



Vale of Glamorgan Council 2020 Air Quality Annual Progress Report

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

September 2020

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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 as a significant concern for Public Health, 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”. 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), 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.

Examining the most recent datasets (2017) made available by Public Health Wales for the total number of all-cause non-accidental deaths registered in the Cardiff and Vale University Health Board area, the long term mortality burden attributable to air pollution (fine particulate matter and nitrogen dioxide combined) is an estimated effect equivalent to 178- 227 deaths.

Despite the efforts made by national government and local authorities there is an apparent disconnection 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 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 as they are more likely to suffer pre-existing health conditions as a result of their poorer living conditions and lifestyle, but also as they are more vulnerable, being more likely to be living in areas with higher levels of air pollution.

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 or not 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), February 2018. 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, car homes etc."

Automatic Monitoring Site

In 2019 VoGC operated 1 automatic analyser located on Windsor Road, Penarth. The monitoring site measures on a 24/7 basis measuring levels of nitrogen dioxide, PM₁₀ and ozone (O₃) and forms part of the Welsh Air Quality Network. The results of this air quality monitoring can be viewed online at <http://www.welshairquality.co.uk>.

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 (data 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.

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

English: <http://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 40µg/m³ (microgrammes 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 2019 there were 51 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 (**40µg/m³**) and 1-hour (**200µg/m³ not to be exceeded > 18 times per year**) air quality objectives for NO₂.

The NO₂ non-automatic monitoring network utilised in the Vale almost mirrors that of the existing 2018 non-automated network, however new NO₂ monitoring locations were commissioned to strengthen understanding in existing monitored areas, such as the Cowbridge and Barry areas.

As part of those described additional non-automated monitoring locations, as discussed in the 2019 Annual Air Quality Progress Report (APR); funded externally by Natural Resources Wales (NRW) as part of the Citizen Science project, commissioned by NRW and initiated in April 2019, air quality monitoring services was provided by Shared Regulatory Services (SRS) on behalf of VoGC for a number of schools premises located in the Vale;

- Ysgol Gymraeg Pen-y- Garth;
- Cogan Primary School;
- Jenner Park Primary School;
- Romilly Community Primary School;
- Rhoose Primary School;
- Cowbridge Comprehensive School; and
- Albert Primary School

These particular schools were chosen based upon local knowledge of the area, previous history, as well as focusing upon annual average daily traffic (AADT) flows of nearby road networks. Where road links are susceptible to traffic volumes greater than 10,000 AADT or 5,000 AADT (narrow streets) it is best practise to consider these areas for potential air quality concerns.

The air quality monitoring specifically targeted levels of nitrogen dioxide (NO₂), known as a transport derived pollutant, utilising the recognised non-automated monitoring method to support the collection of datasets. The objective of the monitoring project was to examine and record levels of

nitrogen dioxide (NO₂), a known traffic derived pollutant. The project was funded for one year, whereby the datasets collected were intended to be used a driver to work with the monitored schools to influence behavioural change and raise awareness for air quality concerns.

Unfortunately, NRW have confirmed that there is no available budget to financially support the project any further, however it is confirmed that all monitored locations were compliant with the annual and 1- hour average legal air quality objectives. Representatives for each school were contacted in February 2020 to notify them of the discontinuation and compliant results to date.

This Annual Progress Report confirms that in 2019 air quality within the Vale of Glamorgan continues to meet the relevant air quality objectives, including within the existing Air Quality Management Area (AQMA) on Windsor Road, Penarth.

There were no recorded exceedences of the 1-hour NO₂ objective at any of the monitoring locations in 2019.

This Annual Progress Report confirms that air quality within the Vale of Glamorgan continues to meet the relevant air quality standards, including within the existing Air Quality Management Area (AQMA) on Windsor Road, Penarth. From the 62 locations monitored throughout the Vale with the use of passive diffusion tubes, no sites breach the national NO₂ annual objective of 40µg/m³ or the NO₂ 1-hour objective (**200µg/m³, not to be exceeded more than 18 times per year**). Detailed in the Local Air Quality Management (LAQM) TG(16), Paragraphs 7.90 & 7.91 focus on predicting exceedences of the NO₂ 1-hour objective (**200µg/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 60µg/m³.”* Therefore, based on the 2019 datasets it can be concluded that the NO₂ 1-hour objective was not breached.

Revocation of the Windsor Road, Cogan, Penarth AQMA

Highlighted by previous findings in the VoGC’s 2018 APR; due to continual compliance over a three year period with the national air quality objectives set for nitrogen dioxide (NO₂) and in accordance with Local Air Quality Management in Wales Policy Guidance, June 2017, it was decided and approved by Cabinet to initiate the process to revoke the AQMA on Windsor Road, Cogan, Penarth.

Following that decision in 2018, SRS have adhered to the requirements of LAQM statutory guidance to ensure that the correct process has been implemented to inform the decision to officially revoke the AQMA.

As outlined within VoGC 2019 APR; In 2019, in order to proceed with the formal revocation of the Windsor Road, Cogan, Penarth AQMA, in line with the requirements of WG, a detailed air quality assessment was undertaken to finalise the decision to revoke the AQMA. This detailed report is appended to the Vale Council's Cabinet report as Appendix 2B. The report adheres to the requirements stipulated by Welsh Government's policy guidance, demonstrating that compliant air quality levels are being met and demonstrate with a degree of certainty that these monitored compliant levels will be sustained for future years.

The assessment undertaken utilised best practise techniques and guidance to ensure a conservative outcome. In accordance with the air quality objectives applicable to LAQM in Wales, concentrations of NO₂ and PM₁₀ were examined at 28 sensitive receptor locations geographical placed within and in close proximity to the established AQMA boundary. The report takes into consideration previous reporting levels as well as uses air quality dispersion modelling software (ADMS-Roads, Version 4.1.1) and latest emission factors (Version 9.0) to look at current pollutant concentrations and projected concentrations. Three modelling year scenarios were chosen for this study (2018, 2023 and 2028).

Utilising Tables 5.1- 5.3 of the detailed report, the predicted concentrations of NO₂ and PM₁₀ at all modelled receptors within the Windsor Road, Cogan, Penarth AQMA are well below both the annual mean and short term AQS objectives for all modelled year scenarios. As stated by the report;

-The maximum annual mean NO₂ concentration predicted at existing receptor locations within the Windsor Road AQMA was at receptors R16 and R18 with a predicted concentration of 31.2µg/m³, 78% of the annual mean NO₂ AQS objective. Similarly, the maximum annual mean concentrations predicted in the future year scenarios (2023 and 2028) were at receptors R16 and R18 (21.4µg/m³ and 15.7µg/m³ respectively). Both receptors are located on the façade of a property bordering the A4160 (Windsor Road), located along the south-western extent of the AQMA.

-Given that the NO₂ annual mean concentrations predicted at all receptor locations are below this limit for all scenarios, exceedances of the 1-hour NO₂ AQS objective are unlikely.

-The maximum predicted annual mean PM₁₀ concentration at existing receptor locations for the 2018 scenario was at receptors R16 and R18 with a predicted concentration of 21.8µg/m³, 54.5% of the annual mean PM₁₀ AQS objective. Similarly, the maximum annual mean concentrations predicted

in the future year scenarios (2023 and 2028) were at receptors R16 and R18 (20.6µg/m³ and 20.1µg/m³ respectively). Both receptors are located within the Windsor Road AQMA.

-The number of days where PM10 concentrations were predicted to be above the 24-hour PM10 50µg/m³ AQS objective was less or equal to 6 days for all modelled scenarios at all receptor locations. This is well below the 35 permitted exceedances.

Considering the captured annual monitoring datasets and given the outcomes derived by the detailed air quality modelling it is recommended that the decision be finalised to revoke the Windsor Road, Penarth AQMA official order. If approved, the decision to revoke the AQMA order will be submitted to Welsh Government for final approval.

Public Consultation & Engagement

As approved by Cabinet following receipt of VoGC 2019 APR, it was decided to proceed to a public consultation to announce the revocation proposal and provide an opportunity for public members to review and discuss the proposal further, the Vale Council hosted a public consultation, whereby a [designated webpage](#) for the specific topic was created. The webpage provided relevant documentation, an online questionnaire to be completed and communication links to submit opinions. Vale and Shared Regulatory Services carried out wider public social media campaigns and designated letter drops to residents and businesses in the vicinity of the Windsor Road, Penarth AQMA to advertise the public consultation and how to become involved.

To support the public consultation exercise, Shared Regulatory Services on behalf of the Vale Council held engagement/drop-in sessions where public members could meet with and talk to Officers about the revocation and voice any concerns. These sessions took place at Penarth Leisure Centre across two days with two available sessions each day;

12th September 09:00 – 11:00 and 17:00 – 19:00

19th September 09:00 – 11:00 and 17:00 – 19:00

The public consultation ran for a period of approximately 11 weeks, from 10th September- 25th November 2019. The consultation received some engagement, whereby there were a total of 23 respondents to the online questionnaire. Emails were also received to the dedicated email inbox AirQuality-SRSWales@valeofglamorgan.gov.uk which requested some further clarity regarding the detailed modelling performed, as well as highlight an agreement with the decision to revoke the Windsor Road, Penarth AQMA.

The online questionnaire prompted that air quality concerns were particularly prevalent amongst the public (57% highlighted as very concerned). It is also apparent that the majority of the respondents did **NOT** support the decision to revoke the AQMA (67% said NO). Examining the responses received from those who oppose the decision, responses raised concerns over future development and potential subsequent impact to the AQMA, as well as it was thought to be counterintuitive to revoke the AQMA as it is believed that improvements have only been developed by the AQMA order being in place. Concerns have also been raised regarding the continuation of air quality monitoring within the current designated AQMA area.

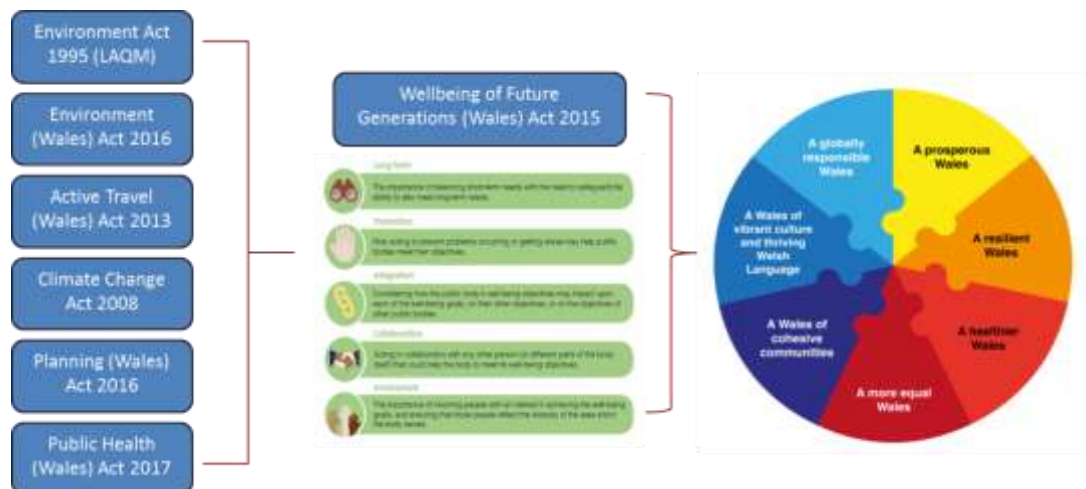
In response to the concerns raised, each key point has been addressed in Appendix 2A- Decision Notice Report which is attached to this year's Vale Council Cabinet report to review the Annual Air Quality Progress Report 2020, therefore in turn alleviating those concerns and decision to oppose the revocation decision.

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.

Figure 1 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 1- The Well- being of Future Generations (Wales) Act 2015 Matrix



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/ BCBC 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.

Actions to Improve Air Quality

Improved monitoring

- In an effort to improve its monitoring capabilities, for 2019, as part of a yearly review SRS have amended and improved the network of diffusion tubes previously assigned in previous years used for the LAQM regime. The amendments include improved monitoring locations to represent the locality of monitoring objectives and implementation of additional sites.
- For 2019; Shared Regulatory Services (SRS) on behalf of the Vale Council was commissioned by Natural Resources Wales (NRW) to establish new air quality monitoring locations around

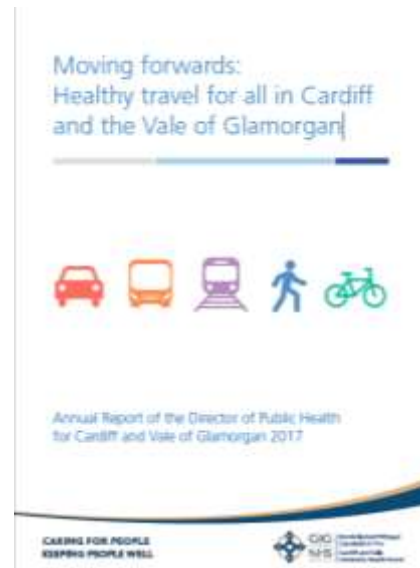
school premises. The monitoring project will be used to examine and record levels of nitrogen dioxide (NO₂), a known traffic derived pollutant. The project is funded for one year. The datasets collected will be used a driver to work with the monitored schools to influence behavioural change and raise awareness for air quality concerns.

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

Publications & Policies

Local Development Plan (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.



Cardiff and Vale University Health Board Report

The report issued in 2017 examines how making active travel alternatives can lead to sustainable improvements in our health and well-being. The report focuses upon Cardiff and Vale's air quality concerns and recognises that alternative sustainable transport is a key enabler to improving air quality.

Public Transport

Improving Bus Networks

The VoGC are committed to improving air quality. With the envisaged desire to improve traffic fleet composition and increase the uptake of sustainable alternatives and fuels, it is extremely encouraging to find out from the VoGC about adopted improved bus fleets and the routes these services use. The contracted bus company **New Adventure Travel (NAT)** currently runs a local bus service (89a & 89b). The service runs through Dinas Powys, Llandough, Penarth (including Windsor Terrace and Pill Street), and into Cardiff Bay and Cardiff. Approximately 6000 passenger journeys are undertaken on this service each month. The operator runs two hybrid buses on the service. These

buses run on electric when doing speeds of 30 miles per hour or less. The buses then run off diesel when undertaking speeds above 30 miles per hour. Using hybrid buses on these routes reduces carbon emissions, specifically in areas where speeds are 30 miles per hour or less, in particular around Penarth, Llandough and Dinas Powys.

Active Travel

Staff Healthy Travel Charter

A Healthy Travel Charter for the Vale has been developed with major public sector employers, launched in October 2019. Signatories to the Charter make 14 commitments on improving access to active and sustainable travel for staff and visitors to their main sites, and jointly commit to three targets namely:

- Reduce the proportion of commuting journeys made by car;
- Increase the proportion of staff cycling weekly; and
- Increase the proportion of vehicles used for business purposes which are plug-in hybrid or electric.

The Charter was signed by 8 public sector organisations at the launch in October 2019. Held at the Civic Offices, along with Cardiff and Vale University Health Board, Cardiff Airport, South Wales Fire and Rescue Service, South Wales Police, HM Prison and Probation Services, Welsh Government and Welsh Ambulance NHS Trust, we agreed to help staff and visitors travel to their sites in a sustainable way.

Currently it is not possible to fully assess the impacts of the above the measures but it is envisaged that such measures will contribute to wider behavioural changes and incentives to encourage further modal shift or uptake of low emission vehicles which will see improvements in air quality.

Education

In accordance with the duties under sections 7 (3) and 10 (2) of the Active Travel (Wales) Act 2013, Vale Council's Active Travel Report 19-20 reported the following successes;

The Council offers National Standard Cycle Training to all its primary schools. 1473 pupils passed Level 1 and 2 in 19/20.

Kerbcraft and Child Pedestrian Training was given to 895 primary aged pupils in 19/20.

Both of these initiatives have a higher participation rate than in 18/19.

The Council engaged the services of Sustrans Cymru to undertake school engagement sessions at 8 Vale schools to create active travel maps showing routes to schools. Maps will be distributed to schools in Penarth, Barry and Llantwit Major in the first term of academic year 20/21.

Each Primary School in the Vale received 4 balance bikes for use in schools (188 in total) to encourage early positive cycle behaviour. Funding for further provision has been agreed for financial year 20/21.

Nextbike

Through the planning system S106 funding has been acquired to provide the requirement of Active Travel infrastructure. Therefore, the Vale Council has started to roll out an e-bike hire scheme, and in doing so awarded the contract to NextBike. Works have started to implement 6 NextBike docking stations in the Penarth area. Docking stations have been installed in Llandough Hospital, Windsor Road (by Windsor Arcade) and The Esplanade. Work is in progress on Penarth Train Station and the Barrage. The only site yet to have the location confirmed is Cosmeston.

In addition; Funding for a Nextbike docking station was granted in Sully which will complement the Penarth scheme. A further aspiration will be to set up a nextbike hire scheme to cover Barry Waterfront, Barry Island and The Knap.

Cycleways

-Darren Farm development - 1.6km through new housing development also improving pedestrian/cycle access from Crossways to Cowbridge.

-A4226 (Five Mile Lane) cycleway/footway linking Barry to A48 – 6.5 km completed August 2019.

-Northern Access Road (St Athan/Llantwit Major) nearing completion – 2.25 km shared use footway/cycleway completed October 2019.

Improvements for Sustainable Transport & Infrastructure

Penarth Cardiff Barrage Sustainable Transport Corridor

For 2019 VoGC together with external consultants completed a Welsh Transport Planning and Appraisal Guidance (WelTAG) Stage 1 'Strategic Outline Case' to develop various options for improving sustainable connectivity through the corridor between Penarth and Cardiff Barrage.

The key objectives of the project are;

- Enhance sustainable connectivity throughout the Penarth Cardiff Barrage transport corridor to achieve modal shift away from the private car towards public transport and active travel;
- Reduce barriers that constrain opportunities to increase travel by sustainable transport modes;
- Increase sustainable transport options that improve accessibility along the Penarth Cardiff Barrage transport corridor and support social inclusion, health and well-being;
- Deliver sustainable transport improvements that encourage increased economic activity and support long-term investment; and
- Introduce sustainable transport measures that protect and enhance the historic, built and natural environment.

The WelTAG Stage 1 looked at a number of possible options to improve sustainable transport within the study area and concluded by recommending three shortlisted options (plus a 'do minimum') for further appraisal at a WelTAG Stage 2.

- Option 1- Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel Integrated Network Map;
- Option 2- Bus Park & Ride and sustainable transport links across Cardiff Barrage;
- Option 3- Multi-modal sustainable transport interchange; and
- Option 4- Do Minimum

The VoGC recently held a public consultation to provide a platform for the public to make comments on the proposals. The consultation is now closed however background information on the project can still be viewed at; <https://www.valeofglamorgan.gov.uk/en/living/Roads/Transport-Studies/Penarth-Cardiff-Barrage-Sustainable-Transport-Corridor-Study.aspx>

Update 2019/ 20

WelTAG Stage two proposals have been completed for the outlined three options;

- Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel Integrated Network Map;
- Bus Park and Ride and sustainable transport links across Cardiff Barrage; and
- Multi-modal sustainable transport interchange at Cogan Railway Station.

Following the WelTAG Stage two process, two preferred options were agreed and will be considered further as part of a WelTAG Stage three analysis;

- Active travel proposals for Penarth within the Vale of Glamorgan's Active Travel Integrated Network Map; and
- Multi-modal sustainable transport interchange at Cogan Railway Station.

As per the findings of the WelTAG Stage two analysis;

Option 1 - should be progressed to WelTAG Stage Three. This option performed most positively of all the options throughout the Strategic Case appraisal and was the most well-supported of the three options receiving the most positive responses during the WelTAG Stage Two consultation activities.

The appraisal should consider the potential transport benefits of all active travel measures, with an additional recommendation to take forward the Penarth Headland Link (PHL) as part of a separate implementation programme to the other active travel measures due to the complexity and large-scale context of the PHL proposal, as well as to allow the PHL appraisal to more widely reflect its potential leisure and tourism benefits.

Option 2 - Progression for further appraisal is not recommended. Option 2 received the most negative responses during the WelTAG Stage Two consultation activities, particularly in relation to the potential impact that the introduction of buses on Cardiff Barrage could have on the existing Active Travel route.

Issues relating to the proposed location of the park and ride, which was Cosmeston, was a common issue raised through the stakeholder and public consultation.

Contributors worried about the it would mainly attract users from the Lower Penarth, Sully and Cosmeston areas and not attract users from Penarth itself or from areas further afield such as Barry.

Option 3 - was recommended to progress for further appraisal. It states that a partnership approach between Transport for Wales and Vale of Glamorgan Council provides the framework to take forward the appraisal.

Unfortunately, Option 1 did not get the funding required from Welsh Government in 2020 for a WelTAG Stage three proposal. Option 3 is proceeding to a WelTAG Stage three proposal which forms part of a regional interchange project.

Local Priorities and Challenges

The main priorities for SRS and Vale of Glamorgan Council in the coming year are;

-Officially revoke the Windsor Road, Cogan, Penarth Air Quality Management Area (AQMA)

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/>

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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 published reports corresponding to stages 1, 2 and 3 of the first round of review and assessment of air quality. These assessments predicted no exceedences 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) exceedences 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 Rhoose.

The Council proceeded to publish Progress Reports in 2004 and 2005, which identified exceedences of the 15-minute SO₂ objectives in Rhoose. The Vale 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 Vale 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 exceedences of either NO₂ limit but recommended continued monitoring.

Fourth Round of Review and Assessment

The Vale 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 exceedences however; annual mean concentration at Windsor Road in Penarth was close to the limit. There were no exceedences of SO₂ 15-minute or 24-hour means. There were 6 exceedences of the PM₁₀ daily mean concentration and no exceedences of the PM₁₀ annual mean objective.

The 2010 Progress Report concluded that there were no exceedences 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 exceedences of the NO₂ or SO₂ objectives however; NO₂ concentrations remain close to objective in some places. A number of exceedences of the 24-hour mean for PM₁₀ were recorded in Fonmon and Penarth but still remained within the permitted 35 exceedences per annum.

Fifth Round of Review and Assessment

The Vale 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 a number of locations on Windsor Road in Penarth, where the annual mean NO₂ objective was likely to be exceeded and that no exceedences 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 are high due to congested traffic moving through a partial 'street canyon' with residential exposure along the western flank. Current AQMA is highlighted in Figure 1.2.

Sixth Round of Review and Assessment

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

The **2018** Annual Progress Report 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 Report 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 report highlighted the outcomes derived by a detailed air quality assessment undertaken in support of the Windsor Road, Cogan, Penarth AQMA revocation. The report outlined the next steps whereby public engagement sessions would be held and a public consultation exercise undertaken.

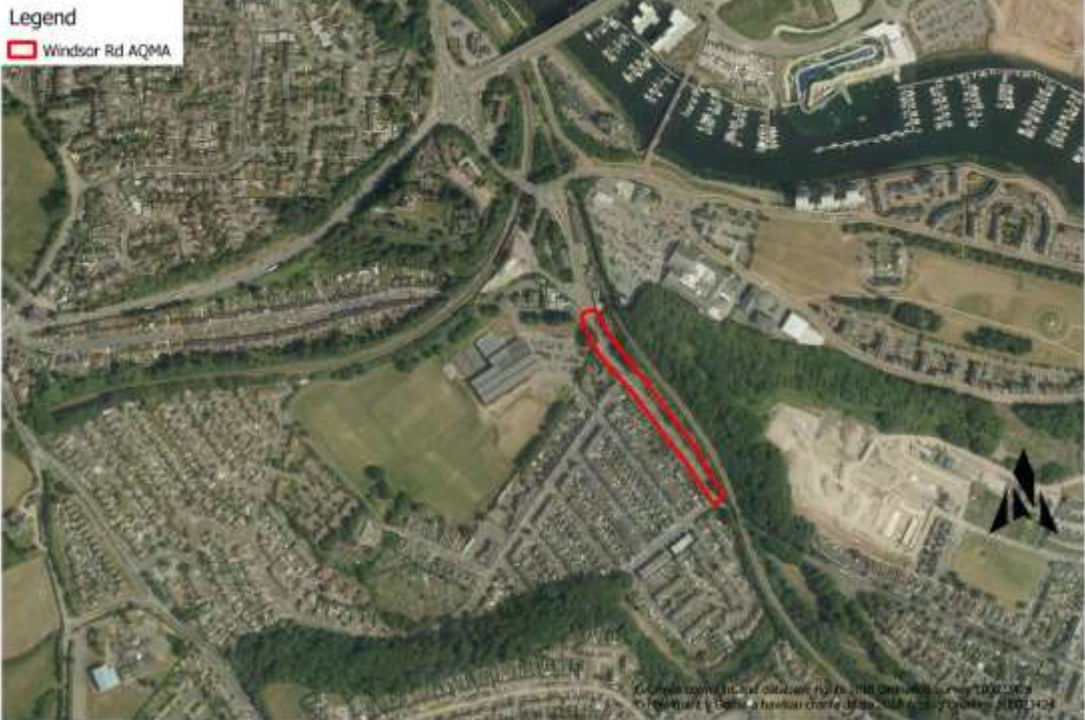
1.2 Air Quality Management Areas

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 (AQMA) 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.

Based on monitoring results and further detailed assessments, there is currently one Air Quality Management Areas (AQMA) declared in The Vale District, declared due to exceedances of the annual mean NO₂ Air Quality Standard (40ug/m³), known to be derived from road transport derived NO₂.

-Windsor Road, Cogan, Penarth AQMA- declared 1st August 2013.

Figure 2- Boundary of the Windsor Road, Cogan, Penarth AQMA



1.3 Implementation of Action Plans

Due to the proposal and ongoing works to revoke the Penarth, Windsor Road AQMA, it is currently not necessary for the Vale of Glamorgan to produce an action plan. However if the Council is unable to successfully fulfil the requirements of Welsh Government and demonstrate future compliance with national air quality objectives then it will be necessary to revisit the Windsor Road AQMA and an appropriate Action Plan developed.

Although not formalised as an action plan, highlighted within the Executive Summary highlighted under the subsection “Actions to Improve Air Quality” there are a number of measures listed which do directly impact the designated Penarth, Windsor Road AQMA.

Welsh Government’s Local Policy Guidance, “Local Air Quality Management in Wales” June 2017 states;

*4.14 Local Authorities wishing to revoke or reduce an AQMA **should only do so with the approval of the Welsh Government following a review and consultation with the local communities affected. The review should clearly demonstrate national air quality objectives are being met and will continue to be met. In other words, the Local Authority should have confidence the observed improvements will be sustained. Typically this requires three years or more of full compliance, but once the revocation or reduction has been agreed by the Welsh Government, it should occur without delay. Following a revocation, the Local Authority should ideally put in place a local or regional air quality strategy to ensure air quality remains a high-profile issue and conditions are prevented from deteriorating in future.***

As discussed previously; As outlined within VoGC 2019 APR; in order to proceed with the formal revocation of the Windsor Road, Cogan, Penarth AQMA, in line with the requirements of WG, a detailed air quality assessment was undertaken to finalise the decision to revoke the AQMA. This detailed report is appended to the Vale Council’s Cabinet report as Appendix 2B. The report adheres to the requirements stipulated by Welsh Government’s policy guidance, demonstrating that compliant air quality levels are being met and demonstrate with a degree of certainty that these monitored compliant levels will be sustained for future years

The assessment undertaken utilised best practise techniques and guidance to ensure a conservative outcome. In accordance with the air quality objectives applicable to LAQM in Wales, concentrations of NO₂ and PM₁₀ were examined at 28 sensitive receptor locations geographical placed within and in close proximity to the established AQMA boundary. The report takes into consideration previous reporting levels as well as uses air quality dispersion modelling software (ADMS-Roads, Version 4.1.1) and latest emission factors (Version 9.0) to look at current pollutant concentrations and projected concentrations. Three modelling year scenarios were chosen for this study (2018, 2023 and 2028).

Furthermore, the outlined detailed report was accompanied by public engagement sessions, as well as a public consultation exercise to review the reported findings.

Following the public consultation exercise and considering the captured annual monitoring datasets and given the outcomes derived by the detailed air quality modelling, it is recommended that the decision be finalised to revoke the Windsor Road, Penarth AQMA official order. If approved, the decision to revoke the AQMA order will be submitted to Welsh Government for final approval.

2. Air Quality Monitoring Data and Comparison with Air Quality Objectives

2.1 Summary of Monitoring Undertaken in 2019

2.1.1 Automatic Monitoring Sites

The Vale Council operated three automatic monitor stations during 2019.

Dock View Road & Holton 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.

Penarth, Windsor Road

This monitor is operated by Shared Regulatory Services (SRS) on behalf of the Vale Council and is classified as a roadside monitor. It was commissioned in 2014 following a re-location from the site (Grid reference: 317550, 171483) to be within the Windsor Road AQMA. The monitoring site measures nitrogen dioxide, PM₁₀ and ozone (O₃) and forms part of the Welsh Air Quality Network. The station is calibrated by a Local Authority Officer on a fortnightly basis and serviced and maintained by an approved contractor on a six-monthly basis following QA/QC checks. Data obtained from the monitor is checked for validation and ratified by Ricardo-AEA. For 2019, data capture for NO₂ was recorded at 98% and 98.6% for PM₁₀.

There are three diffusion tubes co-located at the station, whereby at the end of year, depending on data capture and precision, a locally derived bias adjustment factor is calculated. The bias adjustment factor derived from the co-location study was 0.60. This adjustment has not been applied to the network of diffusion tubes due to the fact that the National Bias Adjustment Factor supplied by the LAQM DEFRA website, based on 42 studies, which appointed Socotec Didcot laboratory, was slightly higher at 0.75. In order to provide a conservative approach it was therefore decided to adopt the nationally derived bias adjustment factor as this would give slightly higher concentrations and fundamentally represent a worst case scenario.

Figure 3- Map of Holton Road & Dock View Road Indicative Automated Monitoring Sites



Figure 4- Map of Penarth, Windsor Road Automatic Monitoring Site



Table 1- Details of Automatic Monitoring Site

| 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? |
|-----------------------|-----------------------|-----------|---------------------|---------------------|------------------|------------------------------------|----------|---|--|--|---|
| Penarth, Windsor Road | Penarth, Windsor Road | Roadside | 317598 | 172399 | 2.5 | NO ₂ | Y | Chemiluminescent Analyser | Y (2m) | 2m | Y |
| | | | | | | PM ₁₀ | | Beta Attenuation Monitor with Gravimetric Equivalence | | | |
| | | | | | | O ₃ | | UV absorption analyser | | | |
| 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 |
| Holton Road | Holton Road, Barry | Roadside | 312193 | 168239 | 4 | NO ₂ & PM ₁₀ | N | Electrochemical Sensor | Y (3m) | 0.5m | N |

2.1.2 Non-Automatic 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 the period since the 2019 Annual Progress Report, monitoring of NO₂ using passive diffusion tubes has been carried out at 51 locations throughout the Vale. The locations of the diffusion tubes are described in Table 2 and shown in Figure 5- 14. Included as part of Table 2 is the NRW funded school monitoring formulated as part of the Citizen Science project.

NO₂ Diffusion Tube Locations

The location of where NO₂ monitoring has taken place;

- a. Cowbridge (Area A)
- b. Llantwit Major (Area B)
- c. St Athan (Area C)
- d. Rhoose (Area D)
- e. Saint Brides Major (Area E)
- f. Culverhouse (Area F)
- g. Dinas Powys (Area G)
- h. Llandough (Area H)
- i. Penarth (Area I)
- j. Barry/ Sully (Area J)

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 0.75 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>). The procedure is described in LAQM (TG16), Section 7.77-7.79.

Figure 5– AREA A – Cowbridge NO₂ Diffusion Tube Locations



Figure 6– AREA B – Llantwit Major NO₂ Diffusion Tube Locations

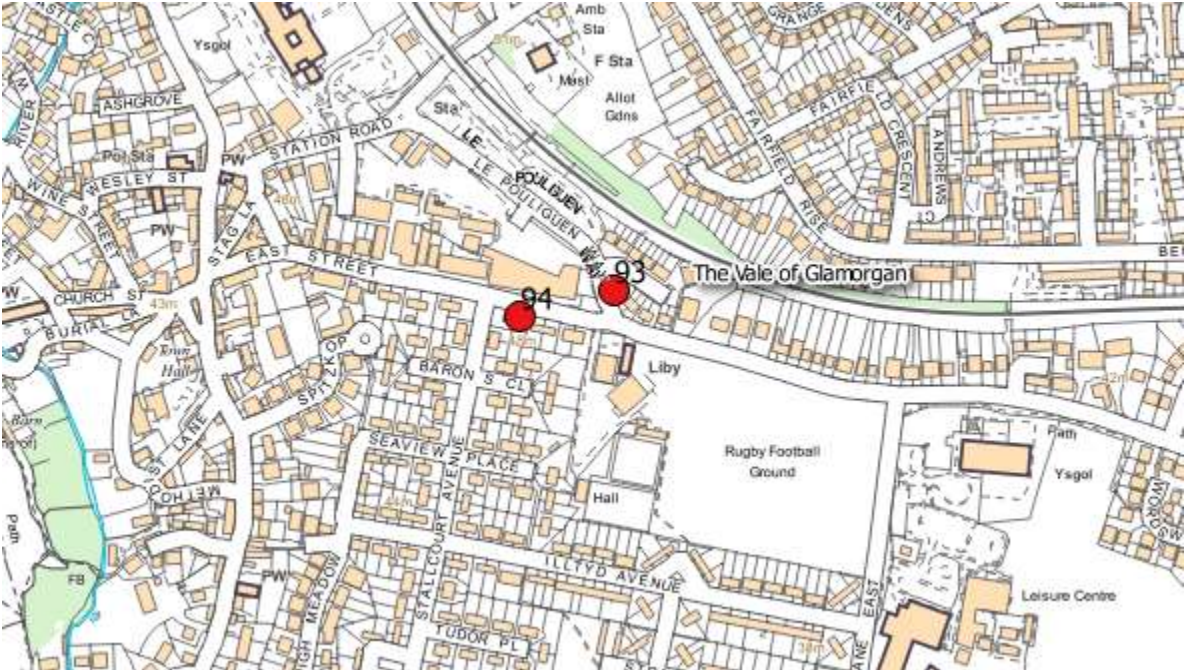


Figure 7– AREA C – St Athan NO₂ Diffusion Tube Locations



Figure 8– AREA D – Rhose NO₂ Diffusion Tube Locations



Figure 9– AREA E – Saint Brides Major NO₂ Diffusion Tube Locations



Figure 10– AREA F – Culverhouse NO₂ Diffusion Tube Locations



Figure 11– AREA G – Dinas Powys NO₂ Diffusion Tube Locations



Figure 12– AREA H – Llandough & Cogan NO₂ Diffusion Tube Locations

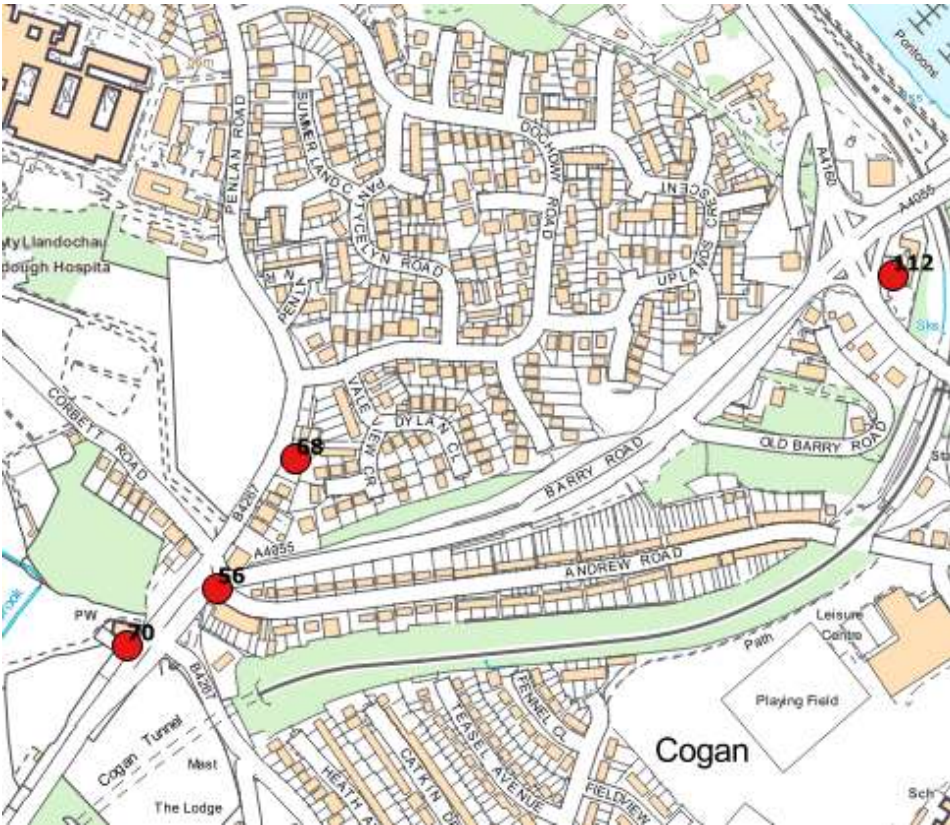


Figure 13– AREA I – Penarth NO₂ Diffusion Tube Locations



Figure 14– AREA J – Barry/ Sully NO₂ Diffusion Tube Locations



Table 2- Details of Non-Automatic Monitoring Sites 2019

| 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 |
| 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 |
| ST ATHAN | | | | | | | | | | | |
| 95 | Millands Caravan Park | Rural | 298861 | 169236 | 1.5 | NO ₂ | N | N | Y (0.00) | 290m | Y |
| 96 | Old Froglands Farm | Suburban | 299045 | 169126 | 1.5 | NO ₂ | N | N | Y (0.00) | 86m | Y |
| 97 | 7 Picketson Close | Urban Background | 300460 | 169310 | 1.5 | NO ₂ | N | N | Y (0.00) | 30m | Y |
| RHOOSE | | | | | | | | | | | |
| 99 | Fonmon Road Lampost | Kerbside | 304894 | 166898 | 1.5 | NO ₂ | N | N | N (8.00) | 0.9m | N |
| 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 |
| CULVERHOUSE | | | | | | | | | | | |

| 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? |
|--------------------|----------------------------------|-----------|---------------------|---------------------|-----------------|----------------------|----------|---|--|--|---|
| 38 | 2 Horseshoes | Roadside | 311892 | 174513 | 1.5 | NO ₂ | N | N | Y (0.00) | 2m | Y |
| 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 |
| 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 |
| 111 | 203 Cardiff Road, Dinas Powys | Roadside | 316366 | 171823 | 1.5 | NO ₂ | N | N | Y (0.00) | 3m | Y |
| LLANDOUGH | | | | | | | | | | | |
| 68 | Glen View, 99 Penlan Road | Roadside | 316886 | 172561 | 1.5 | NO ₂ | N | N | Y (0.00) | 9m | Y |
| 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 |
| 55 | 159 Windsor Road | Roadside | 317595 | 172435 | 1.5 | NO ₂ | Y | N | Y (0.00) | 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? |
|--------------|------------------------|------------------|---------------------|---------------------|-----------------|----------------------|----------|---|--|--|---|
| 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 |
| 73a | Windsor Road Monitor 1 | Roadside | 317598 | 172399 | 1.5 | NO ₂ | Y | Y | 2m | 2m | Y |
| 73b | Windsor Road Monitor 1 | Roadside | 317598 | 172399 | 1.5 | NO ₂ | Y | Y | 2m | 2m | Y |
| 73c | Windsor Road Monitor 1 | Roadside | 317598 | 172399 | 1.5 | NO ₂ | Y | Y | 2m | 2m | Y |
| 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 |
| 82 | 98b Windsor Road | Roadside | 318061 | 171944 | 1.5 | NO ₂ | N | N | Y (0.00) | 8m | Y |
| 88 | 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 |
| 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 |

| 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? |
|--------------------------|----------------------------------|-----------|---------------------|---------------------|-----------------|----------------------|----------|---|--|--|---|
| 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 |
| 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 | Dock View Road | Kerbside | 312401 | 167947 | 1.5 | NO ₂ | N | N | N (3.00) | 1m | N |
| SCHOOL MONITORING | | | | | | | | | | | |
| | Ysgol Gymraeg Pen-y-Garth | Roadside | 316984 | 172024 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Ysgol Gymraeg Pen-y-Garth | Roadside | 316979 | 172037 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Cogan Primary School | Roadside | 317437 | 172132 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Cogan Primary School | Roadside | 317490 | 172222 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Jenner Park Primary School | Roadside | 312261 | 168887 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Jenner Park Primary School | Roadside | 312236 | 168885 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Romilly Community Primary School | Roadside | 310518 | 167684 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Romilly Community Primary School | Roadside | 310521 | 167696 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Rhoose Primary School | Roadside | 306052 | 166375 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | Y |
| | Rhoose Primary School | Roadside | 306089 | 166386 | 2.0 | NO ₂ | N | N | (Y) 0.00 | N/A | 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? |
|---------|--------------------------------|-----------|---------------------|---------------------|-----------------|----------------------|----------|---|--|--|---|
| | Cowbridge Comprehensive School | Roadside | 300227 | 174786 | 2.0 | NO2 | N | N | (Y) 0.00 | N/A | Y |
| | Cowbridge Comprehensive School | Roadside | 300254 | 174793 | 2.0 | NO2 | N | N | (Y) 0.00 | N/A | Y |
| | Albert Primary School | Roadside | 318640 | 172026 | 2.0 | NO2 | N | N | (Y) 0.00 | N/A | Y |
| | Albert Primary School | Roadside | 318640 | 172021 | 2.0 | NO2 | N | N | (Y) 0.00 | N/A | Y |

Notes:

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

2.2 2019 Air Quality Monitoring Results

Table 3– Non-automatic Annual Mean NO₂ Monitoring Results (2015- 2019)

| Site ID | Site Type | Valid Data Capture 2019 (%) ⁽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 |
| COWBRIDGE | | | | | | | | |
| 65 | Roadside | 100 | N | 15.9 | 15.9 | 15.2 | 14.9 | 16.0 |
| 101 | Kerbside | 100 | N | - | - | 19.9 | 16.5 | 15.9 |
| 108 | Kerbside | 100 | N | - | - | 19.9 | 24.4 | 23.3 |
| 118 | Urban Background | 100 | N | - | - | - | - | 8.4 |
| LLANTWIT MAJOR | | | | | | | | |
| 93 | Roadside | 100 | N | - | - | 11.3 | 10.9 | 10.4 |
| 94 | Roadside | 92 | N | - | - | 9.3 | 9.4 | 8.8 |
| ST ATHAN | | | | | | | | |
| 95 | Rural | 75 | N | - | - | 6.9 | 7.2 | 6.2 |
| 96 | Suburban | 100 | N | - | - | 9.4 | 10.2 | 7.9 |
| 97 | Urban Background | 25 | N | - | - | 8.4 | 7.8 | 9.5(2) |
| RHOOSE | | | | | | | | |
| 99 | Kerbside | 100 | N | - | - | 10.0 (2) | 9.1/ 7.6(3) | 8.6/ 7.3(3) |
| SAINT BRIDES MAJOR | | | | | | | | |
| 103 | Roadside | 100 | N | - | - | 10.0 | 10.7 | 10.8 |
| 104 | Roadside | 83 | N | - | - | 10.5 | 11.2 | 11.9 |
| 105 | Kerbside | 100 | N | - | - | 12.3/ 9.3 (3) | 12.1 | 11.8 |
| 106 | Roadside | 100 | N | - | - | 9.4 | 10.3 | 10.3 |
| 107 | Roadside | 100 | N | - | - | 7.3 | 7.7 | 7.9 |

| Site ID | Site Type | Valid Data Capture 2019 (%) (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 |
| CULVERHOUSE CROSS | | | | | | | | |
| 38 | Roadside | 100 | N | 23.3 | 25.9(2) | 19.6 | 19.4 | 18.6 |
| DINAS POWYS | | | | | | | | |
| 46 | Roadside | 100 | N | 18.6 | 18.7 | 17.1 | 17.9 | 16.7 |
| 61 | Roadside | 92 | N | 30.1 | 31.5 | 30.4 | 31.0 | 28.8 |
| 67 | Roadside | 92 | N | 24.2 | 24.8(2) | 21.4 | 23.6 | 22.7 |
| 72a | Roadside | 75 | N | 23.8 | 21.9(2) | 19.9 | 19.8 | 18.5 |
| 89 | Roadside | 100 | N | 30.8 | 31.8 | 28.3 | 27.9 | 26.2 |
| 90 | Roadside | 83 | N | 21.4 | 21.2 | 19.7 | 21.3 | 20.9 |
| 109 | Roadside | 100 | N | - | - | - | 19.4 | 19.6 |
| 110 | Roadside | 100 | N | - | - | - | 20.4 | 19.3 |
| 111 | Roadside | 100 | N | - | - | - | 23.6 | 22.7 |
| LLANDOUGH | | | | | | | | |
| 68 | Roadside | 100 | N | 16.4 | 17.3 | 15.1 | 15.2 | 15.6 |
| PENARTH | | | | | | | | |
| 22 | Kerbside | 92 | N | 23.7 | 23.6/ 20.0(3) | 21.8/ 18.2 (3) | 20.3/ 16.6(3) | 19.7/ 15.8 (3) |
| 53 | Roadside | 75 | Y | 30.8 | 31.5 | 29.8 | 27.7(2) | 28.7 |

| Site ID | Site Type | Valid Data Capture 2019 (%) ⁽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 |
| 55 | Roadside | 33 | Y | 27.7 | 28.9 | 26.3 | 26.3 | 29.5(2) |
| 56 | Kerbside | 83 | N | 40.3/ 29.4(3) | 17.5(2) | 23.2 | 20.5 | 22.2 |
| 62 | Roadside | 100 | Y | 31.7 | 33.2 | 31.2 | 28.1 | 29.2 |
| 70 | Roadside | 92 | N | 23.2 | 24.6 | 20.3 | 22.3 | 19.8 |
| 73a | Roadside | 83 | Y | 30.2 | 32.0 | 31.0 | 28.9 | 29.4 |
| 73b | Roadside | 92 | Y | 29.8 | 31.0 | 30.6 | 29.7 | 29.1 |
| 73c | Roadside | 75 | Y | 30 | 31.2 | 30.5 | 30.4 | 30.1 |
| 74 | Roadside | 100 | Y | 28 | 28.2 | 28.4 | 22.7(2) | 25.4 |
| 76 | Roadside | 100 | Y | 32 | 32.4 | 30.7 | 29.9 | 28.1 |
| 79 | Roadside | 100 | Y | 37.5 | 44.4/ 37.2(3) | 38.3/ 32.3 (3) | 37.9/ 31.6(3) | 36.0/ 30.1(3) |
| 82 | Roadside | 100 | N | 17.4 | 18.0 | 16.9 | 17.1 | 16.0 |
| 88 | Roadside | 100 | Y | 30.7 | 31.4 | 29.8 | 27.6 | 28.4 |
| 100 | Roadside | 83 | N | - | - | 23.9 | 24 | 22.9 |
| 112 | Roadside | 100 | N | - | - | - | 19.4 | 19.8 |
| 113 | Roadside | 92 | N | - | - | - | 21.7 | 22.3 |

| Site ID | Site Type | Valid Data Capture 2019 (%) ⁽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 |
| BARRY | | | | | | | | |
| 8 | Kerbside | 83 | N | 33.6(2) | 23.5(2) | 31.9/ 25.3 (3) | 28.1/ 22.6(3) | 27.5 |
| 41 | Urban Background | 100 | N | 13.1 | 14.5(2) | 11.5 | 10.9 | 10.6 |
| 64 | Roadside | 83 | N | 20.8(2) | 20.4(2) | 17.5 | 16.6 | 17.8 |
| 66 | Roadside | 100 | N | 30.9 | 27.7 | 30.4 | 26.7 | 26.3 |
| 102 | Roadside | 92 | N | - | - | 17.4 (2) | 17.9/ 15.7(3) | 17.0/ 14.9(3) |
| 114 | Roadside | 100 | N | - | - | - | 13.5 | 13.4 |
| 115 | Kerbside | 92 | N | - | - | - | 26.2 | 25.9 |
| 116 | Roadside | 100 | N | - | - | - | - | 17.5 |
| 117 | Kerbside | 92 | N | - | - | - | - | 26.7 |
| 119 | Kerbside | 92 | N | - | - | - | - | 18.9 |
| SCHOOL MONITORING⁴ | | | | | | | | |
| Ysgol Gymraeg Pen-y- Garth | Roadside | 75 | N | - | - | - | - | 8.7 |
| Ysgol Gymraeg Pen-y- Garth | Roadside | 83 | N | - | - | - | - | 9.0 |
| Cogan Primary School | Roadside | 67 | N | - | - | - | - | 12.7 |

| Site ID | Site Type | Valid Data Capture 2019 (%) (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 |
| Cogan Primary School | Roadside | 58 | N | - | - | - | - | 13.7 |
| Jenner Park Primary School | Roadside | 83 | N | - | - | - | - | 13.4 |
| Jenner Park Primary School | Roadside | 75 | N | - | - | - | - | 13.0 |
| Romilly Community Primary School | Roadside | 83 | N | - | - | - | - | 10.5 |
| Romilly Community Primary School | Roadside | 83 | N | - | - | - | - | 10.6 |
| Rhose Primary School | Roadside | 50 | N | - | - | - | - | 12.4 |
| Rhose Primary School | Roadside | 50 | N | - | - | - | - | 13.9 |
| Cowbridge Comprehensive School | Roadside | 83 | N | - | - | - | - | 11.1 |
| Cowbridge Comprehensive School | Roadside | 83 | N | - | - | - | - | 11.8 |
| Albert Primary School | Roadside | 67 | N | - | - | - | - | 8.6 |
| Albert Primary School | Roadside | 58 | N | - | - | - | - | 6.8 |

Notes:

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

NO₂ annual means exceeding 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(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 NO2 concentrations with Distance from the Road"

(4) School Monitoring Programme reported over 12 month period (April 2019- March 2020).

Table 4– Automatic Annual Mean NO₂ Monitoring Results (2015- 2019)

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period % ⁽¹⁾ | Valid Data Capture 2019 % ⁽²⁾ | Annual Mean Concentration (µg/m ³) | | | | |
|-----------------------|-----------|--------------|---|--|--|------|------|------|------|
| | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| Penarth, Windsor Road | Roadside | Y | 100 | 98 | 26.5 | 28.3 | 26.5 | 24.5 | 25.7 |
| Dock View Road | Roadside | N | N/A | N/A | - | - | - | - | 23.2 |
| Holton Road | Roadside | N | N/A | N/A | - | - | - | - | 23.7 |

Notes:

Exceedances of the Annual Average NO₂ objective (40µg/m³) are shown in bold.

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

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

(3) Data has been "annualised" as per Boxes 7.9 in LAQM.TG16 where valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table 5–Automatic 1-hour Mean NO₂ Monitoring Results (2015- 2019)

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period % ⁽¹⁾ | Valid Data Capture 2019 % ⁽²⁾ | Number of Hourly Means (> 200µg/m ³) ⁽³⁾ | | | | |
|-----------------------|-----------|--------------|---|--|---|------|------|------|------|
| | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| Penarth, Windsor Road | Roadside | Y | 100 | 98 | 0 | 0 | 0 | 0 | 0 |

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period % ⁽¹⁾ | Valid Data Capture 2019 % ⁽²⁾ | Number of Hourly Means (> 200µg/m ³) ⁽³⁾ | | | | |
|----------------|-----------|--------------|---|--|---|------|------|------|------|
| | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| Dock View Road | Roadside | N | N/A | N/A | - | - | - | - | 0 |
| Holton Road | Roadside | N | N/A | N/A | - | - | - | - | 0 |

Notes:

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in bold.

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

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

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

Figure 15– Trends in Annual Average NO₂ Concentrations Recorded at Windsor Road Automatic Monitoring Site

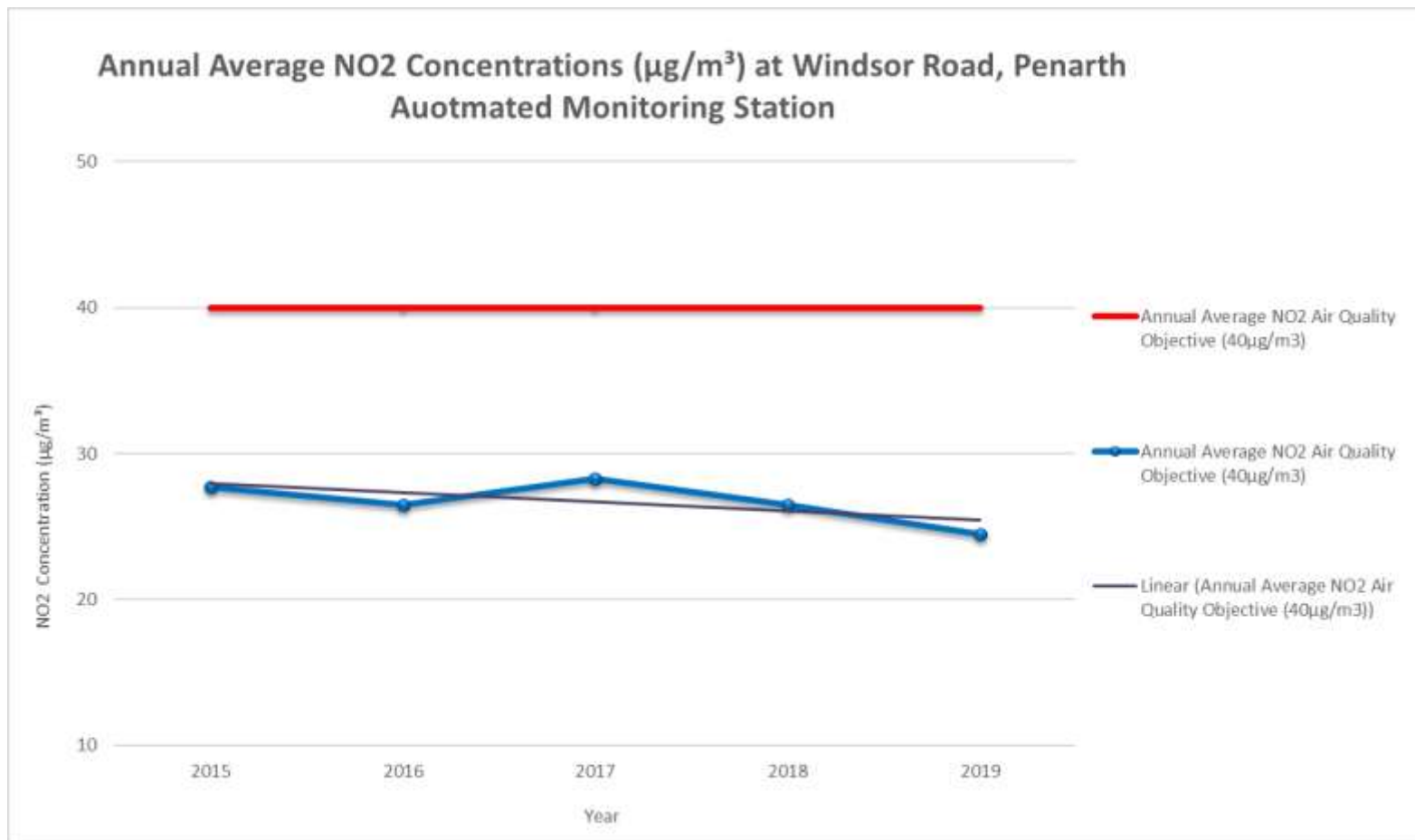


Figure 15 indicates a somewhat stable decreasing trend in annual average NO₂ concentrations recorded at the Penarth, Windsor Road AMS.

Table 6– Automatic Annual Mean PM₁₀ Monitoring Results (2015- 2019)

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2019 (%) ⁽²⁾ | Confirm Gravimetric Equivalent (Y or N/A) | PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾ | | | | |
|-----------------------|-----------|--------------|---|--|---|--|------|------|------|------|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| Penarth, Windsor Road | Roadside | Y | 100 | 98.6 | Y | 20.8 | 21.4 | 15.6 | 21.7 | 21.6 |
| Dock View Road | Roadside | N | N/A | N/A | N/A | - | - | - | - | 11.2 |
| Holton Road | Roadside | N | N/A | N/A | N/A | - | - | - | - | 8.99 |

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in bold.

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

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

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

Table 7– Automatic 24-Hour Mean PM₁₀ Monitoring Results (2015- 2019)

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period (%) ⁽¹⁾ | Valid Data Capture 2019 (%) ⁽²⁾ | Confirm Gravimetric Equivalent (Y or N/A) | Number of Daily Means > 50µg/m ³ ⁽³⁾ | | | | |
|-----------------------|-----------|--------------|---|--|---|--|----------|------|------|------|
| | | | | | | 2015 | 2016 | 2017 | 2018 | 2019 |
| Penarth, Windsor Road | Roadside | Y | 100 | 98.6 | Y | 4 (31.2) | 1 (31.9) | 2 | 0 | 6 |
| Dock View Road | Roadside | N | N/A | N/A | N/A | - | - | - | - | 9 |
| Holton Road | Roadside | N | N/A | N/A | N/A | - | - | - | - | 0 |

Notes:

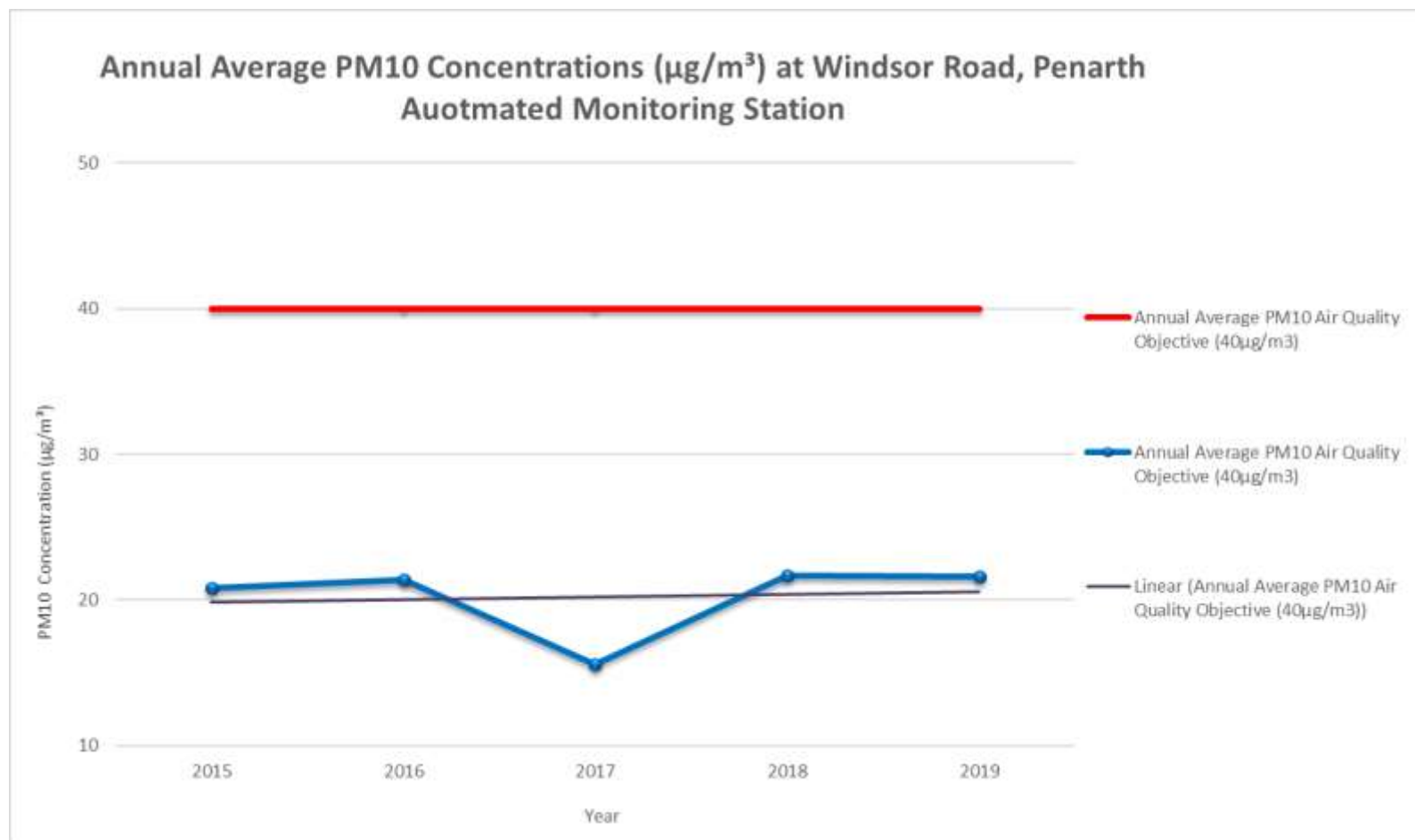
Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

Figure 16– Trends in Annual Average PM₁₀ Concentrations Recorded at Windsor Road Automatic Monitoring Site



Examining **Figure 16**; the displayed datasets indicate a compliant stable trend in PM₁₀ levels at the Penarth, Windsor Road AMS.

Table 8– Automatic Ozone (O3) Monitoring Results: Comparison with Objectives

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2019 (%) (2) | Number of Exceedences |
|-----------------------|-----------|--------------|---|------------------------------------|--|
| | | | | | Number of days where the 8-hour mean >100µg/m ³ |
| Penarth, Windsor Road | Roadside | Y | 100 | 94 | 2 |

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%).

2.3 Comparison of 2019 Monitoring Results with Previous Years and the Air Quality Objectives

During 2019 monitoring was carried out for nitrogen dioxide (NO₂), particulate matter (PM₁₀), and ozone (O₃).

2.3.1 Nitrogen Dioxide (NO₂)

Nitrogen dioxide was measured during 2019 at three automated sites equipped with an NO₂ monitoring capabilities, as well as by a network of 51 passive diffusion tubes.

In order to ratify the 2019 diffusion tube dataset, a bias adjustment factor of 0.75 was applied to the annual average readings. The factor was derived from the Defra website which gave the average correction factor from 42 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 0.75 was obtained from the following website: <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

Automatic Monitoring Data

Monitoring of NO₂ has continued to be carried out at the Penarth, Windsor Road site. 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.

Datasets obtained from the two automated monitoring sensors and the Penarth, Windsor Road site have been cross referenced to the annual and 1-hour average objectives set for NO₂. The findings summarised in Table 4 & Table 5 indicate compliance with both objectives.

Non- automated Monitoring Data

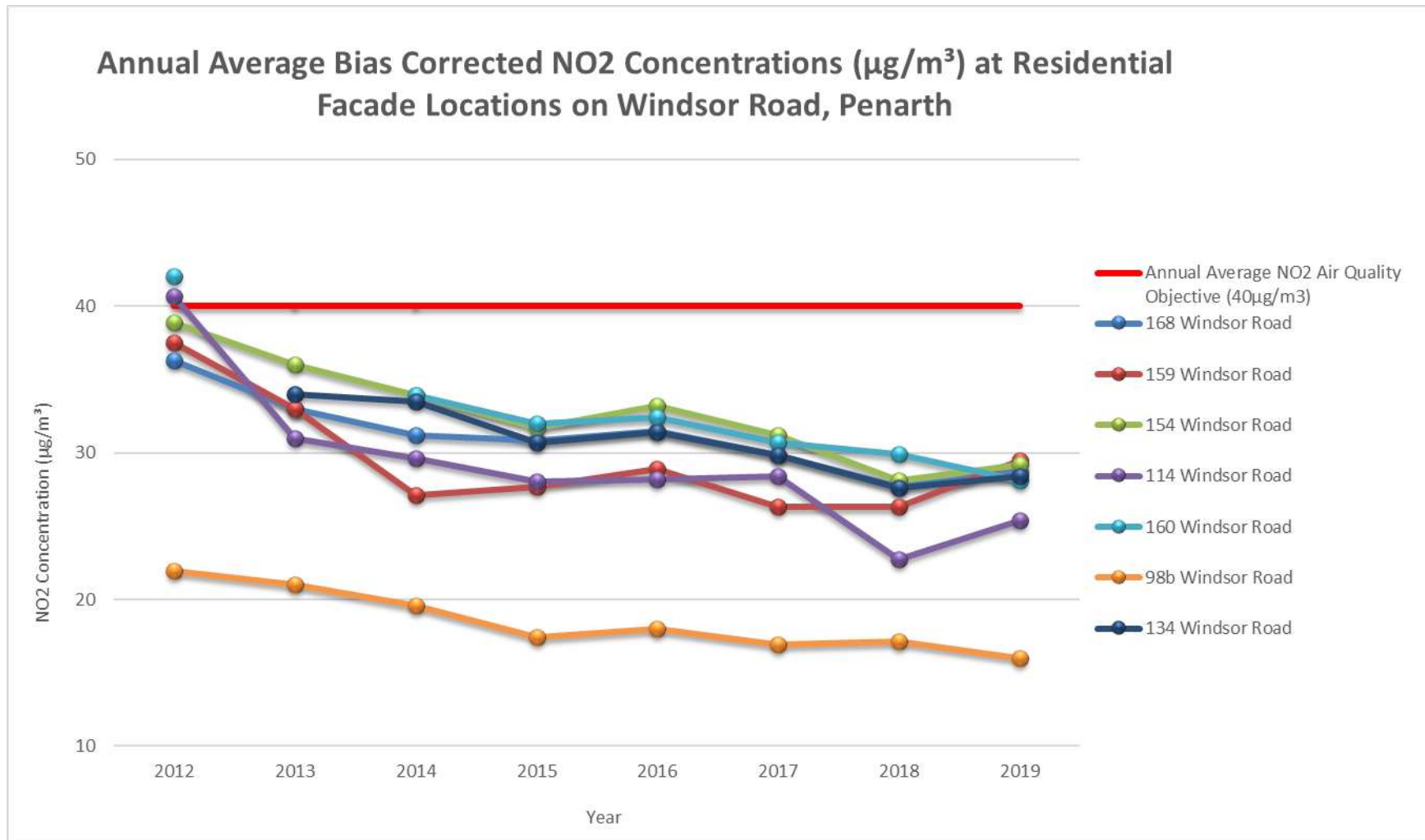
The nitrogen dioxide diffusion tube data is summarised in Table 3. The full dataset (raw monthly mean values) is included in Appendix A. All data displayed in Table 3 has been bias adjusted and where necessary annualised in accordance with Box 7.10 of LAQM TG(16), as well corrected for distance to the nearest sensitive receptor. Evidence of the sites annualised can be seen in Appendix C. The applied bias adjustment factor was 0.75, as described in Appendix C.

As outlined by Table 3; the nitrogen dioxide concentrations measured by the passive diffusion tubes show that there were no exceedences of the national air quality objectives for NO₂ (annual average 40µg/m³ & 1-hour average 200µg/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 60µg/m³ in 2018. Therefore this indicates it is unlikely that the hourly nitrogen dioxide objective was exceeded.

As previously detailed, due to continual compliance with the national air quality objectives set for NO₂ the Vale of Glamorgan Council wish to revoke the Windsor Road, Cogan, Penarth AQMA.

Figure 17 illustrates the annual average NO₂ datasets recorded at residential facades within the Windsor Road AQMA. The graph indicates compliance with the annual average objective at every monitored location since 2013.

Figure 17- Trends in Annual Average NO₂ Concentrations Recorded at Façade Locations on Windsor Road, Penarth



2.3.2 Particulate Matter (PM₁₀)

Continuous monitoring of PM₁₀ is undertaken at three automatic monitoring sites in the Vale.

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

In addition, the Penarth, Windsor Road site is located within the currently declared AQMA and calculates particulate matter using a gravimetric Beta Attenuation Monitor (BAM).

The PM₁₀ data from Windsor Road monitor has been provided as gravimetric equivalence (applying the conversion factor of 0.83 as stipulated in Defra's LAQM TG(16), Section 7.151). The results are presented in Table 6 Table 7.

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

2.3.3 Other Pollutants Monitored

Ozone (O₃)

The Vale monitors Ozone due to its potential correlations with other pollutants. In 2019, ozone was measured at the Windsor Road, Penarth monitoring site. Although Ozone is not included in the Local Air Quality Management system, the results are included in Table 8 for completeness. The results are compared with the running 8-hour mean objective as set by the Expert Panel on Air Quality Standards (EPAQs) which states the running 8-hour mean should not exceed 100µg/m³ on more than 10 days per year. There are no exceedences of the ozone objective in the Vale in 2019.

2.4 Summary of Compliance with AQS Objectives as of 2019

SRS have reviewed the results from the monitoring undertaken across the Vale of Glamorgan area in 2019.

The automated and non- automated datasets show compliance with the AQS objectives at **all locations**.

Based on continued compliance over a three year period with the national air quality objectives set for NO₂ (annual average 40µg/m³ & 1-hour average 200µg/m³ not be exceeded more than 18 times per year), in accordance with Local Air Quality Management in Wales, Policy Guidance, June 2017, the Vale of Glamorgan Council wish to revoke the Penarth, Windsor Road AQMA. As documented; works have been undertaken and a process of consultation implemented that supports the decision to revoke the Windsor Road, Cogan, Penarth AQMA Order.

3. New Local Developments

3.1 Road Traffic Sources (& 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.

3.1.1 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 2019 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.

3.1.2 Busy Streets Where People May Spend 1-hour or more close 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.

3.1.3 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.

3.1.4 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 exceedences of either the NO₂ or PM₁₀ objectives are likely.

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

Northern Access Road

End of 2019 marked the completion of construction works for the St. Athan Northern Access Road.

As highlighted in the 2018 APR, SRS on behalf of the VoGC can confirm, following approval in late 2017, construction works had begun for the Northern Access Road (NAR) which will provide a link from the B4265 near Llantwit Major in the west to Eglwys Brewis Road in Picketston in the east. Works to construct these developments are currently ongoing.

As previously outlined in the 2017 APR, as highlighted by the supporting air quality assessment (AQA);

Predicted annual mean NO₂ and Particulate Matter (PM₁₀ and PM_{2.5}) concentrations are expected to be well below the annual mean objective at all receptors in the study area. Overall, receptors are predicted to experience a negligible effect in accordance with the Institute of Air Quality Management (IAQM) /Environmental Protection UK (EPUK) guidance (2015), which is considered to be not significant, in both the opening year of 2019 and the future year of 2034.

The AQA did indicate a degree of risk identified with respect to dust and PM₁₀ as a result of construction phase activities. The report states;

“There are estimated to be between ten and 100 dust sensitive properties within 20 m of potential construction work areas within the Site. The sensitivity of the area to dust soiling due to the construction activity is therefore considered to be high.”

“The medium dust emission magnitude coupled with the high sensitivity to property and amenity effects suggests that the risk of dust impacts to property and amenity due to construction activity is medium.”

In response to these findings a pre commencement planning condition was implemented;

Condition: Dust Control

Prior to the commencement of development a scheme (Construction Environmental Management Plan) to minimise dust emissions arising from demolition and construction activities on site shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall include details of dust suppression measures and the methods to monitor emissions of dust arising from the development. The construction phase shall be implemented in accordance with the approved

scheme, with the approved dust suppression measures being maintained in a fully functional condition for the duration of the construction phase.

Reason: To assess air quality and agree any mitigation measures that may be required to safeguard the amenity of nearby residents in the area.

The CEMP was received and applicable condition was discharged.

For 2019 and continued into 2020, non-automatic NO₂ diffusion tube monitoring has continued at specific sensitive receptor locations in the vicinity of the proposed development.

A4226 '5 Mile Lane' road infrastructure improvement works

The A4226 (Five Mile Lane) connects Barry at the Waycock Cross roundabout with the Sycamore Cross junction on the A48 and comprises an essential part of the highway network leading to the Enterprise Zone. The proposed Five Mile Lane Highway Improvements stem from the Welsh Government's proposals to trunk the route Culverhouse Cross – Sycamore Cross – Five Mile Lane – Airport. The Council has previously received a Principal Road Grant from the Welsh Government to advance the Five Mile Lane Highway Improvement Scheme, and to date this work has involved the signalisation of Sycamore Cross junction, as well as initial design and feasibility work together with various environmental assessments.

In October 2019 works have were completed for the A4226. As part those completed works; a new footpath and cycleway has been built, along with a bridleway and bridge

3.1.6 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 Defras' LAQM TG(16), 2018. Predictions of increased traffic do not approach 25% on roads with more than 10,000 vpd.

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

3.1.7 Bus and Coach Stations

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

3.1.8 Airports

The criteria for assessing airports are set out in Section 7.16 of Defra's LAQM TG(16), 2018. 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.

3.1.9 Railways (Diesel and Steam Trains)

Defra's LAQM TG(16), 2018 suggests that SO₂ emissions from diesel locomotives may be significant if there are outdoor locations where locomotives are regularly stationary for more than 15 minutes and where members of the public could be regularly exposed over this period at such locations.

Defra's LAQM TG(16), 2018 also requires consideration exposure to nitrogen dioxide within 30m of certain specified railway lines in those areas where the annual mean background concentration is above 25µgm⁻³.

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.

Moving Trains

LAQM TG(09) introduced a new requirement to assess the potential for exceedence of nitrogen dioxide objectives. The assessment criteria are in relation to large numbers of diesel locomotive movements where there is relevant exposure within 30metres of the track in areas where the background annual mean concentration of nitrogen dioxide is above 25µm³.

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

3.1.10 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.

3.2 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources

3.2.1 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 regards to a permit application for the proposed operation, submitted by Biomass UK NO.2 Ltd. This second round of consultation was formed as a result 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.

Currently the plant is yet to be operational, although trials have been undertaken.

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.

3.2.2 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.

3.2.3 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.

3.2.4 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.

3.2.5 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.

It is not necessary, therefore, to consider this further.

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

3.2.6 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.

3.3 Commercial and Domestic Sources

3.3.1 Biomass Combustion – Individual Installations

As highlighted in Section 3.2.1 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 is not currently operational.

The facility is regulated under a Natural Resources Wales Environmental Permit (Permit Number: EPR/AB3790ZB) which outlines an emissions 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.

3.3.2 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 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.

3.3.3 Other Sources

3.3.4 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 a number of enquiries each year from residents in respect of national or local requirements were they to 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 with regard to 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.

3.4 New Developments with Fugitive or Uncontrolled Sources

There are no new locations where fugitive could occur which have not been covered by previous rounds of review and assessment and no locations where new relevant exposure has been introduced to existing locations.

It is not considered necessary to consider this further at this time.

SRS on behalf of the VoGC can confirm that there are no potential sources of fugitive emissions in the Local Authority area.

3.5 Planning Applications

2018/01408/FUL- Aberthin Road Development. Proposed demolition of existing school, development of 34 dwellings (30 flats and four houses) and associated works including the construction of bespoke bat roost, access/parking and landscaping.

The referenced proposal was received in late 2018, however a formal decision is yet to be made. In terms of supporting documentation and therefore air quality assessment (AQA) undertaken, an AQA was submitted in support of the proposal whereby the following comments were made;

Construction Phase

For the construction phase of the proposed development a LOW- medium risk has been identified with respect to dust soiling soil and human effect as a result of construction phase activities (Demolition, Earthworks & Construction). With regards to the identified risk associated with the construction phase of the development, it is therefore considered essential that a suitable Construction Environmental Management Plan outlining a detailed Dust Management Plan with appropriate measures be submitted and approved by the Local Planning Authority (LPA) prior to the development proceeding.

Condition: Dust Control

Prior to the commencement of development a scheme (Construction Environmental Management Plan) to minimise dust emissions arising from construction activities on site shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall include details of dust suppression measures and the methods to monitor emissions of dust arising from the development. It is a necessity that the appointed mitigation measures be capable of addressing the concerns outlined in the supporting air quality assessment. The construction phase shall be implemented in accordance with the approved scheme, with the approved dust suppression measures being maintained in a fully functional condition for the duration of the construction phase.

Reason: To assess air quality and agree any mitigation measures that may be required to safeguard the amenity of nearby residents in the area.

Operational Phase

In accordance with EPUK 2017 Guidance, as agreed with the appointed consultant and detailed within the supporting air quality assessment, the need to quantify the operational phase has been scoped out. The proposed development will not exceed 500 Annual Average Daily Traffic (AADT) movements, as confirmed by the appointed transport consultant. The 500 AADT being the requirement for inclusion in a detailed assessment, as outlined in the EPUK 2017 Guidance. In total, the development would generate 138 AADT.

In agreement with the consultants the air quality changes expectant at existing sensitive receptors along the vehicle movement network can therefore be considered to be negligible and not significant.

I am therefore content on the grounds of air quality.

2019/00262/OUT- Outline Planning application submitted. Proposal Submitted March 2019 for a Wellbeing Hub consisting of new entrance to Penarth Leisure Centre, reconfiguration of internal spaces of part of the existing leisure centre and (up to) two storey extension

A final decision is yet to be taken on the application, however due to its locality careful consideration and scrutiny has been given to information provided relevant to air quality. All comments are available using the following link;

<http://vonline.planning-register.co.uk/PlaRecord.aspx?AppNo=2019/00262/OUT>

4. Polices and Strategies Affecting Airborne Pollution

4.1 Air Quality Planning Policies

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

4.8 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.

4.3 Local Transport Plans and Strategies

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 in order 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.

4.2 Active Travel Plans and Strategies

Walking and Cycling

Walking and Cycling are sustainable and practical alternatives to the private car, supporting healthy lifestyles and reducing the impact on the environment. An essential element in encouraging an increase in walking and cycling is the provision of a network of high-quality dedicated routes that link communities and provide access to local retail, employment and recreation opportunities. The LDP will seek to encourage and give priority to those proposals that enhance opportunities for walking and cycling. (Policy MG16- Transport Proposals, Walking and Cycling).

For the latest available Active Travel report which highlights completed projects and commitments please utilise the following link;

<https://www.valeofglamorgan.gov.uk/Documents/Living/Transport/Active-Travel/TRA125521-Active-Travel-19-20-annual-report-FINAL.pdf>

4.3 Local Authorities Well-being Objectives

In 2015 Welsh Government made a new law called the Well-being of Future Generations (Wales) Act. The new law has the sustainable development principle at its heart. This means that we need to work in a way that improves wellbeing for people today without doing anything that could make things worse for future generations.

As highlighted in the earlier

Figure 1, there are seven national well-being goals that form the basis of the Act and five ways of working which support the goals.

Figure 1- The Well- being of Future Generations (Wales) Act 2015 Matrix



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.

4.4 Climate Change 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.

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

5. Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

SRS on behalf of the VoGC has examined the results from monitoring undertaken in 2019. There were no exceedences of any pollutant objective in 2019, including monitoring locations within the declared AQMA.

As discussed, continual compliance over a three year period with the national air quality objectives set for NO₂ (annual average 40µg/m³ & 1-hour average 200µg/m³ not be exceeded more than 18 times per year), has been demonstrated and in accordance with Local Air Quality Management in Wales, Policy Guidance, June 2017, the Vale of Glamorgan Council wish to revoke the Windsor Road, Penarth AQMA.

As outlined within VoGC 2019 APR; In 2019, in order to proceed with the formal revocation of the Windsor Road, Cogan, Penarth AQMA, in line with the requirements of WG, a detailed air quality assessment was undertaken to finalise the decision to revoke the AQMA. This detailed report is appended to the 2020's Vale Council Cabinet report as Appendix 2B. The report adheres to the requirements stipulated by Welsh Government's policy guidance, demonstrating that compliant air quality levels are being met and demonstrate with a degree of certainty that these monitored compliant levels will be sustained for future years

The assessment undertaken utilised best practise techniques and guidance to ensure a conservative outcome. In accordance with the air quality objectives applicable to LAQM in Wales, concentrations of NO₂ and PM₁₀ were examined at 28 sensitive receptor locations geographically placed within and in close proximity to the established AQMA boundary. The report takes into consideration previous reporting levels as well as uses air quality dispersion modelling software (ADMS-Roads, Version 4.1.1) and latest emission factors (Version 9.0) to look at current pollutant concentrations and projected concentrations. Three modelling year scenarios were chosen for this study (2018, 2023 and 2028).

Utilising Tables 5.1- 5.3 of the detailed report, the predicted concentrations of NO₂ and PM₁₀ at all modelled receptors within the Windsor Road, Cogan, Penarth AQMA are well below both the annual mean and short term AQS objectives for all modelled year scenarios. As stated by the report;

-The maximum annual mean NO₂ concentration predicted at existing receptor locations within the Windsor Road AQMA was at receptors R16 and R18 with a predicted concentration of 31.2µg/m³, 78% of the annual mean NO₂ AQS objective. Similarly, the maximum annual mean concentrations predicted in the future year scenarios (2023 and 2028) were at receptors R16 and R18 (21.4µg/m³ and 15.7µg/m³ respectively). Both receptors are located on the façade of a property bordering the A4160 (Windsor Road), located along the south-western extent of the AQMA.

-Given that the NO₂ annual mean concentrations predicted at all receptor locations are below this limit for all scenarios, exceedances of the 1-hour NO₂ AQS objective are unlikely.

-The maximum predicted annual mean PM₁₀ concentration at existing receptor locations for the 2018 scenario was at receptors R16 and R18 with a predicted concentration of 21.8µg/m³, 54.5% of the annual mean PM₁₀ AQS objective. Similarly, the maximum annual mean concentrations predicted in the future year scenarios (2023 and 2028) were at receptors R16 and R18 (20.6µg/m³ and 20.1µg/m³ respectively). Both receptors are located within the Windsor Road AQMA.

-The number of days where PM₁₀ concentrations were predicted to be above the 24-hour PM₁₀ 50µg/m³ AQS objective was less or equal to 6 days for all modelled scenarios at all receptor locations. This is well below the 35 permitted exceedances.

Considering the captured annual monitoring datasets and given the outcomes derived by the detailed air quality modelling it is recommended that the decision be finalised to revoke the Windsor Road, Penarth AQMA official order.

5.2 Conclusions relating to New Local Developments

Section 3.5 details a number of local developments seeking planning consent recently or for which a planning application has been received.

These applications have been handled accordingly where Air Quality Assessments have been produced and appropriate planning conditions applied.

5.3 Other Conclusions

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

5.4 Proposed Actions

- The VoGC cabinet members will be briefed with the recommendation to revoke the Windsor Road, Cogan, Penarth AQMA. Pending approval, the decision notice to revoke the AQMA will be formally submitted to WG; and

-Non- automated monitoring with the use of diffusion tubes **WILL** continue along Windsor Road, Penarth. The future of the Windsor Road automated monitoring site be will be subject to review, however at this stage it is felt appropriate to decommission the site and potentially seek an alternative location where its use would prove more useful.

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

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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 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 a **DRAFT** Air Quality Action Plan (AQAP) within 18 months, setting out measures it intends to put in place to improve air quality in pursuit of the air quality objectives. The AQAP must be **formally** adopted prior to 24 months has elapsed. Action plans should then be reviewed and updated where necessary at least every 5 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 B.1

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

Table B.2 – Air Quality Objectives Included in Regulations for the Purpose of LAQM in Wales

| Pollutant | Air Quality Objective | | Date to be achieved by |
|--|--|---------------------|------------------------|
| | Concentration | Measured as | |
| Benzene | 16.25 µg/m ³ | Running annual mean | 31.12.2003 |
| | 5.00 µg/m ³ | Annual mean | 31.12.2011 |
| 1,3-butadiene | 2.25 µg/m ³ | Running annual mean | 31.12.2003 |
| Carbon monoxide | 10 mg/m ³ | Running 8-hour mean | 31.12.2003 |
| Lead | 0.50 µg/m ³ | Annual mean | 31.12.2004 |
| | 0.25 µg/m ³ | Annual mean | 31.12.2008 |
| Nitrogen dioxide | 200 µg/m ³ not to be exceeded more than 18 times a year | 1-hour mean | 31.12.2005 |
| | 40 µg/m ³ | Annual mean | 31.12.2005 |
| Particulate matter (PM ₁₀) (gravimetric) | 50 µg/m ³ , not to be exceeded more than 35 times a year | 24-hour mean | 31.12.2004 |
| | 40 µg/m ³ | Annual mean | 31.12.2004 |
| Sulphur dioxide | 350 µg/m ³ , not to be exceeded more than 24 times a year | 1-hour mean | 31.12.2004 |
| | 125 µg/m ³ , not to be exceeded more than 3 times a year | 24-hour mean | 31.12.2004 |
| | 266 µg/m ³ , not to be exceeded more than 35 times a year | 15-minute mean | 31.12.2005 |

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 09/20) was used to obtain an overall adjustment factor of 0.75 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 C.1: National Diffusion Tube Bias Adjustment Factor Spreadsheet

| National Diffusion Tube Bias Adjustment Factor Spreadsheet | | | | | | | Spreadsheet Version Number: 09/20 | | | |
|--|--------------------|--|--|---|--------------------------|---|--|----------|-----------------------------|------------------------------------|
| 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 March 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 | | | |
| 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. | | | |
| 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. | | | | | | | LAQM Helpdesk Website | | | |
| 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 ² shown in blue at the foot of the final column. | | | | |
| If a laboratory is not shown, use have no data for this laboratory. | | If a preparation method is not shown, use have no data for this method at this laboratory. | | If a year is not shown, use have no data. | | If you have your own co-location study then see footnote ¹ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953 | | | | |
| Analysed By | Method | Year | Site Type | Local Authority | Length of Study (months) | Diffusion Tube Mean Conc. (Dm) ($\mu\text{g}/\text{m}^3$) | Automatic Monitor Mean Conc. (Cm) ($\mu\text{g}/\text{m}^3$) | Bias (B) | Tube Precision ³ | Bias Adjustment Factor (A) (Cm/Dm) |
| Socotec Didcot | 50% TEA in acetone | 2019 | B | Gravesham Borough Council | 12 | 27 | 25 | 10.9% | G | 0.90 |
| Socotec Didcot | 50% TEA in acetone | 2019 | R | Slough Borough Council | 11 | 39 | 32 | 22.5% | G | 0.82 |
| Socotec Didcot | 50% TEA in acetone | 2019 | SU | Slough Borough Council | 11 | 32 | 22 | 46.7% | G | 0.68 |
| Socotec Didcot | 50% TEA in acetone | 2019 | UB | Slough Borough Council | 10 | 38 | 31 | 25.6% | G | 0.80 |
| Socotec Didcot | 50% TEA in acetone | 2019 | R | Swansea Council | 12 | 32 | 24 | 35.6% | G | 0.74 |
| Socotec Didcot | 50% TEA in acetone | 2019 | UB | Swansea Council | 12 | 17 | 13 | 31.0% | G | 0.76 |
| Socotec Didcot | 50% TEA in acetone | 2019 | R | Knowsley MBC | 12 | 46 | 37 | 23.5% | G | 0.81 |
| Socotec Didcot | 50% TEA in acetone | 2019 | UI | North Lincolnshire Council | 12 | 22 | 15 | 47.5% | G | 0.68 |
| SOCOTEC Didcot | 50% TEA in acetone | 2019 | Overall Factor² (42 studies) | | | | | | Use | 0.75 |

Discussion of Choice of Factor to use

The bias adjustment factor applied to all 2019 data is 0.75. The applied bias adjustment factor has been calculated using the national diffusion tube bias adjustment factor spreadsheet version 09/20. The individual bias adjustment factor calculated using the Penarth, Windsor Road automatic monitoring system and the co-located triplicate diffusion tubes has not been adopted as the bias adjustment factor derived from the study was slightly less than the figure generated by the national, 0.60 compared to 0.75. Therefore, it was deemed good practise to use the nationally derived bias adjustment factor as this would reflect a “worst-case scenario”.

The calculations to derive the local bias adjustment factor at 0.60 can be seen below;

Checking Precision and Accuracy of Triplicate Tubes

| Diffusion Tubes Measurements | | | | | | | | | | | Automatic Method | | Data Quality Check | |
|------------------------------|--------------------------|------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------|-----------------------|-------------------------------------|-------------------|----------------|---------------------------|-----------------------------|------------------------------|--|
| Period | Start Date dd/mm/yyyy | End Date dd/mm/yyyy | Tube 1 μgm^{-3} | Tube 2 μgm^{-3} | Tube 3 μgm^{-3} | Triplicate Mean | Standard Deviation | Coefficient of Variation (CV) | 95% CI of mean | Period Mean | Data Capture (% DC) | Tubes Precision Check | Automatic Monitor Data | |
| 1 | 07/01/2019 | 05/02/2019 | 48.80 | 46.30 | 45.70 | 47 | 1.6 | 4 | 4.1 | 33.22 | 100 | Good | Good | |
| 2 | 05/02/2019 | 04/03/2019 | | 39.00 | 45.10 | 42 | 4.3 | 10 | 38.8 | 25.93 | 100 | Good | Good | |
| 3 | 04/03/2019 | 02/04/2019 | 43.5 | 44 | 40.8 | 43 | 1.7 | 4 | 4.3 | 26.65 | 100 | Good | Good | |
| 4 | 02/04/2019 | 29/04/2019 | 43.1 | 40.7 | 43.7 | 43 | 1.6 | 4 | 3.9 | 30.99 | 100 | Good | Good | |
| 5 | 29/04/2019 | 03/06/2019 | 31.80 | 37.70 | 29.20 | 33 | 4.4 | 13 | 10.8 | 23.92 | 100 | Good | Good | |
| 6 | 01/07/2019 | 06/08/2019 | 29.30 | 31.30 | 34.50 | 32 | 2.6 | 8 | 6.5 | 18.25 | 100 | Good | Good | |
| 7 | 06/08/2019 | 03/09/2019 | 30.6 | 32.1 | | 31 | 1.1 | 3 | 9.5 | 16.68 | 100 | Good | Good | |
| 8 | 03/09/2019 | 30/09/2019 | 36.20 | 36.40 | 34.80 | 36 | 0.9 | 2 | 2.2 | 19.75 | 95.5 | Good | Good | |
| 9 | 30/09/2019 | 04/11/2019 | 37.6 | 41.8 | 38 | 39 | 2.3 | 6 | 5.8 | 18.37 | 94.1 | Good | Good | |
| 10 | 04/11/2019 | 02/12/2019 | 46.1 | | 49.1 | 48 | 2.1 | 4 | 19.1 | 26.60 | 100 | Good | Good | |
| 11 | 02/12/2019 | 06/01/2020 | 45.6 | 44.4 | | 45 | 0.8 | 2 | 7.6 | 20.23 | 100 | Good | Good | |
| 12 | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | |

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

| | | |
|--------------------|----------------|-----------------|
| Overall survey --> | Good precision | Good Overall DC |
|--------------------|----------------|-----------------|

(Check average CV & DC from Accuracy calculations)

| | |
|---------------|-----------------------|
| Site Name/ID: | Windsor Road, Penarth |
|---------------|-----------------------|

| | |
|-----------|---|
| Precision | 11 out of 11 periods have a CV smaller than 20% |
|-----------|---|

| | |
|--|---|
| Accuracy (with 95% confidence interval) without periods with CV larger than 20% | Bias calculated using 11 periods of data Bias factor A 0.6 (0.53 - 0.67) Bias B 68% (49% - 87%) |
| Diffusion Tubes Mean: 40 μgm^{-3} | Diffusion Tubes Mean: 40 μgm^{-3} |
| Mean CV (Precision): 6 | Mean CV (Precision): 6 |
| Automatic Mean: 24 μgm^{-3} | Automatic Mean: 24 μgm^{-3} |
| Data Capture for periods used: 99% | Data Capture for periods used: 99% |
| Adjusted Tubes Mean: 24 (21 - 27) μgm^{-3} | Adjusted Tubes Mean: 24 (21 - 27) μgm^{-3} |

| | |
|--|---|
| Accuracy (with 95% confidence interval) WITH ALL DATA | Bias calculated using 11 periods of data Bias factor A 0.6 (0.53 - 0.67) Bias B 68% (49% - 87%) |
| Diffusion Tubes Mean: 40 μgm^{-3} | Diffusion Tubes Mean: 40 μgm^{-3} |
| Mean CV (Precision): 6 | Mean CV (Precision): 6 |
| Automatic Mean: 24 μgm^{-3} | Automatic Mean: 24 μgm^{-3} |
| Data Capture for periods used: 99% | Data Capture for periods used: 99% |
| Adjusted Tubes Mean: 24 (21 - 27) μgm^{-3} | Adjusted Tubes Mean: 24 (21 - 27) μgm^{-3} |

Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at:

LAQMHelpdesk@uk.bureauveritas.com

PM 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.

Short-Term to Long-Term Data Adjustment

Diffusion Tubes Adjustment

The Nitrogen Dioxide (NO₂) obtained via the use of passive diffusion tubes during January to December 2018 were annualised via the method described in Box 7.10 of LAQM TG(16). One long-term AURN urban background continuous monitoring sites, within a distance of approximately 50 miles from The Vale were selected; Newport St Julian's Comprehensive School.

Table C.1– Long term AURN site used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 55

| Site | Site Type | Annual Mean ($\mu\text{g}/\text{m}^3$) | Period Mean ($\mu\text{g}/\text{m}^3$) | Ratio |
|--|------------------|--|--|-------|
| Newport St Julian's Comprehensive School | Urban Background | 19.58 | 23.30 | 0.84 |
| Average Ratio | | | | 0.84 |

Table C.2 – Long term AURN site used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 97

| Site | Site Type | Annual Mean ($\mu\text{g}/\text{m}^3$) | Period Mean ($\mu\text{g}/\text{m}^3$) | Ratio |
|--|------------------|--|--|-------|
| Newport St Julian's Comprehensive School | Urban Background | 19.58 | 24 | 0.82 |
| Average Ratio | | | | 0.82 |

Distance Correction Calculations

Site ID 99

Site ID 22

Site ID 79

Site ID 102

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>

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 |
| VoGC | Vale of Glamorgan Council |