



# 2014 Air Quality Progress Report for **Vale of Glamorgan Council**

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

May 2014

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## Executive Summary

The Vale of Glamorgan Council has examined the results from monitoring during 2013.

Concentrations of all measured pollutants were below the objectives to protect human health at all monitoring locations including within the declared Air Quality Management Area, with the exception of:-

- Marine Scene, Cogan where the annual average concentration for nitrogen dioxide (NO<sub>2</sub>) was 42µg/m<sup>3</sup> (as measured by diffusion tube)
- Fonmon (automatic site) where ozone (O<sub>3</sub>) concentrations exceeded limits on 18 days. However, monitoring ozone is not mandatory so there is no need to proceed to a Detailed Assessment .

Locations identified in 2012 with annual average NO<sub>2</sub> concentrations close to the objective in 2012 were compliant in 2013 namely

- Windsor Road Penarth
- Cogan Roundabout
- Railway Terrace, Cardiff Road, Dinas Powys
- Tynewydd Rd Barry
- Culverhouse Cross.

New diffusion tube monitoring locations were commissioned at

- Façade of 134 Windsor Road
- Façade 9, Wayside Cottages, Cardiff Rd Dinas Powys
- Façade 16 Railway Terrace, Cardiff Rd Dinas Powys

One tube location was removed at

- 160, Windsor Rd due to renovation taking place at the property

## Vale of Glamorgan

Public consultation on the declaration of an Air Quality Management Area (AQMA) for a section of Windsor Road, Cogan, Penarth, closed in early 2013. An AQMA was declared, by order, with effect from 01<sup>st</sup> August 2013

On the 29<sup>th</sup> May 2013 due to public concern and complaint about traffic congestion, Vale highways engineers undertook a re-signalisation of traffic lights at Cogan intersection, north of the area declared an AQMA. Anecdotal evidence suggests that traffic flow may have improved. Whether the reduction in NO<sub>2</sub> concentrations was due to the re-signalisation will need to be explored.

Unfortunately the intended commissioning of the automatic monitor within the AQMA, failed due to power supply issues beyond the Council's direct control. This work is ongoing. Once commissioned the station will house an improved (equivalence) automatic monitor for particulates (PM<sub>10</sub>) to replace the indicative monitor (Streetbox) Due to the power supply issue the new monitor was unable to provide data in 2013

The 'Partisol' particulate (PM<sub>10</sub>) monitor at Cardiff Rd, Barry, failed to collect data consistently effectively over the period. This monitor's performance will be reviewed in 2014.

There is no need to undertake a Detailed Assessment for any of the pollutants monitored.

The Vale of Glamorgan Council will proceed to the Updating & Screening Assessment in 2015

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# 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.

To the south is the Bristol Channel across which (about 20 kilometres) 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 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 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 the objectives.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the LAQM process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

## 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,  $\text{mg}/\text{m}^3$  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 <sup>3</sup>	Running annual mean	31.12.2003
	5.00 µg/m <sup>3</sup>	Annual mean	31.12.2011
1,3-Butadiene	2.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m <sup>3</sup>	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m <sup>3</sup>	Annual mean	31.12.2004
	0.25 µg/m <sup>3</sup>	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> ) (gravimetric)	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m <sup>3</sup>	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

## 1.4 Summary of Previous Review and Assessments

By the end of 2012:-

- Air quality across the majority of the Vale complied with limits to protect human health
  
- However, diffusion tube data highlighted locations where road traffic emissions of nitrogen dioxide (NO<sub>2</sub>) were at, or close to, the annual average objective concentration of 40 ug/m<sup>3</sup>, namely:
  - Windsor Road Penarth
  - Cogan Roundabout
  - Railway Terrace, Cardiff Road , Dinas Powys
  - Tynewydd Rd Barry
  - Culverhouse Cross.
  
- Nitrogen dioxide annual average concentrations at Windsor Road, Cogan, were again at, or close to, the annual average objective concentration of 40ug/m<sup>3</sup>. The data supported conclusions within the Detailed Assessment to consult on the declaration of an Air Quality Management Area.
  
- Nitrogen dioxide concentrations at two diffusion tube sites along Holton Road Barry (close to shopping and outdoor dining) were within the objective.
  
- Particulate matter PM<sub>10</sub> concentrations in 2012 did not exceed relevant objectives
  
- Indicative monitoring of PM<sub>10</sub> at Windsor Road, Penarth complied with the relevant objectives in 2012
  
- Sulphur dioxide (SO<sub>2</sub>) concentrations did not exceed the relevant objective
  
- Ozone concentrations did not exceed the relevant Human Health Objective

## 1.5 Proposed Actions from 2013 Progress report

- Continue to monitor at the majority of existing locations.
- Review nitrogen dioxide diffusion tube placement. Re-locate tubes to property facades where practicable. Identify tubes with consistently low, compliant concentrations, to re-deploy elsewhere.
- Place additional tubes at locations with where nitrogen dioxide concentrations are consistently close to the annual average objective with relevant exposure i.e. Railway Terrace, Cardiff Road, Dinas Powys Establish extent of those concentrations and to identify any need for Detailed Assessment
- Propose and consult on the declaration of Air Quality Management Area (AQMA) for the section of Windsor Road as indentified by Detailed Assessment
- Relocate Penarth's automatic monitor from existing location (open aspect) to within the proposed AQMA, where domestic properties are close to the road.
- Replace indicative PM10 monitor (Streetbox) with equivalence, gravimetric PM10 monitor within proposed AQMA.
- Improve performance of 'Partisol' PM10 automatic monitor
- Proceed to Progress Report 2014

## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

#### **2.1.1 Automatic Monitoring Sites**

Automatic monitoring site details are tabulated in table 2.1 below. Regrettably the commissioning of the fixed automatic monitor within the AQMA, failed due to power supply issues beyond the Council's direct control. This work is ongoing

There is no particulate data from the Steetbox monitor at Windsor Road, as it was removed pending commissioning of a new equivalence instrument (BAM) within the automatic monitor enclosure.

The particulate PM10 monitor (Partisol) at Cardiff Rd Barry, failed to collect data consistently and results have been discounted pending a review of the instruments performance.

Non-automatic monitoring comprises of diffusion tubes. These tubes are a type of passive sampler which absorb the pollutant to be monitored from the surrounding air with no need for a power supply. Passive samplers are easy to use and relatively inexpensive. The Vale uses nitrogen dioxide diffusion tubes prepared and analysed by Gradko (20% TEA in water). Diffusion tube quality control information is supplied in Annex 1

Tubes locations are provided in table 2.2 below. Sites listed as 'other' in the table are intended to provide background and comparative concentrations prior to major development projects. Three new tube location were commissioned in 2013

- Façade of 134 Windsor Road (No 80)
- Façade 9, Wayside Cottages (No 89)
- Façade 16 Railway Terrace (No90)

Monitoring tube No 76 at 160 Windsor Rd was suspended in 2013 due to the property being significantly renovated

**Table 2.1 Automatic Monitoring Sites**

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique PM <sub>10</sub>	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?	Quality Control by
Penarth (Vale)	Roadside	317551	171482	NO <sub>2</sub> , O <sub>3</sub>		N	N	5 m	N	AEA
Dinas Powys Infant School (Vale)	Roadside	315840	171526	NO <sub>2</sub>		N	Y (adjacent)	7 m	Y	AEA
Penarth (Vale)	Roadside	317635	172361	NO <sub>2</sub> , PM <sub>10</sub>	Streetbox (indicative) electrochemical	N	Y (4m)	<1m	Y	Vale
Fonmon, Highwayman Inn (Vale)	Other (power station)	305736	167335	NO <sub>2</sub> , SO <sub>2</sub> , PM <sub>10</sub> , O <sub>3</sub>	TEOM & FDMS	N	N	1000 m to main road	N	AEA
Cardiff Road, Barry (Vale)	Roadside	313502	168867	PM <sub>10</sub>	Partisol 2025 (Gravimetric)	N	Y (14m)	4m	N	Vale Filters UKAS analysed by ESG
Pumping Station, Fontygary (RWENpower)	Other (power station)	305221	166133	NO <sub>2</sub> , SO <sub>2</sub>		N	N	2 metres to road	N	RWE Bureau Veritas HS&E Ltd

## 2.2 Non-Automatic Monitoring Sites 2013

Table 2.2 Non-Automatic Monitoring Sites

ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
4	Gwenog Ct Barry	Urban Background	310475	168457	NO <sub>2</sub>	N	N	Y	20m	N
7	Millbrook Rd/Cardiff Rd, Dinas Powys	Roadside	315773	171514	NO <sub>2</sub>	N	N	Y (15m)	5m	N
72 a,b,c,	Dinas Powys Infants School	Roadside	315841	171527	NO <sub>2</sub>	N	Y	Y (<1m)	7m	Y
47	Dinas Powys Health Centre	Urban Background	315710	171385	NO <sub>2</sub>	N	N	Y (4m)	16m	N
8	Tynewydd Road, Barry	Roadside	311797	168503	NO <sub>2</sub>	N	N	Y (4m)	1m	N
62	Windsor Road (nr 154), Penarth	FACADE	317636	172359	NO <sub>2</sub>	N	N	Y	2m	Y

ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
73 a. b c	Penarth Monitor, Windsor Rd	Other Triplicate	317550	172483	NO <sub>2</sub>	N	Y	N	4.5m	Y
46	Cardiff Rd, Dinas Powys	Roadside	315745	171390	NO <sub>2</sub>	N	N	Y (8m)	3m	N
56	Andrew Rd, Llandough	Kerbside	316814	172443	NO <sub>2</sub>	N	N	N	<1m	Y
87	110 Dock View Rd, Barry	Roadside	312663	168289	NO <sub>2</sub>	N	N	Y	9m	N
24	Port Road East, Barry	Roadside	310813	169693	NO <sub>2</sub>	N	N	N	2m	N
41	Despenser Road, Sully	Urban Background	315278	168451	NO <sub>2</sub>	N	N	N	128m	N
66	17 Churchill Tce	Roadside	313342	168823	NO <sub>2</sub>	N	N	Y (4m)	1.5m	Y
65	Riverside Cowbridge	Roadside	299614	174592	NO <sub>2</sub>	N	N	Y (1m)	3m	Y

ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
67	2, Mathew Tce	Roadside	316488	172004	NO <sub>2</sub>	N	N	Y (1m)	2.5m	Y
22	Stanwell Road, Penarth	Roadside	318505	171496	NO <sub>2</sub>	N	N	Y (8m)	<1m	M
75	Catalina Y Rhodfa. Barry Waterfront	Other	312142	167529	NO <sub>2</sub>	N	N	Y (4m)	58m	N
76	160 Windsor Road, Penarth Temp closure	FACADE	317627	172371	NO <sub>2</sub>	N	N	Y	2.5m	Y
29	Cogan Roundabout,	Roadside	317406	172796	NO <sub>2</sub>	N	N	N	3m	Y
53	168 Windsor Road Penarth	FACADE	317589	172411	NO <sub>2</sub>	N	N	Y	5m	Y
39	Cambrian Caravan Park, Wenvoe	Urban Background	311968	174577	NO <sub>2</sub>	N	N	N	110m	N
38	2 Horseshoes Cross, Wenvoe	FACADE	311872	174526	NO <sub>2</sub>	N	N	N	2m	N



ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
77	Culverhouse Cross, Wenvoe	Roadside	311622	174772	NO <sub>2</sub>	N	N	N	4m	N
68	99, Penlan Rd Llandough	Roadside	316886	172561	NO <sub>2</sub>	N	N	Y		Y
43, 57 & 58	Groundhog, Fonmon	Triplicate	305736	167329	NO <sub>2</sub>	N	Y	N	900m	N
54	High St, Cowbridge	Kerbside	299270	174737	NO <sub>2</sub>	N	N	N	<1m	N
55	159 Windsor Rd Penarth	FACADE	317587	172441	NO <sub>2</sub>	N	N	Y	2m	Y
82	98b Windsor Rd, Penarth	FACADE	318061	171944	NO <sub>2</sub>	N	N	Y	8m	N
78	Chelmsford Cottage, Plassey St, Penarth	FACADE	318006	172070	NO <sub>2</sub>	N	N	Y	5m	N
74	110 Windsor Rd, Penarth	FACADE	317718	172252	NO <sub>2</sub>	N	N	Y	2.5m	Y

ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
79	Marine Scene, Windsor Rd, Penarth	Roadside	317549	172572	NO <sub>2</sub>	N	N	N	1.2m	Y
80	113 Plassey St, Penarth	FACADE	318150	172043	NO <sub>2</sub>	N	N	Y	5.4m	Y
81	Paget, Penarth	Roadside	318738	172333	NO <sub>2</sub>	N	N	Y (0m)	0.3m	Y
61	Railway Terrace, Dinas	Roadside	316433	171932	NO <sub>2</sub>	N	N	Y(0m)	2m	Y
83	24 Cardiff Road, Barry	Roadside	313597	168829	NO <sub>2</sub>	N	N	Y(0m)	2.5m	N
84	Bendricks Road, Barry	Urban Background	313407	167477	NO <sub>2</sub>	N	N	Y (0m)	144m	N
85	Thalasa, Dyfrig Street, Barry	Urban Background	311980	166965	NO <sub>2</sub>	N	N	Y (0m)	39m	N
86	Holton Road, Barry	Roadside	311768	168101	NO <sub>2</sub>	N	N	Y	2m	N

ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
71	High Street Barry	Roadside	310764	167505	NO2	N	N	Y	2m	Y
70	Ty Isaf Penarth	FACADE	316731	172391	NO2	N	N	Y	3m	Y
69	65 Penlan Rd	Roadside	316847	172948	NO2	N	N	Y	7.5m	Y
64	Bennys Holton Road	Roadside	311690	168042	NO2	N	N	Y	3m	Y
88	134 Windsor Road	FACADE	317665	172309	NO2	Y	N	Y	3.5m	Y
89	9 Wayside Cottages	FACADE	316445	171963	NO2	N	N	Y	2.9m	Y
90	16 Railway Tce	FACADE	316461	171947	NO2	N	N	Y	3.1m	Y

## **2.3 Comparison of Monitoring Results with Air Quality Objectives**

### **2.3.1 Nitrogen Dioxide (NO<sub>2</sub>)**

#### **Automatic Monitoring Data**

- Concentrations were below the 40ug/m<sup>3</sup> annual average objective at both Fonmon and Dinas Powys (See table 2.3) NB The Windsor Rd site was not successfully re-commissioned.
- There were no measured exceedences of the 1-hour mean objective at either Fonmon or Dinas Powys (See table 2.4)

#### **Results of NO<sub>2</sub> Diffusion Tubes (annual average only)**

- Concentrations were below the 40ug/m<sup>3</sup> annual average objective at all sites (See table 2.5) including sites highlighted previously in 2012 below
  - Windsor Road Penarth
  - Cogan Roundabout
  - Railway Terrace, Cardiff Road , Dinas Powys
  - Tynewydd Rd Barry
  - Culverhouse Cross

with exception of

- Tube No.79 Marine Scene (42ugms). However this location is kerbside and without relevant exposure. It monitors traffic emissions between the AQMA and the intersections to the north. It is opposite land subject to a planning application for residential properties.
- Tube No 55 Andrew Road, Llandough (39ugms). The site is kerbside at a busy traffic intersection. The tube will need to be relocated to the nearest available residential façade in 2014.

**Table 2.3 Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with Annual Mean Objective**

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % <sup>a</sup>	Valid Data Capture 2013 % <sup>b</sup>	Annual Mean Concentration (µg/m <sup>3</sup> )				
					2009* <sup>c</sup>	2010* <sup>c</sup>	2011* <sup>c</sup>	2012* <sup>c</sup>	2013 <sup>c</sup>
Penarth (Vale)	Roadside	N	0	25	27	31	21	26	No data
Dinas Powys Infant School (Vale)	Roadside	N	92.8	24	24	26	24	24	21
Penarth (Streetbox) (Vale)	Roadside	N	0		28	37	42	35	No data
Fonmon (Vale)	Other (power station)	N	84.5	11	11	12	13	13	11
Pumping Station Fontygary (RWE)	Roadside	N	0	17	15	15	<b>12</b>	13	12
Sea View (RWE)	Other (power station)	N	CLOSED				11		

In bold, exceedence of the NO<sub>2</sub> annual mean AQS objective of 40µg/m<sup>3</sup>

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

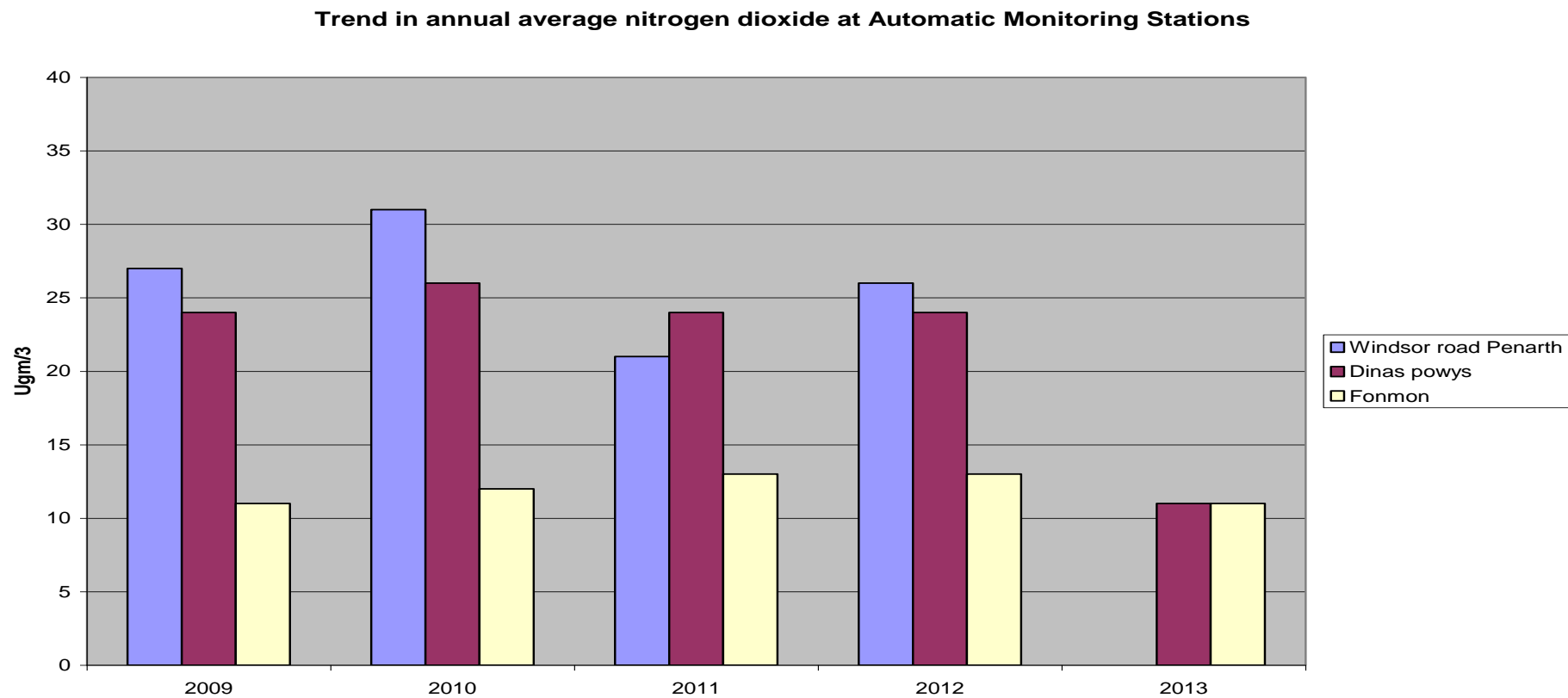
<sup>b</sup> i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%)

<sup>c</sup> Means should be “annualised” [as in Box 3.2 of TG\(09\) \(http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38\)](http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), if valid data capture is less than 75%

\* Annual mean concentrations for previous years are optional

The graph below provides NO<sub>2</sub> annual mean data at each automatic site from 2009. All results are below the 40ug/m<sup>3</sup> annual average objective. A trend is not easy to infer, but 2013 concentrations are lower than preceding years. NB the Penarth(Windsor Rd) monitor was out of commission in 2013.

**Figure 2.3 Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Automatic Monitoring Sites**



**Table 2.4 Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with 1-hour Mean Objective**

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % <sup>a</sup>	Valid Data Capture 2013 % <sup>b</sup>	Number of Hourly Means > 200µg/m <sup>3</sup>				
					2009* <sup>c</sup>	2010* <sup>c</sup>	2011* <sup>c</sup>	2012* <sup>c</sup>	2013 <sup>c</sup>
<b>Penarth (Vale)</b>	Roadside	N	0	98.0	0 (103)	0 (97)	0 (111)	0	No data
<b>Dinas Powys Infant School (Vale)</b>	Roadside	N	92.8	99.1	0 (94)	0 (75)	0 (90)	0	0
<b>Penarth Streetbox (Vale)</b>	Roadside	N	0	<90		0 (74.7)	1 (154.9)	0 (124.4)	No data
<b>Fonmon (Vale)</b>	Other (power station)	N	84.5	98.8	0 (74)	0 (49)	0 (61)	0 (57)	0
<b>Pumping Station Fontygary (RWE)</b>	Roadside	N	91.3	95.0	0 (94)	0 (74)	0	0 (76)	0
<b>Sea View (RWE)</b>	Other (power station)	N	0	Closed		0 (75)	0	0 (58)	Closed

In bold, exceedence of the NO<sub>2</sub> hourly mean AQS objective (200µg/m<sup>3</sup> – not to be exceeded more than 18 times per year)

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

<sup>b</sup> 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%)

<sup>c</sup> If the data capture for full calendar year is less than 90%, include the 99.8<sup>th</sup> percentile of hourly means in brackets

\* Number of exceedences for previous years is optional

**Table 2.5 Results of NO<sub>2</sub> Diffusion Tubes (2009 to 2013).**

Site ID	Name	Type	Within AQMA?	2008* (BF=0.86)	2009* (BF=0.88)	2010* (BF=0.85)	2011 (BF = 0.93) Highest @Penarth	2012 (BF=1.03) Highest @ Penarth	2013 (BF = 0.95) National
7	Millbrook	Roadside	N	24	26	26	29	32	28
72 abc	Dinas Powys Inf (average)	Roadside	N	25	25	24	24	31	25
64	Benny's, Holton Rd	Roadside	N					31	21
47	Dinas Powys, health centre	Urban background	N	15	17	18	17	18	17
8	Tynewydd Rd	Roadside	N			35	33	41	27
65	Riverside Mews	Urban background	N					25	18
62	154, Windsor Rd	FACADE	Y	39	41	39	41	42	36
73abc	Penarth Monitor (average)	Other	Y	22	24	28	23	28	28
4	Gwenog Court	Urban background	N	13	14	17	15	17	17
46	46, Cardiff Rd	Roadside	N	29	31	32	32	25	22
56	Andrew Rd	Kerbside	N	33	35	39	39	43	39
87	110, Dock View	Roadside	N		17	20	19	20	17
24	Port Rd East	Roadside	N	22	23	26	26	27	23
41	Dispenser Rd	Urban background	N	15	14	16	15	17	15
66	17, Churchill Tce	Roadside	N					40	33
22	Stanwell Rd	Roadside	N	25	26	28	27	31	26
75	Catalina	Other	N		18	18	18	22	18
76	160 Windsor Rd	FAÇADE	Y	37	39	39	41	45	Closed for 2013
29	Cogan roundabout	Roadside	N	32	34	36	39	40	35
53	168, Windsor Road	FACADE	Y	30	29	31	32.	39	33

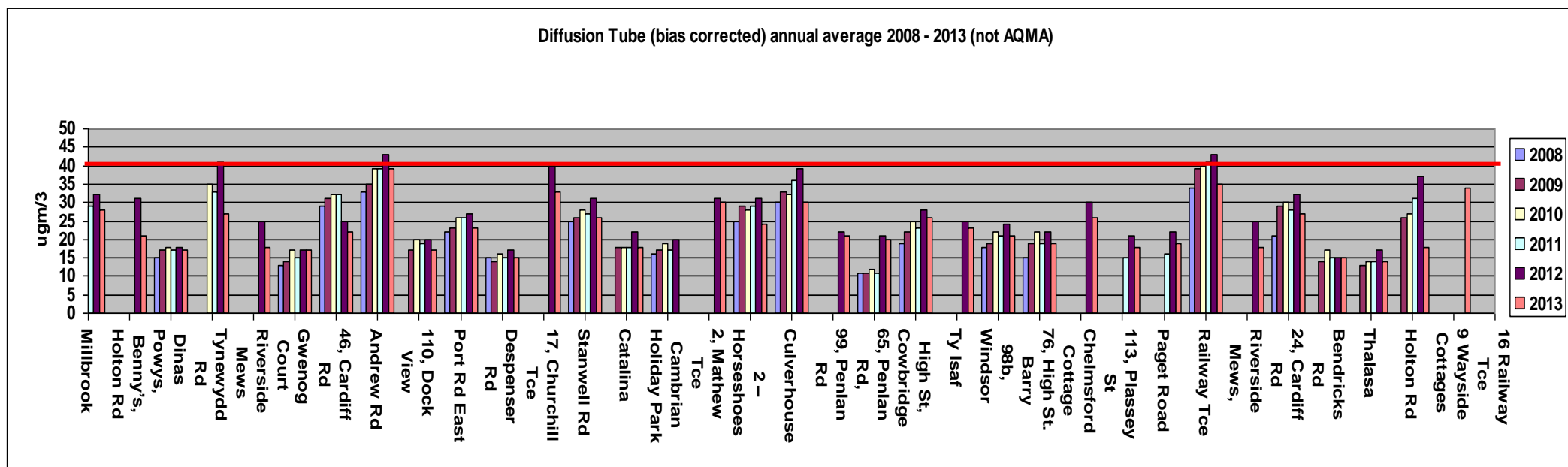


Site ID	Name	Type	Within AQMA?	2008* (BF=0.86)	2009* (BF=0.88)	2010* (BF=0.85)	2011 (BF = 0.93) Highest @Penarth	2012 (BF=1.03) Highest @ Penarth	2013 (BF = 0.95) National
39	Cambrian Holiday Park	Urban Background	N	16	17	19	17	20	
67	2, Mathew Tce	FACADE	N					31	30
38	2 – Horseshoes	FACADE	N	25	29	28	29	31	24
77	Culverhouse	Roadside	N	30	33	32	36	39	30
68	99, Penlan Rd	Other	N					22	21
43 57& 58	Groundhog	Triplicate	N	13	14	14	13	15	14
69	65, Penlan Rd,	Urban background	N	11	11	12	11	21	20
54	High St, Cowbridge	Kerbside	N	19	22	25	23	28	26
55	159, Windsor Rd	FAÇADE	Y	33	33	38	35	<b>40</b>	33
70	Ty Isaf	Roadside	N					25	23
82	98b, Windsor	FAÇADE	N	18	19	22	21	24	21
71	76, High St. Barry	Roadside	N	15	19	22	19	22	19
78	Chelmsford Cottage	FAÇADE	N					30	26
74	110, Windsor	FAÇADE	Y	35	36	38	38	<b>44</b>	31
79	Marine Scene	Roadside	N				<b>40</b>	<b>51</b>	<b>42</b>
80	113, Plassey St	FAÇADE	N				15	21	18
81	Paget Road	Roadside	N				16	22	19
61	Railway Tce	FACADE	N	34	39	<b>40</b>	<b>41</b>	<b>43</b>	35
65	Riverside Mews, Cowbridge	Roadside	N					25	18
83	24, Cardiff Rd	Roadside	N	21	29	30	28	32	27
84	Bendricks Rd	Other	N		14	17	15	15	15
85	Thalasa	Other	N		13	14	14	17	14
86	Holton Rd	Other	N		26	27	31	37	18
88	134 Windsor Road	FACADE	Y						34
89	9 Wayside Cottages	FACADE	N						34
90	16 Railway Tce	FACADE	N						27

In bold, exceedence of the NO<sub>2</sub> annual mean AQS objective of 40µg/m<sup>3</sup>

Annual average NO2 concentrations at diffusion tube location (excluding AQMA) from 2008 are graphed below. The 40ug/m3 objective is the red line. Sites at, close or exceeding the limit can be seen by year. Only the Andrew Rd site was close to the objective with 39ug/m3.

**Fig 2.4 Annual average diffusion tube (bias corrected) data, excluding AQMA**



### 2.3.2 Particulate Matter (PM<sub>10</sub>)

Particulate matter (PM<sub>10</sub>) concentrations complied with relevant objectives where measured at Fonmon (see tables 2.7.& 2.8)

There is no data for the Steetbox at Windsor Road as it was removed pending commissioning of a new instrument (an equivalence BAM). The new BAM was to be incorporated within the relocated automatic monitor which was not commissioned in 2013.

The 'Partisol' monitor failed to collect data consistently and results have been discounted pending a review of the instruments reliability.

**Table 2.7 Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with Annual Mean Objective**

Site ID	Site Type	Within AQMA?	Valid Data Capture 2013 % <sup>b</sup>	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m <sup>3</sup> )				
					2009* <sub>c</sub>	2010* <sub>c</sub>	2011* <sub>c</sub>	2012* <sub>c</sub>	2013 <sub>c</sub>
<b>Fonmon</b>	Rural	N	88.4	Y	19.1	19	22	16	17
<b>Penarth</b>	Roadside Indicative	N	0.0	Y	24	22.8	28.7	20.4	No data
<b>Barry</b>	Roadside	N		Y		22	25.8	21.8	No data

In bold, exceedence of the PM<sub>10</sub> annual mean AQS objective of 40µg/m<sup>3</sup>

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

<sup>b</sup> 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%)

<sup>c</sup> Means should be "annualised" [as in Box 3.2 of TG\(09\)](http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38) (<http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38>), if valid data capture is less than 75%

\* Annual mean concentrations for previous years are optional

**Table 2.8 Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with 24-hour Mean Objective**

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period % <sup>a</sup>	Valid Data Capture 2013 % <sup>b</sup>	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m <sup>3</sup>				
						2009* <sub>c</sub>	2010* <sub>c</sub>	2011* <sub>c</sub>	2012* <sub>c</sub>	2013 <sub>c</sub>
Fonmon	Rural	N	83.6	Y	9 (36.8)	6 (33.4)	3 (28.3)	10	2	2 (28.0)
Penarth	Roadside Indicative Streetbox	N	69	N	N/A	22 (38)	15 (44.7)	<b>40 (52.6)</b>	16	No data
Barry	Roadside PARTISOL	N	<90	Y	Y				15	No data

In bold, exceedence of the PM<sub>10</sub> daily mean AQS objective (50µg/m<sup>3</sup> – not to be exceeded more than 35 times per year)

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

<sup>b</sup> 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%)

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

\* Number of exceedences for previous years is optional

### 2.3.3 Sulphur Dioxide (SO<sub>2</sub>)

Sulphur dioxide concentrations complied with the relevant objective at Fonmon

**Table 2.9 Results of Automatic Monitoring for SO<sub>2</sub>: Comparison with Objectives**

Site ID	Site Type	Within AQMA?	Valid Data Capture 2013 % <sup>b</sup>	Number of: <sup>c</sup>		
				15-minute Means > 266µg/m <sup>3</sup>	1-hour Means > 350µg/m <sup>3</sup>	24-hour Means > 125µg/m <sup>3</sup>
Fonmon	Rural	N	98.2	0	0	0

In bold, exceedence of the relevant AQS objective (15-min mean = 35 allowed/year; 1-hour mean = 24 allowed/year; 24-hour mean = 3 allowed/year)

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

<sup>b</sup> 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%)

<sup>c</sup> if data capture for full calendar year is less than 90%, include the relevant percentile in bracket (in µg/m<sup>3</sup>): 15-min mean = 99.9<sup>th</sup>; 1-hour mean = 99.7<sup>th</sup>; 24-hour mean = 99.2<sup>th</sup> percentile

### 2.3.4 Benzene

The Vale does not monitor Benzene as concluded under previous review and assessment. There were no new sources identified in 2013.

### 2.3.5 Other Pollutants Monitored

The vale has the capability to monitor **Ozone (O3)** and does so due its potential correlation with other pollutants.

**Table 2.10 Results Ozone**

Site ID	Site Type	Within AQMA?	Valid Data Capture 2013 % <sup>b</sup>	Number of: <sup>c</sup>	
				Running 8hr means >100ugm3	No. Days (Max 10)
Fonmon	Rural	N	98.5	106	18

- In 2013 measured Ozone concentrations exceed the relevant human health objective on 18 days (a limit of 10 days applies)

### **2.3.6 Summary of Compliance with AQS Objectives**

The Vale of Glamorgan Council has reviewed results from monitoring during 2013. Pollutant concentrations were below the objectives at all monitoring locations with the exception of the :-

- Annual average NO<sub>2</sub> concentrations at Marine Scene (42ugm<sup>3</sup>). However this location does not have relevant exposure
- Ozone (O<sub>3</sub>) concentrations at Fonmon exceeded the relevant human health objective. However there is no statutory requirement to monitor ozone and consequently no need to undertake a Detailed Assessment.
- The annual average NO<sub>2</sub> concentration at Andrew Road, Llandough was close to the relevant objective at 39ugm<sup>3</sup>. This site is kerbside, adjacent to a busy traffic intersection. The tube will be relocated to the nearest available residential façade in 2014.

## **3 New Local Developments**

### **3.1 New Developments with Fugitive or Uncontrolled Sources**

All new development subject to planning controls are screened for their potential air quality impact. Where necessary air quality assessments are requested during planning consultations

The Vale of Glamorgan Council confirms that in 2013 there were no new or newly identified local developments which may have had an impact on air quality within the Local Authority area.

The Vale confirms that all the following have been considered:

- Road traffic sources
- Other transport sources
- Industrial sources
- Commercial and domestic sources
- New developments with fugitive or uncontrolled sources.



## 4 Planning Applications

The only relevant application submitted in 2013 was north of the declared Air Quality Management Area. The application was for redevelopment of a vacant site to provide 34 affordable residential units (2013/00547/OUT).

The proposed development lies between the northern edge of the AQMA (see fig 4.1) and the mini roundabout and road intersection to the north. Opposite the proposal is diffusion tube No79, Marine Scene, which consistently records annual average NO<sub>2</sub> concentrations above the objective.

As this development could introduce relevant exposure and / or a new micro-climate that could affect pollutant dispersion the developers have been required to provide an air quality assessment.

Developments further afield which could channel additional traffic through the AQMA are also being considered. during routine planning consultation.

## **5 Local Transport Plans and Strategies**

The Local Transport Plan sets the transport agenda for the Vale of Glamorgan. It highlights the Council's primary objectives for transport and provides a robust set of policies for implementation of a more integrated approach to transport. The LTP should be read in conjunction with the Vale of Glamorgan Unitary Development Plan in order to gain a clear understanding of the Council's proposals for the integration of land-use planning and transport.

In response to the Welsh Government's regional approach to planning for transport in Wales, the South East Wales Transport Alliance has published a Regional Transport Plan [RTP] which deals with all aspects of travel throughout our communities.

This document, together with its policies and proposals, replaces the individual Local Transport Plans previously developed by the ten local authorities within South-east Wales.

## 6 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:-

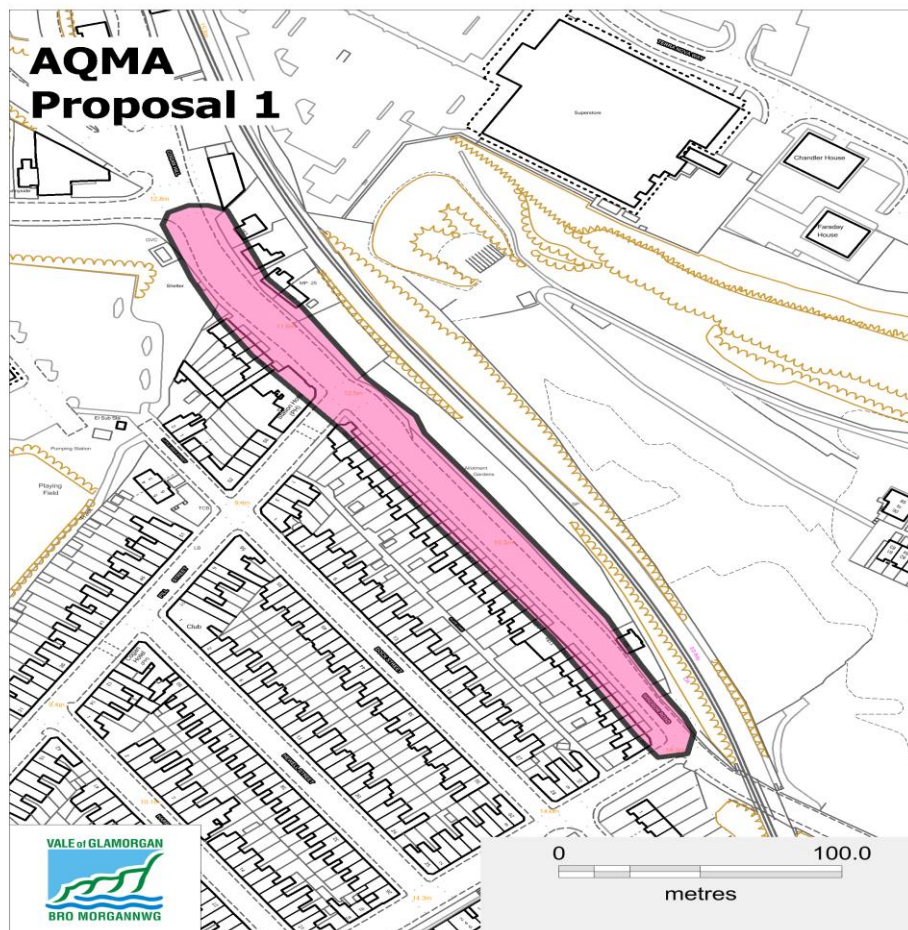
- reduced waste disposal costs
- increased efficiency
- improved processes
- aids in the achievement of national legislation

# 7 AQMA at Windsor Road, Cogan, Penarth. Update, Further Assessment & Proposed Action Plan

## 7.1 Update

The area was identified as likely to exceed the annual average objective for nitrogen dioxide by Detailed Assessment (ref 3). Here NO<sub>2</sub> is generated by road traffic. Congested traffic moves through a partial 'street canyon' with residential exposure along the western flank. Public consultation on the declaration of an AQMA closed in early 2013. An AQMA was subsequently declared by order with effect from 01<sup>st</sup> August 2013.

Figure 7.1 Map of adopted AQMA Boundaries



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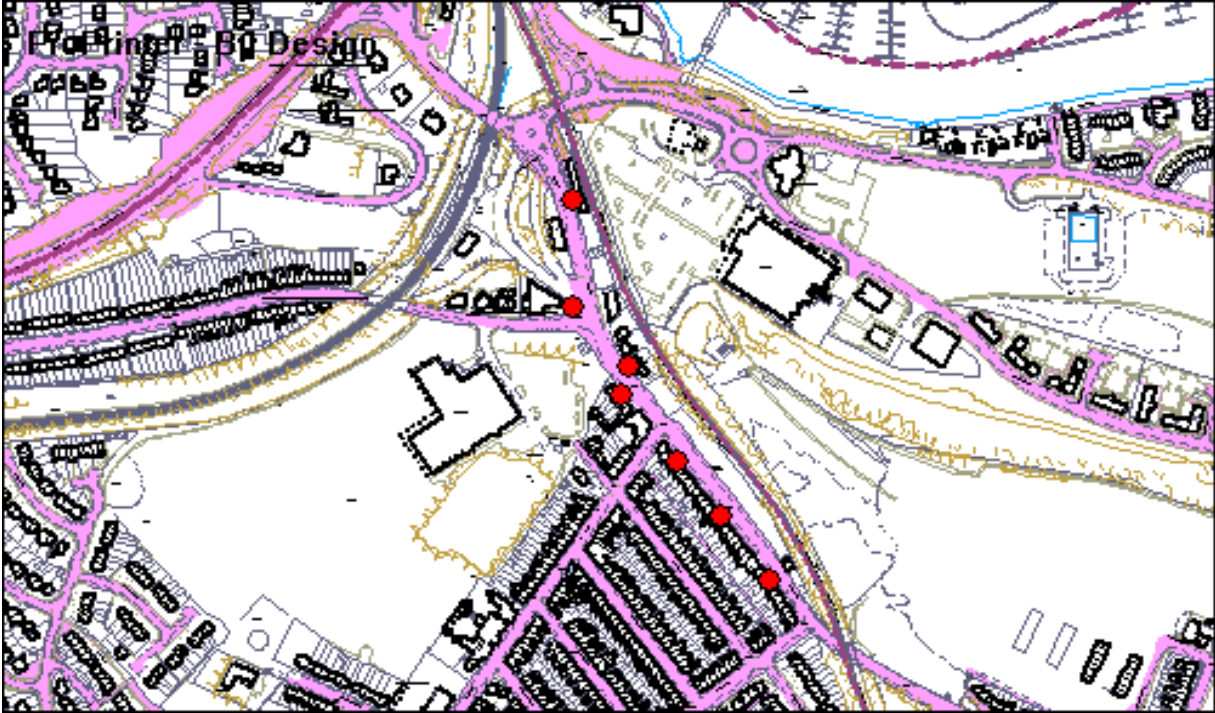
However, in 2013 nitrogen dioxide annual average concentrations within the AQMA as measured by diffusion tube (including those relocated to the facades of residential properties) complied with the objective.

On the 29<sup>th</sup> May 2013 Vale highways engineers undertook a re-signalisation of traffic lights at Cogan intersection; to the north of the AQMA, prompted by public complaint about traffic congestion. Anecdotal observations suggest that traffic flow may have improved. Whether the reduction in NO<sub>2</sub> concentrations was due to the re-signalisation will need to be explored.

The diffusion tube at Marine Scene exceeded the annual average but it lies outside and to the north of the AQMA. It is the most northern tube on the map 7.2 (below).

**Figure 7.2 Map of Diffusion Tube locations within or close to AQMA (displayed as red dots)**

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2014 Arolwg Ordhnans 100023424

Frustratingly, the intended re-commissioning of the automatic monitors for NO<sub>2</sub> and PM<sub>10</sub>, next to the Station Public House, within the AQMA, failed due to power supply issues beyond the Council's direct control. Continuous monitoring data for NO<sub>2</sub> (and also PM<sub>10</sub>) is thus regrettably absent. This work is ongoing.

There were no measured annual average concentrations of NO<sub>2</sub> >60 ug/m<sup>3</sup> so it is unlikely that the relevant hourly objective for NO<sub>2</sub> has been exceeded at any location.

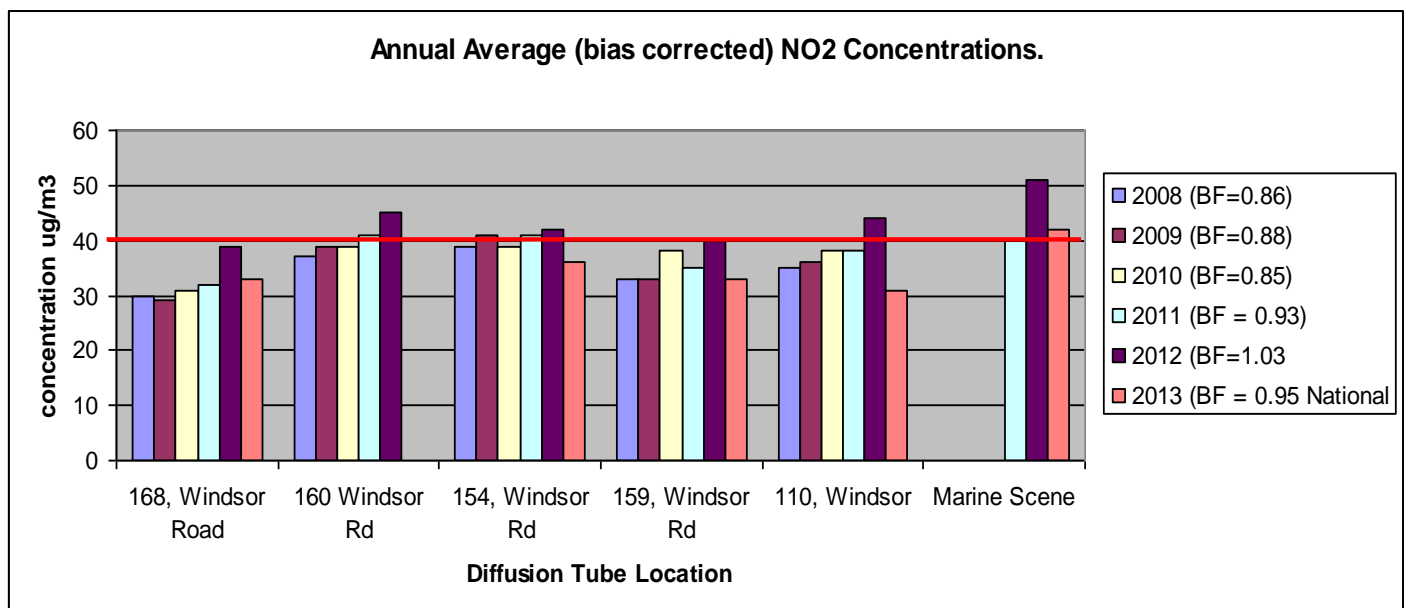
Annual average NO<sub>2</sub> (bias adjusted) concentrations 2009 to 2013 are tabulated and graphed below

**Table 7.1 Annual Average NO<sub>2</sub> (bias adjusted) concentrations 2009 to 2013**

Tube Location	2008	2009	2010	2011	2012	2013
	(BF=0.86)	(BF=0.88)	(BF=0.85)	(BF = 0.93)	(BF=1.03)	(BF = 0.95 National)
168, Windsor Rd	30	29	31	32	39	33
160, Windsor Rd	37	39	39	41	45	No data
154, Windsor Rd	39	41	39	41	42	36
159, Windsor Rd	33	33	38	35	40	33
110, Windsor Rd	35	36	38	38	44	31
Marine Scene				40	51	42

NB Red cells >40ug/m<sup>3</sup>, Amber cells >36ugm<sup>3</sup>, Blue cells <36ugm<sup>3</sup>

**Figure 7.3 Annual Average NO<sub>2</sub> (bias adjusted) concentrations 2009 to 2013**



## 7.2 Proposed AQMA Action Plan

The compliant 2013 annual average NO<sub>2</sub> concentrations within the AQMA are encouraging. However it is too early to conclude that this is a permanent change. Therefore the Vale will need to:-

- Continue to monitor NO<sub>2</sub> at current diffusion tube locations
- Fully commission the automatic NO<sub>2</sub> (and particulate PM<sub>10</sub>) monitors within AQMA
- Recommend the installation of a permanent traffic counter in the vicinity of automatic site. This will enable correlation between pollutant concentrations and traffic flow
- Comment on planning applications likely to force significant traffic through the AQMA or close to Marine Scene. Recommend conditions requiring air quality impact assessments
- There is a railway line running parallel and to the east of the AQMA. Confirm rail traffic movement data. Network Rail have stated that four passenger train movements occur per hour. If correct this is not a significant source of NO<sub>2</sub> (or PM<sub>10</sub>) when assessed against relevant criteria within Local Air Quality Management, Technical Guidance LAQM.TG (09)
- Include reference to the AQMA declaration order and map within strategic planning documents e.g. Local Development Plan

The need to undertake a formal Further Assessment (FA) is confounded by the compliant 2013 concentrations. It may be prudent to defer a FA pending another year of monitoring.

However to proceed with a FA, the following may be required:-

- Measured pollutant concentrations within the AQMA
- Regional and local background concentrations of NO<sub>2</sub> (and NO<sub>x</sub>) using background maps

- Calculation of any required reduction in NO<sub>2</sub> (and NO<sub>x</sub>) to meet objective. Although this may not be required if measures levels continue below the objective
- Obtain traffic flow data. and consider source apportionment using Emission Factor Toolkit
- Test hypothesis that reduction in annual average concentrations is due to re-signalisation e.g. increased traffic flow. A sample of traffic data is available prior signalisation and was used to inform the Detailed Assessment in 2011.



## 8 Conclusions and Proposed Actions

### 8.1 Conclusions from New Monitoring Data

The Vale of Glamorgan Council has reviewed results from monitoring during 2013. Pollutant concentrations were below the objectives in all but the following locations

- Annual average for nitrogen dioxide NO<sub>2</sub> at Marine Scene which does not have relevant exposure
- Ozone (O<sub>3</sub>) at Fonmon. However monitoring this pollutant is not a statutory requirement. Therefore there is no need to proceed to a Detailed Assessment.
- The annual average nitrogen dioxide concentration; as measured by diffusion tube. at Andrew Road, Llandough was 39 µg/m<sup>3</sup>. Located, This tube is kerbside and should be relocated to the nearest available façade with relevant exposure

Other diffusion tube locations with concentrations approaching the nitrogen dioxide annual average objective in 2012, were compliant in 2013

Annual average nitrogen dioxide concentrations within the AQMA were compliant. Further monitoring will be required to confirm a trend. A Further Assessment is also technically required as per guidance (ref 4) ) but the need is confounded by the measured compliant results. Any Further Assessment will need to confirm whether, or not, the reduced annual average concentration in 2013 was due to the re-signalisation at Cogan.

## **8.2 Conclusions relating to New Local Developments**

At the time of writing the impacts of any proposed development are being assessed. The results of which are not yet available but will be considered in future reports.

Applications introducing new relevant exposure close to Marine Scene will be expected to submit air quality impact assessments as will developments that significantly increase traffic through the AQMA

## 8.3 Proposed Actions

### For AQMA

The measured compliant 2013 annual average NO<sub>2</sub> concentrations within the AQMA is positive. However it is too early to conclude that this is a permanent change. Therefore the Vale will need to:-

- Continue to monitor NO<sub>2</sub> at current diffusion tube locations
- Fully commission the automatic NO<sub>2</sub> (and particulate PM<sub>10</sub>) monitors within AQMA
- Recommend the installation of a permanent traffic counter in the vicinity of automatic site. This will enable correlation between pollutant concentrations and traffic flow
- Confirm rail traffic data obtained from Network Rail that four passenger train movements per hour occur on the railway running parallel and to the east of the AQMA. If correct this is not a significant source of NO<sub>2</sub> (or PM<sub>10</sub>) when assessed against relevant criteria within Local Air Quality Management, Technical Guidance LAQM.TG (09)
- Comment on planning applications likely to force significant traffic through the AQMA or close to Marine Scene. Recommend conditions requiring air quality impact assessments
- Include reference to AQMA declaration order and map within strategic planning documents e.g. Local Development Plan

A Further Assessment is also required as per national guidance (ref 4) but it is confounded by the now compliant measured results. It may be prudent to actually defer a FA pending another year of monitoring.

A FA may help to confirm whether, or not, the reduced annual average concentration in 2013 was due to the re-signalisation at Cogan roundabout in May of that year. The FA would need to include:-

- Measured pollutant concentrations within the AQMA

- Regional and local background concentrations of NO<sub>2</sub> (and NO<sub>x</sub>) using background maps
- Calculation of any required reduction in NO<sub>2</sub> to meet objective. Although this may not be required if measures levels continue below the objective
- Obtain traffic flow data. and consider source apportionment using Emission Factor Toolkit
- Test hypothesis that reduction in annual average concentrations is due to re-signalsation e.g. has traffic flow increased. A sample of traffic data is available prior signalisation and was used to inform the Detailed Assessment in 2011.

### **General Actions**

- Detailed Assessments are not required for any pollutants
- Continue to monitor pollutants at current locations. Continue to review sites with regard to any change in relevant exposure.
- Consider relocating diffusion tubes where current data indicates low compliant concentrations.
- Re-deploy the kerbside diffusion tube at Andrew Road to façade of nearest available relevant exposure
- Ozone monitoring is not mandatory but data at Fonmon highlighted non-compliance with the human health objective. Continued surveillance is recommended.
- Review viability of both automatic particulate monitors (PARTISOL and 'Steetbox') and continue to deploy if capable
- Continue to screen planning applications for adverse air quality impacts and require planning conditions to model and assess if required.
- Proceed to Update & Screening Assessment in 2015

## 9 References

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[http://www.valeofglamorgan.gov.uk/en/living/environment/green\\_dragon/green\\_dragon.aspx](http://www.valeofglamorgan.gov.uk/en/living/environment/green_dragon/green_dragon.aspx)

# Appendix 1: QA:QC Data

## Diffusion Tube Bias Adjustment Factors (BF)

For 2013 year a national bias factor was applied.

Gradko	20% TEA in water	2013	Overall Factor <sup>3</sup> (24 studies)			Use	0.95
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Ref:

<http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

## Discussion of Choice of Factor to Use

In previous years a local bias factor (BF) was obtained and applied from the Penarth automatic monitoring site. Unfortunately in 2013 the Penarth automatic monitoring station data was not available. Therefore a national bias factor was applied.

Gradko	20% TEA in water	2013	Overall Factor <sup>3</sup> (24 studies)			Use	0.95
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For information and in the absence of a local 2013 local BF we also notionally applied the 2012 BF (1.03) to 'test' the extent of the risk of exceedence of the annual average.

In this scenario all measured concentrations increased. Only Marine Scene and Andrew Road Llandough (a kerbside site) exceeded the annual average objective. Both locations do not have relevant exposure.

Annual average data with the applied 2013 national BF and notional 2012 BF are tabulated below. Red cells indicate concentrations >40ugm<sup>3</sup>, Amber cells indicate concentration >36ugm<sup>3</sup>

**NB Only data corrected using the 2013 national BF is used in the report.**



## QA/QC of Automatic Monitoring

Produced by Ricardo-AEA on behalf of Vale of Glamorgan Council

# FONMON 01 January to 31 December 2013

These data have been fully ratified by Ricardo-AEA

POLLUTANT	NO <sub>x</sub>	NO	NO <sub>2</sub>	PM <sub>10+</sub>	O <sub>3</sub>	SO <sub>2</sub>
Number Very High*	-	-	0	0	0	0
Number High*	-	-	0	0	3	0
Number Moderate*	-	-	0	4	228	0
Number Low*	-	-	7400	7763	8411	34010
Maximum 15-minute mean	598 µg m <sup>-3</sup>	315 µg m <sup>-3</sup>	120 µg m <sup>-3</sup>	107 µg m <sup>-3</sup>	186 µg m <sup>-3</sup>	149 µg m <sup>-3</sup>
Maximum hourly mean	529 µg m <sup>-3</sup>	280 µg m <sup>-3</sup>	101 µg m <sup>-3</sup>	107 µg m <sup>-3</sup>	182 µg m <sup>-3</sup>	80 µg m <sup>-3</sup>
Maximum running 8-hour mean	236 µg m <sup>-3</sup>	114 µg m <sup>-3</sup>	61 µg m <sup>-3</sup>	71 µg m <sup>-3</sup>	171 µg m <sup>-3</sup>	34 µg m <sup>-3</sup>
Maximum running 24-hour mean	86 µg m <sup>-3</sup>	39 µg m <sup>-3</sup>	45 µg m <sup>-3</sup>	64 µg m <sup>-3</sup>	114 µg m <sup>-3</sup>	14 µg m <sup>-3</sup>
Maximum daily mean	81 µg m <sup>-3</sup>	38 µg m <sup>-3</sup>	40 µg m <sup>-3</sup>	61 µg m <sup>-3</sup>	113 µg m <sup>-3</sup>	13 µg m <sup>-3</sup>
99.8th percentile of hourly means	-	-	71 µg m <sup>-3</sup>	-	-	-
90th percentile of daily means	-	-	-	28 µg m <sup>-3</sup>	-	-
Average	16 µg m <sup>-3</sup>	3 µg m <sup>-3</sup>	11 µg m <sup>-3</sup>	17 µg m <sup>-3</sup>	54 µg m <sup>-3</sup>	3 µg m <sup>-3</sup>
Data capture	84.5 %	84.5 %	84.5 %	88.4 %	98.5 %	98.4 %

\*Banding data is based on the pre 2013 DAQI methodology  
+ PM<sub>10</sub> as measured by a FDMS (No Correction)

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.

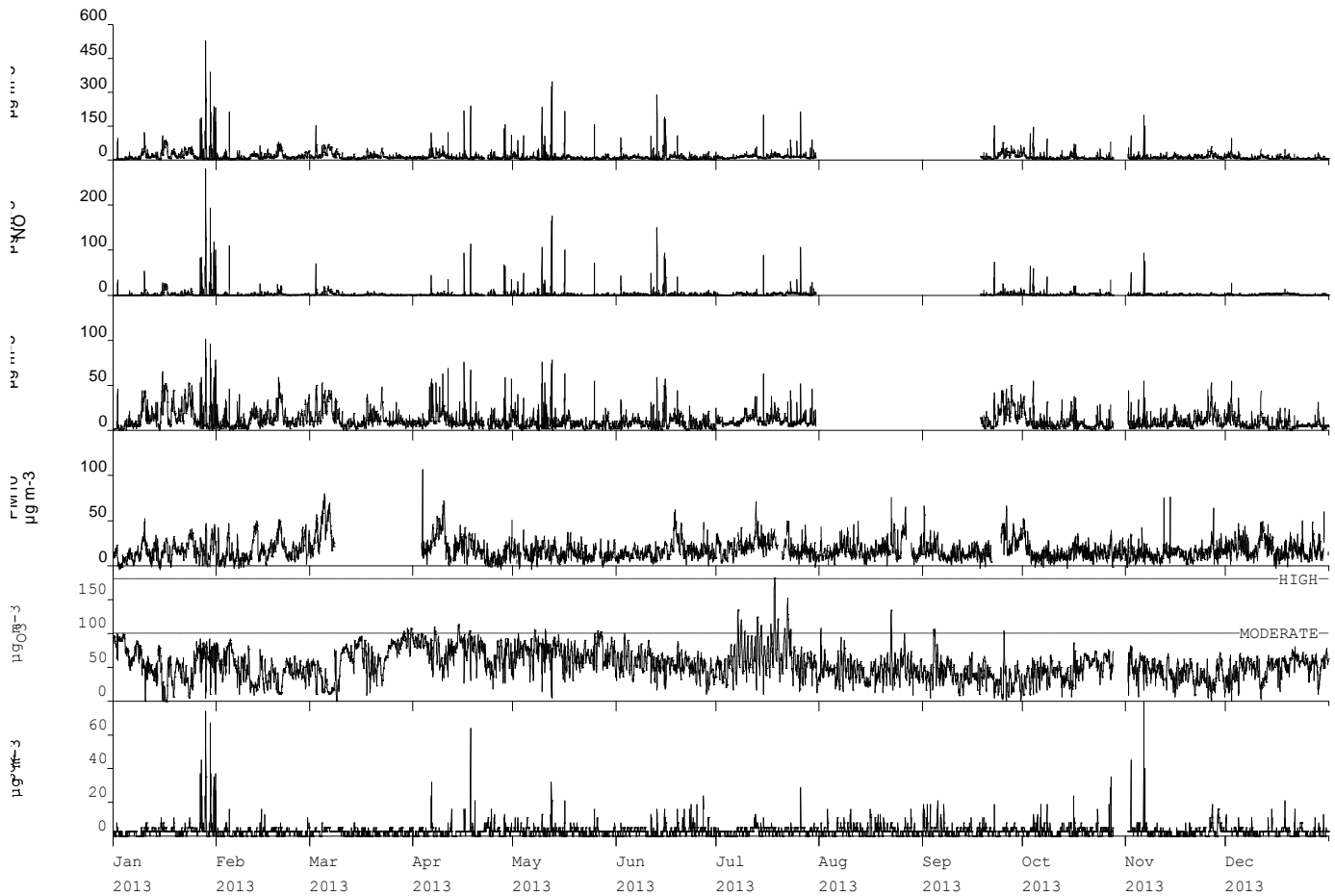
NO<sub>x</sub> mass units are NO<sub>x</sub> as NO<sub>2</sub> µg m<sup>-3</sup>

Pollutant	Air Quality (Wales) Regulations 2000 and (Amendment) Regulations 2002	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m <sup>-3</sup>	No	-
Nitrogen Dioxide	Hourly mean > 200 µg m <sup>-3</sup>	0	0
PM <sub>10</sub> Particulate Matter (Gravimetric)	Daily mean > 50 µg m <sup>-3</sup>	2	2
PM <sub>10</sub> Particulate Matter (Gravimetric)	Annual mean > 40 µg m <sup>-3</sup>	No	-
Ozone	Running 8-hour mean > 100 µg m <sup>-3</sup>	106	18
Sulphur Dioxide	15-minute mean > 266 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Hourly mean > 350 µg m <sup>-3</sup>	0	0
Sulphur Dioxide	Daily mean > 125 µg m <sup>-3</sup>	0	0



Produced by Ricardo-AEA on behalf of Vale of Glamorgan Council

## Fonmon Hourly Mean Data for 01 January to 31 December 2013



Date Created: 28/03/2014

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Produced by Ricardo-AEA on behalf of Vale of Glamorgan Council

## DINAS POWYS ROADSIDE 01 January to 31 December 2013

These data have been fully ratified by Ricardo-AEA

POLLUTANT	NO <sub>x</sub>	NO	NO <sub>2</sub>
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	8127
Maximum 15-minute mean	705 µg m <sup>-3</sup>	414 µg m <sup>-3</sup>	149 µg m <sup>-3</sup>
Maximum hourly mean	661 µg m <sup>-3</sup>	383 µg m <sup>-3</sup>	96 µg m <sup>-3</sup>
Maximum running 8-hour mean	279 µg m <sup>-3</sup>	150 µg m <sup>-3</sup>	67 µg m <sup>-3</sup>
Maximum running 24-hour mean	138 µg m <sup>-3</sup>	68 µg m <sup>-3</sup>	55 µg m <sup>-3</sup>
Maximum daily mean	137 µg m <sup>-3</sup>	62 µg m <sup>-3</sup>	52 µg m <sup>-3</sup>
Average	40 µg m <sup>-3</sup>	13 µg m <sup>-3</sup>	21 µg m <sup>-3</sup>
Data capture	92.8 %	92.8 %	92.8 %

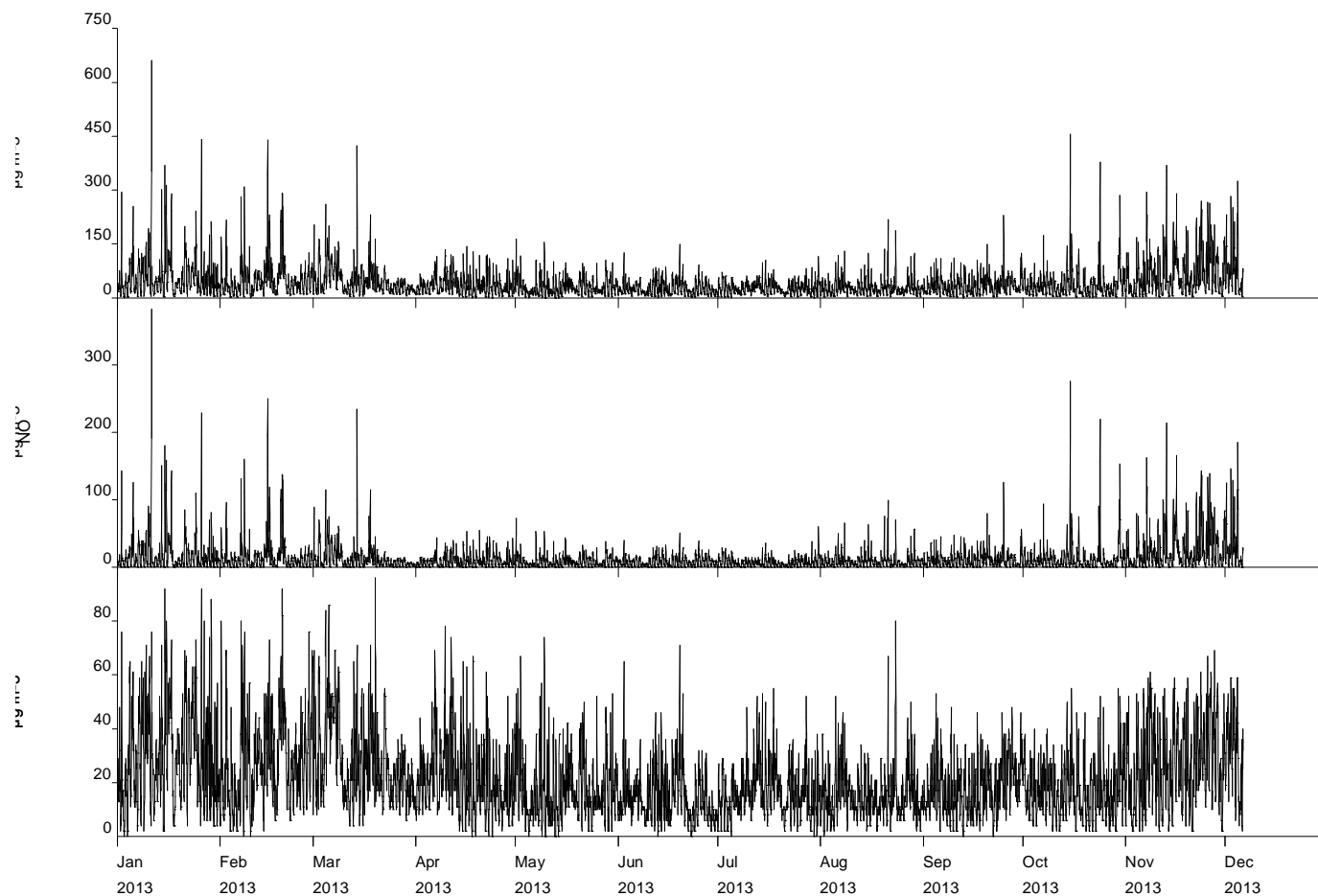
\*Banding data is based on the pre 2013 DAQI methodology

All gaseous pollutant mass units are at 20°C and 1013mb. NO<sub>x</sub> mass units are NO<sub>x</sub> as NO<sub>2</sub> µg m<sup>-3</sup>

Pollutant	Air Quality (Wales) Regulations 2000 and (Amendment) Regulations 2002	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m <sup>-3</sup>	No	-
Nitrogen Dioxide	Hourly mean > 200 µg m <sup>-3</sup>	0	0

Produced by Ricardo-AEA on behalf of Vale of Glamorgan Council

## Dinas Powys Roadside Hourly Mean Data for 01 January to 31 December 2013



Date Created: 28/03/2014

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# Diffusion Tube Technical Data Sheet: TDS 1

## DIF 100 RTU - NITROGEN DIOXIDE (NO<sub>2</sub>)

This tube is designed for passively monitoring gaseous airborne Nitrogen dioxide.

**Description:** Acrylic tube fitted with coloured and white thermoplastic rubber caps. The coloured cap contains the absorbent. The concentrations of Nitrite ions and hence NO<sub>2</sub> chemically adsorbed are quantitatively determined by UV/ Visible Spectrophotometry with reference to a calibration curve derived from the analysis of standard nitrite solutions (UKAS Accredited Methods). Suitable for carrying out spatial or localized assessments for NO<sub>2</sub> in ambient air or workplace monitoring. It can be used for co-location projects alongside an automatic analyzer to obtain bias correction factors. Clips and straps are not included and must be ordered separately.

**Tube Dimensions:** 71.0mm length x 11.0mm internal diameter.

**Absorbent:** Two preparations of Triethanolamine (TEA) absorbent are available:

20% Triethanolamine / De-ionised Water - \*GREY CAP

50% Triethanolamine / Acetone – \*RED CAP

**Recommended Exposure Periods:** 2 -4 weeks.

**Air Velocity:** Influence of Wind Speed < 10% between 1.0 and 4.5 msec<sup>-1</sup> (\* based on original data).

**Storage:** Store in a dark, cool environment preferably between 5-10°C.

**Shelf Life:** 12 weeks from preparation date.

**Desorption Efficiency:** d = 0.98 (determined using N.I.S.T. Standard Analytes). TDS 1:V1 March 2012

**Limit of detection:**

20%TEA/Water – less than 1.5 ugm<sup>-3</sup> over a 4-week exposure period. Specific values available upon request.

50%TEA/Acetone – less than 2 ugm<sup>-3</sup> over a 4-week exposure period. Specific values available upon request.

**Analytical Expanded Measurement Uncertainty:** available upon request.

**Relevant Standards:** BS EN 13528 Parts 1-3: 2002/3

**Reference document:** ED48673043 Issue-1A Feb 2008 – AEA Energy and Environment

**Special Factors:** Potential interference from Nitrous Acid , Peroxy Acetyl Nitrate, which could increase levels of nitrate.

### Nitrogen Dioxide In Diffusion Tubes By U.V.Spectrophotometry

Results have been corrected to a temperature of 293 K (20°)			
Overall M.U.	7.8% +/-	Limit of Detection	0.017mgNO <sub>2</sub>
Tube Preparation : 20% TEA / Water			
Analysed on UV 04 Camspec M550			

### Analysis carried out in accordance with documented in-house Laboratory Method GLM7

The Diffusion Tubes have been tested within the scope of Gradko International Ltd. Laboratory Quality Procedures. Calculations and assessments involving the exposure procedures and periods provided by the client are not within the scope of our UKAS Accreditation. Those results obtained using exposure data shall be indicated by an asterisk. Any queries concerning the data in this report should be directed to the Laboratory Manager Gradko International Ltd. This report is not to be reproduced, except in full, without the written permission of Gradko International Ltd.

### Assessing the performance of a laboratory

End users of analytical services from laboratories should satisfy themselves that such laboratories meet their requirements. A number of factors ideally need to be considered including

- Expertise and skills of staff within the laboratory?
- Does the laboratory follow accepted measurement standards, guidance?
- Does the laboratory operate a robust internal quality control system?
- Is the laboratory third party accredited to relevant standards such as ISO 17025?
- Does the laboratory successfully participation in relevant external proficiency testing schemes?
- How good is their customer care (communication, turnaround times, pricing etc)?

Participation therefore in an external proficiency-testing scheme such as WASP represents but one factor in such considerations.

Participation in a single round of an external proficiency-testing scheme represents but a "snap-shot" in time of the analytical quality that a laboratory can produce. It is more intuitive therefore to consider performance over a number of rounds.

Following on from above, therefore over a rolling five round WASP window, one would expect that 95 % of laboratory results should be  $\pm 2$ . If this percentage is substantially lower than 95 % for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have significant systematic sources of bias in their assay.

A summary of the WASP performance for each laboratory participating in the scheme is provided in Table 1. This table provides the percentage of results where the z-score was between -2 and +2 which is deemed to be a satisfactory z-score.

### Laboratory summary performance for WASP NO2 PT rounds 117 - 124

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent HSL WASP NO2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of  $\pm 2$  as defined above.

WASP Round conducted in the period	WASP R117	WASP R118	WASP R119	WASP R120	WASP R121	WASP R122	WASP R123	WASP R124
Gradko	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
International								

## Appendix 2: 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<sub>x</sub> emissions have fallen in line with predictions made a decade previously, the composition of NO<sub>x</sub> 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<sub>x</sub> to NO<sub>2</sub> relationships.

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

## Appendix 3: Glossary

### Standards:

A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.

### Objectives:

A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date, taking into account costs, benefits, feasibility and practicality. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides.

### Exceedence:

A period of time where the concentration of a pollutant is greater than the appropriate air quality objective.

### Relevant Exposure:

Members of the public who are likely to be regularly present and exposed over the averaging period of the objective.

AQMA: Air Quality Management Area

### PM10:

Small airborne particles, more specifically particulate matter less than 10 micrometers in aerodynamic diameter.

NO<sub>x</sub>: Nitrogen oxides

NO<sub>2</sub>: Nitrogen dioxide.

mg/m<sup>3</sup>: Microgrammes per cubic metre of air.

### Urban Background:

An urban location distanced from sources and therefore broadly representative of city-wide background conditions (DEFRA and the DAs, 2003).

### Roadside:

A site sampling between 1m of the kerbside of a busy road and the back of the pavement. Typically this will be within 5m of the road, but could be up to 15m.