2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: 22 June 2022

Information	Sandwell Metropolitan Borough Council Details
Local Authority Officer	Elizabeth Stephens and Sophie Morris
Department	Pollution Control Team, Public Health
Address	Sandwell Council House, Freeth Street, Oldbury, B69 3DE
Telephone	0121 569 2200
E-mail	Pollution_Control@Sandwell.gov.uk
Report Reference Number	Sandwell ASR 2022
Date	22 June 2022

Executive Summary: Air Quality in Our Area

Air Quality in Sandwell

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 ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Sandwell Metropolitan Borough Council (SMBC) lies in the heart of the West Midlands, in an area of the UK known as "The Black Country". It is one of seven local authorities which share full membership of the West Midlands Combined Authority (WMCA) including; Birmingham, Coventry, Dudley, Solihull, Walsall and Wolverhampton. It is a densely populated area covering approximately 8,600 hectares and approximately 327,378 [5] residents.

The borough's character is one of established industry accompanied by a substantial road network of local and major arterial roads, including the M5 and M6 Motorways, which are amongst some of the busiest and most congested roads in Europe.

In 2005 Sandwell was designated as an Air Quality Management Area (AQMA) due to historic poor air quality caused by both traffic and industrial emissions. Over the past 10 years, the levels of nitrogen dioxide have been decreasing across the Borough but are still high in some areas. High traffic volumes and congestion, as well as homes by busy roads

[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 2021
[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
[5] https://www.sandwelltrends.info/population-change-interactive-chart/

means that nitrogen dioxide concentrations still play an important role in our decision-making when trying to tackle local air pollution.

Concerns about the wide range of negative health impacts from human exposure to particulate matter has grown in the last decade, and we know from our monitoring data, that particulate matter (PM) levels are above the World Health Organisation (WHO) guidelines[6] in Sandwell. We know that traffic is an important contributor of PM, but the domestic burning of wood and coal are still more significant sources of man-made PM in urban areas. We plan to do more to establish public awareness of both the sources and the health impacts of PM in our local area. We want to provide clear and simple messages to explain the type of actions that can be taken to reduce the amount of manmade PM being released into our local communities.

Declaration of Air Quality Management Area

A borough wide Air Quality Management Area was declared in Sandwell in 2005 and remains in place because of continuing exceedances of Nitrogen Dioxide (NO_2). In 2020 and for the first time since the AQMA was declared, Sandwell did not record any exceedances in any of the national objective levels for NO_2, PM_{10} or $PM_{2.5}$. This was due to the Coronavirus (COVID-19) pandemic resulting in an unprecedented reduction in vehicle traffic, along with favourable meteorological conditions in the spring. Although these results have not been repeated in 2021, air pollutants have not returned to levels recorded in 2019 as the NO_2 annual mean objective was only exceeded at one site.

Air Pollution Team

Sandwell Council's Air Pollution Team monitors and regulates air quality in domestic and commercial premises across the borough using a variety of tools. Regulatory activities include enforcement of the existing 51 Smoke Control Areas, investigating statutory nuisance complaints and permitting a range of industrial processes/activities under the Environmental Permitting Regulations. The team also consult and comment on planning applications to prevent and mitigate adverse impacts on air quality from development. In addition to regulatory work, the team are also involved in community engagement work, to

[6] WHO (2021) Global Air Quality Guidelines: https://apps.who.int/iris/handle/10665/345329

educate and advise local communities on causes of air pollution and actions they can take to help improve local air quality.

Sandwell Council continues to work with other partner organisations including the other seven West Midlands Authorities under the leadership of the Low Emissions Towns & Cites Programme, the West Midlands Combined Authority and the public transport delivery group, Transport for West Midlands.

Air Pollution Monitoring – Sandwell's Key Priority Zones

Sandwell successfully maintained its air pollution monitoring network during 2021. Four of the continuous automatic air quality monitoring stations were also updated to enable accurate monitoring of PM_{10} and $PM_{2.5}$. Nitrogen dioxide diffusion tubes were deployed in 123 locations, with triplicate tubes being used at 22 of the sites, in accordance with the Defra colocation data requirements. A total of 165 individual diffusion tubes were deployed each month to monitor Sandwell's annual mean NO_2.

In 2018 Sandwell Council still had seven priority zones for air quality (22 areas had been identified originally), as well as two Hotspots, Mallin Street, in Smethwick and Gorsty Hill in Rowley Regis. These zones and hotspots are included within Sandwell's Air Quality Action Plan 2020-2025. In 2019, two zones and one hotspot were found to be compliant with NO_2 objectives, whilst in 2020 all were compliant. In 2021 an exceedance was recorded on the A41 link road to the M5 which sits in Zone 3, see **Table 1.1**.

The results in both 2020 and 2021 should still be treated with caution, due to the significant reduction in vehicle traffic as a resulted of 'lockdowns' and protective measures that restricted travel and business operations. We know that at the beginning of 2022 there were more cars on the road than there were prior to the Covid-19 pandemic in January 2020, so data from 2022 is likely to give a much more accurate picture of air quality in Sandwell based on society returning to normal activities, business and travel

Table 1.1 Sandwell NO_2 Key Priority Zones for 2020 to 2025 and Historical Non-Compliance with NO_2 National Objectives						
Zone	**Historic Area No.**	**Description of Area**	**NO_2 Compliant**			
			2018	**2019**	**2020**	**2021**
1	13	High Street / Powke Lane, Blackheath	X	X	✓	✓
2	11	Bearwood Road, Smethwick	X	X	✓	✓
3	1	M5 Corridor - Blakeley Hall Road, Oldbury to Birmingham Road (A41),	X	X	✓	X
4	10	Newton Road / Birmingham Road (A34), Great Barr	X	X	✓	✓
5	14	Bromford Lane (including Kelvin Way / Brandon Way Junction), West Bromwich	X	✓	✓	✓
6	16	All Saints Way / Expressway, West Bromwich	X	✓	✓	✓
7	15	Trinity Way / Kenrick Way, West Bromwich	X	X	✓	✓
Hotspot		Mallin Street, Smethwick	X	X	✓	✓
Hotspot		Gorsty Hill, Blackheath	X	✓	✓	✓

A457 (Birmingham Road, Oldbury)

The A457 Birmingham Road, Oldbury lies within Priority Zone 3 and continues to be subject to NO_2 diffusion tube monitoring after being included within the '3rd Wave' of the government's Clean Air Strategy, as this link road exceeded the national objective for NO_2 in 2018. We have maintained 11 monitoring sites on this road, 7 where diffusion tubes have been deployed in triplicate, and there are an additional 4 sites existing where single diffusion tubes are deployed. The Automatic Urban and Rural Network (AURN) monitoring

station is also located on this road. In 2019 the A457 Birmingham Road, Oldbury (Tube BE) demonstrated the greatest exceedance of the mean annual objective at 47.9 µg/m^3. In 2021 the same site recorded 39.2 µg/m^3, this was a significant decrease of just over 18% from 2019, although the level is still high being within 10% of the national objective.

A41 (Birmingham Road, West Bromwich)

In 2019 a new exceedance was identified on a section of the A41 in West Bromwich between the M5 Junction 1 and the boundary with Birmingham City Council. This had not been subject to monitoring in previous years given that this section of 'A' road has relevant receptors set some distance away from the road. It was identified in the '3rd Wave' of the Government's Clean Air Strategy model in 2018 as being likely to exceed the national objective for NO_2 and was subject to a feasibility study on how to reduce levels on this road. This study concluded that retrofitting buses to Euro VI standard would bring forward the date of compliance to 2020 and this work was completed in November 2019.

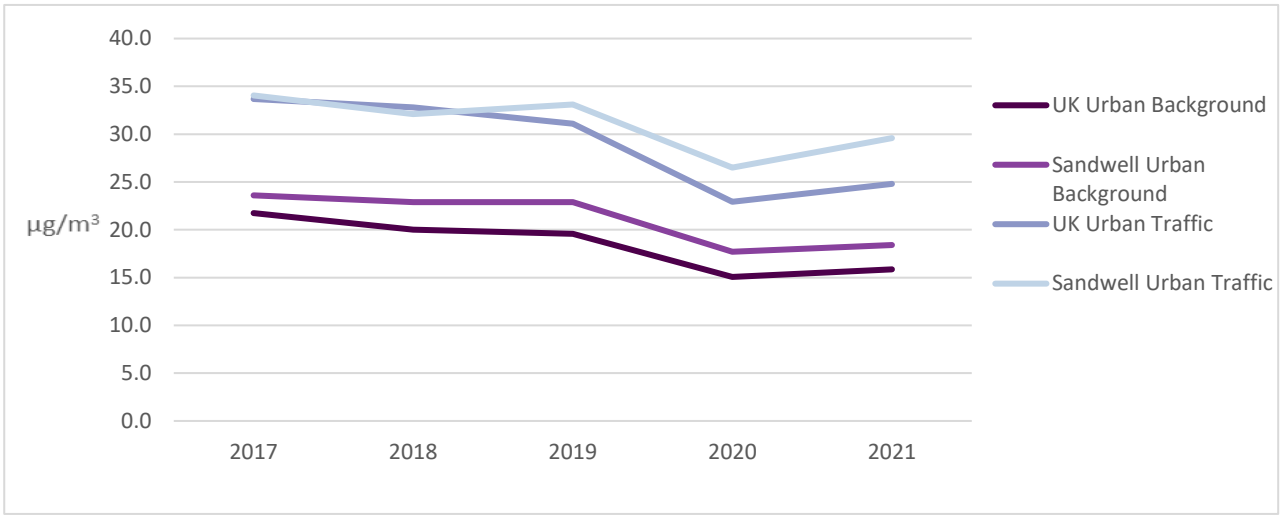
Since August 2019 we have continued to deploy NO_2 diffusion tubes in triplicate at five sites along the A41. In 2019 site PC1/2/3 was recording the highest concentrations with an annual mean of 44.6µg/m^3 this decreased to 38.1µg/m^3 in 2020 but has risen again to 44.2µg/m^3 in 2021. The other sites along this road did however remain more than 10% below the national objective for NO_2 registering annual means of between 32.7µg/m^3 and 35.6µg/m^3.

It is recognised that 2021 is still potentially an atypical year due to the pandemic. As agreed with Defra, we will need to continue measuring NO_2 levels along these link roads to truly evaluate the effectiveness of these interventions.

Levels of Nitrogen Dioxide (NO_2) recorded in Sandwell in 2021 compared with National Trends

Figure 1.1 shows the UK national trends in annual mean nitrogen dioxide concentrations in both urban background and urban traffic locations over the last five years. NO_2 levels were on a downward trajectory before 2020, a reduction that was accelerated by less vehicle usage during the pandemic. In 2021 there has been a slight increase in NO_2, but this has still not taken national averages back to those levels seen in 2019. Sandwell has generally mirrored the national trend in NO_2 averages over the last 5 years, but at a slightly higher concentration.

Figure 1.1- Comparison between the UK and Sandwell's Annual Mean NO_2 at Urban Background and Urban Traffic Sites



Levels of Particulate Matter recorded in Sandwell in 2021 compared with National Trends

The UK national air quality objective for PM_{10}, of 40µg/m^3 is currently met in Sandwell at all four continuous monitoring station sites. **Figure 1.2** demonstrates a slight downward trend in PM_{10} at our two urban traffic sites, with levels slightly below the UK average. Whilst **Figure 1.3** demonstrates a similar downward trend since 2019 at our two urban background sites, with levels in 2021 that were similar or just below the national average.

Figure 1.2 - Comparison between the UK and Sandwell's Annual Mean PM10 concentrations at Urban Traffic Sites

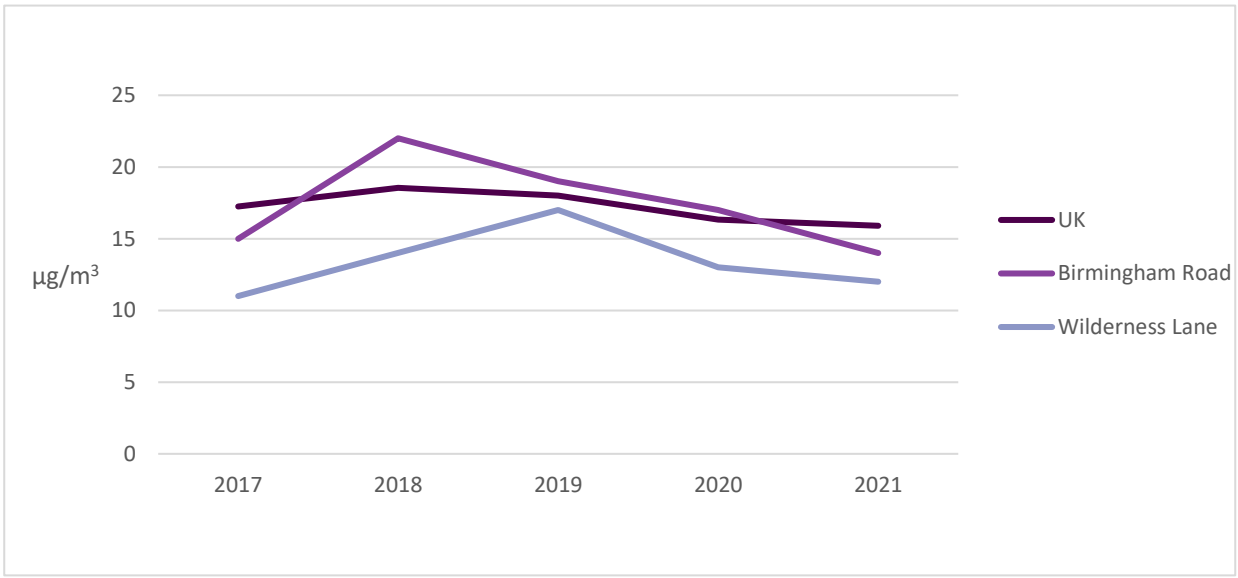
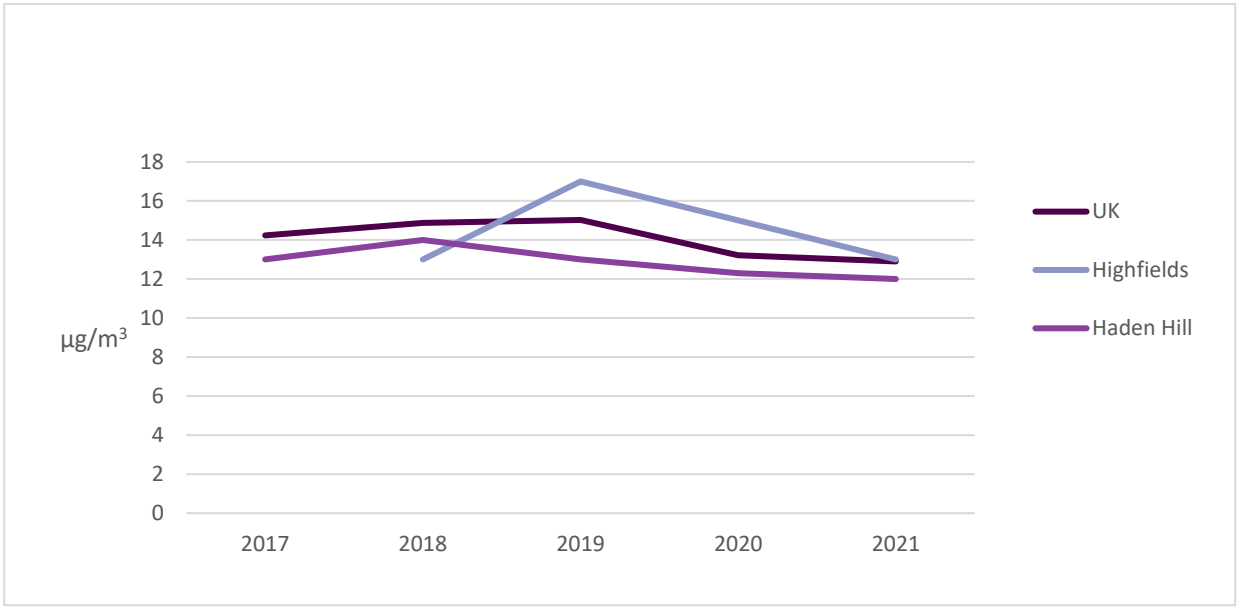
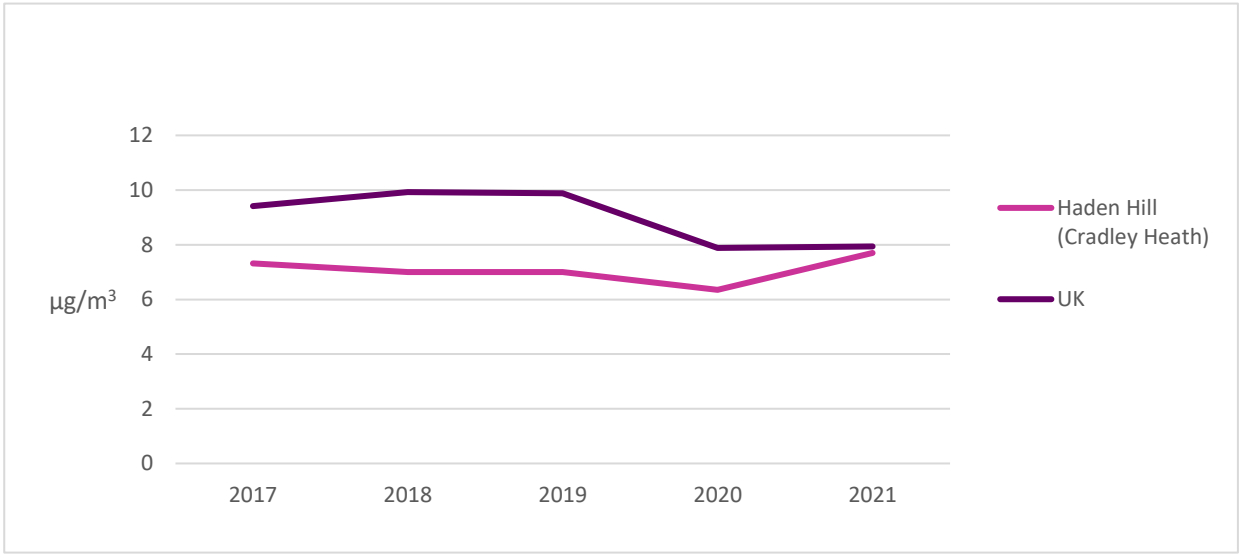


Figure 1.3 - Comparison between the UK and Sandwell's Annual Mean PM_{10} Concentrations at Urban Background Sites



In 2021 we expanded our $PM_{2.5}$ monitoring capability, so as well as Haden Hill we now have a three additional monitoring sites. We currently only have a year's worth of data from these other sites, so it cannot be used to compare against UK trends over the last five years. However, when Haden Hill is compared with the UK trend for $PM_{2.5}$, as shown in **Figure 1.4,** there has been an increase of 1.35µg/m^3 which has bought Sandwell's levels in line with the UK average.

Figure 1.4 - Comparison between the UK and Sandwell's Annual Man PM2.5 Concentrations at an Urban Background Site



Given that the general trend for the UK has been a gradual decline since 2019, Sandwell has deviated from this. This is an issue of concern as the aim is to reduce levels to below 5 µg/m^3 in line with current WHO guidelines, so any increase is of concern.

We do however know that $PM_{2.5}$ concentrations are influenced by many factors including domestic burning and transboundary transport which is closely linked with weather patterns, this means that levels can fluctuate for reasons beyond that of just local sources. Acting to reduce local sources is still very important, as Sandwell does not want to be responsible for the creation of pollutants that harm its own population or the creation of pollutants that are transported to neighbouring authorities and further afield.

As we move into 2022 we are aware that the Environment Act 2021 will require the creation of at least two new legally binding targets and that one of those will be for $PM_{2.5}$. In March 2022 the government proposed a new legally binding target to reduce levels of $PM_{2.5}$ to 10µg/m^3 by 2040. This target would seem relatively achievable for Sandwell, however the new guideline levels established by the World Health Organisation has been set at 5µg/m^3, a standard which recognises that there is no safe level of exposure. Currently no site in Sandwell is below 5 g/m^3 with the lowest annual mean of 6.8 g/m^3 at Wilderness Lane, Great Barr.

Actions to Improve Air Quality

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

The 2019 Clean Air Strategy[7] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[8] sets out the approach to reduce exhaust emissions from road transport through several mechanisms; this is extremely important given that most Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

[7] Defra. Clean Air Strategy, 2019

[8] Department for Transport. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Sandwell has seen a gradual but overall downward trend in NO_2 concentrations in the last 12 years and is coming closer to achieving compliance with the national air quality objective at all sites. However, this downward trend has not been replicated with $PM_{2.5}$ concentrations, yet the list of potentially negative impacts on health from particulate matter continues to grow.

In 2020 we reviewed the authority's ambitions and methods to improve local air quality, these are summarised as follows:

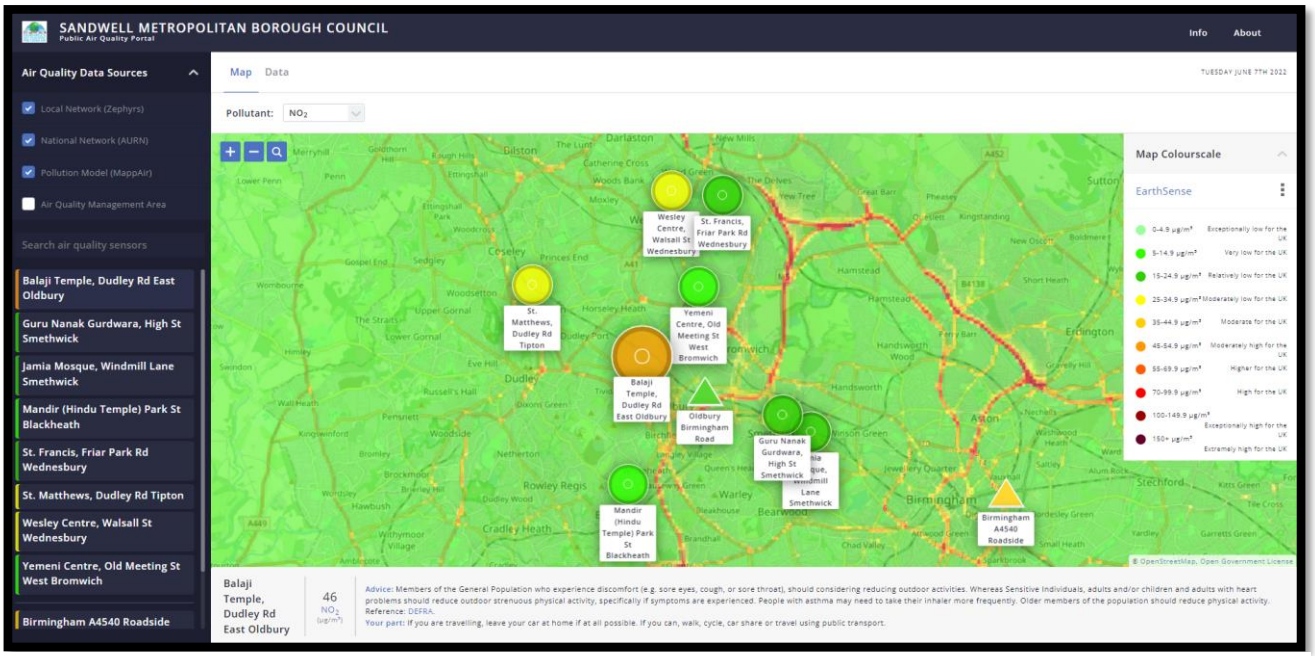
- Increase and update our monitoring capability of particulate matter (PM10 and PM2.5) – to provide data for the national network as well as supporting the development of local strategies.
- Provide real time, air quality data including PM_{10} and $PM_{2.5}$ to those living and working in Sandwell, in an easily accessible and understandable format.
- Follow the principles of behaviour change theory, to engage people, not through dictatorship or instruction, but by communicating a whole range of choices for individuals and groups to adopt in addressing local air pollution concerns.
- Utilise existing community groups and networks with established interest in their local area and environment and equip these communities with the knowledge and support to help them understand and assist in improving local air quality.

In 2020 we designed a project to reflect these ambitions, entitled '*Working with Faith Groups in Sandwell to Improve Air Quality via Behavioural Change'*. This project proposal was submitted in a successful bid to Defra for an Air Quality Grant in 2020 and was awarded in March 2021.

The project started in October 2021 and is expected to run until December 2023 with a total of 16 faith centres participating over the two years. The aim of the project is to empower faith leaders and their communities to improve air quality through initiatives chosen and driven by them.

Each centre has been allocated a low cost 'Zephyr' air quality monitor and a large television screen, which is tuned to a bespoke internet-based dashboard that shows real

time air quality data on a map of Sandwell[9]. Levels of NO_2, PM_{10}, $PM_{2.5}$ and Ozone are shown for each centre, using a green, amber and red rating representing low, medium or high concentrations. Sandwell's air quality dashboard is shown below.



The online air quality dashboard makes air quality visible, through the delivery of live air quality data outside 8 faith centres across Sandwell.

Each faith centre has also been given an 'Air Quality Toolkit' that provides information on air quality as well as a whole range of choices that individuals and groups can use to help reduce air pollution.

Air quality questionnaires were distributed at the start of the project and will be followed up with another questionnaire at the end of the year. The findings will be used to evaluate changes in the participants' knowledge of air quality and any positive changes in their behavioural choices. It is not expected that there will be a detectable improvement in air quality, given that the monitors will only be in location for 12 months at each centre. The long-term aim is that the information and knowledge gained by participants will influence future behaviour e.g. transport choices, private and business vehicle purchases and heating choices, as well as having a positive influence on family, friends and colleagues.

[9] https://portal.earthsense.co.uk/SandwellPublic

A car anti-idling installation was created at the 'Sandwell Breathes Conference' at the Balaji Temple in Oldbury

The Yemeni Community Association in West Bromwich launched a 'Car Free Friday' campaign

Since the project started at the end of 2021 faith centres have already responded with a range of measures including 'Car Free Fridays', held an air quality conference with an anti-idling installation and planted hundreds of trees. Centres have also received talks, at their request, from the air quality staff, on the causes, and effects of local air pollution and ways to help reduce it.

21 Low cost Air Quality Monitors to be Deployed Across Sandwell

In addition to the 8 Zephyr air quality monitors provided by the Defra Air Quality Grant, an additional 13 Zephyr air quality monitors were also purchased in 2021 by Sandwell's Public Health Department. A total of 13 Zephyrs were installed in 2021, the remaining eight are to be installed in 2022. These monitors are being placed across the borough in all six towns to enable additional real-time air quality data to be collected and to assist us with identifying when and where pollutant levels are peaking and if they are of significant concern e.g. areas with vulnerable population exposure such as the young and elderly. They will serve to support and shape future decision making e.g. planning, development and transport proposals across the borough.

Proposal to Designate Boroughwide Smoke Control Area

Actions to reduce local emissions of $PM_{2.5}$ are also a priority for Sandwell. According to the most recent Defra report[10], road traffic is responsible for generating approximately 13% of $PM_{2.5}$, but domestic combustion is still a much greater source accounting for 25%. This Defra report also states that 70% of emissions from domestic burning comes from burning wood in closed stoves and open fires. This means domestic wood burning now accounts for 17% of $PM_{2.5}$ emissions. Worryingly, the report also states that domestic wood burning increased by 35% between 2010 and 2020.

This potential for growth in wood burning stoves and open fireplaces supports our commitment in pursuing the removal of the existing 51 separate smoke control areas and replacing them with a single boroughwide smoke control area. Three public surveys were undertaken in 2021 to gauge opinion on the idea and a generally positive response was received[11]. With agreement from elected members, a public consultation is planned for May/June 2022. The public will be asked to have their say on the proposal to make the whole of Sandwell a Smoke Control Area. Should the response again be positive, and no legitimate objections are received, then the intention is to declare the whole of Sandwell as a Smoke Control Area in 2022, coming into full effect in 2023.

Low Emissions Towns and Cities Programme (LETCP)

Sandwell continues to be part of The Low Emissions Towns & Cities Programme (LETCP). This Defra funded project originally established in 2011 is a partnership comprised of the seven West Midlands Local Authorities (Birmingham CC, Coventry CC, Dudley MBC, Sandwell MBC, Solihull MBC, Walsall MBC and Wolverhampton CC) who continue to work collectively to reduce vehicle emissions whilst encouraging the uptake of cleaner vehicle fuels and technologies. Further information can be found at Walsall's Website: Low Emissions Towns and Cities Programme[12].

[10] https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25

[11] Council Cabinet Report and Minutes– October 20th 2021 https://sandwell.moderngov.co.uk/ieListDocuments.aspx?CId=143&MId=186&Ver=4

[12] https://go.walsall.gov.uk/low_emissions_towns_and_cities_programme

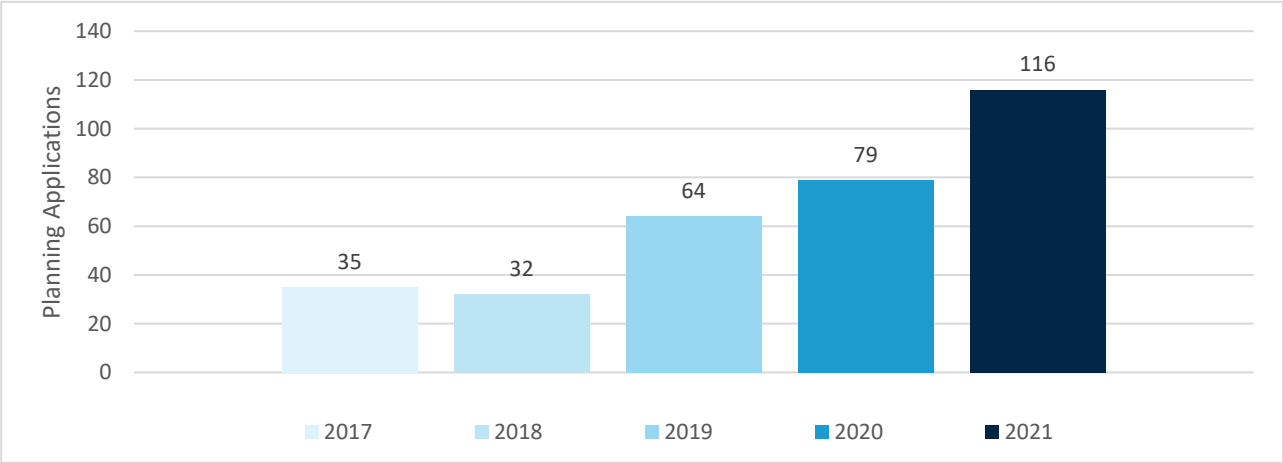
Planning Consultations

In 2016 Sandwell was one of four Black Country Councils (Sandwell, Dudley, Walsall and Wolverhampton) who adopted the Black Country Air Quality Supplementary Planning Document (SPD). This has continued to be implemented in 2021 by Air Quality Officers to ensure consistency in their approach when consulting on planning applications. Officers consider both the acceptability of development where it will introduce more people into areas of existing poor air quality, as well as assessing and finding options to mitigate any negative impacts that developments may themselves have on local air quality.

Planning Conditions

2021 saw a 46.8% increase in the number of planning applications requiring the provision of electric vehicle charging points at both residential, commercial and industrial premises. A comparison in applications conditioned to provide electric vehicle charging points over the last five years is shown in **Figure 1.5**. Conditions requiring developers to provide a travel plan for air quality purposes were also attached to 24 planning permissions.

Figure 1.5 – Number of planning applications conditioned to provide electric vehicle charging point/s



Conclusions and Priorities

Exceedances of National Air Quality Objectives

2020 was the first year since the AQMA was declared in 2005, that Sandwell did not record any exceedances of any of the national objective levels for NO_2, PM_{10} or $PM_{2.5}$. As predicted 2021 saw some bounce back in air pollutant concentrations, there was only one site on the A41 in West Bromwich that was in exceedance for NO_2. The COVID-19 pandemic and national lockdowns over the last two years mean that the results from 2020 and 2021 are likely to become outliers in future data analysis and should not be relied on in predicting long-term trends.

Significant Trends

NO_2 levels were on a downward trajectory before 2020, a reduction that was accelerated by less vehicle usage during the pandemic. In 2021 there has been a slight increase in NO_2, but this has still not taken national averages back to those seen in 2019. Sandwell has generally mirrored the national trend in NO_2 over the last 5 years, but at a slightly higher concentration. There is concern that levels could rise significantly in 2022, as vehicle traffic returns at higher numbers than those seen at the start of 2020 pre-pandemic, with more private car use and less public transport uptake.

PM_{10} levels at all sites have demonstrated a general overall downward trend since 2007, but PM2.5 levels at Haden Hill (an urban background site) have increased slightly to 7.7 µg/m^3 in 2021, after 4 years of plateauing closely to 7µg/m^3. As we now have another three continuous monitoring stations recording $PM_{2.5}$ we can start the process of accurately tracking concentration levels at both urban background and urban traffic sites. This data will enable us to create more targeted strategies and more accurate responses to development proposals, to enable better protection of local population health. Given that there is no safe level of exposure to $PM_{2.5}$, Sandwell's ambition is to ensure that annual levels remain below 10µg/m^3 with the long-term aim of achieving WHO guideline concentrations of below 5µg/m^3 per annum. We know that by working to reduce all pollutant concentrations we will not only meet current national air quality objectives but also improve overall health outcomes for those who live and work in Sandwell.

Sandwell Council's Air Quality aims are to:

- Reduce the overall health impacts and burdens of poor air quality.
- Achieve compliance with the national air quality mean objective for Nitrogen Dioxide within the shortest possible time.
- Reduce PM_{10} and $PM_{2.5}$ concentrations to protect human health.
- Utilise real-time low-cost air quality monitors and monitor particulate matter and specifically $PM_{2.5}$ levels more widely.
- Undertake projects that engage with local communities to raise awareness of local air pollution and create real opportunities that have a positive impact on air quality.
- Use data from the continuous monitoring stations to enable accurate benchmarking of NO_2, PM_{10} and $PM_{2.5}$ pollutant levels to create evidence based local air quality improvement strategies

The priorities listed in Sandwell's Air Quality Action Plan 2020-2025 remain and are stated in the table below.

Priority	Action
Priority 1	Identify and develop specific measures in consultation with communities to reduce NO_2 and PM concentrations at 'hotspot' and other locations where high levels of air pollutants are monitored and there is relevant population exposure.
Priority 2	Promote public transport, walking, cycling and switching to low or zero emission vehicles, including promoting and supporting the implementation of the Black Country ULEV strategy.
Priority 3	Review the impact that the council has on air quality and its role as a provider of public services, to develop a plan to reduce emissions from its activities.
Priority 4	Support and encourage taxi and private hire vehicle operators and drivers in reducing emissions from vehicles.

Priority 5	Application of existing and development of new planning development policies that support air quality improvements.
Priority 6	Develop information, social media and other campaigns to encourage positive behaviour change, including active travel and improving physical health as well as switching to low emission vehicles. Also providing information and advice on the health impacts of wood burning stoves and open fireplaces.
Priority 7	Work in partnership with Birmingham City Council to mitigate negative impacts on Sandwell's air quality resulting from the implementation of the Clean Air Zone (CAZ).

In addition to the priorities identified in the AQAP, additional priorities for 2022 include:

- Undertaking a public consultation on the proposal to remove the 51 existing smoke control areas and replace them with a single boroughwide smoke control area.
- Developing a more collaborative approach towards air quality, working more closely with the West Midlands Combined Authority and National Highways.
- Expanding community engagement work, including the 'Faith Communities' project
- Maintaining and utilising the data from the 21 Zephyr air quality monitors that will be installed across the borough.
- Working with the Climate Change team to identify projects with synergies that both improve air quality and reduce carbon emissions.

Challenges

- The longer-term impacts of the COVID-19 pandemic on Sandwell's air quality are still yet to be fully realised. Although there has been some bounce back in air pollution levels, we have not seen a return to pre-pandemic levels of air pollution. At the beginning of 2022 there were more cars on the road than there were prior to the Covid-19 pandemic at the start of 2020. Sandwell, like the rest of the West Midlands region is now facing a major challenge to get people back onto buses and trains in effort to reduce congestion and local air pollution. Transport for West

Midlands have stated that public transport will need additional government support to attract users back and make it viable for the future[13].

- The rising cost of living is of concern as we see the potential for residents and businesses to look towards dirtier forms of heating including wood and coal burning next autumn and winter. An uptick in domestic burning could negate much of the work done over the last ten years to clean up vehicle emissions. Changing hearts and minds away from wood burning stoves and open fireplaces is going to be a significant challenge, especially when residents face a choice between heating and eating, but an energy crisis should not become a health crisis. We need to ensure that whilst we explain the risks to health and the need for behavioural change, we also signpost to alternative heating methods and resources that will help households reduce their heating costs, for example, grants for home insulation and gas boiler upgrades.
- The implementation of the Black Country Ultra Low Emission Vehicle Strategy within Sandwell continues to require a lot of political support. This is an extremely ambitious strategy and requires determination and commitment from Sandwell Council to implement the actions required, including the provision of an extensive public charging infrastructure that will encourage uptake of cleaner vehicles and be able to meet demand.

Local Engagement and How to get Involved

Sandwell offers a variety of schemes and strategies, community projects and are involved with government action plans and more to improve air quality. There are a wide range of options and information available to the public to improve air quality and health. For example:

- Sandwell Carshare Scheme[14] offers a way of alleviating stress, saving money and improving emissions. Parking congestion is also helped through this scheme.

[13] https://www.expressandstar.com/news/politics/2022/04/01/car-usage-in-west-midlands-surges-past-pre pandemic-levels/

[14] https://liftshare.com/uk/community/sandwell

- Resilient Residents' Going Green webpage[15] is a section of the Council's website that directs residents to information about things like carbon footprint, green spaces and more.
- Faith Centre Air Quality project[16] using the Defra Air Quality Grant 2020, combines air quality monitoring with behavioural change in a community setting.
- GoJauntly[17] partnered with the Council to offer an app for free walking routes around the borough, to increase walking rates.
- TravelWise in Sandwell[18] for information on how to plan a carshare, public transport journey, cycle journey, or walking journey.
- Air Quality Sandwell[19] offers the opportunity to report a pollution problem, and historical information about NO_2 levels in the borough.
- Sandwell Walking Strategy[20] 2015 to increase walking uptake, target resources and deliver improvement and enhancements to the walking environment over a 5-year period.
- Healthy Sandwell[21] offers support for your health and wellbeing. They can provide information about walking, increasing activity and more.
- Smoke Control Areas[22] shows information about which areas of Sandwell that are designated Smoke Control Area by the Clean Air Act 1993. In Smoke Control Areas you can't emit smoke from a chimney unless you are burning authorised fuel or using "exempt appliances". Sandwell Metropolitan Borough Council is currently carrying out public consultation to encompass the whole borough in a smoke control area.

[15] https://www.sandwell.gov.uk/goinggreen

[16] https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/6

[17] https://www.gojauntly.com/sandwell

[18] ww.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell

[19] https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/3

[20] https://www.sandwell.gov.uk/info/200222/healthy_sandwell_healthy_you/3250/sandwell_walking_strategy

[21] https://www.healthysandwell.co.uk/

[22] https://data.gov.uk/dataset/2e59be11-a9db-4b9e-8cbb-8e2f2567c588/sandwell-mbc-smoke-control-area

- Reporting a bonfire problem[23] in Sandwell can help reduce air pollution. There are guidelines to follow when burning a bonfire to minimise the effect on air quality. Composting food and garden waste instead of burning it can reduce air pollution. Sandwell offers a discount on compost bins[24] to help reduce methane and smoke emissions.
- Air quality and climate change are closely linked. Sandwell's Climate Change and Air Quality website[25] provides tips on how residents can help in the fight against climate change. We also have Community Climate Change grants for community groups, and a Community Climate Change Champions network.
- Planting and preserving trees are important in improving air quality. Sandwell's Tree Preservation Orders and Urban Tree Policy[26] highlight the importance of trees and new tree planning. The Woodland Trust[27] is a woodland conservation charity, and a source of information on how to plant a tree, get involved with ongoing tree planting projects in Sandwell and more.
- Using and purchasing electric cars helps reduce air pollution in and around Sandwell. Sandwell has committed to the Black Country Ultra Low Emission Vehicle Strategy[28] commits to deliver a network of electric vehicle charging points and ULEV public service vehicles. Residents can recommend a location[29] for a residential on-street electric vehicle charging point in Sandwell.
- Switching to energy efficient bulbs and appliances, improving insulation, or replacing your boiler to low NO_x options can help reduce carbon emission and improve air quality. ECO3[30] in Sandwell is a government energy efficiency scheme designed to help reduce carbon emissions and tackle fuel poverty. Switching

[23] https://www.sandwell.gov.uk/info/200274/pollution/3188/report_a_bonfire_problem

[24] https://www.sandwell.gov.uk/info/200160/bins_and_recycling/2194/composting

[25] https://www.sandwell.gov.uk/info/200274/pollution/4402/climate_change_and_air_quality_in_sandwell

[26] http://www.sandwell.gov.uk/download/downloads/id/21932/october_2014_-_urban_tree_policy.pdf

[27] https://www.woodlandtrust.org.uk/

[28] https://www.sandwell.gov.uk/ev

[29] https://wh1.snapsurveys.com/s.asp?k=158281500955

[30] https://www.sandwell.gov.uk/info/200190/consumer_advice/4282/eco3

energy providers to those that are sourced from renewable energy sources help improves air quality.

- The Clean Air Strategy[31] 2019 sets out actions required across all parts of government and society to improve air quality. Supporting clean air legislation is important in improving air quality.
- Sandwell's Eco Bus[32] is a project designed to educate children and adults about their local environment, air pollution, climate change and recycling. It is a free service available to all Sandwell schools and community groups.
- Charging points at work help make electric cars viable for commuters who live further away from their homes. If your work doesn't have an electric vehicle charge point installed, it could take advantage of the Government's Workplace Charging Scheme (WGS). The WGS is a voucher-based scheme that provides a contribution towards the up-front costs of the purchase and installation of electric vehicle to the value of £300 per socket – up to a maximum of 20 sockets. Employers can apply for vouchers using the Workplace Charging Scheme application[33].

[31] https://www.gov.uk/government/publications/clean-air-strategy-2019

[32] https://www.sandwell.gov.uk/ecobus

[33] https://www.gov.uk/government/publications/workplace-charging-scheme-application-form

Local Responsibilities and Commitment

This ASR was prepared by the Pollution Control Team of Sandwell Metropolitan Borough Council with the support and agreement of the following officers and departments:

Elizabeth Stephens – Senior Environmental Health Officer, Air Quality

Sophie Morris – Environmental Improvement Officer/Air Quality and Climate Change

Sandwell MBC's Public Health Department

This ASR has been approved by:

- Paul Fisher, Deputy Director of Public Health
- Lisa McNally, Director of Public Health

This ASR has been signed off by the Director of Public Health

Lisa McNally, Director of Public Health, Sandwell MBC

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

Address: Sandwell Council House, Freeth Street, Oldbury, B69 3DE

Email: Pollution_Control@sandwell.gov.uk

Table of Contents

Figures

Tables

1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether 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 Sandwell MBC to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

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 Sandwell MBC can be found in **Table 2. 1.** The table presents a description of the boroughwide AQMA that is currently designated within Sandwell MBC **Appendix D**: Map(s) of Monitoring Locations and AQMAs provides maps of 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:

- NO_2 annual mean

Table 2. 1- Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
Sandwell Air Quality Management Area	Sandwell AQMA Order 2005	NO2 Annual Mean	Sandwell Metropolitan Borough Council	YES	58.51µg/m^3 (C10D)	44.2 µg/m^3 (PC1, PC2, PC3)	Air Quality Action Plan Sandwell MBC 2020-2025	Sandwell MBC AQAP 2020-2025

☒ **Sandwell MBC confirm the information on UK-Air regarding their AQMA(s) is up to date**

☒ **Sandwell confirm that all current AQAPs have been submitted to Defra**

Additional Information on Strategies to Improve Air Quality in Sandwell MBC

Clean Air Strategy 2018 Response

The government's Clean Air Strategy 2018 also included a 'UK plan for tackling roadside nitrogen dioxide (NO_2) concentrations' that focused on bringing certain roads within the statutory average annual limit of 40µg/m^3 in the shortest possible time. Sandwell was included in the "Third wave" of Local Authorities where air quality modelling identified seven road links that were likely to be exceeding the NO_2 national objective and must therefore become compliant before 2021 or earlier. Of the seven roads identified, four of these were under local authority control as listed below, with the remainder managed by National Highways.

Road Link Air Quality Improvement Feasibility Studies			
Census ID	**Road Name**	**Description of Area**	**Priority Zone**
17142	A457 Oldbury	Roundabout with the A4034 and roundabout linking the A4031	3
99155	A41, J1 M5 West Bromwich	Between the roundabout with M5 Junction 1 & the local authority boundary with Birmingham City Council	3
99397	A41 Black Country Route at Wednesbury	Roundabout with the A4037 and the roundabout with A461 at Wednesbury	Not within a designated priority zone.
16330	A34 Great Barr	Junction at A4041 Newton Road and the M6 at Junction 7	4

Both road links 17142 and 99155 fall within Priority Zone 3 (A457 Birmingham Road and A41, Birmingham Road, West Bromwich) and Road link 16330 now falls within Priority Zone 4 (A34 Great Barr).

A consultant was appointed to undertake a feasibility study to evaluate the air quality impact and source apportionment at each of the four-road links and identify key mitigation measures that could be implemented to bring forward the predicted date of compliance.

The feasibility study concluded that retrofitting buses to Euro VI standard that travel along the 17142 (A457 Birmingham Road, Oldbury) and 99155 (A41, West Bromwich) road links, as well as optimising traffic signals on the A41 at Junction 1 M5, would bring forwarded the predicted date of compliance to 2019. The measures identified for the two remaining road links could not bring forward the date of compliance.

The traffic signal optimisation on the A41 was completed on target in September 2018. The retrofitting of the buses to Euro VI standard was completed in November 2019.

It was recognised that long term measurement of NO_2 levels along these link roads was required to determine the effectiveness of these interventions. In February 2019 NO_2 diffusion tubes were deployed (in triplicate) at 5 sites along the A41 West Bromwich M5 J1 link road. Then in August 2019 NO_2 diffusion tubes were deployed in triplicate at 7 locations along the A457 link road, whilst existing monitoring tubes continued to be deployed along this section. The aim being to monitor the levels at these sites for at least five years.

The data for 2020 not surprisingly confirmed no exceedances on either link road for NO_2, but this was an atypical year due to the pandemic. In 2021 we have seen levels rise, but on the A457 the same site that recorded 39.2 µg/m^3 was still 18% lower than the level recorded in 2019, although levels are still high and within 10% of the national objective. Whilst on the A41, one site saw an exceedance of the national objective at 44.2µg/m^3, which is close to the 2019 level of 44.6µg/m^3. The other sites along this road did however remain more than 10% below the national objective for NO_2.

As agreed with Defra, long-term measurement of NO_2 levels along these link roads will continue so that we can determine the true impact of these interventions when traffic returns to post-pandemic levels. We will therefore continue in 2022 with quarterly reporting of NO_2 data to Defra.

Progress and Impact of Measures to address Air Quality in Sandwell

Defra's appraisal of last year's ASR concluded that the report was well structured and provided all the information specified in the Guidance and was accepted in full by Defra. Several comments were made by Defra in response to the report, these are listed below for information.

1. Trends are presented and discussed, and a robust comparison to air quality objectives is provided.
2. They show a good commitment to air quality monitoring despite low pollutant concentration levels in the AQMA.
3. The Council has provided an extensive list of action plan measures and all the relevant fields have been completed with detailed comments.
4. Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment and the annualisation completed were outlined in detail which enhances the reader's understanding. The deliberation over the choice of bias adjustment used was appropriate and considered robust.
5. The Council has responded to last year's appraisal comments and made changes to the report based on the comments. This is encouraging to see.
6. Overall, the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.

Sandwell MBC has taken forward several direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in **Table 2. 2.** A total of 28 measures are included within **Table 2. 2,** with the type of measure and the progress Sandwell MBC have made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within **Table 2. 2.**

Most of the air quality measures identified are included in Sandwell's Air Quality Action Plan 2020-2025, but some additional measures have also been included i.e. the ambition to create a boroughwide Smoke Control Area by revoking the existing 51 separate areas and to combine this with a wood burning stove education campaign. A further addition is

the implementation of the 'Faith Centre Behavioural Change' project funded by a Defra air quality grant.

In addition to work undertaken by Sandwell MBC, the West Midlands Combined Authority (WMCA) continues to be a key player in forming policies and funding projects to improve air quality. The WMCA produced an overriding Strategic Economic Plan[34] which included a regional transport plan, produced by Transport for West Midlands. This plan is now recognised as the WMCA's Movement for Growth[35] strategic transport plan and provides a framework for the key transport challenges in the region, with significant investment programmes planned over the next 14 years or so. This plan includes a Sustainable Travel Team working in conjunction with the seven Metropolitan local authorities to support local businesses, education sites and individuals, enabling them to make smarter travel choices resulting in improvements to air quality.

In February 2022 the WMCA Board approved the development of an Air Quality Framework for the West Midlands region. The decision was based on an options paper, developed in conjunction with the University of Birmingham WM-Air project, that outlined a possible 122 interventions that could be made to tackle poor air quality across the region. A high-level assessment of cost and scale of implementation (national, regional and local) was made, and this will be developed in more detail through an Air Quality Framework. A focus of the options paper is on the growing importance of tackling particulate matter (PM_{10} and $PM_{2.5}$). It is considered that it may be best to deal with particulate matter on a regional level given the fact that particulates remain for long periods in the atmosphere and therefore spread across local authority boundaries to a greater degree than NO_x and NO_2.

The Black Country Transport – Ultra Low Emission Vehicle Strategy was also agreed in May 2020. This is a strategic transport partnership between Dudley, Sandwell, Walsall and Wolverhampton Councils. The overarching aim is to accelerate the uptake of ULEVs across the area before the nationwide ban in 2030 on the sale of petrol and diesel

[34] https://www.wmca.org.uk/what-we-do/strategy/

[35] https://www.tfwm.org.uk/strategy/sustainable-travel/

vehicles. It sets out ambitious targets that Sandwell should meet to ensure that there is an EV charging infrastructure that will both promote the switch to ULEV's as well meet the growing demand for electric vehicles.

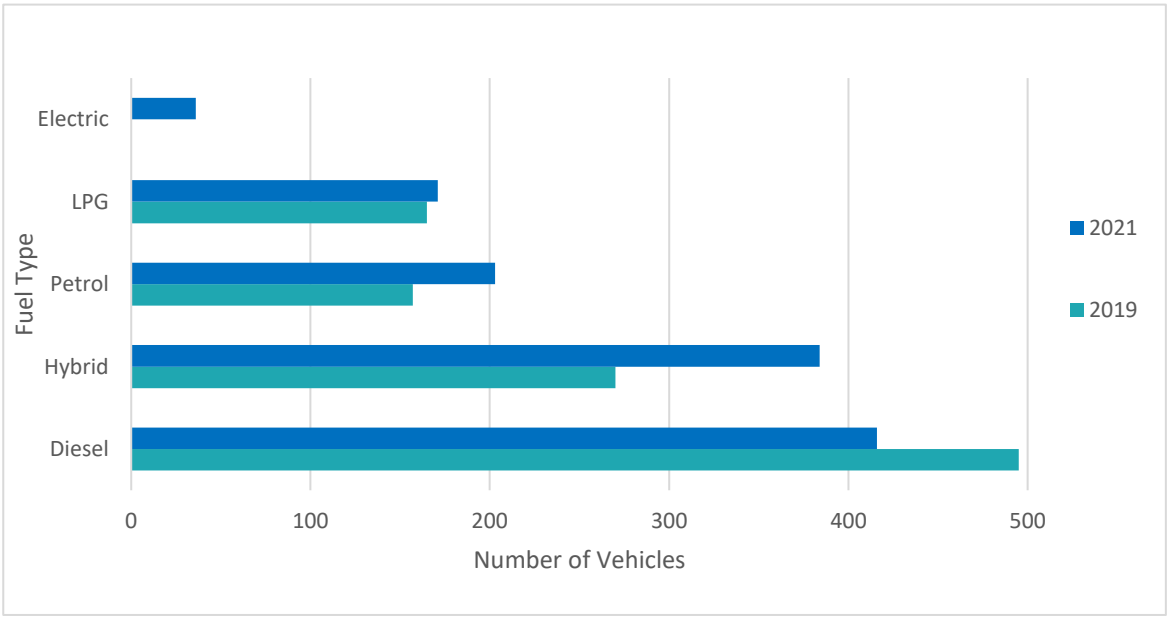
Key Completed Measures

The following measures as identified in the ASR 2021 were completed in 2021.

- Four of Sandwell's five continuous automatic air quality monitoring stations were updated with the installation of FIDAS fine dust aerosol spectrometers that will accurately monitor PM10 and PM2.5 to create network of accurate monitoring of PM_{10} and $PM_{2.5}$. This is particularly important given the plethora of health conditions associated with breathing in fine particulate matter.
- Sandwell secured conditions on 116 planning permissions requiring the provision of electric vehicle charging points. Compared to 2020 this was a 46.8% increase.
- 24 development proposals were conditioned to provide a travel plan for air quality purposes, these included commercial, residential and industrial developments. These conditions help to ensure future sustainable development by identifying and enforcing conditions required to mitigate any potentially negative impacts on air quality from new development.
- Changes were made in 2018 to lane marking, capacity and traffic flow on the Kelvin Way/Trinity Way roundabout in Zone 7 in a bid to reduce NO2 concentrations. The data in 2021 demonstrates an overall reduction of just over 8 µg/m^3 in the last five years. Kelvin Way (N1A) had NO_2 concentration levels of 40.4µg/m^3 in 2017 and 32.2µg/m^3 in 2022. Although the results are positive, the impact of Covid lockdown restrictions during 2021 affects the data. A full 12-month period without lockdowns, is required to see if these levels continue and we will therefore review this measure again in the ASR 2023.
- Actions following the 'Third Wave' study which required measures to reduce NO_2 concentrations on both the A257 (Oldbury) and A41(West Bromwich) link roads were completed in 2020. Understanding the real impact of the traffic signal optimisation and retro-fitting of buses (to Euro VI standards) on NO_2 has been complicated by the pandemic and the concentrations remains under further review. We await further direction in 2022 from the Joint Air Quality Unit (JAQU).

- 13 Zephyr low cost air quality monitors were deployed in July and August 2021, with a further 5 deployed by March 2022. Each Zephyr air quality monitor measures NO_2, O_3, PM_{10} and $PM_{2.5}$.
- The bespoke web-based air quality dashboard[36] was launched to provide real-time, easily accessible air quality information for 8 Zephyrs. This is part of the Defra air quality grant funded project and is set to run till June 2024.
- Three on-line surveys were carried out over July and August 2021 to gauge public opinion on the potential proposal to revoke the existing 51 smoke control areas and declare a single boroughwide smoke control area. The results were presented to cabinet in October 2021. In summary, 75% of residents, 58% of businesses and 69% of young people agreed that Sandwell should be protected by a boroughwide smoke control area.
- Data from Sandwell's licensed private vehicle hire taxis was reviewed to identify any significant changes in the emission profiles of the fleet over the last two years (N.B. there are currently 123 more licensed private hire vehicles in the fleet than in 2019, an increase from 1,087 to 1,210).

Figure 2. 1 The profile of Sandwell's Private Hire Vehicle Fleet in 2019 and 2021



[36] https://portal.earthsense.co.uk/SandwellPublic

As is shown in **Figure 2. 1**, licensed diesel cars were down by 16%, but petrol cars increased by 23%. Hybrid cars have seen a significant increase of 30%. In 2019 there were no electric cars registered in the fleet, but now there are 36. Overall the changes in the private hire vehicle fleet parc are showing a generally positive trend in moving away from diesel and towards cleaner fuels. The fleet make-up will continue to be monitored and we will continue to work with the taxi licensing team to identify measures to encourage the take-up of cleaner vehicles as part of our commitment to the Black Country ULEV Strategy.

- The Black Country ULEV strategy was adopted by Sandwell MBC's Cabinet in September 2021.
- A successful £400,000 bid to the 'Office for Zero Emission Vehicles' was made. This will enable Sandwell MBC to deliver 37 street EV residential charge points. A public consultation on determining location of EV charging points will be held in March 2022.
- Efforts were made to engage with Sandwell employees and cabinet members to promote the use of ultra-low emission transport technologies. Two presentations on low emission and zero emission vehicles were also given by the Energy Savings Trust followed by a Q & A session to council staff and elected members.

Measures to be Completed in 2022

Sandwell MBC expects the following measures to be completed over the course of the next reporting year (2022).

- A total of 21 Zephyr low cost air quality monitors to be operational across Sandwell by June 2022. This will measure NO_2, O_3, PM_{10} and $PM_{2.5}$
- Following unanimous agreement by elected members in December 2021, Sandwell MBC will declare its intention to revoke the existing 51 smoke control areas to create a boroughwide smoke control area. This will include undertaking a formal legal advertising process as well as a public consultation.
- Sandwell MBC's elected members will be expected to make a final decision in 2022 on whether to formally declare a single boroughwide smoke control area. This decision will be based on feedback from the public consultation as well as any legitimate objections made during the 6-week legal advertising period planned for May and June 2022.

- The launch of a 'Wood Burning Stove' information campaign is planned to be undertaken in 2022 to coincide with publicity around designating the whole of the borough as a Smoke Control Area. The plan is to include a digital leaflet, local press releases and information on the council's website as well as the council's own social media communication channels.
- Sandwell Council's Public Health Community Climate Champions are aiming to complete their part in the Net Zero Innovation Programme[37] funded by the Local Government Association and in partnership with the University of Birmingham.

Sandwell MBC's priorities for 2022

- The continued implementation of the Air Quality Action Plan 2020-2025 remains a priority. This plan places an increasing focus on the uptake of low emission transport by domestic and commercial users as well as focussing on sustainable planning and development. In 2022, the plan is to hold quarterly meetings with key stakeholders to give progress updates and providing all interested parties to comment on the actions being taken and as well as providing an opportunity to discuss and steer future work.
- In response to the Environment Act 2021 Sandwell will be seeking a more collaborative approach towards air quality. We will be looking for support from other air quality partners, including the West Midlands Combined Authority (WMCA), as we know pollutants move across local boundaries and collaborative interventions are required. The establishment of the regional Air Quality Framework is welcomed as this would provide a more joined up approach with a large group of local authorities, supported by the WMCA. This provides an opportunity to maximise the impact of interventions (e.g. behaviour change messages and initiatives) and minimise the potential of unintended harms and consequences that could result from uncoordinated actions.
- Raising public awareness about the dangers to health from domestic burning will remain a priority in 2022 and goes in tandem with Sandwell MBC's proposal to create a boroughwide smoke control area. The messaging will focus on the health

[37] https://www.local.gov.uk/our-support/climate-change-hub/net-zero-innovation-programme

impact related to poor air quality both indoors and outdoors from open fires as well as from wood and coal burning stoves. With the expected steep rise in the cost of living in 2022 we are very aware that residents may look towards dirty and dangerous fuels such as wood and coal for heating their homes in a bid to save money. We want to discourage residents from reverting back to using 'traditional' fires and even modern stoves by using impactful and accurate information that highlights the costs to health. We also want to provide advice and guidance in relation to energy efficiency measures that will help reduce energy consumption and costs and not result in exposure to dangerous air pollutants.

- The air quality team will continue to prioritise its community engagement work and specifically its main project, '*Working with Faith Groups in Sandwell to Improve Air Quality via Behavioural Change'*. This project was made possible through the award of a Defra Air Quality Grant in March 2021. This community driven project aims to involve 16 faith centres across Sandwell over 2 years, with the goal of helping local communities understand the links between air quality and health. It is also being used as a platform to share knowledge and ideas of how simple changes in everyday activities can have a positive impact on both health and local air quality.
- Sandwell have invested in 21 Zephyr low cost air quality monitors, so we need to ensure that all these monitors improve our understanding of air quality across the borough. We plan to use this data both to promote behavioural change but also to inform wider decision making within the Council, including planning and transport.
- As the Council continues to develop its response to the climate change crisis, it is important that we identify the synergies between carbon reduction and improved air quality to maximise our impact. Air quality officers will continue to attend the Council's Adaptation and Resilience Group to identify and prioritise actions that both improve air quality as well as slowing down the predicted impacts of climate change.
- Continuing to support the delivery of the Black Country's ULEV Strategy's planning policy and infrastructure recommendations.
- Identification of any potential new measures to improve air quality both at site specific locations, as well as borough wide initiatives.
- Respond to and support community ideas and initiatives designed to help tackle the causes and/or consequences of local air pollution.
- Respond to all relevant planning consultations in accordance with the Black Country SPD and ensure a consistent approach to all new development proposals

in terms of air quality. This is an important tool in mitigating the potential negative impacts of new development on local air quality.

- Promote and encourage continued home and hybrid working amongst council staff where possible, highlighting the air quality and health benefits gained from reducing unnecessary car travel into and around Sandwell.
- Provide opportunities for council staff to receive independent advice about switching to electric car use, this will include signing up for education/Q & A sessions provided by the Energy Savings Trust.
- Establish a closer working partnership with National Highways, given that both the M5 and M6 motorways run through Sandwell. By sharing data and local concerns we can work together to improve air quality in Sandwell. For example, in 2021 National Highways implemented a trial 60mph speed restriction on the elevated section of the M5 between J1 and J2, for air quality and we are keen to understand and build upon their findings from this pilot scheme. In 2022 we will be assisting National Highways in their air quality monitoring by deploying NO_2 diffusion tubes at 11 sites below the 3.2km section of the M5 Oldbury Viaduct.
- To ensure continued active participation within the West Midlands Environmental Protection Group, and to use this as a platform for sharing knowledge and best practice with our neighbouring local authorities.

Sandwell MBC has worked to implement these measures in partnership with the following stakeholders during 2021:

- Balaji Temple, Oldbury
- Department for Environment Food and Rural Affairs (DEFRA)
- EarthSense
- Energy Savings Trust
- EnviroTech
- Guru Nanak Gurdwara, Smethwick
- Jamia Masjid, Smethwick
- National Highways
- Office of Zero Emissions
- St Francis of Assis Church, Wednesbury
- St Matthews Church, Tipton
- Shri Pashupatinath Mandir, Rowley Regis

- University of Birmingham
- Wesley Centre, Wednesbury
- West Midlands Combine Authority
- Yemeni Community Association, West Bromwich

Principal Challenges and Barriers

- The principal challenges and barriers to implementation of Sandwell's AQAP[38], are around securing a sufficient and consistent level of funding. 2020/21 saw significant investment within the Air Quality Team including a new member of staff and updating of air quality monitoring equipment. However, this funding will need to be sustained in the long-term if we are to maintain this momentum in understanding and improving air quality in Sandwell.
- The rising cost of living is of concern as we see the potential for residents and businesses to look towards dirtier forms of heating including wood and coal burning. An uptick in domestic burning could negate much of the work done over the last ten years to clean up vehicle emissions. Changing hearts and minds away from wood burning stoves and open fireplaces is going to be a significant challenge.
- At the beginning of 2022 there are more cars on the road than there were prior to the Covid-19 pandemic at the start of 2020. Sandwell, as well as the rest of the West Midlands region, is now facing a major challenge to get people back onto buses and trains in effort to reduce local air pollution. Transport for West Midlands have stated that public transport will need additional government support to attract users back and make it viable for the future[39].

Progress on the following measures has been slower than expected due to:

- The review of Sandwell MBC's vehicle fleet by the Energy Savings Trust should have been undertaken in 2021. This report would help the council determine the current vehicle emissions profile, provide a steer on how to move towards a low emission fleet as well as the potential costs involved. Although data from

[38] https://www.sandwell.gov.uk/downloads/file/31636/aqap_2020_2025_-_adopted

[39] https://www.expressandstar.com/news/politics/2022/04/01/car-usage-in-west-midlands-surges-past-pre-pandemic-levels/

Sandwell's council's vehicle fleet (including the grey fleet) has been successfully collated, we are still awaiting SERCO's refuse collection vehicle (RCV) data. As RCVs contribute the most to air pollution in most local authority's fleet, data from their operations forms an essential element of this report. Until this data is provided we will not be able to commission the EST report. Officers in the Climate Change team are now pursuing this matter as well as Fleet Services.

- It was expected that the public consultation and formal Notice of Intention to Declare a single boroughwide smoke control area would have been launched by December 2021. Unfortunately, administration and legal checks created unforeseen delays. Although these checks were necessary to ensure correct legal process was being followed, it has added further delay to this air quality improvement measure.

Whilst the measures stated above and in **Error! Reference source not found.** will help to c ontribute towards compliance, Sandwell MBC anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Sandwell's AQMA.

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	Black Country - ULEV Strategy - provision of electric charging infrastructure across Sandwell and other black country local authorities	Promoting Low Emission Transport	Other	2020	2030	Sandwell MBC and Black Country Authorities	Sandwell MBC and Black Country Local Authorities	NO	Partially funded	£1 million - £10 million	Implementation	By 2025 - Transport emissions reduction of 10% for NOx, and 35% for PM	Increase of Sandwell's Vehicle Parc to 4%, 90% of population within 5 minutes' drive of a rapid charger	Strategy was adopted by Cabinet September 2021	
2	Review of homeworking for Sandwell Council – move to long-term home-working and hybrid working contracts	Promoting Travel Alternatives	Encourage / Facilitate home-working	2020	2024	Sandwell MBC	Sandwell MBC	NO	Funded	£100k - £500k	Implementation	Reduction in pollution from staff commute and staff journeys around the district for meetings etc.	Reduction in car mileage claims	Most office staff still working at home in 2021. Hybrid working arrangements for office staff in 2022 – Car mileage claims in 2021 reduced by 57% from 2019.	Likely to see increase in 2022 when more staff return to office working
3	Midland Metro Extension (Wednesbury to Brierley Hill)	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2017	2023	Sandwell MBC WMCA	WMCA, Black Country LEP and HS2 Connectivity	NO	Funded	> £10 million	Implementation	Reduction in emissions due to travel by metro vs. private vehicles	Increased public transport patronage	Work is in progress - can be tracked at https://metroalliance.co.uk/projects/wednesbury-to-brierley-hill-extension/	
4	'Third wave' intervention to reduce NO2 concentrations on A41 and A457	Traffic Management	Public transport improvements-interchanges stations and services	2018	2022	Sandwell MBC, DEFRA	DEFRA	Yes	Fully Funded	£50k - £100k	Completed	Reducing emissions - site specific targets to achieve annual mean <40µgm/m3	NO2 Diffusion tube data demonstrating annual mean <40µgm/m3	Bus retrofit, and traffic signal works completed in 2019. Data to continue to be monitored through 2022	Data from 2021 demonstrates an exceedance of NO2 at one site on the A41
5	Project working with Faith Centres across Sandwell to reduce local air pollution by encouraging behavioural change using low cost air quality monitors and a web based AQ dashboard and AQ toolkit	Public Information	Other	2021	2024	Sandwell MBC	Sandwell MBC	YES	Funded	£100k - £500k	Implementation	No target	Behavioural change assessed through questionnaires at beginning and end of project	Grant award made by DEFRA in March 2021 - project began in August 2021.	6 Month extension to the project agreed by DEFRA till June 2024 due to unforeseen delays
6	Provide air quality information and promote sustainable school transport	Promoting Travel Alternatives	Workplace Travel Planning	2019	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	Reduction in cars travelling to schools for drop off and pick up	Increase use of sustainable travel modes in schools	Limited progress due to limited funding available to promote sustainable school transport. Some promotion of ModeShift STARS tool in schools. Some progress possible with potential to appoint a Sustainable/Active Travel Officer in 2022.	Last updated 2019 - Sustainable Modes of Travel Strategy (SMOTS) https://www.sandwell.gov.uk/download/downloads/id/28553/smbc_sustainable_modes_of_travel_to_school_strategy_-_2019_update.pdf
7	Improve branding to increase awareness and attractiveness of public transport	Promoting Travel Alternatives	Workplace Travel Planning	2012	2025	National Express, Transport for West Midlands	N/A	NO	Funded	£10k - 50k	Implementation	No target	Increased public transport patronage	On-going programme of brand improvement, including safer network, improved connections, signage and accessibility	Promotion of public transport limited in 2021 due to Covid-19 pandemic.

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
8	Develop real-time air pollution monitoring to identify hotspots and areas of public exposure to air pollution	Public Information	Via the Internet	2018	2022	Sandwell MBC	Sandwell MBC	NO	Funded	£50k - £100k	Implementation	No target	Installation of low cost air quality monitors	8 Low cost 'Zephyr' air quality monitors purchased through DEFRA grant that provide data that can be accessed via a public air quality portal.	Public Air Quality Portal can be accessed on the internet @ https://portal.earthsense.co.uk/SandwellPublic
9	Review transport planning and traffic infrastructure in AQ Priority Zones and Hotspot locations. Use to identify and implement programme of work to reduce NO2 concentrations where applicable	Traffic Management	Other	2018	2023	Sandwell MBC	N/A	NO	Funded	£10k - 50k	Implementation	Reducing emissions - site specific targets to achieve annual mean <40µgm/m3	Annual average NO2 value reductions	Implementation on-going	Impact of COVID-19 pandemic - disruption to transport and public transport in 2020 and 2021 has skewed figures - requires further review in 2022
10	Major highway improvement at Birchley Island (Junction 2, M5)	Traffic Management	Other	2014	2026	Sandwell MBC, WMCA	Sandwell MBC, Department of Transport	NO	Funded	> £10 million	Planning	Reduction in emission due to reduced traffic congestion	Reduction in emissions from vehicles queuing	Work expected to start in 2023	Dedicated cycle lanes and pedestrian routes to be included
11	Bus lane enforcement (cameras introduced on three bus lanes) Hagley Road West, Walsall Road and New Street	Traffic Management	UTC, Congestion management, traffic reduction	2019	2032	Sandwell MBC, Nation Express West Midlands, Transport for West Midlands	Sandwell MBC	NO	Funded	£500k - £1 million	Completed	Reduction in bus idling waiting to pull out, stuck in traffic	Increased public transport patronage	Completed - enforcement cameras in use	Improvement in bus service timetabling reliability, encourages alternative to private vehicles. Patronage lower than expected in 2021 due to pandemic.
12	Inclusion of Air Quality considerations in the updated Local Development Planning Framework. Including policies to reduce the need to travel and promote alternatives to car use.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2023	Sandwell MBC, Low Emissions Towns and Cities Programme (LETCP), West Midlands Authorities (WMA), Black Country Core Strategy (BCCS)	N/A	NO	Funded	< £10k	Planning	Medium	Annual average NO2 value reductions	Ongoing work to co-ordinate all relevant local authorities and relevant departments.	
13	Provide air quality guidance to land/property developers prior to planning application submission	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2024	Sandwell MBC, LETCP, WMA's and BCCs	DEFRA	NO	Funded	£50k - £100k	Implementation	No target	Publication of planning and procurement guidance - implemented across the West Midlands	Guidance/advice continues to be provided but needs to be updated.	The Black Country Supplementary Planning Document for Air Quality is referred to in all pre-planning application submissions for AQ comments/advice. The AQ SPD due to be updated in 2024 as part of the Black Country Plan. Public consultation held on the BC Plan Aug-Oct 2021.

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
14	Consult on new planning applications for impact on local air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2010	2024	Sandwell MBC, LETCP, WMA's and BCCs	N/A	NO	Funded	£10k - 50k	Implementation	No target	Conditions attached to planning applications are recorded and discharged when compliance is achieved.	On-going work stream	The Black Country Supplementary Planning Document is referred to in all AQ planning applications. Due to be updated in 2024 as part of the Black Country Plan. Public consultation held on the BC Plan Aug-Oct 2021.
15	Promotion of walking	Promoting Travel Alternatives	Promotion of walking	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	No target	Increase in walking for key journeys, Sandwell Travel Surveys	On-going. Sandwell's walking strategy published in 2015. Sandwell TravelWise web page kept up-to-date	Sandwell website links directly to https://www.gojauntly.com/sandwell
16	Revocation of existing 51 designated smoke control areas and replacement with a single borough wide Smoke Control Order	Other	Other	2020	2023	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Planning	Reduce PM emissions from burning unauthorised fuels	Reduction in particulate emissions from solid fuel burners	Legal advice sought - survey undertaken of residents, young people and businesses in 2021. Full council agreement given for Intention to Declare and Public Consultation planned for Spring 2022	Public Consultation on Proposed Boroughwide Smoke Control Area to be held from 9 May to 20 June 2022
17	Maintain up-to-date air quality information on Sandwell MBC's website to ensure it is a trusted 'go to' source for information for residents	Public Information	Via the Internet	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	Reduce emissions from bonfires, wood burners and educate on causes of air pollution, protection and how to reduce it.	Reduction in number of bonfire complaints and other domestic burning issues	Council website is frequently updated to include relevant and important air quality information	Info on Sandwell's Air Quality can be found at https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality
18	Campaign to educate residents on air pollution and health risks from wood burning and solid fuel stoves	Public Information	Via other mechanisms	2020	2024	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Planning	Reduce PM emissions from burning unauthorised fuels	Reduction in emissions in PM from solid fuel burners	Campaign information being designed - to be used in 2022 alongside Smoke Control Area Intention to Declare Notice	Campaign delayed to 2022 to coincide with Smoke Control Area Consultation
19	Review Sandwell MBC's vehicle fleet including vehicle types, age and emissions profile to formulate a strategy to reduce emissions	Vehicle Fleet Efficiency	Other	2018	2022	Sandwell MBC, SERCO	N/A	NO	Not Funded	£500k - £1 million	Implementation	No target	Collating of appropriate data sets - including pre and post-pandemic vehicle use data	Data collected for fleet and grey fleet, but no data received for refuse collection vehicles (RCV data to be provided by SERCO).	Data collection still delayed by lack of data on Refuse Collection Vehicles operated by SERCO

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
20	Improving access to information regarding transport options	Promoting Travel Alternatives	Personalised Travel Planning	2010	2030	Sandwell MBC, Transport for West Midlands	Sandwell MBC, WMCA	NO	Partially Funded	£10k - 50k	Implementation	No target	Increased public transport patronage	On-going promotion of public transport options remains available and up to date https://www.sandwell.gov.uk/publictransport	Use of public transport decreased during 2020/2021 - greater promotion of public transport and investment needed to encourage return to its use
21	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	2010	2030	Sandwell MBC	Sandwell MBC, Transport for West Midlands	NO	Funded	< £10k	Implementation	No target	Increased uptake of cycling as alternative to car. Sandwell Travel Surveys	Local Cycling and Walking Infrastructure Plan (LCWIP) approved in 2019 and Active Travel Fund Potential appointment of a Sustainable/Active Travel Officer in 2022.	
22	Encourage travel plans for employers, schools and hospitals	Promoting Travel Alternatives	Workplace Travel Planning	2010	2030	Sandwell MBC, Nation Express West Midlands, Transport for West Midlands	Sandwell MBC	NO	Funded	< £10k	Implementation	No Target	Number of travel plans adopted by relevant organisations - including those attached as planning conditions	Used consistently as part of the planning process. ModeShift STARS also promoted. Potential appointment of a Sustainable/Active Travel Officer in 2022	Travel plan supplementary planning document referenced in all relevant planning applications
23	Review taxi fleet licences and private hire vehicle fleet licenced by Sandwell (including fleet composition, age and emission profiles) to understand profile of fleet over time	Other	Other	2018	2024	Sandwell MBC	N/A	NO	Not funded	< £10k	Implementation	No target	Report summarising data findings	Data collected - monitoring to continue to identify vehicle type and age and options to help encourage drivers upgrade to cleaner vehicles	There are 123 more licensed vehicles in 2021 than in 2019. Petrol vehicles increased by 23%, but there was a 16% percentage reduction in diesel and 30% increase in hybrid vehicles.
24	Encourage uptake of ULEVs in Sandwell's taxi fleet - identifying and highlighting opportunities for taxi owners to assist with purchase/lease of cleaner vehicles.	Promoting Low Emission Transport	Taxi emission incentives	2018	2025	Sandwell MBC	N/A	NO	Funded	< £10k	Planning	No target	Percentage increase in number of vehicles that are not diesel or petrol	Further joint work to be undertaken with Sandwell's Taxi licensing team to identify and promote cleaner vehicle uptake.	
25	Section 106 funding - Use of s.106 funds to undertake air quality monitoring and compensate for developments with negative impact on local air quality	Other	Other	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	£10k - 50k	Implementation	No target	Report on air quality monitoring undertaken with funding to identify and improve local air quality	Potential air quality R & D project on speed reduction identified for All Saints Way, West Bromwich	

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
26	Engage with council employees to promote low and ultra-low emission vehicle technologies	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2018	2030	Sandwell MBC	N/A	NO	Funded	< £10k	Implementation	No target	Increased number of employees switching to low emission vehicles	On-going - Energy Savings Trust Information Sessions offered to all Council Staff on EV ownership	
27	Promote car sharing amongst residents and businesses	Alternatives to private vehicle use	Car & lift sharing schemes	2010	2025	Sandwell MBC	N/A	NO	Funded	< £10k	Implementation	Low	Increased number of participants using the scheme	Implementation and promotion of the scheme on-going	Could not promote the scheme in 20201 due to the pandemic and risks of virus transmission.
28	Promotion of car club/pool vehicles and staff to share lifts	Promoting Travel Alternatives	Workplace Travel Planning	2010	2030	Sandwell MBC	N/A	NO	Not Funded	< £10k	Implementation	Reduce mileage claims by 30% and replacement of old vehicles with newer cleaner ones	Reduced mileage claims by local authority staff	On-going - progress – findings were to be included in Energy Savings Trust report, but this has stalled with lack of data from SERCO	The COVID 19 pandemic has resulted in a seismic shift of working arrangements with staff continuing to work at home and more online meetings. Demand for this provision has decreased

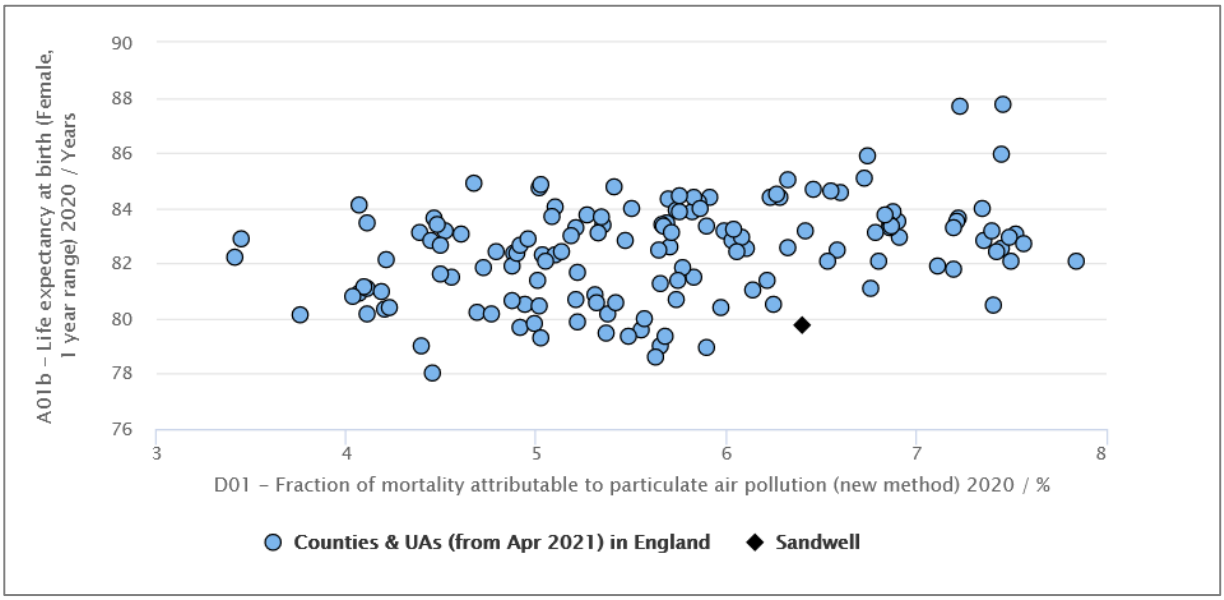
$PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

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. The importance of PM2.5 is also reflected by its inclusion as a key indicator of mortality in the Public Health Outcomes Framework and is defined as a '*fraction of mortality attributable to particulate air pollution*'[40]

In Sandwell, the life expectancy for a female born in 2020 is 79.8 years and for a male 74.7 years. This is below the average life expectancy in England which is 82.6 years for females and 78.7 years for males.

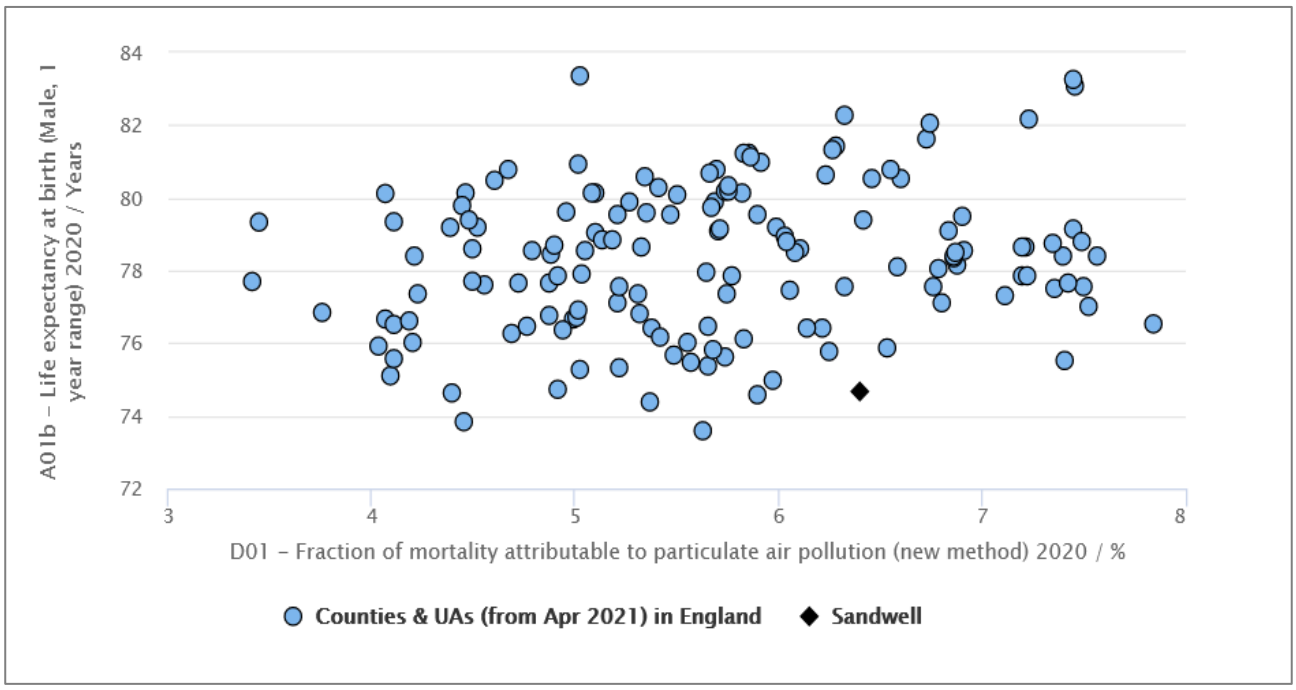
The fraction of mortality attributable to particulate air pollution in Sandwell was 6.4% in 2020. When compared with average life expectancy in **Figure 2. 2** and **Figure 2. 3** we can see that reducing air pollution would have a positive impact on life expectancy.

Figure 2. 2 - Life Expectancy of Females in English Local Authorities compared with Fraction of Mortality Attributable to Fine Particulate Matter



[40] https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

Figure 2. 3 - Life Expectancy of Males in English Local Authorities compared with Fraction of Mortality Attributable to Fine Particulate Matter

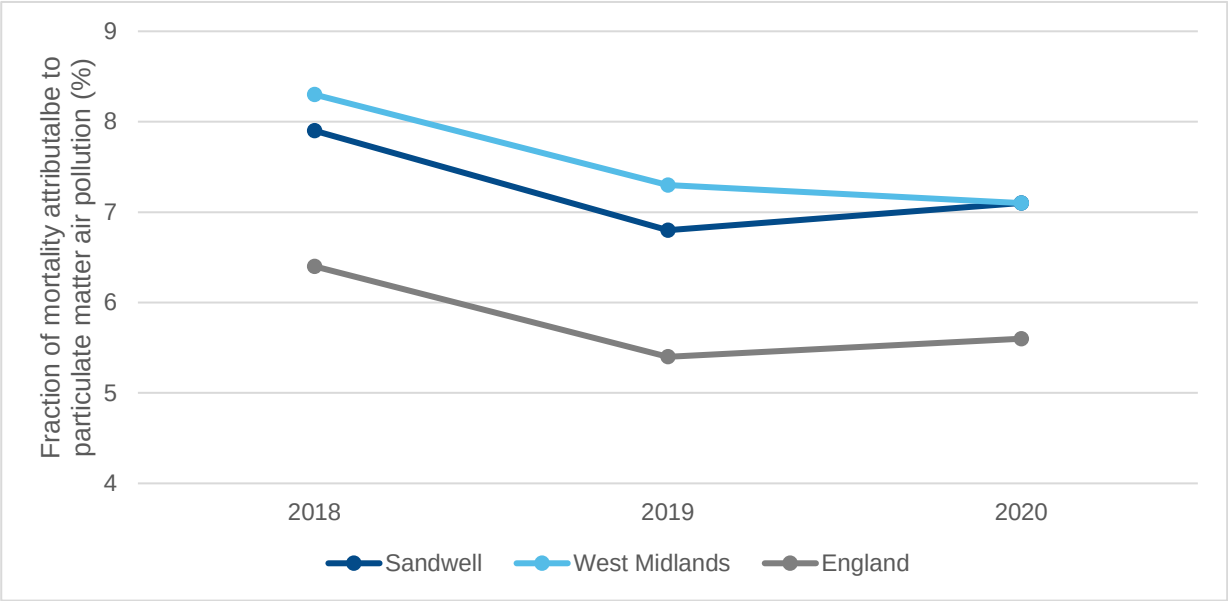


Reducing anthropogenic particulate matter air pollution would also increase the average age of **healthy life-expectancy** for Sandwell residents. Currently a female born in Sandwell in 2020 has a healthy life expectancy of **60.5 years**, whilst a male has **61.6 years**, both are below the England average of 63.4 and 63.1 years respectively.

Figure 2. 4 demonstrates that the percentage fraction of mortality attributable to particulate matter air pollution in Sandwell was very similar to the rest of the West Midlands region in 2020. It has remained approximately 1.5% higher in Sandwell over the last three years when compared to England averages.

Since the declaration of Sandwell's AQMA in 2005, both central and local government efforts have focused on reducing road traffic emissions due to the direct correlation between high levels of road traffic resulting in higher levels of NO_2 concentrations. However, as scientific research continues to demonstrate the far wider and more severe health impacts from exposure to $PM_{2.5}$ than had been previously understood, reducing exposure to $PM_{2.5}$ has become a priority. We are therefore investing in more air quality monitoring to increase our understanding of its distribution across Sandwell with a view to using this information to develop appropriate strategies focused on reducing these levels.

Figure 2. 4 - Fraction of Mortality Attributable to Particulate Matter Air Pollution in Sandwell Compared with the West Midlands and England



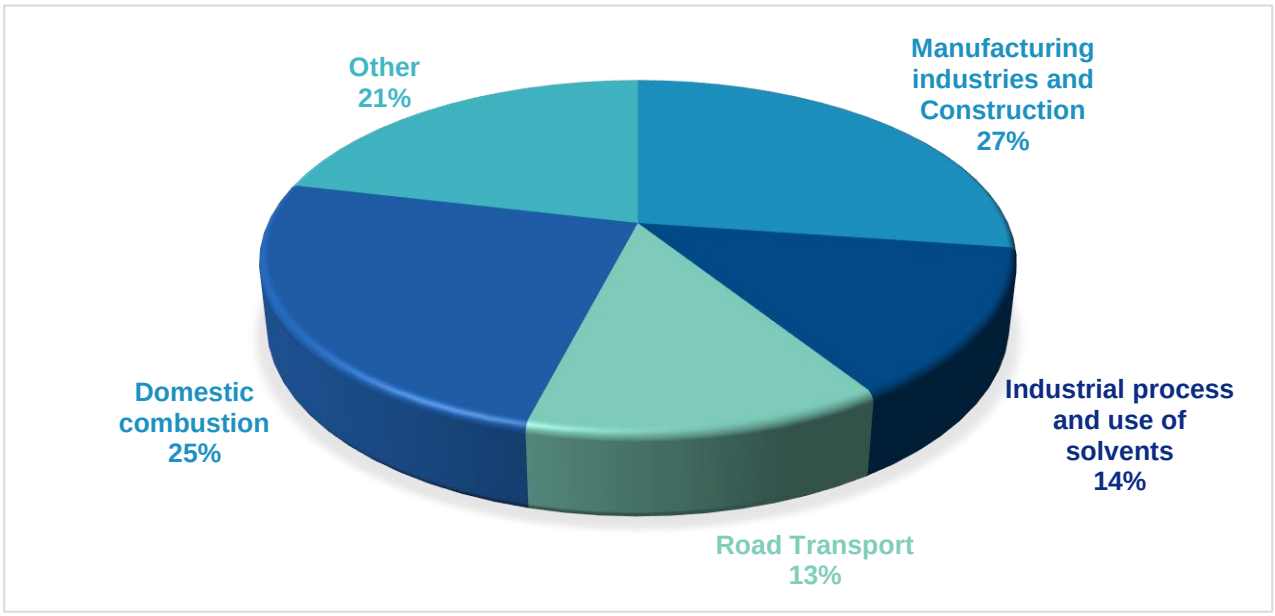
In 2021 four new PM2.5 air quality monitors were installed at four of our five continuous monitoring stations. A further twelve low cost Zephyr air quality monitors were also deployed, with a further 9 to be installed in 2022. These Zephyrs will provide useful indicative readings of PM_1, $PM_{2.5}$ and PM_{10} across the borough.

Understanding the sources of anthropogenic $PM_{2.5}$ is also fundamental when it comes to determining strategies to reduce it. A Defra report[41] in February 2022 revised the statistics for air pollutant emission sources in the UK in 2020 including $PM_{2.5}$.

As shown in **Figure 2. 5,** data provided in this report identifies that combustion in the manufacturing and construction sector accounted for 27% of $PM_{2.5}$, whilst industrial combustion and processes accounted for 14%. And although road traffic was responsible for approximately 13% of $PM_{2.5}$, domestic combustion was still found to be the greater source, accounting for 25%.

[41] https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25

Figure 2. 5 - UK 2020 Annual Emissions of $PM_{2.5}$ by Major Emission Sources



The same report also states that 70% of emissions from domestic burning come from burning wood in closed stoves and open fires. This means domestic wood burning now accounts for 17% of $PM_{2.5}$ emissions and that $PM_{2.5}$ from domestic wood burning increased by 35% between 2010 and 2020. This information supports our commitment to pursuing the creation of a borough wide smoke control area within the next 12 months.

We are also aware that densely populated urban areas like Sandwell have poorer air quality, caused by a range of sources, including high levels of vehicle traffic as well as many commercial and industrial processes which are often located near residents. By collecting data from local monitoring sites in Sandwell we aim to have a greater understanding about the distribution of $PM_{2.5}$ across the borough, enabling us to steer future policies, that both reduce exposure as well as protect those living and working in Sandwell from sources of harmful air pollution.

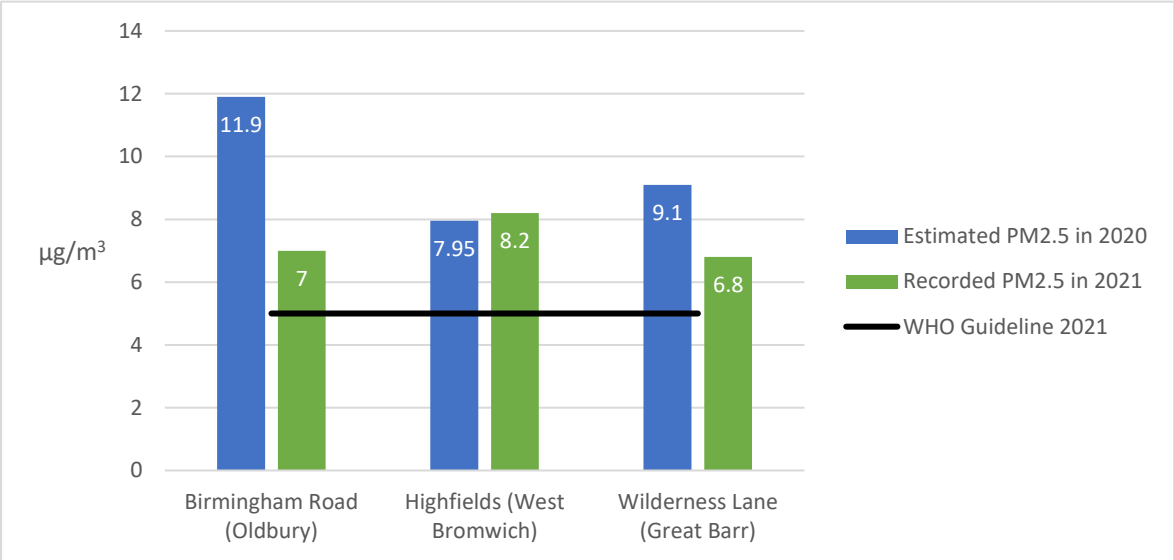
Monitoring of $PM_{2.5}$ in Sandwell

Prior to 2021 we only monitored annual urban background levels of $PM_{2.5}$ at Haden Hill in Cradley Heath. Since monitoring began at Haden Hill the overall trend in $PM_{2.5}$ had been downward, with a significant dip in 2016 to 5.01µg/m^3, however levels have since plateaued at around 7µg/m^3 since 2017.

In 2021 we expanded our $PM_{2.5}$ monitoring into three other continuous monitoring stations and updated the monitor at Haden Hill. Prior to this in 2019 and 2020 we estimated

annual $PM_{2.5}$ using Haden Hill as a reference site. (Details of how estimates were calculated in 2020 is provided in **Appendix C, Table C.4**). A comparison between the estimates in 2020 and recorded annual $PM_{2.5}$ in 2021 are shown in **Figure 2. 6.**

Figure 2. 6 – A comparison of estimated levels of $PM_{2.5}$ in 2020 with recorded $PM_{2.5}$ levels in 2021



There is a noticeable difference between the estimated levels in previous years and the recorded levels in 2021 at two of the monitoring sites. The results for Birmingham Road, Oldbury are particularly surprising as this site was estimated to have the greatest levels of $PM_{2.5}$ in 2020, but recorded levels are almost 5µg/m^3 lower in 2021. At Wilderness Lane in Great Barr, levels of $PM_{2.5}$ were 2µg/m^3 lower than last year, whilst at Highfields the estimated level and recorded values were very similar. Is this poor estimating or were levels generally worse in 2020? Now that we are no longer relying on estimating $PM_{2.5}$ the continued monitoring at these sites remains essential in helping us understand the true levels of $PM_{2.5}$ across the borough, including any significant long-term trends.

As we move into 2022 we are aware that the Environment Act 2021 will require the creation of at least two new legally binding targets and that one of those will be for $PM_{2.5}$. In March 2022 the government proposed and put out to public consultation the option of a new legally binding target to reduce levels of $PM_{2.5}$ to 10µg/m^3 by 2040. However, the new guideline levels established by the World Health Organisation has been set at 5µg/m^3, a standard which recognises that there is no safe level of exposure.

Given that there is no safe level of exposure, Sandwell's ambition is to ensure that annual levels remain below 10µg/m^3 with the aim of working towards 5µg/m^3 per annum. We know that by working to reduce all pollutant concentrations we will not only meet current

national air quality objectives but also improve overall health outcomes for those who live and work in Sandwell.

Sandwell MBC is taking the following measures to address $PM_{2.5}$

Existing Measures

- Sandwell's updated Air Quality Action Plan 2020-2025 continues to refer to measures that will both limit and reduce $PM_{2.5}$ emissions in future years. This will include close partnership working with key stakeholders such as Public Health, Planning and Transportation and Sandwell's Climate Change Action Group.
- The Low Emissions Towns and Cities Planning Guidance and the Black Country Supplementary Planning Document aims to ensure that all new development is sustainable in terms of air quality. This guidance document has been used to ensure that appropriate mitigation measures are made a 'condition' of development. Conditions range from the installation of Electric Vehicle charging points at minor developments to a complete Low Emission strategy (in scale and kind) at major developments. These documents refer to $PM_{2.5}$ and the adoption of these low emission mitigation measures will reduce the impact of $PM_{2.5}$ in future years.
- Sandwell has continued to encourage modal shift towards walking, cycling, public transport and low emission vehicles, all of which will reduce emissions of $PM_{2.5}$ by easing congestion and improving vehicle emissions.
- Reducing traffic congestion through the careful management of road infrastructure including improving traffic and pedestrian signals and introducing speed restrictions and parking enforcement measures to reduce obstructions on congested roads. These measures when incorporated together will help to reduce traffic congestion and therefore reduce $PM_{2.5}$ emissions and help to mitigate the impact on air quality.
- Improving public awareness of poor air quality and providing residents with alternative transport options and opportunities through travel planning, social media, council webpages and better public transport branding continues. Aiming to reduce reliance on private vehicles and help address $PM_{2.5}$ emissions.
- Sandwell's Pollution Control team along with the Environment Agency continues to regulate the control of emissions (including $PM_{2.5}$) from industrial processes. Ensuring that all sites requiring an Environmental Permit operate within the required limits to reduce emissions of particulate matter.

New Measures

- Sandwell MBC is aware of the substantial advantages of extending its $PM_{2.5}$ monitoring network to improve understanding of concentrations across the borough and to be able to benchmark progress at reducing $PM_{2.5}$ at 'hotspot' sites. The council has installed 12 low-cost air quality monitors in 2021. These have been deployed across the borough to provide real-time data at key sites e.g. busy roads with relevant sensitive receptors as well as less busy streets where pollutant levels may be unexpectedly higher due to factors such as street canyons. There is also the option for them to be located for specific project work with local communities e.g. schools. A further 11 low cost air quality monitors are to be installed in 2022.
- There is increasing concern that $PM_{2.5}$ emissions will rise in Sandwell if gas and electricity energy costs continue to increase as businesses turn to biomass technologies and residents opt to use open fireplaces and wood burning stoves to heat them homes. Currently Sandwell is covered with a patchwork of 51 designated Smoke Control Areas, these cause confusion and inequality for those living and working in Sandwell. Elected members agreed a formal '*Intention to Declare a Boroughwide Smoke Control Area'* in December 2021[42]. This includes the proposal to revoke the existing 51 Smoke Control Orders and designate the whole of the borough as a Smoke Control Area. A map showing the current extent of the Smoke Control Areas in Sandwell can be found in **Appendix G.**
- Alongside the review of Sandwell's existing Smoke Control Areas, it is also recognised that we need to continue to raise awareness with residents about the dangers to health from $PM_{2.5}$ air pollution generated by wood burning stoves. A wood burning stove campaign is therefore also planned for 2022.
- The Defra Air Quality Grant awarded in March 2021 to work with faith communities in Sandwell to improve air quality via behaviour change, will also provide a platform for distributing information and education on the sources of $PM_{2.5,}$ The use of a web based dashboard relaying real-time air quality data which can display $PM_{2.5}$ levels should also prove an effective and powerful tool to make this invisible threat to health more visible.

[42] Council Cabinet Report and Minutes (Item No.13a – December 7th 2021)
https://sandwell.moderngov.co.uk/ieListDocuments.aspx?CId=143&MId=186&Ver=4

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

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

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Sandwell Metropolitan Borough Council undertook automatic (continuous) monitoring at 5 sites during 2021. **Table A.1 in Appendix A** shows the details of the automatic monitoring sites. NB. 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. Air quality monitoring results for automatic monitoring stations across the UK including Birmingham Road, Oldbury are available through the UK-Air website[43].

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

3.1.2 Non-Automatic Monitoring Sites

Sandwell MBC undertook non- automatic (i.e. passive) monitoring of NO_2 at 123 sites during 2021. **Table A.2** in **Appendix A** presents the details of the non-automatic sites.

Digital maps showing the location of the monitoring sites are provided https://www.google.com/maps/d/u/0/edit?mid=1nGA4FFE8NldDGtwSqDS08felzsi0t6V-&usp=sharing

[43] https://www.airqualityengland.co.uk/

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**.

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 (NO_2)

Table A.3 and **Table A.4** in **Appendix A** compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

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

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

3.1.4 Interpretation of Nitrogen Dioxide Results

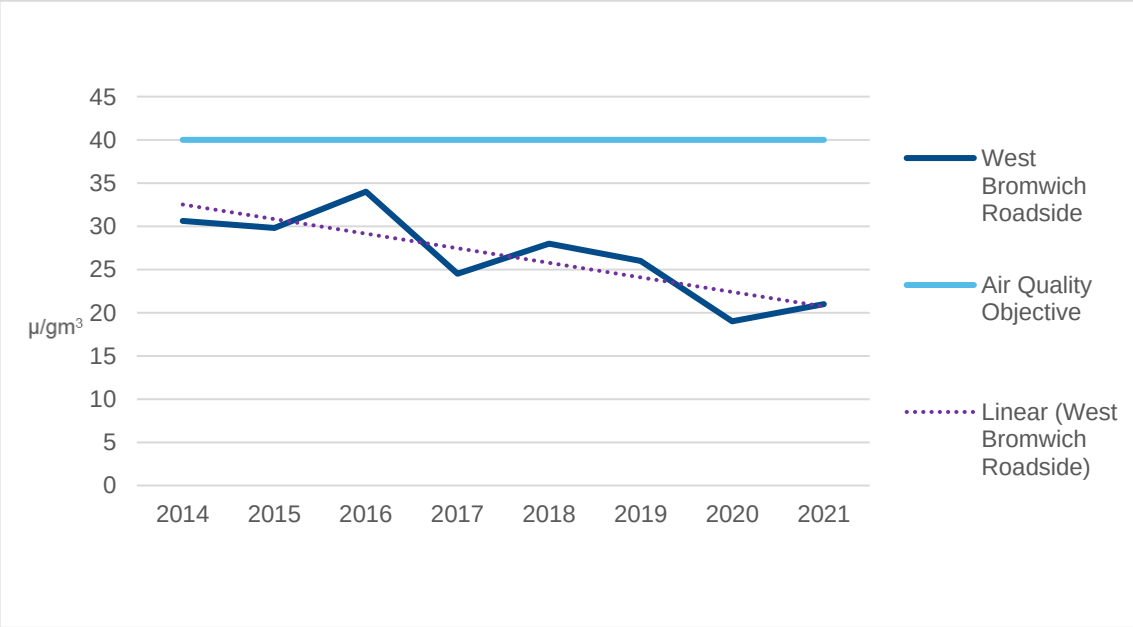
Continuous Monitoring Sites

- Data Capture was 95.6% or above for nitrogen dioxide at all five continuous monitoring sites, so no annualisation of data was required.
- In January, February and part of March 2021 a lockdown was still enforced due to Covid-19, which meant that schools and many businesses remained closed, so it is recognised that this will have impacted on traffic levels and therefore the NO_2 annual mean. All results must be treated with caution as we expect 2022 could see further NO_2 annual mean increases as society returns to both pre-

pandemic routines as well as potentially opting for private car use over public transport.

- There were no exceedances of the NO_2 1-hour mean >200µg/m^3 at any of the monitoring stations in 2021 as recorded in **Table A.5** in **Appendix A**. This is the third year when no exceedances have been identified, although this is positive it may be influenced by traffic reduction in the first few months of 2021.
- In Sandwell MBC's ASR 2021, it was suggested that some indicative monitoring should be establised at the Bearwood Road site following removal of the OPSIS receiver. This is because Bearwood Road is heavily trafficked and is classified as a street canyon due to the close and terraced nature of the buildings lining the road. Unfortunately the positioning of a Zephyr air quality monitor was problematic along Bearwood Road due to the risk of strike to the solar panel from buses and lorries, however it has been agreed that one will be positioned at the end of a side road leading to Bearwood Road in 2022. Whilst long-term monitoring at this site remains under review, passive diffusion tube monitoring will continue at the ten monitoring sites currently located along Bearwood Road.

Figure 3. 1 - Annual Mean Nitrogen Dioxide Concentrations at West Bromwich Roadside 2014- 2021

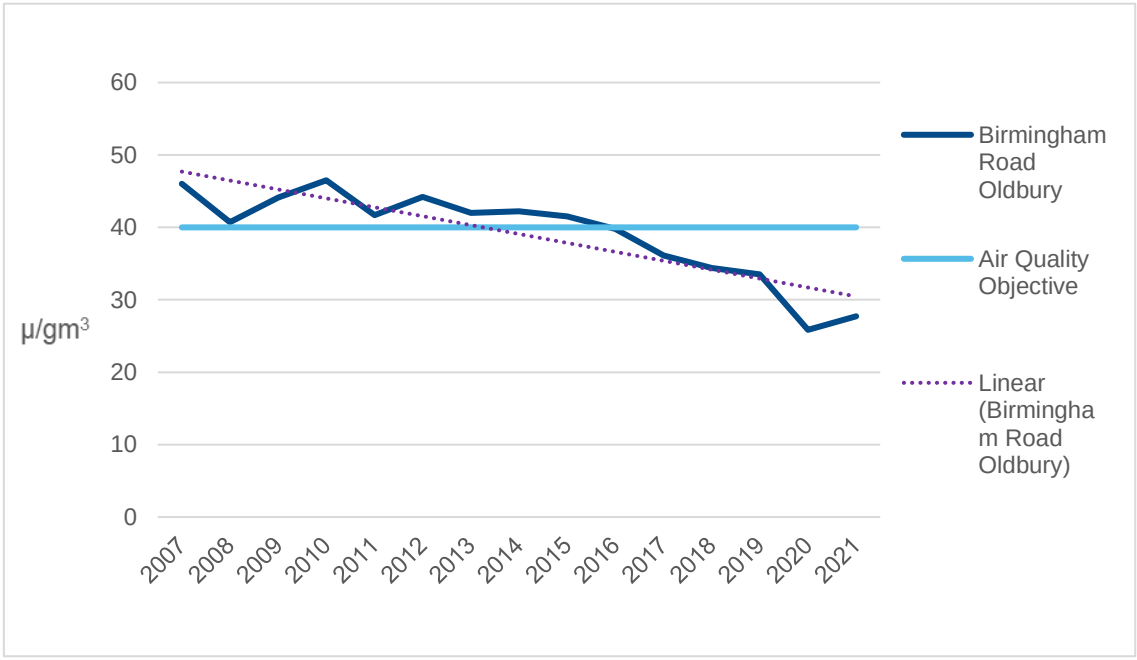


- The Cronehills Linkway air quality monitoring station, known as 'West Bromwich Roadside' was established in 2014. This was installed to monitor the impact of new retail development and associated car parking established on the east side of West Bromwich town centre. The annual mean NO_2 concentration at this site

was 21µg/m^3 in 2021. Although there is a slight and expected increase from last year, (following a 32% reduction from 2019 when traffic levels dropped during the pandemic), there remains an overall downward trend in NO_2 levels at this site, as shown in **Figure 3. 1**.

- In 2015 Birmingam Road, Oldbury, which is a roadside monitoring station, had an annual mean of 41.5µg/m^3, in 2021 this was 27.7µg/m^3 (N.B the three diffusion tubes co-located at this station recorded a bias adjusted mean of 30.6 µg/m^3) . The results in 2021 have demonstrated a 7% increase from 2020, but an increase was always expected following a 23% reduction in the NO_2 annual mean as a consequence of reduced traffic during national lockdowns. **Figure 3. 2** demonstrates that there is still an overall downward trend at this site but there is concern that further rises could be seen in 2022.

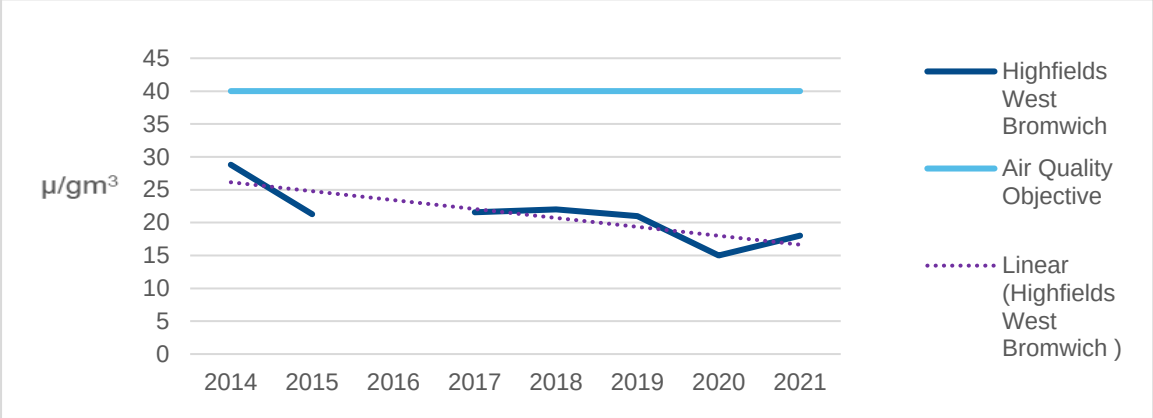
Figure 3. 2 - Annual Mean Nitrogen Dioxide Concentrations at Birmingham Road, Oldbury 2007- 2021



- West Bromwich Highfields is an Urban Background monitoring station, in 2020 the annual mean fell here to 15µg/m^3 a drop of 31%. In 2021 the annual mean was recorded at 18µg/m^3 which is an increase of 16% from 2020 and is shown in **Figure 3. 3.** This is a much greater increase in annual mean NO_2

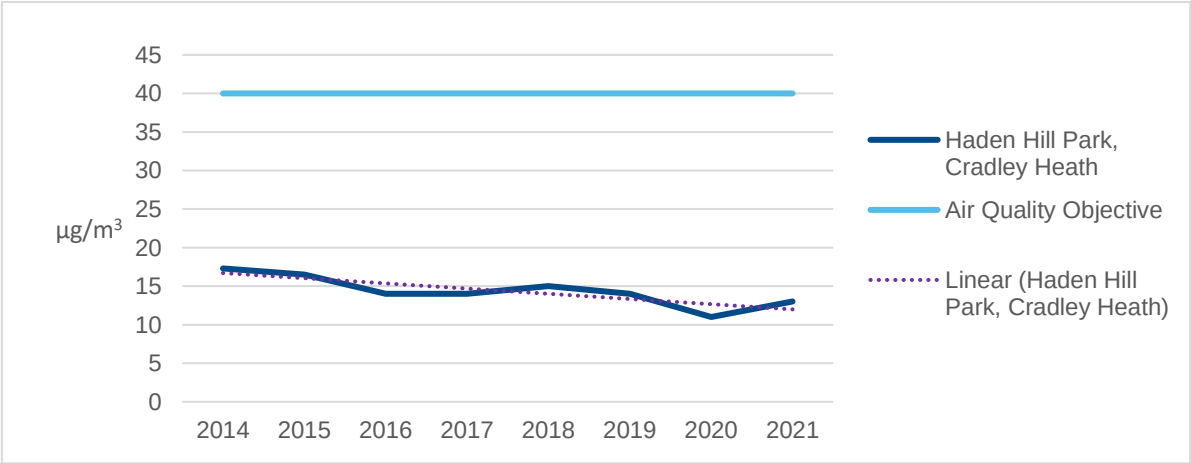
concentrations than the UK average for uban background sites between 2020 and 2021 which is 5.2%[44].

Figure 3. 3- Annual Mean Nitrogen Dioxide Concentrations at Highfields, West Bromwich 2014 -2021



The monitoring sation at Haden Hill, in Cradley Heath records urban background levels. Although there was a dip in annual mean NO_2 concentration from 2019 to 2020 from 14µg/m^3 to 10 µg/m^3, as shown in **Figure 3. 4**, 2021 has seen levels return to 13µg/m^3. Overall NO_2 background levels at this site have shown relatively little change (with the exception of 2020) at this location and continue to remain low.

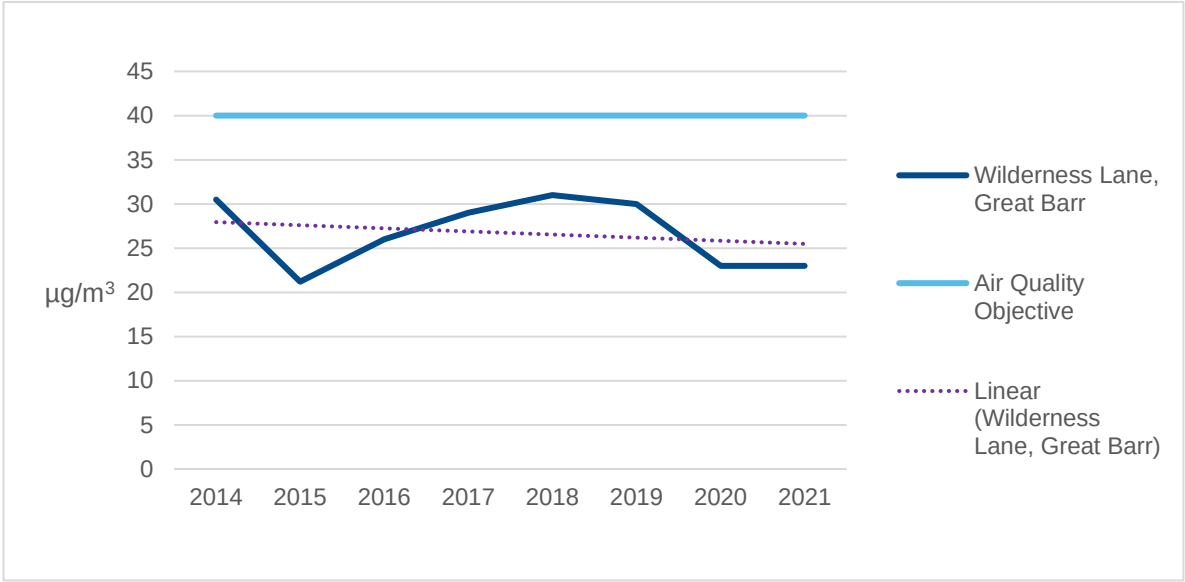
Figure 3. 4 - Annual Mean Nitrogen Dioxide Concentrations at Haden Hill, Cradley Heath 2014-2021



[44] https://www.gov.uk/government/publications/air-quality-statistics/ntrogen-dioxide

- The NO_2 annual mean at Wilderness Lane, Great Barr has plateaued at 23µg/m^3 maintaining the 26% reduction recorded in 2020 as is shown in **Figure 3. 5**. This is surprising as all other sites saw some level of rebound in NO_2 from 2020. It will be interesting to see if this levelling out is sustained through 2022.

Figure 3. 5 - Annual Mean Nitrogen Dioxide Concentrations at Wilderness Lane, Great Barr 2014-2021



Diffusion Tubes

The number of NO_2 diffusion tube sampling sites across the borough has fluctuated over the years, but overall they suggest a fairly continuous downward trend in levels. The results from the current sampling regime which began in 2018, is shown in **Figure 3. 6** and continues to show far fewer sites exceeing the national objective. Although there was an 0.8% increase in sites where NO_2 exeeded the national objective in 2021 from 2020, it was always expected that there would be a 'bounce back' in concentrations as safety measures brought in during the pandemic were eased after March 2021 and we saw road traffic levels increase again. It is interesting however, to see that NO_2 levels have not returned to the pre-pandemic levels recorded in 2019.

Further analysis of the 2021 data confirms that there were 6 sites that were within 10% of the 40µg/m^3 national objective for NO_2, whilst there were none in 2020, but in 2019 there were 26.

Figure 3. 6 - Percentage of NO_2 diffusion tube sites in Sandwell that exceed National Air Quality Objective since 2018

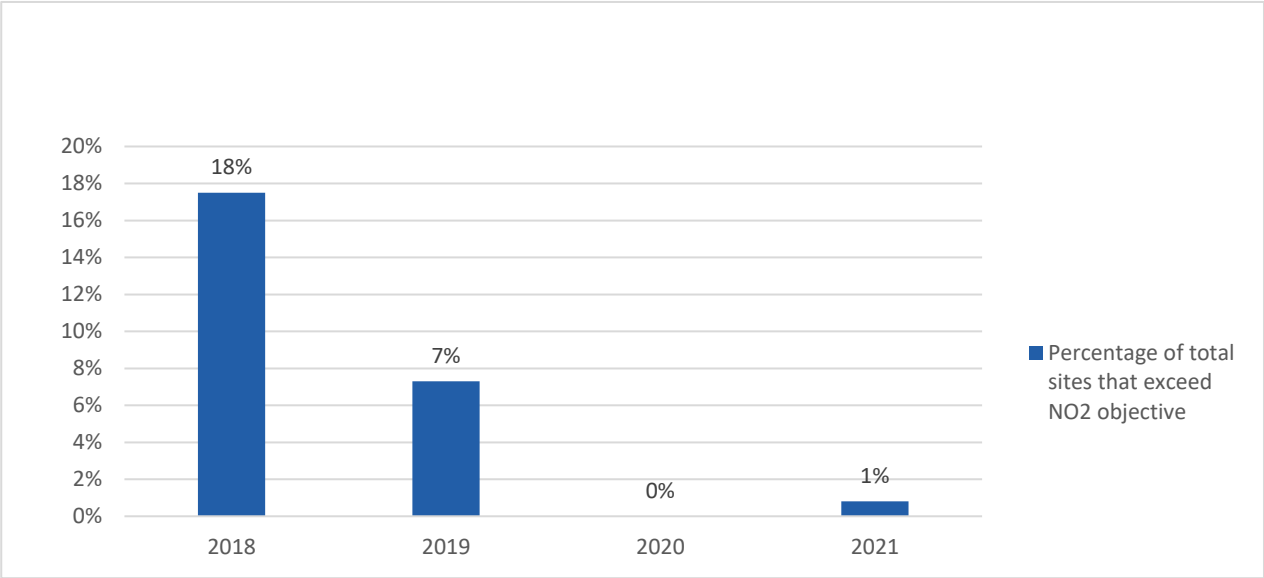
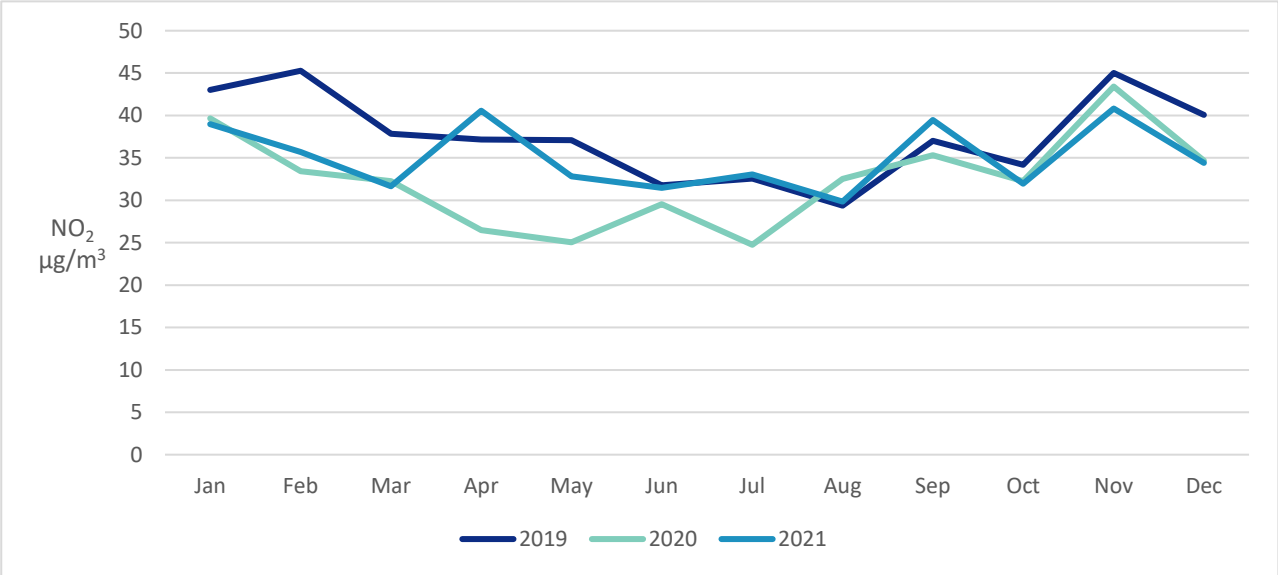


Figure 3. 7 compares the raw data monthly averages of NO_2 between 2019 and 2021, and demonstrates that levels of NO_2 between January and March 2021 were very similar to those lower levels recorded in 2020. By April NO_2 levels are tracking closer to those experienced in 2019 prior to the pandemic, but fall again when compared with those concentrations recorded in 2019.

Figure 3. 7 - Comparison between Monthly NO_2 Averages in Sandwell 2019, 2020 and 2021



It is positive news that 99.2% of the NO_2 annual mean results for 2021 were still within the national air quality objective but it is still considered that the data for 2021 has

continued to be influenced by the Covid-19 pandemic and should be treated with caution, especially when it comes to determining any long term trends.

3.1.5 Particulate Matter (PM_{10})

Table A.6 in **Appendix A**: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

- Data Capture was 96.5% or above at four of the five continuous monitoring sites. However valid data capture at Haden Hill in Cradley Heath was 71.3% and was therefore annualised.
- PM_{10} annual mean concentrations continue to be significantly below the national air quality objective of 40µg/m^3 in 2021, as is shown in **Figure 3. 8.**
- Since 2019 there has been no increase in PM_{10}, but we are aware that there were significant decreases seen in 2020 linked to reduced road traffic, which continued into the first quarter of 2021. We are therefore cautious about these results and will be interested to see if this trend continues in 2022.

Figure 3. 8 - Trends in Annual Mean PM10 Concentrations at Continuous Monitoring Stations in Sandwell 2017-2021

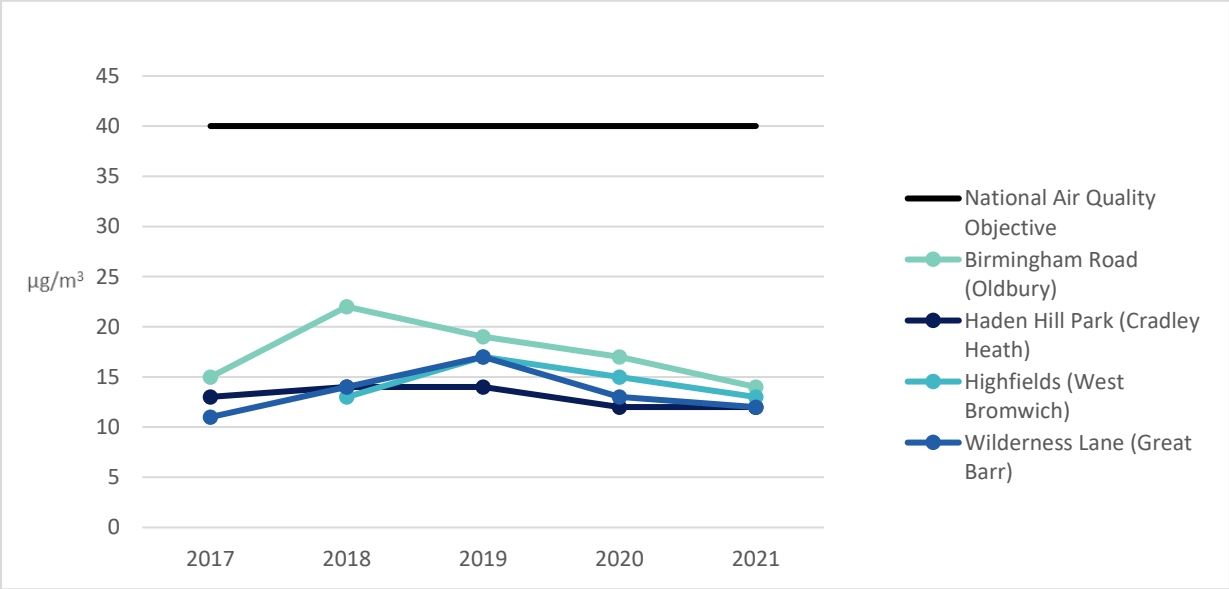


Table A.7 in **Appendix A** compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

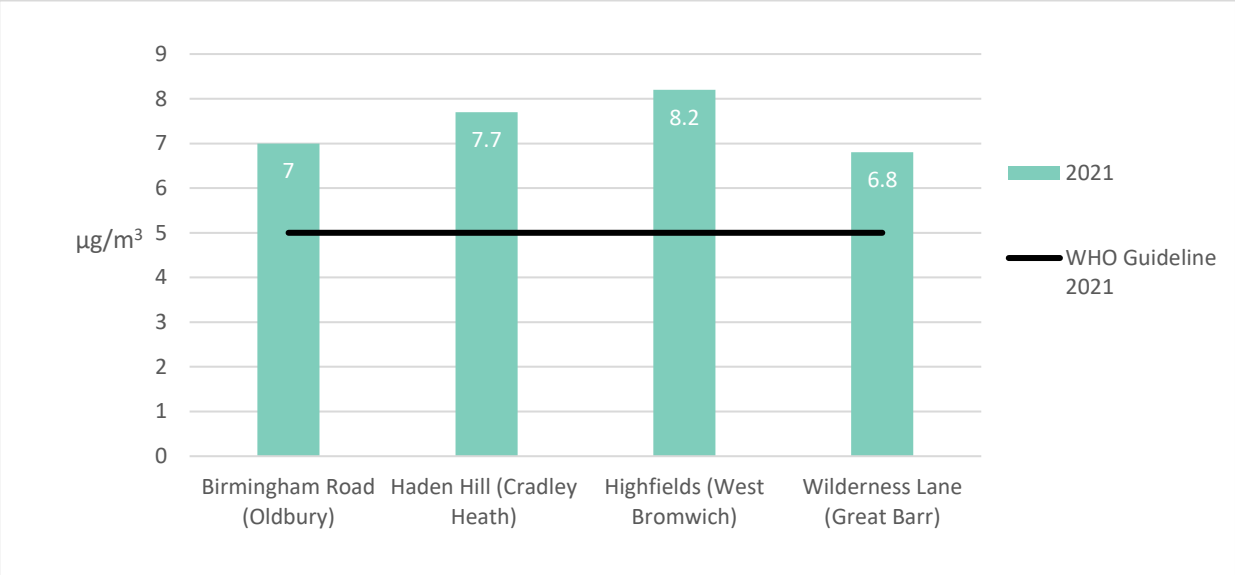
- Due to data capture being below 85% at Haden Hill, Cradley Heath, the 90.4th percentile of the 24-hour mean is provided in accordance with LAQM TG(16).
- The air quality objective for PM_{10} was achieved at all sites. There was one 24-hour exceedance of 50µg/m^3 at Highfields, West Bromwich. The maximum daily mean recorded at this site was 53µg/m^3 on 20 April 2021 and is classified as moderate in accordance with the Daily Air Quality Index (DAQI).
- This is the lowest number of exceedances we have recorded for PM_{10} as exceedances generally occur in November time, correlating with the increased prevalence of bonfires and fireworks being lit at this time of year. Although there was a peak on both the 5th and 6th of November in PM_{10}, the peaks were too brief to exceed the daily mean limit. As there were no restrictions on social gatherings at the beginning of November 2021 it is will be of interest to see if this reduction is replicated in 2022.

3.1.6 Particulate Matter ($PM_{2.5}$)

Table A.8 in **Appendix A** presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

$PM_{2.5}$ is the pollutant which has the biggest impact on public health and it is this pollutant that the Public Health Outcomes Framework (PHOF) indicator is based on. To reflect this growing health concern investment was made in 2021 to both update and increase our monitoring capacity of $PM_{2.5}$. This has been achieved with the installation of four FIDAS analysers to replace the old TEOM analysers. The new FIDAS equipment is now monitoring $PM_{1,}$ $PM_{2.5}$ and PM_{10} from two urban background sites and two roadside sites. The data gathered will enable us to build a much better understanding of the distribution of PM2.5 in the borough and will be reported on in future ASRs. The results from the first year of monitoring PM2.5 at our four sites can be seen in **Figure 3. 9.**

Figure 3. 9 - Annual Mean $PM_{2.5}$ Levels in Sandwell 2021



Prior to 2021 we only monitored urban background levels of $PM_{2.5}$ at Haden Hill in Cradley Heath. The national annual mean objective for $PM_{2.5}$ is 25µg/m^3. In 2007 when monitoring began at Haden Hill the trend in $PM_{2.5}$ had been downward and there was a significant dip in 2016 to 5.01µg/m^3, however levels have plateaued in the last 5 years at around 7µg/m^3.

The government target for $PM_{2.5}$ was a 15% reduction of $PM_{2.5}$ between 2010 and 2020. The site had levels of 12.2 µg/m^3 in 2010, so if we discount the results from 2020 due to the pandemic, the reduction achieved in 2021 is 36%.

A review of legally binding $PM_{2.5}$ targets will be undertaken in 2022, currently the government is proposing a target of 10µg/m^3 by 2040, but this is still open to public consultation. The recorded levels of $PM_{2.5}$ in 2021 are already within this proposed target of 10 µg/m^3 but we will need data for several years to confirm any real trends, and understand more about the distribution and trends in concentrations across the borough.

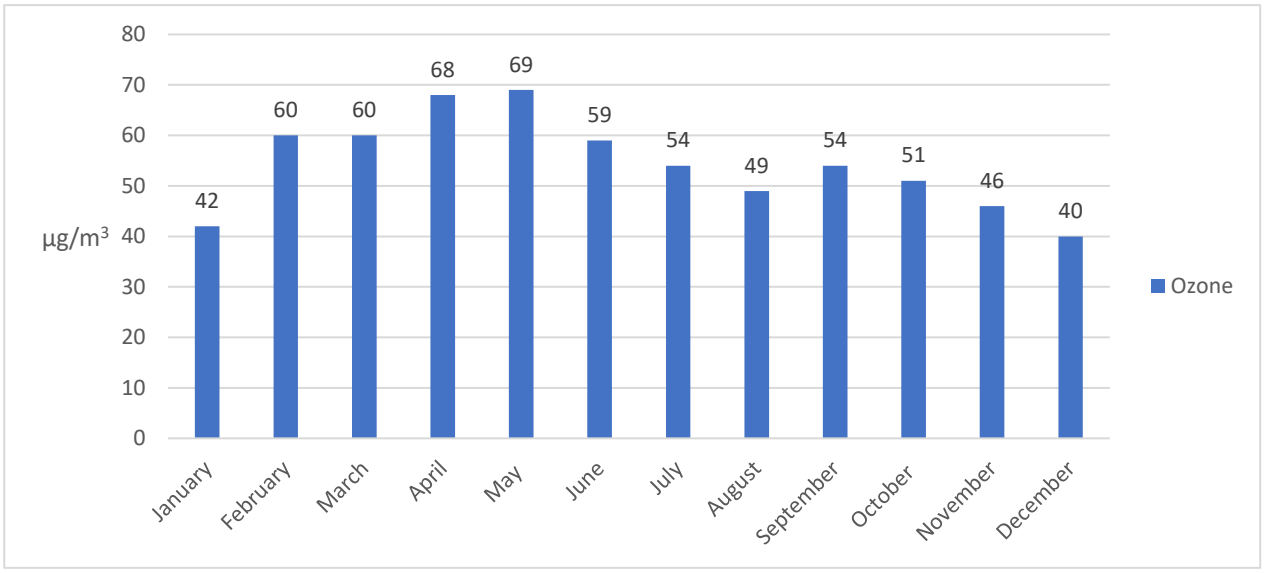
3.1.7 Ozone (O_3)

Currently, there is no requirement for local authorities to meet the WHO objectives for ground level ozone (O_3), as it is identified as a 'transboundary' pollutant which can drift across countries. It is therefore not included within the National Air Quality Objectives. The World Health Organisation Air Quality Objective for ozone is 100µg/m^3, where the daily maximum of the 8-hour running mean should not be exceeded more than 10 times per annum. This is because surface, or ground-level ozone, can trigger a variety of

health problems, particularly for children, the elderly, and people of all ages who have lung diseases such as asthma. Ground level ozone formation is the result of a series of complex chemical reactions, but typically forms where there is sunlight, VOCs and when there are lower levels of nitrogen dioxide.

Ozone is currently monitored at one location in Sandwell - Highfields, West Bromwich. In 2021 data capture was 93.0 %, the annual mean was 54µg/m^3. This was a 1 µg/m^3 increase on the annual mean from 2020. The highest monthly averages were recorded in April and May 2021 as is shown in Figure 3. 10. The maximum running 8-hour mean was 128µg/m^3 and the 100µg/m^3 limit was exceeded on 18 days. This was a 40% decrease since last year, when 30 were recorded. There is an annual allowance of 10 days for exceedances, so the WHO ozone standard was exceeded.

Figure 3. 10- Monthly Mean Ozone Levels at Highfields, West Bromwich



(*Ozone was Moderate on 30th 31st March, 18th 19th 20th 24th Apri**l**, 29th 31st May, 1st 2nd 3rd 15th 16th June, 20th 21st 22nd July, 5th 8th September with a running 8-hour mean reaching 128µg m-3.***)**

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Highfields (West Bromwich)	Highfields	Urban Background	400187	291601	NO2	Yes	Chemiluminescence	35	21	2.5
Highfields (West Bromwich)	Highfields	Urban Background	400187	291601	PM10	Yes	TEOM (Jan -15 April) FIDAS (From 15 April)	35	21	2.5
Highfields (West Bromwich)	Highfields	Urban Background	400187	291601	PM2.5	Yes	FIDAS (From 15 April)	35	21	2.5
Highfields (West Bromwich)	Highfields	Urban Background	400187	291601	O3	Yes	Chemiluminescence	35	21	2.5
Birmingham Rd (Oldbury)	Birmingham Road	Roadside	399857	289392	NO2	Yes	Chemiluminescence	8	5	2.5
Birmingham Rd (Oldbury)	Birmingham Road	Roadside	399857	399857	PM10	Yes	TEOM (Jan – 25 March) FIDAS (From 25 March)	8	5	2.5
Birmingham Rd (Oldbury)	Birmingham Road	Roadside	399857	399857	PM2.5	Yes	FIDAS (From 25 March)	8	5	2.5
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	NO2	Yes	Chemiluminescence	147	11	2.8
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	PM10	Yes	TEOM (Jan – 8 June) FIDAS (From 8 June)	147	11	2.8

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	PM10	Yes	FIDAS (From 8 June)	147	11	2.8
Haden Hill	Haden Hill	Urban Background	395755	285493	NO2	Yes	Chemiluminescence	105	119	2.5
Haden Hill	Haden Hill	Urban Background	395755	285493	PM10	Yes	TEOM (Jan – 15 April) FIDAS (From 15 April)	105	119	2.5
Haden Hill	Haden Hill	Urban Background	395755	285493	PM2.5	Yes	TEOM (Jan -15 April) FIDAS (From 15 April)	105	119	2.5
West Bromwich Roadside	West Bromwich Roadside	Roadside	400521	291541	NO2	Yes	Chemiluminescence	11	7	1.6

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

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)
AD	Myvod Road - Wednesbury	Roadside	399639	296095	NO2	Sandwell	10.0	1.5	No	2.8
AE	Wood Green Road - Wednesbury	Roadside	399680	296089	NO2	Sandwell	11.1	1.7	No	2.7
AF	Wood Green Road - Wednesbury	Roadside	399672	296042	NO2	Sandwell	11.1	1.7	No	2.7
B17	Birmingham Road - Oldbury	Roadside	399733	289401	NO2	Sandwell	15.0	1.5	No	2.8
BA	Lamppost next to Birmingham Road - Oldbury	Roadside	399686	289431	NO2	Sandwell	4.0	4.0	No	2.8
BD	Birmingham Road - Oldbury	Kerbside	399889	289395	NO2	Sandwell	5.8	1.0	No	2.8
BDQ	Birmingham Road - Oldbury	Roadside	399943	289377	NO2	Sandwell	8.6	1.2	No	2.8
BE	Traffic sign Birmingham Road - Oldbury	Kerbside	399915	289353	NO2	Sandwell	2.5	0.8	No	2.7
BF	Birmingham Road - Oldbury	Roadside	399807	289408	NO2	Sandwell	5.8	0.3	No	2.6
BG	Birmingham Road, Oldbury	Roadside	399721	289429	NO2	Sandwell	5.6	0.3	No	2.7
BO	Birmingham Road - Oldbury	Roadside	400039	289366	NO2	Sandwell	6.2	0.3	No	2.8
BP	Birmingham Road - Oldbury	Roadside	400191	289441	NO2	Sandwell	6.8	6.8	No	2.8
BR	148 Birmingham Road - Oldbury	Roadside	399814	289407	NO2	Sandwell	3.0	5.9	No	2.1
BS	Blakeley Hall Road - Oldbury	Roadside	399864	289427	NO2	Sandwell	16.3	8.6	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)
B52	Lamppost by 98 Birmingham Road - Oldbury	Roadside	399692	289428	NO2	Sandwell	5.0	3.0	No	2.8
C10A	Hagley Road West - Bearwood	Roadside	402285	286062	NO2	Sandwell	4.0	0.4	No	2.7
C10D	Hagley Road West - Bearwood	Kerbside	402298	286073	NO2	Sandwell	0.8	5.3	No	2.8
C11A	Halesowen Street - Rowley Regis	Roadside	397439	286416	NO2	Sandwell	4.9	4.9	No	2.8
C11D	High Street - Rowley Regis	Kerbside	397428	286381	NO2	Sandwell	1.3	0.5	No	2.7
C11E	Halesowen Street - Rowley Regis	Kerbside	397391	286359	NO2	Sandwell	4.5	0.1	No	2.8
C12A	Holly Road - Rowley Regis	Roadside	396899	286438	NO2	Sandwell	2.5	1.0	No	2.6
C12D	Powke Lane - Rowley Regis	Kerbside	396872	286454	NO2	Sandwell	3.0	0.1	No	2.7
C12E	Powke Lane - Rowley Regis	Roadside	396780	286465	NO2	Sandwell	3.5	3.0	No	3.0
C13D	Dudley Port - Tipton	Roadside	396411	291471	NO2	Sandwell	4.1	2.4	No	2.9
C14A	Ocker Hill Road - Tipton	Kerbside	397355	293929	NO2	Sandwell	16.0	0.6	No	2.9
C15A	Gorsty Hill - Cradley Heath	Roadside	396867	285536	NO2	Sandwell	2.0	2.0	No	2.7
C1A	Sandwell Road North - West Bromwich	Kerbside	400668	291726	NO2	Sandwell	5.0	0.3	No	2.5
C1D	Grafton Road - West Bromwich	Roadside	400664	292020	NO2	Sandwell	18.0	2.0	No	2.8
C2A	All Saints Way - West Bromwich	Roadside	401050	292898	NO2	Sandwell	9.8	2.0	No	2.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
C2E	Heath Lane - West Bromwich	Roadside	401059	292966	NO2	Sandwell	4.9	1.0	No	2.8
C4A	Walpole Walk - West Bromwich	Roadside	400619	290153	NO2	Sandwell	9.0	0.3	No	2.8
C4D	Kenrick Way - West Bromwich	Kerbside	400657	290090	NO2	Sandwell	9.0	0.3	No	2.7
C4E	Kenrick Way - West Bromwich	Kerbside	400738	290113	NO2	Sandwell	6.0	0.5	No	2.7
C5A	Bromford Lane - West Bromwich	Roadside	399267	290084	NO2	Sandwell	2.1	0.2	No	2.8
C5D	Broadwell Road - Oldbury	Kerbside	399207	290032	NO2	Sandwell	8.3	0.7	No	2.8
C5E	Kellner Gardens - Oldbury	Roadside	399139	289947	NO2	Sandwell	2.9	1.9	No	2.7
C6A	Halesowen Street/Oldbury Ringway - Oldbury	Roadside	398937	289322	NO2	Sandwell	17.9	3.0	No	2.1
C6E	Stone Street - Oldbury	Kerbside	399229	289315	NO2	Sandwell	13.8	0.5	No	2.8
C7A	Dudley Road East - Oldbury	Kerbside	398283	290113	NO2	Sandwell	1.5	0.6	No	2.8
C7D	Dudley Road - Oldbury	Roadside	398136	290226	NO2	Sandwell	11.3	1.6	No	2.8
C7E	Dudley Road East - Oldbury	Kerbside	398042	290285	NO2	Sandwell	9.5	0.4	No	2.8
C7F	Asquith Drive, Tividale - Oldbury	Roadside	397493	290628	NO2	Sandwell	4.7	0.3	No	2.8
C7H	Dudley Road East - Oldbury	Roadside	398311	290135	NO2	Sandwell	4.4	0.5	No	2.7
C9A	Bearwood Road - Bearwood	Roadside	402138	286650	NO2	Sandwell	2.6	0.3	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)
C9D	Sandon Road - Bearwood	Roadside	402160	286554	NO2	Sandwell	2.3	2.0	No	2.8
DA1, DA2, DA3	Lamppost on corner of Bilhay Lane and A41 - West Bromwich	Roadside	399402	292095	NO2	Sandwell	15.0	3.0	No	2.8
DB1, DB2, DB3	Lamppost on Bilhay Street off A41 - West Bromwich	Roadside	399508	292068	NO2	Sandwell	30.0	5.0	No	2.9
DC1, DC2, DC3	Lamppost on the corner of Mill Street - West Bromwich	Roadside	400233	291783	NO2	Sandwell	20.0	1.5	No	2.8
DD1, DD2, DD3	Lamppost by Providence Place on A41 - West Bromwich	Roadside	400366	291781	NO2	Sandwell	60.0	2.0	No	2.8
DE1, DE2, DE3	Lamppost on Congregation Way by A41 - West Bromwich	Roadside	400728	291599	NO2	Sandwell	80.0	2.0	No	2.9
DF1, DF2, DF3	Lamppost on Congregation Way by A41 - West Bromwich	Roadside	400890	291558	NO2	Sandwell	50.0	2.0	No	2.8
DG1, DG2, DG3	Lamppost on Beeches Road - West Bromwich	Roadside	401040	291269	NO2	Sandwell	10.0	2.0	No	2.9
DH1, DH2, DH3	Lamppost on the corner of Nicholls Street - West Bromwich	Kerbside	401195	290934	NO2	Sandwell	10.0	0.5	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)
DEF1	Corner of Joseph St & Wolverhampton Road - Oldbury	Roadside	398469	288673	NO2	Sandwell	40.0	2.0	No	2.8
DEF2	Corner of Birchley Park Ave and Wolverhampton Road	Roadside	398405	288722	NO2	Sandwell	7.0	7.0	No	2.8
DP1	Horseley Heath - Tipton	Roadside	397324	292256	NO2	Sandwell	3.2	1.3	No	2.8
DP4	Tame Road - Tipton	Roadside	397344	292214	NO2	Sandwell	7.1	1.5	No	2.8
EA	Overend Street - West Bromwich	Kerbside	400869	291102	NO2	Sandwell	4.8	0.8	No	2.8
EB	Legge Street - West Bromwich	Roadside	400921	291001	NO2	Sandwell	6.9	2.3	No	2.8
ED	Cronehills Linkway - West Bromwich	Roadside	400555	291257	NO2	Sandwell	4.5	4.0	No	2.8
EE	St Michael Street - West Bromwich	Roadside	400275	291132	NO2	Sandwell	3.5	0.5	No	2.9
EF	Bromford Lane - West Bromwich	Roadside	399789	290547	NO2	Sandwell	5.5	5.2	No	2.8
FA1, FA2, FA3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	398756	289622	NO2	Sandwell	272.0	2.0	No	2.8
FB1, FB2, FB3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	398717	289574	NO2	Sandwell	275.0	2.0	No	2.9
FC1, FC2, FC3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	398788	289451	NO2	Sandwell	160.0	3.0	No	2.8
FD1, FD2, FD3	Lamppost on Judge Close - Oldbury	Roadside	399162	289413	NO2	Sandwell	39.0	3.0	No	2.7

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
FE1, FE2, FE3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	399375	289398	NO2	Sandwell	52.0	2.5	No	2.9
FF1, FF2, FF3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	400370	289532	NO2	Sandwell	150.0	3.0	No	2.8
FG1, FG2, FG3	Lamppost on A457 Birmingham Road - Oldbury	Roadside	400535	289436	NO2	Sandwell	120.0	3.0	No	2.8
GA, GB,GC	AURN Site - Birmingham Road - Oldbury	Roadside	399858	289391	NO2	Sandwell	8.2	5.4	Yes	2.8
HA	High Street - West Bromwich	Kerbside	400383	291307	NO2	Sandwell	1.0	0.3	No	2.9
HH1	Haden Hill - Cradley Heath	Urban Background	395754	285492	NO2	Sandwell	87.0	0.5	No	2.9
KD	Lamp-post outside 2 Attingham Drive, Great Barr	Urban Background	403793	294661	NO2	Sandwell	13.0	0.3	No	2.8
KE	Ragley Drive, Great Barr	Kerbside	403925	294970	NO2	Sandwell	1.2	0.0	No	2.9
LA, LB, LC	AURN Site - Highfields West Bromwich	Urban Background	400216	291633	NO2	Sandwell	N/A	26.1	Yes	2.8
MA	Mallin Street - Smethwick	Roadside	400712	289296	NO2	Sandwell	2.0	1.8	No	2.8
MC	St Paul's Road - Smethwick	Kerbside	400748	289150	NO2	Sandwell	1.6	0.7	No	2.1
N1A	Kelvin Way - West Bromwich	Roadside	399647	290355	NO2	Sandwell	N/A	0.1	No	2.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N1B	Clifford Road - West Bromwich	Kerbside	399615	290358	NO2	Sandwell	N/A	0.9	No	2.8
N2A	Soho Close - Smethwick	Kerbside	403126	288557	NO2	Sandwell	20.0	0.8	No	2.7
OA	Lightwoods Fish Bar, Bearwood Road	Roadside	402240	286203	NO2	Sandwell	2.9	0.2	No	2.8
OB	Bearwood Road	Roadside	402195	286233	NO2	Sandwell	4.0	1.0	No	2.8
OC	Bearwood Road	Roadside	402245	286150	NO2	Sandwell	4.0	1.0	No	2.8
OD	Bearwood Road	Roadside	402222	286162	NO2	Sandwell	5.2	1.0	No	2.9
OE	Bradford and Bingley, Bearwood Road	Roadside	402212	286234	NO2	Sandwell	4.0	1.0	No	2.9
OG	Lamp-post on Bearwood Road	Roadside	402187	286333	NO2	Sandwell	4.0	0.5	No	2.9
OH	Lamp-post on Bearwood Road	Kerbside	402192	286244	NO2	Sandwell	4.0	0.5	No	2.9
OI	Lamp-post on Bearwood Road	Kerbside	402214	286253	NO2	Sandwell	4.0	0.5	No	2.9
OJ	Lamp-post on Bearwood Road	Kerbside	402194	286246	NO2	Sandwell	4.0	0.5	No	2.9
OP4	Bearwood Road - Smethwick	Roadside	402229	286096	NO2	Sandwell	0.0	5.5	No	2.9
PA1, PA2, PA3	3 co-located tubes on a roadside lamppost outside Greggs, A41, West Bromwich	Kerbside	402461	290241	NO2	Sandwell	41.0	0.8	No	2.9
PB1, PB2, PB3	3 co-located tubes roadside on a lamppost adjacent to	Roadside	402221	290290	NO2	Sandwell	55.0	1.5	No	2.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
	the footbridge, A41, West Bromwich									
PC1, PC2, PC3	3 tubes co-located on a lamppost opposite Dartmouth Cricket Club (A41), West Bromwich	Roadside	401950	290355	NO2	Sandwell	25.0	1.5	No	2.9
PD1, PD2, PD3	3 tubes co-located on a lamppost opposite BP Garage (A41) West Bromwich	Kerbside	402111	290331	NO2	Sandwell	75.0	1.0	No	2.8
PE1, PE2, PE3	3 tubes collocated on a lamppost (A41) West Bromwich	Kerbside	402334	290279	NO2	Sandwell	55.0	1.0	No	2.8
PS1A	New Street, West Bromwich Ringway - West Bromwich	Roadside	400504	291239	NO2	Sandwell	6.2	0.1	No	2.9
RA	Lamppost nearest Motorway, Roebuck Lane, W Brom	Roadside	401558	290077	NO2	Sandwell	43.0	42.0	No	2.9
SA	Springfield Site - Hillside Road, Great Barr	Roadside	403951	294852	NO2	Sandwell	N/A	53.0	No	3.1
SU	Summerfield Avenue, West Bromwich	Roadside	400476	291481	NO2	Sandwell	N/A	7.8	No	2.8
TA	Tividale Road, Tipton	Roadside	395958	290645	NO2	Sandwell	N/A	5.4	No	2.1
TC	Burnt Tree Island, Tipton	Roadside	395854	290643	NO2	Sandwell	44.0	3.9	No	2.9
UA	Birchfield Lane - Oldbury	Roadside	398135	287603	NO2	Sandwell	32.0	2.0	No	2.7

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
UB	Birchfield Lane - Oldbury	Roadside	398167	287750	NO2	Sandwell	7.4	1.2	No	2.9
UC	Birchfield Lane - Oldbury	Kerbside	398170	287746	NO2	Sandwell	7.7	0.2	No	2.9
VD	Market Place - Tipton	Roadside	397628	292459	NO2	Sandwell	5.3	2.0	No	2.8
VT	Tipton Road - Tividale - Tipton	Roadside	397155	290867	NO2	Sandwell	10.3	2.7	No	2.8
WA	Lamp-post at side of Snapdragon Drive - Yew Tree	Roadside	401917	295329	NO2	Sandwell	8.0	0.2	No	2.7
WB	Lamp-post near end of Wolfsbane Drive - Yew Tree	Urban Background	402139	295119	NO2	Sandwell	68.0	N/A	No	2.6
WF	Lamp-post outside Woodruff Way - Yew Tree	Urban Background	402133	295234	NO2	Sandwell	8.0	0.2	No	2.7
WW2	Westmore Way - Wednesbury	Roadside	400551	296050	NO2	Sandwell	202.0	N/A	No	2.9
WW3	Westmore Way - Wednesbury	Roadside	400598	296035	NO2	Sandwell	195.0	N/A	No	2.9
XE	Lochranza Croft - Great Barr	Roadside	404435	294866	NO2	Sandwell	4.3	16.3	No	2.8
ZA	Lamp-post opposite 40 Abbotsford Avenue - Great Barr	Roadside	404504	294813	NO2	Sandwell	37.0	33.0	No	1.9
ZC	Whitecrest - Great Barr	Roadside	404493	294532	NO2	Sandwell	3.0	1.9	No	1.9
ZK	Birmingham Road, Scott Arms - Great Barr	Roadside	404621	294291	NO2	Sandwell	17.2	0.3	No	1.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
ZO	Newton Road - Great Barr	Roadside	404290	294179	NO2	Sandwell	4.0	0.8	No	2.7
ZP	Doctors Surgery, Newton Road - Great Barr	Roadside	404555	294219	NO2	Sandwell	3.2	0.4	No	2.8
ZQ	Newton Road - Great Barr	Roadside	404539	294187	NO2	Sandwell	3.5	0.5	No	2.7
ZR	Newton Road, Scott Arms - Great Barr	Roadside	404410	294170	NO2	Sandwell	5.9	0.4	No	2.8

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Highfields ((West Bromwich)	400187	291601	Urban Background	Automatic	95.9	**N/A**	21.6	22	15	18
Birmingham Road (Oldbury)	399857	289392	Roadside	Automatic	96.5	39.8	36.1	34.4	25.9	27.7
Wilderness Lane (Great Barr)	403956	294855	Roadside	Automatic	95.6	26	29	31	23	23
Haden Hill Park (Cradley Heath)	395755	285493	Urban Background	Automatic	98.9	14	14	15	11	13
West Bromwich Roadside	400521	291541	Roadside	Automatic	99.3	34	24.5	28	19	21
Bearwood Road (Smethwick)	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	Automatic	N/A	**41**	35	**30.3***	**N/A**	**N/A**

☒ **Annualisation has been conducted where data capture is <75% and >25% 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 µg/m^3.

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

All means have been "annualised" as per LAQM.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%).

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
AD	399639	296095	Roadside	90.4	90.4		39.4	29.5	26.7	22.2
AE	399680	296089	Roadside	92.3	92.3	36.7	37.9	33.1	28.6	29.6
AF	399672	296042	Roadside	82.7	82.7	31.1	33.5	29.0	24.4	28.7
B17	399733	289401	Roadside	100.0	100.0	32.9		29.1	23.9	26.1
BA	399686	289431	Roadside	92.3	92.3	36.5	37.7	33.0	28.1	31.1
BD	399889	289395	Kerbside	100.0	100.0	41.5	42.9	37.7	31.6	34.6
BDQ	399943	289377	Roadside	100.0	100.0	44.5		43.8	31.3	32.5
BE	399915	289353	Kerbside	92.3	92.3	47.8	49.4	47.9	38.0	39.2
BF	399807	289408	Roadside	100.0	100.0	35.2	31.7	33.0	28.2	29.4
BG	399721	289429	Roadside	90.4	90.4	35.9	32.4	33.2	27.6	32.2
BO	400039	289366	Roadside	100.0	100.0	41.3	37.1	35.7	29.7	32.8
BP	400191	289441	Roadside	84.6	84.6	38.6	34.7	34.3	30.3	36.2
BR	399814	289407	Roadside	100.0	100.0	39.5	35.5	39.8	31.4	30.4
BS	399864	289427	Roadside	100.0	100.0	34.2	30.8	31.3	26.3	28.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
B52	399692	289428	Roadside	100.0	100.0	40.5		37.5	31.4	31.5
C10A	402285	286062	Roadside	100.0	100.0	45.6	41.0	39.6	23.9	34.7
C10D	402298	286073	Kerbside	100.0	100.0	47.6	42.8	44.1	33.4	36.2
C11A	397439	286416	Roadside	100.0	100.0	37.6	33.8	33.0	26.5	27.5
C11D	397428	286381	Kerbside	100.0	100.0	32.7	29.4	28.9	23.7	25.4
C11E	397391	286359	Kerbside	100.0	100.0	32.1	28.9	30.5	23.3	30.2
C12A	396899	286438	Roadside	100.0	100.0	40.7	36.6	40.7	34.3	36.9
C12D	396872	286454	Kerbside	100.0	100.0	36.9	33.1	37.5	26.6	33.3
C12E	396780	286465	Roadside	100.0	100.0	34.4	31.0	32.5	22.9	29.5
C13D	396411	291471	Roadside	57.7	57.7		29.5	33.1	25.7	30.1
C14A	397355	293929	Kerbside	75.0	75.0	35.3	32.5	30.9	24.9	29.2
C15A	396867	285536	Roadside	100.0	100.0	39.8	36.2	32.6	30.2	33.7
C1A	400668	291726	Kerbside	100.0	100.0	33.5	30.1	29.8	24.7	24.5
C1D	400664	292020	Roadside	90.4	90.4	43.0	38.7	36.8	30.3	31.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
C2A	401050	292898	Roadside	92.3	92.3	37.6	33.8	33.2	25.5	30.1
C2E	401059	292966	Roadside	90.4	90.4	38.5	34.6	31.1	25.9	28.3
C4A	400619	290153	Roadside	100.0	100.0	34.9	30.8	32.9	27.7	29.7
C4D	400657	290090	Kerbside	100.0	100.0	43.1	38.7	40.8	32.5	35.2
C4E	400738	290113	Kerbside	100.0	100.0	39.7	35.7	34.9	29.4	31.6
C5A	399267	290084	Roadside	100.0	100.0	31.1	27.9	27.5	22.8	25.6
C5D	399207	290032	Kerbside	100.0	100.0	38.0	34.2	35.8	29.0	32.2
C5E	399139	289947	Roadside	82.7	82.7	27.8	27.7	32.2	24.6	24.0
C6A	398937	289322	Roadside	100.0	100.0	32.6	29.3	31.6	26.7	29.1
C6E	399229	289315	Kerbside	92.3	92.3	31.4	28.2	30.6	24.9	26.9
C7A	398283	290113	Kerbside	100.0	100.0	33.0	29.7	39.0	29.4	26.5
C7D	398136	290226	Roadside	100.0	100.0	32.8	29.4	29.2	28.9	35.7
C7E	398042	290285	Kerbside	100.0	100.0	36.8	33.0	31.3	23.4	28.0
C7F	397493	290628	Roadside	100.0	100.0	34.4	30.9	34.4	27.5	28.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
C7H	398311	290135	Roadside	100.0	100.0	21.4	19.3	21.0	15.7	16.5
C9A	402138	286650	Roadside	100.0	100.0	31.5	28.4	29.1	22.1	25.3
C9D	402160	286554	Roadside	100.0	100.0	44.8	40.3	39.9	29.1	34.1
DA1, DA2, DA3	399402	292095	Roadside	100.0	100.0			29.6	24.5	25.7
DB1, DB2, DB3	399508	292068	Roadside	100.0	100.0			39.9	35.2	37.4
DC1, DC2, DC3	400233	291783	Roadside	100.0	100.0			26.4	21.9	24.1
DD1, DD2, DD3	400366	291781	Roadside	100.0	100.0			29.5	25.2	28.7
DE1, DE2, DE3	400728	291599	Roadside	100.0	100.0			31.0	25.3	27.5
DF1, DF2, DF3	400890	291558	Roadside	100.0	100.0			33.0	27.7	29.8
DG1, DG2, DG3	401040	291269	Roadside	100.0	100.0			35.0	28.6	27.6
DH1, DH2, DH3	401195	290934	Kerbside	90.4	90.4			26.3	22.4	22.8
DEF1	398469	288673	Roadside	84.6	84.6	30.8		30.7	26.0	28.2
DEF2	398405	288722	Roadside	84.6	84.6	21.7		21.1	16.1	18.7
DP1	397324	292256	Roadside	100.0	100.0	23.7	24.5	29.3	27.4	29.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
DP4	397344	292214	Roadside	100.0	100.0	35.0	36.0	28.8	19.2	20.4
EA	400869	291102	Kerbside	100.0	100.0	30.5	27.5	23.8	19.8	21.1
EB	400921	291001	Roadside	90.4	90.4	30.2	27.4	22.6	20.1	20.8
ED	400555	291257	Roadside	100.0	100.0	23.1	23.6	24.5	21.4	26.1
EE	400275	291132	Roadside	92.3	92.3	30.7	27.1	26.7	27.1	30.4
EF	399789	290547	Roadside	100.0	100.0	30.1	27.0	29.2	24.7	27.2
FA1, FA2, FA3	398756	289622	Roadside	100.0	100.0			37.2	31.4	34.0
FB1, FB2, FB3	398717	289574	Roadside	90.4	90.4			27.9	23.0	26.1
FC1, FC2, FC3	398788	289451	Roadside	100.0	100.0			33.8	28.3	30.8
FD1, FD2, FD3	399162	289413	Roadside	100.0	100.0			30.8	24.2	23.9
FE1, FE2, FE3	399375	289398	Roadside	92.3	92.3			35.9	32.1	34.7
FF1, FF2, FF3	400370	289532	Roadside	100.0	100.0			36.9	30.6	31.4
FG1, FG2, FG3	400535	289436	Roadside	100.0	100.0			33.7	30.2	33.0
GA, GB, CC	399858	289391	Roadside	100.0	100.0	38.8	39.9	34.7	27.7	30.6

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
HA	400383	291307	Kerbside	100.0	100.0	29.7	26.7	29.4	24.3	27.4
HH1	395754	285492	Urban Background	84.6	84.6	14.7	13.4	14.5	11.6	11.1
KD	403793	294661	Urban Background	100.0	100.0	26.7	24.0	24.4	19.5	18.0
KE	403925	294970	Kerbside	100.0	100.0	24.5	21.7	22.5	17.7	18.7
LA, LB, LC	400216	291633	Urban Background	94.4	94.4	22.9	20.4	22.3	17.3	18.5
MA	400712	289296	Roadside	90.4	90.4	42.2	37.6	42.5	34.6	34.7
MC	400748	289150	Kerbside	100.0	100.0	34.9	30.8	35.1	28.5	31.9
N1A	399647	290355	Roadside	100.0	100.0	38.1	34.2	38.5	30.9	32.2
N1B	399615	290358	Kerbside	100.0	100.0	40.2	35.3	34.9	29.4	34.6
N2A	403126	288557	Kerbside	84.6	84.6	26.1	23.2	25.1	19.5	26.2
OA	402240	286203	Roadside	92.3	92.3	34.4	30.8	31.3	25.3	29.0
OB	402195	286233	Roadside	100.0	100.0	41.1	37.0	36.6	26.6	30.5
OC	402245	286150	Roadside	100.0	100.0	36.6	33.8	33.6	26.6	29.8
OD	402222	286162	Roadside	100.0	100.0	40.4	36.3	35.6	27.4	30.6

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
OE	402212	286234	Roadside	92.3	92.3	34.1	30.5	32.3	26.8	30.8
OG	402187	286333	Roadside	100.0	100.0	34.8	31.4	32.7	24.2	29.0
OH	402192	286244	Kerbside	84.6	84.6	32.3	28.1	38.1	28.8	31.1
OI	402214	286253	Kerbside	90.4	90.4	36.3	32.9	29.5	24.3	28.4
OJ	402194	286246	Kerbside	92.3	92.3	36.7	32.8	34.4	28.7	31.1
OP4	402229	286096	Roadside	100.0	100.0	33.4	29.9	36.7	28.5	32.4
PA1, PA2, PA3	402461	290241	Kerbside	100.0	100.0			35.9	30.4	34.2
PB1, PB2, PB3	402221	290290	Roadside	100.0	100.0			34.9	29.4	32.7
PC1, PC2, PC3	401950	290355	Roadside	100.0	100.0			44.6	38.1	**44.2**
PD1, PD2, PD3	402111	290331	Kerbside	100.0	100.0			38.8	31.5	34.8
PE1, PE2, PE3	402334	290279	Kerbside	90.4	90.4			39.2	31.9	35.6
PS1A	400504	291239	Roadside	100.0	100.0	30.6		31.1	25.1	28.3
RA	401558	290077	Roadside	100.0	100.0	32.2	28.5	29.4	23.4	28.0
SA	403951	294852	Roadside	100.0	100.0	29.3	25.7	26.2	20.6	21.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
SU	400476	291481	Roadside	100.0	100.0	26.3	27.1	25.4	19.4	22.0
TA	395958	290645	Roadside	100.0	100.0	30.1	26.3	28.6	23.7	24.5
TC	395854	290643	Roadside	100.0	100.0	42.9		39.8	34.1	33.3
UA	398135	287603	Roadside	90.4	90.4	31.7	27.9	29.8	24.1	29.5
UB	398167	287750	Roadside	100.0	100.0	33.9	30.0	33.3	25.2	27.2
UC	398170	287746	Kerbside	100.0	100.0	36.1	32.2	32.4	26.9	28.6
VD	397628	292459	Roadside	100.0	100.0	25.5	22.8	25.6	21.3	23.3
VT	397155	290867	Roadside	100.0	100.0	26.7		26.3	21.5	22.1
WA	401917	295329	Roadside	92.3	92.3	30.8	31.5	29.1	22.6	22.9
WB	402139	295119	Urban Background	100.0	100.0	29.0	30.0	26.5	20.7	21.7
WF	402133	295234	Urban Background	80.8	80.8	30.7	31.6	27.7	20.0	22.5
WW2	400551	296050	Roadside	82.7	82.7		29.1	23.3	17.9	22.1
WW3	400598	296035	Roadside	92.3	92.3		29.4	22.6	17.6	22.0
XE	404435	294866	Roadside	90.4	90.4	30.6	29.1	26.3	20.8	28.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
ZA	404504	294813	Roadside	90.4	90.4	29.2	25.7	26.7	22.4	25.8
ZC	404493	294532	Roadside	90.4	90.4	31.8	28.4	27.0	23.6	22.5
ZK	404621	294291	Roadside	90.4	90.4	34.7	31.2	29.6	23.1	22.5
ZO	404290	294179	Roadside	90.4	90.4	33.3	30.0	30.2	24.3	26.7
ZP	404555	294219	Roadside	100.0	100.0	36.2	33.3	32.0	23.3	26.3
ZQ	404539	294187	Roadside	92.3	92.3	49.1	44.2	41.2	34.3	34.3
ZR	404410	294170	Roadside	100.0	100.0	44.5	39.8	42.0	36.5	35.2

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

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

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

Notes:

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

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.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 NO_2 Concentrations

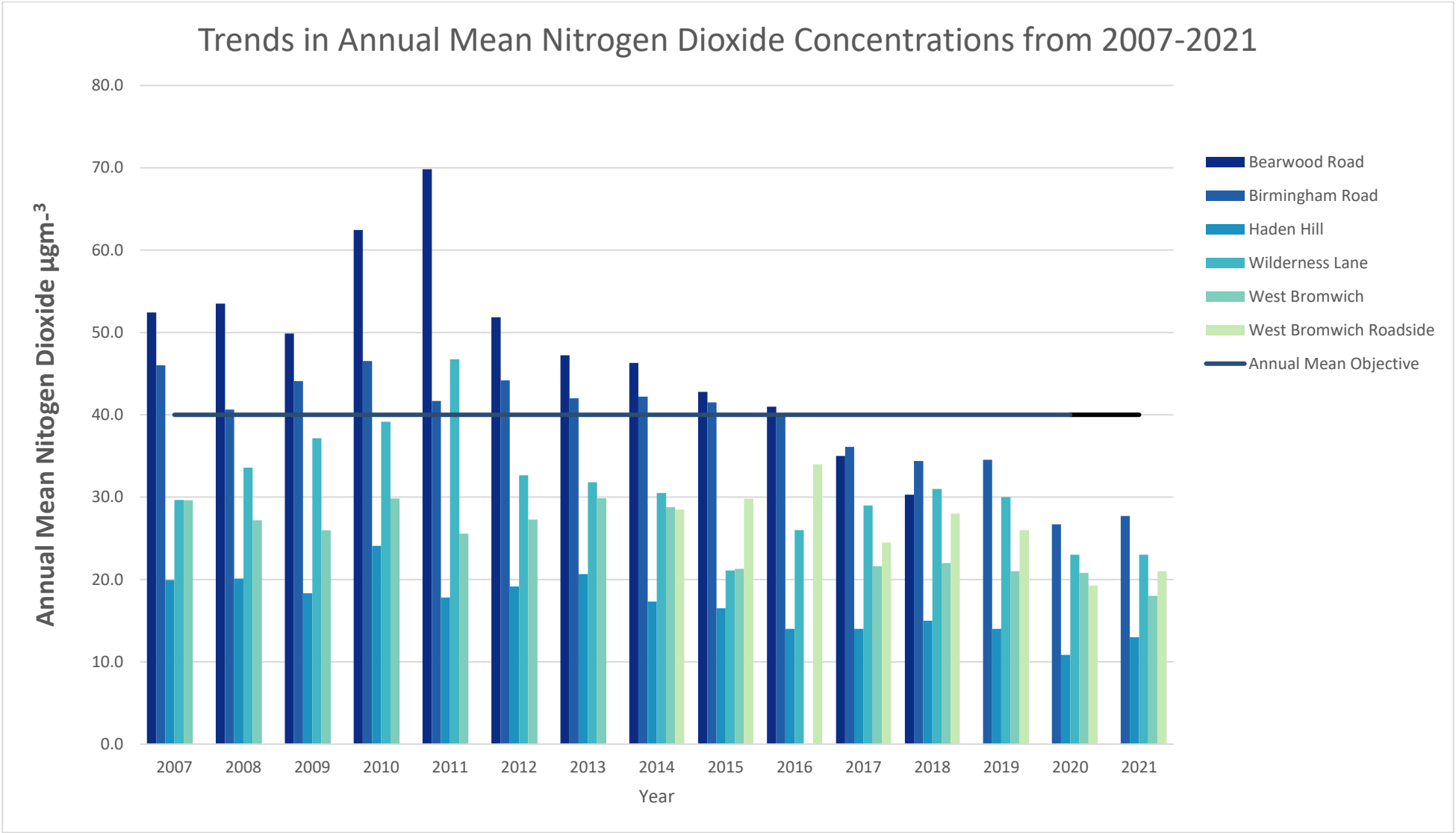


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Birmingham Road (Oldbury)	399857	289392	Roadside	96.5	96.5	**0(131.9)3**	0	**0(116)3**	0	0
Haden Hill Park (Cradley Heath)	395755	285493	Urban Background	98.9	98.9	**0(71)3**	0	0	0	0
Highfields (West Bromwich)	400187	291601	Urban Background	95.9	95.9	**N/A**	**0(73)3**	0	0	0
West Bromwich Roadside	400521	291541	Roadside	99.3	99.3	**0(134)3**	**0(82)3**	0	0	0
Wilderness Lane (Great Barr)	403956	294855	Roadside	97.2	97.2	**0(90)3**	**0(69)3**	0	0	0
Bearwood Road (Smethwick)	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside			1	**0(132)3**	**0(113.1)1, 3**	**N/A**	**N/A**

Notes:

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

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

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

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

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

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Birmingham Road (Oldbury)	399857	289392	Roadside	97.9	97.9	15	22	19	17	14
Haden Hill Park (Cradley Heath)	395755	285493	Urban Background	94.5	71.3	13	14	14	12	12
Highfields (West Bromwich)	400187	291601	Urban Background	96.5	96.5	**N/A**	13	17	15	13
Wilderness Lane (Great Barr)	403956	294855	Roadside	97.4	97.4	11	14	17	13	12

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

Notes:

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

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

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

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

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

Figure A. 2 – Trends in Annual Mean PM10 Concentrations

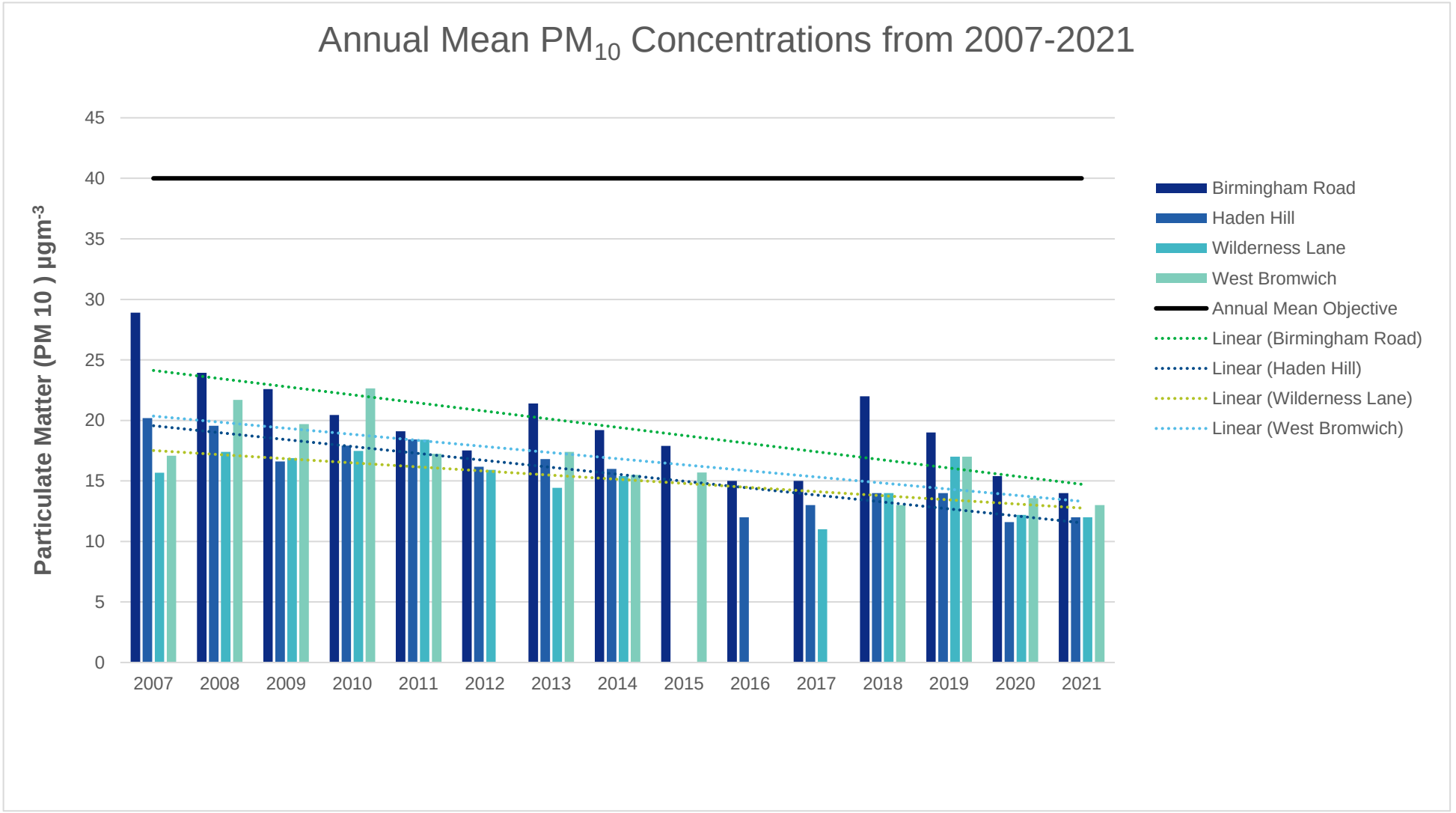


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Birmingham Road (Oldbury)	399857	289392	Roadside	97.9	97.9	3(26.0)	3(34.0)	6	2	0
Haden Hill Park (Cradley Heath)	395755	285493	Urban Background	94.5	71.3	0	0	0	0(22)	0
Highfields (West Bromwich)	400187	291601	Urban Background	96.5	96.5	N/A	1	3	2	1
Wilderness Lane (Great Barr)	403956	294855	Roadside	97.4	97.4	1(24)3	1	3(29)	1	0

Notes:

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

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

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

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

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

Figure A. 3 - Trends in Number of 24-Hour Mean PM10 Results > 50µg/m3

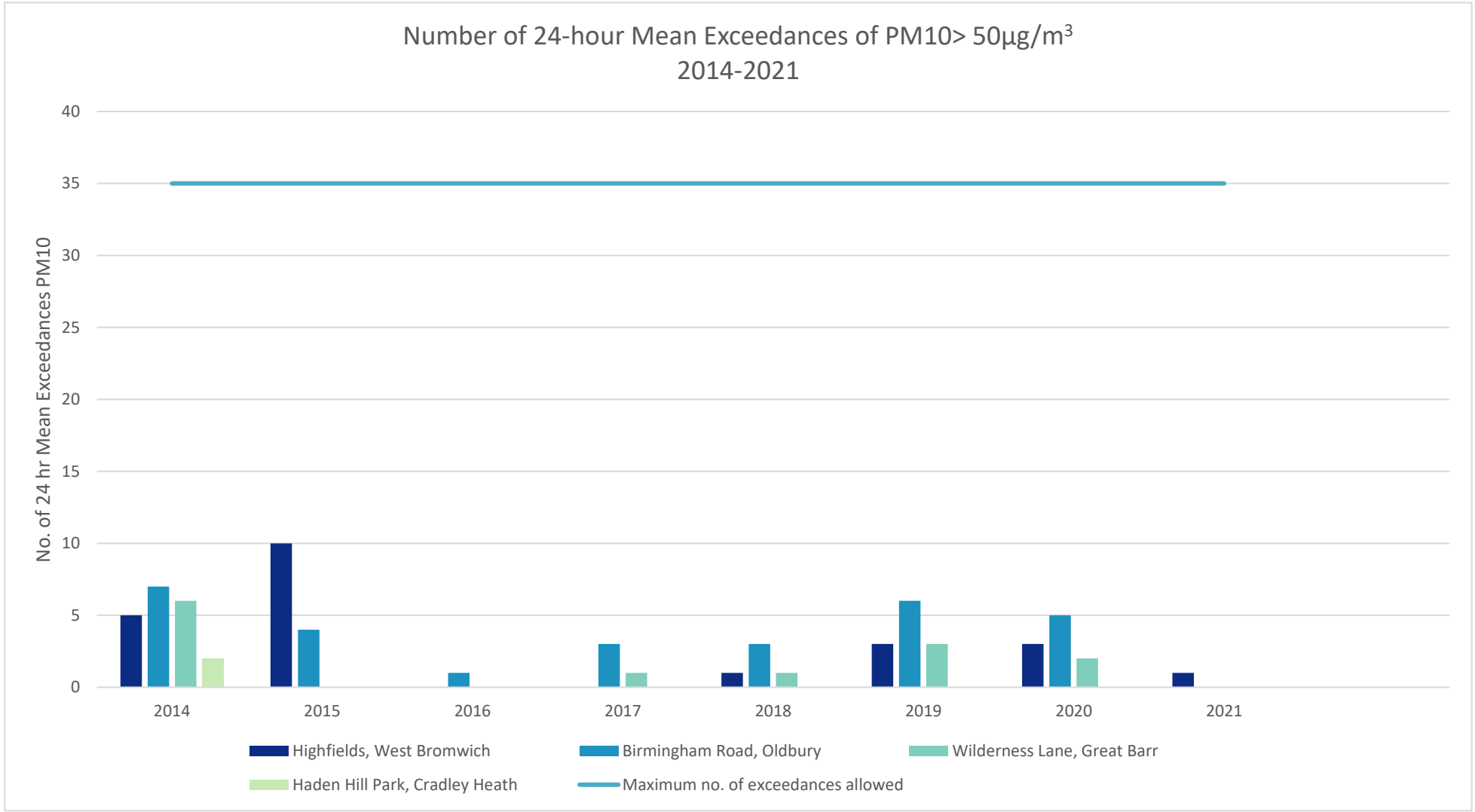


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Birmingham Road (Oldbury)	399857	289392	Roadside	90.7	75.9					7
Haden Hill (Cradley Heath)	332395	433175	Urban Background	95.4	71.3	7.3	7	7	6.3	7.7
Highfields (West Bromwich)	400187	291601	Urban Background	90.6	68.3					8.2
Wilderness Lane (Great Barr)	403956	294855	Roadside	96.4	56.6					6.8

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

Notes:

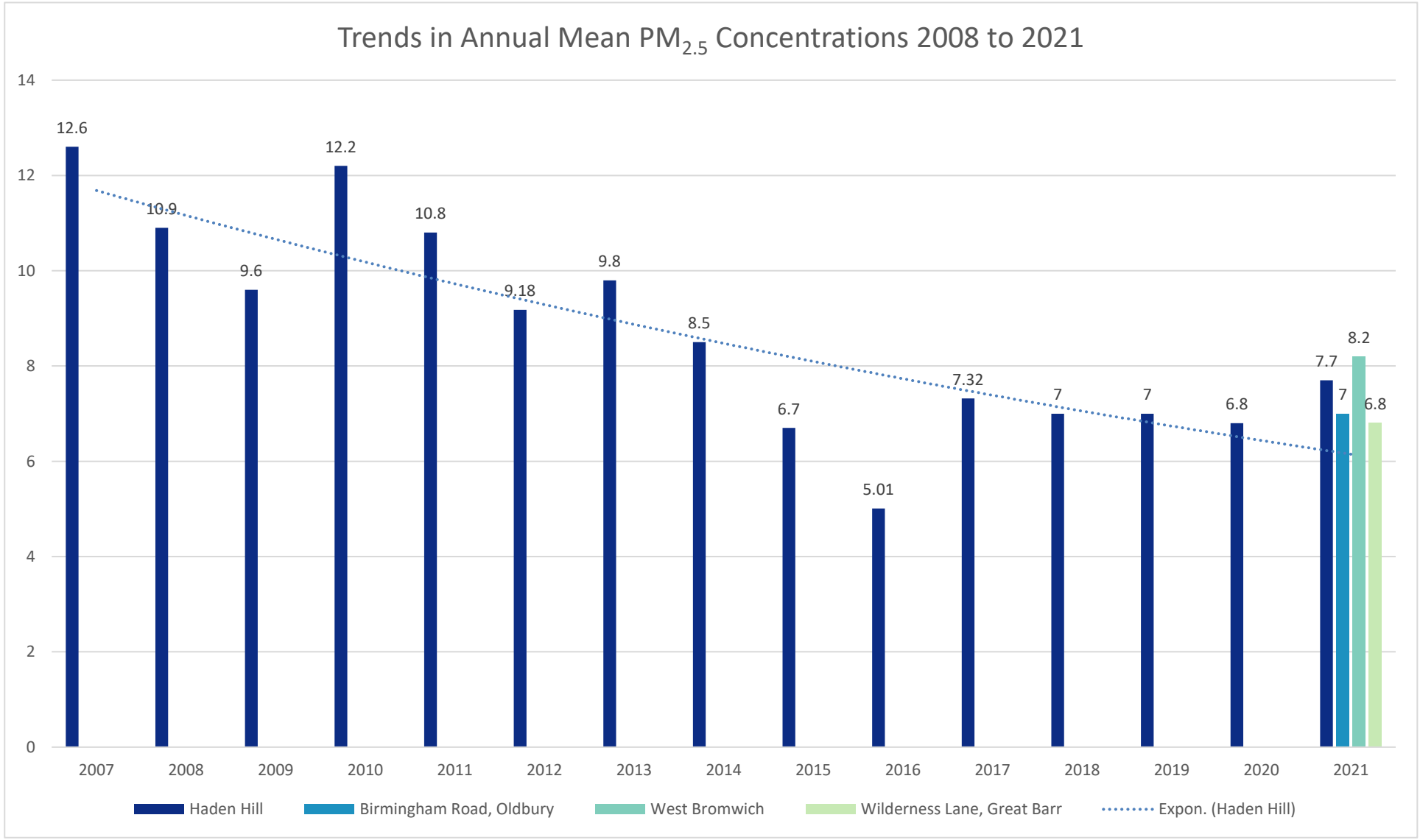
The annual mean concentrations are presented as µg/m^3.

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.

(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.4 - Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3)

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
AD	399639	296095	26.9	27.1	23.0	31.2	25.2	22.0		24.1	29.5	25.6	30.1	30.0	26.8	22.2		
AE	399680	296089	30.9	24.1	29.1	46.1	40.4		36.1	35.2	39.1	38.4	37.8	35.5	35.7	29.6		
AF	399672	296042	27.2	33.2		50.9	34.9	35.6		31.2	33.9	33.2	29.1	37.4	34.6	28.7		
B17	399733	289401	34.7	35.2	27.6	45.5	30.3	28.9	30.6	24.0	31.4	21.4	38.3	30.0	31.5	26.1		
BA	399686	289431	39.4	36.3		47.7	34.5	33.2	31.6	28.1	35.9	32.1	51.7	42.3	37.5	31.1		
BD	399889	289395	46.0	41.1	38.0	56.0	35.7	42.0	41.6	35.4	43.7	33.7	50.4	36.9	41.7	34.6		
BDQ	399943	289377	45.7	37.8	38.5	45.9	39.3	38.5	40.2	30.9	40.4	28.4	48.8	35.9	39.2	32.5		
BE	399915	289353	49.5	54.1	41.6	63.8	44.6	46,70	42.3	41.5	49.6	39.1	48.3	44.7	47.2	39.2	36.1	
BF	399807	289408	40.4	33.6	33.2	47.5	37.9	34.8	31.8	26.2	38.2	28.1	41.8	32.0	35.5	29.4		
BG	399721	289429	42.9	34.6	34.0	48.7	33.6	30.4	33.8	33.1	36.9		54.4	44.8	38.8	32.2		
BO	400039	289366	45.6	40.7	37.3	44.8	41.2	35.5	37.1	34.3	43.6	28.7	50.4	34.6	39.5	32.8		
BP	400191	289441	52.4	42.2	42.6	40.5	23.6	41.4	19.6			44.4	69.4	59.5	43.6	36.2	33.7	
BR	399814	289407	41.7	27.8	36.2	46.2	38.1	35.2	34.7	24.6	41.6	30.6	45.2	37.3	36.6	30.4		
BS	399864	289427	41.2	36.5	30.8	36.2	29.1	27.9	29.4	26.0	37.4	29.9	45.2	37.3	33.9	28.1		
B52	399692	289428	42.9	31.7	36.8	47.8	34.9	34.6	32.5	26.3	43.9	30.9	51.0	41.6	37.9	31.5		
C10A	402285	286062	38.1	34.5	34.5	48.3	39.5	43.5	47.4	44.7	48.1	36.5	49.5	37.3	41.8	34.7		
C10D	402298	286073	43.5	31.9	35.0	56.9	41.8	45.7	50.9	41.9	49.1	33.6	53.4	38.9	43.6	36.2	35.4	
C11A	397439	286416	38.5	29.9	31.5	34.4	29.7	31.2	29.8	27.6	37.0	28.5	43.3	36.7	33.2	27.5		
C11D	397428	286381	40.3	26.1	28.5	31.3	30.2	27.7	25.3	22.3	34.3	25.8	37.2	37.6	30.6	25.4		
C11E	397391	286359	38.6	35.7	34.7	41.3	32.9	34.2	33.2	28.2	38.8	28.1	49.3	40.8	36.3	30.2		
C12A	396899	286438	43.0	46.5	40.1	45.3	46.2	41.2	41.4	31.9	51.9	41.8	53.8	50.5	44.5	36.9	32.6	
C12D	396872	286454	49.2	38.4	36.5	48.0	38.7	35.5	38.1	30.1	43.6	30.9	51.6	41.2	40.1	33.3		
C12E	396780	286465	37.8	33.5	30.6	45.9	36.7	33.9	35.6	28.6	36.9	26.7	44.1	37.1	35.6	29.5		
C13D	396411	291471	39.7	39.2	32.0	43.0	31.6	34.4	32.7						36.1	30.1		
C14A	397355	293929	35.5	39.6	31.7	38.2	33.5	28.7	28.3				42.0	39.4	35.2	29.2		
C15A	396867	285536	43.1	35.8	40.7	43.9	39.3	40.0	40.4	31.8	46.3	34.3	49.7	41.7	40.6	33.7		
C1A	400668	291726	36.7	29.2	26.8	29.1	29.7	22.2	23.2	24.9	36.8	34.3	31.5	30.5	29.6	24.5		
C1D	400664	292020	46.5	37.5	34.6		29.3	37.0	38.5	34.9	42.5	40.6	43.9	38.0	38.5	31.9		
C2A	401050	292898	34.1	38.3		50.4	33.6	34.6	35.2	35.9	39.6	31.1	33.9	32.5	36.3	30.1		
C2E	401059	292966	38.6	38.5	28.6		35.8	33.3	33.9	35.3	37.4	29.6	32.8	31.2	34.1	28.3		
C4A	400619	290153	40.0	36.5	30.4	37.3	33.8	30.0	30.4	31.5	44.7	39.5	39.6	36.2	35.8	29.7		

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
C4D	400657	290090	52.5	47.2	34.6	46.6	34.7	36.2	36.3	34.9	51.6	41.9	45.8	46.7	42.4	35.2		
C4E	400738	290113	42.8	41.2	32.2	46.6	37.6	35.5	32.7	33.0	42.4	36.9	38.8	37.3	38.1	31.6		
C5A	399267	290084	35.0	28.4	25.5	32.0	28.7	27.2	30.0	28.6	36.5	33.1	39.1	25.5	30.8	25.6		
C5D	399207	290032	35.0	39.3	29.7	44.0	39.2	32.5	40.6	38.8	48.0	41.4	39.9	37.2	38.8	32.2		
C5E	399139	289947	17.6	32.9			24.0	27.7	29.8	29.8	34.9	28.4	36.3	27.7	28.9	24.0		
C6A	398937	289322	39.5	32.3	30.4	40.2	38.9	29.7	33.7	27.5	45.4	32.1	39.1	32.6	35.1	29.1		
C6E	399229	289315	35.0		26.4	38.8	33.3	28.7	31.3	29.3	37.3	30.5	35.1	30.7	32.4	26.9		
C7A	398283	290113	30.5	33.2	30.9	36.7	31.6	25.7	29.2	28.5	38.4	33.0	35.9	30.4	32.0	26.5		
C7D	398136	290226	50.1	43.6	36.4	42.3	43.2	43.2	23.8	46.4	56.1	44.5	48.9	37.7	43.0	35.7		
C7E	398042	290285	39.5	30.0	29.1	54.3	34.0	28.1	30.7	31.4	37.5	27.1	32.7	30.8	33.8	28.0		
C7F	397493	290628	39.9	36.5	34.7	39.7	28.3	33.4	37.0	35.7	40.3	34.6	20.0	34.8	34.6	28.7		
C7H	398311	290135	25.7	25.4	20.9	24.4	17.7	16.5	17.1	15.1	24.0	16.8	10.6	23.7	19.8	16.5		
C9A	402138	286650	33.9	37.0	23.1	39.5	30.0	23.9	30.9	26.1	30.7	26.3	32.7	31.1	30.4	25.3		
C9D	402160	286554	44.3	42.3	34.7	58.1	44.6	40.9	43.5	40.3	41.7	29.8	39.4	33.7	41.1	34.1		
DA1	399402	292095	32.6	37.3	28.0	29.8	26.3	24.3	25.2	23.8	38.3	29.9	41.1	30.2	-	-		Triplicate Site with DA1, DA2 and DA3 - Annual data provided for DA3 only
DA2	399402	292095	35.8	36.4	29.9	30.9	32.4	26.1	25.8	20.8	40.0	31.0	38.8	32.2	-	-		Triplicate Site with DA1, DA2 and DA3 - Annual data provided for DA3 only
DA3	399402	292095	30.6	35.5	27.2	30.0	30.8	26.4	25.5	24.5	40.1	31.6	37.2	30.6	31.0	25.7		Triplicate Site with DA1, DA2 and DA3 - Annual data provided for DA3 only
DB1	399508	292068	42.0	45.9	38.6	35.5	47.8	39.3	39.2	31.0	56.6	45.6	54.7	42.9	-	-		Triplicate Site with DB1, DB2 and DB3 - Annual data provided for DB3 only
DB2	399508	292068	43.9	47.8	39.9	40.8	51.8	36.7	41.3	35.6	61.3	41.2	58.8	46.8	-	-		Triplicate Site with DB1, DB2 and DB3 - Annual data provided for DB3 only
DB3	399508	292068	45.7	50.0	40.5	38.3	49.1	41.2	42.2	34.9	60.6	48.6	60.0	44.9	45.0	37.4	31.1	Triplicate Site with DB1, DB2 and DB3 - Annual data provided for DB3 only
DC1	400233	291783	37.1	31.7	30.8	38.6	17.2	24.9	27.4	22.4	27.5	22.7	36.7	31.7	-	-		Triplicate Site with DC1, DC2 and DC3 - Annual data provided for DC3 only
DC2	400233	291783	36.6	35.2	29.3	30.7	28.1	27.2	27.5	26.3	28.7	24.2	38.6	32.4	-	-		Triplicate Site with DC1, DC2 and DC3 - Annual data provided for DC3 only
DC3	400233	291783	30.8	26.8	20.8	41.0	27.3	26.8	27.5	9.8	27.9	24.5	34.5	32.5	29.0	24.1		Triplicate Site with DC1, DC2 and DC3 - Annual data provided for DC3 only
DD1	400366	291781	35.8	38.3	29.2	49.9	32.0	35.5	38.1	31.1	36.7	25.5	37.7	30.7	-	-		Triplicate Site with DD1, DD2 and DD3 - Annual data provided for DD3 only
DD2	400366	291781	23.7	43.2	34.2	50.4	35.5	37.7	37.2	27.5	31.6	25.8	35.5	32.5	-	-		Triplicate Site with DD1, DD2 and DD3 - Annual data provided for DD3 only
DD3	400366	291781	34.2	39.4	34.8	47.1	34.4	33.1	35.1	27.3	36.1	21.7	36.7	29.9	34.6	28.7		Triplicate Site with DD1, DD2 and DD3 - Annual data provided for DD3 only
DE1	400728	291599	39.0	29.0	32.4	35.7	33.7	24.4	31.1	27.5	37.5	31.2			-	-		Triplicate Site with DE1, DE2 and DE3 - Annual data provided for DE3 only
DE2	400728	291599	32.5	38.2	28.0	34.9	30.6	26.6	30.6	25.0	37.4	28.8	44.2	34.5	-	-		Triplicate Site with DE1, DE2 and DE3 - Annual data provided for DE3 only
DE3	400728	291599	35.0	37.9	30.6	33.0	29.2	27.2	31.8	26.1	37.9	23.2	47.2	38.6	33.1	27.5		Triplicate Site with DE1, DE2 and DE3 - Annual data provided for DE3 only
DF1	400890	291558	34.0	38.8	33.7	42.7	31.5	32.2	30.7	24.9	41.9	34.9	43.4	39.2	-	-		Triplicate Site with DF1, DF2 and DF3 - Annual data provided for DF3 only
DF2	400890	291558	38.2	39.8	32.4	41.5	35.3	31.3	35.7	29.2	42.2	33.2	46.4	40.4	-	-		Triplicate Site with DF1, DF2 and DF3 - Annual data provided for DF3 only

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DF3	400890	291558	35.1	39.5	32.6	42.8	34.0	26.5	32.6	27.2	37.0	31.4	42.6	35.9	35.9	29.8		Triplicate Site with DF1, DF2 and DF3 - Annual data provided for DF3 only
DG1	401040	291269	36.8	29.3	29.8	43.8	31.1	30.0	33.1	22.7	36.3	25.7	35.7	30.1	-	-		Triplicate Site with DG1, DG2 and DG3 - Annual data provided for DG3 only
DG2	401040	291269	36.0	33.4	31.2	39.4	32.3	28.6	33.2	27.5	37.6	26.0	45.9	29.0	-	-		Triplicate Site with DG1, DG2 and DG3 - Annual data provided for DG3 only
DG3	401040	291269	35.1	39.2	30.5	47.6	33.3	28.7	31.8	25.4	39.0	28.7	42.3	33.2	33.3	27.6		Triplicate Site with DG1, DG2 and DG3 - Annual data provided for DG3 only
DH1	401195	290934	32.4	26.7	24.3	30.5	23.9	20.4	22.1	22.3	30.3		36.3	30.1	-	-		Triplicate Site with DH1, DH2 and DH3 - Annual data provided for DH3 only
DH2	401195	290934	32.5	34.3	25.0	33.0	27.2	22.0	21.9	23.3	31.8		36.1	27.5	-	-		Triplicate Site with DH1, DH2 and DH3 - Annual data provided for DH3 only
DH3	401195	290934	30.8	33.2	24.0	26.2	23.4	20.1	21.0	21.1	31.5		35.0	28.3	27.5	22.8		Triplicate Site with DH1, DH2 and DH3 - Annual data provided for DH3 only
DEF1	398469	288673	34.8	38.0	31.6	34.9	33.4	30.0	31.7			30.3	42.1	33.3	34.0	28.2		
DEF2	398405	288722	25.7	26.9	19.9	29.9	18.8	19.1	18.9			15.2	28.1	22.9	22.5	18.7		
DP1	397324	292256	44.6	37.6	33.3	39.7	28.4	30.4	30.2	29.0	37.7	33.1	40.9	35.4	35.0	29.1		
DP4	397344	292214	30.0	28.2	23.5	29.8	21.5	20.0	21.7	20.4	27.1	22.1	25.7	24.5	24.6	20.4		
EA	400869	291102	34.5	28.8	21.6	23.4	23.3	20.4	22.8	21.2	27.8	21.5	32.6	27.2	25.4	21.1		
EB	400921	291001	37.2	23.9	21.1	26.9	20.8	16.8		20.0	25.6	25.0	34.7	23.5	25.0	20.8		
ED	400555	291257	37.4	33.5	27.4	34.6	26.6	29.7	25.9	25.9	33.5	32.0	36.6	33.6	31.4	26.1		
EE	400275	291132	35.9	40.7	32.9	50.1	33.7		25.3	33.5	41.0	32.8	42.5	33.9	36.6	30.4		
EF	399789	290547	42.0	39.6	26.9	38.4	30.9	24.5	26.8	30.0	35.2	32.0	35.8	31.0	32.8	27.2		
FA1	398756	289622	43.1	41.8	39.0	40.6	37.8	39.1	40.9	33.9	50.1	38.2	41.1	37.9	-	-		Triplicate Site with FA1, FA2 and FA3 - Annual data provided for FA3 only
FA2	398756	289622	44.6	43.6	39.0	42.5	39.7	39.3	44.5	34.1	50.9	38.5	51.4	40.8	-	-		Triplicate Site with FA1, FA2 and FA3 - Annual data provided for FA3 only
FA3	398756	289622	37.1	45.0		40.8	38.7	38.2	40.6	35.6	47.0	34.5	48.7		41.0	34.0		Triplicate Site with FA1, FA2 and FA3 - Annual data provided for FA3 only
FB1	398717	289574	27.8	40.4	29.4	42.6	26.0	27.0					30.6		-	-		Triplicate Site with FB1, FB2 and FB3 - Annual data provided for FB3 only
FB2	398717	289574	34.1	37.9	28.3	45.2	29.7	27.0	27.6	26.0	38.1				-	-		Triplicate Site with FB1, FB2 and FB3 - Annual data provided for FB3 only
FB3	398717	289574	33.8	38.2	27.5	40.1	26.6	28.3		28.7	37.7		30.7	26.2	31.5	26.1		Triplicate Site with FB1, FB2 and FB3 - Annual data provided for FB3 only
FC1	398788	289451	43.0	31.7	35.5	37.7	35.1	31.8	39.2	29.9	49.2	37.0	42.4	38.3	-	-		Triplicate Site with FC1, FC2 and FC3 - Annual data provided for FC3 only
FC2	398788	289451	42.2	26.7	31.7	36.8	39.3	29.9	40.1	30.7	49.3	35.8	46.6	39.4	-	-		Triplicate Site with FC1, FC2 and FC3 - Annual data provided for FC3 only
FC3	398788	289451	31.6	37.0	34.9	36.9	37.0	33.6	35.1	30.7	49.4	34.6	42.0	31.9	37.1	30.8		Triplicate Site with FC1, FC2 and FC3 - Annual data provided for FC3 only
FD1	399162	289413	36.7	30.4	26.9	30.3	26.6	20.8	24.4	19.8	35.0	28.4	34.9	27.3	-	-		Triplicate Site with FD1, FD2 and FD3 - Annual data provided for FD3 only
FD2	399162	289413	38.5	25.2	28.4	32.8	25.9	23.4	23.6	22.9	33.4	28.4	36.3	33.2	-	-		Triplicate Site with FD1, FD2 and FD3 - Annual data provided for FD3 only
FD3	399162	289413	32.0	27.8	26.7	32.4	21.9	24.4	26.1	24.0	33.0	28.4	31.8	34.0	28.8	23.9		Triplicate Site with FD1, FD2 and FD3 - Annual data provided for FD3 only
FE1	399375	289398	46.5	33.6	36.8	60.4	39.9	37.0	46.1	33.7	53.9	38.4		35.5	-	-		Triplicate Site with FE1, FE2 and FE3 - Annual data provided for FE3 only

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
FE2	399375	289398	41.4	34.3	37.7	55.9	38.8	39.6	42.2	37.1	50.3	38.3		37.3	-	-		Triplicate Site with FE1, FE2 and FE3 - Annual data provided for FE3 only
FE3	399375	289398	44.0	32.5	37.1	55.2	40.6	36.9	45.6	40.2	53.1	42.4		37.3	41.8	34.7		Triplicate Site with FE1, FE2 and FE3 - Annual data provided for FE3 only
FF1	400370	289532	47.6	29.9	36.1	43.8	32.3	33.5	33.2	34.2	52.9	33.9	50.0	40.9	-	-		Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
FF2	400370	289532	47.7	30.1	33.9	42.0	32.8	33.8	34.5	36.1	52.2	35.9	48.4	38.2	-	-		Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
FF3	400370	289532	25.2	32.4	32.2	39.6	33.6	33.2	34.1	30.3	45.8	33.7		37.0	37.8	31.4		Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
FG1	400535	289436	44.7	27.7	38.6	56.2	37.6	45.1	47.5	37.7	43.2	30.5	42.5	34.9	-	-		Triplicate Site with FG1, FG2 and FG3 - Annual data provided for FG3 only
FG2	400535	289436	38.3	24.3	34.3	55.7	36.9	40.8	47.1	38.5	47.1	26.7	43.1	37.0	-	-		Triplicate Site with FG1, FG2 and FG3 - Annual data provided for FG3 only
FG3	400535	289436	36.8	22.1	42.8	54.7	34.0	39.2	45.9	36.6	48.5	30.8	46.9	35.2	39.7	33.0		Triplicate Site with FG1, FG2 and FG3 - Annual data provided for FG3 only
GA	399858	289391	45.1	39.5	31.7	41.4	32.7	30.2	32.4	27.0	40.0	34.2	43.9	37.0	-	-		
GB	399858	289391	45.1	38.9	28.3	41.1	36.1	32.0	33.3	32.2	44.4	34.0	47.8	41.1	-	-		
GC	399858	289391	39.2	36.8	33.1	37.0	34.2	31.4	33.3	29.4	42.6	31.2	48.6	39.5	36.7	30.6		Triplicate Site with GA, GB and GC – Annual data provided for GC only
HA	400383	291307	35.9	29.7	32.6	39.1	25.8	31.3	30.7	33.5	35.1	29.7	41.1	32.4	33.1	27.4		
HH1	395754	285492		16.1	`4.25	18.0	9.6	12.4	11.4	9.8	12.5	9.8	15.7	18.1	13.3	11.1		
KD	403793	294661	26.3	20.0	25.1	29.3	22.1	21.4	22.0	22.5	23.6	19.5	27.3	1.5	21.7	18.0		
KE	403925	294970	28.6	27.3	18.8	23.8	20.5	15.8	9.6	17.9	28.3	27.2	27.2	26.1	22.6	18.7		
LA	400216	291633	31.5	26.9	23.3	26.2	13.7	16.0	17.1			21.9	25.7	25.1	-	-		
LB	400216	291633	26.5	26.1	22.6	23.1	19.4	15.9	17.0	17.2	23.1	22.2	26.3	27.9	-	-		
LC	400216	291633	31.7	27.3	15.7	24.7	17.1	16.7	18.2	16.6	23.0	20.6	29.6	21.9	22.3	18.5		Triplicate Site with LA, LB and LC - Annual data provided for LC only
MA	400712	289296	54.2	40.4	42.1	48.9	44.7	42.2		34.1	40.7	35.5	41.8	35.2	41.8	34.7		
MC	400748	289150	44.5	33.7	30.9	41.6	39.4	35.6	39.9	34.5	47.1	35.8	42.5	34.9	38.4	31.9		
N1A	399647	290355	44.8	44.3	30.7	37.6	35.6	32.7	36.3	33.5	48.7	43.3	40.8	36.7	38.7	32.2		
N1B	399615	290358	54.1	45.5	31.2	44.1	35.4	35.9	37.0	36.1	47.4	47.0	45.7	41.3	41.7	34.6		
N2A	403126	288557	35.5	32.1		38.0	30.7		34.1	28.3	33.7	21.2	35.4	26.2	31.5	26.2		
OA	402240	286203	41.7	40.2	22.8	44.8	32.2	33.0	38.7	32.9	36.3	27.0		35.2	35.0	29.0		
OB	402195	286233	39.9	38.1	33.1	39.4	34.6	34.5	40.2	28.0	41.9	33.1	42.3	35.5	36.7	30.5		
OC	402245	286150	33.1	37.5	29.7	46.4	34.9	35.1	40.0	27.8	41.1	29.9	40.0	36.0	36.0	29.8		
OD	402222	286162	34.7	32.8	34.4	34.0	34.9	38.3	38.4	24.9	43.7	36.4	50.5	39.9	36.9	30.6		
OE	402212	286234	40.1	37.8	31.8	44.8	31.9		39.1	33.2	40.4	32.8	43.3	33.2	37.1	30.8		
OG	402187	286333	42.6	32.9	32.4	35.5	32.2	40.2	37.0	30.6	34.5	27.4	37.8	36.8	35.0	29.0		
OH	402192	286244	36.1	38.7		35.5	32.5	40.3	35.4	30.8	43,32	33.5	52.3	40.0	37.5	31.1		
OI	402214	286253	33.8	36.2	28.5	45.3	34.8	37.1	36,20	29.6	36.4	28.8	35.1	31.2	34.3	28.4		
OJ	402194	286246	38.9	29.0	33.4	35.9		31.3	38.7	31.2	46.9	38.1	50.6	38.6	37.5	31.1		
OP4	402229	286096	32.5	36.9	39.9	41.7	30.1	40.0	40.1	31.6	46.7	35.1	53.3	40.0	39.0	32.4		

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
PA1	402461	290241	46.0	45.0	38.9	59.1	39.7		49.3	43.4	38.5	34.6	45.6	37.4	-	**-**		Triplicate Site with PA1, PA2 and PA3 - Annual data provided for PA3 only
PA2	402461	290241	43.7	42.7	40.8	56.1	34.7	42.9	47.3	40.0	38.3	35.0	48.9	33.3	-	**-**		Triplicate Site with PA1, PA2 and PA3 - Annual data provided for PA3 only
PA3	402461	290241	39.1	43.3	39.3	57.1	40.8	41.6	46.1	40.8	33.0	30.4	46.3	2.7	41.2	34.2		Triplicate Site with PA1, PA2 and PA3 - Annual data provided for PA3 only
PB1	402221	290290	46.8	41.7	36.8	57.5	37.2	39.8	43.2	35.1	38.1	31.3	46.6	34.7	-	**-**		Triplicate Site with PB1, PB2 and PB3 - Annual data provided for PB3 only
PB2	402221	290290	44.4	40.7	38.8	52.0	32.4	38.4	42.0	34.2	35.4	31.9	42.4	35.6	-	**-**		Triplicate Site with PB1, PB2 and PB3 - Annual data provided for PB3 only
PB3	402221	290290	46.2	34.6	36.5	51.2	32.3	38.0	38.5	36.8	37.6	33.7	38.7	38.1	39.4	32.7		Triplicate Site with PB1, PB2 and PB3 - Annual data provided for PB3 only
PC1	401950	290355	48.7	45.6	52.3	53.4	52.2	55.4	55.1	49.1	54.9	51.1	68.6		-	**-**		Triplicate Site with PC1, PC2 and PC3 - Annual data provided for PC3 only
PC2	401950	290355	60.5	41.1	54.4	60.2	50.9	54.4	54.3	47.9	56.7	47.4	66.9		-	**-**		Triplicate Site with PC1, PC2 and PC3 - Annual data provided for PC3 only
PC3	401950	290355	62.5	50.0	50.1	60.7	48.1	57.7	58.8	42.8	52.3	46.3	61.4	48.1	53.2	**44.2**	35.0	Triplicate Site with PC1, PC2 and PC3 - Annual data provided for PC3 only
PD1	402111	290331	50.9	47.9	33.0	39.8	37.0	34.6	33.1	35.1	45.2	41.8	46.3	45.5	-	**-**		Triplicate Site with PD1, PD2 and PD3 - Annual data provided for PD3 only
PD2	402111	290331	46.1	49.1	34.6	40.4	42.3	34.6	35.2	35.7	44.1	38.4	50.4	42.6	-	**-**		Triplicate Site with PD1, PD2 and PD3 - Annual data provided for PD3 only
PD3	402111	290331	55.8	52.7	36.6	42.5	42.3	33.7	35.2	36.2	46.4	48.5	51.6	44.7	41.9	34.8		Triplicate Site with PD1, PD2 and PD3 - Annual data provided for PD3 only
PE1	402334	290279	56.5	45.6	33.9	47.4	42.4	41.0		34.4	43.8	34.0	53.3	40.4	-	**-**		Triplicate Site with PE1, PE2 and PE3 - Annual data provided for PE3 only
PE2	402334	290279	58.9	43.9	33.1	42.0	41.9	39.6		35.8	44.9	42.5	53.5	40.4	-	**-**		Triplicate Site with PE1, PE2 and PE3 - Annual data provided for PE3 only
PE3	402334	290279	51.8	43.2	36.0	45.2	40.7	38.5		33.4	42.9	41.3	51.3	43.5	42.9	35.6		Triplicate Site with PE1, PE2 and PE3 - Annual data provided for PE3 only
PS1A	400504	291239	44.7	32.3	29.9	33.0	30.7	30.3	27.6	31.9	37.5	34.8	42.9	33.7	34.1	28.3		
RA	401558	290077	32.0	43.5	31.7	45.6	30.8	28.1	27.8	32.9	36.1	30.4	35.0	31.1	33.7	28.0		
SA	403951	294852	36.2	30.6	22.0	25.6	26.3	18.4	19.8	20.6	28.7	27.8	28.7	31.4	26.3	21.9		
SU	400476	291481	32.3	27.8	22.2	36.6	23.4	23.2	23.2	22.6	26.6	24.0	26.8	29.5	26.5	22.0		
TA	395958	290645	36.4	30.5	27.6	31.1	25.7	24.9	27.3	26.5	36.3	26.9	29.4	31.9	29.5	24.5		
TC	395854	290643	48.8	37.0	38.4	36.9	33.2	38.7	32.5	34.3	48.9	38.8	55.6	38.2	40.1	33.3		
UA	398135	287603	38.8	39.3	32.6	37.5	33.8	29.5	29.0	30.5	38.8		41.5	39.8	35.6	29.5		
UB	398167	287750	38.2	32.7	30.9	41.0	31.1	28.5	30.1	27.7	36.3	27.1	34.0	35.9	32.8	27.2		
UC	398170	287746	43.2	36.1	32.0	39.4	30.8	30.7	32.0	25.6	39.8	29.9	41.2	33.0	34.5	28.6		
VD	397628	292459	34.1	31.4	26.7	35.8	22.1	26.0	23.3	23.6	29.8	23.4	32.6	28.5	28.1	23.3		
VT	397155	290867	34.4	28.5	25.7	31.7	20.3	21.2	22.2	21.9	29.8	25.1	30.2	28.0	26.6	22.1		
WA	401917	295329	26.4		25.4	24.9	26.4	20.0	25.5	22.9	34.6	29.1	33.7	35.3	27.6	22.9		
WB	402139	295119	27.5	27.7	22.6	23.1	25.0	18.8	23.4	21.4	32.1	30.3	32.6	29.6	26.2	21.7		
WB	402139	295119	27.5	27.7	22.6	23.1	25.0	18.8	23.4	21.4	32.1	30.3	32.6	29.6	26.2	21.7		
WF	402133	295234	35.3	30.0	23.6	23.2	27.7	18.6	24.3	22.1	31.5		34.5		27.1	22.5		
WW2	400551	296050	35.3	40.9	23.3	30.9		19.0		21.3	22.2	20.9	29.4	23.2	26.6	22.1		

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WW3	400598	296035	36.1	40.0		28.0	21.9	21.2	21.7	22.2	25.4	20.1	31.0	23.5	26.5	22.0		
XE	404435	294866	37.7	38.1	29.2	45.2	35.2	29.7	32.6	29.7	36.6		27.5	33.7	34.1	28.3		
ZA	404504	294813	40.4	30.1	28.2	28.1	30.3	25.7	31.4	25.6	36.0		34.3	32.4	31.1	25.8		
ZC	404493	294532	36.4	32.4	26.0	29.4	23.1	22.3	24.8	21.9	30.2		26.3	25.7	27.1	22.5		
ZK	404621	294291	30.2	29.9	19.5	31.0	29.8	23.0	26.0	22.8	32.2		24.0	29.3	27.1	22.5		
ZO	404290	294179	37.7	37.4	25.9	38.7	28.4	26.2	28.3	29.0	34.6		35.3	32.3	32.2	26.7		
ZP	404555	294219	33.6	35.4	25.4	40.0	31.4	26.3	28.2	27.6	38.5	29.4	31.0	33.2	31.7	26.3		
ZQ	404539	294187	44.4		33.4	44.4	42.2	36.4	40.8	41.7	49.4	43.4	40.0	38.8	41.3	34.3		
ZR	404410	294170	45.5	35.7	38.6	52.1	45.6	39.2	46.0	42.7	48.4	37.2	40.4	37.0	42.4	35.2		

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

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used**

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

☒ **Sandwell MBC confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Sandwell Metropolitan Borough Council During 2021

There are several significant new or ongoing developments within Sandwell which may cumulatively contribute to pollution sources in the area. These include:

Commercial/industrial development currently under construction:

- Former Toys R Us - Wolverhampton Road, Oldbury – retail, leisure, stand-alone café/drive thru restaurant. Due to open spring/summer 2022.
- Sandwell Aquatic Centre, Londonderry Lane, Smethwick – 50m Olympic sized pool with diving boards as well as additional leisure facilities. Currently under construction to be used as the swimming and diving centre for the Commonwealth Games 2022.
- The Midland Metropolitan University Hospital, Grove Lane, Smethwick. This will replace City Hospital located in Birmingham. The new hospital will offer maternity, children's and inpatient adult services to half a million people. Following a series of delays the hospital is due to open in 2022.

Commercial development coming forward 2022/23:

- Locarno Works, Lorcano Road, Tipton – 3 storey office building, utility yard. Planning permission granted December 2021.
- Land East of Perrott Street, Smethwick - New secondary school with associated sports pitches, MUGA, access and parking. Planning permission granted December 2021
- Newcomen Drive Open Space, Newcomen Drive, Tipton – Industrial/warehousing (B2/B8). Planning permission granted May 2022

Residential development currently under construction:

- Hall Green Road, West Bromwich – 223 dwellings. Planning permission granted May 2021
- Land at West Bromwich Street, Oldbury – 152 dwellings. Planning permission granted February 2021.

Residential development coming forward 2022/23:

- Duchess Parade, High Street, West Bromwich – Nine storey mixed use development, including retail unit and 60 apartments. Permission granted January 2022.
- Former Gas Works, Swan Lane, West Bromwich – 147 dwelling houses (65 houses and 82 apartments)
- 43-63 Carters Green, West Bromwich – 202 residential units. Awaiting planning application.
- Phoenix Collegiate, Wednesbury – 84 dwellings. Awaiting further planning information.

Major Planned development – Development schemes assessments / EIA due to size and impact on the local area.

Brandhall Village

- Proposed development of 550 homes, as well as a new primary school and public park. Public consultation was completed in November 2021. Report to cabinet expected in 2022 following further technical investigations into potential flood risk.

Friar Park Urban Village

- A proposed development of homes and open spaces. The site covers approximately 27 hectares (around 40 football pitches) which will make it one of the largest brownfield development sites in the region. A public consultation was held in May/June 2021 and a second public consultation is planned for 2022 prior to submission of a planning application.

All new developments are examined through the planning system and where necessary air quality assessments and mitigation are required from developers in order to offset the impacts of existing and new sources of pollution on future residents.
In addition, we continue to utilise the information from our diffusion tube monitoring and air quality monitoring stations to measure the effects of new developments and new pollution sources, allowing the council to identify pollution hotspots and assess long term trends. These results are reported annually as part of the LAQM process.

Additional Air Quality Works Undertaken by Sandwell Metropolitan Borough Council During 2021

Sandwell Metropolitan Borough Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

Air quality data must meet Quality Control and Quality Assurance (QA/QC) criteria to ensure that the concentrations of pollutants measured represent the actual concentrations of pollutants in the atmosphere. In addition, the data must be consistent over time and sufficiently accurate and precise to enable a comparison with the National Air Quality Objectives. Sandwell follows QA/QC procedures laid down in Technical Guidance provided by Defra in LAQM.TG (16).

In 2021 Sandwell used Gradko International as their diffusion tube supplier, details are provided in **Table C.1** below. Diffusion tubes were exposed for monthly periods as prescribed in the Diffusion Tube Monitoring Calendar published by Defra[45].

Table C. 1 - NO_2 Diffusion Tube Details	
Supplier	Gradko International
Period	2021
Type of Tube	Nitrogen Dioxide NO_2
Type of Absorbent	Triethanolamine
Method of Tube Preparation	50% TEA in Acetone
Exposure Dates	LAQM Exposure Calendar 2021
Exposure Duration	One Month
Bias Adjustment Factor Applied	0.83

[45] https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-monitoring-calendar/

Gradko International follow the procedures set out in the Air Proficiency Testing Scheme (AIR-PT) an independent analytical proficiency testing scheme operated by LGC Standards. AIR offers several test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient air.

Diffusion Tube Annualisation

Annualisation was required for one diffusion tube site. The annualisation was completed using the Diffusion Tube Data Processing Tool[46]. The continuous monitoring data from four reference sites, Walsall Woodlands, Coventry, Telford and Leamington Spa were used as reference sites. Details of the sites and the annualisation results are presented in **Table C9.**

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 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/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Sandwell MBC have applied the national bias adjustment factor of 0.83 to the 2021 monitoring data. A summary of bias adjustment factors used by Sandwell MBC over the p**ast five years is presented in Table C.2. The local bias was calculated as shown in Table C. 10.**

It was determined that the national bias adjustment factor would be used instead of the local bias adjustment factor of 0.78. By adjusting the data by higher figure of 0.83 we continue to present the most conservative (or worse case) annual mean concentrations for NO2 and reduce the likelihood of underestimating NO_2 concentrations across the borough.

[46] https://laqm.defra.gov.uk/tools-monitoring-data/dtdp.html

Table C. 2 - Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.83
2020	National	03/21	0.82
2019	National	03/20	0.81
2018	National	06/19	0.89
2017	National	03/18	0.97

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in **Table C. 11**and a summary of the relevant exposed receptors is provided below in **Table C.3.**

Table C. 3 – Summary of Fall-Off-With-Distance Calculations Required at Non-Automatic Monitoring Sites

Diffusion Tube ID	Raw Data	Bias Adjusted (0.83) and Annualised	Distance Corrected to Nearest Exposure	Comment
BE (Birmingham Road, Oldbury)	47.2	39.2	*36.1*	Predicted concentration at Receptor within 10% the AQS objective.
BP (Birmingham Road, Oldbury)	43.6	36.2	33.7	
C10D (Hagley Road West, Bearwood)	43.6	36.2	35.4	
C12A (Holly Road, Rowley Regis)	44.5	36.9	32.6	
DB1, DB2, DB3 (Bilhay Street off A41, West Bromwich)	45.0	37.4	31.1	Receptor is more than 20m further from the kerb than your monitor - treat result with caution.
PC1/PC2/PC3 – (A41 – Opposite Dartmouth Cricket Club)	53.2	44.2	35.0	Receptor is more than 20m further from the kerb than your monitor - treat result with caution.

Distance correction was required at these sites as the annual mean concentration was greater than 36µg/m^3 and the monitoring sites were not located at a point of relevant exposure.

QA/QC of Automatic Monitoring

All routine calibration and maintenance is carried out by Sandwell Council's Air Quality Officer. To retain high quality data, fortnightly calibration visits are made by the LSO to ensure that any instrumental drifts since the last calibration can be quantified. These site visits also allow the following activities to be undertaken:

- Site inspection
- Pre-calibration checks
- Calibration of the analysers
- Filter change
- Post-calibration checks and site inspection

In addition, non-routine visits are also undertaken to respond to events such as power cuts, instrument malfunction and vandalism.

Verification and Ratification

- Air Quality Data Management (AQDM) carries out all data verification and ratification on automatic monitoring station data for Sandwell Council in accordance with the LAQM (TG16) April 2021 standards using the AURN methodology.
- Data verification and ratification is the process whereby provisional data are combined with all other relevant information to derive the best final dataset, which is as accurate as possible and has known measurement uncertainties to allow meaningful comparison with other data using specialised data handling software.
- Verification is carried out on an ongoing basis and is essentially a process to "clean-up" the provisional data by reviewing/excluding/including any data due to instrument malfunctions or faulty calibrations, and updates to data scaling following application of the most recent calibration factors.
- Ratification is a detailed manual check of the data set carried out on a monthly/ quarterly/yearly basis. It requires a longer-term view of the dataset incorporating the results from independent QA/QC audits of the monitoring stations, and

assessment on the validity of data by experienced air quality scientists. It will consider a range of variables such as: relationships between pollutants, the impact of air pollution episodes, the context of the results in the overall climate, national and regional pollutant patterns, long-term trends etc.

- Once all the checks and corrections have been completed the data is given a “fully ratified” status.

The following automatic analysers are used within Sandwell’s monitoring stations:

Highfields, West Bromwich AURN

APNA370 Ambient NOx

APOA370 Ambient O_3

FIDAS PM_1, $PM_{2.5}$ and PM_{10} (Installed 15 April 2021)

Tapered Element Oscillating Microbalance (TEOM) measuring PM_{10} (Particulate Matter < 10 microns). (Removed 15 April 2021)

West Bromwich Roadside

Teledyne API T200 Ambient NOx

Birmingham Road

APNA370 Ambient NOx

FIDAS PM_1, $PM_{2.5}$ and PM_{10} (Installed 25 March 2021)

Tapered Element Oscillating Microbalance (TEOM) measuring PM_{10} (Particulate Matter < 10 microns). (Removed 25 March 2021)

Wilderness Lane – Great Barr

APNA370 Ambient NOx

FIDAS PM_1, $PM_{2.5}$ and PM_{10} (Installed 8 June 2021)

Tapered Element Oscillating Microbalance (TEOM) measuring PM_{10} (Particulate Matter < 10 microns). (Removed 8 June 2021)

Haden Hill

APNA370 Ambient NOx

FIDAS PM_1, $PM_{2.5}$ and PM_{10} (Installed 15 April 2021)

Tapered Element Oscillating Microbalance (TEOM) 1400AB Measuring PM_{10} (Particulate Matter <10 microns) (Removed 15 April 2021)

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

Tapered Element Oscillating Microbalance (TEOM) data was collected and ratified.

The Volatile Correction Model (VCM) has been run on the TEOM PM_{10} data to calculate the EU Reference Equivalent PM_{10} required for the LAQM reports.

The VCM correction has not been applied to the $PM_{2.5}$ data, as no suitable correction method has been developed for $PM_{2.5}$.

The instruments are manually checked on a fortnightly basis. Instrument filters are changed when the filter loading reaches 80% or is likely to reach 80% before the unit can be visited again. All work is carried out in accordance with the procedures described in the AURN Operator's Manual.

$PM_{2.5}$ Estimation of Concentrations

As discussed in the section '*$PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or concentrations',* estimates of $PM_{2.5}$ levels had to be calculated for three additional continuous monitoring sites in 2020 as we did not have PM2.5 monitoring capability at these sites. The calculations were made in accordance with Box 7.7 of LAQM TG (16) and are show in **Table C. 4** below.

Table C. 4 - Estimation of PM2.5 Concentrations using PM10 Data

Site	Classification	Annual PM2.5	Annual PM10	Ratio PM2.5/ PM10	
Haden Hill (Reference Site)	Urban Background	6.35	12	0.53	
					Estimated Annual PM2.5
Highfields, West Bromwich	Urban Background	-	15	0.53†	7.95
Birmingham Oldbury Road	Roadside	-	17	0.7₮	11.9

† Local reference ratio for Haden Hill is 0.53 – annual PM_{10} is multiplied by this local reference as an 'Urban Background' classified site.

₮ National derived correction factor is 0.7– annual PM_{10} is multiplied by national correction factor for roadside as no local reference site of the same roadside classification was available.

Table C. 4 - Estimation of PM2.5 Concentrations using PM10 Data					
Site	**Classification**	**Annual PM2.5**	**Annual PM10**	**Ratio PM2.5/ PM10**	
Wilderness Lane, Great Barr	Roadside	-	13	0.7[₮]	9.1

Automatic Monitoring Annualisation

Data with <75% data capture rate were adjusted in accordance with Box 7.9 of LAQM. TG (16), which states that it is permissible to annualise the data using background, roadside or kerbside sites. Valid data capture of PM_{10} was less than <75% at Haden Hill, so this data has been annualised. Whilst valid data capture of $PM_{2.5}$ was <75% for three stations. A breakdown of the annualisation calculations is provided in **Table C. 5 to Table C. 8.**

Table C. 5 - Annualisation Calculation Summary of PM10 at Haden Hill – Continuous Monitoring Site

Site	PM_{10} Annual Mean 2021	Period Mean 2021	Ratio Am/Pm
Haden Hill		11	
Background sites			
Birmingham Ladywood	11.81	11.3	1.04
Coventry	11.82	11.17	1.06
Leamington Spa	11.21	10.46	1.07
		Sum of Ratios	3.17
		R (average)	1.05
		Annualised mean µg/m3	**11.55**

Table C. 6 - Annualisation Calculation Summary of $PM_{2.5}$ at Haden Hill – Continuous Monitoring Site

Site	$PM_{2.5}$ Annual Mean 2021	Period Mean 2021	Ratio Am/Pm
Haden Hill		7	
Background sites			
Birmingham Ladywood	7.14	6.84	1.04
Coventry	7.39	6.76	1.09
Leamington Spa	7.14	6.39	1.18
		Sum of Ratios	3.31
		R (average)	1.10
		Annualised mean µg/m3	**7.7**

Table C. 7 - Annualisation Calculation Summary of PM2.5 at Highfields, West Bromwich – Continuous Monitoring Site

Site	$PM_{2.5}$ Annual Mean 2021	Period Mean 2021	Ratio Am/Pm
Highfields, West Bromwich		7.6	
Background sites			
Birmingham Ladywood	7.14	6.70	1.06
Coventry	7.39	6.65	1.11
Leamington Spa	7.14	6.39	1.11
		Sum of Ratios	3.28
		R (average)	1.09
		Annualised mean µg/m3	**8.28**

Table C. 8 - Annualisation Calculation Summary of $PM_{2.5}$ at Wilderness Lane, Great Barr– Continuous Monitoring Site

Site	$PM_{2.5}$ Annual Mean 2021	Period Mean 2021	Ratio Am/Pm
Wilderness Lane		6.3	
Background sites			
Birmingham Ladywood	7.14	6.69	1.07
Coventry	7.39	6.79	1.08
Leamington Spa	7.14	6.39	1.11
		Sum of Ratios	3.26
		R (average)	1.08
		Annualised mean µg/m3	**6.80**

Table C. 9 - Annualisation Summary (concentrations presented in µg/m^3)

Diffusion Tube NO_2 Annualisation								
Diffusion Tube ID	Annualisation Factor Walsall Woodlands	Annualisation Factor Coventry Allesley	Annualisation Factor Telford	Annualisation Factor Leamington Spa	Average Annualisation Factor	Raw Data Simple Annual Mean (µg/m3)	Annualised Data Simple Annual Mean (µg/m3)	Comments
C13D	0.9838	1.0161	0.9744	1.0520	1.0066	36.1	36.3	

Automatic Monitoring Stations $PM_{2.5}$ Annualisation							
Site ID	**Annualisation Factor Leamington Spa**	**Annualisation Factor Coventry Allesley**	**Annualisation Factor Birmingham Ladywood**	**Average Annualisation Factor**	**Raw Data Annual Mean (µg m^{-3})**	**Annualised Annual Mean µg m^{-3}**	**Comments**
Haden Hill	1.18	1.09	1.04	1.10	7	**7.7**	FIDAS monitor installed April 2021
Wilderness Lane	1.11	1.08	1.07	1.08	6.3	**6.8**	FIDAS monitor installed June 2021
Highfields	1.11	1.11	1.06	1.09	7.6	**8.2**	FIDAS monitor installed June 2021

Automatic Monitoring Station PM_{10} Annualisation							
Site ID	**Annualisation Factor Leamington Spa**	**Annualisation Factor Coventry Allesley**	**Annualisation Factor Birmingham Ladywood**	**Average Annualisation Factor**	**Raw Data Annual Mean µg m^{-3}**	**Annualised Annual Mean µg m^{-3}**	**Comments**
Haden Hill	1.07	1.06	1.04	1.05	11	**11.5**	FIDAS monitor installed June 2021

Table C. 10 - Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12	10			
Bias Adjustment Factor A	0.75 (0.71 - 0.81)	0.81 (0.75 - 0.89)			
Diffusion Tube Bias B	33% (24% - 41%)	23% (12% - 33%)			
Diffusion Tube Mean (µg/m^3)	36.8	22.9			
Mean CV (Precision)	5.4%	5.1%			
Automatic Mean (µg/m^3)	27.7	18.6			
Data Capture	96%	98%			
Adjusted Tube Mean (µg/m^3)	28 (26 - 30)	19 (17 - 20)			

Notes:

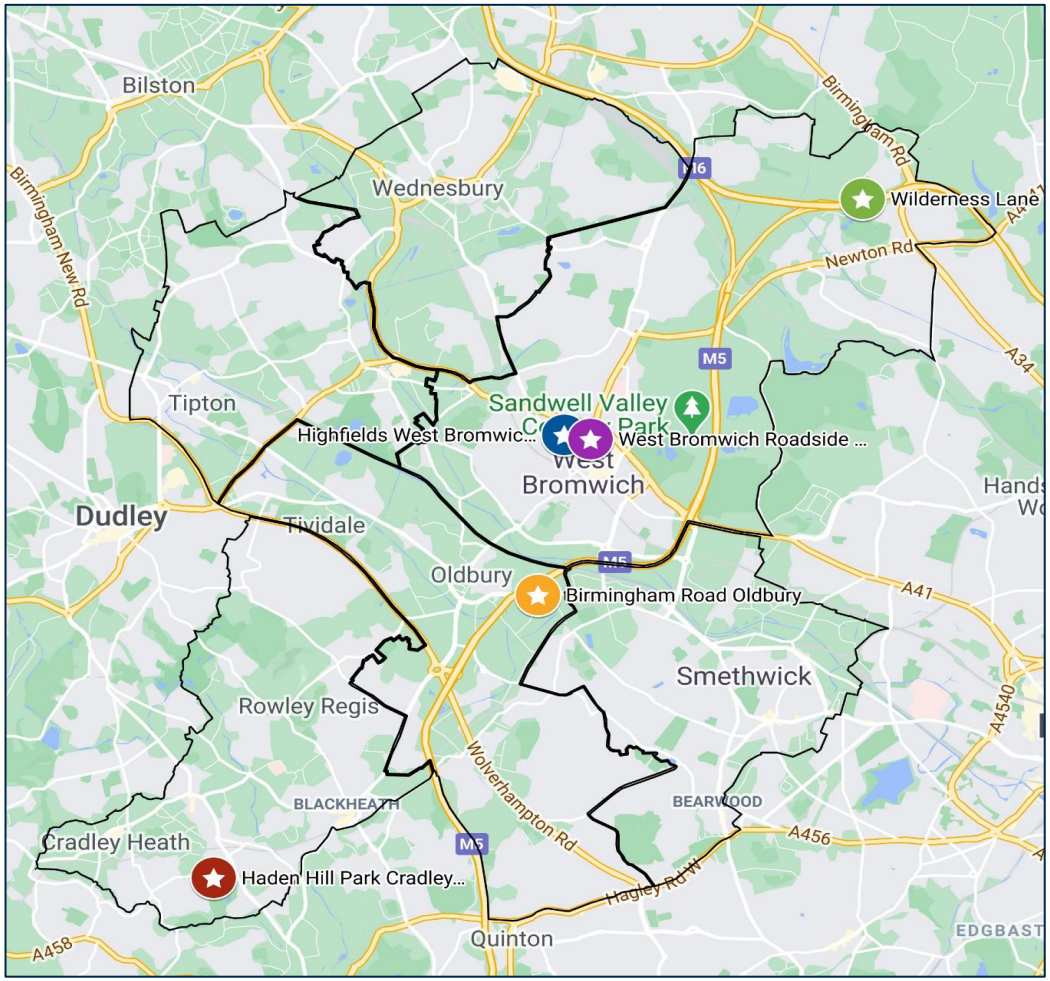
A combined local bias adjustment factor of 0.78 was obtained, however as discussed earlier, the national bias adjustment factor has been used to adjust the 2021 diffusion tube results.

Table C. 11 - NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
BE	0.8	3.3	39.2	28.0	*36.1*	Predicted concentration at Receptor within 10% the AQS objective.
BP	6.8	13.6	36.2	25.5	33.7	
C10D	5.3	6.1	36.2	19.1	35.4	
C12A	1.0	3.5	36.9	19.7	32.6	
DB1, DB2, DB3	5.0	35.0	37.4	26.6	31.1	Receptor is more than 20m further from the kerb than your monitor - treat result with caution.
PC1, PC2, PC3	1.5	26.5	44.2	29.6	35.0	Receptor is more than 20m further from the kerb than your monitor - treat result with caution.

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

Figure D. 1- Map of Automatic Monitoring Stations in Sandwell

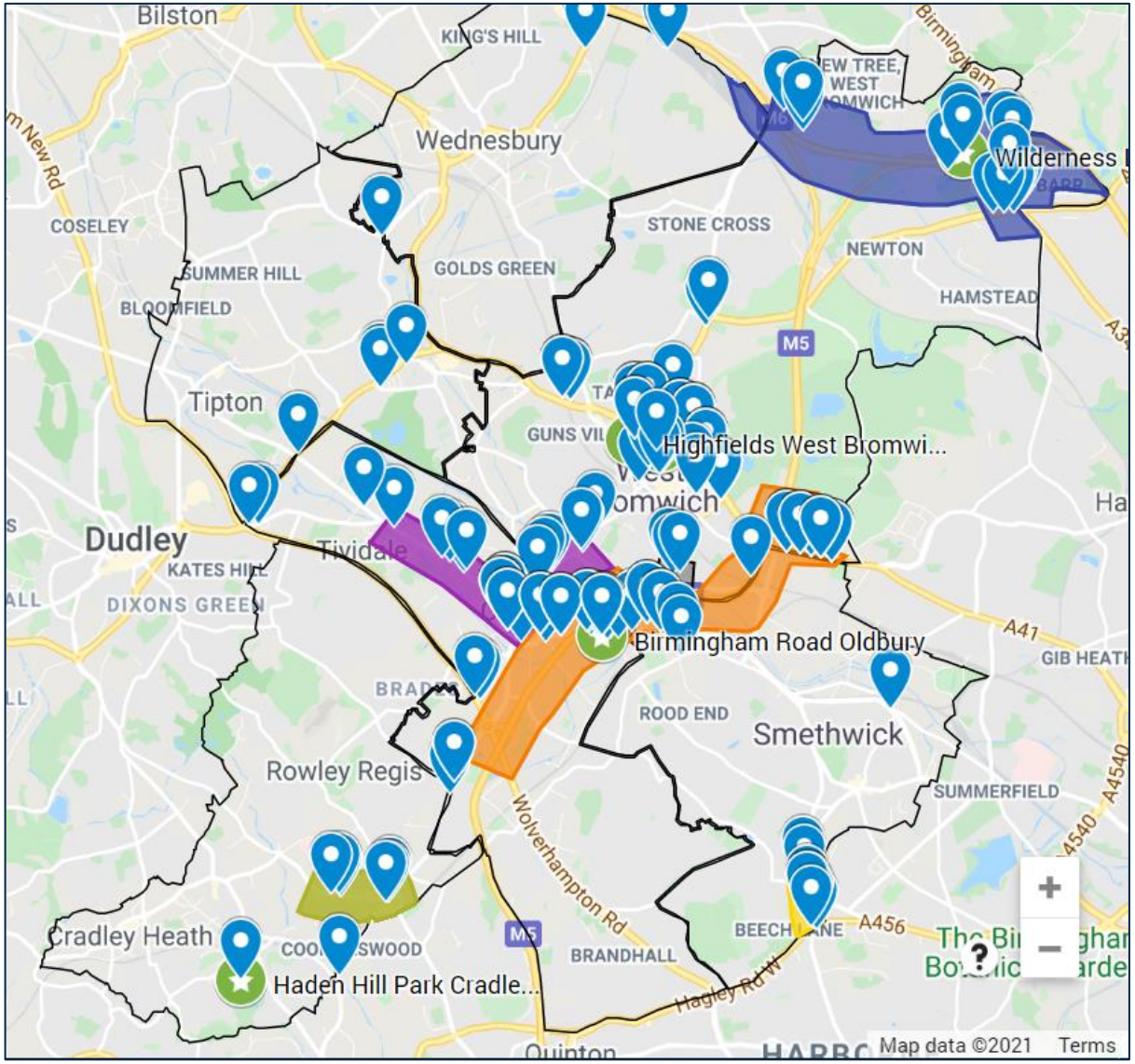


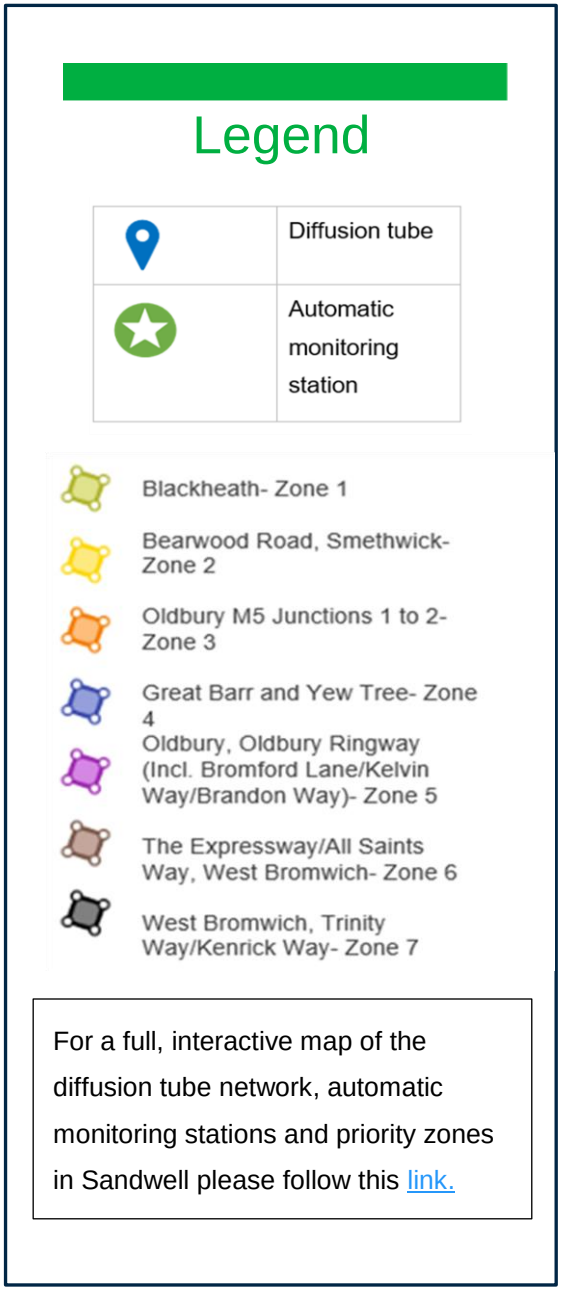
Legend

- Highfields, West Bromwich
- Birmingham Rd, Oldbury
- Wilderness Lane, Great Barr
- Haden Hill Park
- Cradley Heath
- West Bromwich Roadside Cronehills

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

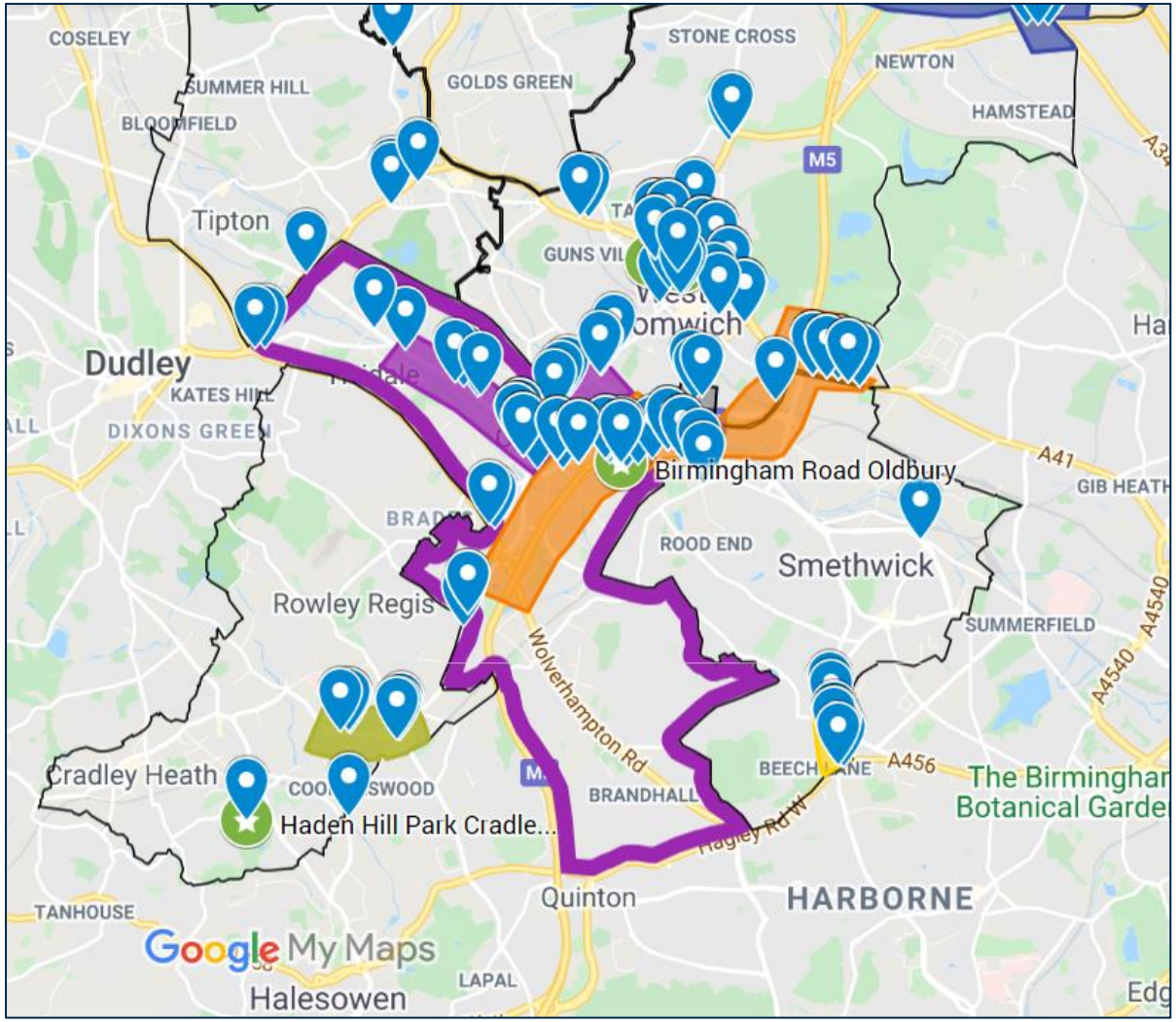
Figure D. 2 - Map of Non-Automatic Monitoring Sites in Sandwell





For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D. 3 - Map of Oldbury, Sandwell



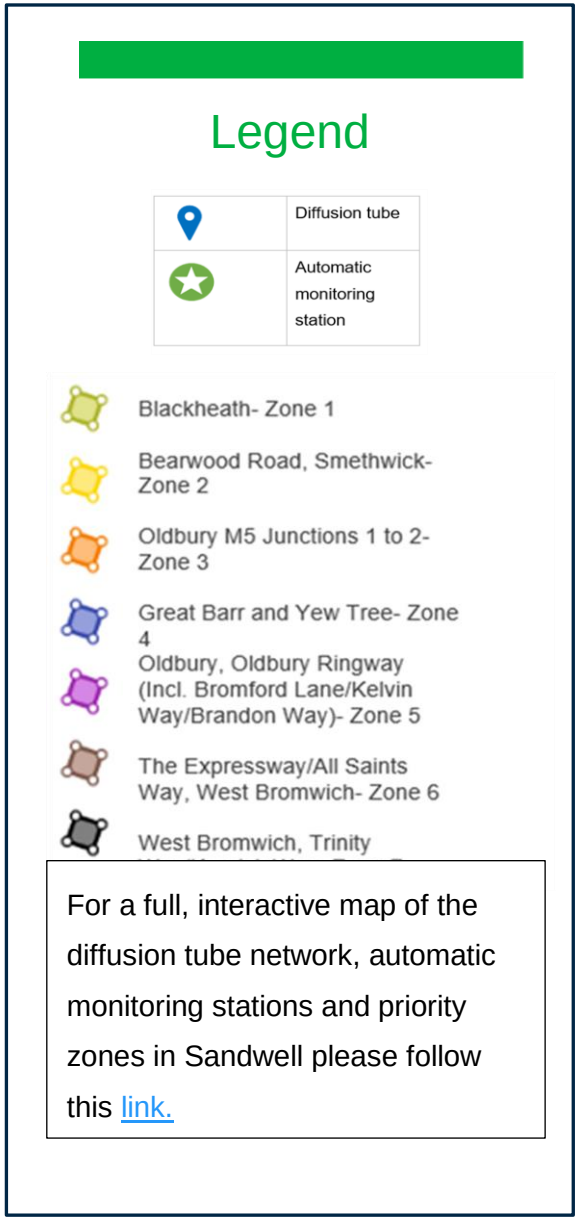
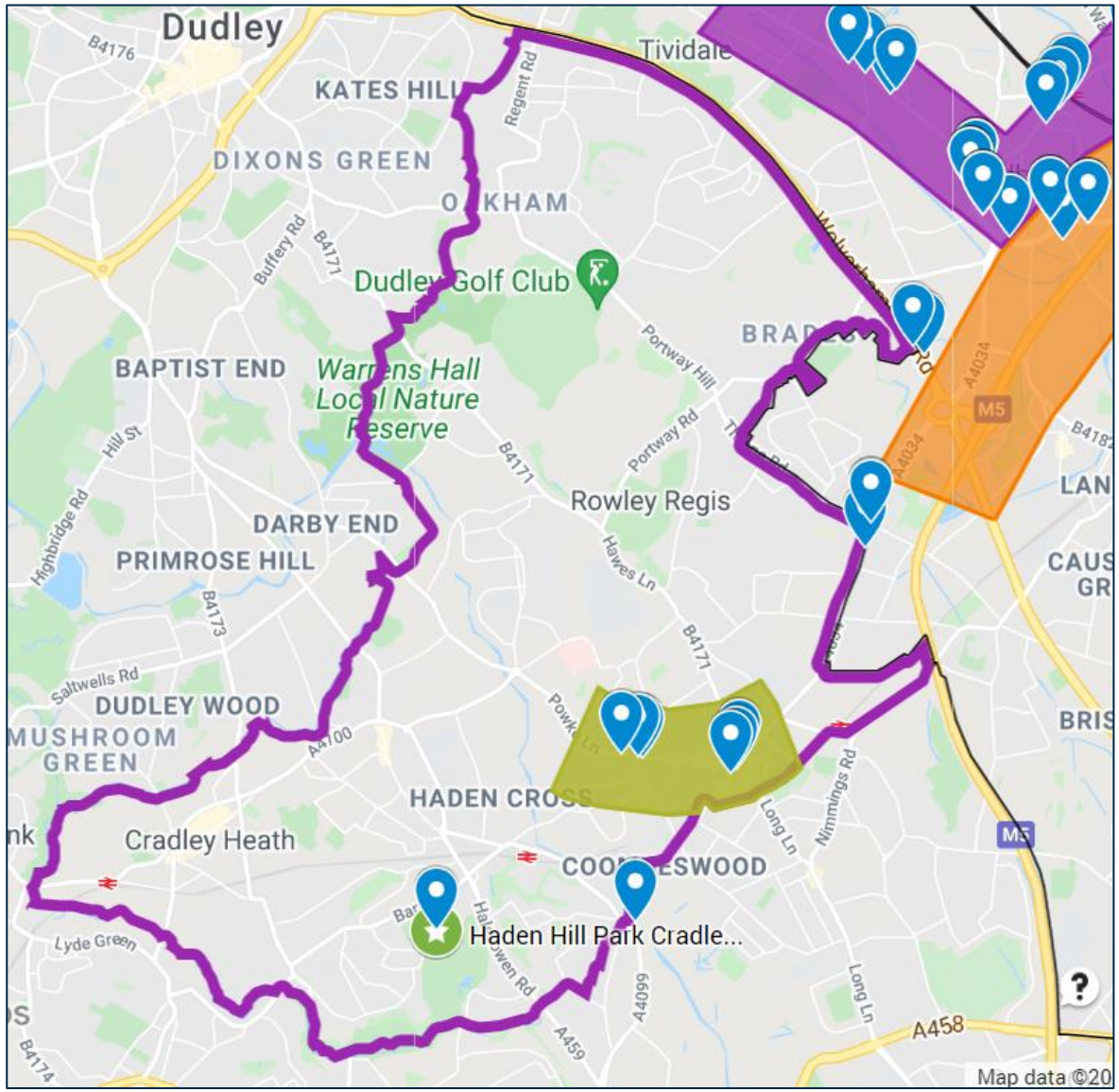


Figure D. 4- Map of Rowley Regis, Sandwell

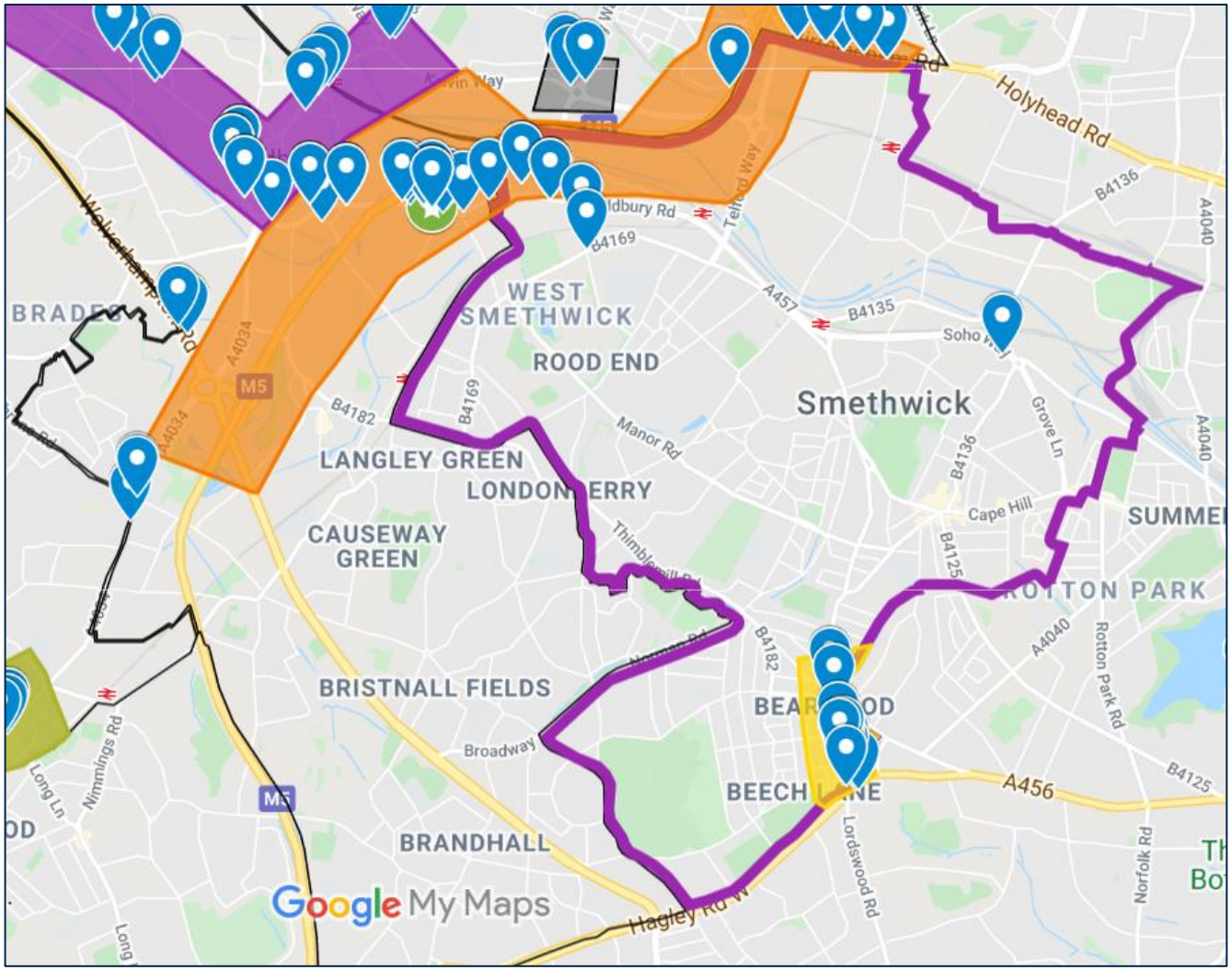


Legend

- Diffusion tube
- Automatic monitoring
- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D. 5 - Map of Smethwick, Sandwell



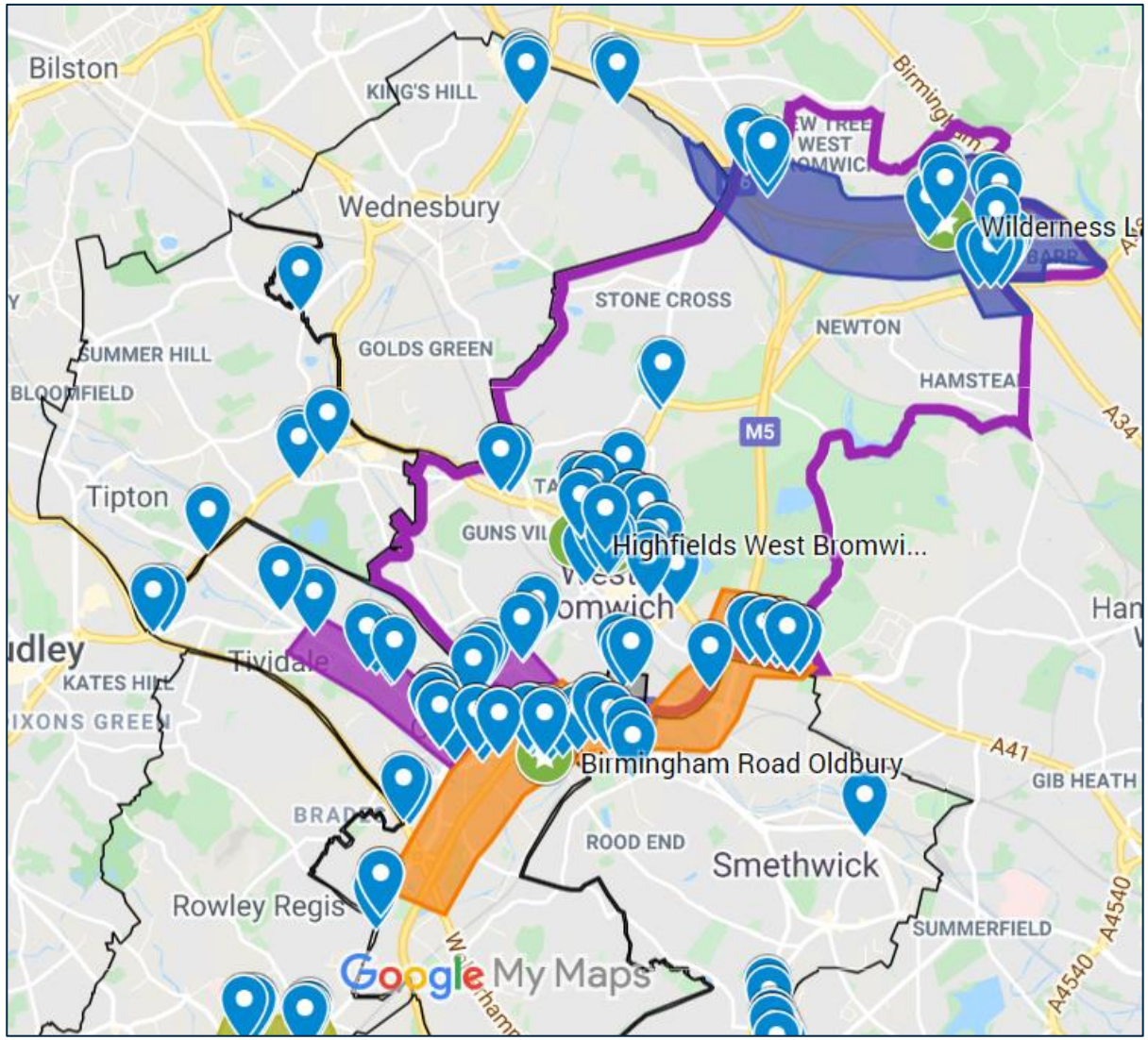
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D. 6 - Map of West Bromwich, Sandwell



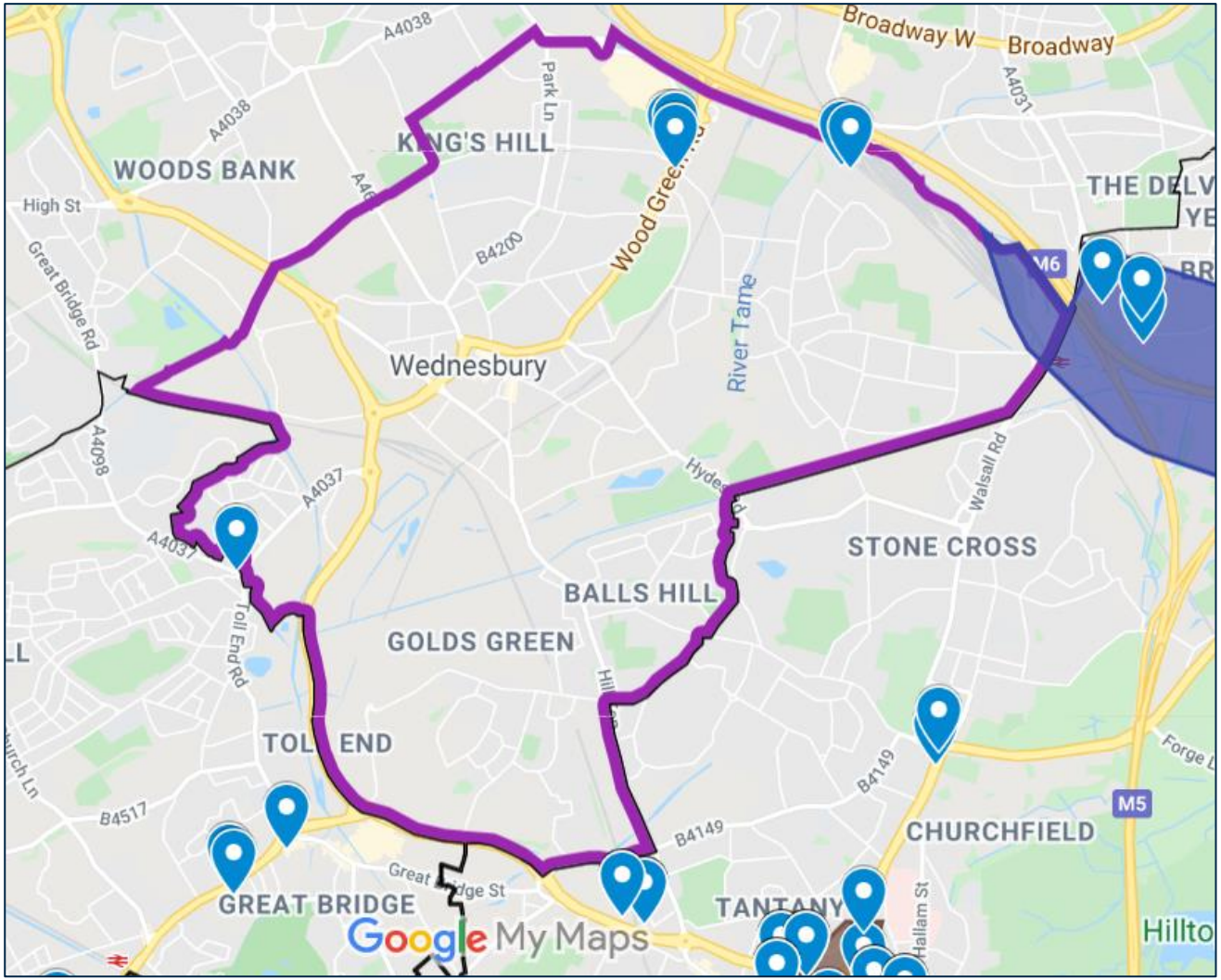
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D. 7 - Map of Wednesbury, Sandwell



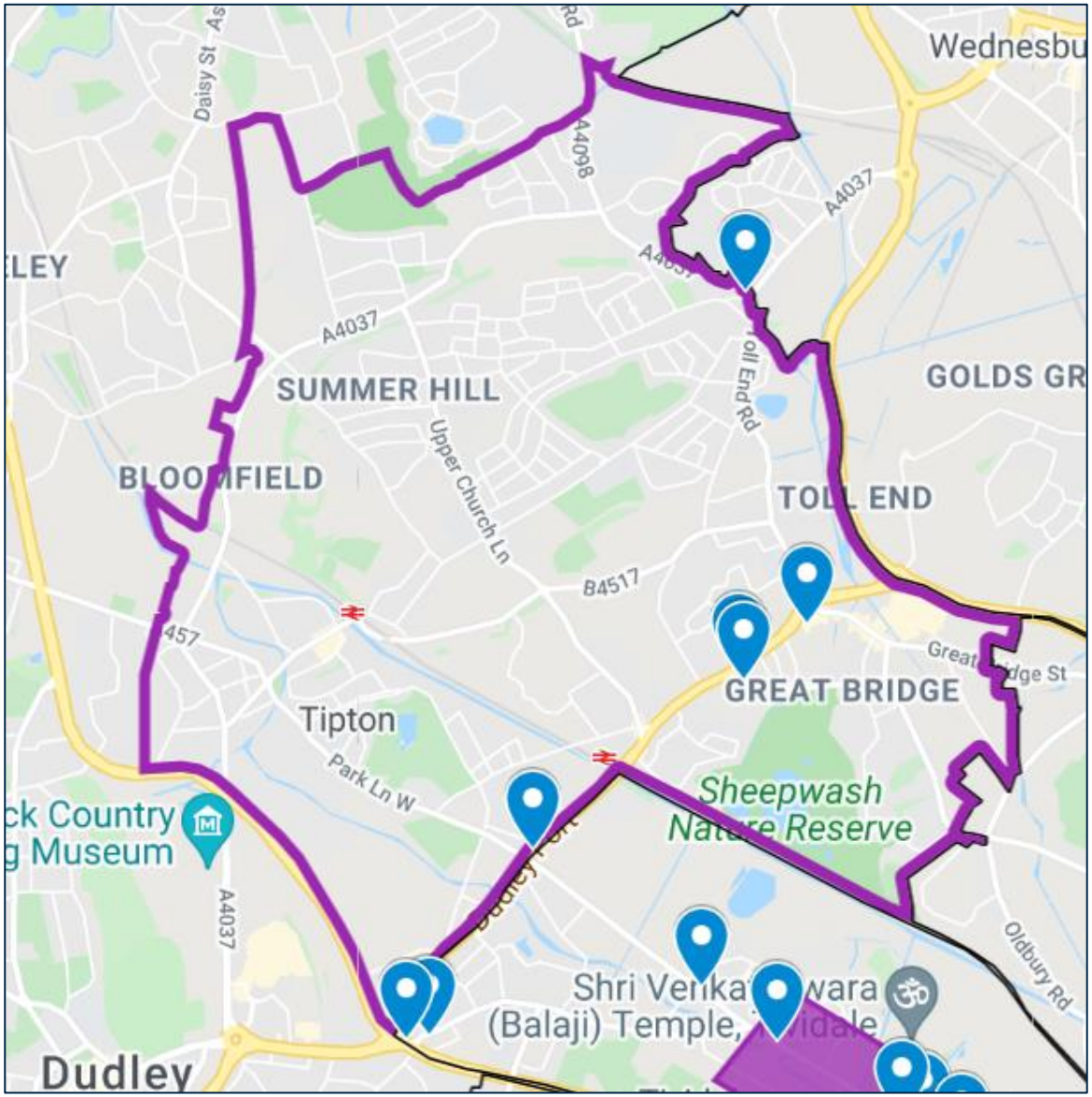
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D. 8 - Map of Tipton, Sandwell



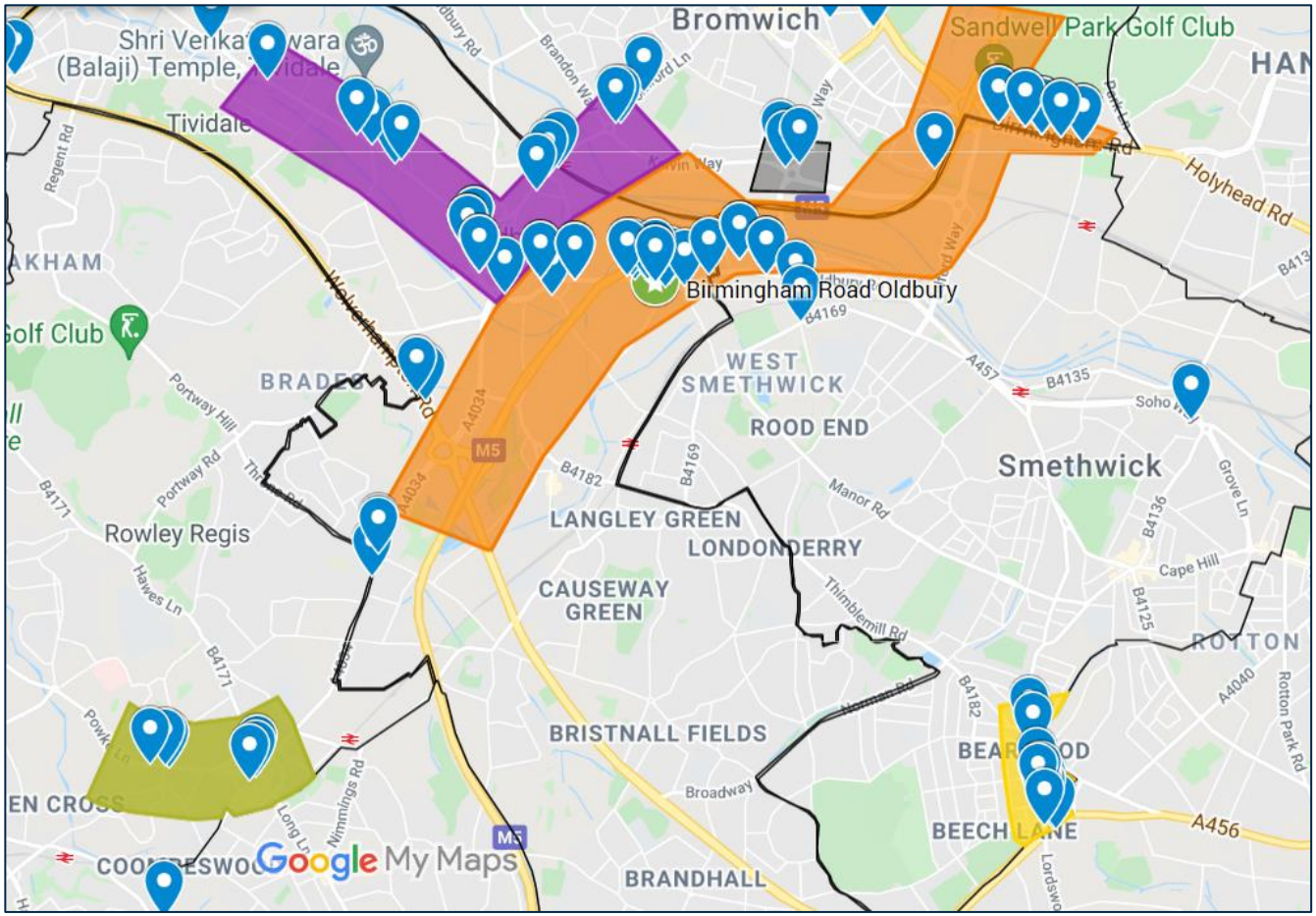
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D. 9 - Map of Priority Zones 1, 2, 3, 5 and 7



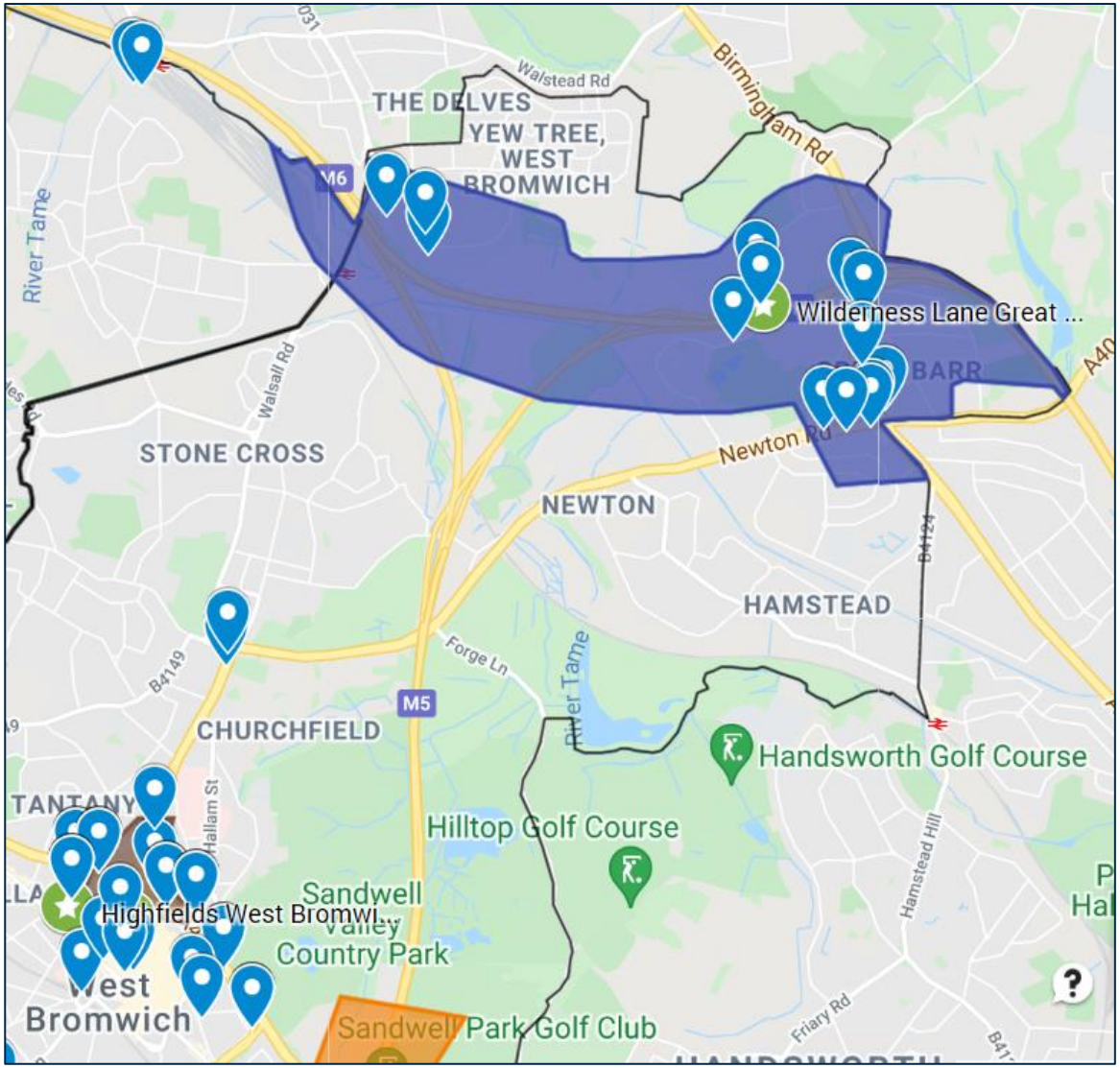
Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D. 10 - Map of Priority Zones 5 & 6



Legend

	Diffusion tube
	Automatic monitoring station

- Blackheath- Zone 1
- Bearwood Road, Smethwick- Zone 2
- Oldbury M5 Junctions 1 to 2- Zone 3
- Great Barr and Yew Tree- Zone 4
- Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5
- The Expressway/All Saints Way, West Bromwich- Zone 6
- West Bromwich, Trinity Way/Kenrick Way- Zone 7

For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

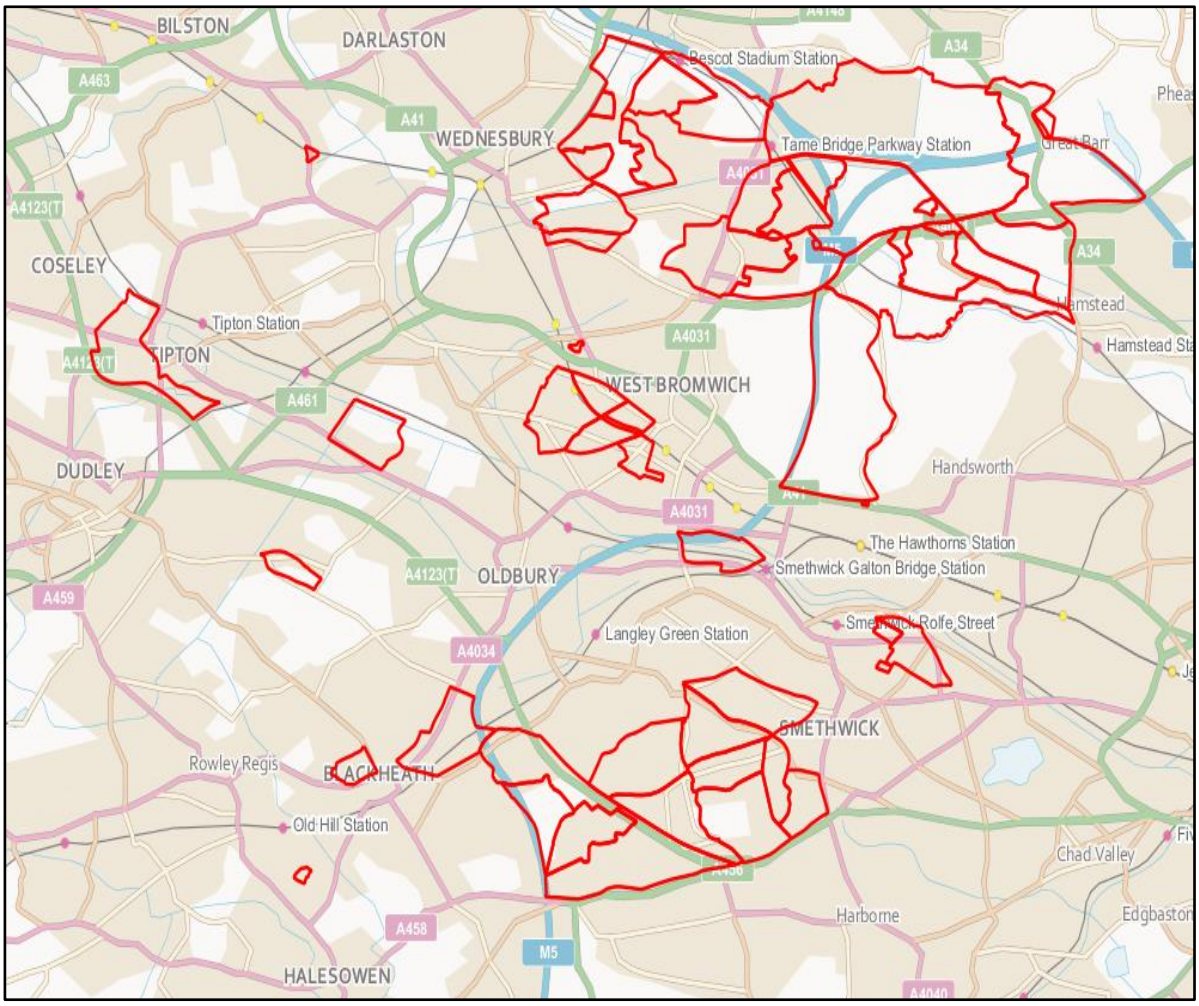
Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[47]

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

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

Appendix G: Map of Sandwell's Smoke Control Areas



Map provided by data.gov.uk: https://data.gov.uk/dataset/2e59be11-a9db-4b9e-8cbb-8e2f2567c588/sandwell-mbc-smoke-control-area

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
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
EV	Electric Vehicle
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
ULEV	Ultra-Low Emission Vehicle
WHO	World Health Organisation

References

1. 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.

2. 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.

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

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

5. Defra. Air quality appraisal: damage cost guidance, July 2021

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

7. Census 2011. https://www.sandwelltrends.info/population-change-interactive-chart/ https://www.sandwelltrends.info/population-change-interactive-chart/

8. WHO (2021) Global Air Quality Guidelines: https://apps.who.int/iris/handle/10665/345329

9. Defra. Clean Air Strategy, 2019 https://www.gov.uk/government/publications/clean-air-strategy-2019

10. Department for Transport. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

11. Defra: Emissions of air pollutants in the UK – Particulate matter (PM10 and PM2.5) 18 February 2022 https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25

12. Walsall Council Low Emissions Towns and Cities Programme:https://go.walsall.gov.uk/low_emissions_towns_and_cities_programme

13. Sandwell Express and Star – April 2022 https://www.expressandstar.com/news/politics/2022/04/01/car-usage-in-west-midlands-surges-past-pre-pandemic-levels/

14. Sandwell MBC ‘Car Share’ Website: https://liftshare.com/uk/community/sandwell

15. Sandwell MBC ‘Going Green’ Website: https://www.sandwell.gov.uk/goinggreen

16. Sandwell MBC ‘Air Quality’ Website: https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/6

17. Go Jaunty Website: https://www.gojauntly.com/sandwell

18. Sandwell MBC 'Travelwise' Website: https://www.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell

19. Sandwell MBC 'Walking Strategy' Website: https://www.sandwell.gov.uk/info/200222/healthy_sandwell_healthy_you/3250/sandwell_walking_strategy

20. Sandwell MBC 'Healthy Sandwell' Website: https://www.healthysandwell.co.uk/

21. Data.Gov.UK – Smoke Control Area Map: https://data.gov.uk/dataset/2e59be11-a9db-4b9e-8cbb-8e2f2567c588/sandwell-mbc-smoke-control-area

22. Sandwell MBC Website 'Report a bonfire problem': https://www.sandwell.gov.uk/info/200274/pollution/3188/report_a_bonfire_problem

23. Sandwell MBC Website 'Bins and Recycling' https://www.sandwell.gov.uk/info/200160/bins_and_recycling/2194/composting

24. Sandwell MBC– Details on strategies for Climate Change and Air Quality in Sandwell: https://www.sandwell.gov.uk/info/200274/pollution/4402/climate_change_and_air_quality_in_sandwell

25. Sandwell MBC Highways and Environment Services http://www.sandwell.gov.uk/download/downloads/id/21932/october_2014_-_urban_tree_policy.pdf

26. The Woodland Trust: https://www.woodlandtrust.org.uk/

27. Sandwell MBC Website 'Electric Vehicles': https://www.sandwell.gov.uk/ev

28. Sandwell MBC Website: Register your interest in an Electric Vehicle Charging Point: https://wh1.snapsurveys.com/s.asp?k=158281500955

29. The Eco3Scheme – Commercial consultation company providing eligible home owners with advice and assistance on free Heating and Insulating Upgrade: https://www.sandwell.gov.uk/info/200190/consumer_advice/4282/eco3

30. Sandwell Council Website: Eco Bus: https://www.sandwell.gov.uk/ecobus

31. GOV.UK.: Details on Workplace Charging Scheme: https://www.gov.uk/government/publications/workplace-charging-scheme-application-form

32. Sandwell MBC Website: Air Quality Management Designation Order 2005: https://www.sandwell.gov.uk/downloads/file/768/air_quality_management_area_designation_order_2005

33. West Midlands Combined Authority: Strategy: https://www.wmca.org.uk/what-we-do/strategy/

34. Travel for West Midlands: Encouraging cycling in the West Midlands: https://www.tfwm.org.uk/strategy/sustainable-travel/

35. Sandwell MBC's Public Air Quality Dashboard: https://portal.earthsense.co.uk/SandwellPublic

36. Local Government Association Net Zero Innovation Programme: https://www.local.gov.uk/our-support/climate-change-hub/net-zero-innovation-programme

37. Sandwell MBC Website: Air Quality Action Plan: https://www.sandwell.gov.uk/downloads/file/31636/aqap_2020_2025_-_adopted

38. Public Health England: Public Health Outcomes Framework https://fingertips.phe.org.uk/profile/public-health-outcomes-framework

39. Air Quality in England Website https://www.airqualityengland.co.uk/

40. GOV.UK: Air Quality Statistics – Concentrations of Nitrogen Dioxide (Updated April 2021) https://www.gov.uk/government/publications/air-quality-statistics/ntrogen-dioxide

41. Defra – Assessing progress towards WHO guideline levels of $PM_{2.5}$ in the UK (July 2019): https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/930104/air-quality-who-pm25-report.pdf

42. Defra - Nitrogen dioxide diffusion tube monitoring calendar of suggested exposure periods 2021: *https://laqm.defra.gov.uk/assets/2020laqmcalendar1.pdf*

43. Defra – Diffusion Tube Data Processing Tool - *https://laqm.defra.gov.uk/tools-monitoring-data/dtdp.html*