
# 2018 Annual Air Quality Progress Report for Bridgend County Borough Council

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

August 2018

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# Executive Summary: Air Quality in Our Area

## Air Quality in Bridgend County Borough Council (BCBC)

Local authorities have a statutory duty under Part IV of the Environment Act 1995 & Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 to manage local air quality. The Local Air Quality Management (LAQM) process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not air quality objectives are likely to be achieved.

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

In line with the Local Authorities' statutory duties under Part IV of the Environment Act 1995, Shared Regulatory Services (SRS) on behalf of BCBC undertakes regular air quality monitoring at specifically allocated locations across Bridgend using automated and non-automated principles for ambient air nitrogen dioxide ($NO_2$), particulate matter ($PM_{10}$) & sulphur dioxide ($SO_2$).

With regards to prioritising ambient air quality sampling locations, the Council adopts a risk based approach to any allocation of monitoring sites, considering the requirements of The Department for Environment, Food and Rural Affairs' (Defra) Local Air Quality Management Technical Guidance 16, February 2018 (previously April 2016). The designated monitoring locations are assigned based on relevant exposure and where the certain Air Quality Objective levels for a particular pollutant applies. TG(16) states that annual mean objectives should apply at "All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, car homes etc."

**Automatic Monitoring Sites-** BCBC has two automatic air quality monitoring sites which are located at Ewenny Cross Roundabout and Rhiwceilog (Rockwool Ltd). The sites monitor on a 24/7 basis measuring levels of $NO_2$, $PM_{10}$ & $SO_2$.

In October 2017, due to continued compliance for $SO_2$, following permissions from SRS on behalf of BCBC and NRW, Rockwool Ltd has relocated its $SO_2$ monitor to the vestry of Soar Chapel, Rhiwceiliog.

**Non-automatic Monitoring Sites-** In 2017 BCBC operated 30 specifically allocated non automatic monitoring sites in Bridgend which monitor levels of Nitrogen Dioxide ($NO_2$).

The 2017 Annual Progress Report (APR) outlined that the $NO_2$ non-automatic monitoring network utilised in Bridgend had been expanded for 2017. Ten additional non-automatic NO2 monitoring locations were commissioned based on known areas of particularly elevated traffic flows, introduction of traffic management systems and foreseeable development, all with nearby relevant exposure. These newly commissioned sites included Park Street, Coity Road, Cowbridge Road and Bridgend Town Centre's Market Street.

Previous annual LAQM reporting for Bridgend has highlighted continued compliance with national air quality objectives as prescribed in the Air Quality (Wales) Regulations 2000 and the Air Quality (Amendment) (Wales) Regulations 2002. Therefore there have been no requirements to implement any Air Quality Management Areas (AQMA) in Bridgend. However, since the commissioning of ten non-automatic $NO_2$ monitoring locations in 2017, a review of the yearly datasets indicate elevated and exceeding annual average levels of $NO_2$ at sensitive receptor locations along Park Street, Bridgend. **Figure 1.1** illustrates the locations of the Park Street monitors in 2017.

**Figure 1.1**- 2017 $NO_2$ Diffusion Tube Monitors Park Street


The two $NO_2$ monitoring locations situated on Park Street highlight elevated and exceeding annual average levels of $NO_2$ when compared to the annual average $NO_2$ objective set at 40µg/$m^3$;

**OBC-103-** 39 Park Street **(37.6µg/m3)**
**OBC-104-** 51 Park Street **(41.5µg/m3)**

Despite the highlighted area of concern, compliance with the air quality objectives was achieved at all other monitoring locations.

At the time of writing this report, BCBC's network of $NO_2$ diffusion tubes has been assessed, whereby the network has been expanded to encapsulate a wider foot print of Bridgend. Existing monitoring locations have also been amended and improved to represent worse case exposure. The new areas of monitoring now include Pencoed and Porthcawl and therefore results from these areas will be examined and reported in BCBC's 2019 APR.

SRS & BCBC recognises that in order to tackle these known pockets of poor air quality, a more suitable and constructive approach is required to target the whole of Bridgend, improving overall air quality. With the implementation of correct long term measures, highlighted road networks and identified areas of concern should be able to benefit from improved air quality. The recent Welsh Government guidance on local air quality management recommended two clear goals:

(1) achieve compliance with the national air quality objectives in specific hotspots and
(2) reduce exposure to pollution more widely, so as to achieve the greatest public health benefit.

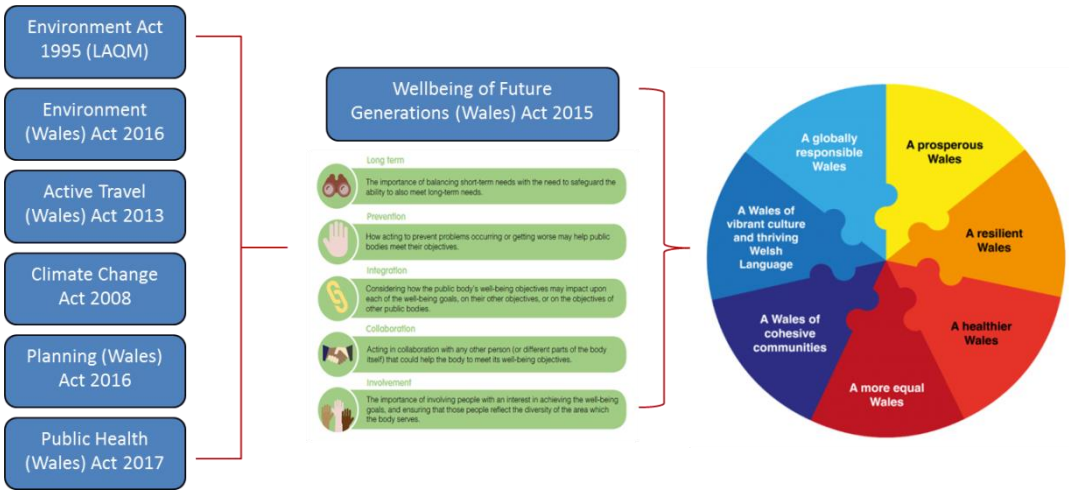
Collective efforts, therefore, should look beyond targeted action in localised air pollution hotspots and do this in parallel with universal action to reduce risks for everyone.

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

As **Figure 1.2** illustrates below, the Act is the legislative vehicle for "Health in all Policies in Wales" and provides the underpinning principles for all policy and decision making, including economic

development, in Wales. Reducing air pollution, health risks and inequalities can help contribute to most, if not all, of the well-being goals. As such, the Act presents excellent opportunities to change policy and practice to enhance air quality management arrangements across Bridgend (and wider).

**Figure 1.2- The Well- being of Future Generations (Wales) Act 2015 Matrix**




## Actions to Improve Air Quality

To date BCBC has not declared an AQMA, therefore no further action was required to address air quality management. SRS & BCBC, in accordance with Welsh Government's (WG) Local Air Quality Management Policy Guidance, July 2017, looked to improve its monitoring capability and strengthen the datasets captured in 2017. As referenced in the policy guidance;

***"the national air quality objectives are not 'safe' levels of air pollution. Rather they represent a pragmatic threshold above which government considers the health risks associated with air pollution are unacceptable."***

As mentioned, in an effort to broaden its air quality understanding BCBC acquired additional non-automatic $NO_2$ monitoring sites in 2017 and also recently in 2018 amended and improved the network.

It was also noted in the 2017 APR that quality issues were apparent with the automatic monitoring station installed at Ewenny Cross Roundabout. Due to staffing requirements routine calibrations needed every two weeks, as per the requirements of LAQM TG(16), Section 7.170 were unable to be fulfilled. This consequently impacted the ability to undertake a site specific co-location study. In October 2017, the Specialist Services Team acquired additional staff resource to assist with local air quality monitoring. Unfortunately this position only came into place in the later part of the year, whereby inconsistency with calibrations was prevalent for much of 2017.

# Local Priorities and Challenges

Based on the 2017 figures, under Part IV of the Environment Act 1995 & Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, according to the statutory requirements of LAQM a DRAFT Air Quality Action Plan (AQAP) must be implemented within 18 months of declaring an AQMA. In accordance with WG's Policy Guidance for LAQM;

***4.12 A draft action plan must be produced for review by the Welsh Government within 18 months of the coming-into-force date of the AQMA order, and the action plan must be formally adopted before two years have elapsed. A Local Authority failing to produce a draft action plan for review by the Welsh Government within two years of declaring or extending an AQMA will, in the absence of a compelling explanation, be issued with a direction from the Welsh Ministers under section 85(3) of the 1995 Act.***

During 2018, monitoring for $NO_2$ has been increased further along Park Street, with an additional two NO2 monitoring sites implemented. **Figure 1.3** illustrates the current 2018 network of monitoring for Park Street including the additional two locations.

**Figure 1.3**- 2018 $NO_2$ Diffusion Tube Monitors Park Street


Although a full dataset is not available for 2018, it is evident that site **OBC-110,** situated at the residential facades of 101/103 Park Street, figures are elevated and there is the likelihood of exceedances of the air quality objectives set for $NO_2$.

In line with Welsh Governments Policy Guidance, following submission and approval of the 2018 Annual Progress Report, SRS & BCBC will need to legally declare an Air Quality Management Area (AQMA) for the Park Street Area, and this will be accompanied by an appropriate technical report setting out the reasons for the declaration.

Given that a number of residential properties will be included in the boundary of AQMA, SRS & BCBC will need to engage with these residents in a formal and effective communications exercise in order that the reasons and the implications of an AQMA can be adequately explained to them and the wider community as necessary.

Following the declaration of the AQMA, the Council will have up to 24 months to formalise an Action Plan in order to implement appropriate measures to try and improve/ reduce the NO2 levels within the AQMA.

As part of the action plan a thorough understanding for air quality levels and trends will need to be gathered to inform any mitigation measures implemented. Therefore it is envisaged that the Ewenny Cross Roundabout automatic monitoring station will be installed in an appropriate location along Park Street which will measure $NO_2$ and $PM_{10}$. Progress has already started with the allocation of a new sampling location with site visits undertaken and acquiring a contracted service to support data handling and ratification. At the time of writing this report consultants have successfully started the data handling of data collected at Ewenny Cross Roundabout.

The development of a suitable action plan will require cross departmental working, especially from colleagues in Transportation, Highways and Planning.

In order to demonstrate the effectiveness of any proposed actions, detailed air quality and transport modelling will likely be required to support any decisions to implement the preferred action measures.

## How to Get Involved

BCBC welcomes any correspondence relating to air quality enquiries or concerns. Shared Regulatory Services (SRS) Specialist Services Team represents BCBC for air quality and therefore is contactable via the webpage www.srs.wales/en/Home.aspx. Monthly average monitoring data for nitrogen dioxide ($NO_2$) is available at https://airquality.gov.wales/

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# 1. Actions to Improve Air Quality

## 1.1 Previous Work in Relation to Air Quality

### First Round of Review and Assessment

Between 1999 and 2001, Bridgend County Borough Council published reports corresponding to stages 1, 2 and 3 of the first round of review and assessment of air quality. Seven key pollutants were examined (carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, fine particles ($PM_{10}$) and sulphur dioxide). These assessments predicted no exceedences of any of the objectives. It concluded that in order to fulfil the requirements of the Environment Act 1995, air quality should be reviewed and assessed again in 2003.

### Second Round of Review and Assessment

Following new technical and policy guidance issued by Defra, Bridgend County Borough Council published its first Updating and Screening Assessment in June 2003. Of the seven pollutants subjected to the updating and screening assessment process, it was concluded that the likelihood of the air quality objectives for carbon monoxide, benzene, 1,3-butadiene, lead and sulphur dioxide being exceeded was negligible and that it was not necessary to carry out a detailed assessment of any of these pollutants. However, the updating and screening assessment for nitrogen dioxide and $PM_{10}$ revealed gaps in the data gathered and concluded that there was evidence to suggest non-compliance with the air quality objectives for $PM_{10}$ and $NO_2$ at three locations resulting from road traffic emissions. It was suggested that there was a requirement to continue to a Detailed Assessment for the following locations;

- A48 Ewenny Cross, Bridgend
- The western end of Cowbridge Road, Bridgend
- The western end of the Bridgend Cross Valley Link Road.

In addition it was also recommended to carry out a co-location exercise to determine the bias correction for the passive nitrogen dioxide detector tubes provided and analysed by Severn Trent Laboratories.

In July 2005, Bridgend County Borough Council's Local Air Quality Management Progress Report recommended that;

-All currently held data should be, as far as possible, ratified.

-Data shall continue to be gathered from the three sites identified in the June 2003 USA to enable conclusions to be drawn on the current and future air quality at these locations. The results will be presented in a Detailed Assessment of Air Quality at these locations by 31st December 2005.

-The mobile $PM_{10}$ and $NO_x$ monitoring station should be added to the Welsh Air Quality Forum Network of sites and receive appropriate Quality Assurance and Quality Control (QA/QC) to validate any data gathered.

In March 2006 a Detailed Assessment for Nitrogen Dioxide and Particles ($PM_{10}$) was produced in March 2006 and concluded that the current air quality objectives for nitrogen dioxide and particles $PM_{10}$ are being met and that the 2010 Air Quality Daughter Directive limit value for nitrogen dioxide will also be achieved at the three road junctions assessed. However, it also recommended that monitoring data from the three road junction sites identified in the June 2003 USA should continue to be gathered to enable assessment of future air quality at these locations.

## Third Round of Review and Assessment

Bridgend County Council published its second USA in May 2006. The assessment concluded that there was no requirement to proceed to a detailed assessment for any pollutant in Bridgend County Borough.

The Council published Progress Reports in 2007 and 2008. Both reports coincided with one another, issuing similar conclusions and recommendations. They indicated that no air quality objectives prescribed in the Air Quality (Wales) Regulations 2000 and the Air Quality (Amendment) (Wales) Regulations 2002 will be breached at any relevant locations.

In terms of monitoring locations, the reports highlighted the following;

-Data on $NO_2$ concentrations will continue to be gathered at relevant locations adjacent to A48 Ewenny Cross, the western end of Cowbridge Road and at Tondu Road on the western end of the Bridgend Cross Valley Link Road.

-Monitoring of $PM_{10}$ and $NO_2$ will continue at Kenfig Hill adjacent to the opencast coal site operated by Celtic Energy Ltd.

-Monitoring of $NO_2$ and sulphur dioxide ($SO_2$) will take place at relevant locations adjacent to Rockwool Ltd, Wern Tarw, Pencoed when the new factory extension becomes operational.

## Fourth Round of Review and Assessment

The Bridgend County Council published its third USA in June 2009. There was no evidence of any significant breaches of the air quality objectives prescribed in the Air Quality (Wales) Regulations 2000 and the Air Quality (Amendment) (Wales) Regulations 2002, at any relevant locations. The report did however draw attention upon an ongoing trend for $NO_2$ concentrations at Ewenny Cross, Bridgend, and Tondu Road, Bridgend, at the façade of the nearest houses, to be at or close to the air quality objective for $NO_2$ for 2007.'' It was decided that monitoring would continue at the two highlighted sites as part of an ongoing Detailed Assessment to be produced later that year.

The 2010 Progress Report stated the following;

The conclusions for the new monitoring data in relation to Ewenny Cross and Tondu Rd show that Ewenny Cross has exceeded the annual mean National Air Quality Objective for nitrogen dioxide ($NO_2$) and this will be reported in depth in the Detailed Assessment to be produced later this year.

The results for nitrogen dioxide at Tondu Rd show that the annual mean National Air Quality Objective for nitrogen dioxide ($NO_2$) has not been exceeded. However, in view of the results which are very close to the objective, monitoring will continue at this location for at least another year.

There are no new local developments likely to give rise to a significant impact on air quality within the County Borough.

There are no other issues that give rise to concern in terms of impact on air quality within the County Borough.

The Detailed Assessment for Ewenny Cross is near completion and will be produced in May 2010. A further progress report will be produced early in 2011.

The 2010 Detailed Assessment for Ewenny Cross was subsequently submitted and stated:

This Detailed Assessment of Air Quality has shown that the current air quality objectives for nitrogen dioxide ($NO_2$) are not being met at the south western sector of Ewenny Cross, Bridgend but are being met at the Bridgend Cross Valley Link, Tondu Road, Bridgend.

In view of the above, the following recommendations have been made:

-Monitoring should continue at its present level at the Bridgend Cross Valley Link, Tondu Road and at Ewenny Cross, Bridgend.

-A continuous monitor, together with a meteorological station, should be installed at or as near to the south western sector of Ewenny roundabout as is practical.

Following discussions with Welsh Assembly Government and UWE it was decided that the Detailed Assessment should remain ongoing and that any decision to declare an AQMA for Ewenny Cross should be delayed until continuous monitoring data for 2010 has been collated and analysed.

The 2011 Progress report stated the following:

Following the Detailed Assessment submitted in June 2010 and the response from WAG, the Authority decided, in consultation with WAG and UWE to defer a decision to declare an AQMA for Ewenny Cross until a full calendar year of continuous monitoring data had been collated and analysed.

Due to equipment failure and contractual issues, continuous monitoring at Ewenny Cross has been significantly delayed. Continuous sampling commenced in March 2011 as did a diffusion tube co-location study.

The conclusions from annualised monitoring data obtained since the last report show that one sampling point at Ewenny Cross has exceeded the annual mean National Air Quality Objective for nitrogen dioxide ($NO_2$). The other nine around the Cross remain within the annual mean National Air Quality Objective.

The results for nitrogen dioxide diffusion tube monitoring at Tondu Rd show that the National Air Quality Objective's annual mean for nitrogen dioxide ($NO_2$) has not been exceeded. However, results are very close to the objective and monitoring will continue at this location for another year.

No continuous $PM_{10}$ data could be retrieved for South Cornelly or Kenfig Hill due to equipment failure.

The nitrogen dioxide diffusion tube sampling locations in Maesteg town centre which were set up in July 2010 following local concerns have shown to date, an exceedance at one sampling point. As a result, more monitoring location points have been put in place and will be reported upon in the next USA report.

## Fifth Round of Review and Assessment

Bridgend County Council published its fourth USA May 2012. In addition a Detailed Assessment was submitted for Ewenny Cross. The reports identified;

-There were no indications of any significant breaches of the air quality objectives prescribed in the Air Quality (Wales) Regulations 2000 and the Air Quality (Amendment) (Wales) Regulations 2002.

-There was an exceedence of the objective for Nitrogen Dioxide at one location in Maesteg. However, this was marginal and the other sample points in the immediate vicinity were below the National Objectives for Nitrogen Dioxide. Monitoring continued at this site and extra sample sites, in addition to those already in place were set up where practicable. The data so far for this location, in view of the above, does not suggest that a Detailed Assessment is necessary at this time, although this will be subject to review as more data is collected and analysed.

-The positioning of an Automated Continuous NOx Analyser and co-location study at Ewenny Cross has provided robust information as to the air quality situation and indicates that Nitrogen Dioxide levels do not exceed the National Air Quality Objectives. This Automated Continuous NOx Analyser will be retained at this site to gather more data over the coming year.

-The Detailed Assessment 2012 completed in tandem with this Report concluded that it is not necessary at this point in time to proceed with declaring an Air Quality Management Area at

Ewenny Cross. The situation will continue to be monitored by way of the co-location study utilising the Automated Continuous NOx Analyser and the numerous Nitrogen Dioxide Diffusion Tube sites situated at the Cross

The 2013 Progress report provided the following findings and recommendations;

The Report has not identified a need to proceed to a Detailed Assessment for any pollutant.

The Report has identified a need to continue monitoring for Nitrogen Dioxide in Maesteg Town Centre.

Monitoring of Nitrogen Dioxide and $PM_{10}$ will continue at the same sites as at the end of 2012.

The Automated Continuous NOx Analyser and co-location study will continue at Ewenny Cross Roundabout for this year to acquire more robust data. In the light of the acquired data, the positioning and possible relocation of the Automatic Monitoring Station will be decided at the end of 2013.

Bridgend County Borough Council will submit a Progress Report in May 2014.

The 2014 Progress report stated the following:

With the exception of Ewenny Cross Roundabout as highlighted above, the Progress Report has not identified a need to consider proceeding to a Detailed Assessment for any other pollutant.

Monitoring of Nitrogen Dioxide and $PM_{10}$ will continue at the same sites as at the end of 2013.

Bridgend County Borough Council will submit a progress report in May 2015.

## Sixth Round of Review and Assessment

Bridgend County Council published its fourth USA September 2015. The assessment identified no need to proceed to a Detailed Assessment for any pollutant.

2016 Annual Progress Report highlighted no concerns and no objectives were exceeded.

### 2017 Annual Progress Report

BCBC's 2017 Annual Progress Report highlighted that air quality within Bridgend County Borough continued to meet the relevant air quality objectives as prescribed in the Air Quality (Wales) Regulations 2000 and the Air Quality (Amendment) (Wales) Regulations 2002.

Reporting described the amendments to the non-automatic $NO_2$ network with 10 new locations commissioned for 2017.

Quality and technical issues were outlined regarding the automatic monitoring at Ewenny Cross Roundabout, for both $NO_2$ and $PM_{10}$. The inability to conform to the frequency of calibration checks and technical issues faced with the $PM_{10}$ Met One E Sampler were noted. Data capture was also an issue at the Rockwool Ltd site for $SO_2$ monitoring, recorded at 47.1%.

## 1.2 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when air quality is close to or above an acceptable level of pollution (known as the air quality objective (Please see Appendix A)). After declaring an AQMA the authority must prepare a **DRAFT** Air Quality Action Plan (AQAP) within 18 months setting out measures it intends to put in place to improve air quality to at least the air quality objectives, if not even better. The AQAP must be **formally** adopted prior to 24 months has elapsed. AQMA(s) are seen by local authorities as the focal points to channel resources into the most pressing areas of pollution as a priority.

BCBC does not currently have any AQMAs implemented, however following a revision of the annual average NO2 datasets an AQMA will need to be implemented. In line with Welsh Governments Policy Guidance following submission and approval of the 2018 Annual Progress Report, BCBC will need to legally declare an Air Quality Management Area (AQMA) for the Park Street Area, and this will be accompanied by an appropriate technical report setting out the reasons for the declaration.

## 1.3 Implementation of Action Plans

BCBC will adhere to the timeframes outlined within WG Policy Guidance, July 2017 ensuring that a DRAFT AQAP will be in place within 18 months of the formal declaration of the AQMA, and also a formalised AQAP with appropriate measures assessed is implemented within 24 months.

At this stage the nature of these measures is not certain but may entail some or all of the following:

- Junction/ traffic signal improvements with Tondu Road;
- Consideration of vehicle flow/ access restrictions;
- Wider transportation improvements across Bridgend to encourage more sustainable and active travel; and
- Improved monitoring, including real time capabilities, to enable more robust understanding of trends and levels of pollution;

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

## 2.1 Summary of Monitoring Undertaken in 2017

### 2.1.1 Automatic Monitoring Sites

Within the County Borough, there are two automatic monitoring location sites; Rhiwceilog and Ewenny Cross Roundabout.

The Rhiwceilog monitoring site is managed and maintained by Rockwool Ltd. Within the monitoring unit is an API AMX monitor capable of giving continuous fifteen minute averages of sulphur dioxide ($SO_2$) concentrations. Rockwool Environmental Officers have operated the continuous ambient SO2 monitor since 2008/9. . The equipment is calibrated by an Environment Officer at Rockwool on a fortnightly basis and serviced and maintained by Enviro Technology on a six monthly basis. Data obtained is checked for validation and ratified by Rockwool's Environment Officer. In addition to this, the Rockwool environmental team manage 10 $SO_2$ diffusion tubes placed at 10 locations in the vicinity of the Rockwool Ltd site.

The location of the $SO_2$ automated monitor is shown in **Figure 2.2** and details of the site are contained in **Table 2.1**. Due to continued compliance with the $SO_2$ air quality objectives appointed officers from Rockwool Ltd, BCBC and NRW decided upon a new preferred location for the $SO_2$ automated monitoring station. On the 3rd October 2017 the monitoring was assigned to its new location in the vestry of Soar Chapel, Rhiwceilog. Please refer to **Figure 2.3** and **Table 2.1** for further details. Rockwool Ltd continues to operate the $SO_2$ diffusion tube locations, which satisfies the improvement programme requirement IP5V.

The Ewenny Cross Roundabout unit has been located at this site since 2011 following elevated levels of nitrogen dioxide recorded via diffusion tubes located within the area. The location of the site is shown in **Figure 2.1** and details of the site are contained in **Table 2.1**. Within the mobile station is an API NOx analyser capable of providing continuous fifteen minute averages of nitrogen dioxide ($NO_2$) concentrations and a Met One E-Sampler $PM_{10}$ monitor.

The mobile station is also equipped with a meteorological station so that local weather data can be gathered for use in conjunction with the air quality data. The Ewenny Cross Roundabout air quality monitoring station is calibrated by a Local Authority Officer on a fortnightly basis and serviced and

maintained by an approved authorised contractor on a six monthly basis. Data obtained is checked for validation and ratified by a Local Authority Officer.

The Ewenny Cross Roundabout Automatic Monitoring Station (AMS) was unfortunately subjected to some quality and technical issues in 2017. The chemiluminescent NOx Analyser had a total data capture of 27% and did not adhere to the calibration requirements outlined in LAQM (TG16), 7.170. It is specified that calibrations for roadside/ kerbside located monitors should be undertaken **every two weeks** by LAs. Unfortunately due to staffing requirements this was not adhered to. As a best practise approach, due to the inconsistency of LA calibrations an nitrogen dioxide ($NO_2$) co-location study was not undertaken and alternatively a national bias adjustment factor was obtained from the DEFRA website and applied to the $NO_2$ datasets. The bias adjustment figure was based on an average of 29 co-location studies, undertaken by various Local Authorities around the UK who had appointed the same analytical laboratory and analysis method as BCBC for the $NO_2$ diffusion tubes. In accordance with LAQM (TG16) the data from the NOx Analyser has been annualised in accordance with box 7.9 and the 90.8$^{th}$ Percentile value has been given to examine the 1 hour objective.

Due to mechanical issues and technical data issues, the Met One E PM10 Sampler captured only 12% valid data in 2017. Therefore a NO RESULT (NR) value was given for PM10.

In addition to the above, it is also important to note that whilst the monitoring equipment obtained automatic data, it was not connected to the Automatic Urban & Rural Network (AURN) or Welsh Air Quality Network and no external QA/QC monitoring is currently being carried out at any of the sites.

**Figure 2.1- Map of Ewenny Cross Roundabout Automatic Monitoring Site**

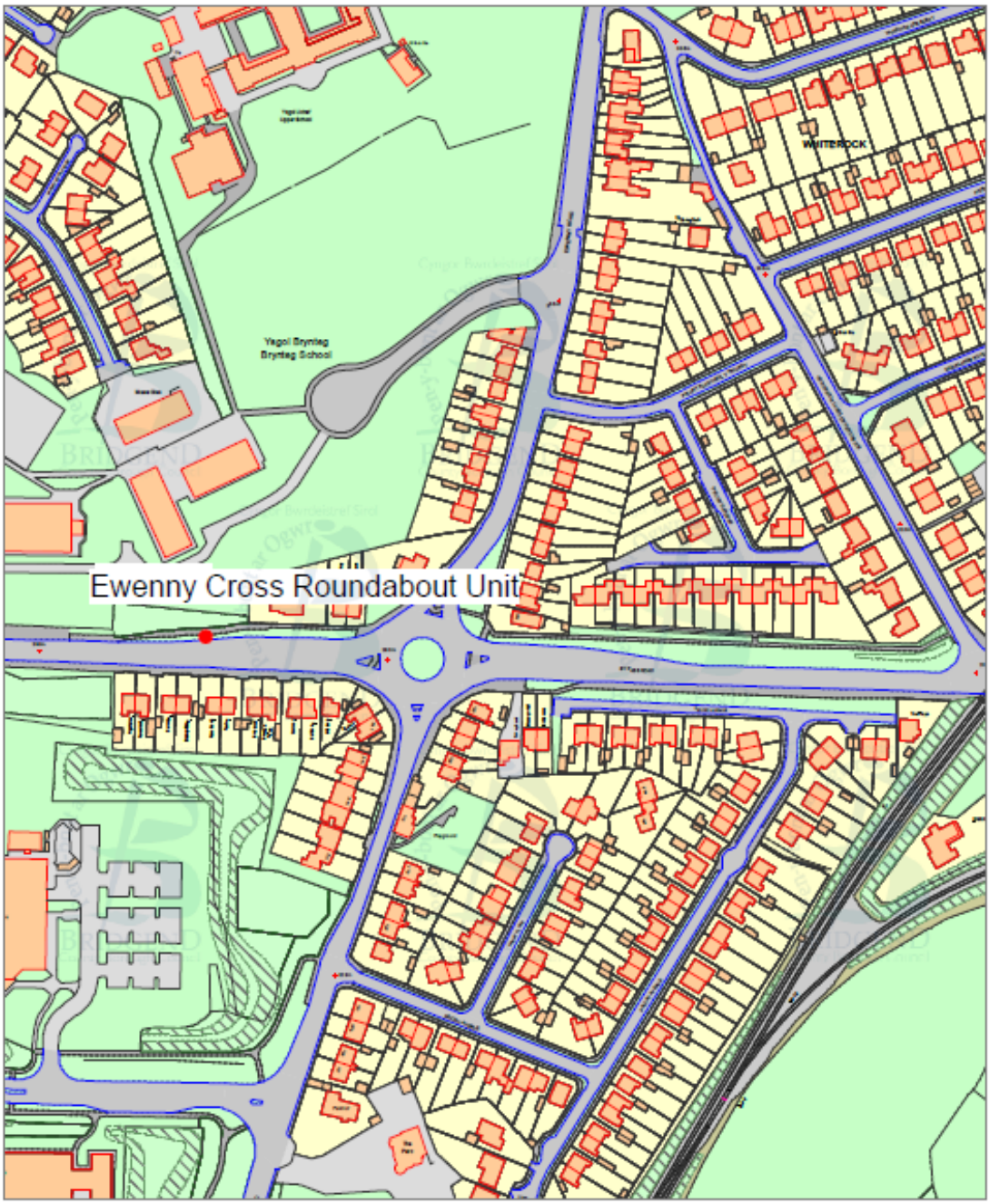


**Figure 2.2- Map of Rockwool Automatic Monitoring Site (Original Location Cadairfarch Farm)**

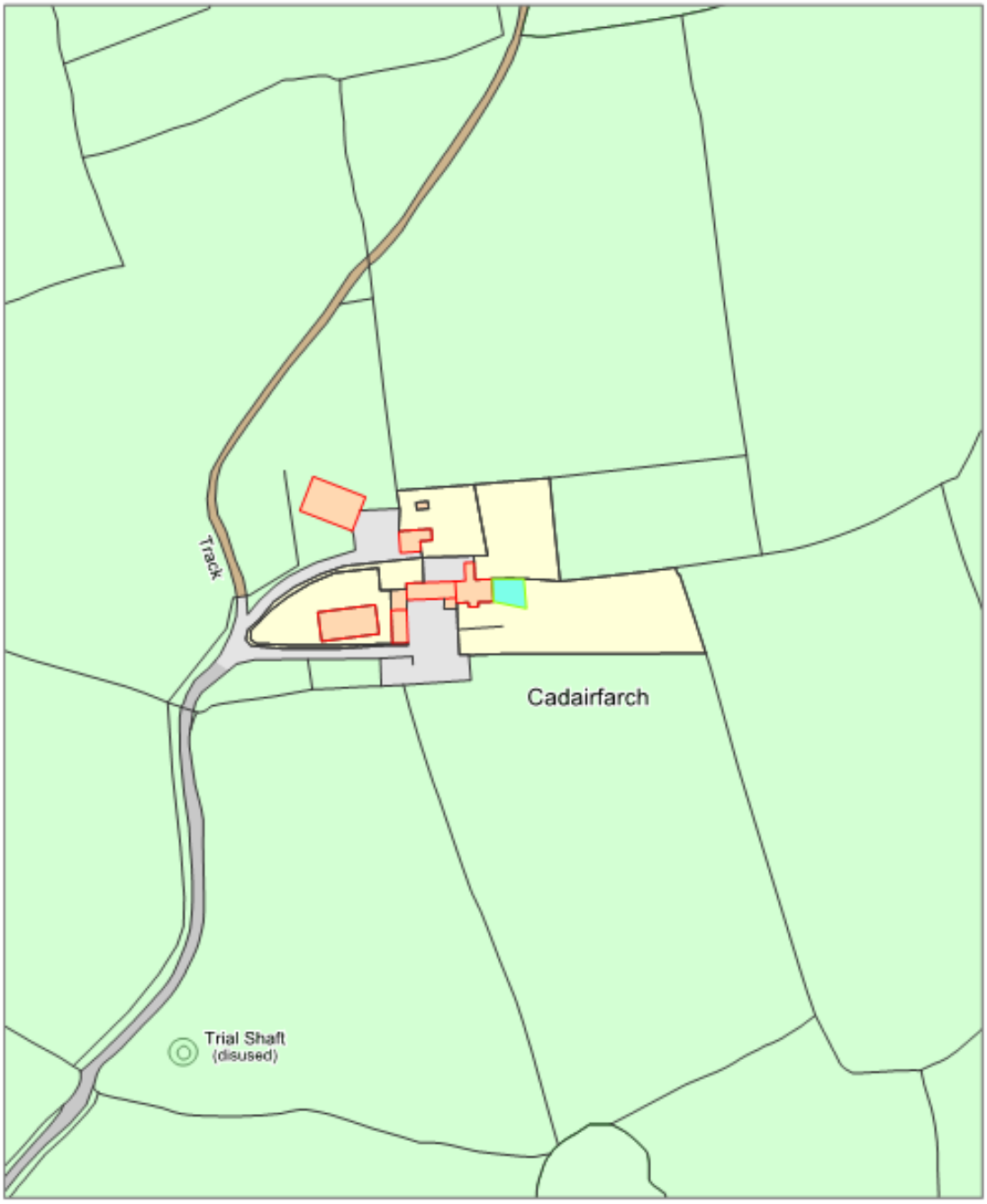


**Figure 2.3- Map of Rockwool Automatic Monitoring Site (New Location- Vestry of Soar Chapel, Rhiwceiliog est October 2017)**

**Table 2.1 Details of Automatic Monitoring Sites**

| Site ID | Site Name | Site Type | X OS Grid Reference | Y OS Grid Reference | Inlet Height (m) | Pollutants Monitored | In AQMA? | Monitoring Technique | Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure) | Distance to Kerb of Nearest Road (m) (N/A if not applicable) | Does this Location Represent Worst-Case Exposure? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **CM1** | Ewenny Cross Roundabout | Roadside | 290565 | 178567 | 2.0 | $NO_2$<br>$PM_{10}$ | N | Automated continuous NOx Analyser<br>Met One E-Sampler $PM_{10}$ monitor | Y (8.8m) | 2.22m | Y |
| **CM2 (Original)** | Rockwool | Industrial | 297512 | 184539 | 4.0 | $SO_2$ | N | Automated continuous $SO_2$ Analyser | 1700m | N/A | Y |
| **CM2 (Revised)** | Rockwool | Industrial | 297232 | 184331 | 4.0 | $SO_2$ | N | Automated continuous $SO_2$ Analyser | 1200m | 7.5m | Y |

### 2.1.2 Non-Automatic Monitoring Sites

SRS on behalf of BCBC carries out monitoring of ambient air quality for nitrogen dioxide ($NO_2$). In 2017, **30** specifically allocated non-automatic monitoring sites in Bridgend monitored levels of nitrogen dioxide ($NO_2$). The non-automatic sites do not provide live data; instead they consist of diffusion tubes which are placed at each of the sites, collected and replaced on a rolling monthly basis. The results derived from the tube sampling are then averaged over the year to enable a comparison of the results against the **annual average (40µg/m3) and 1-hour (200µg/m3 not to be exceeded > 18 times per year)** air quality objectives for $NO_2$.

With regards to prioritising ambient air quality sampling locations, the Council adopts a risk based approach to any allocation of monitoring sites, considering the requirements of Local Air Quality Management Technical Guidance 16, February 2018 (previously April 2016). The designated monitoring locations have been assigned based on relevant exposure and where the certain Air Quality Objective levels for a particular pollutant applies. The document states that annual mean objectives should apply at "All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, car homes etc."

National background concentrations provided by Defra are now utilised for the purpose of bias correcting and annualising data can be obtained via the website link:
https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015

## $NO_2$ Diffusion Tube Locations

The location of the 7 areas where $NO_2$ monitoring took place in 2017;

a. Tondu Road Roundabout at the Western End of the Bridgend Cross Valley Link Road (**Figure 2.4a** Area A).
b. Ewenny Cross Roundabout, Bridgend (**Figure 2.4b** Area B).
c. Nolton Street/ Ewenny Cross Link/ A473 Cowbridge Road (**Figure 2.4c** Area C).
d. Bridgend town Centre (**Figure 2.4d** Area D).
e. Park Street (**Figure 2.4e** Area E).
f. Coity Road (**Figure 2.4f** Area F).
g. Maesteg Town Centre (**Figure 2.4g** Area G).

The location, site description and data gathered since January 2017 are given in Table 2.2. The data has been gathered over a period of 12 months between January and December 2017, adhering to specific monitoring dates controlled by Defra.

## Laboratory Methods and Analysis of Diffusion Tubes

Analysis of the exposed tubes is carried out by Environmental Scientifics Group Didcot **(now formally known as Socotec**) operating procedure HS/GW1/1015, issue 10. The tubes are prepared by spiking acetone:triethanolomine (50:50) on the grids prior to the tubes being assembled. The tubes are desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection. As set out in the practical guidance the results were initially calculated assuming an ambient temperature of 11°C and then adjusted to 20°C to allow direct comparison with EU limits. The national bias correction factor for this laboratory was utilised as opposed to our own local co-location data. The reason for this was due to an inconsistent calibration record, whereby calibrations of the NOx analyser were not undertaken every two weeks, as outlined in LAQM (TG16). Adopting best practice, no local co-location was carried out and a bias correction factor of 0.77 was obtained and applied using the DEFRA website, available using the following link; https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Where valid data capture for the year is less than 75% (9 months), the $NO_2$ diffusion tube monitoring data have been ''annualised'' following the methods as described in Box 7.10 of LAQM (TG16).

Where an exceedance is measured at a monitoring site not representative of public exposure, $NO_2$ concentration at the nearest relevant exposure has been estimated based on the "$NO_2$ fall-off with distance" calculator (http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html). The procedure is described in LAQM. TG16 Section 7.77-7.79.

**Figure 2.4a – AREA A – Tondu Roundabout $NO_2$ Diffusion Tube Locations**

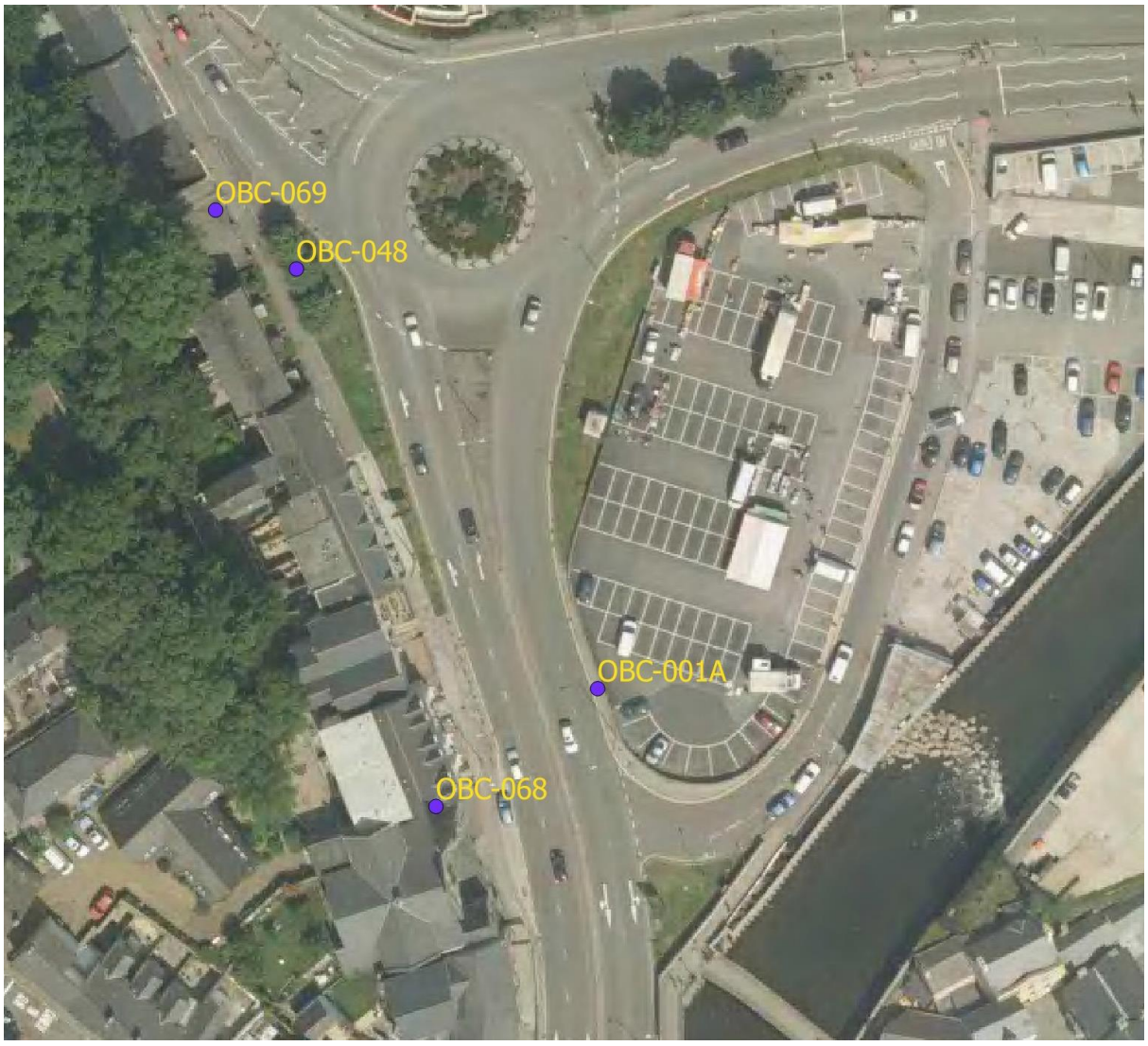


**Figure 2.4b – AREA B – Ewenny Cross Roundabout, A48 By-Pass $NO_2$ Diffusion Tube Locations**

**Figure 2.4c – AREA C – Nolton Street/ Ewenny Cross Link/ A473 Cowbridge Road $NO_2$ Diffusion Tube Locations**


**Figure 2.4d – Area D – Bridgend town Centre $NO_2$ Diffusion Tube Location**

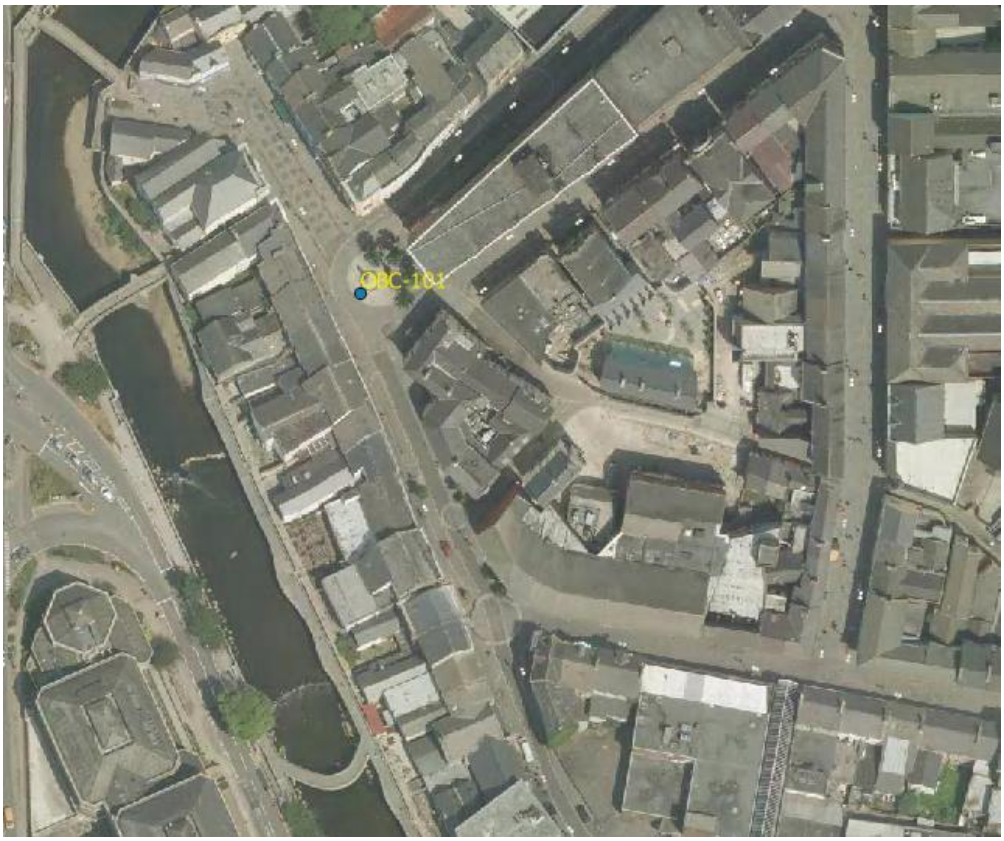


**Figure 2.4e – Area E – Park Street $NO_2$ Diffusion Tube Locations**

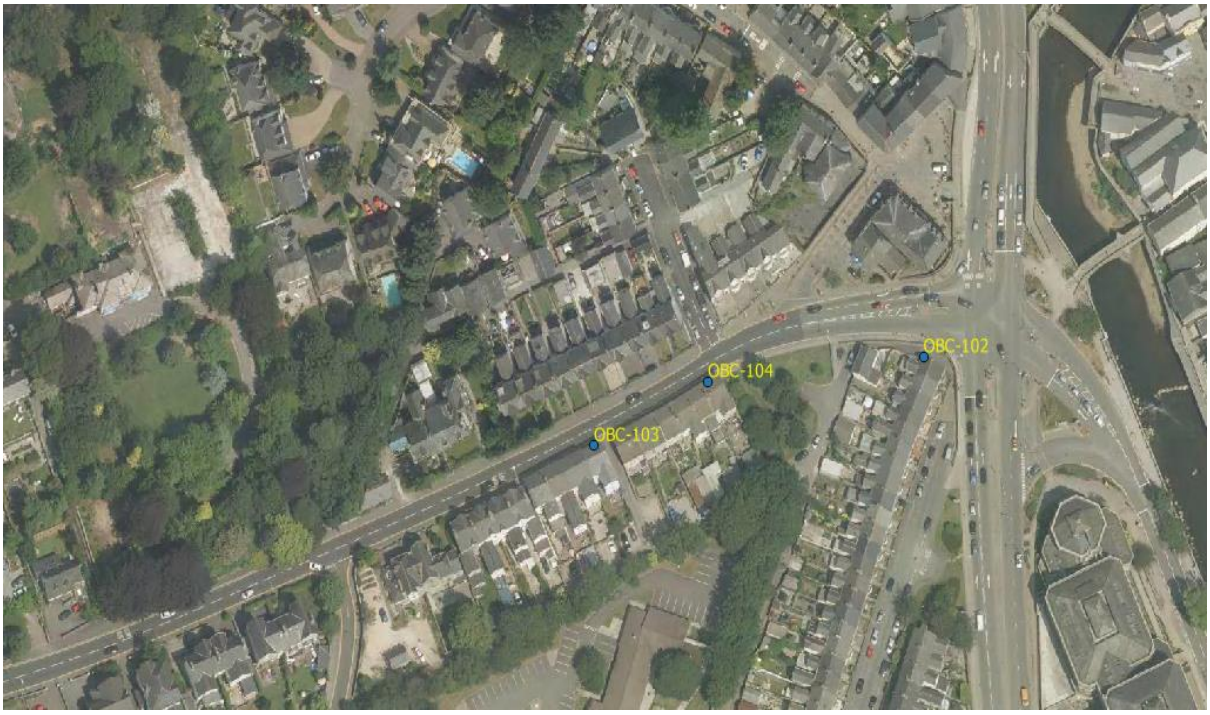



**Figure 2.4f – Area F – Coity Road $NO_2$ Diffusion Tube Locations**

## Figure 2.4g – AREA G – Maesteg Town Centre $NO_2$ Diffusion Tube Locations

## Table 2.2 Details of Non-Automatic Monitoring Sites 2017

| Site Id | Area | Site Name | Site Type | X OS Grid Ref. | Y OS Grid Ref. | Site Height (m) | Pollutants Monitored | In AQMA | Co-located with a Continuous Analyser (Y/N) | Relevant Exposure?[1] (Y/N with (m) to relevant exposure) | Distance to kerb of nearest road in metres | Worst-case Location? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TONDU ROAD ROUNDABOUT** | | | | | | | | | | | | |
| OBC-001A | A | Tondu Road, Bridgend | Kerbside | 290378 | 179940 | 2.0 | $NO_2$ | N | N | (N) 6.74 | 0.46 | N |
| OBC-048 | A | Tondu Road Roundabout, Bridgend | Roadside | 290337 | 179997 | 2.0 | $NO_2$ | N | N | (N) 9.60 | 2.23 | N |
| OBC-068 | A | Bridgend United Club | Roadside | 290356 | 179924 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 3.83 | Y |
| OBC-069 | A | Tondu Rd Steps | Roadside | 290326 | 180005 | 2.0 | $NO_2$ | N | N | (N)10.44 | 2.89 | N |
| **EWENNY CROSS ROUNDABOUT** | | | | | | | | | | | | |
| OBC-041 | B | Priory Avenue, Bridgend | Roadside | 290733 | 178535 | 2.0 | $NO_2$ | N | N | (N) 7.38 | 1.29 | N |
| OBC-043 | B | A48 Bypass, Bridgend | Roadside | 290609 | 178567 | 2.0 | $NO_2$ | N | N | (N) 9.79 | 2.04 | N |
| OBC-044 | B | Ewenny Road, Bridgend | Roadside | 290680 | 178582 | 2.0 | $NO_2$ | N | N | (N) 10.38 | 13.66 | N |
| OBC-055 | B | Ewenny Road | Roadside | 290583 | 178371 | 2.0 | $NO_2$ | N | N | (N) 6.48 | 3.18 | N |
| OBC-056 | B | Ewenny Road | Kerbside | 290596 | 178361 | 2.0 | $NO_2$ | N | N | (N)11.83 | 0.47 | N |
| OBC-078 | B | Corner of Ewenny Roundabout | Roadside | 290662 | 178533 | 2.0 | $NO_2$ | N | N | (N) 4.40 | 1.85 | N |
| OBC-085 | B | A48 Bypass, Bridgend | Roadside | 290524 | 178541 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 10.28 | Y |
| OBC-087 | B | A48 Bypass, Bridgend | Roadside | 290606 | 178572 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 9.40 | Y |
| OBC-088 | B | A48 Bypass, Bridgend- Co-Location Study 1 | Roadside | 290566 | 178566 | 2.0 | $NO_2$ | N | Y | (Y) 0.00 | 2.20 | Y |
| OBC-089 | B | A48 Bypass, Bridgend- Co-Location Study 2 | Roadside | 290566 | 178566 | 2.0 | $NO_2$ | N | Y | (Y) 0.00 | 2.20 | Y |
| OBC-090 | B | A48 Bypass, Bridgend- Co-Location Study 3 | Roadside | 290566 | 178566 | 2.0 | $NO_2$ | N | Y | (Y) 0.00 | 2.20 | Y |
| OBC-091 | B | A48 Bypass, Bridgend | Roadside | 290610 | 178533 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 13.39 | Y |
| **NOLTON STREET/ EWENNY CROSS LINK/ A473 COWBRIDGE ROAD** | | | | | | | | | | | | |
| OBC-049 | C | Nolton Street, Bridgend | Roadside | 290700 | 179305 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 4.25 | Y |
| OBC-050 | C | Ewenny Road, Bridgend | Roadside | 290665 | 179293 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 7.33 | Y |
| OBC-105 | C | Cowbridge Road | Roadside | 290899 | 179185 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 4.10 | Y |
| OBC-106 | C | Cowbridge Road | Kerbside | 290826 | 179210 | 2.0 | $NO_2$ | N | N | (N) 3.30 | 0.90 | N |
| **BRIDGEND TOWN CENTRE** | | | | | | | | | | | | |
| OBC-101 | D | Bridgend town Centre | Urban Centre | 290469 | 179837 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 1.0 | Y |
| **PARK STREET** | | | | | | | | | | | | |
| OBC-102 | E | Sunnyside Street | Roadside | 290354 | 179807 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 2.95 | Y |
| OBC-103 | E | Park Street | Roadside | 290250 | 179782 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 1.20 | Y |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OBC-104 | E | Park Street | Roadside | 290286 | 179800 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 1.05 | Y |
| **COITY ROAD** | | | | | | | | | | | | |
| OBC-097 | F | Coity Road, Bridgend | Roadside | 290687 | 180185 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 5.30 | Y |
| OBC-098 | F | Coity Road, Bridgend | Roadside | 290681 | 180198 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 4.20 | Y |
| OBC-099 | F | Coity Road, Bridgend | Roadside | 290663 | 180251 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 5.60 | Y |
| OBC-100 | F | Coity Road, Bridgend | Roadside | 290623 | 180374 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 4.10 | Y |
| **MAESTEG TOWN CENTRE** | | | | | | | | | | | | |
| OBC-080 | G | Commercial Street, Maesteg | Urban Centre/ Kerbside | 285131 | 191284 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 0.58 | Y |
| OBC-081 | G | Talbot Street, Maesteg | Urban Centre / Roadside | 285229 | 191331 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 1.26 | Y |
| OBC-082 | G | Castle Street, Maesteg | Urban Centre / Roadside | 285296 | 191398 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 2.72 | Y |
| OBC-083 | G | Castle Street, Maesteg | Urban Centre / Roadside | 285370 | 191382 | 2.0 | $NO_2$ | N | N | (Y) 0.00 | 2.04 | Y |

**Notes:**

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

## 2.2 2017 Air Quality Monitoring Results

**Table 2.1 – Non-automatic Annual Mean $NO_2$ Monitoring Results (2013- 2017)**

| Site ID | Site Type | Monitoring Type | Valid Data Capture 2017 (%) (1) | Within AQMA? | Annual Mean Concentration (µg/m$^3$) (2) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 (Bias Adjustment Factor = 0.80) | 2014 (Bias Adjustment Factor = 0.81) | 2015 (Bias Adjustment Factor = 0.81) | 2016 (Bias Adjustment Factor = 0.78) | 2017 (Bias Adjustment Factor = 0.77) |
| **TONDU ROAD ROUNDABOUT** | | | | | | | | | |
| OBC-001A | Kerbside | Diffusion Tube | 83 | N | 33 | 40 | 27 | 38 | 34.2/ 24.2(3) |
| OBC-048 | Roadside | Diffusion Tube | 83 | N | **41** | 36 | 34 | **42** | 38.1/ 28.2(3) |
| OBC-068 | Roadside | Diffusion Tube | 83 | N | 32 | 28 | 26 | 27 | 25.9 |
| OBC-069 | Roadside | Diffusion Tube | 58 | N | 40 | 29 | 27 | 34 | 29.9/ 23.4(2 & 3) |
| **NOLTON STREET/ EWENNY CROSS LINK/ A473 COWBRIDGE ROAD** | | | | | | | | | |
| OBC-049 | Roadside | Diffusion Tube | 58 | N | 18 | 28 | 27 | 27 | 27.9/ 27.3(2 & 3) |
| OBC-050 | Roadside | Diffusion Tube | 50 | N | 24 | 19 | 16 | 22 | 19.0/ 17.8(2 & 3) |
| OBC-105 | Roadside | Diffusion Tube | 83 | N | N/A | N/A | N/A | N/A | 24.6 |
| OBC-106 | Kerbside | Diffusion Tube | 42 | N | N/A | N/A | N/A | N/A | 30.4/ 25.2(2 & 3) |
| **EWENNY CROSS ROUNDABOUT** | | | | | | | | | |
| OBC-041 | Roadside | Diffusion Tube | 83 | N | 27 | 24 | 24 | 26 | 23.0/ 17.7(3) |
| OBC-043 | Roadside | Diffusion Tube | 83 | N | **43** | 38 | 35 | 39 | 37.5/ 26.1(3) |
| OBC-044 | Roadside | Diffusion Tube | 83 | N | 28 | 27 | 26 | 27 | 25.9/ 22.0(3) |
| OBC-055 | Roadside | Diffusion Tube | 83 | N | 22 | 18 | 16 | 20 | 23.0/ 19.2(3) |

| Site ID | Site Type | Monitoring Type | Valid Data Capture 2017 (%) [1] | Within AQMA? | Annual Mean Concentration (µg/m$^3$) [2] | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 (Bias Adjustment Factor = 0.80) | 2014 (Bias Adjustment Factor = 0.81) | 2015 (Bias Adjustment Factor = 0.81) | 2016 (Bias Adjustment Factor = 0.78) | 2017 (Bias Adjustment Factor = 0.77) |
| OBC-056 | Kerbside | Diffusion Tube | 83 | N | 30 | 31 | 29 | 32 | 26.6/ 17.1[3] |
| OBC-078 | Roadside | Diffusion Tube | 83 | N | 33 | 31 | 29 | 31 | 30.5/ 24.7[3] |
| OBC-085 | Roadside | Diffusion Tube | 83 | N | 27 | 21 | 23 | 21 | 19.9 |
| OBC-087 | Roadside | Diffusion Tube | 67 | N | 19 | 21 | 22 | 20 | 20.0[2] |
| OBC-088 | Roadside | Diffusion Tube | 83 | N | 24 | 22 | 21 | 21 | 20.3 |
| OBC-089 | Roadside | Diffusion Tube | 83 | N | 24 | 22 | 21 | 23 | 21.8 |
| OBC-090 | Roadside | Diffusion Tube | 75 | N | 24 | 23 | 23 | 21 | 19.5 |
| OBC-091 | Roadside | Diffusion Tube | 83 | N | 28 | 25 | 23 | 24 | 22.0 |
| **BRIDGEND TOWN CENTRE** | | | | | | | | | |
| OBC-101 | Urban Centre | Diffusion Tube | 58 | N | N/A | N/A | N/A | N/A | 18.1[2] |
| **PARK STREET** | | | | | | | | | |
| OBC-102 | Roadside | Diffusion Tube | 75 | N | N/A | N/A | N/A | N/A | 23.7 |
| OBC-103 | Roadside | Diffusion Tube | 83 | N | N/A | N/A | N/A | N/A | 37.6 |
| OBC-104 | Roadside | Diffusion Tube | 83 | N | N/A | N/A | N/A | N/A | **41.5** |
| **COITY ROAD** | | | | | | | | | |
| OBC-097 | Roadside | Diffusion Tube | 83 | N | N/A | N/A | N/A | N/A | 26.3 |
| OBC-098 | Roadside | Diffusion Tube | 83 | N | N/A | N/A | N/A | N/A | 24.0 |
| OBC-099 | Roadside | Diffusion Tube | 83 | N | N/A | N/A | N/A | N/A | 23.8 |

| Site ID | Site Type | Monitoring Type | Valid Data Capture 2017 (%) (1) | Within AQMA? | Annual Mean Concentration (µg/m$^3$) (2) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 (Bias Adjustment Factor = 0.80) | 2014 (Bias Adjustment Factor = 0.81) | 2015 (Bias Adjustment Factor = 0.81) | 2016 (Bias Adjustment Factor = 0.78) | 2017 (Bias Adjustment Factor = 0.77) |
| OBC-100 | Roadside | Diffusion Tube | 75 | N | N/A | N/A | N/A | N/A | 24.1 |
| **MAESTEG TOWN CENTRE** | | | | | | | | | |
| OBC-080 | Urban / Kerbside | Diffusion Tube | 50 | N | 36 | 34 | 24 | 23 | 23.9(2) |
| OBC-081 | Urban / Roadside | Diffusion Tube | 58 | N | 38 | 26 | 25 | 24 | 21.4(2) |
| OBC-082 | Urban / Roadside | Diffusion Tube | 42 | N | 37 | **48** | 26 | 28 | 23.4(2) |
| OBC-083 | Urban / Roadside | Diffusion Tube | 42 | N | 33 | 26 | 26 | 29 | 25.1(2) |

**Notes:**

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

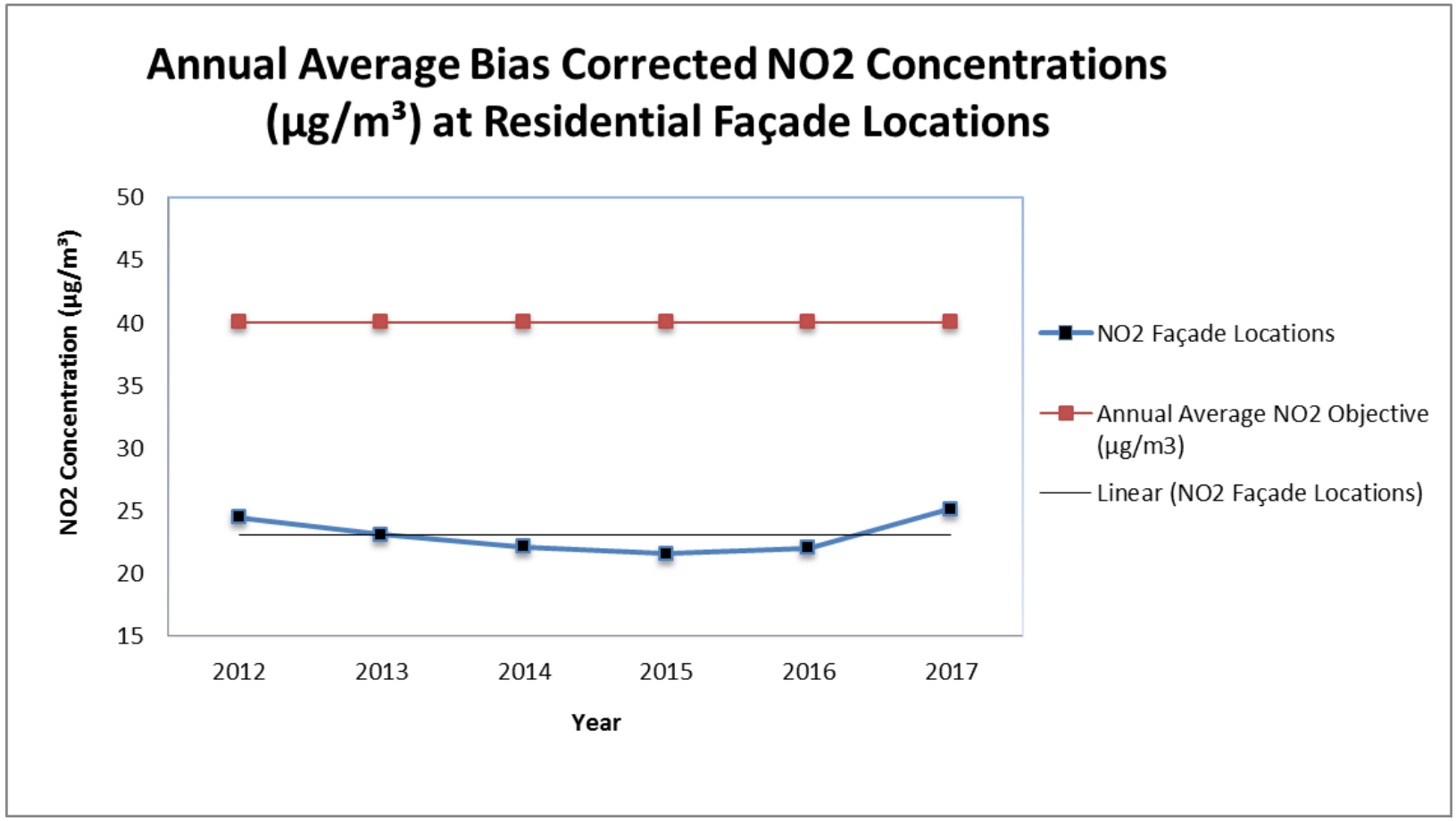
$NO_2$ annual means exceeding 60µg/m$^3$, indicating a potential exceedance of the $NO_2$ 1-hour mean objective are shown in **bold and underlined.**

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

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

(3) Diffusion tube data has been corrected for distance to represent relevant exposure in accordance with Sections 7.77- 7.79 in LAQM.TG16 "Fall-off in NO2 concentrations with Distance from the Road"

**Figure 2.5 – Trends in Annual Mean $NO_2$ Concentrations**




The graph represents annual average bias corrected $NO_2$ data since 2012. The locations examined represent worst case exposure due to the fact monitoring was undertaken at residential façade locations. The displayed average datasets indicate **compliant** $NO_2$ results for Bridgend in general since 2012. The results are somewhat stable. Datasets utilised for 2017 include newly added monitoring locations at residential properties.

**Table 2.4 – Automatic Annual Mean $NO_2$ Monitoring Results (2013- 2017)**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period % (1) | Valid Data Capture 2017 % (2) | Annual Mean Concentration (µg/m$^3$) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| CM1 | Roadside | N | 100 | 27 | **42** | NR(4) | 30.49(3) | 32.37 | 25.7(3) |

Notes:
Exceedances of the Annual Average NO2 objective (40µg/m3) are shown in bold.
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
(3) Data has been "annualised" as per Boxes 7.9 in LAQM.TG16 where valid data capture for the full calendar year is less than 75%. See Appendix C for details.
(4) NO RESULT "NR". No data recorded for 2014 due to technical faults incurred with Automatic Monitoring Station

**Table 2.5 –Automatic 1-hour Mean $NO_2$ Monitoring Results (2013- 2017)**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period % (1) | Valid Data Capture 2017 % (2) | Number of Hourly Means (> 200µg/m$^3$)(3) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| CM1 | Roadside | N | 100 | 27 | 0 | NR(4) | 0 (30.44) | 0 | 0 (131.3) |

Notes:
Exceedances of the $NO_2$ 1-hour mean objective (200µg/m$^3$ not to be exceeded more than 18 times/year) are shown in bold.
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
(3) If the period of valid data is less than 85%, the 99.8$^{th}$ percentile of 1-hour means is provided in brackets.
(4) NO RESULT "NR". No data recorded for 2014 due to technical faults incurred with Automatic Monitoring Station.

**Table 2.6 – Automatic Annual Mean $PM_{10}$ Monitoring Results (2013- 2017)**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | Confirm Gravimetric Equivalent (Y or N/A) | $PM_{10}$ Annual Mean Concentration (µg/m$^3$) (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| CM1 | Roadside | N | 100 | 12 | N/A | 14.30 | NR(4) | NR(4) | 15.18(3) | NR(4) |

Notes:
Exceedances of the $PM_{10}$ annual mean objective of 40µg/m$^3$ are shown in bold.
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
(3) Data has been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 where valid data capture for the full calendar year is less than 75%. See Appendix C for details.
(4) NO RESULT "NR". No data recorded for 2014, 2015 & 2017 due to technical faults incurred with Automatic Monitoring Station.

**Table 2.7 – Automatic 24-Hour Mean $PM_{10}$ Monitoring Results (2013- 2017)**

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | Confirm Gravimetric Equivalent (Y or N/A) | Number of Daily Means > 50µg/m$^3$ (3) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 2013 | 2014 | 2015 | 2016 | 2017 |
| CM1 | Roadside | N | 100 | 12 | N/A | 0 | NR(4) | NR(4) | 2 (24.66) | NR(4) |

**Notes:**
Exceedances of the $PM_{10}$ 24-hour mean objective (50µg/m$^3$ not to be exceeded more than 35 times/year) are shown in **bold.**
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).
(3) If the period of valid data is less than 85%, the 90.4$^{th}$ percentile of 24-hour means is provided in brackets.
(4) NO RESULT "NR". No data recorded for 2014, 2015 & 2017 due to technical faults incurred with Automatic Monitoring Station.

## Table 2.8 – Automatic $SO_2$ Monitoring Results: Comparison with Objectives

| Site ID | Site Type | Within AQMA? | Valid Data Capture for Monitoring Period (%) (1) | Valid Data Capture 2017 (%) (2) | Number of Exceedences (percentile in bracket μg/m³) | | |
|---|---|---|---|---|---|---|---|
| | | | | | 15-minute Objective (266 μg/m³) | 1-hour Objective (350 μg/m³) | 24-hour Objective (125 μg/m³) |
| CM2 | Industrial | N | 100 | 70.1 | 0 (39.82)(3) | 0 (32.36)(4) | 0 (30.27)(5) |

**Notes:**

Exceedances of the SO2 mean objectives are shown in **bold.**

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

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

(3) In accordance with LAQM TG(16), due to the fact data capture is <85% it is a requirement to report the 99.9th percentile for 15 minute $SO_2$, however in this instance it is the 99.9th percentile for 10 minute $SO_2$.

(4) In accordance with LAQM TG(16), due to the fact data capture is <85% it is a requirement to report the 99.7th percentile for 1 hour $SO_2$

(5) In accordance with LAQM TG(16), due to the fact data capture is <85% it is a requirement to report the 99.2nd percentile for 24 hour $SO_2$

## 2.3 Comparison of 2017 Monitoring Results with Previous Years and the Air Quality Objectives

During 2017 monitoring was carried out for nitrogen dioxide ($NO_2$), particulate matter ($PM_{10}$) and Sulphur Dioxide ($SO_2$). There was no monitoring undertaken for benzene or 1-3-butadiene.

### 2.3.1 Nitrogen Dioxide ($NO_2$)

Nitrogen dioxide was measured during 2017 at one site equipped with an automatic NOx analyser and by a network of 30 passive diffusion tubes.

In order to ratify the 2017 diffusion tube dataset, a bias adjustment factor of 0.77 was applied to the annual average readings. The factor was derived from the Defra website which gave the average correction factor from 29 co-location studies across the UK, whereby the analytical laboratory and method used was the same as BCBC.

#### Automatic Monitoring Data

Monitoring of $NO_2$ has continued to be carried out at the Ewenny Cross Roundabout Automatic Monitoring Site. As previously discussed, due to quality and technical issues in 2017, data capture for NO2 from the Ewenny automated site was limited to 27% and a site specific co-location study could not be performed. Annual average $NO_2$ datasets have been annualised in accordance to the requirements of LAQMTG(16), Box 7.9. **Tables 2.4 & 2.5** confirms compliance with the set long term and short term $NO_2$ air quality objectives in 2017.

#### Non- automated Monitoring Data

Annual average datasets outline elevated and exceeding levels of $NO_2$ at sensitive receptor locations situated on Park Street, Bridgend. There are two sites of particular concern; **Sites OBC-103 & OBC-104**. These sites provided annual average levels of **37.6 & 41.5µg/m3**.

In view of the given elevated and exceeding annual average figures examined at Park Street, Bridgend, it is proposed that the Ewenny Automated Monitoring site be located to a new location on Park Street. This will provide a greater level of certainty which regards to air quality levels. The Specialist Service Team has also acquired a new member of staff (Sampling Officer) and entered an annual contract with appointed contractors whom will manage the data collected by the automated NOx and PM10 analysers. These measures will hopefully eradicate any quality or technical concerns as previously experienced.

### 2.3.2 Particulate Matter ($PM_{10}$)

As described in previous sections, monitoring of $PM_{10}$ has continued to be carried out at Ewenny Cross Roundabout. However, Due to mechanical issues and technical data issues, the Met One E PM10 Sampler captured only 12% valid data in 2017. Therefore a NO RESULT **(NR)** value was given for PM10.

### 2.3.3 Sulphur Dioxide ($SO_2$)

Monitoring of Sulphur Dioxide $SO_2$ has continued to be carried out by Rockwool Ltd in the Rhiwceilog area of Bridgend. Monitoring has been carried out using an API AMX monitor capable of giving continuous fifteen minute averages of Sulphur Dioxide $SO_2$ concentrations. The equipment is calibrated by an Environment Officer at Rockwool and serviced and maintained by an approved contractor on a six monthly basis. Data obtained is checked for validation and ratified by Rockwool's Environment Officer.

The total data capture for 2017 was 70.1%. There were no exceedences of the objectives during this time period. With regards to the 15 minute $SO_2$ objective, Rockwool has provided 10 minute sampling periods, therefore please be aware that the result stipulated in **Table 2.8** gives the 10 minute 99.9$^{th}$ Percentile result.

As previously mentioned, due to continued compliance with the SO2 air quality objectives, appointed officers from Rockwool Ltd, BCBC and NRW decided upon a new preferred location for the SO2 automated monitoring station. On the 3$^{rd}$ October 2017 the monitoring was assigned to its new location in the vestry of Soar Chapel, Rhiwceilog.

## 2.4 Summary of Compliance with AQS Objectives as of 2017

BCBC Intends to declare an AQMA (by way of the Fast Track declaration process) for Park Street, Bridgend due to the proven exceedance of the annual average NO2 objective (40µg/m3).

# 3. New Local Developments

## 3.1 Road Traffic Sources (& other transport)

SRS on behalf of BCBC can confirm that there are no new significant developments since the Progress Report in 2017. The 2017 highlighted the potential for increased vehicular access to parts of Bridgend Town Centre. Due to financial funding difficulties this proposal has since become stagnant and therefore no further progress made.

### 3.1.1 Airports

SRS on behalf of BCBC confirms that there are no airports in the Local Authority area. However a small quantity of air traffic now traverses the south eastern part of the County Borough prior to its final approach to Cardiff International airport, Rhoose. It is unlikely that the emissions from the aircraft, in view of this small number, will have a significant effect on air quality in Bridgend.

### 3.1.2 Railways (Diesel and Steam Trains)

#### Stationary Trains

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

### 3.1.3 Ports (Shipping)

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

## 3.2 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources

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

SRS on behalf of BCBC has assessed new/proposed industrial installations, and concluded that no further air quality analysis via a detailed air quality assessment is necessary.

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

SRS on behalf of BCBC 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.

### 3.2.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

SRS on behalf of BCBC has assessed new/proposed industrial installations, and concluded that no further air quality analysis via a detailed air quality assessment is necessary.

### 3.2.4 Major Fuel (Petrol) Storage Depots

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

### 3.2.5 Petrol Stations

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

### 3.2.6 Poultry Farms

SRS on behalf of BCBC confirms there are no poultry farms meeting the specified criteria.

## 3.3 Commercial and Domestic Sources

### 3.3.1 Biomass Combustion – Individual Installations

As previously identified in the 2011 Progress Report, planning consent had been granted for the installation of a Bio Gas Plant with gas pipeline and in vessel composting facility. It has however been established that the proposed development will not have a significant impact on air quality.

The 2016 Progress Report highlighted that planning consent has been granted for the installation of a bio-mass plant within the Llynfi Valley. However the plant has not yet been installed.

In April 2017, subject to the fulfillment of conditions sanctioned by criteria detailed within the consent application and requirements highlighted within the Clean Air Act legislation, consent under the Clean Air Act, 1993 has been granted for the operation of a Novalux Energy Solutions Ltd 999kWt Wood Chip Biomass System and its emissions at Pentre Hwnt Farm, Llampha, Bridgend.

### 3.3.2 Biomass Combustion – Combined Impacts

SRS on behalf of BCBC has assessed the proposed biomass combustion plant, and concluded that no further air quality analysis via a detailed air quality assessment is necessary.

### 3.3.3 Other Sources

### 3.3.4 Domestic Solid-Fuel Burning

SRS on behalf of BCBC confirms that there are no areas of significant domestic fuel use in the Local Authority area.

## 3.4 New Developments with Fugitive or Uncontrolled Sources

SRS on behalf of BCBC confirms that there are no new potential sources of fugitive particulate matter emissions in the Local Authority area since the last Progress Report produced in 2017.

## 3.5 Planning Applications

Bridgend Council continue to monitor the impact of proposed developments and recent developments already underway or in use.

Since the publication of the 2016 Progress Report, major planning application **(P/16/549/OUT)** had been recently approved subject to discharge of conditions for a development of up to 71,441sq.m of B1, B2 and B8 employment floor space, including access, car parking, diversion of public rights of way, site remediation, drainage, landscaping and associated engineering operations. The site is located on land east of the A48 (Crack Hill) Brocastle, Bridgend. In terms of air quality, following correspondence with SRS Specialist Officers, the following air quality conditions have been implemented;

*-No development shall commence until a 'Construction Environmental Management Plan' (CEMP) to minimise dust emissions arising from construction activities on the site has been submitted to and agreed in writing by the Local Planning Authority. The scheme shall include details of dust suppression measures and the methods to monitor emissions of dust arising from the development and shall include the control measures as detailed in section 5.4.2 of Chapter 5 of the Air Quality Assessment contained in the Environmental Statement 'Land at Brocastle, Bridgend. Environmental Statement Volume II. The construction phase shall be implemented in accordance with the agreed scheme with the approved dust suppression measures being maintained in a fully functional condition for the duration of the construction phases. Reason: In the interests of safeguarding the amenities of existing residents.*

*-No development shall commence until a revised Air Quality Assessment (AQA) has been submitted to and agreed in writing by the Local Planning Authority. The AQA should address the following additional scenario which would encapsulate a cumulative air quality impact: Year of 2026 (projected year of opening for Parc Ewenni), providing projected concentration levels for traffic derived N02 & PM10 (both from the natural increase in traffic and the increase that will be generated as a result of this development) at the already designated sensitive receptors. The 2026 scenario should look to examine a cumulative effect whereby both the Parc Ewenni and Brocastle developments will be in place. Where the Air Quality objectives are indicated to be exceeded, mitigation measures shall be included in the revised report. The mitigation measures and a program of implementation shall be*

*submitted to and agreed in writing by the Local Planning Authority prior to any development commencing. Reason: In the interests of limiting air pollution resulting from the development.*

At the time of writing this report, the supporting air quality assessment (AQA) in accordance with the referenced planning application has been submitted for review. The AQA considers the operational phase impacts of the proposed development. For operational purposes the modelling accounts for 2 scenarios, which focus around 'Do-Minimum' & 'Do-Something' scenarios for a proposed year of opening in 2026. The report summarises in Tables 6 & 7 that a "negligible" impact is anticipated for NO2 & $PM_{10}$ for a projected year of opening at **all** sensitive receptor locations modelled.

# 4. Polices and Strategies Affecting Airborne Pollution

## 4.1 Air Quality Planning Policies

**Local Development Plan (LDP)** 2006- 2021. The document provides a framework for sustainable development within the County Borough of Bridgend, outlining strategies and policies for future land use and development.

One of the main strategic LDP objectives is highlighted in **Strategic Policy 4 (SP4)** which promotes the conservation and enhancement of the natural environment. SP4 illustrates that development proposals will not be permitted where they have an adverse impact upon the quality of natural resources, including water air and soil.

Also highlighted within the LDP document is Policy **ENV 7** (Natural Resource Protection and Public Health);

*"Development proposals will only be permitted where it can be demonstrated that they would not cause a new, or exacerbate an existing, unacceptable risk of harm to health, biodiversity and/or local amenity due to: air pollution"*

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.

The LDP documentation for Bridgend County Council is available at http://www1.bridgend.gov.uk/media/174812/ldp_text.pdf

## 4.2 Local Transport Plans and Strategies

**The Local Transport Plan (LTP)** 2015- 2030. The Welsh Government now requires local authorities in Wales to prepare and adopt Local Transport Plan (LTPs) as the framework for identifying local transport schemes for improvements. LTPs therefore replace Regional Transport Plans.

Under guidance from the Welsh Government, local authorities have the choice to develop and adopt either joint LTPs with neighbouring local authorities or a stand-alone LTP for their own geographical area.

Bridgend County Borough Council has opted for the latter approach in view of the uncertainty of the future of local authority boundaries and structures amid discussions of reorganisation of local government.

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.

*"The Council is mindful of the broader negative impact of transport related emissions on health and the natural environment"*

*"To reduce the environmental impact of transport, the LTP includes measures and interventions that will increase opportunities for active travel, encourage the use of public transport and promote modal integration."*

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 policy is available at http://www1.bridgend.gov.uk/media/352797/bridgend-ltp-wg-approved-version-may-2015.pdf

## 4.3 Active Travel Plans and Strategies

In September 2014, the Welsh Government introduced the Active Travel (Wales) Act. This measure legally requires Welsh local authorities to map and plan suitable routes for Active Travel within certain areas, as designated by the Welsh Government.

Following formal public consultation and review by Welsh Government, BCBC has produced Integrated Network Maps (INM) that show highlighted routes dedicated to pedestrians and cyclists. The maps are available to download from;

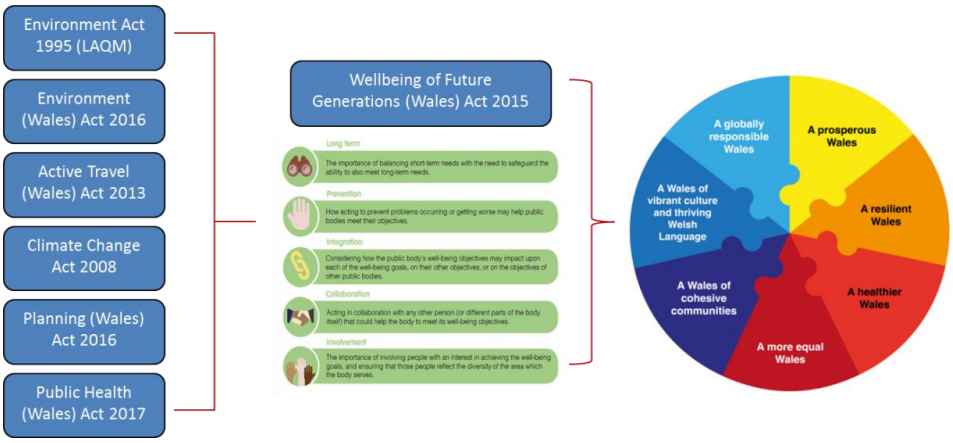
https://www.bridgend.gov.uk/residents/roads-transport-and-parking/active-travel-routes/

## 4.4 Local Authorities Well-being Objectives

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

As highlighted in the earlier **Figure 1.2**, there are seven national well-being goals that form the basis of the Act and five ways of working which support the goals.

**Figure 1.2- The Well- being of Future Generations (Wales) Act 2015 Matrix**




Public, third and business sectors have come together in Bridgend to form a Public Services Board (PSB). Bridgend PSB is committed to working together to improve wellbeing in Bridgend County Borough now and in the future. Bridgend PSB has used the sustainable development principle and the new five ways of working to develop a Well-Being Plan (2018-2023).

The plan outlines the things that Bridgend PSB will work together on, over the next five years, well-being objectives and steps, and provide a vision for how Bridgend will look in 10 years' time. The plan is seen as a mechanism that provides the best possible means of working to help understand the underlying causes of problems and prevent those problems getting worse or happening in the future.

Contributing to the seven national well-being goals and long term vision for Bridgend, Bridgend PSB has developed four main objectives.

**Figure 2.6- Bridgend PSB Four Well-being Objectives**


In accordance with air quality, as part of the objective for **"Healthy Choices in a Healthy Environment"** Bridgend PSB outlines that resources are best utilised and collaborative working ensures that the built, cultural and natural environment remains resilient in future. The priority areas to endorse and encourage the success of the objective will include working together to maximise benefit from cultural, built and natural assets. It will also look at promoting a more resource and energy efficient way of living and working. In order to measure the success of promoting a more resource and energy way of living air quality, particularly NO2 levels will be examined.

Bridgend PSB Well-being Plan is available at;

https://www.bridgend.gov.uk/media/3657/bridgend-wellbeing-bps-plan-e-0518.pdf

## 4.5 Green Infrastructure Plans and Strategies

Outlined in Bridgend's Local Development Plan (LDP) 2006- 2021, Policy **ENV5** focuses upon Green infrastructure.

**Policy ENV5**

**Green Infrastructure**

Green infrastructure will be provided through the protection and enhancement of existing natural assets and the creation of new multi-functional areas of green space. Green infrastructure corridors will connect locations of natural heritage, green space, biodiversity or other environmental interest. They will be safeguarded through:

1) Not permitting development that compromises their integrity and therefore that of the overall green infrastructure framework;
2) Using developer contributions to facilitate improvements to their quality and robustness;
3) Investing in appropriate management, enhancement and restoration, and the creation of new resources.

A Supplementary Planning Guidance (SPG) concerning Green Infrastructure was produced in 2014 by BCBC to provide a detailed understanding to the elements raised in the LDP.


-The document highlights how the Council expect habitats to be considered as part of development proposals within the County Borough of Bridgend. It also introduces the concept of adopting a *Green Infrastructure Approach* to development.

In addition to the above, outlined within **the Bridgend PSB Well-being Plan**, as part of the objective "Healthy Choices in a Healthy Environment" and priority area to include working together to maximise benefit from cultural, built and natural assets, the steps involved will;

- identify opportunities to improve the green asset base by implementing the Bridgend Nature Recovery Plan.
- improve the public estate and green spaces in urban areas by encouraging award of green flag status.

## 4.6 Climate Change Strategies

The Authority's Climate Change Strategy was approved in April 2010.

**Policy PLA4**
**Climate Change and Peak Oil**

All development proposals will be required to make a positive contribution towards tackling the causes of, and adapting to the impacts of Climate Change and Peak Oil issues. Means of achieving this may include:

- Having lower carbon energy requirements by reducing energy demand, and promoting energy efficiency;
- Utilising local materials and supplies wherever feasible;
- Encouraging the development of renewable energy generation;
- Having a location and layout which reflects sustainable transport and access principles, thereby reducing the overall need to travel;
- Having a design, layout and landscaping which:
  (i) helps wildlife and habitats to adapt to the changing climate;
  (ii) assists cooling of the urban environment, including the use of passive building techniques where appropriate;
- Using resources more efficiently and minimising waste water use and pollution;
  Avoiding or minimising the risk from flooding and/ or adapting to the increased risk of flooding, coastal erosion and warmer annual mean temperatures; and
- Promoting sustainable building methods and drainage systems where appropriate.

# 5. Conclusions and Proposed Actions

## 5.1 Conclusions from New Monitoring Data

Since the commissioning of ten non-automatic $NO_2$ monitoring locations in 2017, a review of the yearly datasets indicate elevated and exceeding annual average levels of NO2 at sensitive receptor locations along Park Street, Bridgend.

The two $NO_2$ monitoring locations situated on Park Street highlight elevated and exceeding annual average levels of $NO_2$ when compared to the annual average $NO_2$ objective set at 40µg/$m^3$;

**OBC-103-** 39 Park Street **(37.6µg/m3)**
**OBC-104-** 51 Park Street **(41.5µg/m3)**

Despite the highlighted area of concern, compliance with the air quality objectives was achieved at all other monitoring locations.

## 5.2 Conclusions relating to New Local Developments/ Sources

The assessment of likely impacts from new local development, transport industrial, commercial/domestic and fugitive/uncontrolled sites concludes that there are no new/newly identified sources are likely to give rise to a significant impact on air quality within the County Borough

## 5.3 Other Conclusions

Technical and quality issues still persisted in 2017 with the Ewenny Cross Roundabout automatic monitoring station.

## 5.4 Proposed Actions

Based on the 2017 figures, under Part IV of the Environment Act 1995 & Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, according to the statutory requirements of LAQM a **DRAFT** Air Quality Action Plan (AQAP) must be implemented within 18 months of declaring an AQMA. In accordance with WG's Policy Guidance for LAQM;

***4.12 A draft action plan must be produced for review by the Welsh Government within 18 months of the coming-into-force date of the AQMA order, and the action plan must be formally adopted before two years***

***have elapsed. A Local Authority failing to produce a draft action plan for review by the Welsh Government within two years of declaring or extending an AQMA will, in the absence of a compelling explanation, be issued with a direction from the Welsh Ministers under section 85(3) of the 1995 Act.***

During 2018, monitoring for $NO_2$ has been increased further along Park Street, with an additional two NO2 monitoring sites implemented. It is evident that data is also elevated at these locations and therefore will be reviewed in the 2019 APR.

In line with Welsh Governments Policy Guidance following submission and approval of the 2018 Annual Progress Report, BCBC will need to legally declare an Air Quality Management Area (AQMA) for the Park Street Area, and this will be accompanied by an appropriate technical report setting out the reasons for the declaration.

Given that a number of residential properties will be included in the boundary of AQMA, BCBC will need to engage with these residents in a formal and effective communications exercise in order that the reasons and the implications of an AQMA can be adequately explained to them and the wider community as necessary.

As part of the action plan a thorough understanding for air quality levels and trends will need to be gathered to inform any mitigation measures implemented. Therefore it is envisaged that the Ewenny Cross Roundabout automatic monitoring station will be installed in an appropriate location along Park Street which will measure $NO_2$ and $PM_{10}$. Progress has already started with the allocation of a new sampling location with site visits undertaken and acquiring a contracted service to support data handling and ratification. At the time of writing this report consultants have successfully started the data handling of data collected at Ewenny Cross Roundabout.

Following the declaration of the AQMA, the Council will have up to 24 months to formalise an Action Plan in order to implement appropriate measures to try and improve/ reduce the NO2 levels within the AQMA. At this stage the nature of these measures is not certain but may entail some or all of the following:

# References

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 February 2018).

Welsh Government, Local Air Quality Management in Wales, Policy Guidance, June 2017.

**BRIDGEND COUNTY BOROUGH COUNCIL LAQM REPORTS**

-First Stage Review and Assessment of Air Quality in Bridgend County Borough, September 1999

-Second Stage Review and Assessment of Air Quality in Bridgend County Borough, December 2000

-Updating and Screening Assessment of Air Quality in Bridgend County Borough, July 2003

-Local Air Quality Management Progress Report, July 2005

-Detailed Assessment of Nitrogen Dioxide and Particles ($PM_{10}$), March 2006

-Updating and Screening Assessment of Air Quality in Bridgend County Borough, May 2006

-Local Air Quality Management Progress Report, August 2007

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-Local Air Quality Management Progress Report, June 2014

-Updating and Screening Assessment of Air Quality in Bridgend County Borough, May 2015

-Local Air Quality Management Progress Report, June 2016

-Local Air Quality Management Progress Report, August 2017

# Appendices

Appendix A: Monthly Diffusion Tube Monitoring Results

Appendix B: A Summary of Local Air Quality Management

Appendix C: Air Quality Monitoring Data QA/QC

# Appendix A: Monthly Diffusion Tube Monitoring Results

## Table A.2 – Full Monthly Diffusion Tube Results for 2017

| Site No | Nitrogen Dioxide Sites, Bridgend CBC | 03/01/2017- 02/02/2017 | 02/02/2017- 03/03/2017 | 03/03/2017- 27/03/2017 | 27/03/2017- 25/04/2017 | 25/04/2017- 02/06/2017 | 02/06/2017- 29/06/2017 | 29/06/2017- 04/08/2017 | VOID DUE TO EXPOSURE | VOID DUE TO EXPOSURE | 28/09/2017 - 03/11/2017 | 03/11/202017 - 08/12/2017 | 08/12/2017 - 04/01/2018 | AVERAGE SINCE JAN 17 | Bias Corrected (Correction Factor 0.77) | Annualised and Bias Corrected | Disatance corrected to Façade |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TONDU ROAD ROUNDABOUT** | | | | | | | | | | | | | | | | | |
| OBC-001A | 13 Tondu Road, Bridgend | 55.6 | 50.1 | 47.8 | 48.7 | 44.7 | 30.1 | 27.3 | | | 33.5 | 56.0 | 49.9 | **44.4** | 34.2 | 34.2 | **24.2** |
| OBC-048 | Tondu Road Roundabout, Bridgend | 71.2 | 56.7 | 50.2 | 48.4 | 48.3 | 40.9 | 34.5 | | | 38.6 | 55.1 | 51.1 | **49.5** | 38.1 | 38.1 | **28.2** |
| OBC-068 | Bridgend United Club | 41.7 | 32.9 | 35.0 | 38.4 | 36.2 | 23.0 | 17.7 | | | 26.2 | 44.1 | 40.8 | **33.6** | 25.9 | 25.9 | **25.9** |
| OBC-069 | Tondu Rd Steps | 48.8 | 37.9 | 40.4 | | 40.7 | 30.8 | 29.1 | | | | | 46.3 | **39.1** | 30.1 | 29.9 | **23.4** |
| **PARK STREET** | | | | | | | | | | | | | | | | | |
| OBC-102 | 4 Sunnyside | 51.2 | 37.0 | 34.5 | 33.0 | 24.5 | 20.9 | 16.6 | | | 26.0 | | 33.5 | **30.8** | 23.7 | 23.7 | **23.7** |
| OBC-103 | 39 Park Street | 56.7 | 62.5 | 58.6 | 45.5 | 53.8 | 43.6 | 28.3 | | | 42.0 | 53 | 43.8 | **48.8** | 37.6 | 37.6 | **37.6** |
| OBC-104 | 51 Park Street | 62.4 | 56.2 | 58.9 | 59.5 | 54.2 | 47.6 | 37.1 | | | 44.5 | 61 | 57.6 | **53.9** | 41.5 | 41.5 | **41.5** |
| **BRIDGEND TOWN CENTRE** | | | | | | | | | | | | | | | | | |
| OBC-101 | Bridgend tow n Centre | 40.5 | | 24.0 | 25.2 | 19.5 | | 10.0 | | | 21.0 | 33 | | **24.8** | 19.1 | 18.1 | **18.1** |
| **NOLTON STREET / EWENNY RD CROSS LINK/ A473 COWBRIDGE ROAD** | | | | | | | | | | | | | | | | | |
| OBC-049 | 91 Nolton Street, Bridgend | 61.9 | 41.5 | 36.4 | 37.7 | 36.9 | 21.9 | 11.1 | | | | | | **35.3** | 27.2 | 27.9 | **27.3** |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OBC-050 | 2 Ewenny Road, Bridgend | 41.4 | | 24.1 | 25.7 | | 13.4 | 19.3 | | | 21.7 | | | 24.3 | 18.7 | 19.0 | **17.8** |
| OBC- 105 | 65 Cowbridge Road | 52.1 | 36.8 | 33.3 | 31.9 | 26.3 | 17.9 | 16.4 | | | 26.5 | 43.4 | 35.0 | 32.0 | 24.6 | 24.6 | **24.6** |
| OBC- 106 | 38/40 Cowbridge Road | | 48.6 | 48.2 | | | | 22.4 | | | 34.8 | 53.1 | | 41.4 | 31.9 | 30.4 | **25.2** |
| **EWENNY ROUNDABOUT** | | | | | | | | | | | | | | | | | |
| OBC-041 | 55/57 Priory Avenue, Bridgend | 39.5 | 40.2 | 30.3 | 31.1 | 28.5 | 18.4 | 16.2 | | | 21.2 | 41.6 | 31.9 | 29.9 | 23.0 | 23.0 | **17.7** |
| OBC-043 | Darbury, A48 Bypass, Bridgend | 63.9 | 48.2 | 49.5 | 52.4 | 53.3 | 37.3 | 31.7 | | | 43.3 | 59.3 | 47.8 | 48.7 | 37.5 | 37.5 | **26.1** |
| OBC-044 | 99 Ewenny Road, Bridgend | 49.5 | 41.2 | 36.6 | 36.9 | 31.9 | 24.3 | 20.0 | | | 25.6 | 39.4 | 31.4 | 33.7 | 25.9 | 25.9 | **22.0** |
| OBC-055 | STL, Ewenny Road | 43.0 | 29.0 | 21.8 | 22.0 | 22.1 | 11.5 | 11.0 | | | 33.1 | 51.9 | 53.8 | 29.9 | 23.0 | 23.0 | **19.2** |
| OBC-056 | Parkhof, Ewenny Road | 46.6 | 43.4 | 38.1 | 37.5 | 42.0 | 29.5 | 27.9 | | | 15.1 | 27.1 | 37.8 | 34.5 | 26.6 | 26.6 | **17.1** |
| OBC-078 | Corner of Ewenny Roundabout | 55.6 | 40.0 | 44.6 | 38.3 | 35.9 | 27.4 | 24.6 | | | 32.8 | 50.8 | 45.5 | 39.6 | 30.5 | 30.5 | **24.7** |
| OBC-085 | Property Façade of (Further down from Milstead) | 35.1 | 30.8 | 24.7 | 23.5 | 26.7 | 18.1 | 15.6 | | | 22.5 | 32.1 | 29.5 | 25.9 | 19.9 | 19.9 | **19.9** |
| OBC-087 | Property Façade of Danbury | 36.9 | 30.1 | 24.3 | 27.3 | 30.8 | 18.2 | 15.0 | | | | | 26.6 | 26.2 | 20.1 | 20.0 | **20.0** |
| OBC-088 | Co-location -Tube 1 | 42.5 | 35.8 | 28.3 | 26.7 | 32.8 | 17.6 | 15.4 | | | 12.3 | 29.5 | 23.2 | 26.4 | 20.3 | 20.3 | **20.3** |
| OBC-089 | Co-location -Tube 2 | 51.0 | 34.5 | 25.6 | 30.2 | 33.2 | 15.2 | 14.9 | | | 21.8 | 31.5 | 24.6 | 28.3 | 21.8 | 21.8 | **21.8** |
| OBC-090 | Co-location -Tube 3 | 48.8 | 31.4 | 24.3 | 25.2 | | 20.3 | 14.9 | | | 12.2 | 29.5 | 21.3 | 25.3 | 19.5 | 19.5 | **19.5** |
| OBC-091 | Property Façade of Milstead | 36.1 | 32.0 | 27.8 | 28.1 | 32.9 | 20.8 | 17.5 | | | 26.3 | 31.6 | 32.2 | 28.5 | 22.0 | 22.0 | **22.0** |
| **MAESTEG TOWN CENTRE** | | | | | | | | | | | | | | | | | |
| OBC-080 | Opposite Card Factory, Talbot Street, Maesteg | 45.2 | 33.5 | 37.1 | | 25.1 | 25.6 | | | | | | 37.5 | 34.0 | 26.2 | 23.9 | **23.9** |
| OBC-081 | Opposite Maesteg Indoor Market Entrance, Talbot Street, Maesteg | 45.6 | 35.8 | 38.8 | | 26.3 | 23.3 | | | | | 42.4 | 41.0 | 36.2 | 27.9 | 21.4 | **21.4** |
| OBC-082 | Opposite Fluid Nightclub, Castle Street, Maesteg | 51.0 | 32.0 | 37.0 | | | | | | | | 36.4 | 41.1 | 39.5 | 30.4 | 23.4 | **23.4** |
| OBC-083 | Outside Maesteg Day Centre, Castle Street, Maesteg | 50.4 | 40.2 | 43.0 | | 36.4 | | | | | | 41.4 | | 42.3 | 32.6 | 25.1 | **25.1** |
| **COITY ROAD, BRIDGEND** | | | | | | | | | | | | | | | | | |
| OBC-097 | 22 Coity Road, Bridgend | 50.7 | 30.5 | 34.7 | 34.3 | 36.8 | 25.2 | 22.6 | | | 27.9 | 41 | 37.6 | 34.1 | 26.3 | 26.3 | **26.3** |
| OBC-098 | 26 Coity Road, Bridgend | 45.2 | 32.5 | 30.2 | 34.4 | 27.7 | 21.7 | 18.5 | | | 27.1 | 41 | 34.0 | 31.2 | 24.0 | 24.0 | **24.0** |
| OBC-099 | 42 Coity Road, Bridgend | 49.1 | 40.2 | 30.8 | 31.4 | 29.9 | 21.7 | 17.7 | | | 24.4 | 34 | 29.7 | 30.9 | 23.8 | 23.8 | **23.8** |
| OBC-100 | 11 Coity Road, Bridgend | 49.8 | 40.2 | 34.6 | 36.4 | 28.8 | 23.9 | 22.6 | | | 27.5 | | 17.5 | 31.3 | 24.1 | 24.1 | **24.1** |

**Notes:**

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

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

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

(2) Distance corrected to nearest relevant public exposure.

# Appendix B: A Summary of Local Air Quality Management

## Purpose of an Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment Act 1995 and associated government guidance. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas and to determine whether or not the air quality objectives are being achieved. Where exceedances occur, or are likely to occur, the local authority must then declare an Air Quality Management Area (AQMA) and prepare a **DRAFT** Air Quality Action Plan (AQAP) within 18 months, setting out measures it intends to put in place to improve air quality in pursuit of the air quality objectives. The AQAP must be **formally** adopted prior to 24 months has elapsed. Action plans should then be reviewed and updated where necessary at least every 5 years.

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

## Air Quality Objectives

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in **Table B.2.**

The table shows the objectives in units of microgrammes per cubic metre µg/m3 (milligrammes per cubic metre, mg/m3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

| Pollutant | Air Quality Objective | | Date to be achieved by |
|---|---|---|---|
| | Concentration | Measured as | |
| Nitrogen Dioxide ($NO_2$) | 200µg/$m^3$ not to be exceeded more than 18 times a year | 1-hour mean | 31.12.2005 |
| | 40µg/$m^3$ | Annual mean | 31.12.2005 |
| Particulate Matter ($PM_{10}$) | 50µg/$m^3$, not to be exceeded more than 7 times a year | 24-hour mean | 31.12.2010 |
| | 18µg/$m^3$ | Annual mean | 31.12.2010 |
| Particulate Matter ($PM_{2.5}$) | 10µg/$m^3$ | Annual mean | 31.12.2020 |
| Sulphur dioxide ($SO_2$) | 350µg/$m^3$, not to be exceeded more than 24 times a year | 1-hour mean | 31.12.2004 |
| | 125µg/$m^3$, not to be exceeded more than 3 times a year | 24-hour mean | 31.12.2004 |
| | 266µg/$m^3$, not to be exceeded more than 35 times a year | 15-minute mean | 31.12.2005 |
| Benzene | 3.25µg/$m^3$ | Running annual mean | 31.12.2010 |
| 1,3 Butadiene | 2.25µg/$m^3$ | Running annual mean | 31.12.2003 |
| Carbon Monoxide | 10.0mg/$m^3$ | Running 8-Hour mean | 31.12.2003 |
| Lead | 0.25µg/$m^3$ | Annual Mean | 31.12.2008 |

# Appendix C: Air Quality Monitoring Data QA/QC

## Diffusion Tube Bias Adjustment Factors

A database of bias adjustment factors determined from Local Authority co-location studies throughout the UK has been collated by the LAQM Helpdesk. The National Diffusion Tube Bias Adjustment Factor Spreadsheet (Version 06/18) was used to obtain an overall adjustment factor of 0.77 from the input data shown in the following screen shot. This overall factor is based on 29 co-location studies where the tube preparation method and analysis laboratory used were the same as those used by BCBC.

### Figure C.1: National Diffusion Tube Bias Adjustment Factor Spreadsheet

**National Diffusion Tube Bias Adjustment Factor Spreadsheet** — Spreadsheet Version Number: 06/18

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

This spreadsheet will be updated at the end of September 2018
LAQM Helpdesk Website

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

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

| Step 1: | Step 2: | Step 3: | Step 4: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Select the Laboratory that Analyses Your Tubes from the Drop-Down List | Select a Preparation Method from the Drop-Down List | Select a Year from the Drop-Down List | Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column. | | | | | | | | |
| If a laboratory is not shown, we have no data for this laboratory. | If a preparation method is not shown, we have no data for this method at this laboratory. | If a year is not shown, we have no data[2] | If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953 | | | | | | | | |
| Analysed By[1] | Method To undo your selection, choose (All) from the pop-up list | Year[2] To undo your selection, choose (All) | Site Type | Local Authority | Length of Study (months) | Diffusion Tube Mean Conc. (Dm) (µg/m³) | Automatic Monitor Mean Conc. (Cm) (µg/m³) | Bias (B) | Tube Precision[4] | Bias Adjustment Factor (A) (Cm/Dm) |
| ESG Didcot | 50% TEA in acetone | 2017 | R | Tunbridge Wells | 12 | 56 | 40 | 38.2% | G | **0.72** |
| ESG Didcot | 50% TEA in acetone | 2017 | UB | Kingston upon Hull City Council | 12 | 32 | 23 | 38.2% | G | **0.72** |
| ESG Didcot | 50% TEA in acetone | 2017 | UB | Kingston upon Hull City Council | 12 | 32 | 23 | 38.2% | G | **0.72** |
| ESG Didcot | 50% TEA in acetone | 2017 | R | Suffolk Coastal DC | 12 | 45 | 37 | 23.8% | G | **0.81** |
| ESG Didcot | 50% TEA in acetone | 2017 | R | Dacorum Borough Council | 9 | 31 | 27 | 14.7% | G | **0.87** |
| ESG Didcot | 50% TEA in acetone | 2017 | R | North East Lincolnshire Council | 11 | 37 | 24 | 53.5% | G | **0.65** |
| ESG Didcot | 50% TEA in acetone | 2017 | UB | Swansea Council | 10 | 17 | 14 | 23.4% | G | **0.81** |
| ESG Didcot | 50% TEA in acetone | 2017 | R | Swansea Council | 12 | 33 | 24 | 34.5% | G | **0.74** |
| ESG Didcot | 50% TEA in acetone | 2017 | | **Overall Factor[3] (29 studies)** | | | | Use | | 0.77 |

## Discussion of Choice of Factor to use

The bias adjustment factor applied to all 2017 data is 0.77. The applied bias adjustment factor has been calculated using the national diffusion tube bias adjustment factor spreadsheet version 06/18. The individual bias adjustment factor calculated using Ewenny Cross Roundabout automatic monitoring system and the co-located triplicate diffusion tubes has not been used due to technical & quality issues. As previously stated calibrations for roadside/ kerbside located monitors should be undertaken **every two weeks** by LAs. Unfortunately due to staffing requirements this was not adhered to. As a best practise approach, due to the inconsistency of LA Calibrations a nitrogen dioxide ($NO_2$) co-location study was not undertaken and alternatively a national bias adjustment factor was obtained and applied from the Defra website, based on an average of 29 co-location studies.

## Short-Term to Long-Term Data Adjustment

**AMS Adjustment**

The Ewenny Cross Roundabout AMS had poor annual data capture for nitrogen dioxide ($NO_2$) (**27%**). As a result, the $NO_2$ data presented in this report from this monitor has been annualised according to the methods presented in Box 7.9 of LAQM TG(16). Two long-term AURN urban background continuous monitoring sites, within a distance of approximately 50 miles from Bridgend were selected, Cwmbran and Bristol St Paul's.

**Table C.1 – Long term AURN sites used for calculation of $NO_2$ annualisation ratio for Ewenny Cross Roundabout AMS**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.04 | 17.19 | 0.70 |
| Bristol St Paul's AURN | Urban Background | 23.79 | 32.70 | 0.73 |
| Average Ratio | | | | 0.71 |

**Diffusion Tubes Adjustment**

The Nitrogen Dioxide ($NO_2$) obtained via the use of passive diffusion tubes during January to December 2017 were annualised via the method described in Box 7.10 of LAQM TG(16). Due to potential quality issues surrounding Ewenny Roundabout's AMS $NO_2$ data, three long-term AURN urban background continuous monitoring sites, within a distance of approximately 50 miles from Bridgend were selected, Cardiff, Cwmbran and Bristol St Paul's.

**Table C.2 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-069**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 12.5 | 0.96 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 24.17 | 0.98 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 19.80 | 1.04 |
| Average Ratio | | | | 0.99 |

**Table C.3 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-101**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 12.70 | 0.95 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 25.27 | 0.94 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 22.23 | 0.93 |

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Average Ratio | | | | 0.94 |

**Table C.4 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-049**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 11.76 | 1.02 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 23.16 | 1.02 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 20.09 | 1.03 |
| Average Ratio | | | | 1.02 |

**Table C.5 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-050**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 11.87 | 1.01 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 23.27 | 1.02 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 20.08 | 1.03 |
| Average Ratio | | | | 1.02 |

**Table C.6 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-106**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 12.26 | 0.98 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 24.88 | 0.95 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 22.32 | 0.92 |
| Average Ratio | | | | 0.95 |

**Table C.7 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-087**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 12.31 | 0.98 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 23.63 | 1.00 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 20.70 | 1.00 |
| Average Ratio | | | | 0.92 |

**Table C.8 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-080**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 13.68 | 0.88 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 25.77 | 0.92 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 22.02 | 0.94 |
| Average Ratio | | | | 0.91 |

**Table C.9 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-081**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 14.06 | 0.85 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 26.93 | 0.88 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 23.03 | 0.89 |
| Average Ratio | | | | 0.88 |

**Table C.10 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-082**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 16.88 | 0.71 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 31.86 | 0.74 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 25.96 | 0.79 |
| Average Ratio | | | | 0.75 |

**Table C.11 – Long term AURN sites used for calculation of nitrogen dioxide annualisation ratio for Diffusion Tube OBC-083**

| Site | Site Type | Annual Mean (µg/m$^3$) | Period Mean (µg/m$^3$) | Ratio |
|---|---|---|---|---|
| Cwmbran AURN | Urban Background | 12.02 | 15.18 | 0.79 |
| Bristol St Paul's AURN | Urban Background | 23.68 | 29.74 | 0.80 |
| Cardiff City Centre AURN | Urban Background | 20.60 | 24.70 | 0.83 |
| Average Ratio | | | | 0.81 |

## 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

# Glossary of Terms

| Abbreviation | Description |
|---|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| APR | Air quality Annual Progress Report |
| AURN | Automatic Urban and Rural Network (UK air quality monitoring network) |
| BCBC | Bridgend County Borough Council |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England |
| FDMS | Filter Dynamics Measurement System |
| LAQM | Local Air Quality Management |
| $NO_2$ | Nitrogen Dioxide |
| $NO_x$ | Nitrogen Oxides |
| $PM_{10}$ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less |
| $PM_{2.5}$ | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |
| $SO_2$ | Sulphur Dioxide |