



2021 Air Quality Annual Status Report (ASR)

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

Date: June 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Swindon Borough

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

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Swindon monitors air quality through a network of 42 diffusion tubes at 38 locations across the Borough.

Air Quality in Swindon is generally good, and in 2020; all areas of the Borough met all legal objectives for pollutants in air, including within the Air Quality Management Area on Kingshill Road. The disruption arising from the Covid-19 pandemic has significantly reduced traffic flows across the Borough however, and so this past year is not representative for Nitrogen Dioxide (NO₂), which is our main pollutant of concern. It is expected to be shown as an outlier year in due course.

Within the Kingshill Road Air Quality Management Area, as elsewhere, annual traffic flows were reduced by 20% through 2020, and measured NO₂ levels improved substantially as a result. Roadside NO₂ levels at all monitoring sites improved by between 8 and 28% in 2020, and the average improvement across all sites between 2019 and 2020 was 19%.

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

³ Defra. Air quality appraisal: damage cost guidance, July 2020

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

The highest annual average exposure to NO₂ in Swindon in 2020 was 36.4µg/m³ at S15, on Kingshill Road. This site was the only site in Swindon within 10% of the annual average objective limit for 2020. It must be noted again however, that 2020 will be an outlier year, and so we expect roadside monitoring results to increase again in 2021 and to return to the previous trend of gradual improvement, but from a higher base than in 2020.

Prior to 2020; the average measured roadside NO₂ level fell by around 11% between 2016 and 2019, and we expect that slowly improving trend to continue once a new base is established.

Work to bring NO₂ levels sustainably within objective limits inside the Air Quality Management Area has continued, though at a slower pace than we would have liked due to the disruption of the Covid-19 pandemic.

Actions to Improve Air Quality

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

The 2019 Clean Air Strategy⁵ sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero⁶ sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs), as in Swindon, are designated due to elevated concentrations heavily influenced by transport emissions.

In the past year, Swindon Borough Council has understandably dedicated large portions of its energy and resources to dealing with the Covid-19 pandemic, but progress has mostly been maintained in moving the Air Quality Action Plan measures for Kingshill Road forward. This is especially so with the principal measure, the Traffic Regulation Order, which has been our focus. The first and most complex phase of this work has very recently completed. Potential alternative routes have been identified, and signage and

⁵ Defra. Clean Air Strategy, 2019

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

funding estimates prepared, and these are being considered by the Council's Highways team prior to beginning consultation phases this Summer.

Those measures which have been delayed are the business and public outreach based measures, as it has not been possible to run effective outreach campaigns during the pandemic. Those measures will restart as normality returns in 2021/22. Also, now that traffic levels are returning to more normal levels, we will commission an Automatic Number Plate Recognition (ANPR) and emissions survey on Kingshill Road to inform future actions and refine forecasts for improvements. Funding has been allocated for this.

As Swindon begins to recover from the pandemic, more attention is now also being given to fine particulate matter (PM2.5) pollution locally, and to the connected climate change agenda. Work is committed to try to quantify the current level of solid fuel burning in the Borough, and to effectively enforce the newly introduced restrictions on the sale of unseasoned wood and the most polluting fuels.

Swindon has always been thought to have low levels of solid fuel burning, but the rise in popularity of solid fuel burners in recent years, and the contribution these can make to local PM2.5 emissions, means that we now need to look at this again. We await the new Environment Act, which is currently in the House of Lords, for new powers or duties around this.

Conclusions and Priorities

Air quality in Swindon in 2020 was generally good.

- No exceedances were identified in Swindon in 2020.
- The disruption wrought by the Covid-19 pandemic, the reduced traffic and economic activity levels, have led to a substantial (but likely transient) improvement in NO₂ levels across the Borough.
- Notwithstanding the improvements seen, and the single year of compliant NO₂ levels within the Kingshill Road AQMA, we expect a return to the previous trend once normality returns. No immediate amendments to the AQMA are proposed as a result.
- Swindon is a growth town, and there are a number of large expansion areas subject to intense current and proposed development. We will continue to monitor pollution levels as the town adjusts to this change, but at present; no new hotspots are emerging or expected.

The Kingshill Draft Air Quality Action Plan remains relevant and there are no immediate plans to amend or update it. The output from the planned ANPR and emissions survey, and ongoing monitoring, will inform ongoing development of the plan.

Local Engagement and How to get Involved

The Council's Air Quality Steering Group, which reports to the Chief Executive, works to identify measures to improve air quality at Kingshill, and has produced an Air Quality Action Plan setting out the means by which exceedance of Nitrogen Dioxide objectives can be remedied. The terms of reference for the Steering Group also include for the monitoring and protection of air quality across the Borough, and not just in the Management Area, although this will be its major focus initially.

The Council encourages the reduction of private vehicle use, reducing the number of motor powered vehicles and sources of airborne emissions (oxides of nitrogen, particulate matter, VOC etc.), contributing to improvements in air quality in the area. Various Council initiatives promote healthy life choices by encouraging local residents to walk, cycle, or use public transport whenever possible.

One of the Council's partnership initiatives (with British Cycling) includes free guided bike rides around various areas of Swindon which introduces easy and comfortable routes connecting different locations, and safe and pleasant journeys around the Borough. Completing shorter journeys by cycle reduces the use of private motor powered vehicles and can positively affect local air quality. Further information may be found here: www.letsride.co.uk. This initiative has recently restarted with the relaxation of Covid-19 restrictions.

Some other measures and initiatives are listed below, described in section 2.2 and summarised in Table 2.2.

- The Council operates the Swindon Travel Choices website, which aims to help individuals plan journeys via walking, cycling or public transport. See this link: <http://www.swindontravelchoices.co.uk/>
- Promoting Low Emission Transport – The Council's Plan ("Vision for Swindon, How are we going to get there? Plan 2016-2020") has been published that sets out its vision for Swindon and the priorities it is trying to achieve for residents and the borough of Swindon. It gives details of the pledges made on how it will achieve the

vision. Priority 1 of the Vision for Swindon commits the Council to “encourage the increased take-up of low-emission vehicles”.

- Immediately prior to the writing of this report; Swindon launched its [‘Be The Change’](#) campaign. Targeted principally at carbon emissions, climate change and the drive to ‘nett zero’, there are however many crossovers with air pollution. The campaign seeks to change everyone’s behaviour around consumption, and particularly around fossil fuel use; including home energy use and active travel.

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1 Local Air Quality Management

This report provides an overview of air quality in Swindon Borough Council during 2020. 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 Swindon Borough Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

Air Quality Management Areas

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

A summary of AQMAs declared by Swindon Borough Council can be found in Table 2.1. The table presents a description of the single AQMA that is currently designated within Swindon. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of the Kingshill AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO₂ annual mean

Nitrogen Dioxide levels improved substantially within the AQMA during 2020, but this was due to the extraordinary disruption caused by the Covid-19 pandemic. We do not propose to amend the AQMA until more is known of the long-term effects of the pandemic.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Kingshill	06.02.2018	NO2 Annual Mean	An area encompassing 14 properties on Kingshill Road west of the junction of Clifton Road	NO	56µg/m3	N/A (36.4 µg/m3)	DRAFT Air Quality Action Plan, March 2019	http://ww5.swindon.gov.uk/moderngov/documents/s107997/DRAFT%20Air%20Quality%20Action%20Plan%20Final.pdf

- Swindon Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date.
- Swindon Borough Council confirm that all current AQAPs have been submitted to Defra.

Progress and Impact of Measures to address Air Quality in Swindon.

Swindon Borough Council has taken forward a number of direct measures during the 2020 reporting year in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Nineteen measures are included within Table 2.2, with the type of measure and the progress Swindon Borough Council have made during the 2020 reporting year presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans. Key completed measures are:

- Amendment of Taxi and Hackney Carriage Licensing Policy to green the fleet over the Action Plan period.
- Review of a number of key Planning and Transport Policies.
- Phase One of the Traffic Regulation Order to impose a weight limit on Kingshill Road; with alternative routes and costings identified and assessed.
- Commissioning of an Automatic Number Plate Recognition and emissions survey of Kingshill Road, for completion in Summer 2021.

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

- Implementation of the weight limit on Kingshill Road.
 - This is our flagship measure and is expected to reduce road emissions by around 10%. This estimate will be refined by the ANPR and emissions survey this year.
- Completion of the ANPR and emissions survey.
 - This will inform emissions reduction estimates in the Action Plan, and enable the Plan to move to its final version.
- Engagement with business around staff travel plans and ways of working is expected to relaunch this year as conditions return to normal.
 - We know that many businesses are reviewing staff accommodation and travel arrangements following the pandemic, and this is likely to lead to reduced travel and office based working.

- Engagement with the public is also expected to relaunch this year as we move into recovery from the pandemic.
- As the Council's fleet is renewed; we expect the number of alternative fuelled Council vehicles, and the provision of depot charging points to increase.

Swindon Borough Council's priorities for the coming year are:

- To implement the Traffic Regulation Order on Kingshill Road. This will have important air quality and amenity benefits for local residents, and the most complex work to prepare for this has now been completed.
- To complete the ANPR and emissions survey to inform measures development, and to then submit the final Action Plan for review.
- To seek funding for currently unfunded measures to enable them to progress further, such as:
 - Old Town Railway Cycle Path upgrades.
 - Physical Implementation of the TRO on Kingshill.
- To step up engagement with business and residents to drive behaviour change, increase active travel, and so improve air quality across the town.
 - The Council's recently launched 'Be The Change' campaign around climate change is one example of this, and will drive improvements in air quality together with climate change.

The principal challenges and barriers to implementation that Swindon Borough Council anticipates facing are

- Continuing funding limitations
- Continuing disruption through the remainder of the pandemic, and the recovery phase; both to resourcing and prioritisation of air quality issues by business and the public.

Progress on all measures has been slower than expected to date; firstly as a result of funding limitations, and then as an unavoidable result of the Covid-19 pandemic which has, quite rightly, been the priority through 2020.

Swindon Borough Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in the Kingshill Air Quality Management Area by 2024. The disruption to travel and economic activity from Covid-19 has led to much reduced NO₂ levels and brought levels into compliance this year, but this will clearly be an outlier. It remains unknown what long term effects the disruption will have, and how it will change ongoing

travel behaviours. At this stage it seems likely that fewer people will travel for work after 2020, and that the downward trend in NO₂ levels we have seen in recent years may continue, or even accelerate; including on Kingshill Road.

At this stage it is not clear that the already identified Action Plan measures will be sufficient to bring the Management Area into long term compliance. We expect this to become clearer through the 2021 and 2022 monitoring years. The impact of the TRO and other measures, along with the ANPR and emissions study will inform the need for and nature of any future measures.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Seek to Implement Restrictions (Traffic Regulation Order) on Kingshill Road for certain vehicle classes.	Traffic Management	UTC, Congestion management, traffic reduction	2019	2021	Highways, Local Authority, Local Authority Transport,	Highways	NO	Partially Funded	£100k - £500k	Implementation	3.6µg	12% reduction in road NO2	Consultation with Highway Authority. Modelling of impacts of further restrictions. Stakeholder consultation and firm proposal being drafted.	Source apportionment shows that Heavy Vehicles make up less than 1.5% of the road users on this road, yet produce over 12% of the emissions. Removing this category of vehicles can be achieved through a weight restriction on the road
2	Upgrade the Old Town Railway cycle path and connect it to existing paths.	Transport Planning and Infrastructure	Cycle network	2019	2023	Highways, Local Authority, Local Authority Transport,	Highways	NO	Partially Funded	£500k - £1 million	Implementation	0.5µg	A surfaced and useable route from Wichelstowe to Old Town	Drainage and some surfacing works completed. Seeking additional funding to progress.	The Old Town Railway cycle path could provide an attractive alternative route into and out of Old Town, especially for Wichelstowe residents, and those in West Swindon.
3	Improve emissions from Private Hire and Hackney Carriages through the licensing regime.	Promoting Low Emission Transport	Taxi Licensing conditions	2019	2020	Local Authority - Licensing	Licensing	NO	Funded	< £10k	Completed	0.5µg	All Private Hire at least Euro 6 by 2024. All Hackney Carriages Euro 6, EV, or alternative fuel by 2024.	Policy now in place. Phased implementation with age of vehicles.	1000 Licensed Private Hire, and 104 licensed Hackney Carriages in Swindon. Private Hire may be first licensed at no more than 5 years old, and may not be licensed after 10 years of age. Hackney Carriages may be licensed up to 15 years old. There are no current conditions around cleaner propulsion Cost: Normal Business

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
4	Investigate options for the installation of 'nudge' signage on approaches to the AQMA; to divert traffic and encourage good driver behaviour.	Public Information	Via other mechanisms	2019	2024	Highways, Public Health	Highways, Public Health	NO	Not Funded	£50k - £100k	Planning	0.5µg	Reduction in road vehicles using Kingshill Road, and reduced emissions	Seeking funding opportunities	Seeking to encourage drivers to use alternative routes where practicable, and to drive appropriately in the AQMA.
5	Promote active travel (walking, cycling and public transport) through travel plans and the Swindon Travel Choices campaign.	Promoting Travel Alternatives	Encourage / Facilitate home-working	2019	2024	Highways	Highways	NO	Not Funded	£10k - 50k	Planning	1.0µg	Greening of company vehicle fleets Reduction in business miles	Campaign planned, but stalled by Covid-19.	Active modes of transport are part of the Town Centre plan and the Swindon Transport Strategy Travel Plan Officer actively engages schools, communities and workplaces, particularly for new developments. Promote Swindon Travel Choices for active journey planning http://www.swindontravelchoices.co.uk/ Cost: Normal Business
6	Support and collaborate with local bus companies to minimise emissions and maximise usability of the bus network in Swindon, including their vehicle fleet renewal plans.	Alternatives to private vehicle use	Bus based Park & Ride	2019	2024	Bus companies Planning Public Health	Bus companies Planning Public Health	NO	Not Funded	£1 million - £10 million	Planning	0.1µg	Substantial increase in efficiency and reduction in emissions from buses. Increasing bus use.	1st Electric bus town bid unsuccessful. 2nd bid in train for EV and/or alternative fuels buses. Ongoing replacement program of oldest buses by largest operator.	Bus companies operating in Swindon are Thamesdown Transport and Stagecoach. Across that fleet; 53% of vehicles are EuroIII or EuroIV, and only 47% EuroV or EuroVI. Swindon's bus routes are radial; in and out from the centre, and there are comparatively few connections between the spokes. Improving routes offers the potential to displace car journeys. Park and Ride schemes have not taken off in Swindon. Cost: To be determined

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7	Raise awareness of Air Quality Issues with local residents, schools and businesses to encourage behaviour change	Public Information	Via leaflets	2019	2024	Public Health Localities LEP	Public Health Localities LEP	NO	Not Funded	£10k - 50k	Planning	0.3µg	Substantial increase in public transport use and active travel.	Campaign designed, but stalled by Covid-19. Plans to revive in 2021-22.	Influencing behaviour change through health education and promotion Cost: Normal Business
8	Engage and work with employers to promote greener fleets and staff transport arrangements.	Promoting Travel Alternatives	Encourage / Facilitate home-working	2019	2024	Highways Public Health	Highways Public Health	NO	Not Funded	< £10k	Planning	0.3µg	Greening of company vehicle fleets Reduction in business miles	Activity stalled by Covid-19 disruption to employers and ways of working. Much greater home working now planned by largest office based employers in Covid aftermath.	Active modes of transport are part of the Town Centre plan and the Swindon Transport Strategy Travel Plan Officer actively engages schools, communities and workplaces, particularly for new developments. Promote Swindon Travel Choices for active journey planning http://www.swindontravelchoices.co.uk/
9	Review and, if necessary, update Local Development Orders relating to electric vehicle charging requirements and alternative fueled vehicle fueling stations	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2020	Planning	Planning	NO	Funded	< £10k	Completed	0.1µg	Reviewed LDOs in place.	LDOs now in place for parking and EV charging. Will be reviewed ongoing to identify further opportunities; in line with planning cycle.	Local development Order is already in place, but to be reviewed to ensure that it provides appropriate planning guidance.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	across the borough. Review Parking Standards for new developments to mandate vehicle charging provision.														
10	Pursue the Transport Vision 2026 for Swindon & Wiltshire LEP with regard to sustainable transport outcomes.	Transport Planning and Infrastructure	Other	2019	2024	Planning Highways	Planning Highways	NO	Funded	< £10k	Implementation	1.0µg	NA	Actively pursuing all parts of the Vision.	<p>Wiltshire and Swindon LEP Local Energy Strategy – draft https://swlep.co.uk/docs/default-source/board-meetings/2018/28-nov-2018/agenda-for-board-meeting-28th-nov-2018.pdf?sfvrsn=15645c74_2</p> <p>Cost: Normal Business</p>
11	Review and enhance the Swindon Borough Local Plan (2026) to prioritise sustainable transport and ensure that policies relating to, and impacting upon air quality,	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2021	Planning Highways Public Health	Planning Highways Public Health	NO	Funded	< £10k	Completed	0	Local Plan review adopted	Plan review now adopted.	<p>Swindon Borough Local Plan 2026 available at: https://www.swindon.gov.uk/info/20113/local_plan_and_planning_policy/635/swindon_borough_local_plan_2026</p> <p>Cost: Normal Business</p>

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	are fit for purpose and serve to reduce emissions where possible.														
12	Review and enhance the developing Town Centre Movement Strategy with air quality improvements a central theme.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	TBC	Planning Localities Public Health Highways	Planning Localities Public Health Highways	NO	Not Funded	< £10k	Completed	1µg	New Town Centre Movement Strategy targeting air quality improvements as a central theme	Reviewed plan now adopted, but priorities unfunded to date	Cost: Normal Business
13	Review and enhance the Swindon Local Transport Plan 2011-2026	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2020	Air Quality Planning and Policy Guidance Other policy	Air Quality Planning and Policy Guidance Other policy	NO	Funded	£10k - 50k	Implementation	0.25µg	Revised Swindon Local Transport Plan	In progress	Normal business

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14	Review the Park and Ride Strategy for Swindon to minimise the need for vehicular journeys into the town centre.	Alternatives to private vehicle use	Bus based Park & Ride	2019	2020	Highways Planning Localities Highways	Highways Planning Localities Highways	NO	Not Funded	< £10k	Aborted	0	New Park and Ride Strategy in place	No progress on review. Unclear if need for park and rides as previous iterations not well used.	Cost: Normal Business	
15	Amend purchasing policy for Council owned vehicles to prioritise greener fuels and efficiency where viable.	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2019	2023	Highways Waste Housing	Highways Waste Housing	NO	Funded	< £10k	Implementation	0.5µg	All Council vehicles to be low emission where viable.	New purchasing policy in place. 4 replacement EV vans, and 35 ULEV vans ordered, awaiting delivery. Investigating replacement of bin lifts on refuse lorries with electric lifts.	Housing fleet renewed on a 1/3 replacement every year. Policy currently being refreshed to prioritise environmental considerations where viable. Large vehicle fleet for streetworks, waste, etc due for renewal in 2 years. Policy being refreshed to give greater weight to environmental considerations.	Cost: Normal Business

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16	Installation of vehicle charging points at Council depot	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	2021	Highways Waste Housing	Highways Waste Housing	NO	Funded	£50k - £100k	Implementation	0	Alternative fuel points installed and in use at depot	Delivered initial quota, more to follow as EV fleet increases	Prior to procuring alternative fueled public vehicles; charging and fueling infrastructure must be in place. Cost: Normal Business
17	Change the schedule for recycling and waste collection to out of peak times on Kingshill Road(7am-9am)	Traffic Management	UTC, Congestion management, traffic reduction	2019	2019	Waste management	Waste management	NO	Funded	< £10k	Completed	0	No peak time collections of Kingshill Road	Delivered. Collections now take place in middle of day. Periodic acute congestion much reduced as a result.	Potential to move slots to middle of the day. Reduce queuing on Kingshill Road and create smoother traffic flow. Cost: Normal Business
18	Engage with local bus companies to increase the number and frequency of services to foster	Alternatives to private vehicle use	Other	2019	2020	Public Health	Public Health	NO	Funded	< £10k	Implementation	0	N/A	Constant engagement with 2 local bus companies around greening fleets and routes.	Potential to assist modal shift

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19	ANPR & Emissions Survey of Kingshill	Other	Other	2021	2021	Public Health	Public Health	NO	Funded	£10k - 50k	Implementation	0	Survey output report received and assessed	Requested by DEFRA to finalise AQAP. Previously stalled due to lack of funding, and then Covid-19 disruption to traffic. Order placed with Ricardo for delivery Summer 2021.	To inform estimates of measures impact, and to inform development of existing and new measures. Traffic flows now returned to pre-Covid levels and stable.

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.

Swindon Borough Council does not undertake Particulate Matter monitoring, and relies on the DEFRA background mapping facility here: <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>.

Air quality in Swindon with regard to PM_{2.5} is generally good, and all parts of Swindon comply with the 25µg/m³ target. DEFRA maximum background maps show that all but 14 of the 232 x 1km² grid squares covering Swindon also meet the World Health Organisation's target value of 10µg/m³, the highest modelled value for 2021 being 10.72µg/m³, and this is forecast to improve year on year. There is no threshold for medical effects from PM_{2.5} however, and the issue is gaining greater traction locally.

PM_{2.5} is though a wide area issue, and a relatively small portion of it is generated locally. The greater portion of PM_{2.5} stems from sources some distance away, predominantly secondary PM_{2.5} formed from precursors emitted by fossil fuel burning.

Public Health England estimates of the burden of mortality from PM_{2.5} in Swindon are close to the England average.

There are no significant local point sources for PM_{2.5} within the Borough. Domestic solid fuel burning is not widespread due to Swindon's urban nature and good connections to the gas grid, but is thought to be rising due to the growing popularity of wood burners in recent years. As other sources of PM_{2.5} such as road transport, industry and energy generation have become increasingly well controlled,; domestic solid fuel burning is becoming a more prominent source.

All actions taken to increase energy efficiency, limit motorised transport, and move to renewable energy decrease PM_{2.5} emissions and help to address climate change too.

Swindon Borough Council is taking the following measures to address PM_{2.5}:

- The following measures in our Kingshill Air Quality action Plan will help to reduce PM2.5 emissions:
 - Measure 1; the TRO for Kingshill will reduce emissions from HGVs in this area, but will likely marginally increase overall PM2.5 emissions over longer alternative routes. In moving the emissions further away from residents, it is expected to reduce exposure however.
 - Measure 2; upgrading the Old Town Railway Cycle Path to provide a real alternative to motorised transport into Old Town.
 - Measure 3; improving emissions per mile from Taxi and Hackney Carriages licensed in Swindon.
 - Measure 4; installing nudge signage to change driver behaviour.
 - Measure 5; promoting active travel will limit emissions from transport.
 - Measures 6 & 18; helping to green the bus fleets and maximise the attractiveness of public transport.
 - Measures 7 & 8; engaging with local residents and businesses on air quality can help change behaviours around fossil fuels and renewable energy.
 - Measures 9 to 14; amending local policy and development controls seek to enable a move to greener forms of energy and active travel.
 - Measures 15 & 16; aim to green the Council's fleet, reducing PM2.5 emissions and giving a lead to local residents and businesses to do the same.
- The following wider activities also reduce fossil fuel use and increase renewables more generally:
 - Continuing to build out the Council's own solar farm estate, displacing fossil fuel derived energy.
 - The launch of the 'Be the Change' campaign on climate change in Swindon, seeking to change behaviour of Swindon business and residents.
 - Effective regulation of potentially polluting industries through Environmental Permitting regimes.
 - Effective control of PM2.5 emissions from construction and highways projects through robust Construction Environmental Management Plans enforced through the planning process.
 - Prompt and effective investigation of large bonfire or other uncontrolled burnings, which can have large effects on short term PM levels.

In addition; Swindon has arrangements in place to effectively enforce the newly introduced [Air Quality \(Domestic Solid Fuels Standards\) \(England\) Regulations 2020](#) during 2021.

In line with growing local interest and the emerging Environment Act 2021, a project is programmed to investigate the scale of solid fuel burning in Swindon during 2021/22 or 2022/23, and for this to inform the potential future need for one or more smoke control areas in the Borough.

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

This section sets out the monitoring undertaken within 2020 by Swindon Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Swindon undertook no automatic (continuous) monitoring during 2020.

3.1.2 Non-Automatic Monitoring Sites

Swindon Borough Council undertook non-automatic (i.e. passive) monitoring of NO₂ via a network of 42 diffusion tubes at 38 sites during 2020. Table A1 in Appendix A presents the details of the non-automatic sites.

Monitoring locations are shown in maps presented at Appendix D.

Individual Pollutants

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

3.1.3 Nitrogen Dioxide (NO₂)

Figures A1 to A5 and Table A.2 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. **Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).**

The full 2020 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, but only where relevant.

On average; monitored roadside NO₂ levels in Swindon fell by 19% in 2020, including within the AQMA. The median improvement in measured roadside NO₂ levels for 2020 was 18.3%.

The greatest reduction (27.8%) was seen at site S42, alongside the A419 dual carriageway and this is assumed to reflect the large drop in travelling during 2020.

The smallest reduction was seen at site S13 (8.4%), close to the Moonrakers roundabout on Cricklade Road. This junction was subject to significant disruption from major roadworks during 2020 with heavy queuing and emissions from plant affecting this result. It is not seen as representative for this site.

3 **roadside** sites, bias adjusted and annualised, exceeded the 40µg/m³ objective, and these were S15, S29, and S30 within the Kingshill AQMA. With distance correction to the nearest exposure applied in each case however; each lay comfortably below that objective limit.

2 **roadside** sites (S7 within the Kingshill AQMA, and S42 alongside the A419 major route) returned NO₂ levels within 10% of the objective limit, but these too lay well below the objective limit with distance correction applied.

Moreover; the distance correction formula used to estimate receptor values for 2020 very likely over-estimates the true value. This is because the distance correction formula uses modelled background values for the grid square in which the monitoring location is sited, and the model for this is based to 2018 data (the latest available version), prior to the Covid-19 pandemic.

We know that reduced travel during 2020 has had a positive effect on background NO₂ levels. For example; DEFRA's urban background monitor stationed at Walcot in Swindon recorded an annual average for background NO₂ in 2019 of 13.5µg/m³, and the same figure for 2020 was 9.9µg/m³: a 26.7% reduction. We can therefore assume that, for locations where a receptor value is estimated in this report; the true figure for 2020 is lower.

One site, S30, which is within the AQMA, recorded NO₂ levels marginally above the 60µg/m³ level (62.2µg/m³) at which a potential exceedance of the hourly limit may be indicated. There is no relevant exposure at this monitoring location however.

Overall; the monitoring results clearly reflect the disruption to traffic levels across the Borough arising from the restrictions introduced to manage the Covid-19 pandemic. The 2020 monitoring year will undoubtedly be considered an outlier year however, and so no amendments to the Kingshill AQMA are proposed based on these measurements. In the first half of 2021, traffic levels within the Kingshill AQMA have snapped back to pre-Covid-19 levels, and we therefore expect NO₂ levels generally to return to the same gradual downward trendline seen between 2016 and 2019.

Appendix A: Monitoring Results

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
S1	GWR Museum	Roadside	414629.34	184736.82	NO2	No	2.3	2.0	No	2.5
S3	S4, 8 Okus Road	Roadside	414758.67	183718.55	NO2	No	7.1	2.3	No	2.5
S4	186 Kingshill Rd	Roadside	414257.86	183972.1	NO2	No	4.3	2.0	No	2.6
S5	Chalet School, Queens Drive	Roadside	416088.78	184906.88	NO2	No	7.5	7.5	No	2.8
S6	Swindon 8 - 102 Bath Road	Roadside	414925.19	183741.49	NO2	No	6.9	3.0	No	2.7
S7	No. 81 Kingshill Road	Roadside	414625.93	183848.04	NO2	Yes, Kingshill	7.6	1.6	No	2.3
S8	Aylesbury Street	Roadside	415108.27	185157.98	NO2	No	2.7	1.1	No	2.4
S9	Manchester Rd	Roadside	415156.96	185100.84	NO2	No	2.8	2.6	No	2.8
S10	Meadow Way Badbury	Roadside	419347.33	180974.53	NO2	No	43.2	36.7	No	1.8
S11	Kingshill Rd/Clifton St	Roadside	414733.29	183782.89	NO2	Yes, Kingshill	4.5	1.3	No	2.9

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
S12	Westcott Place	Roadside	414075.8	184040.99	NO2	No	12.8	1.2	No	2.8
S13	Cricklade Rd (Moonraker)	Roadside	415677.18	187335.48	NO2	No	5.7	3.5	No	2.9
S14	Iffley Rd from 10.05.2017	Roadside	413893.07	185621.33	NO2	No	8.4	7.7	No	2.0
S15	102 Kingshill Road	Roadside	414698.37	183800.27	NO2	Yes, Kingshill	1.4	1.3	No	2.5
S16	86 Clifton Road	Roadside	414755.79	183788.58	NO2	No	18.6	8.6	No	2.6
S17	A420 South Marston	Roadside	419437.78	186764.67	NO2	No	20.7	12.5	No	2.7
S18	63 Kingshill Rd	Roadside	414552.28	183884.71	NO2	Yes, Kingshill	8.0	2.0	No	2.8
S19	No. 85 Kingshill Road (New from 03.04.19)	Roadside	414654.35	183833.97	NO2	Yes, Kingshill	3.1	1.4	No	2.4
S20, S21, S22	37 Devizes Rd	Roadside	415547	183552.03	NO2	No	6.3	1.8	No	2.4
S23	30 Devizes Road	Roadside	415554.74	183494.78	NO2	No	5.5	2.0	No	2.4
S24	68 Cheney Manor Rd (Rodbourne Rd)	Roadside	415532	183666	NO2	No	5.0	2.4	No	2.3
S25	Tadpole Lane	Roadside	411973.26	189625.23	NO2	No	16.7	0.7	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
S26	66 Ermin St	Roadside	417398.65	187353.88	NO2	No	2.6	1.9	No	2.5
S2, S27, S28	Bath Rd Car Park	Roadside	415289.6	183789.81	NO2	No	8.6	5.3	No	2.6
S29	Opp 101 Kingshill Road	Roadside	414707.53	183806.25	NO2	Yes, Kingshill	9.6	1.8	No	2.5
S30	Corner of Kingshill/ Clifton Street (New from 03.04.19)	Roadside	414756.8	183782.97	NO2	Yes, Kingshill	17.1	1.4	No	2.3
S31	Wanborough Road - Merlin Way (New from 03.04.19)	Roadside	418426.51	186275.44	NO2	No	4.1	0.6	No	2.4
S32	516A Cricklade Road (New from 03.04.19)	Roadside	415666.52	187458.47	NO2	No	11.4	0.8	No	2.2
S33	Whitworth Road/ Moonrakers (New from 03.04.19)	Roadside	415591.43	187366.75	NO2	No	9.7	1.3	No	2.3
S34	Beechcroft Road/ Moonrakers (New from 03.04.19)	Roadside	415720.84	187414.25	NO2	No	6.5	0.4	No	2.5
S35	32 Swindon Street Highworth (New from 03.04.19)	Roadside	420029.62	192366.81	NO2	No	4.6	2.5	No	2.1
S36	Highworth - Cricklade Road	Roadside	419987.18	192409.43	NO2	No	3.7	1.6	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
	(New from 03.04.19)									
S37	St Michaels Avenue Corner/ Highworth (New from 03.04.19)	Roadside	420036.74	192478.9	NO2	No	4.4	1.2	No	2.5
S38	Hanleys, High Street - Highworth (New from 03.04.19)	Roadside	420078.36	192450.06	NO2	No	3.9	1.8	No	2.3
S39	Goddard Arms - Cricklade Street (New from 03.04.19)	Roadside	415711.69	183817.45	NO2	No	2.9	1.7	No	2.6
S40	10 Marlborough Road - Wroughton (New from 03.04.19)	Roadside	414879.63	180586.08	NO2	No	4.8	0.9	No	2.9
S41	No.88 High Street - Wroughton (New from 03.04.19)	Roadside	414408.83	180472.53	NO2	No	3.0	0.2	No	2.5
S42	Nythe Farm A419 (New from 07.08.19)	Roadside	419050.23	185658.12	NO2	No	8.1	2.1	No	1.5

Table A.2 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
S1	414629.34	184736.82	Roadside	58.3	59.6	37.5	37.1	34.0	30.0	24.3
S3	414758.67	183718.55	Roadside	91.7	90.4	24.3	19.9	19.4	17.8	14.1
S4	414257.86	183972.1	Roadside	91.7	92.3	30.6	33.6	30.0	30.5	23.8
S5	416088.78	184906.88	Roadside	100	100.0	31.8	34.3	28.0	28.5	22.2
S6	414925.19	183741.49	Roadside	100	100.0	33.9	36.9	34.3	32.4	28.1
S7	414625.93	183848.04	Roadside	83.3	80.8				44.8	38.3
S8	415108.27	185157.98	Roadside	91.7	92.3				22.8	17.8
S9	415156.96	185100.84	Roadside	100	100.0	43.4	39.1	38.9	35.6	27.6
S10	419347.33	180974.53	Roadside	100	100.0	30.1	28.4	24.6	24.7	18.1
S11	414733.29	183782.89	Roadside	83.3	84.6	38.6	40.6	38.4	39.3	32.4
S12	414075.8	184040.99	Roadside	91.7	92.3	33.6	31.2	29.8	28.1	22.9
S13	415677.18	187335.48	Roadside	91.7	90.4	38.7	35.2	35.3	30.6	28.0
S14	413893.07	185621.33	Roadside	100	100.0	<u>n/a</u>	40.2	31.7	32.5	27.0

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
S15	414698.37	183800.27	Roadside	91.7	92.3	51.2	56.2	49.1	46.7	40.6
S16	414755.79	183788.58	Roadside	100	100.0	30.5	29.0	26.2	25.8	21.1
S17	419437.78	186764.67	Roadside	100	100.0	26.3	23.4	20.7	17.6	14.7
S18	414552.28	183884.71	Roadside	100	100.0	33.2	31.7	30.4	29.5	24.4
S19	414654.35	183833.97	Roadside	83.3	82.7				38.5	32.7
S20, S21, S22	415547	183552.03	Roadside	100	100.0	42.3	45.6	40.7	40.1	31.8
S23	415554.74	183494.78	Roadside	100	100.0	43.2	42.8	37.2	36.4	28.6
S24	415532	183666	Roadside	100	100.0	41.6	39.9	38.1	38.2	31.3
S25	411973.26	189625.23	Roadside	100	100.0	15.5	16.5	16.2	16.2	12.8
S26	417398.65	187353.88	Roadside	100	100.0	28.7	28.3	27.8	26.4	22.4
S2, S27, S28	415289.6	183789.81	Roadside	100	100.0	<u>n/a</u>	21.9	22.0	21.2	16.0
S29	414707.53	183806.25	Roadside	100	100.0	51.5	<u>64.1</u>	<u>66.3</u>	<u>60.1</u>	51.8
S30	414756.8	183782.97	Roadside	83.3	82.7				<u>75.9</u>	<u>62.2</u>
S31	418426.51	186275.44	Roadside	100	100.0				16.5	14.1

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
S32	415666.52	187458.47	Roadside	91.7	90.4				30.1	26.1
S33	415591.43	187366.75	Roadside	75	73.1				30.5	25.4
S34	415720.84	187414.25	Roadside	100	100.0				30.5	26.3
S35	420029.62	192366.81	Roadside	91.7	92.3				20.9	16.4
S36	419987.18	192409.43	Roadside	100	100.0				20.6	16.3
S37	420036.74	192478.9	Roadside	100	100.0				33.1	27.7
S38	420078.36	192450.06	Roadside	100	100.0				16.7	13.7
S39	415711.69	183817.45	Roadside	100	100.0				32.9	24.0
S40	414879.63	180586.08	Roadside	100	100.0				20.5	16.5
S41	414408.83	180472.53	Roadside	91.7	92.3				20.7	17.1
S42	419050.23	185658.12	Roadside	100	100.0				52.3	37.8

Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16.

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

Notes:

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO₂ Concentrations in South Swindon urban area

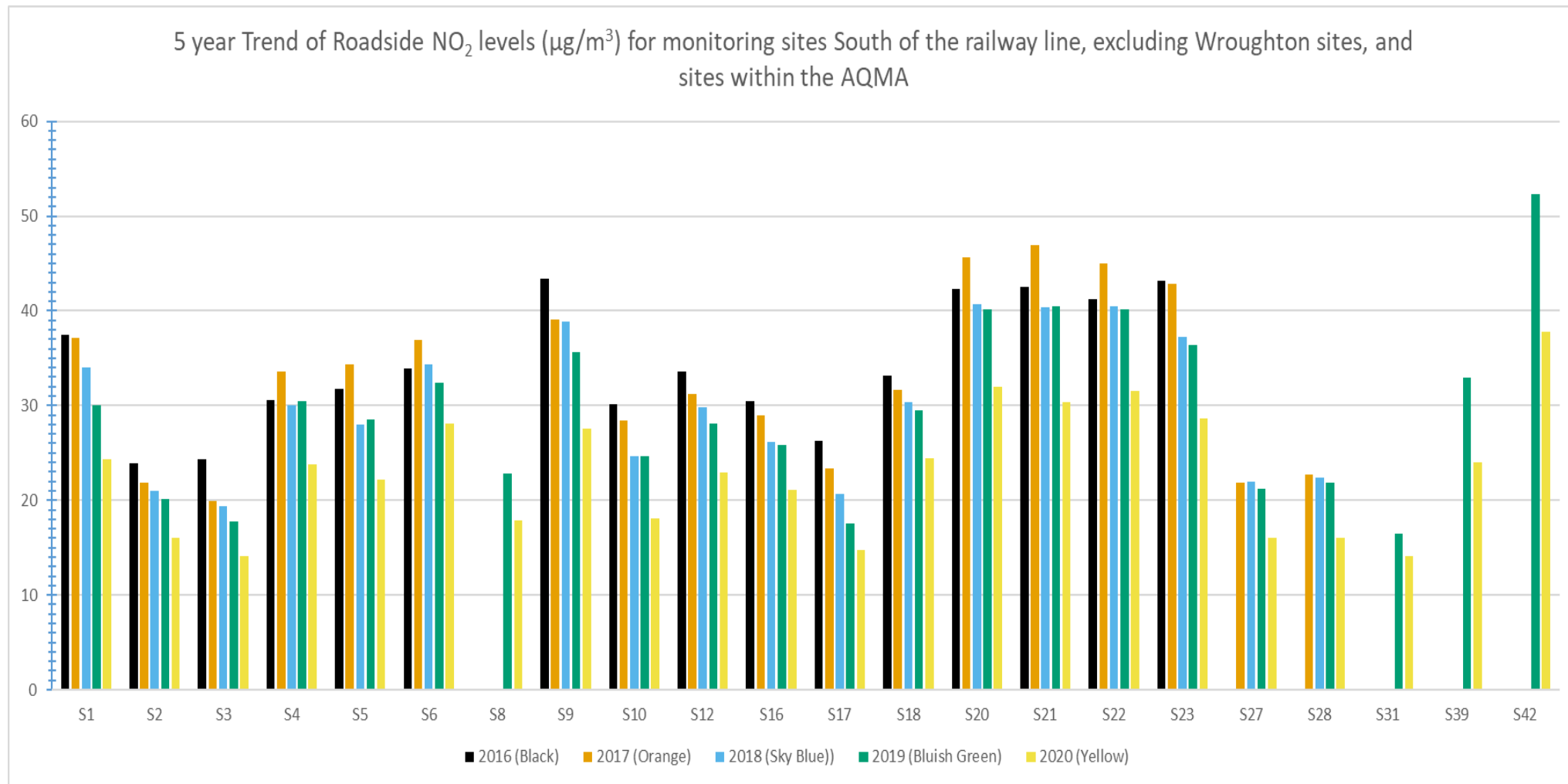


Figure A.2 – Trends in Annual Mean NO₂ Concentrations within or nearby the Kingshill Air Quality Management Area

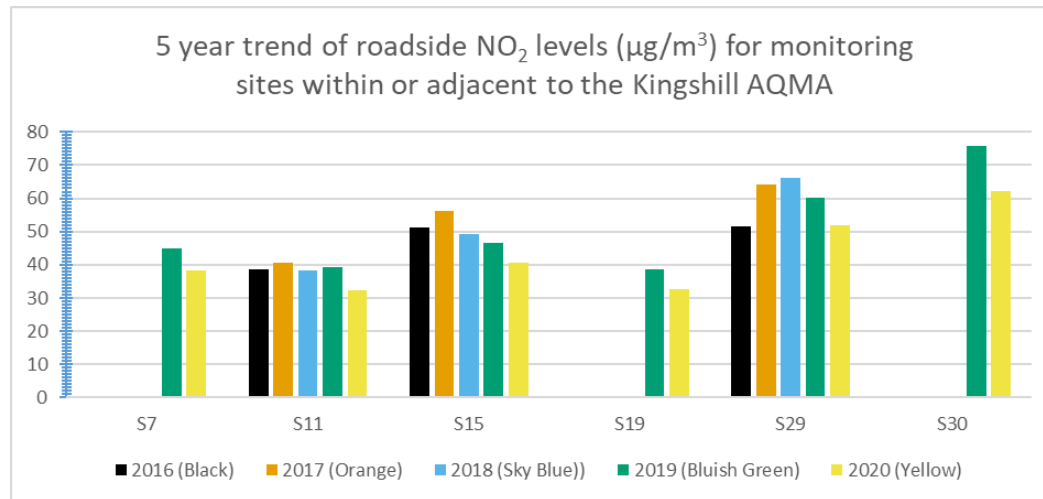


Figure A.3 – Trends in Annual Mean NO₂ Concentrations in North Swindon urban area

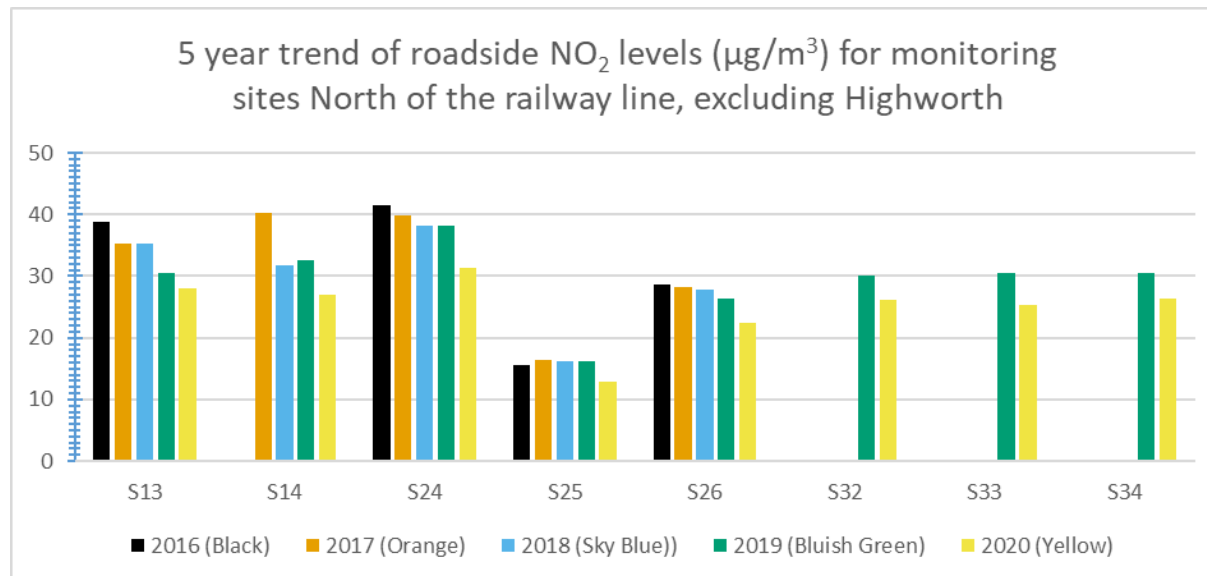


Figure A.4 – Trends in Annual Mean NO₂ Concentrations in Highworth area

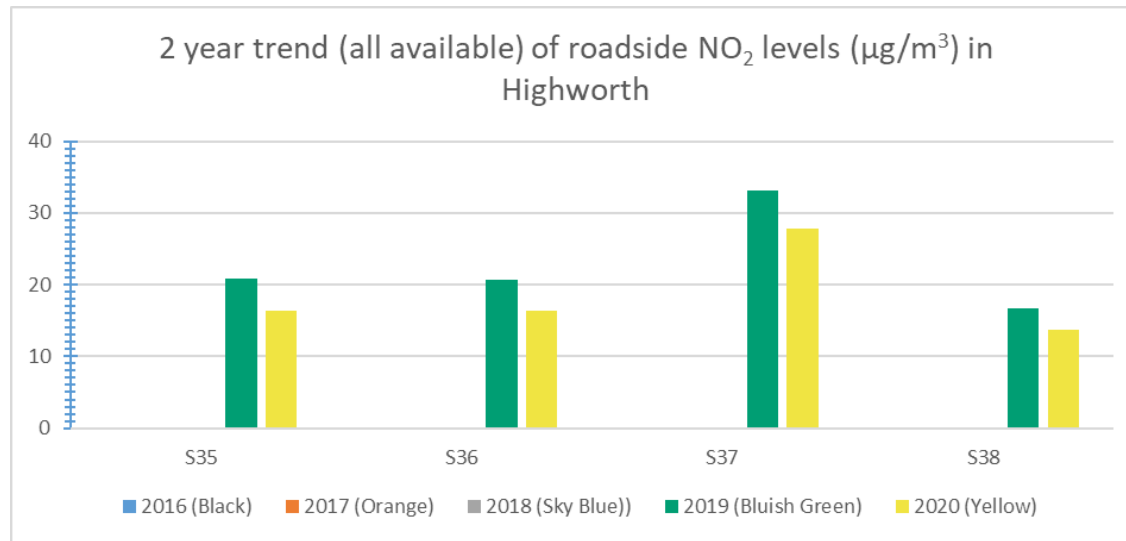
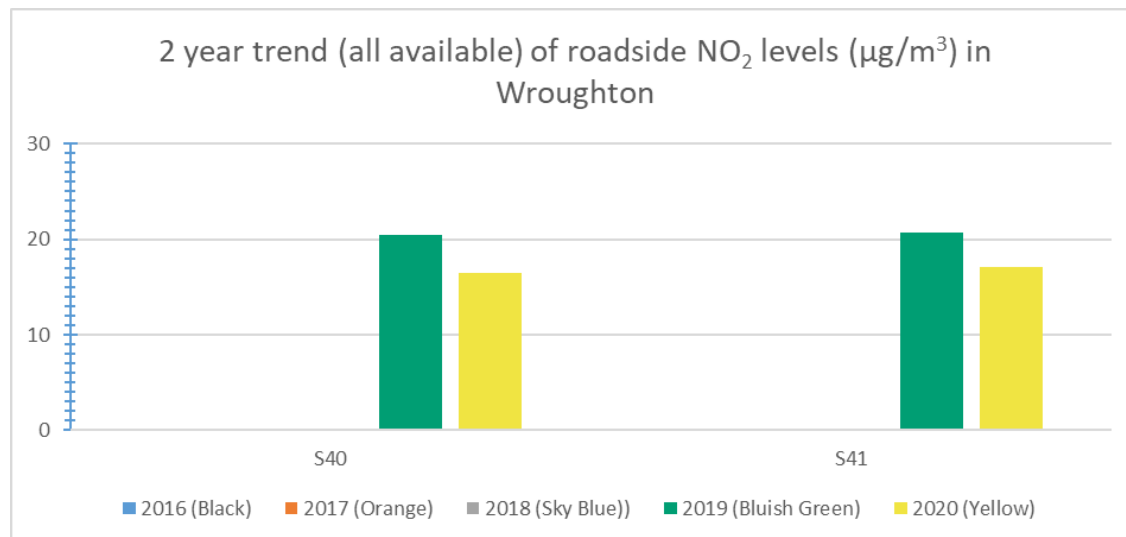


Figure A.5 – Trends in Annual Mean NO₂ Concentrations in Wroughton area



Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO₂ 2020 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
S1	414629	184737				27.3		28.3		32.1	36.0	35.1	41.0	37.8	33.9	24.3	-	
S2	415290	183790	32.9	23.0	18.1	20.7	12.0	17.2	13.5	16.2	21.7	22.3	29.0	22.8	-	-	-	Triplicate Site with S2, S27 and S28 - Annual data provided for S28 only
S3	414759	183719	30.5	17.4	13.5	22.1	13.8	12.8	10.2		19.3	13.4	27.2	21.7	18.4	14.1	-	
S4	414258	183972	51.2		25.4	27.3	20.3	29.9	18.7	30.6	31.4	29.2	41.8	33.9	30.9	23.8	-	
S5	416089	184907	48.0	37.1	15.9	21.7	18.8	23.6	23.0	25.6	32.5	32.3	35.4	32.3	28.9	22.2	-	
S6	414925	183741	58.1	38.8	34.1	36.7	24.1	27.0	26.6	31.3	38.2	38.5	44.5	39.9	36.5	28.1	-	
S7	414626	183848	72.2	43.6	40.6	51.6	39.7	40.5	36.4	53.6	62.1		57.5		49.8	38.3	28.4	
S8	415108	185158	40.9	25.7	20.6	25.4	13.8	15.6	9.9	17.0		21.5	35.7	28.6	23.2	17.8	-	
S9	415157	185101	54.1	35.4	33.8	37.2	23.1	25.9	22.6	33.1	41.4	37.9	45.7	40.1	35.9	27.6	-	
S10	419347	180975	44.4	35.0	12.7	18.5	12.9	18.3	17.5	21.2	21.9	25.5	29.5	24.0	23.5	18.1	-	
S11	414733	183783	65.7		36.3		29.5	39.8	26.6	42.9	40.8	40.7	50.9	47.5	42.1	32.4	-	
S12	414076	184041	49.6		24.9	31.1	20.3	22.1	18.9	28.7	34.2	33.6	28.1	35.6	29.7	22.9	-	
S13	415677	187335	53.9	33.1	34.2	39.4	26.9	28.2	22.5	38.3	39.0		45.7	39.3	36.4	28.0	-	
S14	413893	185621	52.1	41.3	30.3	25.6	20.4	26.4	27.5	34.3	33.0	39.1	48.3	42.0	35.0	27.0	-	
S15	414698	183800	80.9		37.0	45.7	38.9	48.9	35.4	57.5	59.6	69.6	43.3	63.4	52.7	40.6	36.4	
S16	414756	183789	41.5	25.4	22.7	28.6	21.7	24.5	21.6	24.8	32.3	25.0	31.1	30.2	27.5	21.1	-	
S17	419438	186765	31.0	20.6	18.5	21.0	13.0	12.3	13.2	18.1	19.0	19.6	25.8	17.4	19.1	14.7	-	
S18	414552	183885	46.4	26.0	27.4	36.7	25.2	23.7	20.0	28.5	34.4	31.2	42.8	37.7	31.7	24.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
S19	414654	183834	61.0	32.0	37.2	48.8	38.7		28.7		49.9	33.7	48.7	45.8	42.5	32.7	-	
S20	415547	183552	70.9	51.9	26.3	30.7	26.4	31.6	35.9	36.9	43.1	47.7	47.1	49.6	-	-	-	Triplicate Site with S20, S21 and S22 - Annual data provided for S22 only
S21	415547	183552	60.7		35.1	32.5	25.5	30.7	33.7	41.0	46.1	44.2	42.7	41.8	-	-	-	Triplicate Site with S20, S21 and S22 - Annual data provided for S22 only
S22	415547	183552	66.1		36.0	30.6	28.1	31.7	35.7	43.3	48.6	44.3	43.2	43.5	41.3	31.8	-	Triplicate Site with S20, S21 and S22 - Annual data provided for S22 only
S23	415555	183495	62.3	41.7	33.2	32.0	23.6	27.9	29.1	34.3	43.3	35.5	46.0	37.3	37.2	28.6	-	
S24	415532	183666	54.1	31.0	37.2	49.5	32.1	38.4	23.3	42.3	41.4	38.4	51.9	47.9	40.6	31.3	-	
S25	411973	189625	28.6	17.9	11.2	16.0	9.9	10.9	9.1	14.1	17.8	16.7	25.2	22.5	16.7	12.8	-	
S26	417399	187354	45.5	33.6	24.6	22.6	18.7	22.5	16.9	27.0	32.2	32.1	38.0	36.0	29.1	22.4	-	
S27	415290	183790	32.1	24.0	11.8	23.6	14.6	14.7	10.8	18.1	22.1	21.8	31.4	24.4	-	-	-	Triplicate Site with S2, S27 and S28 - Annual data provided for S28 only
S28	415290	183790	35.9	18.5	13.0	22.7	13.2	13.8	11.2	20.0	21.1	20.9	31.4	27.7	20.8	16.0	-	Triplicate Site with S2, S27 and S28 - Annual data provided for S28 only
S29	414708	183806	91.9	57.9	64.4	77.8	58.9	68.7	49.4	71.0	81.9	65.2	69.7	50.3	67.3	51.8	35.2	
S30	414757	183783	121.8	71.7	62.0	74.2	70.5	78.2		85.4	88.2	81.5	74.3		80.8	62.2	34.6	
S31	418427	186275	29.0	16.6	17.3	23.5	13.3	10.8	9.6	14.8	19.9	17.4	24.9	21.9	18.3	14.1	-	
S32	415667	187458	56.8	31.1	27.4	29.4	23.0	28.7	18.0	34.7	37.3		41.5	44.3	33.8	26.1	-	
S33	415591	187367	53.4	38.1	34.3	39.7	23.0	25.1	24.5	31.7	26.8				33.0	25.4	-	
S34	415721	187414	59.2	39.6	26.2	35.3	24.9	28.2	26.2	36.0	32.7	29.1	41.8	30.8	34.2	26.3	-	
S35	420030	192367		23.4	19.2	18.4	14.3	16.8	18.5	20.1	24.4	25.6	28.1	25.2	21.3	16.4	-	
S36	419987	192409	28.7	16.2	13.4	22.5	16.3	20.7	12.2	21.9	23.7	22.6	28.8	26.9	21.2	16.3	-	
S37	420037	192479	55.3	37.9	31.6	29.2	22.4	34.6	19.4	39.5	36.1	37.2	45.8	43.2	36.0	27.7	-	
S38	420078	192450	31.0	21.1	14.3	13.9	11.3	14.0	13.4	14.6	17.3	17.5	24.2	21.4	17.8	13.7	-	
S39	415712	183817	43.2	24.4	28.4	33.4	24.8	26.9	11.5	34.6	34.9	31.9	41.4	37.9	31.1	24.0	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
S40	414880	180586	34.1	26.1	18.2	18.2	14.1	16.2	14.7	19.2	23.4	22.3	23.8	27.1	21.5	16.5	-	
S41	414409	180473	33.9	25.6	22.2		15.9	15.0	15.4	17.9	24.7	21.8	27.1	25.4	22.3	17.1	-	
S42	419050	185658	63.6	53.2	46.2	47.9	38.9	45.0	41.0	46.3	52.7	49.4	62.9	41.5	49.1	37.8	28.6	

- All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Swindon Borough Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Swindon During 2020

Swindon Borough Council has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Swindon During 2020

Swindon Borough Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

- Monitoring via diffusion tubes was undertaken in adherence with the 2020 Diffusion Tube Monitoring Calendar in 2020.
- Diffusion tubes used were prepared with 50%TEA in Acetone, supplied and then analysed by SOCOTEC laboratory in Didcot.
- SOCOTEC UK Ltd. hold a [UKAS Accreditation](#) for its laboratory at Didcot for environmental chemistry to ISO/IEC 17025:2017.
- SOCOTEC UK Ltd. participates in the AIR NO₂ PT scheme and achieved an average score across the period January 2019 to October 2020 (where completed, 6 rounds) of 97.9% of satisfactory diffusion tube results.
- DEFRA monitor the precision of laboratories through comparison of a [number of co-location studies](#) across England. In the 3 years between 2018 and 2020 SOCOTEC UK Ltd. at Didcot achieved good precision in all but one of the studies monitored (72 studies: 98.6%).

Diffusion Tube Annualisation

Annualisation was undertaken for one site, S1, that had less than 75% and greater than 33% data capture. This annualisation was undertaken within the Diffusion Tube Data Processing Tool (DTDTP) using hourly NO₂ concentrations from 2 sites (Swindon Walcot and Bristol St. Pauls) for the period to provide a correction factor.

The annualisation correction factor derived, from the average of the 2 comparison sites, was 0.9293.

Annualisation results from the DTDPT are produced at Table C2.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Swindon Borough Council have applied a national bias adjustment factor of 0.77 to the 2020 monitoring data. A summary of bias adjustment factors used by Swindon Borough Council over the past five years is presented in Table C..

For the 2020 monitoring year, Swindon used the March 2021 version of the National Diffusion Tube Bias Adjustment Factor Spreadsheet, which is maintained by the National Physical Laboratory. 'SOCOTEC Didcot' was selected as the analysing laboratory, and 50% TEA in Acetone as the preparation method.

A bias adjustment factor of 0.77 was derived from 22 colocation sites.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	03/21	0.77
2019	National	03/20	0.75
2018	National	03/19	0.77

2017	National	03/18	0.77
2016	National	09/16	0.79

NO₂ Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations, corrected for distance, are presented in Table B..

In 2020; 5 sites produced NO₂ levels within 10% of the annual average objective limit; S7, S15, S29, S30, and S42.

These sites' results were adjusted for distance from the monitoring site to the relevant exposure using the DTDPT. Results of that distance correction are produced in Table C3.

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

Site ID	Annualisation Factor Swindon Walcot	Annualisation Factor Bristol St. Pauls	Annualisation Factor	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
S1	0.9480	0.9106	-	-	0.9293	33.9	31.5	

Table C.3 – NO₂ Fall off With Distance Calculations (concentrations presented in µg/m³)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
S7	1.6	9.2	38.3	12.7	28.4	
S15	1.3	2.7	40.6	12.7	36.4	Predicted concentration at Receptor within 10% the AQS objective.
S29	1.8	11.4	51.8	12.7	35.2	
S30	1.4	18.5	62.2	12.7	34.6	
S42	2.1	10.1	37.8	13.2	28.6	

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

Figure D. 1 – Map of All Non-Automatic Monitoring Sites in Swindon

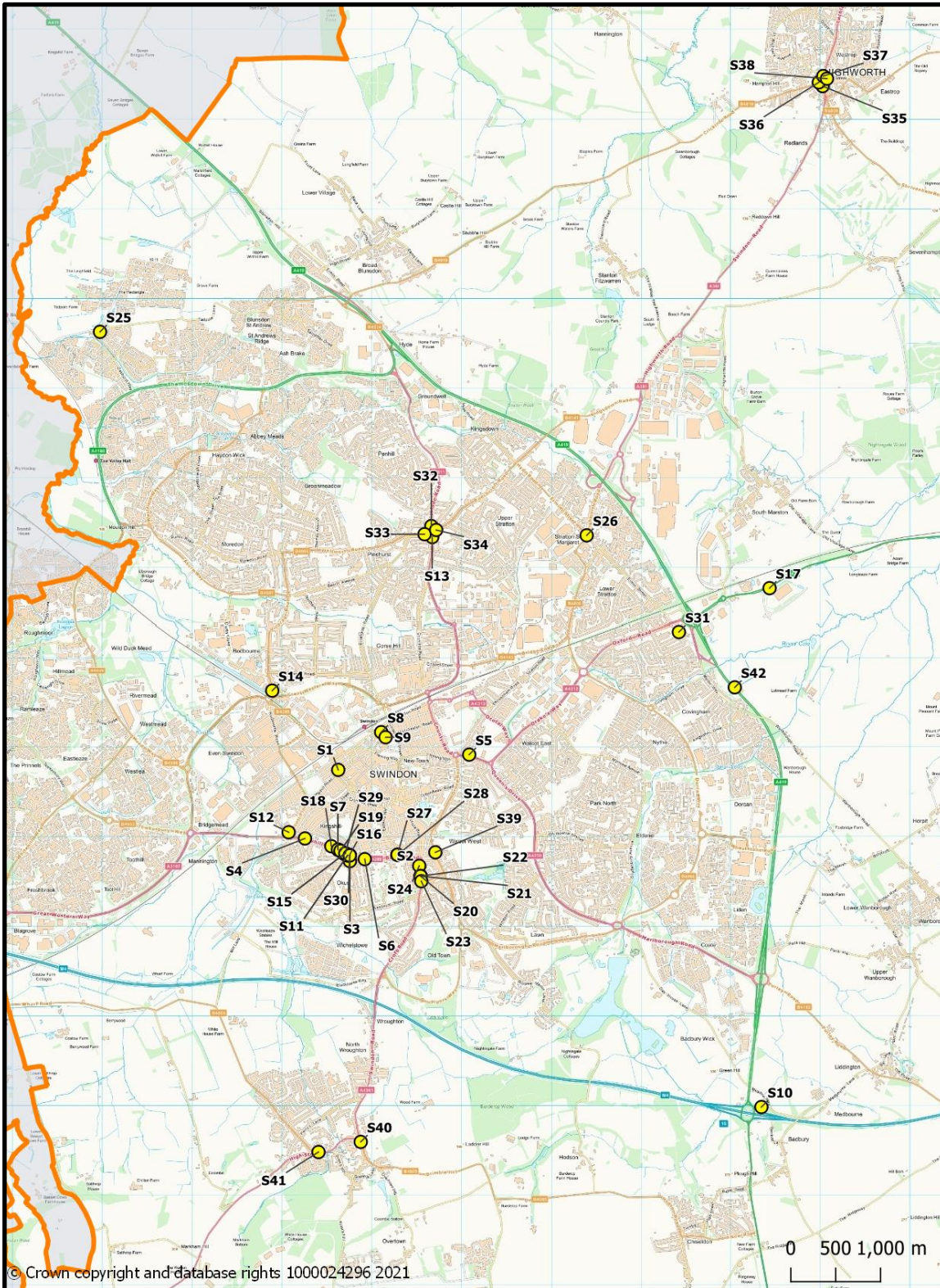
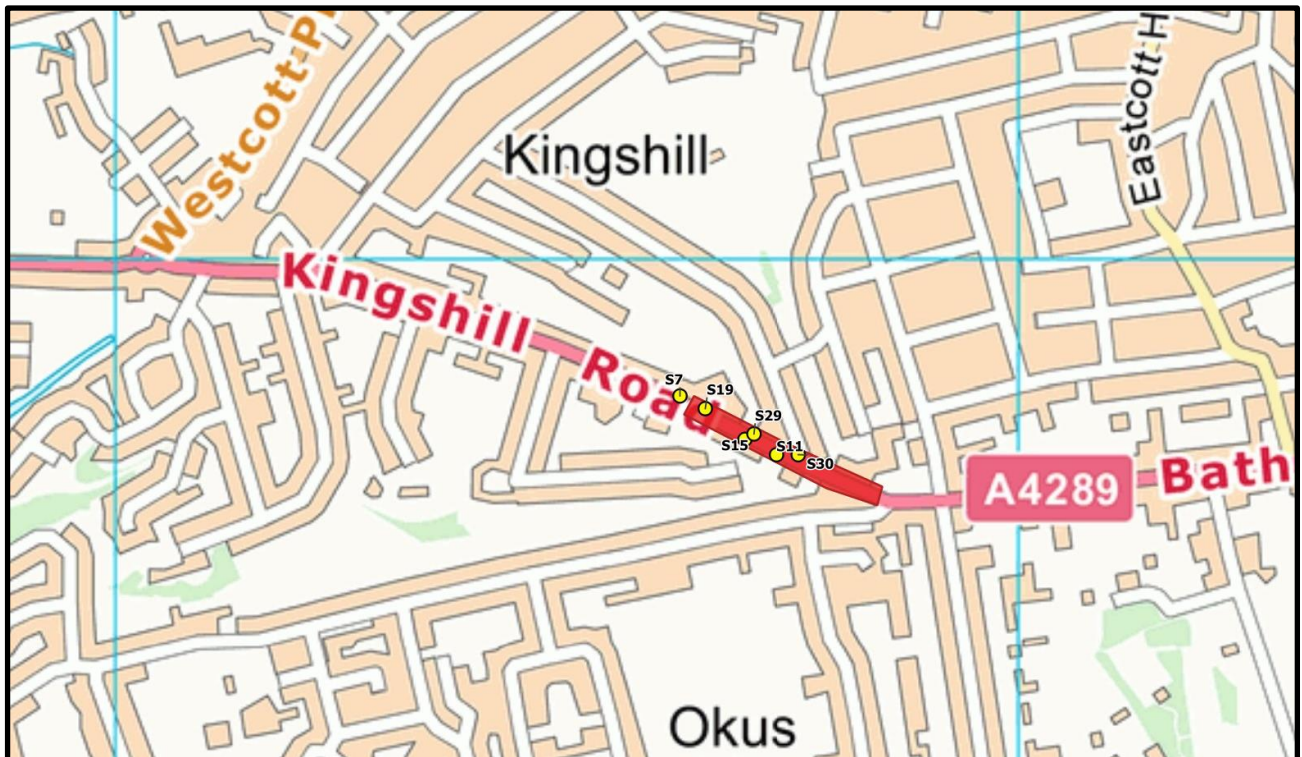


Figure D.2 – Map of Non-Automatic Monitoring Sites within or adjacent to the Kingshill AQMA



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

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

⁷ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO₂) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data⁸ suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)⁹ has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO₂ annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

⁸ Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

⁹ Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20 $\mu\text{g}/\text{m}^3$ if expressed relative to annual mean averages. During this period, changes in PM_{2.5} concentrations were less marked than those of NO₂. PM_{2.5} concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that PM_{2.5} concentrations during the initial lockdown period are of the order 2 to 5 $\mu\text{g}/\text{m}^3$ lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Swindon

As noted in the main body of this report; Swindon monitors traffic flow within the AQMA on Kingshill, and the average traffic flow there for 2020 reduced by 20% from 2019 values. Unsurprisingly; this led to a similar improvement in measured NO₂ levels. This reduction led to measured, and distance corrected, NO₂ levels moving back to within the annual average objective limit.

It is reasonable to assume that this pattern was replicated across Swindon, as average NO₂ levels reduced by 19% (minimum: 8%, maximum 28%).

Background concentrations at the UARN Swindon Walcot monitor fell by a similar amount. Lower background values may reduce the accuracy of distance corrected values as a result, as the distance correction uses modelled background values as an input and these stem from a model based on 2018 base data.

Notwithstanding that NO₂ levels fell to below the objective limit everywhere in Swindon in 2020, this is not sufficient evidence to revoke or amend the AQMA.

Opportunities Presented by COVID-19 upon LAQM within Swindon

No LAQM related opportunities have arisen as a consequence of COVID-19 within Swindon.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Swindon

The Covid-19 pandemic has posed a number of constraints in furthering Swindon's air quality ambitions.

- Capacity constraints within the Council and within its consultants have led to a delay in the first phase of the Traffic Regulation Order for Kingshill Road, measure 1 of the draft Action Plan for the Kingshill AQMA. Small Impact.
- The ANPR and emissions study which is needed to inform the final version of the Air Quality Action Plan has been delayed due to abnormal traffic conditions throughout the last year. (This is now scheduled for 2021) Medium Impact.
- Much of Councils' resources and energy has been focused on dealing with the Covid-19 pandemic, and in mitigating the impacts of such on local residents. This has had an unquantifiable impact on the progression of all remaining actions. As we recover from the pandemic more will become known as to how much of a delay this may impose on remaining actions. Medium Impact.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

Glossary of Terms

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

References

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