VALE of GLAMORGAN
BRO MORGANNWG

Vale of Glamorgan Council
2019 Air Quality Annual Progress Report

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

August 2019

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Executive Summary: Air Quality in Our Area

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 (NO_2), particulate matter (PM_{10})) & ozone (O_3).

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 2018 VoGC operated 1 automatic analyser located on Windsor Road, Penarth. The monitoring site measures on a 24/7 basis measuring levels of nitrogen dioxide, PM_{10} and ozone (o_3) 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 (NO_2)

Annual Average not to exceed 40µg/m^3 (microgrammes per metre cubed); and
1 Hour average not to exceed 200 µg/m^3 more than 18 times per year.

PM_{10}

Annual Average not to exceed 40µg/m^3; and
24 Hour Mean not to exceed 50 µg/m^3 more than 35 days per year.

$PM_{2.5}$

Annual Average not to exceed 25 µg/m^3.

Non-automatic Monitoring Sites

In 2018 there were 50 specifically allocated non automatic monitoring sites across the Vale which monitored levels of nitrogen dioxide (NO_2). 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/m^3)** and 1-hour **(200µg/m^3 not to be exceeded > 18 times per year)** air quality objectives for NO_2.

For 2018 SRS on behalf of the VoGC revised the network of diffusion tubes to improve and add to the monitoring network by capturing annual datasets at "worst-case" sensitive receptors (residential facades).

This Annual Progress Report confirms that in 2018 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 NO_2 objective at any of the monitoring locations in 2018.

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 50 locations monitored throughout the Vale with the use of passive diffusion tubes, no sites breach the national NO_2 annual objective of 40µg/m3 or the NO_2 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 NO_2 1-hour objective (**200µg/m3, not to be exceeded more than 18 times per year)** with the use of NO_2 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 2018 datasets it can be concluded that the NO_2 1 hour objective was not breached.

As highlighted by the findings in the VoGC's 2018 APR which considers datasets collected in 2017; due to the continual compliance over a three year period with the national air quality objectives set

for nitrogen dioxide (NO_2) and in accordance with Local Air Quality Management in Wales Policy Guidance, June 2017, the Vale of Glamorgan Council would look to revoke the AQMA on Windsor Road, Cogan, Penarth. At the time of review, Vale of Glamorgan Council's Cabinet approved the following recommendations;

RESOLVED –

(1) T H A T the Local Air Quality Management Annual Progress Report, attached at Appendix 1 to the report, be approved for submission to Welsh Government;

(2) T H A T the commencement of a public consultation on the removal of the Air Quality Management Area covering Windsor Road, Penarth, be approved; and

(3) T H A T following the consultation detailed in Resolution 2 above, a report be submitted to Cabinet to approve a formal submission to Welsh Government requesting the revocation of the Windsor Road Air Quality Management Area.

At the time of writing this report, a supporting detailed assessment has been undertaken by appointed external professional air quality consultants to support the decision to revoke the Windsor Road, Cogan, Penarth AQMA.

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 NO_2 and PM_{10} 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).

The report outlines that predicted concentrations of NO_2 and PM_{10} at all modelled receptors within the Windsor Road, Cogan, Penarth AQMA are compliant with both the annual mean and short term AQS objectives for all modelled year scenarios.

As continued compliance with the air quality standards is likely it is recommended to revoke the Windsor Road, Cogan, Penarth AQMA.

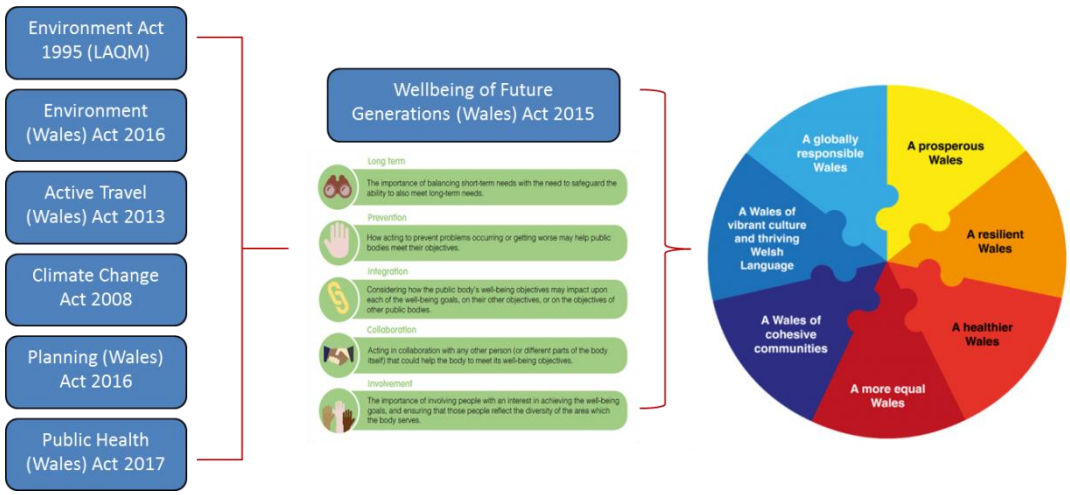
A copy of the discussed detailed assessment is provided as a supporting document to this Annual Progress Report.

In line with the recommendations of the 2018 APR Cabinet Report a Public Consultation will be undertaken to discuss the detailed assessment's findings and Council's next steps. SRS/ VoGC will be looking to initiate the public consultation as soon as possible with a view to complete by the end of 2019.

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

As Figure 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



Actions to Improve Air Quality

Improved monitoring

- In an effort to improve its monitoring capabilities, for 2018, 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.

- In 2018 SRS on behalf of the VoGC has commissioned two near real-time indicative automatic monitors. The AQ Mesh analysers continuously monitor for nitric oxide, nitrogen dioxide & ozone, PM10 & PM2.5, and do so every 15 minutes (data uploaded every hour). The data from the pod is sent to a cloud server where it is corrected for temperature, pressure and relative humidity as well as cross gas interference. Data is available to view via the SRS webpage in English and in Welsh using the following;

  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

- For 2019; Shared Regulatory Services (SRS) on behalf of the Vale Council has been 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 (NO_2), 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.

  After the data has been collected for a year, reporting of the data will be included in Vale Council's LAQM Annual Air Quality Progress Report 2020. As part of the LAQM process if levels are found to be encroaching upon or exceeding the air quality objectives set for NO_2, SRS/ VoGC will have a requirement to fulfil the requirements of LAQM and adopt formal procedures to start implementing an Air Quality Management Area (AQMA). SRS/ VoGC would work with the school to develop strategic measures that could be implemented to alleviate any concerns and improve air quality levels for NO_2.

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.

Improvements for Sustainable Transport & Infrastructure

Penarth Cardiff Barrage Sustainable Transport Corridor

For 2019 VoGC together with external consultants have 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

Local Priorities and Challenges

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

-Deliver a public consultation to revoke the Penarth, Windsor Road 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 (NO_2), sulphur dioxide (SO_2) and particulate matter (PM_{10}).

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 (PM_{10}) 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 SO_2 in Rhoose.

The Council proceeded to publish Progress Reports in 2004 and 2005, which identified exceedences of the 15-minute SO_2 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 NO_2 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 NO_2 in the Penarth area was published in June 2009. It concluded that there were no exceedences of either NO_2 limit but recommended continued monitoring.

Fourth Round of Review and Assessment

The Vale published it third USA in June 2009. Nitrogen Dioxide, Sulphur Dioxide and Particulate Matter (PM_{10}) 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 SO_2 15-minute or 24-hour means. There were 6 exceedences of the PM_{10} daily mean concentration and no exceedences of the PM_{10} 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 NO_2 or SO_2 objectives however; NO_2 concentrations remain close to objective in some places. A number of exceedences of the 24-hour mean for PM_{10} 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 NO_2 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 NO_2 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 ≥36 µg/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 NO_2 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 PM_{10} 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 NO_2. NO_2 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 NO_2 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.

1.2 Air Quality Management Areas

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

Based on monitoring results and further detailed assessments, there is currently one Air Quality Management Areas (AQMAs) declared in The Vale District, declared due to exceedances of the annual mean NO_2 Air Quality Standard (40ug/m^3), known to be derived from road transport derived NO_2.

-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.*

A separate report will be published following this Annual Progress Report which will underpin the decision to revoke the Windsor Road AQMA and will include a public consultation on these proposals.

As outlined earlier within this report, the AQMA Revocation Decision Report will demonstrate existing compliant levels and ensure compliance for future years based on projected levels. The report will also highlight any suggestions and proposed works the VoGC are committed to undertaking within the locality of Windsor Road.

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

2.1 Summary of Monitoring Undertaken in 2018

2.1.1 Automatic Monitoring Sites

The Vale Council operated one automatic monitor station during 2018.

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 & PM2.5, 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, PM_{10} and ozone (o_3) 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 2018, data capture for NO_2 was recorded at 99.7% and 95% for PM_{10}.

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 0.63. 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 28 studies, which appointed Socotec Didcot laboratory, was slightly higher at 0.76. 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 Penarth, Windsor Road Automatic Monitoring Site

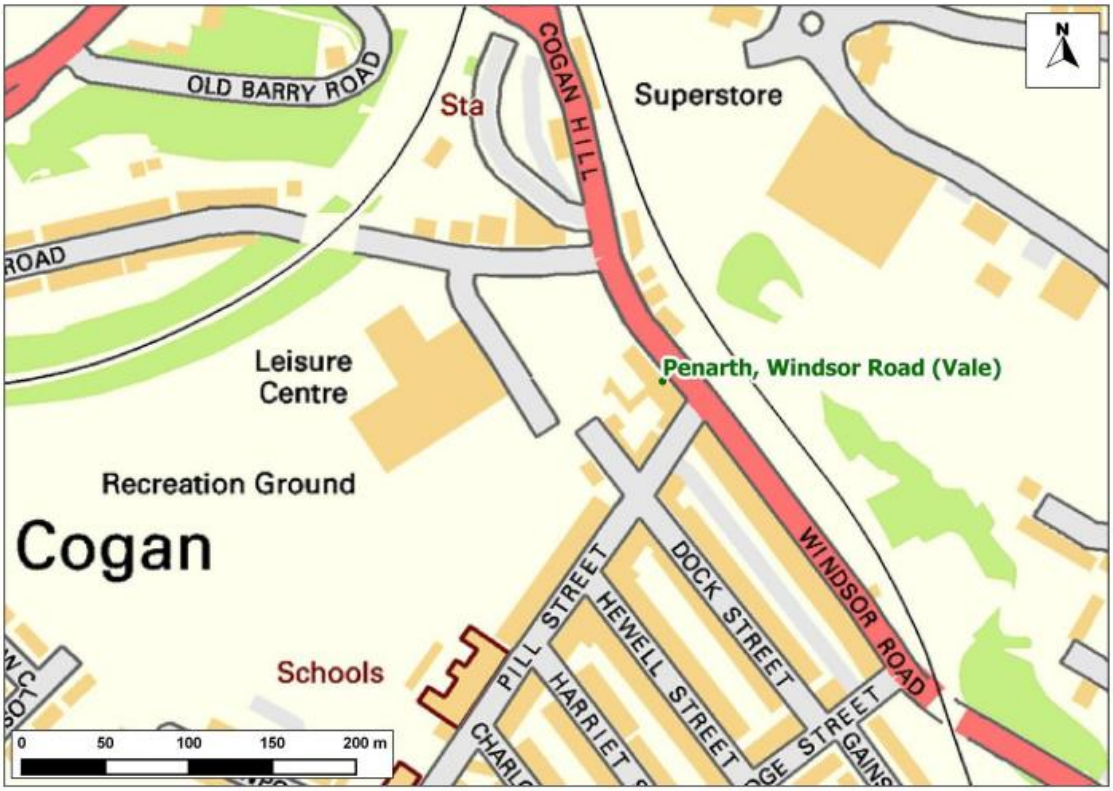


Table 1- Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
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			

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 (NO_2). During the period since the Progress Report in 2018, monitoring of NO_2 using passive diffusion tubes has been carried out at 50 locations throughout the Vale. The locations of the diffusion tubes are described in Table 2 and shown in Figure 4- 14.

NO_2 Diffusion Tube Locations

The location of where NO_2 monitoring has taken place;

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

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:triethanolomine (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 0.76 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 NO_2 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, NO_2 concentration at the nearest relevant exposure has been estimated based on the "NO_2 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 4– AREA A – Cowbridge NO_2 Diffusion Tube Locations

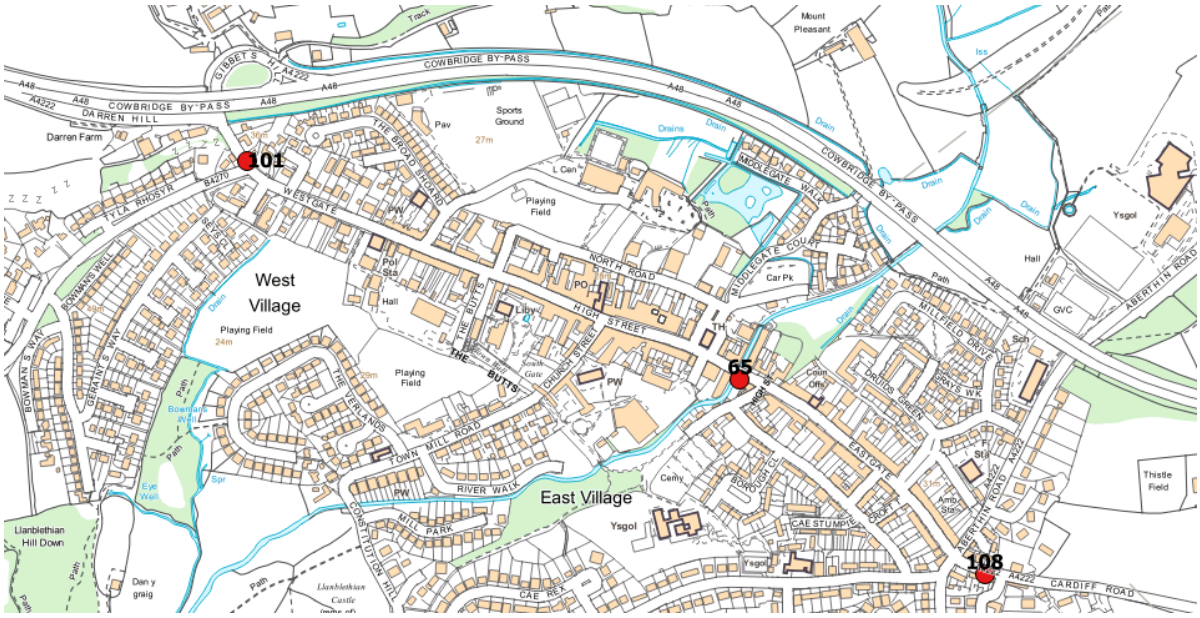


Figure 5– AREA B – Llantwit Major NO_2 Diffusion Tube Locations

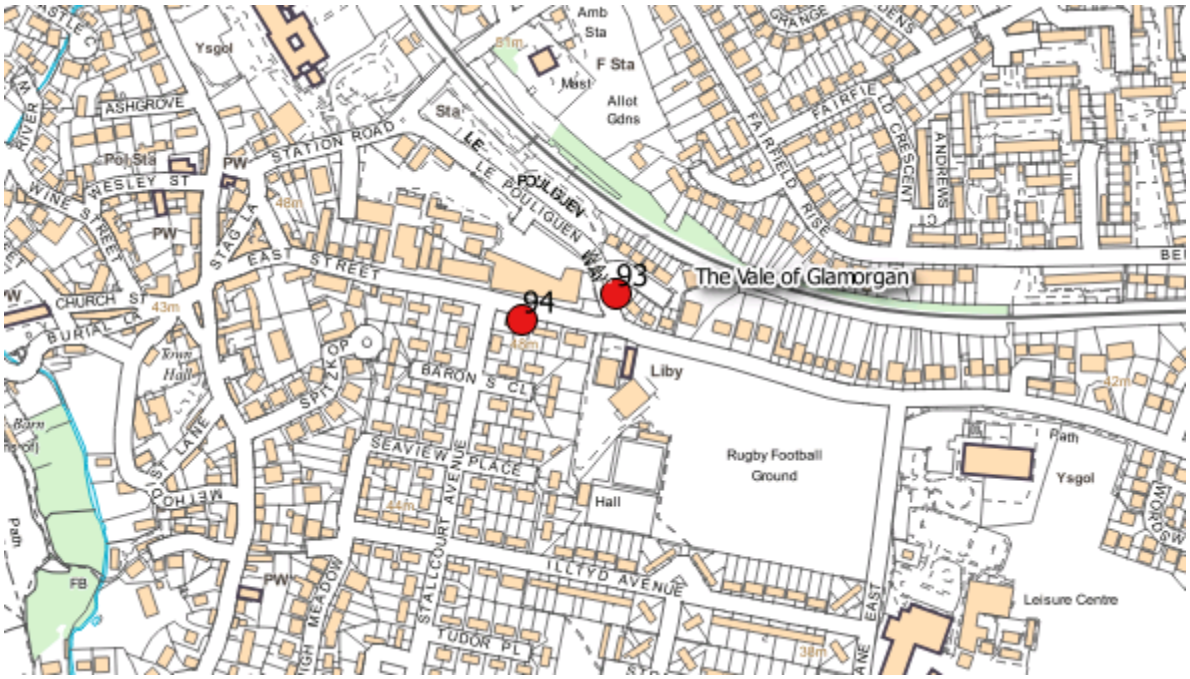


Figure 6– AREA C – St Athan NO_2 Diffusion Tube Locations

Figure 7– AREA D – Gileston NO_2 Diffusion Tube Locations

Figure 8– AREA E – Rhoose NO_2 Diffusion Tube Locations

Figure 9– AREA F – Saint Brides Major NO_2 Diffusion Tube Locations

Figure 10– AREA G – Culverhouse NO_2 Diffusion Tube Locations

Figure 11– AREA H – Dinas Powys NO_2 Diffusion Tube Locations

Figure 12– AREA I – Llandough & Cogan NO_2 Diffusion Tube Locations

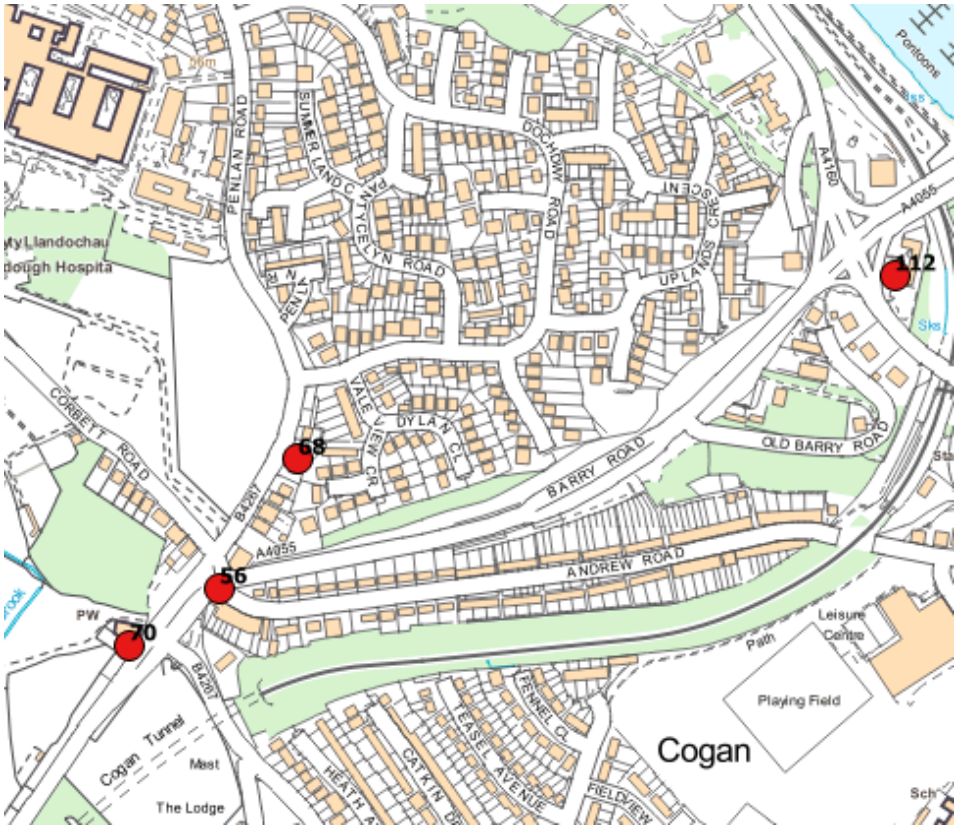


Figure 13– AREA J – Penarth NO_2 Diffusion Tube Locations

Figure 14– AREA K – Barry NO_2 Diffusion Tube Locations

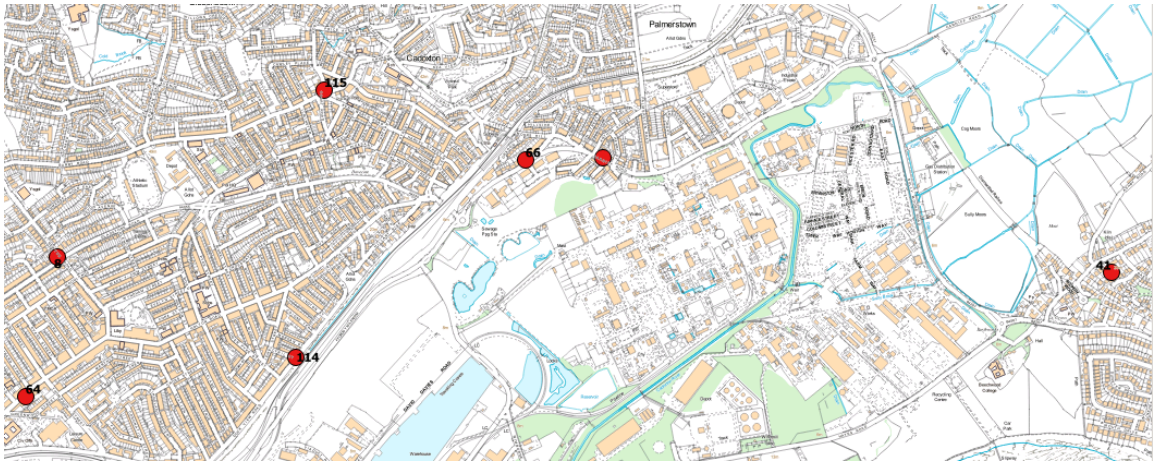


Table 2- Details of Non-Automatic Monitoring Sites 2018

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	NO2	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
LLANTWIT MAJOR											
93	Le Pouliguen Way	Roadside	297171	168741	1.5	NO2	N	N	Y (0.00)	4.8m	Y
94	5 Boverton Road	Roadside	297069	168715	1.5	NO2	N	N	Y (0.00)	7.4m	Y
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
ST ATHAN											
97	7 Picketson Close	Urban Background	300460	169310	1.5	NO_2	N	N	Y (0.00)	30m	Y
GILESTON											
98	Orchard Way (Ivy Cottage)	Suburban/ Industrial	301899	167043	1.5	NO_2	N	N	Y (0.00)	450m	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	NO2	N	N	Y (0.00)	6.5m	Y
104	Greengate Cottage	Roadside	289496	174858	1.5	NO2	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	NO2	N	N	Y (0.00)	2m	Y
DINAS POWYS											
47	Dinas Powys Health Centre	Urban Background	315710	171385	1.5	NO2	N	N	N (4.00)	16m	N
61	Railway Terrace	Roadside	316433	171932	2.5	NO2	N	N	Y (0.00)	2m	Y
67	2 Matthew Terrace	Roadside	316488	172004	1.5	NO2	N	N	Y (0.00)	2.5m	Y
72a	Dinas Powys Infants School	Roadside	315841	171527	1.5	NO2	N	Y	Y (0.00)	7m	Y
89	9 Wayside Cottages, Cardiff Road	Roadside	316447	171963	2.5	NO2	N	N	Y (0.00)	3m	Y
90	16 Railway Terrace, Cardiff Road	Roadside	316453	171945	1.5	NO2	N	N	Y (0.00)	3m	Y
109	85 Cardiff Road, Dinas Powys	Roadside	315739	171444	1.5	NO2	N	N	Y (0.00)	5m	Y
110	103 Cardiff Road, Dinas Powys	Roadside	31585	171555	1.5	NO2	N	N	Y (0.00)	4m	Y
111	203 Cardiff Road, Dinas Powys	Roadside	316366	171823	1.5	NO2	N	N	Y (0.00)	3m	Y
LLANDOUGH											
68	Glen View, 99 Penlan Road	Roadside	316886	172561	1.5	NO2	N	N	Y (0.00)	9m	Y
PENARTH											
22	Stanwell Road	Kerbside	318505	171496	1.5	NO2	N	N	N (8.00)	1m	N
53	168 Windsor Road	Roadside	317589	172411	1.5	NO2	Y	N	Y (0.00)	5m	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?
55	159 Windsor Road	Roadside	317595	172435	1.5	NO2	Y	N	Y (0.00)	2m	Y
56	134 Andrew Road	Kerbside	316814	172443	1.5	NO2	N	N	Y (0.00)	10m	Y
62	154 Windsor Road	Roadside	317633	172357	1.5	NO2	Y	N	Y (0.00)	2m	Y
70	Ty-Isaf	Roadside	316731	172391	1.5	NO2	N	N	Y (0.00)	3m	Y
73a	Windsor Road Monitor 1	Roadside	317598	172399	1.5	NO2	Y	Y	2m	2m	Y
73b	Windsor Road Monitor 1	Roadside	317598	172399	1.5	NO2	Y	Y	2m	2m	Y
73c	Windsor Road Monitor 1	Roadside	317598	172399	1.5	NO2	Y	Y	2m	2m	Y
74	114 Windsor Road	Roadside	317708	172259	1.5	NO2	Y	N	Y (0.00)	2.5m	Y
76	160 Windsor Road	Roadside	317627	172371	1.5	NO2	Y	N	Y (0.00)	2.5m	Y
79	Marine Scene	Roadside	317549	172572	1.5	NO2	N	N	N (2.80)	1.2m	Y
82	98b Windsor Road	Roadside	318061	171944	1.5	NO2	N	N	Y (0.00)	8m	Y
88	134 Windsor Road	Roadside	317668	172312	1.5	NO2	Y	N	Y (0.00)	3.5m	Y
100	141 Plassey Street	Roadside	317968	172105	1.5	NO2	N	N	Y (0.00)	4.5m	Y
112	Cogan Hill Flats	Roadside	317434	172729	1.5	NO2	N	N	Y (0.00)	10m	Y
113	3 Plassey Street	Roadside	317999	172067	1.5	NO2	N	N	Y (0.00)	3m	Y
BARRY											
8	Tynewydd Road	Kerbside	311797	168503	1.5	NO2	N	N	N (4.00)	1m	N

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?
41	Dispenser Road	Urban Background	315278	168451	1.5	NO2	N	N	N	128m	N
64	Holton Road	Roadside	311690	168042	1.5	NO2	N	N	Y (0.00)	3m	Y
66	17 Churchill Terrace	Roadside	313342	168823	1.5	NO2	N	N	Y (0.00)	2.5m	Y
71	76 High Street (O'Donovans)	Roadside	310764	167505	1.5	NO2	N	N	Y (0.00)	2m	Y
83	24 Cardiff Road	Roadside	313597	168829	1.5	NO2	N	N	Y (4.5m)	1.5m	N
102	Powell Dyffryn Way	Roadside	311115	167041	1.5	NO2	N	N	N (3.40)	1m	N
114	107 Dock View Road	Roadside	312585	168171	1.5	NO2	N	N	Y (0.00)	3m	Y
115	20 Barry Road, Cadoxton	Kerbside	312677	168171	1.5	NO2	N	N	Y (0.00)	1m	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 2018 Air Quality Monitoring Results

Table 3– Non-automatic Annual Mean NO_2 Monitoring Results (2014- 2018)

Site ID	Site Type	Valid Data Capture 2018 (%) (1)	Within AQMA?	Annual Mean Concentration (µg/m³) - Adjusted for Bias (2)				
				2014 Bias Adjustment Factor = 0.91	2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76
COWBRIDGE								
65	Roadside	100	N	16.7	15.9	15.9	15.2	14.9
101	Kerbside	100	N	-	-	-	19.9	16.5
108	Kerbside	100	N	-	-	-	19.9	24.4
LLANTWIT MAJOR								
93	Roadside	92	N	-	-	-	11.3	10.9
94	Roadside	100	N	-	-	-	9.3	9.4
95	Rural	100	N	-	-	-	6.9	7.2
96	Suburban	92	N	-	-	-	9.4	10.2
ST ATHAN								
97	Urban Background	100	N	-	-	-	8.4	7.8
GILESTON								
98	Suburban/ Industrial	100	N	-	-	-	6.5	7.0
RHOOSE								
99	Kerbside	100	N	-	-	-	10.0 (2)	9.1/ 7.6(3)
SAINT BRIDES MAJOR								
103	Roadside	100	N	-	-	-	10.0	10.7
104	Roadside	75	N	-	-	-	10.5	11.2
105	Kerbside	92	N	-	-	-	12.3/ 9.3 (3)	12.1
106	Roadside	100	N	-	-	-	9.4	10.3
107	Roadside	92	N	-	-	-	7.3	7.7

Site ID	Site Type	Valid Data Capture 2018 (%) (1)	Within AQMA?	Annual Mean Concentration (µg/m³) - Adjusted for Bias (2)				
				2014 Bias Adjustment Factor = 0.91	2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76
CULVERHOUSE CROSS								
38	Roadside	92	N	25.9	23.3	25.9(2)	19.6	19.4
DINAS POWYS								
46	Roadside	100	**N**	19.7	18.6	18.7	17.1	17.9
61	Roadside	100	N	31	30.1	31.5	30.4	31.0
67	Roadside	92	N	26	24.2	24.8(2)	21.4	23.6
72a	Roadside	83	N	27.8	23.8	21.9(2)	19.9	19.8
89	Roadside	83	N	31.2	30.8	31.8	28.3	27.9
90	Roadside	100	N	24.6	21.4	21.2	19.7	21.3
109	Roadside	92	N	-	-	-	-	19.4
110	Roadside	100	N	-	-	-	-	20.4
111	Roadside	100	N	-	-	-	-	23.6
LLANDOUGH								
68	Roadside	100	N	16.9	16.4	17.3	**15.1**	**15.2**
PENARTH								
22	Kerbside	100	N	24.4	23.7	23.6/ 20.0(3)	21.8/ 18.2 (3)	20.3/ 16.6(3)
53	Roadside	67	Y	31.2	30.8	31.5	29.8	27.7(2)

Site ID	Site Type	Valid Data Capture 2018 (%) (1)	Within AQMA?	Annual Mean Concentration (µg/m³) - Adjusted for Bias (2)				
				2014 Bias Adjustment Factor = 0.91	2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76
55	Roadside	92	Y	27.1	27.7	28.9	26.3	26.3
56	Kerbside	100	N	33.9	**40.3/** 29.4(3)	17.5(2)	23.2	20.5
62	Roadside	83	Y	33.9	31.7	33.2	31.2	28.1
70	Roadside	100	N	21.9	23.2	24.6	20.3	22.3
73a	Roadside	92	Y	28.3	30.2	32.0	31.0	28.9
73b	Roadside	100	Y	28.3	29.8	31.0	30.6	29.7
73c	Roadside	100	Y	28.3	30	31.2	30.5	30.4
74	Roadside	67	Y	29.6	28	28.2	28.4	22.7(2)
76	Roadside	83	Y	33.9	32	32.4	30.7	29.9
79	Roadside	100	Y	39.6	37.5	**44.4**/ 37.2(3)	38.3/ 32.3 (3)	37.9/ 31.6(3)
82	Roadside	83	N	19.6	17.4	18.0	16.9	17.1
88	Roadside	75	Y	33.5	30.7	31.4	29.8	27.6
100	Roadside	100	N	-	-	-	23.9	24
112	Roadside	100	N	-	-	-	-	19.4

Site ID	Site Type	Valid Data Capture 2018 (%) (1)	Within AQMA?	Annual Mean Concentration (µg/m³) - Adjusted for Bias (2)				
				2014 Bias Adjustment Factor = 0.91	2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78	2017 Bias Adjustment Factor = 0.77	2018 Bias Adjustment Factor = 0.76
113	Roadside	92	N	-	-	-	-	21.7
BARRY								
8	Kerbside	75	N	32.4	33.6(2)	23.5(2)	31.9/ 25.3 (3)	28.1/ 22.6(3)
41	Urban Background	100	N	13.1	13.1	14.5(2)	11.5	10.9
64	Roadside	100	N	20.2	20.8(2)	20.4(2)	17.5	16.6
66	Roadside	100	N	30.2	30.9	27.7	30.4	26.7
71	Roadside	92	N	17.8	18.4	17.9(2)	16.7	16.1
83	Roadside	92	N	23.2	23.2	24.9	27.7/ 22.4 (2 &3)	22.0/ 19.4(3)
102	Roadside	100	N	-	-	-	17.4 (2)	17.9/ 15.7(3)
114	Roadside	100	N	-	-	-	-	13.5
115	Kerbside	75	N	-	-	-	-	26.2

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m³ are shown in **bold**.

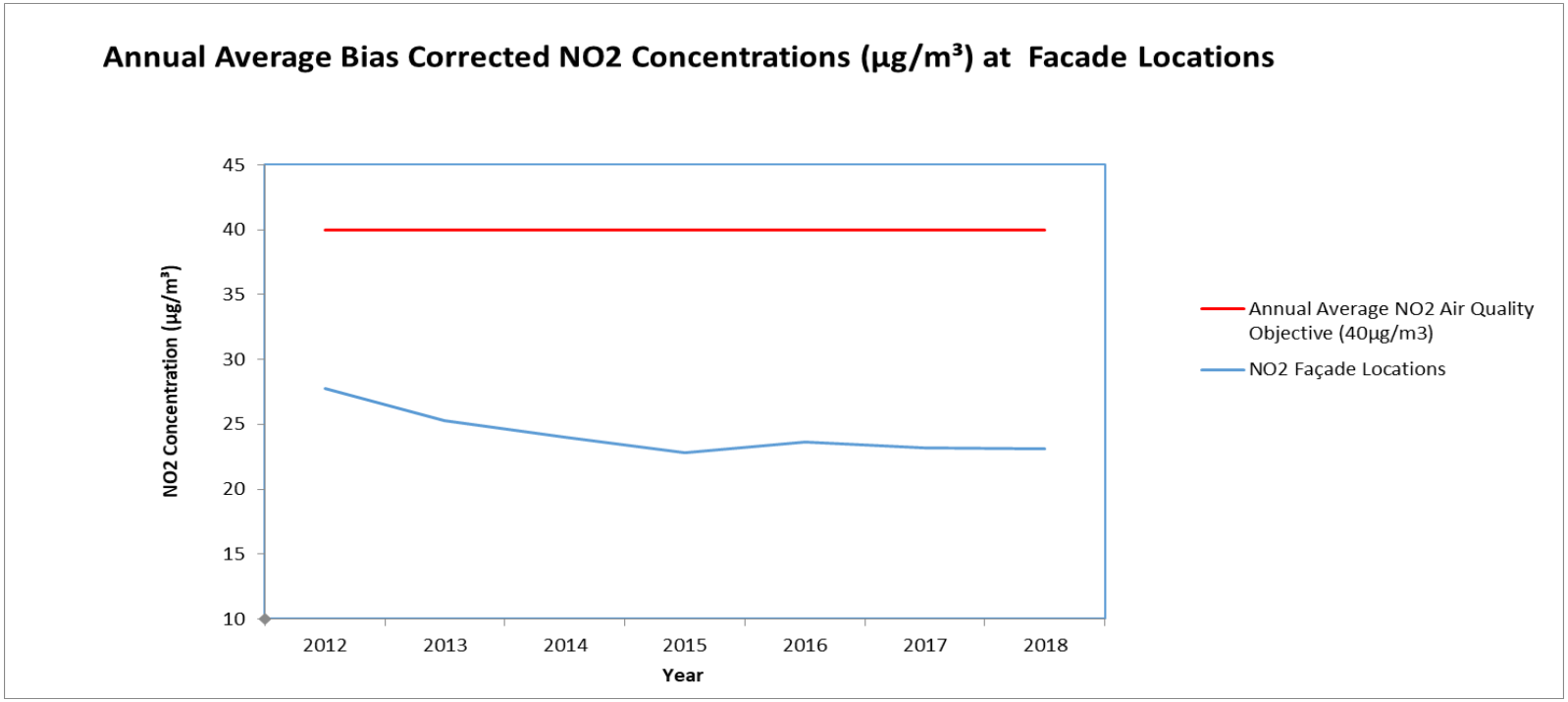
NO_2 annual means exceeding 60µg/m³, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(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"

Figure 15– Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



The graph represents annual average bias corrected NO_2 data since 2012. The locations examined represent worst case exposure due to the fact monitoring was undertaken at residential façade locations. The displayed average datasets indicate **compliant** NO_2 results in general for the Vale since 2012. The results are somewhat stable with a decreasing trend. As the network of diffusion tubes were amended for 2017 the graph does not capture a few previously included sites as these were decommissioned for 2017's monitoring.

Table 4– Automatic Annual Mean NO_2 Monitoring Results (2014- 2018)

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % (1)	Valid Data Capture 2018 % (2)	Annual Mean Concentration (µg/m^3)				
					2014	2015	2016	2017	2018
Penarth, Windsor Road	Roadside	Y	100	99.7	27.7	26.5	28.3	26.5	24.5

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 NO_2 Monitoring Results (2014- 2018)

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % (1)	Valid Data Capture 2018 % (2)	Number of Hourly Means (> 200µg/m^3)(3)				
					2014	2015	2016	2017	2018
Penarth, Windsor Road	Roadside	Y	100	99.7	0(86)	0	0	0	0

Notes:
Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in bold.
(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 16– Trends in Annual Mean NO_2 Concentrations Recorded at Windsor Road Automatic Monitoring Site

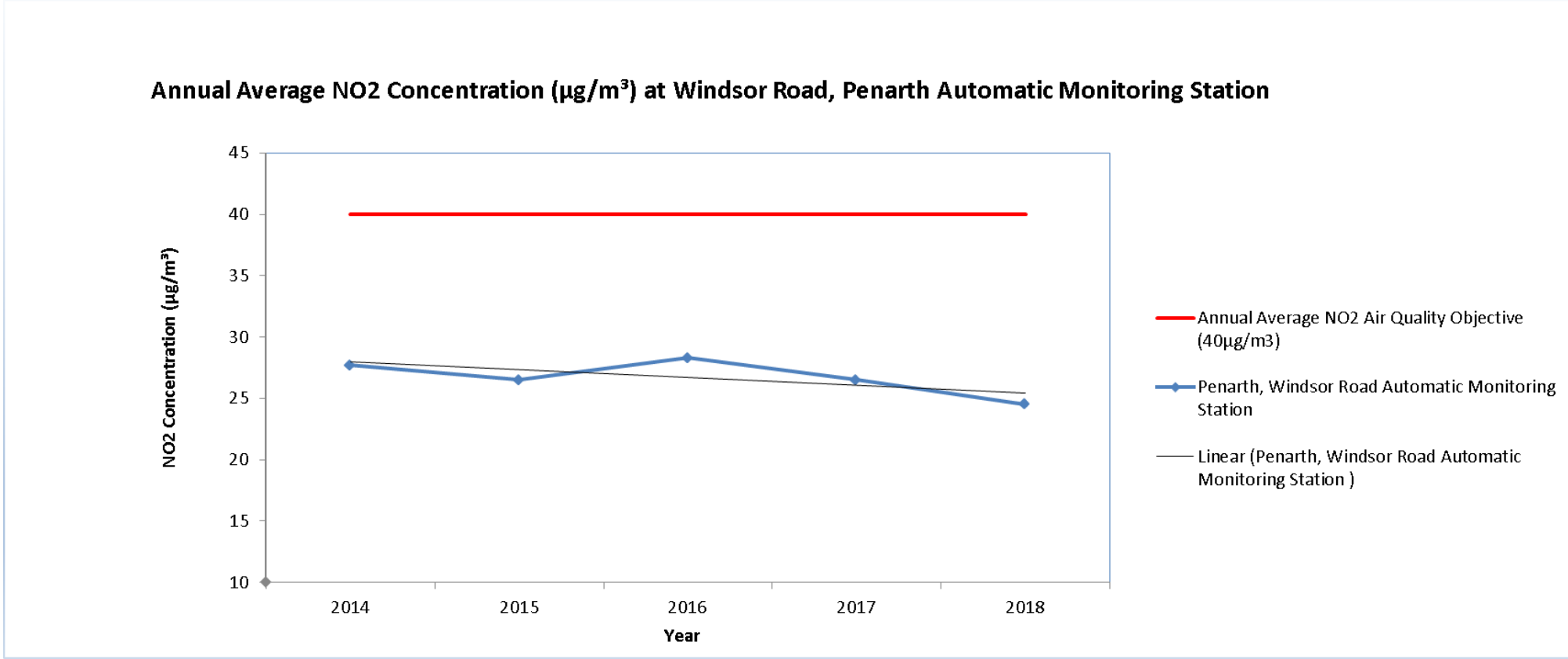


Figure 16 indicates a somewhat stable decreasing trend in annual average NO_2 concentrations recorded at the Penarth, Windsor Road AMS.

Table 6– Automatic Annual Mean PM_{10} Monitoring Results (2014- 2018)

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	Confirm Gravimetric Equivalent (Y or N/A)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
						2014	2015	2016	2017	2018
Penarth, Windsor Road	Roadside	Y	100	95	Y	17.5(3)	20.8	21.4	15.6	21.7

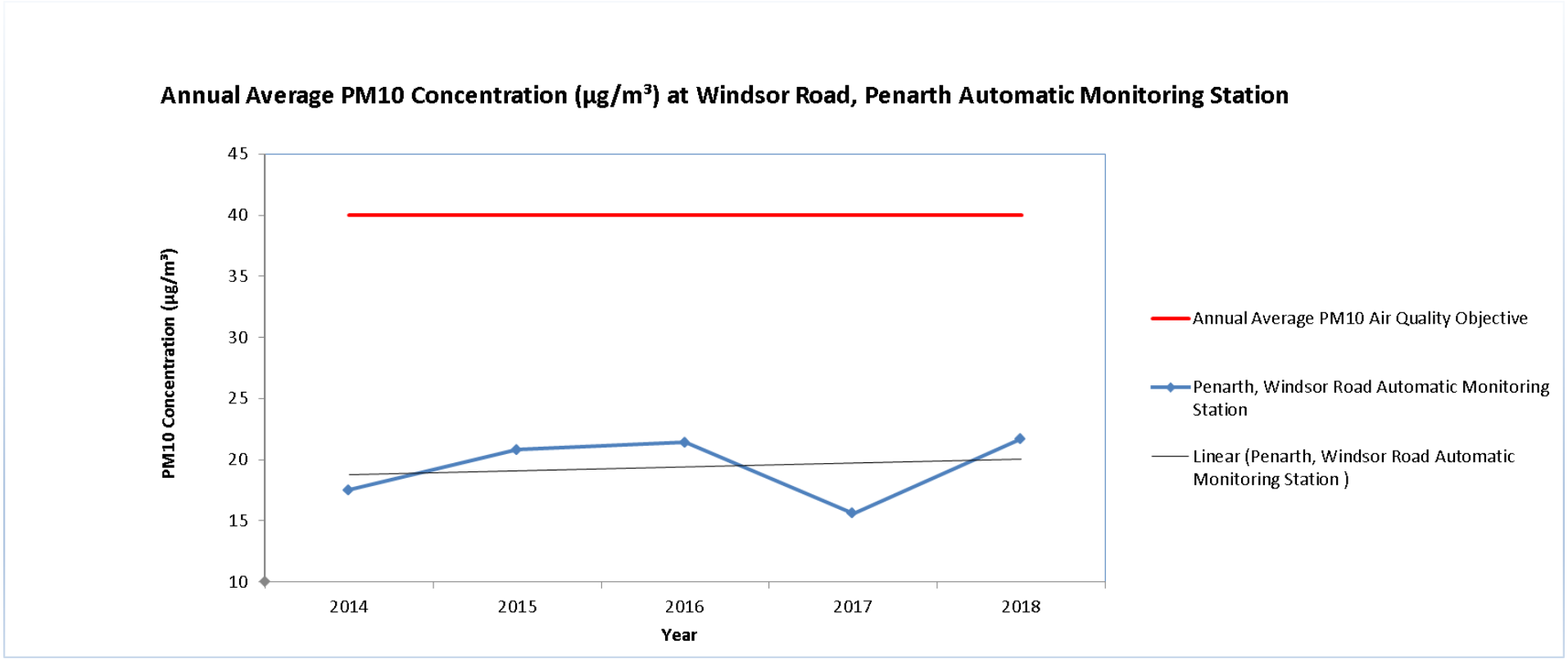
Notes:
Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in bold.
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum 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 PM_{10} Monitoring Results (2014- 2018)

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m^3 (3)				
						2014	2015	2016	2017	2018
Penarth, Windsor Road	Roadside	Y	100	95	Y	0 (20.7)	4 (31.2)	1 (31.9)	2	0

Notes:
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold.**
(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 17– Trends in Annual Mean PM_{10} Concentrations Recorded at Windsor Road Automatic Monitoring Site



Examinig **Figure 17**; the displayed datasets indicate a compliant stable trend in PM_{10} 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 2018 (%) (2)	Number of Exceedences
					Number of days where the 8-hour mean >100µg/m^3
Penarth, Windsor Road	Roadside	Y	100	81	0

Notes

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

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

2.3 Comparison of 2018 Monitoring Results with Previous Years and the Air Quality Objectives

During 2018 monitoring was carried out for nitrogen dioxide (NO_2), particulate matter (PM_{10}), and ozone (O_3).

2.3.1 Nitrogen Dioxide (NO_2)

Nitrogen dioxide was measured during 2018 at one site equipped with an automatic NOx analyser and by a network of 52 passive diffusion tubes.

In order to ratify the 2018 diffusion tube dataset, a bias adjustment factor of 0.76 was applied to the annual average readings. The factor was derived from the Defra website which gave the average correction factor from 28 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 0.76 was obtained from the following website: http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Automatic Monitoring Data

Monitoring of NO_2 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 Penarth, Windsor Road site have been cross referenced to the annual and 1-hour average objectives set for NO_2. The findings summarised in Table 4 Table 5 indicate compliance with both objectives.

Non- automated Monitoring Data

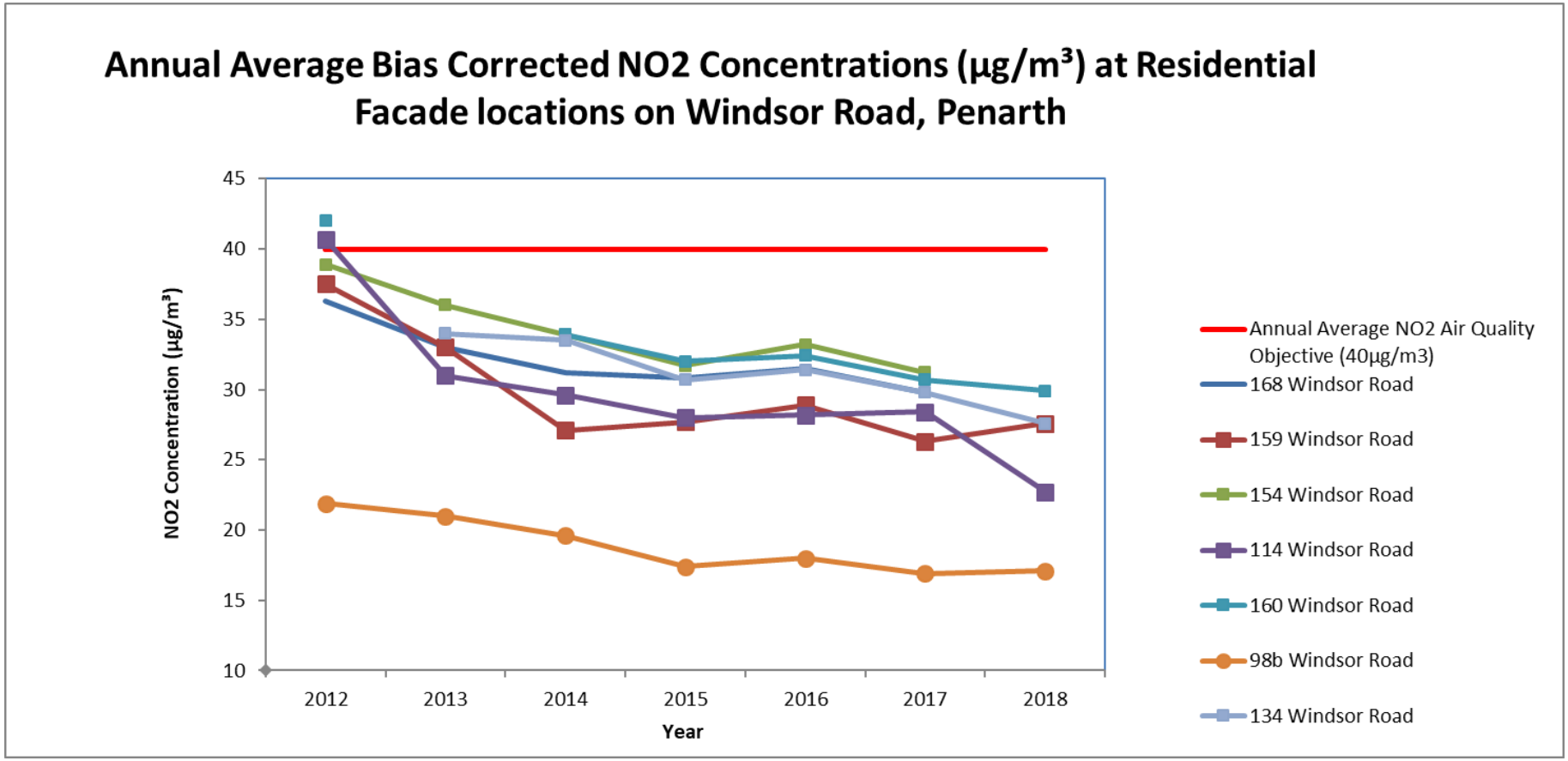
The nitrogen dioxide diffusion tube data is summarised in Table 3. The full dataset (raw monthly mean values) is included in Appendix A. All data displayed in Table 3 has been bias adjusted and where necessary annualised in accordance with Box 7.10 of LAQM TG(16), as well corrected for distance to the nearest sensitive receptor. Evidence of the sites annualised can be seen in Appendix C. The applied bias adjustment factor was 0.76, 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 NO_2 (annual average 40µg/m^3 & 1-hour average 200µg/m^3 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/m^3 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 NO_2 the Vale of Glamorgan Council wish to revoke the Windsor Road, Cogan, Penarth AQMA.

Figure 18 illustrates the annual average NO_2 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 18- Trends in Annual Average NO_2 Concentrations Recorded at Façade Locations on Windsor Road, Penarth



2.3.2 Particulate Matter (PM_{10})

Continuous monitoring of PM_{10} is undertaken at one automatic monitoring site in The Vale District. The Penarth, Windsor Road site is located within the declared AQMA and calculates particulate matter using a gravimetric Beta Attenuation Monitor (BAM).

The PM_{10} 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 PM_{10} concentrations at the Windsor Road monitoring station are compliant with both the annual mean (40µg/m^3) and 24-hour mean (>50 µg/m^3 not to be exceeded more than 18 times per year) AQS objectives set for PM_{10}.

2.3.3 Other Pollutants Monitored

Ozone (O_3)

The Vale monitors Ozone due to its potential correlations with other pollutants. In 2018, 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 2018.

2.4 Summary of Compliance with AQS Objectives as of 2018

SRS have reviewed the results from the monitoring undertaken across the Vale of Glamorgan area in 2018.

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 NO_2 (annual average 40µg/m^3 & 1-hour average 200µg/m^3 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 are currently ongoing to revoke the Windsor Road, Cogan, Penarth AQMA Order and a public consultation is imminent to respond to the Council's decision.

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 2018 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 NO_2 or PM_{10} objectives are likely.

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

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 NO_2 and Particulate Matter (PM10 and PM2.5) 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 PM_{10} 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 condition was discharged.

Non-automatic NO_2 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 2018 works have initiated for the improvement works on the A4226. These works are currently ongoing.

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 SO_2 emissions from diesel locomotives may be significant if there are outdoor locations where locomotives are regularly stationary for more than 15minutes and where members of the public could be regularly exposed over this period at such locations.

Defra's LAQM TG(16), 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 25µm^3.

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.

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 2000m^3 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 2018 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 2018 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

2017/01136/HYB- St Cyres School, Murch Crescent, Dinas Powys Residential Development

Full application for residential development for 215 units, highways and drainage infrastructure and associated landscaping; and Outline application in respect of the community and recreational use zone.

The referenced proposal was received in 2017 and following review of the submitted documentation was approved at the start of 2018.

An AQA was submitted as part of the proposal.

The main outcomes to be drawn from the AQA report are;

1. The operational impact of the Proposed Development on existing receptors is predicted to be “negligible”
2. For the construction phase, the most important consideration is dust. Without appropriate mitigation, dust could cause temporary soiling of surfaces, particularly windows, cars and laundry. The mitigation measures provided within this report should ensure that the risk of adverse dust effects is reduced to a level categorised as “not significant”.

With regards to the element of 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 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 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.

2017/00564/FUL- Northern Access Road

As described in Section 3.1.5.

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.

The LDP includes the following policy which draws upon specific projects targeted for the Vale District;

POLICY MG16 – TRANSPORT PROPOSALS

WALKING AND CYCLING

1. National Cycle Network Route 88 and associated local urban and rural connections
2. A4050 Port Road to Cardiff Airport.
3. A48 Culverhouse Cross to Bridgend.
4. Eglwys Brewis Road in conjunction with the proposed Northern Access Road, St Athan Enterprise Zone.
5. Barry waterfront to Dinas Powys.

The Council has a long standing commitment to develop the National Cycle Network within the Vale of Glamorgan. NCN Route 88 links NCN Route 4 at Margam Park in the County Borough of Bridgend, through the Vale of Glamorgan to the start of NCN Route 8 in Cardiff Bay. A feasibility study that

identifies an indicative but preferred route for NCN 88 has been prepared for the Vale of Glamorgan Council by Sustrans and this is shown on the LDP Proposals Map, found using the following link;

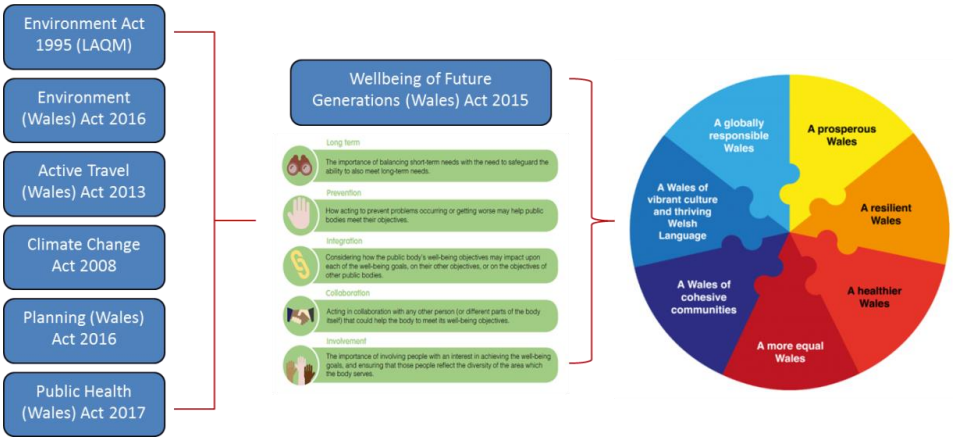
http://www.valeofglamorgan.gov.uk/Documents/Living/Planning/Policy/LDP/LDP-Adoption/Adopted-LDP-Proposals-Map.pdf

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 in the district. There were no exceedences of any pollutant objective in 2018, including monitoring locations within the declared AQMA. As discussed, continual compliance over a three year period with the national air quality objectives set for NO_2 (annual average 40µg/m^3 & 1-hour average 200µg/m^3 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 required a supporting detailed assessment will follow this annual progress report which will highlight the continued compliance and will demonstrate compliance for future years for the defined AQMA area. The final decision to revoke the Windsor Road, Penarth AQMA will be decided by Welsh Government following a review and consultation with the local communities affected. As mentioned the support detailed assessment has been completed.

The assessment undertaken utilised best practise techniques and guidance to ensure a conservative outcome. In accordance with the Welsh Air Quality Standards, 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).

The predicted concentrations of NO_2 and PM_{10} 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 continued compliance with the air quality standards is likely it is recommended to revoke the Windsor Road, Cogan, Penarth AQMA.

5.2 Conclusions relating to New Local Developments

Section 3.5 details a number of local developments which have either gained 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 conditions applied accordingly.

5.3 Other Conclusions

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

5.4 Proposed Actions

-The VoGC/ SRS will initiate the decision to revoke the Windsor Road, Cogan, Penarth AQMA;

-The detailed assessment and decision notice to revoke the AQMA will be made publically available for a 6 week consultation which will be extended if necessary. All information supporting the public consultation will be advertised via SRS'/ VoGC's webpages. Persons will be able to respond to the public consultation to a dedicated email address which will be managed by SRS' Specialist Services Team;

-The VoGC cabinet members will be briefed following the consultation period and pending approval of the recommendation to revoke the Windsor Road, Cogan, Penarth AQMA, the decision notice to revoke the AQMA will be formally submitted to WG;

-Non- automated monitoring with the use of diffusion tubes will continue along Windsor Road, Penarth, however the Windsor Road automated monitoring site will be decommissioned and replaced at an alternative location.

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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4. Vale of Glamorgan Planning Link
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5. UK National Air Quality Archive LAQM
http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

6. Vale of Glamorgan Local Development Plan 2011- 2026
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7. Vale of Glamorgan The Local Transport Plan (2015- 2030)
https://www.valeofglamorgan.gov.uk/en/living/planning_and_building_control/Planning/planning_policy/Local-Transport-Plan.aspx

8. Vale of Glamorgan Green Dragon
http://www.valeofglamorgan.gov.uk/en/living/environment/green_dragon/green_dragon.aspx

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 A: Monthly Diffusion Tube Monitoring Results

Table A.1 – Full Monthly Diffusion Tube Results for 2018

Site No	Nitrogen Dioxide Sites, VALE CBC	Grid Ref	Class	Distance of measurement from Kerb (m)	Distance from Kerb to Receptor	Relevant Exposure in m	Background Concentration (if required for distance correction)	02/01/2018 - 31/01/2018	31/01/2018 - 28/02/2018	28/02/2018 - 28/03/2018	28/03/2018 - 01/05/2018	01/05/2018 - 05/06/2018	05/06/2018 - 03/07/2018	03/07/2018 - 30/07/2018	30/07/2018 - 04/09/2018	04/09/2018 - 02/10/2018	02/10/2018 - 30/10/2018	30/10/2018 - 03/12/2018	03/12/2018 - 07/01/2019	AVERAGE SINCE JAN 18	Bias Corrected (Correction Factor 0.76)	Annualised	Disatance corrected to Façade (if required)	Percentage of Data Capture
COWBRIDGE																								
108	4 Cardiff Road, Cowbridge	299967 174311	Kerbside	0.75	0.75	0.00		32.30	35.7	35.3	31.4	30.60	28.00	36.70	25.00	32.20	30.6	34.10	32.8	32.1	24.4	24.4	24	100
65	1 Riverside Mews, Cowbridge	299614 174592	Roadside	3.00	3.00	0.00		20.80	28.50	26.6	18.8	21.10	16.30	16.70	13.30	16.90	17.9	22.00	16.6	19.6	14.9	14.9	15	100
101	37 Westgate House	298903 174907	Kerbside	0.75	0.75	0.00		28.70	25..6	26.5	21.2	16.50	14.80	16.90	13.00	23.20	24.4	25.60	27.3	21.6	16.5	16.5	16	100
LLANTWIT MAJOR																								
93	Le Pouliguen Way	297171 168741	Roadside	4.80	4.80	0.00		16.50	20.50	19.4	13.5	13.00	10.90	11.80	8.90	12.60	13.5	16.00	15.6	14.4	10.9	10.9	11	100
94	5 Boverton Road	297069 168715	Roadside	7.40	7.40	0.00		15.40	16.30	15.5	11.8	11.20	8.60	10.20	8.00	10.00	12	15.60	14.4	12.4	9.4	9.4	9	100
95	Millands Caravan Park	298861 169236	Rural	290.00	290.00	0.00		10.90	10.80	13.1	8.3	8.00	9.20	7.70	6.50	6.60	7.5	14.60	10.4	9.5	7.2	7.2	7	100
96	Old Froglands Farm	299045 169126	Suburban	86.00	86.00	0.00		19.00	22.20	20.6	17.9	9.60	6.30		4.70	8.70	10.3	16.40	12.5	13.5	10.2	10.2	10	92
St. ATHAN																								
97	7 Picketson Close	300460 169310	Urban Background	30.00	30.00	0.00		11.60	14	15.7	7.7	7.8	7.4	7.1	6.3	8.2	9	15.4	12.3	10.2	7.8	7.8	7.8	100
GILESTON																								
98	Orchard Way (Ivy Cottage)	301899 167043	Suburban/ Industrial	450.00	450.00	0.00		12.30	12.7	12.3	8.3	7.5	6.4	6.7	5.2	7	8.8	13.3	9.7	9.2	7.0	7.0	7.0	100
RHOOSE																								
99	Fonmon Road Lampost	304894 166898	Kerbside	0.90	8.90	8.00	5.89	15.10	15.3	16.3	12	10.4	9.9	8.4	6.5	8.8	11	16.5	14	12.0	9.1	9.1	7.6	100
SAINT BRIDES MAJOR																								
103	September Cottage	289530 174896	Roadside	6.50	6.50	0.00		14.10	20.4	18	13.4	13	12.3	9.4	7.9	11	14.1	19.3	16.5	14.1	10.7	10.7	10.7	100
104	Greengate Cottage	289496 174858	Roadside	12.50	12.50	0.00		15.60	18.6		16.4	14		14.6	9.3	12.1	14.9	17.7		14.8	11.2	11.2	11.2	75
105	St. Brides Primary School Walway Entrance	289473 174752	Kerbside	0.95	9.00	8.05		17.50	18.6	21.4	16.1	14.7	12.9		7.9	13.1	15.4	20.6	16.3	15.9	12.1	12.1	12.1	92
106	Dany Bryn House	289454 174668	Roadside	2.10	2.10	0.00		11.90	17.1	18.2	14.5	11.5	11.9	10.3	7.9	11.9	14.4	17.7	15.5	13.6	10.3	10.3	10.3	100
107	Hillboro	289512 174805	Roadside	7.50	7.50	0.00		9.40	12.7	14.1	9.1	7.9	6.8	7.7	5.5		10.3	12.5	15	10.1	7.7	7.7	7.7	92
CULVERHOUSE																								
38	2 Horseshoes	311892 174513	Roadside	2.00	2.00	0.0		27.50	26.60	30.4	25.1	23.60	18.10	28.90		26.60	24.7	22.7	26.50	25.5	19.4	19.4	19	92
DINAS POWYS																								
46	46 Cardiff Road	315747 171369	Roadside	5.00	5.00	0.0		28.10	29.10	29.4	25	22.90	22.80	17.90	13.40	19.70	24.3	27.00	23.30	23.6	17.9	17.9	18	100
61	Railway Terrace	316433 171932	Roadside	2.00	2.00	0.0		45.90	45.50	40.7	38.3	42.20	34.40	43.60	34.80	40.60	42.9	38.20	42.70	40.8	31.0	31.0	31	100
67	2 Matthew Terrace	316488 172004	Roadside	2.50	2.50	0.0		32.80	37.60	33.7	34.3	33.20	35.90	29.40	21.30	25.00	32.5		25.90	31.1	23.6	23.6	24	92
72a	Dinas Powys Infants School	315841 171527	Roadside	7.00	7.00	0.0		27.00	34.10	34.8	25.6	24.20	21.70	23.20	16.60	23.90			29.90	26.1	19.8	19.8	20	83
89	9 Wayside Cottages, Cardiff Road	316447 171963	Roadside	3.00	3.00	0.0		40.10	41.60		32.6		31.10	35.90	28.80	35.70	41.4	40.90	38.60	36.7	27.9	27.9	28	83
90	16 Railway Terrace, Cardiff Road	316453 171945	Roadside	3.00	3.00	0.0		31.40	35.00	32.4	31.6	26.10	22.20	24.30	18.40	23.80	30.5	32.3	29.10	28.1	21.3	21.3	21	100
109	85 Cardiff Road, Dinas Powys	315739 171444	Roadside	5.00	5.00	0.0		31.20	31.10	30.5	22.8	23.70	20.40	23.40	19.70	24.00	26.2		27.20	25.5	19.4	19.4	19	92
110	103 Cardiff Road, Dinas Powys	31585 171555	Roadside	4.00	4.00	0.0		33.40	29.50	31.5	24.4	24.20	20.60	24.70	20.60	23.90	27.5	28.9	32.80	26.8	20.4	20.4	20	100
111	203 Cardiff Road, Dinas Powys	316366 171823	Roadside	3.00	3.00	0.0		30.20	35.40	34.1	30.9	31.70	28.10	32.50	23.70	29.40	33.1	32	32.10	31.1	23.6	23.6	24	100
LLANDOUGH																								
68	Glen View, 99 Penlan Road	316886 172561	Roadside	9.00	9.00	0.00		21.80	24.60	25.1	20.4	18.10	14.40	18.20	13.10	18.70	21.1	26.60	18.50	20.1	15.2	15.2	15	100
PENARTH																								
22	Stanwell Road	318505 171496	Roadside	1.00	9.00	8.0	11.94	31.70	33.00	28.9		17.90	20.00	23.60		24.90	31		29.40	26.7	20.3	20.3	16.6	75
112	Cogan Hill Flats	317434 172729	Roadside	10.00	10.00	0.0		31.90	32.40	28.2	24.3	22.60	17.00	22.90	17.90	26.30	27	26.30	29.60	25.5	19.4	19.4	19	100
53	168 Windsor Road	317589 172411	Roadside	5.00	5.00	0.0		44.00	46.40				38.40		34.60	36.30	37.5	32.80	39.60	38.7	29.4	27.7	28	67
55	159 Windsor Road	317595 172435	Roadside	2.00	2.00	0.0			36.90	42.6	36.2	35.80	34.20	35.20	26.80	31.90	33.90	31.50	35.20	34.6	26.3	26.3	26	92
56	134 Andrew Road	316814 172443	Roadside	10.00	10.00	0.0		33.80	31.40	28.4	26	25.00	19.50	20.70	23.10	29.70	26.9	27.9	31.5	27.0	20.5	20.5	21	100
62	154 Windsor Road	317633 172357	Roadside	2.00	2.00	0.0				47.8	40.2	40.90	32.90	36.90	29.70	36.60	36.3	26.2	41.60	36.9	28.1	28.1	28	83
70	Ty-Isaf	316731 172391	Roadside	3.00	3.00	0.0		28.70	36.10	35.5	32.3	26.40	28.50	27.40	15.50	20.90	29.90	39.2	32.30	29.4	22.3	22.3	22	100
73a	Windsor Road Monitor 1	317598 172399	Roadside	2.00	4.00	2.0		31.50	41.50	42.3	37.2	30.60	37.10		33	40.90	43.2	35.6	45.90	38.1	28.9	28.9	29	92
73b	Windsor Road Monitor 2	317598 172399	Roadside	2.00	4.00	2.0		40.70	40.10	44.6	39.3	40.10	36.50	36.80	30.4	37.60	41.9	36.1	44.20	39.0	29.7	29.7	30	100
73c	Windsor Road Monitor 3	317598 172399	Roadside	2.00	4.00	2.0		42.40	43.70	42.4	37.2	41.70	35.90	42.20	34.4	38.70	38.3	41.5	41.50	40.0	30.4	30.4	30	100
74	114 Windsor Road	317708 172259	Roadside	2.50	2.50	0.0		35.20	38.40	34.3					27.30	34.40	36.8	30.3	38.00	34.3	26.1	22.7	23	67
76	160 Windsor Road	317627 172371	Roadside	2.50	2.50	0.0		40.50	44.10	47.9	39	36.50	33.80	38.70	32.10	39.10	41.3			39.3	29.9	29.9	30	83
100	141 Plassey Street	317968 172105	Roadside	4.50	4.50	0.0		35.80	38.30	37	29.1	36.10	35.20	30.60	21.60	27.80	33.2	23.4	31.1	31.6	24.0	24.0	24	100
79	Marine Scene	317549 172572	Roadside	1.20	4.00	2.8	12.9	47.70	57.60	53.7	54	59.50	39.80	48.40	37.20	41.30	51.2	67	40.7	49.8	37.9	37.9	31.6	100
113	03 Plassey Street	317999 172067	Roadside	3.00	3.00	0.0		35.70	35.00	30.1	23.8	26.40	18.60	27.60	24.20	30.30	29.70	33.2		28.6	21.7	21.7	22	92
82	98b Windsor Road	318061 171944	Roadside	8.00	8.00	0.0		21.40	26.70	25.5	22.7	19.10			15.10	19.10	22	29.2	23.90	22.5	17.1	17.1	17	83
88	134 Windsor Road	317668 172312	Roadside	3.50	3.50	0.0		36.40				41.20	31.40	37.40	32.90	37.80	39.3	29.3	41.40	36.3	27.6	27.6	28	75
BARRY																								
8	Tynewydd Road	311797 168503	Kerbside	1.00	5.00	4	11.12	41.40		42.9		35.80		33.30	29.20	33.30	36.00	37.4	43.7	37.0	28.1	28.1	22.6	75
41	Despenser Road	315278 168451	Urban Background	128.00	128.00	0		19.20	16.80	20.8	13.00	10.40	9.10	9.00	8.60	13.90	13.4	20.4	18	14.4	10.9	10.9	11	100
64	Holton Road	311690 168042	Roadside	3.00	3.00	0		22.60	26.40	29.4	24.6	21.20	19.80	17.30	13.80	18.30	19.7	27	22.7	21.9	16.6	16.6	17	100
66	17 Churchill Terrace	313342 168823	Roadside	2.50	2.50	0		42.10	43.50	41.3	35.7	31.90	25.00	32.80	28.40	35.60	34.8	35.6	35.40	35.2	26.7	26.7	27	100
71	76 High Street (O'Donovans)	310764 167505	Roadside	2.00	2.00	0		24.00	24.90	29.5		20.20	17.30	16.10	12.70	16.40	18.7	27.2	26.40	21.2	16.1	16.1	16	92
83	24 Cardiff Road	313597 168829	Roadside	1.50	6.00	4.5	13.46	34.40	36.70	33.2	28.30	23.40	18.20	25.10	24.30	29.10	35		30.50	28.9	22.0	22.0	19.4	92
102	Powell Dyfryyn Way	311115 167041	Kerbside	1.00	4.40	3.4	10.68	33.60	28.10	31.2	21	20.80	17.40	18.70	14.80	20.90	22.8	28.2	24.60	23.5	17.9	17.9	15.7	100
114	107 Dock View Road	312585 168171	Roadside	3.00	3.00	0		20.40	24.70	23.70	18.80	18.20	14.10	9.70	9.80	13.60	15.5	25.4	19.90	17.8	13.5	13.5	13.5	100
115	20 Barry Road, Cadoxton	312677 169054	Kerbside	1.00	1.00	0		36.30	35.20	36.3		32.10			28.40	31.70	37.2	38	34.50	34.4	26.2	26.2	26.2	75

Notes:

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

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

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

(2) Distance corrected to nearest relevant public exposure.

Appendix B: A Summary of Local Air Quality Management

Purpose of an Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment Act 1995 and associated government guidance. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas and to determine whether or not the air quality objectives are being achieved. Where exceedances occur, or are likely to occur, the local authority must then declare an Air Quality Management Area (AQMA) and prepare 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 micrograms per cubic metre µg/m3 (milligrammes per cubic metre, mg/m3 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 06/19) was used to obtain an overall adjustment factor of 0.76 from the input data shown in the following screenshot. This overall factor is based on 28 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: 06/19

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of September 2019
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[3]	If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Socotec Didcot	50% TEA in acetone	2018	KS	Marylebone Road Intercomparison	12	95	85	11.3%	G	**0.90**
Socotec Didcot	50% TEA in acetone	2018	B	Gravesham Borough Council	12	37	30	22.1%	G	**0.82**
Socotec Didcot	50% TEA in acetone	2018	B	Gravesham Borough Council	12	28	24	18.8%	G	**0.84**
Socotec Didcot	50% TEA in acetone	2018	UI	North Lincolnshire Council	12	24	16	53.5%	G	**0.65**
Socotec Didcot	50% TEA in acetone	2018	R	Swansea Council	12	33	24	39.0%	G	**0.72**
Socotec Didcot	50% TEA in acetone	2018	UB	Swansea Council	10	19	16	23.4%	G	**0.81**
Socotec Didcot	50% TEA in acetone	2018	R	Sevenoaks District Council	12	34	25	34.8%	G	**0.74**
Socotec Didcot	50% TEA in Acetone	2018	R	Wrexham County Borough Council	11	21	18	16.1%	G	**0.86**
SOCOTEC Didcot	50% TEA in acetone	2018		**Overall Factor[3] (28 studies)**				**Use**		**0.76**

Discussion of Choice of Factor to use

The bias adjustment factor applied to all 2018 data is 0.76. The applied bias adjustment factor has been calculated using the national diffusion tube bias adjustment factor spreadsheet version 06/19. 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, 0.63 compared to 0.76. Therefore it was deemed good practise to use the nationally derived bias adjustment factor as this would reflect a “worst-case scenario”.

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 (NO_2) 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). Two long-term AURN urban background continuous monitoring sites, within a distance of approximately 50 miles from The Vale were selected; Cwmbran and Bristol St Paul's.

Table C.1– Long term AURN site used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 53

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Cwmbran AURN	Urban Background	12.89	13.60	0.95
Bristol St Paul's AURN	Urban Background	23.93	25.58	0.94
Average Ratio				0.94

Table C.2 – Long term AURN site used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 74

Site	Site Type	Annual Mean (µg/m^3)	Period Mean (µg/m^3)	Ratio
Cwmbran AURN	Urban Background	12.89	14.88	0.87
Bristol St Paul's AURN	Urban Background	23.93	27.41	0.87
Average Ratio				0.87

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