

Meeting of:	Cabinet
Date of Meeting:	Thursday, 17 November 2022
Relevant Scrutiny Committee:	Environment and Regeneration
Report Title:	Local Air Quality Management Annual Progress Report 2022
Purpose of Report:	To seek approval for the 2022 Local Air Quality Management Annual Progress Report (APR) on air quality monitoring conducted in 2021 to enable submission to Welsh Government no later than 31st December, 2022.
Report Owner:	Cabinet Member for Community Engagement, Equalities and Regulatory Services
Responsible Officer:	Miles Punter Director of Environment and Housing Services
Elected Member and Officer Consultation:	Head of Service for Shared Regulatory Services Head of Legal and Democratic Services/Monitoring Officer Section 151 Officer
Policy Framework:	This is a matter for Executive decision by Cabinet
<p>Executive Summary:</p> <ul style="list-style-type: none"> • Under Section 82 of the Environment Act 1995 every local authority has an obligation to regularly review and assess air quality in their areas, and to determine whether air quality objectives are likely to be achieved. • In pursuance of this, the Council produces an Annual Progress Report on Local Air Quality Management. • The 2022 report satisfies the relevant legal requirements examining results of air quality monitoring undertaken across the Vale of Glamorgan during 2021. • The Annual Progress Report needs to be approved and issued to Welsh Government no later than 31st December, 2022 • The report confirms that air quality within the Vale of Glamorgan continues to meet all the relevant air quality objectives. 	

Recommendations

1. That Cabinet notes the monitored results gathered in 2021.
2. That Cabinet approves the 2022 Annual Progress Report, attached at Appendix 1 to this report, for submission to Welsh Government for approval.

Reasons for Recommendations

1. and 2.

To fulfil the requirements of the statutory Local Air Quality Management (LAQM) process under Part IV of the Environment Act 1995.

1. Background

- 1.1 The LAQM process places a statutory duty on all local authorities to regularly review and assess air quality in their areas and to determine whether the air quality objectives to protect health are likely to be achieved.
- 1.2 Welsh Government issues statutory policy guidance to Local Authorities under Section 88 of the Environment Act 1995 to bring the local air quality management system in Wales into line with the sustainable development principle outlined in Welsh Government's Well-being for Future Generations Act 2015. This guidance, with which local authorities must have regard when carrying out their air quality functions under the Environment Act 1995, sets out that authorities in Wales have to produce an Annual Progress Report in draft form by 30th September each year and publish it by 31st December at the latest.
- 1.3 The Annual Progress Report must include monitoring results for the previous calendar year, a progress report on action plan implementation and an update on any new policies or developments likely to affect local air quality.
- 1.4 Note that during the 2020 calendar year, the Windsor Road, Penarth Air Quality Management Area (AQMA) was still in place. Following consideration previously by Cabinet, it was revoked in January 2021.

2. Key Issues for Consideration

- 2.1 In 2021 there were 47 specifically allocated non-automatic monitoring sites across the Vale of Glamorgan which monitored levels of nitrogen dioxide (NO₂). The non-automatic sites do not provide live data; instead, they consist of diffusion tubes which are placed at each of the sites, collected and replaced on a rolling monthly basis. The results derived from the tube sampling are then averaged over the year to enable a comparison of the results against the annual average (40 µg/m³) and 1-hour (200 µg/m³ not to be exceeded > 18 times per year) air quality objectives for NO₂.

- 2.2** From the 47 locations monitored throughout the Vale with the use of passive diffusion tubes, no sites breached the national NO₂ annual objective of 40µg/m³ or the NO₂ 1-hour objective (200 µg/m³ , not to be exceeded more than 18 times per year).
- 2.3** The results of the monitoring indicate that the annual average particulate matter PM₁₀ concentrations at AQmesh indicative monitoring stations located in Barry and Saint Brides Major were compliant with the annual air quality objective of (40µg/m³) and 24-hour (50µg/m³ not to be exceeded >35 times per year).

3. How do proposals evidence the Five Ways of Working and contribute to our Well-being Objectives?

- 3.1** The Well-Being of Future Generations (Wales) Act 2015 places a ‘well-being duty’ on public bodies aimed at achieving seven national well-being goals for Wales - a Wales that is prosperous, resilient, healthier, more equal, has cohesive communities, a vibrant culture and thriving Welsh language, and is globally responsible.
- 3.2** In discharging its duties under the 2015 Act, the Council has set and published Well-being objectives designed to maximise its contribution to achieving the national Well-being goals. The Well-being objectives are set out in Vale Council's Well-being Objectives and Improvement Plan
<https://www.valepsb.wales/en/Our-Plan.aspx>
- 3.3** When exercising its functions, the Council is required to take all reasonable steps to meet its Well-being objectives. This means that the decision makers should consider how the proposed decision will contribute towards meeting the Well-being objectives and must be satisfied that all reasonable steps have been taken to meet those objectives.
- 3.4** The Well-being duty also requires the Council to act in accordance with a ‘sustainable development principle’. This principle requires the Council to act in a way which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs. Put simply, this means that Council decision makers must take account of the impact of their decisions on people living their lives in Wales in the future. In doing so, the Council must:
- Look to the long term;
 - Focus on prevention by understanding the root causes of problems;
 - Deliver an integrated approach to achieving the seven national well-being goals;
 - Work in collaboration with others to find shared sustainable solutions; and
 - Involve people from all sections of the community in the decisions which affect them.

- 3.5** The Corporate Plan for the Vale of Glamorgan Council for 2020-2025, includes a Well-Being Outcome which is - An Environmentally Responsible and Prosperous Vale. A key part of this outcome states that The Vale of Glamorgan Council will look 'to protect our environment for future generations.'
- 3.6** The Annual Progress Report demonstrates that currently Air Quality within the Vale meets air quality objectives set in Wales and exhibits that The Vale of Glamorgan Council is meeting its desired objectives and outcomes.

4. Climate Change and Nature Implications

- 4.1** The Annual Progress Report provides the latest full data set of air quality monitoring data for the Vale of Glamorgan.
- 4.2** One of the key challenges identified in Project Zero is to achieve a modal shift away from cars to more sustainable forms of transport with an increase in walking, cycling and the use of less polluting transport.
- 4.3** Given that road transportation is one of the key contributors to air pollution the ongoing assessment of air quality data trends will assist the Council in assessing the impact of Project Zero and interventions to increase modal shift. By increasing modal shift to more sustainable forms of transport it is anticipated that further improvements to air quality will be achieved and thus future air quality monitoring results will provide supporting evidence on the progression of Project Zero.

5. Resources and Legal Considerations

Financial

- 5.1** SRS has an existing budget to complete a programme of air quality monitoring across the Vale.

Employment

- 5.2** There are no employment implications.

Legal (Including Equalities)

- 5.3** With regards to annual reporting requirements under the LAQM regime, Welsh Government issues statutory policy guidance to Local Authorities under section 88 of the Environment Act 1995 to bring the local air quality management system in Wales into line with the sustainable development principle in our Future Generations legislation. This guidance, with which local authorities must have regard to when carrying out their air quality functions under the 1995 Act, sets out that authorities in Wales have to produce an Annual Progress Report in draft form by 30th September each year and publish it by 31st December at the latest. This must include monitoring results for the previous calendar year, a progress

report on action plan implementation and an update on any new policies or developments likely to affect local air quality.

- 5.4** Section 82 of the Environment Act 1995 places a duty on all Local Authorities to review periodically air quality in their area. This includes assessment of compliance of present and likely future air quality to comply with the objectives of the Air Quality (Wales) Regulations 2010.
- 5.5** Where air quality is unlikely to meet the objectives Section 83 of the Environment Act 1995 requires that the Council declares an Air Quality Management Area.
- 5.6** Section 84 of the Environment Act 1995 places a duty on the Council to develop an Action Plan to address the situation.
- 5.7** The Authority has a statutory duty to produce and publish reports fulfilling the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and relevant Policy.
- 5.8** There are no equal opportunities implications from the publication of the report. Invitations to comment will be sent to all known stakeholders and interest groups to provide an opportunity for comments.

6. Background Papers

None.



Vale of Glamorgan Council 2022 Air Quality Progress Report

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

July 2022

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Report Reference number	2022 Air Quality Progress Report for Vale of Glamorgan Council
Date	July 2022

Executive Summary: Air Quality in Our Area

Public Health

What has become distinctly apparent is that air Pollution is a local and national problem. Long-term exposure reduces life expectancy by increasing mortality, as well as increasing morbidity risks from heart disease and strokes, respiratory diseases, lung cancer and other effects.

What we know is that poor air quality in Wales poses a significant concern for Public Health and is regarded as the most significant environmental determinant of health. Its associated adverse risk to public health is particularly prevalent within urban areas and near major roads. The pollutants of primary concern for public health are particulate matter and primary/ secondary derived nitrogen dioxide (NO₂). Both pollutants primarily originate from motor vehicles.

The UK expert Committee on the Medical Effects of Air Pollution (COMEAP) estimates that air pollution is responsible for “an effect equivalent of between 28,000 and 36,000 deaths (at typical ages) each year”¹. This does not mean there are ‘actual’ deaths from air pollution exposure; rather, that the reduced life expectancy which everyone experiences because of air pollution exposure (6-8 months on average but could range from days to years) is ‘equivalent’ to between 28,000 and 36,000 deaths when summed. In Wales, based on the latest data available (for 2017)², Public Health Wales estimates the burden of long-term air pollution exposure to be the equivalent of 1,000 to 1,400 deaths (at typical ages) each year.

Despite the efforts made by national government and local authorities there is an apparent disconnect between air quality management and Public Health. The status of Air Quality management in Wales focuses upon a hotspot approach and fails to reference other factors such as socioeconomic status or exposure to other environmental determinants of health.

Fundamentally, it is plausible that air pollution affects everyone to some extent. Whilst the legislative air quality limit values are based on epidemiological evidence and are ultimately intended to protect public health, there is also recognition that health effects may be experienced below these thresholds for some of the key pollutants (e.g., PM_{2.5} and NO₂), particularly affecting the most susceptible groups: young children, the elderly and those with pre-existing health conditions and comorbidities. Acknowledged as the triple jeopardy concept- air pollution combines with other aspects of the social and physical environment to create an inequitable disease burden on more deprived parts of society; populations of areas with low socioeconomic status are prone to exacerbated effects from exposure to air pollution. In part this is because they are more likely to suffer pre-existing health conditions as a result of their poorer living conditions and lifestyle, and

¹ COMEAP (2018). Associations of long-term average concentrations of nitrogen dioxide with mortality. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/734799/COMEAP_NO2_Report.pdf

² Welsh Government StatsWales. <https://statswales.gov.wales/Catalogue/Environment-and-Countryside/Air-Quality/airqualityindicators>

also as they are more vulnerable, being more likely to be living in areas with higher levels of air pollution.

The impact of Covid-19 on Air Quality Monitoring

The COVID-19 pandemic has impacted air quality at local, regional and national scales and presented challenges to Local Authorities in undertaking statutory LAQM duties. The impact of Covid-19 on air quality is identified in Appendix D.

Air Quality in the Vale of Glamorgan

Local authorities have a statutory duty under Part IV of the Environment Act 1995 & Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 to manage local air quality. Under Section 82 of the Environment Act 1995 the Local Air Quality Management (LAQM) process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether air quality objectives are likely to be achieved.

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138) and Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298). Where the air quality reviews indicate that the air quality objectives may not be met the local authority is required to designate an Air Quality Management Area (AQMA). Action must then be taken at a local level and outlined in a specific Air Quality Action Plan (AQAP) to ensure that air quality in the identified area improves.

In line with the Vale of Glamorgan Council's (VoGC) statutory duties, under Part IV of the Environment Act 1995 Shared Regulatory Services (SRS) on behalf of VoGC undertakes regular air quality monitoring at specifically allocated locations across the Vale District using automated and non-automated principles for ambient air, nitrogen dioxide (NO₂), particulate matter (PM₁₀) & ozone (O₃).

With regards to prioritising ambient air quality sampling locations, the Council adopts a risk-based approach to any allocation of monitoring sites, considering the requirements of The Department for Environment, Food and Rural Affairs' (Defra) Local Air Quality Management (LAQM) Technical Guidance 16 (TG16), April 2021 . The designated monitoring locations are assigned based on relevant exposure and where the certain Air Quality Objective levels for a particular pollutant applies. TG (16) states that annual mean objectives should apply at "All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc."

Automatic Monitoring Sites

In 2018, SRS gave commitment to enhance monitoring capabilities via purchasing two near real time indicative air quality analysers. The analysers have been specifically placed in the Barry locality of The Vale of Glamorgan Council area and represent relevant exposure. The analysers continuously monitor for Nitric Oxide, Nitrogen Dioxide & Ozone, PM10 & PM2.5, and do so every 15 minutes

(the data for this is uploaded every hour). Information regarding the specification of the monitors can be viewed at <https://www.aqmesh.com/product/>. These monitors do not form part of the regulated Welsh automated monitoring network, but as specified they are an indicative form of monitoring and a useful tool to look at datasets on a high-resolution basis. In 2021, these monitors were placed in Dock View Road, Barry & Buttrills Road, Barry.

In February 2021, another monitor was installed in St Brides Major to assess the impact of air quality for the 20mph speed limit pilot scheme in the village.

The scheme in St Brides is part of a Welsh Government pilot project designed to gather data on whether 20mph should be the new default lower speed setting across the Country. Peterson-supercity was also proposed for that project, but after not being selected to take part, the Council opted to implement a 20mph zone itself.

It should be noted that due to the lack of QA procedures, regular instrument calibration and the use non-standard reference methods, the provided indicative automatic data cannot be used for formal assessment of compliance with any air quality objective.

Details of the monitoring sites and their collected datasets can be viewed via the SRS webpage at:

English: <https://www.srs.wales/en/Environmental-Health/Noise-and-Air-Pollution/Air-quality-and-pollution/Air-Monitoring.aspx>

Welsh: <http://www.srs.wales/cy/Environmental-Health/Noise-and-Air-Pollution/Air-quality-and-pollution/Air-Monitoring.aspx>

You will note that results are compared with the following air quality objectives.

Nitrogen Dioxide (NO₂)

Annual Average not to exceed 40 µg/m³ (micrograms per metre cubed); and
1 Hour average not to exceed 200 µg/m³ more than 18 times per year.

PM₁₀

Annual Average not to exceed 40µg/m³; and
24 Hour Mean not to exceed 50 µg/m³ more than 35 days per year.

PM_{2.5}

Annual Average not to exceed 25 µg/m³.

Non-automatic Monitoring Sites

In 2021 there were 47 specifically allocated non-automatic monitoring sites across the Vale which monitored levels of nitrogen dioxide (NO₂). These sites are supported and maintained by SRS on behalf of the VoGC. The non-automatic sites do not provide live data; instead, they consist of diffusion tubes which are placed at each of the sites, collected and replaced on a rolling monthly basis. The results derived from the tube sampling are then averaged over the year to enable a comparison of the results against the annual average (**40 µg/m³**) and 1-hour (**200 µg/m³ not to be exceeded > 18 times per year**) air quality objectives for NO₂.

This Annual Progress Report confirms that in 2021 air quality within the Vale of Glamorgan continues to meet the relevant air quality objectives at all monitored locations.

From the 47 locations monitored throughout the Vale with the use of passive diffusion tubes, no sites breached the national NO₂ annual objective of 40µg/m³ or the NO₂ 1-hour objective (**200 µg/m³ , not to be exceeded more than 18 times per year**). Detailed in the Local Air Quality Management (LAQM) TG (16)³, paragraphs 7.90 & 7.91 focus on predicting exceedances of the NO₂ 1-hour objective (**200 µg/m³ , not to be exceeded more than 18 times per year**) with the use of NO₂ diffusion tubes. It is stated that *“exceedances of the NO₂ 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m³ .”* Therefore, based on the 2021 datasets it can be concluded that the NO₂ 1-hour objective was not breached.

Improved monitoring

To improve its monitoring capabilities, for 2021, as part of a yearly review SRS have installed indicative automatic monitors at Buttrills Road, Barry and St Brides Major.

An additional non-automatic diffusion tube monitoring site was implemented near the A48, Sycamore Cross.

Reporting of this data is included in Section 2.2 of this report.

How to Get Involved

VoGC welcomes any correspondence relating to air quality enquiries or concerns. Shared Regulatory Services (SRS) Specialist Services Team represents VoGC for air quality management and therefore is contactable via the webpage www.srs.wales/en/Home.aspx. Hourly and monthly average monitoring data for pollutants measured at the Penarth, Windsor Road site is available at <https://airquality.gov.wales/>

³ <https://laqm.defra.gov.uk/documents/LAQM-TG16-April-21-v1.pdf>

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1 Actions to Improve Air Quality

1.1 Previous Work in Relation to Air Quality

First Round of Review and Assessment

Between 1999 and 2001, the Vale of Glamorgan Council published reports corresponding to stages 1, 2 and 3 of the first round of review and assessment of air quality. These assessments predicted no exceedances of any of the objectives but concluded that monitoring should continue for nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and particulate matter (PM₁₀).

Second Round of Review and Assessment

Following new technical and policy guidance issued by Defra, the Vale published its first Updating and Screening Assessment (USA) in June 2003. The USA concluded that no nitrogen dioxide or (PM₁₀) exceedances were likely but that monitoring should continue. However, it was suggested that there was a requirement to continue to a Detailed Assessment for the 15- minute limit of SO₂ in Rhose.

The Council proceeded to publish Progress Reports in 2004 and 2005, which identified exceedances of the 15-minute SO₂ objectives in Rhose. The Council therefore proceeded to publish a Detailed Assessment in 2005 which concluded that there was no need to declare an AQMA but to continue monitoring.

Third Round of Review and Assessment

The published its second USA in June 2006, which again concluded that there was no requirement to go onto the detailed stage. However, the USA did note that NO₂ concentrations were close to the limit at Penarth due to road works and recommend that a Detailed Assessment to be carried out if there was no change.

The Council published Progress Reports in 2007 and 2008, which identified that nitrogen dioxide concentrations continued to be close to the limit value at Penarth. A Detailed Assessment was recommended.

The Detailed Assessment of NO₂ in the Penarth area was published in June 2009. It concluded that there were no exceedances of either NO₂ limit but recommended continued monitoring.

Fourth Round of Review and Assessment

The Council published its third USA in June 2009. Nitrogen Dioxide, Sulphur Dioxide and Particulate Matter (PM₁₀) were being monitored in the area by both the Vale and RWENpower. There were no recorded nitrogen dioxide exceedances however; annual mean concentration at Windsor Road in Penarth was close to the limit. There were no exceedances of SO₂ 15-minute or 24-hour means. There were 6 exceedances of the PM₁₀ daily mean concentration and no exceedances of the PM₁₀ annual mean objective.

The 2010 Progress Report concluded that there were no exceedances of the relevant standards for any of the pollutants measured and that there was no need to proceed to a Detailed Assessment. The 2011 Progress Report concluded that there were no exceedances of the NO₂ or SO₂ objectives; however, NO₂ concentrations remain close to objective in some places. Several exceedances of the 24-hour mean for PM₁₀ were recorded in Fonmon and Penarth but still remained within the permitted 35 exceedances per annum.

Fifth Round of Review and Assessment

The Vale of Glamorgan Council published its fourth USA in April 2012, which again concluded that some locations continued to be at or close to the annual mean NO₂ concentrations. Appendix D of the report contains a Detailed Assessment of the air quality in Cogan.

The Detailed Assessment identified several locations on Windsor Road in Penarth, where the annual mean NO₂ objective was likely to be exceeded and that no exceedances of the 1-hour mean were likely. It was therefore recommended that an Air Quality Management Area (AQMA) be declared to include, as a minimum the residential properties with concentrations $\geq 36 \mu\text{g}/\text{m}^3$. It was also recommended that the monitoring network be extended to include locations at the façade of properties on Windsor Road, the results of which could be used to inform a further assessment.

The 2013 Progress Report recommended that; diffusion tubes with consistently low, compliant concentrations, be re-deployed in new locations; additional tubes be placed at locations where the NO₂ concentrations are consistently close to the annual mean objective with relevant exposure; Penarth's automatic monitor be relocated to within the proposed AQMA; and that the indicative

PM₁₀ monitor be replaced with a gravimetric equivalence monitor. The 2014 Progress Report concluded that there was no need to proceed to a Detailed Assessment for any of the pollutants monitored.

An AQMA was declared on 1st August 2013 for a section of Windsor Road, Penarth with respect to the annual mean objective NO₂. NO₂ concentrations were high due to congested traffic moving through a partial 'street canyon' with residential exposure along the western flank. The AQMA is highlighted in Figure 1.

Sixth Round of Review and Assessment

The Council published its fifth USA in May 2015 which confirmed that air quality within the Vale of Glamorgan continued to meet the relevant air quality objectives, including within the existing Air Quality Management Area (Windsor Road, Penarth). 2015's USA also highlighted the need for further investigations with regards to three biomass boiler installations.

The **2016** Annual Progress Report⁴ confirmed that air quality within the Vale of Glamorgan continued to meet the relevant air quality objectives, including within the existing Air Quality Management Area (Windsor Road, Penarth). It was highlighted that it would be decided following the examination of the 2016 dataset whether to revoke the Windsor Road, Penarth AQMA. Three biomass boiler installations were investigated, and it was ascertained if their emissions would breach targeted emission thresholds.

The **2017** Annual Progress Report⁵ confirmed that air quality within the Vale of Glamorgan continued to meet the relevant air quality objectives, including within the existing Air Quality Management Area (AQMA) on Windsor Road, Penarth.

Following a review of the 2016 NO₂ diffusion tube network, it was agreed to assign and relocate new monitoring locations. The new locations have been allocated based on known areas of particularly elevated traffic flows and foreseeable development, all with nearby relevant exposure.

⁴ <https://www.srs.wales/Documents/Pollution/Air-Quality-Reports/16.09.21-Air-Quality-Progress-Report-2016-May-2016-Revised-LTP-and-LDP.pdf>

⁵ <https://www.srs.wales/Documents/Air-Quality/6398-6337-2-27.09.17-2017-Vale-Annual-Progress-Report.pdf>

These newly monitored areas for 2017 are Llantwit Major, Gileston, St Athan, Rhoose (Fonmon), Barry Docks and Saint Brides Major.

The **2018** Annual Progress Report⁶ confirmed that air quality within the Vale of Glamorgan continued to meet the relevant air quality objectives, including within the existing Air Quality Management Area (AQMA) on Windsor Road, Penarth. It was made a priority that the decision to revoke the Windsor Road, Cogan, Penarth AQMA was supported by a detailed assessment and a public consultation was undertaken to review the supporting assessment prior to submission to Welsh Government to formalise the revocation of the AQMA Order.

The **2019** Annual Progress Report⁷ confirmed that air quality within the Vale of Glamorgan continued to meet the relevant air quality objectives, including within the existing Air Quality Management Area (AQMA) on Windsor Road, Penarth. It was made a priority that the decision to revoke the Windsor Road, Cogan, Penarth AQMA was supported by a detailed assessment and a public consultation was undertaken to review the supporting assessment prior to submission to Welsh Government to formalise the revocation of the AQMA Order.

The **2020** Annual Progress Report⁸ confirmed that air quality within the Vale of Glamorgan continued to meet the relevant air quality objectives, including within the existing Air Quality Management Area (AQMA) on Windsor Road, Penarth. The revocation order for the Windsor Road, Cogan, Penarth AQMA came into force on 1st January 2021.

The **2021** Annual Progress Report⁹ confirmed that air quality within the Vale of Glamorgan continued to meet the relevant air quality objectives. The Covid-19 pandemic and associated restrictions had a considerable impact on air quality during the period of 2020. In 2020 a reduction of 19% in the NO₂ annual mean concentration was experienced at all roadside diffusion tube monitoring sites relative to 2019. The automatic monitor located at Windsor Road; Penarth showed

⁶ <https://www.srs.wales/Documents/Air-Quality/7313-7298-Vale-Council-2018-Air-Quality-Progress-Report.pdf>

⁷ <https://www.srs.wales/Documents/Air-Quality/8124-8140-Vale-Council-Annual-Air-Quality-Progress-Report-2019.pdf>

⁸ <https://www.srs.wales/Documents/Air-Quality/8839-8911-2-Vale-Council-2020-Air-Quality-Progress-Report.pdf>

⁹ <https://www.srs.wales/Documents/Air-Quality/9847-9976-Vale-of-Glamorgan-Air-Quality-Annual-Progress-Report-2021.pdf>

a reduction in NO₂ daily mean concentrations of 41% for the months of April to June 2020 relative to the previous months of January to March 2020. A total reduction of 22% in NO₂ annual mean concentration was also experienced at Windsor Road, Penarth monitoring station compared to 2019.

1.2 Air Quality Management Areas

Where the air quality reviews indicate that the air quality objectives are not being achieved, or are not likely to be achieved, Section 83 of the 1995 Environment Act requires local authorities to designate an Air Quality Management Area ('AQMA'). Air Quality Management Areas (AQMAs) are declared when air quality is close to or above an acceptable level of pollution (known as the air quality objective (Please see Appendix A)). Section 84 of the Act ensures that action must then be taken at a local level which is outlined in a specific Air Quality Action Plan (AQAP) to ensure that air quality in the identified area improves. The authority must prepare a **DRAFT** Air Quality Action Plan (AQAP) within 18 months setting out measures it intends to put in place to improve air quality to at least the air quality objectives, if not even better. The AQAP must be **formally** adopted prior to 24 months has elapsed. AQMA(s) are seen by local authorities as the focal points to channel resources into the most pressing areas of pollution as a priority.

Due to the revocation of the Windsor Road, Penarth AQMA on the 1st of January 2021, there are now no AQMAs within the Vale of Glamorgan Council area.

2 Air Quality Monitoring Data and Comparison with Air Quality Objectives

2.1 Summary of Monitoring Undertaken in 2021

2.1.1 Automatic Monitoring Sites

The Vale of Glamorgan Council operated three indicative automatic monitor stations during 2021.

Dock View Road & Buttrills Road Indicative Monitors

As previously discussed, in 2018 SRS on behalf of the VoGC has commissioned two near real-time indicative automatic monitors. The AQMesh analysers continuously monitor for Nitric Oxide, Nitrogen Dioxide & Ozone, PM₁₀ & PM_{2.5}, and do so every 15 minutes (data uploaded every hour). The data from the monitor is sent to a cloud server where it is corrected for temperature, pressure and relative humidity as well as cross gas interference.

St Brides Major Indicative Monitor

In February 2021, an indicative automatic monitor (AQMesh Pod) was installed at St Brides Major. The monitor captures datasets every 15 minutes and displays hourly average readings for NO₂, PM₁₀ & PM_{2.5}. The site is located within a designated 20mph pilot scheme area. This monitor does not form part of the regulated Welsh automated monitoring network but is an indicative form of monitoring and a useful tool to look at datasets on a high-resolution basis.

2.1.2 Non-Automating Monitoring Sites

Shared Regulatory Services (SRS) on behalf of the Vale of Glamorgan Council carries out monitoring of ambient air quality for Nitrogen Dioxide (NO₂). During 2021, monitoring of NO₂ using passive diffusion tubes has been carried out at 47 locations throughout the Vale.

NO₂ Diffusion Tube Locations

The location of where NO₂ monitoring has taken place.

- a. Cowbridge (Area A)
- b. Llantwit Major (Area B)
- c. Saint Brides Major (Area C)

- d. Culverhouse (Area D)
- e. Dinas Powys (Area E)
- f. Penarth (Area F)
- g. Barry/ Sully (Area G)

Laboratory Methods and Analysis of Diffusion Tubes

Analysis of the exposed tubes is carried out by Socotec UK Ltd, Didcot operating procedure ANU/SOP/1015. The tubes are prepared by spiking acetone:triethanolamine (50:50) on the grids prior to the tubes being assembled. The tubes are desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection. As set out in the practical guidance, the results were initially calculated assuming an ambient temperature of 11°C and then adjusted to 20°C to allow direct comparison with EU limits. The national bias correction factor for this laboratory was utilised as opposed to our own local co-location data. Adopting best practice guidance and adopting a conservative approach a bias correction factor of 0.78 was obtained and applied using the DEFRA website which is available using the following link: <https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

Where valid data capture for the year is less than 75% (9 months), where necessary the continuous and NO₂ diffusion tube monitoring data have been “annualised” following the methods as described in Defra’s LAQM (TG16), Boxes 7.9 & 7.10.

Where an exceedance is measured at a monitoring site not representative of public exposure, NO₂ concentration at the nearest relevant exposure has been estimated based on the “NO₂ fall-off with distance” calculator ([http://laqm.defra.gov.uk/tools-monitoring-data/NO₂-falloff.html](http://laqm.defra.gov.uk/tools-monitoring-data/NO2-falloff.html)). The procedure is described in LAQM (TG16), Section 7.77-7.79.

Table 1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
St Brides Major	Ewenny Road, St Brides Major	Roadside	289439	174660	2.5	NO ₂ & PM ₁₀	N	Electrochemical Sensor	Y (2m)	2m	N
Dock View Road	Dock View Road, Barry	Roadside	312401	167947	3.5	NO ₂ & PM ₁₀	N	Electrochemical Sensor	Y (2.5m)	1.5m	Y
Buttrills Road	Buttrills Road, Barry	Roadside	311269	168362	4	NO ₂ & PM ₁₀	N	Electrochemical Sensor	Y (3m)	0.5m	N

Map(s) of Automatic Monitoring Sites

Figure 1 - Map of indicative monitoring pods in Barry

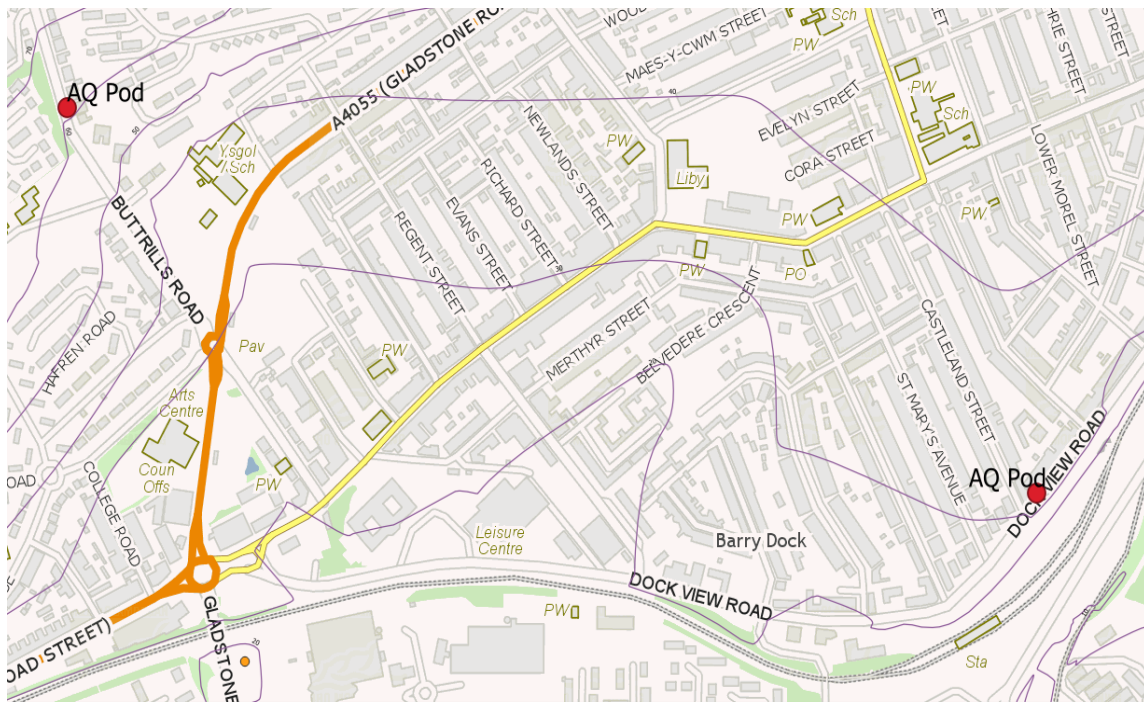


Figure 2 - Map of indicative monitoring pod in St Brides Major

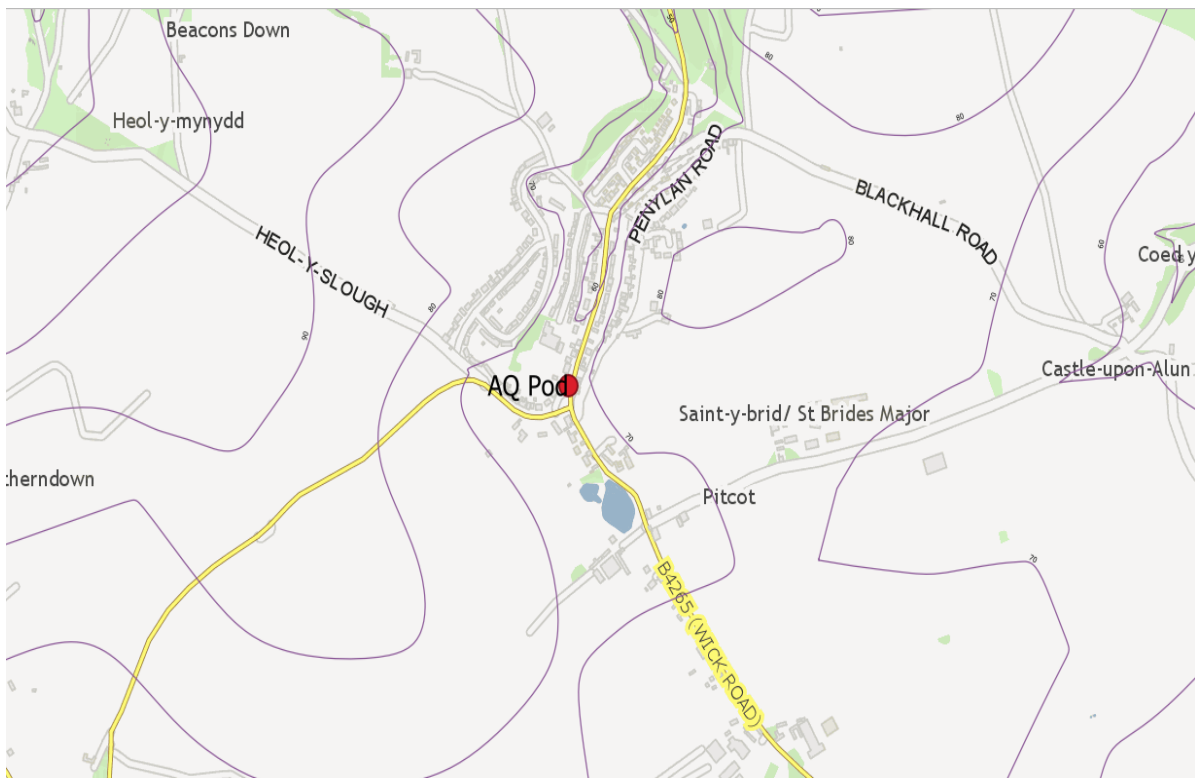


Table 2 – Details of Non-Automatic Monitoring Sites in Cowbridge

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
COWBRIDGE											
65	1 Riverside Mews, Cowbridge	Roadside	299614	174592	1.5	NO ₂	N	N	Y (0.00)	4m	Y
101	37 Westgate House	Kerbside	298903	174907	1.5	NO ₂	N	N	Y (0.00)	0.75m	Y
108	4 Cardiff Road, Cowbridge	Kerbside	299967	174311	1.5	NO ₂	N	N	Y (0.00)	0.75m	Y
118	6 Middlegate Walk, Cowbridge	Urban Background	299646	174920	1.5	NO ₂	N	N	Y (0.00)	30m	Y

Table 3 – Details of Non-Automatic Monitoring Sites in Llantwit Major

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
LLANTWIT MAJOR											
93	Le Pouliguen Way	Roadside	297171	168741	1.5	NO ₂	N	N	Y (0.00)	4.8m	Y
94	5 Boverton Road	Roadside	297069	168715	1.5	NO ₂	N	N	Y (0.00)	7.4m	Y
96	Old Froglands Farm	Suburban	299045	169126	1.5	NO ₂	N	N	Y (0.00)	86m	Y

Table 4 – Details of Non-Automatic Sites in Saint Brides Major

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
SAINT BRIDES MAJOR											
103	September Cottage	Roadside	289530	174896	1.5	NO ₂	N	N	Y (0.00)	6.5m	Y
104	Greengate Cottage	Roadside	289496	174858	1.5	NO ₂	N	N	Y (0.00)	12.5m	Y
105	St. Brides Primary School Walkway Entrance	Kerbside	289473	174752	1.5	NO ₂	N	N	N (8.05)	0.95m	N
106	Dany Bryn House	Roadside	289454	174668	1.5	NO ₂	N	N	Y (0.00)	2.1m	Y
107	Hillboro	Roadside	289512	174805	1.5	NO ₂	N	N	Y (0.00)	7.5m	Y

Table 5 – Details of Non-Automatic Sites in Brooklands Terrace, Culverhouse Cross

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
CULVERHOUSE											
38	2 Horseshoes	Roadside	311892	174513	1.5	NO ₂	N	N	Y (0.00)	2m	Y

Table 6 – Details of Non-Automatic Sites in Dinas Powys

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DINAS POWYS											
46	46 Cardiff Road	Roadside	315747	171369	1.5	NO ₂	N	N	Y (0.00)	5m	N
61	Railway Terrace	Roadside	316433	171932	2.5	NO ₂	N	N	Y (0.00)	2m	Y
67	2 Matthew Terrace	Roadside	316488	172004	1.5	NO ₂	N	N	Y (0.00)	2.5m	Y
72a	Dinas Powys Infants School	Roadside	315841	171527	1.5	NO ₂	N	Y	Y (0.00)	7m	Y
89	9 Wayside Cottages, Cardiff Road	Roadside	316447	171963	2.5	NO ₂	N	N	Y (0.00)	3m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
DINAS POWYS											
90	16 Railway Terrace, Cardiff Road	Roadside	316453	171945	1.5	NO ₂	N	N	Y (0.00)	3m	Y
109	85 Cardiff Road, Dinas Powys	Roadside	315739	171444	1.5	NO ₂	N	N	Y (0.00)	5m	Y
110	103 Cardiff Road, Dinas Powys	Roadside	31585	171555	1.5	NO ₂	N	N	Y (0.00)	4m	Y
120	Cross Common Road	Kerbside	312405	167951	1.5	NO ₂	N	N	Y (0.00)	1m	Y

Table 7 – Details of Non-Automatic Sites in Penarth

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PENARTH											
22	Stanwell Road	Kerbside	318505	171496	1.5	NO ₂	N	N	N (8.00)	1m	N
53	168 Windsor Road	Roadside	317589	172411	1.5	NO ₂	Y	N	Y (0.00)	5m	Y
56	134 Andrew Road	Kerbside	316814	172443	1.5	NO ₂	N	N	Y (0.00)	10m	Y
62	154 Windsor Road	Roadside	317633	172357	1.5	NO ₂	Y	N	Y (0.00)	2m	Y
70	Ty-Isaf	Roadside	316731	172391	1.5	NO ₂	N	N	Y (0.00)	3m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PENARTH											
74	114 Windsor Road	Roadside	317708	172259	1.5	NO ₂	Y	N	Y (0.00)	2.5m	Y
76	160 Windsor Road	Roadside	317627	172371	1.5	NO ₂	Y	N	Y (0.00)	2.5m	Y
79	Marine Scene	Roadside	317549	172572	1.5	NO ₂	N	N	N (2.80)	1.2m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
PENARTH											
82	98b Windsor Road	Roadside	318061	171944	1.5	NO ₂	N	N	Y (0.00)	8m	Y
55	134 Windsor Road	Roadside	317668	172312	1.5	NO ₂	Y	N	Y (0.00)	3.5m	Y
100	141 Plassey Street	Roadside	317968	172105	1.5	NO ₂	N	N	Y (0.00)	4.5m	Y
112	Cogan Hill Flats	Roadside	317434	172729	1.5	NO ₂	N	N	Y (0.00)	10m	Y
113	3 Plassey Street	Roadside	317999	172067	1.5	NO ₂	N	N	Y (0.00)	3m	Y

Table 8 – Details of Non-Automatic Sites in Barry and Sully

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
BARRY											
8	Tynewydd Road	Kerbside	311797	168503	1.5	NO ₂	N	N	N (4.00)	1m	N
41	Dispenser Road	Urban Background	315278	168451	1.5	NO ₂	N	N	N	128m	N
64	Holton Road	Roadside	311690	168042	1.5	NO ₂	N	N	Y (0.00)	3m	Y
66	17 Churchill Terrace	Roadside	313342	168823	1.5	NO ₂	N	N	Y (0.00)	2.5m	Y
102	Powell Dyffryn Way	Roadside	311115	167041	1.5	NO ₂	N	N	N (3.40)	1m	N
114	107 Dock View Road	Roadside	312585	168171	1.5	NO ₂	N	N	Y (0.00)	3m	Y

Table 9 - Non-automatic monitoring sites in Barry & Sully

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
BARRY											
115	20 Barry Road, Cadoxton	Kerbside	312677	168171	1.5	NO ₂	N	N	Y (0.00)	1m	Y
116	Ffordd y Mileniwm	Roadside	311371	167628	1.5	NO ₂	N	N	Y (0.00)	5m	Y
117	1 Riverside Place, Barry	Kerbside	313612	166807	1.5	NO ₂	N	N	Y (0.00)	1m	Y
119	Dockview Road co-location	Kerbside	315445	170577	1.5	NO ₂	N	N	N (3.00)	1m	N
121	Buttrills Road	Kerbside	311270	168363	1.5	NO ₂	N	N	N (3.00)	1m	N

Table 10 - Non-automatic monitoring site at Sycamore Cross

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
48 Sycamore Cross											
122	Sycamore Cottage	Roadside	307283	174138	1.5	NO ₂	N	N	Y (0.00)	15	Y

Figure 3 – Map(s) of Non-Automatic Monitoring Sites in Cowbridge

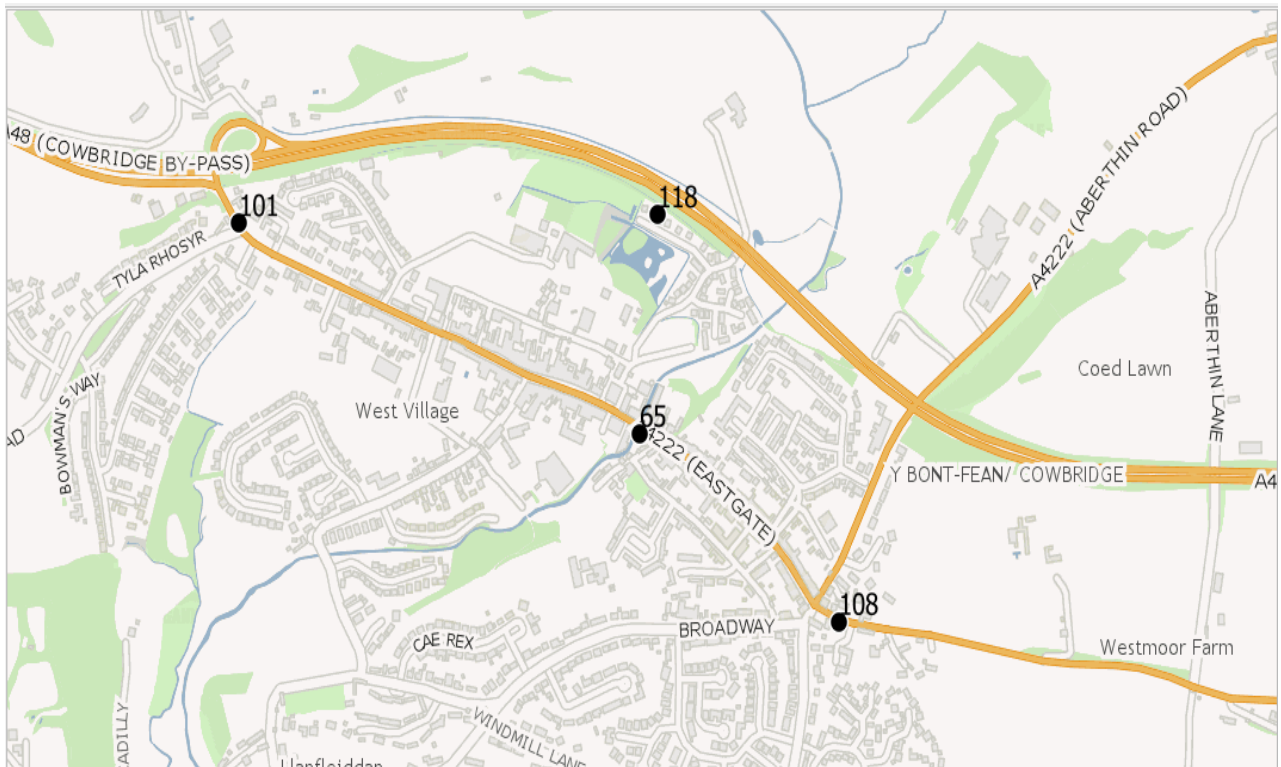


Figure 4 – Map(s) of Non-Automatic Monitoring Sites in Llantwit Major

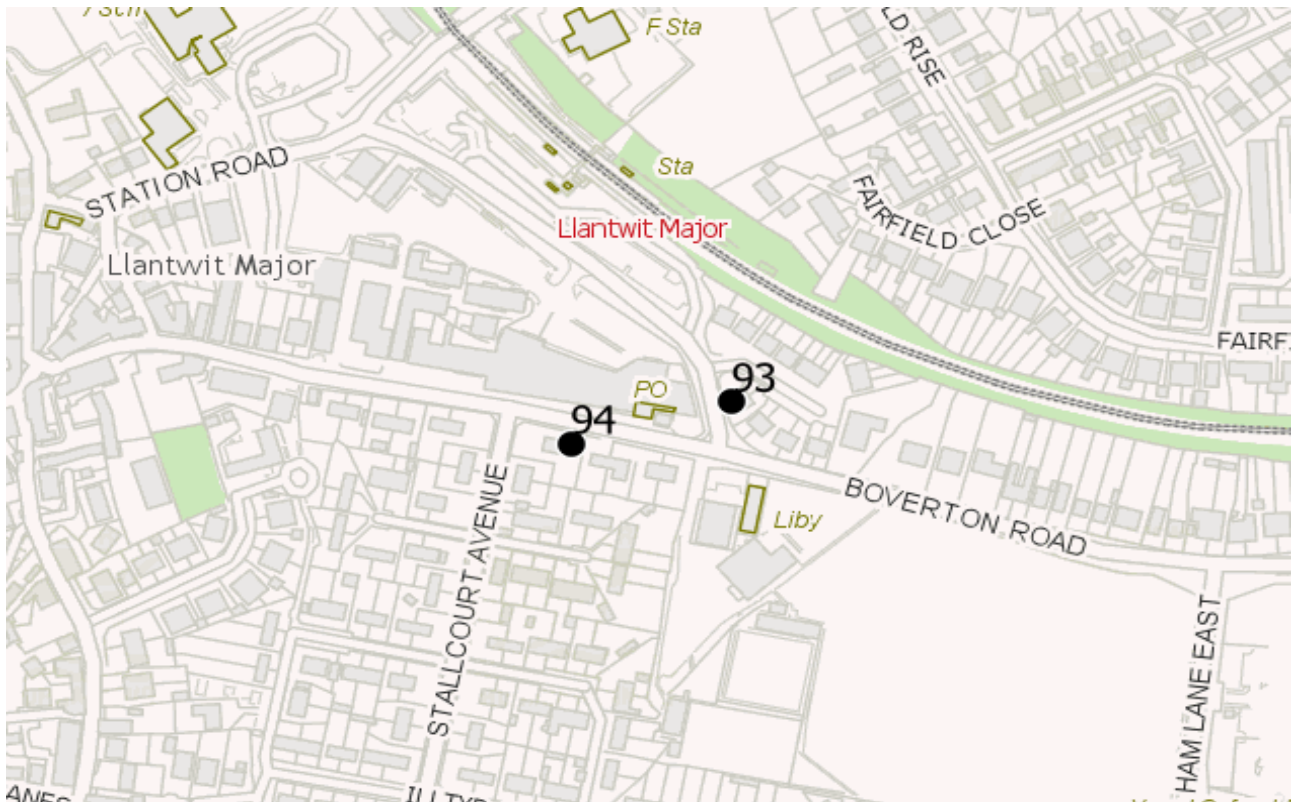


Figure 5 – Map(s) of Non-Automatic Monitoring Sites in St Brides Major

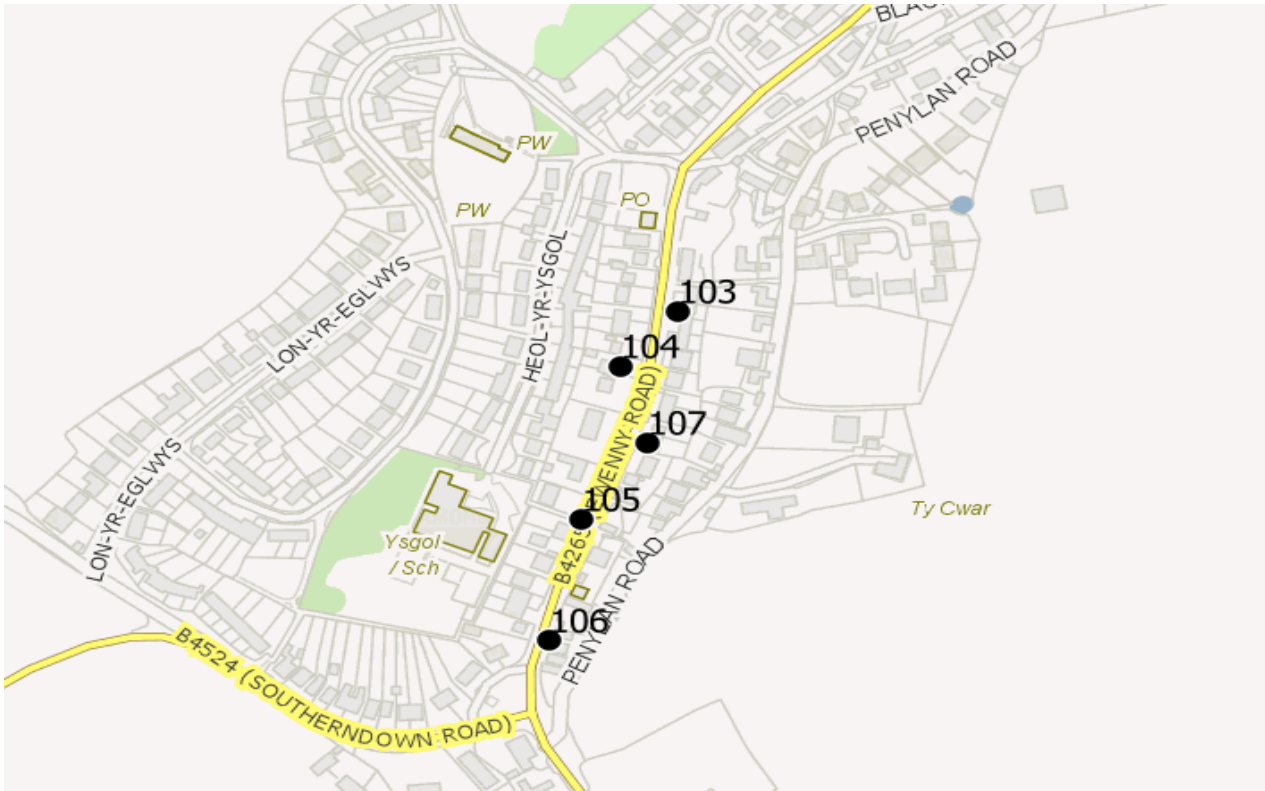


Figure 6 – Map(s) of Non-Automatic Monitoring Sites in Brooklands Terrace, Culverhouse Cross

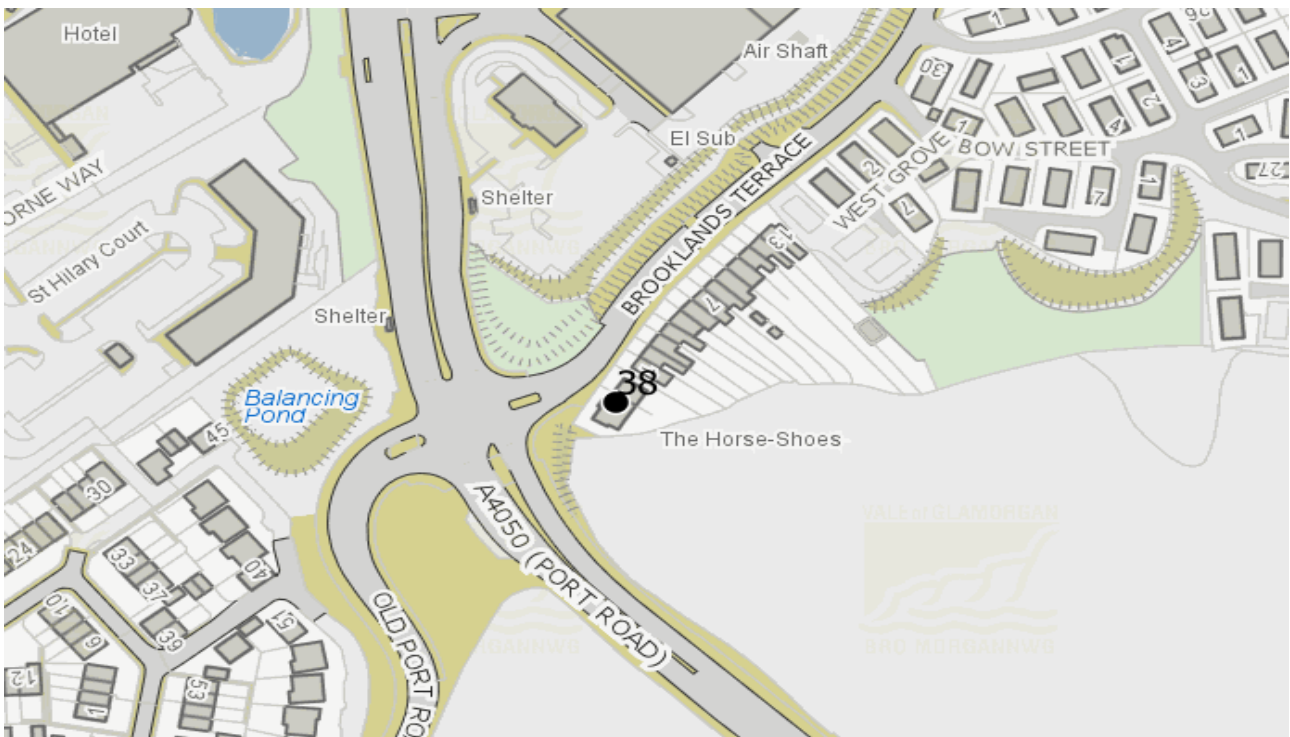


Figure 7 – Map(s) of Non-Automatic monitoring Sites in Dinas Powys, Cross Common Road



Figure 8 – Map(s) of Non-Automatic Monitoring Sites in Dinas Powys, Cardiff Road

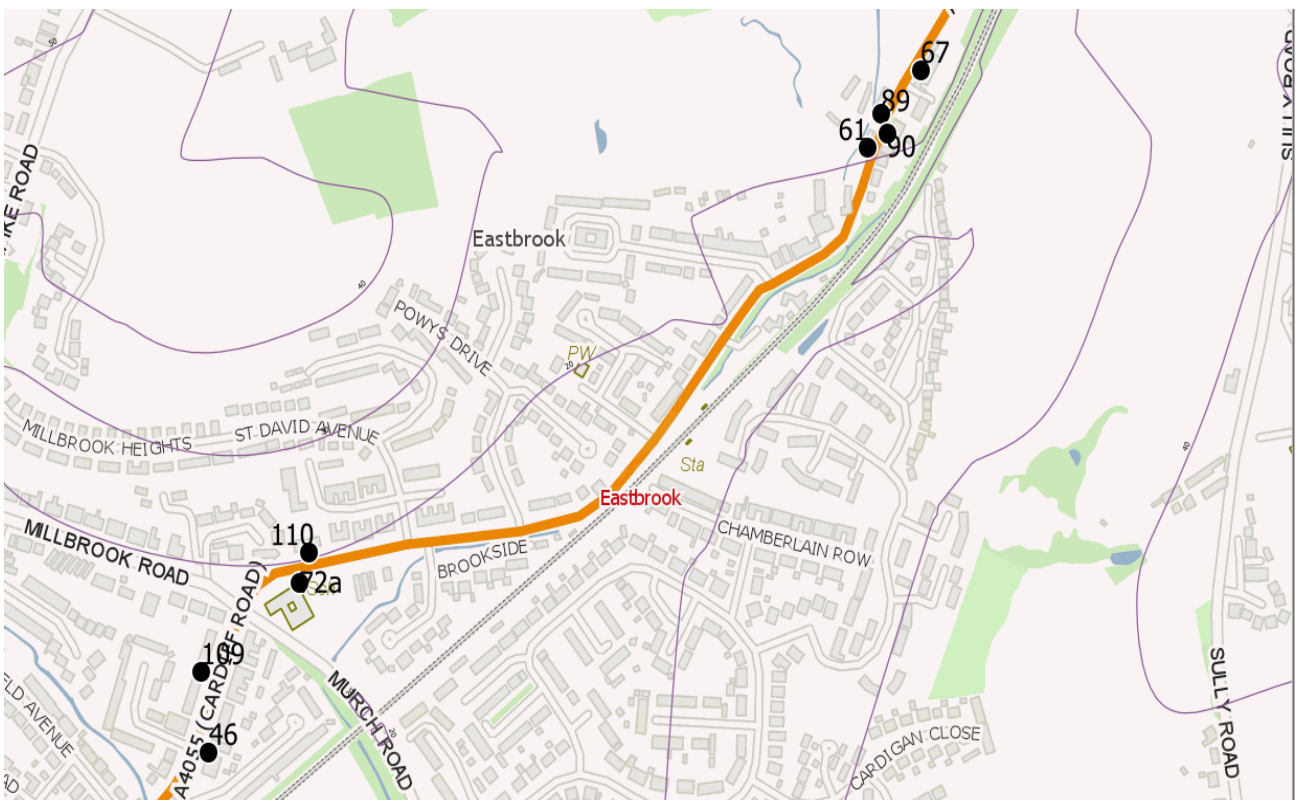


Figure 9 – Map(s) of Non-Automatic Monitoring Sites in Penarth



Figure 10 – Map(s) of Non-Automatic Monitoring Sites in Penarth



Figure 11 – Map(s) of Non-Automatic Monitoring Sites in Penarth

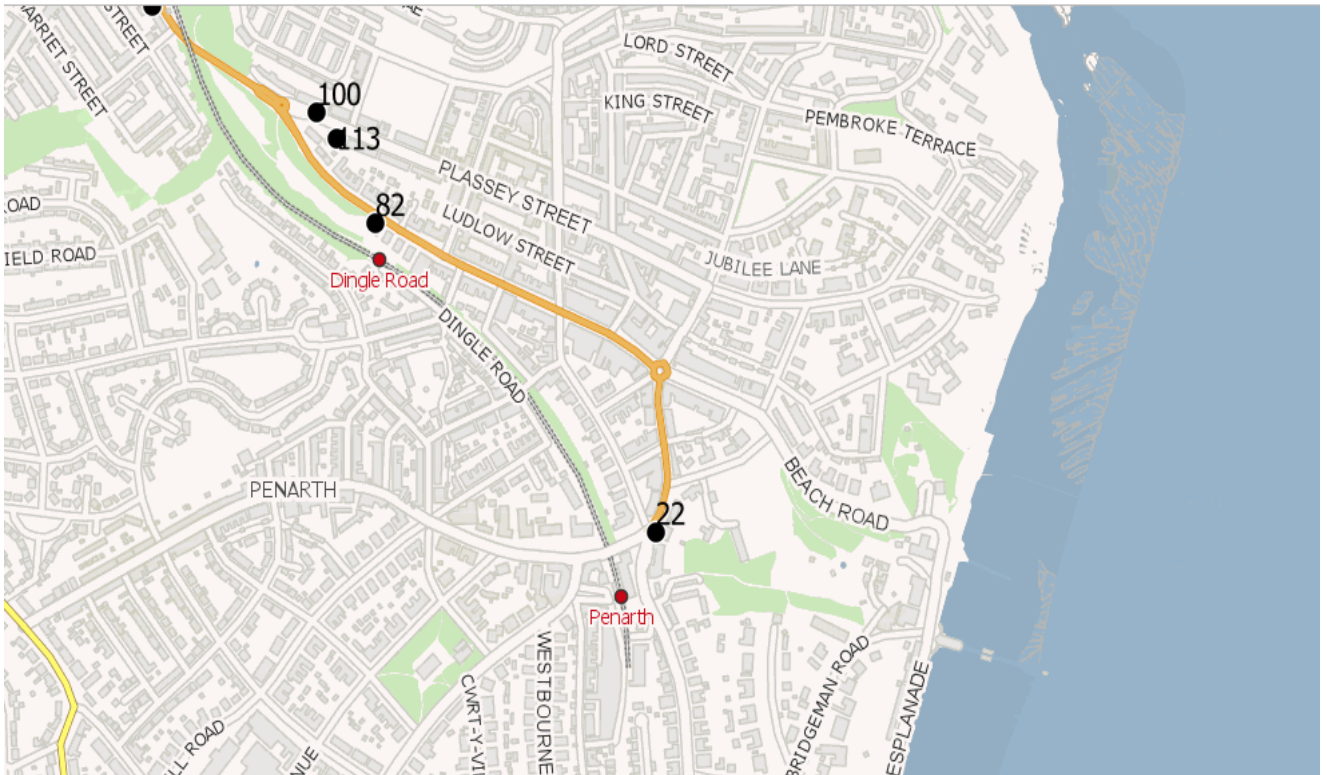


Figure 12 – Map(s) of Non-Automatic Monitoring Sites in Barry

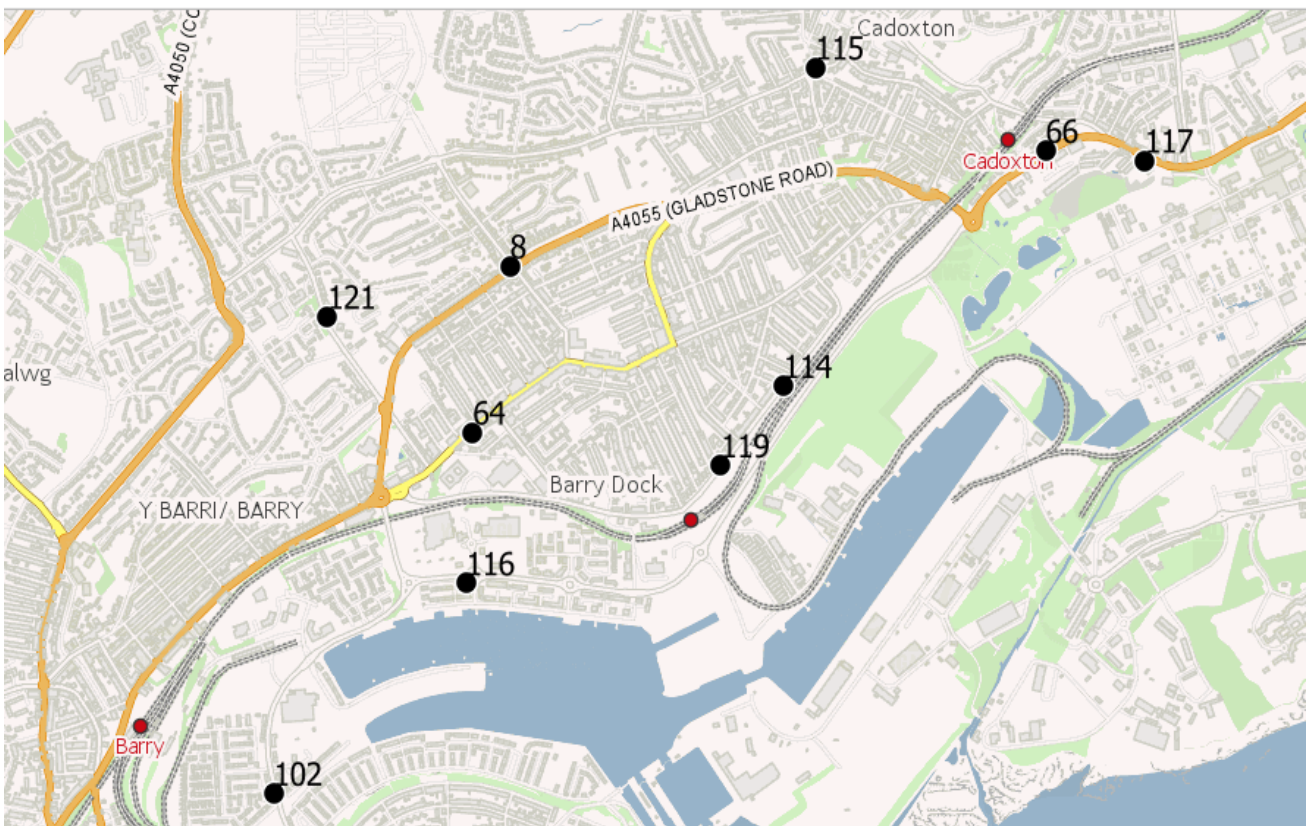


Figure 13 – Map(s) of Non-Automatic Monitoring Sites in Sully

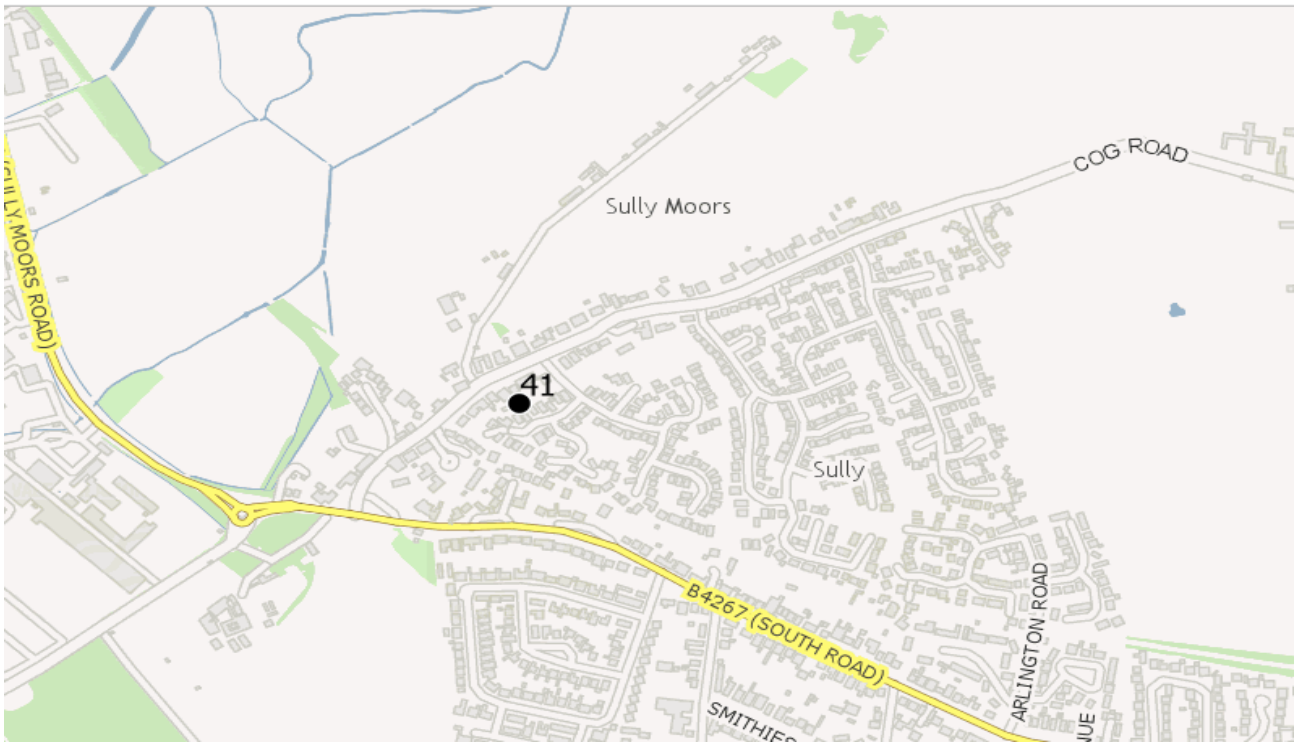
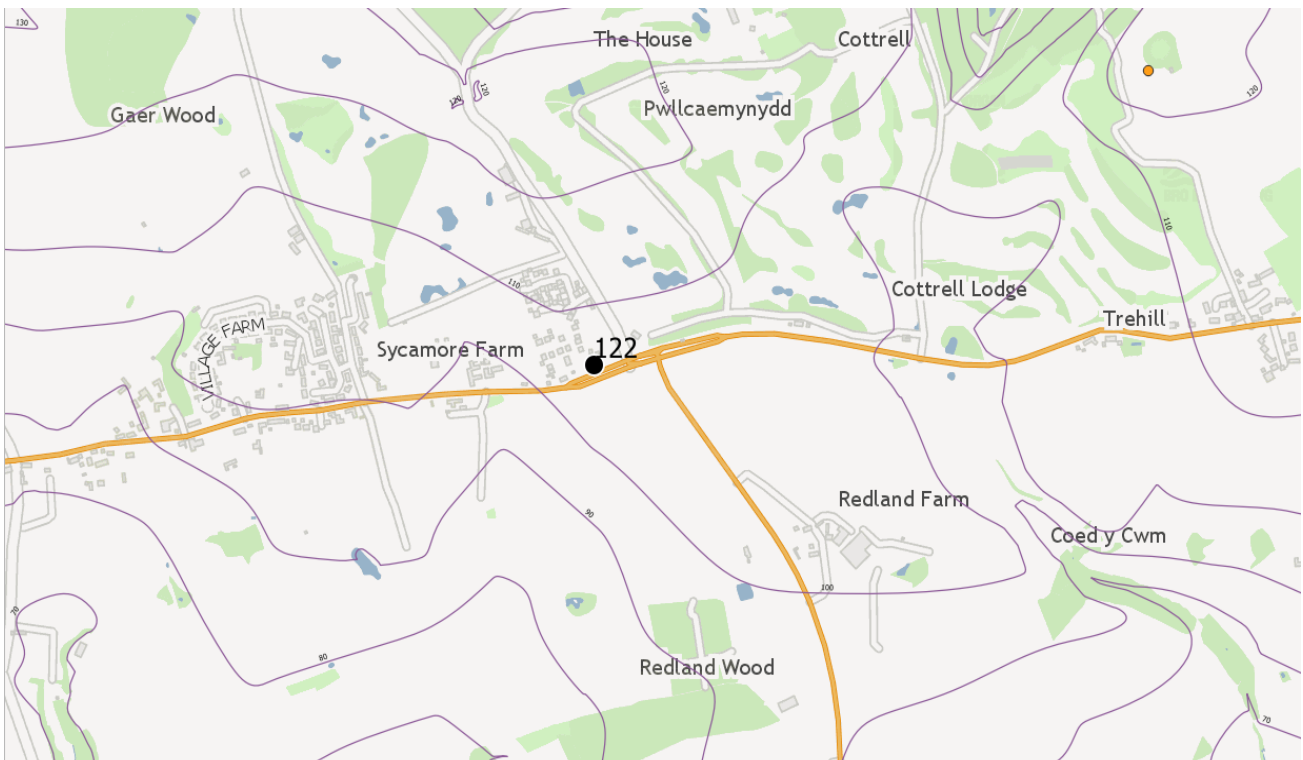


Figure 14 – Map of Non-automatic monitoring site A48 Sycamore Cross



2.2 2021 Air Quality Monitoring Results

Table 11 - Non-automatic monitoring results for Cowbridge

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias ⁽²⁾						
				2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
COWBRIDGE										
65	Roadside	83	N	15.9	15.9	15.2	14.9	16	11.6	11.5
101	Kerbside	100	N	-	-	19.9	16.5	15.9	13.1	12.8
108	Kerbside	100	N	-	-	19.9	24.4	23.3	16.4	18.5
118	Urban Background	100	N	-	-	-	-	8.4	6.6	7

Table 12 – Annual Mean NO₂ Monitoring Results Llantwit Major

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ⁽²⁾				
				2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
LLANTWIT MAJOR								
93	Roadside	100	N	11.3	10.9	10.4	8.1	8.6
94	Roadside	100	N	9.3	9.4	8.8	7.3	7.5
96	Suburban	100	N	9.4	10.2	7.9	5.7	6.1

Table 13 – Annual Mean NO₂ Monitoring Results St Brides Major

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ⁽²⁾				
				2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
SAINT BRIDES MAJOR								
103	Roadside	100	N	10	10.7	10.8	7.7	8.3
104	Roadside	100	N	10.5	11.2	11.9	8.3	9.3
105	Kerbside	92	N	12.3	12.1	11.8	8.5	9.3
106	Roadside	100	N	9.4	10.3	10.3	7.3	8.1
107	Roadside	100	N	7.3	7.7	7.9	6.1	6.6

Table 14 – Annual Mean NO₂ Monitoring Results Brooklands Terrace, Culverhouse Cross

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ⁽²⁾						
				2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
CULVERHOUSE CROSS / BROOKLANDS TERRACE										
38	Roadside	100	N	23.3	25.9	19.6	19.4	18.6	14.4	14.6

Table 15 - Annual Mean NO₂ Monitoring Results Dinas Powys

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ⁽²⁾						
				2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
DINAS POWYS										
46	Roadside	100	N	18.6	18.7	17.1	17.9	16.7	11.6	15.1
61	Roadside	42	N	30.1	31.5	30.4	31	28.8	26.5	20.7
67	Roadside	100	N	24.2	24.8	21.4	23.6	22.7	18.1	20.7
72a	Roadside	67	N	23.8	21.9	19.9	19.8	18.5	15.1	14.1
89	Roadside	100	N	30.8	31.8	28.3	27.9	26.2	21.7	20.2
90	Roadside	100	N	21.4	21.2	19.7	21.3	20.9	15.8	23.8
109	Roadside	92	N	-	-	-	19.4	19.6	17.0	17.4
110	Roadside	100	N	-	-	-	20.4	19.3	16.8	18.2
120	Roadside	100	N	-	-	-	-	-	13.2	14.8

Table 16 - Annual Mean NO₂ Monitoring Results Penarth

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ⁽²⁾						
				2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
PENARTH										
22	Kerbside	83	N	23.7	23.6	21.8	20.3	19.7	15.8	17.2
53	Roadside	100	N	30.8	31.5	29.8	27.7	28.7	24.4	22.6
56	Kerbside	100	N	29.4	17.5	23.2	20.5	22.2	17.1	17.1
62	Roadside	100	N	31.7	33.2	31.2	28.1	29.2	22.2	24.5
70	Roadside	100	N	23.2	24.6	20.3	22.3	19.8	15.8	18.2
74	Roadside	100	N	28	28.2	28.4	22.7	25.4	27.5	21.1
76	Roadside	100	N	32	32.4	30.7	29.9	28.1	11.8	24
79	Roadside	83	N	37.5	37.2	32.3	31.6	30.1	27.5	30.9

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias ⁽²⁾						
				2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
PENARTH										
82	Roadside	100	N	17.4	18	16.9	17.1	16	17.1	13.6
55	Roadside	92	N	30.7	31.4	29.8	27.6	28.4	15.9	22.3
100	Roadside	92	N	-	-	23.9	24	22.9	17.6	17.2
112	Roadside	100	N	-	-	-	19.4	19.8	15.9	17.4
113	Roadside	100	N	-	-	-	21.7	22.3	17.6	19.3

Table 17 - Annual Mean NO₂ Non-Automatic Monitoring Results Barry & Sully

Site ID	Site Type	Valid Data Capture 2021 (%) ⁽¹⁾	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias ⁽²⁾						
				2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76	2019 Bias Adjustment Factor = 0.75	2020 Bias Adjustment Factor = 0.76	2021 Bias Adjustment Factor = 0.78
BARRY & SULLY										
8	Kerbside	83	N	33.6	23.5	31.9	28.1	27.5	22.9	24.1
41	Urban Background	100	N	13.1	14.5	11.5	10.9	10.6	8.4	8.3
64	Roadside	83	N	20.8	20.4	17.5	16.6	17.8	12.8	14.7
66	Roadside	92	N	30.9	27.7	30.4	26.7	26.3	23.8	24.4
102	Roadside	100	N	-	-	17.4	17.9	17.0	14.6	15.6
114	Roadside	100	N	-	-	-	13.5	13.4	11.5	11.8
115	Kerbside	92	N	-	-	-	26.2	25.9	21.9	23
116	Roadside	100	N	-	-	-	-	17.5	15.3	16.7
117	Kerbside	92	N	-	-	-	-	26.7	21.9	22.2
119	Kerbside	100	N	-	-	-	-	18.9	15.4	17.9
121	Kerbside	100	N	-	-	-	-	-	22.4	24.8

Table 18 - Non-automatic monitoring results from Sycamore Cross

Site ID	Site Type	Valid Data Capture 2021 (%) (1)	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias (2)
				2021 Bias Adjustment Factor = 0.78
A48 SYCAMORE CROSS				
122	Roadside	100	N	8.1

Notes:

(1) 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%).

(2) Diffusion tube data has been “bias adjusted” in accordance with Box 7.11 in LAQM.TG16 and “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details

(3) Diffusion tube data has been corrected for distance to represent relevant exposure in accordance with Sections 7.77- 7.79 in LAQM.TG16 “Fall-off in NO_2 concentrations with Distance from the Road

2.2.1 Trends in Annual Mean NO₂ Concentration

Figure 15 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Monitoring Sites in Cowbridge

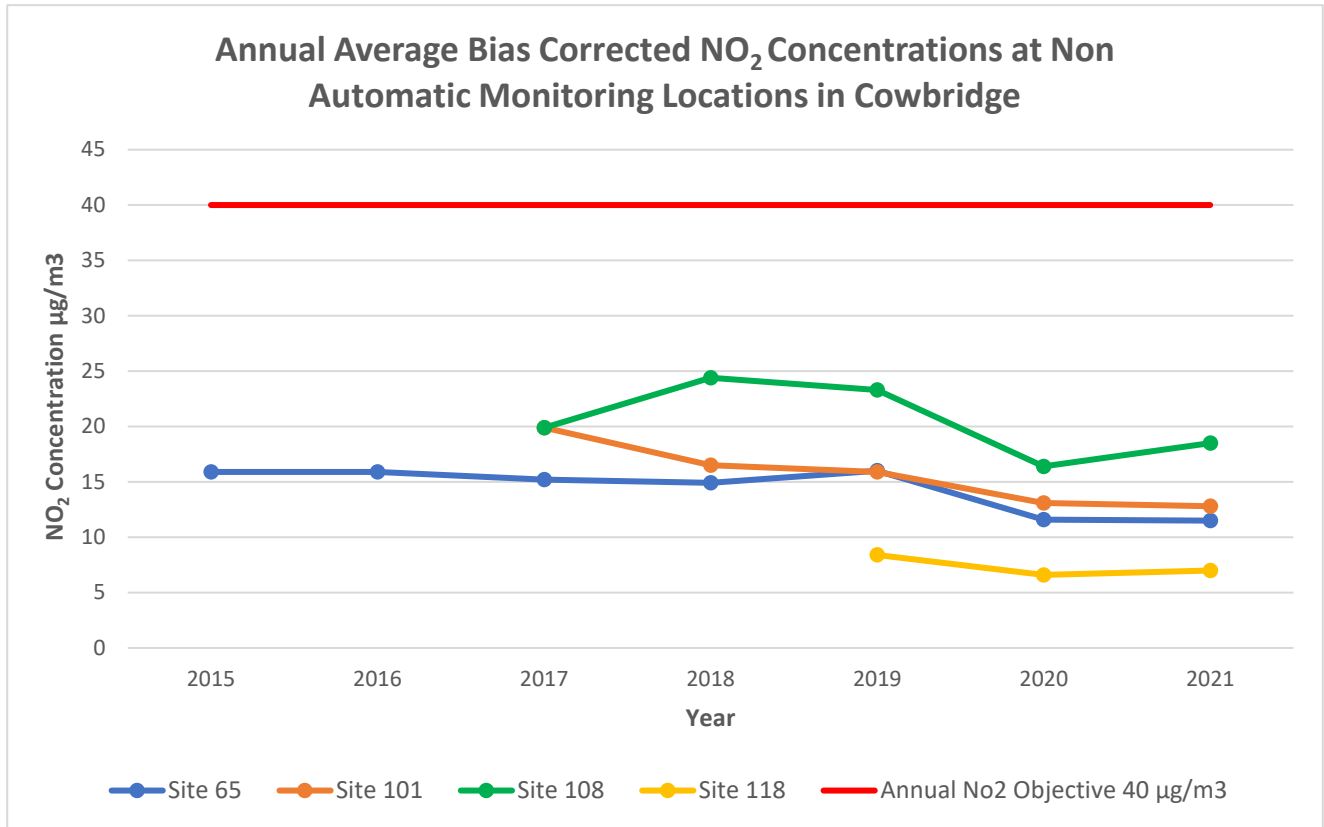


Figure 15 illustrates compliance with the annual NO₂ objective at all monitoring locations in Cowbridge.

Figure 16 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Monitoring Sites in Llantwit Major

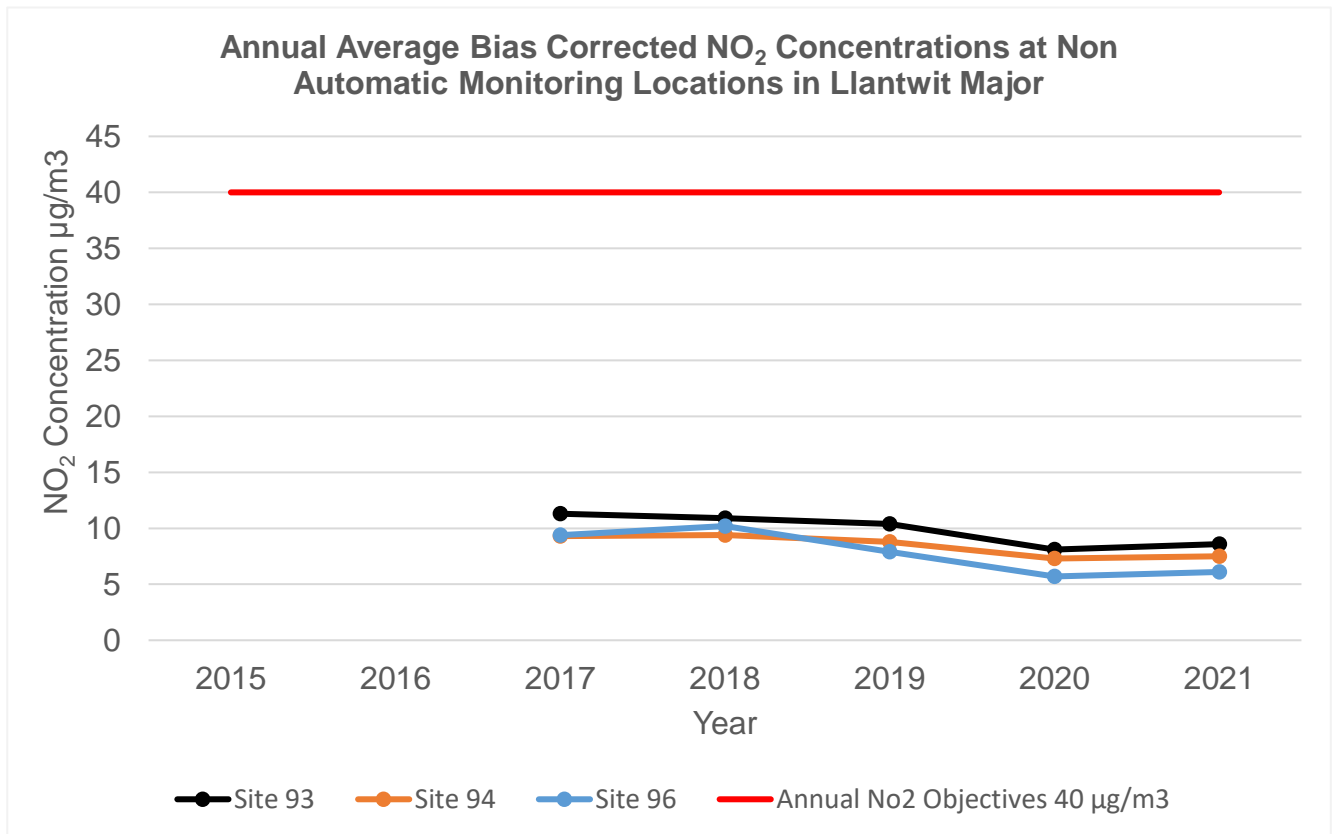


Figure 16 illustrates compliance with the annual NO₂ objective at all monitoring locations in Llantwit Major.

Figure 17 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Sites in St Brides Major

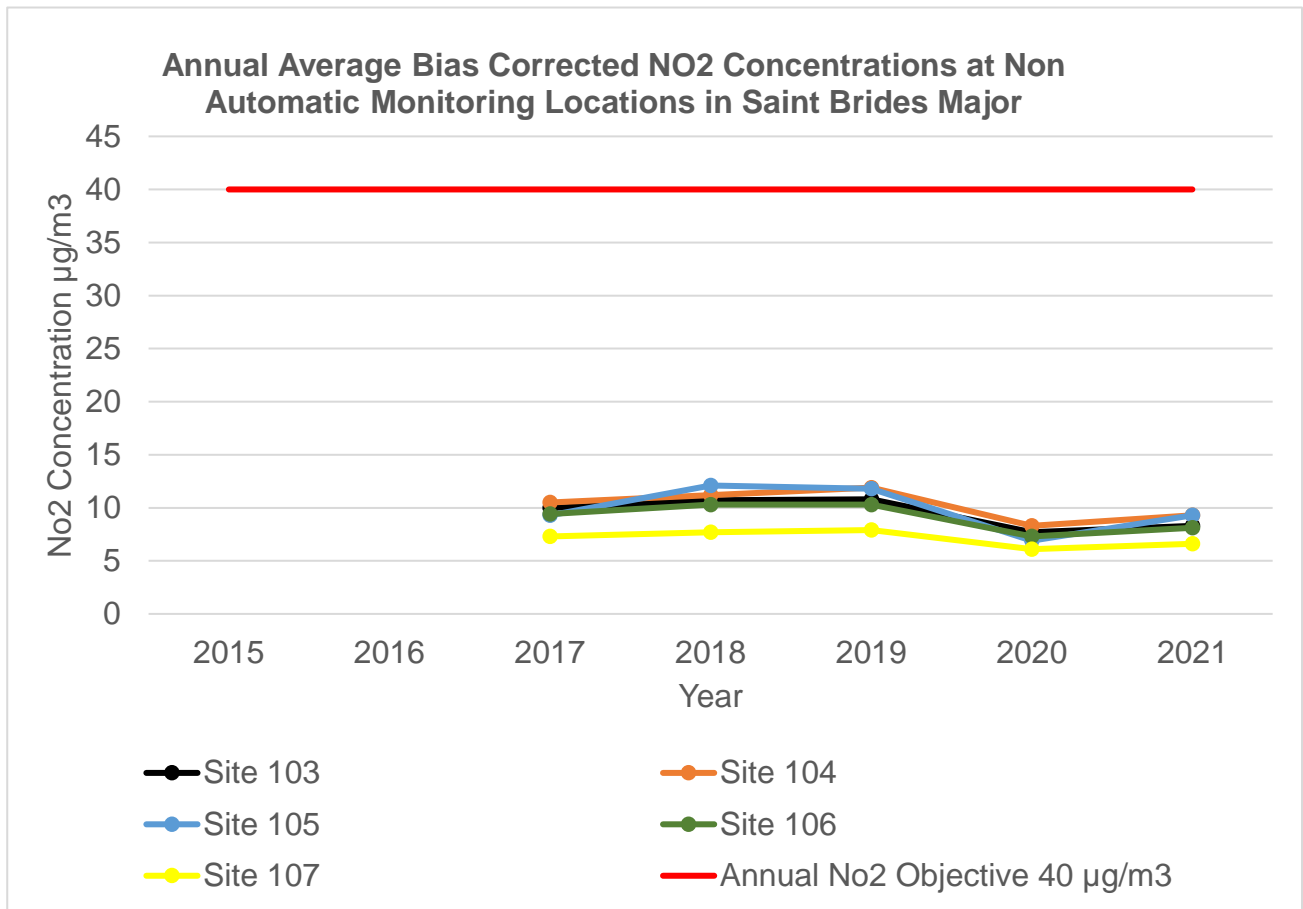


Figure 17 illustrates compliance with the annual NO₂ objective at all monitoring locations in St Brides Major.

Figure 18 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Sites in Brooklands Terrace, Culverhouse Cross

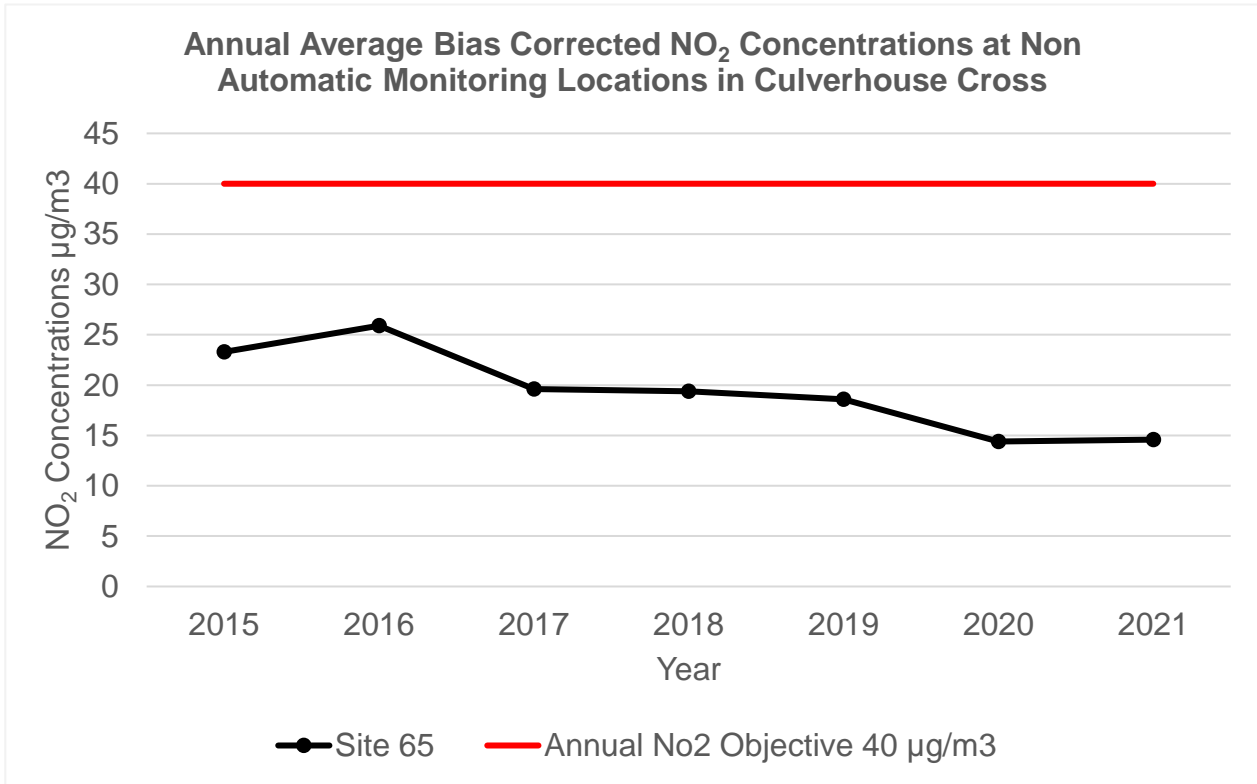


Figure 18 illustrates compliance with the annual NO₂ objective at all monitoring locations in Brooklands Terrace.

Figure 19 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Monitoring Sites in Dinas Powys

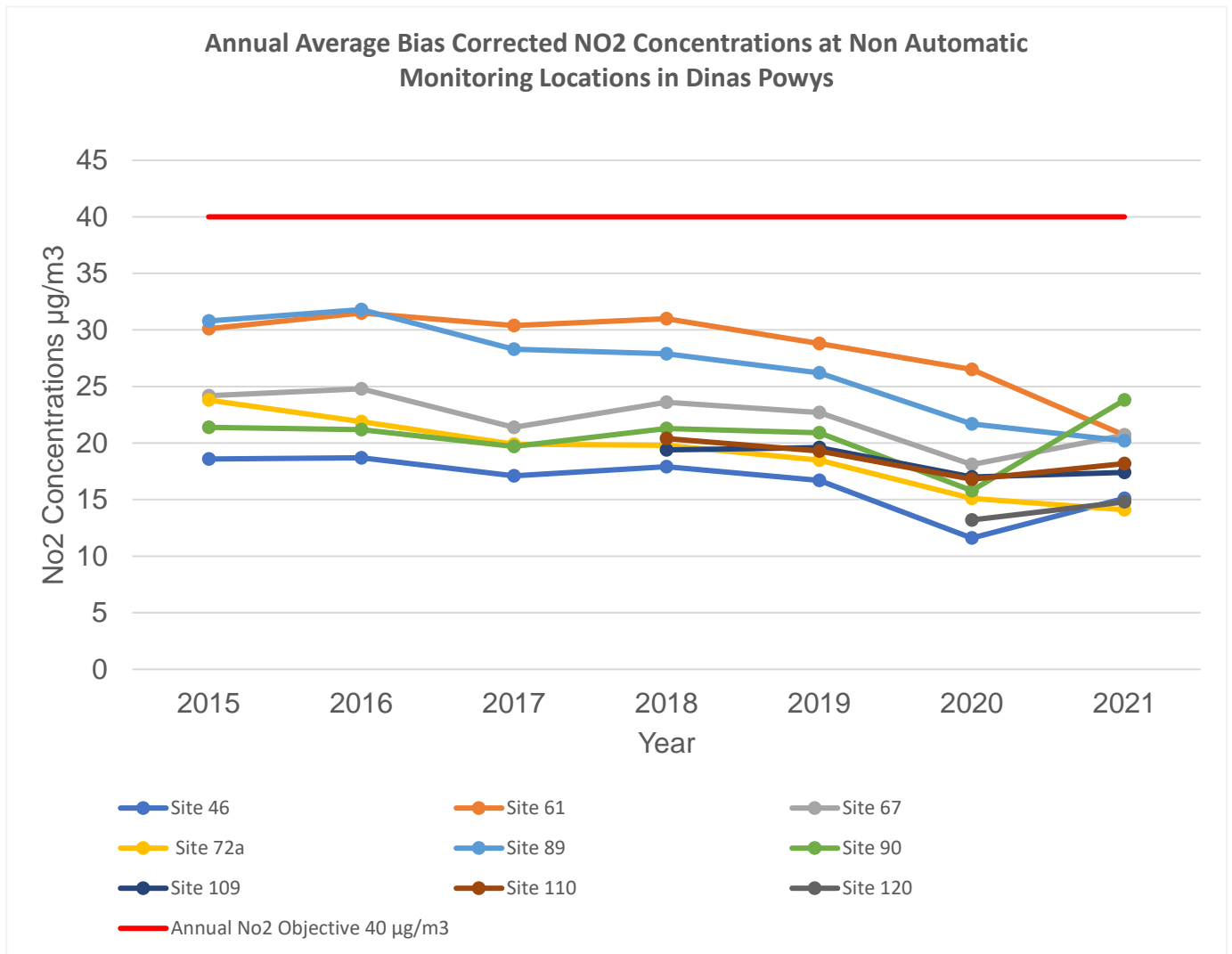


Figure 19 illustrates compliance with the annual NO₂ objective at all monitoring locations, and an overall decreasing trend Dinas Powys.

Figure 20 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Monitoring Locations in Windsor Road, Penarth.

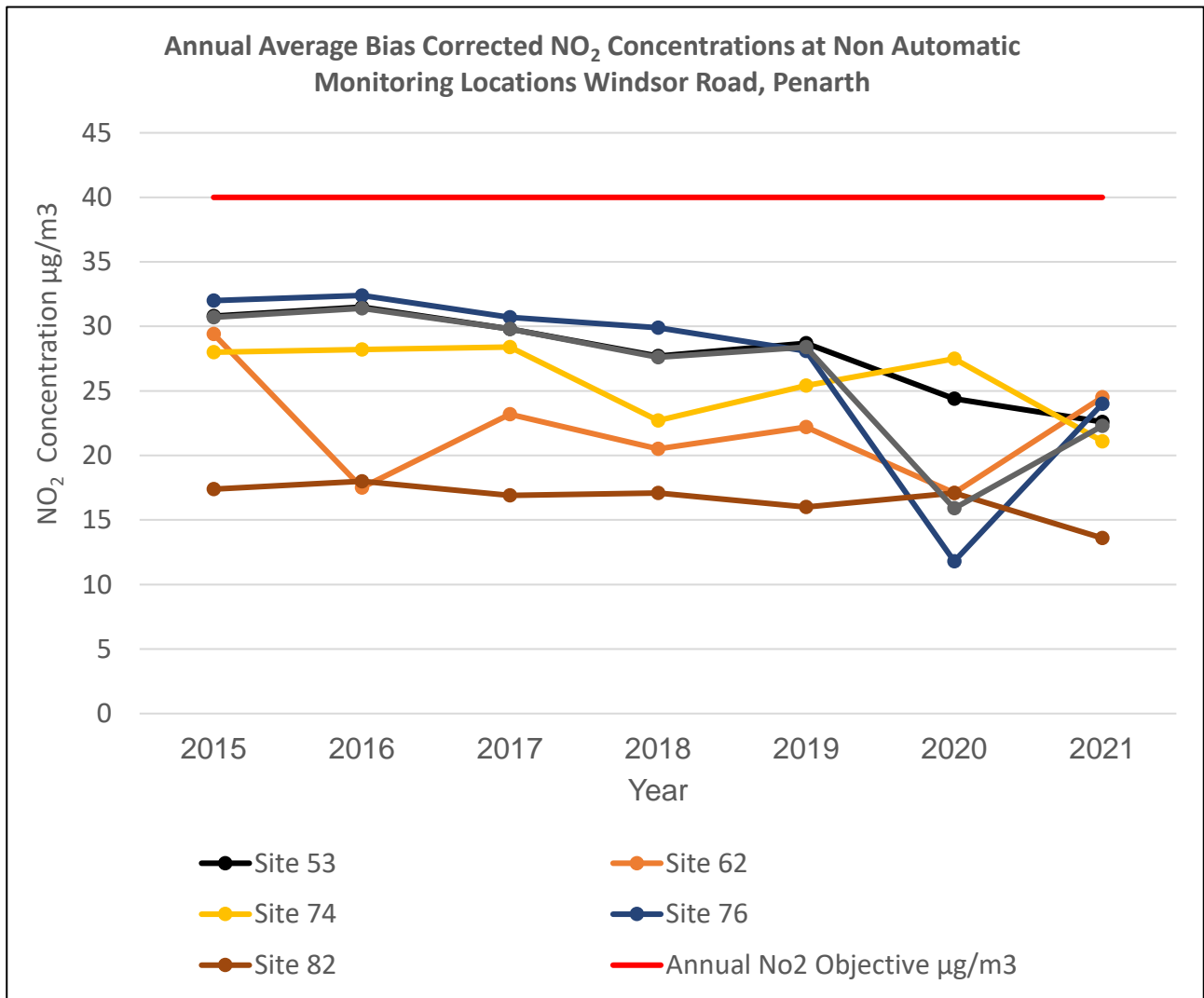


Figure 20 illustrates the annual average NO₂ datasets recorded at residential facades within the Windsor Road. The graph indicates compliance with the annual average objective at every monitored location since 2013.

Figure 21 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Monitoring Sites in Penarth

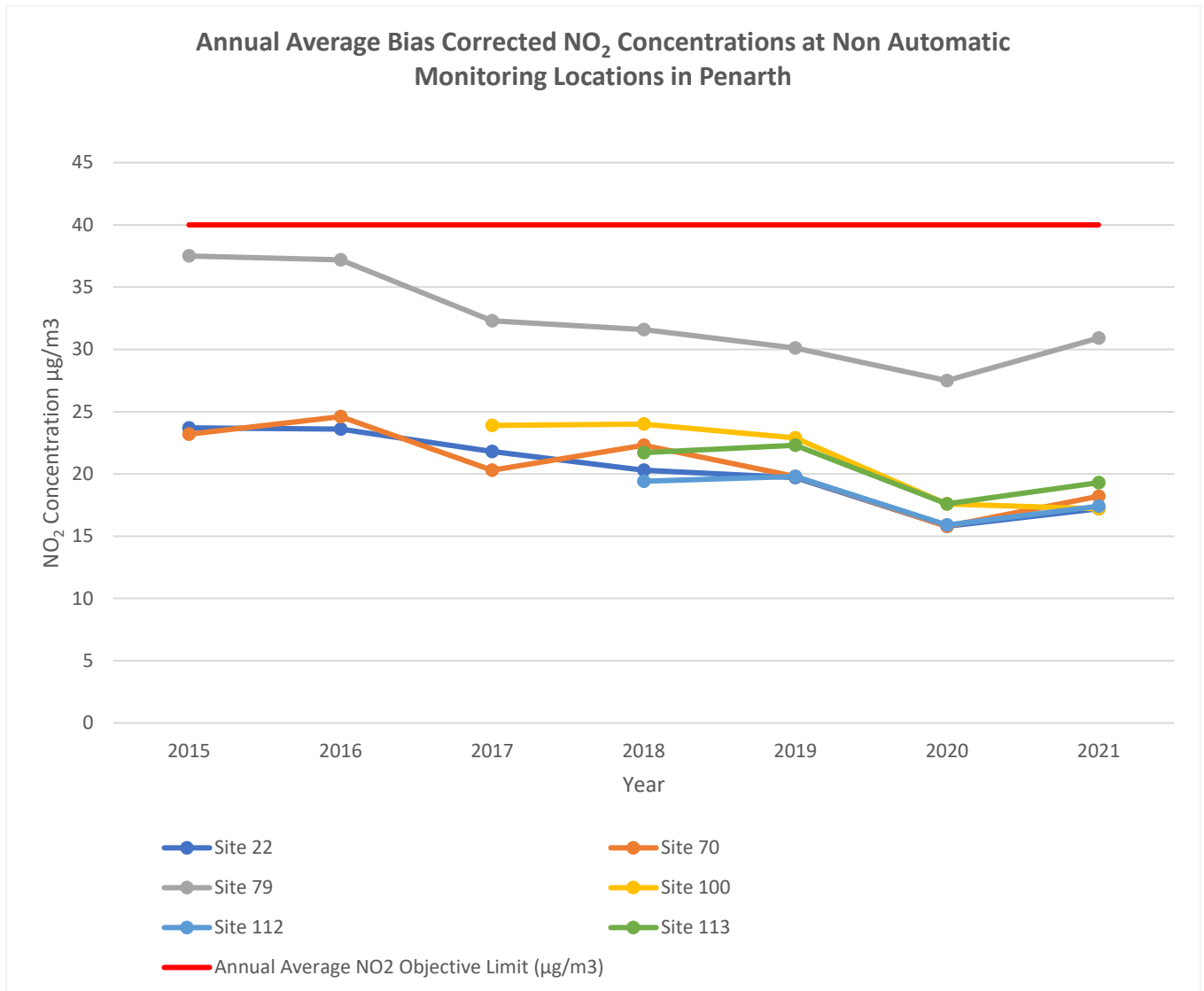


Figure 21 illustrates compliance with the annual NO₂ objective at all monitoring locations in Penarth.

Figure 22 - Annual Average Bias Corrected NO₂ Concentrations at Non-Automatic Monitoring Sites in Barry

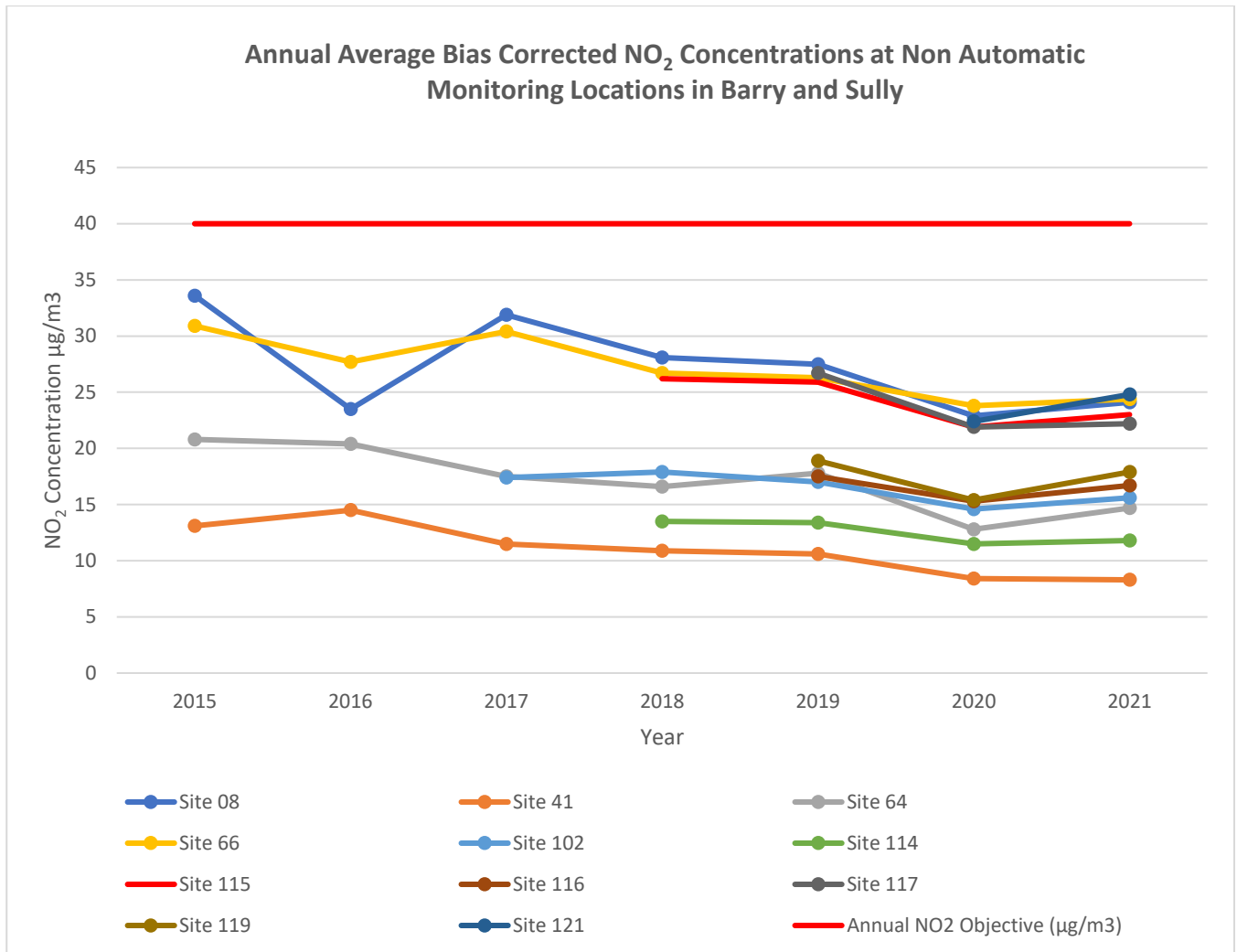


Figure 22 illustrates compliance with the annual NO₂ objective at all monitoring locations in Barry and Sully.

Table 19 - Automatic Annual Mean NO₂ Monitoring Results (2019-2021)

Site ID	Site Type	Within AQMA?	Valid Data Capture 2021 % ⁽²⁾	Annual Mean Concentration (µg/m ³)		
				2019	2020	2021
St Brides Major	Roadside	Y	68	-	-	23.2
Dock View Road	Roadside	N	88	23.2	19	36.3
Buttrills Road	Roadside	N	89	23.7	20.2	26.6

Notes:

(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 20 - 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means >200µg/m³

Site ID	Site Type	Within AQMA?	Valid Data Capture 2020 % (2)	Number of Hourly Means (> 200µg/m ³)(3)		
				2019	2020	2021
St Brides Major	Roadside	N	68	0	0	0
Dock View Road	Roadside	N	88	0	0	0
Buttrills Road	Roadside	N	89	0	0	0

Notes:

(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 21 - Annual Mean PM10 Monitoring Results

Site ID	Site Type	Within AQMA?	Valid Data Capture 2021 (%) ⁽²⁾	Confirm Gravimetric Equivalent (Y or N/A)	PM ₁₀ Annual Mean Concentration (µg/m ³)		
					2019	2020	2021
St Brides Major	Roadside	N	68	N/A	21.6	19	9.08
Dock View Road	Roadside	N	88	N/A	11.2	7.3	12.8
Buttrills Road	Roadside	N	0 ⁽³⁾	N/A	8.99	8.7	N/A

Notes:

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
(3) Data not available due to fault.

Table 22 - Automatic 24-Hour Mean PM10 Monitoring Results (2019-2021)

Site ID	Site Type	Within AQMA?	Valid Data Capture 2021 (%) ⁽²⁾	Confirm Gravimetric Equivalent (Y or N/A)	PM ₁₀ 24 Mean Objective (50 µg/m ³) Exceedances ⁽³⁾		
					2019	2020	2021
St Brides Major	Roadside	N	68	N/A	-	-	0
Dock View Road	Roadside	N	88	N/A	9	0	0
Buttrills Road	Roadside	N	0 ⁽³⁾	N/A	N/A	N/A	N/A

Notes: Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

(3) Data not available due to fault.

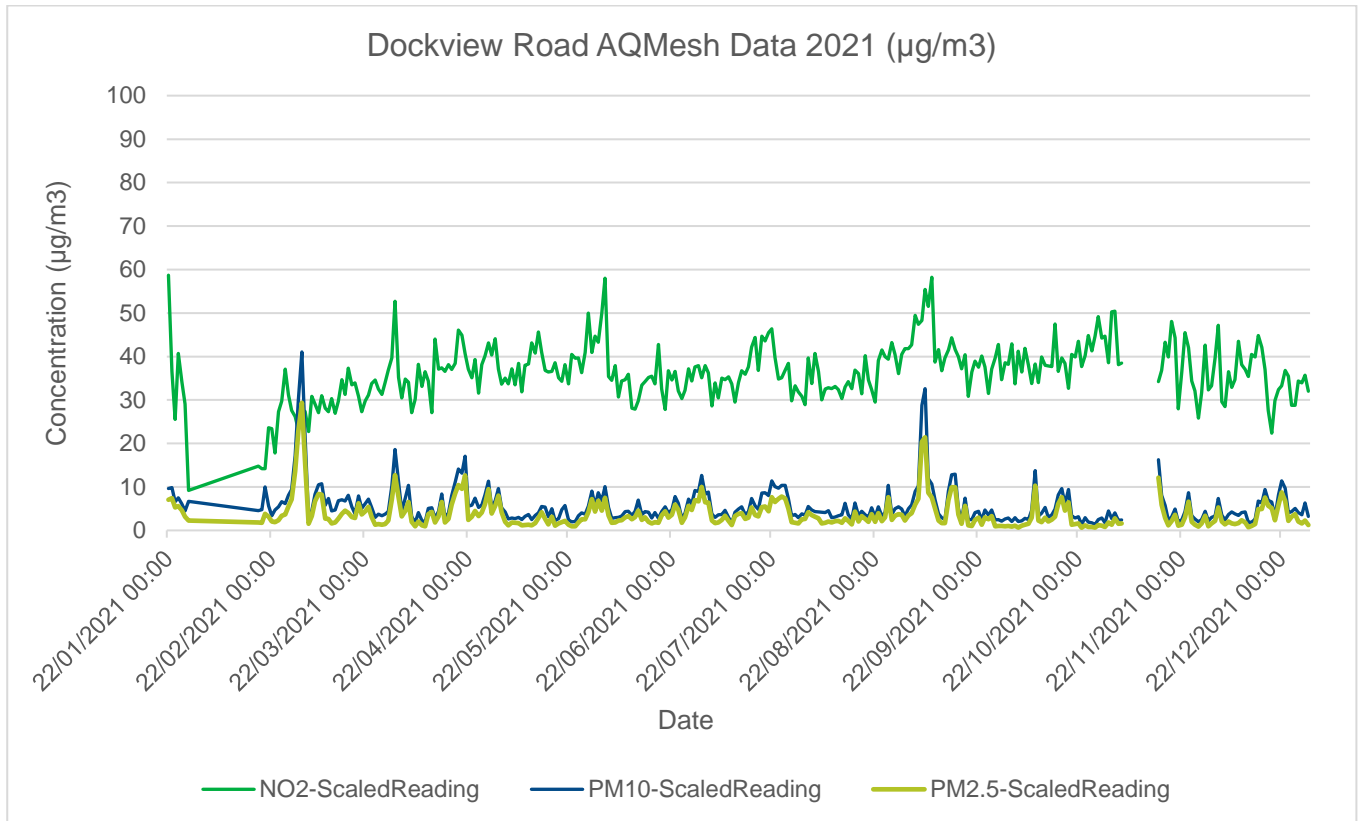
Figure 23 – Dock View Road Indicative Automatic Monitoring Data.

Figure 23 illustrates indicative automatic monitor data for the AQMesh analysers located in Dock View Road in 2021. Periods of invalid particulate matter data caused by high atmospheric humidity have been removed. The data indicates that air quality concentrations within Dock View Road are compliant with the Air Quality Objectives. Comparisons of NO₂ concentrations with diffusion tube results from Dock View Road show higher levels of NO₂ recorded by the indicative monitor. Indicative concentrations measured by the AQMesh monitors can be subject to variations due to environmental factors, requirement for regular scaling checks and lack of standard QC/QA procedures. It is, therefore, important to reiterate that the AQMesh analysers provide **indicative data only**.

3 Comparison of 2021 Monitoring Results with Previous Years and the Air Quality Objectives

During 2021 monitoring was carried out for nitrogen dioxide (NO₂) and particulate matter (PM₁₀).

3.1 Nitrogen Dioxide (NO₂)

Nitrogen dioxide was measured during 2021 at three automated sites equipped with an NO₂ monitoring capabilities, as well as by a network of passive diffusion tubes.

To ratify the 2021 diffusion tube dataset, a bias adjustment factor of 0.78 was applied to the annual average readings. The factor was derived from the Defra website which gave the average correction factor from 23 co-location studies across the UK, whereby the analytical laboratory and method used was the same as the VoGC. The national bias correction factor was utilized as it would provide results representative of a worst-case scenario. The bias correction factor of 0.78 was obtained from the following website: <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

As previously discussed, 2018 saw the introduction of two near real time automated indicative monitoring commissioned by SRS on behalf of the VoGC and installed in the Barry area. In 2021 an additional indicative monitor was located in St Brides Major. The indicative monitor previously located at Holton Road, Barry, was moved to Buttrills Road, Barry. These monitors indicated compliance with the national air quality objectives for NO₂ (annual average 40 µg/m³ & 1-hour average 200 µg/m³ not be exceeded more than 18 times per year).

The nitrogen dioxide diffusion tube data is summarised in Tables 9 - 17. The full dataset (raw monthly mean values) is included in Appendix A. All data displayed in Table 9 – 17 has been bias adjusted and where necessary annualised in accordance with Box 7.10 of LAQM TG(16).

Evidence of the sites annualised can be seen in Appendix C with the bias adjustment factor of 0.78 applied.

As outlined by Table 9-17; the nitrogen dioxide concentrations measured by the passive diffusion tubes show that there were no exceedances of the national air quality objectives for NO₂ (annual average 40 µg/m³ & 1-hour average 200 µg/m³ not be exceeded more than 18 times per year). In accordance with LAQM best practise guidance, there are no monitoring sites in the district with annual average concentrations above 60 µg/m³ in 2020. Therefore, this indicates it is unlikely that the hourly nitrogen dioxide objective was exceeded.

3.2 Particulate Matter (PM₁₀)

In 2021 continuous monitoring of PM₁₀ was undertaken at three automatic monitoring sites in the Vale.

Three indicative near-real time air quality monitors adopt the use of electrochemical sensors to examine levels of PM₁₀.

The results of the monitoring indicate that recorded PM₁₀ concentrations at all monitored locations are within both the annual mean (40 µg/m³) and 24-hour mean (>50 µg/m³ not to be exceeded more than 18 times per year) AQS objectives set for PM₁₀.

As previously mentioned, it should be noted that due to the lack of QA procedures, regular instrument calibration and the use non-standard reference methods, the provided indicative automatic data cannot be used for formal assessment of compliance with any air quality objective.

4 Summary of Compliance with AQS Objectives as of 2021

SRS has reviewed the results from the monitoring undertaken across the Vale of Glamorgan area in 2021. The datasets show compliance with the AQS objectives at all locations.

5 New Local Developments

5.1 Road Traffic Sources (and Other Transport)

SRS on behalf of VoGC continue to work and engage with the Transport and Highways team in the Council, consulting upon any road network proposals that have the potential to influence local air quality levels.

5.1.1 Narrow Congested Streets with Residential Properties Close to the Kerb

SRS on behalf of the VoGC has considered road traffic sources extensively in both this and earlier reports; the monitoring network is very largely focused on measuring concentrations of nitrogen dioxide close to many of them. These have been discussed either in previous reports or earlier in this report.

There are no newly identified road traffic sources which need to be considered.

For 2022 SRS on behalf of the VoGC Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

5.1.2 Busy Streets Where People May Spend 1-hour or closer to Traffic

SRS on behalf of the VoGC confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

5.1.3 Roads with a High Flow of Buses and/or HGVs.

SRS on behalf of the VoGC confirms that there are no new/newly identified roads with high flows of buses/HDVs.

5.1.4 Junctions

Junctions have been fully considered in previous annual reviews and assessments. SRS on behalf of the VoGC can confirm that there are no new/newly identified busy junctions/busy roads where exceedances of either the NO₂ or PM₁₀ objectives are likely.

5.1.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

There are no new roads that meet the criteria stated in LAQM Technical guidance of an air quality assessment required if the road exceeds 10,000 vehicles/day with exposure within 10m from kerb (20m in conurbations > 2m inhabitants).

5.1.6 Roads with Significantly Changed Traffic Flows

The criteria for assessing roads with significantly changed traffic flows are set out in Table 7.1, row/point 6 of DEFRA's LAQM TG (16), 2021. Predictions of increased traffic do not approach 25% on roads with more than 10,000 vehicles per day.

SRS on behalf of the VoGC confirms that there are no new/newly identified roads with significantly changed traffic flows.

5.1.7 Bus and Coach Stations

SRS on behalf of the VoGC confirms that there are no relevant bus stations in the Local Authority area.

5.1.8 Airports

The criteria for assessing airports are set out in Section 7.16 of Defra's LAQM TG(16), 2021. The Vale confirms that there are two airports in the Local Authority area: Cardiff Wales Airport and MOD St Athan. Neither of these airports meets the criteria for further consideration.

SRS on behalf of the VoGC confirms that there are no airports meeting the criteria in the Local Authority area.

5.1.9 Railways (Diesel and Steam Trains)

Defra's LAQM TG(16), 2021 suggests that SO₂ emissions from diesel locomotives may be significant if there are outdoor locations where locomotives are regularly stationary for more than 15minutes and where members of the public could be regularly exposed over this period at such locations.

Defra's LAQM TG(16), 2021 also requires consideration of exposure to nitrogen dioxide within 30m of certain specified railway lines in those areas where the annual mean background concentration is above 25 µg/m³.

5.2 Stationary Trains

SRS on behalf of the VoGC confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

5.3 Moving Trains

LAQM TG(09) introduced a new requirement to assess the potential for exceedance of nitrogen dioxide objectives. The assessment criteria are in relation to large numbers of diesel locomotive movements where there is relevant exposure within 30 metres of the track in areas where the background annual mean concentration of nitrogen dioxide is above 25 µg/m³.

SRS on behalf of the VoGC confirms that there are no locations with many movements of diesel locomotives, and potential long-term relevant exposure within 30m.

5.4 Ports (Shipping)

SRS on behalf of the VoGC confirms that there are no ports or shipping that meets the specified criteria within the Local Authority area.

5.5 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources

5.5.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out.

Biomass Gasification Facility, Woodham Road, Barry

As previously outlined in the 2017 APR: on the 31st July 2015 the Vale Council approved planning permission for the construction and operation of a biomass gasification facility at Woodham Road, Barry, CF63 4JE (Grid Reference ST 12610 67683). It was noted in the 2017 APR that Natural Resources Wales (NRW) were going through a second round of consultation in regard to a permit application for the proposed operation, submitted by Biomass UK NO.2 Ltd. This second round of consultation was formed because of a Section 5 amendment direction sanctioned by NRW; "NRW Schedule 5 notice re Biomass requesting more information" dated 4 May 2017. As part of the amendment a revised air quality assessment (AQA) was submitted in July 2017. Following much

dialogue involving comments passed by SRS on behalf of VoGC, NRW granted approval for the sites permit application in February 2018. Quite recently, VOG Planners have issued a Stop Notice on the plant, for matters to be agreed.

In February 2021, the Welsh Government confirmed the scope of a voluntary and retrospective Environmental Impact Assessment (EIA) for the plant. Following this, on Friday 30 April 2021 Biomass UK No.2 Ltd submitted an Environmental Statement, which presented the findings of the EIA to the Welsh Government.

A public consultation was carried out and further information will be available in 2022.

Cog Moors Wastewater Treatment Works

In the late part of 2017, a full permission was sought after for the following proposal; **2017/01203/FUL**- for the change of use of land as an extension to the existing wastewater treatment works site and the construction of an Advanced Anaerobic Digestion (AAD) Plant, together with associated landscaping and mitigation measures and the formation of a temporary construction compound at Cog Moors Wastewater Treatment Works (WwTW), Cardiff Road, Dinas Powys.

Supporting AQA was submitted in accordance with the referenced planning application. The assessment concluded.

The results of the pollution model indicate that the AAD plant will not lead to exceedances of air pollution thresholds, and pollution levels are expected to be well below human health-based thresholds with the plant in operation. The emissions from the AAD plant are also predicted to have no significant effects on ecology and habitats.

The application was approved in 2018, and the Construction of the AAD plant was completed in Spring 2021.

5.5.2 Existing Installations where Emissions have Increased Substantially, or New Relevant Exposure has been introduced

SRS on behalf of the VoGC can confirm there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.5.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

There are no new or significantly changed industrial installations for which previous air quality assessments have not been carried out and which could give rise to potentially significant emissions of regulated pollutants either within the Vale or within neighbouring local authorities.

SRS on behalf of the VoGC can confirm that there are new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.5.4 Major Fuel (Petrol) Storage Depots

SRS on behalf of the VoGC can confirm that there are major fuel (petrol) storage depots within the Local Authority area, but these have been considered in previous reports.

5.5.5 Petrol Stations

There are no new petrol stations in the Vale District with throughputs greater than 2000m³ per annum with a busy road nearby where there is relevant exposure within 10m of the pumps.

SRS on behalf of the VoGC can confirm that there are no petrol stations meeting the specified criteria.

5.5.6 Poultry Farms

The criteria for assessing poultry farms are set out in Table 7.3, point 4 of TG (16) (Defra, 2016). No farms exceeding the relevant criteria (turkey units with greater than 100,000 birds, naturally ventilated units with greater than 200,000 birds or mechanically ventilated units with greater than 400,000) have been identified.

SRS on behalf of the VoGC can confirm that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

As already mentioned in section 5.2.4, a permit application for the biomass gasification facility at Woodham Road, Barry was approved by Natural Resources Wales (NRW). Commissioning works took place during 2018, however the facility has not been operational under testing conditions since April 2020 due to the ongoing disruptive effects of COVID-19 effecting the security of fuel supply. This has severely disrupted the operation of the facility and only necessary maintenance activities have been carried out in the intervening period.

In February 2021, the Welsh Government confirmed the scope of a voluntary and retrospective Environmental Impact Assessment (EIA) to be prepared by Biomass UK No.2 Ltd. Following this, on Friday 30 April 2021, Biomass UK No.2 Ltd submitted an Environmental Statement, which presents the findings of the EIA, to the Welsh Government. The Environmental Statement concludes that there are no likely significant environmental effects arising from the development, which have not already been suitably mitigated through existing planning and environmental permitting controls.

The facility is regulated under a Natural Resources Wales Environmental Permit (Permit Number: EPR/AB3790ZB) which outlines an emission to air schedule. This permit specifies emissions generated at the source, i.e., the stack exhaust. The schedule provides a monitoring time schedule and applicable emissions monitoring standards that are required. Monitoring undertaken to comply with the conditions within the permit will be facilitated by accredited personnel and equipment.

6.2 Biomass Combustion – Combined Impacts

Previous reports have confirmed that there are no known areas in The Vale District where coal or solid fuel burning provides a significant level or primary household heating. Nothing has changed in this regard since the 2021 APR, despite the potential for increasing popularity of solid fuel heating with increased fossil-fuel prices, and there is no need to consider this further at this time.

7 Other Sources

7.1 Domestic Solid-Fuel Burning

Previous reports have confirmed that there are no known areas in The Vale District where coal or solid fuel burning provides a significant level or primary household heating. Nothing has changed in this regard since the 2019 APR, despite the potential for increasing popularity of solid fuel heating with increased fossil-fuel prices, and there is no need to consider this further at this time.

It should be noted that the Council receives several enquiries each year from residents in respect of national or local requirements where they wish to install log-burners or similar appliances in their homes. There are no smoke control areas in The Vale and hence no legal requirements regarding appliances that may be installed. However, residents are always reminded of the legislation in respect of statutory smoke nuisance and, where they can't be persuaded otherwise for reasons of air quality and health, recommended to seek out an appliance certified for use in a smoke control area.

SRS on behalf of the VoGC can confirm that there are no areas of significant domestic fuel use in the Local Authority area.

8 Policies and Strategies Affecting Airborne Pollution

8.1 Air Quality Planning Policies

8.1.1 Local Development Plan (LDP) 2011- 2026

On the 28th June 2017 the Council adopted the Vale of Glamorgan Local Development Plan 2011-2026. The LDP became operative on its adoption and supersedes the previous adopted Unitary Development Plan (UDP). The LDP will be the basis for decisions on land use planning in the Vale of Glamorgan and will be used by the Council to guide and manage new development proposals.

The Plan sets out the vision, objectives, strategy and policies for managing development in the Vale of Glamorgan and contains a number of local planning policies and makes provision for the use of land for the purposes of housing, employment, retailing, recreation, transport, tourism, minerals, waste, and community uses. It also seeks to identify the infrastructure that will be required to meet the growth anticipated in the Vale of Glamorgan up to 2026 and provides a monitoring framework for assessing the effectiveness of the Plan.

Also highlighted within the LDP document is Policy **MD7** (Environmental Protection).

POLICY MD7 -

ENVIRONMENTAL PROTECTION

Development proposals will be required to demonstrate they will not result in an unacceptable impact on people, residential amenity, property and / or the natural environment from either:

1. Pollution of land, surface water, ground water and the air.
2. Land contamination.
3. Hazardous substances.
4. Noise, vibration, odour nuisance and light pollution.
5. Flood risk and consequences.
6. Coastal erosion or land stability.
7. The loss of the best and most versatile agricultural land; or
8. Any other identified risk to public health and safety.

Where impacts are identified the Council will require applicants to demonstrate that appropriate measures can be taken to minimise the impact identified to an acceptable level. Planning conditions may be imposed, or legal obligation entered into, to secure any necessary mitigation and monitoring processes.

Featured as a main objective of the adopted LDP;

Objective 4- To protect and enhance the Vale of Glamorgan’s historic, built, and natural environment

The historic, built, and natural environment of the Vale of Glamorgan is highly valued by residents and visitors and includes European, National and local designations which provide local identity and distinctiveness and present opportunities for recreation and tourism. The LDP will ensure that these natural and built environmental assets are protected, conserved and where appropriate enhanced as an important resource for local people and which attract visitors and contributes to the local economy.

8.1.2 Climate Change Strategy Project Zero

In July 2019 the Vale of Glamorgan Council joined with Welsh Government and other Councils across the UK in declaring a global ‘climate emergency’ in response to the findings of the IPCC ‘Special Report on Global Warming of 1.5°C’ (October 2018). The Council made a commitment to:

- Reduce the Council’s carbon emissions to net zero before the Welsh Government target of 2030 and support the implementation of the Welsh Government’s new Low Carbon Delivery Plan.
- Make representations to the Welsh and UK Governments, as appropriate, to provide the necessary powers, resources and technical support to Local Authorities in Wales to help them successfully meet the 2030 target.
- Continue to work with partners across the region.
- Work with local stakeholders including Councillors, residents, young people, businesses, and other relevant parties to develop a strategy in line with a target of net zero emissions by 2030 and explore ways to maximise local benefits of these actions in other sectors such as employment, health, agriculture, transport and the economy.

The Intergovernmental Panel on Climate Change (IPCC) was set up by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) to provide an objective source of scientific information on climate change. The IPCC is clear that climate change is real and human activities are the main cause. Project Zero¹⁰ is the Vale of Glamorgan Council’s response to this climate change emergency.

¹⁰

<https://www.valeofglamorgan.gov.uk/Documents/Our%20Council/Achieving%20our%20vision/Consultation/Project-Zero-Challenge-Plan.pdf>

In 2019 the Vale of Glamorgan Council declared a climate emergency. However, since early 2020 we have been tackling another emergency as we have worked with partners and the community to respond to the COVID-19 pandemic. The pandemic has changed all of our lives, how we work, socialise, travel and shop and its effects will remain with us for some time. The pandemic has brought about significant challenge and hardship and it has also demonstrated our ability to change, to be more responsive and to be more innovative. We must build on what we have learnt and apply this to how we respond to the many and complex issues that climate change presents.

8.2 Local Transport Plans and Strategies

8.2.1 The Local Transport Plan (LTP) 2015- 2030.

The Vale of Glamorgan authority is part of the Capital Region which comprises of Cardiff and the nine south east unitary authorities. The implementation of this policy was carried out to support Welsh Government's vision in the future development of the Capital Region and commitment to a low carbon future.

“The Capital Region is committed to a low carbon future, which has a transport network and mobility culture that positively contributes to a thriving economy and the health and wellbeing of its citizens and where sustainable travel is the option of choice”

The LTP looks to tackle growing traffic levels (and hence air quality impacts) by providing strategies which focus upon providing efficient and effective transport networks. In order to be successful, the plans need a collaborative approach for the future development of the Capital Region's transport needs, therefore providing improved mobility for both residents and visitors, enhanced accessibility to jobs and services and fundamentally sustainable economic growth.

“This Local Transport Plan (LTP) seeks to identify the sustainable transport measures required to ensure the Vale of Glamorgan Council adheres to current requirements and good practices to allow for a sustainable transport environment for the period 2015 to 2020 as well as looking forward to 2030”

The LTP policy recognises the Council's objective to achieving sustainable travel (alternatives to using cars) and reducing negative impacts on the environment. The policy suggests that through improved transport infrastructure and transport services this can be achieved.

9 Active Travel Plans and Strategies

9.1 Active Travel

The Vale of Glamorgan Council is working to promote and improve opportunities for active travel within the local authority area. Active travel means walking and cycling (including the use of mobility scooters) for everyday journeys. This includes journeys to school, to work to the shops or to access services e.g. health or leisure centres.

In September 2014, the Welsh Government introduced the Active Travel (Wales) Act 2013 which makes it a legal requirement for local authorities in Wales to map and plan for suitable routes for active travel within certain settlements, as specified by Welsh Government.

The Council submitted its Integrated Network Maps in November 2017 which set out the Authority's aspirations for improving active travel routes across the County over the next 15 years. They included routes that were currently used but may not have met the standard of Active Travel routes, or they were routes that did not exist but were identified within other strategic plans or identified through the consultation process.

Section 4 of the Act requires that the next edition of the INM should be submitted by local authorities three years following the previous edition, or no later than a date specified by the Welsh Ministers. In view of circumstances at this time, Ministers consider it appropriate to extend the submission of the next round of integrated networks maps and updated existing routes maps to 31 December 2021.

The Vale of Glamorgan Council will be asking for the public to be fully involved in the Active Travel Network Mapping process and will be arranging for questionnaires, surveys, and public consultations.

We hope that the information gained through the consultations will help identify routes that need improving to get more people to walk and cycle more and not use their car to get to a destination.

9.2 Active Travel Schemes and Safe Routes in Communities Projects

Active Travel funding comes from Welsh Government in the form of a dedicated grant, known as core allocation, and larger grants for specific projects which local authorities must bid for in a competitive process.

In addition, the Council receives sustainable transport Section 106 financial contributions, when new developments are constructed, which is used to improve active travel and public transport services in a localised area.

Active Travel is about connecting people with their communities. We want people to be proud of where they are from and feel safe walking or cycling around their local neighbourhoods. It's also about looking after our environment. Active Travel is an easy way to build exercise into your day, which will help your mental and physical health.

We want to make active travel options the first choice for the residents of the Vale of Glamorgan. These are the schemes we are currently working on:

- St Athan Active Travel Route
- Eglwys Brewis Active Travel Route
- Llanmaes Road, Llantwit Major - pedestrian and cycle improvements
- Barry to Dinas Powys Active Travel Route
- Cardiff Road, Barry Active Travel Improvement

- Waycock Cross to Cardiff Airport Active Travel Route
- Sully to Cosmeston Active Travel Improvement (consultation live 17/2/22 - 10/3/22)
- SRiC – Fairfield Primary School
- Cowbridge to Ystradowen Active Travel Route
- Cowbridge to Llantwit Major Active Travel Route
- St Athan to Rhoose Active Travel Route
- Penarth Road to Llandough Active Travel Route
- Redlands Road Active Travel
- Culverhouse Cross to St Nicholas Active Travel
- A48 to Llangan and Colwinston Active Travel (Colwinston consultation live 17/2/22-23/3/22 and Llangan consultation live 2/3/22-23/3/22)

9.3 Cycle track installations in Vale schools

Eight schools working on their School Active Travel Plans have had cycle track and road safety installations in their playgrounds thanks to the Active Travel team and Prevention Health Funding. Using bikes provided through Welsh Government Active Travel funding, these will help pupils build bike confidence and reinforce kerbcraft skills.

9.4 Bike pump and repair stations installed around the Vale

With funding from Public Health Wales, the Council hopes that the scheme will encourage residents and families to dig out their bikes and enjoy a problem-free ride.

The new repair stations will offer people a free facility to repair their bike with air pumps and tools. The pumps can also be used on wheelchairs, pushchairs and footballs.

Figure 24 - Bicycle repair stations



The repair station sites have been placed at family-orientated locations:

- Alexandra Gardens, Barry
- Barry Island car park
- Barry Leisure Centre
- Colcot Sports centre
- Cowbridge Leisure centre
- Llantwit Major leisure centre
- Llantwit Major beach car park

- Murchfield Community Centre
- Penarth Leisure Centre
- Cosmeston Country Park

9.5 Barry Docks Transport Interchange

The aim of the proposed Barry Docks Transport Interchange is to provide a bus and taxi interchange, enhance station access and facilities to accommodate increasing numbers of people using an increased number of trains, each with increased seating capacity, which will stop at Barry Docks Station from 2023 onwards.

These improvements will need to be implemented in stages.

The Council have an opportunity to bid for funds from Phase 1 of the Cardiff Capital Region, Metro Plus Regional Transport Authority (RTA) Programme and funding is available for:

- The creation of 'interchanges' that incorporate all modes
- Enhanced Park and Ride facilities, including electric charging infrastructure
- New and extended Metro networks, giving opportunities for all

The Vale of Glamorgan Council is making a bid to this programme for funds to enable provision of a Transport Interchange at Barry Docks Station, as the next stage of improvements following the Park and Ride and Station upgrades in 2010-12.

In consultation with a wide range of stakeholders including local businesses, service providers and community organisations, a number of options for establishing a transport interchange at Barry Docks have been explored.

The aim is to improved transport connections and support modal shift.

The strategic aims are to support to the economic development of both Barry and the wider Cardiff City region, assist those seeking to access employment, training and other services in the region, encourage greater use of sustainable transport modes and help improve air quality and reduce congestion and noise.

The Council has been using the Weltag process of appraising options and at the end of Stage 2 the preferred option was indicated as Option 2.

- **Option 2** – Bus/Taxi Interchange to be located south of the Station on part of Docks Offices Car Park and an additional Park & Ride Car Park, accessed from Dock View Road, to be located north of the Station platform, with Residential and possibly Commercial Uses to be located northwest of station

The development anticipated under Option 2 will make a significant contribution towards the establishment of the comprehensive mobility hub at Barry Docks that is the ultimate vision of the Council.

Housing on site, on land north of the line, could include social housing provision and mean anyone taking up residency had direct access to all modes of sustainable transport for the journeys they need to undertake, negating the need for car ownership.

Commercial development will make the station environment more attractive in general, by increasing the available facilities, including the potential for further community as well as retail facilities to be provided.

Locating the bus/taxi interchange to the south of the station establishes it as a distinct facility in its own space, emphasising its role as the gateway between the station and the town.

The preferred Option 2 also offers greater support for walking and cycling (active travel) by improving routes to the station from the north, the south and the west.

By placing the focus on use of sustainable modes option 2 also offer greater capacity to achieve inclusion and equality, with those excluded more likely to be able to access these modes than they are to own or have access to a car. Increased inclusion will, in turn, lead to greater opportunities for vulnerable groups to access jobs, training and services, via the rail network. This will be particularly relevant to post-Covid recovery.

The Vale of Glamorgan Council is proposing that their funding bid seeks support to establish a Transport Interchange based on **Option 2** as a first stage of development.

If funding is agreed, this will establish a bus and taxi interchange to the south of the station platforms. It will also lay the foundations to provide an additional Park & Ride Car Park, accessed from Dock View Road to the north of the Station platforms and Residential and possibly Commercial Uses to the north west of the Station, as future development phases.

The Transport Interchange provided will include:

- Capacity to accommodate a small number of business, retail and/or community hubs in its central area.
- Electric vehicle charging infrastructure will be provided in car park areas that can be used by both station users or local residents
- Improvements to existing pedestrian and cycle route to the Station from Dock View Road

- Designated cycle and pedestrian route (and crossings) provided north/south across the site
- Existing pedestrian subway leading to the station platforms will be refurbished
- Additional cycle parking (Sheffield stands and cycle lockers) will be provided
- Signage, lighting and seating in the Station vicinity will be improved.

9.6 E-Bike hire scheme

The Vale of Glamorgan Council is the first council in Wales to launch an electric bike share scheme. Following the success of the nextbike cycle hire scheme in Cardiff, we received requests for a similar system in the Vale.

In response to this, a pilot scheme was launched in Penarth and nextbike installed six docking stations, with one also due to launch in Sully. Electric bikes (E-bikes) are a combination of a conventional bike with a motor that take some of the effort out of pedalling for the rider.

Figure 25 - E-Bikes Located at Cosmeston Country Park



With top speeds of 25km per hour, the e-bikes can cover greater distances in less time and with less effort than conventional cycles. Docking stations have been installed in the following locations

-
- Windsor Road, Penarth
- The Esplanade, Penarth
- Penarth Train Station
- Cosmeston Country Park
- Llandough Hospital
- The Barrage

We will soon be installing stations in:

- Sully
- Dinas Powys

For more information on active travel please use the following link

<https://www.valeofglamorgan.gov.uk/en/living/transportation/Active-Travel.aspx>

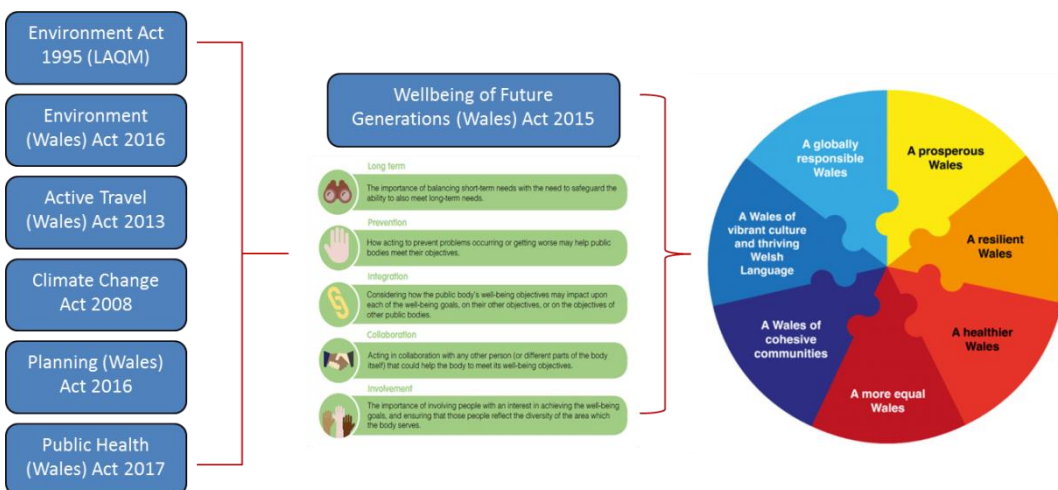
10 Local Authorities Well-being Objectives

10.1 Well-being of Future Generations (Wales) Act 2015

SRS/ VoGC adopts the principles of The Well-being of Future Generations (Wales) Act 2015. The Act is a significant enabler to improve air quality as it calls for sustainable cross-sector action based on the principles of long-term, prevention-focused integration, collaboration and involvement. It intends to improve economic, social, environmental, and cultural well-being in Wales to ensure the needs of the present are met without compromising the ability of future generations to meet their own needs. The Act places responsibilities on public bodies in Wales to work in new ways (including via Public Services Boards) towards national Well-being goals. Progress is measured against a suite of well-being and Public Health Outcomes Framework indicators; there is one specifically concerned with air pollution.

As Figure 26 illustrates below, the Act is the legislative vehicle for “Health in all Policies in Wales” and provides the underpinning principles for all policy and decision making, including economic development, in Wales. Reducing air pollution, health risks and inequalities can help contribute to most, if not all, of the well-being goals. As such, the Act presents excellent opportunities to change policy and practice to enhance air quality management arrangements across The Vale (and wider).

Figure 26 - The Well-being of Future Generations (Wales) Act 2015



10.2 Welsh Government, Clean Air Plan for Wales, Healthy Air Healthy Wales

At the time of drafting this report WG has published its latest plan which underpins its commitment and long-term ambition to improve air quality in Wales. The plan sets out WG's policy direction and proposed actions to reduce air pollution to support improvement in public health and the natural environment. Actions are proposed across four thematic themes, examined as People, Environment, Prosperity and Place.

The plan and its proposed actions is available at

<https://gov.wales/sites/default/files/publications/2020-08/clean-air-plan-for-wales-healthy-air-healthy-wales.pdf>

SRS/ VGBC support the aspirations of the plan and welcome the development of more stringent mitigation measures that will enable a cohesive approach to air quality management and protecting public health and the natural environment.

10.3 Green Infrastructure Plans and Strategies

Featured in the adopted LDP, a main objective of the LDP is;

To ensure that development within the Vale of Glamorgan makes a positive contribution towards reducing the impact of and mitigating the adverse effects of climate change.

The LDP will seek to ensure that new development makes a positive contribution towards reducing the impact of and mitigating the adverse effects of climate change. New development will be located in sustainable locations that minimise the need to travel, incorporate sustainable design and building solutions. The Council's Renewable Energy Assessment (2016) has identified opportunities in the Vale of Glamorgan for a range of renewable energy schemes, particularly from standalone solar PV developments, small clusters of wind energy potential, biomass, and micro generation including Building Integrated Renewables [BIR]. Accordingly, to contribute towards meeting national renewable energy targets the Plan includes monitoring targets to meet 21.19% of projected electricity demand and 1.48% of projected heat demand in the Vale of Glamorgan through renewable sources by 2026. Therefore, the LDP will also promote energy conservation and local renewable energy generation. To mitigate the adverse effects of climate change new development will avoid areas susceptible to flooding.

10.3.1 Green Dragon

The Council is committed to obtaining at least Green Dragon Level 1 across the whole of the Council. Green Dragon is a scheme that raises awareness of environmental issues among businesses and staff and promotes sustainable working practices including: -

- reduced waste disposal costs
- increased efficiency
- improved processes
- aids in the achievement of national legislation

11 Conclusion and Proposed Actions

11.1 Conclusions from New Monitoring Data

SRS on behalf of the VoGC has examined the results from monitoring undertaken in 2021. There were no exceedances of any pollutant objective in 2021

11.2 Other Conclusions

There are no other conclusions to be drawn from the information provided herein.

12 Proposed Actions

The Specialist Services Team of SRS will work with VoGC representatives from Highways & Transport and Planning Department, and outline measures which have been undertaken, the effectiveness of these measures and future commitments/initiatives that the Council may need to consider to be implemented in the area to ensure compliance is maintained and improved upon.

As a long-term measure, SRS would recommend that the Vale of Glamorgan Council consider developing a Clean Air Strategy with its main objective to improve air quality and protect public health, whilst considering the sustainable development and future growth within the authority.

References

1. The Vale of Glamorgan Council Air Quality Progress Reports 2013 – 2021
<https://www.srs.wales/en/Environmental-Health/Noise-and-Air-Pollution/Air-quality-and-pollution/Air-Quality-and-Pollution.aspx>
2. Welsh Government, Local air quality management in Wales, Policy Guidance, June 2017
3. Department for Environment, Food and Rural Affairs, 2003. *Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III Local Air Quality Management, Technical Guidance LAQM.TG(16)*. London: DEFRA (as updated April 2016)
4. Vale of Glamorgan Planning Link
<http://vog.planning-register.co.uk/plaDetails.aspx>
5. UK National Air Quality Archive LAQM
<http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>
6. Vale of Glamorgan Local Development Plan 2011- 2026
<http://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP/LDP-Adoption/Adopted-LDP-Written-Statement-June-2017-final-interactive-web-version.pdf>
7. Vale of Glamorgan The Local Transport Plan (2015- 2030)
https://www.valeofglamorgan.gov.uk/en/living/planning_and_building_control/Planning/planning_policy/Local-Transport-Plan.aspx
8. Vale of Glamorgan Green Dragon
http://www.valeofglamorgan.gov.uk/en/living/environment/green_dragon/green_dragon.aspx
9. Clean Air Advisory Panel Report – Impact of the COVID-19 Pandemic on air quality in Wales
<https://airquality.gov.wales/reports-seminars/reports>

Appendices

Appendix A: Monthly Diffusion Tube Monitoring Results

Appendix B: A Summary of Local Air Quality Management

Appendix C: Air Quality Monitoring Data QA/QC

Appendix D: AQMA Boundary Maps

Appendix E: Impact of COVID-19 upon LAQM

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Table A.1 – Full Monthly Diffusion Tube Results for 2021 (µg/m³)

Site No	Nitrogen Dioxide Sites,VALE CBC	06/01/2021 - 01/02/2021	01/02/2021 - 04/03/2021	04/03/2021 - 31/03/2021	31/03/2021 - 05/05/2021	05/05/2021 - 04/06/2021	04/06/2021 - 02/07/2021	02/07/2021 - 04/08/2021	04/08/2021 - 31/08/2021	31/08/2021 - 29/09/2021	29/09/2021 - 02/11/2021	02/11/2021-01/12/2021	1/12/2021 -04/01/2022	Annual average	Annual average bias adjusted & Annualised	
108	4 Cardiff Road, Cowbridge	24.80	22.5	23.8	21.3	25.20	18.10	22.20	18.40	25.70	25.9	33.20	24.2	23.8	18.5	100
65	1 Riverside Mews, Cowbridge	20.20	16.20	13.9			6.00	11.70	10.90	14.80	15.8	20.70	17.8	14.8	11.5	83
118	6 Middlegate walk, Cowbridge	11.10	12.50	9.1	9.5	6.60	6.30	5.20	4.40	9.30	8.7	12.10	12.2	8.9	7.0	100
101	37 Westgate House	20.50	16.80	17	15.3	12.60	12.00	10.90	12.60	16.90	17.3	24.00	20.5	16.4	12.8	100
93	Le Poulliguen Way	14.00	12.30	11	12.1	9.60	8.20	7.10	7.80	10.90	10.2	15.60	13.3	11.0	8.6	100
94	5 Boverton Road	13.40	11.10	10.3	11.1	5.70	6.40	6.50	5.80	10.50	8.5	13.50	12.2	9.6	7.5	100
96	Old Froglands Farm	10.70	13.20	8.6	8.2	6.20	4.30	4.3	4.80	7.2	5.7	9.80	10.6	7.8	6.1	100
103	September Cottage	14.90	13.4	12.3	13.4	8.3	7.7	6.5	6.6	9.8	8.3	14	12.6	10.7	8.3	100
104	Greengate Cottage	16.20	13.9	13	13.7	10.5	8.9	8.4	9.4	11.9	9.4	14.4	13.8	12.0	9.3	100
105	St. Brides Primary School Walway Entrance	16.10	15.8		12.7	10.5	8.4	8.7	7.9	10.5	10.7	16.3	14.2	12.0	9.3	92
106	Dany Bryn House	12.20	12.8	12	14.8	7	5.9	7	7.9	10.6	7.9	14	13.2	10.4	8.1	100
107	Hillboro	12.70	8.7	12	9.4	6.2	5	5	5.6	7.4	6.9	11.9	10.2	8.4	6.6	100
38	2 Horseshoes	21.50	17.80	20.9	18.2	18.20	13.70	17.60	15.8	19.40	17.8	24	20.20	18.8	14.6	100
46	46 Cardiff Road	24.00	21.60	19.9	21.7	15.90	15.20	12.60	14.40	19.70	18.90	23.50	25.30	19.4	15.1	100
61	Railway Terrace		34.50				30.30				23.30	26.60	37.00	30.3	20.7	42
67	2 Matthew Terrace	35.50	30.90	24.9	28.4	24.90	22.70	19.90	23.60	28.10	23.6	29.90	26.40	26.6	20.7	100
72a	Dinas Powys Infants School	25.10	19.80					13.90	14.20	19.80	19.5	24.90	21.90	19.9	14.1	67
89	9 Wayside Cottages, Cardiff Road	25.50	26.10	22.5	21.7	19.9	17.50	19.00	19.40	24.20	35.8	44.30	34.90	25.9	20.2	100
90	16 Railway Terrace, Cardiff Road	29.50	25.20	30.8	32.6	32.10	26.50	27.30	28.30	32.80	35	41.7	24.40	30.5	23.8	100
109	85 Cardiff Road, Dinas Powys	31.30	22.30	23.7		20.40	17.50	16.20	15.10	21.50	22.1	30.7	24.60	22.3	17.4	92
110	103 Cardiff Road, Dinas Powys	29.30	23.00	24.5	21.3	22.00	16.00	15.40	19.50	25.50	26	28	29.30	23.3	18.2	100
120	Cross Common Road, Dinas powys	25.4	19.7	19.5	18.9	15.6	15.6	11.7	13.9	19.7	19.1	25.8	22.3	18.9	14.8	100
22	Stanwell Road	26.40	19.00	22.2	18.6		16.50		18.10	21.50	21.9	33.00	23.40	22.1	17.2	83
112	Cogan Hill Flats	33.10	24.20	20.9	16.6	19.50	16.40	17.00	20.90	23.40	21.6	30.10	23.80	22.3	17.4	100
53	168 Windsor Road	18.50	28.00	29.30	31.1	27.10	27.10	25.50	32.20	34.70	31	33.60	29.30	29.0	22.6	100
56	134 Andrew Road	18.00	28.30	23.4	20.9	20.40	13.50	18.30	20.60	22.30	25.3	30.4	21.4	21.9	17.1	100
62	154 Windsor Road	35.20	28.80	32.2	31.7	28.20	28.10	25.50	27.10	36.10	31.9	38.2	33.90	31.4	24.5	100
70	Ty-Isaf	27.90	25.00	21	28.9	20.50	16.80	17.80	21.90	25.30	18.80	26.90	28.90	23.3	18.2	100
74	114 Windsor Road	32.30	23.10	28.3	23.10	25.40	22.80	20.00	25.30	29.60	29.2	35.9	30.30	27.1	21.1	100
76	160 Windsor Road	32.20	31.60	28.1	28.5	29.70	25.00	26.00	28.50	34.50	34.8	36.2	33.70	30.7	24.0	100
100	141 Plassey Street	28.90	20.80	20.3		18.50	17.10	18.50	16.70	21.10	23.10	32.7	24.4	22.0	17.2	92
79	Marine Scene	37.90	38.70	34.5	48.3	38.50	35.40	35.30			40.3	47.8	39.3	39.6	30.9	83
113	03 Plassey Street	29.10	22.50	26	30.3	23.90	16.80	20.90	23.60	28.50	23.00	27.6	25.3	24.8	19.3	100
82	98b Windsor Road	20.30	20.80	16.4	17.5	13.80	13.30	12.90	13.30	18.50	19	22.70	20.40	17.4	13.6	100
55	134 Windsor Road	26.70	28.30	31.50		19.90	28.00	27.50	27.40	32.60	25.3	37.1	30.30	28.6	22.3	92
8	Tynewydd Road	38.60		32.2	31.30	30.50	28.50	26.50	25.70	31.50	29.00		35.5	30.9	24.1	83
41	Dispenser Road	17.60	12.40	12	9.70	8.30	7.60	5.90	8.00	9.50	9	13	14.1	10.6	8.3	100
64	Holton Road	23.10	22.40		19.1	16.60	13.20	14.10	12.90	18.50		22.7	26.3	18.9	14.7	83
66	17 Churchill Terrace	38.40	30.70		30.1	29.60	25.30	26.80	24.40	30.40	29.7	43.3	35.30	31.3	24.4	92
116	Ffordd y Mileniwm, Barry	29.50	27.00	22.9	21.80	18.10	14.60	15.00	15.70	21.30	21.1	24.8	24.70	21.4	16.7	100
117	1 Riverside Place, Barry	34.00	30.90	29.4	25.90	28.20		25.50	22.40	14.80	31	38.2	33.10	28.5	22.2	92
102	Powell Dyffryn Way	27.70	20.30	20.8	20.6	15.40	14.50	16.60	14.60	19.60	17.6	28.6	23.60	20.0	15.6	100
114	107 Dock View Road	22.60	20.00	14.50	14.30	11.30	10.20	9.60	11.20	16.70	13.4	18.8	18.60	15.1	11.8	100
115	20 Barry Road, Cadoxton	25.40	29.60		29.40	30.10	29.80	25.30	21.70	30.70	28.8	39	33.90	29.4	23.0	92
119	Dock View Road Co-location	29.50	23.90	20.5	20.40	18.20	28.30	16.10	17.60	23.10	22.2	32.2	23.20	22.9	17.9	100
121	Buttrills Road	38.80	32.60	33.1	27.90	29.10	23.70	23.20	26.50	31.8	37.8	40.90	35.8	31.8	24.8	100
122	Sycamore Cottage	14.10	13.5	10.4	10.5	9.30	7.30	7.00	7.00	11.10	10	11.50	13.3	10.4	8.1	100

Notes:

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

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

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

(2) Distance corrected to the nearest relevant public exposure

Appendix B: A Summary of Local Air Quality Management

Purpose of an Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment Act 1995 and associated government guidance. 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 being achieved. Where exceedances occur, or are likely to occur, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) within 18 months of declaration setting out the measures it intends to put in place in pursuit of the objectives. Action plans should then be reviewed and updated where necessary at least every five years.

For Local Authorities in Wales, an Annual Progress Report replaces all other formal reporting requirements and have a very clear purpose of updating the general public on air quality, including what ongoing actions are being taken locally to improve it if necessary.

Air Quality Objectives

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in Table 21.

The table shows the objectives in units of micrograms per cubic metre $\mu\text{g}/\text{m}^3$ (milligrams per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table 23 - Air Quality Objectives Included in Regulations for the Purpose of LAQM in Wales

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as	Date to be achieved by
Nitrogen Dioxide (NO₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen Dioxide (NO₂)	40µg/m ³	Annual mean	31.12.2005
Particulate Matter (PM₁₀)	50µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2010
Particulate Matter (PM₁₀)	40µg/m ³	Annual mean	31.12.2010
Sulphur dioxide (SO₂)	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO₂)	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO₂)	266µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	16.25µg/m ³	Running annual mean	31.12.2003
Benzene	5µg/m ³	Annual mean	31 12 2010
1,3 Butadiene	2.25µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0mg/m ³	Maximum Daily Running 8-Hour mean	31.12.2003
Lead	0.25µg/m ³	Annual Mean	31.12.2008

Appendix C: Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

A database of bias adjustment factors determined from Local Authority co-location studies throughout the UK has been collated by the LAQM Helpdesk. The National Diffusion Tube Bias Adjustment Factor Spreadsheet (Version 06/21) was used to obtain an overall adjustment factor of 0.78 from the input data shown in the following screenshot. This overall factor is based on 42 co-location studies where the tube preparation method and analysis laboratory used were the same as those used by VoGC.

Figure 27 - National Diffusion Tube Bias Adjustment Factor Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 06/21			
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of Sept 2021			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods							Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet			
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.							LAQM Helpdesk Website			
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.			
Step 1:		Step 2:	Step 3:	Step 4:						
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ³ shown in blue at the foot of the final column.						
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ² .	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953						
Analysed By ¹	Method	Year ²	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2020	R	East Suffolk Council	12	30	25	19.6%	G	0.84
SOCOTEC Didcot	50% TEA in acetone	2020	UB	Canterbury City Council	10	13	10	28.1%	G	0.78
SOCOTEC Didcot	50% TEA in acetone	2020	R	Canterbury City Council	9	26	20	29.6%	G	0.77
SOCOTEC Didcot	50% TEA in acetone	2020	UB	Kingston upon Hull City Council	12	24	18	34.8%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2020	R	Ipswich Borough Council	12	27	21	28.5%	G	0.78
SOCOTEC Didcot	50% TEA in acetone	2020	R	Ipswich Borough Council	12	36	26	36.3%	G	0.73
SOCOTEC Didcot	50% TEA in acetone	2020	R	Thanet District Council	9	20	17	21.2%	G	0.83
SOCOTEC Didcot	50% TEA in acetone	2020	R	Medway Council	12	26	18	41.7%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2020	B	Medway Council	11	20	10	96.3%	G	0.51
SOCOTEC Didcot	50% TEA in acetone	2020	B	Gravesham Borough Council	12	23	22	5.6%	G	0.95
SOCOTEC Didcot	50% TEA in acetone	2020	B	Gravesham Borough Council	12	27	24	16.1%	G	0.86
SOCOTEC Didcot	50% TEA in acetone	2020	R	Monmouthshire County Council	10	32	24	36.3%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2020	UI	North Lincolnshire Council	13	18	14	26.6%	G	0.79
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	12	24	19	29.0%	G	0.78
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	11	22	17	34.3%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2020	R	City of York Council	12	33	23	40.4%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2020	R	Cambridge City Council	10	30	20	47.6%	G	0.68
SOCOTEC Didcot	50% TEA in acetone	2020	R	Wrexham County Borough Council	9	17	13	26.6%	G	0.79
SOCOTEC Didcot	50% TEA in acetone	2020	KS	Marylebone Road Intercomparison	11	59	43	38.0%	G	0.72
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	10	23	23	2.2%	G	0.98
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	12	22	19	18.6%	G	0.84
Socotec Didcot	50% TEA in acetone	2020	R	Horsham District Council	9	25	18	42.0%	G	0.70
Socotec Didcot	50% TEA in acetone	2020	R	Dacorum Borough Council	10	24	19	25.2%	G	0.80
Socotec Didcot	50% TEA in acetone	2020	R	Huntingdonshire District Council	12	36	25	47.1%	G	0.68
SOCOTEC Didcot	50% TEA in acetone	2020		Overall Factor³ (24 studies)				Use		0.76

Discussion of Choice of Factor to use

The bias adjustment factor applied to all 2021 data is 0.78. The applied bias adjustment factor has been calculated using the national diffusion tube bias adjustment factor spreadsheet version 03/22.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes are supplied and analysed by Socotec UK Ltd Didcot, using the 50% triethanolamine (TEA) in water method. Socotec UK Ltd Didcot participates in the Annual Field Inter-Comparison Exercise and Workplace Analysis Scheme for Proficiency (WASP) inter-comparison scheme for nitrogen dioxide diffusion tube analysis. From April 2014 the WASP Scheme was combined with the STACKS scheme to form the new AIR scheme, which Socotec UK Ltd Didcot participates in. The AIR scheme is an independent analytical proficiency testing scheme operated by LGC Standards and supported by the Health and Safety Laboratory (HSL).

The laboratory Socotec UK Ltd Didcot is regarded ranked as the highest rank of satisfactory in relation to the WASP intercomparison scheme for spiked nitrogen dioxide diffusion tubes.

Information regarding tube precision can be obtained via <http://laqm.defra.gov.uk/diffusion-tubes/precision.html> Information regarding WASP results can be obtained via <http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>

Table 24 - Bias Adjustment Factor

Year	Local or National	National Reference	Adjustment Factor
2021	National	03/22	0.78
2020	National	09/20	0.76
2019	National	06/19	0.75

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within the Vale of Glamorgan required distance correction during 2021.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The PM monitor at the Penarth, Windsor Road site is a Beta Attenuation Monitor (BAM) with gravimetric equivalence. Therefore, in order to present the data as gravimetric equivalence, a conversion factor of 0.83 has been applied, using the European Standards.

Automatic Monitoring Annualisation

There are no automatic monitoring locations that required annualization during 2021.

NO₂ Fall-off with Distance from the Road

No automatic NO₂ monitoring locations within the Vale of Glamorgan required distance correction during 2021.

Table 25 - Annualisation Table (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor St Julian's Newport	Annualisation Factor Bristol St Paul's	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
Railway Terrace	0.8279	0.9252	0.9824	23.7	20.7	Annualised annual mean includes bias adjustment factor 0.78
Dinas Powys Infants School	0.8698	0.9458	1.0580	15.5	14.1	Annualised annual mean includes bias adjustment factor 0.78

Appendix D : Impact of COVID-19 upon LAQM

The COVID-19 pandemic has impacted air quality at local, regional and national scales and presented challenges to Local Authorities in undertaking statutory LAQM duties. This section outlines the impact of COVID 19 on air quality in the Vale of Glamorgan during 2021. Welsh Government have produced a report where further detail on air quality impacts from COVID-19 at national scale can be viewed through the [Reports & Seminars section of air quality.gov.wales](#).

Impacts of COVID-19 on Air Quality within the Vale of Glamorgan

In 2020 a reduction of 19% in the NO₂ annual mean concentration was experienced at all roadside diffusion tube monitoring sites relative to 2019. In 2021 the reduction in the NO₂ annual mean concentration has decreased slightly to 16.7% relative to 2019.

Opportunities Presented by COVID-19 upon LAQM within the Vale of Glamorgan

No LAQM related opportunities have arisen as a consequence of COVID-19 within the Vale of Glamorgan.

Challenges and Constraints Imposed by COVID-19 upon LAQM within the Vale of Glamorgan

LAQM duties were not affected by in the impact of COVID-19 during 2021.

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA 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
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide