 25 Broad Street Westbury Inks	Roadside	364990	175920	NO ₂	YES (Staple Hill)	6.5	1.5	NO	2.7
73	Staple Hill - 11 Soundwell Road Starlight	Roadside	364902	175843	NO ₂	YES (Staple Hill)	1.5	0.4	NO	2.5
74	Staple Hill - 29-31 Soundwell Road opp Page Comm Assoc	Roadside	364885	175772	NO ₂	YES (Staple Hill)	4	0.4	NO	2.7
75	Staple Hill - 118 High Street Lloyd Bottoms/ R K Fashion	Roadside	364856	175917	NO ₂	YES (Staple Hill)	2.5	0.5	NO	2.5
76	Staple Hill - 84-86 High Street Staple Hill Oak Pub façade	Roadside	364722	175926	NO ₂	YES (Staple Hill)	0	2	NO	2.7
78	Staple Hill - 9-11 Victoria Street	Roadside	364909	176016	NO ₂	YES (Staple Hill)	3.7	1.2	NO	2.6
79	Staple Hill - 27-29 Victoria Street	Roadside	364913	176067	NO ₂	YES (Staple Hill)	3.3	1.2	NO	2.4
83	Chipping Sodbury – 51A Broad Street façade	Roadside	372791	182241	NO ₂	NO	0	4.7	NO	2.2
87A	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	Roadside	357739	181334	NO ₂	NO (Cribbs Causeway AQMA Revoked 2020)	0	13	NO	1.7

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
87B	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	Roadside	357739	181334	NO ₂	NO (Cribbs Causeway AQMA Revoked 2020)	0	13	NO	1.7
87C	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	Roadside	357739	181334	NO ₂	NO (Cribbs Causeway AQMA Revoked 2020)	0	13	NO	1.7
92	Kingswood - Regent Street Entertainment & Sports Club	Roadside	364968	173836	NO ₂	YES (Kingswood - Warmley)	0	2	NO	2.7
93	Kingswood - Hanham Road Exchange Court Flats	Roadside	364979	173801	NO ₂	YES (Kingswood - Warmley)	0	2	NO	2.4
95	Kingswood - 45 High Street Adam Lee	Roadside	365078	173846	NO ₂	YES (Kingswood - Warmley)	0	2.7	NO	2.5
96	Kingswood - 71 High Street Homeless Project	Roadside	365164	173832	NO ₂	YES (Kingswood - Warmley)	5.5	2.3	NO	2.7
98	Kingswood - High Street Sainsbury's Local façade	Roadside	365463	173785	NO ₂	YES (Kingswood - Warmley)	N/A	2.5	NO	2.6
101	Staple Hill - High Street Ip outside Beech House	Roadside	364546	175951	NO ₂	NO	9	1.5	NO	2.9

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
102	Staple Hill - 58 High Street CBS Consultants	Roadside	364637	175934	NO ₂	YES (Staple Hill)	0	1.5	NO	2.4
105	Staple Hill - North Street Ip outside no 2	Roadside	364932	176147	NO ₂	YES (Staple Hill)	2.5	2	NO	2.7
106	Stoke Gifford - 73 Hambrook Lane façade	Other ⁽³⁾	363112	179559	NO ₂	NO	0	10	NO	1.9
113	Patchway - 5 Falcon Close façade	Roadside	359112	181909	NO ₂	NO	0	7.5 (M5 45)	NO	1.9
114	Pilning - 23 Keens Grove façade	Roadside	355263	185351	NO ₂	NO	0	7	NO	2.3
115	Pilning - 2 Wick Road façade	Roadside	355212	185360	NO ₂	NO	0	8.5	NO	2.3
116	Warmley - 14 High Street (former Webbs) Ip at façade	Roadside	366882	173562	NO ₂	YES (Kingswood - Warmley)	0	2.2	NO	3.1
117	Filton Northville - 29 Gloucester Road North Rowe Vets	Roadside	359874	178259	NO ₂	NO	2.5	2.9	NO	2.5
119	Filton - 137 Gloucester Road North	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	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 Road	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	2.4

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
129	Cribbs Causeway – 2 Holly Cottages rear façade	Roadside	357508	181059	NO ₂	NO	0	18 (M5 44)	NO	2.1
130	Cribbs Causeway – 2 Mayfield Cottages façade	Roadside	357488	181011	NO ₂	NO	0	17 (A4018 38)	NO	1.8
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	10.4 (A4174)	NO	1.9
134	Hambrook – Bristol Road Old Bakery façade	Roadside	364048	178719	NO ₂	NO	0	2.2	NO	1.9
135	Frenchay – Harford Drive Dyrham Flats	Roadside	364029	178413	NO ₂	NO	12.5*	24.5 (A4174)	NO	2.5
136	Little Stoke – 26 Gipsy Patch Lane façade	Roadside	361242	180544	NO ₂	NO	0	12	NO	2.2
137	Warmley - 35 High Street (lp at façade)	Roadside	366984	173563	NO ₂	YES (Kingswood - Warmley)	0	1.9	NO	2.6
138	Warmley - 18 High Street façade	Roadside	366941	173558	NO ₂	YES (Kingswood - Warmley)	0	2	NO	2.8
139	Warmley - 14 High Street (former Webbs) façade (dp)	Roadside	366890	173560	NO ₂	YES (Kingswood - Warmley)	0	2.3	NO	2.1

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
141	Warmley - 41 Deanery Road façade	Roadside	366705	173581	NO ₂	YES (Kingswood - Warmley)	0	7.7	NO	2.7
142	Warmley - 33 Deanery Road Warmley Court façade	Roadside	366613	173597	NO ₂	YES (Kingswood - Warmley)	0	8.9 (A4174 18.2)	NO	2
143	Warmley - 1 High Street Ideal Pharmacy façade	Roadside	366815	173574	NO ₂	YES (Kingswood - Warmley)	0	5	NO	2.5
144	Warmley - 8 Tower Road North façade	Roadside	366913	173523	NO ₂	NO	0	4.3	NO	2.7
145	Warmley - 1 London Road (Cycle Path)	Roadside	367107	173531	NO ₂	YES (Kingswood - Warmley)	4.9*	5	NO	2.3
146	Kingswood - 34 Hill Street façade	Roadside	365910	173680	NO ₂	YES (Kingswood - Warmley)	0	1.6	NO	2.2
147A	Soundwell - 264 Soundwell Rd façade	Roadside	364586	174496	NO ₂	NO	0	2.6	NO	2.3
147B	Soundwell - 264 Soundwell Rd façade	Roadside	364586	174496	NO ₂	NO	0	2.6	NO	2.3
147C	Soundwell - 264 Soundwell Rd façade	Roadside	364586	174496	NO ₂	NO	0	2.6	NO	2.3
148	Filton – 109 Gloucester Road North façade	Roadside	360076	178901	NO ₂	NO	0	10.2	NO	1.9
149	Filton – 707 Southmead Road façade	Roadside	360050	179020	NO ₂	NO	0	9.8	NO	1.8
150	Soundwell – 296 Soundwell Road façade	Roadside	364528	174425	NO ₂	NO	0	4.3	NO	1.7

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Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
151	Hambrook – Bristol Road Old Bakery FP signpost	Roadside	364048	178726	NO ₂	NO	1*	1.2	NO	2.3
152	Bradley Stoke -188 Oaktree Crescent Ip49	Roadside	360942	182833	NO ₂	NO	1*	12.2	NO	2.8
153	Bradley Stoke -141 Wheatfield Drive façade	Roadside	361841	182417	NO ₂	NO	0	8.2	NO	2.1
154	Bradley Stoke - 166 Ellan Hay Road façade	Roadside	363241	180724	NO ₂	NO	0	9.7	NO	1.8
155	Stoke Gifford - 3 Earl Close façade	Roadside	363324	179854	NO ₂	NO	0	26.5 (SGTL)	NO	2.2
156	Stoke Gifford - Lancelot Road Ip1	Roadside	362400	177624	NO ₂	NO	21.2	1.8	NO	2.4
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	366156	178556	NO ₂	NO	0	20.2 (A4174)	NO	2.1
159	Wickwar - 21 High Street façade	Roadside	372395	188581	NO ₂	NO	0	2.5	NO	2.3
160	Staple Hill - 62 High Street Ip10	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	4.4	NO	2
162	Staple Hill - 28 Victoria Street façade	Roadside	364925	176062	NO ₂	YES (Staple Hill)	0	4.8	NO	1.9
163	Staple Hill - 2 Victoria Street façade	Roadside	364918	175979	NO ₂	YES (Staple Hill)	0	4.8	NO	1.9

South Gloucestershire Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
164	Staple Hill - 102 High Street Jay Jays Hair (façade)	Roadside	364811	175919	NO ₂	YES (Staple Hill)	0	3.5	NO	2.2
165	Staple Hill - 3 Soundwell Rd Chinese Kitchen (façade)	Roadside	364906	175864	NO ₂	YES (Staple Hill)	0	1.5	NO	2.6
166	Kingswood - 12 Cecil Road Ip9	Roadside	364770	173695	NO ₂	NO	2.1	1.5	NO	2.5
167	Kingswood - 7 Downend Road Ip4	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	3.1	NO	2.4
169	Warmley - 20 Deanery Road Warmley Community Centre façade	Roadside	366714	173560	NO ₂	YES (Kingswood - Warmley)	0	4.2	NO	2.5
170	Patchway - 204 Gloucester Road front façade	Roadside	360606	181675	NO ₂	NO	0	10.5	NO	2.3
171	Soundwell - 225 Soundwell Rd façade	Roadside	364664	174672	NO ₂	NO	0	2.6	NO	2.7
172	Downend - 31 Badminton Road Brownes (façade)	Roadside	365153	176812	NO ₂	NO	0	5.4	NO	2.2
173	Mangotsfield - 10 Cossham Street façade	Roadside	366459	176138	NO ₂	NO	0	2.4	NO	2.3
174	Charfield - 25 Wotton Road façade	Roadside	372011	192189	NO ₂	NO	0	4.7	NO	2.4

South Gloucestershire Council

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
180	Wick - 70 High Street The Old Post Office façade	Roadside	370605	172681	NO ₂	NO	0	1.6	NO	2.3
181	Warmley - 16 London Road façade	Roadside	367297	173452	NO ₂	YES (Kingswood - Warmley)	0	1.7	NO	2.1

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property). * Where the receptor is located off to the side of the monitor rather than behind the monitor.

(2) N/A if not applicable.

(3) Other locations where any special source orientated monitoring is undertaken in relation to specific emission sources; in this case, railway line.

Table A.3 Annual Mean NO₂ Monitoring Results

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
	Yate Station Road (Automatic)	370418	182525	Roadside	Automatic	n/a	96.6	21	24	23	20	19
1	Yate - 88 Station Road The Candle	370692	182499	Roadside	Diffusion Tube	n/a	100	29.1	32.2	29.6	27.4	28.2
4A	Yate - Station Road Co-location 1	370418	182525	Roadside	Diffusion Tube	n/a	100	22.7	24.7	22.1	20.1	20.0
4B	Yate - Station Road Co-location 2	370418	182525	Roadside	Diffusion Tube	n/a	100	23	22.7	22.8	19.9	20.5
4C	Yate - Station Road Co-location 3	370418	182525	Roadside	Diffusion Tube	n/a	100	22.8	24.7	23.2	20.5	20.4
10	Filton - 152 Gloucester Road North Pizza Bello façade	360266	179136	Roadside	Diffusion Tube	n/a	100	33.2	34.1 ^a	34.7	34.7	35.9
11	Thornbury – 48 High Street Uniq Family Wealth	363654	189893	Roadside	Diffusion Tube	n/a	100	25.5	26.8	25.6	24.7	24.2
12	Stoke Gifford - Church Road Rear of Aviva	362161	179570	Roadside	Diffusion Tube	n/a	100	28.6	29.7	28.4	27.7	25.1
13	Filton - MOD Roundabout	361523	178732	Roadside	Diffusion Tube	n/a	92	32.1	34.6	30.1	31.7	30.5
21	Downend – Boscombe Crescent St Augustines Church	365673	177475	Urban Background	Diffusion Tube	n/a	100	16.6	17.4	16.4	14.9	14.5
27	Kingswood - 90 Regent Street Nat West façade	364866	173835	Roadside	Diffusion Tube	n/a	100	30.2	31.4	29.8	27.0	27.3
29	Staple Hill - 123 High Street Backhouse Bet	364822	175932	Roadside	Diffusion Tube	n/a	100	31.2	36.2	30.9	28.1	28.0
34	Bradley Stoke – 109 Ormonds Close M4 East of Almondsbury Interchange	362395	182544	Roadside	Diffusion Tube	n/a	100	28.9	31.0	26.9	26.1	24.0
35	Bradley Stoke - Woodlands Lane M4 East of Almondsbury Interchange	362118	183031	Roadside	Diffusion Tube	n/a	100	27.9	32.0	26.1	26.5	25.8

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Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
36	Hambrook – Whiteshill M4 East of M32 Fairwater	364544	178855	Roadside	Diffusion Tube	n/a	100	19.3	19.4	18.8	18.8	16.2
37	Almondsbury - Old Aust Road M4 West of Almondsbury Interchange	361147	184846	Roadside	Diffusion Tube	n/a	92	31.5	32.2	25.2	30.7	27.1
38	Severn Beach – Ableton Lane Severn Beach Primary School façade	354282	184653	Urban Background	Diffusion Tube	n/a	100	14.6	14.6	13.8	13.6	12.3
44	Stoke Gifford - Hatchet Road	362061	180025	Roadside	Diffusion Tube	n/a	100	29.8	31.9	30.1	30.6	30.4
46	Winterbourne - High Street opp Winterbourne Academy	364852	180758	Roadside	Diffusion Tube	n/a	100	29.4	32.9	28.8	25.1	25.7
53	Hambrook – Bristol Road Rear of 17 Fenbrook Close	363907	178389	Roadside	Diffusion Tube	n/a	100	30.0	33.7	27.9	27.7	26.2
54	Longwell Green - A431 / Aldermoor Way	365256	171656	Roadside	Diffusion Tube	n/a	100	30.2	34.9	31.9	30.2	28.4
57	Coalpit Heath - 225 Badminton Road GT Plumbing	367742	181160	Roadside	Diffusion Tube	n/a	100	29.0	28.7	24.7	23.6	23.6
60	Downend - North Street Kustom Floors & Furniture	365101	176688	Roadside	Diffusion Tube	n/a	100	30.7	33.7	28.4	28.4	31.3
61	Staple Hill Crossroads - 1 Broad Street William Hill	364926	175926	Roadside	Diffusion Tube	n/a	100	39.4	41.5	39.2	37.8	36.6
62	Staple Hill Crossroads - 2 Broad Street 501 Bar façade	364909	175908	Roadside	Diffusion Tube	n/a	100	36.4	39.2	34.6	33.6	36.3
63	Patchway – 28 Park Leaze	359487	182479	Roadside	Diffusion Tube	n/a	100	23.1	25.9	24.8	22.2	19.0
67	Kingswood - 40 Regent Street Thomas Cook façade	364671	173877	Roadside	Diffusion Tube	n/a	100	38.1	40.7	37.9	34.0	35.6

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Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
68	Kingswood - 26-32 Regent Street Store Twenty One façade	364631	173886	Roadside	Diffusion Tube	n/a	100	40.5	42.5	39.7	36.2	36.5
69	Kingswood - 12 Regent Street Domino's Pizza façade	364597	173892	Roadside	Diffusion Tube	n/a	100	34.8	36.5	33.2	33.9	35.0
70	Kingswood - Two Mile Hill Road Job Centre Plus façade	364533	173896	Roadside	Diffusion Tube	n/a	100	31.0	32.7	30.8	30.1	29.6
71	Staple Hill - 11 The Square Bunch Florist	365075	175918	Roadside	Diffusion Tube	n/a	100	23.6	26.1	24.6	21.5	22.7
72	Staple Hill - 25 Broad Street Westbury Inks	364990	175920	Roadside	Diffusion Tube	n/a	100	32.2	36.2	31.1	28.1	28.1
73	Staple Hill - 11 Soundwell Road Starlight	364902	175843	Roadside	Diffusion Tube	n/a	100	40.4	40.2	37.3	35.4	36.0
74	Staple Hill - 29-31 Soundwell Road opp Page Comm Assoc	364885	175772	Roadside	Diffusion Tube	n/a	83	28.5	30.9	27.1	27.0	25.6
75	Staple Hill - 118 High Street Lloyd Bottoms/ R K Fashion	364856	175917	Roadside	Diffusion Tube	n/a	83	44.8	46.1	40.3	37.2	38.0
76	Staple Hill - 84-86 High Street Staple Hill Oak Pub façade	364722	175926	Roadside	Diffusion Tube	n/a	100	34.9	36.9	32.9	29.3	31.2
78	Staple Hill - 9-11 Victoria Street	364909	176016	Roadside	Diffusion Tube	n/a	100	41.5	44.9	39.0	35.4	35.1
79	Staple Hill - 27-29 Victoria Street	364913	176067	Roadside	Diffusion Tube	n/a	100	37.5	37.2	34.7	34.1	32.3
83	Chipping Sodbury – 51A Broad Street façade	372791	182241	Roadside	Diffusion Tube	n/a	92	23.1	25.4	22.8	21.9	21.7
87A	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	357739	181334	Roadside	Diffusion Tube	n/a	100	28.4	28.3 ^a	26.6	24.7	25.0

South Gloucestershire Council

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
87B	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	357739	181334	Roadside	Diffusion Tube	n/a	100	28.7	29.9 ^a	27.2	25.4	25.6
87C	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	357739	181334	Roadside	Diffusion Tube	n/a	100	29.5	29.3 ^a	27.2	25.5	25.4
92	Kingswood - Regent Street Entertainment & Sports Club	364968	173836	Roadside	Diffusion Tube	n/a	100	34.1	36.7	33.2	30.5	30.4
93	Kingswood - Hanham Road Exchange Court Flats	364979	173801	Roadside	Diffusion Tube	n/a	100	29.2	31.1	26.7	26.6	24.4
95	Kingswood - 45 High Street Adam Lee	365078	173846	Roadside	Diffusion Tube	n/a	100	34.3	39.6	36.6	37.8	37.0
96	Kingswood - 71 High Street Homeless Project	365164	173832	Roadside	Diffusion Tube	n/a	100	34.2	37.0	35.0	31.3	30.3
98	Kingswood - High Street Sainsbury's Local façade	365463	173785	Roadside	Diffusion Tube	n/a	92	37.0	35.3	34.8	32.2	32.2
101	Staple Hill - High Street Ip outside Beech House	364546	175951	Roadside	Diffusion Tube	n/a	100	25.7	28.5	25.4	23.3	22.6
102	Staple Hill - 58 High Street CBS Consultants	364637	175934	Roadside	Diffusion Tube	n/a	100	38.4	40.7	37.2	32.4	34.3
105	Staple Hill - North Street Ip outside no 2	364932	176147	Roadside	Diffusion Tube	n/a	100	26.7	29.8	27.0	25.0	26.0
106	Stoke Gifford - 73 Hambrook Lane façade	363112	179559	Other	Diffusion Tube	n/a	100	20.1	20.9	20.5	18.7	18.2
113	Patchway - 5 Falcon Close façade	359112	181909	Roadside	Diffusion Tube	n/a	100	32.4	31.9	30.3	27.2	24.7
114	Pilning - 23 Keens Grove façade	355263	185351	Roadside	Diffusion Tube	n/a	83	25.7	27.5	23.4	24.5	22.1
115	Pilning - 2 Wick Road façade	355212	185360	Roadside	Diffusion Tube	n/a	100	24.9	25.5	24.2	23.0	22.9
116	Warmley - 14 High Street (former Webbs) Ip at façade	366882	173562	Roadside	Diffusion Tube	n/a	100	42.9	40.2 ^a	39.7	38.3	35.9

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Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
117	Filton Northville - 29 Gloucester Road North Rowe Vets	359874	178259	Roadside	Diffusion Tube	n/a	100	31.0	34.2	30.5	29.7	29.2
119	Filton - 137 Gloucester Road North	360263	179250	Roadside	Diffusion Tube	n/a	100	33.6	34.6	30.2	30.1	29.1
122	Filton - 549 Filton Avenue	360566	178229	Roadside	Diffusion Tube	n/a	100	30.6	31.4	29.4	29.0	28.0
124	Filton - 702a Filton Ave Way Ahead	360918	178905	Roadside	Diffusion Tube	n/a	92	32.1	34.4	29.7	32.0	30.7
125	Filton - 71 Station Road	360891	179005	Roadside	Diffusion Tube	n/a	100	25.8	26.7	29.1	26.8	27.3
128	Kingswood - 109 Downend Road	364587	174431	Roadside	Diffusion Tube	n/a	100	33.2	34.6	31.7	30.0	28.1
129	Cribbs Causeway – 2 Holly Cottages rear façade	357508	181059	Roadside	Diffusion Tube	n/a	100	29.5	33.4	29.2	28.6	23.9
130	Cribbs Causeway – 2 Mayfield Cottages façade	357488	181011	Roadside	Diffusion Tube	n/a	100	26.8	28.9	26.5	24.9	22.1
132	Hanham - 66 High Street Sassy Hair Studio	364178	172337	Roadside	Diffusion Tube	n/a	100	29.2	31.6	29.0	28.8	23.8
133	Hambrook - 123 Old Gloucester Road façade	363736	178507	Roadside	Diffusion Tube	n/a	100	28.4	30.7	25.6	25.9	25.5
134	Hambrook – Bristol Road Old Bakery façade	364048	178719	Roadside	Diffusion Tube	n/a	100	36.0	37.4	32.7	28.3	29.5
135	Frenchay – Harford Drive Dyrham Flats	364029	178413	Roadside	Diffusion Tube	n/a	100	26.8	28.5	27.4	24.0	23.8
136	Little Stoke – 26 Gipsy Patch Lane façade	361242	180544	Roadside	Diffusion Tube	n/a	100	22.1	22.9	22.5	21.4	20.8
137	Warmley - 35 High Street (lp at façade)	366984	173563	Roadside	Diffusion Tube	n/a	100	43.2	43.7	39.0	37.2	34.5
138	Warmley - 18 High Street façade	366941	173558	Roadside	Diffusion Tube	n/a	100	37.5	37.3	36.3	33.7	31.9
139	Warmley - 14 High Street (former Webbs) façade (dp)	366890	173560	Roadside	Diffusion Tube	n/a	100	39.6	38.3 ^a	41.4^a	37.2	34.4

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Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
141	Warmley - 41 Deanery Road façade	366705	173581	Roadside	Diffusion Tube	n/a	100	30.9	32.6	31.8	29.0	27.7
142	Warmley - 33 Deanery Road Warmley Court façade	366613	173597	Roadside	Diffusion Tube	n/a	100	29.7	29.3	29.0	26.8	26.7
143	Warmley - 1 High Street Ideal Pharmacy façade	366815	173574	Roadside	Diffusion Tube	n/a	100	25.6	27.1	25.1	23.1	22.5
144	Warmley - 8 Tower Road North façade	366913	173523	Roadside	Diffusion Tube	n/a	100	26.5	25.7	25.3	22.9	21.6
145	Warmley - 1 London Road (Cycle Path)	367107	173531	Roadside	Diffusion Tube	n/a	92	25.6	26.0	26.8	23.6	21.1
146	Kingswood - 34 Hill Street façade	365910	173680	Roadside	Diffusion Tube	n/a	92	41.8	45.7	46.3	40.8	42.3
147A	Soundwell - 264 Soundwell Rd façade	364586	174496	Roadside	Diffusion Tube	n/a	100	38.7	39.9	37.3	33.9	33.8
147B	Soundwell - 264 Soundwell Rd façade	364586	174496	Roadside	Diffusion Tube	n/a	92	n/a	46.5^a	37.8	36.7	36.2
147C	Soundwell - 264 Soundwell Rd façade	364586	174496	Roadside	Diffusion Tube	n/a	100	n/a	46.6^a	39.4	35.5	35.9
148	Filton – 109 Gloucester Road North façade	360076	178901	Roadside	Diffusion Tube	n/a	100	34.0	34.2	24.2	23.9	22.1
149	Filton – 707 Southmead Road façade	360050	179020	Roadside	Diffusion Tube	n/a	100	29.4	31.3	26.9	27.8	25.1
150	Soundwell – 296 Soundwell Road façade	364528	174425	Roadside	Diffusion Tube	n/a	100	29.4	32.7	26.1	26.3	24.1
151	Hambrook – Bristol Road Old Bakery FP signpost	364048	178726	Roadside	Diffusion Tube	n/a	100	39.5	38.8	35.5	29.8	29.2
152	Bradley Stoke -188 Oaktree Crescent Ip49	360942	182833	Roadside	Diffusion Tube	n/a	100	30.9 ^a	30.1	30.5	27.4	26.9
153	Bradley Stoke -141 Wheatfield Drive façade	361841	182417	Roadside	Diffusion Tube	n/a	100	18.2	22.2	19.5	18.2	17.5
154	Bradley Stoke - 166 Ellan Hay Road façade	363241	180724	Roadside	Diffusion Tube	n/a	100	20.5	25.0	22.5	20.4	20.3
155	Stoke Gifford - 3 Earl Close façade	363324	179854	Roadside	Diffusion Tube	n/a	100	17.2	21.8	19.5	19.2	18.0

South Gloucestershire Council

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
156	Stoke Gifford - Lancelot Road Ip1	362400	177624	Roadside	Diffusion Tube	n/a	92	19.9	23.2	21.8	21.1	21.6
157	Hambrook - Bristol Road Poplars House (garage façade)	363999	178505	Roadside	Diffusion Tube	n/a	92	30.5 ^a	28.7	25.3	23.0	26.5
158	Downend - 5 Wick Wick Close façade	366156	178556	Roadside	Diffusion Tube	n/a	100	28.4 ^a	29.6	24.8	24.6	23.4
159	Wickwar - 21 High Street façade	372395	188581	Roadside	Diffusion Tube	n/a	100	n/a	n/a	27.2	26.7	25.8
160	Staple Hill - 62 High Street Ip10	364655	175931	Roadside	Diffusion Tube	n/a	100	n/a	n/a	30.9	29.3	30.0
161	Staple Hill - 13 Victoria Street façade	364906	176022	Roadside	Diffusion Tube	n/a	100	n/a	n/a	29.8	26.8	29.1
162	Staple Hill - 28 Victoria Street façade	364925	176062	Roadside	Diffusion Tube	n/a	100	n/a	n/a	25.7	25.5	25.4
163	Staple Hill - 2 Victoria Street façade	364918	175979	Roadside	Diffusion Tube	n/a	100	n/a	n/a	26.9	26.4	26.9
164	Staple Hill - 102 High Street Jay Jays Hair (façade)	364811	175919	Roadside	Diffusion Tube	n/a	100	n/a	n/a	28.3	28.2	28.2
165	Staple Hill - 3 Soundwell Rd Chinese Kitchen (façade)	364906	175864	Roadside	Diffusion Tube	n/a	100	n/a	n/a	36.3	38.6	39.2
166	Kingswood - 12 Cecil Road Ip9	364770	173695	Roadside	Diffusion Tube	n/a	100	n/a	n/a	27.9	28.8	27.5
167	Kingswood - 7 Downend Road Ip4	364652	173957	Roadside	Diffusion Tube	n/a	100	n/a	n/a	32.5	30.4	29.5
168	Kingswood - 133 High Street façade	365366	173805	Roadside	Diffusion Tube	n/a	100	n/a	n/a	29.4 ^a	28.1	25.6
169	Warmley - 20 Deanery Road Warmley Community Centre façade	366714	173560	Roadside	Diffusion Tube	n/a	100	n/a	n/a	36.9 ^a	29.0	28.3
170	Patchway - 204 Gloucester Road front façade	360606	181675	Roadside	Diffusion Tube	n/a	92	n/a	n/a	24.3 ^a	24.1	22.7

South Gloucestershire Council

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
								2015	2016	2017	2018	2019
171	Soundwell - 225 Soundwell Rd façade	364664	174672	Roadside	Diffusion Tube	n/a	100	n/a	n/a	32.1 ^a	29.5	30.3
172	Downend - 31 Badminton Road Brownes (façade)	365153	176812	Roadside	Diffusion Tube	n/a	100	n/a	n/a	35.2 ^a	30.6	30.8
173	Mangotsfield - 10 Cossham Street façade	366459	176138	Roadside	Diffusion Tube	n/a	100	n/a	n/a	27.0 ^a	24.8	25.0
174	Charfield - 25 Wotton Road façade	372011	192189	Roadside	Diffusion Tube	n/a	100	n/a	n/a	n/a	18.0	17.0
180	Wick - 70 High Street The Old Post Office façade	370605	172681	Roadside	Diffusion Tube	100	83	n/a	n/a	n/a	n/a	26.8
181	Warmley - 16 London Road façade	367297	173452	Roadside	Diffusion Tube	100	75	n/a	n/a	n/a	n/a	23.7

☒ Diffusion tube data has been bias corrected

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

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

Notes:

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

Borderline results within 10% of NO₂ annual mean objective (>36 µg/m³) are shown in *italics*.

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

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details. (^a denotes annualised results for previous years 2015 – 2018 where full calendar year data capture <75%.

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

Figure A.1 Trends in Annual Mean NO2 Concentrations at Automatic Monitoring Sites

Annual Average Nitrogen Dioxide at Automatic Monitoring Sites 2009 - 2019

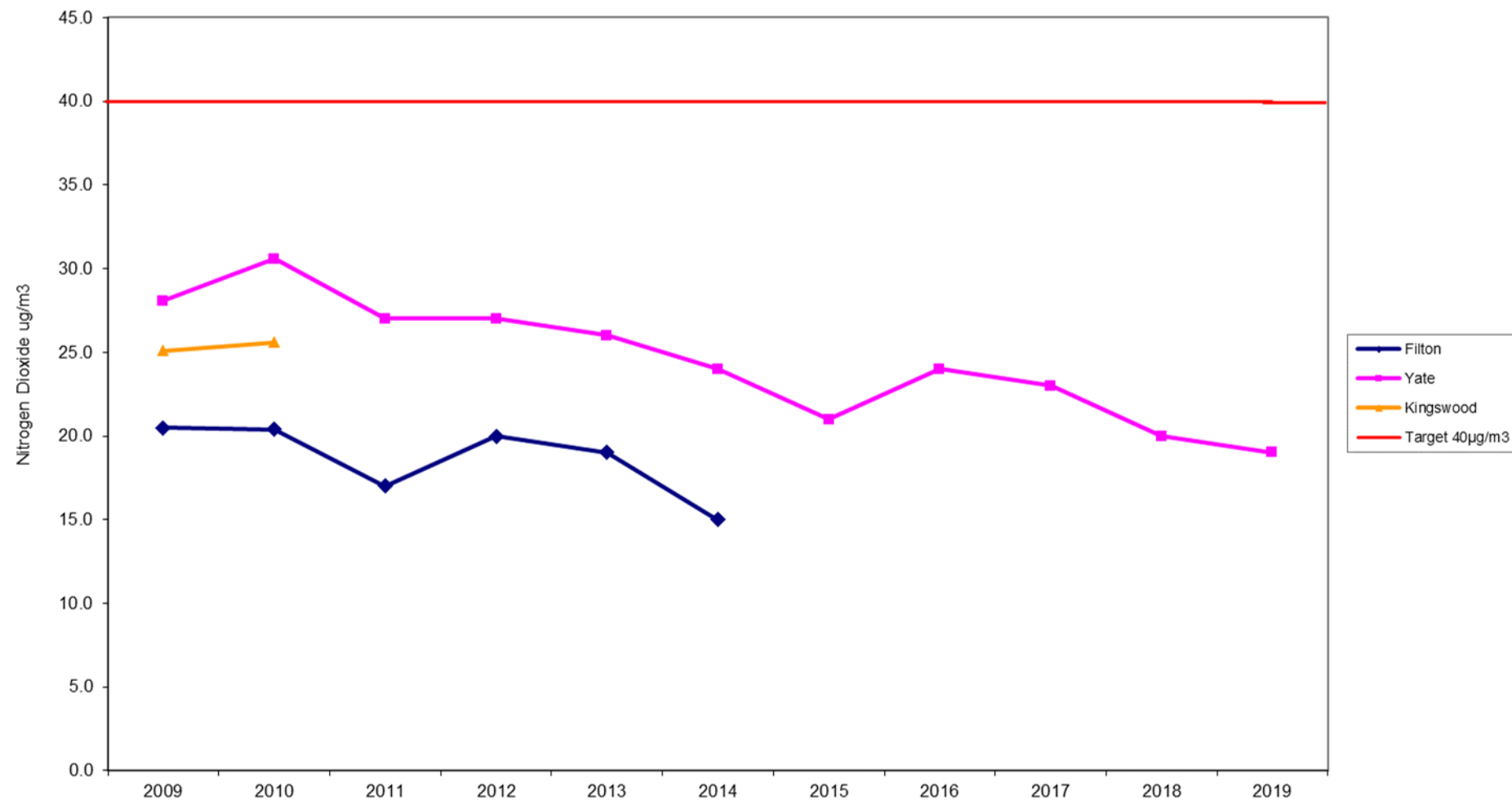


Table A.4 1-Hour Mean NO₂ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
							2015	2016	2017	2018	2019
Yate Station Road	370418	182525	Roadside	Automatic	n/a	96.6	0	0	0	0	0

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 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%).

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

Table A.5 Annual Mean PM10 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
						2015	2016	2017	2018	2019
Yate Station Road	370418	182525	Roadside	n/a	92.6	15	14	14	13	13

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

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ 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%).

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.2 Trends in Annual Mean PM₁₀ Concentrations at Automatic Monitoring Sites

Annual Average PM₁₀ at Automatic Monitoring Sites 2009 - 2019

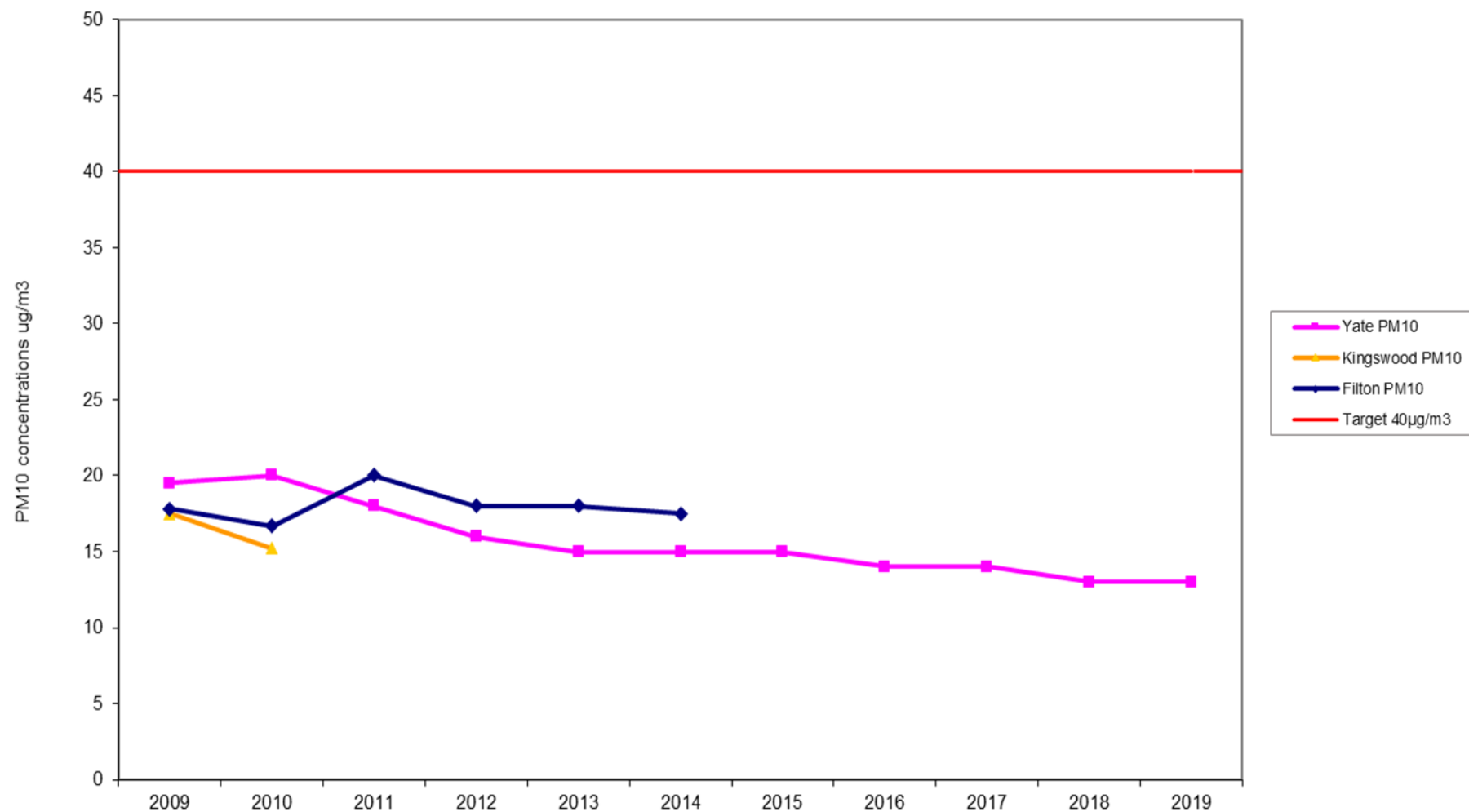


Table A.6 24-Hour Mean PM₁₀ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
						2015	2016	2017	2018	2019
Yate Station Road	370418	182525	Roadside	n/a	92.6	4	0	0	0	0

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 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%).

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

Table A.7 Kingswood - Warmley AQMA Annual Mean NO₂ Monitoring Results

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
								2015	2016	2017	2018	2019
27	Kingswood - 90 Regent Street Nat West façade	364866	173835	Roadside	Diffusion Tube	n/a	100	30.2	31.4	29.8	27.0	27.3
67	Kingswood - 40 Regent Street Thomas Cook façade	364671	173877	Roadside	Diffusion Tube	n/a	100	38.1	40.7	37.9	34.0	35.6
68	Kingswood - 26-32 Regent Street Store Twenty One façade	364631	173886	Roadside	Diffusion Tube	n/a	100	40.5	42.5	39.7	36.2	36.5
69	Kingswood - 12 Regent Street Domino's Pizza façade	364597	173892	Roadside	Diffusion Tube	n/a	100	34.8	36.5	33.2	33.9	35.0
70	Kingswood - Two Mile Hill Road Job Centre Plus façade	364533	173896	Roadside	Diffusion Tube	n/a	100	31.0	32.7	30.8	30.1	29.6
92	Kingswood - Regent Street Entertainment & Sports Club	364968	173836	Roadside	Diffusion Tube	n/a	100	34.1	36.7	33.2	30.5	30.4
93	Kingswood - Hanham Road Exchange Court Flats	364979	173801	Roadside	Diffusion Tube	n/a	100	29.2	31.1	26.7	26.6	24.4
95	Kingswood - 45 High Street Adam Lee	365078	173846	Roadside	Diffusion Tube	n/a	100	34.3	39.6	36.6	37.8	37.0
96	Kingswood - 71 High Street Homeless Project	365164	173832	Roadside	Diffusion Tube	n/a	100	34.2	37.0	35.0	31.3	30.3
98	Kingswood - High Street Sainsbury's Local façade	365463	173785	Roadside	Diffusion Tube	n/a	92	37.0	35.3	34.8	32.2	32.2
116	Warmley - 14 High Street (former Webbs) Ip at façade	366882	173562	Roadside	Diffusion Tube	n/a	100	42.9	40.2^a	39.7	38.3	35.9

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Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
								2015	2016	2017	2018	2019
137	Warmley - 35 High Street (lp at façade)	366984	173563	Roadside	Diffusion Tube	n/a	100	43.2	43.7	39.0	37.2	34.5
138	Warmley - 18 High Street façade (dp)	366941	173558	Roadside	Diffusion Tube	n/a	100	37.5	37.3	36.3	33.7	31.9
139	Warmley - 14 High Street (former Webbs) façade (dp)	366890	173560	Roadside	Diffusion Tube	n/a	100	39.6	38.3 ^a	41.4^a	37.2	34.4
141	Warmley - 41 Deanery Road façade (dp)	366705	173581	Roadside	Diffusion Tube	n/a	100	30.9	32.6	31.8	29.0	27.7
142	Warmley - 33 Deanery Road Warmley Court façade (dp)	366613	173597	Roadside	Diffusion Tube	n/a	100	29.7	29.3	29.0	26.8	26.7
143	Warmley - 1 High Street Ideal Pharmacy façade (dp)	366815	173574	Roadside	Diffusion Tube	n/a	100	25.6	27.1	25.1	23.1	22.5
145	Warmley - 1 London Road (Cycle Path)	367107	173531	Roadside	Diffusion Tube	n/a	92	25.6	26.0	26.8	23.6	21.1
146	Kingswood - 34 Hill Street façade (dp)	365910	173680	Roadside	Diffusion Tube	n/a	92	41.8	45.7	46.3	40.8	42.3
168	Kingswood - 133 High Street (façade)	365366	173805	Roadside	Diffusion Tube	n/a	100	n/a	n/a	29.4 ^a	28.1	25.6
169	Warmley - 20 Deanery Road Warmley Community Centre (façade)	366714	173560	Roadside	Diffusion Tube	n/a	100	n/a	n/a	36.9 ^a	29.0	28.3
181	Warmley - 16 London Road façade	367297	173452	Roadside	Diffusion Tube	100	75	n/a	n/a	n/a	n/a	23.7

☒ Diffusion tube data has been bias corrected

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

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

Notes:

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

Borderline results within 10% of NO₂ annual mean objective (>36 µg/m³) are shown in *italics*.

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

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details. (^a denotes annualised results for previous years 2015 – 2018 where full calendar year data capture <75%.

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

Figure A.3 Trends in Annual Mean Nitrogen Dioxide Concentrations in Kingswood Section of Kingswood - Warmley AQMA

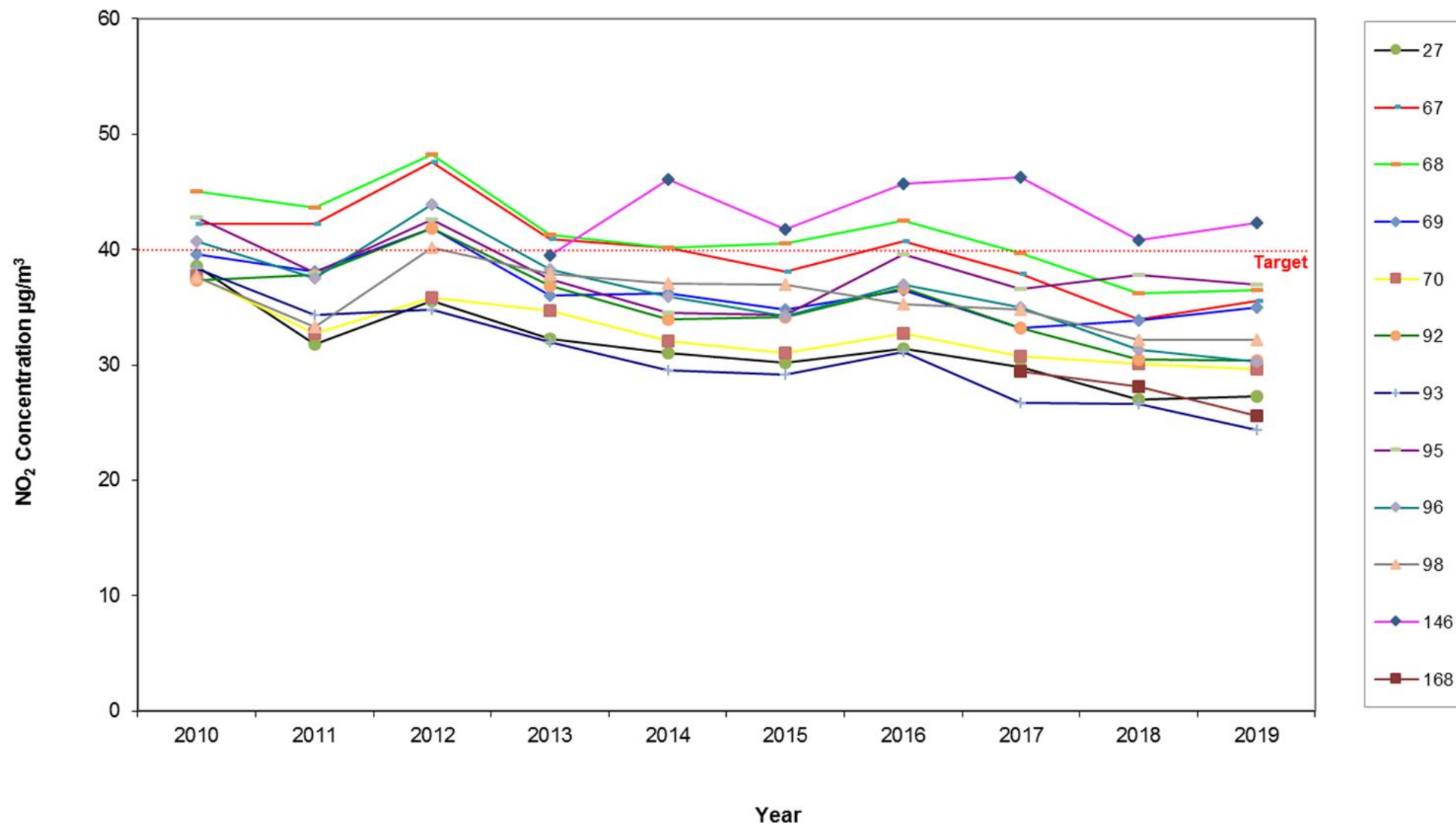


Figure A.4 Trends in Annual Mean Nitrogen Dioxide Concentrations in Warmley Section of Kingswood - Warmley AQMA

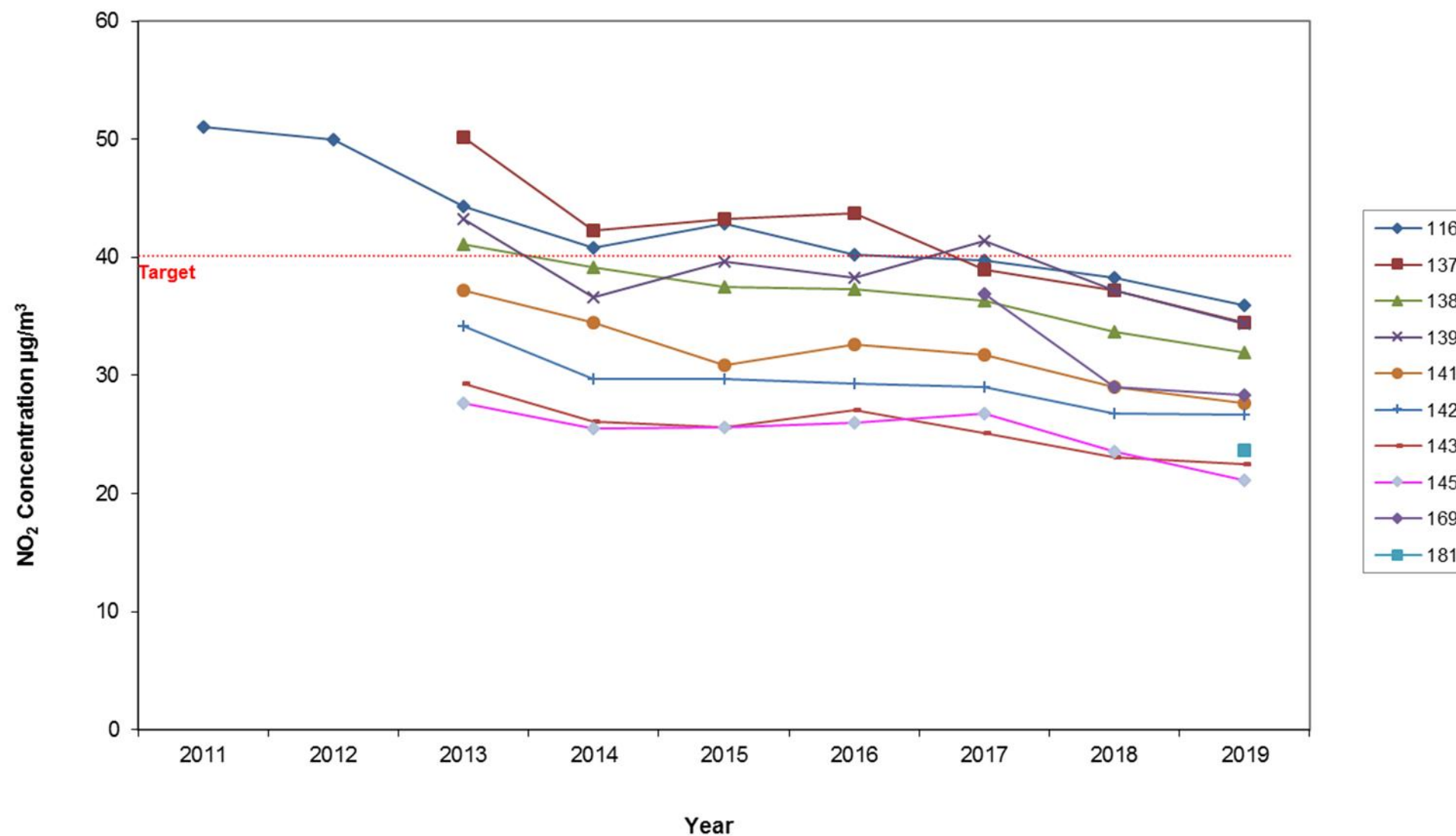


Table A.8 Staple Hill AQMA Annual Mean NO₂ Monitoring Results

Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
								2015	2016	2017	2018	2019
29	Staple Hill - 123 High Street Backhouse Bet	364822	175932	Roadside	Diffusion Tube	n/a	100	31.2	36.2	30.9	28.1	28.0
61	Staple Hill Crossroads - 1 Broad Street William Hill	364926	175926	Roadside	Diffusion Tube	n/a	100	39.4	41.5	39.2	37.8	36.6
62	Staple Hill Crossroads - 2 Broad Street 501 Bar façade	364909	175908	Roadside	Diffusion Tube	n/a	100	36.4	39.2	34.6	33.6	36.3
71	Staple Hill - 11 The Square Bunch Florist	365075	175918	Roadside	Diffusion Tube	n/a	100	23.6	26.1	24.6	21.5	22.7
72	Staple Hill - 25 Broad Street Westbury Inks	364990	175920	Roadside	Diffusion Tube	n/a	100	32.2	36.2	31.1	28.1	28.1
73	Staple Hill - 11 Soundwell Road Starlight	364902	175843	Roadside	Diffusion Tube	n/a	100	40.4	40.2	37.3	35.4	36.0
74	Staple Hill - 29-31 Soundwell Road opp Page Community Association	364885	175772	Roadside	Diffusion Tube	n/a	83	28.5	30.9	27.1	27.0	25.6
75	Staple Hill - 118 High Street Lloyd Bottoms/ R K Fashion	364856	175917	Roadside	Diffusion Tube	n/a	83	44.8	46.1	40.3	37.2	38.0
76	Staple Hill - 84-86 High Street Staple Hill Oak Pub façade	364722	175926	Roadside	Diffusion Tube	n/a	100	34.9	36.9	32.9	29.3	31.2
78	Staple Hill - 9-11 Victoria Street	364909	176016	Roadside	Diffusion Tube	n/a	100	41.5	44.9	39.0	35.4	35.1
79	Staple Hill - 27-29 Victoria Street	364913	176067	Roadside	Diffusion Tube	n/a	100	37.5	37.2	34.7	34.1	32.3
102	Staple Hill - 58 High Street CBS Consultants	364637	175934	Roadside	Diffusion Tube	n/a	100	38.4	40.7	37.2	32.4	34.3

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Site ID	Site Name	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
								2015	2016	2017	2018	2019
105	Staple Hill - North Street Ip outside no 2	364932	176147	Roadside	Diffusion Tube	n/a	100	26.7	29.8	27.0	25.0	26.0
160	Staple Hill - 62 High Street Ip10	364655	175931	Roadside	Diffusion Tube	n/a	100	n/a	n/a	30.9	29.3	30.0
161	Staple Hill - 13 Victoria Street (façade)	364906	176022	Roadside	Diffusion Tube	n/a	100	n/a	n/a	29.8	26.8	29.1
162	Staple Hill - 28 Victoria Street (façade)	364925	176062	Roadside	Diffusion Tube	n/a	100	n/a	n/a	25.7	25.5	25.4
163	Staple Hill - 2 Victoria Street (façade)	364918	175979	Roadside	Diffusion Tube	n/a	100	n/a	n/a	26.9	26.4	26.9
164	Staple Hill - 102 High Street Jay Jays Hair (façade)	364811	175919	Roadside	Diffusion Tube	n/a	100	n/a	n/a	28.3	28.2	28.2
165	Staple Hill - 3 Soundwell Rd Chinese Kitchen (façade)	364906	175864	Roadside	Diffusion Tube	n/a	100	n/a	n/a	36.3	38.6	39.2

☒ Diffusion tube data has been bias corrected

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

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

Notes:

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

Borderline results within 10% of NO₂ annual mean objective (>36 µg/m³) are shown in *italics*.

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

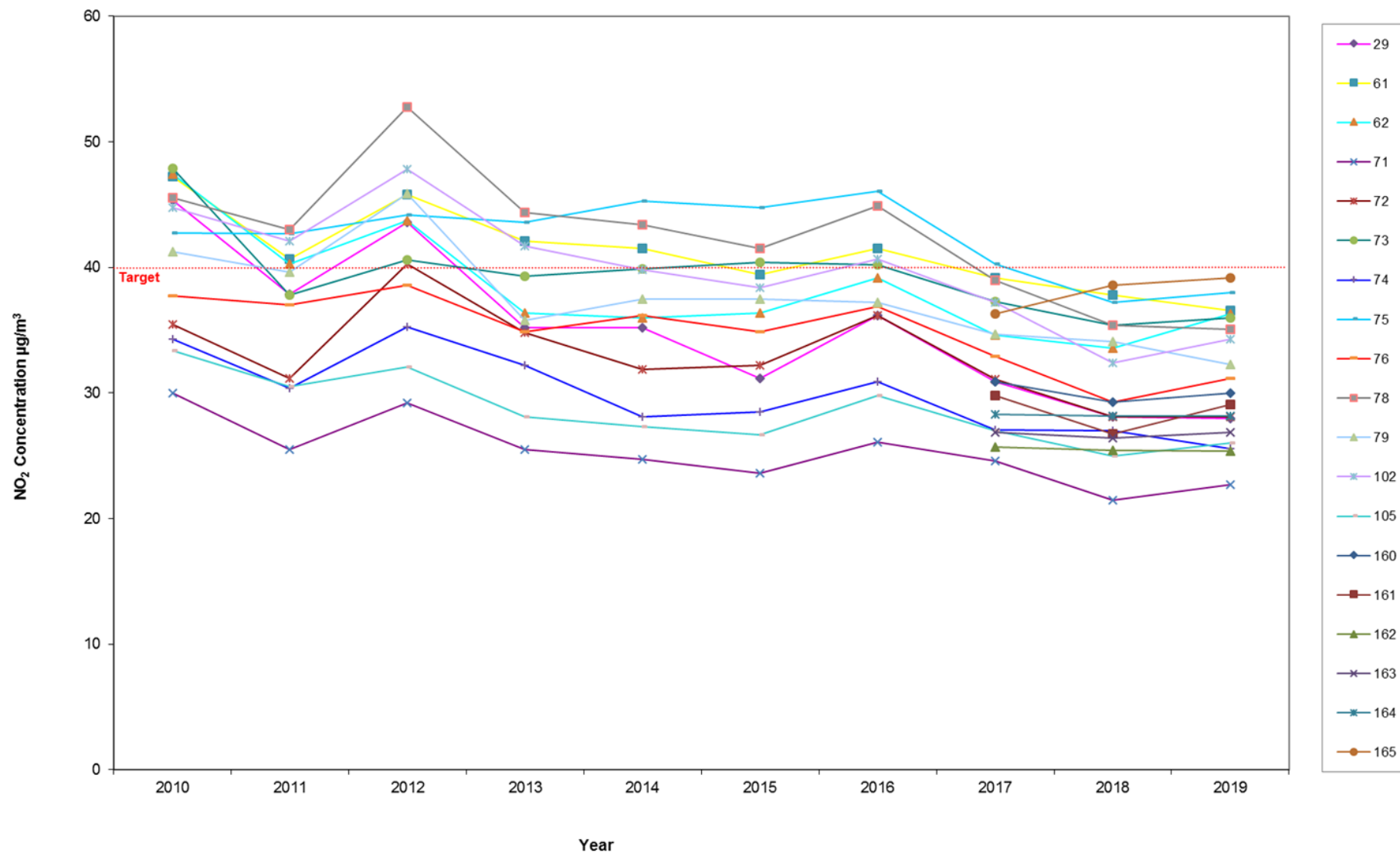
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

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

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details. (^a denotes annualised results for previous years 2015 – 2018 where full calendar year data capture <75%.

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

Figure A.5 Trends in Annual Mean Nitrogen Dioxide Concentrations in Staple Hill AQMA



Estimated PM_{2.5} Concentrations from PM₁₀ MonitoringTable A.9 Estimation of PM_{2.5} concentrations and % reductions

Year	Yate PM ₁₀ Annual Means ⁽¹⁾ (µg/m ³)	Yate Estimated PM _{2.5} Annual Means (PM ₁₀ x 0.7) ⁽²⁾ (µg/m ³)	Bristol St. Pauls (AURN) Monitored PM _{2.5} Annual Means ⁽³⁾ (µg/m ³)
2019	13	9.1	11
2018	13	9.1	12
2017	14	9.8	10
2016	14	9.8	12
2015	15	10.5	10
2014	15	10.5	13
2013	15	10.5	13
2012	16	11.2	13
2011	18	12.6	15
2010	20	14	14
% Reduction 2010 -2019	35%	35%	23%

(1) As reported in Table A.5 (Appendix A)

(2) Estimated as per Technical Guidance LAQM TG16 Box 7.7

(3) Obtained from UK-AIR Data Archive Annual and Exceedance Statistics

<https://uk-air.defra.gov.uk/data/exceedance>

Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 NO₂ Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.83) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
1	370692	182499	48.0	36.9	35.8	32.5	31.5	28.3	25.6	30.3	31.2	35.2	38.8	34.3	34.0	28.2	24.7
4A	370418	182525	33.3	29.8	25.4	19.8	19.2	18.1	16.6	19.6	21.3	26.2	31.8	28.0	24.1	20.0	n/a
4B	370418	182525	35.9	30.2	25.5	19.6	18.9	17.6	18.1	19.8	21.6	25.8	34.2	28.8	24.7	20.5	n/a
4C	370418	182525	36.7	31.9	24.6	20.3	19.3	15.6	17.6	19.3	22.8	25.1	33.4	27.7	24.5	20.4	n/a
10	360266	179136	51.2	44.4	37.8	40.8	29.1	35.6	33.2	32.4	38.8	62.7	52.9	59.9	43.2	35.9	-
11	363654	189893	38.8	38.0	30.9	23.3	23.4	19.3	24.2	25.9	26.0	31.1	33.3	35.6	29.2	24.2	20.0
12	362161	179570	43.8	27.1	35.6	27.0	27.5	26.4	24.9	23.4	29.1	27.9	42.2	28.0	30.2	25.1	n/a
13	361523	178732	46.0	35.1	34.4	40.8	17.9	33.9		28.1	36.4	41.6	53.4	35.9	36.7	30.5	n/a
21	365673	177475	32.5	20.8	18.2	17.6	11.7	8.4	10.0	8.7	14.0	19.5	27.3	21.0	17.5	14.5	n/a
27	364866	173835	42.7	39.5	31.9	30.0	28.4	25.8	26.2	27.2	34.0	32.6	41.8	35.1	32.9	27.3	-
29	364822	175932	48.8	33.3	35.3	38.1	35.8	28.6	26.8	21.4	30.9	33.1	45.0	28.4	33.8	28.0	25.4
34	362395	182544	36.8	33.7	29.1	40.3	26.6	23.7	21.8	18.1	24.4	28.6	37.2	27.1	28.9	24.0	23.2
35	362118	183031	39.6	38.1	31.3	41.1	29.5	27.3	12.4	19.7	28.1	32.7	44.6	28.3	31.0	25.8	n/r
36	364544	178855	24.9	23.2	21.2	17.0	17.7	14.1	18.0	18.4	18.7	18.9	21.8	20.2	19.5	16.2	n/r
37	361147	184846	36.9	46.2	15.4		30.6	31.4	28.4	20.0	31.8	37.4	46.3	34.0	32.6	27.1	n/a

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.83) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
38	354282	184653	20.1	21.0	13.2	14.8	12.3	9.8	11.6	10.4	13.2	15.2	22.5	14.2	14.9	12.3	-
44	362061	180025	47.7	41.3	42.5	32.2	31.8	27.4	29.6	34.8	32.7	37.0	43.8	38.6	36.6	30.4	24.1
46	364852	180758	41.7	39.8	32.7	27.3	25.5	18.6	27.0	25.9	28.1	32.5	39.2	33.3	31.0	25.7	20.7
53	363907	178389	40.5	35.1	33.6	35.9	27.1	26.6	25.3	19.1	28.0	28.0	48.1	31.9	31.6	26.2	23.9
54	365256	171656	44.9	38.3	35.5	33.0	29.5	23.7	29.5	29.0	31.2	35.9	43.5	36.2	34.2	28.4	n/a
57	367742	181160	42.8	34.4	28.4	24.2	23.4	23.2	21.3	19.7	25.6	30.0	35.7	32.3	28.4	23.6	18.9
60	365101	176688	44.8	44.2	33.1	35.7	32.0	28.0	24.5	26.3	29.4	69.2	48.4	36.2	37.7	31.3	25.0
61	364926	175926	54.1	51.7	46.6	39.9	29.8	37.4	36.0	39.0	45.0	49.1	52.1	47.6	44.0	36.6	34.9
62	364909	175908	57.0	51.4	37.2	44.0	46.2	36.8	36.0	36.2	38.3	46.4	54.1	41.5	43.8	36.3	-
63	359487	182479	31.9	26.4	24.6	17.9	20.1	16.4	17.7	17.8	20.1	23.6	32.8	25.4	22.9	19.0	n/r
67	364671	173877	52.3	51.2	40.2	40.5	35.7	35.6	35.5	37.3	38.3	46.9	53.0	48.5	42.9	35.6	-
68	364631	173886	49.0	53.5	39.2	42.2	38.4	36.6	35.8	37.6	42.3	45.1	55.3	52.7	44.0	36.5	-
69	364597	173892	51.3	48.8	38.7	40.6	36.7	33.5	36.4	33.3	39.4	43.5	50.7	52.5	42.1	35.0	-
70	364533	173896	45.5	43.0	32.5	38.1	31.3	29.6	28.4	26.0	32.4	37.0	47.9	36.3	35.7	29.6	-
71	365075	175918	37.2	29.3	26.1	27.6	39.4	20.1	18.3	18.2	23.2	27.1	33.7	28.7	27.4	22.7	22.5
72	364990	175920	53.4	36.8	37.8	29.7	20.2	27.0	25.6	29.1	34.0	34.9	43.1	35.3	33.9	28.1	23.7
73	364902	175843	55.5	48.8	46.4	43.3	47.1	36.0	35.2	24.9	42.5	44.5	55.7	40.7	43.4	36.0	31.1
74	364885	175772	42.1	31.8	30.8			25.8	23.8	19.3	30.1	30.9	45.9	27.7	30.8	25.6	21.7
75	364856	175917			42.8	48.8	42.6	35.8	34.9	43.0	48.8	52.7	58.3	50.5	45.8	38.0	31.1

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.83) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
76	364722	175926	47.6	43.9	41.1	32.4	34.4	31.0	27.5	32.2	40.0	37.6	43.1	40.8	37.6	31.2	-
78	364909	176016	55.6	50.7	49.2	36.0	32.5	35.0	29.7	38.4	38.9	47.3	49.5	44.1	42.2	35.1	29.3
79	364913	176067	42.2	41.8	46.7	35.5	24.9	33.8	32.5	37.4	37.4	40.5	48.6	45.9	38.9	32.3	27.7
83	372791	182241	33.2	28.9	24.3	29.9	25.6	21.9	19.7	16.4		23.9	35.1	28.5	26.1	21.7	-
87A	357739	181334	30.9	44.8	23.3	35.9	25.7	24.0	22.9	23.4	25.8	30.4	36.9	37.1	30.1	25.0	-
87B	357739	181334	30.1	44.9	24.9	38.0	26.5	24.0	22.8	26.1	28.3	31.6	34.7	37.8	30.8	25.6	-
87C	357739	181334	31.7	45.4	21.8	38.2	25.8	24.9	23.6	25.2	27.1	30.7	35.2	36.9	30.6	25.4	-
92	364968	173836	46.2	39.8	38.0	29.3	34.0	30.3	32.1	34.8	38.6	37.8	41.3	37.5	36.6	30.4	-
93	364979	173801	38.1	34.2	26.4	37.5	12.4	25.6	22.6	25.5	28.5	28.6	42.2	31.7	29.4	24.4	-
95	365078	173846	63.0	47.6	51.3	40.9	40.1	39.5	37.3	36.2	42.8	44.5	48.7	43.4	44.6	37.0	-
96	365164	173832	52.9	39.3	34.8	36.4	30.8	30.6	27.4	25.5	38.8	38.7	44.4	39.1	36.6	30.3	25.5
98	365463	173785	48.7	43.8	36.6	34.6	33.9		30.8	30.9	34.7	41.7	46.0	44.8	38.8	32.2	-
101	364546	175951	37.7	33.7	26.9	27.7	24.0	19.4	19.4	20.2	23.8	28.0	38.4	27.7	27.2	22.6	19.8
102	364637	175934	48.7	48.7	41.3	41.3	38.1	36.2	34.6	35.5	38.1	41.8	49.4	41.9	41.3	34.3	-
105	364932	176147	44.7	40.4	31.0	28.6	27.1	22.9	21.3	22.0	26.8	33.3	42.9	35.0	31.3	26.0	24.0
106	363112	179559	33.1	20.3	27.6	21.2	18.1	14.8	16.1	15.4	17.6	22.4	33.2	23.5	22.0	18.2	-
113	359112	181909	38.5	29.7	32.1	18.7	29.5	26.3	28.3	29.9	28.9	30.3	36.2	29.4	29.8	24.7	-
114	355263	185351	35.1	29.7	26.3	25.8	23.0	20.0	23.2			24.9	33.2	25.5	26.7	22.1	-
115	355212	185360	29.6	34.6	23.5	25.8	24.9	20.2	23.6	28.7	24.9	31.7	34.8	28.4	27.5	22.9	-

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.83) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
116	366882	173562	53.4	50.0	48.3	40.8	38.0	38.1	39.6	41.8	37.4	41.0	43.9	47.2	43.3	35.9	-
117	359874	178259	48.7	39.3	38.6	31.1	26.9	28.6	32.2	28.9	34.3	39.3	36.2	38.3	35.2	29.2	26.8
119	360263	179250	43.1	36.2	36.1	34.5	30.2	29.5	30.6	25.5	35.0	36.9	45.1	38.3	35.1	29.1	28.6
122	360566	178229	43.5	34.3	31.5	39.2	24.2	26.6	25.4	22.1	33.4	34.1	47.1	44.1	33.8	28.0	25.3
124	360918	178905	43.4	41.7	32.9	46.7	34.0		28.2	23.1	33.3	38.4	49.4	35.1	36.9	30.7	25.3
125	360891	179005	43.1	38.6	31.1	33.6	32.2	24.2	22.8	22.2	29.4	34.7	43.5	38.8	32.9	27.3	n/r
128	364587	174431	45.4	37.6	35.6	30.5	30.0	30.4	28.6	25.1	32.4	34.6	42.1	33.7	33.9	28.1	26.1
129	357508	181059	37.4	31.5	30.2	31.1	25.9	24.4	20.6	20.9	27.6	28.9	37.0	29.3	28.7	23.9	-
130	357488	181011	34.9	29.6	28.5	25.9	23.4	22.2	22.2	21.8	24.9	27.2	30.3	28.3	26.6	22.1	-
132	364178	172337	42.9	33.7	30.9	33.6	23.9	19.7	21.2	18.1	24.3	27.0	40.2	27.9	28.6	23.8	23.3
133	363736	178507	35.6	25.7	36.0	36.3	32.7	27.4	29.6	21.5	32.2	29.7	37.1	25.2	30.7	25.5	-
134	364048	178719	42.8	41.4	35.0	39.3	32.5	32.8	32.2	30.3	35.0	33.6	38.4	33.6	35.6	29.5	-
135	364029	178413	39.3	26.4	35.0	32.1	28.0	24.2	24.7	18.5	27.2	22.9	40.5	25.2	28.7	23.8	23.4
136	361242	180544	33.4	30.4	22.8	23.5	21.4	15.6	19.5	19.7	23.5	26.7	36.5	28.2	25.1	20.8	-
137	366984	173563	58.5	42.4	45.7	44.1	34.8	33.6	35.9	33.1	36.7	44.5	48.3	40.9	41.5	34.5	-
138	366941	173558	47.9	48.2	38.4	37.6	34.7	27.2	34.2	36.1	37.7	35.1	44.3	39.5	38.4	31.9	-
139	366890	173560	51.8	47.0	45.6	37.6	37.1	37.1	38.0	40.6	38.9	39.6	40.4	44.1	41.5	34.4	-
141	366705	173581	46.1	39.0	35.0	28.1	29.1	28.7	28.3	28.6	31.1	32.3	36.8	37.4	33.4	27.7	-
142	366613	173597	51.5	38.5	32.6	23.4	27.8	25.4	25.1	27.7	24.8	33.2	38.4	37.1	32.1	26.7	-

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.83) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
143	366815	173574	37.3	32.1	28.0	26.5	23.9	22.0	21.1	21.5	23.1	26.8	33.4	29.5	27.1	22.5	-
144	366913	173523	35.8	32.2	28.4	21.8	23.9	20.5	20.8	20.7	23.5	28.2	28.6	28.3	26.1	21.6	-
145	367107	173531	34.5	23.5	26.3	25.1	20.9		20.8	23.3	20.4	27.3	30.1	27.4	25.4	21.1	21.6
146	365910	173680	57.4	58.4	51.6	45.7	45.4	42.4	42.8	45.7	49.8	53.0	68.9		51.0	42.3	-
147A	364586	174496	51.4	44.2	37.4	33.6	41.8	38.7	37.7	33.1	41.3	40.5	49.9	39.8	40.8	33.8	-
147B	364586	174496	54.2	48.8	45.2	40.0	42.6	38.9	40.4	39.0	43.7		48.1	39.2	43.7	36.2	-
147C	364586	174496	54.0	50.9	44.2	36.7	38.1	40.0	35.5	38.8	42.8	42.3	53.8	41.3	43.2	35.9	-
148	360076	178901	33.8	22.5	23.5	34.3	22.9	24.7	21.1	18.4	25.3	27.8	38.9	26.0	26.6	22.1	-
149	360050	179020	40.4	22.2	31.8	36.8	21.6	29.0	22.0	22.1	27.8	33.3	45.9	30.1	30.3	25.1	-
150	364528	174425	38.0	31.0	28.8	33.1	23.0	26.1	23.7	17.9	27.0	31.1	41.6	27.1	29.0	24.1	-
151	364048	178726	44.5	39.1	33.6	31.8	34.0	30.5	32.7	32.1	34.0	34.5	38.8	37.0	35.2	29.2	-
152	360942	182833	43.6	31.9	33.5	37.2	28.9	28.3	25.9	21.6	30.7	33.3	43.4	30.6	32.4	26.9	27.0
153	361841	182417	31.3	26.0	19.8	22.6	16.3	14.9	12.7	14.3	19.6	20.3	32.6	23.3	21.1	17.5	-
154	363241	180724	32.6	33.3	18.5	22.0	18.8	17.0	17.3	19.4	22.0	27.3	35.7	28.8	24.4	20.3	-
155	363324	179854	30.9	26.0	22.9	21.1	15.9	15.0	15.2	17.5	21.3	22.7	27.9	24.0	21.7	18.0	-
156	362400	177624	36.6	30.0	21.3	26.1		18.2	15.7	14.2	21.9	34.6	40.8	27.1	26.0	21.6	18.7
157	363999	178505	39.1	35.0	29.9	21.7	24.2		29.2	30.8	31.8	33.2	39.5	37.1	32.0	26.5	n/r
158	366156	178556	41.7	28.9	30.6	34.6	25.7	22.5	25.6	15.9	25.6	26.0	38.3	23.3	28.2	23.4	-
159	372395	188581	44.5	33.5	32.5	34.7	20.1	29.2	26.9	19.7	28.9	31.6	44.3	27.7	31.1	25.8	-

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.83) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
160	364655	175931	45.4	43.6	39.0	33.9	27.9	27.4	30.5	31.5	33.4	36.6	46.0	37.8	36.1	30.0	29.3
161	364906	176022	46.6	41.2	39.1	28.2	29.1	29.0	29.2	33.2	32.3	37.7	37.6	38.1	35.1	29.1	-
162	364925	176062	41.3	37.4	28.1	35.2	22.9	23.9	21.2	23.2	26.3	33.4	40.2	34.5	30.6	25.4	-
163	364918	175979	39.9	37.4	31.7	32.5	40.6	25.9	21.1	23.9	30.3	33.1	42.0	30.8	32.4	26.9	-
164	364811	175919	42.5	38.6	33.0	34.1	29.8	26.3	26.1	27.9	32.9	36.1	45.7	35.1	34.0	28.2	-
165	364906	175864	52.6	55.5	41.9	54.0	40.9	42.5	39.0	34.0	43.2	49.6	67.7	45.9	47.2	39.2	-
166	364770	173695	45.1	37.9	31.2	34.6	28.4	25.9	24.1	25.8	31.1	34.2	44.2	34.7	33.1	27.5	25.2
167	364652	173957	47.3	44.1	35.4	28.5	25.7	28.4	28.7	32.2	34.9	38.0	43.7	39.9	35.6	29.5	26.7
168	365366	173805	41.4	29.2	31.3	35.4	28.3	26.7	25.7	21.1	29.4	33.3	40.5	28.1	30.9	25.6	-
169	366714	173560	45.6	41.7	37.6	19.0	30.7	31.2	27.8	34.4	34.3	34.4	35.2	36.9	34.1	28.3	-
170	360606	181675	36.4	33.1	27.5	29.4	20.9	20.3	22.0	18.9	24.3		39.1	29.4	27.4	22.7	-
171	364664	174672	48.0	42.5	33.1	35.7	32.6	31.8	28.1	30.0	32.6	36.5	48.8	38.8	36.5	30.3	-
172	365153	176812	45.6	39.8	41.3	30.3	32.9	31.9	31.2	35.8	34.6	38.6	44.0	39.7	37.1	30.8	-
173	366459	176138	37.8	37.1	29.7	31.3	26.7	21.0	21.6	23.1	29.5	34.2	36.2	32.4	30.1	25.0	-
174	372011	192189	29.5	23.6	21.6	19.0	17.9	16.5	15.9	14.8	16.3	22.0	29.6	19.7	20.5	17.0	-
180	370605	172681	N/O	N/O	28.5	40.8	32.2	28.7	27.6	24.8	30.5	35.5	45.1	29.2	32.3	26.8	-
181	367297	173452	N/O	N/O	N/O	28.8	30.6	26.1	26.7	25.0	27.2	28.5	32.5	31.2	28.5	23.7	-

☐ Local bias adjustment factor used

☒ National bias adjustment factor used

☒ Annualisation has been conducted where data capture is <75% (Note: No sites <75% data capture in 2019)

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

Notes:

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

Borderline results within 10% of NO₂ annual mean objective (>36 µg/m³) are shown in *italics*.

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

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

(2) Distance corrected to nearest relevant public exposure. (- where monitoring location at façade of relevant exposure so distance correction not required; n/a where not applicable as no relevant exposure; n/r (no result) where distance adjustment could not be calculated (see Appendix C)

N/O Not operational

Appendix C: Air Quality Monitoring Data QA/QC

QA/QC of Diffusion Tube Monitoring

In 2019, the diffusion tubes were prepared and analysed by Somerset County Council Scientific Services, following a change from Gradko for the years 2017 and 2018. Somerset County Council Scientific Services 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. The laboratory participates in the AIR-NO₂ Proficiency Testing (PT) scheme for which the results were 100% satisfactory in 2019⁶⁶.

The tube changing frequency is in line with the calendar of suggested exposure periods for 2019⁶⁷ and is carried out by South Gloucestershire Council officers.

Data Ratification and Bias Adjustment

The diffusion tube results are examined on a monthly basis to identify any spurious data and any suspect data is investigated further. Trends in monitored levels across the diffusion tube sites are compared to take into account seasonal factors, such as changing weather patterns and increased traffic flows, and to detect any local changes at the sites, such as road works. The monthly raw data is then averaged for the calendar year to give an annual mean.

While diffusion tubes provide a simple, cost-effective way of monitoring a wide range of locations, the accuracy of the tubes can be variable depending on the laboratory preparation, handling and analysis. To overcome this, a Bias Adjustment Factor, is applied to the raw mean for the relevant monitoring period. This factor is calculated from monitoring sites where triplicate diffusion tubes are co-located with an automatic NO_x analyser by comparing results of the two measurement methods.

Diffusion Tube Bias Adjustment Factors

National Bias Adjustment Factor

During 2019, the Council operated a co-location study at the Yate automatic monitoring site and the study was included in the national bias adjustment factors database provided by the LAQM Helpdesk. Combined bias adjustment factors from

⁶⁶<https://laqm.defra.gov.uk/assets/laqmno2performancedatauptooctober2020v1.pdf>

⁶⁷<https://laqm.defra.gov.uk/assets/dttimetable2019v1.pdf>

the local authority co-location studies are calculated for each laboratory that analyse diffusion tubes.

The 2019 national bias-adjustment factor for Somerset County Council Scientific Services obtained at the time the data was compiled for this report was 0.83 (spreadsheet version 06/20).

The Summary of Precision Results for NO₂ Diffusion Tube Co-location Studies, by Laboratory⁶⁸ show Somerset County Council Scientific Services to have good tube precision (the ability for a measurement to be consistently reproduced) in 2019.

Local Bias Adjustment Factor

The precision and accuracy spreadsheet available on the LAQM Tools Defra webpage⁶⁹ was used to compare the triplicate co-located diffusion tubes with the automatic monitor in Yate and calculate a local bias adjustment factor of 0.77 for 2019 as shown in Figure C.1.

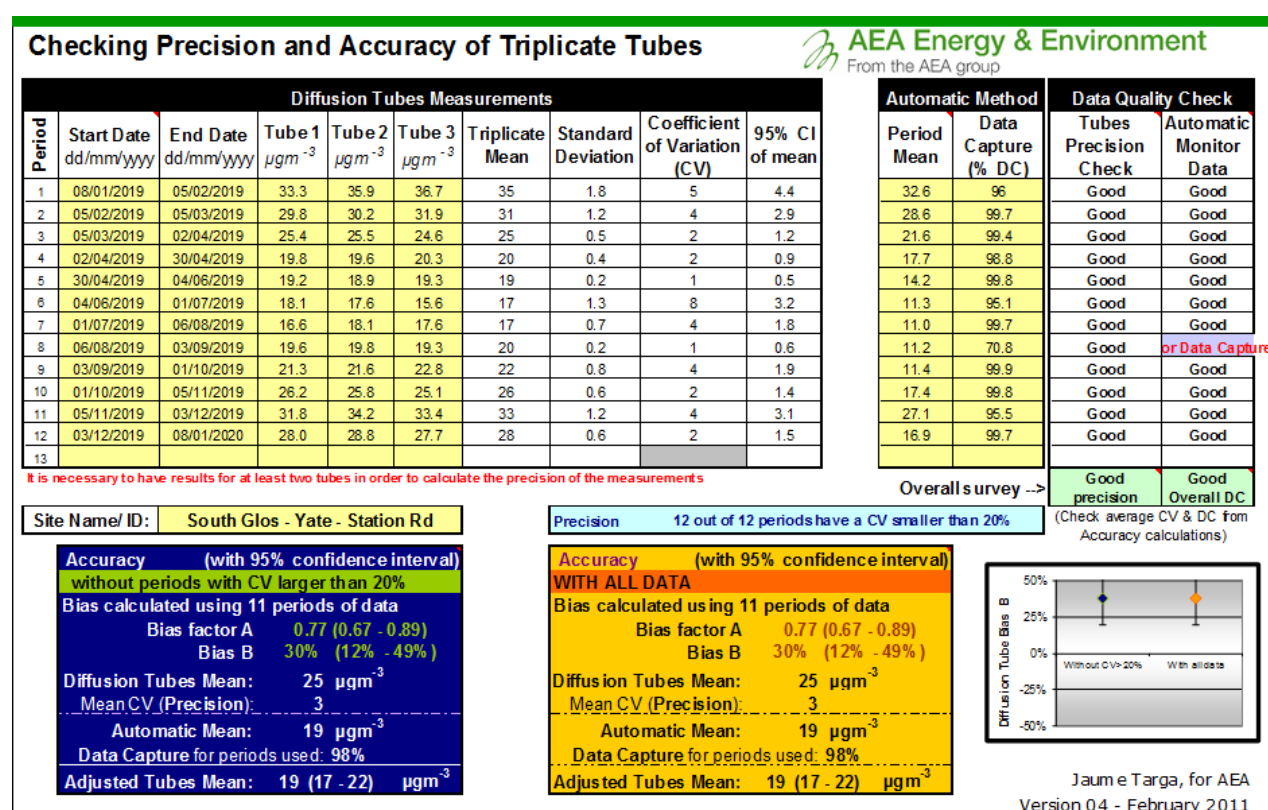


Figure C.1 2019 Precision and Accuracy spreadsheet for Yate Co-location Study

⁶⁸ <https://laqm.defra.gov.uk/diffusion-tubes/precision.html>

⁶⁹ <http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html>

Discussion of Choice of Factor to Use

For 2019, the national bias adjustment factor (0.83) and local bias adjustment factor (0.77) compare reasonably well, although the national bias adjustment factor being slightly higher is more conservative.

Guidance on the choice of bias adjustment factor is included in LAQM TG16 Box 7.11. Having considered this guidance, it was decided it would be more robust and precautionary to use the national bias adjustment factor of 0.83 as this would give the worse-case annual means.

The national and local bias adjustment factors for the years 2014 -19; the period of data included in this report, are shown in Table C.1. The bias adjustment factor used in these years has been the more conservative bias adjustment factor to give the worse-case annual means.

Table C.1 Bias Adjustment Factors previously used

Year	Bias Adjustment Factor		Laboratory
	National	Local	
2019	0.83	0.77	Somerset CC
2018	0.93	0.94	Gradko
2017	0.89	0.91	Gradko
2016	0.88	0.87	Somerset CC
2015	0.87	0.82	Somerset CC

Notes:

Bias adjustment factor used shown in **bold**

Short-term to Long-term Data adjustment

In 2019, data capture was equal to or greater than 75% at all monitoring sites so short term to long term data adjustment (annualisation) was not required.

Where monthly results are not shown in Table B.1, this is due to either missing or compromised tubes. However, as the data capture overall for 2019 was not less than 75%, annualisation was not necessary as detailed in LAQM TG16.

Distance Adjustment to façade

It is not always possible to locate diffusion tubes on building facades representing worst case exposure. However, nitrogen dioxide concentrations fall off rapidly with increasing distance from the roadside so where the monitoring location is closer to the road than a location of relevant exposure, the NO₂ concentration can be estimated at the nearest location of relevant exposure using the NO₂ fall-off with distance calculator⁷⁰ on the LAQM Tools Defra webpage. Distance correction of results to the façade is particularly important for monitoring sites where exceedances or borderline NO₂ concentrations (i.e. within 10% of the objective), have been recorded.

In 2019, the only exceeding monitoring site (site 146) is located at façade so does not require distance adjusting. There were three borderline monitoring sites (sites 61, 73 & 75) where relevant exposure is set back from the monitoring site, all of which are located within the Staple Hill AQMA. The results have been distance corrected to the façade of the nearest relevant receptor using the NO₂ fall-off with distance calculator and the data and results from the calculator are presented in Table C.2.

When the results are adjusted for distance, none of the three sites remain borderline as all have estimated concentrations below 36.0 µg/m³. It should also be noted there is no relevant exposure at ground floor level in relation to either site 61, 73 or 75 and concentrations at higher floors would be further reduced.

The distance adjusted results were also calculated in the same way for the other monitoring sites where monitoring is not directly at a location of relevant exposure (i.e. façade) as shown in Table C.3 and the results are also reported in Table B.1 in Appendix B. However, a result could not be calculated for sites 36 and 63 as the measured annual mean NO₂ concentrations (18.8 and 19.0 µg/m³ respectively) were less than the local annual mean background NO₂ concentrations (21.0 and 20.7 µg/m³ respectively). Also the calculator cannot be used due to the influence of two roads at sites 35 (Woodlands Lane and M4), 125 (Station Road and A4174) and 157 (A4174 and B4058). It should also be noted that the distance adjusted result for site 156 should be treated with caution as the receptor is more than 20m further from the kerb than the monitor.

⁷⁰ <https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

Table C.2 Distance adjustment of Annual Mean NO₂ at “borderline” sites to nearest façade

Site No.	Site Name	Monitor distance to kerb (m)	Receptor distance to kerb (m)	Background NO ₂ 2019 (µg/m ³)	Annual mean concentrations 2019 (µg/m ³) adjusted for bias	Adjusted to façade (µg/m ³)
61	Staple Hill Crossroads – 1 Broad Street William Hill	2.3	3.25	16.1	36.6	34.9
73	Staple Hill - 11 Soundwell Road Starlight	0.5	2.0	16.1	36.0	31.1
75	Staple Hill – 118 High Street Lloyd Bottoms/R K Fashion	0.5	3.0	16.1	38.0	31.1

Notes:

Borderline results within 10% of NO₂ annual mean objective (>36 µg/m³) are shown in *italics*.

Table C.3 Distance adjustment of Annual Mean NO₂ at other sites not at façade to the nearest façade

Site No.	Site Name	Monitor distance to kerb (m)	Receptor distance to kerb (m)	Background NO ₂ 2019 (µg/m ³)	Annual mean concentrations 2019 (µg/m ³) adjusted for bias	Adjusted to façade (µg/m ³)
1	Yate - 88 Station Road The Candle	2.5	7.1	14.5	28.2	24.7
11	Thornbury – 48 High Street Uniq Family Wealth	0.6	3.4	11.0	24.2	20.0
29	Staple Hill - 123 High Street Backhouse Bet	1	3.0	16.1	28.0	25.4
34	Bradley Stoke – 109 Ormonds Close M4 East of Almondsbury Interchange	33	44.0	19.9	24.0	23.2
44	Stoke Gifford - Hatchet Road	4	18.0	15.4	30.4	24.1
46	Winterbourne - High Street opp Winterbourne Academy	1.3	17.8	16.7	25.7	20.7
53	Hambrook – Bristol Road Rear of 17 Fenbrook Close	6.5	22.5	20.5	26.2	23.9

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Site No.	Site Name	Monitor distance to kerb (m)	Receptor distance to kerb (m)	Background NO ₂ 2019 (µg/m ³)	Annual mean concentrations 2019 (µg/m ³) adjusted for bias	Adjusted to façade (µg/m ³)
57	Coalpit Heath - 225 Badminton Road GT Plumbing	2	14.0	13.3	23.6	18.9
60	Downend - North Street Kustom Floors & Furniture	0.5	4.5	15.1	31.3	25.0
71	Staple Hill - 11 The Square Bunch Florist	6.5	7.0	15.3	22.7	22.5
72	Staple Hill - 25 Broad Street Westbury Inks	1.5	8.0	16.1	28.1	23.7
74	Staple Hill - 29-31 Soundwell Road opp Page Comm Assoc	0.4	4.4	16.1	25.6	21.7
78	Staple Hill - 9-11 Victoria Street	1.2	4.9	15.5	35.1	29.3
79	Staple Hill - 27-29 Victoria Street	1.2	4.5	15.5	32.3	27.7
96	Kingswood - 71 High Street Homeless Project	2.3	7.8	14.2	30.3	25.5
101	Staple Hill - High Street Ip outside Beech House	1.5	10.5	16.1	22.6	19.8
105	Staple Hill - North Street Ip outside no 2	2	4.5	15.5	26.0	24.0
117	Filton Northville - 29 Gloucester Road North Rowe Vets	2.9	5.4	14.1	29.2	26.8
119	Filton - 137 Gloucester Road North	3.6	4.1	15.2	29.1	28.6
122	Filton - 549 Filton Avenue	4	8.5	15.1	28.0	25.3
124	Filton - 702a Filton Ave Way Ahead	1.9	8.5	15.1	30.7	25.3
128	Kingswood - 109 Downend Road	1.4	3.0	15.7	28.1	26.1

South Gloucestershire Council

Site No.	Site Name	Monitor distance to kerb (m)	Receptor distance to kerb (m)	Background NO ₂ 2019 (µg/m ³)	Annual mean concentrations 2019 (µg/m ³) adjusted for bias	Adjusted to façade (µg/m ³)
132	Hanham - 66 High St Sassy Hair Studio	2.7	3.3	14.1	23.8	23.3
135	Frenchay – Harford Drive Dyrham Flats ⁽¹⁾	24.5	29.0	20.1	23.8	23.4
145	Warmley - 1 London Road (Cycle Path) ⁽¹⁾	5	4.2	12.3	21.1	21.6
152	Bradley Stoke -188 Oaktree Crescent Ip49 ⁽¹⁾	12.2	12.0	18.8	26.9	27.0
156	Stoke Gifford - Lancelot Road Ip1	1.8	23.0	16.7	21.6	18.7 ⁽²⁾
160	Staple Hill - 62 High Street Ip10	1.6	2.0	16.1	30.0	29.3
166	Kingswood - 12 Cecil Road Ip9	1.5	3.6	15.4	27.5	25.2
167	Kingswood - 7 Downend Road Ip4	2.3	5.2	15.4	29.5	26.7

Notes:

(1) Sites where the receptor is located to the side of the monitor rather than behind the monitor

(2) Warning – treat result with caution as receptor is more than 20m further from the kerb than the monitor

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
- Four-weekly calibration checks on the analysers using nationally traceable standard gases by Bristol City Council (BCC) under contract to South Gloucestershire Council
- Ad-hoc site inspections to check equipment operational status, site security, detect equipment malfunction and to change inlet filters
- Repairs as required and planned six monthly servicing and re-calibration of the analysers by EnviroTechnology Services under contract to South Gloucestershire Council.

Calibration methods

Calibration procedures are carried out four-weekly by BCC. 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.

Each analyser zero/span check is fully documented and the records are kept centrally using Google Sheets. The calibration factors are calculated in Google Sheets and used in the data scaling and ratification process.

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, which is supplied and certified by BOC. 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 maintained on a planned schedule following manufacturers' instructions. A six monthly full service and multi-point recalibration is carried out on the Yate NO_x analyser under contract by the equipment suppliers; EnviroTechnology Services. The multi-point calibration involves the use of zero air, NO and NO₂ calibration gases, which are again traceable to national standards, enabling the analyser data slope and offset factors to be reset. A check on the efficiency of the molybdenum converter is undertaken during the services.

The 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. Results of the servicing, calibrations and repairs are fully documented and stored centrally.

Data Processing, Validation and Ratification

Raw data from the Yate analysers is downloaded automatically twice a day to a designated PC within the council via a modem and telephone line from the site. All data is collected by Opsi EnviMan software. The data from the analysers is visually screened regularly in-house using EnviMan ComVisioner to check for obvious erroneous data and equipment faults.

The data is also collected by Air Quality Data Management (AQDM). AQDM then undertakes the subsequent validation, scaling and ratification of the data in accordance with LAQM (TG16) on behalf of the Council. 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 four weekly 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.

PM₁₀ Monitoring Adjustment

The PM₁₀ data measured by the Beta Attenuation Monitor (BAM) at the Yate automatic monitoring site have been adjusted to gravimetric equivalent by using a factor of 0.833.

Appendix D: Supporting Technical Information

Revocation of Cribbs Causeway AQMA

Background

The Cribbs Causeway AQMA was declared in April 2010 adjacent to the M5 Junction 17 roundabout following a detailed assessment⁷¹. The AQMA was declared on the basis of exceeding distance adjusted results from roadside monitoring sites 80 and 81. Following the declaration, a further assessment of air quality within the AQMA was undertaken. As part of this, a monitoring site (87) was set up at the façade of the single residential property within the AQMA to better represent relevant exposure and the roadside sites (80 and 81) ceased operation.

The Further Assessment Report 2011 concluded the 2010 nitrogen dioxide concentration ($33.0 \mu\text{g}/\text{m}^3$) at site 87 was below the annual mean objective, indicating the AQMA may not be required. As a precaution, the recommendation was made to continue monitoring and review the 2011 results. If these were also below the objective, it might then be appropriate to revoke the AQMA.

The 2011 result ($34.0 \mu\text{g}/\text{m}^3$) also showed the annual mean nitrogen dioxide concentration at site 87 was below the objective. Revocation of the AQMA was proposed in the 2012 Updating and Screening Assessment, however, the Defra appraisal of the report recommended the AQMA be retained pending further monitoring results, as while 2010 and 2011 results were below the objective, pollutant concentrations can vary significantly from one year to another.

The Council accepted the recommendation to retain the AQMA and review further monitoring results. Triplicate diffusion tube monitoring, which is considered to be more robust, was set up at the façade of the single property within the AQMA in 2013.

The precision between the triplicate results from 2013 onwards was checked using the precision and accuracy LAQM spreadsheet tool⁷² and the precision was shown to be good in all years. The results of the triplicate monitoring at site 87 undertaken since 2013 are shown in Table D.1. An overall declining trend in nitrogen dioxide

⁷¹ <https://www.southglos.gov.uk/documents/cos090126.pdf>

⁷² <http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html>

annual mean concentrations can be observed, with the concentrations remaining stable between 2018 and 2019. Works completed at the M5 junction 17 in 2015/16, following Local Pinch Point Funding secured in 2013 to manage the impact of planned development in the Cribbs Causeway/Patchway area and reduce congestion, is likely to have contributed to the significant decrease in concentrations in 2015.

Table D.1 Triplicate Monitoring Results in the Cribbs Causeway AQMA

Site ID	Site Name	NO ₂ Annual Mean Concentration (µg/m ³) ⁽¹⁾						
		2013	2014	2015	2016	2017	2018	2019
87A	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	32.7	34.9	28.4	28.3 ^a	26.6	24.7	25.0
87B	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	32.2	34.3	28.7	29.9 ^a	27.2	25.4	25.6
87C	Cribbs Causeway – Blackhorse Hill Hollywood Cottage façade	32.1	34.3	29.5	29.3 ^a	27.2	25.5	25.4
Triplicate Average		32.3	34.5	28.9	29.1^a	27.0	25.2	25.3

⁽¹⁾ Means for diffusion tubes have been corrected for bias⁷³

^a Annualisation has been conducted where data capture is <75% as per Boxes 7.9 and 7.10 in LAQM.TG16⁷⁴.

Revocation

Since the AQMA declaration in 2010, the monitored nitrogen dioxide concentrations at site 87 have been below the annual mean objective (40 µg/m³) and also the precautionary “borderline” level (36 µg/m³). This demonstrates sustained compliance with the objective where there is relevant exposure within the AQMA.

Revocation of the AQMA was proposed in the 2017 ASR following Defra’s recommendation that revocation should be considered, and Council Cabinet members subsequently approved the revocation in 2018 based on the monitoring evidence. There is a requirement in the Environment Act 1995 to consult on the revocation of an AQMA and a consultation was carried out between 30 January and 20 March 2019.

⁷³ <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

⁷⁴ <https://laqm.defra.gov.uk/technical-guidance/>

The consultation methodology consisted of a dedicated consultation webpage with an online survey and paper survey to download. Letters were sent out to all addresses within a 250 metre buffer zone around the AQMA and information was sent to Town and Parish Councils, South Gloucestershire councillors, local voluntary and community organisations and also to a range of other stakeholders and interested parties. The full consultation methodology is provided in the Consultation Outcome Report on the consultation webpage⁷⁵.

The consultation survey received 34 responses and four emails were also received. Half of the total number of respondents (19 out of 38) were not in favour of revoking the AQMA at Cribbs Causeway, while just under a quarter of respondents (9) supported it, with the remaining respondents either unsure or not stating an opinion. The main reason for objections was the expected future increase in traffic due to planned development in the area and overall concern about air quality. The Consultation Outcome Report contains the full analysis of the consultation survey responses.

Although more respondents objected to the revocation of the AQMA than supported it, the monitoring results provided the fundamental evidence that there was no valid reason to retain the AQMA and that it should therefore be revoked. Sustained compliance with the objective and the precautionary “borderline” level where there was relevant exposure within the AQMA, had been demonstrated for nine years (2010 – 2018) at that point. It is considered very unlikely that nitrogen dioxide concentrations would so significantly increase to cause future exceedances at this location, despite the new development planned in the vicinity and changes such as the removal of the tolls on the Prince of Wales and Severn Bridges.

The Cribbs Causeway AQMA was subsequently formally revoked by a legal order on 22 July 2020 and the revocation order submitted to Defra. It is emphasised that monitoring at this location will remain in place to check the future impact of any changes, including current and future development in the vicinity.

As the nitrogen dioxide concentrations at the residential property within the AQMA have been below the annual average objective since the AQMA was declared, an action plan has not been required.

⁷⁵ https://consultations.southglos.gov.uk/consult/ti/Cribbs_AQMA/consultationHome

Monitoring Review in Staple Hill AQMA

The monitoring site locations in the Staple Hill AQMA were reviewed in 2017, as while the results from the existing monitoring sites can be distance adjusted to the façade using the “Nitrogen dioxide fall off with distance” calculator⁷⁶ where relevant exposure is set back from the site, the calculator provides estimated concentrations and has some uncertainty, so diffusion tubes should ideally be located at relevant receptor façades.

Six additional monitoring sites (160 – 165) were set up at façade to better represent relevant exposure and monitor in the potential worse case locations, where this was possible bearing in mind there are many commercial/retail premises within the AQMA. Existing monitoring sites in similar locations but closer to the roadside, were retained for initial comparison. A map showing the location of the diffusion tube monitoring sites is provided in Figure E.10 (Appendix E).

The 2019 results from the established sites closer to the road, the distance adjusted results for these sites and the newer sites at nearby worse-case façades of relevant exposure are shown in Table D.2 and discussed below.

Site 160 was set up adjacent to a façade of relevant exposure at ground floor to better represent relevant exposure in a worse-case location near the High Street/ Pendennis Road/ Acacia Road crossroads because there is no ground floor relevant exposure at existing site 102 at this junction. While the result for site 160 requires distance adjustment to correct for the small distance the tube is located away from the façade on a lamp post, the result ($29.3 \mu\text{g}/\text{m}^3$) is well below the objective ($40 \mu\text{g}/\text{m}^3$) where there is relevant exposure. The higher concentration at site 102 ($34.3 \mu\text{g}/\text{m}^3$) is likely because the site is located closer to the crossroad junction, however it is still below the borderline level ($36 \mu\text{g}/\text{m}^3$) and there is only relevant exposure at first floor.

On Victoria Street, sites 161 and 162 were set up at façades of relevant exposure in effect to replace site 78 and site 79 respectively, which are closer to the roadside. The monitored concentration at site 161 was $29.1 \mu\text{g}/\text{m}^3$ which compares well to the distance adjusted result of $29.3 \mu\text{g}/\text{m}^3$ for site 78. Site 162 is on the opposite side of the road to site 79 but is located in a worse case location on the side of the road

⁷⁶ <http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>

where traffic can queue up to the Broad Street/ High Street/ Soundwell Road/Victoria Street crossroads. Although not directly comparable as the monitoring sites are on opposite sides of the road, the results for both sites compare reasonably well with a monitoring result of $25.4 \mu\text{g}/\text{m}^3$ at site 162 and the distance adjusted result of $27.7 \mu\text{g}/\text{m}^3$ for site 79, both being well below the objective and borderline level.

Site 163 was set up on the same side of Victoria Street as site 162 at the façade of the property closest to the crossroads in a worse-case location of relevant exposure, because at the closest existing site (61) around the corner on Broad Street, there is no relevant exposure at ground floor or first floor as it is single storey. These are not strictly comparable locations, but it does show that the monitored concentration at site 163 ($26.9 \mu\text{g}/\text{m}^3$) was well below the objective where there is relevant exposure, while at site 61, the concentration on distance adjustment was higher ($34.9 \mu\text{g}/\text{m}^3$) although still below the borderline level and with no relevant exposure.

Site 164 was set up at façade slightly further west along High Street (B4465) than the existing site 75 located closer to the roadside, which pre-2018 consistently exceeded the objective (unadjusted for distance). The monitored concentration at site 164 was $28.2 \mu\text{g}/\text{m}^3$ and compares reasonably to distance adjusted result for site 75 ($31.1 \mu\text{g}/\text{m}^3$), with both being below the borderline level. However site 164 is more representative of where there is likely to be relevant exposure, being at façade, although it should be noted there is no relevant exposure at ground floor level in relation to either site as the premises are commercial/retail premises, but there is first floor relevant exposure at site 164, compared to first floor of an adjoining property set back from site 75.

Site 165 was set up at façade on Soundwell Road within the narrow street canyon section closer to the Broad Street/High Street/Soundwell Road/Victoria Street crossroads than the existing site 73. While there is no ground floor relevant exposure at site 165, there is first floor exposure and also ground floor exposure at the adjoining property, compared to only first floor exposure set back from site 73. The results show the monitoring better represents a worse-case location with a borderline concentration of $39.2 \mu\text{g}/\text{m}^3$ at site 165, compared to the distance adjusted result at site 73 of $31.1 \mu\text{g}/\text{m}^3$ and where concentrations at higher floors would be further reduced.

As discussed in Chapter 3, there were only two sites in 2019 that were borderline at façade within the AQMA; site 165, one of the “new” sites set up at worst-case façade and site 62, an existing site which was (just) borderline ($36.3 \mu\text{g}/\text{m}^3$). However, the annual mean concentrations increased at both of these sites in 2019, with the concentration at site 165 ($39.2 \mu\text{g}/\text{m}^3$) in particular, moving closer to the objective.

While there were no exceedances in the Staple Hill AQMA, Defra advice is that AQMAs should remain in place until several years of data below the borderline level of $36 \mu\text{g}/\text{m}^3$ is collected which can support revocation, as annual mean pollutant concentrations can vary from year to year due to a number of factors, most notably meteorological conditions.

Therefore, monitoring will need to continue and the situation reviewed before revocation of the AQMA can be considered. While existing monitoring sites close to the road were retained for initial comparison purposes, where they have been effectively replaced with new monitoring sites located at worse case facades of relevant exposure, the existing sites were removed at the end of 2019. This ensures the monitoring network remains fit for purpose and allows monitoring to be deployed elsewhere as necessary.

Table D.2 Comparison of Staple Hill AQMA monitoring sites at roadside and façade of the nearest receptors

Site No.	Site Name (Existing Sites close to roadside)	Annual mean concentrations 2019 ($\mu\text{g}/\text{m}^3$) adjusted for bias	Adjusted to façade ($\mu\text{g}/\text{m}^3$)	Site No. (comparison new site at façade)	Site Name	Annual mean concentrations 2019 ($\mu\text{g}/\text{m}^3$) adjusted for bias	Adjusted to façade ($\mu\text{g}/\text{m}^3$)
61	Staple Hill Crossroads – 1 Broad Street William Hill	36.6	34.9	163	Staple Hill - 2 Victoria Street (façade)	26.9	-
73	Staple Hill – 11 Soundwell Road Starlight	36.0	31.1	165	Staple Hill - 3 Soundwell Rd Chinese Kitchen (façade)	39.2	-
75	Staple Hill – 118 High Street Lloyd Bottoms/Eclipse Sewing	38.0	31.1	164	Staple Hill - 102 High Street Charlie & Co Barbers (façade)	28.2	-
78	Staple Hill – 9-11 Victoria Street	35.1	29.3	161	Staple Hill - 13 Victoria Street (façade)	29.1	-
79	Staple Hill - 27-29 Victoria Street	32.3	27.7	162	Staple Hill - 28 Victoria Street (façade)	25.4	-
102	Staple Hill - 58 High Street CBS Consultants (TL adj to façade)	34.3	-	160	Staple Hill - 62 High Street lp10 adjacent to façade	30.0	29.3

Notes:

Exceedances of the NO₂ annual mean objective of 40 $\mu\text{g}/\text{m}^3$ are show in **bold**

Borderline results within 10% of NO₂ annual mean objective (>36 $\mu\text{g}/\text{m}^3$) are shown in *italics*

Appendix E: Maps of Monitoring Locations and Air Quality Management Areas

Maps of Current Air Quality Management Areas

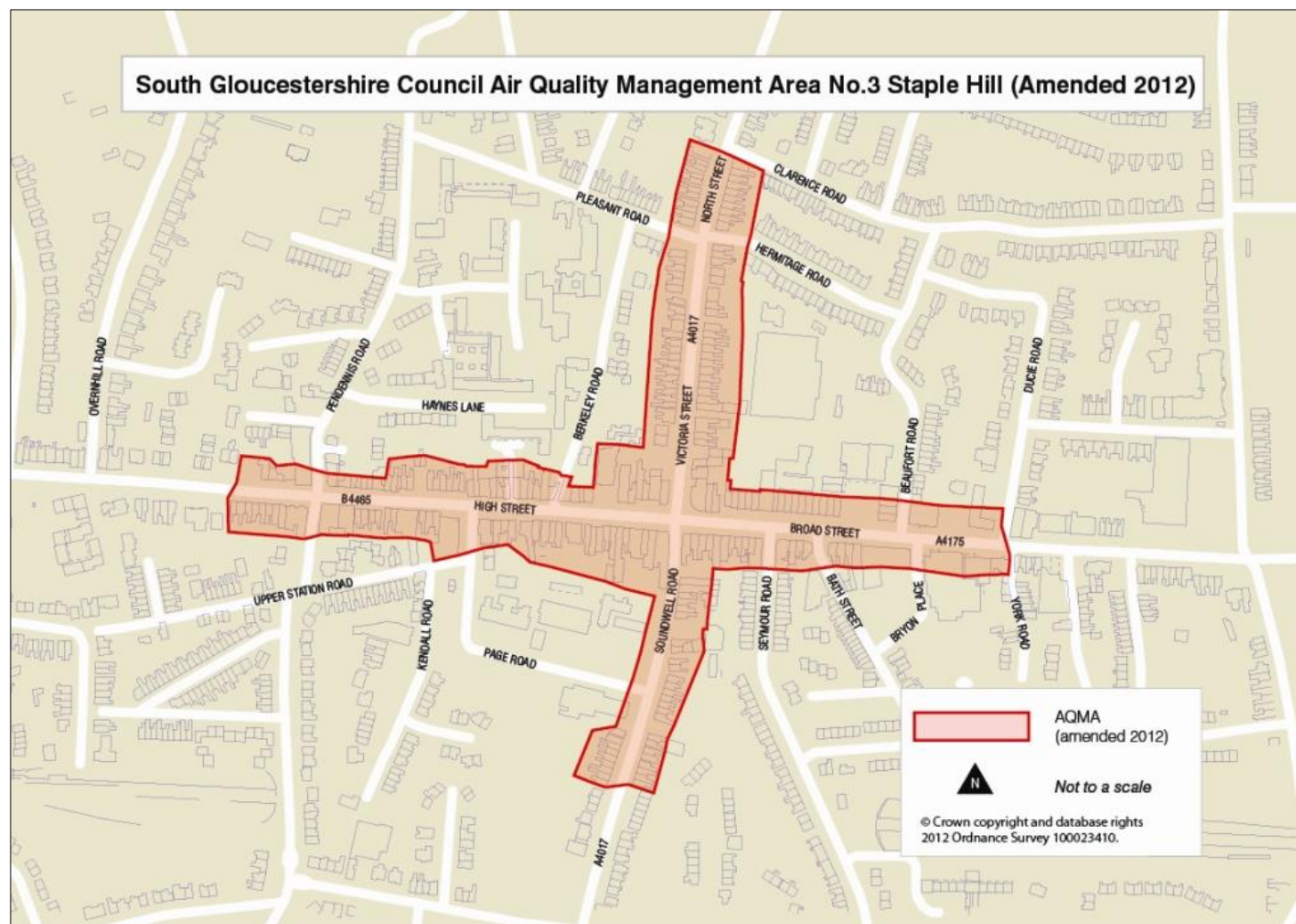


Figure E.1 Staple Hill AQMA (Amended 2012)

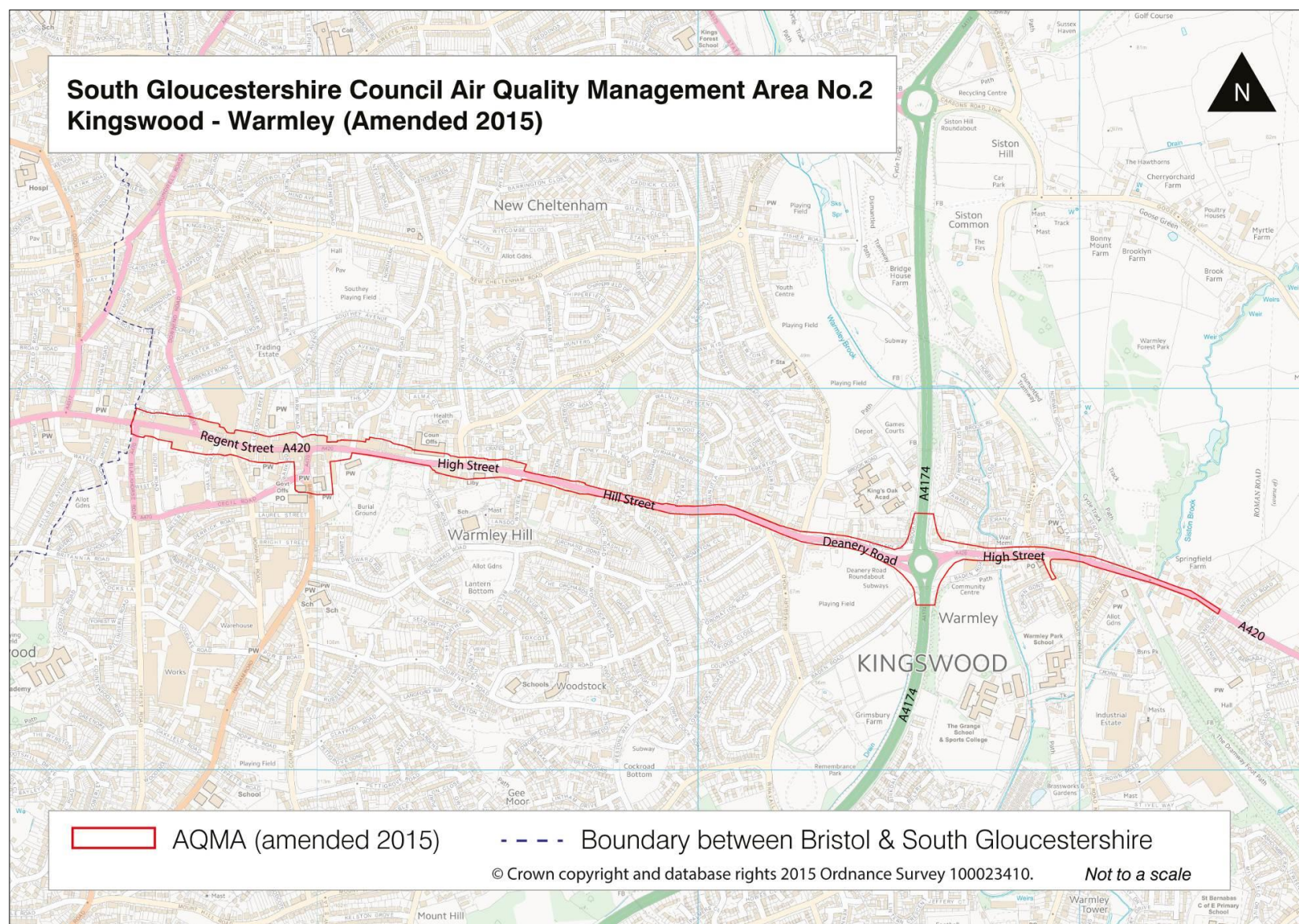


Figure E.2 Kingswood – Warmley AQMA (Amended 2015)

Map of Air Quality Management Area Revoked in 2020

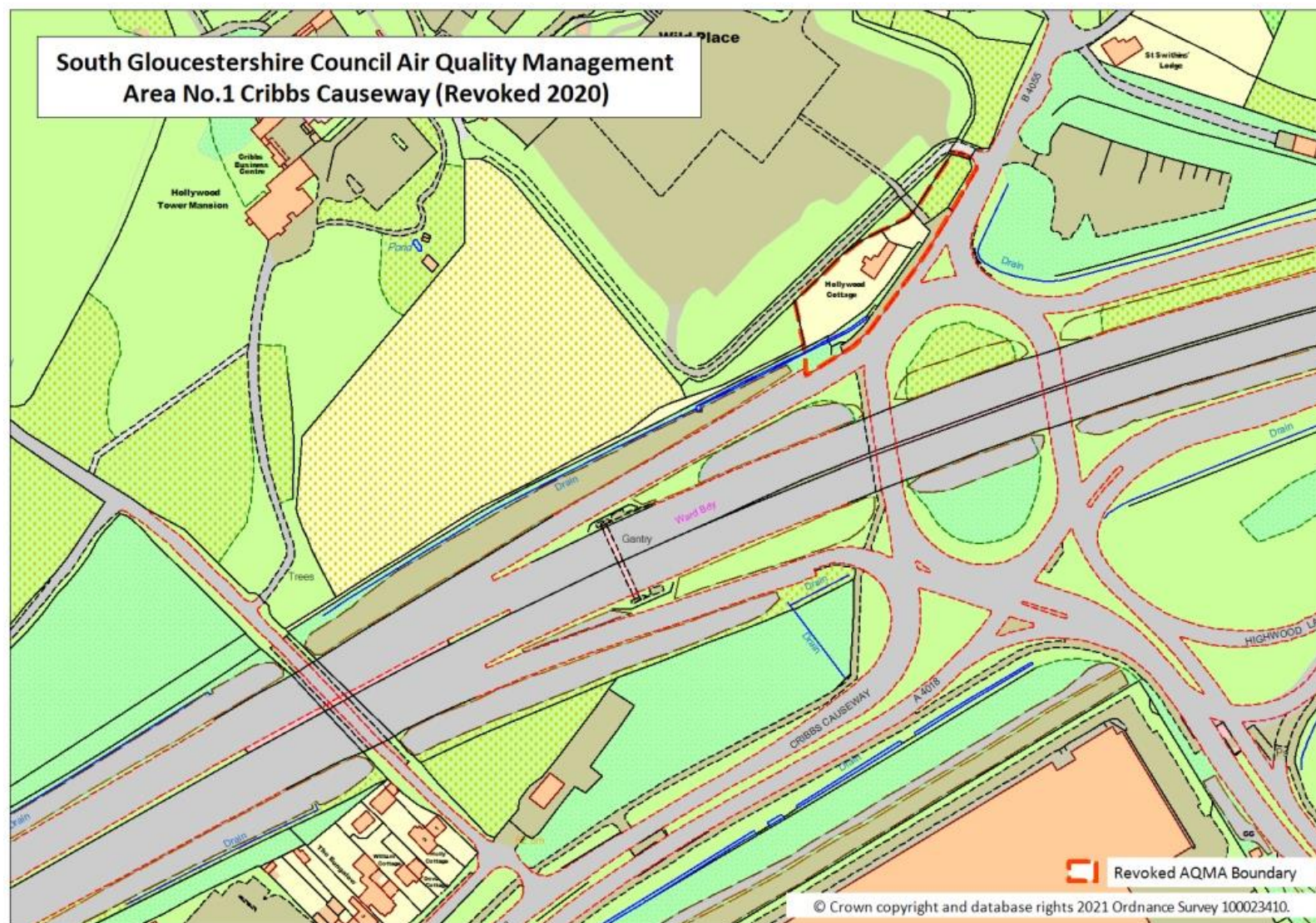


Figure E.3 Cribbs Causeway AQMA (Revoked 2020)

Maps of Monitoring Locations

Maps of Automatic Monitoring Site

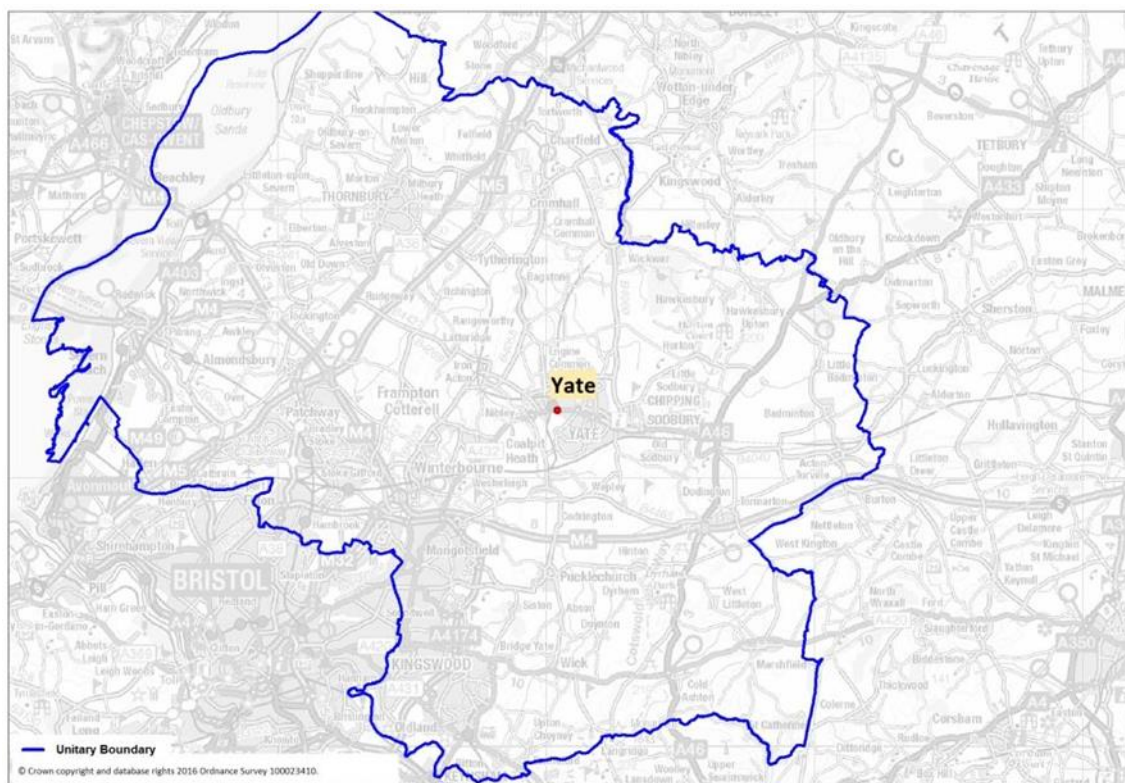


Figure E.4 Automatic Monitoring Site in South Gloucestershire – Yate

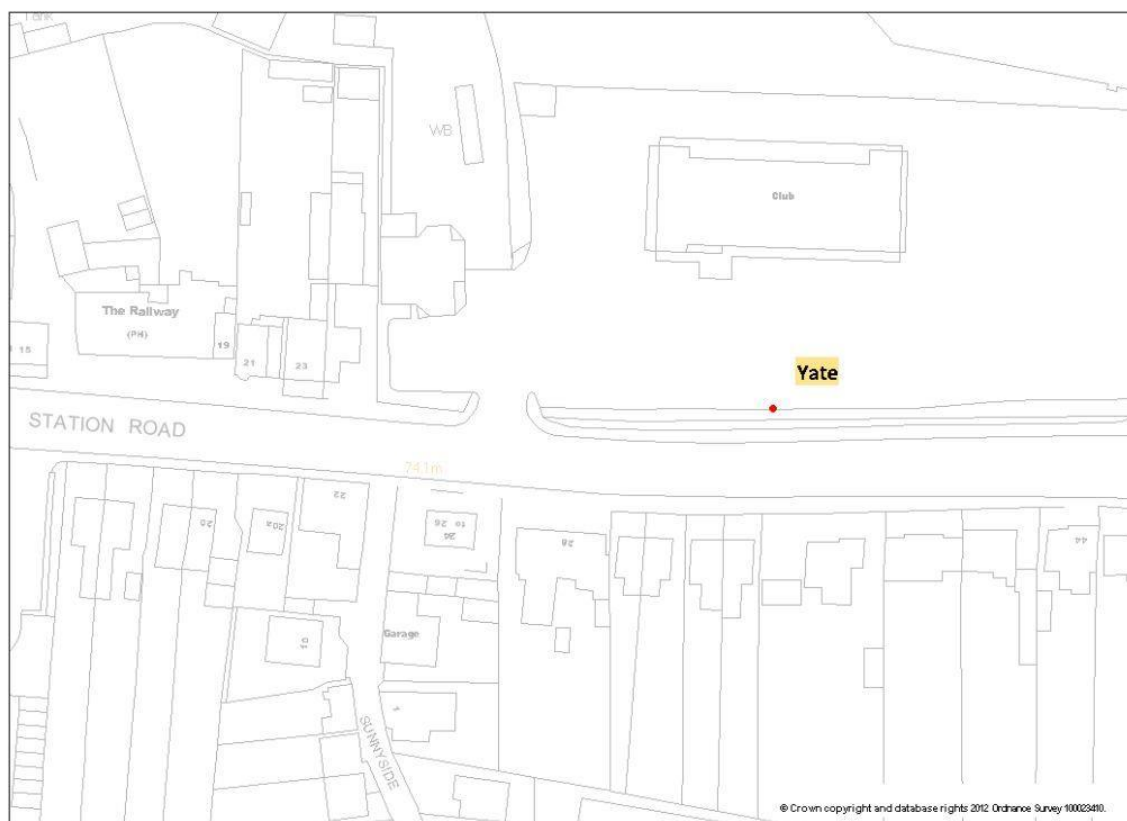
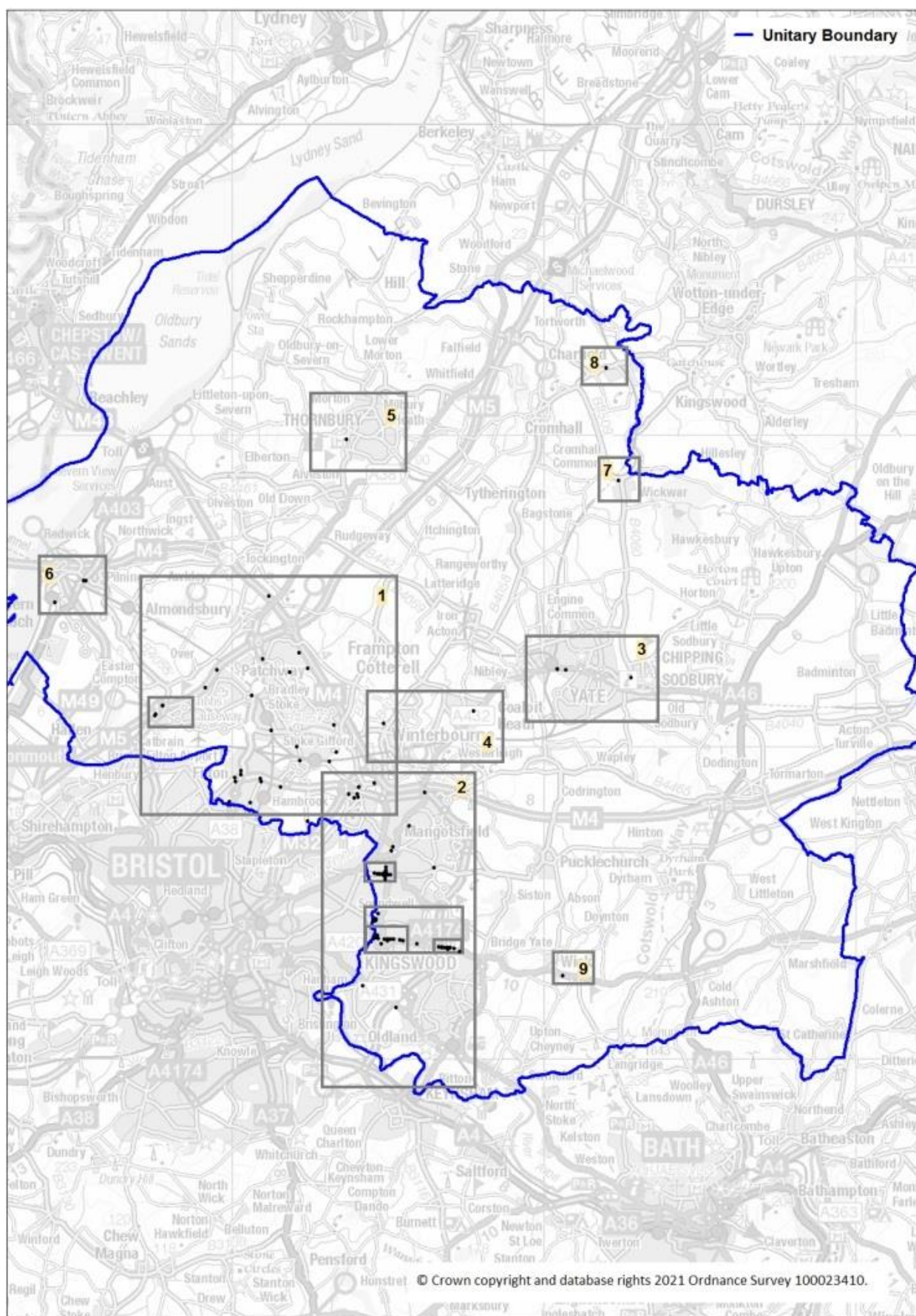


Figure E.5 Automatic Monitoring Site Yate - Station Road

Maps of Diffusion Tube Monitoring Sites



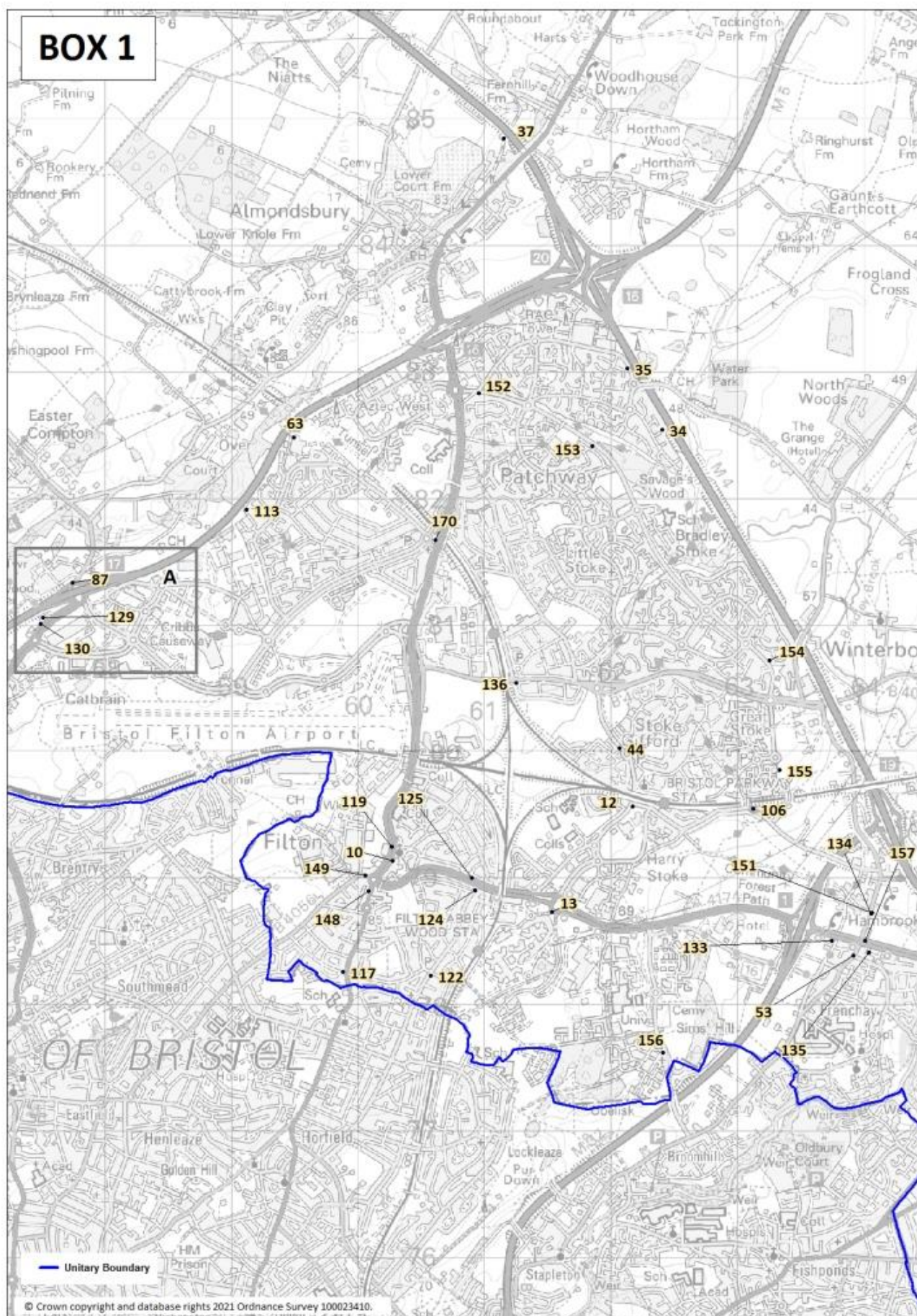


Figure E.7 Diffusion Tube Sites in Bristol North (Box 1 Figure E.6)

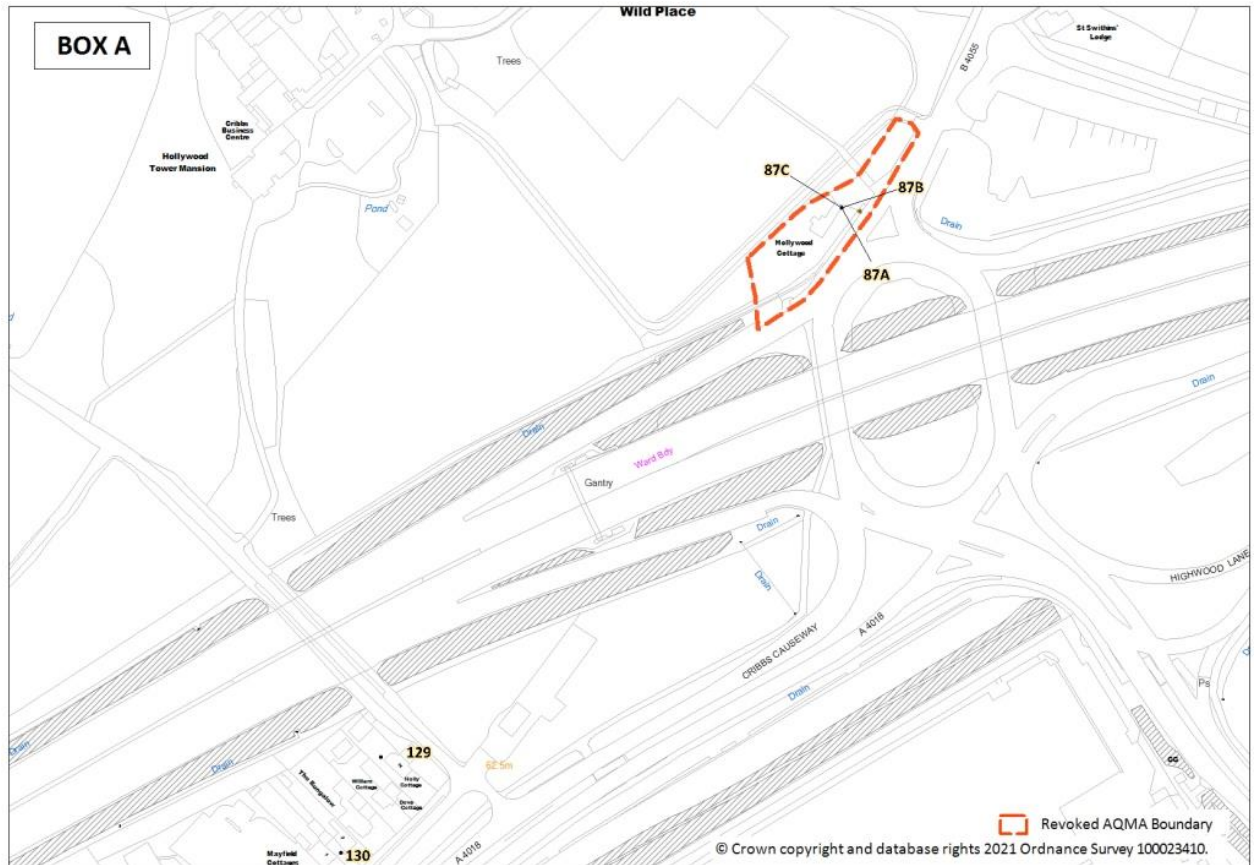


Figure E.8 Diffusion Tube Sites in Cribbs Causeway (Box A Figure E.7)

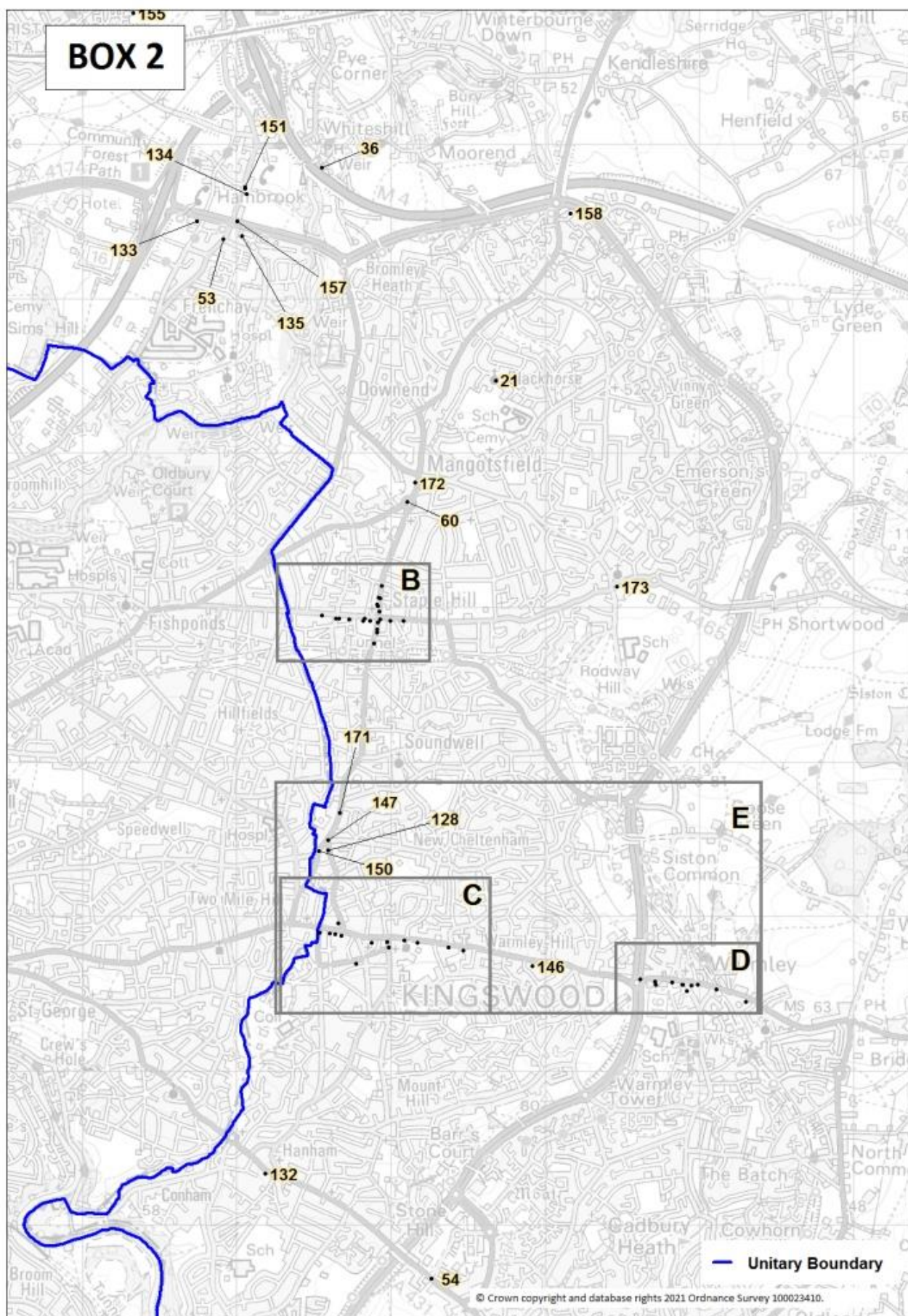


Figure E.9 Diffusion Tube Sites in Bristol East (Box 2 Figure E.6)

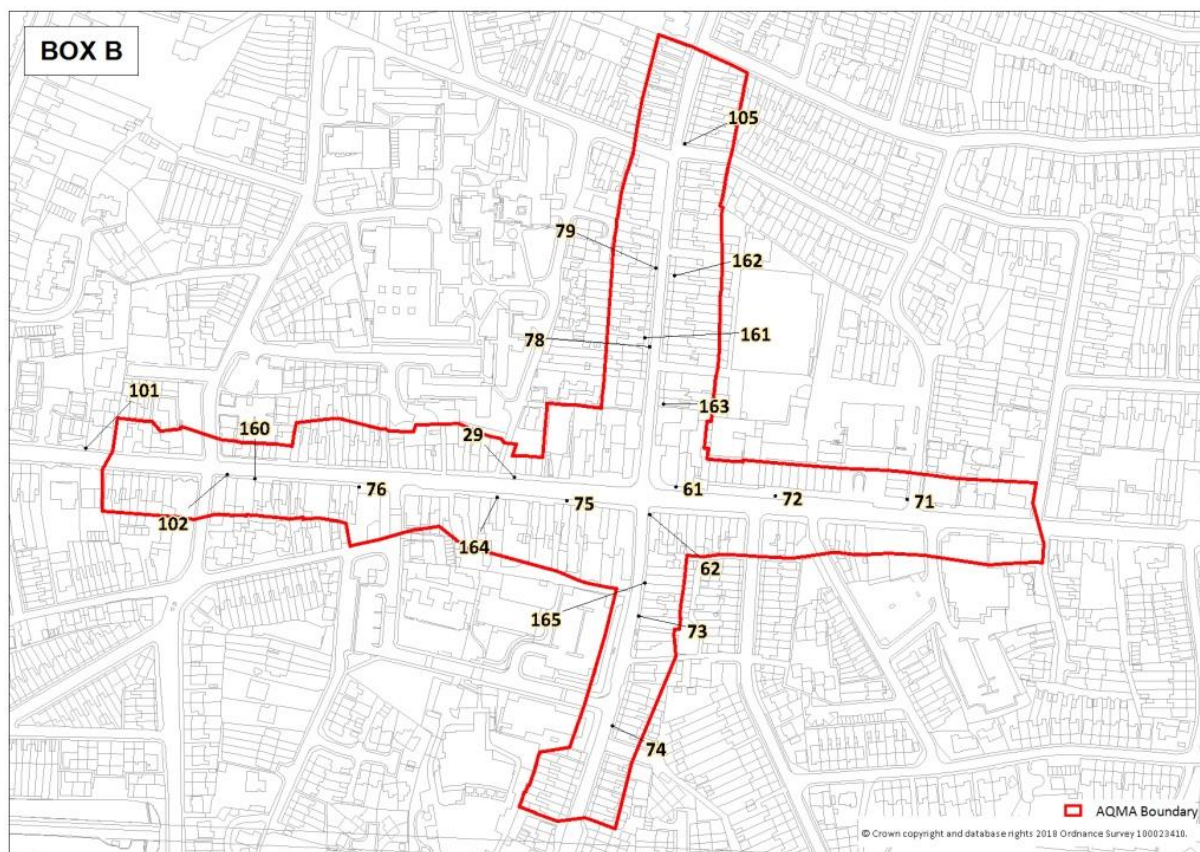


Figure E.10 Diffusion Tube Sites in Staple Hill (Box B Figure E.9)

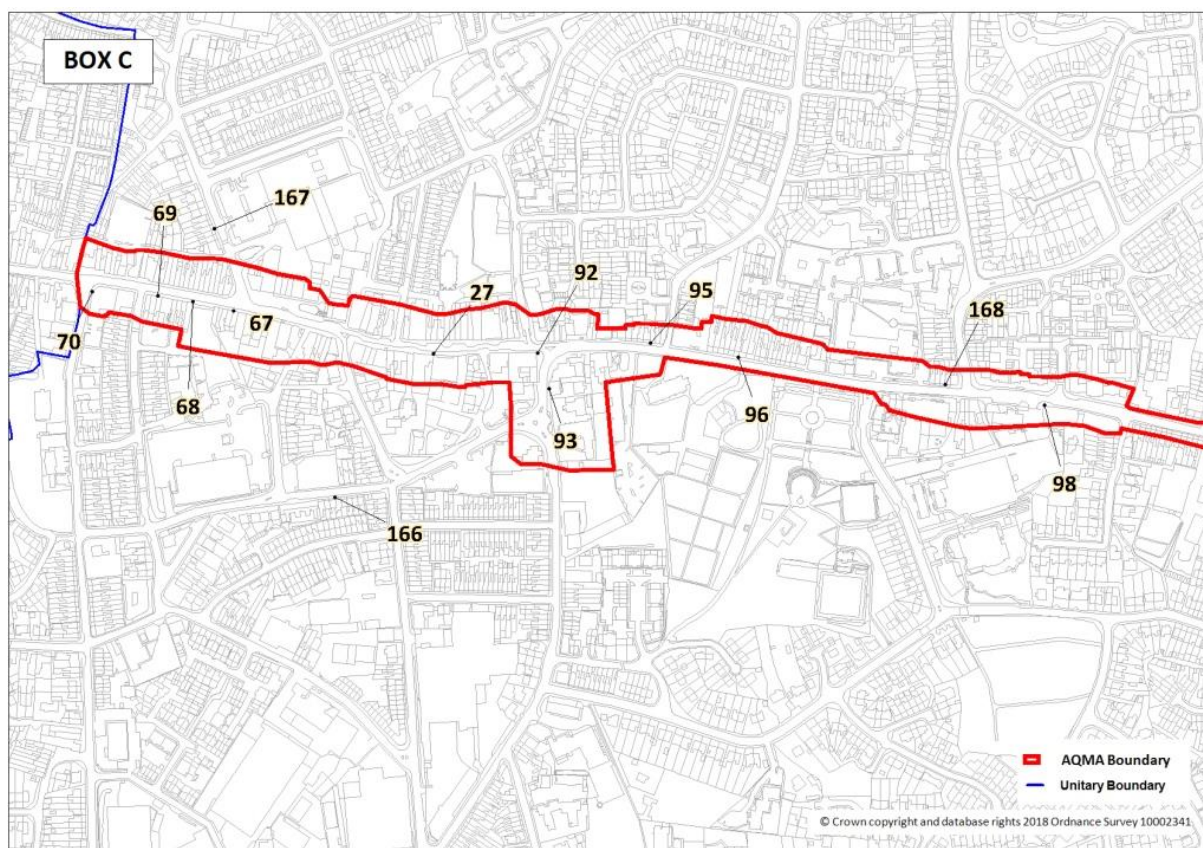


Figure E.11 Diffusion Tube Sites in Kingswood (Box C Figure E.9)

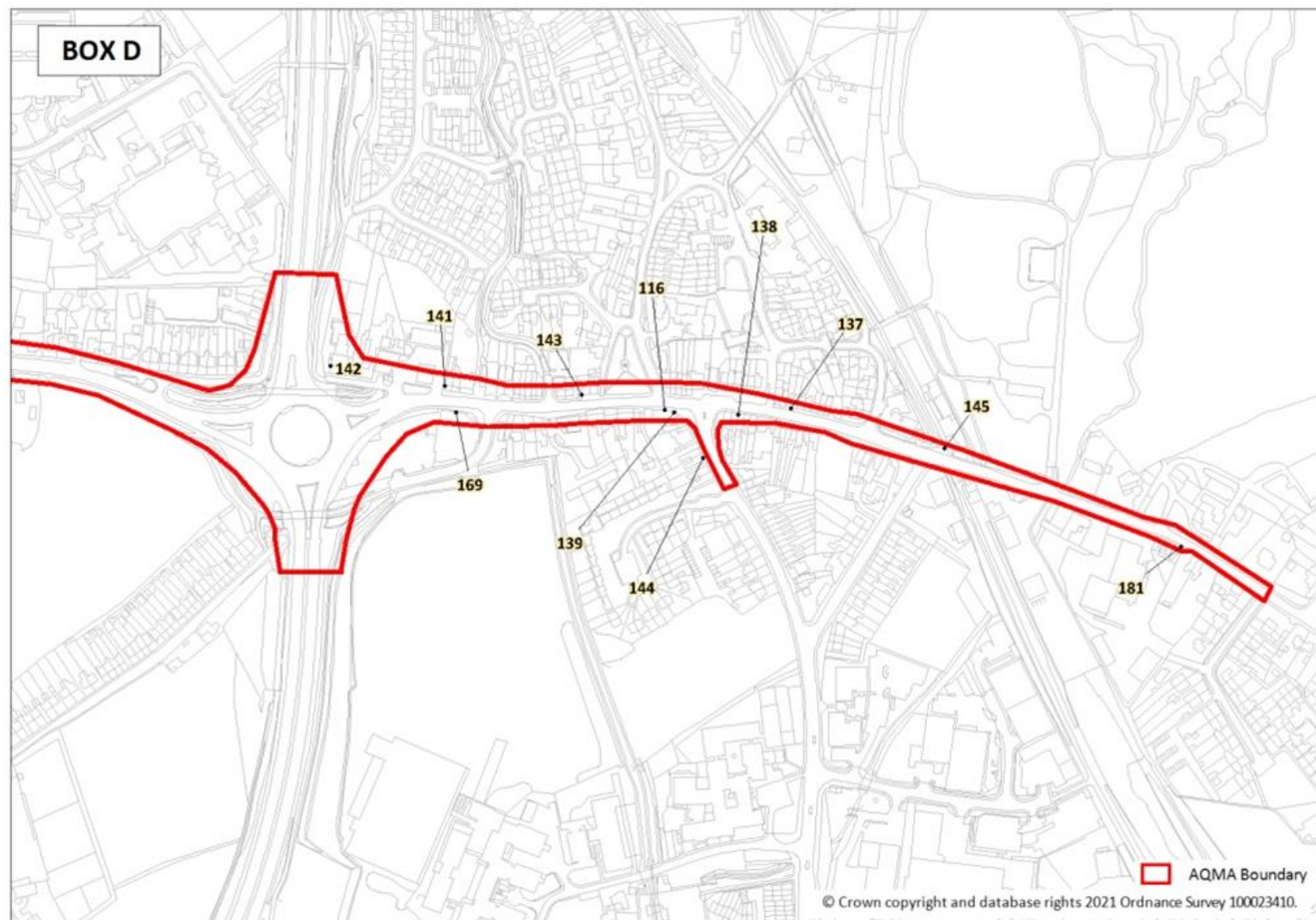


Figure E.12 Diffusion Tube Sites in Warmley (Box D Figure E.9)

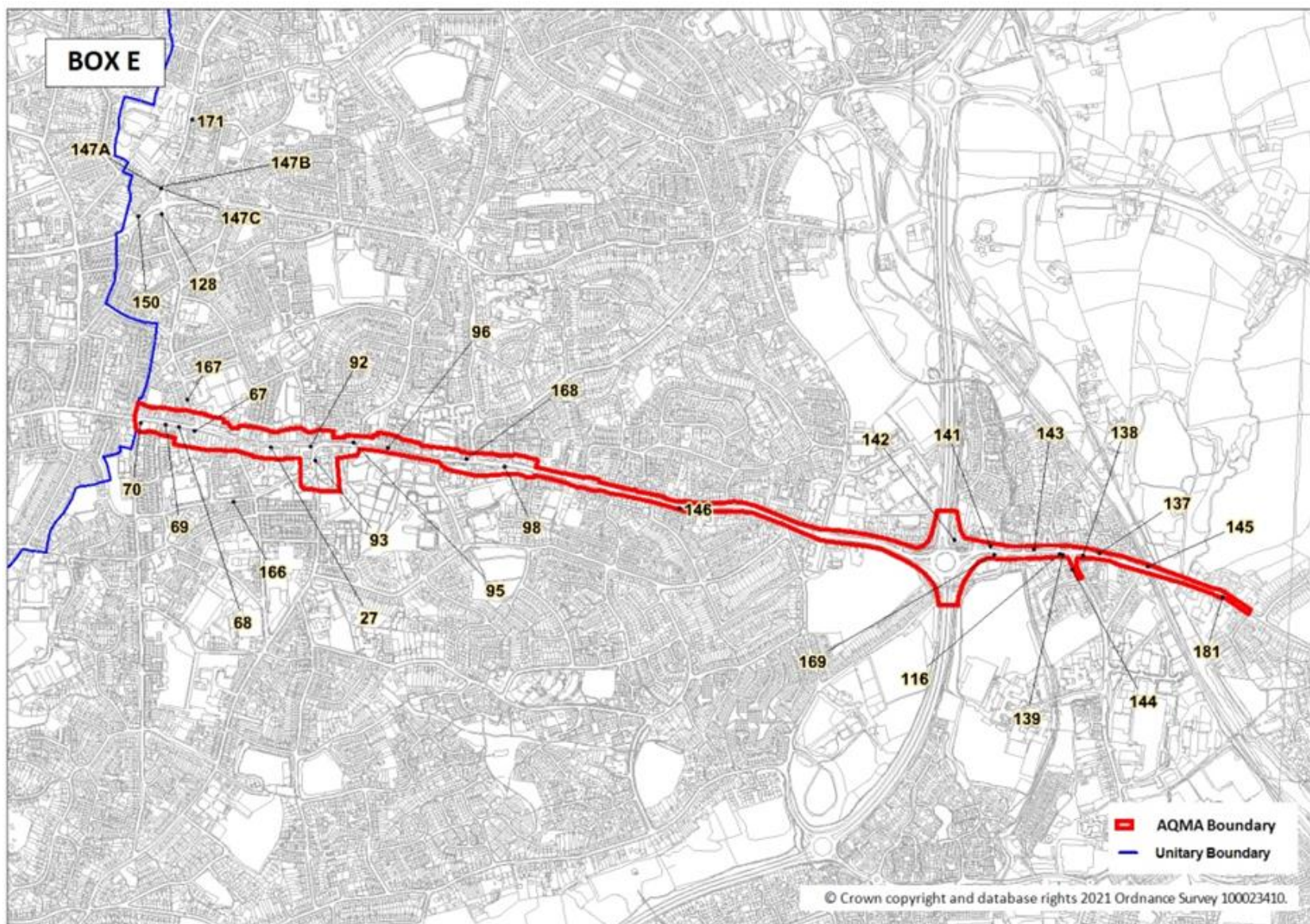


Figure E.13 Diffusion Tube Sites in Kingswood & Warmley (Box E Figure E.9)



Figure E.14 Diffusion Tube Sites in Yate and Chipping Sodbury (Box 3 Figure E.6)



Figure E.15 Diffusion Tube Sites in Winterbourne & Coalpit Heath (Box 4 Figure E.6)



Figure E.16 Diffusion Tube Site in Thornbury (Box 5 Figure E.6)

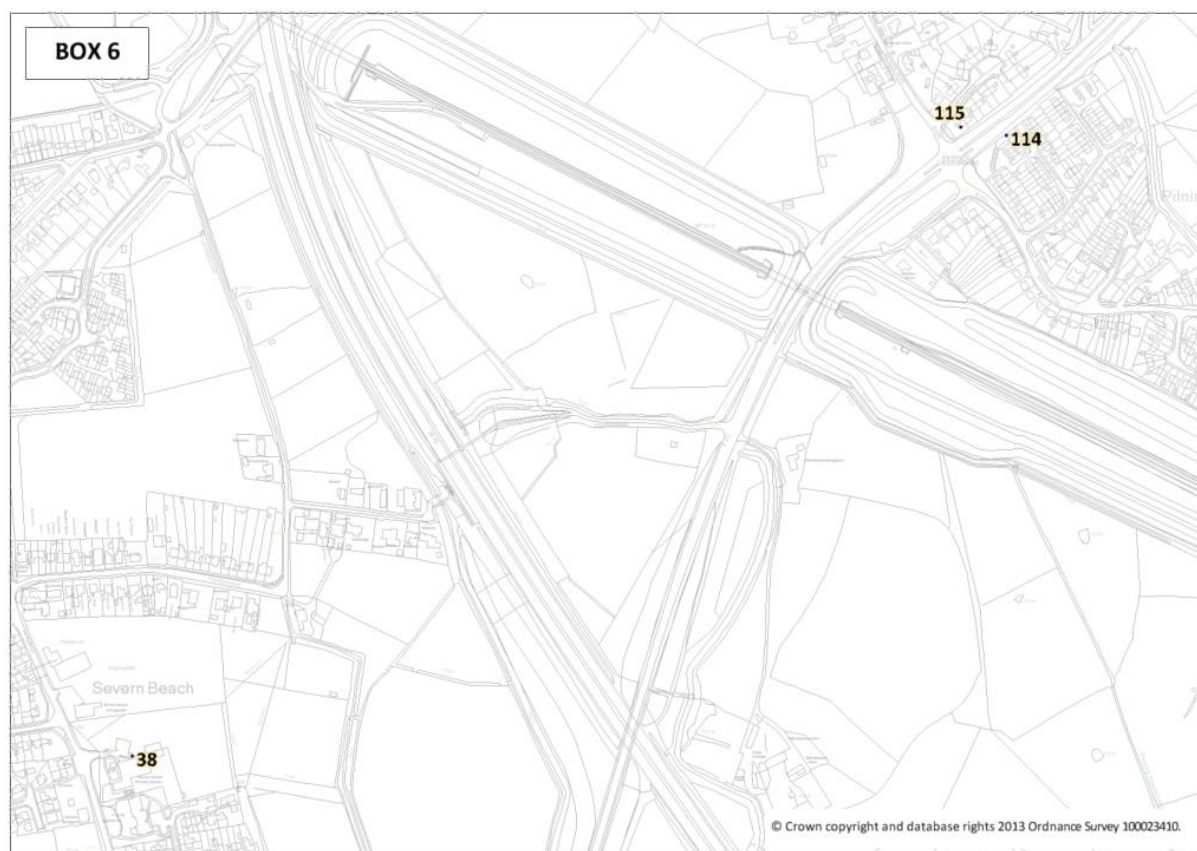


Figure E.17 Diffusion Tube Sites in Severn Beach and Pilning (Box 6 Figure E.6)

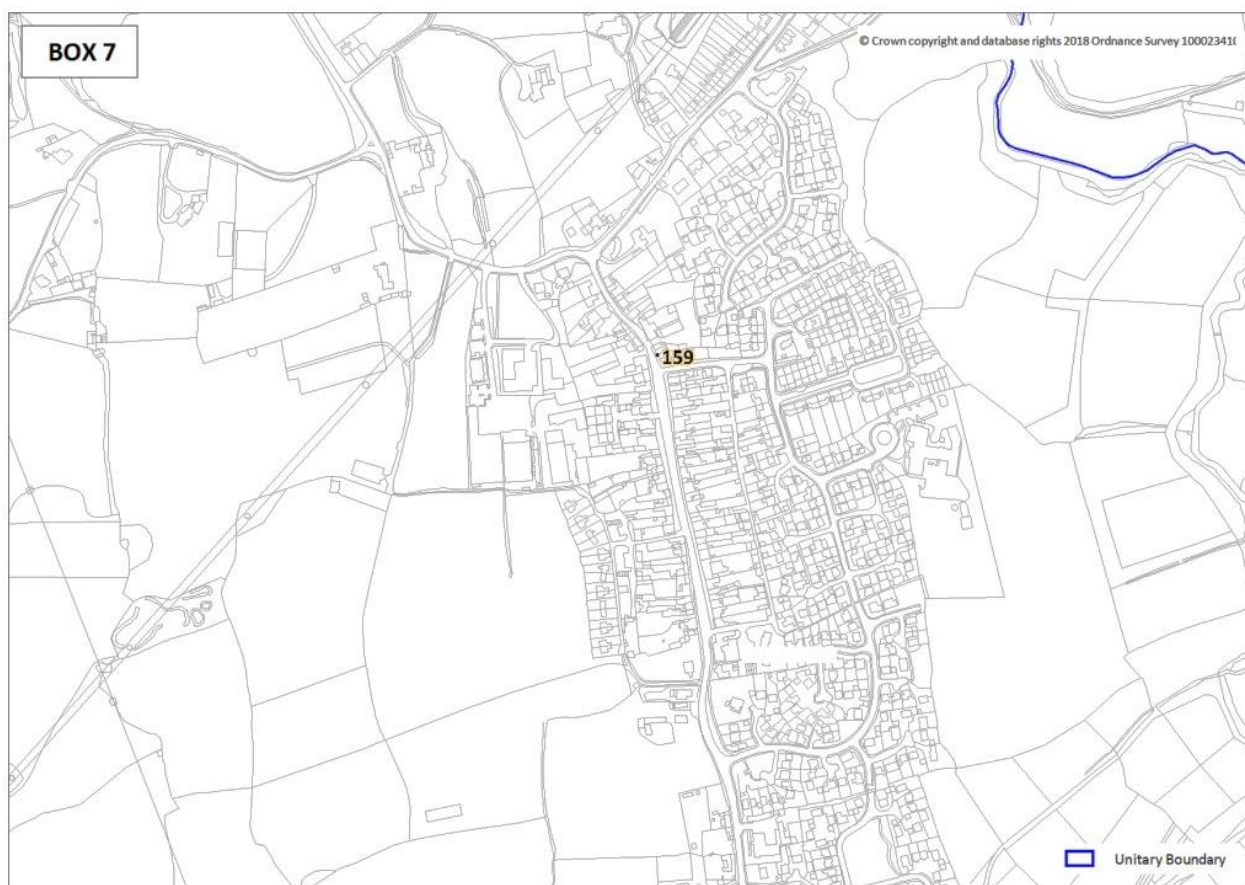


Figure E.18 Diffusion Tube Site in Wickwar (Box 7 Figure E.6)



Figure E.19 Diffusion Tube Site in Charfield (Box 8 Figure E.6)



Figure E.20 Diffusion Tube Site in Wick (Box 9 Figure E.6)

Appendix F: Summary of Air Quality Objectives in England

Table F.1 Air Quality Objectives in England

Pollutant	Air Quality Objective ⁷⁷	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁷⁷ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
AURN	Automatic Urban and Rural Network – a national automatic monitoring network
BAM	Beta Attenuation Monitor (for PM ₁₀ measurement)
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
Exceedance	A period of time where the concentration of a pollutant is greater than the appropriate air quality objective
JLTP	Joint Local Transport Plan
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SGC	South Gloucestershire Council
WoE	West of England Authorities (Bath & North East Somerset, Bristol City Council, North Somerset and South Gloucestershire Council)
µg/m ³	Microgrammes per cubic metre

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