



Vale of Glamorgan Council 2017 Air Quality Annual Progress Report

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

September 2017



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Executive Summary

The report fulfils the requirements of Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents.

This document is part of The Vale of Glamorgan Council's sixth round of Review and Assessment. Results from air quality data captured in 2016 by the Council are presented and sources of air pollution identified. The Progress Report determines those changes since the last assessment, which could lead to the risk of an air quality objective being exceeded.

This Annual Progress Report confirms that 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. From the 44 locations monitored throughout the Vale Borough with the use of passive diffusion tubes, one site does breach the national annual objective of $40\mu\text{g}/\text{m}^3$ (Site ID 79), however as this site is described as a kerbside location and its nearest relevant exposure is that of a retail shop, therefore the 1-hour objective would only apply at this location. 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 (**$200\mu\text{g}/\text{m}^3$, 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 NO_2 1-hour mean are unlikely to occur where the annual mean is below $60\mu\text{g}/\text{m}^3$."* Therefore, based on the 2016 datasets it can be concluded that the NO_2 1 hour objective was not breached.

As a result of continual compliance over a three year period with the national air quality objectives set for NO_2 (annual average $40\mu\text{g}/\text{m}^3$ & 1-hour average $200\mu\text{g}/\text{m}^3$ 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 Windsor Road, Penarth AQMA. As required a supporting report will accompany 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 part of Section 3.25 LAQM TG(16) it is a requirement to list any installations with the potential to impede on air quality with relevant exposure nearby. A planning application was approved in January 2016 for the construction of 12 log cabins and biomass house at the Walled Garden, Rosedew Farm,

Llantwit Major. Using Defra's Screening Emissions Calculation Tools for Biomass Boilers and Industrial Sources the biomass installation was shown to be compliant with their derived emissions thresholds (please see Section 3.4).

The automatic monitoring station located at Dinas Powys Primary School was decommissioned at the start of 2016. The three co-located NO₂ diffusion tube tubes were no longer required and so one diffusion tube remained at this location. Diffusion tube site 86 was removed due to continued vandalism whereby the tube and its holder were continuously removed. Also as detailed in the last progress Report, 2016, site 56 has now been relocated to a location where results are indicative of relevant exposure, this being at a façade of a residential property.

Following a review of the 2016 NO₂ diffusion tube network, it was agreed to assign and relocate new monitoring locations. The new locations have been allocated based on known areas of particularly elevated traffic flows and foreseeable development, all with nearby relevant exposure. These newly monitored areas for 2017 are Llantwit Major, Gileston, St Athan, Rhoose (Fonmon), Barry Docks and Saint Brides Major.



Table of Contents

Executive Summary	i
1 Introduction	1
1.1 Description of Local Authority Area	1
1.2 Purpose of Progress Report	1
1.3 Air Quality Objectives.....	2
1.4 Summary of Previous Review and Assessments	4
2 New Monitoring Data	8
2.1 Summary of Monitoring Undertaken.....	8
2.2 Comparison of Monitoring Results with Air Quality Objectives	20
3 New Local Developments	40
3.1 Road Traffic Sources.....	40
3.2 Other Transport Sources	44
3.3 Industrial Sources	45
3.4 Commercial and Domestic Sources.....	47
4 Planning Applications	48
5 Air Quality Planning Policies	49
6 Local Transport Plans and Strategies	50
7 Climate Change Strategies	52
8 Implementation of Action Plans	53
9 Conclusions and Proposed Actions	54
9.1 Conclusions from New Monitoring Data.....	54
9.2 Conclusions relating to New Local Developments	and
Sources.....	54
9.3 Proposed Actions	55
10 References	56

List of Tables

Table 1.1 – Air Quality Objectives included in Regulations for the purpose of LAQM in Wales

Table 2.2 – Details of Non- Automatic Monitoring Sites

Table 2.3 – Results of Automatic Monitoring for NO₂: Comparison with Annual Mean Objective

Table 2.4 – Results of Automatic Monitoring for NO₂: Comparison with 1-hour Mean Objective

Table 2.5 – Results of NO₂ Diffusion Tubes 2016

Table 2.6 – Results of NO₂ Diffusion Tubes (2012 to 2016)

Table 2.7 – Results of Automatic Monitoring for PM₁₀: Comparison with Annual Mean Objective

Table 2.8 – Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour Mean Objective

Table 2.9: Results of Automatic Monitoring of Ozone (2012 – 2016)^{a & b}

Table 3.1: Screening Out Study Beili Mawr, Dyffryn

Table 3.2: Screening Out Study Bryn y Ddafad Guest House

Table B.1 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 38 (2 Horseshoes)

Table B.2 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 77 (A48 Culverhouse Cross)

Table B.3 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 72a (Dinas Powys Primary School)

Table B.4 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 67 (2 Matthew Terrace)

Table B.5 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 56 (134 Andrew Road)

Table B.6 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 78 (Chelmsford Cottage)

Table B.7 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 80 (113 Plassey Street)

Table B.8 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 8 (Tynewydd Road)

Table B.9 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 24 (Port Road East)

Table B.10 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 41 (Dispenser Road)

Table B.11 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 64 (Holton Road)

Table B.12 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 71 (76 High Street)

Table B.13 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 78 (Catalina, y Rhodfa)

List of Figures

Figure 1.1 – Map of Windsor Road AQMA

Figure 2.1 – Map of Penarth, Windsor Road Automatic Monitoring Site

Figure 2.2 – Map of Non-Automatic Monitoring Sites in Cowbridge

Figure 2.3 – Map of Non-Automatic Monitoring Sites in Culverhouse

Figure 2.4 – Map of Non-Automatic Monitoring Sites in Dinas Powys

Figure 2.5 – Map of Non-Automatic Monitoring Sites in Llandough and Cogan

Figure 2.6 – Map of Non-Automatic Monitoring Sites in Penarth

Figure 2.7 – Map of Non-Automatic Monitoring Sites in Barry

Figure 2.8- Trends in Annual Average NO₂ Concentrations Recorded at Windsor Road Automatic Monitoring Site

Figure 2.9 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites

Figure 2.10- Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Windsor Road Residential Diffusion Tube Monitoring Sites

Figure B.1: National Diffusion Tube Bias Adjustment Factor Spreadsheet

Appendices

Appendix A: Diffusion Tube Monitoring Data 2016

Appendix B: QA/QC Data

1 Introduction

1.1 Description of Local Authority Area

The Vale of Glamorgan Council (Vale) is a rural, coastal area adjoining the City and County of Cardiff to the east, Rhondda Cynon Taff County Council (RCT) to the North and Bridgend County Borough Council (Bridgend) to the west,

The boundaries to the east and north are major road links namely the Cardiff Bay Link Road to the east and the M4 motorway to the north. Small sections of each are within the Vale. The southern boundary is the Bristol Channel, across which are large population centres. The western boundary is the Ewenny River, which leads to the channel, via the confluence with the Ogmore River.

The major population centres within the Vale are to the southeast and comprise of Wenvoe, Penarth, Dinas Powys, Barry, Llantwit Major, Rhoose, St Athan and Cowbridge.

All but two of the major industrial processes (Part A) are concentrated to the south of Barry. The other two lie about a kilometre apart in Aberthaw. Smaller industrial processes (Part B) predominantly mineral processes are dispersed from east to west. There are two aerodromes, one military and one civilian, about two kilometres apart and a port where shipping, though not busy, is regular.

1.2 Purpose of the Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of compliance with air quality objectives.

The latest Policy Guidance from Welsh Government⁽²⁾ details a new streamlined approach in terms of the reporting requirements for Local Authorities in Wales. Previous guidance required the submission of Progress Reports, in the intervening years between a three-yearly Updating and Screening Assessment report. The new Policy Guidance removes the need for these separate reports

and local authorities are now only required to submit an Annual Progress Report. These reports incorporate monitoring results for the previous calendar year, a progress report on action plan implementation, and an update on any new policies or developments likely to affect local air quality.

Where an Annual Progress report indicates an area exceeds or likely exceeds an air quality standard the new Policy Guidance removes the requirement for a local authority to undertake a Detailed or Further Assessment before declaring an Air Quality Management Area (AQMA). Where the local authority does declare an AQMA the Policy Guidance requires that a local authority produce an action plan with 18 months of the declaration of the AQMA.

1.3 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 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 – 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

1.4 Summary of Previous Review and Assessments

First Round of Review and Assessment

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

Second Round of Review and Assessment

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

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

Third Round of Review and Assessment

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

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

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

Fourth Round of Review and Assessment

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

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

Fifth Round of Review and Assessment

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

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

The 2013 Progress Report recommended that; diffusion tubes with consistently low, compliant concentrations, be re-deployed in new locations; additional tubes be placed at locations where the NO₂ concentrations are consistently close to the annual mean objective with relevant exposure; Penarth's automatic monitor be relocated to within the proposed AQMA; and that the indicative PM₁₀ monitor be replaced with a gravimetric equivalence monitor. The 2014 Progress Report

concluded that there was no need to proceed to a Detailed Assessment for any of the pollutants monitored.

An AQMA was declared on 1st August 2013 for a section of Windsor Road, Penarth with respect to the annual mean objective NO₂. NO₂ concentrations are high due to congested traffic moving through a partial 'street canyon' with residential exposure along the western flank. Current AQMA is highlighted in Figure 1.1.

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.



Figure 1.1 – Map of Windsor Road AQMA

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites (AMS)

The Vale Council operated one automatic monitor station during 2016.

Penarth, Windsor Road

This monitor is operated by Shared Regulatory Services (SRS) on behalf of the Vale Council and is classified as a roadside monitor. It was commissioned in 2014 following a re-location from the site (Grid reference: 317550, 171483) to be within the Windsor Road AQMA. The monitoring site measures nitrogen dioxide, PM₁₀ and ozone (O₃) and forms part of the Welsh Air Quality Network. The station is calibrated by a Local Authority Officer on a fortnightly basis and serviced and maintained by an approved contractor on a six monthly basis following QA/QC checks. Data obtained from the monitor is checked for validation and ratified by Ricardo-AEA. For 2016, data capture for NO₂ was recorded at 94% and 84% for PM₁₀.

There are three diffusion tubes co-located at the station, whereby at the end of year, depending on data capture and precision, a locally derived bias adjustment factor is calculated. The bias adjustment factor derived from the co-location study was 0.70. 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 38 studies, which appointed ESG Didcot laboratory, was slightly higher at 0.78. 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 2.1 – Map of Penarth, Windsor Road Automatic Monitoring Site

Table 2.1 – Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	In AQMA?	Pollutants Monitored	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m)	Does this Location Represent Worst-Case Exposure?
Penarth, Windsor Road	Roadside	317598	172399	Y	NO ₂	Chemiluminescent Analyser	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 (NO₂). During the period since the Progress Report in 2016, monitoring of NO₂ using passive diffusion tubes has been carried out at 44 locations throughout the Vale. The locations of the diffusion tubes are described in Table 2.2 and shown in Figures 2.2- 2.7.

NO₂ Diffusion Tube Locations

The location of the 6 areas where NO₂ monitoring has taken place;

- a. Cowbridge (Area A)
- b. Culverhouse (Area B)
- c. Dinas Powys (Area C)
- d. Llandough (Area D)
- e. Penarth (Area E)
- f. Barry (Area F)

The diffusion tubes are supplied and analysed by ESG Didcot using the 50% triethanolamine (TEA) in water method. Further details regarding the ESG Didcot laboratory and QA/QC procedures are provided in Appendix A2.

Figure 2.2 – Map of Non-Automatic Monitoring Sites in Cowbridge



Figure 2.3 – Map of Non-Automatic Monitoring Sites in Culverhouse

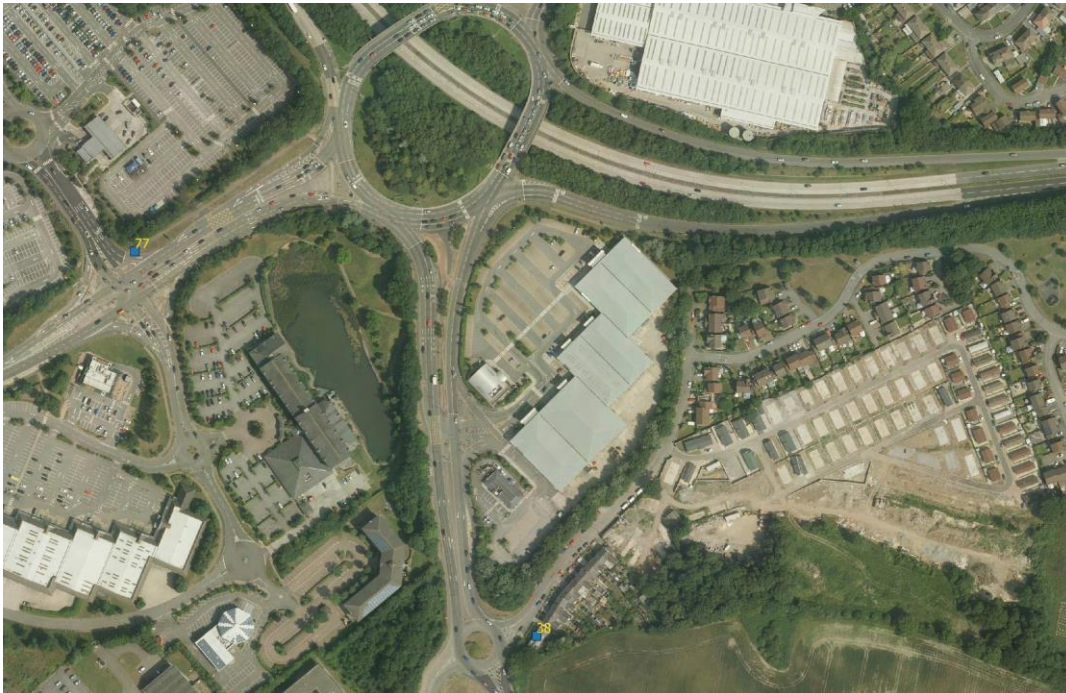


Figure 2.4 – Map of Non-Automatic Monitoring Sites in Dinas Powys



Figure 2.5 – Map of Non-Automatic Monitoring Sites in Llandough and Cogan



Figure 2.6 – Map of Non-Automatic Monitoring Sites in Penarth

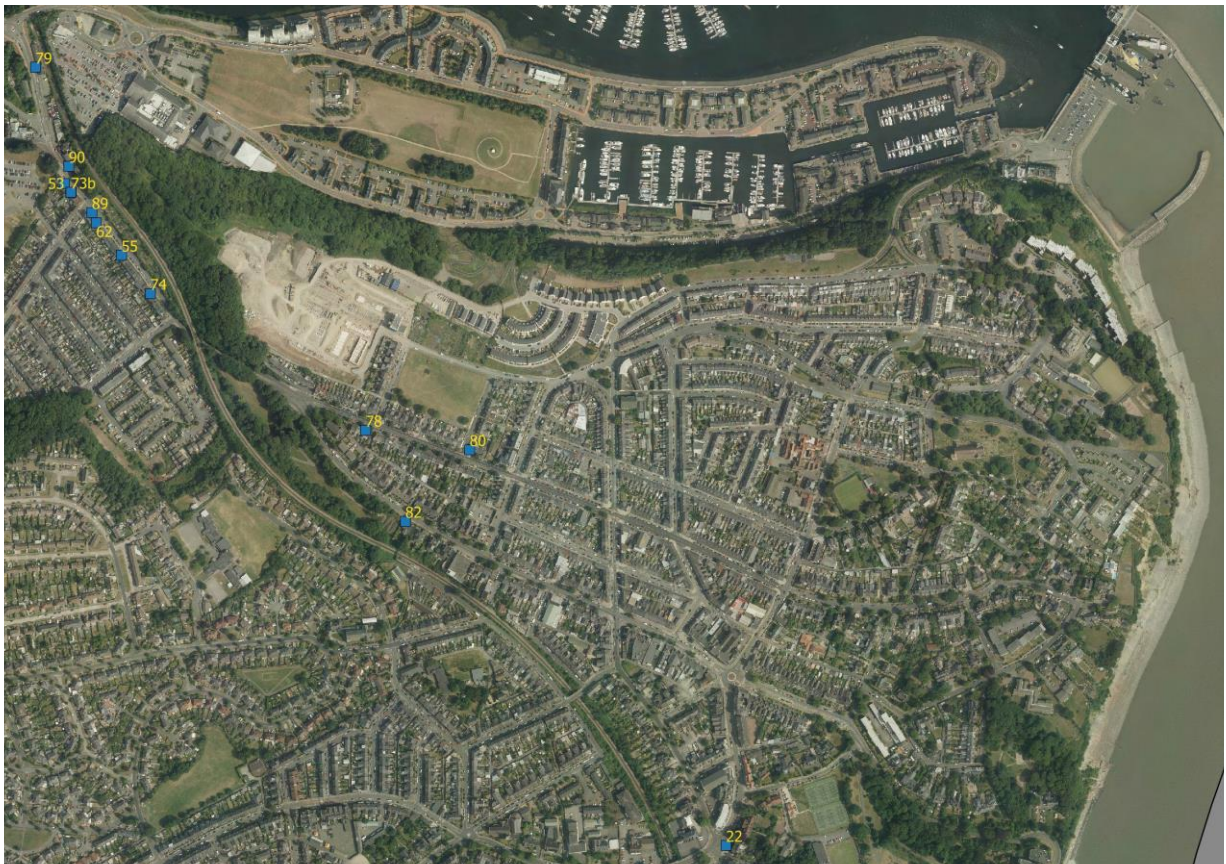


Figure 2.7 – Map of Non-Automatic Monitoring Sites in Barry



Table 2.2 – Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	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										
54	High Street, Cowbridge	Kerbside	299270	174737	NO2	N	N	1m	1m	N
65	1 Riverside Mews, Cowbridge	Roadside	299614	174592	NO2	N	N	1m	3m	Y
CULVERHOUSE										
38	2 Horseshoes	Roadside	311892	174513	NO2	N	N	0m	2m	Y
77	A48, Culverhouse Tesco	Roadside	311622	174772	NO2	N	N	N	4m	N
DINAS POWYS										
7	Cardiff Road/Millbrook	Roadside	315773	171514	NO2	N	N	15m	5m	N
46	46 Cardiff Road	Roadside	315747	171369	NO2	N	N	8m	3m	N
47	Dinas Powys Health Centre	Urban Background	315710	171385	NO2	N	N	4m	16m	N
61	Railway Terrace	Roadside	316433	171932	NO2	N	N	0m	2m	Y



Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	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?
67	2 Matthew Terrace	Roadside	316488	172004	NO2	N	N	0m	2.5m	Y
72a	Dinas Powys Infants School	Roadside	315841	171527	NO2	N	Y	0m	7m	Y
89	9 Wayside Cottages, Cardiff Road	Roadside	316447	171963	NO2	N	N	0m	3m	Y
90	16 Railway Terrace, Cardiff Road	Roadside	316453	171945	NO2	N	N	0m	3m	Y
LLANDOUGH										
68	Glen View, 99 Penlan Road	Roadside	316886	172561	NO2	N	N	0m	9m	Y
69	65 Penlan Road	Roadside	316847	172948	NO2	N	N	0m	7.5m	Y
PENARTH										
22	Stanwell Road	Kerbside	318505	171496	NO2	N	N	8m	1m	N
29	Cogan Roundabout	Roadside	317406	172796	NO2	N	N	0m	3m	N
53	168 Windsor Road	Roadside	317589	172411	NO2	Y	N	0m	5m	Y
55	159 Windsor Road	Roadside	317595	172435	NO2	Y	N	0m	2m	Y

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with (m) to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
56	134 Andrew Road	Kerbside	316814	172443	NO2	N	N	0m	10m	Y
62	154 Windsor Road	Roadside	317633	172357	NO2	Y	N	0m	2m	Y
70	Ty-Isaf	Roadside	316731	172391	NO2	N	N	0m	3m	Y
73a	Windsor Road Monitor 1	Roadside	317598	172399	NO2	Y	Y	2m	2m	Y
73b	Windsor Road Monitor 1	Roadside	317598	172399	NO2	Y	Y	2m	2m	Y
73c	Windsor Road Monitor 1	Roadside	317598	172399	NO2	Y	Y	2m	2m	Y
74	114 Windsor Road	Roadside	317708	172259	NO2	Y	N	0m	2.5m	Y
76	160 Windsor Road	Roadside	317627	172371	NO2	Y	N	0m	2.5m	Y
78	Chelmsford Cottage	Roadside	318006	172070	NO2	N	N	0m	5m	Y
79	Marine Scene	Roadside	317549	172572	NO2	N	N	N	1.2m	Y
80	113 Plassey Street	Roadside	318150	172043	NO2	N	N	0m	5.4m	Y
81	Paget Road/ Terrace Intersection	Kerbside	318738	172333	NO2	N	N	0m	0.3m	Y



Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	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?
82	98b Windsor Road	Roadside	318061	171944	NO2	N	N	0m	8m	Y
88	134 Windsor Road	Roadside	317668	172312	NO2	Y	N	0m	3.5m	Y
BARRY										
4	CWM Parc	Urban Background	310475	168457	NO2	N	N	0m	20m	N
8	Tynewydd Road	Kerbside	311797	168503	NO2	N	N	4m	1m	N
24	Port Road East	Roadside	310813	169693	NO2	N	N	N	2m	N
41	Dispenser Road	Urban Background	315278	168451	NO2	N	N	N	128m	N
64	Holton Road	Roadside	311690	168042	NO2	N	N	0m	3m	Y
66	17 Churchill Terrace	Roadside	313342	168823	NO2	N	N	0m	4m	Y
71	76 High Street (O'Donovans)	Roadside	310764	167505	NO2	N	N	0m	2m	Y
75	Catalina Road	Urban Background	312142	167529	NO2	N	N	4m	58m	N
83	24 Cardiff Road	Roadside	313597	168829	NO2	N	N	0m	2.5m	N



Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	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?
84	Bendricks Road	Urban Background	313407	167477	NO2	N	N	0m	144m	N
85	Thalassa, Dyfrig Street	Urban Background	311980	166965	NO2	N	N	0m	39m	N
87	110 Dock View Road	Roadside	312663	168289	NO2	N	N	0m	9m	N

2.2 Comparison of Monitoring Results with Air Quality Objectives

During 2016 monitoring was carried out for Nitrogen Dioxide and Particulate Matter (PM₁₀). There was no monitoring undertaken for benzene or 1-3-butadiene.

2.2.1 Nitrogen Dioxide (NO₂)

Nitrogen Dioxide was measured during 2016 at one site equipped with an automatic analyser and by a network of 44 passive diffusion tubes.

2.2.2 Automatic Monitoring Data

The annual mean nitrogen dioxide concentrations at The Vale Council's automatic monitoring station are summarised in Table 2.3, for the years 2012 to 2016. The annual mean nitrogen dioxide concentrations for both AMS sites were below the objective in 2016. In addition there were no exceedences of the 1- hour mean objective at any of the automatic monitors (Table 2.4).

Table 2.3 – Results of Automatic Monitoring for NO₂: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2016 %	Annual Mean Concentration (µg/m ³)				
					2012	2013	2014	2015	2016
Windsor Road, Penarth	Roadside	Y	100	94	-	-	27.7	26.5	28.3

Figure 2.8- Trends in Annual Average NO₂ Concentrations Recorded at Windsor Road Automatic Monitoring Site

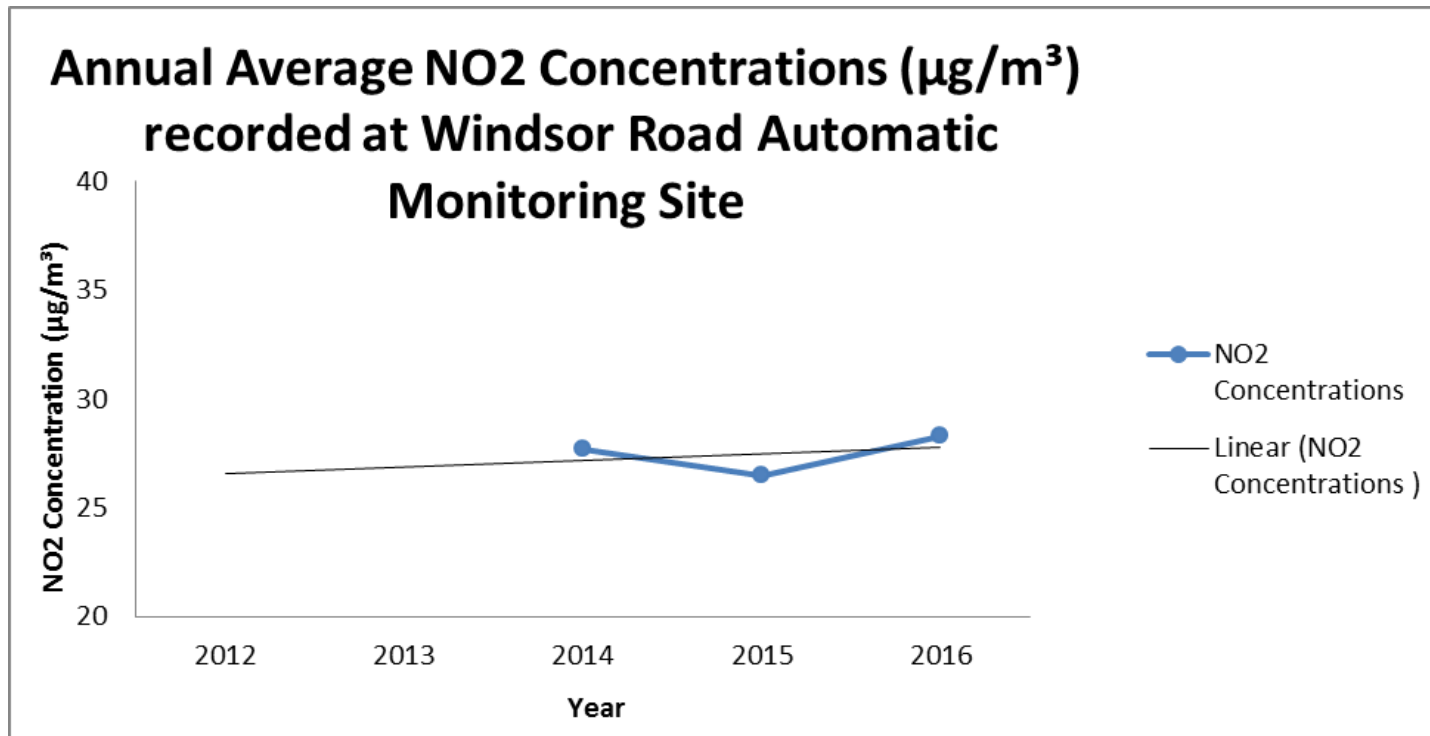


Table 2.4 – Results of Automatic Monitoring for NO₂: Comparison with 1-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2016 %	Number of Hourly Means > 200µg/m ³				
					2012	2013	2014	2015	2016
Windsor Road, Penarth	Roadside	Y	100	94	-	-	0(86) ¹	0	0

¹ In accordance with LAQM TG(16), where the period of valid data is less than 85%, the 99.8th percentile of hourly means is shown in brackets.

2.2.3 Diffusion Tube Monitoring Data

The nitrogen dioxide diffusion tube data is summarised in Table 2.5. The full dataset (monthly mean values) is included in Appendix A1. All data has been bias adjusted and where necessary distance corrected to account for relevant exposure. The applied bias adjustment factor was 0.78, as described in Appendix A2. The national bias correction factor was utilized as it would provide results representative of a worst case scenario. The bias correction factor of 0.78 was obtained from the following website: <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

Where the year data capture is less than 75% (9 months), the Bias Corrected Annual Mean Concentrations have been "annualised" following the method as in Box 7.9 & 7.10 of LAQM.TG16. Evidence of the sites annualised can be seen in Appendix A2.

The nitrogen dioxide concentrations measured by the passive diffusion tubes show that there were no exceedences of the national air quality objectives for NO₂ (annual average 40µg/m³ & 1-hour average 200µg/m³ not be exceeded more than 18 times per year). In accordance with LAQM best practise guidance; there are no monitoring sites in the district with annual average concentrations above 60µg/m³ in 2016. Therefore this indicates it is unlikely that the hourly nitrogen dioxide objective was exceeded.

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

Table 2.6 shows the nitrogen dioxide diffusion tube data for The Vale Council for 2012 – 2016 for comparison purposes. It is evident that NO₂ levels have seen a noticeable decrease or have remained stable during this monitoring period.

Table 2.5 – Results of NO₂ Diffusion Tubes 2016

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %) ^a	2016 Annual Mean Concentration (µg/m ³) - Bias Adjustment factor = 0.78
COWBRIDGE						
54	High Street, Cowbridge	Kerbside	N	N	9	19.7/ 18.3 ^b
65	1 Riverside Mews, Cowbridge	Roadside	N	N	9	15.9
CULVERHOUSE						
38	2 Horseshoes	Roadside	N	N	7	25.9 ^a
77	A48, Culverhouse Tesco	Roadside	N	N	8	33.9 ^a
DINAS POWYS						
7	Cardiff Road/Millbrook	Roadside	N	N	10	25.5/ 20.7 ^b
46	46 Cardiff Road	Roadside	N	N	11	18.7
47	Dinas Powys Health Centre	Urban Background	N	N	10	13.5
61	Railway Terrace	Roadside	N	N	10	31.5
67	2 Matthew Terrace	Roadside	N	N	8	24.8 ^a
72a	Dinas Powys Infants School	Roadside	N	Y	8	21.9 ^a
89	9 Wayside Cottages, Cardiff Road	Roadside	N	N	11	31.8

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %) ^a	2016 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.78
90	16 Railway Terrace, Cardiff Road	Roadside	N	N	9	21.2
LLANDOUGH						
68	Glen View, 99 Penlan Road	Roadside	N	N	10	17.3
69	65 Penlan Road	Roadside	N	N	10	18.1
PENARTH						
22	Stanwell Road	Kerbside	N	N	12	23.6/ 20.0 ^b
29	Cogan Roundabout	Roadside	N	N	12	34.4
53	168 Windsor Road	Roadside	Y	N	12	31.5
55	159 Windsor Road	Roadside	Y	N	12	28.9
56	134 Andrew Road	Roadside	N	N	5	17.5 ^a
62	154 Windsor Road	Roadside	Y	N	12	33.2
70	Ty-Isaf	Roadside	N	N	12	24.6
73a	Windsor Road Monitor 1	Roadside	Y	Y	10	32.0
73b	Windsor Road Monitor 2	Roadside	Y	Y	10	31.0
73c	Windsor Road Monitor 3	Roadside	Y	Y	10	31.2
74	114 Windsor Road	Roadside	Y	N	11	28.2
76	160 Windsor Road	Roadside	Y	N	12	32.4

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %) ^a	2016 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.78
78	Chelmsford Cottage	Roadside	N	N	8	24.5 ^a
79	Marine Scene	Roadside	Y	N	12	44.4/ 37.2 ^b
80	113 Plassey Street	Roadside	N	N	8	17.6 ^a
81	Paget Road/ Terrace Intersection	Kerbside	N	N	12	18.0
82	98b Windsor Road	Roadside	N	N	11	18.0
88	134 Windsor Road	Roadside	Y	N	11	31.4
BARRY						
4	CWM Parc	Urban Background	N	N	9	18.0
8	Tynewydd Road	Kerbside	N	N	7	23.5 ^{a&b}
24	Port Road East	Roadside	N	N	7	18.6 ^a
41	Dispenser Road	Urban Background	N	N	8	14.5 ^a
64	Holton Road	Roadside	N	N	8	20.4 ^a
66	17 Churchill Terrace	Roadside	N	N	10	27.7
71	76 High Street (O'Donovans)	Roadside	N	N	6	17.9 ^a
75	Catalina Road	Urban Background	N	N	8	17.2 ^a
83	24 Cardiff Road	Roadside	N	N	10	24.9
84	Bendricks Road	Urban Background	N	N	9	13.7 ^b

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months or %) ^a	2016 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Bias Adjustment factor = 0.78
85	Thalassa, Dyfrig Street	Urban Background	N	N	10	14.0
87	110 Dock View Road	Roadside	N	N	10	15.0

^a Result has been annualised in accordance with Boxes 7.9 and 7.10 of LAQM.TG16 as data capture for the year was less than 75%.

^b NO₂ exceedence is measured at a monitoring site not representative of public exposure. NO₂ concentration at the nearest relevant exposure calculated based on the “NO₂ fall-off with distance” calculator (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>)

Table 2.6 – Results of NO₂ Diffusion Tubes (2012 to 2016)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m ³) - Adjusted for Bias				
			2012 Bias Adjustment Factor = 0.96	2013 Bias Adjustment Factor = 0.95	2014 Bias Adjustment Factor = 0.91	2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78
COWBRIDGE							
54	Kerbside	N	25.7	26	21.5	22.4 ^a	19.7/ 18.3 ^b
65	Roadside	N	22.9	18	16.7	15.9	15.9
CULVERHOUSE							
38	Roadside	N	29	24	25.9	23.3	25.9 ^a
77	Roadside	N	36.4	30	29.6	28.9	33.9 ^a
DINAS POWYS							
7	Roadside	N	29.4	28.5	26.3	24.6	25.5/ 20.7 ^b
46	Roadside	N	23.7	22	19.7	18.6	18.7
47	Urban Background	N	19.2	17.5	15.6	14.4	13.5
61	Roadside	N	39.7	34.6	31	30.1	31.5
67	Roadside	N	28.8	30	26	24.2	24.8 ^a
72a	Roadside	N	29.1	24.1	27.8	23.8	21.9 ^a
89	Roadside	N	N/A	34	31.2	30.8	31.8
90	Roadside	N	N/A	27	24.6	21.4	21.2
LLANDOUGH							
68	Roadside	N	20.5	20.9	16.9	16.4	17.3
69	Roadside	N	19.1	19.8	19.6	17.2	18.1
PENARTH							
22	Kerbside	N	28.8	26	24.4	23.7	23.6/ 20.0 ^b
29	Roadside	N	37.5	35.4	32.9	31.8	34.4
53	Roadside	Y	36.3	33	31.2	30.8	31.5

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias				
			2012 Bias Adjustment Factor = 0.96	2013 Bias Adjustment Factor = 0.95	2014 Bias Adjustment Factor = 0.91	2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78
55	Roadside	Y	37.5	33	27.1	27.7	28.9
56	Roadside	N	40.3	38.5	33.9	40.3/ 29.4^b	17.5 ^a
62	Roadside	Y	38.9	36	33.9	31.7	33.2
70	Roadside	N	23	19	21.9	23.2	24.6
73a	Roadside	Y	25	28	28.3	30.2	32.0
73b	Roadside	Y	25.3	28	28.3	29.8	31.0
73c	Roadside	Y	26.9	28	28.3	30	31.2
74	Roadside	Y	40.7	31	29.6	28	28.2
76	Roadside	Y	42	N/A	33.9	32	32.4
78	Roadside	N	27.7	26	24.1	23.6	24.5 ^a
79	Roadside	Y	47.6	42	39.6	37.5	44.4/ 37.2^b
80	Roadside	N	19.5	18	16.1	14.3	17.6 ^a
81	Kerbside	N	22	19	18.2	16.8	18.0
82	Roadside	N	21.9	21	19.6	17.4	18.0
88	Roadside	Y	N/A	34	33.5	30.7	31.4
BARRY							
4	Urban Background	N	16.1	17	13.2	13.3	18.0
8	Kerbside	N	38.2	27	32.4	33.6 ^a	23.5 ^a
24	Roadside	N	25.3	23	22.5	21.3	18.6 ^a
41	Urban Background	N	16.1	15	13.1	13.1	14.5 ^a
64	Roadside	N	28.5	21	20.2	20.8 ^a	20.4 ^a
66	Roadside	N	37.5	33	30.2	30.9	27.7
71	Roadside	N	20.8	19	17.8	18.4	17.9 ^a
75	Urban Background	N	20.8	18	18.2	15.4	17.2 ^a

Site ID	Site Type	Within AQMA?	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) - Adjusted for Bias				
			2012 Bias Adjustment Factor = 0.96	2013 Bias Adjustment Factor = 0.95	2014 Bias Adjustment Factor = 0.91	2015 Bias Adjustment Factor = 0.88	2016 Bias Adjustment Factor = 0.78
83	Roadside	N	29.5	27	23.2	23.2	24.9
84	Urban Background	N	13.8	15	12.9	12.5	13.7 ^b
85	Urban Background	N	15.6	14	13.7	11.9	14.0
87	Roadside	N	18.9	17	16.6	14.8	15.0

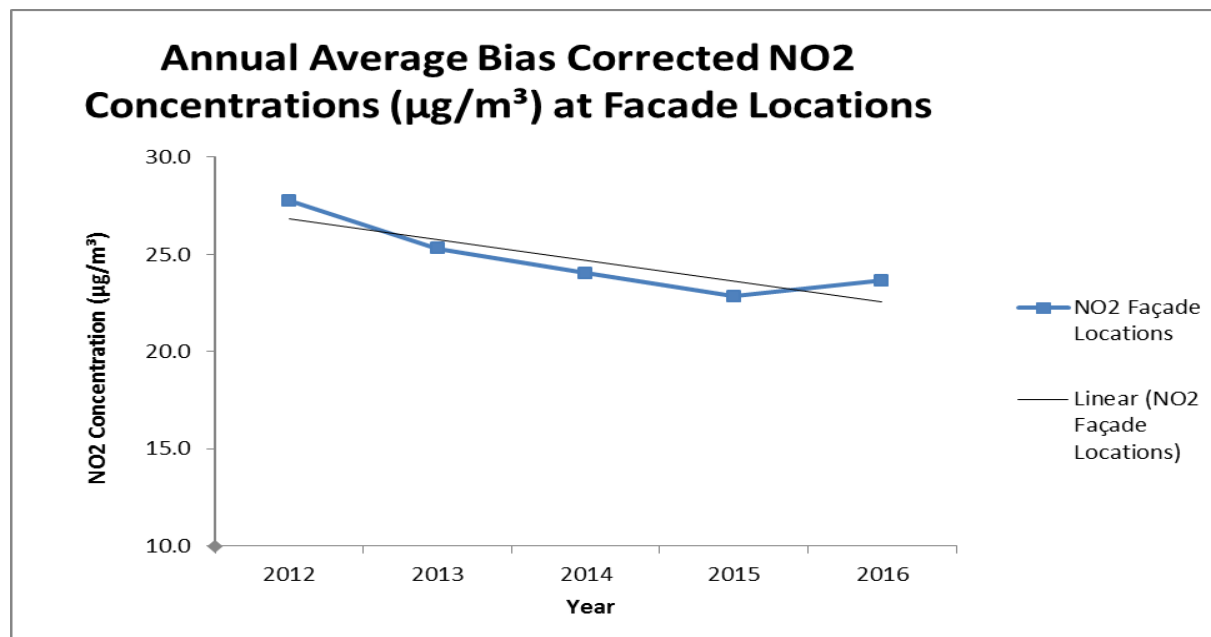
In bold, exceedence of the NO₂ annual mean AQS objective of 40 $\mu\text{g}/\text{m}^3$

Underlined, annual mean > 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedence of the NO₂ hourly mean AQS objective

^a Result has been annualised in accordance with Boxes 7.9 and 7.10 of LAQM.TG16 as data capture for the year was less than 75%.

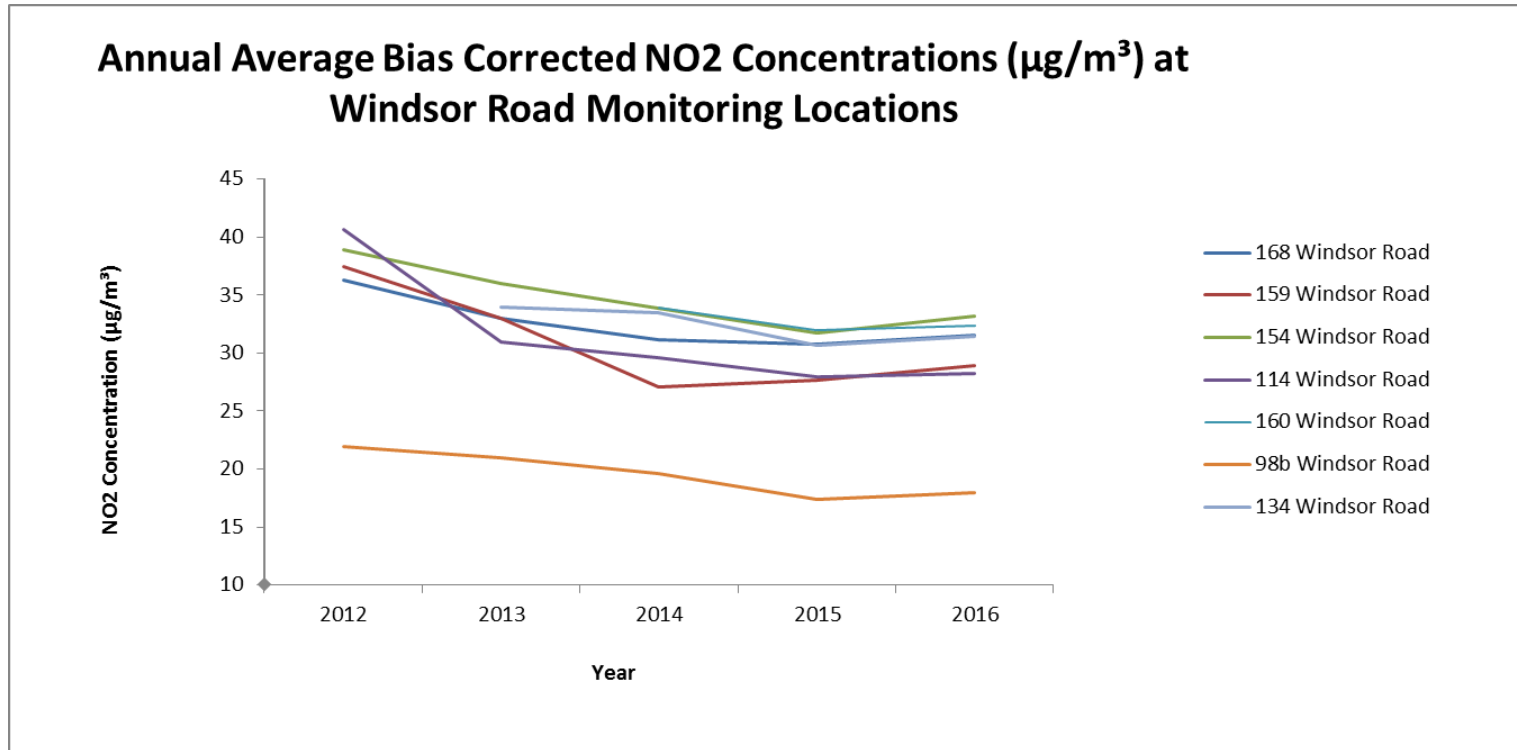
^b NO₂ exceedence is measured at a monitoring site not representative of public exposure. NO₂ concentration at the nearest relevant exposure calculated based on the “NO₂ fall-off with distance” calculator (<http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html>)

Figure 2.9 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



The graph represents annual average bias corrected NO₂ data since 2012. The locations examined represent worst case exposure with monitoring undertaken at façade locations. The displayed datasets indicate overall compliant NO₂ results for the Vale since 2012. The results are stable with a somewhat decreasing trend.

Figure 2.10- Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Windsor Road Residential Diffusion Tube Monitoring Sites



2.2.4 Particulate Matter (PM₁₀)

Continuous monitoring of PM₁₀ 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 PM₁₀ data from Windsor Road monitor has been provided as gravimetric equivalence (by applying the conversion factor of 0.83 as stipulated in Section 7.150 TG(16)). The results are presented in Tables 2.7 & 2.8.

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

Annual and 24-hour average PM₁₀ concentrations (where available) displayed in Tables 2.7 & 2.8 for the years 2012 to 2016 show compliance with the AQS objectives.

Table 2.7 – Results of Automatic Monitoring for PM₁₀: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2016 % ^b	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration 40 (µg/m ³)				
						2012	2013	2014	2015	2016
Penarth, Windsor Road	Roadside	Y	100	84	Y	-	-	17.5 ^{a&c}	20.8	21.4
Penarth Streetbox	Roadside	N	N/A	N/A	Y	20	No data	Closed	Closed	Closed
Fonman, Highway Man Inn	Rural	N	N/A	N/A	N/A	16	17	21	Closed	Closed
Cardiff Road, Barry	Roadside	N	N/A	N/A	Y	22	No data	No data	Closed	Closed

In bold, exceedence of the PM₁₀ annual mean AQS objective of 40µg/m³

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

^b i.e. data capture for the full calendar year

^c Means should be “annualised” as in Boxes 7.9 and 7.10 of LAQM.TG16, if valid data capture is less than 75%

Table 2.8 – Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % ^a	Valid Data Capture 2016 % ^b	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m ³				
						2012	2013 ^c	2014 ^c	2015 ^c	2016 ^c
Penarth, Windsor Road	Roadside	Y	100	84	Y	-	-	0 (20.7)	4 (31.2)	1 (31.9)
Penarth Streetbox	Roadside	N	N/A	N/A	Y	16	No data	Closed	Closed	Closed
Fonman, Highway Man Inn	Rural	N	N/A	N/A	N/A	2	2 (28)	0 (30.9)	Closed	Closed
Cardiff Road, Barry	Roadside	N	N/A	N/A	Y	15	No data	No data	Closed	Closed

In bold, exceedence of the PM₁₀ daily mean AQS objective (50µg/m³ – not to be exceeded more than 35 times per year)

^a i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year

^b i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

^c if data capture for full calendar year is less than 90%, include the 90.4th percentile of 24-hour means in brackets

* Number of exceedences for previous years is optional

2.2.5 Sulphur Dioxide (SO₂)

No monitoring of Sulphur Dioxide was undertaken by The Vale Council in 2016.

2.2.6 Benzene

No monitoring of Benzene was undertaken by The Vale Council in 2016.

2.2.7 Other Pollutants monitored

Ozone (O₃)

The Vale monitors Ozone due to its potential correlations with other pollutants. In 2016, 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 2.9 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 2016.

Table 2.9: Results of Automatic Monitoring of Ozone (2012 – 2016)^{a & b}

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2016 %	Number of days where the 8-hour mean >100µg/m ³				
					2012	2013	2014	2015	2016
Penarth, Windsor Road	Roadside	Y	100	98	-	-	2 (74)	0 (77)	0

a Exceedences are shown in bold

b Where annual data capture is less than 90%, the 97th percentile of the maximum daily 8-hour running mean is shown in brackets.

2.2.8 Summary of Compliance with AQS Objectives

Shared Regulatory Services have reviewed the results from the monitoring undertaken across the Vale of Glamorgan area in 2016.

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

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

3 New Local Developments

3.1 Road Traffic Sources

SRS on behalf of the VoGC can confirm that there are no new significant developments since the Annual Progress Report in 2016.

At the time of writing this report SRS have decommissioned and commissioned NO₂ monitoring locations with monitoring commencing in 2017. Monitoring locations of continuous compliance for over three year periods have been decommissioned. New monitored locations have been identified in line with the Councils Local Development Plan (LDP) 2011- 2026 and localised information/knowledge for known road networks with elevated levels of traffic flow and nearby relevant exposure. These monitoring datasets will be considered in VoGC's 2018 Air Quality Annual Progress Report. These newly monitored areas for 2017 are Llantwit Major, Gileston, St Athan, Rhoose (Fonmon), Barry Docks and Saint Brides Major.

3.1.1 Narrow Congested Streets with Residential Properties Close to the Kerb

For 2016 SRS on behalf of the VoGC 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 HGV's

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

3.1.4 Junctions

SRS on behalf of the VoGC confirms that there are no newly identified busy junctions/ busy roads.

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

SRS on behalf of the VoGC confirms that there is a proposal for a new road link known as the St Athan Northern Access Road (NAR). In 2016, an EIA Screening opinion proposal was submitted by Welsh Government for the development.

The Welsh Government proposes to submit a planning application for a new access road to serve the Aerospace Business Park in St. Athan. The new road, referred to as the Northern Access Road, will provide a link from the B4265 near Llantwit Major in the west to Eglwys Brewis Road in Picketston in the east.

The proposal for NAR accords with the Council's emerging development plan (Local Development Plan (LDP) 2011- 2026)- in which it forms an important part of the Vale Council's policies;

- Policy SP 7(2) Transportation- pages 45- 46
- Policy MG 16(14) Transport Proposals- pages 77- 84

As part of the screening opinion an Air Quality Assessment was undertaken in accordance by best practise guidance. The report made the following conclusions which we agreed;

- The construction phase for the proposed Northern Access Road is expected to be carried out over a period of approximately 14 months. It is anticipated that emissions of airborne particulate matter generated by construction activities will be controlled using on site management practices to the extent that the proposed Northern Access Road should give rise to negligible short-term effects on dust deposition rates and concentrations of particulate matter at the nearest sensitive receptors.
- Once operational the proposed Northern Access Road will provide access to the Aerospace Business Park which occupies a large part of the former RAF camp. Traffic will be able to utilise the proposed Northern Access Road rather than the existing Eglwys-Brewis Road.
- Predicted annual mean NO₂ and Particulate Matter (PM₁₀ and PM_{2.5}) concentrations are expected to be well below the annual mean objective at all receptors in the Study Area. Overall, receptors are predicted to experience a negligible effect in accordance with the Institute of Air Quality Management (IAQM) /Environmental Protection UK (EPUK) guidance

(2015), which is considered to be not significant, in both the opening year of 2019 and the future year of 2034.

- No additional mitigation measures are recommended for air quality as part of the operational phase of the Proposed Northern Access Road.

Vale's planning department made the following comments in regards to the proposal;

“Having regard to the key issues identified in Schedule 3 of the Regulations and WO Circular 11/99, the Local Planning Authority is of the view that when taking into account the size of the development; the accumulation with other development; the use of natural resources; the production of waste; pollution and nuisances; the risk of accidents, having regard in particular to substances or technologies used, along with the extent of the impact (geographical area and size of the affected population); the (non-transfrontier) nature of the impact; the magnitude and complexity of the impact; the probability of the impact; the duration, frequency and reversibility of the impact together with the existing land use; the relative abundance, quality and regenerative capacity of natural resources in the area; the absorption capacity of the natural environment paying particular attention to areas of wetlands; coastal zones; mountain and forest areas; nature reserves and parks; areas classified or protected under Member States’ legislation; areas designated by Member States pursuant to Council Directive 79/409/EEC on the conservation of wild birds and Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora; areas in which the environmental quality standards laid down in Community legislation have already been exceeded and densely populated areas and landscapes of historical, cultural or archaeological significance, it is considered that the potential impacts of the development are not significant enough upon the environment to require an Environmental Impact Assessment. Accordingly, it is considered that there is no requirement for a formal Environmental Impact Assessment to be submitted under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2016.”

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 TG(16) (Defra, 2016). 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.

3.2 Other Transport Sources

3.2.1 Airports

The criteria for assessing airports are set out in Section 7.16 of TG(16) (Defra, 2016). 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.

3.2.2 Railways (Diesel and Steam Trains)

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

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.

3.2.3 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.

3.3 Industrial Sources

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

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). The approval is subject to a number of stringent planning conditions, including further air quality monitoring assessments to be undertaken once operational.

The proposed development is a renewable energy generation facility which has been designed to recover energy from pre-prepared mixed waste wood feedstocks using gasification. The gasification facility is an Advanced Thermal Treatment (ATT) process that will produce a combustible synthesis gas, which is then used to raise steam and generate electricity, through steam cycle turbine generation.

The Advanced Thermal Treatment (ATT) plant is designed to process shredded mixed waste wood feedstock to produce heat to raise steam in a conventional tube boiler for utilisation in a steam turbine for the production of renewable electricity with an export capacity up to 10MWe.

The Installation has been designed to process approximately 86,400 tonnes of pre-processed non-hazardous mixed waste wood per annum.

At the time of writing this report, Natural Resources Wales (NRW) are currently 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. SRS on behalf of VoGC have submitted a response in regards to this revised modelling. A final decision whether the proposed facility will be granted approval for its permit application is yet to be decided, therefore an update will be provided in the Vale's 2018 Annual Progress Report, depending on the outcome of any decision by Natural Resources Wales.

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

SRS on behalf of the VoGC confirms that 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.

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

SRS on behalf of the VoGC has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment

3.3.4 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

3.3.5 Petrol Stations

SRS on behalf of the VoGC confirms that there are no petrol stations meeting the specified criteria

3.3.6 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 confirms there are no poultry farms meeting the specified criteria highlig

3.4 Commercial and Domestic Sources

3.4.1 Biomass Combustion – Individual Installations

As part of Section 3.25 LAQM TG(16) it is a requirement to list any installations with the potential to impede on air quality with relevant exposure nearby. A planning application was approved in January 2016 for the construction of 12 log cabins and biomass house at the Walled Garden, Rosedew Farm, Llantwit Major.

Following LAQM TG(16) and using Defra’s Screening Emissions Calculation tools for the calculation of actual and targeted emission rates, the need for further detailed assessments was evaluated. In this instance, the biomass boiler at Rosedew Farm, Llantwit Major indicated that actual emission rates were below the targeted emission rates, therefore both could be confidently screened out.

Rosedew Farm, Llantwit Major

Boiler make: Gilles HPK-RA 160 woodchip biomass

Boiler capacity: 150kWh

Emission Certificate: Attached in Appendix A

Table 3.1: Screening Out Study Rosedew Farm, Llantwit Major

Parameter	PM ₁₀	PM _{2.5}	Annual Mean NO ₂	1-Hour Mean NO ₂
Actual Emissions g/s	0.004	0.004	0.012	0.012
Targeted Emissions g/s	0.004	0.004	0.036	0.036

3.4.2 Biomass Combustion – Combined Impacts

The Vale Council confirms that there are no combined biomass combustion plants in the Local Authority area.

3.4.3 Domestic Solid-Fuel Burning

The Vale Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

4 Planning Applications

Land at Cogan Hill, Penarth

The 2016 Progress Report highlighted a planning application with the potential to generate road traffic with the construction of 44 affordable housing units (2016/00115/OUT). The location of the proposal was particularly sensitive based on the fact the site was situated between the northern edge of the declared AQMA on Windsor Road, Penarth and the mini roundabout and road intersection to the north.

It was concluded that increases in pollutant concentrations resulting from emissions from these additional traffic movements will have **negligible** impact on nitrogen dioxide, PM10 and PM2.5 concentrations at sensitive locations. Concentrations will remain below the air quality objectives at existing local properties, including those within the AQMA.

The application was approved by the Vale planning department on the 2nd March 2017, however no works have commenced.



5 Air Quality Planning Policies

Local Development Plan (LDP) 2011- 2026. The document provides a framework for sustainable development within the Vale of Glamorgan, outlining strategies and policies for future land use and development.

There are two policies with particular relevance to air quality;

MD4- Community Infrastructure and Planning Obligations

Policy discusses new and improved community infrastructure, facilities and services. In terms of air quality it states;

“Community infrastructure may include the provision or improvement of: Environmental protection and enhancement such as nature conservation, nature conservation, flood prevention, town centre regeneration, pollution management or historic renovation.”

MD8- Environmental Protection

Policy addresses how new development proposals will be required to demonstrate that negative impacts on the natural environment will not breach unacceptable levels; Pollution of land, surface water, ground water and the air.

Where proposed developments indicate negative impacts, measures and mitigation methods must be detailed to enable impacts to be minimised to an acceptable level. For example, in terms of air quality, measures can include the production of an Air Quality Assessment and the implementation of conditions.

6 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.

The LTP lists its proposed schemes for the next 5 years which will aid in improving transport infrastructure and services, which in turn drive healthier air quality. Schemes of high priority or currently being undertaken;

-National Cycle Network Route 88 and associated local, urban and rural connections to include new future identified Active Travel routes

- A4050 Culverhouse Cross to Cardiff Airport Element 1 Barry Docks Link Road to Garden Centre, Wenvoe *(Provide cycle infrastructure to enable a cycling network as identified by Sustrans and other Plans, including School Travel Plans (STPs). This route also links Cardiff Airport to Barry and the rural*

villages, with possible links to St Athan and the Enterprise Zone. Segments of the corridor already in place)

- A4050 Culverhouse Cross to Cardiff Airport Element 2: A4050 Port Road to Cardiff Airport (This route also links Cardiff Airport to Barry and the rural villages, with possible links to St Athan and within the Enterprise Zone).

-Barry Waterfront to Dinas Powys Cycle Route (Provide off-road cycle route from Biglis Roundabout to Dinas Powys linking Barry to Dinas Powys)

-A4050 Culverhouse Cross to Cardiff Airport Bus Priority (Provide Bus Priority measures along this commuter corridor. (Bus priority to encompass a range of measures to make bus travel more attractive, including new infrastructure and information)

-Barry Island Link Road (To provide a new access road from Barry Waterfront to Barry Island to alleviate the congestion on the Causeway to Barry Island and to access new development on the Waterfront.)

-Gileston – Old Mill B4265 (To provide road improvements where there are severe width restrictions on this access road to St Athan and the Enterprise Zone and Airport).

-Improvements to the A4226 between Waycock Cross, Barry and Sycamore Cross, A48 (Five Mile Lane) (To provide off line improvements to this very busy corridor to assist with access to the strategic highway network and to the airport Enterprise Zone).

-Service 321 – Llantwit Major to Cowbridge to Talbot Green (New trial supported local bus service that will join together two of the council's current strategic local bus services. The service will connect with the existing service 320 at Talbot Green and the 303 service in Llantwit Major. Times will be revised on these services to ensure fluidity in linking services).

-Welsh Government Pilot Project – Integrated Transport provision within the authority (As part of the WG funded integrated transport project the Public Transport Team are bringing in elements of community transport, mainstream school services and social services transport. The project funded a new Greenlinks vehicle that is being used to combine these forms of transport that were previously outsourced.)

7 Climate Change Strategies

Carbon Management

Sustainability is a thread that runs throughout the Vale of Glamorgan. To reflect this, the Vale Local Service Board and its partners have made a commitment to reduce the carbon emissions produced by those buildings in the Vale owned by Local Service Board partner organizations.

To help the Local Service Board reduce their carbon emissions the Carbon Trust appointed ARUP to undertake a study on behalf of the Local Service Board. The study identified the best and worst performing buildings in the Vale in terms of carbon emissions and suggested a carbon emission target for the group to achieve.

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

8 Implementation of Action Plans

Due to the proposal to revoke the Windsor Road, Penarth 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.

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 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.

9 Conclusions and Proposed Actions

9.1 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 2016, including monitoring locations within the declared AQMA. As discussed, continual compliance over a three year period with the national air quality objectives set for NO₂ (annual average 40µg/m³ & 1-hour average 200µg/m³ not be exceeded more than 18 times per year), has been demonstrated and in accordance with Local Air Quality Management in Wales, Policy Guidance, June 2017, the Vale of Glamorgan Council wish to revoke the Windsor Road, Penarth AQMA.

As required a supporting decision report will accompany 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.

9.2 Conclusions relating to New Local Developments and Sources

As outlined earlier in this report there are three significant developments detailed for the Vale of Glamorgan;

- Cogan Hill Residential Apartment Development (2016/00115/OUT)
- St Athan Northern Access Road (NAR) (2016/00291/SC1)
- Barry Docks Biomass Power Generation Facility (2015/00031/OUT)

All three developments are yet to commence or start works. An update regarding any progress will be provided in 2018's Annual Progress Report.

The Annual Progress Report has not identified any significant changes in emissions sources within The Vale of Glamorgan. The installation of the biomass boiler at Rosedew Farm, Llantwit Major has been screened out as its rural location and distance to any relevant exposure poses little or no concern.

9.3 Proposed Actions

The Annual Progress Report has identified that NO₂ and PM₁₀ concentrations continue to satisfy national objectives. In line with best practise guidance it is acceptable to proceed to a revocation proposal for the Windsor Road, AQMA.

A detailed assessment using ADMS- Urban dispersion modelling software, will be utilised to verify existing compliant levels and project future levels for Windsor Road, using data from the existing monitoring sites. The report will outline the commitment of the VoGC to ensure that there will be a continued focus in the area to ensure air quality is still given a level of priority and considered carefully with any future developments that may arise.

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.

Recent discussions with representatives from the above highlighted teams have indicated that scheduled works will look to increase the uptake of sustainable travel alternatives in the vicinity of the Windsor Road AQMA. Works will involve the improvement of road network to support sustainable travel alternatives (cycling & walking) and implementation of green space areas.

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. .

10 References

1. The Vale of Glamorgan Council Air Quality Progress Report, August 2016
2. Welsh Government, Local air quality management in Wales, Policy Guidance, June 2017
3. Planning Application & Associated Documents 2016/00115/OUT
4. Planning Application & Associated Documents 2016/00291/SC1
5. Planning Application & Associated Documents 2015/00031/OUT
6. Natural Resources Wales Permit Application Consultation, July 2017
<https://naturalresources.wales/about-us/news-and-events/new-consultation-for-barry-gasification-permit/?lang=en>
7. Department for Environment, Food and Rural Affairs, 2003. *Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III Local Air Quality Management, Technical Guidance LAQM.TG(16)*. London: DEFRA (as updated April 2016)
8. Vale of Glamorgan Planning Link
<http://vog.planning-register.co.uk/plaDetails.aspx>
9. UK National Air Quality Archive LAQM
<http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>
10. LAQM Helpdesk – June 2015
<http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>
11. <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#biomass>
12. Vale of Glamorgan Local Development Plan 2011- 2026
13. Vale of Glamorgan's The Local Transport Plan (2015- 2030)
http://www.valeofglamorgan.gov.uk/en/living/planning_and_building_control/planning_policy/local_transport_plan.aspx
14. Vale of Glamorgan Green Dragon
http://www.valeofglamorgan.gov.uk/en/living/environment/green_dragon/green_dragon.aspx

Appendices

Appendix A: Diffusion Tube Monitoring Data 2016

Site No	Nitrogen Dioxide Sites VALE/CBC	Grid Ref	Class	Distance of measurement from kerb (m)	Distance from kerb to receptor	Relevant Exposure (h m)	Background Concentration (if required for distance correction)	09/01/2016 - 03/02/2016	03/02/2016 - 03/03/2016	03/03/2016 - 04/04/2016	04/04/2016 - 03/05/2016	24/05/2016 - 20/06/2016	24/06/2016 - 20/07/2016	24/07/2016 - 24/08/2016	24/08/2016 - 27/09/2016	24/09/2016 - 27/10/2016	27/10/2016 - 30/11/2016	30/11/2016 - 01/01/2017	AVERAGE SINCE JAN '16	Blank Corrected (Correction Factor 0.76)	Distance corrected for receptor (if required)	Percentage of Data Capture	
COWBRIDGE																							
54	High Street, Cowbridge	SS 29570 17437	Kerbside	1.00	2.00	1.00	9.35	30.70	17.40	15.90			15.80	17.20	20.90	29.50	38.70	41.3	25.3	19.7	18.3	75	
85	1 Riverside Mews, Cowbridge	SS 29614 17492	Roadside	3.00	3.00	0.00		20.60	23.40	19.60			13.50	13.80	19.20	18.10	27.20	27.5	28.3	15.9	15.9	75	
CULVERHOUSE																							
38	2 Horseshoes	SS 31162 17451	Roadside	2.00	2.00	0.00		35.10	33.80	33.20			22.00	27.70	33.60	33.30			33.2	25.9	25.9	58	
77	A48 Culverhouse Tesco	SS 31162 17472	Roadside	4.00	4.00	0.00		39.70	39.80	41.40	26.20			28.80	29.70	35.10	47.00		43.4	33.9	33.8	67	
DINAS POWYS																							
7	Cardiff Road/Milbrook	SS 31573 17154	Roadside	5.00	20.00	15.00	13.63	36.80	29.90	36.30	31.00	37.40	23.20	15.20		32.30	42.40	42.80	32.7	25.5	20.7	83	
46	46 Cardiff Road	SS 31574 17136	Roadside	5.00	5.00	0.00		24.00	28.60	21.20	25.10	19.10	11.10	13.80	20.80	28.10	35.10	37.30	24.0	18.7	18.7	92	
47	Dinas Powys Health Centre	SS 31570 17135	Urban Background	16.00	20.00	4.00	13.83	25.10	24.40	23.00	15.40	18.30	12.10	7.30	10.20	14.60	22.50		17.3	13.5	13.8	83	
61	Railway Terrace	SS 31643 17193	Roadside	2.00	2.00	0.00		37.10		37.40	44.80	37.70	34.40	33.90	34.40	43.50	46.00	54.90	40.4	31.5	31.5	83	
67	2 Matthew Terrace	SS 31648 17204	Roadside	2.50	2.50	0.00		31.60	33.70	38.00		35.20	29.60	19.20		43.50	48.10	41.2	24.8	24.8	67		
72a	Dinas Powys Infants School	SS 31584 17127	Roadside	7.00	7.00	0.00		35.10	34.10			24.30	21.60		26.40	31.00	40.90	38.70	28.1	21.9	21.9	67	
89	9 Wayside Cottages, Cardiff Road	SS 31647 17193	Roadside	3.00	3.00	0.00		46.00	42.20	33.60	42.00	34.70	27.40	27.30	34.30	46.40	57.00	57.50	40.8	31.8	31.8	92	
90	16 Railway Terrace, Cardiff Road	SS 31643 17194	Roadside	3.00	3.00	0.00		33.30	33.00	25.70	30.70	24.10	15.00	18.80	25.10		38.90	27.2	21.2	21.2	75		
LLANDOUGH																							
68	Glen View, 99 Penlan Road	SS 31686 17261	Roadside	9.00	9.00	0.00		24.90	25.20	24.60	16.10		10.20	12.50	18.00	24.90	31.90	33.60	22.2	17.3	17.3	83	
69	65 Penlan Road	SS 31687 17298	Roadside	7.50	7.50	0.00		27.20	22.20	24.50	20.80		10.40	13.10	18.80	24.90	31.60	38.60	23.2	18.1	18.1	83	
PENARTH																							
22	Stanwell Road	SS 31805 17456	Roadside	1.00	9.00	8.00	15.41	35.50	31.50	29.50	27.30	24.50	25.40	21.70	21.00	27.60	30.40	42.80	45.70	38.2	23.6	20.0	100
29	Ogvan Roundabout	SS 31740 17276	Roadside	3.00	3.00	0.00		46.00	45.10	45.80	43.10	44.20	36.50	38.10	35.10	40.00	47.60	45.10	61.50	44.1	34.4	34.0	100
53	168 Windsor Road	SS 31789 17241	Roadside	5.00	5.00	0.00		43.50	45.10	43.80	39.50	38.90	36.20	32.60	28.20	34.70	38.80	51.40	51.00	40.3	31.5	31.5	100
55	169 Windsor Road	SS 31795 17235	Roadside	2.00	2.00	0.00		37.70	37.90	42.80	40.80	40.10	32.70	27.20	26.80	32.90	32.80	44.80	48.60	37.1	28.9	28.9	100
56	134 Andrew Road	SS 31814 17243	Kerbside	10.00	10.00	0.00								22.40	26.90	32.10	35.50	42.1	22.4	17.5	17.5	42	
62	154 Windsor Road	SS 31763 17257	Roadside	2.00	2.00	0.00		47.10	46.20	48.00	38.80	44.60	35.10	32.30	33.10	40.00	46.70	48.2	50.00	42.5	33.2	33.2	100
70	Ty-baf	SS 31871 17291	Roadside	4.00	4.00	0.00		35.00	29.00	36.60	29.90	32.90	24.00	14.30	18.00	24.10	37.20	46.4	50.30	31.5	24.6	24.6	100
73a	Windsor Road Monitor 1	SS 31798 17259	Roadside	2.00	4.00	2.00		41.90	44.60	43.60			35.80	32.60	31.00	34.40	41.80	51	53.50	41.8	32.0	32.0	83
73b	Windsor Road Monitor 2	SS 31798 17299	Roadside	2.00	4.00	2.00		44.60	42.30	40.70			35.40	30.30	32.90	37.60	41.30	43	49.50	39.7	31.0	31.0	83
73c	Windsor Road Monitor 3	SS 31798 17299	Roadside	2.00	4.00	2.00		44.50	37.30	35.80			34.80	33.70	30.10	36.60	45.10	53.4	48.40	40.0	31.2	32.0	83
74	114 Windsor Road	SS 31778 17259	Roadside	2.50	2.50	0.00		41.10	39.20	40.10	30.20	34.40	27.70	28.10	32.40	34.90	44.1	46.00	36.2	28.2	28.2	92	
76	160 Windsor Road	SS 31767 17291	Roadside	2.50	2.50	0.00		46.50	47.20	47.70	40.10	40.00	33.70	33.20	29.00	35.80	41.80	50.2	52.90	41.5	32.4	32.4	100
78	Chelmsford Cottage	SS 31806 17207	Roadside	5.00	5.00	0.00		35.40	29.10		27.10	28.60	20.00	20.80	20.70	26.90			31.4	24.5	24.5	67	
79	Marine Scene	SS 31758 17232	Roadside	1.20	4.00	2.80	15.71	55.10	52.50	58.60	52.20	55.90	40.10	44.90	53.60	66.70	72.6	65.8	56.9	44.4	37.2	100	
80	113 Passway Street	SS 31810 17243	Roadside	5.40	5.40	0.00						18.00	15.30	11.40	12.40	18.20	23.40	33.1	34.7	22.6	17.6	17.6	67
81	Pagef Road/ Terrace Intersection	SS 31878 17233	Kerbside	0.30	0.30	0.00		28.70	24.40	24.60	21.20	18.30	16.50	21.10	11.60	19.90	26.20	31.3	38.30	23.1	18.0	18.0	100
82	88b Windsor Road	SS 31801 17184	Roadside	8.00	8.00	0.00		29.30	26.50	18.90	22.70	16.40	11.60	12.90	22.00	26.20	28.1	38.80	23.0	18.0	18.0	92	
88	134 Windsor Road	SS 31768 17232	Roadside	3.50	3.50	0.00		46.70	43.10	42.30	37.60	34.70	29.50	31.90	36.50	40.00	47.6	53.50	40.3	31.4	31.4	92	
BARRY																							
4	QVM Parc	SS 31475 16847	Urban Background	20.00	20.00	0.00		19.60	22.80	42.80	40.60			8.70	8.30	11.60	16.50		32.6	22.6	17.8	18.0	75
8	Tynewydd Road	SS 31179 16893	Kerbside	1.00	5.00	4.00	13.16	43.60	36.70		32.00			30.00		41.00	55.2	58.5	35.5	28.4	23.5	58	
24	Port Road East	SS 31813 16893	Roadside	2.00	4.00	2.00	11.69	22.50		17.30			10.70	16.40	25.40		38.4	51.00	25.5	19.9	18.6	58	
41	Dispenser Road	SS 31528 16841	Urban Background	128.00	128.00	0.00		23.00	22.20	21.80			11.00		12.40	19.90	26.4	28.8	18.7	14.5	14.5	67	
66	17 Churchill Terrace	SS 31342 16853	Roadside	4.00	4.00	0.00		46.30	49.50	22.70	20.80			32.30	29.90	32.10	35.80	48.3	51.80	35.5	27.7	27.7	83
71	76 High Street (Downwans)	SS 31074 16726	Roadside	2.00	2.00	0.00		28.10	27.60				12.40	12.90	18.40	24.60			32.9	17.9	17.9	80	
75	Catalina, Yrhoaf	SS 31342 16726	Urban Background	68.00	62.00	4.00	11.67	21.60		21.30			11.60	11.60	16.70	25.50	33.3	38.80	22.1	17.2	17.2	67	
83	24 Cardiff Road	SS 31367 16859	Roadside	2.50	2.50	0.00		35.40	37.90	42.60	37.00			19.40	17.60	12.70	30.40	41.3	45.50	32.8	24.9	24.9	83
84	Bendrick Road	SS 31347 16747	Urban Background	1.50	5.00	3.50	11.44	17.30	18.50	29.00			8.90	7.90	12.20	20.50	26.6	26.60	18.6	14.5	13.7	75	
85	Thalassa, Dyrig Street	SS 31190 16895	Urban Background	39.00	39.00	0.00		20.00	18.30	16.10	15.60			9.00	8.40	20.80	19.00	27.2	26.90	18.1	14.1	14.0	83
84	Holton Road	SS 31480 16842	Roadside	3.00	3.00	0.00		30.60	30.50	22.80			12.90	15.20	20.80	30.20	30.4		25.1	20.4	20.4	67	
87	110 Dock View Road	SS 31263 16828	Roadside	9.00	9.00	0.00		20.70	22.90	17.30	15.10			11.20	11.30	16.60	20.90	28.9	33.1	19.8	15.4	15.0	83


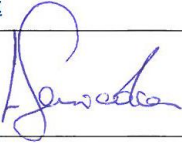


Walled Garden, Rosedew Farm, Llantwit Major Biomass Boiler Emissions Certification



This certificate provides evidence that the tested boiler meets the air quality requirements of the non-domestic Renewable Heat Incentive (RHI). It must be issued by a testing laboratory. Applicants applying for the RHI with biomass boilers must submit a certificate with their application, or alternatively, an environmental permit.

2213110-2, GILLES, HPK-RA 43 to HPK-RA 160, chipped wood

1. TEST HOUSE	
a) name and address of testing laboratory	 Landesgesellschaft Österreich TÜV SÜD Landesgesellschaft Österreich GmbH Grazerstraße 18 A-8600 Bruck/Mur Mail: office@tuev-sud.at http: www.tuev-sued.at
b) name and signature of the person authorised by the testing laboratory to issue the certificate	Ing. Johann Geineder 
c) date of issue of the certificate together with certificate reference number	date: 18 November 2013 reference number: 2213110-2
d) if testing laboratory is accredited to ISO 17025, date of accreditation and accreditation number <i>(note: if testing conducted after 24 September 2013, the testing laboratory must be ISO 17025 accredited)</i>	accreditation number: A0033 date of accreditation: - first accreditation: 13 February 1996 - last re-accreditation: 12 October 2012



2.a PLANT Nr.	1	2	3
a) name of the plant tested	HPK-RA	HPK-RA	HPK-RA
b) model of the plant tested	HPK-RA 43	HPK-RA 49	HPK-RA 60
c) manufacturer of the plant tested	GILLES Energie- und Umwelttechnik GmbH & Co KG Koaserbauerstrasse 16 A – 4810 Gmunden		
d) installation capacity of the plant in kilowatts (kW)	12.0 - 43.0	12.0 - 43.0	12.0 - 60.0
e) is the plant a <u>manually stoked, natural draught</u> plant? (that is, without a fan providing forced or induced draught)	no	no	no
f) the date the plant was tested	24 Oct. 2005	2 Aug. 2004	23 Nov. 2004
g) list of all the plants in the type-testing range of plants to which the certificate applies, if any ¹	HPK-RA 43	HPK-RA 49	HPK-RA 60

2.b PLANT Nr.	4	5	6
a) name of the plant tested	HPK-RA	HPK-RA	HPK-RA
b) model of the plant tested	HPK-RA 75*)	HPK-RA 85*)	HPK-RA 100
c) manufacturer of the plant tested	GILLES Energie- und Umwelttechnik GmbH & Co KG Koaserbauerstrasse 16 A – 4810 Gmunden		
d) installation capacity of the plant in kilowatts (kW)	22.5 - 75.0	25.5 - 85.0	28.7 - 100.0
e) is the plant a <u>manually stoked, natural draught</u> plant? (that is, without a fan providing forced or induced draught)	no	no	no
f) the date the plant was tested	24 Nov. 2004	24 Nov. 2004	2 Aug. 2004
g) list of all the plants in the type-testing range of plants to which the certificate applies, if any ²	HPK-RA 75	HPK-RA 85	HPK-RA 100

*) type test in accordance to EN 303-5:2012, item 5.1.4 / EN 303-5:1999, item 5.1.3

¹ The type-testing approach enables testing laboratories to provide assurance that all boilers in a given range meet the air quality requirements, without needing to specifically test each boiler.

² The type-testing approach enables testing laboratories to provide assurance that all boilers in a given range meet the air quality requirements, without needing to specifically test each boiler.



2.c PLANT Nr.	7	8	9
a) name of the plant tested	HPK-RA	HPK-RA	HPK-RA
b) model of the plant tested	HPK-RA 120*)	HPK-RA 145*)	HPK-RA 160*)
c) manufacturer of the plant tested	GILLES Energie- und Umwelttechnik GmbH & Co KG Koaserbauerstrasse 16 A – 4810 Gmunden		
d) installation capacity of the plant in kilowatts (kW)	28.7 - 120.0	28.7 - 145.0	28.7 - 150.0
e) is the plant a <u>manually stoked, natural draught</u> plant? (that is, without a fan providing forced or induced draught)	no	no	no
f) the date the plant was tested	16 Sept. 2004	24 Nov. 2004	1 Nov. 2004
g) list of all the plants in the type-testing range of plants to which the certificate applies, if any ³	HPK-RA 120	HPK-RA 145	HPK-RA 160

3. FUELS	
a) types of fuels used when testing	Wood chip as per EN 14961-4, Property Class A1
b) based on the testing, list the range of fuels that can be used in compliance with the emission limits of 30 grams per gigajoule (g/GJ) net heat input for particulate matter (PM), and 150 g/GJ net heat input for oxides of nitrogen (NOx) <i>(based if relevant on classifications from EN14961 or EN303-5)</i>	Wood chip as per EN 14961-4, Property Class A1
c) moisture content of the fuel used during testing	HPK-RA 43 25.3 % HPK-RA 49 25.3 % HPK-RA 60 34.3 % HPK-RA 75 *) HPK-RA 85 *) HPK-RA 100 35.5 % HPK-RA 120 *) HPK-RA 145 *) HPK-RA 160 *)
d) maximum moisture content of the fuel which can be used so as to ensure that the emission limits are not exceeded	< 35 % according to EN 14961-4

*) type test in accordance to EN 303-5:2012, item 5.1.4 / EN 303-5:1999, item 5.1.3

³ The type-testing approach enables testing laboratories to provide assurance that all boilers in a given range meet the air quality requirements, without needing to specifically test each boiler.



4. TESTS																			
a) if the plant is 500kW or lower, and BS EN 303-5:1999 or EN 303-5:2012⁴ applies to it , please confirm: - tests were conducted to whichever standard was current at the time of testing. <i>(please circle the applicable standard)</i>	BS EN 303-5:1999: yes BS EN 303-5:2012: no																		
b) if the plant is 500kW or lower, and BS EN 303-5:1999 or BS EN 303-5:2012 do not apply to it , please confirm: - emissions of PM represent the average of at least three measurements, each of at least 30 minutes duration and; - the value for NOx emissions is derived from the mean of measurements made throughout the PM tests.	not applicable not applicable																		
c) if the plant is 500kW or higher , please confirm: - emissions of PM represent the average of at least three measurements, each of at least 30 minutes duration and; - the value for NOx emissions is derived from the mean of PM measurements made throughout the PM tests.	not applicable not applicable																		
d) please confirm the tests were conducted to: - EN 14792:2005 in respect of NOx, and; - EN 13284-1:2002 or ISO 9096:2003 in respect of PM ⁵	yes*) yes																		
e) please confirm the plant tested at ≥85% of its rated output	yes																		
f) please confirm the tests show that emissions were no greater than 30 g/GJ PM and 150 g/GJ NOx	yes																		
g) measured emissions of PM in g/GJ net heat input *)	<table border="0"> <tr><td>HPK-RA 43</td><td>19.0 / 13.0</td></tr> <tr><td>HPK-RA 49</td><td>19.0 / 13.0</td></tr> <tr><td>HPK-RA 60</td><td>8.0 / 13.0</td></tr> <tr><td>HPK-RA 75</td><td>13.7 / 15.5</td></tr> <tr><td>HPK-RA 85</td><td>21.9 / 15.4</td></tr> <tr><td>HPK-RA 100</td><td>30.0 / 16.9</td></tr> <tr><td>HPK-RA 120</td><td>27.4 / 16.9</td></tr> <tr><td>HPK-RA 145</td><td>23.7 / 16.9</td></tr> <tr><td>HPK-RA 160</td><td>23.0 / 16.9</td></tr> </table>	HPK-RA 43	19.0 / 13.0	HPK-RA 49	19.0 / 13.0	HPK-RA 60	8.0 / 13.0	HPK-RA 75	13.7 / 15.5	HPK-RA 85	21.9 / 15.4	HPK-RA 100	30.0 / 16.9	HPK-RA 120	27.4 / 16.9	HPK-RA 145	23.7 / 16.9	HPK-RA 160	23.0 / 16.9
HPK-RA 43	19.0 / 13.0																		
HPK-RA 49	19.0 / 13.0																		
HPK-RA 60	8.0 / 13.0																		
HPK-RA 75	13.7 / 15.5																		
HPK-RA 85	21.9 / 15.4																		
HPK-RA 100	30.0 / 16.9																		
HPK-RA 120	27.4 / 16.9																		
HPK-RA 145	23.7 / 16.9																		
HPK-RA 160	23.0 / 16.9																		
h) measured emissions of NOx in g/GJ net heat input *)	<table border="0"> <tr><td>HPK-RA 43</td><td>72 / 69</td></tr> <tr><td>HPK-RA 49</td><td>72 / 69</td></tr> <tr><td>HPK-RA 60</td><td>66 / 69</td></tr> <tr><td>HPK-RA 75</td><td>69 / 73</td></tr> <tr><td>HPK-RA 85</td><td>82 / 72</td></tr> <tr><td>HPK-RA 100</td><td>91 / 73</td></tr> <tr><td>HPK-RA 120</td><td>87 / 73</td></tr> <tr><td>HPK-RA 145</td><td>82 / 73</td></tr> <tr><td>HPK-RA 160</td><td>81 / 73</td></tr> </table>	HPK-RA 43	72 / 69	HPK-RA 49	72 / 69	HPK-RA 60	66 / 69	HPK-RA 75	69 / 73	HPK-RA 85	82 / 72	HPK-RA 100	91 / 73	HPK-RA 120	87 / 73	HPK-RA 145	82 / 73	HPK-RA 160	81 / 73
HPK-RA 43	72 / 69																		
HPK-RA 49	72 / 69																		
HPK-RA 60	66 / 69																		
HPK-RA 75	69 / 73																		
HPK-RA 85	82 / 72																		
HPK-RA 100	91 / 73																		
HPK-RA 120	87 / 73																		
HPK-RA 145	82 / 73																		
HPK-RA 160	81 / 73																		

*) equivalent procedure in the Association of German Engineers' VDI Series of Guidelines

**) nominal load / minimal load

⁴ BS EN303-5:1999 and 2012 explain what should be measured and when.

⁵ These standards explain how to make the PM and NOx measurements.

Appendix B: QA/QC Data

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 06/17) was used to obtain an overall adjustment factor of 0.78 from the input data shown in the following screen shot. This overall factor is based on 38 co-location studies where the tube preparation method and analysis laboratory used were the same as those used by SRS on behalf of VoGC.

Figure B.1: National Diffusion Tube Bias Adjustment Factor Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 06/17			
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of September 2017			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods							LAQM Helpdesk Website			
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet										
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.			
Step 1:		Step 2:		Step 3:		Step 4:				
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ² shown in blue at the foot of the final column.				
If a laboratory is not shown, use have no data for this laboratory.		If a preparation method is not shown, use have no data for this method at this laboratory.		If a year is not shown, use have no data.		If you have your own co-location study then see footnote ¹ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953				
Analysed By ¹	Method	Year ²	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu\text{g}/\text{m}^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu\text{g}/\text{m}^3$)	Bias (B)	Tube Precision ³	Bias Adjustment Factor (A) (Cm/Dm)
ESG Didcot	50% TEA in acetone	2016	R	City of York Council	12	33	25	33.4%	G	0.75
ESG Didcot	50% TEA in acetone	2016	R	City of York Council	12	41	27	51.2%	G	0.66
ESG Didcot	50% TEA in acetone	2016	KS	Leeds City Council	9	66	55	20.1%	S	0.83
ESG Didcot	50% TEA in acetone	2016	R	Leeds City Council	12	57	44	27.6%	S	0.78
ESG Didcot	50% TEA in acetone	2016	R	City and County Swansea	9	35	31	12.7%	G	0.89
ESG Didcot	50% TEA in acetone	2016	R	North East Lincolnshire Council	10	36	30	20.0%	G	0.83
ESG Didcot	50% TEA in acetone	2016	R	North East Lincolnshire Council	10	57	42	37.3%	G	0.73
ESG Didcot	50% TEA in acetone	2016	R	North East Lincolnshire Council	11	44	29	52.0%	G	0.66
ESG Didcot	50% TEA in acetone	2016	SU	Reigate and Banstead BC	12	27	20	33.6%	G	0.75
ESG Didcot	50% TEA in acetone	2016	B	Reigate and Banstead BC	12	20	17	20.7%	G	0.83
ESG Didcot	50% TEA in acetone	2016	KS	Slough Borough Council	11	42	33	27.6%	G	0.78
ESG Didcot	50% TEA in acetone	2016	R	Wrexham County Borough Council	9	20	18	8.2%	G	0.92
ESG Didcot	50% TEA in acetone	2016	Overall Factor² (38 studies)						Use	0.78

Discussion of Choice of Factor to use

The bias adjustment factor applied to all 2016 data is 0.78. The applied bias adjustment factor has been calculated using the national diffusion tube bias adjustment factor spreadsheet version 06/17. The individual bias adjustment factor calculated using the Windsor Road, Penarth 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, 0.70 compared to 0.78. 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

The Nitrogen Dioxide (NO₂) obtained via the use of passive diffusion tubes during January to December 2016 were annualised via the method described in Boxes 7.9 & 7.10 of LAQM TG(16). Due to the location of the Windsor Road, Penarth AMS (Roadside), 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 B.1 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 38 (2 Horseshoes)

Site	Site Type	Annual Mean (µg/m ³)	Period Mean (µg/m ³)	Ratio
Cwmbran AURN	Urban Background	12.72	11.83	1.08
Bristol St Paul's AURN	Urban Background	26.70	25.4	1.05
Average Ratio				1.06

Table B.2 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 77 (A48 Culverhouse Cross)

Site	Site Type	Annual Mean (µg/m ³)	Period Mean (µg/m ³)	Ratio
Cwmbran AURN	Urban Background	11.97	10.41	1.22
Bristol St Paul's AURN	Urban Background	26.04	22.38	1.19
Average Ratio				1.21

Table B.3 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 72a (Dinas Powys Primary School)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	14.46	0.88
Bristol St Paul's AURN	Urban Background	26.04	29.27	0.91
Average Ratio				0.90

Table B.4 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 67 (2 Matthew Terrace)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	14.07	0.90
Bristol St Paul's AURN	Urban Background	26.04	29.08	0.92
Average Ratio				0.91

Table B.5 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 56 (134 Andrew Road)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	14.28	0.89
Bristol St Paul's AURN	Urban Background	26.04	28.42	0.94
Average Ratio				0.91

Table B.6 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 78 (Chelmsford Cottage)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	10.30	1.24
Bristol St Paul's AURN	Urban Background	26.04	22.82	1.17
Average Ratio				1.20

Table B.7 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 80 (113 Plassey Street)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	11.66	1.09
Bristol St Paul's AURN	Urban Background	26.04	24.76	1.08
Average Ratio				1.08

Table B.8 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 8 (Tynewydd Road)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	15.18	0.84
Bristol St Paul's AURN	Urban Background	26.04	30.29	0.88
Average Ratio				0.86

Table B.9 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 24 (Port Road East)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	13.20	0.96
Bristol St Paul's AURN	Urban Background	26.04	26.65	1.00
Average Ratio				0.98

Table B.10 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 41 (Dispenser Road)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	14.43	0.88
Bristol St Paul's AURN	Urban Background	26.04	28.97	0.92
Average Ratio				0.90

Table B.11 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 64 (Holton Road)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	11.53	1.10
Bristol St Paul's AURN	Urban Background	26.04	25.27	1.06
Average Ratio				1.08

Table B.12 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 71 (76 High Street)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	11.36	1.12
Bristol St Paul's AURN	Urban Background	26.04	24.33	1.10
Average Ratio				1.11

Table B.13 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube 78 (Catalina, y Rhodfa)

Site	Site Type	Annual Mean ($\mu\text{g}/\text{m}^3$)	Period Mean ($\mu\text{g}/\text{m}^3$)	Ratio
Cwmbran AURN	Urban Background	11.97	13.21	0.96
Bristol St Paul's AURN	Urban Background	26.04	26.81	1.00
Average Ratio				0.98

QA/QC of Automatic Monitoring

The Vale's automatic monitors are calibrated by Vale's Air Quality Officer Representative on a fortnightly basis. The quality assurance/ quality control (QA/QC) procedures used are equivalent to UK AURN procedures. Calibration readings are recorded and sent to Ricardo-AEA to ratify the data for these sites. An independent audit is carried out annually.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes are supplied and analysed by Environmental Scientifics Group Didcot, using the 50% triethanolamine (TEA) in water method. Environmental Scientifics Group 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 Environmental Scientifics Group 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 Environmental Scientifics Group 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>

Uncertainties

All values presented in this report are the best possible estimates, but uncertainties in the results might cause over-or under-predictions. All of the measured concentrations presented have an intrinsic margin of error. DEFRA and the Das suggest that this is of the order of plus or minus 20% for diffusion tube data and plus or minus 10% for automatic measurements.

The UK Government's Air Quality Expert Group (AQEG) has published a report on trends in primary nitrogen dioxide in the UK (AQEG, 2007). This examines evidence that shows that while NO_x emissions have fallen in line with predictions made a decade previously, the composition of NO_x has, in some urban environments, changed. This may have caused nitrogen dioxide levels at some locations to fall less rapidly than was expected. The latest guidance from DEFRA and the DAs (2009) has been followed regarding NO_x to NO₂ relationships.

The limitations to the assessment should be borne in mind when considering the results set out in preceding sections.