2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management, as amended by the Environment Act 2021

Date: 29 June 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Sandwell

Air pollution is associated with a wide range 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 29,000 to 43,000 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, these are amongst some of the busiest and most congested roads in Europe.

Sandwell was designated as an Air Quality Management Area (AQMA) in 2005 due to poor air quality caused by traffic and industrial emissions. Over the past decade nitrogen dioxide concentrations have decreased across the borough, but concentrations are still high in a few areas. High traffic volumes and congestion, as well as homes located by

[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, January 2023
[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/

busy roads means that measures to continue to reduce nitrogen dioxide concentrations are still important in tackling local air pollution.

Concerns about the wide range of negative health impacts from human exposure to particulate matter (PM) has also increased over the last decade, and we know from our monitoring data, that PM levels are above the World Health Organisation (WHO) guidelines[6] in Sandwell. Although traffic is an important contributor of PM, domestic burning of wood and coal are still significant sources of man-made PM in urban areas like Sandwell. We are striving to raise public awareness of the sources of PM and the impact on health, to encourage positive behavioural changes that support the reduction of these harmful emissions.

Declaration of an Air Quality Management Area

In 2020 and for the first time since the AQMA was declared in 2005, Sandwell did not record any exceedances in the national objective levels for NO_2. These significant reductions from 2019 were attributed to the Coronavirus (COVID-19) pandemic that resulted in an unprecedented reduction in vehicle traffic, along with favourable meteorological conditions in the spring. Although the concentrations in 2020 have not been replicated in either 2021 or 2022, we are recording annual mean concentrations across the borough that are lower than those before the pandemic. The annual mean objective for NO_2 was only exceeded at one monitoring location in both years.

Monitoring and Regulation of Air Quality

The monitoring and regulation of air quality in domestic and commercial premises in Sandwell is undertaken by officers working within the Pollution Control Team and in Regulatory Services. Regulatory activities include the enforcement of the existing 52 Smoke Control Areas, investigation of statutory nuisance complaints involving the emission of smoke and fumes and permitting a wide range of industrial processes/activities under the Environmental Permitting Regulations. Officers also consult and comment on planning applications to prevent and mitigate adverse impacts on air quality from land development. In addition to the regulatory work, the Pollution Control Team have recently appointed an ‘Air Quality and Climate Change Community Engagement Officer’ and an ‘Active Travel Officer’. These officers meet with residents,

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

workers, school children, faith groups and other community organisations to raise air pollution awareness and encourage behavioural change, including the promotion of active and sustainable travel.

Sandwell Council continues to work with other partner organisations to share knowledge and develop measures to improve air quality, examples of those we have worked with in 2022 include the six other West Midlands Local Authorities, the West Midlands Combined Authority (WMCA), Transport for West Midlands (TfWM), National Highways, the NHS, The University of Birmingham, Black Country Transport, the Office for Environmental Protection, as well as a range of external commercial organisations including EarthSense, AECOM, Innovate UK and Enjoy the Air.

Air Pollution Monitoring – Sandwell's Key Priority Zones

Sandwell successfully maintained its air pollution monitoring network during 2022 with five continuous automatic air quality monitoring stations monitoring NO_2, of which four also monitor 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 total, 165 individual diffusion tubes were deployed each month to monitor Sandwell's annual mean NO_2 concentrations.

In 2018 Sandwell Council still had seven priority zones for air quality (22 areas had been identified originally), as well as two Hotspots. In 2022, only Zone 3 had an exceedance in annual NO_2 concentrations, this was recorded on the A457 link road to the M5 see **Table 1.1**. The 2022 results no longer need to be treated with the same caution as those from 2020 and 2021 as there were no imposed vehicle traffic restrictions in 2022.

A457 (Birmingham Road, Oldbury)

The A457 Birmingham Road, Oldbury lies within Air Quality Priority Zone 3 and continues to be subject to NO_2 diffusion tube monitoring and is 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 continue to monitor at 11 sites on this road. 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 2022 the same site recorded 34.4 µg/m^3, this is a very significant decrease of just over 28% from 2019. Whilst conversely, Tube BP which recorded 34.3 µg/m^3 in 2019 had increased in 2022 by 17% to 40.2 µg/m^3. This suggest that there continue to be very local factors influencing NO_2 concentrations along one stretch of road.

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	2022
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), West Bromwich	X	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 1		Mallin Street, Smethwick	X	X	✓	✓	✓
Hotspot 2		Gorsty Hill, Blackheath	X	✓	✓	✓	✓

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 as there were no sensitive receptors close to the road. It was identified in the '3rd Wave' of the Government's Clean Air Strategy model in 2018 as being a road link likely to exceed the national objective for NO_2. An NO_2 reduction feasibility 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.

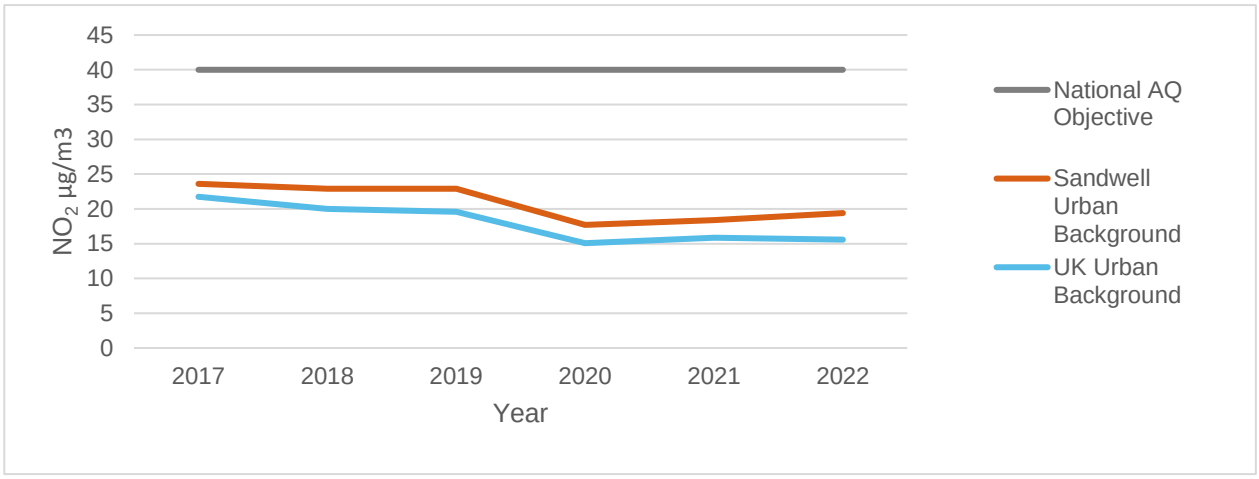
Since August 2019 we have deployed NO_2 diffusion tubes in triplicate at five sites along the A41. In 2021 site PC1/2/3 was recording the highest concentrations with an annual mean of 44.2µg/m^3 this has decreased to 39.6µg/m^3 in 2022, but it is still within 10% of the national objective. The other sites along this road have all remained well below the 10% national objective for NO_2 with annual means between 27.6 µg/m^3 and 33.0 µg/m^3.

As agreed with Defra, we will continue measuring NO_2 levels along these link roads to truly evaluate the effectiveness of these interventions, but the results continue to be encouraging with an overall downward trend keeping us below the national objective level.

Levels of Nitrogen Dioxide (NO2) recorded in Sandwell in 2022 compared with national trends

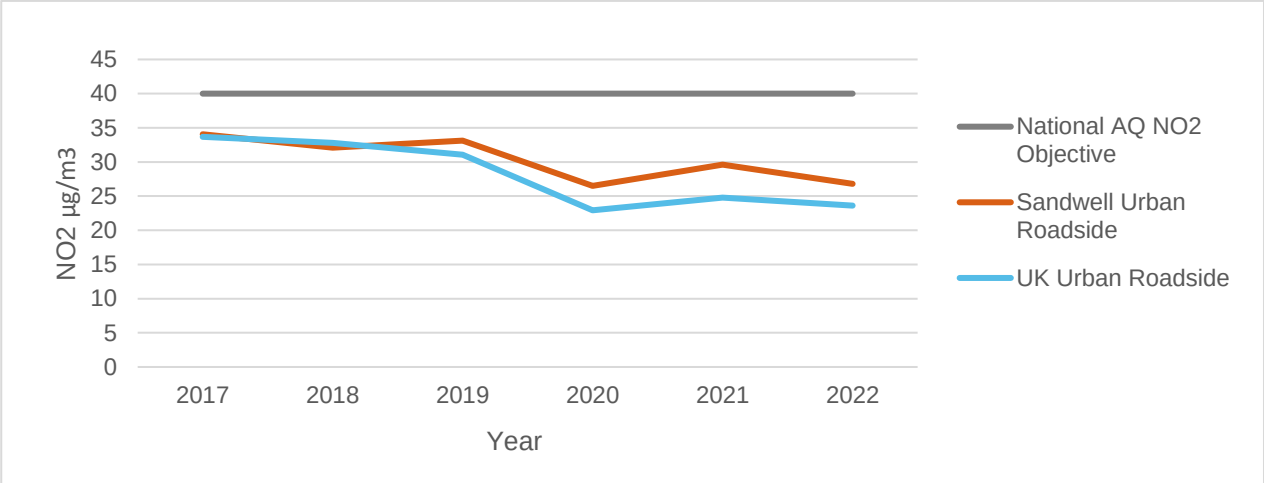
Figure 1.1 shows the UK national trends in annual mean nitrogen dioxide concentrations in urban background locations, compared with Sandwell. Sandwell has generally mirrored the national trend, including the clear decrease seen in 2020, however this year our background levels have increased slightly widening the gap between the UK average (15.6 µg/m^3) and Sandwell (19.4 µg/m$^{3)}$.

Figure 1. 1 - Comparison between Annual Urban Background Concentrations of NO2 in the UK and Sandwell 2017-2022



When we compare annual roadside concentrations of NO_2 in Sandwell with the average for the UK as shown in **Figure 1.2,** Sandwell again mirrors the UK trend but with a greater decrease between 2021 and 2022, thus narrowing the gap between national and local averages. Interestingly, NO_2 roadside concentrations in Sandwell in 2022 were almost identical to those recorded in 2020 (at 26.8 µg/m^3 and 26.5 µg/m^3 respectively)

Figure 1. 2 - Comparison between Annual Roadside Concentrations of NO2 in the UK and Sandwell 2017-2022



Levels of Particulate Matter recorded in Sandwell in 2022 compared with National Trends

The UK national air quality objective for PM_{10}, of 40µg/m^3 has continued to be met in Sandwell at all four continuous monitoring station sites. **Figure 1.3** shows a slight upward trend in PM_{10} annual concentrations at Birmingham Road, Oldbury, reflecting the national trend but is still tracking below the average. However, concentrations at the Wilderness Lane site have remained the same since 2022 at 12 µg/m^3, these levels are significantly below the national average of 17 µg/m^3.

Figure 1. 3 - Comparison between the UK and Sandwell's Annual Mean PM10 concentrations at Urban Roadside Sites

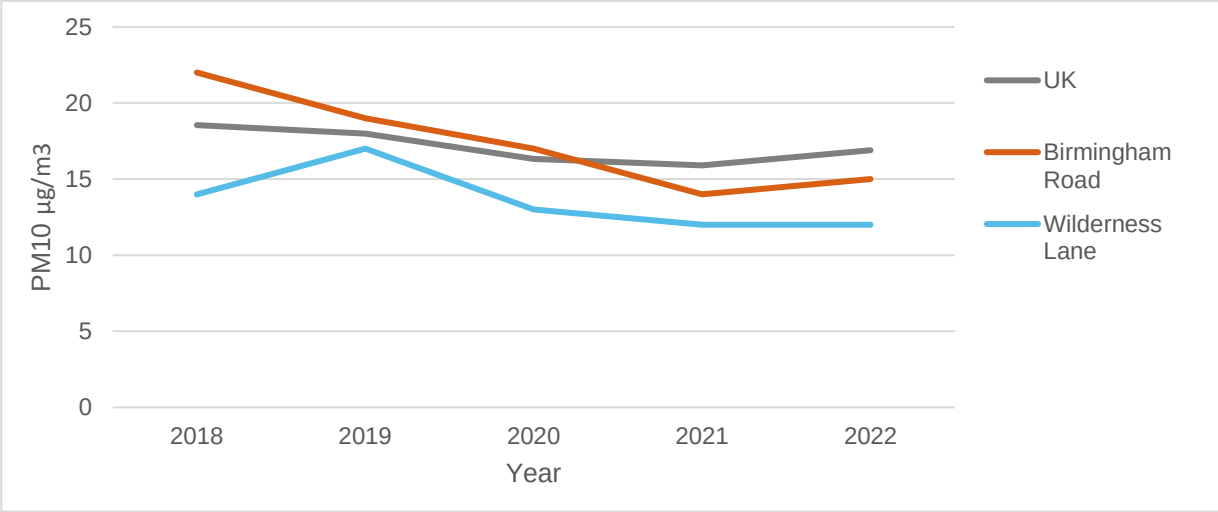
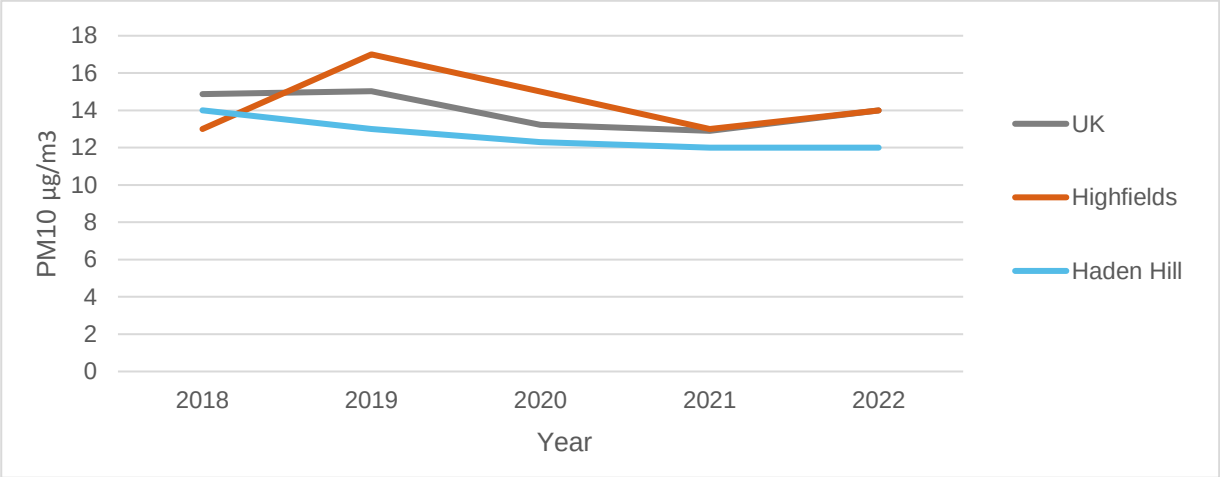


Figure 1.4 demonstrates that our PM_{10} concentrations at our urban background site at Highfields has tracked the national average since 2021 increasing from 13 µg/m^3 to 14 µg/m^3. Whilst PM_{10} at Haden Hill has plateaued at annual concentration of 12 µg/m^3 since 2020, staying 2 µg/m^3 below the national average.

Figure 1. 4- Comparison between the UK and Sandwell's Annual Mean PM_{10} Concentrations at Urban Background Sites



New legislation in the form of the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 has set a maximum target of 10 µg/m3 for annual $PM_{2.5}$ concentrations for all English local authorities to be met by the end of 2040. There is also the requirement that population exposure to $PM_{2.5}$ is at least 35% less than in 2018. Population exposure refers to the average concentration that someone in England is exposed to and is based on urban background measurements, as these are representative of the type of environment that most people live and work in.

In Sandwell $PM_{2.5}$ monitoring capability was expanded in 2021 from one site at Haden Hill, to a further three sites, but therefore we only have data for two years at these sites so are unable to compare the results against the national trends for the last five years.

Figure 1.5 compares data from both the Urban Background sites (Haden Hill and Highfields) with the national averages and the new UK target. This demonstrates that Haden Hill has plateaued over the last two years and is tracking just under the national trend, whilst Highfields has increased by 0.8 µg/m^3 since 2021.

Figure 1. 5- Comparison between the UK and Sandwell's Annual $PM_{2.5}$ Concentrations at an Urban Background Site

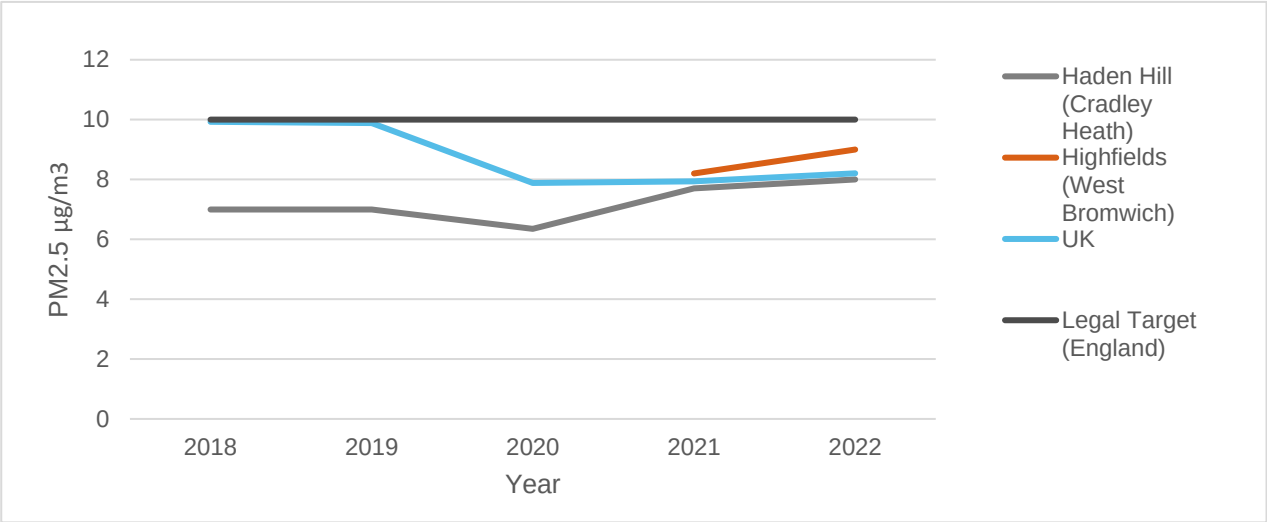
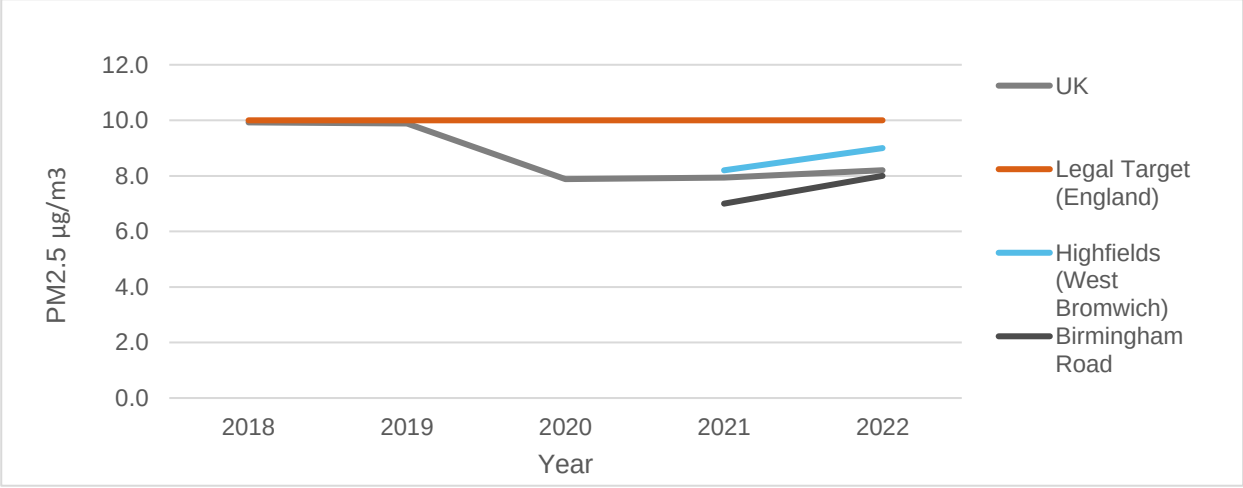


Figure 1.6 shows $PM_{2.5}$ annual average data for the last two years from Sandwell's Urban Roadside sites (Birmingham Road and Wilderness Lane) and how these relate to the five-year national trend. The UK has seen little change in $PM_{2.5}$ annual averages since 2020, but Sandwell has deviated from this marginally with both sites increasing by 1 µg/m^3 since 2021.

Figure 1. 6 - Comparison between the UK and Sandwell's Annual $PM_{2.5}$ Concentrations at an Urban Roadside Sites



Although the new target level requiring that $PM_{2.5}$ is 10µg/m^3 or less by 2040 seems achievable, guideline levels established by the World Health Organisation are 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 µg/m^3, with the lowest concentrations at Haden Hill (7µg/m^3), and the highest Highfields, West Bromwich (9µg/m^3), it is important that we continue to

maintain our monitoring capabilities at these sites, to identify the long-term trends. It is also worth noting that $PM_{2.5}$ concentrations are influenced by many factors including transboundary transport which is closely linked with weather patterns and agricultural practices resulting in secondary formation of fine particulate matter. This means that levels can fluctuate for reasons beyond that of just local sources such as domestic burning and transport. Nevertheless, acting to reduce local sources is still very important, as we do not want to create pollutants that harm our own communities or be responsible for the creation of pollutants that are transported to neighbouring authorities and further afield.

Actions to Improve Air Quality

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

The Environmental Improvement Plan[7] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[8] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

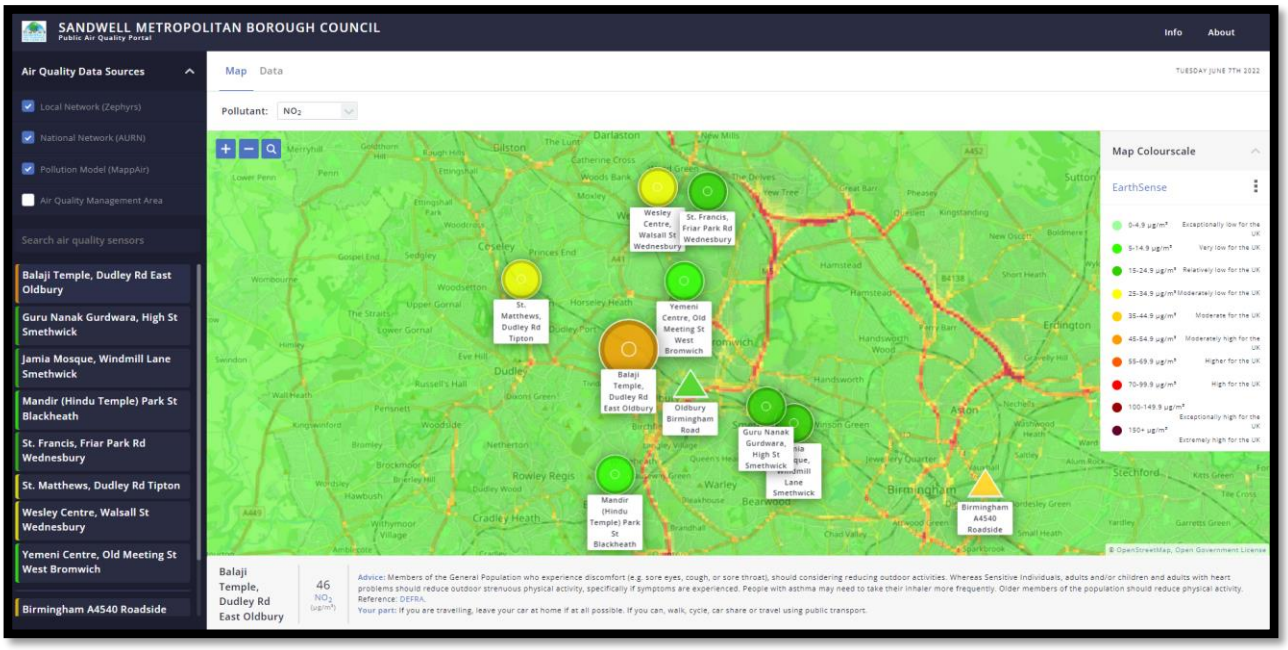
Faith Communities for Clean Air

In 2020 we designed a project with the initial title of '*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 planned to continue until December 2023 with a total of 16 faith centres participating over the two years.

[7] Defra. Environmental Improvement Plan 2023, January 2023
[8] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

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 is allocated a low cost 'Zephyr' air quality monitor and a large television screen, which links 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.



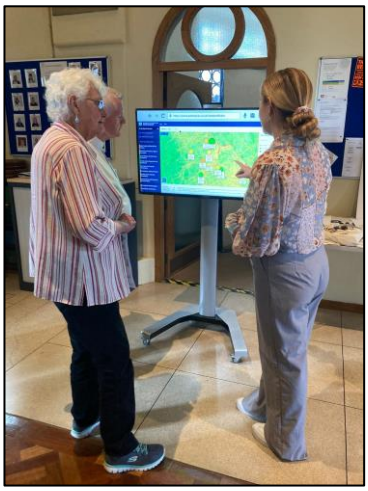
The online air quality dashboard makes air quality visible, through the delivery of live air quality data outside 8 participating faith centres across Sandwell.

Each faith centre has been provided with 'Air Quality Toolkit' that provides information on air quality, including the sources, health impacts and information on some of the positive lifestyle choices that individuals and groups can make 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 project. The findings will be used to evaluate changes in the participants' knowledge of air quality and any positive changes in their behaviour. 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 aim is

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

that the information and knowledge gained by participants will create a positive attitude towards improving air quality and that this will influence their future behaviour e.g. transport choices, vehicle purchases, heating choices, as well as having a positive influence on family, friends and colleagues.



Air Quality talks have been provided at faith centres across Sandwell

The Jamia Mosque in Smethwick held free bicycle repair shops

The Yemeni Community Association in West Bromwich have continued their 'Car Free Friday' initiative

Over 400 trees were planted on waste land at the Balaji Temple in Oldbury

Since the project started in the autumn of 2021 faith centres have responded with a range of measures including 'Car Free Fridays', litter picks, planting trees, free bicycle repair sessions, uptake of energy saving measures in centres and homes and pledges to walk and cycle more. Centre members have also attended talks on the sources, and health impacts of local air pollution and received ideas on how to protect themselves and reduce their own air pollution impact.

An important part of the faith centre project work has involved sharing the project idea, as well as our resources/experiences with other local authorities and organisations, including the WMCA, the OEP, the West Midlands Environmental Protection Group, EarthSense, the Environment Centre, Trees for Cities and Bradford MDC. This sharing of knowledge not only benefits other local authorities and organisations by giving them ideas for undertaking their own community-based projects, but also benefits the project itself, by allowing others to question and challenge our approach so we also gain from the knowledge and experience of others.

Presenting Sandwell's Faith Communities for Clean Air project at the EarthSense User Day in July 2022

Declaration of a Boroughwide Smoke Control Area

As stated in our ambitions, reducing local emissions of $PM_{2.5}$ continues to be 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

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

source accounting for 27%. 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 and that domestic wood burning worryingly increased by 35% between 2010 and 2020.

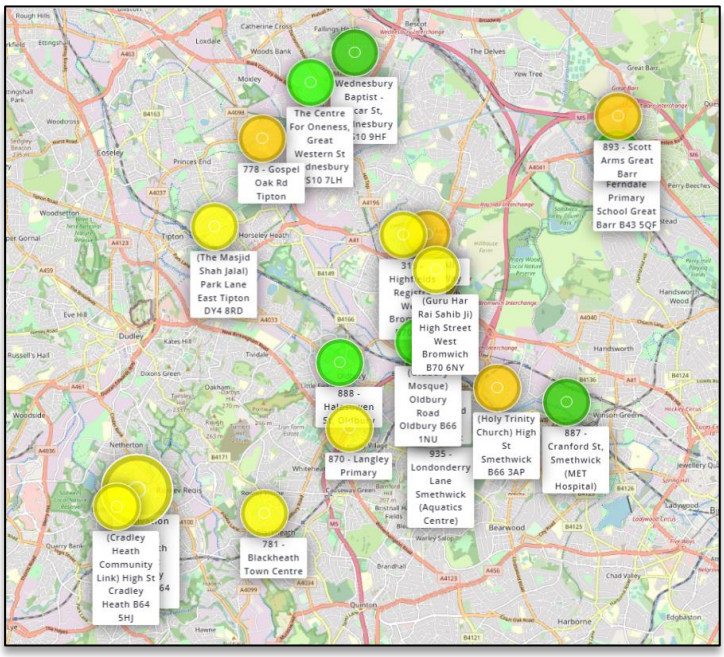
This potential for growth in wood burning stoves and open fireplaces supports our commitment in pursuing the removal of the existing 52 separate smoke control areas and replacing them with a single boroughwide smoke control area.

Sandwell MBC formally declared its intention to revoke the existing 52 smoke control areas to create a boroughwide smoke control area in May 2022. A public consultation was undertaken in May and June 2022 with the majority in favour of the proposal. Following unanimous agreement by Council Members in November 2022, Sandwell formally declared a new boroughwide Smoke Control Area on 16 February 2023 through the issuing of the Borough Council of Sandwell Smoke Control Order 2022.[11]. This should come into force by the end of 2023 beginning of 2024 as it awaits confirmation by Defra.

Network of 21 Low Cost Air Quality Monitors Operational Across Sandwell

In 2022 we established a network of 21 Zephyr air quality monitors. 8 of these Zephyrs were funded through the Defra Air Quality Grant and were allocated for faith centre use, and a further 13 were purchased by Sandwell's Public Health Department for the collection of additional air quality data.

The 13 monitors were placed in strategic locations across Sandwell's six towns, at sites of specific air quality concern. Monitors were placed where there were high traffic volumes close to sensitive populations including schools, hospitals and care homes.



Location of the 21 Air Quality Monitoring 'Zephyrs' across Sandwell

[11] https://www.sandwell.gov.uk/SmokeControlArea

Three monitors were also located at sites that were in the process of undergoing significant land redevelopment/change in use, the aim being to establish baseline data that could help establish any significant negative impacts on local air quality once these sites became operational. Sites chosen included the Aquatic Centre, the Midland Metropolitan University Hospital in Smethwick and Bull Street where major redevelopment is proposed as part of the regeneration of West Bromwich's town centre.

This extensive network of Zephyrs provides an additional tool when it comes to understanding air quality issues at a granular level, along with the advantage of being able to move them relatively quickly to new locations of interest or concern. We are keen to maintain this network and are now looking to establish a public portal so that all 21 can be viewed by the public.

Case Study - The Smoke House at Oldbury Fire Station

Following concerns raised by staff at Oldbury Fire Station about the potential impact of emissions from their Smoke House (used for breathing apparatus training), a Zephyr air quality monitor was located outside nearby Langley Primary School in Oldbury in March 2022. Working with the Watch Commander we were able to analyse air quality data against the use of the Smoke House. The initial results demonstrated no breaches of the annual air quality objectives, but it was noted that there was a correlation between the use of the Smoke House and very high short-lived concentrations of fine particulate matter ($PM_{2.5}$), particularly when the wind was in a westerly direction. Short term exposure to high concentrations of $PM_{2.5}$ can be problematic for those with poor respiratory health. Given that 1 in 11 children in England have asthma, approximately 40 children in this school may have this condition and be more vulnerable to high pollution episodes. Further discussion is now in progress around options to try and reduce the potential harm from this activity, possible solutions include retrofitting filters to the Smoke House, changing the fuel used to generate smoke and restricting the use of the Smoke House when the wind is in a westerly direction.

Planning Consultations

Sandwell has continued to utilise the Black Country Air Quality Supplementary Planning Document (SPD) when providing a regulatory response to planning development applications. Officers consider both the acceptability of a development in terms of it's potential to introduce people (sensitive receptors) into areas of existing poor air quality, or

to mitigate the impact that the development itself may have on local air quality. This SPD is expected to be replaced with the Sandwell Local Development Plan by 2024. In 2022 air quality officers provided a consultation response on 237 planning applications, which is a 20% increase from 2021, when 191 consultation responses were provided.

Conclusions and Priorities

Exceedances of National Air Quality Objectives

Sandwell has only recorded one exceedance of the NO_2 national air quality objective in both 2021 and 2022, demonstrating a compliance rate of 99.6%, so it is now within reach of full compliance at all sites. Although a few locations have demonstrated an increase in NO_2 concentrations since 2021, these are still well within the national air quality objective.

Significant Trends

Air quality monitoring data gathered in 2022 continues to demonstrate an overall downward trend in NO_2 concentrations, with only a few sites demonstrating slight increases since 2021, generally mirroring the UK averages. PM_{10} concentrations at all sites have either plateaued since last year or demonstrated a slight increase. Confidence in $PM_{2.5}$ trends is harder to establish having 5+ years' worth of data available for only one site. Based on this one site $PM_{2.5}$ is demonstrating an upward trend since 2020, having remained consistent at 7µg/m^3 between 2017 and 2020. This upward trend in $PM_{2.5}$ is also reflected by data from the analysers installed in 2021. Although $PM_{2.5}$ remains below the government target of 10µg/m^3 are aim is work towards reducing this level to be closer to WHO guideline of 5µg/m^3, given that there is no safe level of exposure to $PM_{2.5}$.

Sandwell's Air Quality Priorities

Air pollution remains a serious concern to Sandwell Council, it's citizens and businesses. As a Council our priorities continue to be focused on the continued reduction of nitrogen dioxide concentrations along with the identification and implementation of practicable measures to reduce particle emissions across all six towns.

The following priorities and challenges to improve air quality and reduce emissions in Sandwell are as follows:

- Promote public transport and active travel, including walking and cycling, through public campaigns and information resources to encourage positive behaviour change.
- Promote and support the implementation of the Black Country ULEV strategy and the switch to low or zero emission vehicles.
- Maintain our continuous air quality monitoring stations to ensure the provision of accurate and reliable baseline data for NO_2, PM_{10} and $PM_{2.5}$ for future local and national air quality improvement strategies.
- Maintain our low cost-air quality monitoring network, so that we can devise appropriate actions and interventions that are specific and relevant to tackling air quality issues identified at a granular level and make this information available to all.
- Reduce pollution from domestic burning through the introduction of the Boroughwide Smoke Control Area following formal declaration in February 2023.
- Expand our work with local communities to raise awareness around air quality and develop meaningful partnerships with existing community groups and organisations.
- Provide constructive and practical input into new planning development policies to ensure that they support air quality improvements.
- Control and reduce emissions from industrial sources by ensuring environmental permits are complied with at existing sites and timely recognition and inclusion of new industrial sources.
- Extend our collaborative approach to improving local air quality by working with a wide variety of organisations and institutions including the NHS, West Midlands Combined Authority, National Highways, The University of Birmingham – WM Air, as well as other relevant stakeholders.

Local Engagement and How to get Involved

Sandwell Metropolitan Borough Council aims to engage with a wide variety of departments and organisations, as well as its citizens when designing measures to improve local air quality. This takes many forms, including public consultations, as well as community-based projects and initiatives. Sandwell's Air Quality Action Plan 2020-2025 is reviewed by a steering group that meets on a quarterly basis. In 2022 this brought together a range of external stakeholders including officers from Sandwell's Transport and Road Safety team

and Climate Change team, WM-Air at the University of Birmingham, Transport for West Midlands, the Forestry Commission, AECOM, National Highways, and the Black Country's NHS Integrated Care Board. These meetings provide an important opportunity for us to report on air quality measures both in progress and planned and help steer future work.

How you can help

All the options mentioned below are easy to access via the Council's webpage or via our customer information services either by telephone or in person. Involvement in any these initiatives can help to raise awareness of air quality and promote lower emissions of harmful air pollutants.

- The Faith Communities for Clean Air[12] project - provides an opportunity for those attending faith centres across the borough to increase their understanding of air quality and provides advice and guidance on how to reduce harmful emissions.
- Sandwell Council's Interactive Cycle Map[13] helps residents explore on and off-road cycling routes, including segregated paths, traffic-calmed routes and canal towpaths. It also highlights cycle parking infrastructure locations, cycle shops and more.
- The GoJauntly[14] walking route planner app provides information on free walking routes around the local community, to promote safe, greener and stress-free walking routes.
- Carshare Sandwell[15] offers a way to reduce traffic, emissions, alleviate stress and save money.
- TravelWise in Sandwell[16] is a one stop shop providing a wide range of information on planning sustainable travel, including carshares, public transport routes, cycle routes and walking journeys.
- Resilient Residents[17] has sections with information on Going Green, Health and Wellbeing and Saving Money.

[12] https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/6
[13] https://sandwell.activemap.co.uk/
[14] https://www.gojauntly.com/sandwell
[15] https://liftshare.com/uk/community/sandwell
[16] https://www.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell
[17] https://www.sandwell.gov.uk/resilientresidents

- The Sandwell Cycling and Walking Infrastructure Plan 2020[18] explains Sandwell Council's aims to increase walking and cycling uptake, the targeting of resources and the delivery of improvements to the walking and cycling environment.
- Air Quality Sandwell[19] offers residents the opportunity to report a pollution problem and is also where reports detailing Sandwell's air quality history can be found.
- The Healthy Sandwell[20] website offers health and wellbeing support to residents', providing information and services on walking and increasing physical activity.
- Details of Sandwell's Smoke Control Area[21] are provided on this government web page, whilst further information is also available on Sandwell's Air Quality website, including the decision to designate all of Sandwell as a smoke control area, following public consultation.
- Reporting repetitive bonfires[22] can help reduce air pollution and help prevent them from becoming a nuisance. Guidelines are also provided on how to help minimise the impact on neighbour's health and safety should you choose to burn any garden waste.
- Sandwell have partnered with GetComposting[23] to reduce methane and potential emissions from garden waste being burned, this website provides information about the importance of composting and offers discounts.
- Air quality and climate change are closely linked. Sandwell's Climate Change and Air Quality[24] website provides tips on how we can all 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[25] highlight the importance of trees and new tree planning. The Woodland Trust[26] is a woodland conservation charity, and

[18] https://www.sandwell.gov.uk/downloads/download/2500/sandwell_cycling_and_walking_infrastructure_plan
[19] https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/4
[20] https://www.healthysandwell.co.uk/
[21] https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/4
[22] https://www.sandwell.gov.uk/info/200274/pollution/3188/report_a_bonfire_problem
[23] https://www.sandwell.gov.uk/info/200160/bins_and_recycling/2194/composting
[24] https://www.sandwell.gov.uk/info/200274/pollution/4402/climate_change_and_air_quality_in_sandwell
[25] https://www.sandwell.gov.uk/info/200248/parks_and_green_spaces/4916/trees
[26] https://www.woodlandtrust.org.uk/

they provide information on how to plant a tree and how to get involved with tree planting projects in Sandwell.

- 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[27] commits to deliver a network of electric vehicle charging points and ULEV public service vehicles. Maps of planned on-street residential chargers are available to view, based on consultation with residents.
- Sandwell's Eco Bus[28] 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.
- Switching to energy efficient bulbs and appliances, improving insulation, and replacing your boiler with a lower NO_x options can help reduce carbon emission and improve air quality. The government are also funding the Boiler Upgrade Scheme, which enables some people to get a grant to cover part of the cost of replacing fossil fuel heating systems with a heat pump[29].
- Switching energy providers to those that source energy from renewable energy sources[30] (wind, solar and water) is also a good way to reduce the impact of our homes on air quality and climate change.
- 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 chargers. Employers can apply for vouchers using the Workplace Charging Scheme application[31].

[27] http://www.blackcountrytransport.org.uk/projects/ultra-low-emission-vehicle-programme.html
[28] https://www.sandwell.gov.uk/info/200160/bins_and_recycling/1594/eco_bus
[29] https://www.gov.uk/apply-boiler-upgrade-scheme
[30] https://www.which.co.uk/news/article/which-eco-provider-energy-companies-revealed-for-2022-asQEp6s6jxrg
[31] https://www.gov.uk/guidance/workplace-charging-scheme-guidance-for-applicants#site-eligibility

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:

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Sophie Morris – Public Health Specialist (Air Quality and Climate Change)

This ASR has been approved by:

- Liann Brookes-Smith – Interim Director of Public Health
- Andy Thorpe – Healthy Urban Development Officer
- Lina Martino – Public Health Consultant

This ASR has been signed off by:

Liann Brookes-Smith, Interim Director of Public Health

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Figures

Tables

1. Local Air Quality Management

This report provides an overview of air quality in Sandwell during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by 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 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

A summary of the AQMA's declared by Sandwell MBC can be found in **Table 0.1**. The table presents a description of the AQMA that is currently designated within Sandwell. **Appendix D: Map(s) of Monitoring Locations and AQMAs** provides a map of the 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 0.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Sandwell Air Quality Management Area	Sandwell AQMA Order 2005	NO2 Annual Mean	Sandwell Metropolitan Borough Council	YES	58.51	40.2	0	Air Quality Action Plan Sandwell MBC 2020-2025	https://www.sandwell.gov.uk/downloads/download/2598/air_quality_action_plan_2020-2025

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

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

Progress and Impact of Measures to address Air Quality in Sandwell

Defra's appraisal of last year's ASR concluded that Sandwell's report was well structured, detailed, and provides the information specified in the Guidance. Several comments were provided by Defra in response to the report, these comments are in black and Sandwell MBC's response when appropriate is provided in green below each comment:

1. Sandwell Metropolitan Borough Council have presented trends in pollutant concentrations and have provided a thorough discussion of the patterns. Monitoring data has been compared against air quality objectives as well as national trends in figures across the report. This is welcomed.
   We will endeavour to continue our efforts to present air quality data in a clear and transparent format.

2. The Council updated their AQAP in 2020 and have highlighted their progress in 2021 extensively.
   We aim to provide a clear picture of the progress we are making against our seven air quality priorities, and this includes identifying successes as well as areas for improvement. As well as identifying new priorities as we look towards updating the AQAP in 2025.

3. The Council have several priority zones and hotspot locations which they have identified, as well as specific road links identified by Clean Air Strategy 2018, as areas of to focus their efforts to monitor and reduce concentrations. The Council have provided a thorough update on these areas. This is commended and demonstrates the Councils commitment to improving local air quality.
   As a council we are committed to being proactive and are dedicated to improving air quality across the borough.

4. The Council have clearly declared monitoring of and reducing PM_{10} and $PM_{2.5}$ concentrations as a priority. This is demonstrated by the Council expanding their PM_{10} and $PM_{2.5}$ monitoring capabilities in 2021, with new FIDAS monitors installed at three continuous monitoring sites, as well as installing low-cost Zephyr monitors. Additionally, the report also includes an extensive discussion of the impact of particulate matter with specific reference to the Public Health Outcomes Framework. The Council have outlined several measures to target particulate matter; of note are the Borough Councils plans to consolidate the current 52 Smoke Control Areas into one Boroughwide Area.

Sandwell MBC continues to be acutely aware of both the short-term health impacts as well as the morbidity burden associated with long-term exposure to man-made particulate matter air pollutants. The Council has supported the declaration of a boroughwide Smoke Control Area which is planned to come into force into 2023.

5. QA/QC procedures are robust with sufficient supporting evidence and discussion has been provided.
   We will continue to ensure that these standards are maintained to ensure confidence is maintained in the data we provide and its analysis.

6. In Table A.4, diffusion tubes OP4 to ZR appear twice. The values are the same and is therefore likely a copy and paste error. To avoid confusion on the number of monitoring locations, the repeated entries should be deleted.
   We apologise for this error and it has now been amended. A revised copy is available on our website at www.sandwell.gov.uk.

7. There are inconsistencies in the number of reported triplicate locations. The text states there are 22 triplicate sites, which would be consistent with Table A.2 based upon the X and Y OS grid references and heights. However, Table A.4 only shows averaged data for 21 sites (LA, LB, LC are reported individually), whilst Table B.1 only shows averaged data for 20 sites (LA, LB, LC and GA, GB, GC are reported individually). The Council should adopt a consistent approach and report averaged data for all triplicates.
   These reporting inconsistencies with the triplicate diffusion tubes have been noted and addressed in this ASR.

8. Figure 3.6 shows the percentage of diffusion tubes which exceeded the objective in each year since 2012. The Council should approach this with caution. If monitoring strategy has significantly changed across the years, the overall sample size would have changed, and therefore influence the percentage.
   It is accepted that there have been changes in the monitoring strategy, with the addition of more diffusion tubes in 2017. The additional tube locations have been specifically chosen because they have been identified as being in areas of significant pollution, so we may therefore be under-representing the progress made. However, it is agreed that to ensure future transparency, only tubes from 2017 onwards (which represent the current monitoring strategy) will be used in any trend analysis.

9. Overall, the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.

Sandwell's Air Quality Measures

Sandwell MBC has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in **Table 0.2**. A total of 29 measures are included within **Table 0.2**, with the type of measure and the progress Sandwell MBC have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within **Table 0.2**.

More detail on these measures can be found in Sandwell's Air Quality Action Plan 2020-2025, but some additional measures have also been added, including the ambition to revoke Sandwell's 52 smoke control areas through the declaration of a boroughwide Smoke Control Area and the on-going implementation of the 'Faith Communities Behavioural Change' project.

West Midlands Combined Authority

The West Midlands Combined Authority (WMCA) is increasing its role in supporting the seven West Midlands local authorities in their efforts to improve local air quality. The WMCA has produced an overriding Strategic Economic Plan[32] which includes a regional transport plan, produced by Transport for West Midlands. This plan is now recognised as the WMCA's Movement for Growth[33] strategic transport plan and provides a framework for the key transport challenges in the region, with significant investment programmes planned over the next 13 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 also approved the development of an Air Quality Framework for the West Midlands region[34]. This framework is designed to complement the Air Quality Action Plans of Sandwell and the other constituent local authorities.

[32] https://www.wmca.org.uk/what-we-do/strategy/
[33] https://www.tfwm.org.uk/strategy/sustainable-travel/
[34] https://governance.wmca.org.uk/ieDecisionDetails.aspx?ID=952

The development of the Framework is timely, given the new Environment Act (2021) which includes new targets for $PM_{2.5}$ pollutant concentrations by 2040 as well as an associated reduction in concentrations. The WMCA believes the targets should go further to protect public health in the West Midlands and to increase ambition in line with WHO guidelines, with a greater emphasis on tackling solid fuel burning and reduction of traffic.

The plan is that the Air Quality Framework will operate on a regional level to implement a variety of measures which will have more impact, given that PM can remain for long periods in the atmosphere and spreads across local authority boundaries to a greater degree than NO_x and NO_2. This development is being led by the Environment Team at the WMCA and is supported by the University of Birmingham's WM-Air team. The Framework will place a greater focus on domestic emissions, planning, the built environment, community engagement, behaviour change and integrating/supporting public health. The draft categories for potential measures are as follows:

- Non-road emissions
- Transport
- Natural environment
- Public health
- Governance and mechanisms for change
- Engagement and behaviour change
- Monitoring and digital.

Black Country Transport – Ultra Low Emission Vehicle Strategy

The Black Country Transport – Ultra Low Emission Vehicle Strategy was 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 planned nationwide ban on the sale of petrol and diesel vehicles in 2030. 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.

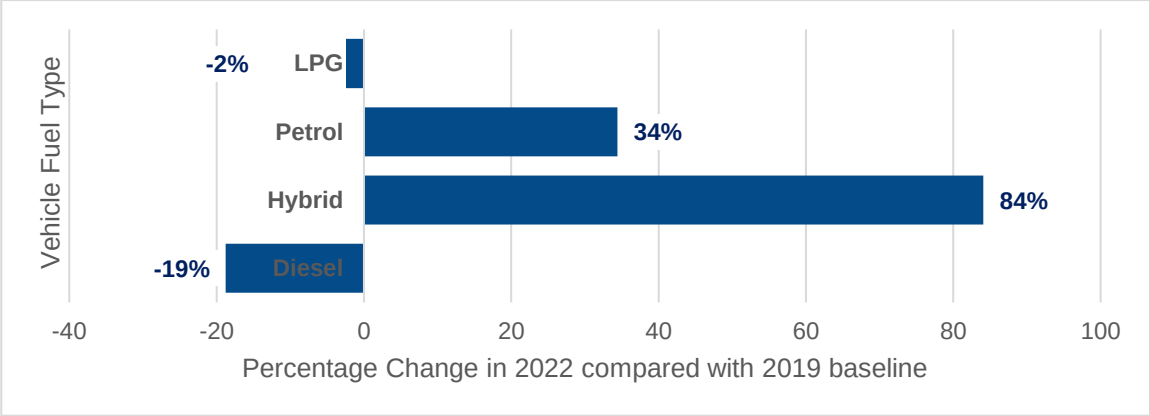
Key Completed Measures

The following measures identified in the ASR 2022 were completed in 2022.

- Sandwell secured conditions on 108 planning conditions requiring the provision of electric vehicle charging points (EVCP), similar to 2021, when 116 were conditioned for EVCPs.
- 11 development proposals were conditioned requiring a travel plan for air quality purposes, including commercial, residential and industrial developments. Travel planning is critical for larger developments to ensure that sustainable modes of transport are facilitated among occupiers and visitors to the development from the outset, and to mitigate the impact on air quality by trips generated by the site.
- In 2018 changes were made to lane marking, capacity and traffic flow on the Kelvin Way/Trinity Way roundabout in Air Quality Priority Zone 7 to reduce NO2 concentrations. Monitoring data from Kelvin Way (N1A) in 2021 demonstrated an overall reduction of just over 8 µg/m^3 in NO_2 since 2017, with levels falling from 40.4µg/m^3 in 2017 to 32.2µg/m^3 in 2021. We were however unsure if the impact of the Covid lockdown travel restrictions during 2021 were giving a positive but short-term picture. The data from 2022 provides a 12-month period without lockdowns and we are encouraged that the NO_2 annual concentrations remains very similar to last year at 32.3µg/m^3. We will of course continue to monitor this site.
- 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. We continue to monitor these sites to determine whether the traffic signal optimisation and retro-fitting of buses (to Euro VI standards) on reducing NO_2 in the long-term has been achieved. The results in 2020 and 2021 were complicated by the pandemic and the concentrations remains under further review. We await further direction in 2023 from the Joint Air Quality Unit (JAQU).
- Data from Sandwell's licensed private vehicle hire taxis was reviewed to identify any significant changes in the fuel type profiles of the fleet over the last four years. In 2022 there were 212 more licensed private hire vehicles in the fleet than in 2019, an increase from 1,087 to 1,299).
- The percentage change in private hire vehicle fuel types between 2019 (baseline data) compared with 2022 is shown in the chart in **Figure 2.1** below. Electric

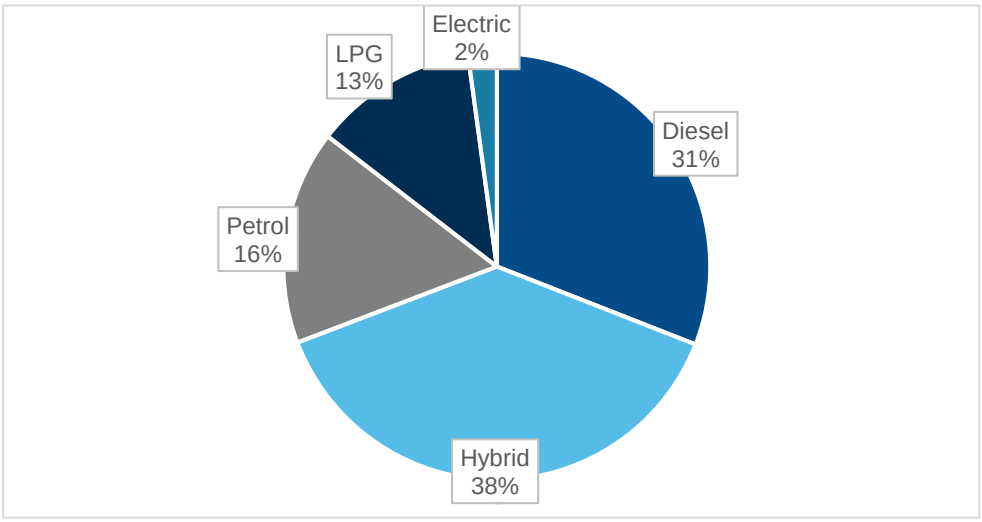
vehicles are not included in this chart as there were no electric vehicles in 2019, but 28 EVs were licensed in 2022.

Figure 2 1 Percentage Change in Private Hire Vehicle Fuel Types between 2019 and 2022



- The greatest percentage change in fuel type since 2019 is seen in the licensing of hybrid vehicles, with an 84% increase, but petrol car numbers have also increased by 34%. The overall changes in the private hire vehicle fleet parc are positive in that they are moving away from diesels, but the increase in number of petrol vehicles is disappointing whilst the overall the uptake of fully electric vehicles remains very low.

Figure 2 2 - Percentage of Vehicle Fuel Types for Private Hire Vehicles Licensed in Sandwell in 2022



- The private hire vehicles fleet make-up in 2022 is shown in **Figure 2.2**, this will continue to be monitored and we 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.

- As planned, by June 2022 we had 21 Zephyr low cost air quality monitors operating across Sandwell. The majority of these are now located in traffic hotspots or installed at locations to provide pre-building development baseline data. They are currently measuring NO_2, O_3, PM_{10} and $PM_{2.5}$
- Following unanimous agreement by elected members in December 2021, Sandwell MBC formally declared its intention to revoke the existing 52 smoke control areas to create a boroughwide smoke control area in May 2022. This included undertaking a formal legal advertising process as well as an additional public consultation.
- A public consultation was undertaken in May and June 2022 with regards the council's proposal to create a boroughwide smoke control area. The results of this public consultation are provided in Sandwell's 'Smoke Control Area Public Consultation Results and Analysis Report' [35] published in July 2022. The results were presented to cabinet in September 2022. In summary, 85% of respondents agreed or strongly agreed that improving air quality should be a key priority in Sandwell. 67% of respondents agreed that Sandwell should be protected by a boroughwide smoke control area whilst 10% had no opinion on the issue and 23% were not in favour.
- Feedback from the smoke control area public consultation and the 6-week legal advertising period in May and June2022 were presented to Sandwell MBC's elected members in November 2022. There was once again unanimous agreement to issue a new Boroughwide Smoke Control Order.
- Sandwell Council's Public Health Community Climate Champions completed their part in the Net Zero Innovation Programme[36] funded by the Local Government Association and in partnership with the University of Birmingham.

Measures to be completed in 2023

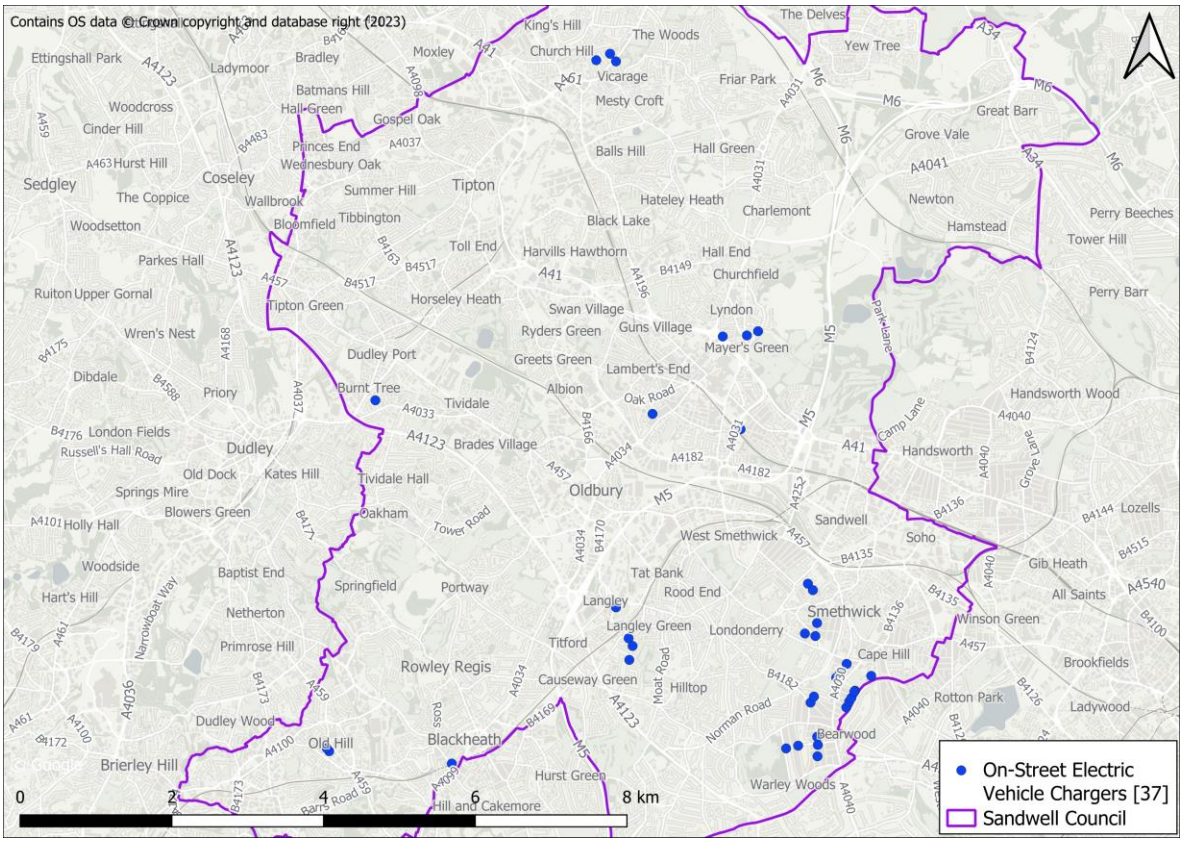
Sandwell MBC expects the following measures to be completed over the course of the next reporting year:

[35] https://www.sandwell.gov.uk/downloads/file/33486/smoke_control_area_public_consultation_results_and_analysis

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

- The issuing of a new Boroughwide Smoke Control Order and revocation of the existing smoke control orders is planned for 2023. Given that approximately 25 % of $PM_{2.5}$ in urban areas is attributable to domestic burning, and the continued growth in the popularity of solid fuel burning in homes, this measure is designed to both control and reduce the impact on health to both those who chose to burn solid fuels for home heating and those who live in the communities who are impacted by this burning. By making the SCA boroughwide, we remove the current inequity where some communities are protected, whilst others are not. Furthermore, the declaration of a boroughwide SCA provides an opportunity to inform and educate on the damaging health consequences from solid fuel burning.
- If no legitimate objections are made to Defra regarding the declaration of the Boroughwide Smoke Control Area following the final 6-week advertising period, and Defra are satisfied that correct process has been followed, then the intention is for the boroughwide Smoke Control Area to be enforced after 6 months of its confirmation by Defra. It is envisaged that this will be before the end of 2023.
- A new Smoke Control Area Enforcement Policy will also need to be agreed to reflect amendments to the Smoke Control Area enforcement under the Environment Act 2021, including the provision to serve fixed penalty notices on those who are in breach of this Order. The enforcement policy will ensure that we are consistent and transparent in our enforcement approach.
- The Defra Air Quality Grant funding our community engagement work with faith centres to raise awareness of local air pollution and create positive behavioural change, will be completed at the end of 2023. A report the project and its findings will be produced by June 2024.
- Utilising s106 monies to undertake modelling of the potential benefits to local air quality if vehicle speeds were reduced from 40 to 30mplh on All Saints Way, West Bromwich. Real word transport data collection for the modelling project began in autumn 2022. The data from the modelling will be used to determine if this would provide a benefit to local air quality and if so look at options for implementation.
- Following receipt of a £300,000 grant from the Office for Zero Emission Vehicles (OZEZ) for an On-Street Residential Charge Scheme (ORCS) a public consultation on determining the potential location of EV charging points was held in March 2022. The funding covers installations at 37 sites, each providing two charging sockets, with installations now planned for summer 2023. A map of the proposed charging sites is shown in **Figure 2.3**.

Figure 2 3 - Map of Proposed EV On-Street Residential Charging Sites in Sandwell



Priorities for 2023

Sandwell MBC's priorities for the coming year are as follows;

- Sandwell MBC will continue to prioritise its delivery of the Air Quality Action Plan 2020-2025. In 2023 we are planning to develop an active travel strategy to identify measures and interventions to encourage and support greater levels of active travel in our communities. This work will be led by a newly appointed Active Travel Officer working within the Air Quality Team in Public Health. This is a pivotal role in that the officer will also be co-ordinating and promoting work already being undertaken across the council including our Public Health and Transportation teams. Progress with the AQAP will continue to be monitored at quarterly meetings where we work with a wide range of key stakeholders. We will continue to encourage, support and promote our key partners and organisations who play an essential role in supporting Sandwell MBC in achieving our ambitions of improving local air quality.
- In response to the introduction of the Environment Act 2021, Sandwell will continue to maintain and expand its collaborative approach towards improving air quality. We are particularly keen to work with our neighbouring local authorities, partners in

the NHS and the West Midlands Combined Authority (WMCA). As air pollution does not respect local authority boundaries we consider that a co-ordinated and collaborative approach to tackling air pollution sources and consequences, is more effective than working in isolation. The work now being undertaken by the regional Air Quality Framework team at the WMCA is welcomed, as this provides an opportunity for the constituent local authorities to maximise the impact of air quality interventions (e.g. behaviour change messages and initiatives) whilst potentially minimising the potential risk of unintended harms and consequences that could result from uncoordinated actions.

- As part of our collaborative approach to sharing information and resources on local air quality, we have partnered with our NHS colleagues at the NHS Black Country Integrated Care Board (ICB) – The Asthma Transformation Team. This team are in the process of implementing the '*National bundle of care for children and young people with asthma'*. Working with this team has highlighted significant knowledge gaps amongst many of their health practitioners in relation to the impacts of poor air quality, so we are planning to provide training and support production of resources to understand more about the potential indoor and outdoor air pollution triggers for asthma and other respiratory conditions. The aim is to enable health practitioners to share basic air quality knowledge with the families they work with, as environmental triggers such as air pollution should always be considered in a child or young person's asthma management plan.
- Maintaining a good working partnership with National Highways remains very important, given that both the M5 and M6 motorways run through Sandwell. Sharing data, information and local issues of concern will enable us to collaborate more effectively to reduce the impact of motorway traffic on those who live and work nearby. In 2021 National Highways implemented a trial 60mph speed restriction on the elevated section of the M5 between J1 and J2, for air quality. The M5 speed limit reduction was consulted on in February 2022 and made law in March 2022 and came into force in May 2022. We will continue to assist National Highways in their air quality monitoring by deploying NO_2 diffusion tubes at 9 sites below the 3.2km section of the M5 Oldbury Viaduct.
- Support technological advances and innovative research that increases our understanding of local air quality issues in Sandwell through partnership working with other organisations and stakeholders.

- In 2023 Sandwell MBC active travel will continue to be encouraged in the borough through the creation of the first “blue cycle route” in the West Midlands outside of Birmingham. This will provide wide, two-way cycle routes which are separated from other traffic, to make it safer for cyclists and encourage more people to get on their bikes. Targeted areas have already seen the introduction of 20mph speed restrictions which make the roads safer for pedestrians and cyclists, supporting increased use of active, sustainable travel.
- Raising public awareness about the dangers to health from domestic burning remains a priority in 2023 and goes in tandem with Sandwell MBC’s declaration of a boroughwide smoke control area. With the steep rise in the cost of living in 2022 we are very aware that residents may consider introducing solid fuels to heat 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 real harms 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 their exposure to dangerous air pollutants.
- The air quality team will continue to prioritise its community engagement work, including the Defra funded 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 has enlisted the support from 16 faith centres across Sandwell for a 2-year period, the ambition being to provide communities with local air pollution information and help them to 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.
- In 2023 we need to ensure that data captured by the 21 Zephyr indicative air quality monitors is utilised effectively to improve our understanding of air quality across the borough. We plan to use this data both to encourage and support behavioural change but also to inform wider decision making within the Council, including future planning and transport projects and policies.
- As the Council continues to develop its response to the climate change crisis, it is important that we identify and capitalise on the synergies between carbon reduction and improved air quality to maximise our impact. The Council’s Adaptation and

Resilience Group will continue to meet to 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.
- Respond to and support wider 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.
- 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 worked to implement these measures in partnership with the following stakeholders during 2022:

- AECOM
- Air Quality Data Management (AQDM)
- Balaji Temple, Oldbury
- Department for Environment Food and Rural Affairs (DEFRA)
- Enjoy the Earth
- EarthSense
- Energy Savings Trust
- EnviroTech
- Guru Nanak Gurdwara, Smethwick
- Jamia Masjid, Smethwick
- National Highways
- NHS Black Country Integrated Care Board – Children and Young People with Asthma
- Office of Zero Emissions
- St Francis of Assis Church, Wednesbury

- St Matthews Church, Tipton
- Shri Pashupatinath Mandir, Rowley Regis
- University of Birmingham
- Oldbury Fire Station
- Wesley Centre, Wednesbury
- West Midlands Combined Authority
- Yemeni Community Association, West Bromwich

Principal Challenges and Barriers

The principal challenges and barriers to implementation that Sandwell MBC anticipates facing are;

- The continuing high cost of living is of concern, as we are aware that this encourages residents to look for cheaper options for home heating, which are invariably more damaging to health i.e. wood burning. Changing hearts and minds in relation to wood burning is now a significant challenge. Wood burning is not perceived in the general population as being a danger to health or to the environment, in fact, the burning of wood for heat and energy has been re-branded as ‘carbon neutral’ and ‘green’, whilst the purchase of a wood burning stove is viewed as being aspirational. Creating factual, persuasive and impactful messaging to ensure that residents can make informed choices in the future is a big challenge. We welcome the support of the WMCA and their proposals to assist with producing campaign and resource material that can be delivered more efficiently and extensively than we can achieve as a lone local authority.

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

- The formal declaration of Sandwell’s boroughwide smoke control area was expected to take place by December 2022. However, the declaration incurred further delays as queries were made in relation to interpretation of amendments to the Clean Air Act 1993 that required clarification with Defra. The formal declaration was therefore not made until 16 February 2023.
- Following receipt of a £300,000 grant in February 2022 from the Office for Zero Emission Vehicles (OZEZ) for an On-Street Residential Charge Scheme (ORCS) in

2021, it was expected that the would be rolled out at the end of 2022[37]. However due to major delays on procurement and contracting, an agreed extension was provided by OZEV, and installations are now expected to take place in the summer of 2023.

Whilst the measures stated above and in **Table 0.2** will help to contribute 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 the Sandwell Air Quality Management Area for nitrogen dioxide.

[37] https://www.sandwell.gov.uk/news/article/6345/sandwell_council_makes_successful_bid_for_300000_electric_vehicle_chargepoint_funding

Table 0.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	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	2030	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	Hybrid working arrangements in place during 2022. Grey fleet car mileage claims increased by 23% from 2021 but still by 44% less than in 2019.	Likely to see increase in 2023 with a push to see more people in the office and potentially more travelling to meetings/ on-site visits
3	Midland Metro Extension (Wednesbury to Brierley Hill)	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2017	2024	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	2023	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. Continue to monitor until advised otherwise by Defra and the Joint Air Quality Unit (JAQU)	Data from 2022 demonstrates no exceedances of the NO2 air quality objective at any of the monitoring locations.
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. Air Quality and Climate Change Engagement Officer recruited in December 2022 to assist with this project.
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. Appointment of an	Last updated 2019 - Sustainable Modes of Travel Strategy (SMOTS) https://www.sandwell.gov.uk/download/downloads/id/

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	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
														Active Travel Officer in December 2022 to accelerate progress with this.	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	
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	NO2 annual concentrations have continued to remain much lower than pre-pandemic levels in the 2022 roadside data.
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.
12	Inclusion of Air Quality considerations in the updated Local Development Planning Framework. Including policies to reduce the need to travel and	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2019	2024	Sandwell MBC	N/A	NO	Funded	< £10k	Planning	Medium	Annual average NO2 value reductions	Ongoing work to co-ordinate all relevant teams to create a comprehensive document.	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	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
	promote alternatives to car use.														
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	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 Local Development Plan is expected to replace the Black Country Supplementary Planning Document for Air Quality in 2024 and will be referred to in all pre-planning application submissions for AQ comments/advice.
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	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 Local Development Plan is expected to replace the Black Country Supplementary Planning Document for Air Quality in 2024 and will be referred to in all pre-planning application submissions for AQ comments/advice.
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. New Active Travel Office in post from December 2022
16	Revocation of existing 52 designated smoke control areas and replacement with a single borough wide Smoke Control Order	Other	Other	2020	2024	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Planning	Reduce PM emissions from burning unauthorised fuels	Reduction in particulate emissions from solid fuel burners	Full council agreement given for Intention to Declare and Public Consultation in November 2022. Formal declaration made in February 2022	Public Consultation on Proposed Boroughwide Smoke Control Area held 9 May to 20 June 2022. Declaration of boroughwide SCA made 16 February 2023. Awaiting ratification from Defra.
17	Maintain up-to-date air quality information on Sandwell MBC's	Public Information	Via the Internet	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	< £10k	Implementation	Reduce emissions from bonfires, wood burners	Reduction in number of bonfire complaints and	Council website is frequently updated to include relevant and	Info on Sandwell's Air Quality can be found at https://www.sand

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	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
	website to ensure it is a trusted 'go to' source for information for residents											and educate on causes of air pollution, protection and how to reduce it.	other domestic burning issues	important air quality information	well.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 used in 2022 alongside Smoke Control Area Intention to Declare Notice.	It is hoped that further campaign material will be made through collaboration with WMCA in 2023/2024
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	2030	Sandwell MBC, SERCO	N/A	NO	Not Funded	£500k - £1 million	Implementation	No target	Reduction in tail pipe emissions from Sandwell's own vehicle fleet including refuse collection lorries.	Currently 3% of Sandwell MBC's fleet are electric vehicles. 37 charging units planned to be installed by end of 2023.	Installation of fleet EV has high level support and is included in the Directors Climate Change Programme Board. Working with waste contractors SERCO, to install charge points to replace 42 vehicles with EVs.
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	
21	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	2010	2030	Sandwell MBC	Sandwell MBC, Transport for West Midlands	NO	Funded	£50k - £100k	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. Appointment of a British Cycling - Cycling Activator (early 2022) and an Active Travel Officer (end of 2022)	Led rides undertaken by Cycling Activator but Active Travel Officer not in post until December 2022 so not able to progress this as quickly as originally planned.
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. Appointment of an Active Travel Officer December 2022 to start promoting this.	Travel plan supplementary planning document referenced in all relevant planning applications
23	Review taxi fleet licences and private hire vehicle fleet	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 options to help	There are 212 more licensed vehicles in 2022 than in 2019.

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	licenced by Sandwell (including fleet composition, age and emission profiles) to understand profile of fleet over time													encourage drivers upgrade to cleaner vehicles	Since the baseline data in 2019 petrol vehicles have seen a percentage increase of 36%, but there was an 18% percentage reduction in diesel and 84% increase in hybrid vehicles.
24	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	Air Quality Planning and Policy Guidance	2010	2030	Sandwell MBC	Sandwell MBC	NO	Funded	£10k - 50k	Implementation	No target	Planning guidance requiring all development to contribute to offsetting emission creep, plus additional contributions for significant new sources.	Included in policies - subject to updating the Local Development Planning Framework	Funding used in 2022/2023 to undertake speed reduction modelling from 40 to 30mph on All Saints Way, West Bromwich. Results to be analysed in 2023.
25	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	
26	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	No target	Increased number of participants using the scheme	Implementation and promotion of the scheme on-going	
27	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 year on year mileage to work and meetings	Reduced mileage claims by local authority staff	The potential for using car club vehicles as pool cars for staff was not developed by SMBC.	Hybrid working has reduced t commuting to the office, reducing car/lift sharing opportunities. Staff are now conducting in-person meetings so the business case for using car club vehicles as pool cars could be marginal.
28	West Midlands Bike Hire Scheme	Alternatives to private vehicle use	Other	2021	2030	Transport for West Midlands (WMCA)	WMCA	NO	Funded	> £10 million	Completed	No target	Log maintained of time and distance travelled by users- aim to increase this year on year.	Over 1,500 bikes and e-bikes available for hire from locations across Birmingham, Coventry, Sandwell, Solihull, Stourbridge, Sutton Coldfield, Walsall, and	More bicycles are needed to allow a greater range of journeys to be made across the West Midlands.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	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
														Wolverhampton. An average of 750 journeys being cycled daily with over 250,000 hours of cycling across the West Midlands Region since it started in Birmingham in 2020.	
29	West Midlands Air Quality Framework	Other	Other	2022	2030	West Midlands Combined Authority, Sandwell and West Midlands Local Authorities	WMCA	YES	Funded	£500k - £1 million	Planning	No target	A variety of interventions including the provision of live air quality data used to review, assess and increase awareness of air pollution with the aim of a year on year reduction in air pollution.	Bid made for Air Quality Grant Funding in 2022 and approved February 2023	Now determining measures that operate well 'at scale' to improve air quality. Including the monitoring of $PM_{2.5}$ and PM_{10} particulates to produce real-time data to enable residents to understand the need for action to address poor air quality and what that action might involve.

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

This importance of $PM_{2.5}$ is reflected by its inclusion as a key indicator or mortality in the Public Health Outcomes Framework and is defined as the 'fraction of mortality attributable to particulate air pollution'. This is the mortality burden associated with long term exposure to particulate air pollution at current levels and is expressed as the percentage of annual deaths from all causes in those aged 30 and older.

In Sandwell, the latest data (2021), demonstrates that the fraction of mortality attributable to particulate air pollution was 6.5% in 2021, compared with a mean of 5.5% for England. The average life expectancy for a male born in Sandwell in 2021 is 75.5 years, is less than the England average of 78.7 and for a female it was 80.4 years, again lower than the 82.8 average for England. When these figures are compared, as shown in **Figure 2.4** and **Figure 2.5** we can clearly see that Sandwell has much lower levels of life expectancy than most other local authorities in England and above average mortality rates attributable to fine particulate matter.

Figure 2 4 Average Life Expectancy of Females in English Local Authorities Compared with the Fraction of Mortality Attributable to Fine Particulate Matter

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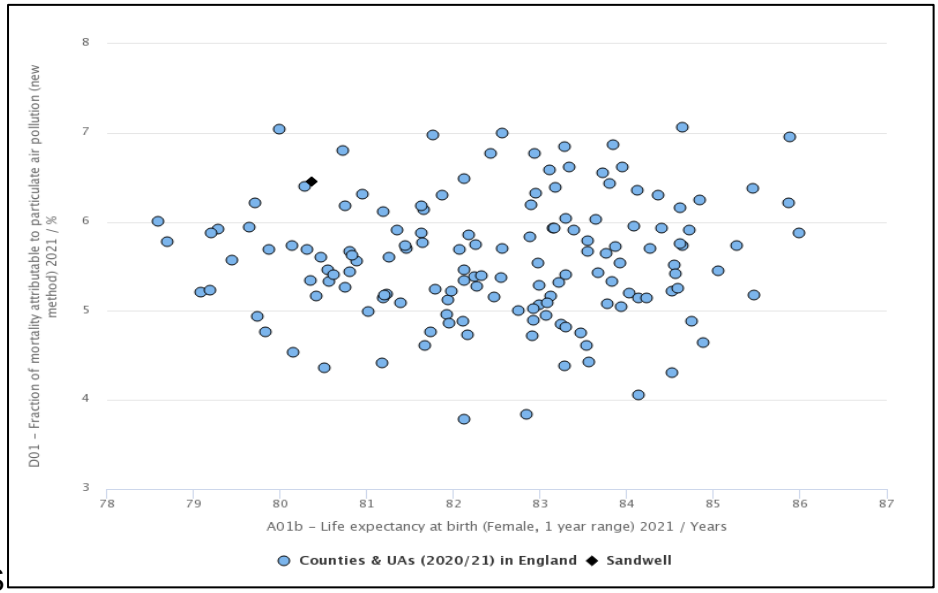
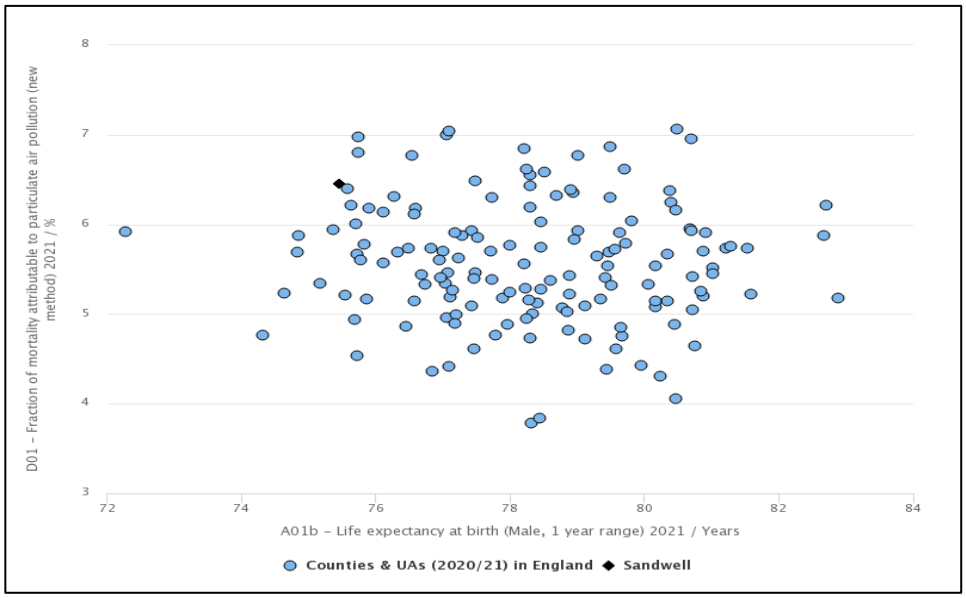
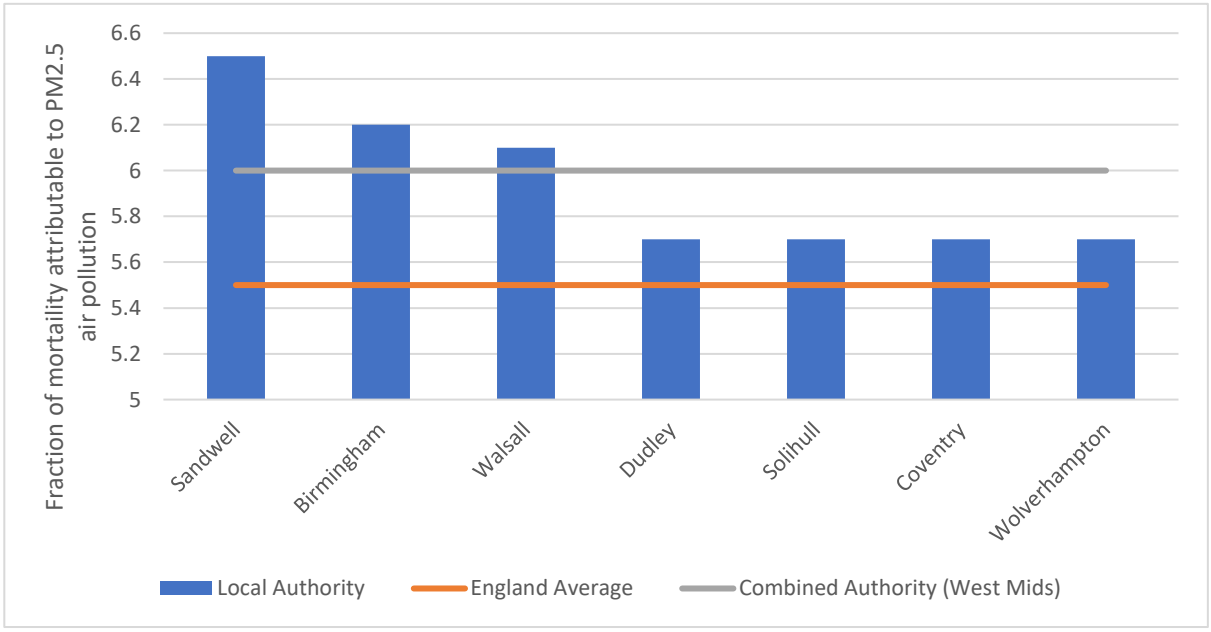


Figure 2 5 - Average Life Expectancy of Males in English Local Authorities Compared with the Fraction of Mortality Attributable to Fine Particulate Matter



Furthermore, if we also compare Sandwell with the six other local authorities that constitute to the West Midlands Combined Authorities, Sandwell has the highest fraction of mortality attributable to fine particulate air pollution at 6.5 %.

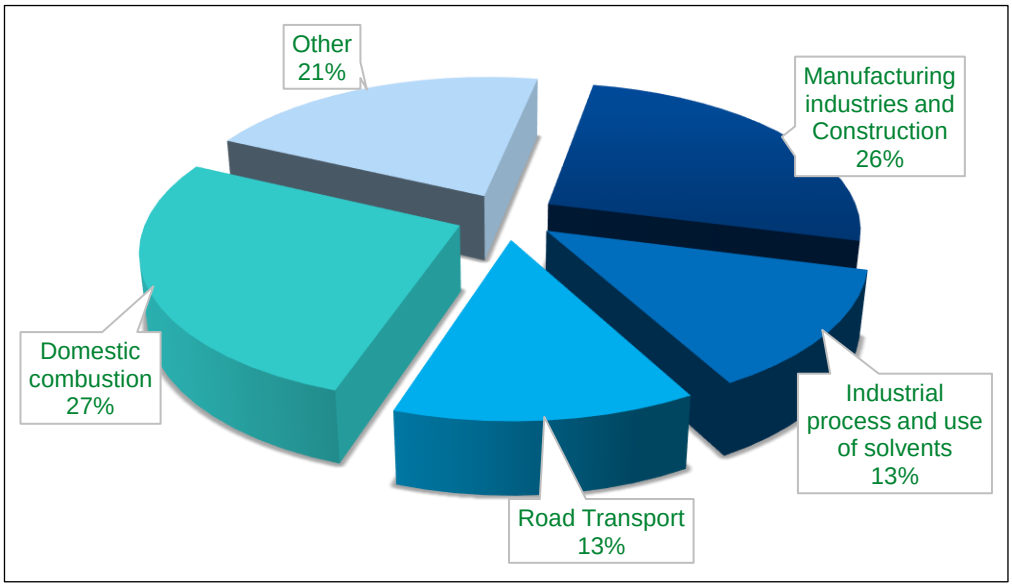
Figure 2 6 - Comparison of the Fraction of Mortality Attributable to Fine Particulate Matter ($PM_{2.5}$) Air Pollution across the West Midlands' Local Authorities



Understanding the main sources of anthropogenic $PM_{2.5}$ is important when it comes to determining strategies to reduce it. The latest Defra statistics on source apportionment of

$PM_{2.5}$ is demonstrated in **Figure 2.7** with domestic combustion accounting for 27% of the total anthropogenic $PM_{2.5}$ being created in the UK in 2021[38].

Figure 2 7- UK 2021 Annual Emissions of $PM_{2.5}$ by Major Emission Sources



Defra's report also confirmed that of the 70% of emissions apportioned to 'domestic burning' were found to be created through burning wood in closed stoves and open fires, with domestic wood burning accounting for 17% of $PM_{2.5}$ emissions. The report also states that decreases in emissions from industrial and commercial sources have been partially offset by increases in emissions from domestic combustion (with emissions of $PM_{2.5}$ from domestic burning increasing by 50 % between 2011 and 2021). The report suggests that this increase reflects the rising popularity of solid fuel appliances in the home, such as wood burning stoves as well as industrial combustion of biomass, another growing source.

Given that there is no safe level of exposure to $PM_{2.5}$ Sandwell MBC has a public health duty to ensure that we take measures that not only ensure that annual levels do not rise above 10µg/m^3 but that we also aim to reduce them so that they are closer to the WHO guideline of 5 µg/m^3.

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

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

- Sandwell MBC extended its $PM_{2.5}$ air quality monitoring network in 2022 to further understanding of concentrations at a variety of sites across the borough. This data provides the authority with additional capability to understand a range of local air pollution concerns e.g. identifying pollutant trends, rogue point source emissions, pollution hot spots and bench marking air quality conditions at proposed land development sites. Sandwell now has four $PM_{2.5}$ continuous air quality monitors and a network of 21 Zephyr low cost air quality monitors that provide indicative readings. 11 of these monitors were installed in 2022.
- In February 2023 Sandwell MBC formally declared a new Boroughwide Smoke Control Order and revocation of the existing 52 smoke control orders that covered approximately 1/5th of the borough. This measure is designed to both control and reduce the impact on health to both those who chose to burn solid fuels for home heating and those who live in communities where residents and small businesses are using wood and coal for space heating. By making the SCA boroughwide, we remove the current inequity where some communities are offered a higher level of protection than others. Furthermore, the declaration of a boroughwide SCA and its subsequent enforcement will provide further opportunities to inform and educate residents and businesses on the damaging health consequences from solid fuel burning.
- Sandwell is increasing its efforts to encourage residents, businesses and visitors to make a modal shift towards walking, cycling, public transport as well as low emission vehicles. This work is to be boosted through the employment of a dedicated Active Travel Officer, working within the Public Health department.
- A commitment to improving public awareness of $PM_{2.5}$ (including sources, how to reduce personal emissions and exposure) through place-based community engagement remains a strong focus to our work. From December 2022 an ‘Air Quality and Climate Change Engagement Officer’ has been employed to help with increasing our community outreach. The officer will support the delivery of our air quality projects and help create information resources for a wide range of audiences, including schools, faith centres, work places and community groups, as well as promoting national events such as Clean Air Day, Walk to School Week and Asthma Awareness Day
- Measures to reduce traffic congestion continue to be implemented to reduce idling that result in increased fine particulate emissions. Sandwell’s Highways Team

continue to review measures to keep traffic moving, examples include improving the optimisation of traffic and pedestrian signals, speed restrictions and the enforcement of parking restrictions.

- A project using s.106 money to model the benefits to local air quality of reducing maximum traffic speeds from 40 to 30mph on All Saints Way, West Bromwich is being undertaken. The results are to be analysed in 2023 to determine if this would be of any significant benefit. Although we know vehicle traffic is not the greatest generator of $PM_{2.5}$, there is a potential for reduction in emissions through smoothing traffic flow and reducing sharp braking along this section of road, next to sensitive receptors.
- Sandwell's Pollution Control team play an extremely important role in the regulation of $PM_{2.5}$ emissions from industrial processes and policing adherence to Environmental Permits, both through regular inspections and complaint investigations.
- The Air Quality Action Plan quarterly steering group continues to meet to evaluate both existing and potential to limit and reduce particulate matter emissions. This is an important process, as it brings together key stakeholders with a wide variety of expertise and experience.

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

This section sets out the monitoring undertaken within 2023 by Sandwell MBC and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1. Automatic Monitoring Sites

Sandwell MBC undertook automatic (continuous) monitoring at 5 sites during 2022. **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 our Birmingham Road, Oldbury site, are available through the UK-Air website[39]

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 2022. **Table A.2** in Appendix A presents the details of the non-automatic sites.

A map showing the location of the NO_2 diffusion tube monitoring sites is provided in **Appendix D, Figure D.2** and a digital map is also available at https://www.google.com/maps/d/u/0/edit?mid=1nGA4FFE8NldDGtwSqDS08felzsi0t6V-&usp=sharing.

[39] https://uk-air.defra.gov.uk/networks

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 2022 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

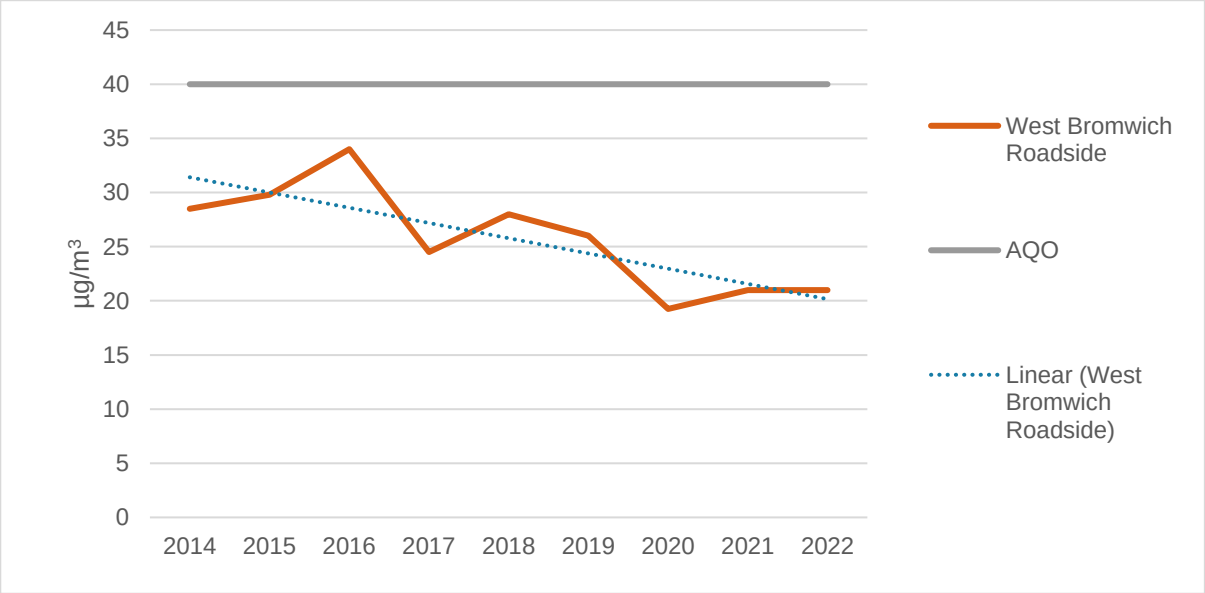
Continuous Monitoring Sites

- Data capture was 98.4% or above for nitrogen dioxide at all the continuous monitoring stations so no annualisation of data was required.
- 2022 was the first year since 2020 without travel restrictions being enforced to the Covid-19 pandemic, so the results no longer need to be treated with caution. Nitrogen dioxide levels have essentially plateaued, with marginal increases at 3

sites and marginal decreases at two sites. increases as shown in Figure A1 in Appendix A.

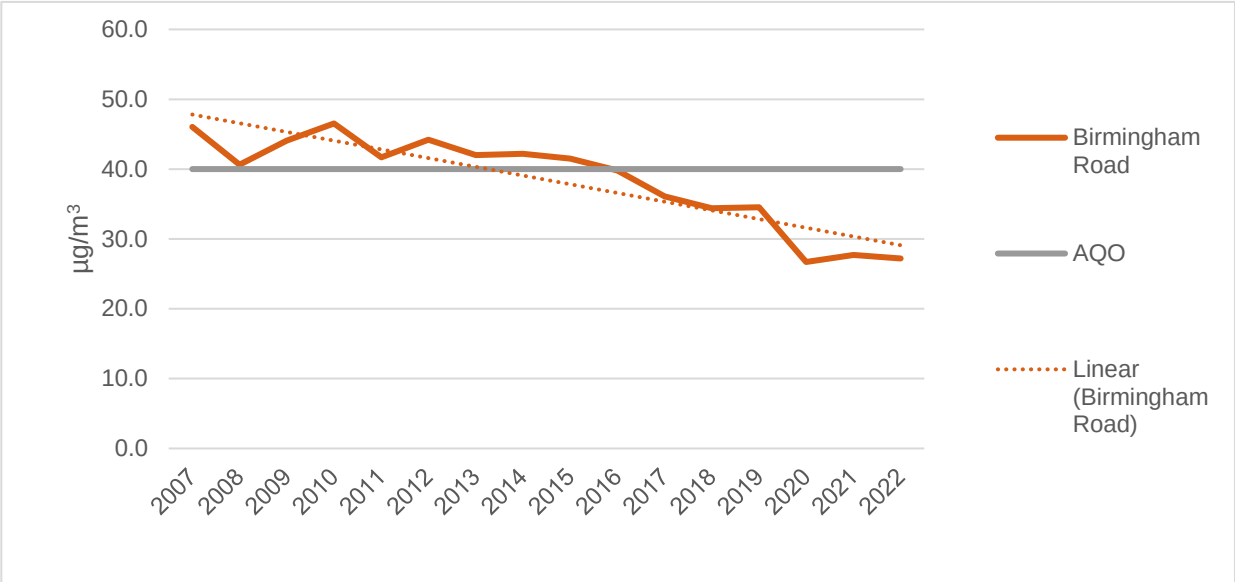
- There were no exceedances of the NO_2 1-hour mean >200µg/m^3 at any of the monitoring stations in 2022 as recorded in **Table A.5** in **Appendix A**. This is the fourth year when no exceedances have been identified which is positive.
- The Cronehills Linkway air quality monitoring station (West Bromwich Roadside) has been monitoring since 2014, assessing impact of a new retail development and associated car parking. The annual mean NO2 concentration at this site was 21 µg/m^3 in 2022, the same as 2021 as shown in **Figure 3.1**.

Figure 3 1- Annual Mean Nitrogen Dioxide Concentrations at West Bromwich Roadside 2014- 2022



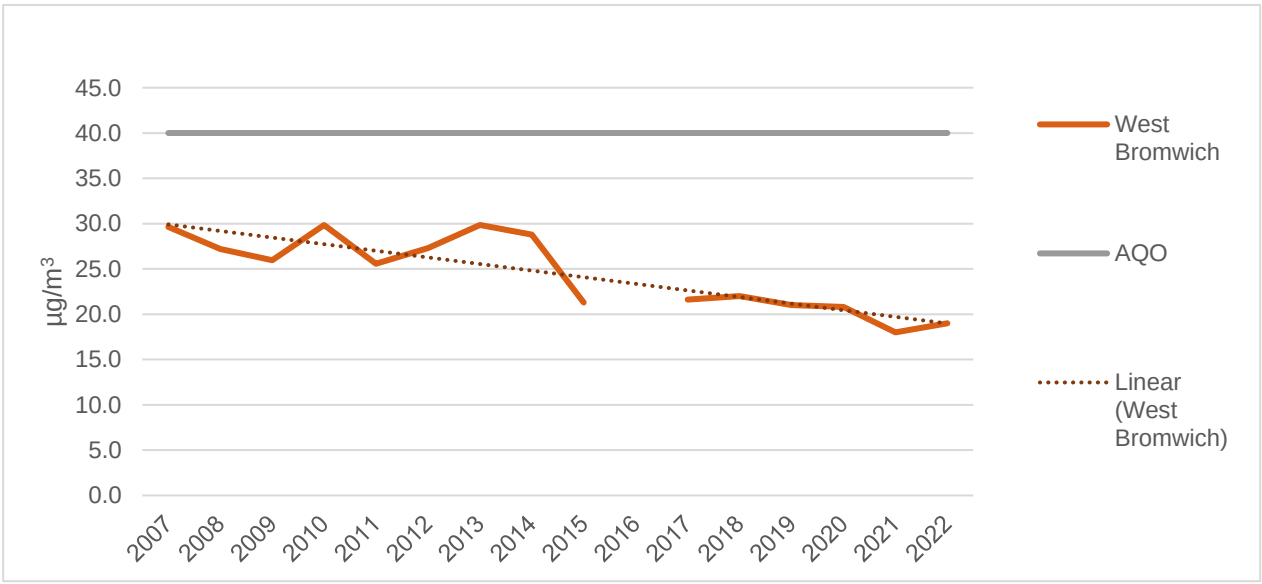
- Birmingham Road, Oldbury is a roadside monitoring station, the annual concentration of NO_2 in 2022 was 27.2 µg/m^3. This is a very marginal decrease from 2021 and even considering the slight bounce back in concentrations seen in 2021, as is shown in **Figure 3.2** the overall long-term trend continues to be downward at this site.

Figure 3 2- Annual Mean Nitrogen Dioxide Concentrations at Birmingham Road, Oldbury 2007- 2022



- West Bromwich (Highfields) is an urban background station. Levels increased by 1 µg/m^3 from last year, from 18 µg/m^3 to 19µg/m^3, however this site did experience a 30% decrease in levels during 2020 so a level of bounce back was expected. Despite this the overall trend is still downward at this site as shown in **Figure 3.3.**

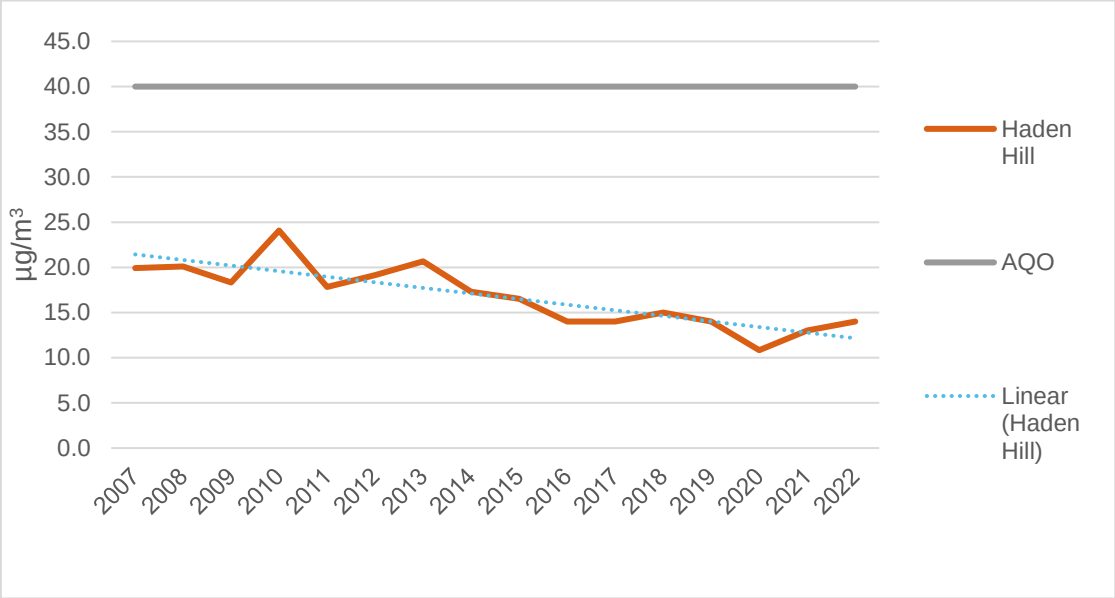
Figure 3 3- Annual Mean Nitrogen Dioxide Concentrations at Highfields,
- **West Bromwich 2014 -2022**



- Haden Hill, Cradley Heath is an urban background station. Nitrogen dioxide annual concentration levels have increased here by 1 µg/m^3 to 14 µg/m^3, which is the same as 2019 levels. Overall concentrations at this site continue to show a gentle

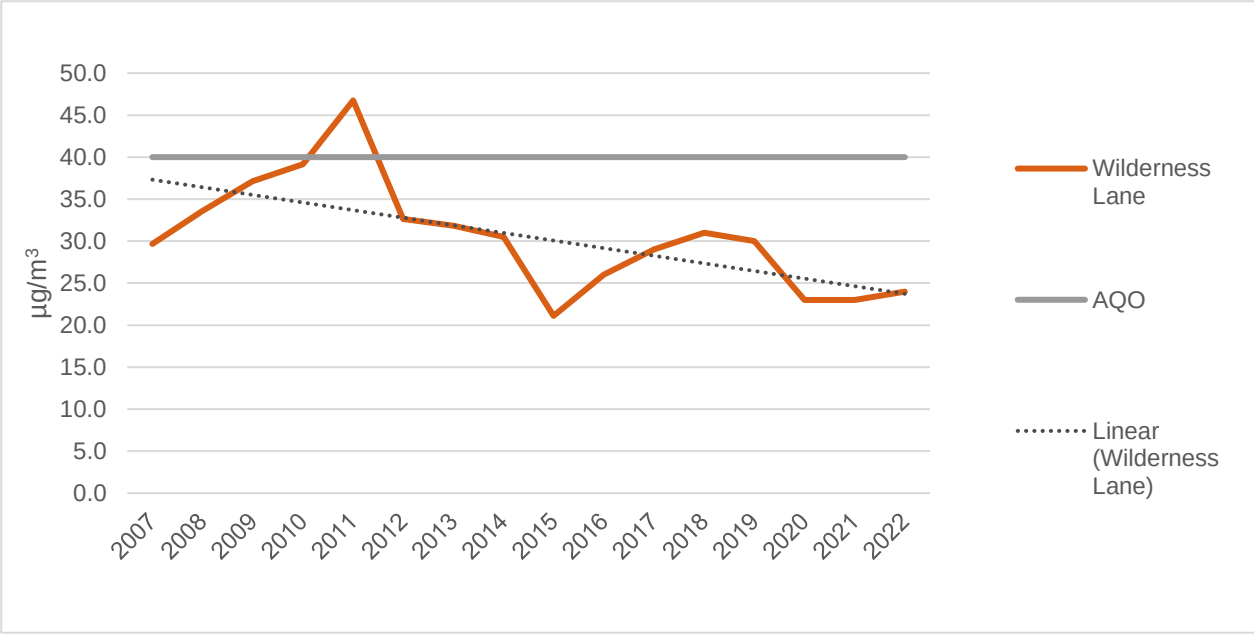
downward trend as shown in **Figure 3.4**, as NO_2 levels at this location have always been relatively low when compared to the other monitoring sites.

Figure 3 4- Annual Mean Nitrogen Dioxide Concentrations at Haden Hill, Cradley Heath 2014-2022



- Annual mean concentrations of nitrogen dioxide at Wilderness Lane, Great Barr increased by 1 µg/m^3 to 24 µg/m^3 as is shown in **Figure 3.5.** This remains significantly below the pre-pandemic levels for this site.

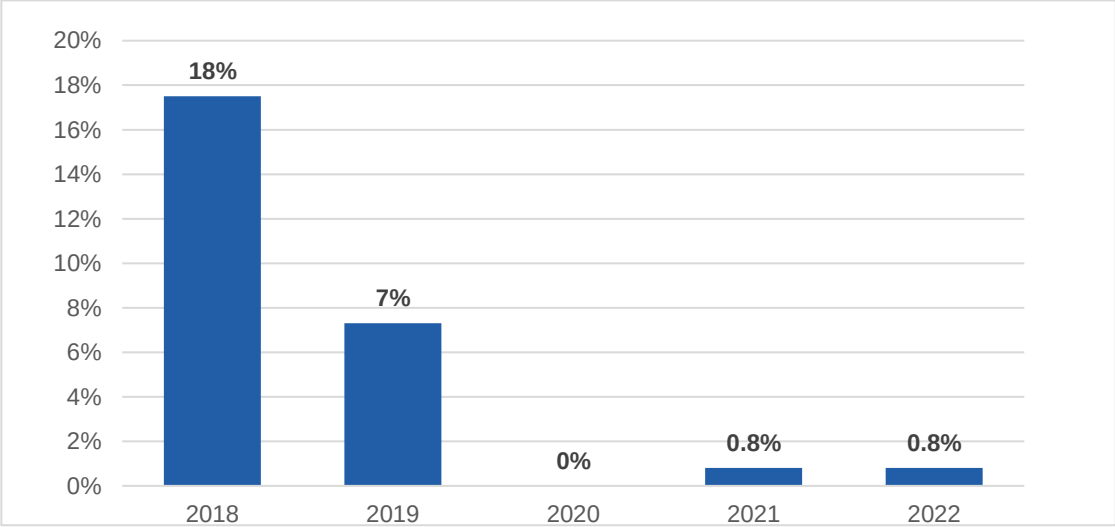
Figure 3 5 - Annual Mean Nitrogen Dioxide Concentrations at Wilderness Lane, Great Barr 2014-2022



Diffusion Tubes

The NO_2 diffusion tube results in 2022 demonstrate a sustained reduction in concentrations across the borough, with 99.2% of the monitoring sites compliant with the national objective. The one monitoring site, which exceeded the national objective was on the Oldbury Road, Birmingham (BP) at 40.2µg/m^3.

Figure 3 6- Percentage of NO_2 diffusion tube sites in Sandwell that have exceeded the National Air Quality Objective (2018-2022)



Along with the Birmingham Road site, only three other sites have demonstrated an increase in NO_2 concentrations since 2019, and none of these other sites were within 10% of the national air quality objective. The locations were Dudley Road, Oldbury (30.4 µg/m^3), Wood Green Road, Wednesbury (30 µg/m^3) and Price Street, West Bromwich (28.6 µg/m^3). The percentage change increase at these four sites from 2019 to 2022 is shown in Figure 3.7 below.

Figure 3 7- Diffusion tube monitoring sites demonstrating a higher annual mean concentration of NO_2 in 2022 than in 2019

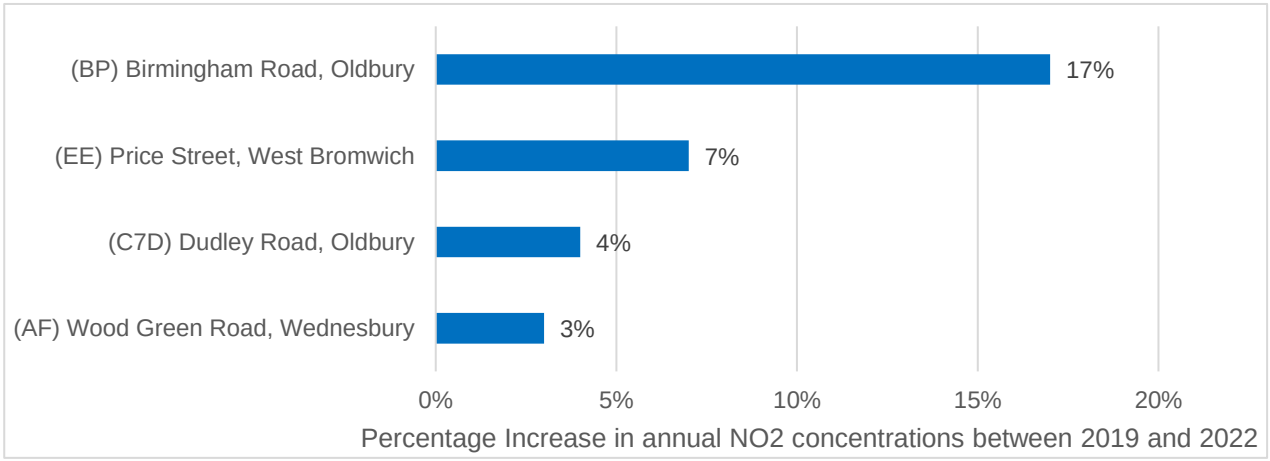
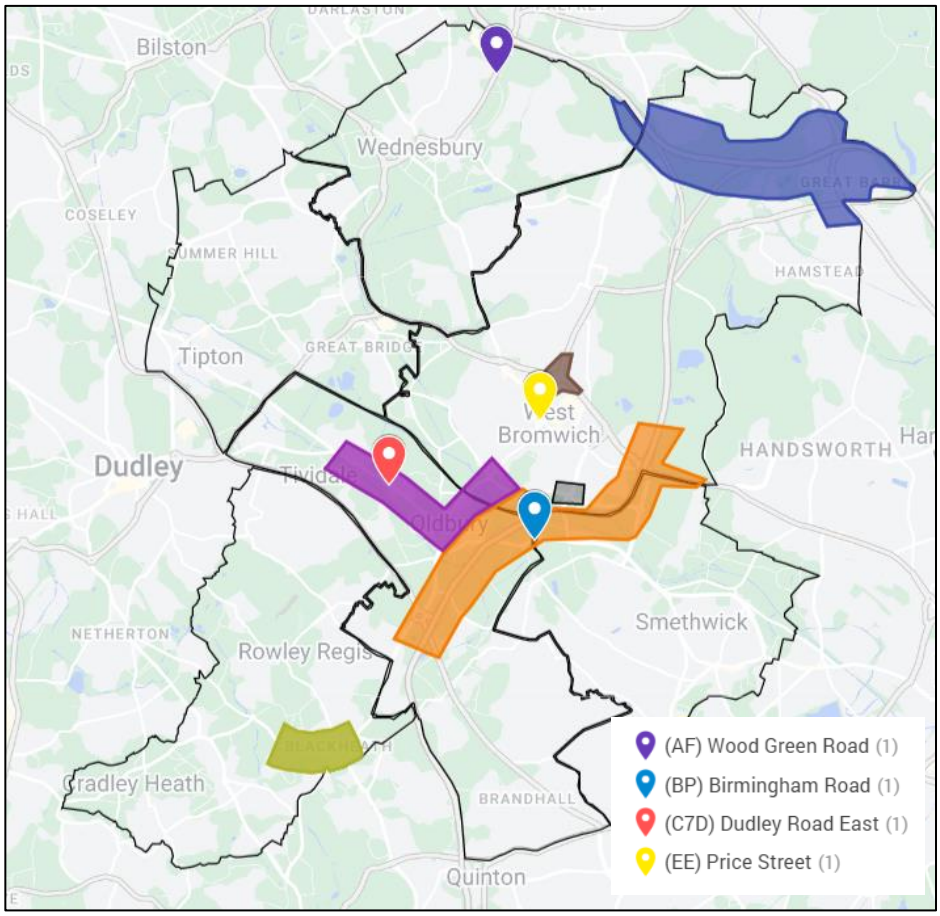


Figure 3 8- Location of the diffusion tube monitoring sites where the annual mean concentration of NO_2 was higher in 2022 than in 2019



It should be noted that two of the sites (Birmingham Road and Dudley Road East) are in Air Quality Priority Zones and all are located next to very busy 'A' roads and near to roundabouts. Wood Green Road (AF) is not in a priority zone but it is the main A46 link road to the M6. These 'A' roads are subject to a significant number of HGVs and commercial vehicles with the majority of these vehicles still being diesel.

Price Street is the only location to see an increase that is not an 'A' road. This site is subject to a lot of queuing traffic due to traffic signals and includes buses queueing that are returning to the bus station. NO_2 concentrations here are still well within the national objective at 28.6 µg/m^3 and are lower than last year when it was at 30.4 µg/m^3.

Overall NO_2 concentrations are continuing to demonstrate a positive trend, with over 96% of sites now demonstrating no increase in NO_2 concentrations since 2019 and remaining compliant with national air quality objective. We are not however complacent, and we are aware that we still need to do more to reduce NO_2 in several persistent hotspot locations. It is important to remember that even when NO^2 levels are within the national objective, higher levels can still have a detrimental impact on health.

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.

- Annual data capture was 97.6% or above at all five continuous monitoring stations.
- PM_{10} annual mean concentrations remain significantly below the national air quality objective of 40µg/m^3 in 2022, as is shown in **Figure 3.9**.
- In 2022 all sites demonstrated lower concentrations of PM_{10} than that recorded in 2019, however there has been increase of 1µg/m^3 at two of the stations (Oldbury Road and Highfields) since 2021, whilst concentrations at the other two sites have remained the same.

Figure 3 9- Trends in Annual Mean PM_{10} Concentrations at Continuous Monitoring Stations in Sandwell 2018 - 2023

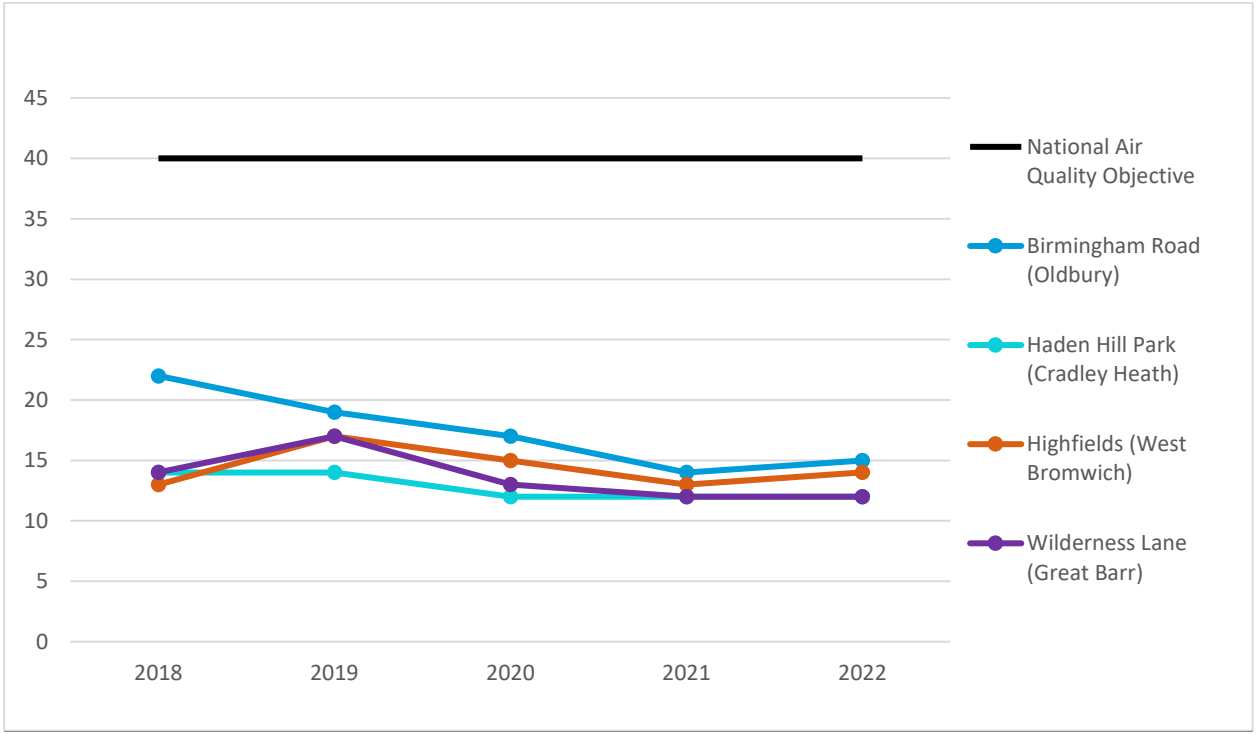


Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

- The air quality objective for PM_{10} was achieved at all sites. There were four 24 -hour exceedances at the 50 µg/m^3 at both the Birmingham Road (Oldbury) and Highfields (West Bromwich) stations. At Highfields PM_{10} was moderate on 21, 23rd, 24th and

25th March with a daily mean reaching 73µg/m3. At Birmingham Road, Oldbury, PM_{10} was moderate on 21st, 23rd and 25th March with a daily mean reaching 75µg/m3 and was high on 24th March with a daily mean reaching 83µg/m3. There were two moderate exceedances at Haden Hill park with a daily mean reaching 63µg/m3 recorded on 24th and 25th March.

- This is a greater number of exceedances than were recorded in 2021 but the same as recorded in 2020 and less than 2019. All the exceedances occurred in March 2022, which mirrors the general UK pattern. Analysis of the pollution episodes during this spring of 2022, suggests this was driven by several factors including agricultural and farming practices. The spreading of fertiliser and manure on farms across Europe results in the release of huge quantities of ammonia, this reacts with air pollutants from industry and traffic, as well as domestic burning which forms concentrated particulate matter episodes that extend over vast parts of Europe[40].

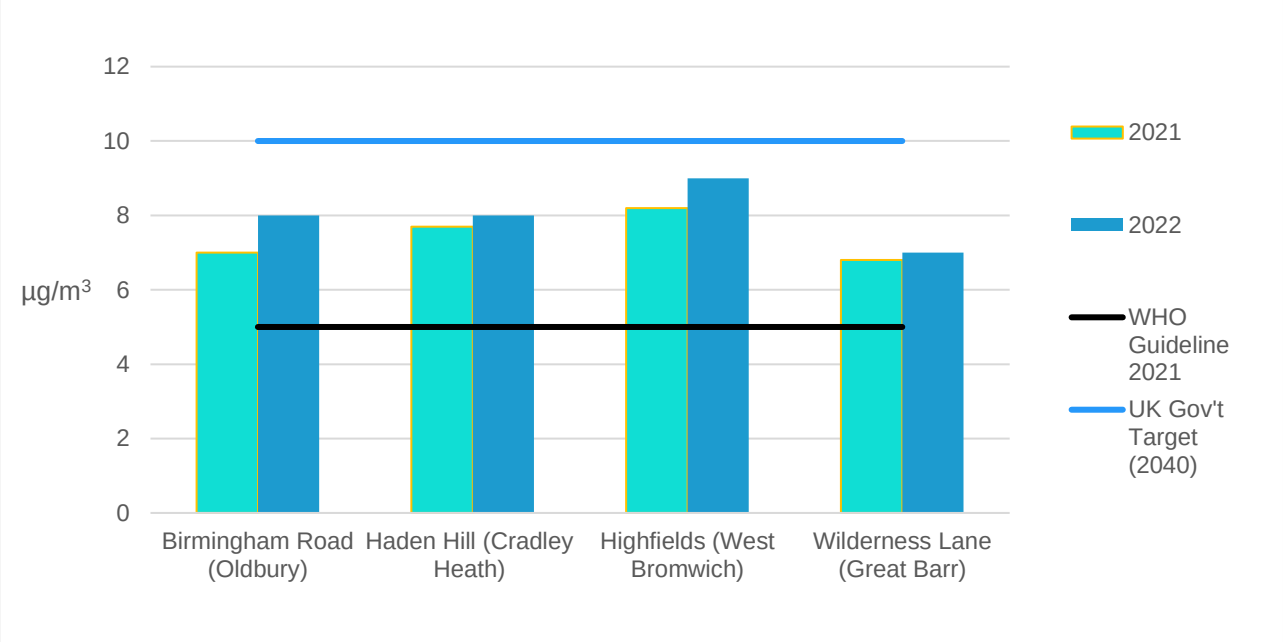
3.1.6 Particulate Matter ($PM_{2.5}$)

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 most significant impact on public health and therefore is the pollutant on which the Public Health Outcomes Framework (PHOF) is based. Investment was made in 2021 to update our existing monitoring of $PM_{2.5}$ and expand the number of monitoring locations. We now monitor $PM_{2.5}$ at four locations with FIDAS analysers, two are urban background and two are roadside. The data now being gathered will provide us with a clearer picture of the distribution of $PM_{2.5}$ across the borough over time. The results from the first two years of monitoring at all sites is shown in **Figure 3.10.**

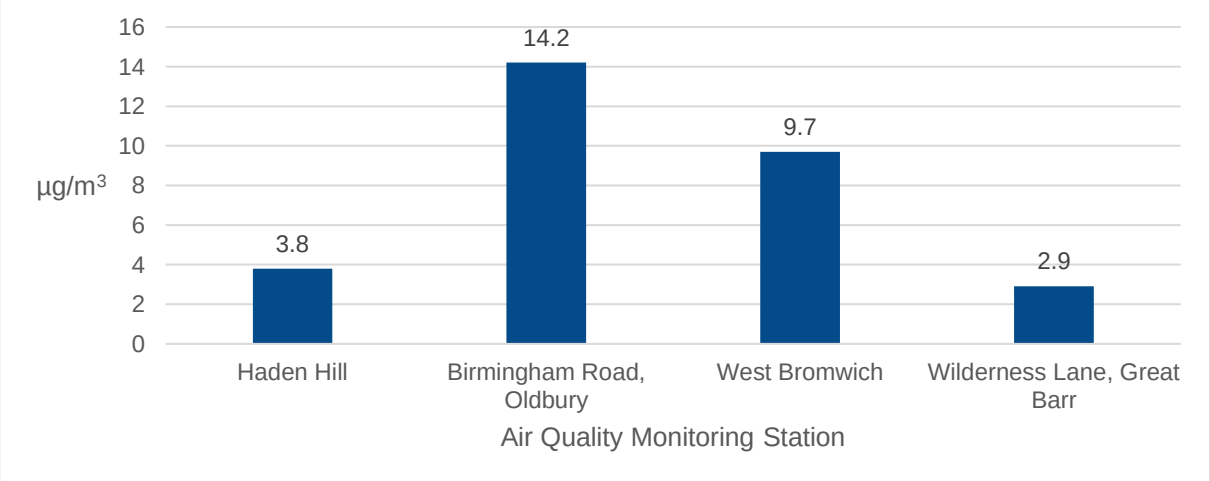
[40] https://www.theguardian.com/environment/2022/apr/22/law-needs-to-protect-uk-from-spring-air-pollution-increase

Figure 3 10 – Annual Mean $PM_{2.5}$ Concentrations in Sandwell 2021-2022 Compared with WHO Guidelines and the UK Government Target (2040)



Prior to 2021 we only monitored $PM_{2.5}$ at Haden Hill, Cradley Heath, with records dating back to 2007. At this site we have witnessed a general downward trend in $PM_{2.5}$ with a plateauing off at around 7µg/m^3 from 2017. However, in 2022 we saw a slight increase in annual concentrations of $PM_{2.5}$ to 8µg/m^3.

Figure 3 11– Percentage Change in Annual Mean Concentrations of $PM_{2.5}$ in Sandwell between 2021 and 2022



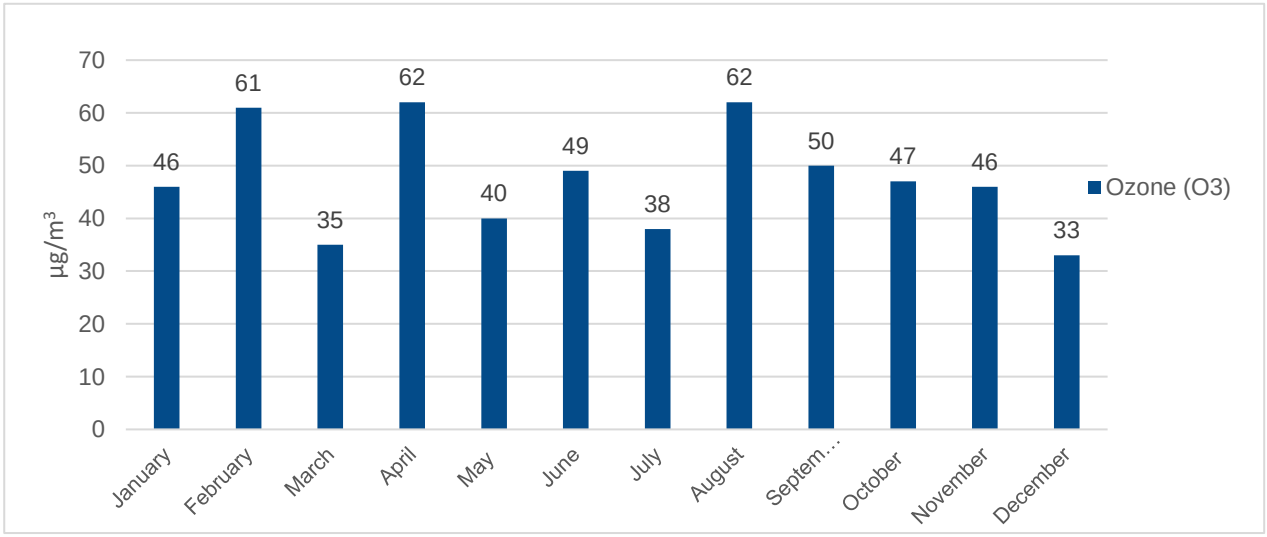
As we only have two years of data from these additional four monitoring stations we are not able to deduce any meaningful trends in annual mean $PM_{2.5}$ concentrations. It is recognised that $PM_{2.5}$ increased at all sites between 2021 and 2022, with the greatest percentage change at Birmingham Road in Oldbury with concentrations 14.2% higher than in 2021, whilst the least percentage change was at Wilderness Lane, Great Barr at 2.9%.

We cannot determine at this time if this increase in $PM_{2.5}$ is the start of an upward trend, as we need at least years of data to establish any real trends. The annual mean concentrations were still within the UK target of 10µg/m^3, but all still exceed the WHO target of 5µg/m^3.

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 anyone with 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.

Figure 3 12 - Monthly Mean Ozone Levels at Highfields, West Bromwich in 2022



Ozone is currently only monitored at Highfields, West Bromwich. In 2021 data capture was 97.7 %, the annual mean was 47µg/m^3, which was a 7µg/m^3 decrease on the annual mean from 2021. The highest monthly averages were recorded in February, April and August as is shown in **Figure 3.12**. The maximum running 8-hour mean was 175µg/m^3 on 13th and 14th August and the 100µg/m^3 limit was exceeded on 23 days. This was a slight increase on last year, when 18 were recorded. There is an annual allowance of 10 days for exceedances, so the WHO ozone standard was exceeded.

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)
West Bromwich	Highfields	Urban Background	400187	291601	NO2	Yes	Chemiluminescence	35	21	2.5
West Bromwich	Highfields	Urban Background	400187	291601	PM10	Yes	FIDAS	35	21	2.5
West Bromwich	Highfields	Urban Background	400187	291601	PM2.5	Yes	FIDAS	35	21	2.5
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	FIDAS	8	5	2.5
Birmingham Rd (Oldbury	Birmingham Road	Roadside	399857	399857	PM2.5	Yes	FIDAS	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	FIDAS	147	11	2.8
Wilderness Lane (Great Barr)	Wilderness Lane	Roadside	403956	294855	PM2.5	Yes	FIDAS	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)
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	FIDAS	105	119	2.5
Haden Hill	Haden Hill	Urban Background	395755	285493	PM2.5	Yes	FIDAS	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	Street Sign Myvod Road Wednesbury WS10 9BU	Roadside	399639	296095	NO2	Sandwell AQM	10.0	1.5	No	2.8
AE	Traffic Lights Wood Green Road Wednesbury WS10 9QS	Roadside	399680	296089	NO2	Sandwell AQM	11.1	1.7	No	2.7
AF	Traffic Lights corner of Myvod Road & Wood Green Road Wednesbury WS10 9QS	Roadside	399672	296042	NO2	Sandwell AQM	11.1	1.7	No	2.7
B17	Street Sign Birmingham Road Oldbury B69 4EQ (far side of road)	Roadside	399733	289401	NO2	Sandwell AQM	15.0	1.5	No	2.8
BA	Lamp post corner of Blakeley Hall Road & Birmingham Road B69 4EQ (M5 viaduct)	Roadside	399686	289431	NO2	Sandwell AQM	4.0	4.0	No	2.8
BD	Crossing Point Birmingham Road B69 4EH	Kerbside	399889	289395	NO2	Sandwell AQM	5.8	1.0	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)
BDQ	Street Sign Birmingham Road B69 4EH	Roadside	399943	289377	NO2	Sandwell AQM	8.6	1.2	No	2.8
BE	Crossing Point opp. British Queen PH Birmingham Road B69 4EH	Kerbside	399915	289353	NO2	Sandwell AQM	2.5	0.8	No	2.7
BF	Downpipe Birmingham Road B69 4EQ	Kerbside	399807	289408	NO2	Sandwell AQM	5.8	0.3	No	2.6
BG	Downpipe Birmingham Road B69 4EQ	Kerbside	399721	289429	NO2	Sandwell AQM	5.6	0.3	No	2.7
BO	Street Sign Birmingham Road B69 4EH	Kerbside	400039	289366	NO2	Sandwell AQM	6.2	0.3	No	2.8
BP	Telegraph Pole Birmingham Road B69 4EH	Roadside	400149	289424	NO2	Sandwell AQM	6.8	6.8	No	2.8
BR	Downpipe Birmingham Road B69 4EQ	Roadside	399814	289407	NO2	Sandwell AQM	3.0	5.9	No	2.1
BS	Lamp post near AQ Monitoring Station Birmingham Road B69 4HA	Roadside	399864	289427	NO2	Sandwell AQM	16.3	8.6	No	2.9
B52	Lamp post Birmingham Road Oldbury B69 4EQ	Roadside	399692	289428	NO2	Sandwell AQM	5.0	3.0	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)
C10A	Crossing Point Hagley Road Smethwick B66 4AX	Kerbside	402285	286062	NO2	Sandwell AQM	4.0	0.4	No	2.7
C10D	Lamp post Hagley Road Smethwick B66 4AX	Roadside	402298	286073	NO2	Sandwell AQM	0.8	5.3	No	2.8
C11A	Street Sign opp Shoulder of Mutton PH Blackheath B65 9BA	Roadside	397439	286416	NO2	Sandwell AQM	4.9	4.9	No	2.8
C11D	Crossing Point near Blackheath Post Office B65 0HG	Kerbside	397428	286381	NO2	Sandwell AQM	1.3	0.5	No	2.7
C11E	Lamp post opp. Halesowen Street Blackheath B65 0HG	Kerbside	397391	286359	NO2	Sandwell AQM	4.5	0.1	No	2.8
C12A	Downpipe Jinks Watch Shop High Street Blackheath B65 0EH	Kerbside	396899	286438	NO2	Sandwell AQM	2.5	1.0	No	2.6
C12D	Crossing Point Powke Lane Blackheath B65 0AA	Kerbside	396872	286454	NO2	Sandwell AQM	3.0	0.1	No	2.7
C12E	Downpipe Powke Lane Blackheath B65 0AA	Roadside	396780	286465	NO2	Sandwell AQM	3.5	3.0	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
C13D	Downpipe Dudley Port Tipton DY4 7RL	Roadside	396411	291471	NO2	Sandwell AQM	4.1	2.4	No	2.9
C14A	Lamp post opp. Ocker Hill Infant School Tipton DY4 0DS	Kerbside	397355	293929	NO2	Sandwell AQM	16.0	0.6	No	2.9
C15A	Telegraph Pole Gorsty Hill Road Rowley Regis B65 OHA	Roadside	396867	285536	NO2	Sandwell AQM	2.0	2.0	No	2.7
C1A	Lamp post Grafton Road West Bromwich B71 4EH	Kerbside	400668	291726	NO2	Sandwell AQM	5.0	0.3	No	2.5
C1D	Crossing Point near JB Stores Grafton Road B71 4EB	Roadside	400664	292020	NO2	Sandwell AQM	18.0	2.0	No	2.8
C2A	Street Sign opp. Churchwell Gardens West Bromwich B71 1RR	Roadside	401050	292898	NO2	Sandwell AQM	9.8	2.0	No	2.8
C2E	Crossing Point All Saints Way West Bromwich B71 1RR	Kerbside	401059	292966	NO2	Sandwell AQM	4.9	1.0	No	2.8
C4A	Street Sign opp. Spon Lane West Bromwich B70 6BD	Kerbside	400619	290153	NO2	Sandwell AQM	9.0	0.3	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)
C4D	Lamp post at Kelvin Way and Trinity Way (Traffic Island) West Bromwich B70 6BD	Kerbside	400657	290090	NO2	Sandwell AQM	9.0	0.3	No	2.7
C4E	Crossing Point Trinity Way West Bromwich B70 6BB	Kerbside	400738	290113	NO2	Sandwell AQM	6.0	0.5	No	2.7
C5A	Lamp post McKean Road Oldbury B69 4BY (Train Station Entrance/Exit)	Kerbside	399267	290084	NO2	Sandwell AQM	2.1	0.2	No	2.8
C5D	Crossing Point Bromford Road & Broadwell Road Oldbury B69 4BD	Kerbside	399207	290032	NO2	Sandwell AQM	8.3	0.7	No	2.8
C5E	Street Sign corner of Bromford Road & Century Road Oldbury B69 3DX	Roadside	399139	289947	NO2	Sandwell AQM	2.9	1.9	No	2.7
C6A	Downpipe Halesowen Street Oldbury B69 2RW	Roadside	398937	289322	NO2	Sandwell AQM	17.9	3.0	No	2.1
C6E	Street Sign opp Bethel Church Oldbury B69 4JG	Kerbside	399229	289315	NO2	Sandwell AQM	13.8	0.5	No	2.8
C7A	Downpipe Dudley Road East Oldbury B69 3DR	Kerbside	398283	290113	NO2	Sandwell AQM	1.5	0.6	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)
C7D	Lamp post Brades Road & Dudley Road East (Traffic Island) Oldbury B69 3DU	Roadside	398136	290226	NO2	Sandwell AQM	11.3	1.6	No	2.8
C7E	Downpipe Dudley Road East Oldbury B69 3EB	Kerbside	398042	290285	NO2	Sandwell AQM	9.5	0.4	No	2.8
C7F	Crossing Point Asquith Drive Oldbury B69 3LL	Kerbside	397493	290628	NO2	Sandwell AQM	4.7	0.3	No	2.8
C7H	Lamp post Dudley Road East Oldbury B69 3DR	Kerbside	398311	290135	NO2	Sandwell AQM	4.4	0.5	No	2.7
C9A	Street Sign Bearwood Road Smethwick B66 4DH	Roadside	402138	286650	NO2	Sandwell AQM	2.6	0.3	No	2.9
C9D	Crossing Point Bearwood Road Smethwick B66 4BL	Roadside	402160	286554	NO2	Sandwell AQM	2.3	2.0	No	2.8
DA1, DA2, DA3	Lamp post Bilhay Lane & Black Country New Road West Bromwich B70 9RP	Roadside	399402	292095	NO2	Sandwell AQM	15.0	2.0	No	2.8
DB1, DB2, DB3	Lamp post Black Country New Road West	Roadside	399508	292068	NO2	Sandwell AQM	30.0	5.0	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)
	Bromwich B70 9LS									
DC1, DC2, DC3	Lamp post corner of Temple Street & Mill Street West Bromwich B70 9TE	Roadside	400233	291783	NO2	Sandwell AQM	20.0	1.5	No	2.8
DD1, DD2, DD3	Lamp post entrance to Holiday Inn & Providence Place West Bromwich B70 8AF	Roadside	400366	291781	NO2	Sandwell AQM	60.0	2.0	No	2.8
DE1, DE2, DE3	Lamp post Congregation Way West Bromwich B71 4JA (near traffic island Tesco petrol station)	Roadside	400728	291599	NO2	Sandwell AQM	80.0	2.0	No	2.9
DF1, DF2, DF3	Lamp post Congregation Way West Bromwich B71 4AQ (near traffic island Reform St)	Roadside	400890	291558	NO2	Sandwell AQM	50.0	2.0	No	2.8
DG1, DG2, DG3	Lamp post near King George V Primary School Beeches Rd West	Roadside	401040	291269	NO2	Sandwell AQM	10.0	2.0	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)
	Bromwich B70 6JA									
DH1, DH2, DH3	Lamp Post corner of Beeches Road & Nicholls Street West Bromwich B70 6HQ	Kerbside	401195	290934	NO2	Sandwell AQM	10.0	0.5	No	.2.9
DEF1	Lamp post near Penny Farm PH Oldbury B69 2AQ	Roadside	398469	288673	NO2	Sandwell AQM	40.0	2.0	No	2.8
DEF2	Lamp post Corner of Birchy Park Avenue & Wolverhampton Road Oldbury B69 2JW	Roadside	398405	288722	NO2	Sandwell AQM	7.0	7.0	No	2.8
DP1	Lamp post opp. Port 'n' Ale PH Tipton DY4 7DS	Roadside	397324	292256	NO2	Sandwell AQM	3.2	1.3	No	2.8
DP4	Lamp post Tame Road Tipton DY4 7HU	Roadside	397344	292214	NO2	Sandwell AQM	7.1	1.5	No	2.8
EA	Street Sign corner of Herbert Road & Overend Street West Bromwich B70 6ER	Kerbside	400869	291102	NO2	Sandwell AQM	4.8	0.8	No	2.8
EB	Lamp post Legge Street West Bromwich B70 6HD	Roadside	400921	291001	NO2	Sandwell AQM	6.9	2.3	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)
ED	Lamp post opp. Probation Services West Bromwich B70 7PQ	Roadside	400555	291257	NO2	Sandwell AQM	4.5	4.0	No	2.8
EE	Lamp post opp. Jarnak Polish Shop Price Street West Bromwich B70 8EP	Roadside	400275	291132	NO2	Sandwell AQM	3.5	0.5	No	2.9
EF	Lamp post Bromford Lane West Bromwich B70 7HS	Roadside	399789	290547	NO2	Sandwell AQM	5.5	5.2	No	2.8
FA1, FA2, FA3	A457 Lamp Post traffic island Freeth St & Oldbury Ringway Oldbury B69 3DL	Roadside	398756	289622	NO2	Sandwell AQM	272.0	2.0	No	2.8
FB1, FB2, FB3	A457 Lamp post near entrance to Oldbury Retail Park Oldbury B69 3DD	Roadside	398717	289574	NO2	Sandwell AQM	275.0	2.0	No	2.9
FC1, FC2, FC3	A457 Lamp post Oldbury Ringway opp. Sainsburys Petrol Station Oldbury B69 4JW	Roadside	398788	289451	NO2	Sandwell AQM	160.0	3.0	No	2.8
FD1, FD2, FD3	A457 Lamp post (rear to car park) Judge Close off	Roadside	399162	289413	NO2	Sandwell AQM	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)
	Oldbury Ringway Oldbury B69 4DY									
FE1, FE2, FE3	A457 Lamp post opp. The George PH corner of Broadwell Rd & Birmingham Rd Oldbury B69 4EE	Roadside	399375	289398	NO2	Sandwell AQM	52.0	2.5	No	2.9
FF1, FF2, FF3	A457 Lamp post near Crystal Drive & Birmingham Rd Oldbury B66 1NY	Roadside	400370	289532	NO2	Sandwell AQM	150.0	3.0	No	2.8
FG1, FG2, FG3	A457 Lamp post near Redwood Trade Park (Murco Petrol Station) Birmingham Rd Oldbury B66 1NU	Roadside	400535	289436	NO2	Sandwell AQM	120.0	3.0	No	2.8
GA	Co-Location AQ Monitoring Station Birmingham Road Oldbury B69 4HA	Roadside	399858	289391	NO2	Sandwell AQM	8.2	5.4	Yes	2.8
GB	Co-Location AQ Monitoring Station Birmingham Road Oldbury B69 4HA	Roadside	399858	289391	NO2	Sandwell AQM	8.2	5.4	Yes	2.8
GC	Co-Location AQ Monitoring Station Birmingham Road Oldbury B69 4HA	Roadside	399858	289391	NO2	Sandwell AQM	8.2	5.4	Yes	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)
HA	Crossing Point near Astle Retail Park West Bromwich B70 8NS	Kerbside	400383	291307	NO2	Sandwell AQM	1.0	0.3	No	2.9
HH1	Co-Location AQ Monitoring Station Haden Hill Park Cradley Heath B64 7HS	Kerbside	395754	285492	NO2	Sandwell AQM	87.0	0.5	No	2.9
KD	Lamp post Ragley Drive Great Barr 6QB	Kerbside	403793	294661	NO2	Sandwell AQM	13.0	0.3	No	2.8
KE	Lamp post entrance to Q3 Academy Wilderness La Great Barr B43 7SD	Roadside	403925	294970	NO2	Sandwell AQM	1.2	1.2	No	2.9
LA	Co-Location AQ Monitoring Station Highfields West Bromwich B70 8RJ	Urban Background	400216	291633	NO2	Sandwell AQM	N/A	26.1	Yes	2.8
LB	Co-Location AQ Monitoring Station Highfields West Bromwich B70 8RJ	Urban Background	400216	291633	NO2	Sandwell AQM	N/A	26.1	Yes	2.8
LC	Co-Location AQ Monitoring Station Highfields West	Urban Background	400216	291633	NO2	Sandwell AQM	N/A	26.1	Yes	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)
	Bromwich B70 8RJ									
MA	Downpipe 56 Mallin Street Smethwick B66 1QZ	Roadside	400712	289296	NO2	Sandwell AQM	2.0	1.8	No	2.8
MC	Crossing Point adjacent Ivy Bush PH St Mallin Street Smethwick B66 1QS	Kerbside	400748	289150	NO2	Sandwell AQM	1.6	0.7	No	2.1
N1A	Lamp post Bromford Lane & Brandon Way (Traffic Island) West Bromwich B70 7JW	Kerbside	399647	290355	NO2	Sandwell AQM		0.1	No	2.8
N1B	Lamp post Bromford Lane & Brandon Way (Traffic Island) West Bromwich B70 7JZ	Kerbside	399615	290358	NO2	Sandwell AQM		0.9	No	2.8
N2A	Street Sign corner of Oakfield Road & Soho Way Smethwick B66 3JZ	Kerbside	403126	288557	NO2	Sandwell AQM	20.0	0.8	No	2.7
OA	Crossing Point Bearwood Road	Kerbside	402240	286203	NO2	Sandwell AQM	2.9	0.2	No	2.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
	Smethwick B66 4BL (WBBS)									
OB	Downpipe Bearwood Road Smethwick B66 4BS	Kerbside	402195	286233	NO2	Sandwell AQM	4.0	1.0	No	2.8
OC	Street Sign Bearwood Road Smethwick B66 4BL	Kerbside	402245	286150	NO2	Sandwell AQM	4.0	1.0	No	2.8
OD	Downpipe Bearwood Road Smethwick B66 4BS	Kerbside	402222	286162	NO2	Sandwell AQM	5.2	1.0	No	2.9
OE	Street Sign Bearwood Road Smethwick B66 4BJ	Kerbside	402212	286234	NO2	Sandwell AQM	4.0	1.0	No	2.9
OG	Crossing Point opp. (Aldi) Bearwood Road Smethwick B66 4BQ	Kerbside	402187	286333	NO2	Sandwell AQM	4.0	0.5	No	2.9
OH	Crossing Point Bearwood Road Smethwick B66 4BS	Kerbside	402192	286244	NO2	Sandwell AQM	4.0	0.5	No	2.9
OI	Crossing Point Bearwood Road Smethwick B66 4BJ	Kerbside	402214	286253	NO2	Sandwell AQM	4.0	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)
OJ	Crossing Point Bearwood Road Smethwick B66 4BS	Kerbside	402194	286246	NO2	Sandwell AQM	4.0	0.5	No	2.9
OP4	Lamp post Bearwood Road Smethwick B66 4BW	Roadside	402229	286096	NO2	Sandwell AQM	0.0	5.5	No	2.9
PA1, PA2, PA3	A41 Lamp post corner of Halfords Lane & Birmingham Rd West Bromwich (WBA Stadium) B71 4LD	Kerbside	402461	290241	NO2	Sandwell AQM	41.0	0.8	No	2.9
PB1, PB2, PB3	A41 Lamp post near Walkway Bridge Birmingham Rd West Bromwich B71 4JZ	Urban Background	402221	290290	NO2	Sandwell AQM	55.0	1.5	No	2.8
PC1, PC2, PC3	A41 Lamp post near J1 M5 Birmingham Rd West Bromwich B71 4JQ	Urban Background	401950	290355	NO2	Sandwell AQM	25.0	1.5	No	2.9
PD1, PD2, PD3	A41 Lamp post near Sandwell Cricket Club Birmingham Rd West Bromwich B71 4JZ	Urban Background	402111	290331	NO2	Sandwell AQM	75.0	1.0	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)
PE1, PE2, PE3	A41 Lamp post near Starbucks Birmingham Rd West Bromwich B71 4JZ	Urban Background	402334	290279	NO2	Sandwell AQM	55.0	1.0	No	2.8
PS1A	Downpipe Goose & Granite PH West Bromwich B70 7PN	Roadside	400504	291239	NO2	Sandwell AQM	6.2	0.1	No	2.9
RA	Lamp post opp. Roebuck Lane West Bromwich B70 6QX	Urban Background	401558	290077	NO2	Sandwell AQM	43.0	43.0	No	2.9
SA	Co-Location AQ Monitoring Station Wilderness Lane Great Barr B43 7SD	Urban Background	403951	294852	NO2	Sandwell AQM	N/A	53.0	No	3.1
SU	Street Sign opp Bratt Street West Bromwich B71 8SH	Roadside	400476	291481	NO2	Sandwell AQM	N/A	7.8	No	2.8
TA	Downpipe Tividale Road Tividale B69 2LG	Roadside	395958	290645	NO2	Sandwell AQM	N/A	5.4	No	2.1
TC	Lamp post New Birmingham Road Tividale DY4 7TD	Roadside	395854	290643	NO2	Sandwell AQM	44.0	3.9	No	2.9
UA	Lamp post opp. Oldbury Road Rowley Regis B65 0PR	Roadside	398135	287603	NO2	Sandwell AQM	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	Street Sign Throne Road Rowley Regis B65 9JS	Roadside	398167	287750	NO2	Sandwell AQMA	7.4	1.2	No	2.9
UC	Street Sign Titford Lane Rowley Regis B65 0PT	Kerbside	398170	287746	NO2	Sandwell AQMA	7.7	0.2	No	2.9
VD	Lamp post near ABS Carpets Market Place Great Bridge DY4 7EJ	Roadside	397628	292459	NO2	Sandwell AQMA	5.3	2.0	No	2.8
VT	Lamp post Tipton Road Oldbury B69 3HY	Roadside	397155	290867	NO2	Sandwell AQMA	10.3	2.7	No	2.8
WA	Lamp post Snapdragon Drive Walsall WS5 4SX	Kerbside	401917	295329	NO2	Sandwell AQMA	8.0	0.2	No	2.7
WB	Lamp post Wolfsbane Drive Walsall WS5 4RT	Urban Background	402139	295119	NO2	Sandwell AQMA	68.0		No	2.6
WF	Lamp post Woodruff Way Walsall WS5 4RS	Kerbside	402133	295234	NO2	Sandwell AQMA	8.0	0.2	No	2.7
WW2	Lamp post corner of Westmore Way & Pemberton Crescent Wednesbury WS10 0TZ	Roadside	400564	296037	NO2	Sandwell AQMA	202.0		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)
WW3	Lamp post Westmore Way Wednesbury WS10 0TR	Urban Background	400598	296035	NO2	Sandwell AQMA	195.0		No	2.9
XE	Lamp post Lochranza Croft Great Barr B43 7AA	Roadside	404435	294866	NO2	Sandwell AQMA	4.3	16.3	No	2.8
ZA	Garage Post Whitecrest Great Barr B43 6EP	Urban Background	404504	294813	NO2	Sandwell AQMA	37.0	33.0	No	1.9
ZC	Downpipe Birmingham Road Great Barr B43 6NX	Roadside	404493	294532	NO2	Sandwell AQMA	3.0	1.9	No	1.9
ZK	Downpipe Tabitha Home Care Birmingham Road Great Barr B43 6NW	Kerbside	404621	294291	NO2	Sandwell AQMA	17.2	0.3	No	1.8
ZO	Downpipe GP Surgery corner of Pages Lane & Newton Road Great Barr B43 6AA	Kerbside	404290	294179	NO2	Sandwell AQMA	4.0	0.8	No	2.7
ZP	Street Sign exit from Aldi Newton Road Great Barr B43 6BW	Kerbside	404555	294219	NO2	Sandwell AQMA	3.2	0.4	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)
ZQ	Street Sign opp Meat Centre 20 Newton Road Great Barr B43 6BN	Kerbside	404539	294187	NO2	Sandwell AQMA	3.5	0.5	No	2.7
ZR	Street Sign Newton Road Great Barr B43 6BW	Kerbside	404410	294170	NO2	Sandwell AQMA	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 2022 (%) (2)	2018	2019	2020	2021	2022
Highfields West Bromwich	400187	291601	Urban Background	99.6	99.6	22	21	15	18	19
Birmingham Road Oldbury	399857	289392	Roadside	99.7	99.7	34.4	33.5	25.85	27.7	27.2
Wilderness Lane Great Barr	403956	294855	Roadside	98.4	98.4	31	30	23	23	24
Haden Hill Park Cradley Heath	395755	285493	Urban Background	99.7	99.7	15	14	11	13	14
West Bromwich Roadside	400521	291541	Roadside	99.1	99.1	28	26	19	21	21
Bearwood Road Smethwick	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	N/A	N/A	30.26	**N/A**	**N/A**	**N/A**	**N/A**

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

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

Notes:

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

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

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

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 2022 (%) (2)	2018	2019	2020	2021	2022
AD	399639	296095	Roadside	100	100.0	39.4	29.5	26.7	22.2	22.6
AE	399680	296089	Roadside	100	100.0	37.9	33.1	28.6	29.6	30.2
AF	399672	296042	Roadside	100	100.0	33.5	29.0	24.4	28.7	30.0
B17	399733	289401	Roadside	100	100.0		29.1	23.9	26.1	23.5
BA	399686	289431	Roadside	100	100.0	37.7	33.0	28.1	31.1	25.8
BD	399889	289395	Kerbside	92	92.0	**42.9**	37.7	31.6	34.6	31.3
BDQ	399943	289377	Roadside	100	100.0		**43.8**	31.3	32.5	29.9
BE	399915	289353	Kerbside	100	100.0	**49.4**	**47.9**	38.0	39.2	34.4
BF	399807	289408	Kerbside	100	100.0	31.7	33.0	28.2	29.4	26.9
BG	399721	289429	Kerbside	90	90.4	32.4	33.2	27.6	32.2	32.3
BO	400039	289366	Kerbside	100	100.0	37.1	35.7	29.7	32.8	30.4
BP	400149	289424	Roadside	100	100.0	34.7	34.3	30.3	36.2	**44.5**
BR	399814	289407	Roadside	100	100.0	35.5	39.8	31.4	30.4	27.8

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 2022 (%) [2]	2018	2019	2020	2021	2022
BS	399864	289427	Roadside	100	100.0	30.8	31.3	26.3	28.1	25.7
B52	399692	289428	Roadside	100	100.0		37.5	31.4	31.5	29.3
C10A	402285	286062	Kerbside	100	100.0	**41.0**	39.6	23.9	34.7	32.9
C10D	402298	286073	Roadside	100	100.0	**42.8**	**44.1**	33.4	36.2	33.4
C11A	397439	286416	Roadside	100	100.0	33.8	33.0	26.5	27.5	27.6
C11D	397428	286381	Kerbside	92	92.3	29.4	28.9	23.7	25.4	24.9
C11E	397391	286359	Kerbside	92	92.3	28.9	30.5	23.3	30.2	30.2
C12A	396899	286438	Kerbside	100	100.0	36.6	**40.7**	34.3	36.9	34.9
C12D	396872	286454	Kerbside	100	100.0	33.1	37.5	26.6	33.3	29.6
C12E	396780	286465	Roadside	100	100.0	31.0	32.5	22.9	29.5	27.5
C13D	396411	291471	Roadside	100	100.0	29.5	33.1	25.7	30.1	26.1
C14A	397355	293929	Kerbside	65	65.4	32.5	30.9	24.9	29.2	30.2
C15A	396867	285536	Roadside	100	100.0	36.2	32.6	30.2	33.7	31.1
C1A	400668	291726	Kerbside	92	92.3	30.1	29.8	24.7	24.5	25.0

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 2022 (%) [2]	2018	2019	2020	2021	2022
C1D	400664	292020	Roadside	100	100.0	38.7	36.8	30.3	31.9	37.8
C2A	401050	292898	Roadside	80.8	80.8	33.8	33.2	25.5	30.1	28.8
C2E	401059	292966	Kerbside	100	100.0	34.6	31.1	25.9	28.3	27.2
C4A	400619	290153	Kerbside	100	100.0	30.8	32.9	27.7	29.7	29.3
C4D	400657	290090	Kerbside	100	100.0	38.7	**40.8**	32.5	35.2	34.6
C4E	400738	290113	Kerbside	100	100.0	35.7	34.9	29.4	31.6	30.4
C5A	399267	290084	Kerbside	100	100.0	27.9	27.5	22.8	25.6	24.8
C5D	399207	290032	Kerbside	100	100.0	34.2	35.8	29.0	32.2	31.9
C5E	399139	289947	Roadside	100	100.0	27.7	32.2	24.6	24.0	24.0
C6A	398937	289322	Roadside	100	100.0	29.3	31.6	26.7	29.1	28.7
C6E	399229	289315	Kerbside	92	92.3	28.2	30.6	24.9	26.9	23.7
C7A	398283	290113	Kerbside	100	100.0	29.7	39.0	29.4	26.5	24.0
C7D	398136	290226	Roadside	100	100.0	29.4	29.2	28.9	35.7	36.9
C7E	398042	290285	Kerbside	100	100.0	33.0	31.3	23.4	28.0	26.4

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 2022 (%) [2]	2018	2019	2020	2021	2022
C7F	397493	290628	Kerbside	92	92.3	30.9	34.4	27.5	28.7	26.2
C7H	398311	290135	Kerbside	100	100.0	19.3	21.0	15.7	16.5	17.3
C9A	402138	286650	Roadside	100	100.0	28.4	29.1	22.1	25.3	24.4
C9D	402160	286554	Roadside	100	100.0	**40.3**	39.9	29.1	34.1	31.7
DA1, DA2, DA3	399402	292095	Roadside	90.4	90.4		29.6	24.5	25.7	24.0
DB1, DB2, DB3	399508	292068	Roadside	100	100.0		39.9	35.2	37.4	35.0
DC1, DC2, DC3	400233	291783	Roadside	100	100.0		26.4	21.9	24.1	23.3
DD1, DD2, DD3	400366	291781	Roadside	100	100.0		29.5	25.2	28.7	26.7
DE1, DE2, DE3	400728	291599	Roadside	88.7	88.7		31.0	25.3	27.5	24.7
DF1, DF2, DF3	400890	291558	Roadside	100	100.0		33.0	27.7	29.8	29.1
DG1, DG2, DG3	401040	291269	Roadside	100	100.0		35.0	28.6	27.6	26.8
DH1, DH2, DH3	401195	290934	Kerbside	100	100.0		26.3	22.4	22.8	22.6

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 2022 (%) [2]	2018	2019	2020	2021	2022
DEF1	398469	288673	Roadside	84.3	84.3		30.7	26.0	28.2	26.6
DEF2	398405	288722	Roadside	100	100.0		21.1	16.1	18.7	17.7
DP1	397324	292256	Roadside	88.7	88.7	24.5	29.3	27.4	29.1	28.1
DP4	397344	292214	Roadside	100	100.0	36.0	28.8	19.2	20.4	20.0
EA	400869	291102	Kerbside	84.3	84.3	27.5	23.8	19.8	21.1	18.7
EB	400921	291001	Roadside	100	100.0	27.4	22.6	20.1	20.8	19.1
ED	400555	291257	Roadside	92.3	92.3	23.6	24.5	21.4	26.1	24.0
EE	400275	291132	Roadside	100	100.0	27.1	26.7	27.1	30.4	28.6
EF	399789	290547	Roadside	100	100.0	27.0	29.2	24.7	27.2	25.8
FA1, FA2, FA3	398756	289622	Roadside	100	100.0		37.2	31.4	34.0	33.1
FB1, FB2, FB3	398717	289574	Roadside	92	92.0		27.9	23.0	26.1	27.7
FC1, FC2, FC3	398788	289451	Roadside	100	100.0		33.8	28.3	30.8	31.4
FD1, FD2, FD3	399162	289413	Roadside	100	100.0		30.8	24.2	23.9	23.6

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 2022 (%) [2]	2018	2019	2020	2021	2022
FE1, FE2, FE3	399375	289398	Roadside	100	100.0		35.9	32.1	34.7	32.9
FF1, FF2, FF3	400370	289532	Roadside	92.3	92.3		36.9	30.6	31.4	31.3
FG1, FG2, FG3	400535	289436	Roadside	100	100.0		33.7	30.2	33.0	30.5
GA	399858	289391	Roadside	100	100.0	39.9	34.7	27.7	30.1	27.1
GB	399858	289391	Roadside	100	100.0	34.2	36.1	28.0	31.4	29.0
GC	399858	289391	Roadside	100	100.0	34.6	35.6	27.8	30.2	27.5
HA	400383	291307	Kerbside	92.3	92.3	26.7	29.4	24.3	27.4	26.1
HH1	395754	285492	Kerbside	73.1	73.1	13.4	14.5	11.6	11.1	13.8
KD	403793	294661	Kerbside	100	100.0	24.0	24.4	19.5	18.0	19.2
KE	403925	294970	Roadside	100	100.0	21.7	22.5	17.7	18.7	18.0
LA	400216	291633	Urban Background	84.6	84.6	20.5	22.7	16.9	18.9	18.7
LB	400216	291633	Urban Background	100	100.0	20.5	22.2	17.6	18.5	17.7
LC	400216	291633	Urban Background	100	100.0	20.1	22.1	17.4	18.2	17.8

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 2022 (%) [2]	2018	2019	2020	2021	2022
MA	400712	289296	Roadside	100	100.0	37.6	**42.5**	34.6	34.7	29.7
MC	400748	289150	Kerbside	100	100.0	30.8	35.1	28.5	31.9	30.5
N1A	399647	290355	Kerbside	81	81.0	34.2	38.5	30.9	32.2	32.3
N1B	399615	290358	Kerbside	100	100.0	35.3	34.9	29.4	34.6	32.2
N2A	403126	288557	Kerbside	88.7	88.7	23.2	25.1	19.5	26.2	23.5
OA	402240	286203	Kerbside	100	100.0	30.8	31.3	25.3	29.0	27.9
OB	402195	286233	Kerbside	92.3	92.3	37.0	36.6	26.6	30.5	29.6
OC	402245	286150	Kerbside	100	100.0	33.8	33.6	26.6	29.8	27.8
OD	402222	286162	Kerbside	92.3	92.3	36.3	35.6	27.4	30.6	28.3
OE	402212	286234	Kerbside	100	100.0	30.5	32.3	26.8	30.8	30.2
OG	402187	286333	Kerbside	100	100.0	31.4	32.7	24.2	29.0	27.4
OH	402192	286244	Kerbside	100	100.0	28.1	38.1	28.8	31.1	30.6
OI	402214	286253	Kerbside	92.3	92.3	32.9	29.5	24.3	28.4	27.6
OJ	402194	286246	Kerbside	100	100.0	32.8	34.4	28.7	31.1	29.9

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 2022 (%) [2]	2018	2019	2020	2021	2022
OP4	402229	286096	Roadside	100	100.0	29.9	36.7	28.5	32.4	31.1
PA1, PA2, PA3	402461	290241	Kerbside	100	100.0		35.9	30.4	34.2	30.8
PB1, PB2, PB3	402221	290290	Urban Background	100	100.0		34.9	29.4	32.7	29.1
PC1, PC2, PC3	401950	290355	Urban Background	100	100.0		**44.6**	38.1	**44.2**	39.6
PD1, PD2, PD3	402111	290331	Urban Background	100	100.0		38.8	31.5	34.8	32.9
PE1, PE2, PE3	402334	290279	Urban Background	100	100.0		39.2	31.9	35.6	33.0
PS1A	400504	291239	Roadside	100	100.0		31.1	25.1	28.3	27.6
RA	401558	290077	Urban Background	100	100.0	28.5	29.4	23.4	28.0	25.1
SA	403951	294852	Urban Background	100	100.0	25.7	26.2	20.6	21.9	20.4
SU	400476	291481	Roadside	100	100.0	27.1	25.4	19.4	22.0	21.1
TA	395958	290645	Roadside	100	100.0	26.3	28.6	23.7	24.5	23.2
TC	395854	290643	Roadside	100	100.0		39.8	34.1	33.3	30.5
UA	398135	287603	Roadside	100	100.0	27.9	29.8	24.1	29.5	27.3

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 2022 (%) [2]	2018	2019	2020	2021	2022
UB	398167	287750	Roadside	100	100.0	30.0	33.3	25.2	27.2	24.4
UC	398170	287746	Kerbside	80.8	80.8	32.2	32.4	26.9	28.6	26.1
VD	397628	292459	Roadside	100	100.0	22.8	25.6	21.3	23.3	21.1
VT	397155	290867	Roadside	100	100.0		26.3	21.5	22.1	21.1
WA	401917	295329	Kerbside	92.3	92.3	31.5	29.1	22.6	22.9	25.7
WB	402139	295119	Urban Background	100	100.0	30.0	26.5	20.7	21.7	21.8
WF	402133	295234	Kerbside	100	100.0	31.6	27.7	20.0	22.5	22.9
WW2	400564	296037	Roadside	100	100.0	29.1	23.3	17.9	22.1	18.9
WW3	400598	296035	Urban Background	100	100.0	29.4	22.6	17.6	22.0	19.7
XE	404435	294866	Roadside	100	100.0	29.1	26.3	20.8	28.3	25.9
ZA	404504	294813	Urban Background	100	100.0	25.7	26.7	22.4	25.8	24.9
ZC	404493	294532	Roadside	92.3	92.3	28.4	27.0	23.6	22.5	21.5
ZK	404621	294291	Kerbside	100	100.0	31.2	29.6	23.1	22.5	23.5
ZO	404290	294179	Kerbside	100	100.0	30.0	30.2	24.3	26.7	24.2

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 2022 (%) (2)	2018	2019	2020	2021	2022
ZP	404555	294219	Kerbside	100	100.0	33.3	32.0	23.3	26.3	23.8
ZQ	404539	294187	Kerbside	84.6	84.6	**44.2**	**41.2**	34.3	34.3	33.4
ZR	404410	294170	Kerbside	100	100.0	39.8	**42.0**	36.5	35.2	33.4

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

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

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

Notes:

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

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

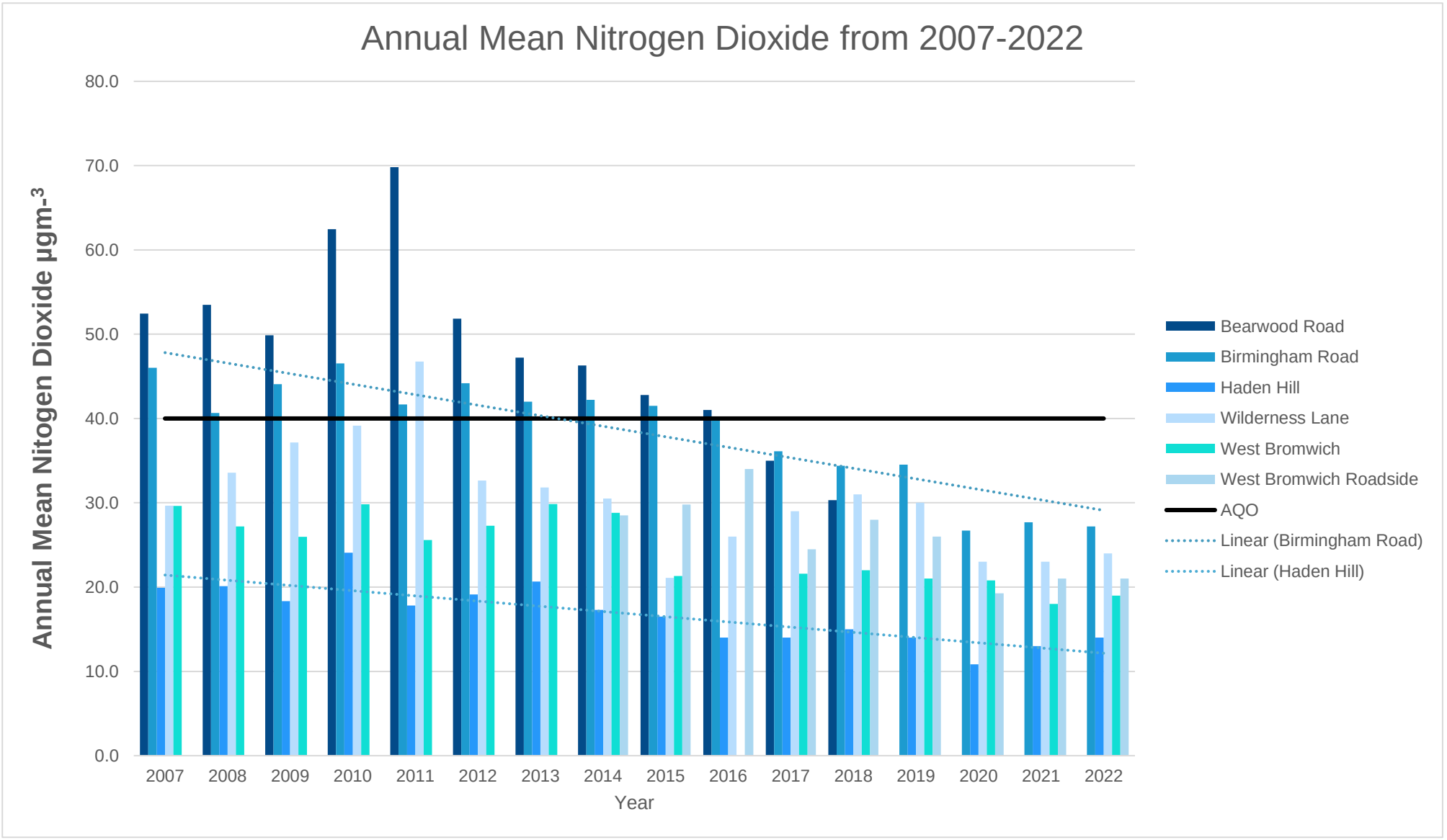


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
Birmingham Road (Oldbury)	399857	289392	Roadside	99.7	99.7	0	**0(116)3**	0	0	0
Haden Hill Park (Cradley Heath)	395755	285493	Urban Background	99.7	99.7	0	0	0	0	0
Highfields (West Bromwich)	400187	291601	Urban Background	99.6	99.6	**0(73)3**	0	0	0	0
West Bromwich Roadside	400521	291541	Roadside	99.1	99.1	**0(82)3**	0	0	0	0
Wilderness Lane (Great Barr)	403956	294855	Roadside	98.4	98.4	**0(69)3**	0	0	0	0
Bearwood Road (Smethwick)	402181 286360 Northern point of OPSIS - source	402223 286097 Southern point of OPSIS - receiver	Kerbside	N/A	N/A	**0(132)3**	**0(113.1)1, 3**	N/A	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 ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
Birmingham Road (Oldbury)	399857	289392	Roadside	99.7	99.7	**22**	**19**	**17**	**14**	**15**
Haden Hill Park (Cradley Heath)	395755	285493	Urban Background	97.7	97.7	14	14	12	12	12
Highfields (West Bromwich)	400187	291601	Urban Background	97.6	97.6	13	17	15	13	14
Wilderness Lane (Great Barr)	403956	294855	Roadside	99.9	99.9	14	17	13	12	12

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

Notes:

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

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

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

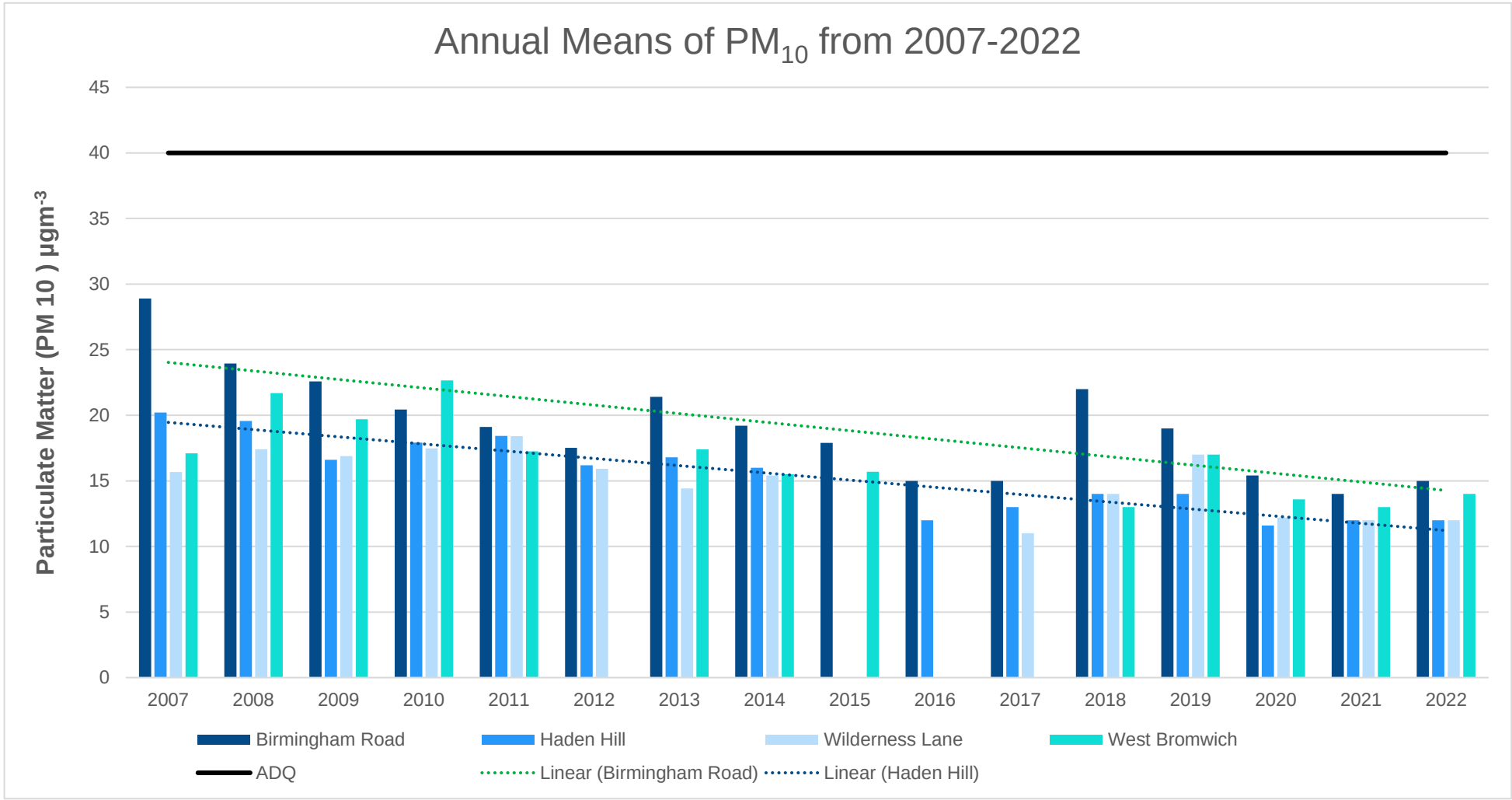


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
Birmingham Road (Oldbury)	399857	289392	Roadside	99.7	99.7	**3(34.0)**	6	2	0	4
Haden Hill Park (Cradley Heath)	395755	285493	Urban Background	97.7	97.7	0	0	**0(22)**	**0(19)**	2
Highfields (West Bromwich)	400187	291601	Urban Background	97.6	97.6	1	3	2	1	4
Wilderness Lane (Great Barr)	403956	294855	Roadside	99.9	99.9	1	3(29)	1	0	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 PM_{10} Results > 50µg/m^3

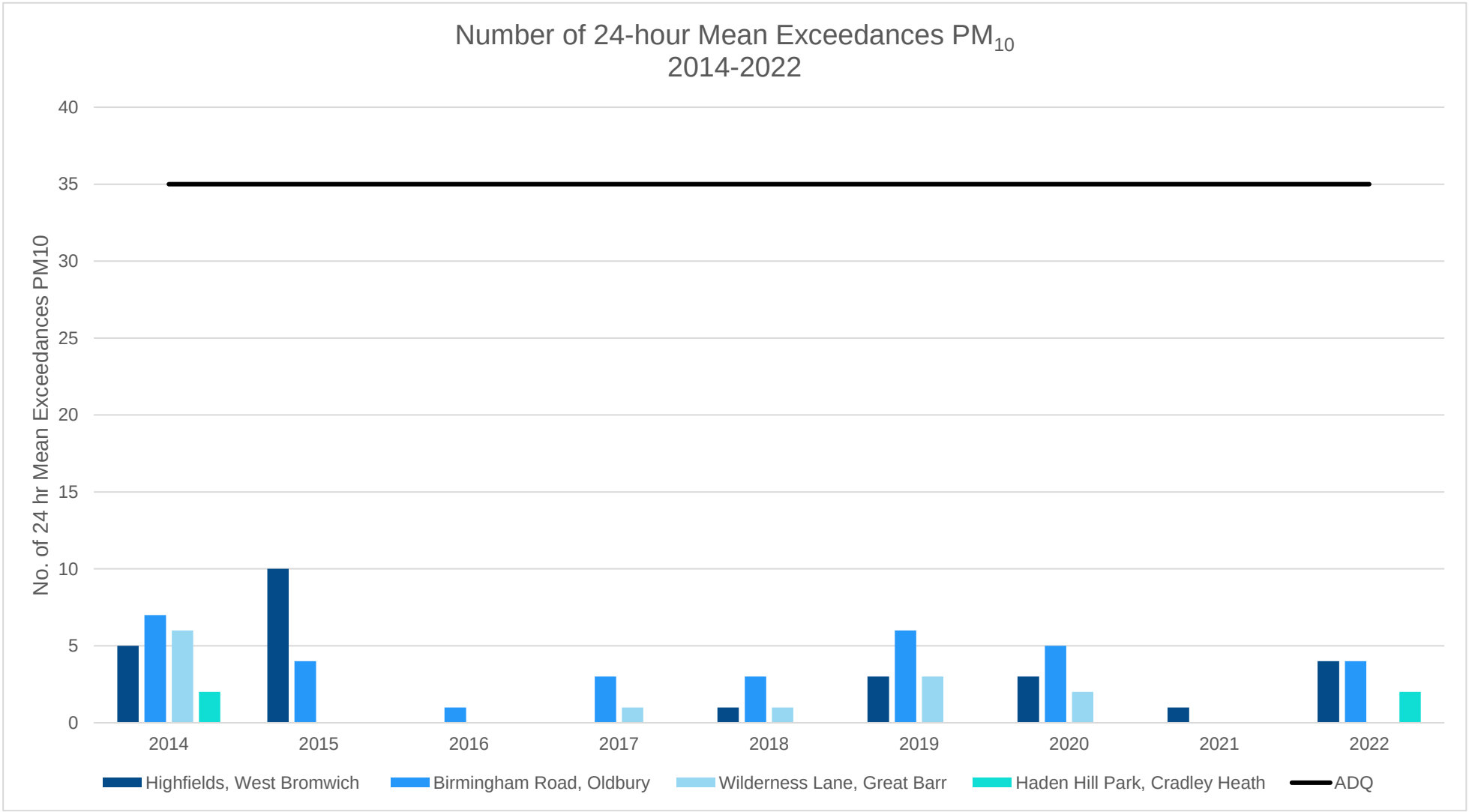


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
Birmingham Road (Oldbury)	399857	289392	Roadside	99.7	99.7				7	8
Haden Hill	332395	433175	Urban Background	97.7	97.7	7	7	6.4	7.7	8
Highfields (West Bromwich)	400187	291601	Urban Background	97.6	97.6				8.2	9
Wilderness Lane (Great Barr)	403956	294855	Roadside	99.9	99.9				6.8	7

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

Notes:

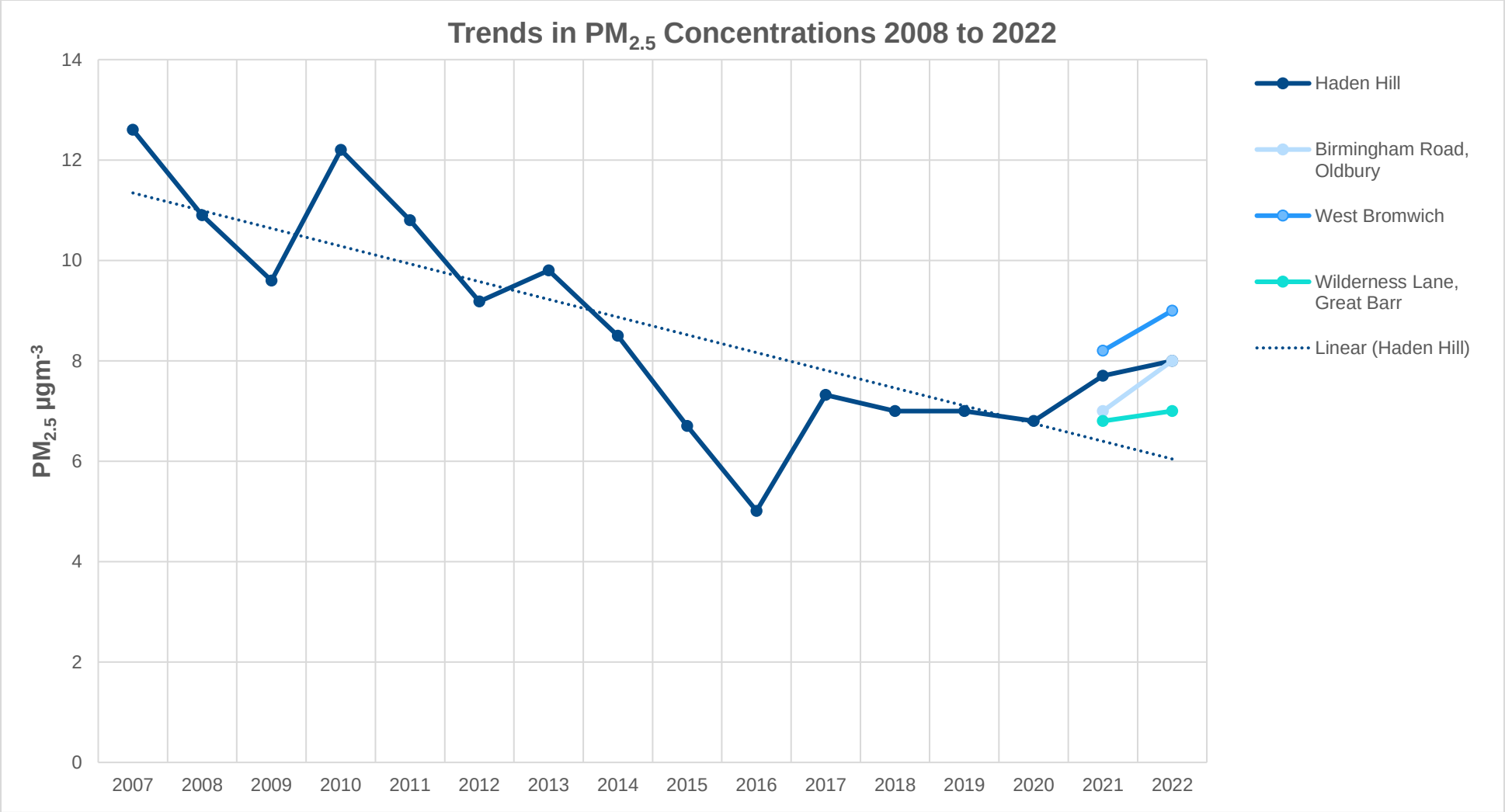
The annual mean concentrations are presented as $\mu g/m^3$.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure A.4 – Trends in Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
AD	399639	296095	36.3	19.9	44.8	23.0	20.3	18.9	18.5	27.6	27.2	26.5	34.8	34.4	27.6	22.6	-	
AE	399680	296089	44.1	23.9	55.7	33.7	29.8	29.0	25.8	40.2	37.7	37.6	41.0	43.0	36.8	30.2	-	
AF	399672	296042	41.2	21.3	58.1	34.6	27.1	27.2	25.9	44.7	36.6	37.6	43.1	41.2	36.6	30.0	-	
B17	399733	289401	35.6	25.4	38.6	31.1	18.9	22.2	26.6	31.2	29.9	22.5	30.9	31.7	28.7	23.5	-	
BA	399686	289431	38.1	9.1	39.6	32.6	29.5	26.7	30.6	30.8	27.4	32.3	34.6	42.4	31.4	25.8	-	
BD	399889	289395	41.5	31.7	42.8	41.6		34.8	34.6	34.4	40.8	35.6	38.0	41.9	38.1	31.3	-	
BDQ	399943	289377	40.4	28.2	42.2	38.0	28.0	32.2	35.1	42.2	42.3	32.1	37.7	39.3	36.5	29.9	-	
BE	399915	289353	47.4	37.2	41.1	39.0	34.3	42.8	40.4	45.4	43.2	42.2	48.4	43.7	42.0	34.4	-	
BF	399807	289408	37.0	30.4	35.7	35.0	29.3	29.7	31.3	34.3	36.7	28.1	33.1	33.6	32.8	26.9	-	
BG	399721	289429	49.1	43.8	42.9	41.5	29.5	34.1	34.2	39.0	36.2		39.4	42.3	39.4	32.3	-	
BO	400039	289366	40.5	36.1	45.4	35.9	32.7	32.2	33.3	39.8	39.4	34.1	39.0	37.8	37.1	30.4	-	
BP	400149	289424	57.8	57.5	47.0	50.6	52.0	49.0	54.8	56.9	60.3	50.6	58.1	58.0	54.2	**44.5**	**40.2**	
BR	399814	289407	38.7	34.3	37.8	32.9	29.3	31.4	32.4	31.3	37.6	30.7	33.4	37.7	33.9	27.8	-	
BS	399864	289427	36.5	31.4	37.1	30.4	26.5	26.5	27.3	28.3	31.6	31.8	33.9	34.2	31.3	25.7	-	
B52	399692	289428	42.8	41.0	43.5	36.8	31.9	28.2	29.7	34.4	27.4	35.0	39.2	38.1	35.7	29.3	-	
C10A	402285	286062	41.8	36.4	40.8	43.3	35.5	37.3	43.6	43.7	47.1	35.7	33.2	42.2	40.1	32.9	-	
C10D	402298	286073	47.1	35.9	41.1	42.9	35.0	40.8	46.3	45.6	43.1	33.4	35.0	43.7	40.8	33.4	-	
C11A	397439	286416	37.0	35.2	32.7	33.9	28.9	29.1	32.0	31.0	35.3	32.0	34.8	41.2	33.7	27.6	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
C11D	397428	286381	30.5	31.2	34.0	29.6	26.5	27.9	28.9	30.0	29.2	31.5		33.6	30.3	24.9	-	
C11E	397391	286359	38.6	37.1	34.4	36.6	33.7	33.2		35.5	36.9	34.9	40.3	43.5	36.9	30.2	-	
C12A	396899	286438	39.3	39.9	47.2	37.4	42.0	40.8	41.9	39.7	43.7	40.9	50.9	49.0	42.6	34.9	-	
C12D	396872	286454	41.0	32.4	31.7	37.4	28.9	33.3	36.9	36.5	44.2	32.0	34.9	43.2	36.1	29.6	-	
C12E	396780	286465	39.9	26.3	35.5	38.5	27.3	27.4	33.6	38.6	39.0	25.4	30.0	39.8	33.6	27.5	-	
C13D	396411	291471	38.9	23.6	35.4	33.8	25.5	26.3	29.6	34.0	33.3	32.4	29.4	37.1	31.8	26.1	-	
C14A	397355	293929	45.6	30.2	41.2	32.8	29.5	28.4	30.7	32.3					33.7	30.2	-	
C15A	396867	285536	48.8	37.6	37.2	38.5	31.3	34.4	38.1	38.9	40.6	31.8	36.0	42.9	38.0	31.1	-	
C1A	400668	291726	41.1	27.4	41.3	23.2	25.8		20.0	25.9	27.4	31.5	38.5	34.9	30.4	25.0	-	
C1D	400664	292020	52.2	26.5	44.9	39.6	45.0	46.8	38.9	55.1	49.4	45.5	59.2	51.8	46.1	37.8	31.1	
C2A	401050	292898	40.3	19.6	51.8			29.3	26.3	43.1	34.3	33.8	34.0	38.2	35.1	28.8	-	
C2E	401059	292966	40.0	21.3	45.0	34.2	24.3	24.7	22.9	42.1	37.6	33.2	33.0	38.7	33.2	27.2	-	
C4A	400619	290153	50.6	36.8	36.7	33.5	28.8	30.3	29.9	32.7	28.9	38.2	38.8	43.1	35.8	29.3	-	
C4D	400657	290090	56.1	41.4	43.7	40.7	34.6	35.1	39.2	37.1	37.9	42.3	47.6	49.1	42.1	34.6	-	
C4E	400738	290113	43.9	32.5	41.7	43.8	31.0	29.4	30.2	38.8	36.4	34.8	40.1	39.4	37.1	30.4	-	
C5A	399267	290084	44.6	23.1	41.1	25.9	22.3	24.6	23.9	34.6	23.3	31.6	31.7	36.5	30.2	24.8	-	
C5D	399207	290032	46.4	28.8	53.5	33.6	32.5	36.5	36.0	46.1	33.4	37.9	40.3	43.1	38.8	31.9	-	
C5E	399139	289947	43.7	24.9	40.2	27.5	21.6	23.3	21.6	34.0	28.1	24.2	29.2	34.5	29.3	24.0	-	
C6A	398937	289322	47.1	29.2	44.7	29.3	31.0	33.4	30.8	39.2	35.6	33.3	35.9	34.6	35.1	28.7	-	
C6E	399229	289315	40.1	20.9		26.3	25.7	25.8	25.8	33.2	30.3	27.5	29.8	33.0	28.9	23.7	-	
C7A	398283	290113	36.2	28.0	26.1	28.5	28.5	27.1	26.9	27.4	29.0	28.4	31.7	32.6	29.2	24.0	-	

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C7D	398136	290226	54.3	42.1	41.8	44.6	41.6	41.4	44.0	50.1	44.6	43.5	44.9	47.4	45.0	36.9	30.4	
C7E	398042	290285	34.2	22.9	35.2	33.0	25.2	30.3	28.9	34.1	37.5	32.4	33.7	38.0	32.2	26.4	-	
C7F	397493	290628	46.6	31.1	34.6	31.4	29.3	28.6		32.2	33.0	27.6	28.9	29.8	31.9	26.2	-	
C7H	398311	290135	29.1	17.2	24.9	19.1	15.6	14.3	16.7	18.4	20.4	20.3	25.2	31.5	21.2	17.3	-	
C9A	402138	286650	32.6	24.0	37.7	28.2	22.6	23.1	27.2	28.7	32.9	29.1	28.7	40.4	29.7	24.4	-	
C9D	402160	286554	41.1	30.3	43.5	43.1	33.6	35.1	39.7	49.4	41.6	30.8	35.6	40.4	38.7	31.7	-	
DA1	399402	292095	33.2	29.0	35.0	29.5	27.1	24.4	26.7	25.8	28.7	31.5	36.2		-	-	-	Triplicate Site with DA1, DA2 and DA3 - Annual data provided for DA3 only
DA2	399402	292095	39.0	30.1	36.5	26.8	27.9	23.9	26.9	25.5	28.0	11.5	33.4		-	-	-	Triplicate Site with DA1, DA2 and DA3 - Annual data provided for DA3 only
DA3	399402	292095	40.7	25.8	33.8	29.5	28.0	24.3	26.3	26.2	26.8	34.4	39.4		29.3	24.0	-	Triplicate Site with DA1, DA2 and DA3 - Annual data provided for DA3 only
DB1	399508	292068	61.2	42.8	38.6	38.0	38.8	39.1	40.1	36.3	39.6	45.1	47.2	43.8	-	-	-	Triplicate Site with DB1, DB2 and DB3 - Annual data provided for DB3 only
DB2	399508	292068	61.2		36.1	41.8	46.2	39.4	42.4	37.2	37.8	47.0	47.8	45.2	-	-	-	Triplicate Site with DB1, DB2 and DB3 - Annual data provided for DB3 only
DB3	399508	292068	59.5	38.7	41.1	36.0	43.2	33.3	39.9	37.9	41.0	46.8	44.5	44.6	42.7	35.0	-	Triplicate Site with DB1, DB2 and DB3 - Annual data provided for DB3 only
DC1	400233	291783	34.6	23.9	33.6	31.1	20.6	18.6	22.8	29.7	30.8	26.7		39.3	-	-	-	Triplicate Site with DC1, DC2 and DC3 - Annual data provided for DC3 only
DC2	400233	291783	39.7	23.4	34.6	32.7	21.5	17.8	23.3	29.8	30.1	25.5	23.7	33.4	-	-	-	Triplicate Site with DC1, DC2 and DC3 - Annual data provided for DC3 only
DC3	400233	291783	41.9	20.7	33.7	34.3	22.0	18.6	23.2	28.4	28.3	22.8	30.5	36.8	28.4	23.3	-	Triplicate Site with DC1, DC2 and DC3 - Annual data provided for DC3 only
DD1	400366	291781	40.0	18.1	34.7	37.9	25.9	22.1	29.3	37.4	37.8	29.3	30.1	39.2	-	-	-	Triplicate Site with DD1, DD2 and DD3 - Annual data provided for DD3 only
DD2	400366	291781	40.0	20.9	43.8	41.0	26.7	21.6	30.2	38.8	36.9	28.0	30.8	39.2	-	-	-	Triplicate Site with DD1, DD2 and DD3 - Annual data provided for DD3 only
DD3	400366	291781	38.3	23.0	38.5	38.5	25.2	22.5	29.2	36.4	35.8	28.7	27.1	38.4	32.5	26.7	-	Triplicate Site with DD1, DD2 and DD3 - Annual data provided for DD3 only
DE1	400728	291599		24.7	25.1		23.7	22.1	24.1	28.4	29.1	30.0		35.9	-	-	-	Triplicate Site with DE1, DE2 and DE3 - Annual data provided for DE3 only

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DE2	400728	291599	37.1	21.8	27.6		25.5	23.1	29.7	29.1	31.4	32.7	34.2	40.1	-	-	-	Triplicate Site with DE1, DE2 and DE3 - Annual data provided for DE3 only
DE3	400728	291599	41.3	26.9	27.5		23.8	22.5	29.2	30.4	29.2	31.6		40.0	30.1	24.7	-	Triplicate Site with DE1, DE2 and DE3 - Annual data provided for DE3 only
DF1	400890	291558	55.5	36.1	37.3	30.0	28.5	26.6	31.1	34.5	37.7	34.9	40.3	42.2	-	-	-	Triplicate Site with DF1, DF2 and DF3 - Annual data provided for DF3 only
DF2	400890	291558	47.0	30.9	41.8	36.5	27.4	25.4	28.6	34.6	33.2	32.6	33.9	40.7	-	-	-	Triplicate Site with DF1, DF2 and DF3 - Annual data provided for DF3 only
DF3	400890	291558	44.7	34.9	39.6	36.0	29.3	26.0	30.6	34.9	34.9	36.6	40.1	40.3	35.4	29.1	-	Triplicate Site with DF1, DF2 and DF3 - Annual data provided for DF3 only
DG1	401040	291269	42.6	25.8	34.6	35.7	23.1	21.2	28.0	31.9	32.9	24.9	30.2	40.0	-	-	-	Triplicate Site with DG1, DG2 and DG3 - Annual data provided for DG3 only
DG2	401040	291269	42.5	25.1	39.0	34.1	24.0	23.2	29.1	33.9	33.6	30.7	28.4	41.2	-	-	-	Triplicate Site with DG1, DG2 and DG3 - Annual data provided for DG3 only
DG3	401040	291269	48.0	27.2	41.6	38.0	26.9	23.0	29.7	34.8	36.4	32.3	30.1	44.2	32.7	26.8	-	Triplicate Site with DG1, DG2 and DG3 - Annual data provided for DG3 only
DH1	401195	290934	42.8	26.1	37.8	22.7	17.3	20.2	21.2	25.4	26.5	28.9	31.8	37.7	-	-	-	Triplicate Site with DH1, DH2 and DH3 - Annual data provided for DH3 only
DH2	401195	290934	33.7	23.1	41.1	23.4	22.3	20.7	23.1	25.3	26.3	29.4	32.2	35.9	-	-	-	Triplicate Site with DH1, DH2 and DH3 - Annual data provided for DH3 only
DH3	401195	290934	39.8	16.6	40.6	22.1	20.1	19.7	22.2	24.5	24.6	25.9	28.0	33.8	27.5	22.6	-	Triplicate Site with DH1, DH2 and DH3 - Annual data provided for DH3 only
DEF1	398469	288673	36.0	30.4		29.2		28.2	30.9	28.7	36.0	29.8	33.2	41.7	32.4	26.6	-	
DEF2	398405	288722	24.1	17.7	31.7	22.7	14.1	15.3	16.6	22.4	23.2	19.1	21.5	29.4	21.6	17.7	-	
DP1	397324	292256	41.5	31.1	31.4		24.7	27.0	37.1	39.8	39.7	29.0	35.4	40.3	34.3	28.1	-	
DP4	397344	292214	32.0	22.0	28.8	26.8	16.6	16.5	19.9	25.7	25.8	22.0	21.7	32.3	24.4	20.0	-	
EA	400869	291102		14.6	34.3	19.8		16.8	16.7	23.5	23.7	24.2	25.2	29.2	22.8	18.7	-	
EB	400921	291001	28.7	19.9	34.0	16.9	18.8	16.2	15.5	23.0	23.4	24.8	29.2	30.7	23.3	19.1	-	
ED	400555	291257		28.9	30.2	26.8	21.7	23.8	26.4	28.3	27.9	30.6	33.0	43.0	29.3	24.0	-	
EE	400275	291132	40.4	23.2	36.1	37.5	27.5	27.5	32.0	39.1	33.8	36.9	38.2	43.1	34.9	28.6	-	

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EF	399789	290547	34.2	21.3	42.2	28.6	22.6	22.6	21.5	34.3	30.2	36.5	40.2	41.1	31.4	25.8	-	
FA1	398756	289622	48.3	35.8	38.7	40.3	36.9	34.3	37.2	39.2	39.3	40.2	42.3	46.2	-	-	-	Triplicate Site with FA1, FA2 and FA3 - Annual data provided for FA3 only
FA2	398756	289622	54.3	37.8	39.3	42.9	38.1	36.6	40.6	41.7	40.3	42.5	38.0	43.0	-	-	-	Triplicate Site with FA1, FA2 and FA3 - Annual data provided for FA3 only
FA3	398756	289622	49.3		39.0	38.6	36.9	35.9	39.3	39.9	39.5	40.0	36.7	43.9	40.4	33.1	-	Triplicate Site with FA1, FA2 and FA3 - Annual data provided for FA3 only
FB1	398717	289574	37.1		43.9			26.0	31.9	33.6	35.5	35.5	34.6	43.7	-	-	-	Triplicate Site with FB1, FB2 and FB3 - Annual data provided for FB3 only
FB2	398717	289574	37.5	19.5	41.8			26.0	32.3	31.6	29.7	33.7	39.8	39.0	-	-	-	Triplicate Site with FB1, FB2 and FB3 - Annual data provided for FB3 only
FB3	398717	289574	32.2	15.6	39.7	34.7		26.3	31.7	31.4	33.8	36.3	40.4	42.9	33.7	27.7	-	Triplicate Site with FB1, FB2 and FB3 - Annual data provided for FB3 only
FC1	398788	289451	47.8	35.8	34.0	37.4	35.0	32.7	39.1	37.6	35.9	38.3	34.8	44.4	-	-	-	Triplicate Site with FC1, FC2 and FC3 - Annual data provided for FC3 only
FC2	398788	289451	47.0	38.5	41.4	36.9	33.8	32.0	38.8	35.2	35.5	39.6	42.0	46.2	-	-	-	Triplicate Site with FC1, FC2 and FC3 - Annual data provided for FC3 only
FC3	398788	289451	49.8	35.0	42.9	39.3	36.2	31.3	37.3	35.7	37.5	34.6	36.8	40.6	38.3	31.4	-	Triplicate Site with FC1, FC2 and FC3 - Annual data provided for FC3 only
FD1	399162	289413	32.7	28.3	33.6	28.2	23.6	19.7	23.4	25.9	27.0	27.1	29.0	35.4	-	-	-	Triplicate Site with FD1, FD2 and FD3 - Annual data provided for FD3 only
FD2	399162	289413	39.2	29.3	38.5	31.1	22.7	19.8	23.5	26.3	27.6	31.7	36.0	36.5	-	-	-	Triplicate Site with FD1, FD2 and FD3 - Annual data provided for FD3 only
FD3	399162	289413	31.8	25.1	35.3	30.8	22.8	20.9	23.9	23.9	26.0	28.1	27.3	39.3	28.8	23.6	-	Triplicate Site with FD1, FD2 and FD3 - Annual data provided for FD3 only
FE1	399375	289398	49.5	24.2	43.1	46.9	36.5	33.4	38.5	44.0	43.5	37.2	38.8	43.0	-	-	-	Triplicate Site with FE1, FE2 and FE3 - Annual data provided for FE3 only
FE2	399375	289398	44.6	28.0	41.8	46.5	33.0	32.4	33.5	42.7	42.6	36.7	41.6	43.3	-	-	-	Triplicate Site with FE1, FE2 and FE3 - Annual data provided for FE3 only
FE3	399375	289398	44.6	30.3	45.0	47.9	35.5	33.9	37.0	42.4	44.6	41.1	43.6	42.0	40.1	32.9	-	Triplicate Site with FE1, FE2 and FE3 - Annual data provided for FE3 only
FF1	400370	289532	56.3	39.6	39.3	40.0	34.6	32.3	34.3	35.9	36.7	30.8		44.1	-	-	-	Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
FF2	400370	289532	53.2	40.0	38.7	43.8	37.3	26.7	33.8	37.0	38.7	36.2			-	-	-	Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only

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FF3	400370	289532		26.6	39.4	40.9	34.3	31.3	33.3	33.8	36.4	32.2		41.7	38.2	31.3	-	Triplicate Site with FF1, FF2 and FF3 - Annual data provided for FF3 only
FG1	400535	289436	47.6	27.1	43.9	47.3	33.6	28.5	37.6	45.3	34.0	31.4		46.2	-	-	-	Triplicate Site with FG1, FG2 and FG3 - Annual data provided for FG3 only
FG2	400535	289436	45.4	24.3	40.5	47.5	31.4	26.7	37.6	47.4	43.6	31.2	33.8	44.0	-	-	-	Triplicate Site with FG1, FG2 and FG3 - Annual data provided for FG3 only
FG3	400535	289436	44.0	22.5	38.5	44.2	30.2	27.1	35.4	43.1	38.8	29.7	27.5	39.8	37.2	30.5	-	Triplicate Site with FG1, FG2 and FG3 - Annual data provided for FG3 only
GA	399858	289391	39.3	31.5	41.1	29.0	15.9	30.3	32.9	31.0	35.9	31.1	37.6	41.7	33.0	27.1	-	
GB	399858	289391	39.5	37.0	39.1	33.1	31.6	30.1	31.0	30.4	36.1	37.3	40.4	39.2	35.4	29.0	-	
GC	399858	289391	36.9	24.4	37.1	32.6	29.3	30.5	30.1	30.2	36.8	36.2	40.9	36.5	33.5	27.5	-	
HA	400383	291307	40.0	21.2	31.8	32.8	25.5		29.7	35.1	36.5	31.2	27.4	37.4	31.8	26.1	-	
HH1	395754	285492		8.3	15.1			11.2	13.2	15.8	20.7	19.8	21.6	23.7	16.9	13.8	-	
KD	403793	294661	35.3	16.1	34.7	22.4	16.6	16.7	18.1	23.2	26.1	18.2	23.8	30.5	23.4	19.2	-	
KE	403925	294970	33.6	17.1	23.6	17.1	19.9	16.5	17.7	18.5	21.6	23.5	26.6	28.2	22.0	18.0	-	
LA	400216	291633	33.4	19.2	26.5	19.4	13.4			17.6	19.8	22.4	26.6	30.3	22.8	18.7	-	
LB	400216	291633	30.3	18.8	25.9	20.4	13.7	16.9	16.2	17.2	19.2	21.4	27.1	30.6	21.6	17.7	-	
LC	400216	291633	32.5	18.1	26.7	19.4	14.3	15.1	16.0	16.9	21.8	22.2	26.6	30.0	21.7	17.8	-	
MA	400712	289296	46.0	35.2	39.6	36.8	29.0	32.3	29.2	45.3	37.7	32.9	31.0	40.3	36.3	29.7	-	
MC	400748	289150	49.7	28.4	49.7	32.3	35.3	35.0	32.2	40.3	36.1	35.8	37.6	36.2	37.2	30.5	-	
N1A	399647	290355	53.5	31.1	46.2		25.6	34.0	32.5		39.2	41.2	47.8	42.2	39.4	32.3	-	
N1B	399615	290358	53.9	28.1	45.2	34.6	35.9	34.5	33.1	41.0	38.4	35.4	49.5	43.6	39.2	32.2	-	
N2A	403126	288557	38.6	27.4	25.5		18.3	21.7	26.7	35.4	35.8	21.9	25.3	37.9	28.6	23.5	-	
OA	402240	286203	34.5	38.6	41.5	35.2	27.6	28.7	33.3	35.8	35.9	31.1	32.1	34.5	34.0	27.9	-	

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OB	402195	286233	38.2	34.1	37.8	33.3	34.9	38.5		31.6	36.4	34.7	34.5	43.1	36.1	29.6	-	
OC	402245	286150	35.1	28.6	38.0	35.2	29.7	31.2	32.0	37.2	35.6	29.5	30.7	42.2	33.9	27.8	-	
OD	402222	286162		31.0	36.6	30.8	32.7	36.1	37.4	34.1	39.8	29.3	32.4	41.3	34.5	28.3	-	
OE	402212	286234	35.8	29.2	42.4	36.8	31.1	31.9	33.4	39.7	41.3	33.7	39.1	46.1	36.8	30.2	-	
OG	402187	286333	34.2	26.7	43.2	35.5	26.2	27.6	29.8	36.6	36.7	30.9	31.8	39.8	33.4	27.4	-	
OH	402192	286244	37.9	35.8	38.6	32.5	35.1	37.5	39.1	31.8	36.8	38.3	37.4	46.5	37.3	30.6	-	
OI	402214	286253	32.4	23.7		38.0	25.8	26.8	31.7	39.1	38.6	32.5	34.0	43.4	33.6	27.6	-	
OJ	402194	286246	42.2	34.8	36.4	35.0	29.4	37.4	36.7	35.3	40.2	37.3	33.8	39.5	36.5	29.9	-	
OP4	402229	286096	41.5	25.3	37.9	37.3	33.0	39.5	41.2	37.5	40.5	34.5	40.3	45.5	37.9	31.1	-	
PA1	402461	290241	51.4	27.6	47.8	36.5	30.5	28.2	40.2	45.4	42.7	33.2	35.8	42.3	-	-	-	Triplicate Site with PA1, PA2 and PA3 - Annual data provided for PA3 only
PA2	402461	290241	43.7	27.5	48.8	32.2	30.6	31.9	38.6	47.2	43.2	34.3	30.2	39.3	-	-	-	Triplicate Site with PA1, PA2 and PA3 - Annual data provided for PA3 only
PA3	402461	290241	48.1		47.8	39.0	30.1	28.3	37.9	44.5	42.0	30.4	31.2		37.6	30.8	-	Triplicate Site with PA1, PA2 and PA3 - Annual data provided for PA3 only
PB1	402221	290290	48.6	26.5	42.4	37.3	29.9	27.0	33.0	43.2	39.8	30.7	28.1	41.9	-	-	-	Triplicate Site with PB1, PB2 and PB3 - Annual data provided for PB3 only
PB2	402221	290290	51.0	28.8	43.2	33.8	28.6	27.3	33.3	41.6	37.8	30.3	32.0	38.6	-	-	-	Triplicate Site with PB1, PB2 and PB3 - Annual data provided for PB3 only
PB3	402221	290290	44.6	24.8	44.1	35.0	29.1	27.7	34.2	44.1	37.8	28.1	34.0	39.3	35.4	29.1	-	Triplicate Site with PB1, PB2 and PB3 - Annual data provided for PB3 only
PC1	401950	290355	57.8	49.1	51.1	46.6	47.8	46.9	51.9	54.6	43.6	41.9	41.0	48.6	-	-	-	Triplicate Site with PC1, PC2 and PC3 - Annual data provided for PC3 only
PC2	401950	290355	68.6	44.0	45.2	46.7	45.3	44.0	53.0	55.0	47.2	38.2	36.2	53.2	-	-	-	Triplicate Site with PC1, PC2 and PC3 - Annual data provided for PC3 only
PC3	401950	290355	60.0	47.4	52.1	47.0	46.5	44.3	50.3	55.0	46.8	44.2	40.7		48.3	39.6	32.3	Triplicate Site with PC1, PC2 and PC3 - Annual data provided for PC3 only
PD1	402111	290331	55.1	44.8	46.5	31.8	34.7	33.3	35.7	36.2	33.3	39.0	45.5	43.1	-	-	-	Triplicate Site with PD1, PD2 and PD3 - Annual data provided for PD3 only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
PD2	402111	290331	58.1	41.1	51.1	32.4	36.7	33.0	33.4	34.0	34.0	31.2	43.2	44.7	-	-	-	Triplicate Site with PD1, PD2 and PD3 - Annual data provided for PD3 only
PD3	402111	290331	56.4	41.3	51.9	32.0	39.6	33.9	36.1	36.3	38.6	44.1	47.3	43.6	40.1	32.9	-	Triplicate Site with PD1, PD2 and PD3 - Annual data provided for PD3 only
PE1	402334	290279	57.5	38.8	49.9	35.8	34.5	34.4	35.9	42.4	38.8	33.1	42.5	44.7	-	-	-	Triplicate Site with PE1, PE2 and PE3 - Annual data provided for PE3 only
PE2	402334	290279	54.4	33.3	50.7	36.1	32.2	33.5	34.2	41.0	39.4	40.2	38.5	47.5	-	-	-	Triplicate Site with PE1, PE2 and PE3 - Annual data provided for PE3 only
PE3	402334	290279	55.9	42.5	48.1	36.3	33.4	27.6	37.5	40.3	37.7	38.4	40.8	46.5	40.3	33.0	-	Triplicate Site with PE1, PE2 and PE3 - Annual data provided for PE3 only
PS1A	400504	291239	46.4	28.7	31.6	29.5	26.9	29.6	29.0	30.1	31.1	36.6	40.6	42.8	33.6	27.6	-	
RA	401558	290077	32.9	21.5	45.0	29.1	24.1	20.7	24.2	32.7	32.8	30.0	37.0	37.1	30.6	25.1	-	
SA	403951	294852	32.1	24.2	35.9	20.3	16.8	19.6	19.4	20.8	22.3	26.9	31.4	29.3	24.9	20.4	-	
SU	400476	291481	34.3	18.0	31.8	27.2	16.6	18.0	20.2	25.4	26.5	25.3	29.0	34.3	25.7	21.1	-	
TA	395958	290645	39.1	25.8	33.2	28.7	22.1	24.6	21.4	26.4	26.9	26.1	31.3	33.7	28.3	23.2	-	
TC	395854	290643	24.6	32.3	36.1	36.2	36.8	37.2	41.0	40.3	36.7	34.8	44.1	44.8	37.1	30.5	-	
UA	398135	287603	33.6	31.3	37.1	34.3	27.4	28.2	29.2	36.4	30.1	33.5	34.4	42.0	33.3	27.3	-	
UB	398167	287750	26.8	23.5	34.0	31.4	26.8	26.1	29.0	30.2	30.4	28.2	33.2	35.7	29.8	24.4	-	
UC	398170	287746	35.0	26.8	37.8			24.2	30.4	29.2	33.6	29.8	33.8	36.9	31.8	26.1	-	
VD	397628	292459	32.5	20.6	25.6	32.2	17.9	18.3	23.4	29.7	30.1	21.7	21.8	31.4	25.7	21.1	-	
VT	397155	290867	38.9	24.8	29.2	26.3	19.6	18.6	20.6	22.3	24.8	23.3	26.2	33.4	25.8	21.1	-	
WA	401917	295329	76.7		32.6	19.0	25.4	25.7	20.7	26.5	27.2	30.3	34.4	31.8	31.3	25.7	-	
WB	402139	295119	38.6	23.7	33.2	18.8	20.4	22.6	19.5	24.6	27.7	26.4	34.3	32.2	26.6	21.8	-	
WF	402133	295234	42.4	26.3	37.7	21.4	21.7	23.6	20.7	26.5	29.1	24.0	32.7	31.9	27.9	22.9	-	
WW2	400564	296037	31.9	16.1	35.0	19.6	15.0	16.9	18.1	26.0	24.2	20.2	25.9	28.5	23.0	18.9	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
WW3	400598	296035	34.8	15.5	37.8	20.9	16.0	14.8	18.2	26.8	25.4	21.8	23.6	32.6	24.0	19.7	-	
XE	404435	294866	48.7	19.9	39.6	29.8	24.7	23.8	27.4	33.8	30.8	29.5	33.6	37.3	31.5	25.9	-	
ZA	404504	294813	49.5	22.5	34.2	25.5	25.6	27.2	28.5	31.9	32.2	27.4	28.1	33.7	30.3	24.9	-	
ZC	404493	294532	38.7		35.8	22.5	19.2	17.9	19.7	24.0	25.9	24.7	27.4	33.6	26.3	21.5	-	
ZK	404621	294291	40.3	23.7	39.7	23.9	23.1	23.4	23.4	26.5	27.9	26.2	32.9	33.9	28.6	23.5	-	
ZO	404290	294179	39.0	25.3	44.5	24.2	23.2	23.1	23.2	30.5	30.0	29.6	31.7	32.1	29.5	24.2	-	
ZP	404555	294219	36.6	19.6	42.4	26.8	21.5	21.0	24.0	31.7	31.2	27.0	32.1	35.1	29.1	23.8	-	
ZQ	404539	294187		30.8	58.1	39.5	35.9		36.9	46.9	41.0	36.1	40.8	42.7	40.7	33.4	-	
ZR	404410	294170	53.0	28.6	50.9	36.8	35.6	36.4	37.1	49.9	43.9	37.2	38.6	42.9	40.7	33.4	-	

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

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **Sandwell MBC confirm that all 2022 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 MBC During 2022

There are several significant new or ongoing developments within Sandwell which may cumulatively contribute to local air pollution. These include:

Commercial/industrial development under construction in 2022:

- The Midland Metropolitan University Hospital, Grove Lane, Smethwick was built to replace City Hospital located in Birmingham. The new hospital will offer maternity, children's and inpatient adult services to half a million people. Additional development on the adjacent sites for further associated services has continued through 2022 and 2023.
- 'Kelvin', off Kelvin Way, West Bromwich – Kelvin is an energy from waste facility, that was granted planning consent in September 2019 and is currently under construction. When operational, it will burn 395,000 tonnes of non-recyclable household and business waste. With capability of generating 44MW (gross) of energy per annum.
- Land East of Perrott Street, Smethwick – This is a new secondary school with associated sports pitches, MUGA, access and parking. Due to open in September 2023.
- Land at Vaughan Trading Estate, Sedgley Road East, Tipton – Large industrial warehousing development for storage & distribution processes, with associated car parking.

Commercial development coming forward 2023/24:

- Newcomen Drive Open Space, Newcomen Drive, Tipton – Industrial/warehousing (B2/B8). Planning permission granted May 2022
- Land west of Bridge Street North, Smethwick - Proposed temporary soil treatment facility – planning recommendation for temporary permission for 5 years. Still awaiting a final decision.

- 1-7 Crystal Drive, Smethwick, B66 1QG - new commercial warehouse development with service yard and car parking. Change of use from B8 to B2. Granted planning permission March 2023
- Land at Horner Way, Rowley Regis - Proposed single storey detached coffee shop with drive thru, new road access and parking. Awaiting planning permission.

Residential development currently under construction 2022/23:

- Hall Green Road, West Bromwich – 223 dwellings. Planning permission granted May 2021
- West Bromwich Street, Oldbury – 152 houses and 82 apartments, including car parking. Planning permission granted February 2021.

Proposed residential development coming forward 2023/24:

- 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) – planning permission granted December 2022.
- Intersection House – 110 Birmingham Road, West Bromwich – 84 dwellings, retail shops and a drive through – registered May 2023, awaiting planning decision.
- PJ House London Street Smethwick - include 392 residential dwellings as well as commercial activities including drinking establishments, hot food takeaways and amenity space – awaiting planning decision.
- Edwin Richards Quarry, Portway Road, Rowley Regis –276 residential dwellings – awaiting planning decision.
- Chance Glassworks – proposal includes 160 apartments, a small conference facility, café, retail space, heritage educational centre, enterprise space and a 30m lighthouse within the Oldbury Air Quality Priority Zone 3 and next to the M5 viaduct between Junctions 1 & 2 and opposite the ‘Kelvin’ power station (currently under construction). No formal planning application submitted as of June 2023.

Major Planned/Proposed development

(Development schemes that require assessments including Environmental Impact Assessments (EIAs) due to size and impact on the local area)

Brandhall Village - Oldbury

The re-development of the Brandhall Golf Course to provide 190 homes, a new primary school and first new public park has been approved. A public consultation was completed in November 2021 and the plans were approved by Sandwell MBC's Cabinet on 20 July 2022.

Friar Park Urban Village

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

Queens Square

Queens Square, West Bromwich – proposed development that would consist of new apartments, townhouses and public realm improvements alongside the retention of existing retail units to form a mixed-use development. Pre-application stage, awaiting a formal planning application submission.

Bescot Sidings

Bescot Sidings, Sandy Lane, Wednesbury - proposed construction of new rail carriage facility with potential for 6 road carriage sidings 12 vehicles long, including 2 long through sidings for network freight. Pre-application stage, awaiting formal planning application submission.

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 MBC During 2022

The 21 Zephyr air quality monitors located at a variety of sites around Sandwell since June 2022 have been providing the council with additional air quality data at a more granular

level. Most Zephyrs have been located next to busy roads where there are relevant sensitive receptors. Due to the large amount of data being collected by these automatic analysers, EarthSense were commissioned to provide an Annual Status Report for each of the Zephyrs, providing summary analysis of the data against national air quality objectives where appropriate.

A copy of the annual results for 2022 from the Zephyrs is provided in **Appendix G.** The results demonstrate compliance with current national objectives except for the 8hr mean for Nitrogen Dioxide which was exceeded more than ten times at ten different locations. The Zephyrs recording the highest annual concentration of a pollutant species or the greatest number of breaches of an air quality objective 2022 have been highlighted in yellow.

EarthSense were also commissioned to assist with producing a summary report for each Zephyr. This will allow each of the faith centres taking part in the 'Faith Communities for Clean Air' project to be provided with their own report on air quality at their centre.

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.TG22.

In 2022 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[41].

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

Table C. 1 - NO_2 Diffusion Tube Details	
Supplier	Gradko International
Period	2022
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	0.82

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 where data capture was less than 75% but greater than 25%. The annualisation was completed using the Diffusion Tube Data Processing Tool[42]. Continuous monitoring data from four reference sites, Walsall Woodlands, Coventry, Telford and Leamington Spa was used. Details of the diffusion tube site and the annualisation results are presented in **Table C1** below**.**

[42] https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-data-processing-tool/

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

Site ID	Annualisation Factor Walsall Woodlands	Annualisation Factor Coventry Allesley	Annualisation Factor Telford	Annualisation Factor Leamington Spa	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
C14A	1.1316	1.0909	1.0483	1.0893	1.0900	33.7	36.8

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented in the 2022 ASR has been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance regarding 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 have applied a national bias adjustment factor of 0.82 to the 2022 monitoring data. A summary of bias adjustment factors used by Sandwell over the past five years is presented in **Table C.2.** The local bias adjustment factor was also calculated and is shown in **Table C.3**.

This year the national bias adjustment factor of 0.82 was chosen instead of the local bias adjustment factor of 0.86. This was determined on the basis that the national bias adjustment factor is likely to be a fairer representation of annual mean NO_2 concentrations across the borough given that we monitor NO_2 at a wide variety of locations types. Furthermore, the national factor includes both of Sandwell's locally derived factors as well as the factors from 14 other studies. It is therefore considered that this national factor is likely to be the most representative bias adjustment factor for Sandwell's monitoring data.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.82
2021	National	03/22	0.83
2020	National	03/21	0.82
2019	National	03/20	0.81
2018	National	06/19	0.89

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Birmingham Road, Oldbury	Local Bias Adjustment Highfields, West Bromwich
Periods used to calculate bias	10	12
Bias Factor A	0.81 (0.74 - 0.88)	0.92 (0.75 - 1.18)
Bias Factor B	24% (14% - 35%)	9% (-15% - 33%)
Diffusion Tube Mean (µg/m^3)	35.1	21.2
Mean CV (Precision)	4.4%	4.0%
Automatic Mean (µg/m^3)	28.3	19.4
Data Capture	99%	99%
Adjusted Tube Mean (µg/m^3)	28 (26 – 31)	19 (16 - 25)

NO_2 Fall-off with Distance from the Road

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

automatic annual mean NO_2 concentrations corrected for distance are presented in **Table B.1.** and a summary of the relevant receptors is provided below in **Table C.4.**

Table C.4 – 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
BP	6.8	13.6	44.5	25.5	**40.2**	*Predicted concentration at Receptor above AQS objective.*
C1D	2.0	20.0	37.8	25.3	31.1	
C7D	1.6	12.9	36.9	22.9	30.4	
PC1, PC2, PC3	1.5	26.5	39.6	28.03	32.3	*Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.*

QA/QC of Automatic Monitoring

All routine calibration and maintenance is carried out by Sandwell Council's Air Quality Officer also known as the Local Site Operator (LSO). 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.TG22 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)

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)

Wilderness Lane – Great Barr

APNA370 Ambient NOx

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

Haden Hill

APNA370 Ambient NOx

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

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

The FIDAS PM10 and $PM_{2.5}$ monitors utilised within Sandwell MBC do not require the application of a correction factor.

Automatic Monitoring Annualisation

All automatic monitoring locations within Sandwell recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

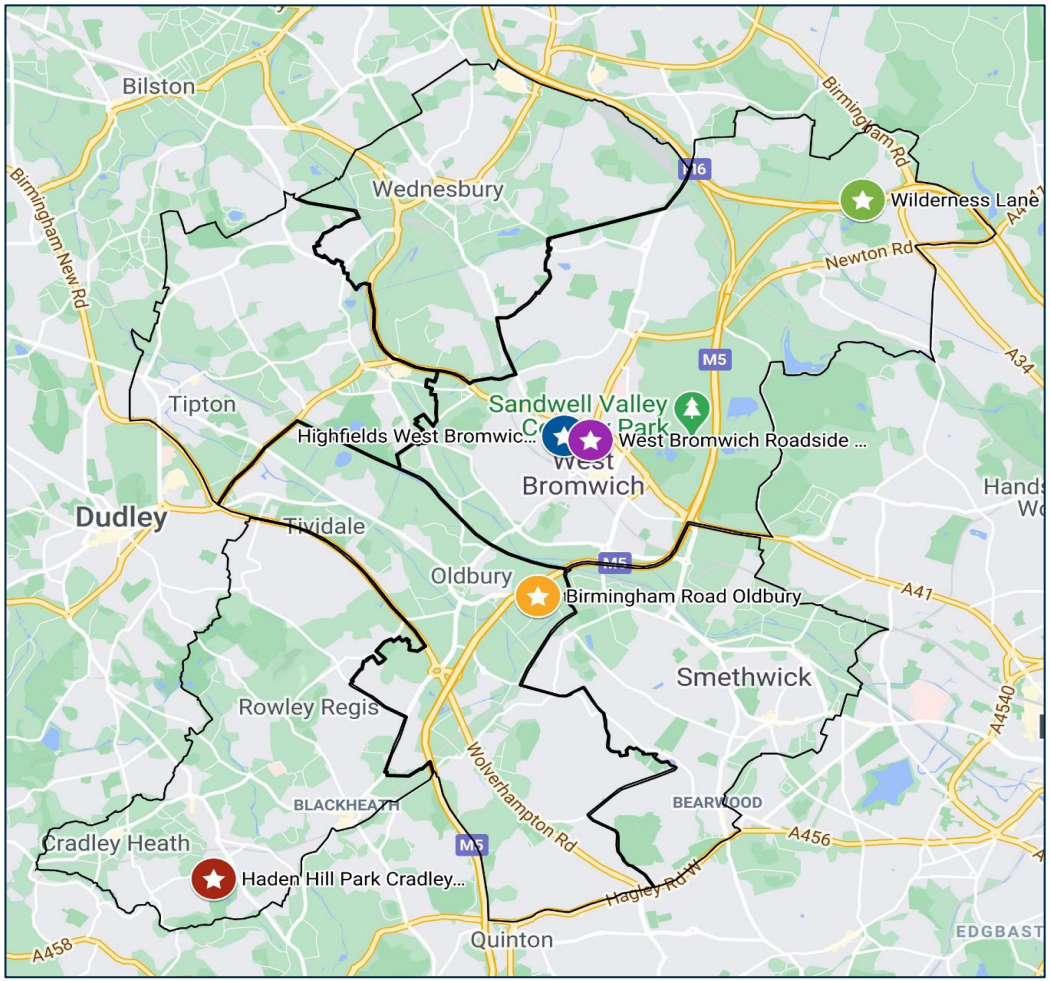
NO_2 Fall-off with Distance from the Road

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 NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in **Table B.1**.

No automatic NO_2 monitoring locations within Sandwell required distance correction during 2022.

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

Figure D 1 - Map of Automatic Monitoring Stations in Sandwell

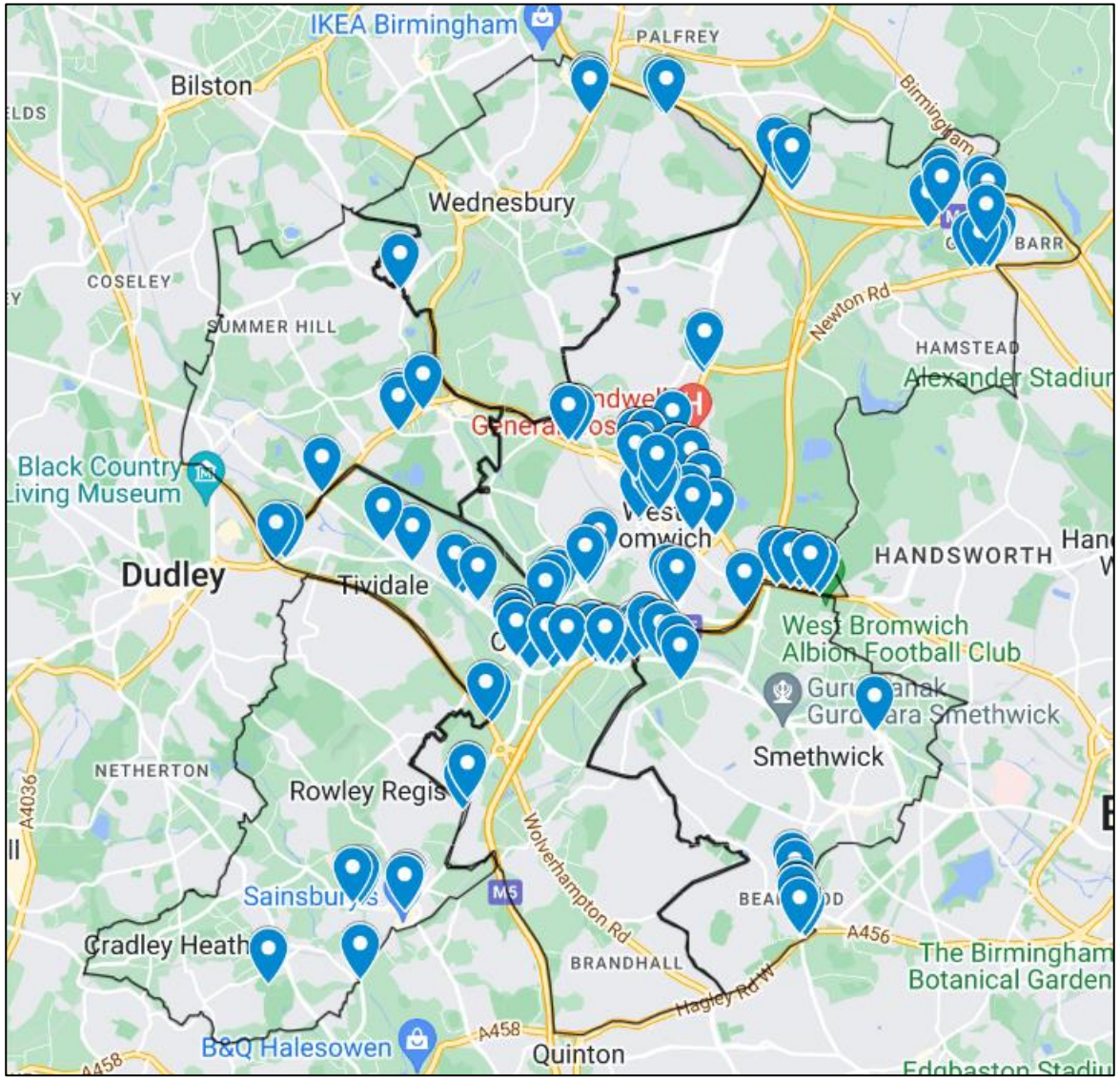


Legend

- 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 NO2 Diffusion Tube Sites in Sandwell



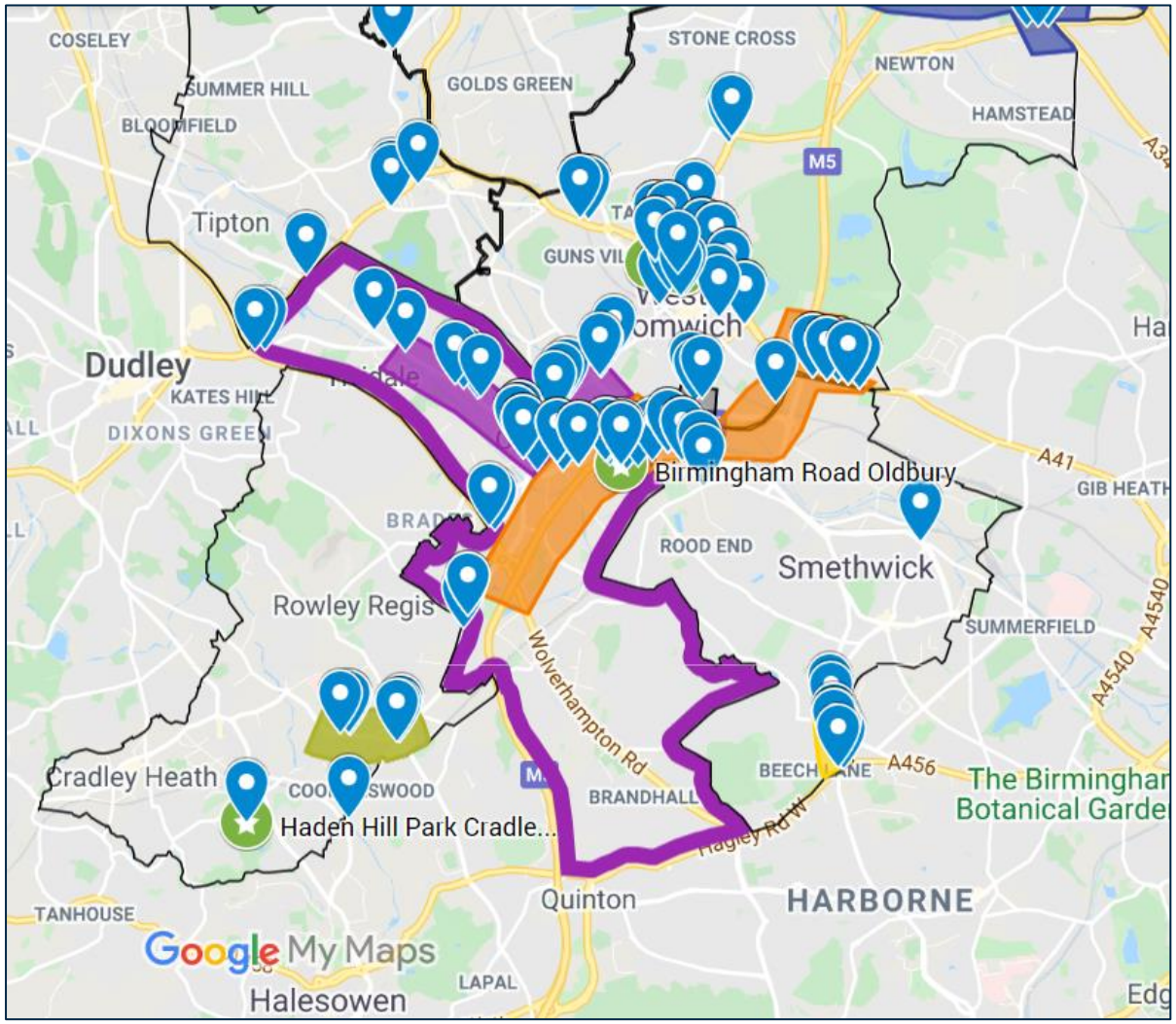
Legend

	Diffusion tube

- 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 3- Map of Diffusion Tube Sites and Air Quality Monitoring Stations, Oldbury, Sandwell



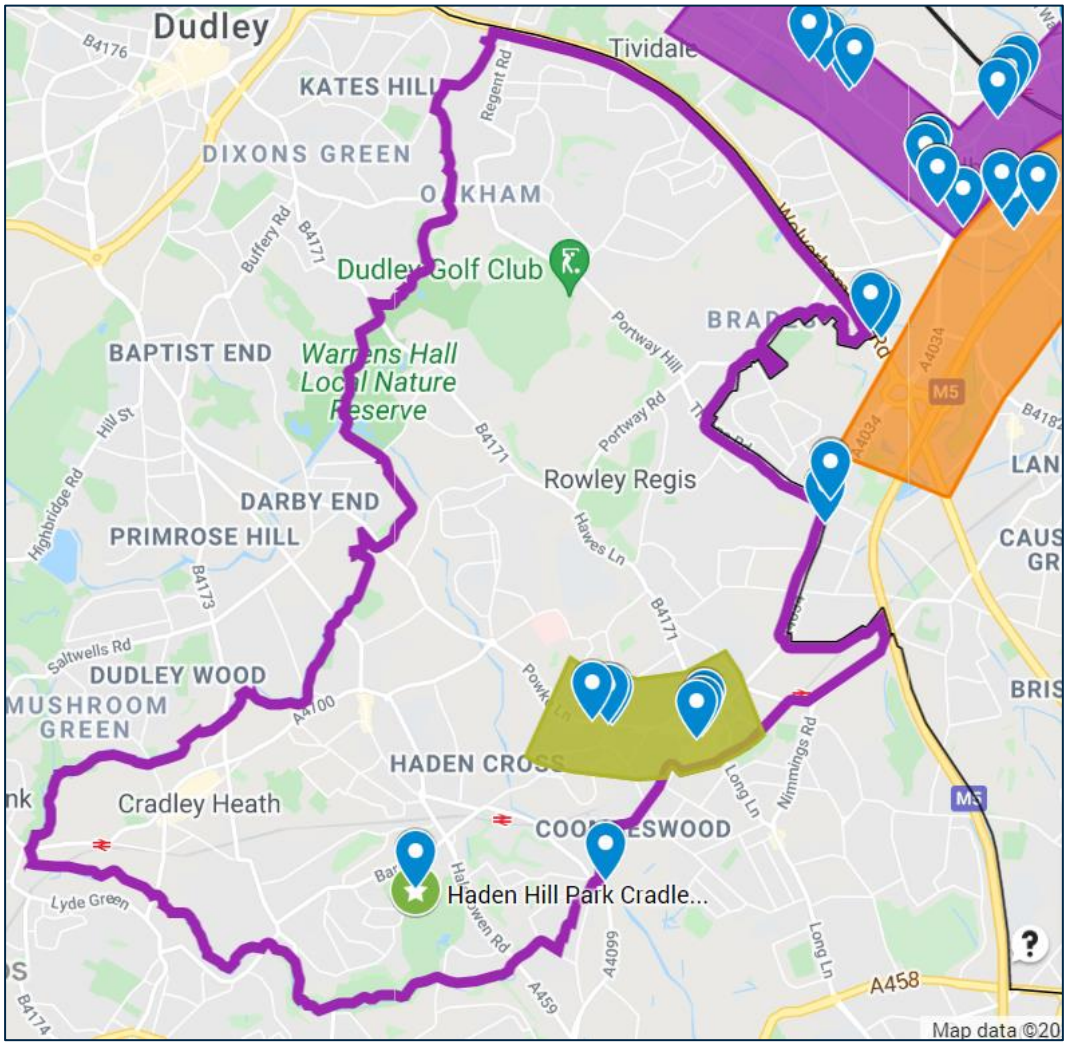
Legend

	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 4 Map of Diffusion Tube Sites and Air Quality Monitoring Stations, Rowley Regis, Sandwell

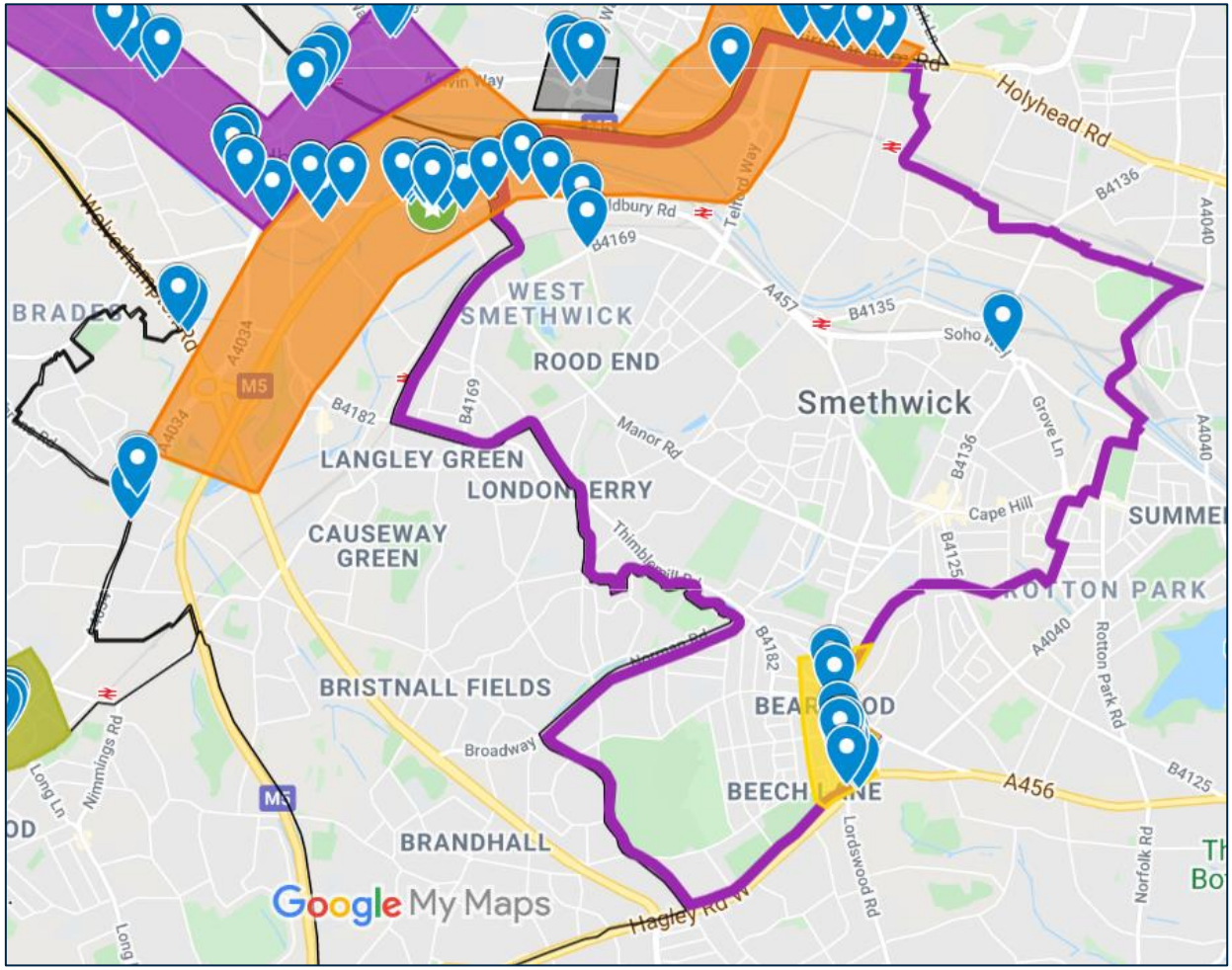


Legend

- 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 5 - Map of Diffusion Tube Sites in Smethwick, Sandwell



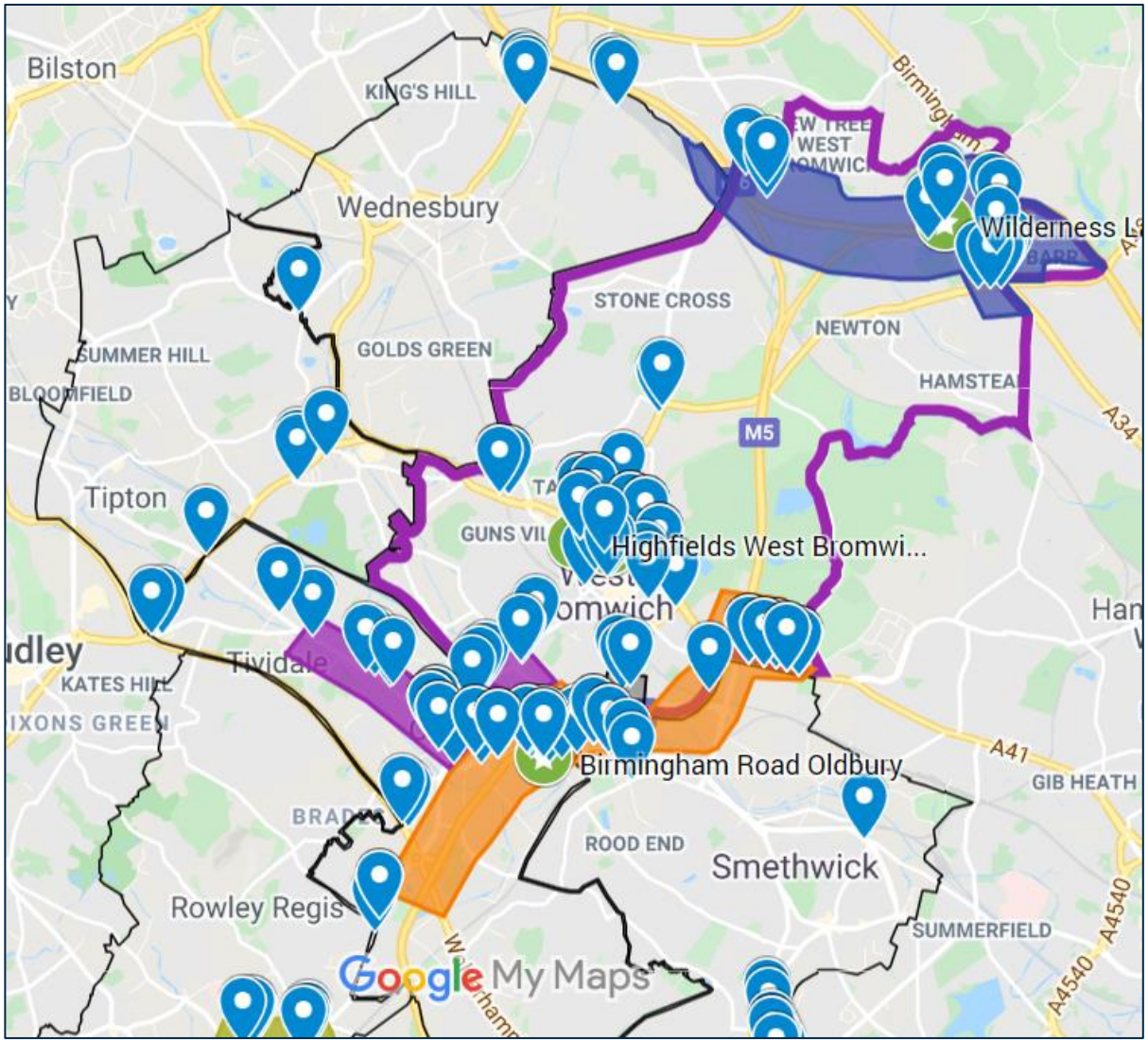
Legend

	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 Diffusion Tube Sites and Automatic Air Quality Monitoring Stations in West Bromwich, Sandwell



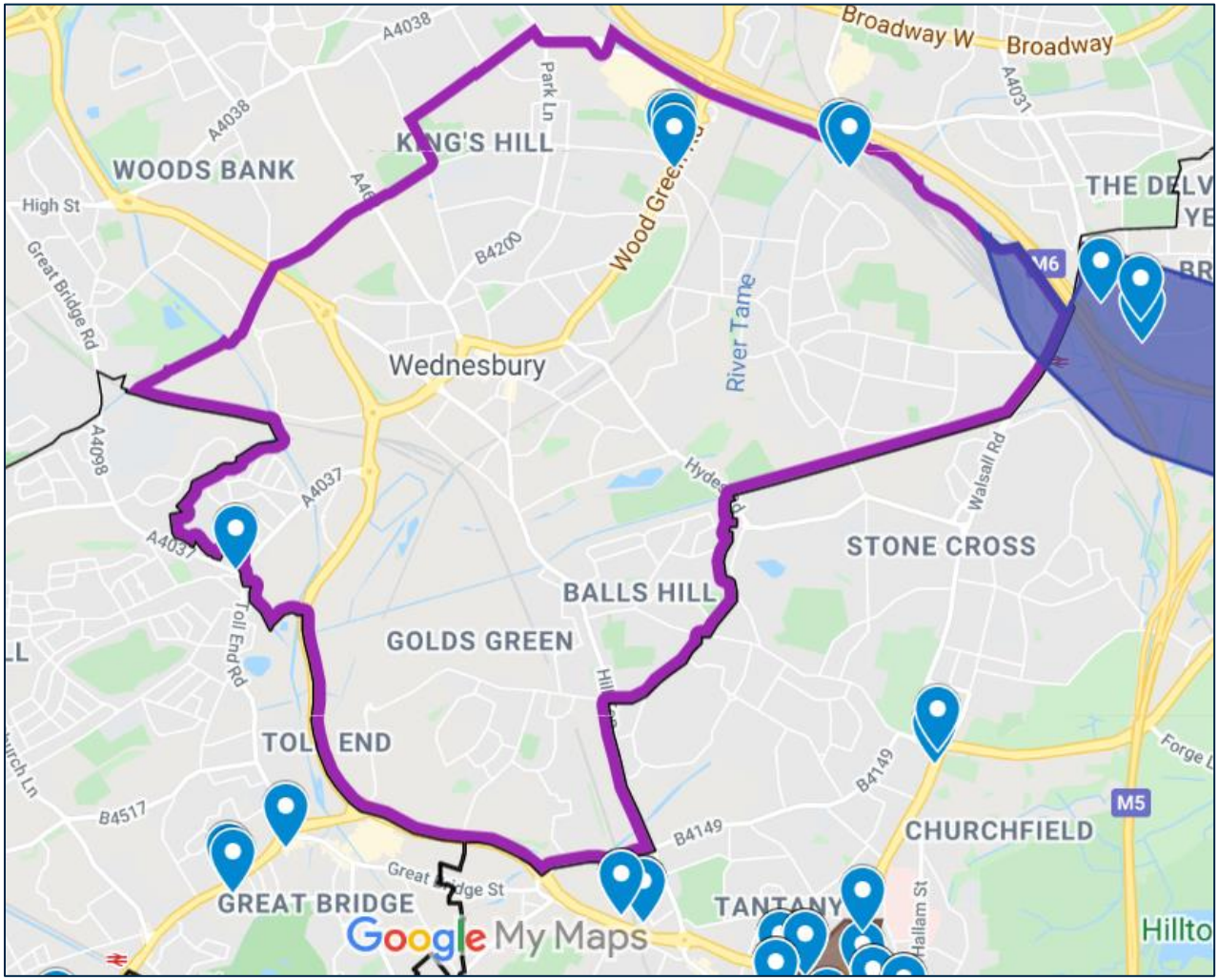
Legend

	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 Diffusion Tube Sites, Wednesbury, Sandwell

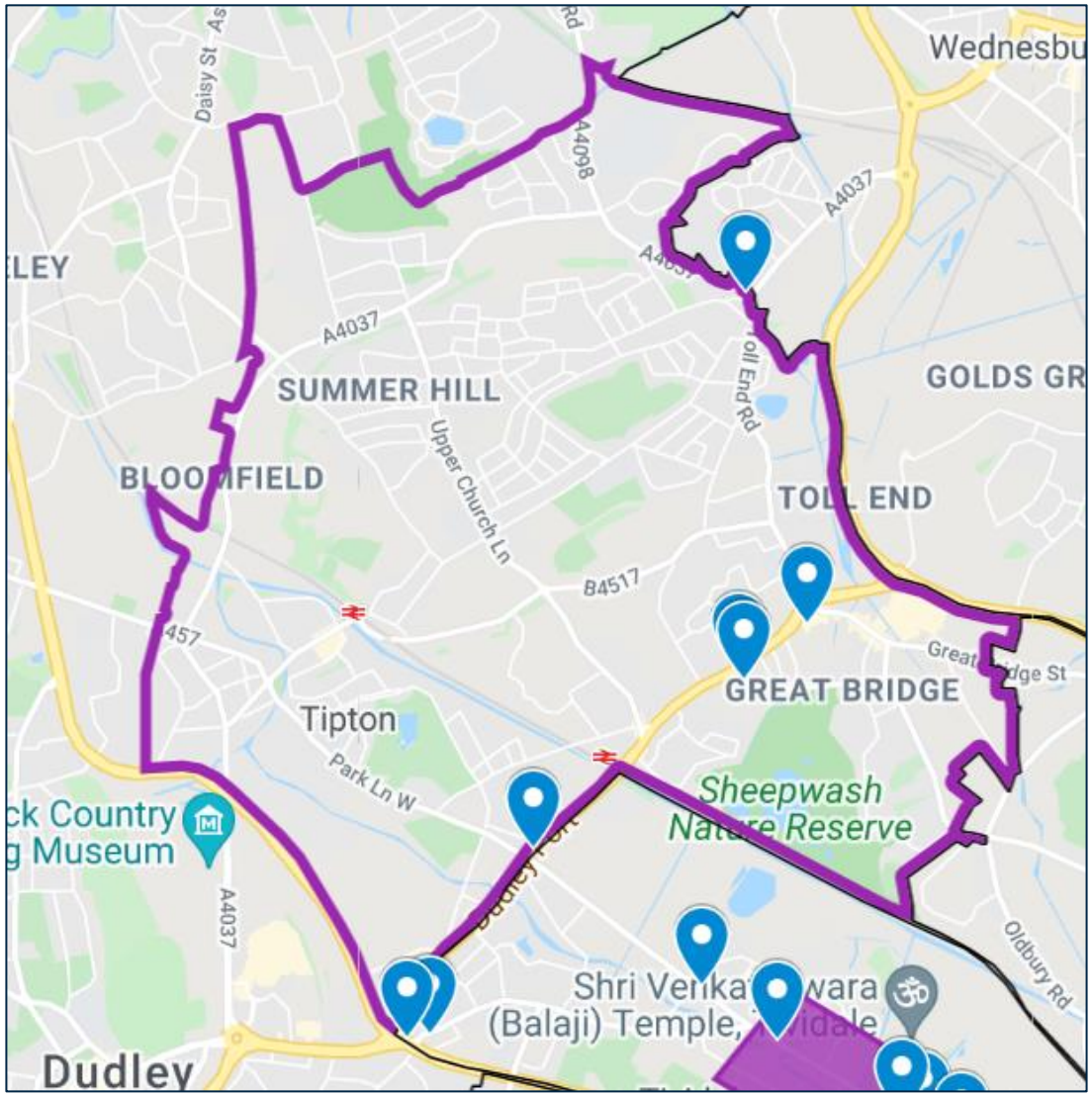


Legend

- 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 Diffusion Tube Locations, Tipton, Sandwell



Legend

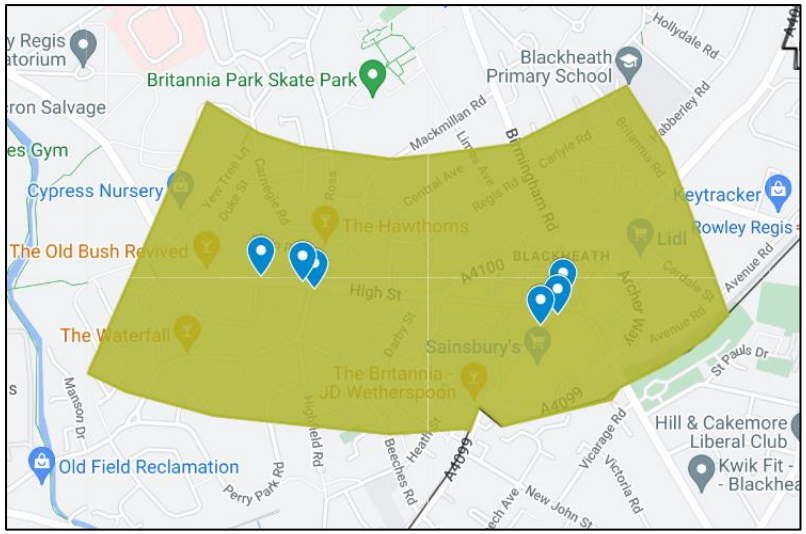
	Diffusion tube
	Automatic monitoring station

- 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

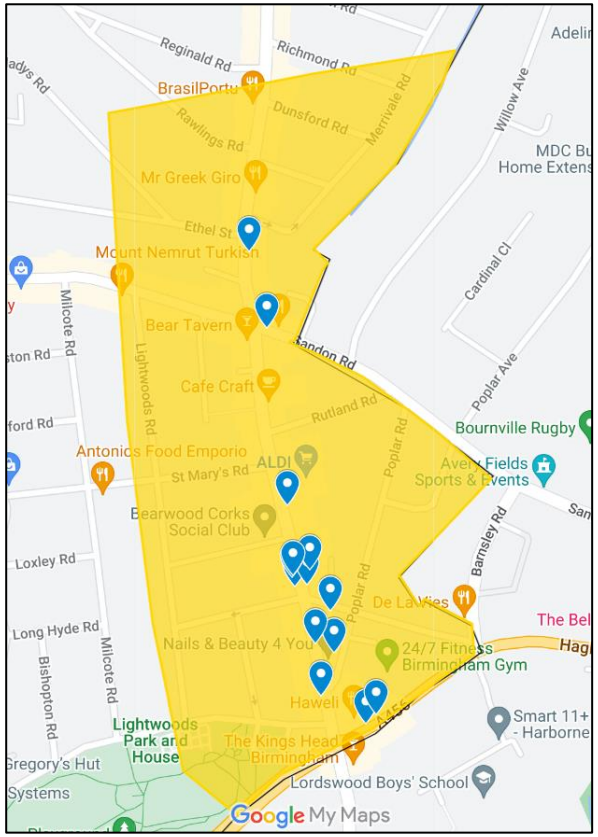
For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D 9 - Maps of Air Quality Priority Zones 1 & 2

Blackheath - Zone 1



Bearwood Road, Smethwick – Zone 2



Legend

	Diffusion tube
	Automatic monitoring station

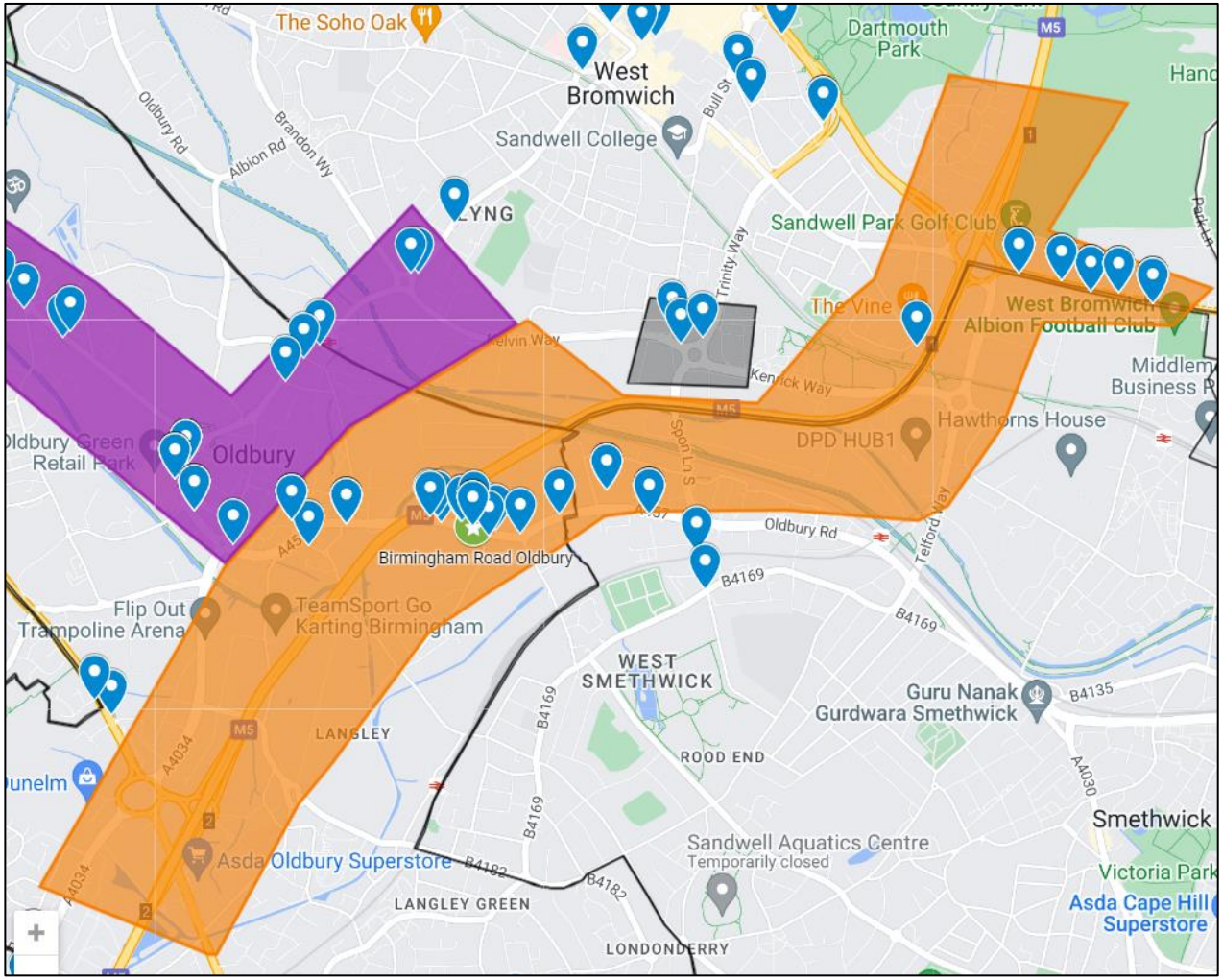
Blackheath- Zone 1

Bearwood Road, Smethwick- Zone 2

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 Air Quality Priority Zone 3

Oldbury M5, Junctions 1 to 2 – Zone 3



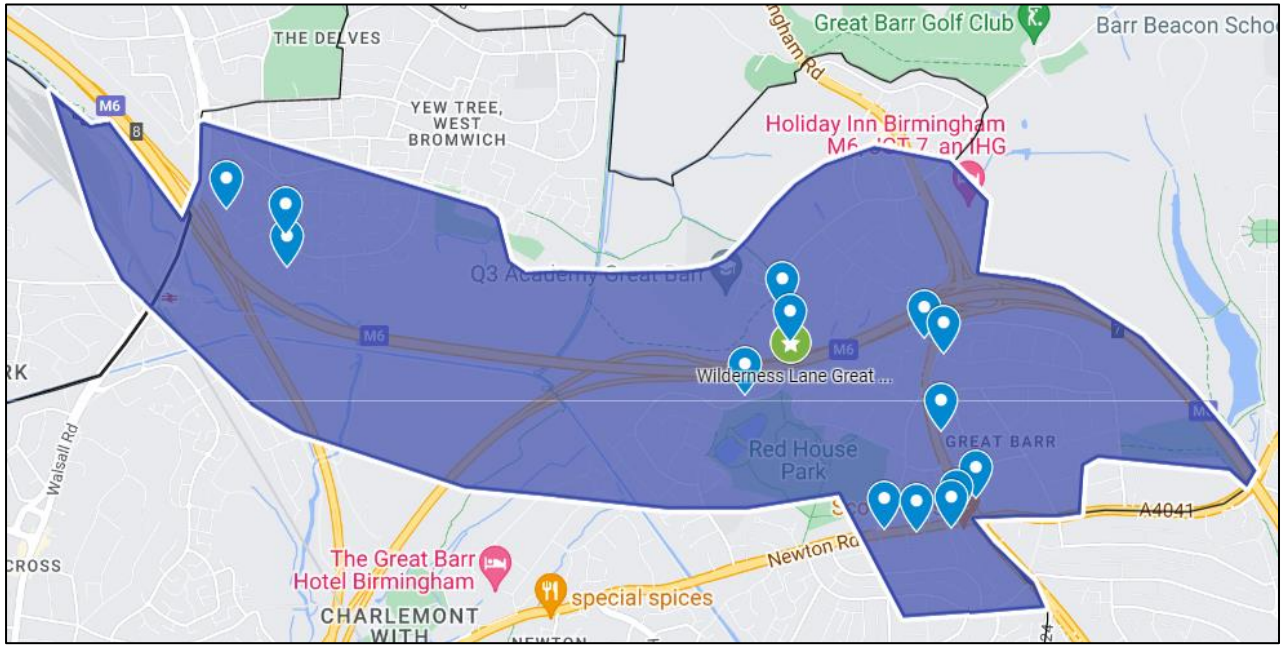
Legend

	Diffusion tube
	Automatic monitoring station
	Oldbury M5 Junctions 1 to 2- Zone 3

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

Figure D 11 - Map of Air Quality Priority Zone 4

Great Barr and Yew Tree– Zone 4



Legend

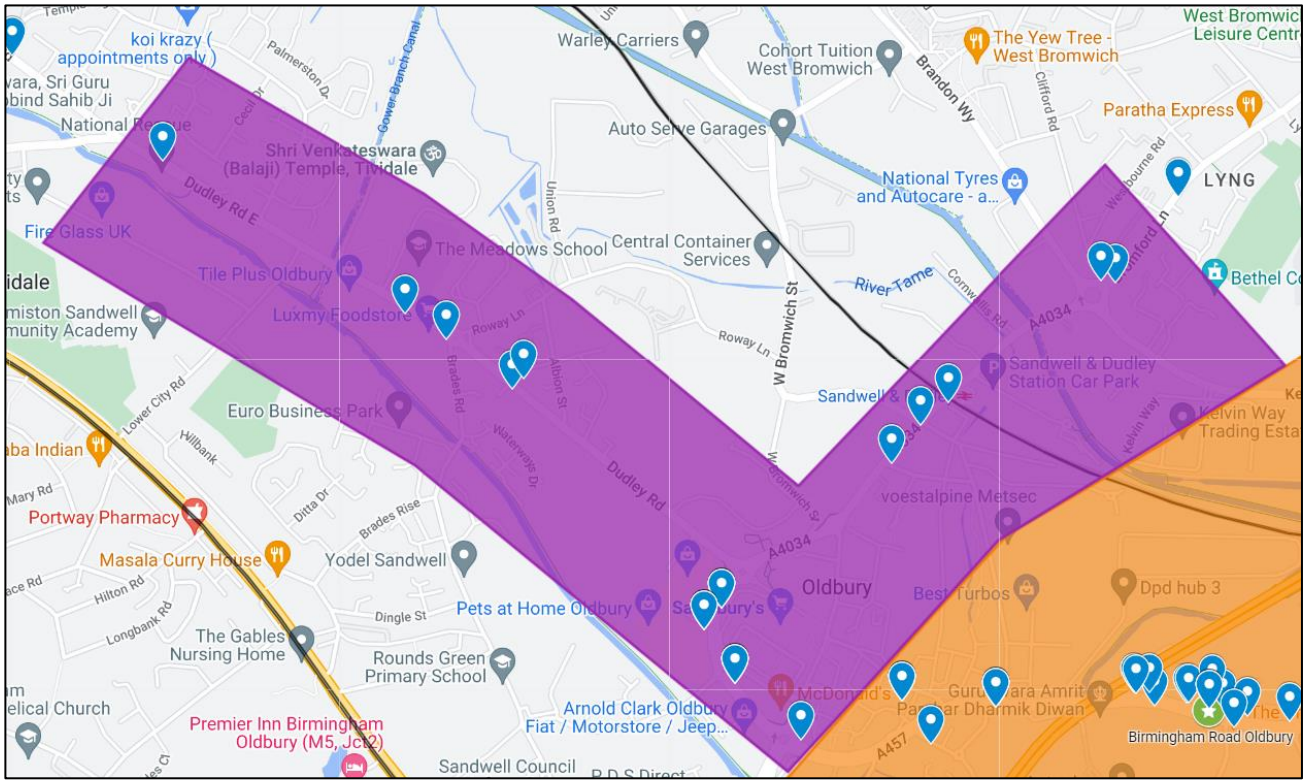
	Diffusion tube
	Automatic monitoring station

Great Barr and Yew Tree- Zone 4

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

Figure D 12 - Map of Air Quality Priority Zone 5

Oldbury Ringway (including Bromford Lane, Kelvin Way and Brandon Way – Zone 5



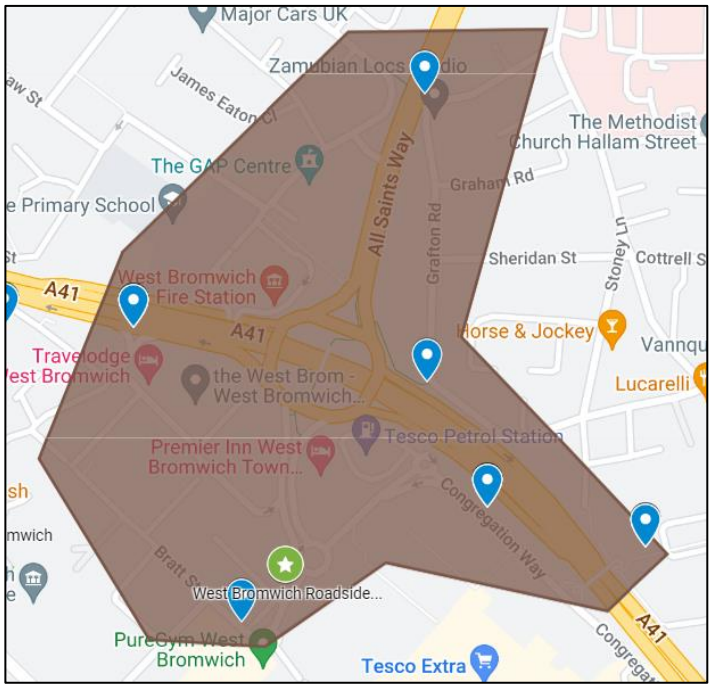
Legend

	Diffusion tube
	Automatic monitoring station
	Oldbury, Oldbury Ringway (Incl. Bromford Lane/Kelvin Way/Brandon Way)- Zone 5

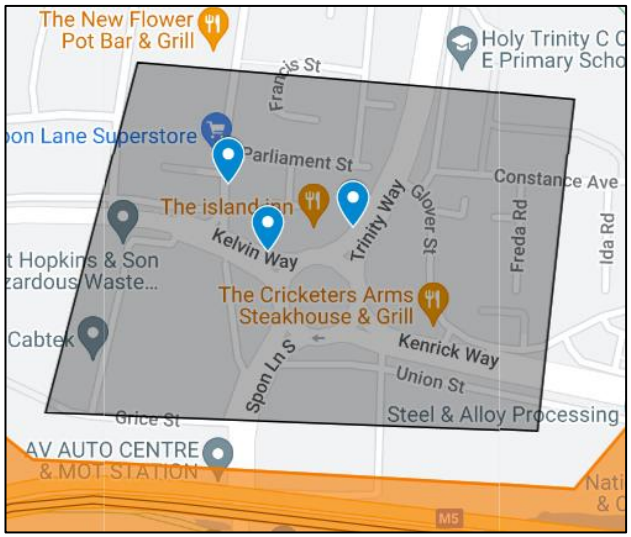
For a full, interactive map of the diffusion tube network, automatic monitoring stations and priority zones in Sandwell please follow this link.

Figure D 13 - Maps of Air Quality Priority Zones 6 and 7

The Expressway / All Saints Way, West Bromwich, - Zone 6



Trinity Way / Kenrick Way – Zone 7



Legend

	Diffusion tube
	Automatic monitoring station

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.

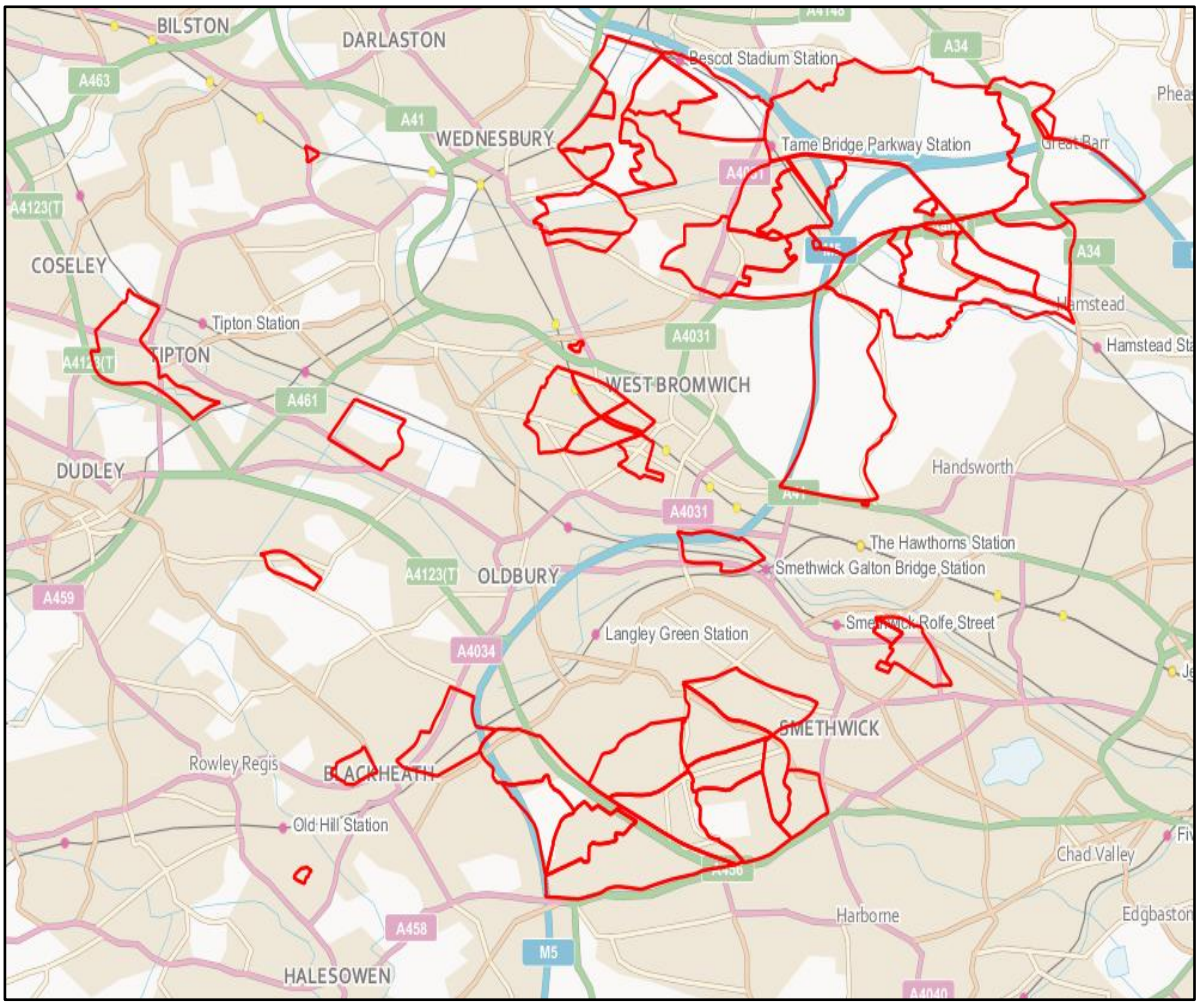
Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[43]

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

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

Appendix F: 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

APPENDIX G: Zephyr Air Quality Monitors Annual Status Report – Sandwell MBC

EARTHSENSE

TRUSTED AIR QUALITY INSIGHT

Zephyr® Summary

Isaac Mitchell | January 2023

Zephyr® Summary for the inclusion within the Sandwell Metropolitan BoroughCouncil, 2023 Air Quality Annual Status Report (ASR)

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

Table of Contents

Document Information

Version	Date	Drafted by	Checked by	Approved by
First Issue	31st January 2023	Isaac Mitchell	Pablo Garcia	Owen Gardner
Revision 1	14th February 2023	Isaac Mitchell	Pablo Garcia	Owen Gardner

1. Preface

This report summarises data collected by Zephyr(s) in the Sandwell Metropolitan Borough Council (SMBC) user group.

The Air Quality Objectives (AQO), limits and thresholds defined within this document are summarised in the National Air Quality Objectives document published by the UK's Department for Environment, Food and Rural Affairs (Defra).

2. Introduction

Air pollution is a leading health emergency - clean air is a human right, yet access is disparate, with an estimated 4.2 million premature deaths each year. The distribution of air pollution both with respect to time and space can differ greatly, with changes driven by emissions, chemical evolution, destruction, dispersion and deposition. The World Health Organisation (WHO) and the UK's Defra detail the key ambient air pollutants, sources and health effects.

3. Zephyr® Sensors

The Zephyr® sensor retrieves several pollutants that are of interest specifically for urban environments. Its small form-factor makes the sensor easy to deploy on street furniture and can be powered from an internal battery, mains power or a solar panel. The capacity to deploy a high-density Zephyr® network whilst recording at up to 10 second intervals with 15-minute latency gives the opportunity for near-real time air pollution data to be used for decision making to better manage towns and cities. The Zephyr® sensor measures Nitrogen Dioxide (NO_2), Ozone (O_3), Nitrogen Oxide (NO), Particulate Matter (PM_1, $PM_{2.5}$ and PM_{10}) as standard, with the option of including hardware capacity to also measure Carbon Monoxide (CO), Sulphur Dioxide (SO_2), Hydrogen Sulphide (H_2S) Carbon Dioxide (CO_2) and Total Volatile Organic Compounds (TVOCs).

4. How are gas concentration retrieved?

Electrochemical Sensors (EC) are used in the Zephyr® sensor for NO_2, O_3, NO, CO, SO_2 and H_2S. The analogue response that is converted to a digital signal is affected by the concentration of the gas of interest as well as other interfering gases (the specific gases and the severity is unique for each EC) and environmental conditions. The retrieved concentration has these effects accounted for, which is validated by both long-term studies and a sensor validation period prior to delivery to the client. Total Volatile Organic Compounds (TVOCs) are retrieved using a photoionisation detector (PID) which has corrections for environmental conditions. A self-correcting algorithm to ensure a common background is maintained has been applied to this data. This algorithm is presently being written into standard operational protocols, and as such is not presently available on MyAir®. Carbon Dioxide (CO_2) is retrieved using non-dispersive infrared sensor. A self-correcting algorithm accounts for inherent drift on the sensor to improve real time data quality.

5. How are particulates retrieved?

An Optical Particle Counter (OPC) is used in the Zephyr® sensor to retrieve a mass concentration for PM_1, $PM_{2.5}$ and PM_{10}. This has been found to produce very good agreement with reference methods in the UK. A hygroscopy factor is included in the retrieval to correct for humidity interactions with aerosol.

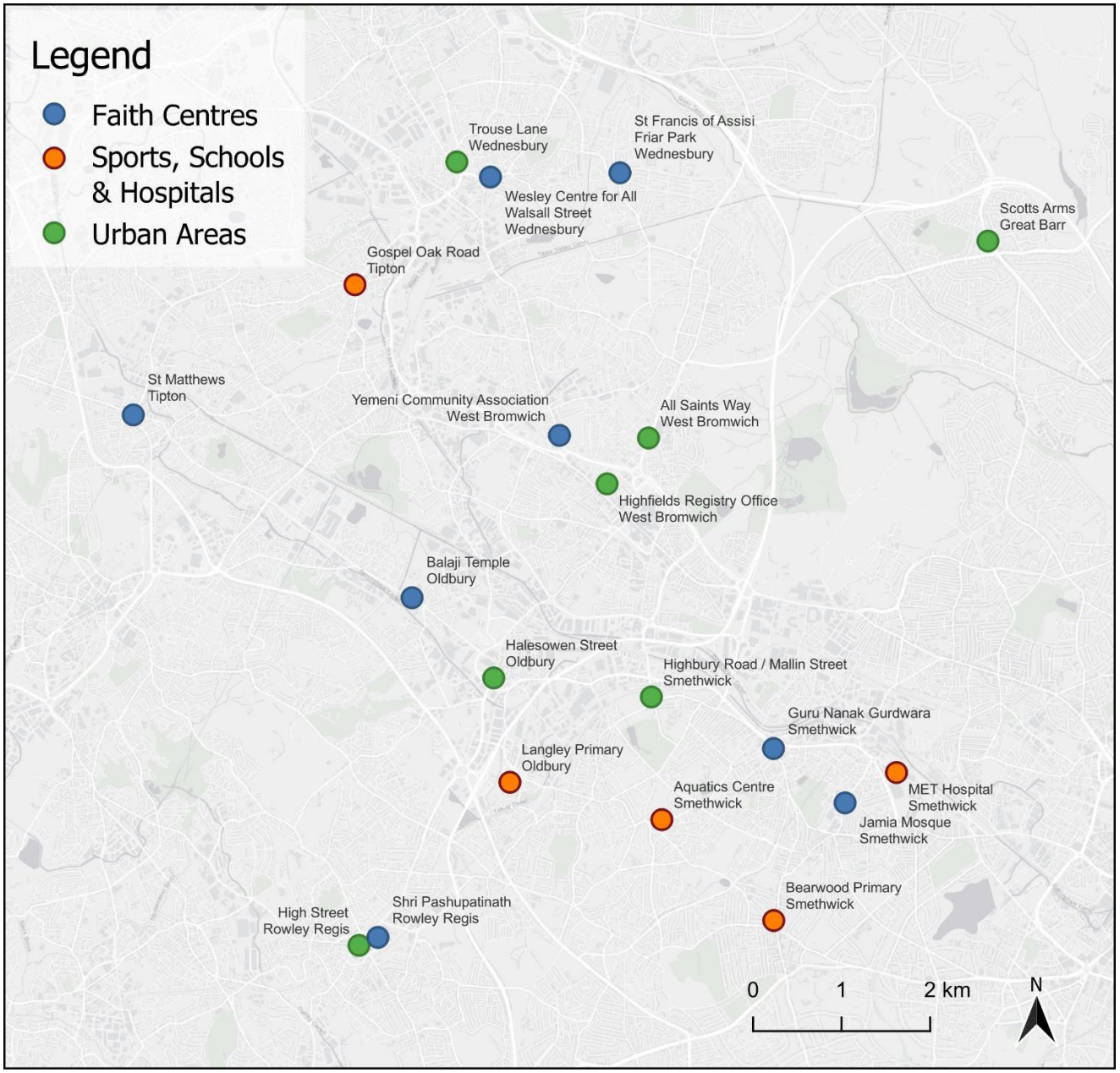
6. Summary of Zephyr® monitoring

Table 6.1 Details of Zephyr® Monitoring

'Z' Number	Site Name	Site Type	X OS Grid Ref (Easting)	X OS Grid Ref (Northing)	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure(m)	Distance to kerb of nearest road (m)	Inlet Height (m)
Z315	Highfields Registry Office,West Bromwich	Background	400222	291612	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	41.18	33.28	4.5
Z778	Gospel Oak Road, Tipton	Roadside	397373	293866	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	26.22	2.85	4
Z781	High Street, Rowley Regis	Roadside	397418	286388	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	9.68	2.65	4
Z864	All Saints Way, West Bromwich	Roadside	400690	292131	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	6.84	12.36	4
Z870	Langley Primary, Oldbury	Roadside	399124	288234	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	8.14	10.2	4
Z881	St Matthews, Tipton	Roadside	394867	292392	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter			4
Z884	Bearwood Primary, Smethwick	Roadside	402106	286669	NO_2, NO, O_3, PM_1, $PM_{2.5}$ & PM_{10}	Electrochemical Sensors & Optical Particulate Counter	7.54	1.04	4
Z887	MET Hospital, Smethwick	Roadside	403493	288344	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	6.12	1.81	4

'Z' Number	Site Name	Site Type	X OS Grid Ref (Easting)	X OS Grid Ref (Northing)	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
Z888	Halesowen Street, Oldbury	Roadside	398941	289415	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	7.23	2.85	4
Z892	Wesley Centre for All, Walsall Street, Wednesbury	Roadside	398904	295085	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter			4
Z893	Scotts Arms, Great Barr	Roadside	404527	294360	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	14.53	1.96	4
Z898	Highbury Road, Smethwick	Roadside	400723	289200	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	8.35	2.45	4
Z916	Balaji Temple, Oldbury	Roadside	398018	290323	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	5.18	1.77	4
Z917	St Francis of Assisi, Friar Park, Wednesbury	Roadside	400368	295133	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter			4
Z918	Shri Pashupatinath, Rowley Regis	Background	397632	286478	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter			4
Z919	Yemeni Community Association, West Bromwich	Roadside	399684	292161	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	15.68	2.21	4
Z920	Jamia Mosque , Smethwick	Roadside	402912	288001	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	18.76	3.66	4

'Z' Number	Site Name	Site Type	X OS Grid Ref (Easting)	X OS Grid Ref (Northing)	Pollutants Monitored	Monitoring Technique	Distance to Relevant Exposure (m)	Distance to kerb of nearest road (m)	Inlet Height (m)
Z931	Guru Nanak Gurdwara, Smethwick	Roadside	402103	288616	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	4.52	1	4
Z935	Aquatics Centre, Smethwick	Roadside	400841	287811	NO_2, NO, O_3, PM_1, $PM_{2.5}$ &PM_{10}	Electrochemical Sensors & Optical Particulate Counter	5.4	3.36	4
Z1019	Trouse Lane, Wednesbury	Roadside	398524	295256	NO_2, NO, O_3, PM_1, $PM_{2.5}$ & PM_{10}	Electrochemical Sensors & Optical Particulate Counter	6.69	1.04	4


Legend
Faith Centres
Sports, Schools & Hospitals
Urban Areas
Trouse Lane Wednesbury
St Francis of Assisi Friar Park Wednesbury
Wesley Centre for All Walsall Street Wednesbury
Scotts Arms Great Barr
Gospel Oak Road Tipton
St Matthews Tipton
Yemeni Community Association West Bromwich
All Saints Way West Bromwich
Highfields Registry Office West Bromwich
Balaji Temple Oldbury
Halesowen Street Oldbury
Highbury Road / Mallin Street Smethwick
Guru Nanak Gurdwara Smethwick
Langley Primary Oldbury
Aquatics Centre Smethwick
MET Hospital Smethwick
Jamia Mosque Smethwick
Bearwood Primary Smethwick
High Street Rowley Regis
Shri Pashupatinath Rowley Regis
0
1
2 km
N

7. Zephyr® Specification

Table 7.1 Zephyr Specification

Pollutant	Unit	Estimated Accuracy (µg/m^3)	Lower Detection Limit (µg/m^3)	Upper Detection Limit (µg/m^3)
NO_2	µg/m^3	10.00	1.50	20,000.00
NO	µg/m^3	10.00	1.50	6000.00
O_3	µg/m^3	15.00	1.50	15,000.00
PM_{10}	µg/m^3	5.00	0.20	20,000.00
$PM_{2.5}$	µg/m^3	5.00	1.30	20,000.00
PM_1	µg/m^3	5.00	1.40	20,000.00
H_2S	µg/m^3	5.00	1.50	1500.00
CO	µg/m^3	0.30	0.03	40.00
SO_2	µg/m^3	20.00	1.50	6500.00
TVOC	ppb	-	0.00	15000.00
CO_2	ppm	30.00	350.00	5000.00
Temperature	°C	5.00	-20.00	45.00
Relative Humidity	%	5.00	0.00	100.00
Pressure	hPa	1.20	300.0	1100.00

8. Data Capture 2022

Data capture stats have been calculated assuming the maximum possible capture is one datapoint for each species on each hour of the hourly-averaged dataset. This calculation is agnostic of cause. Capture percentages below 95% are explained in the relevant quarterly summary reports where possible.

Using an hourly-averaged dataset means that capture stats may be lower or higher if using an alternative averaging period (i.e. capture rates are likely to be higher if calculated using the unaveraged data).

Table 8.1 Data Capture by Zephyr, Year & Cartridge slot (%)

'Z' Number	Site Name	NO_2	NO	O_3	PM_1	$PM_{2.5}$	PM_{10}
Z315	Highfields Registry Office	100.00	100.00	100.00	100.00	100.00	100.00
Z778	Gospel Oak Road	76.05	76.05	76.05	76.05	76.05	76.05
Z781	High Street	99.14	100.00	99.14	100.00	100.00	100.00
Z864	All Saints Way	75.78	75.78	75.78	75.78	75.78	75.78
Z870	Langley Primary	74.33	74.33	74.33	74.33	74.33	74.33
Z881	St Matthews	100.00	100.00	100.00	100.00	100.00	100.00
Z884	Bearwood Primary	54.23	54.23	54.23	54.23	54.23	54.23
Z887	MET Hospital	66.08	66.08	66.08	66.08	66.08	66.08
Z888	Halesowen Street	65.37	65.37	65.37	65.37	65.37	65.37
Z892	Wesley Centre for All	100.00	100.00	100.00	100.00	100.00	100.00
Z893	Scotts Arms	60.62	60.62	60.62	60.62	60.62	60.62
Z898	Highbury Road /	100.00	100.00	100.00	100.00	100.00	100.00
Z916	Balaji Temple	100.00	100.00	100.00	100.00	100.00	100.00
Z917	St Francis of Assisi, Friar Park	99.92	99.92	99.92	99.92	99.92	94.32
Z918	Shri Pashupatinath	86.47	86.47	86.47	86.47	86.47	86.47
Z919	Yemeni Community Association	94.47	94.47	94.47	94.47	94.47	94.47
Z920	Jamia Mosque	99.82	99.82	99.82	99.82	99.82	99.82
Z931	Guru Nanak Gurdwara	95.33	95.33	95.33	95.33	95.33	95.33
Z935	Aquatics Centre	100.00	100.00	100.00	100.00	100.00	100.00
Z1019	Trouse Lane	100.00	100.00	100.00	100.00	100.00	100.00

9. Zephyr® Nitrogen Dioxide (NO_2) Monitoring Results

Table 9.1 Annual Mean NO2 Monitoring Results (µg/m^3)

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	17.90	40	Y
Z778	Gospel Oak Road	76.05	17.97	40	Y
Z781	High Street	99.14	25.86	40	Y
Z864	All Saints Way	75.78	17.17	40	Y
Z870	Langley Primary	74.33	18.54	40	Y
Z881	St Matthews	100.00	23.16	40	Y
Z884	Bearwood Primary	54.23	27.19	40	Y
Z887	MET Hospital	66.08	15.56	40	Y
Z888	Halesowen Street	65.37	19.28	40	Y
Z892	Wesley Centre for All	100.00	23.84	40	Y
Z893	Scotts Arms	60.62	19.96	40	Y
Z898	Highbury Road /	100.00	13.62	40	Y
Z916	Balaji Temple	100.00	26.68	40	Y
Z917	St Francis of Assisi, Friar Park	99.92	15.23	40	Y
Z918	Shri Pashupatinath	86.47	11.23	40	Y
Z919	Yemeni Community Association	94.47	10.86	40	Y
Z920	Jamia Mosque	99.82	19.13	40	Y
Z931	Guru Nanak Gurdwara	95.33	26.92	40	Y
Z935	Aquatics Centre	100.00	18.31	40	Y
Z1019	Trouse Lane	100.00	17.17	40	Y

Table 9.2 24-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means >200 µg/m^3

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 1-Hour Means >200 µg/m^3	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z778	Gospel Oak Road	76.05	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z781	High Street	99.14	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z864	All Saints Way	75.78	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z870	Langley Primary	74.33	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z881	St Matthews	100.00	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z884	Bearwood Primary	54.23	12	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z887	MET Hospital	66.08	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z888	Halesowen Street	65.37	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z892	Wesley Centre for All	100.00	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z893	Scotts Arms	60.62	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z898	Highbury Road /	100.00	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z916	Balaji Temple	100.00	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 1-Hour Means >200 µg/m^3	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z917	St Francis of Assisi, Friar Park	100.00	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z918	Shri Pashupatinath	99.92	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z919	Yemeni Community Association	86.47	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z920	Jamia Mosque	94.47	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z931	Guru Nanak Gurdwara	99.82	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z935	Aquatics Centre	95.33	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y
Z1019	Trouse Lane	100.00	0	200 µg/m^3 not to be exceeded more than 18 times a year	Y

10. Zephyr® Nitrogen Oxide (NO) Monitoring Results

Table 10.1 Annual Mean NO Monitoring Results (µg/m^3)

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	0.46	30	Y
Z778	Gospel Oak Road	76.05	4.67	30	Y
Z781	High Street	100.00	12.70	30	Y
Z864	All Saints Way	75.78	16.88	30	Y
Z870	Langley Primary	74.33	6.13	30	Y
Z881	St Matthews	100.00	11.86	30	Y
Z884	Bearwood Primary	54.23	10.14	30	Y

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z887	MET Hospital	66.08	4.55	30	Y
Z888	Halesowen Street	65.37	6.60	30	Y
Z892	Wesley Centre for All	100.00	5.09	30	Y
Z893	Scotts Arms	60.62	11.11	30	Y
Z898	Highbury Road /	100.00	3.70	30	Y
Z916	Balaji Temple	100.00	26.06	30	Y
Z917	St Francis of Assisi, Friar Park	99.92	4.41	30	Y
Z918	Shri Pashupatinath	86.47	3.44	30	Y
Z919	Yemeni Community Association	94.47	4.97	30	Y
Z920	Jamia Mosque	99.82	0.62	30	Y
Z931	Guru Nanak Gurdwara	95.33	8.89	30	Y
Z935	Aquatics Centre	100.00	1.86	30	Y
Z1019	Trouse Lane	100.00	16.88	30	Y

11. Zephyr® Ozone (O_3) Monitoring Results

Table 11.1 Annual Mean O3 Monitoring Results (µg/m^3)

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	30.10	100	Y
Z778	Gospel Oak Road	76.05	53.88	100	Y
Z781	High Street	99.14	39.05	100	Y
Z864	All Saints Way	75.78	53.17	100	Y
Z870	Langley Primary	74.33	62.72	100	Y
Z881	St Matthews	100.00	47.62	100	Y
Z887	MET Hospital	66.08	52.33	100	Y

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	30.10	100	Y
Z888	Halesowen Street	65.37	52.09	100	Y
Z892	Wesley Centre for All	100.00	54.37	100	Y
Z893	Scotts Arms	60.62	40.63	100	Y
Z898	Highbury Road	100.00	44.75	100	Y
Z916	Balaji Temple	100.00	42.33	100	Y
Z917	St Francis of Assisi, Friar Park	99.92	61.07	100	Y
Z918	Shri Pashupatinath	86.47	73.06	100	Y
Z919	Yemeni Community Association	94.47	71.77	100	Y
Z920	Jamia Mosque	99.82	57.21	100	Y
Z931	Guru Nanak Gurdwara	95.33	24.52	100	Y
Z935	Aquatics Centre	100.00	45.27	100	Y
Z1019	Trouse Lane	100.00	53.17	100	Y

Table 11.2 8-Hour Mean NO_2 Monitoring Results, Number of 8-Hour Means >100 µg/m^3

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 8-Hour Means >100 µg/m^3	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	7	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z778	Gospel Oak Road	76.05	15	100 µg/m^3 not to be exceeded more than 10 times a year	N

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 8-Hour Means >100 µg/m^3	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z781	High Street	99.14	0	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z864	All Saints Way	75.78	15	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z870	Langley Primary	74.33	44	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z881	St Matthews	100.00	1	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z884	Bearwood Primary	54.23	17	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z887	MET Hospital	66.08	19	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z888	Halesowen Street	65.37	24	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z892	Wesley Centre for All	100.00	5	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z893	Scotts Arms	60.62	0	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z898	Highbury Road	100.00	2	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z916	Balaji Temple	100.00	5	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z917	St Francis of Assisi, Friar Park	99.92	22	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z918	Shri Pashupatinath	86.47	47	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z919	Yemeni Community Association	94.47	67	100 µg/m^3 not to be exceeded more than 10 times a year	N

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 8-Hour Means >100 µg/m^3	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z920	Jamia Mosque	99.82	13	100 µg/m^3 not to be exceeded more than 10 times a year	N
Z931	Guru Nanak Gurdwara	95.33	0	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z935	Aquatics Centre	100.00	5	100 µg/m^3 not to be exceeded more than 10 times a year	Y
Z1019	Trouse Lane	100.00	2	100 µg/m^3 not to be exceeded more than 10 times a year	Y

12. Zephyr® Particulate Matter 10 (PM_{10}) Monitoring Results

Table 12.1 Annual Mean PM_{10} Monitoring Results (µg/m^3)

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	10.74	40	Y
Z778	Gospel Oak Road	76.05	11.15	40	Y
Z781	High Street	100.00	11.77	40	Y
Z864	All Saints Way	75.78	8.70	40	Y
Z870	Langley Primary	74.33	11.46	40	Y
Z881	St Matthews	100.00	14.07	40	Y
Z884	Bearwood Primary	54.23	9.80	40	Y
Z887	MET Hospital	66.08	10.52	40	Y
Z888	Halesowen Street	65.37	10.07	40	Y
Z892	Wesley Centre for All	100.00	12.22	40	Y
Z893	Scotts Arms	60.62	10.11	40	Y
Z898	Highbury Road	100.00	10.29	40	Y
Z916	Balaji Temple	100.00	13.03	40	Y

Z917	St Francis of Assisi, Friar Park	94.32	12.71	40	Y
Z918	Shri Pashupatinath	86.47	10.37	40	Y
Z919	Yemeni Community Association	94.47	10.71	40	Y
Z920	Jamia Mosque	99.82	8.77	40	Y
Z931	Guru Nanak Gurdwara	95.33	12.31	40	Y
Z935	Aquatics Centre	100.00	11.68	40	Y
Z1019	Trouse Lane	100.00	8.70	40	Y

Table 12.2 24-Hour Mean PM10 Monitoring Results (µg/m^3)

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 24-Hour Means >50 µg/m^3	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z778	Gospel Oak Road	76.05	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z781	High Street	100.00	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z864	All Saints Way	75.78	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z870	Langley Primary	74.33	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z881	St Matthews	100.00	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z884	Bearwood Primary	54.23	2	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z887	MET Hospital	66.08	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z888	Halesowen Street	65.37	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z892	Wesley Centre for All	100.00	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z893	Scotts Arms	60.62	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z898	Highbury Road	100.00	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z916	Balaji Temple	100.00	1	50 µg/m^3 not to be exceeded more than 35 times a year	Y

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 24-Hour Means >50 µg/m^3	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z917	St Francis of Assisi, Friar Park	94.32	2	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z918	Shri Pashupatinath	86.47	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z919	Yemeni Community Association	94.47	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z920	Jamia Mosque	99.82	1	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z931	Guru Nanak Gurdwara	95.33	1	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z935	Aquatics Centre	100.00	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y
Z1019	Trouse Lane	100.00	0	50 µg/m^3 not to be exceeded more than 35 times a year	Y

13. Zephyr® Particulate Matter 2.5 ($PM_{2.5}$) Monitoring Results

Table 13.1 Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	UK Target Level (2040) (AQO)(µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	7.42	10	Y
Z778	Gospel Oak Road	76.05	9.09	10	Y
Z781	High Street	100.00	9.07	10	Y
Z864	All Saints Way	75.78	6.60	10	Y
Z870	Langley Primary	74.33	8.83	10	Y
Z881	St Matthews	100.00	10.18	10	Y
Z884	Bearwood Primary	54.23	8.22	10	Y
Z887	MET Hospital	66.08	8.22	10	Y
Z888	Halesowen Street	65.37	8.26	10	Y

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	UK Target Level (2040) (AQO)(µg/m^3)	Pollutant Concentration within Limit?
Z892	Wesley Centre for All	100.00	9.55	10	Y
Z893	Scotts Arms	60.62	8.45	10	Y
Z898	Highbury Road	100.00	8.24	10	Y
Z916	Balaji Temple	100.00	9.95	10	Y
Z917	St Francis of Assisi, Friar Park	99.92	9.57	10	Y
Z918	Shri Pashupatinath	86.47	8.39	10	Y
Z919	Yemeni Community Association	94.47	8.18	10	Y
Z920	Jamia Mosque	99.82	5.66	10	Y
Z931	Guru Nanak Gurdwara	95.33	9.49	10	Y
Z935	Aquatics Centre	100.00	9.30	10	Y
Z1019	Trouse Lane	100.00	6.60	10	Y

14. Zephyr® Particulate Matter 1 (PM_1) Monitoring Results

Table 14.1 Annual Mean PM_1 Monitoring Results (µg/m^3)

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z315	Highfields Registry Office	100.00	4.69	n/a	n/a
Z778	Gospel Oak Road	76.05	5.60	n/a	n/a
Z781	High Street	100.00	5.55	n/a	n/a
Z864	All Saints Way	75.78	3.00	n/a	n/a
Z870	Langley Primary	74.33	5.18	n/a	n/a
Z881	St Matthews	100.00	6.31	n/a	n/a
Z884	Bearwood Primary	54.23	4.54	n/a	n/a
Z887	MET Hospital	66.08	4.40	n/a	n/a

'Z' Number	Site Name	Valid Data Capture 2022 (%)	2022 Annual Average Pollutant Concentration (µg/m^3)	Defra Air Quality Objective (AQO) (µg/m^3)	Pollutant Concentration within Limit?
Z888	Halesowen Street	65.37	5.04	n/a	n/a
Z892	Wesley Centre for All	100.00	5.62	n/a	n/a
Z893	Scotts Arms	60.62	5.22	n/a	n/a
Z898	Highbury Road	100.00	5.41	n/a	n/a
Z916	Balaji Temple	100.00	6.08	n/a	n/a
Z917	St Francis of Assisi, Friar Park	99.92	5.85	n/a	n/a
Z918	Shri Pashupatinath	86.47	5.22	n/a	n/a
Z919	Yemeni Community Association	94.47	5.03	n/a	n/a
Z920	Jamia Mosque	99.82	3.01	n/a	n/a
Z931	Guru Nanak Gurdwara	95.33	5.25	n/a	n/a
Z935	Aquatics Centre	100.00	5.62	n/a	n/a
Z1019	Trouse Lane	100.00	3.00	n/a	n/a

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FIDAS	Fine Dust Analysis System
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NHS (ICB)	National Health Service – Integrated Care Board
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
ORCS	On-Street Residential Charge Schemes
OZEZ	Office for Zero Emission Vehicles
SO_2	Sulphur Dioxide
TfWM	Transport for West Midlands
WHO	World Health Organisation
WMCA	West Midlands Combined Authority

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017
- Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
- Defra. Air quality appraisal: damage cost guidance, July 2023
- Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018
- Census 2011. https://www.sandwelltrends.info/population-change-interactive-chart/ https://www.sandwelltrends.info/population-change-interactive-chart/
- WHO (2021) Global Air Quality Guidelines: https://apps.who.int/iris/handle/10665/345329
- Defra. Environmental Improvement Strategy https://www.gov.uk/government/publications/environmental-improvement-plan
- Department for Transport. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018
- Sandwell MBC ‘Smoke Control Area’ website https://www.sandwell.gov.uk/SmokeControlArea
- Sandwell MBC ‘Air Quality’ Website: https://www.sandwell.gov.uk/info/200274/pollution/485/air_quality/6
- Go Jaunty Website: https://www.gojauntly.com/sandwell
- Sandwell MBC ‘Car Share’ Website: https://liftshare.com/uk/community/sandwell
- Sandwell MBC ‘Travelwise’ Website: https://www.sandwell.gov.uk/info/200284/roads_travel_and_parking/1830/travelwise_in_sandwell
- Sandwell MBC ‘ Resilient Residents’ Website https://www.sandwell.gov.uk/resilientresidents

- Sandwell MBC Cycling and Walking Infrastructure plan 2020 https://www.sandwell.gov.uk/downloads/download/2500/sandwell_cycling_and_walking_infrastructure_plan
- Website: Sandwell MBC 'Healthy Sandwell' Website: https://www.healthysandwell.co.uk/
- Data.Gov.UK – Smoke Control Area Map: https://data.gov.uk/dataset/2e59be11-a9db-4b9e-8cbb-8e2f2567c588/sandwell-mbc-smoke-control-area
- Sandwell MBC Website 'Report a bonfire problem': https://www.sandwell.gov.uk/info/200274/pollution/3188/report_a_bonfire_problem
- Sandwell MBC Website 'Bins and Recycling' https://www.sandwell.gov.uk/info/200160/bins_and_recycling/2194/composting
- 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
- Sandwell MBC's Tree Preservation Orders and Urban Tree Policy https://www.sandwell.gov.uk/info/200248/parks_and_green_spaces/4916/trees
- The Woodland Trust: https://www.woodlandtrust.org.uk/
- The Black Country Low Emission Vehicle Programme: http://www.blackcountrytransport.org.uk/projects/ultra-low-emission-vehicle-programme.html
- GOV.UK.: Details of the boiler upgrade scheme https://www.gov.uk/apply-boiler-upgrade-scheme
- Sandwell Council Website: Eco Bus: https://www.sandwell.gov.uk/ecobus
- Which? Review of Eco Provider Energy Companies https://www.which.co.uk/news/article/which-eco-provider-energy-companies-revealed-for-2022-asQEp6s6jxrg
- GOV.UK.: Details on Workplace Electric Vehicle Charging Scheme: https://www.gov.uk/guidance/workplace-charging-scheme-guidance-for-applicants#site-eligibility
- Sandwell MBC Website: Air Quality Management Designation Order 2005: https://www.sandwell.gov.uk/downloads/file/768/air_quality_management_area_designation_order_2005
- West Midlands Combined Authority – Board Decision on proposed Air Quality Framework https://governance.wmca.org.uk/ieDecisionDetails.aspx?ID=952

- West Midlands Combined Authority: Strategy: https://www.wmca.org.uk/what-we-do/strategy/Travel for West Midlands: Encouraging cycling in the West Midlands: https://www.tfwm.org.uk/strategy/sustainable-travel/

- Sandwell MBC 'Smoke Control Area Public Consultation Results and Analysis Report' https://www.sandwell.gov.uk/downloads/file/33486/smoke_control_area_public_consultation_results_and_analysis

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

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

- Sandwell MBC – Council's Successful bid for On Street Residential Electric Vehicle Charging Points (Feb 2022) https://www.sandwell.gov.uk/news/article/6345/sandwell_council_makes_successful_bid_for_300000_electric_vehicle_chargepoint_funding

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

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

- GOV.UK – Air Quality Statistics – Emissions of Air Pollutants in the UK (PM10 and PM2.5)_https://www.gov.uk/government/statistics/emissions-of-air-pollutants/emissions-of-air-pollutants-in-the-uk-particulate-matter-pm10-and-pm25

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

- Guardian News Article – Spring Air Pollution – April 2022 https://www.theguardian.com/environment/2022/apr/22/law-needs-to-protect-uk-from-spring-air-pollution-increase

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

- 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

- Defra - Nitrogen dioxide diffusion tube monitoring calendar of suggested exposure periods 2022: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-monitoring-calendar/

- Defra – Diffusion Tube Data Processing Tool - https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-data-processing-tool/