



***North Wales Combined Authority  
Annual Progress Report 2017***

*Bureau Veritas*





*September 2017*

***Move Forward with Confidence***



**BUREAU  
VERITAS**

**Document Control Sheet**

Issue/Revision	Issue 1	Issue 2
Remarks	Draft	Final
Date	August 2017	September 2017
Submitted to	Robert Johnston	Robert Johnston
Prepared by	Hannah Smith – Senior Consultant	Hannah Smith – Senior Consultant
Signature		
Approved by	Jamie Clayton	Jamie Clayton
Signature		
Project number	6461908	

Disclaimer

This Report was completed by Bureau Veritas on the basis of a defined programme of work and terms and conditions agreed with the Client. Bureau Veritas' confirms that in preparing this Report it has exercised all reasonable skill and care taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

Bureau Veritas accepts no responsibility to any parties whatsoever, following the issue of the Report, for any matters arising outside the agreed scope of the works.

This Report is issued in confidence to the Client and Bureau Veritas has no responsibility to any third parties to whom this Report may be circulated, in part or in full, and any such parties rely on the contents of the report solely at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, the consultant asserts and retains all Copyright, and other Intellectual Property Rights, in and over the Report and its contents.

Any questions or matters arising from this Report should be addressed in the first instance to the report author.



# North Wales Combined Authority 2017 Air Quality Progress Report

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

September, 2017

## North Wales Combined Authority

<p><b>Eilir Rhiannon Thomas – Public Protection Isle of Anglesey County Council</b> Council Offices Llangefni Anglesey LL77 7TW Tel: 01248 752820 Email: eilirThomas@ynysmon.gov.uk</p>	<p><b>Simon Contrill – Principal Environment Officer</b> <b>Conwy County Borough Council</b> Civic Offices Colwyn Bay Conwy LL29 6DW Tel: 01492 575266 Email: simon.cottrill@conwy.gov.uk</p>
<p><b>Andrew Lord - Public Protection Business Manager</b> <b>Denbighshire County Council</b> PO Box 62 Ruthin Denbighshire LL15 9AZ Tel: 01824 706087 Email: andrew.lord@denbighshire.gov.uk</p>	<p><b>Dave Jones – Pollution Control Officer</b> <b>Flintshire County Council</b> Pollution Control Section Country Hall Mold CH7 6NF Tel: 01352 703276 Email: dave.l.jones@flintshire.gov.uk</p>
<p><b>David A Williams – Environment Officer</b> <b>Gwynedd Council</b> Dwyfor Area Office Ffordd y Cob Pwllheli Gwynedd LL53 5AA Tel: 01758 704125 Email: davidawilliams@gwynedd.llyw.cymru</p>	<p><b>Robert Johnston – Environmental Health &amp; Housing Standards Lead</b> <b>Wrexham County Borough Council</b> Environment and Planning Department, Ruthin Road Wrexham LL13 7TU Tel: 01978 297425 Email: robert.johnston@wrexham.gov.uk</p>
<p><b>Report Reference Number</b></p>	<p>6461908</p>
<p><b>Date</b></p>	<p>September 2017</p>

## Executive Summary

Part IV of the Environment Act 1995 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Annual Progress Report is a requirement of the Sixth Round of Review and Assessment and is a requirement for all local authorities. The Report covers the 6 local authorities which encompass the North Wales region (The North Wales Combined Authority). The local authorities are as follows:

- Isle of Anglesey County Council (IACC)
- Conwy County Borough Council (CCBC)
- Denbighshire County Council (DCC)
- Flintshire County Council (FCC)
- Gwynedd Council (GC)
- Wrexham County Borough Council (WCBC)

The Report has been undertaken in accordance with the Technical Guidance LAQM.TG (16) and associated tools.

This annual progress report considers all new monitoring data within the North Wales Combined Authority and assesses the data against the Air Quality Strategy (AQS) objectives. It also considers any changes that may have an impact on air quality.

Automatic monitoring was carried out in IACC and WCBC. The four Osiris monitoring stations measuring PM<sub>10</sub> and PM<sub>2.5</sub> in IACC reported no exceedances of the annual and 24-hour mean PM<sub>10</sub> AQS objectives or the PM<sub>2.5</sub> target value. The AURN station located in WCBC measured NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> and SO<sub>2</sub> concentrations in 2016. Similar to the stations in IACC, no exceedances of the relevant AQS objectives or target values for any measured pollutant was reported.

Diffusion tube NO<sub>2</sub> monitoring was carried out throughout the North Wales Combined Authority at key locations within town centres and along the main transport links throughout North Wales. Only one exceedance was reported, at a diffusion tube in IACC. NO<sub>2</sub> concentrations at this site have either exceeded or been within 10% of the annual mean AQS objective for the past 5 years. The diffusion tube is located along

## **North Wales Combined Authority**

the A55 at a kerbside location. There are no nearby sensitive receptors and as a consequence the site does not represent relevant exposure.

There were no other diffusion tube monitoring sites in 2016 where the annual mean AQS objective for NO<sub>2</sub> was exceeded.

WCBC also monitored benzene at one diffusion tube location near an acid tar lagoon. No exceedances of the annual mean AQS objective for benzene have been reported for the past 5 years.

Having considered each pollutant and reviewed the new developments approved in 2016, it can be concluded that there is no requirement for any of the six local authorities within the North Wales Combined Authority to undertake a detailed assessment.

The North Wales Combined Authority will continue to maintain their monitoring programmes and ensure new monitoring sites are installed as required.

# Table of Contents

<b>Executive Summary .....</b>	<b>i</b>
<b>1 Introduction.....</b>	<b>1</b>
1.1 Description of Local Authority Areas.....	1
1.2 Purpose of Progress Report .....	4
1.3 Air Quality Objectives .....	4
1.4 Summary of Previous Review and Assessments.....	6
<b>2 New Monitoring Data .....</b>	<b>8</b>
2.1 Summary of Monitoring Undertaken .....	8
2.2 Comparison of Monitoring Results with Air Quality Objectives .....	34
<b>3 New Local Developments.....</b>	<b>63</b>
3.1 Road Traffic Sources .....	63
3.2 Other Transport Sources .....	64
3.3 Industrial Sources.....	65
3.4 Commercial and Domestic Sources.....	66
3.5 New Developments with Fugitive or Uncontrolled Sources .....	66
<b>4 Air Quality Planning Policies .....</b>	<b>68</b>
<b>5 Local Transport Plans and Strategies .....</b>	<b>69</b>
<b>6 Conclusions and Proposed Actions.....</b>	<b>71</b>
6.1 Conclusions from New Monitoring Data.....	71
6.2 Other Conclusions .....	71
6.3 Proposed Actions.....	71
<b>7 References .....</b>	<b>72</b>

## List of Tables

Table 1.1 – Air Quality Objectives included in Regulations for the purpose of LAQM in Wales .....	5
Table 1.2 – Summary of Previous Rounds of Review and Assessment in the North Wales Combines Authority .....	6
Table 2.1 – Details of Automatic Monitoring Sites in the North Wales Combined Authority .....	11
Table 2.2 – Details of Non- Automatic Monitoring Sites in the North Wales Combined Authority .....	21
Table 2.3 – Results of Automatic Monitoring for NO <sub>2</sub> : Comparison with Annual Mean Objective.....	35
Table 2.4 – Results of Automatic Monitoring for NO <sub>2</sub> : Comparison with 1-hour Mean Objective.....	35
Table 2.5 – Results of NO <sub>2</sub> Diffusion Tubes 2016 .....	40
Table 2.6 – Results of Automatic Monitoring for PM <sub>10</sub> : Comparison with Annual Mean Objective.....	57
Table 2.7 – Results of Automatic Monitoring for PM <sub>10</sub> : Comparison with 24-hour Mean Objective.....	57
Table 2.8 – Results of PM <sub>2.5</sub> Automatic Monitoring .....	59
Table 2.9 – Results of SO <sub>2</sub> Automatic Monitoring.....	60
Table 2.10 – Results of Benzene Diffusion Tube Monitoring .....	61
Table 3.1 – Approved Planning Applications: Road Traffic Sources.....	63
Table 3.2 – Approved Planning Applications: Industrial Sources.....	65
Table 3.3 – Approved Planning Applications: Commercial and Domestic Sources ...	66
Table A.1 – Short-Term to Long-Term Monitoring NO <sub>2</sub> Adjustment: Non-Automatic Stations.....	79
Table A.2 – Short-Term to Long-Term Monitoring PM <sub>10</sub> Adjustment .....	79
Table A.3 – Short-Term to Long-Term Monitoring PM <sub>2.5</sub> Adjustment.....	79
Table B.1 – Results of NO <sub>2</sub> Diffusion Tubes (2012 to 2016): Isle of Anglesey .....	80
Table B.2 – Results of NO <sub>2</sub> Diffusion Tubes (2012 to 2016): Conwy Borough Council	80
Table B.3 – Results of NO <sub>2</sub> Diffusion Tubes (2012 to 2016): Denbighshire County Council .....	81
Table B.4 – Results of NO <sub>2</sub> Diffusion Tubes (2012 to 2016): Flintshire Council .....	82
Table B.5 – Results of NO <sub>2</sub> Diffusion Tubes (2012 to 2016): Gwynedd Council.....	85
Table B.6 – Results of NO <sub>2</sub> Diffusion Tubes (2012 to 2016): Wrexham County Borough Council .....	86
Table C.1- Full Monthly Diffusion Tube Results for 2016: Isle of Anglesey County Council .....	87
Table C.2- Full Monthly Diffusion Tube Results for 2016: Conwy County Borough Council .....	88



Table C.3- Full Monthly Diffusion Tube Results for 2016: Denbighshire County Council .....	88
Table C.4- Full Monthly Diffusion Tube Results for 2016: Gwynedd Council .....	90
Table C.5- Full Monthly Diffusion Tube Results for 2016: Flintshire Council .....	90
Table C.6- Full Monthly Diffusion Tube Results for 2016: Wrexham County Borough Council .....	93

## List of Figures

Figure 2.1 – Map of Automatic Monitoring Site: Isle of Anglesey County Council .....	9
Figure 2.2 – Map of Automatic Monitoring Site: Isle of Anglesey County Council – Felin Cafnan, close to the Wylfa Newydd construction site .....	9
Figure 2.3 – Map of Automatic Monitoring Site: Wrexham County Borough Council .....	10
Figure 2.4 – Map of non-Automatic Monitoring Sites: Isle of Anglesey County Council – Llanfairpwllgwyngyll and Llangefni .....	13
Figure 2.5 – Map of non-Automatic Monitoring Sites: Isle of Anglesey County Council – Along the A55 and A5025.....	13
Figure 2.6 – Map of non-Automatic Monitoring Sites: Isle of Anglesey County Council – Along A5025, Cemaes and Amlwch .....	14
Figure 2.7 – Map of non-Automatic Monitoring Sites: Denbighshire County Council – Ruthin .....	14
Figure 2.8 – Map of non-Automatic Monitoring Sites: Denbighshire County Council – Denigh .....	15
Figure 2.9 – Map of non-Automatic Monitoring Sites: Denbighshire County Council – North.....	15
Figure 2.10 – Map of non-Automatic Monitoring Sites: Conwy County Borough Council – A55 by Llanfairfechan .....	16
Figure 2.11 – Map of non-Automatic Monitoring Sites: Conwy County Borough Council – Wider Area.....	16
Figure 2.12 – Map of non-Automatic Monitoring Sites: Gwynedd Council – Wider Area.....	17
Figure 2.13 – Map of non-Automatic Monitoring Sites: Gwynedd Council – Pwllhei..	17
Figure 2.14 – Map of non-Automatic Monitoring Sites: Flintshire County Council Wider Area.....	18
Figure 2.15 – Map of non-Automatic Monitoring Sites: Flintshire County Council – Rhewl Mostyn and Treffynnon Holywell areas.....	18
Figure 2.16 – Map of non-Automatic Monitoring Sites: Flintshire County Council – Hope Area .....	19
Figure 2.17 – Map of non-Automatic Monitoring Sites: Wrexham County Borough Council – South .....	19
Figure 2.18 – Map of non-Automatic Monitoring Sites: Wrexham County Borough Council – North.....	20
Figure 2.19 – Trends in Annual Mean NO <sub>2</sub> Concentrations Measured at Automatic Monitoring Stations.....	36

## North Wales Combined Authority

Figure 2.20 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Isle of Anglesey County Council .....	48
Figure 2.21 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Conwy County Borough Council .....	49
Figure 2.22 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Denbighshire County Council.....	50
Figure 2.23 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Flintshire Council <20µg/m <sup>3</sup> in 2016 .....	51
Figure 2.24 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Flintshire Council >20µg/m <sup>3</sup> in 2016 .....	52
Figure 2.25 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Gwynedd Council.....	53
Figure 2.26 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Wrexham County Borough Council.....	54
Figure 2.27 – Trends in Annual Mean PM <sub>10</sub> Concentrations .....	58
Figure 2.28 – Trends in Annual Mean PM <sub>2.5</sub> Concentrations at the AURN Continuous Monitoring Site.....	60
Figure 2.29 – Trends in SO <sub>2</sub> Concentrations .....	61
Figure 2.30 – Trends in Annual Mean Benzene Concentrations .....	62
Figure A.1 – Factor from Local Co-Location Study.....	74
Figure A.2 – Fall-off Distance Correction of DT4: Isle of Anglesey County Council...	78
Figure A.3 – Fall-off Distance Correction of Site 57: Flintshire Council .....	78

### Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B: Complete Monitoring Results (2012-2016)

Appendix C: Full Monthly Diffusion Tube Results for 2016

# 1 Introduction

## 1.1 Description of Local Authority Areas

The North Wales Combined Authority Area is comprised of six local authorities. A summary of each local authority and their main pollution sources can be found below. There are no Air Quality Management Areas (AQMAs) declared in any of the six local authority areas.

### **Isle of Anglesey County Council**

Isle of Anglesey County Council (IACC) is an island situated off the coast of north-west Wales. It is linked to the mainland by two bridges, Telford's Menai Suspension Bridge and Stephenson's Britannia Bridge. IACC is predominately rural in nature with a number of scattered towns and villages throughout. The Council serves a resident population of approximately 67,800<sup>1</sup> with the majority of whom are situated in the larger towns of Holyhead, Llangefni, Amlwch, Menai Bridge and Beaumaris.

The island suffers from significant job losses and outward migration due to the closure of a number of industrial processes. IACC has been declared as an Enterprise Zone focusing on Energy by the Welsh Government in an attempt to bring low carbon energy industrial activities onto the island. The industrial emissions from such activities will likely be a source of air pollution on the island. Furthermore, Holyhead remains a principal shipping port serving Dublin and as a tourist stop for Snowdonia National Park. Road traffic emissions also contribute to pollution levels, notably along the A55 dual carriage way which begins at Holyhead and runs in a south-easterly direction across the island. The A55 is the most heavily used road on the island and helps alleviate congestion on the A5 which travels through many of the towns and villages.

### **Conwy County Borough Council**

Conwy County Borough Council (CCBC) is bounded by the Irish Sea to the north, with the coastal boundary stretching for 37 miles between Llanfairfechan in the west to the River Clwyd in the east. CCBC extends down to Dolwyddelan and across to Carrigydrudion in the southwest. The Borough serves a total resident population of

## **North Wales Combined Authority**

approximately 115,200<sup>1</sup>, the majority of which are settled along the coastal strip in the larger towns of Abergele, Colwyn Bay and Llandudno. Approximately 35% of the geographical area of CCBC lies within Snowdonia National Park. As a consequence, the number of residents and visitors increase dramatically during the summer months due to high levels of tourism.

CCBC is a main trunk route through North Wales and therefore the major arterial roads are a significant source of pollution from emissions from road vehicles. In particular, the A55 dual carriage way which is the main trunk route between the northwest and Holyhead ferry port and the A470 single carriage way which leads inland to Snowdonia.

### **Denbighshire County Council**

Denbighshire County Council (DCC) covers an area extending from Rhyl and Prestatyn, through the Vale of Clwyd, as far south as Corwen and Llangollen. DCC is largely rural in character with tourism and agriculture being the main industries. The Council serves a total resident population of approximately 93,700<sup>1</sup>, the majority of which are located in the largest coastal towns of Rhyl and Prestatyn.

The main source of air pollution in DCC is road traffic emissions from major roads, notably the A55, A5 and A494. The A55 crosses north Denbighshire providing direct links to the national motorway network, whilst the A5 crosses the county linking through to Snowdonia in the south. The A494 runs across the county linking Chester to Dolgellau.

### **Flintshire County Council**

Flintshire County Council (FCC) is the north-eastern gateway to Wales. It is bounded by Wrexham in the south, Denbighshire to the west and Cheshire to the east. The extreme north-west of the Council area is bounded by the Irish Sea with the tidal estuary of the River Dee acting as the local authority boundary. FCC is largely rural in character however the coast along the Dee estuary is heavily developed by industry and the northern coast much developed for tourism. The Council serves a total resident population of approximately 152,500<sup>1</sup>, the majority of which are located in

---

<sup>1</sup> Source : Office of National Statistics - 2011 Census Published 11th July 2012 (<http://ons.gov.uk>)

## **North Wales Combined Authority**

the larger towns of Buckley, Connah's Quay, Flint, Hawarden, Holywell, Mold, Queensferry and Shotton.

The main source of air pollution in FCC is road traffic emissions from major roads linking England to the rest of north Wales. These include the A55 towards Colwyn Bay in the north and the A494 towards Snowdonia in the south.

### **Gwynedd Council**

Gwynedd Council (GC) lies between the area from Abergwyngregyn in the north to Aberdyfi in the south, and from the Llyn Peninsula in the west to Glan yr Afon in the east. Gwynedd has a population of approximately 120,000<sup>1</sup>. The county shares its inland boundary with four other counties; Conwy, Denbighshire, Powys and Ceredigion. GC is predominantly rural in nature, with the main areas of population concentrated at the University City of Bangor and Gwynedd Administration Centre, Caernarfon, both situated on the south shore of the Menai Strait to the north-west of the county.

The main source of air pollution is emissions from road traffic due to the dependence of cars and the increase in the influx from tourism along the main roads. The busiest road within the country is the A55, connecting the port of Holyhead on Anglesey to the north-west of England. The A470 is the primary route between north and south Wales. It traverses Gwynedd from Blaenau Ffestiniog to Mallwyd in the south. Another important road is the A487 which links Caernarfon and Bangor with the south of the county before merging with the A470 at Llan Ffestiniog, then continuing from the south of Dolgellau towards, Machynlleth and beyond.

### **Wrexham County Borough Council**

Wrexham County Borough Council (WCBC) is bounded by the Clwydian Hills to the west and the Shropshire and Powys countryside to the south. The council serves a resident population of approximately 133,500<sup>1</sup> of which the majority are situated within the centre of Wrexham itself or in the surrounding urban villages. Outside Wrexham centre, the predominant land use is agriculture with the landscape being largely rural in nature.

The main source of air pollution is traffic emissions from vehicles travelling along the A483 which links the north of the county to the south. There are also several industrial estates within its borders, the largest of which is located 5 miles to the east of the main town area and contain over 300 businesses.

### **1.2 Purpose of Progress Report**

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

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

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

### **1.3 Air Quality Objectives**

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre  $\mu\text{g}/\text{m}^3$  (milligrammes per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

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

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

## 1.4 Summary of Previous Review and Assessments

Previous rounds of review and assessment have identified areas in the North Wales Combined Authority where exceedances of the annual mean objectives have occurred. Detailed assessments have been carried out when exceedances have been reported to evaluate whether an Air Quality Management Area (AQMA) needs to be declared. There are currently no AQMAs declared in the North Wales Combined Authority.

**Table 1.2 – Summary of Previous Rounds of Review and Assessment in the North Wales Combines Authority**

Year	Report Type	Detailed Assessment Recommended	AQMA Declared
2003	Updating and Screening Assessment	No detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2004	Progress Report	Detailed assessment carried out for PM <sub>10</sub> and NO <sub>2</sub> close to the A494 in <b>FCC</b> . No other detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2005	Progress Report	No detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2006	Updating and Screening Assessment	Detailed assessment required at Trimm Rock and Aberdo Limestone Quarries and at Roadrunner Waste Transfer Station in <b>FCC</b> . No other detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2007	Progress Report	Detailed assessment carried out for SO <sub>2</sub> 15-minute mean objective for Penrhos Coastal Park in <b>IACC</b> . No other detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2008	Progress Report	No detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.



## North Wales Combined Authority

Year	Report Type	Detailed Assessment Recommended	AQMA Declared
2009	Updating and Screening Assessment	<p>Detailed assessment no longer required at Trimm Rock and Aberdo Limestone Quarries and at Roadrunner Waste Transfer Station in <b>FCC</b>.</p> <p>Detailed assessment carried out for SO<sub>2</sub> 15-minute mean objective for Holyhead Railway Station in <b>IACC</b>.</p> <p>Detailed assessment required for SO<sub>2</sub> as a result of steam trains in <b>GC</b>.</p> <p>No other detailed assessments required in any Local Authority Area.</p>	No AQMAs declared in any Local Authority Area.
2010	Progress Report	<p>Detailed assessment required for the area around Wrexham Road in Cefn Y Bedd in <b>FCC</b>.</p> <p>Detailed assessment carried out for SO<sub>2</sub> as a result of steam trains in <b>GC</b>.</p> <p>No other detailed assessments required in any Local Authority Area.</p>	No AQMAs declared in any Local Authority Area.
2011	Progress Report	Detailed assessment carried out for NO <sub>2</sub> along Vale Street, Denbigh in <b>DCC</b> .	No AQMAs declared in any Local Authority Area.
2012	Updating and Screening Assessment	<p>Detailed assessment no longer required for the area around Wrexham Road in Cefn Y Bedd in <b>FCC</b>.</p> <p>Detailed assessment carried out for the junction of the A5119 and A494 in Mold in <b>FCC</b>.</p> <p>No other detailed assessments required in any Local Authority Area.</p>	No AQMAs declared in any Local Authority Area.
2013	Progress Report	No detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2014	Progress Report	No detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2015	Updating and Screening Assessment	No detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.
2016	Progress Report	No detailed assessments required in any Local Authority Area.	No AQMAs declared in any Local Authority Area.

## 2 New Monitoring Data

### 2.1 Summary of Monitoring Undertaken

#### 2.1.1 Automatic Monitoring Sites

Automatic monitoring was carried out at four sites within the IACC and at one location in WCBC. No other automatic monitoring was undertaken in the North Wales Combined Authority. The monitoring sites are as follows:

- CM1: Llynfaes – Measuring PM<sub>10</sub> and PM<sub>2.5</sub> at Gwyndy Quarry;
- CM2: Brynteg – Measuring PM<sub>10</sub> and PM<sub>2.5</sub> at Rhuddlan Back Quarry;
- CM3: Felin Cafnan – Measuring PM<sub>10</sub> and PM<sub>2.5</sub> at a National Trust Property located near to the Wylfa Newydd construction site;
- CM4: IVC Penhesgyn – Measuring PM<sub>10</sub> and PM<sub>2.5</sub> at Penhesgyn Recycling Centre; and
- AURN: Victoria Road – Measuring NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> at a roadside location in Wrexham.

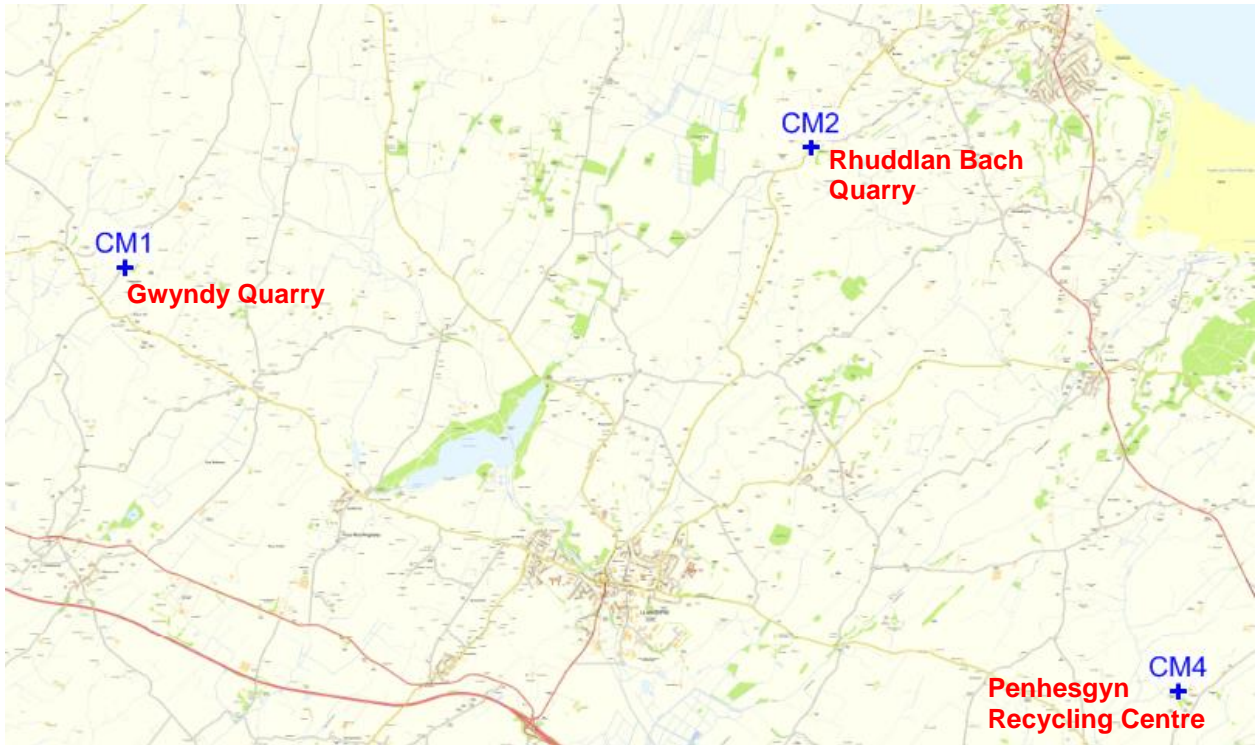
Figure 2.1 to Figure 2.3 and Table 2.1 provide further information with regards to the automatic monitoring sites.

There was one new automatic station installed in the North Wales Combined Authority, at Felin Cafnan, measuring PM<sub>10</sub>. Monitoring started in December 2015 at the site which is run by the IACC. PM<sub>10</sub> monitoring was completed in August 2016 at the IVC Penhesgyn site which was also run by the IACC.

The Rose Cottage, Mold automatic monitor measuring PM<sub>10</sub>, NO<sub>x</sub> and NO<sub>2</sub> in FCC was decommissioned in 2016 due to resource constraints. Reported concentrations have been below the relevant Air Quality Standards for the past couple of years and therefore continued monitoring was not deemed to be necessary at this location.

The Wrexham Isycoed automatic monitor measuring PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>x</sub> in WCBC was decommissioned at the start of 2016 by the Welsh Air Quality Forums (WAQF) as the monitoring programme had concluded that there were no breaches of the air quality objectives over nine years of monitoring.

Figure 2.1 – Map of Automatic Monitoring Site: Isle of Anglesey County Council



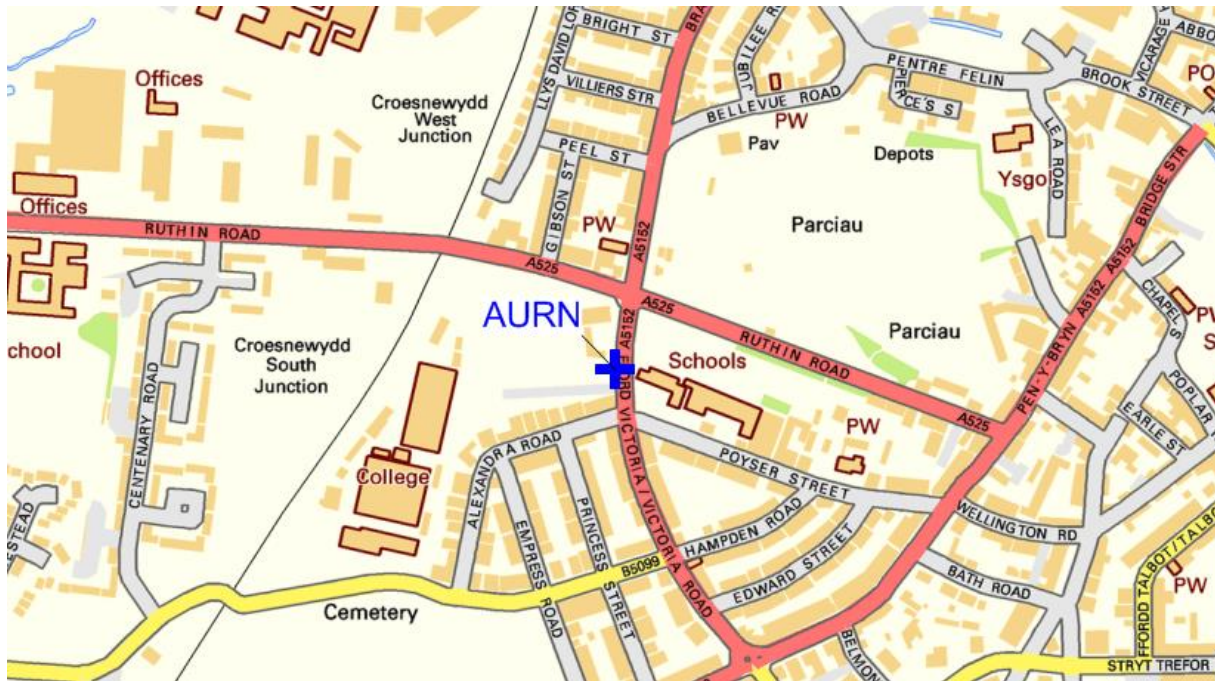
Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Figure 2.2 – Map of Automatic Monitoring Site: Isle of Anglesey County Council – Felin Cafnan, close to the Wylfa Newydd construction site



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Figure 2.3 – Map of Automatic Monitoring Site: Wrexham County Borough Council



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Table 2.1 – Details of Automatic Monitoring Sites in the North Wales Combined Authority

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?
<b>Isle of Anglesey County Council</b>											
CM1	Llynfaes (Creigiau)	Rural	239692	379774	1.5	PM <sub>10</sub>	N	Osiris	Y (1m)	10	Y
CM2	Brynteg (Chwarelau)	Rural	248566	381325	4.0	PM <sub>10</sub>	N	Osiris	Y (1m)	5	Y
CM3	Felin Cafnan, Cemlyn	Rural	234355	393310	1.5	PM <sub>10</sub>	No	Osiris	Y (10m)	N/A	Y
CM4	IVC Penhesgyn	Rural	253320	374281	1.5	PM <sub>10</sub>	N	Osiris	N (100m)	200	Y
<b>Wrexham Country Borough Council</b>											
AURN	Victoria Road AURN	Roadside	332863	349913	3	NO <sub>x</sub> , SO <sub>2</sub>	No	Continuous	Y (20m)	4m	Y (20m)
AURN	Victoria Road AURN	Roadside	332863	349913	3	PM <sub>10</sub> , PM <sub>2.5</sub>	No	Daily Gravimetric	Y (20m)	4m	Y (20m)

### 2.1.2 Non-Automatic Monitoring Sites

Non-automatic monitoring of NO<sub>2</sub> using passive diffusion tubes were undertaken within all six local authorities at roadside, kerbside, industrial and urban background locations. The number of monitoring locations within each local authority is as follows:

- Isle of Anglesey County Council undertook monitoring at 15 locations. A 12-month NO<sub>2</sub> survey, consisting of 12 diffusion tubes, commenced along sections of the A55 and A5025 in February 2016 to gather baseline data for the Horion Nuclear Power Project. The monitoring survey has been since extended for a further 6 months.
- Conwy County Borough Council undertook monitoring at 15 locations. A new diffusion tube location was added at a roadside site along Victoria Drive in March 2016 (CBC-034).
- Denbighshire County Council undertook monitoring at 26 locations. No changes to the monitoring locations or number of tubes deployed have occurred in 2016.
- Flintshire County Council undertook monitoring at 52 locations, including duplicate diffusion tube monitoring at 3 sites (3 Davies Cottage, 20/22 Glynne Way and Llys Alun). Triplicate tubes were installed at Rose Cottage until July 2016 where they were then moved to be co-located with the South Bank, Aston Park continuous station for the remainder of 2016.
- Gwynedd Council undertook monitoring at 12 locations. No changes to the monitoring locations or number of diffusion tubes deployed have occurred in 2016.
- Wrexham Country Borough Council undertook monitoring at 24 locations, including one triplicate site which is co-located with the Victoria Road AURN station. There was one new diffusion tube site installed in 2016 at Chapel Lane.

Non-automatic monitoring of benzene (C<sub>6</sub>H<sub>6</sub>) was also undertaken at one monitoring location in WCBC.

Figure 2.4 to Figure 2.17 and Table 2.2 provide further information with regards to the non-automatic monitoring sites.

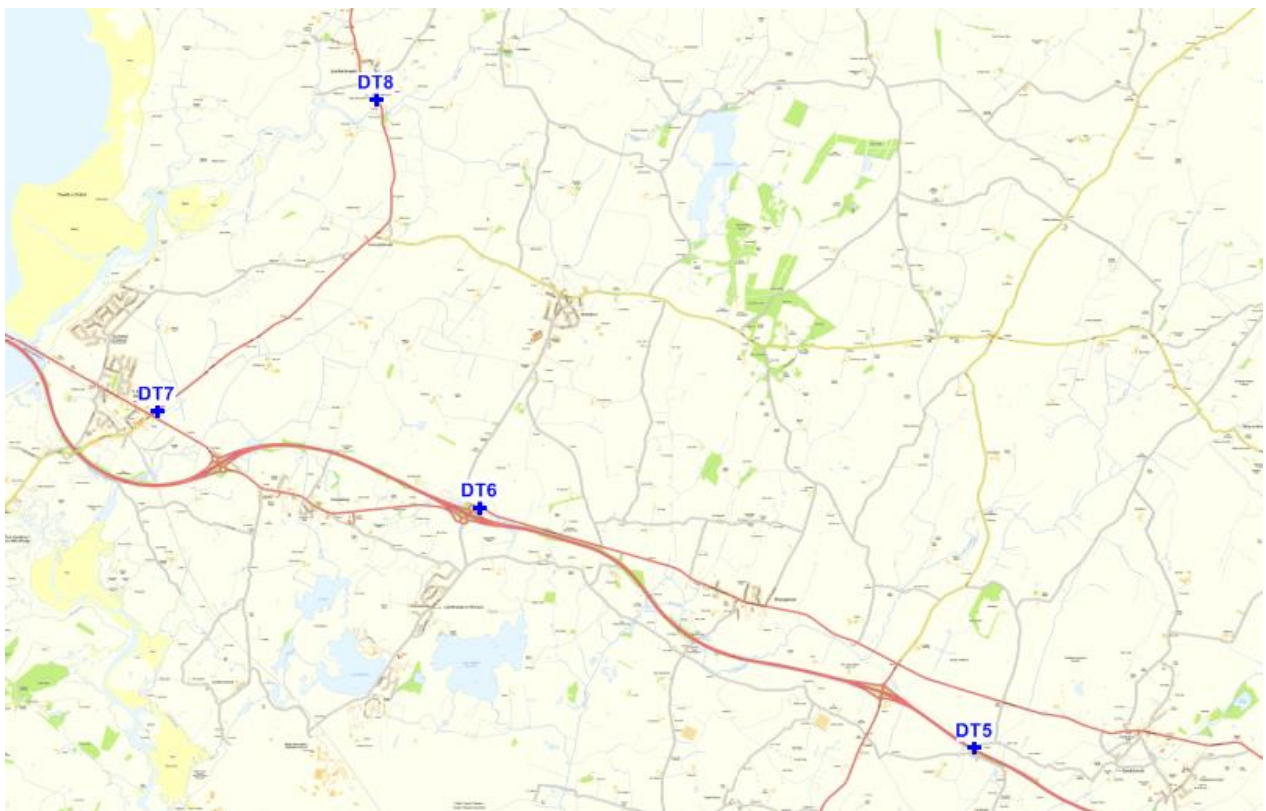


**Figure 2.4 – Map of non-Automatic Monitoring Sites: Isle of Anglesey County Council – Llanfairpwllgwyngyll and Llangefni**



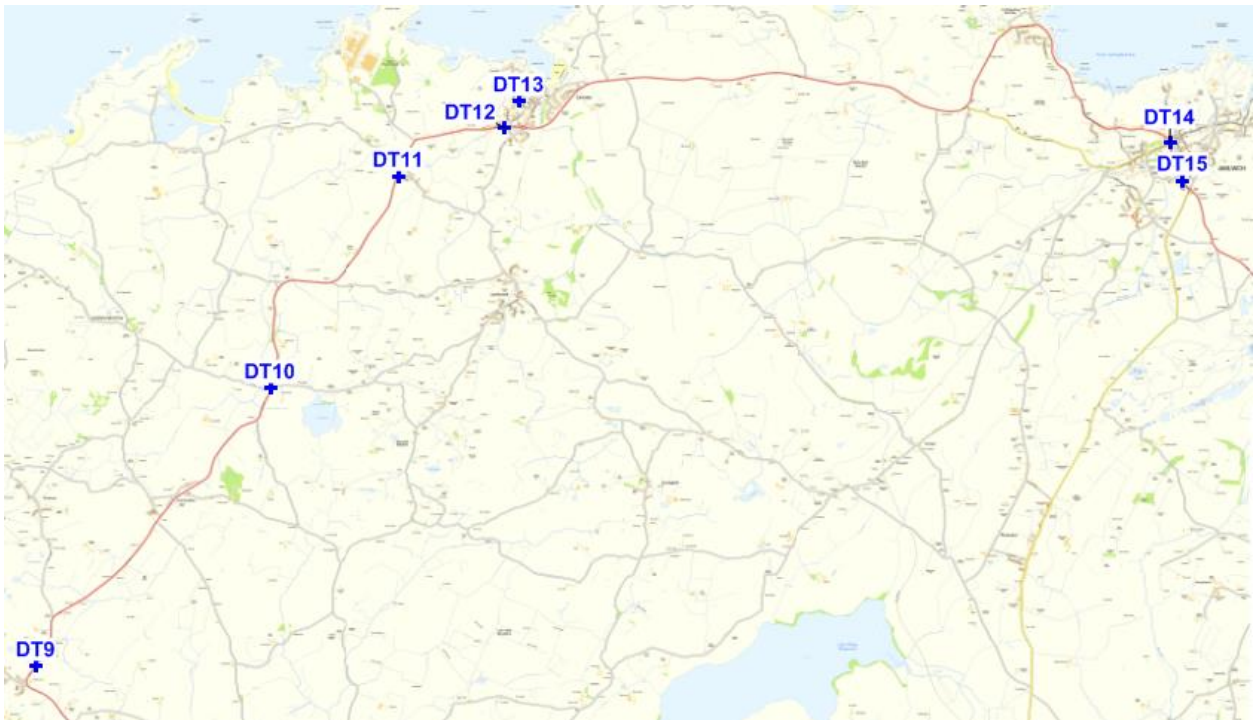
Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

**Figure 2.5 – Map of non-Automatic Monitoring Sites: Isle of Anglesey County Council – Along the A55 and A5025**



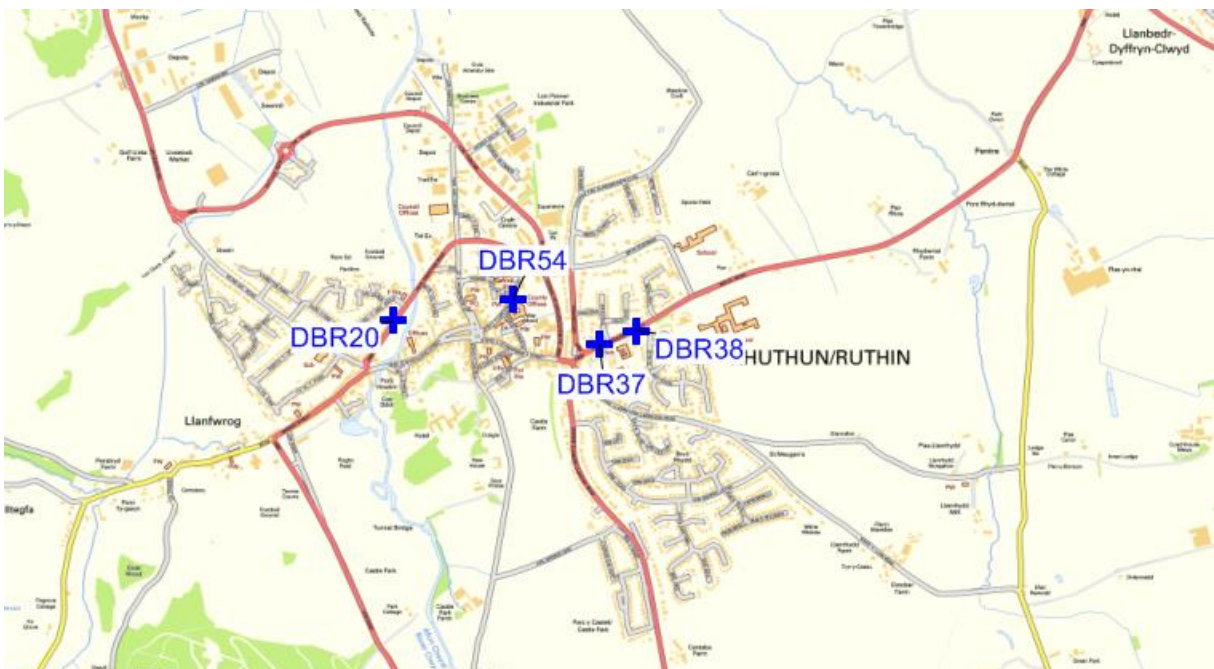
Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Figure 2.6 – Map of non-Automatic Monitoring Sites: Isle of Anglesey County Council – Along A5025, Cemaes and Amlwch



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

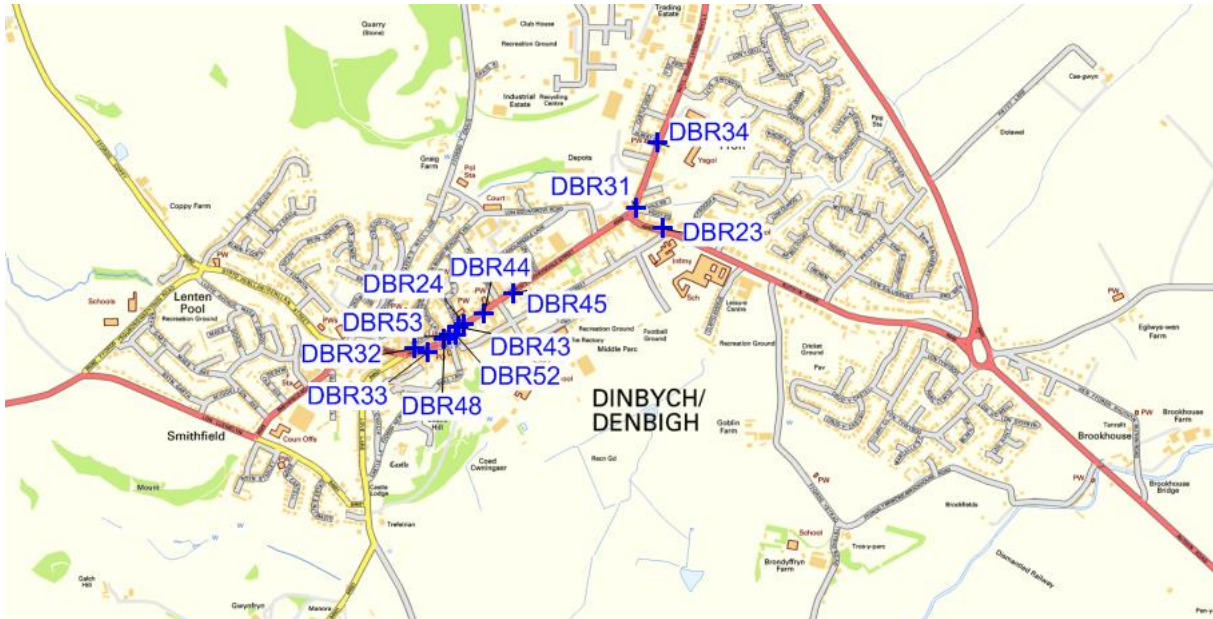
Figure 2.7 – Map of non-Automatic Monitoring Sites: Denbighshire County Council – Ruthin



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license



Figure 2.8 – Map of non-Automatic Monitoring Sites: Denbighshire County Council – Denigh



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Figure 2.9 – Map of non-Automatic Monitoring Sites: Denbighshire County Council – North

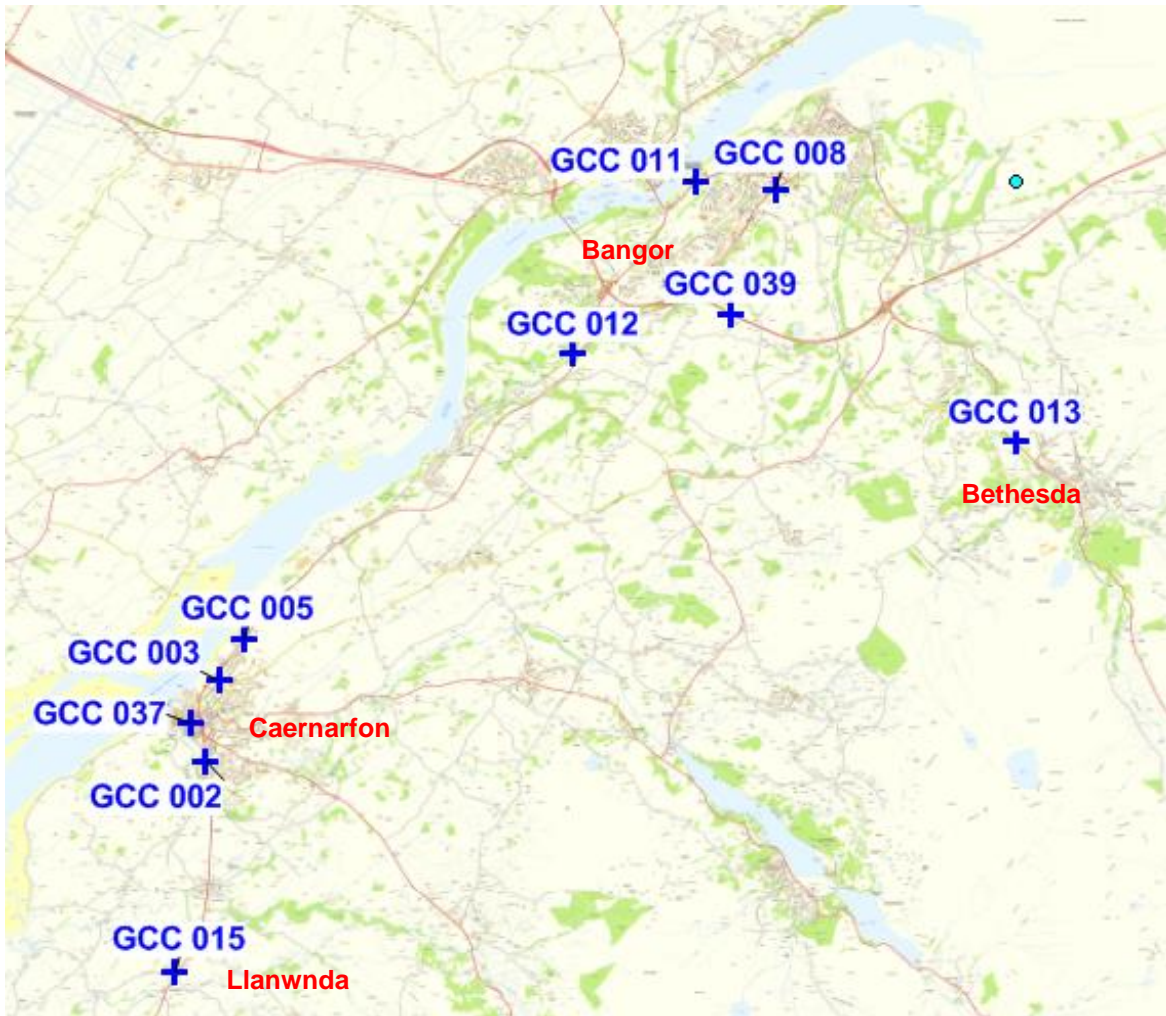


Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license



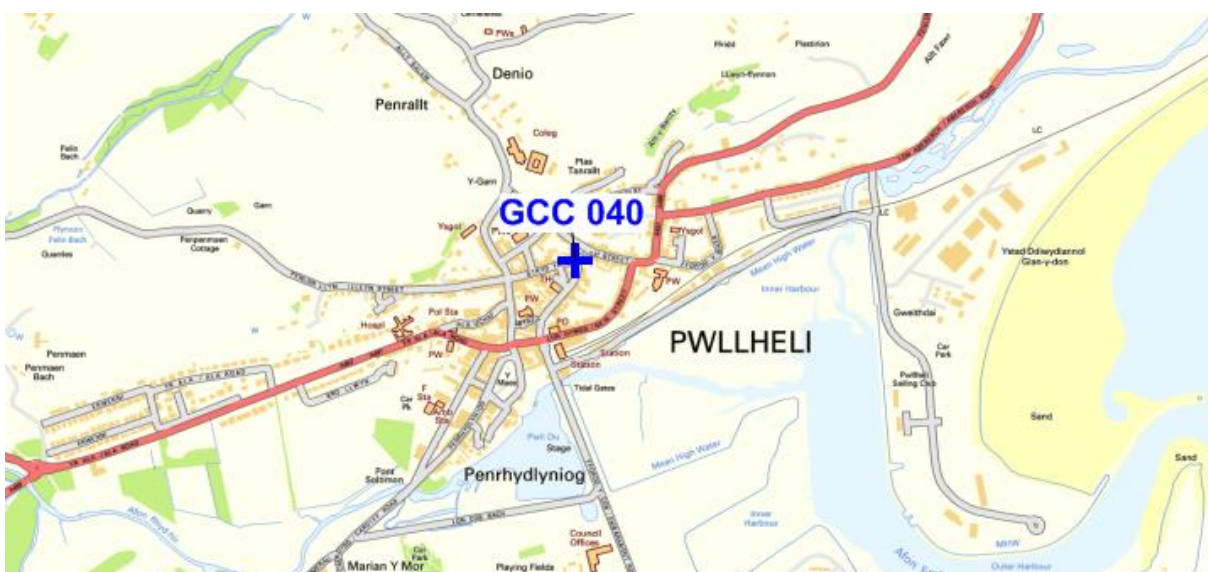


Figure 2.12 – Map of non-Automatic Monitoring Sites: Gwynedd Council – Wider Area



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

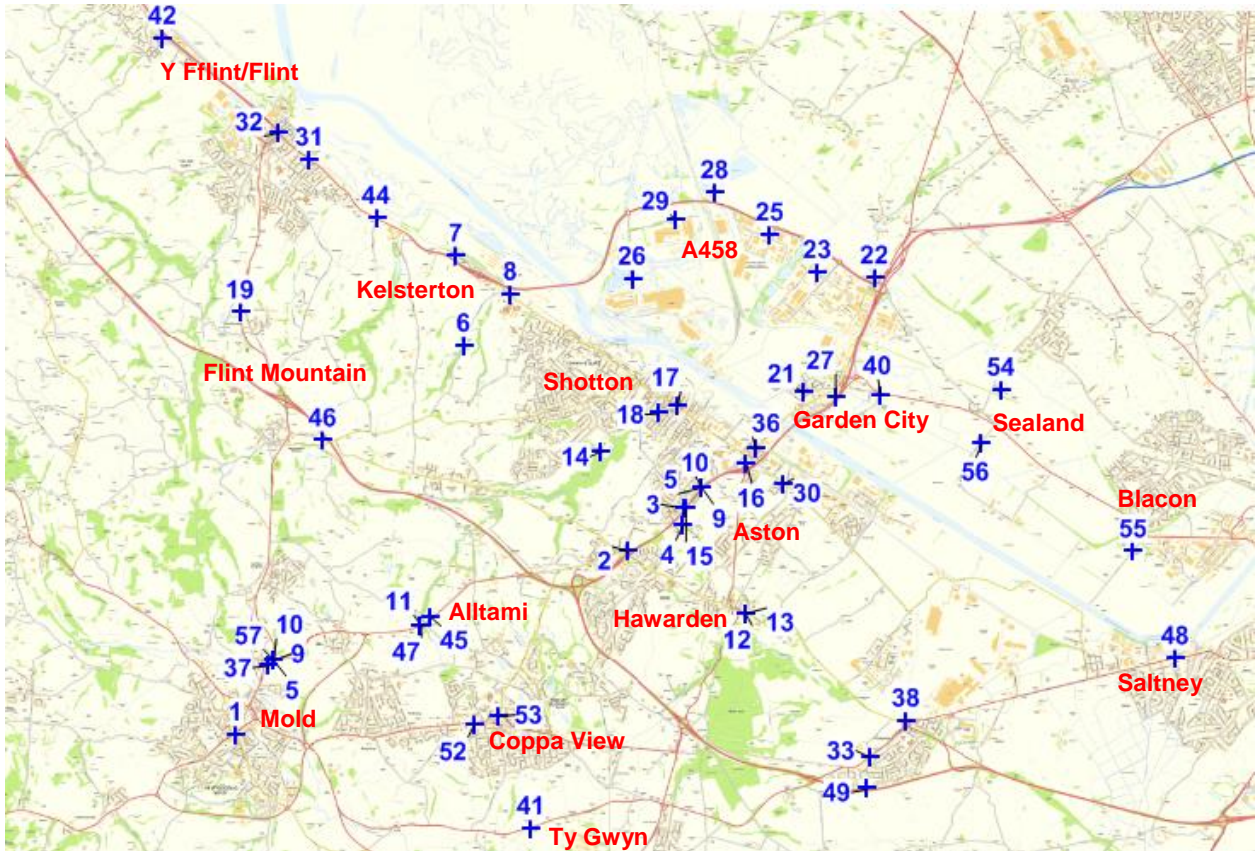
Figure 2.13 – Map of non-Automatic Monitoring Sites: Gwynedd Council – Pwllheli



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

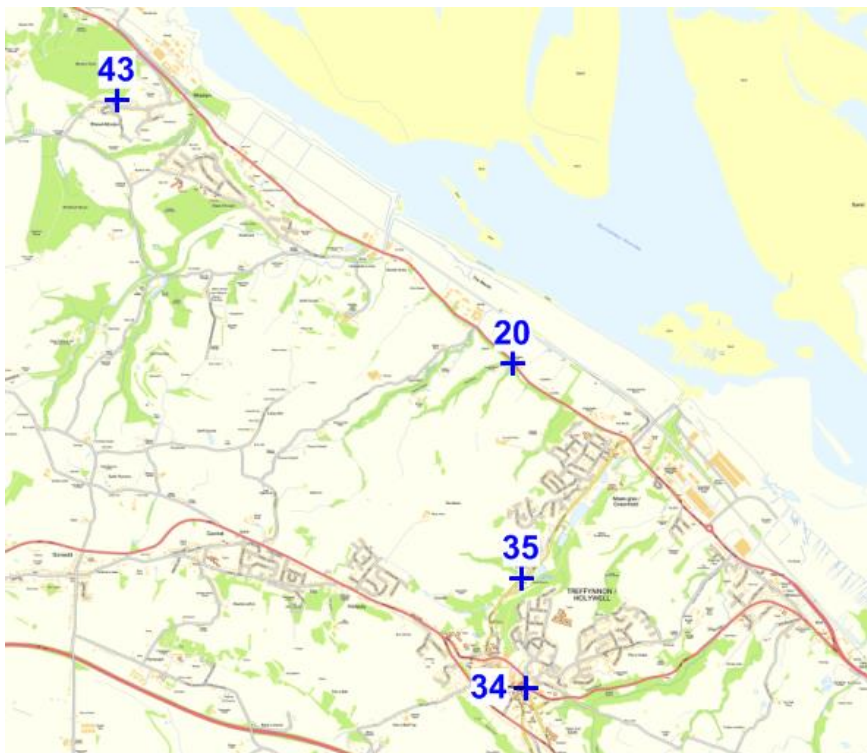


Figure 2.14 – Map of non-Automatic Monitoring Sites: Flintshire County Council Wider Area



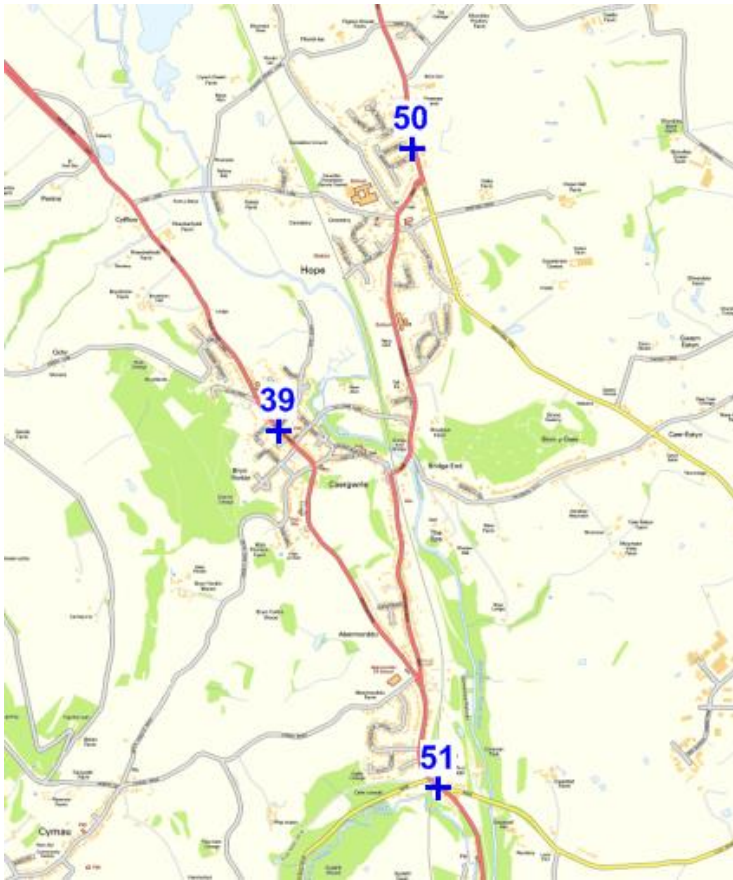
Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Figure 2.15 – Map of non-Automatic Monitoring Sites: Flintshire County Council – Rhewl Mostyn and Treffynnon Holywell areas



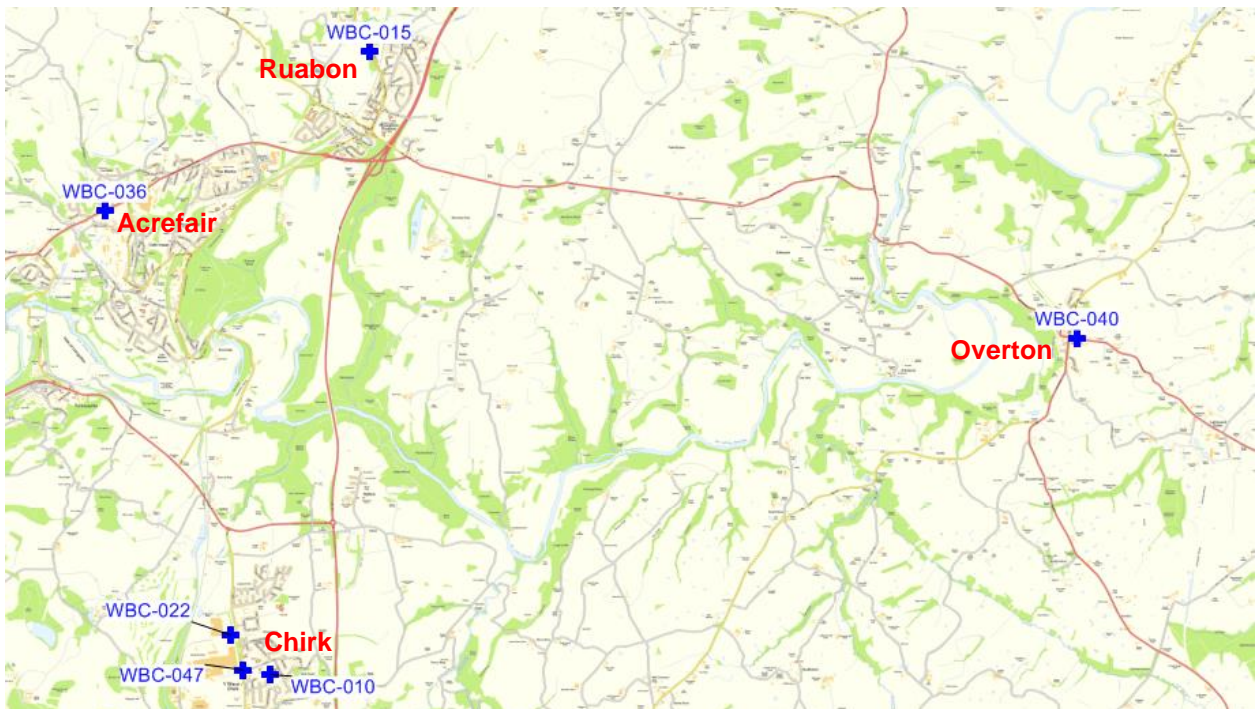
Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Figure 2.16 – Map of non-Automatic Monitoring Sites: Flintshire County Council – Hope Area



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

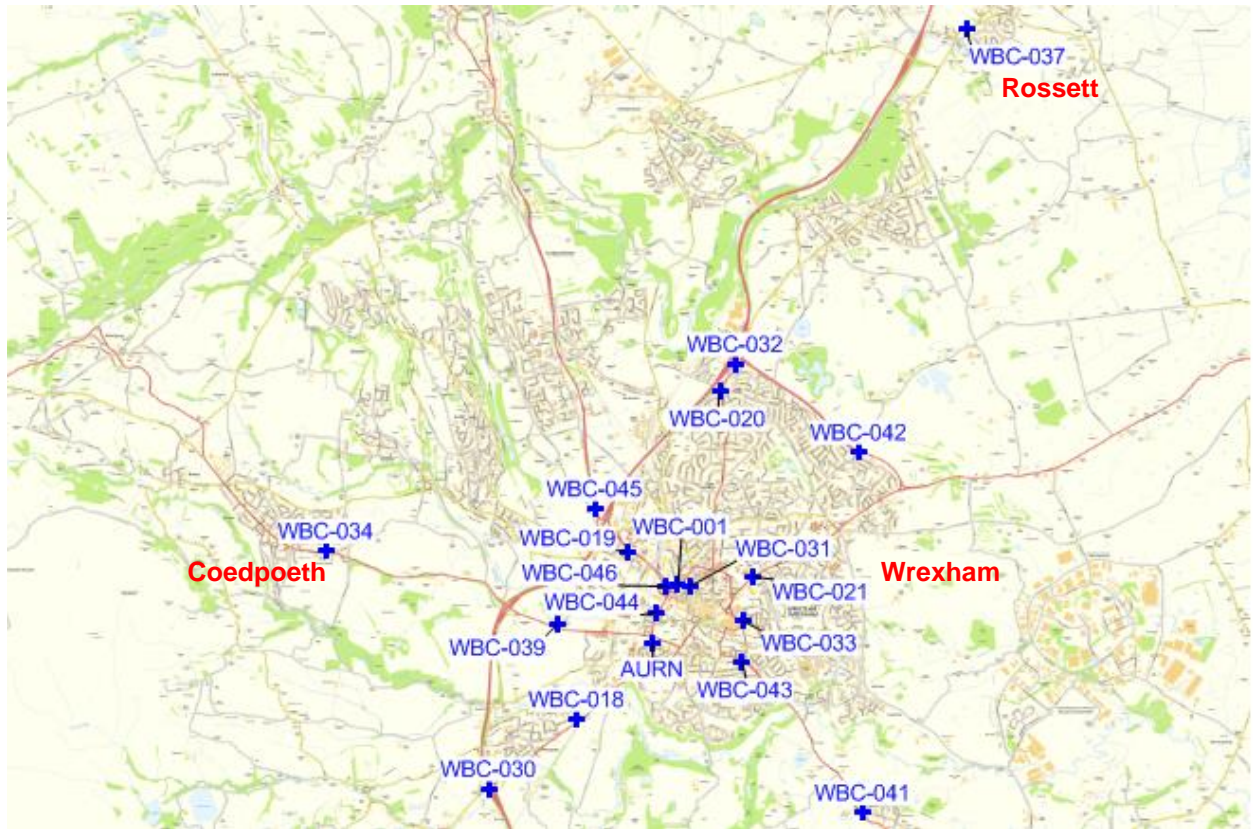
Figure 2.17 – Map of non-Automatic Monitoring Sites: Wrexham County Borough Council – South



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license



Figure 2.18 – Map of non-Automatic Monitoring Sites: Wrexham County Borough Council – North



Contains Ordnance Survey Data Crown Copyright and Database Right [2017] Used under license

Table 2.2 – Details of Non- Automatic Monitoring Sites in the North Wales Combined Authority

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
<b>Isle of Anglesey County Council</b>											
DT1	Llanfair P.G. By-pass	Kerbside	252700	372100	1.2	NO <sub>2</sub>	No	No	N	1	Y
DT2	Bulkeley Square, Llangefni	Kerbside	245926	375688	2.5	NO <sub>2</sub>	No	No	Y (1)	1	Y
DT3	Penmynydd Road	Roadside	247084	375511	2.8	NO <sub>2</sub>	No	No	Y (10)	1.9	Y
DT4	Llanfair P.G. O <sub>2</sub> Mast	Roadside	253265	372372	1.4	NO <sub>2</sub>	No	No	Y (30)	3	Y
DT5	Bridge over A55	Roadside	237267	376129	1.8	NO <sub>2</sub>	No	No	Y (50)	1.2	Y
DT6	A55, Junction 4	Roadside	232573	378407	2.4	NO <sub>2</sub>	No	No	Y (40)	1.5	Y
DT7	A5025, Valley	Kerbside	229513	379321	1.5	NO <sub>2</sub>	No	No	N	1	Y
DT8	A5025, Llanfachraeth	Roadside	231593	382274	2.8	NO <sub>2</sub>	No	No	Y (8)	1.7	Y
DT9	A5025, Llanfaethlu	Roadside	231555	387112	1.9	NO <sub>2</sub>	No	No	Y (75)	1.5	Y
DT10	A5025, Llanfellech Crossroads	Roadside	234152	390193	1.9	NO <sub>2</sub>	No	No	N	3.5	Y
DT11	A5025, Tregel	Roadside	235575	392545	2.5	NO <sub>2</sub>	No	No	Y (15)	1.6	Y
DT12	Ffordd Caergybi, Cemaes	Roadside	236752	393090	2.7	NO <sub>2</sub>	No	No	Y (10)	1.7	Y
DT13	Maes Cynfor, Cemaes	Roadside	236908	393378	2.6	NO <sub>2</sub>	No	No	Y (10)	1.7	Y
DT14	A5025, Amlwch	Roadside	244126	392914	2.8	NO <sub>2</sub>	No	No	Y (1)	1.4	Y
DT15	A5025 Near Salem Street, Amlwch	Roadside	244270	392498	2.2	NO <sub>2</sub>	No	No	Y (10)	1.2	Y

**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
<b>Conwy County Borough Council</b>											
CBC-001	Theatre Colwyn, Colwyn Bay	Roadside	285119	378817	3	NO <sub>2</sub>	N	N	Y (0.5)	3.5	Y
CBC-034	Victoria Drive	Roadside	279245	377995	3	NO <sub>2</sub>	N	N	Y (1.0)	2.2	Y
CBC-004	Grove Park Rd. Colwyn Bay	Urban Background	285089	378592	3	NO <sub>2</sub>	N	N	Y (1.0)	1.7	N
CBC-016	Silva Gardens North, Llandudno	Urban Background	285089	378592	3	NO <sub>2</sub>	N	N	Y (1.0)	2.1	N
CBC-017	Kingsway, Colwyn Bay	Roadside	279724	381877	3	NO <sub>2</sub>	N	N	Y (1.0)	1.1	Y
CBC-018	Heol Dewi Pensarn	Roadside	284526	379417	3	NO <sub>2</sub>	N	N	Y (2.0)	1.0	Y
CBC-026	Chapel Street Abergele	Roadside	295049	378144	3	NO <sub>2</sub>	N	N	Y (1.0)	1.0	Y
CBC-025	Parc Llandudno	Roadside	294571	377534	3	NO <sub>2</sub>	N	N	Y (1.0)	1.0	Y
CBC-031	Conwy Road East (53), Llandudno Jcn	Roadside	278574	382071	2.5	NO <sub>2</sub>	N	N	Y (2.0)	1.75	Y
CBC-032	Conwy Road West, Llandudno Jcn (39)	Roadside	279279	377946	3	NO <sub>2</sub>	N	N	Y (3.0)	1.0	Y
CBC-021	Llanfairfechan	Roadside	279235	377936	3	NO <sub>2</sub>	N	N	Y (2.0)	1.1	Y
CBC-022	Bryn Marl, Mochdre	Roadside	268572	375472	3	NO <sub>2</sub>	N	N	Y (2.0)	1.5	Y
CBC-033	Coed Pella Road, Colwyn Bay	Roadside	282362	378757	3	NO <sub>2</sub>	N	N	Y (2.0)	1.0	Y



**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
CBC-027	Llandudno Junction, New Roundabout	Roadside	284789	378983	3	NO <sub>2</sub>	N	N	Y (2.0)	2.0	Y
CBC-029	Llandudno Railway Stn Taxi Rank	Roadside	280271	377692	3	NO <sub>2</sub>	N	N	Y (2.0)	1.0	Y
<b>Denbighshire County Council</b>											
DBK1	Wellington Road, Rhyl	Roadside	300846	381407	2.3	NO <sub>2</sub>	N	N	Y (0.5)	2.2	Y
DBR2	10 Kinmel Street, Rhyl	Roadside	300903	381292	2.5	NO <sub>2</sub>	N	N	Y (2.5)	0.3	Y
DBB3	5 St. Georges Cres., Rhyl	Suburban	301640	381800	2.1	NO <sub>2</sub>	N	N	Y (0)	15.1	Y
DBB4	73 Bryn Coed Park, Rhyl	Suburban	302128	380611	2.3	NO <sub>2</sub>	N	N	Y (4.7)	1.7	Y
DBR5	2 Pant Glas, St. Asaph	Suburban	302938	374638	2.0	NO <sub>2</sub>	N	N	Y (9.6)	27.5	Y
DBR48	Adj. 1 Vale Street, Denbigh	Roadside	305276	366119	2.4	NO <sub>2</sub>	N	N	Y (0)	1.0	Y
DBR23	31 Ruthin Road, Denbigh	Suburban	305878	366424	2.5	NO <sub>2</sub>	N	N	Y (1.4)	2.5	Y
DBR8	1 Plas Elwy Orchard, The Roe, St. Asaph	Roadside	303270	374640	2.0	NO <sub>2</sub>	N	N	Y (0)	19.4	Y
DBR9	7 Roe Park, St. Asaph	Roadside	303197	374830	2.0	NO <sub>2</sub>	N	N	Y (0)	14	Y
DBR10	13 Roe Park, St. Asaph	Suburban	303263	374867	2.0	NO <sub>2</sub>	N	N	Y (0)	47	Y

**North Wales Combined Authority**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Type</b>	<b>X OS Grid Reference</b>	<b>Y OS Grid Reference</b>	<b>Site Height (m)</b>	<b>Pollutants Monitored</b>	<b>In AQMA?</b>	<b>Is Monitoring Co-located with a Continuous Analyser (Y/N)</b>	<b>Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)</b>	<b>Distance to Kerb of Nearest Road (m) (N/A if not applicable)</b>	<b>Does this Location Represent Worst-Case Exposure?</b>
DBR24	Denbigh Cutters, 21 Vale Street, Denbigh	Suburban	305330	366160	2.2	NO <sub>2</sub>	N	N	Y (0)	3	Y
DBR54	Adj. 2 Market Street, Ruthin	Suburban	312502	358376	2.2	NO <sub>2</sub>	N	N	Y (0)	2.9	Y
DBR20	25 Park Road, Ruthin.	Roadside	312106	358306	2.2	NO <sub>2</sub>	N	N	Y (4)	1.4	Y
DBR43	Adj HSBC Bank, Vale Street, Denbigh	Suburban	305314	366153	2.6	NO <sub>2</sub>	N	N	Y (5.5)	2.5	Y
DBR44	Opp Rowlands Pharm., Vale Street, Denbigh	Roadside	305386	366191	2.6	NO <sub>2</sub>	N	N	Y (1.7)	1.2	Y
DBR45	Adj 50 Vale Street, Denbigh	Roadside	305467	366246	2.5	NO <sub>2</sub>	N	N	Y (3.9)	2.0	Y
DBR37	Haul Fryn Depot, Ruthin	Roadside	312789	358231	2.3	NO <sub>2</sub>	N	N	Y (1)	3.5	Y
DBR38	Adj 62 Rhos Street, Ruthin	Roadside	312913	358273	2.6	NO <sub>2</sub>	N	N	Y (0)	2.3	Y
DBR52	Adj. Swayne Johnston Sol., Vale Street, Denbigh	Roadside	305308	366130	2.9	NO <sub>2</sub>	N	N	N	1.8	Y
DBR53	7 Vale Street, Denbigh	Roadside	305290	366130	2.3	NO <sub>2</sub>	N	N	N	2.0	Y
DBR31	2 Rhyl Road, Denbigh	Roadside	305805	366480	2.4	NO <sub>2</sub>	N	N	Y (1.3)	0.8	Y
DBR32	47 High Street, Denbigh	Roadside	305193	366093	2.4	NO <sub>2</sub>	N	N	N	5.9	Y

**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
DBR33	Adj CO-OP, High Street, Denbigh	Kerbside	305229	366082	2.3	NO <sub>2</sub>	N	N	N	5.3	Y
DBR34	Adj Fairyburn, Rhyl Road, Denbigh	Roadside	305863	366661	2.5	NO <sub>2</sub>	N	N	Y (11.4)	0.9	Y
DBR49	79 High Street, Prestatyn	Roadside	306580	382906	2.6	NO <sub>2</sub>	N	N	N	1.0	N
DBR50	Adj., Saronie Court, High Street, Prestatyn	Kerbside	306795	382638	2.6	NO <sub>2</sub>	N	N	N	1.0	N
<b>Flintshire County Council</b>											
Site 1	10A Wrexham Road, Mold	Kerbside	323800	363856	2.2	NO <sub>2</sub>	N	N	Y (0)	1	Y
Site 2	1, St.Davids Close, Ewloe CH5 3AP	Urban	329830	366682	1.8	NO <sub>2</sub>	N	N	Y (0)	35	Y
Site 3	Aston Hill Roadside	Kerbside	330718	367350	2	NO <sub>2</sub>	N	N	Y (10)	1	N
Site 4	4, Moorfield Court, Aston	Urban Background	330690	367091	1.6	NO <sub>2</sub>	N	N	Y (5)	116	Y
Site 5/9/10	Rose Cottage Junction A5119/A494 Co-located with Continuous Monitoring Station	Kerbside	324373	365009	2.2	NO <sub>2</sub>	N	Y - Triplicate and co-located	Y (5)	5	Y
Site 6	Kelsterton Farm, Kelsterton Lane, Connah's Quay	Rural Background	327307	369856	2.2	NO <sub>2</sub>	N	N	Y (40)	1	N
Site 7	Kelsterton Road, Connah's Quay	Kerbside	327187	371243	1.8	NO <sub>2</sub>	N	N	Y (15)	5	Y

**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
Site 8	86, Kelsterton Road, Connah's Quay CH5 4BJ	Urban background	328032	370647	1.6	NO <sub>2</sub>	N	N	Y (0)	22	Y
Site 11/47	3 Davies Cottage, Mold Road, Alltami	Kerbside	326643	365550	1.6	NO <sub>2</sub>	N	N - Duplicate	Y (0)	4	Y
Site 12/13	20/22 Glynne Way, Hawarden	Kerbside	331648	365730	2	NO <sub>2</sub>	N	N - Duplicate	Y (0)	1	Y
Site 14	Wepre Park, Connah's Quay	Rural Background	329406	368224	1.6	NO <sub>2</sub>	N	N	N	290	N
Site 15	Aston Hill	Kerbside	330727	367354	2	NO <sub>2</sub>	N	N	Y (10)	1	Y
Site 16	4, Belvedere Close, Queensferry CH5 1TG	Urban	331663	368028	1.8	NO <sub>2</sub>	N	N	Y (0)	20	Y
Site 17	32 Chester Road West, Shotton	Kerbside	330599	368922	2.3	NO <sub>2</sub>	N	N	Y (0)	4	Y
Site 18	Victoria Crescent, Shotton	Urban Background	330319	368812	2	NO <sub>2</sub>	N	N	Y (7)	1	N
Site 19	Gwylfa, Northop Rd., Flint Mountain	Kerbside	323864	370368	2	NO <sub>2</sub>	N	N	Y (0)	3	Y
Site 20	Coed Mawr Cott., Mostyn Road, Greenfield CH8 9DN	Kerbside	318669	378290	2.2	NO <sub>2</sub>	N	N	Y (0)	2	Y
Site 21	18, Kingsley Road, Garden City CH5 2JA	Urban Background	332549	369135	1.8	NO <sub>2</sub>	N	N	Y (0)	7	Y
Site 22	Green Lane West, Sealand	Rural Background	333645	370898	2.2	NO <sub>2</sub>	N	N	Y (15)	70	N

**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
Site 23	Second Avenue, Deeside Industrial Estate (Valspar)	Kerbside	332764	370981	2	NO <sub>2</sub>	N	N	N	1	N
Site 24/51	Llys Alun, Wrexham Road, Cefn Y Bedd	Kerbside	331079	356100	1.8	NO <sub>2</sub>	N	N - Duplicate	Y (0)	2	Y
Site 25	BASF, Deeside Industrial Park, Sealand	Industrial	332031	371562	1.8	NO <sub>2</sub>	N	N	N	20	N
Site 26	Corus rear entrance DIP, Sealand	Industrial	329906	370882	1.8	NO <sub>2</sub>	N	N	N	1	N
Site 27	89, Riverside Park, Garden City	Urban Background	333040	369051	2.2	NO <sub>2</sub>	N	N	Y (0)	15	Y
Site 28	Yacht Club, Deeside Industrial Park, Sealand	Industrial	331184	372215	2	NO <sub>2</sub>	N	N	N	1	N
Site 29	Weighbridge Road, Deeside Industrial Park, Sealand	Industrial	330575	371802	2.2	NO <sub>2</sub>	N	N	N	1	N
Site 30	28, Chester Road, Pentre, Deeside CH5 2DT	Kerbside	332221	367723	1.8	NO <sub>2</sub>	N	N	Y (0)	5	Y
Site 31	Trelawney Towers 79 Chester Road, Flint CH6 5DU	Kerbside	324935	372722	2	NO <sub>2</sub>	N	N	Y (0)	18	Y
Site 32	Flint Town Council Buildings.	Kerbside	324459	373141	4	NO <sub>2</sub>	N	N	Y (0)	6	N
Site 33	133, Main Road, Broughton CH4 0NR	Kerbside	333568	363511	2.4	NO <sub>2</sub>	N	N	Y (0)	1	Y

**North Wales Combined Authority**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Type</b>	<b>X OS Grid Reference</b>	<b>Y OS Grid Reference</b>	<b>Site Height (m)</b>	<b>Pollutants Monitored</b>	<b>In AQMA?</b>	<b>Is Monitoring Co-located with a Continuous Analyser (Y/N)</b>	<b>Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)</b>	<b>Distance to Kerb of Nearest Road (m) (N/A if not applicable)</b>	<b>Does this Location Represent Worst-Case Exposure?</b>
Site 34	2, Coleshill Street, Holywell CH8 7UP	Kerbside	318766	375758	2.4	NO <sub>2</sub>	N	N	Y (0)	1	Y
Site 35	Sycamore House, Greenfield Road, Holywell CH8 7PY	Kerbside	318735	376611	2.2	NO <sub>2</sub>	N	N	Y (0)	1	Y
Site 36	43, Station Road, Queensferry CH5 1SU	Kerbside	331806	368271	2	NO <sub>2</sub>	N	N	Y (0)	5	Y
Site 37	Glendale Lodge, Rhydgaled, Mold A5119	Kerbside	324281	364926	2	NO <sub>2</sub>	N	N	Y (0)	6	Y
Site 38	Oakdene, St Marys Way, Broughton CH4 0NQ	Urban	334130	364076	1.8	NO <sub>2</sub>	N	N	Y (0)	23	Y
Site 39	Medical Centre, High Street, Caergwrie	Kerbside	330436	357543	1.8	NO <sub>2</sub>	N	N	Y (0)	4	Y
Site 40	1 Manor Road, Sealand CH5 2SB	Kerbside	333731	369079	1.8	NO <sub>2</sub>	N	N	Y (0)	15	Y
Site 41	Ty-Gwyn, A5118, Padeswood CH7 4JF	Kerbside	328348	362413	2	NO <sub>2</sub>	N	N	Y (5)	15	N
Site 42	Casa Sol, High Street, Bagillt CH6 6AP	Kerbside	322665	374595	1.8	NO <sub>2</sub>	N	N	Y (0)	7	Y
Site 43	9, Bryn Tirion, Rhewl-Mostyn CH8 9QW	Urban Background	315580	380347	1.8	NO <sub>2</sub>	N	N	Y (0)	15	Y

**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
Site 44	413 Chester Road, Oakenholt, Flint CH6 5SF	Urban Background	325961	371822	2.2	NO <sub>2</sub>	N	N	Y (0)	15	Y
Site 45	Belmont, Alltami, Nr. Mold CH7 6LG	Kerbside	326801	365668	1.8	NO <sub>2</sub>	N	N	Y (1)	20	Y
Site 46	22, Park View, Northop CH7 6DD	Urban Background	325136	368397	1.8	NO <sub>2</sub>	N	N	Y (5)	40	Y
Site 48	74, High Street, Saltney CH4 8SQ	Kerbside	338283	365032	1.8	NO <sub>2</sub>	N	N	Y (0)	6	Y
Site 49	31, The Rowans, Broughton CH4 0TD	Kerbside	333531	363028	2	NO <sub>2</sub>	N	N	Y (5)	25	Y
Site 50	Bryn Estyn, Wrexham Road, Hope LL12 9NB	Kerbside	330972	358681	1.8	NO <sub>2</sub>	N	N	Y (0)	5	Y
Site 52	74, High Street, Saltney CH4 8SQ	Kerbside	327463	364013	2	NO <sub>2</sub>	N	N	Y (0)	8	Y
Site 53	17, Mill Lane, Buckley CH7 3HA	Kerbside	327849	364146	2.3	NO <sub>2</sub>	N	N	Y (4)	1	Y
Site 54	Elm Tree Rd Saughall	Kerbside	335594	369179	2.3	NO <sub>2</sub>	N	N	Y (10)	1	N
Site 55	Ferry Lane, Chester	Kerbside	337632	366682	2.2	NO <sub>2</sub>	N	N	Y (15)	2	N
Site 56	Deeside Lane, Sealand	Kerbside	335292	368346	2.2	NO <sub>2</sub>	N	N	N	1	N
Site 57	Rose Cottage Junction A5119/A494	Kerbside	324375	365007	2.2	NO <sub>2</sub>	N	N	Y (2)	1	Y

**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
Site 58	South Bank, Aston Park, Queensferry CH5 1XZ	Kerbside	330969	367674	2.0	NO <sub>2</sub>	N	Y*	Y (4)	3	Y
<b>Gwynedd Council</b>											
GCC 002	Roundabout A487, Caernarfon (C1)	Kerbside	248273	362132	1.96	NO <sub>2</sub>	N	N	Y (10)	1	No
GCC 003	Lon Campbell, Caernarfon (C3)	Urban Background	248480	363456	2	NO <sub>2</sub>	N	N	Y (5)	N/A	N/A
GCC 005	Ffordd Bangor, Caernarfon (C5)	Kerbside	248892	364120	1.84	NO <sub>2</sub>	N	N	Y (7)	1	Yes
GCC 008	A4087, Bangor (B3)	Kerbside	257587	371543	1.90	NO <sub>2</sub>	N	N	Y (2)	1	Yes
GCC 011	A5122, Bangor (B5)	Kerbside	256292	371663	1.73	NO <sub>2</sub>	N	N	Y (>25)	1	Yes
GCC 012	Faenol Roundabout, Bangor (B6)	Kerbside	254286	368835	1.80	NO <sub>2</sub>	N	N	Y (>25)	1	Yes
GCC 013	Bethesda (BETH 1)	Kerbside	261529	367380	2.03	NO <sub>2</sub>	N	N	Y (10)	1	Yes
GCC 015	Llanwnda (LL1)	Roadside	247770	358663	1.93	NO <sub>2</sub>	N	N	Y 95)	2	Y
GCC 037	Poolside, Caernarfon (C6)	Kerbside	248022	362757	1.93	NO <sub>2</sub>	N	N	Y (2)	1	Y
GCC 038	A55, Bangor (B4)	Roadside	256871	369493	1.32	NO <sub>2</sub>	N	N	Y (>25)	2	Y
GCC 039	A55, Bangor (CO-LOC)	Roadside	256871	369493	1.32	NO <sub>2</sub>	N	N	Y (>25)	2	Y



**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
GCC 040	Pwllheli (PW1)	Kerbside	237517	335217	2.04	NO <sub>2</sub>	N	N	Y (2)	1	Y
<b>Wrexham County Borough Council</b>											
WBC-001	Grosvenor Rd, Wrexham	Roadside	333200	350600	2.75	NO <sub>2</sub>	N	N	N	5	Y
WBC-010	Ceiriog School, Chirk	Suburban	329300	338300	2	NO <sub>2</sub>	N	N	Y (25)	2	Y
WBC-015	Gardden View, Ruabon	Roadside	330300	344600	2	NO <sub>2</sub>	N	N	Y (15)	7	Y
WBC-018	Old Farm Rd, Rhostyllen	Roadside	332000	349000	1.75	NO <sub>2</sub>	N	N	Y (40)	2	Y
WBC-019	Mold Rd, Wrexham	Roadside	332600	351000	2	NO <sub>2</sub>	N	N	Y (30)	7	Y
WBC-020	Chester Rd, Wrexham	Intermediate	333700	352900	2	NO <sub>2</sub>	N	N	Y (16)	3	Y
WBC-021	Holt Rd, Wrexham	Roadside	334100	350700	1.75	NO <sub>2</sub>	N	N	Y (30)	2	Y
WBC-022	Holyhead Rd, Chirk	Intermediate	328900	338700	1.5	NO <sub>2</sub>	N	N	Y (55) (30)	30	Y
WBC-030	Rhostyllen Roundabout, Wrexham (A483)	Roadside	330950	348170	1.5	NO <sub>2</sub>	N	N	Y (35)	4	Y
WBC-031	Bus Station, Wrexham	Roadside	333350	350590	3	NO <sub>2</sub>	N	N	Y (35) (3)	2	Y
WBC-032	The Sycamores, Chester Road	Roadside	333887	353222	1.75	NO <sub>2</sub>	N	N	Y (25)	n/a	Y
WBC-033	Smithfield Road	Roadside	333981	350171	1.5	NO <sub>2</sub>	N	N	Y (4)	1	Y

**North Wales Combined Authority**

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with 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?
WBC-034	Coed Poeth	Roadside	329017	351002	2	NO <sub>2</sub>	N	N	Y (8)	9	Y
WBC-036	Acrefair	Roadside	327630	342990	2	NO <sub>2</sub>	N	N	Y (2)	2	Y
WBC-037	Rossett	Roadside	336635	357211	1.5	NO <sub>2</sub>	N	N	Y(7)	3	Y
WBC-039	Pentre Bach	Roadside	331765	350132	1.5	NO <sub>2</sub>	N	N	Y (20) (2)	2	Y
WBC-040	Overton	Roadside	337449	341702	1.5	NO <sub>2</sub>	N	N	Y (14)	4	Y
WBC-041	Marchwiel	Roadside	335407	347890	2	NO <sub>2</sub>	N	N	Y (28) (3)	8	Y
WBC-042	Llan-Y-Pwll	Roadside	335359	352178	1.75	NO <sub>2</sub>	N	N	Y (9)	5	Y
WBC-043	Hightown	Roadside	333966	349691	2	NO <sub>2</sub>	N	N	Y(10)	1	Y
WBC-044	Cobden Road	Roadside	332935	350278	2	NO <sub>2</sub>	N	N	Y(5)	1	Y
WBC-045	STANSTY	Roadside	332214	351503	1.75	NO <sub>2</sub>	N	N	Y (8)	8	Y
WBC-046	Regent Street	Roadside	333063	350587	2	NO <sub>2</sub>	N	N	Y(15)	1	Y
WBC-047	Chapel Lane	Roadside	329023	338348	3	NO <sub>2</sub>	N	N	Y (50) (15)	1	Y
AURN 1	Victoria Road 1	Roadside	332900	349900	2	NO <sub>2</sub>	N	Y	Y (20) (7)	5	Y
AURN 2	Victoria Road 2				1.75	NO <sub>2</sub>	N	Y			

**North Wales Combined Authority**

<b>Site ID</b>	<b>Site Name</b>	<b>Site Type</b>	<b>X OS Grid Reference</b>	<b>Y OS Grid Reference</b>	<b>Site Height (m)</b>	<b>Pollutants Monitored</b>	<b>In AQMA?</b>	<b>Is Monitoring Co-located with a Continuous Analyser (Y/N)</b>	<b>Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)</b>	<b>Distance to Kerb of Nearest Road (m) (N/A if not applicable)</b>	<b>Does this Location Represent Worst-Case Exposure?</b>
AURN 3	Victoria Road 3				2.75	NO <sub>2</sub>	N	Y			
WBC-026	Llwyneinion Rd Rhosllanerchrugog	Urban Background	347400	328700	1.5	C <sub>6</sub> H <sub>6</sub>	-	-	-	-	-

\* Automatic monitoring station at this location ran by the Welsh Government. Data from the site is not yet available.

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

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

#### **Automatic Monitoring Data**

During 2016 automatic monitoring was carried out at one roadside location along Victoria Road in WCBC.

The automatic monitoring data for NO<sub>2</sub> can be seen in Table 2.3 and Table 2.4. Full details of the QA/QC procedure are provided in Appendix A.

As data capture for NO<sub>2</sub> was 84% during 2016, annualisation was not required. Results for 2016 show that concentrations of NO<sub>2</sub> at the Victoria Road AURN site in Wrexham were below the annual mean objective and there were no exceedances of the hourly mean objective.

Figure 2.19 shows the trend in annual mean NO<sub>2</sub> concentrations at the automatic monitoring site between 2012 and 2016. The annual mean NO<sub>2</sub> concentration can be seen to be declining since 2013 onwards. The decrease the annual mean NO<sub>2</sub> concentration appears to have slowed between 2015 and 2016. Nonetheless, the reported concentration is well below the annual mean objective and no exceedances have been reported in the past 5 years.

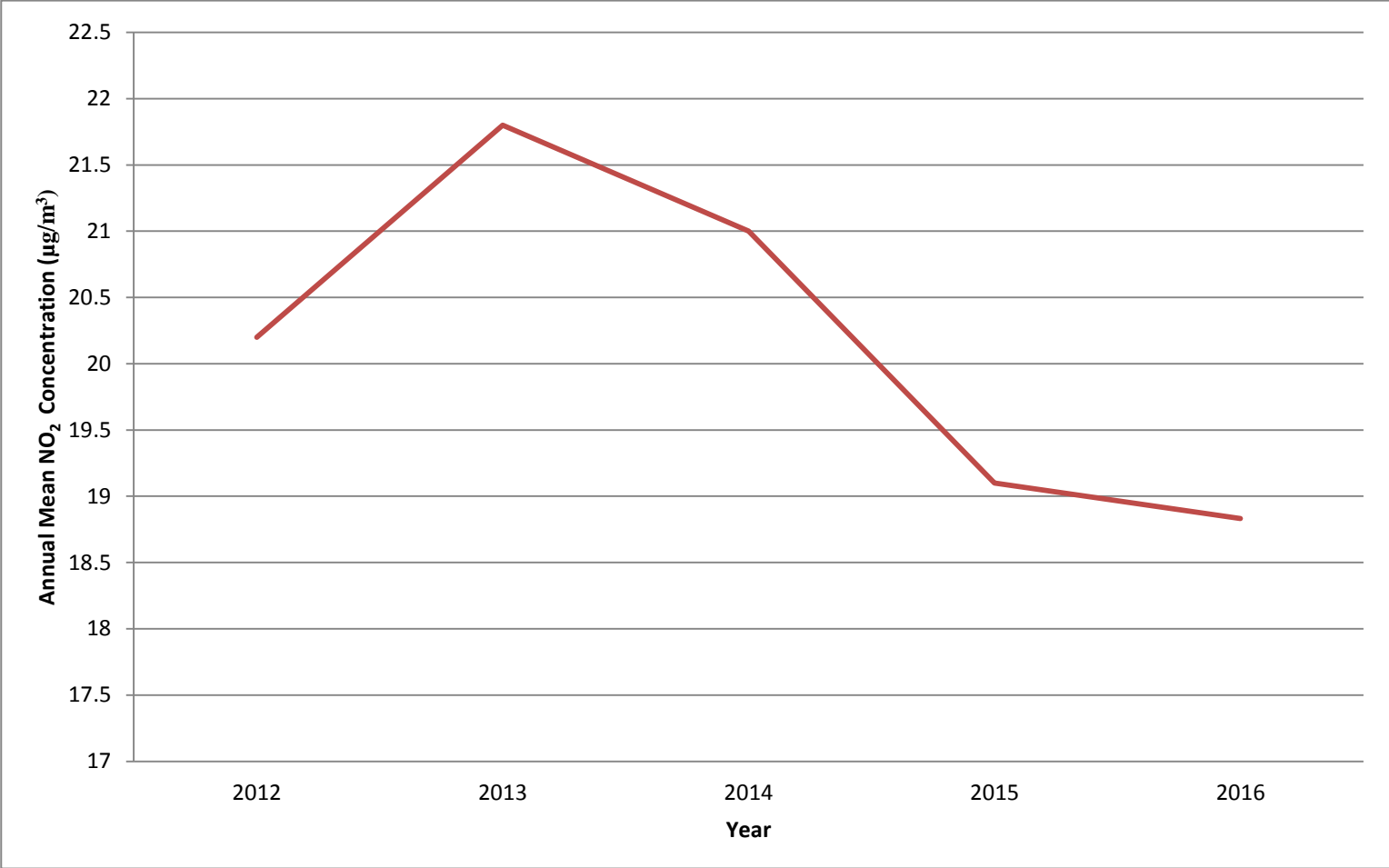
**Table 2.3 – Results of Automatic Monitoring for NO<sub>2</sub>: Comparison with Annual Mean Objective**

ID	Type	Within AQMA?	Valid Data Capture for Monitoring Period % <sup>a</sup>	Valid Data Capture 2016 % <sup>b</sup>	Annual Mean Concentration (µg/m <sup>3</sup> )				
					2012	2013	2014	2015	2016
AURN (WCBC)	Roadside	N	84	84	20.2	21.8	21	19.1	18.8

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

ID	Type	Within AQMA?	Valid Data Capture for Monitoring Period % <sup>a</sup>	Valid Data Capture 2016 % <sup>b</sup>	Number of Hourly Means > 200µg/m <sup>3</sup>				
					2012	2013	2014	2015	2016
AURN (WCBC)	Roadside	N	84	84	0	0	0	0	0

Figure 2.19 – Trends in Annual Mean NO<sub>2</sub> Concentrations Measured at Automatic Monitoring Stations



## Diffusion Tube Monitoring Data

The NO<sub>2</sub> diffusion tube data for 2016 is summarised in Table 2.5 for all six local authorities. The full dataset, including the reported results from 2012 to 2016 and the 2016 monthly mean values are detailed in Appendix B and C respectively. Figure 2.20 to Figure 2.26 show the general trends in annual mean NO<sub>2</sub> concentrations for the past five years in all six local authorities. Only trend data for DT1 and DT2 in IACC are available as the remaining diffusion tubes were installed in 2016 and therefore no historic data is available.

Results for the year 2016 have been bias adjusted against national bias adjustment factors for all six local authorities. For CCBC, DCC, FCC, IACC and WCBC a factor of 0.78 was used and for GC a factor of 0.92 was used. Details of the factor selection are outlined in Appendix A.

Annualisation was carried out at the following diffusion tube locations where data capture was less than 75%:

- DT2 and DT3 in the Isle of Anglesey County Council
- Site 5/9/10 and Site 58 in Flintshire County Council
- GCC 003 and GCC 037 in Gwynedd Council
- WBC-047 in Wrexham County Borough Council

Details of the annualisation process are outlined in Appendix A.

Only one exceedance of the annual mean AQS objective for NO<sub>2</sub> was recorded at any diffusion tube monitoring site within the North Wales Combined Authority. The exceedance was reported at DT4 in IACC. The diffusion tube is located along the A55 at a roadside location and did not represent relevant exposure. Following distance correction to estimate the concentration at relevant exposure, the annual mean NO<sub>2</sub> concentration fell below 10% of the annual mean NO<sub>2</sub> AQS objective. It should be noted that DT4 in IACC is located over 20m from the nearest sensitive receptor. Therefore, the predicted concentration at the relevant exposure site should be treated with caution. As NO<sub>2</sub> concentrations fall rapidly with distance it is unlikely that concentrations at the sensitive receptor will be elevated.

## **North Wales Combined Authority**

There were a further two locations within the North Wales Combined Authority where annual mean NO<sub>2</sub> concentrations were reported to be within 10% of the annual mean AQS objective for NO<sub>2</sub>. These were at DT1 in IACC and at Site 57 in FCC. Both these diffusion tubes were at locations which did not represent annual mean relevant exposure.

The NO<sub>2</sub> fall-off with distance calculator was used to estimate the NO<sub>2</sub> concentration at the nearest location with relevant exposure for Site 57 in FCC. Following distance correction, the annual mean NO<sub>2</sub> concentration fell below 10% of the annual mean NO<sub>2</sub> AQS objective.



Figure A.2 and Figure A.3 in Appendix A detail the procedure for calculating the concentration at relevant exposure for both DT4 and Site 57.

Distance correction was not carried out for DT1 as there were no nearby sensitive receptors. However, it should be noted that DT1 in IACC is located close to an authorised layby that has a maximum waiting time of 4-hours. Therefore DT1 is at a location where the 1-hour NO<sub>2</sub> AQS objective (not to be exceeded more than 18 times per year) would apply. Due to the use of a diffusion tube at this location no hourly measurements are able to be recorded. In accordance with LAQM.TG16 the 1-hour AQS objective for NO<sub>2</sub> is unlikely to be exceeded where the annual mean NO<sub>2</sub> concentration is below 60µg/m<sup>3</sup>. The annual mean recorded at DT1 in 2016 was 45.2µg/m<sup>3</sup>; therefore it can be assumed that the 1-hour objective was not exceeded at this location.

All other diffusion tubes measuring NO<sub>2</sub> concentrations in the North Wales Combined Authority were well below the annual mean NO<sub>2</sub> AQS objective. Furthermore, annual mean NO<sub>2</sub> concentrations were not greater than 60µg/m<sup>3</sup> at any non-automatic monitoring site. Therefore exceedances of the 1-hour mean objective are unlikely at all monitoring locations.

The diffusion tube study undertaken at 12 locations along the A5025 by IACC has shown that annual mean NO<sub>2</sub> concentrations are well below the annual mean AQS objective. These results will help support the A5025 highways improvements between Valley and the Wylfa Newydd Development Area. Furthermore, there were no exceedances reported at relevant exposure locations across the main road network in North Wales, including along the A55, A5 and A494.

There does not appear to be any clear overall trends with regards to annual mean NO<sub>2</sub> concentrations within the six local authorities. However, on the whole, there appears to be a slight overall increase in NO<sub>2</sub> concentrations when compared to the 2015 data. As this increase is widespread, it is unlikely that localised increases in emissions are the cause. It is more likely that adverse meteorological conditions over the year led to the overall increase in NO<sub>2</sub> concentrations. Nonetheless, when comparing NO<sub>2</sub> concentrations over the past 5 years, there has been a clear

## **North Wales Combined Authority**

decrease reported at the majority of diffusion tube locations throughout the North Wales Combined Authority since 2012.

Table 2.5 – Results of NO<sub>2</sub> Diffusion Tubes 2016

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = 0.78 <sup>a</sup> / 0.92 <sup>b</sup>
<b>Isle of Anglesey County Council</b>						
DT1	Llanfair P.G. By-pass	Kerbside	N	N	12	39.7
DT2	Bulkeley Square, Llangefni	Kerbside	N	N	6	23.5 (28.0)
DT3	Penmynydd Road	Roadside	N	N	6	9.5 (11.2)
DT4	Llanfair P.G. O <sub>2</sub> Mast	Roadside	N	N	11	45.2
DT5	Bridge over A55	Roadside	N	N	10	9.8
DT6	A55, Junction 4	Roadside	N	N	11	11.3
DT7	A5025, Valley	Kerbside	N	N	11	15.3
DT8	A5025, Llanfachraeth	Roadside	N	N	11	9.9
DT9	A5025, Llanfaethlu	Roadside	N	N	11	9.5
DT10	A5025, Llanfellech Crossroads	Roadside	N	N	11	7.0
DT11	A5025, Tregele	Roadside	N	N	11	10.2
DT12	Ffordd Caergybi, Cemaes	Roadside	N	N	11	9.0
DT13	Maes Cynfor, Cemaes	Roadside	N	N	11	6.7
DT14	A5025, Amlwch	Roadside	N	N	11	12.7
DT15	A5025 Near Salem Street, Amlwch	Roadside	N	N	10	11.2
<b>Conwy County Borough Council</b>						
CBC-001	Theatre Colwyn, Colwyn Bay	Roadside	N	N	12	19.3
CBC-034	Victoria Drive	Roadside	N	N	10	21.1
CBC-004	Grove Park Rd. Colwyn Bay	Urban Background	N	N	12	10.3

North Wales Combined Authority

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = $0.78^a / 0.92^b$
CBC-016	Silva Gardens North, Llandudno	Urban Background	N	N	12	9.1
CBC-017	Kingsway, Colwyn Bay	Roadside	N	N	12	19.0
CBC-018	Heol Dewi Pensarn	Roadside	N	N	12	20.9
CBC-026	Chapel Street Abergele	Roadside	N	N	12	27.8
CBC-025	Parc Llandudno	Roadside	N	N	12	15.6
CBC-031	Conwy Road East (53), Llandudno Jcn	Roadside	N	N	12	21.0
CBC-032	Conwy Road West, Llandudno Jcn (39)	Roadside	N	N	12	18.9
CBC-021	Llanfairfechan	Roadside	N	N	12	17.7
CBC-022	Bryn Marl, Mochdre	Roadside	N	N	12	20.7
CBC-033	Coed Pella Road, Colwyn Bay	Roadside	N	N	12	13.8
CBC-027	Llandudno Junction, New Roundabout	Roadside	N	N	12	14.7
CBC-029	Llandudno Railway Stn Taxi Rank	Roadside	N	N	9	11.2
<b>Denbighshire County Council</b>						
DBK1	Wellington Road, Rhyl	Roadside	N	N	12	23.5
DBR2	10 Kinmel Street, Rhyl	Roadside	N	N	12	26.4
DBB3	5 St. Georges Cres., Rhyl	Suburban	N	N	12	9.8
DBB4	73 Bryn Coed Park, Rhyl	Suburban	N	N	12	10.3
DBR5	2 Pant Glas, St. Asaph	Suburban	N	N	12	15.5
DBR48	Adj. 1 Vale Street, Denbigh	Roadside	N	N	11	26.7
DBR23	31 Ruthin Road, Denbigh	Roadside	N	N	12	18.6

North Wales Combined Authority

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = $0.78^a / 0.92^b$
DBR8	1 Plas Elwy Orchard, The Roe, St. Asaph	Suburban	N	N	12	15.5
DBR9	7 Roe Park, St. Asaph	Suburban	N	N	12	21.1
DBR10	13 Roe Park, St. Asaph	Suburban	N	N	12	16.1
DBR24	Denbigh Cutters, 21 Vale Street, Denbigh	Roadside	N	N	11	33.1
DBR20	25 Park Road, Ruthin.	Roadside	N	N	11	19.8
DBR43	Adj HSBC Bank, Vale Street, Denbigh	Roadside	N	N	12	29.1
DBR44	Opp Rowlands Pharm., Vale Street, Denbigh	Roadside	N	N	11	25.0
DBR45	Adj 50 Vale Street, Denbigh	Roadside	N	N	11	23.3
DBR37	Haul Fryn Depot, Ruthin	Roadside	N	N	12	26.6
DBR38	Adj 62 Rhos Street, Ruthin	Roadside	N	N	12	16.8
DBR31	2 Rhyl Road, Denbigh	Kerbside	N	N	12	18.9
DBR32	47 High Street, Denbigh	Roadside	N	N	12	18.9
DBR33	Adj CO-OP, High Street, Denbigh	Roadside	N	N	11	28.2
DBR34	Adj Fairyburn, Rhyl Road, Denbigh	Kerbside	N	N	12	15.2
DBR49	79 High Street, Prestatyn	Roadside	N	N	12	17.1
DBR50	Adj., Saronie Court, High Street, Prestatyn	Roadside	N	N	11	16.0
DBR52	Adj. Swayne Johnston Sol., Vale Street, Denbigh	Roadside	N	N	12	24.1
DBR53	7 Vale Street, Denbigh	Roadside	N	N	12	31.2
DBR54	Adj 2 Market Street, Ruthin	Roadside	N	N	12	13.7

North Wales Combined Authority

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = $0.78^a / 0.92^b$
<b>Flintshire County Council</b>						
Site 1	10A Wrexham Road, Mold	Kerbside	N	N	12	25.6
Site 2	1, St.Davids Close, Ewloe CH5 3AP	Urban	N	N	11	20.6
Site 3	Aston Hill Roadside	Kerbside	N	N	9	33.7
Site 4	4, Moorfield Court, Aston	Urban Background	N	N	12	18.0
Site 5/9/10	Rose Cottage Junction A5119/A494 Co-Located with Continuous Monitoring Station	Kerbside	N	Y - Triplicate and co-located	7	23.2 (33.2)
Site 6	Kelsterton Farm, Kelsterton Lane, Connah's Quay	Rural Background	N	N	10	14.0
Site 7	Kelsterton Road, Connah's Quay	Kerbside	N	N	12	15.0
Site 8	86, Kelsterton Road, Connah's Quay CH5 4BJ	Urban background	N	N	12	14.5
Site 11/47	3 Davies Cottage, Mold Road, Alltami	Kerbside	N	N - Duplicate	12	35.6
Site 12/13	20/22 Glynne Way, Hawarden	Kerbside	N	N - Duplicate	12	34.0
Site 14	Wepre Park, Connah's Quay	Rural Background	N	N	11	12.7
Site 15	Aston Hill	Kerbside	N	N	9	27.9
Site 16	4, Belvedere Close, Queensferry CH5 1TG	Urban	N	N	12	26.7
Site 17	32 Chester Road West, Shotton	Kerbside	N	N	9	29.2
Site 18	Victoria Crescent, Shotton	Urban Background	N	N	11	14.5
Site 19	Gwylfa, Northop Rd., Flint Mountain	Kerbside	N	N	12	25.0
Site 20	Coed Mawr Cott., Mostyn Road, Greenfield CH8 9DN	Kerbside	N	N	12	23.4

North Wales Combined Authority

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = $0.78^a / 0.92^b$
Site 21	18, Kingsley Road, Garden City CH5 2JA	Urban Background	N	N	12	15.2
Site 22	Green Lane West, Sealand	Rural Background	N	N	12	18.6
Site 23	Second Avenue, Deeside Industrial Estate (Valspar)	Kerbside	N	N	10	24.4
Site 24/51	Llys Alun, Wrexham Road, Cefn Y Bedd	Kerbside	N	N - Duplicate	10	31.4
Site 25	BASF, Deeside Industrial Park, Sealand	Industrial	N	N	12	21.3
Site 26	Corus rear entrance DIP, Sealand	Industrial	N	N	12	16.3
Site 27	89, Riverside Park, Garden City	Urban Background	N	N	11	21.3
Site 28	Yacht Club, Deeside Industrial Park, Sealand	Industrial	N	N	12	15.5
Site 29	Weighbridge Road, Deeside Industrial Park, Sealand	Industrial	N	N	12	18.0
Site 30	28, Chester Road, Pentre, Deeside CH5 2DT	Kerbside	N	N	12	24.9
Site 31	Trelawney Towers 79 Chester Road, Flint CH6 5DU	Kerbside	N	N	12	23.6
Site 32	Flint Town Council Buildings.	Kerbside	N	N	12	20.2
Site 33	133, Main Road, Broughton CH4 0NR	Kerbside	N	N	12	26.9
Site 34	2, Coleshill Street, Holywell CH8 7UP	Kerbside	N	N	12	25.3
Site 35	Sycamore House, Greenfield Road, Holywell CH8 7PY	Kerbside	N	N	12	21.0
Site 36	43, Station Road, Queensferry CH5 1SU	Kerbside	N	N	12	23.2
Site 37	Glendale Lodge, Rhydgaled, Mold A5119	Kerbside	N	N	12	26.3

North Wales Combined Authority

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = $0.78^a / 0.92^b$
Site 38	Oakdene, St Marys Way, Broughton CH4 0NQ	Urban	N	N	12	19.1
Site 39	Medical Centre, High Street, Caergwrie	Kerbside	N	N	12	17.2
Site 40	1 Manor Road, Sealand CH5 2SB	Kerbside	N	N	11	16.8
Site 41	Ty-Gwyn, A5118, Padeswood CH7 4JF	Kerbside	N	N	12	12.0
Site 42	Casa Sol, High Street, Bagillt CH6 6AP	Kerbside	N	N	12	12.3
Site 43	9, Bryn Tirion, Rhewl-Mostyn CH8 9QW	Urban Background	N	N	12	9.2
Site 44	413 Chester Road, Oakenholt, Flint CH6 5SF	Urban Background	N	N	10	25.5
Site 45	Belmont, Alltami, Nr. Mold CH7 6LG	Kerbside	N	N	12	17.8
Site 46	22, Park View, Northop CH7 6DD	Urban Background	N	N	11	12.7
Site 48	74, High Street, Saltney CH4 8SQ	Kerbside	N	N	12	18.8
Site 49	31, The Rowans, Broughton CH4 0TD	Kerbside	N	N	10	16.9
Site 50	Bryn Estyn, Wrexham Road, Hope LL12 9NB	Kerbside	N	N	10	16.9
Site 52	74, High Street, Saltney CH4 8SQ	Kerbside	N	N	12	16.6
Site 53	17, Mill Lane, Buckley CH7 3HA	Kerbside	N	N	12	26.7
Site 54	Elm Tree Rd Saughall	Kerbside	N	N	10	13.2
Site 55	Ferry Lane, Chester	Kerbside	N	N	10	13.0
Site 56	Deeside Lane, Sealand	Kerbside	N	N	9	13.2
Site 57	Rose Cottage Junction A5119/A494	Kerbside	N	N	11	37.8



North Wales Combined Authority

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = $0.78^a / 0.92^b$
Site 58	South Bank, Aston Park, Queensferry CH5 1XZ		N	Y <sup>c</sup>	6	24.5 (24.5)
<b>Gwynedd Council</b>						
GCC 002	Roundabout A487, Caernarfon (C1)	Kerbside	N	N	12	31.4
GCC 003	Lon Campbell, Caernarfon (C3)	Urban Background	N	N	5	10.9 (10.5)
GCC 005	Ffordd Bangor, Caernarfon (C5)	Kerbside	N	N	11	27.6
GCC 008	A4087, Bangor (B3)	Kerbside	N	N	12	22.8
GCC 011	A5122, Bangor (B5)	Kerbside	N	N	9	23.8
GCC 012	Faenol Roundabout, Bangor (B6)	Kerbside	N	N	12	26.9
GCC 013	Bethesda (BETH 1)	Kerbside	N	N	12	21.9
GCC 015	Llanwnda (LL1)	Roadside	N	N	12	24.8
GCC 037	Poolside, Caernarfon (C6)	Kerbside	N	N	7	24.2 (25.5)
GCC 038	A55, Bangor (B4)	Roadside	N	N	9	28.6
GCC 039	A55, Bangor (CO-LOC)	Roadside	N	N	9	28.4
GCC 040	Pwllheli (PW1)	Kerbside	N	N	12	19.1
<b>Wrexham County Borough Council</b>						
WBC-001	Grosvenor Rd, Wrexham	Roadside	N	N	12	27.8
WBC-010	Ceiriog School, Chirk	Suburban	N	N	12	13.2
WBC-015	Garden View, Ruabon	Roadside	N	N	12	16.4
WBC-018	Old Farm Rd, Rhostyllen	Roadside	N	N	12	16.9
WBC-019	Mold Rd, Wrexham	Roadside	N	N	11	21.4

North Wales Combined Authority

ID	Location	Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2016 (Number of Months)	2016 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment factor = $0.78^{\text{a}}$ / $0.92^{\text{b}}$
WBC-020	Chester Rd, Wrexham	Intermediate	N	N	12	25.5
WBC-021	Holt Rd, Wrexham	Roadside	N	N	12	19.9
WBC-022	Holyhead Rd, Chirk	Intermediate	N	N	12	16.3
WBC-030	Rhostyllen Roundabout, Wrexham (A483)	Roadside	N	N	12	35.8
WBC-031	Bus Station, Wrexham	Roadside	N	N	12	35.9
WBC-032	The Sycamores, Chester Road	Roadside	N	N	12	29.1
WBC-033	Smithfield Road	Roadside	N	N	12	19.2
WBC-034	Coed Poeth	Roadside	N	N	12	14.6
WBC-036	Acrefair	Roadside	N	N	12	20.0
WBC-037	Rossett	Roadside	N	N	12	22.3
WBC-039	Pentre Bach	Roadside	N	N	11	19.7
WBC-040	Overton	Roadside	N	N	12	11.9
WBC-041	Marchwiel	Roadside	N	N	12	15.2
WBC-042	Llan-Y-Pwll	Roadside	N	N	12	25.6
WBC-043	Hightown	Roadside	N	N	12	17.9
WBC-044	Cobden Road	Roadside	N	N	12	23.6
WBC-045	STANSTY	Roadside	N	N	12	19.8
WBC-046	Regent Street	Roadside	N	N	12	24.1
WBC-047	Chapel Lane	Roadside	N	N	5	23.2 (21.2)
AURN	Victoria Road 1	Roadside	N	Y	12	16.7

<sup>a</sup> Bias Adjustment factor for CCBC, DCC, FCC, IACC and WCBC

<sup>b</sup> Bias Adjustment factor for GC

<sup>c</sup> Automatic monitoring station at this location ran by the Welsh Government. Data from the site is not yet available.

\*Values shown in brackets represent annualised concentrations

Figure 2.20 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Isle of Anglesey County Council

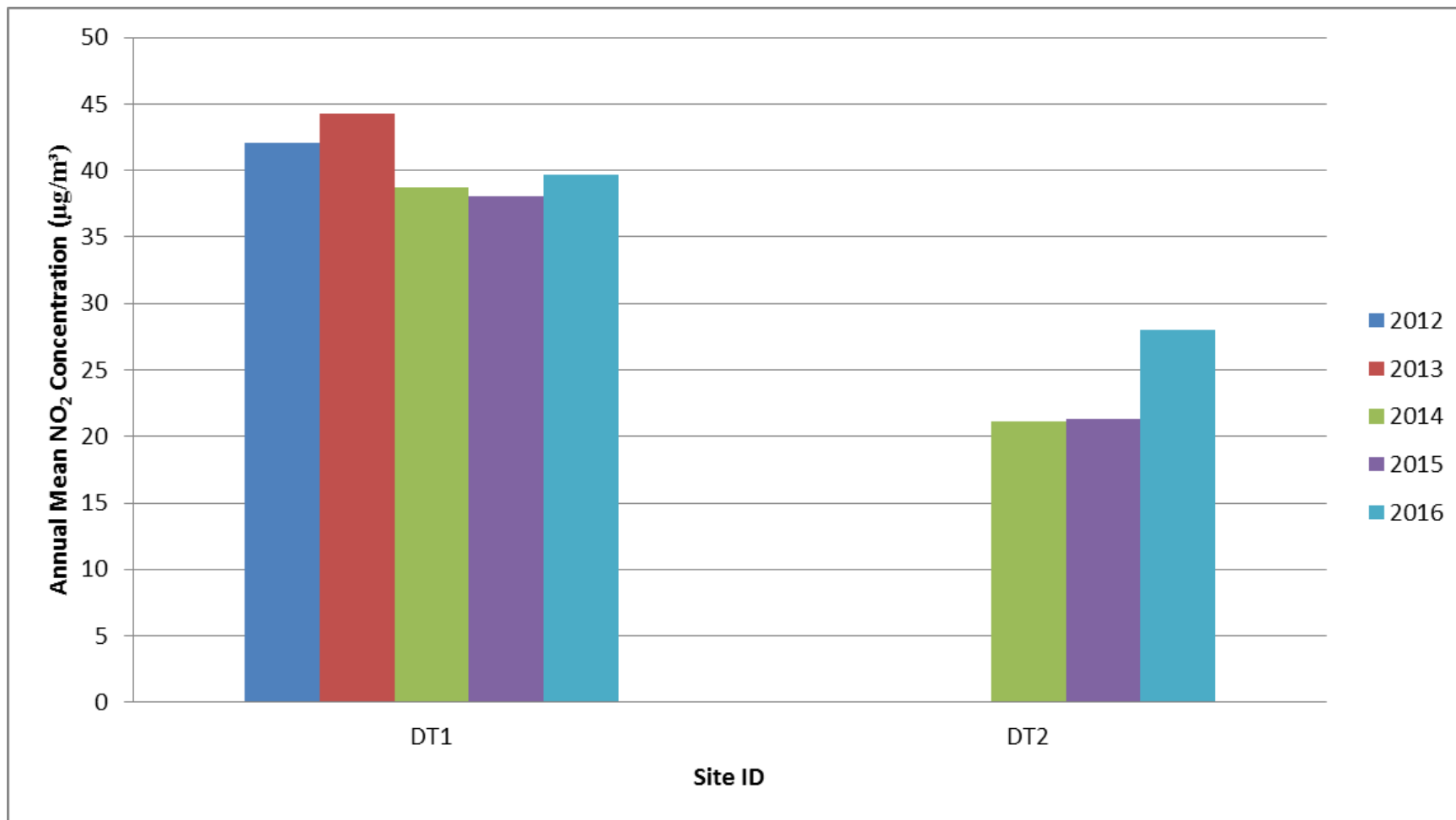


Figure 2.21 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Conwy County Borough Council

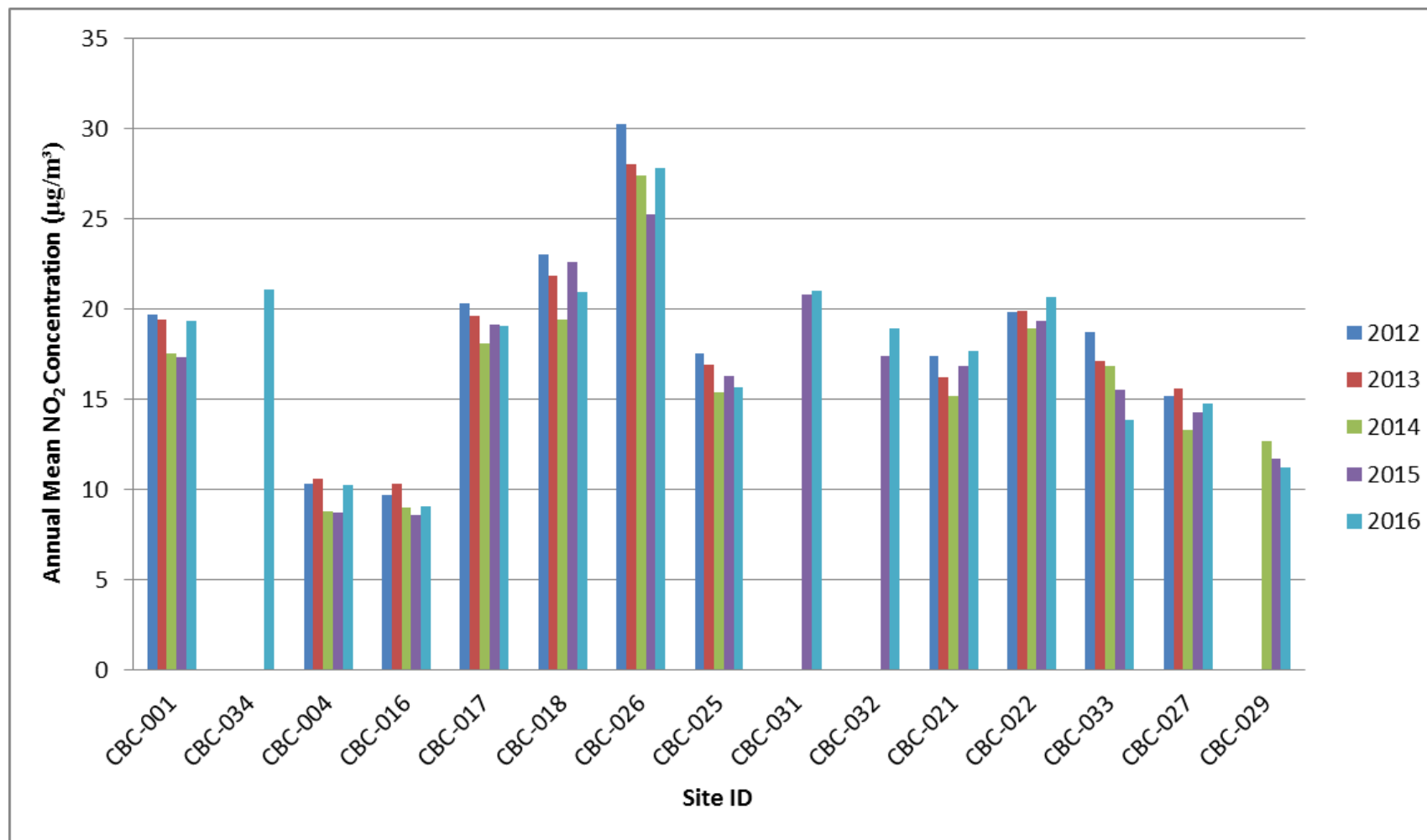


Figure 2.22 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Denbighshire County Council

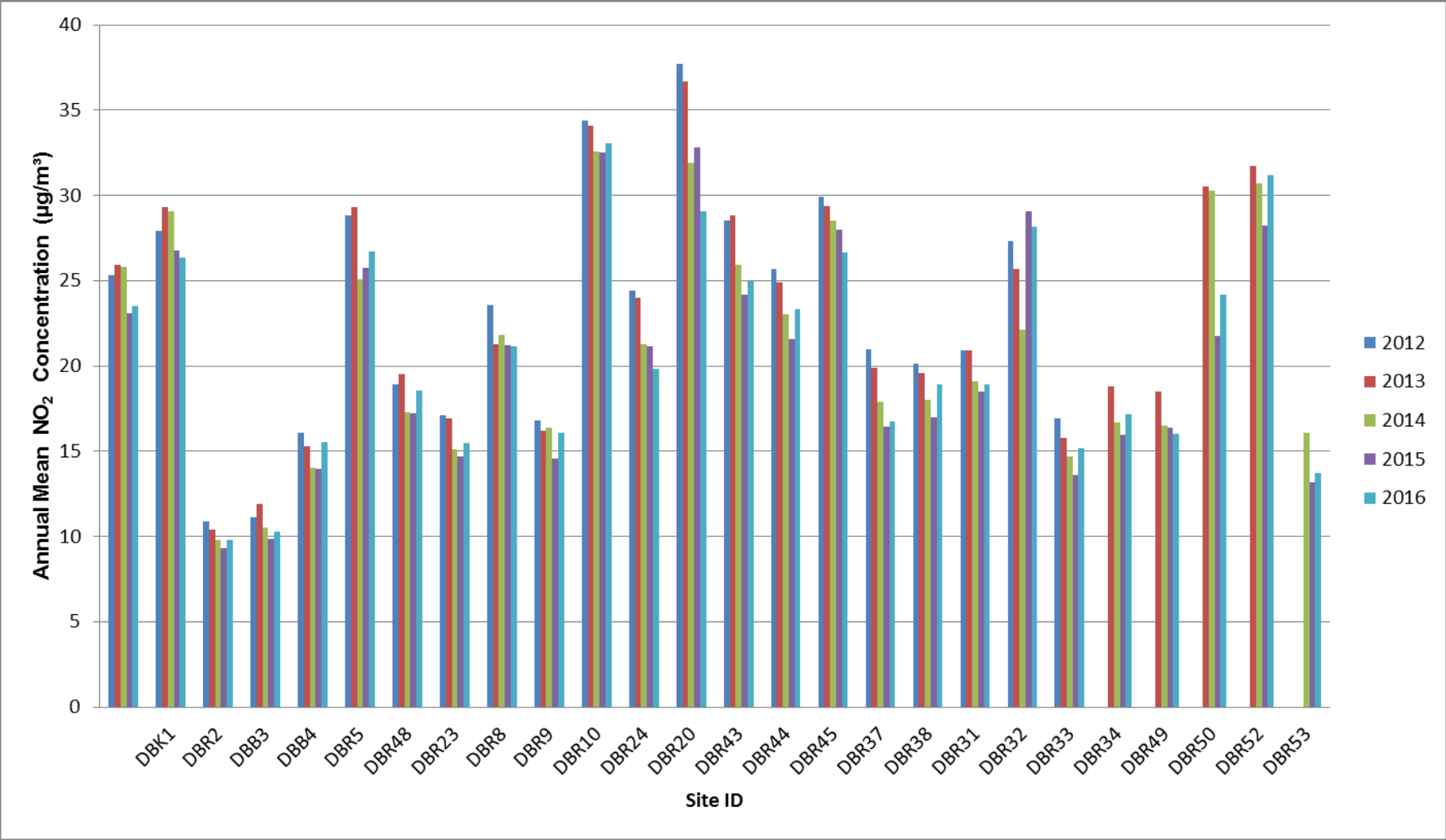


Figure 2.23 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Flintshire Council <math><20\mu\text{g}/\text{m}^3</math> in 2016

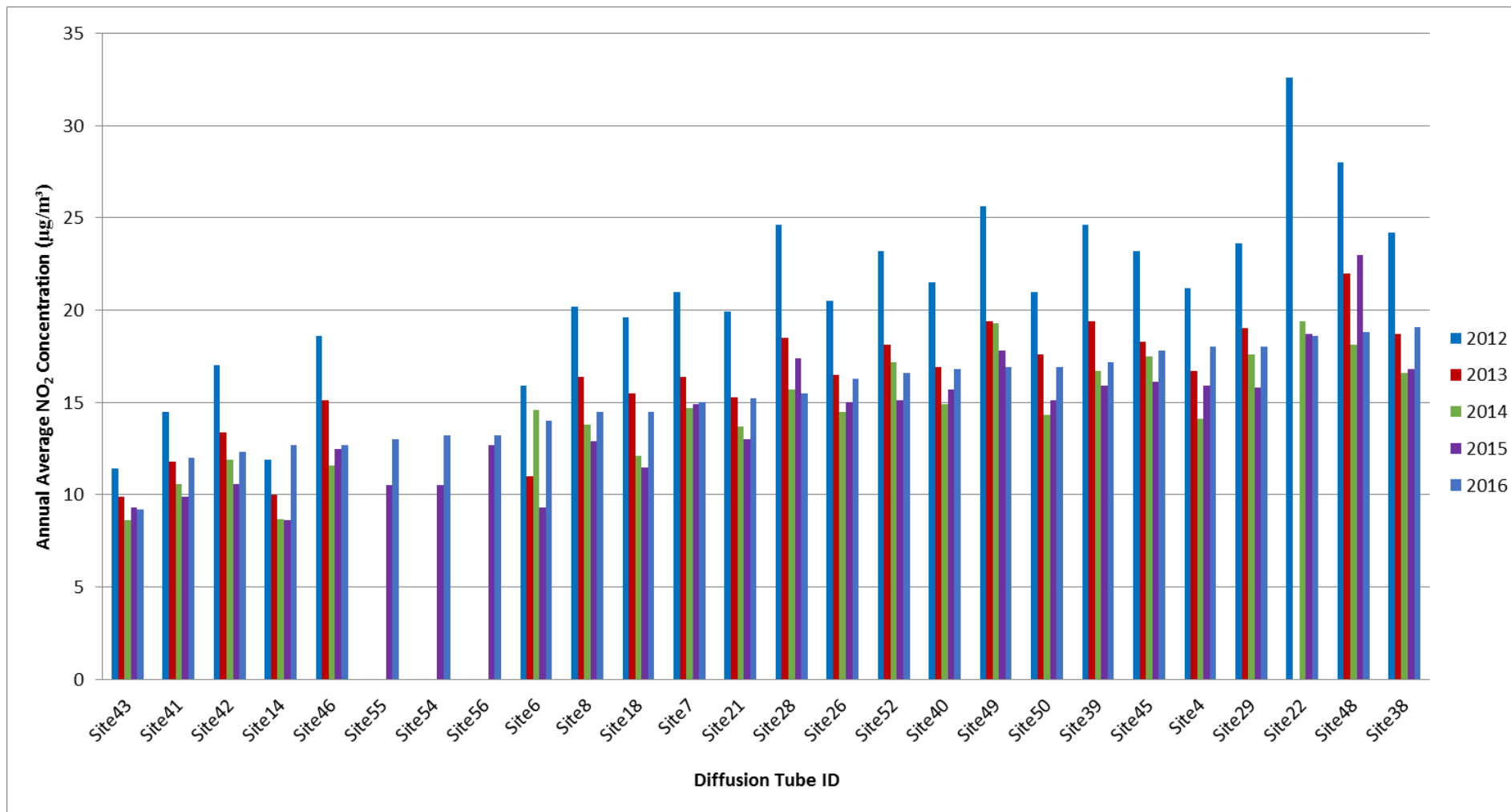


Figure 2.24 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Flintshire Council >20µg/m<sup>3</sup> in 2016

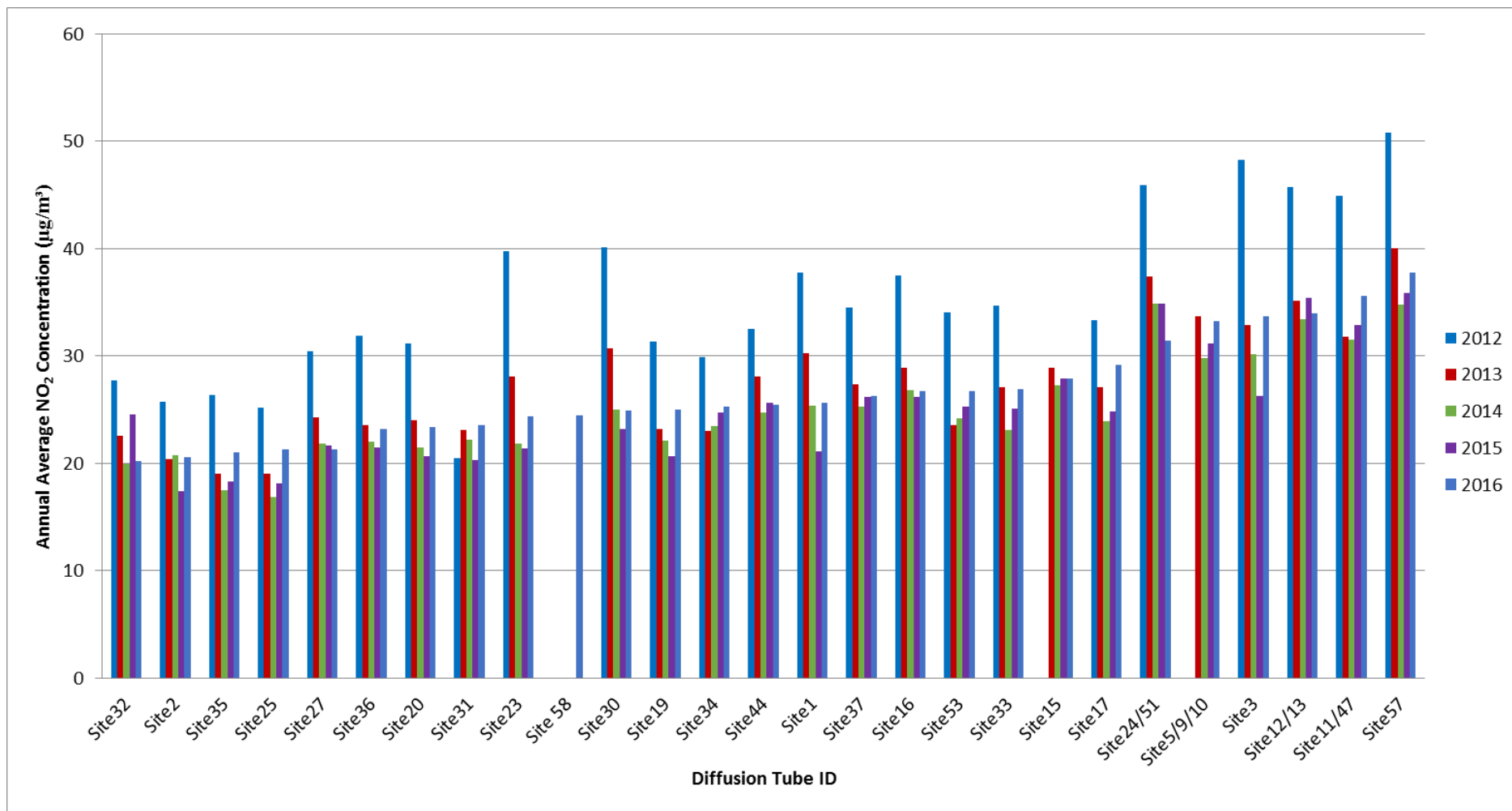


Figure 2.25 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Gwynedd Council

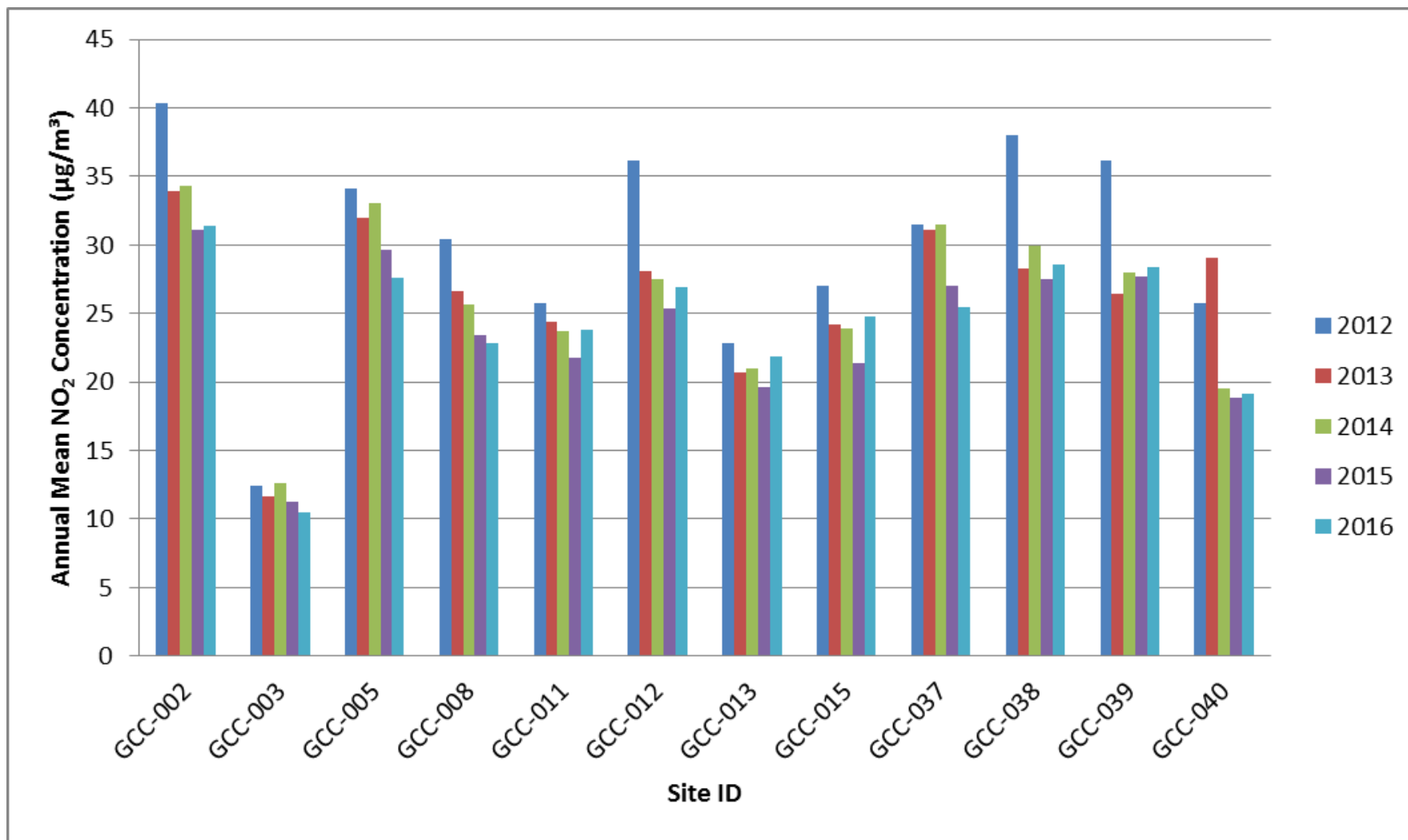
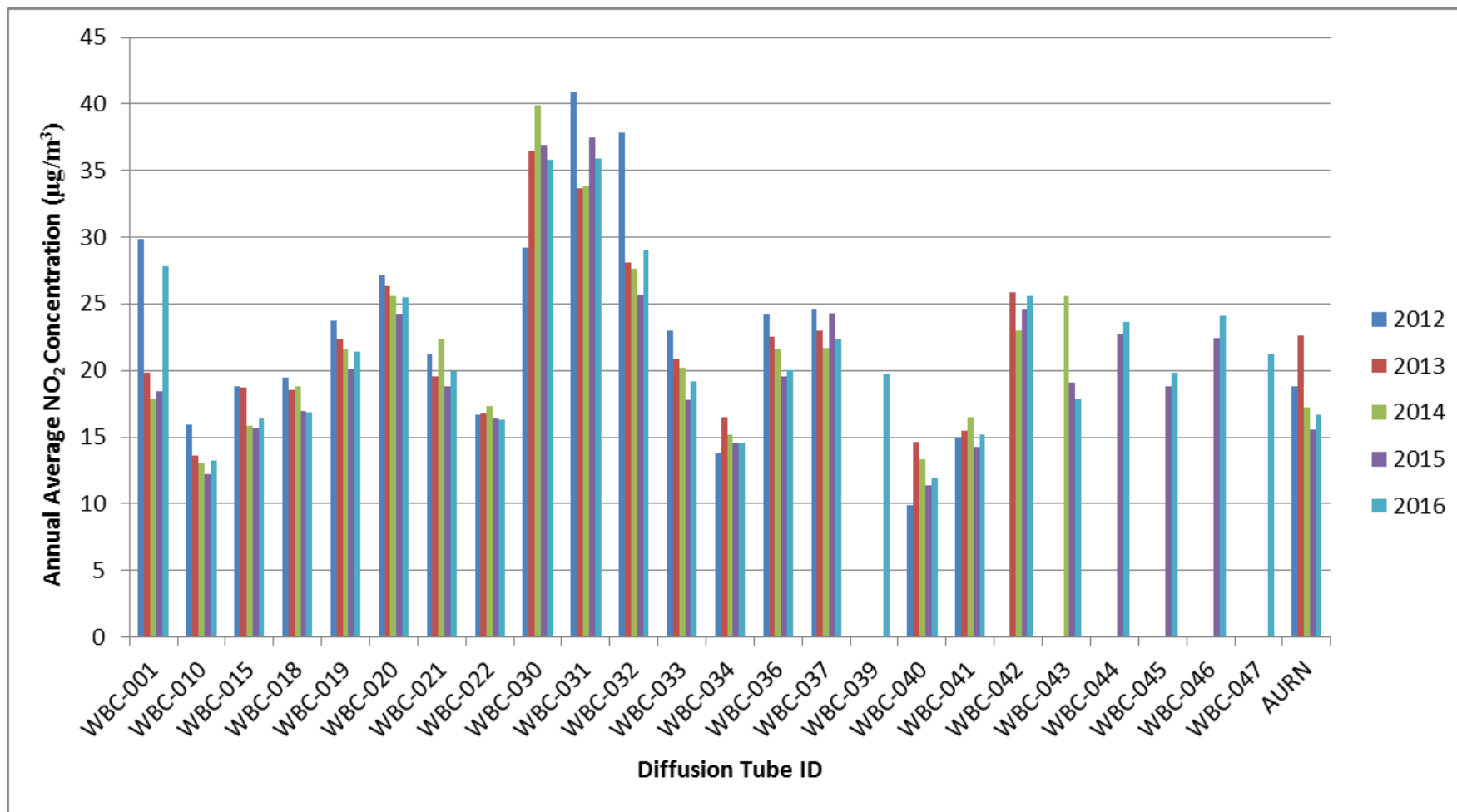




Figure 2.26 – Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites: Wrexham County Borough Council



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

During 2016 PM<sub>10</sub> monitoring was carried out at four rural and one roadside location within the North Wales Combined Authority. The automatic monitoring data for PM<sub>10</sub> can be seen in Table 2.6 and Table 2.7. Full details of the QA/QC procedures are provided in Appendix A.

The four Osiris monitoring stations were run by IACC. Data capture was above 75% at CM1 (Llynfaes) and CM3 (Felin Cafnan). Data capture was just under 75% at CM2 (Brynteg). CM4 (IVC Penhesgyn) was decommissioned in August 2016 and therefore only half a years' worth of data was captured. Annualisation was carried out at CM2 and CM4. It should be noted that the background automatic monitoring stations used to annualise the data against were over 100km from the monitoring sites. Therefore, the results of the annualisation should be used with caution as the background locations may not necessarily be representative of the background conditions at the PM<sub>10</sub> monitoring sites. Further information can be found in Appendix A.

CM1 reported 4 exceedances of the 24-hour mean objective. This is well below the 18 allowed exceedances in a year. As less than 85% of data was available at sites CM2, CM3 and CM4, the 90.4<sup>th</sup> percentile was recorded to compare against the 24-hour mean objective. The 90.4<sup>th</sup> percentile concentrations were all well below the objective level of 50µg/m<sup>3</sup>. The roadside monitoring location measuring PM<sub>10</sub> was situated along Victoria Road in Wrexham and is run by the AURN. There were also no exceedances of the 24-hour mean air quality objective at this location.

No exceedances of the annual mean air quality objective was reported at any of the PM<sub>10</sub> monitoring locations in 2016. Figure 2.27 shows the trend in annual mean PM<sub>10</sub> concentrations over the past 5 years. CM3 was not included in the graph as 2016 was the first year with a complete set of data available.

CM2 reported the lowest annual mean PM<sub>10</sub> concentration in 2016. Concentrations have continued to decline since 2014. The Osiris is located by a quarry and suggests that improvements made to manage dust emissions at the quarry have been successful in reducing PM<sub>10</sub> concentrations. CM4 and the AURN monitoring sites

## North Wales Combined Authority

have also both reported a decrease in annual mean PM<sub>10</sub> concentrations since 2015. CM4 is located on the boundary of a recycling centre with no relevant exposure nearby. The site is now out of service. The AURN site is located at a roadside location. Similar to the annual mean NO<sub>2</sub> downward trend at the same site, it is likely that traffic management in the area has reduced the level of pollutants emitted from vehicles.

An increase in the annual mean PM<sub>10</sub> concentration was reported at CM1. There has been a reported upward trend in annual mean PM<sub>10</sub> concentrations since 2014. Prior to 2014 concentrations had been gradually declining. The monitoring site is located at a quarry. The quarry implemented a stockpile management plan in late 2013 which resulted in processed material being relocated away from the site boundary to a more sheltered location. Reported concentrations are still below levels prior to this management plan being enforced however, continued monitoring at the site will help determine whether it has been successful in maintaining a low PM<sub>10</sub> annual mean concentration.

CM3 was relocated to a National Trust Property in December 2015 which is close to the Wylfa Newydd construction site. The annual mean PM<sub>10</sub> concentration reported at this site was well below the AQS objective in 2016. Continued monitoring at this site will help assess annual PM<sub>10</sub> trends at the site.

Overall there have been no reported exceedances of the annual and 24-hour mean AQS objectives for PM<sub>10</sub> at any of the monitoring locations in 2016.

Table 2.6 – Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with Annual Mean Objective

ID	Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2016 %	Confirm Gravimetric Equivalent (Y or N/A)	Annual Mean Concentration (µg/m <sup>3</sup> )				
						2012	2013	2014	2015	2016
<b>Isle of Anglesey County Council</b>										
CM1	Rural	N	86.9	86.9	Y	25.4	19.2	13.8	17.2	18.8
CM2	Rural	N	74.3	74.3	Y	15.6	15.2	17.6	13.1	8.1 (8.1)
CM3	Rural	N	76.8	76.8	Y	-	-	-	34.8 <sup>a</sup>	14.9
CM4	Rural	N	78.2	46.2 <sup>b</sup>	Y	14.3	-	9.8	10.4	9.0 (9.1)
<b>Wrexham County Borough Council</b>										
AURN	Roadside	N	96	96	Y	15.1	17.1	14.1	13.3	12.2

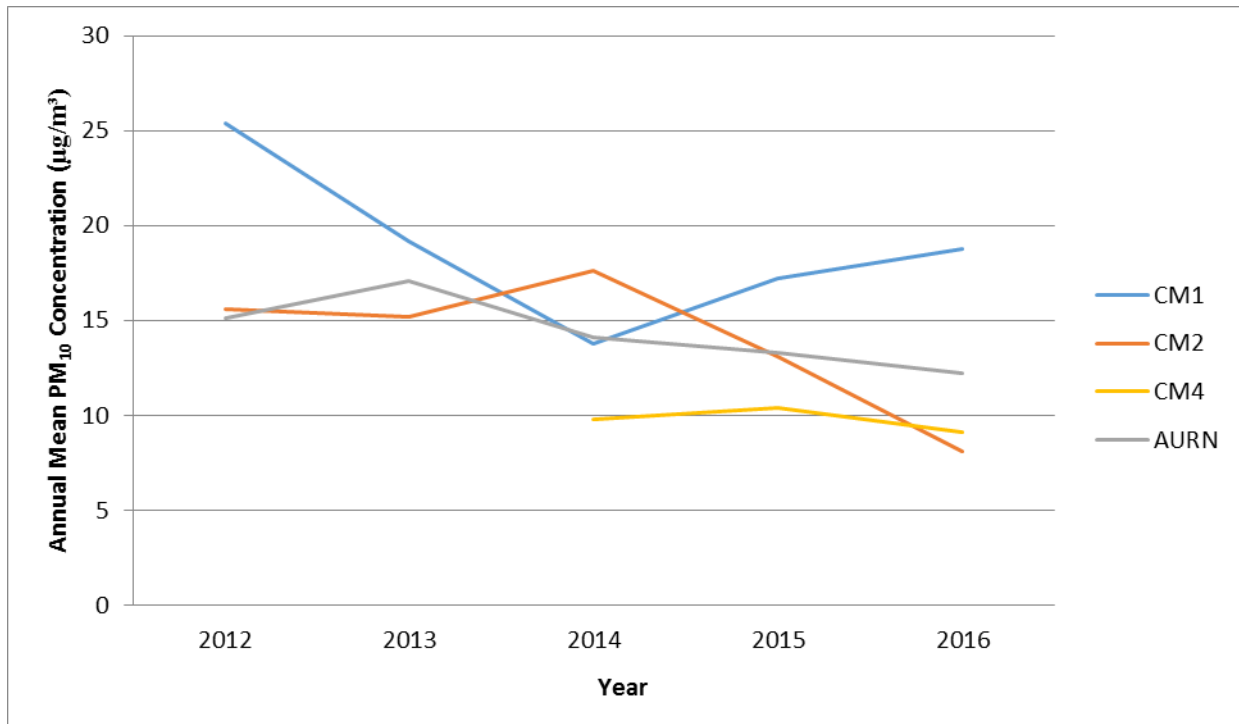
<sup>a</sup> CM3 installed on the 16<sup>th</sup> December 2015 <sup>b</sup>CM4 was decommissioned in August 2016 \*Values shown in brackets represent annualised concentrations

Table 2.7 – Results of Automatic Monitoring for PM<sub>10</sub>: Comparison with 24-hour Mean Objective

ID	Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2016 %	Confirm Gravimetric Equivalent (Y or N/A)	Number of Daily Means > 50µg/m <sup>3</sup>				
						2012	2013	2014	2015	2016
<b>Isle of Anglesey County Council</b>										
CM1	Rural	N	86.9	86.9	Y	8	5	2	2	4
CM2	Rural	N	74.3	74.3	Y	4	0	6	3	16.9µg/m <sup>3</sup>
CM3	Rural	N	76.8	76.8	Y	-	-	-	-	24.9µg/m <sup>3</sup>
CM4	Rural	N	78.2	46.2 <sup>a</sup>	Y	1	-	0	0	15.5µg/m <sup>3</sup>
<b>Wrexham County Borough Council</b>										
AURN	Roadside	N	96	96	Y	4	12	8	3	0

<sup>a</sup>CM4 was decommissioned in August 2016 \*Where there is less than 85% data capture, the 90.4<sup>th</sup> percentile is reported

Figure 2.27 – Trends in Annual Mean PM<sub>10</sub> Concentrations



### 2.2.3 Particulate Matter (PM<sub>2.5</sub>)

Obligatory standards for PM<sub>2.5</sub> are provided in the AQS however currently there is no statutory duty on local government to achieve of these standards. Nonetheless, as detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub>. PM<sub>2.5</sub> monitoring is carried out at the Victoria Road AURN continuous monitor in Wrexham County Borough Council and at CM1, CM2, CM3 and CM4 in the Isle of Anglesey County Council. No other local authorities in the North Wales Combined Authority monitor PM<sub>2.5</sub>.

Annualisation was carried out at CM2 and CM4. It should be noted that the background automatic monitoring stations used to annualise the data against were over 80km from the monitoring sites. Therefore, the results of the annualisation should be used with caution as the background locations may not necessarily be representative of the background conditions at the PM<sub>2.5</sub> monitoring sites. Further information can be found in Appendix A.

## North Wales Combined Authority

Table 2.8 shows the results of the PM<sub>2.5</sub> monitoring over the past five years. The IACC only began publishing collected PM<sub>2.5</sub> data in 2016 as a response to the growing interest surrounding the health impacts of PM<sub>2.5</sub>. As a consequence, data for previous years are not available for these sites.

No exceedances of the 25µg/m<sup>3</sup> annual mean target, to be achieved by 2020 and published in the AQS, were recorded in the past five years at any of the monitoring locations.

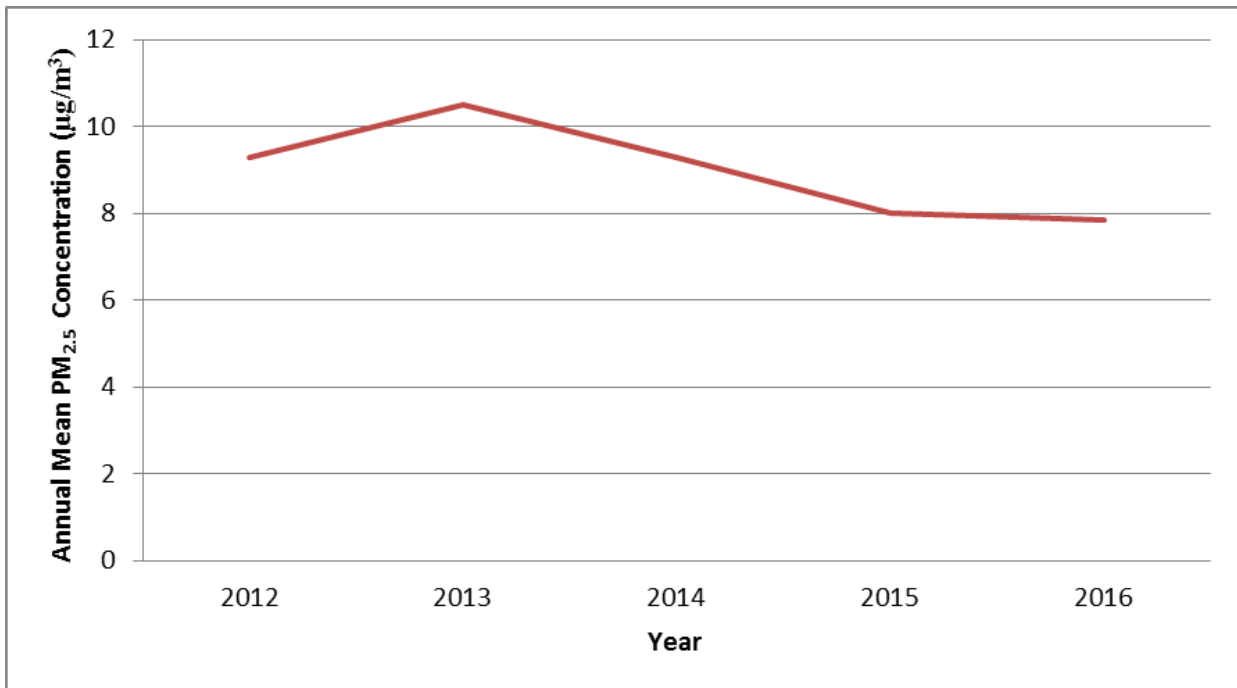
**Table 2.8 – Results of PM<sub>2.5</sub> Automatic Monitoring**

Site ID	Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2016 %	Annual mean concentrations (µg/m <sup>3</sup> )				
					2012	2013	2014	2015	2016
<b>Isle of Anglesey County Council</b>									
CM1	Rural	N	86.9	86.9	-	-	-	-	6.1
CM2	Rural	N	74.3	74.3	-	-	-	-	3.9 (4.0)
CM3	Rural	N	76.8	76.8	-	-	-	-	7.4
CM4	Rural	N	78.2	46.2 <sup>a</sup>	-	-	-	-	5.3 (5.4)
<b>Wrexham County Borough Council</b>									
Victoria Road AURN	Roadside	N	93	93	9.3	10.5	9.3	8	7.8

<sup>a</sup>CM4 was decommissioned in August 2016 \*Values shown in brackets represent annualised concentrations

Figure 2.28 shows the trend in annual mean PM<sub>2.5</sub> concentrations over the past five years. There has been a gradual decline recorded at the AURN site since 2013 with concentrations decreasing from 10.5µg/m<sup>3</sup> in 2013 to 7.8µg/m<sup>3</sup> in 2016. However the decrease in annual mean concentrations appears to level off slightly between 2015 and 2016. Nonetheless, the reported concentrations are well below the 25µg/m<sup>3</sup> target value. Only 2016 data is available for CM1, CM2, CM3 and CM4. At all monitoring locations annual mean PM<sub>2.5</sub> concentrations are well below the target value.

**Figure 2.28 – Trends in Annual Mean PM<sub>2.5</sub> Concentrations at the AURN Continuous Monitoring Site**



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

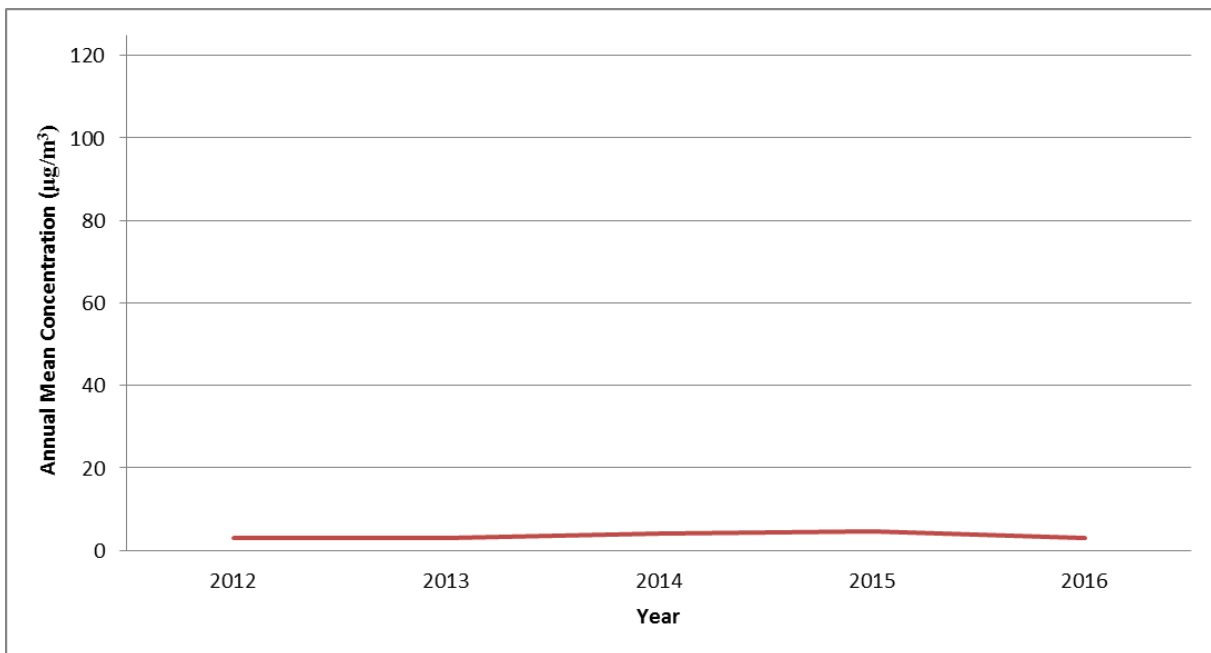
SO<sub>2</sub> monitoring is only carried out in Wrexham County Borough Council, at the AURN Victoria Road automatic monitoring station. The following table shows the results of the SO<sub>2</sub> monitoring.

**Table 2.9 – Results of SO<sub>2</sub> Automatic Monitoring**

ID	Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2016 %	Number of:		
					15-minute Means > 266µg/m <sup>3</sup>	1-hour Means > 350µg/m <sup>3</sup>	24-hour Means > 125µg/m <sup>3</sup>
Victoria Road AURN	Roadside	N	97	97	0	0	0

Table 2.9 shows the annual mean SO<sub>2</sub> concentrations at the Victoria Road AURN station. There is no annual mean objective in the AQS for SO<sub>2</sub> and therefore the graph is solely to illustrate the trend in SO<sub>2</sub> concentrations over the past 5 years. Since 2012 the annual mean SO<sub>2</sub> concentration has stayed relatively consistent and remained low.

Figure 2.29 – Trends in SO<sub>2</sub> Concentrations



There were no reported exceedances of the objective levels for SO<sub>2</sub> and therefore there is no need to proceed to a detailed assessment.

### 2.2.5 Benzene (C<sub>6</sub>H<sub>6</sub>)

Benzene monitoring is only carried out in Wrexham County Borough Council who maintains one diffusion tube for monitoring benzene near to an acid tar lagoon. It has been sited in this location to monitor for benzene levels that may be released from the lagoon.

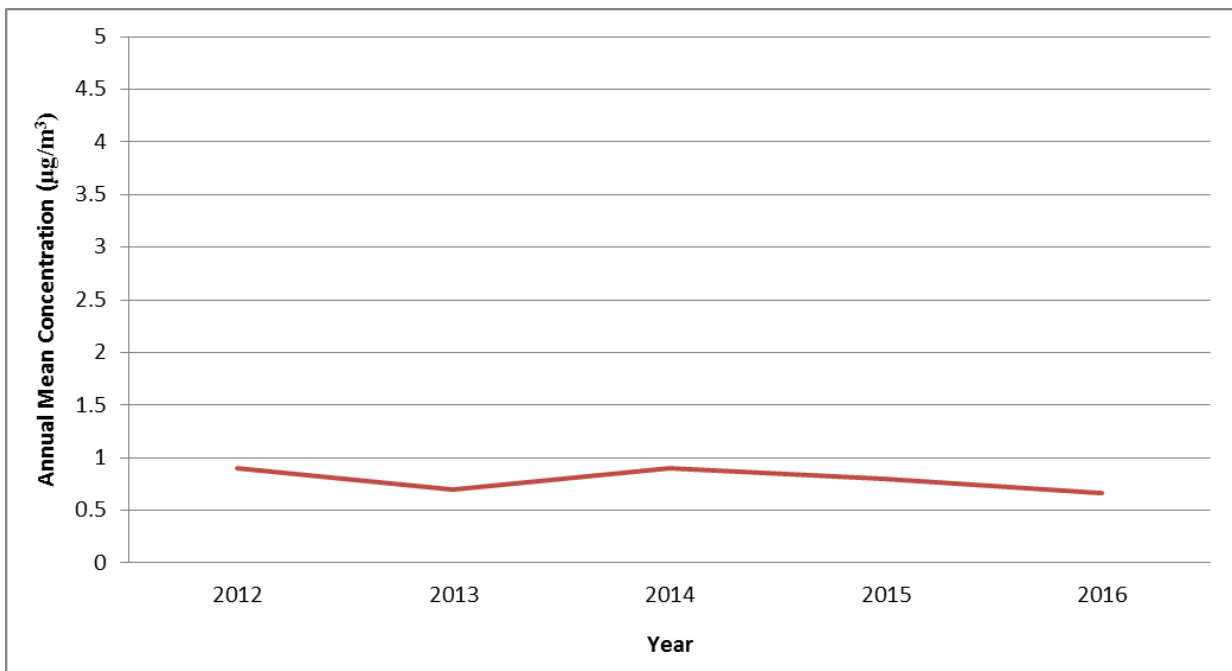
Table 2.10 – Results of Benzene Diffusion Tube Monitoring

Site ID	Location	Within AQMA?	Data Capture 2017 (%)	Annual mean concentrations (µg/m <sup>3</sup> )				
				2012	2013	2014	2015	2016
WCBC26	Llwyneinion Rd (Rhosllanerchrugog)	N	100	0.9	0.7	0.9	0.8	0.7

The annual mean benzene concentration recorded in 2016 was well below the limit value of 5µg/m<sup>3</sup>. Figure 2.30 shows the trend in annual mean benzene concentrations for the past 5 years.



Figure 2.30 – Trends in Annual Mean Benzene Concentrations



The graph shows that the level of benzene recorded in Rhosllanerchrugog have remained largely consistent since monitoring began. No exceedances of the objective level have been reported in the last 5 years. As a result, there is no need to proceed to a detailed assessment for Benzene.

### 2.2.1 Other Pollutants Monitored

No other pollutants listed on the Air Quality Standards are monitored within the North Wales Combined Authority. No new or existing sources of pollution have been identified that may lead to an exceedance of the Air Quality objectives of any other pollutant not covered in this report.

### 2.2.2 Summary of Compliance with AQS Objectives

The North Wales Combined Authority has examined the results from monitoring in the six local authority areas (Isle of Anglesey County Council, Conwy Borough Council, Denbighshire County Council, Flintshire Council, Gwynedd Council and Wrexham County Borough Council).

Concentrations are all below the objectives or at locations not relevant to exposure, therefore there is no need to proceed to a Detailed Assessment.

## 3 New Local Developments

### 3.1 Road Traffic Sources

Table 3.1 shows the newly identified developments which have been approved in 2016. The table includes details on the outcome of the decision with regards to impacts on air quality.

**Table 3.1 – Approved Planning Applications: Road Traffic Sources**

Local Authority	Source Type	Planning Application	Outcome
Isle of Anglesey County Council	Roads with significantly changed traffic flows.  New roads constructed or proposed since the last Updating and Screening Assessment.	Application for a leisure village at Penrhos Coastal Park, London Road, Holyhead. Comprising up to 500 new leisure units, a central hub building with leisure facilities.	Traffic assessed as part of planning application process. No significant air quality impacts predicted.
		Application for the erection of a replacement Alternative Emergency Control Centre and District Survey Laboratory facilities to support the Magnox Power Station. Includes parking and new vehicular access and road widening.	It is deemed unlikely that the changes proposed to the road layout will significantly impact air quality.
		Application for the erection of a science park, creation of a car park and installation of solar panels. New vehicular access on land at Cefn Du, Gaerwen.	Receptors located over 300m from the source of air pollution. No significant impacts on sensitive receptors are predicted.
		A5025 highways improvements between Valley and the Wylfa Newydd Development Area.	Improvements to the A5025 from Valley to Wylfa have been discussed in the 2016 Air Quality Progress Report. A 12 month NO <sub>2</sub> diffusion tube study at various locations along the A5025 commenced in February 2016. See Section 2.2.1 for results of this study.

## North Wales Combined Authority

Local Authority	Source Type	Planning Application	Outcome
Conwy County Borough Council	Roads with significantly changed traffic flows.	Construction and operation of a new superstore and restaurant development including demolition, preparatory earthworks, a new (A1) retail superstore unit, a new (Sui Generis) petrol filling station, 4 new (including 1 no. replacement) (A3) restaurant units, a new primary site access road from the A55, hard and soft landscaping and associated new drainage and utility infrastructure at former Brickworks Site, Tremarl Industrial Estate.	An air quality assessment was carried out in support of the application. The existing air quality in the area is significantly below Objective levels and the assessment predicted that annual mean NO <sub>2</sub> and PM <sub>10</sub> concentrations will have a small/imperceptible impact.
		Demolition of all existing on-site buildings and structures at Land in Colwyn Bay Town Centre. The construction of a new four storey council office building including customer service area, child contact centre, CCTV suite, multi storey car park, landscaping and other associated facilities and works.	Due to the potential increase in traffic associated with the use of the large facility an air quality assessment was carried out. The impact significance was predicted to be negligible for the sensitive receptors identified for both NO <sub>2</sub> and PM <sub>10</sub> . Diffusion tubes are now located at positions representing worst case scenario receptor points.
Gwynedd Council	New roads constructed or proposed since the last Updating and Screening Assessment.	Bypass from the Goat roundabout on the A499/A487 junction to the Plas Menai roundabout, around Llanwnda, Dinas, Bontnewydd and Caernarfon avoiding the town centres.	An air quality assessment was carried out to assess the air quality impacts from construction and operation on both human and ecological receptors. No significant adverse impacts are anticipated.

Since the previous Local Authority Air Quality Progress Reports, there have been none of the following new or newly identified developments:

- Narrow congested streets with residential properties close to the kerb;
- Busy streets where people may spend one hour or more close to traffic;
- Roads with a high flow of buses and/or HGVs;
- Junctions; or
- Bus or coach stations.

### 3.2 Other Transport Sources

Since the previous Local Authority Air Quality Progress reports, there have been none of the following new or newly identified developments:

- Airports;

- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m;
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m; or
- Ports for shipping.

### 3.3 Industrial Sources

Table 3.2 shows the newly identified developments which have been approved in 2016. The table includes details on the outcome of the decision with regards to impacts on air quality.

**Table 3.2 – Approved Planning Applications: Industrial Sources**

Local Authority	Source Type	Planning Application	Outcome
Isle of Anglesey County Council	New or proposed installations	Application for the erection of a replacement Alternative Emergency Control Centre and District Survey Laboratory facilities to support the Magnox Power Station. Includes installation of emergency generators, which will be tested periodically.	It is considered unlikely that these emergency generators will lead to exceedances of the Air Quality Objectives.
	Petrol Stations	Application for the demolition of a petrol station and the adjacent retail furniture unit, together with the erection of a new petrol filling station, replacement of underground fuel tanks together with the erection of three retail units and three storage units and alterations to the existing access at Herron Serivce, Ffordd Glanhwa Road, Llangefni.	Impacts associated with the application have been assessed and no significant impacts on air quality are predicted. Stage I and II vapour recovery will be included as part of the development.

Since the previous Local Authority Air Quality Progress Reports, there have been none of the following new or newly identified developments:

- Industrial installations: existing where emissions have increased substantially or relevant exposure introduced;
- Major fuel storage depots;

### 3.4 Commercial and Domestic Sources

Table 3.3 shows the newly identified developments which have been approved in 2016. The table includes details on the outcome of the decision with regards to impacts on air quality.

**Table 3.3 – Approved Planning Applications: Commercial and Domestic Sources**

Local Authority	Source Type	Planning Application	Outcome
Isle of Anglesey County Council	Combined Heat and Power (CHP) Plant	Application for a leisure village at Penrhos Coastal Park, London Road, Holyhead. Includes the use of Combined Heat and Power.	Separate chimney height assessments are required as part of the planning application.

Since the previous Local Authority Air Quality Progress Reports, there have been none of the following new or newly identified developments:

- Biomass combustion plant – individual installations;
- Areas where the combined impact of several biomass combustion sources may be relevant; or
- Areas where domestic solid fuel burning may be relevant.

### 3.5 New Developments with Fugitive or Uncontrolled Sources

Since the previous Local Authority Air Quality Progress Reports, there have been none of the following new developments:

- Landfill sites;
- Quarries;
- Unmade haulage roads on industrial sites;
- Waste transfer stations etc; or
- Other potential sources of fugitive particulate emissions.

The North Wales Combined Authority confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority areas.

The North Wales Combined Authority confirms that all the following have been considered:

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

## 4 Air Quality Planning Policies

There are no AQMAs declared in the North Wales Combined Authority. Therefore there are currently no active air quality action plans. As air quality is considered to be good within all six local authority areas, there have been no local policies specifically related to air quality developed. Nonetheless, air quality is considered in the wider context in several local policies including:

- The Isle of Anglesey County Council and Gwynedd Council have adopted a joint Local Development Plan which provides the land use strategy for the next 15 years. The plan addresses the need to maintain good air quality in the area and ensure new development does not cause adverse impacts.
- The Conwy Local Development Plan 2007-2022 includes strategic policies (NTE/1) to ensure natural resources, including air quality, are protected.
- The Denbighshire County Council Local Development Plan 2006-2021 was adopted in 2013 and includes a commitment to avoid reaching critical air quality levels. It acknowledges that assessments of the environmental impact of transport proposals will need to also include air pollution along with noise and ecological impacts.
- Flintshire County Council is currently preparing their Local Development Plan. However, in the interim their Unitary Development Plan for the 15 year period, from 2000 to 2015 remains adopted. The plan identifies sites where new housing, employment and other development can take place, as well as setting out policies to protect important countryside, habitats, resources and heritage. Specific to air quality, Policy STR1 addresses the need to minimise pollution to air, water and land when proposing new developments and STR7 highlights the need to safeguard the natural environment.
- Wrexham County Borough Council is currently preparing the Local Development Plan 2 2013 to 2028 which will replace the adopted Unitary Development Plan 1996 to 2011. The plan is a long-term land use and development strategy focused on achieving sustainable development. It will set out policies that will be used to decide planning applications and safeguard areas of land requiring protection including strategies to ensure the environment is protected from adverse effects of pollution.

## 5 Local Transport Plans and Strategies

North Wales Joint Local Transport Plan (LTP) (2015-2025) has been jointly produced by the six North Wales Local Authorities in response to the Welsh Government requirement for LTPs to be submitted by the end of January 2015. The plan preparation has been overseen by Taith as a Joint Committee of the local authorities for transport. The Plan is a statutory document for transport in the region.

A review of the Wales Transport Strategy Objectives, the Welsh Government targets for investment and the Regional Transport Plan priorities, together with the review of issues and opportunities led to the drafting of outcomes for the Local Transport Plan. The Local Transport Plan Outcomes that relate to bringing about air quality improvements includes:

- Connections to Key Destinations and Markets: Support for Economic Growth through an improvement in the efficiency, reliability, resilience, and connectivity of movement, including freight, within and between North Wales and other regions and countries (with a particular focus on accessibility to the Enterprise Zones and an improvement in the vitality and viability of towns and other key centres);
- Benefits and Minimised Impacts on the Environment: the potential for transport improvements to positively affect the local and global natural and built environment will have been maximised and negative impacts minimised, including adaptation to the effects of climate change.

A set of higher level interventions have been developed which together aim to deliver the vision and outcomes sought for the LTP:

- Transport network resilience improvements—Improvements to key county corridors to remove/ improve resilience problems
- Integration with strategic public transport services—Schemes to improve access to rail stations including road access and bus services and interchange facilities, support for park and ride, walking and cycling routes and facilities.
- Improved links to Employment—Schemes to provide improved access to Enterprise Zones (EZs), ports, employment sites and town centres.



## **North Wales Combined Authority**

- Access to services—Range of integrated transport measures to improve access to education, health, community, shopping and other services by public transport, walking and cycling as well as community transport, taxi, car share sites.
- Encouraging sustainable travel—Infrastructure improvements and promotional initiatives to increase levels of walking and cycling both for travel and for leisure as well as public transport. May include road and rail bridges/ crossings, cycle routes, footway/ footpath provision, safe routes to school, travel planning as well as road safety measures to assist vulnerable users

## **6 Conclusions and Proposed Actions**

### **6.1 Conclusions from New Monitoring Data**

Monitoring carried out in 2016 indicated that annual mean and hourly concentrations of NO<sub>2</sub> were below the relevant AQS objective for all but one monitoring location within the North Wales Combined Authority. The one diffusion tube location (DT1 in IACC) was situated at a kerbside site along the A55 and did not represent relevant exposure. Therefore an exceedance at this location was not deemed to be of concern.

The annual mean concentrations of PM<sub>10</sub>, PM<sub>2.5</sub> and C<sub>6</sub>H<sub>6</sub> and the 24-hour mean concentrations of PM<sub>10</sub> were below the relevant AQS objectives at all sites where monitoring was undertaken. Furthermore, the 15 minute, 1-hour and 24-hour mean concentrations of SO<sub>2</sub> were all also below the relevant AQS objectives.

### **6.2 Other Conclusions**

There were no local developments approved in 2016, in the North Wales Combined Authority, which are expected to cause an adverse air quality impact on the surrounding area. Therefore no newly identified or previously unconsidered sources of air pollution were introduced in 2016.

No detailed assessments are required as a result of exceedances of pollutant concentrations and no AQMAs need to be declared. As a result there are no air quality action plans in the North Wales Combined Authority. Nonetheless, wider policy documents discussed in Section 4 and 5 address air quality issues to ensure concentrations remain below the AQS objectives.

### **6.3 Proposed Actions**

The recommendations for the coming year are listed below:

- Proceed to the 2018 Updating and Screening Assessment;
- Maintain the air quality monitoring programmes in each local authority and ensure new monitoring sites are added as required.

## 7 References

- Department for Environment, Food and Rural Affairs (Defra) (2016) Local Air Quality Management Technical Guidance LAQM.TG(16).
- Department for Environment, Food and Rural Affairs (Defra) (2016) *Local Air Quality Management Policy Guidance LAQM.PG(16)*.
- Isle of Anglesey County Council (2016) *Annual Status Report*
- Conwy County Borough Council (2016) *Annual Status Report*
- Denbighshire County Council (2016) *Annual Status Report*
- Gwynedd Council (2016) *Annual Status Report*
- Flintshire County Council (2016) *Annual Status Report*
- Wrexham County Borough Council (2016) *Annual Status Report*
- National Diffusion Tube Bias Adjustment Spreadsheet, version 07/17 published in July 2017.
- <https://laqm.defra.gov.uk/assets/airptrounds7to18apr2015feb2017.pdf>
- <https://www.gwynedd.llyw.cymru/en/Council/Strategies-and-policies/Environment-and-planning/Planning-policy/Joint-Local-Development-Plan/Joint-Local-Development-Plan.aspx>
- Flintshire County Council Unitary Development Plan 2000-2015
- <http://www.flintshire.gov.uk/en/PDFFiles/Planning/LDP-evidence-base/Local/North-Wales-Joint-Local-Transport-Plan-2015.pdf>
- The Conwy Local Development Plan 2007-2022
- The Denbighshire County Council Local Development Plan 2006-2021
- Wrexham County Borough Council Unitary Development Plan 1996 to 2011

# Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

Appendix B: Complete Monitoring Results (2012-2016)

Appendix C: Full Monthly Diffusion Tube Results for 2016

## Appendix A: QA/QC Data

### Diffusion Tube Bias Adjustment Factors

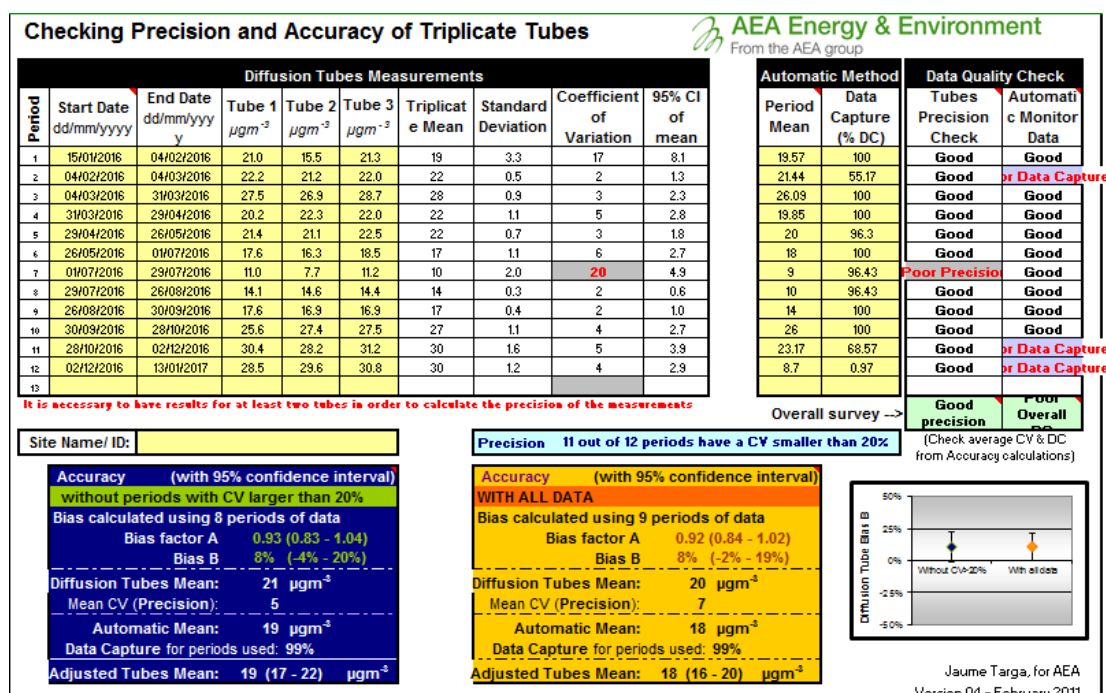
The diffusion tubes for CCBC, DCC, FCC, IACC and WCBC are supplied and analysed by Environmental Scientific Group (ESG) Didcot utilising the 50% triethanolamine (TEA) in acetone preparation method. The bias adjustment factor for 2016 is 0.78 (based on 38 studies, June 2017) as obtained from the national bias adjustment calculator.

The diffusion tubes for GC are supplied and analysed by Gradko utilising 20% TEA in water preparation method. The bias adjustment factor for 2016 is 0.92 (based on 27 studies, June 2017) as obtained from the national bias adjustment calculator.

### Factor from Local Co-location Studies

A co-location study was undertaken at one location within the North Wales Combined Authority. Three diffusion tubes were co-located at the Victoria Road AURN continuous monitoring station in WCBC. The data capture in 2016 was above 90% during 9 of the monitoring periods and the precision was good at 11 of the monitoring periods. A factor of 0.93 was produced from the study, which is present in Figure A.1.

Figure A.1 – Factor from Local Co-Location Study



## Discussion of Choice of Factor to Use

Data have been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentrations and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The technical guidance LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tubes. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data from NO<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

No co-location studies were carried out in CCBC, DCC, FCC, IACC and GC. Therefore the relevant national bias adjustment factor was used to adjust the diffusion tube data in 2016. The co-location study carried out in WCBC had good precision for 11 months and data capture of more than 90% for 9 months. However it was deemed appropriate to use the national bias adjustment factor, which was based on 38 studies and therefore considered to be more representative, to adjust the diffusion tube data in WCBC in 2016.

For previous year's data 2012 to 2015, the bias adjustment factors have been taken from the Council's previous LAQM annual reports. The factors used are as follows:

- IACC: 0.79 (2012), 0.81 (2013), 0.81 (2014) and 0.79 (2015);
- CCBC: 0.79 (2012), 0.80 (2013), 0.81 (2014) and 0.81 (2015);
- DCC: 0.79 (2012), 0.80 (2013), 0.81 (2014) and 0.79 (2015);
- FCC: 1.05 (2012), 0.81 (2013), 0.76 (2014) and 0.8 (2015);
- GC: 0.97 (2012), 0.95 (2013), 0.92 (2014) and 0.88 (2015); and
- WBCB: 0.8 (2012), 0.8 (2013), 0.81 (2014) and 0.81 (2015).

## PM Monitoring Adjustment

The particulate monitoring undertaken in WCBC was via use of daily gravimetric Partisols. These meet the European equivalence testing and therefore are not subject to any correction.

The Osiris instruments run by IACC have not been adjusted. The IACC have previously demonstrated that an adjustment factor of 1.3 would lead to a significant overestimation of the impact of coarse dust (e.g. quarry dust). Therefore it was deemed inappropriate to adjust the data gathered using the Osiris monitors as these instruments are normally monitoring for the coarse fractions e.g. quarry dust.

### **QA/QC of Automatic Monitoring**

The Victoria Road AURN automatic monitoring station in Wrexham County Borough Council is part of the Automatic Urban and Rural Network (AURN). The data ratification and station audit are carried out by Ricardo-AEA under contract with DEFRA and the Devolved Administrations.

The four PM<sub>10</sub> automatic monitoring stations in the Isle of Anglesey County Council are run by the local authority. Routine filter changes and air flow checks (600ml/min) on the Turnkey Osiris instruments are carried out normally on a quarterly basis. This is in addition to an annual service and calibration undertaken by Turnkey Instruments under the terms of the service contract. The data is downloaded electronically from each of the instruments approximately 2 to 3 times a week using a GSM modem. This enables the performance of the instrument to be monitored and enables problems to be rectified quickly and with minimum loss of data. The data is stored as 15-minute averages and is analysed using a dedicated software system (AirQ32). A visual data ratification process is employed, to safeguard against erroneous peaks etc., before any results are reported.

### **QA/QC of Diffusion Tube Monitoring**

ESG Didcot and Gradko are both UKAS accredited laboratories who participate in the in the new AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO<sub>2</sub> tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO<sub>2</sub> concentrations reported are of a high calibre. The labs follow the procedures set out in the Harmonisation Practical Guidance In the latest available AIR-PT results, AIR-PT AR 0012 (January to February 2016), AIR-PT AR013 (April to May 2016), AIR-PT AR015 (July to August 2016), AIR-PT AR016 (September to October 2016) and AIR-PT AR01 (October to November 2016).

ESG Didcot has scored 100% except AR013 and AR015 with 75%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of  $< \pm 2$ . 75% of all local Authority co-location studies in 2016 were rated as 'good' (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

Gradko has scored 100% on all results. The percentage score reflects the results deemed to be satisfactory based upon the z-score of  $< \pm 2$ . All local Authority co-location studies in 2016 were rated as 'good' (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

### **Fall-off with Distance Correction of Sites Exceeding and within 10% of the NO<sub>2</sub> Annual Mean Objective**

There was one diffusion tube location which exceeded the annual mean AQS objective for NO<sub>2</sub> (DT4 in IACC). There were a further two diffusion tube locations where the reported concentration was within 10% of the annual mean AQS objective for NO<sub>2</sub>. The two locations were Site 57 in FCC and DT1 in IACC. DT1 was at a kerbside location which did not represent exposure and therefore no adjustment was required for this site.

The two remaining locations required adjustment using the NO<sub>2</sub> fall-off with distance calculator to estimate the NO<sub>2</sub> concentration at the nearest location with relevant exposure. The exposure. The calculations are shown in



## **North Wales Combined Authority**

Figure A.2 and Figure A.3. It should be noted that DT4 was over 20m from a sensitive receptors and therefore the predicted concentration should be treated with caution.

Figure A.2 – Fall-off Distance Correction of DT4: Isle of Anglesey County Council

**Enter data into the red cells**

Step 1	How far from the KERB was your measurement made (in metres)?	3	metres
Step 2	How far from the KERB is your receptor (in metres)?	30	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	6.6	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	39.7	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	20.0	µg/m <sup>3</sup>

**Warning: your receptor is more than 20m further from the kerb than your monitor, treat result with caution**

Figure A.3 – Fall-off Distance Correction of Site 57: Flintshire Council

**Enter data into the red cells**

Step 1	How far from the KERB was your measurement made (in metres)?	1	metres
Step 2	How far from the KERB is your receptor (in metres)?	2	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	9.6	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	39.7	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	35.5	µg/m <sup>3</sup>

### Short-term to Long-term Data Adjustment

Data capture at all sites which recorded less than 75% data capture during 2016 has been annualised according to the method set out in Boxes 7.9 and 7.10 of LAQM.TG16. The details of the annualisation have been provided in Table A.1 to Table A.3.

It should be noted that the background automatic stations used for annualisation of the PM<sub>10</sub> and PM<sub>2.5</sub> data were over 80km from the monitoring locations. Therefore, the annualised results should be treated with caution as the background locations

## North Wales Combined Authority

may not necessarily be representative of the conditions at the monitoring sites in Anglesey.

**Table A.1 – Short-Term to Long-Term Monitoring NO<sub>2</sub> Adjustment: Non-Automatic Stations**

Site	Uncorrected Diffusion Tube Mean (µg/m <sup>3</sup> )	Annualisation Factor					Annualised Data Average (µg/m <sup>3</sup> )	Annualised Bias Adjusted Concentration (µg/m <sup>3</sup> )
		Glazebury	Stoke-on-Trent	Aston Hill	Wirral Tranmere	Average		
<b>Isle of Anglesey County Council</b>								
DT2	30.1	1.026	1.000	0.909	1.113	1.012	30.5	28.0
DT3	12.2	0.977	1.000	1.103	0.917	0.999	12.2	11.2
<b>Gwynedd Council</b>								
GCC 003	11.9	0.946	0.955	0.853	1.083	0.959	11.4	10.5
GCC 037	26.3	0.976	0.989	1.206	1.042	1.053	27.7	25.5
<b>Flintshire Council</b>								
Site5/9/10	39.7	1.094	1.039	1.016	1.144	1.073	42.6	33.2
Site 58	31.5	0.977	1.000	1.103	0.917	0.999	31.4	24.5
<b>Wrexham County Borough Council</b>								
WBC-047	29.4	0.904	0.956	0.984	0.867	0.928	27.2	25.3

**Table A.2 – Short-Term to Long-Term Monitoring PM<sub>10</sub> Adjustment**

Site	Uncorrected Mean (µg/m <sup>3</sup> )	Annual Mean/Period Mean (µg/m <sup>3</sup> )			Average Ratio	Corrected Mean
		Salford Eccles	Sheffield Devonshire Green	Chesterfield Loundsley Green		
<b>Isle of Anglesey County Council</b>						
CM2	8.1	17.3/17.4	17.6/17.2	14.7/14.6	1.01	8.1
CM4	9.0	17.3/16.6	17.6/16.9	14.7/15.1	1.02	9.1

**Table A.3 – Short-Term to Long-Term Monitoring PM<sub>2.5</sub> Adjustment**

Site	Uncorrected Mean (µg/m <sup>3</sup> )	Annual Mean/Period Mean (µg/m <sup>3</sup> )			Average Ratio	Corrected Mean
		Salford Eccles	Wirral Tranmere	Stoke-on-Trent		
<b>Isle of Anglesey County Council</b>						
CM2	3.9	10.5/10.3	7.9/7.5	11.7/11/1	1.04	4.0
CM4	5.3	10.5/10.0	7.9/7.5	11.7/12/2	1.02	5.4

## Appendix B: Complete Monitoring Results (2012 – 2016)

Table B.1 – Results of NO<sub>2</sub> Diffusion Tubes (2012 to 2016): Isle of Anglesey

ID	Type	Within AQMA?	Annual Mean Concentration (µg/m <sup>3</sup> ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.81)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.79)	2016 (Bias Adjustment Factor = 0.78)
DT1	Kerbside	N	42.1	44.3	38.7	38.1	39.7
DT2	Kerbside	N	-	-	21.1	21.3	23.5
DT3	Roadside	N	-	-	-	-	9.5
DT4	Roadside	N	-	-	-	-	45.2
DT5	Roadside	N	-	-	-	-	9.8
DT6	Roadside	N	-	-	-	-	11.3
DT7	Kerbside	N	-	-	-	-	15.3
DT8	Roadside	N	-	-	-	-	9.9
DT9	Roadside	N	-	-	-	-	9.5
DT10	Roadside	N	-	-	-	-	7
DT11	Roadside	N	-	-	-	-	10.2
DT12	Roadside	N	-	-	-	-	9
DT13	Roadside	N	-	-	-	-	6.7
DT14	Roadside	N	-	-	-	-	12.7
DT15	Roadside	N	-	-	-	-	11.2

Table B.2 – Results of NO<sub>2</sub> Diffusion Tubes (2012 to 2016): Conwy Borough Council

ID	Type	Within AQMA?	Annual Mean Concentration (µg/m <sup>3</sup> ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.8)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.78)
CBC-001	Roadside	N	19.7	19.4	17.5	17.3	19.3
CBC-034	Roadside	N	-	-	-	-	21.1

ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.8)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.78)
CBC-004	Urban Background	N	10.3	10.6	8.8	8.7	10.3
CBC-016	Urban Background	N	9.7	10.3	9	8.6	9.1
CBC-017	Roadside	N	20.3	19.6	18.1	19.1	19.0
CBC-018	Roadside	N	23	21.8	19.4	22.6	20.9
CBC-026	Roadside	N	30.2	28	27.4	25.2	27.8
CBC-025	Roadside	N	17.5	16.9	15.4	16.3	15.6
CBC-031	Roadside	N	-	-	-	20.8	21.0
CBC-032	Roadside	N	-	-	-	17.4	18.9
CBC-021	Roadside	N	17.4	16.2	15.2	16.8	17.7
CBC-022	Roadside	N	19.8	19.9	18.9	19.3	20.7
CBC-033	Roadside	N	18.7	17.1	16.8	15.5	13.8
CBC-027	Roadside	N	15.2	15.6	13.3	14.3	14.7
CBC-029	Roadside	N	-	-	12.7	11.7	11.2

Table B.3 – Results of NO<sub>2</sub> Diffusion Tubes (2012 to 2016): Denbighshire County Council

ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.8)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.79)	2016 (Bias Adjustment Factor = 0.78)
DBK1	Roadside	N	25.3	25.9	25.8	23.1	23.5
DBR2	Roadside	N	27.9	29.3	29.1	26.7	26.4
DBB3	Suburban	N	10.9	10.4	9.8	9.3	9.8
DBB4	Suburban	N	11.1	11.9	10.5	9.9	10.3
DBR5	Suburban	N	16.1	15.3	14	14.0	15.5
DBR48	Roadside	N	28.8	29.3	25.1	25.7	26.7

ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.79)	2013 (Bias Adjustment Factor = 0.8)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.79)	2016 (Bias Adjustment Factor = 0.78)
DBR23	Roadside	N	18.9	19.5	17.3	17.2	18.6
DBR8	Suburban	N	17.1	16.9	15.1	14.7	15.5
DBR9	Suburban	N	23.6	21.3	21.8	21.2	21.1
DBR10	Suburban	N	16.8	16.2	16.4	14.5	16.1
DBR24	Roadside	N	34.4	34.1	32.6	32.5	33.1
DBR20	Roadside	N	24.4	24	21.3	21.2	19.8
DBR43	Roadside	N	37.7	36.7	31.9	32.8	29.1
DBR44	Roadside	N	28.5	28.8	25.9	24.2	25.0
DBR45	Roadside	N	25.7	24.9	23	21.6	23.3
DBR37	Roadside	N	29.9	29.4	28.5	28.0	26.6
DBR38	Roadside	N	21	19.9	17.9	16.5	16.8
DBR31	Kerbside	N	20.1	19.6	18	17.0	18.9
DBR32	Roadside	N	20.9	20.9	19.1	18.5	18.9
DBR33	Roadside	N	27.3	25.7	22.1	29.0	28.2
DBR34	Kerbside	N	16.9	15.8	14.7	13.6	15.2
DBR49	Roadside	N	-	18.8	16.7	16.0	17.1
DBR50	Roadside	N	-	18.5	16.5	16.4	16.0
DBR52	Roadside	N	-	30.5	30.3	21.7	24.1
DBR53	Roadside	N	-	31.7	30.7	28.2	31.2
DBR54	Roadside	N	-	-	16.1	13.2	13.7

Table B.4 – Results of NO<sub>2</sub> Diffusion Tubes (2012 to 2016): Flintshire Council

ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 1.05)	2013 (Bias Adjustment Factor = 0.81)	2014 (Bias Adjustment Factor = 0.76)	2015 (Bias Adjustment Factor = 0.8)	2016 (Bias Adjustment Factor = 0.78)
Site 1	Kerbside	N	37.8	30.3	25.4	21.1	25.6

North Wales Combined Authority

ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 1.05)	2013 (Bias Adjustment Factor = 0.81)	2014 (Bias Adjustment Factor = 0.76)	2015 (Bias Adjustment Factor = 0.8)	2016 (Bias Adjustment Factor = 0.78)
Site 2	Urban	N	25.7	20.4	20.8	17.4	20.6
Site 3	Kerbside	N	<b>48.3</b>	32.9	30.2	26.3	33.7
Site 4	Urban Background	N	21.2	16.7	14.1	15.9	18
Site 5/9/10	Kerbside	N	-	33.7	29.8	31.2	33.2
Site 6	Rural Background	N	15.9	11	14.6	9.3	14
Site 7	Kerbside	N	21	16.4	14.7	14.9	15
Site 8	Urban background	N	20.2	16.4	13.8	12.9	14.5
Site 11/47	Kerbside	N	<b>44.9</b>	31.8	31.5	32.9	35.6
Site 12/13	Kerbside	N	<b>45.7</b>	35.1	33.4	35.4	34
Site 14	Rural Background	N	11.9	10	8.7	8.6	12.7
Site 15	Kerbside	N	-	28.9 <sup>a</sup>	27.3	27.9	27.9
Site 16	Urban	N	37.5	28.9	26.8	26.2	26.7
Site 17	Kerbside	N	33.3	27.1	23.9	24.8	29.2
Site 18	Urban Background	N	19.6	15.5	12.1	11.5	14.5
Site 19	Kerbside	N	31.3	23.2	22.1	20.7	25
Site 20	Kerbside	N	31.2	24	21.5	20.7	23.4
Site 21	Urban Background	N	19.9	15.3	13.7	13	15.2
Site 22	Rural Background	N	32.6	20.8	19.4	18.7	18.6
Site 23	Kerbside	N	39.8	28.1	21.8	21.4	24.4
Site 24/51	Kerbside	N	<b>45.9</b>	37.4	34.9	34.9	31.4
Site 25	Industrial	N	25.2	19	16.9	18.1	21.3
Site 26	Industrial	N	20.5	16.5	14.5	15	16.3

North Wales Combined Authority

ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 1.05)	2013 (Bias Adjustment Factor = 0.81)	2014 (Bias Adjustment Factor = 0.76)	2015 (Bias Adjustment Factor = 0.8)	2016 (Bias Adjustment Factor = 0.78)
Site 27	Urban Background	N	30.4	24.3	21.8	21.7	21.3
Site 28	Industrial	N	24.6	18.5 <sup>a</sup>	15.7	17.4	15.5
Site 29	Industrial	N	23.6	19	17.6	15.8	18
Site 30	Kerbside	N	<b>40.1</b>	30.7	25	23.2	24.9
Site 31	Kerbside	N	20.5	23.1	22.2	20.3	23.6
Site 32	Kerbside	N	27.7	22.6	19.9	24.6	20.2
Site 33	Kerbside	N	34.7	27.1	23.1	25.1	26.9
Site 34	Kerbside	N	29.9	23	23.5	24.7	25.3
Site 35	Kerbside	N	26.4	19	17.5	18.3	21
Site 36	Kerbside	N	31.9	23.6	22	21.5	23.2
Site 37	Kerbside	N	34.5	27.4	25.3	26.2	26.3
Site 38	Urban	N	24.2	18.7	16.6	16.8	19.1
Site 39	Kerbside	N	24.6	19.4	16.7	15.9	17.2
Site 40	Kerbside	N	21.5	16.9	14.9	15.7	16.8
Site 41	Kerbside	N	14.5	11.8	10.6	9.9	12
Site 42	Kerbside	N	17	13.4	11.9	10.6	12.3
Site 43	Urban Background	N	11.4	9.9	8.6	9.3	9.2
Site 44	Urban Background	N	32.5	28.1	24.7	25.6	25.5
Site 45	Kerbside	N	23.2	18.3	17.5	16.1	17.8
Site 46	Urban Background	N	18.6	15.1	11.6	12.5	12.7
Site 48	Kerbside	N	28	22	18.1	23	36.6
Site 49	Kerbside	N	25.6	19.4	19.3	17.8	18.8
Site 50	Kerbside	N	21	17.6	14.3	15.1	16.9
Site 52	Kerbside	N	23.2	18.1	17.2	15.1	16.6



ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 1.05)	2013 (Bias Adjustment Factor = 0.81)	2014 (Bias Adjustment Factor = 0.76)	2015 (Bias Adjustment Factor = 0.8)	2016 (Bias Adjustment Factor = 0.78)
Site 53	Kerbside	N	34.1	23.6	24.2	25.3	26.7
Site 54	Kerbside	N	-	-	-	10.5	13.2
Site 55	Kerbside	N	-	-	-	10.5	13
Site 56	Kerbside	N	-	-	-	12.7	13.2
Site 57	Kerbside	N	<b>50.8</b>	<b>40</b>	34.8	35.9	37.8
Site 58		N	-	-	-	-	24.5

Results in bold exceed the annual mean NO<sub>2</sub> AQS objective of 40 $\mu\text{g}/\text{m}^3$

**Table B.5 – Results of NO<sub>2</sub> Diffusion Tubes (2012 to 2016): Gwynedd Council**

ID	Type	Within AQMA?	Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.8)	2013 (Bias Adjustment Factor = 0.8)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.78)
GCC 002	Kerbside	N	40.4 (22.9)	33.9	34.3	31.1	31.4
GCC 003	Urban Background	N	12.5	11.6	12.6	11.3	10.5
GCC 005	Kerbside	N	34.2	32.0	33.0	29.6	27.6
GCC 008	Kerbside	N	30.4	26.6	25.6	23.4	22.8
GCC 011	Kerbside	N	25.7	24.4	23.7	21.8	23.8
GCC 012	Kerbside	N	36.2	28.1	27.5	25.3	26.9
GCC 013	Kerbside	N	22.9	20.7	21.0	19.6	21.9
GCC 015	Roadside	N	27.1	24.2	23.9	21.4	24.8
GCC 037	Kerbside	N	31.5	31.1	31.5	27.1	25.5
GCC 038	Roadside	N	38.0	28.3	29.9	27.5	28.6
GCC 039	Roadside	N	36.2	26.5	28.0	27.7	28.4
GCC 040	Kerbside	N	25.8	29.1	19.6	18.9	19.1

\*Value in brackets is distance corrected for nearest relevant exposure.

Table B.6 – Results of NO<sub>2</sub> Diffusion Tubes (2012 to 2016): Wrexham County Borough Council

ID	Type	Within AQMA?	Annual Mean Concentration (µg/m <sup>3</sup> ) - Adjusted for Bias				
			2012 (Bias Adjustment Factor = 0.8)	2013 (Bias Adjustment Factor = 0.8)	2014 (Bias Adjustment Factor = 0.81)	2015 (Bias Adjustment Factor = 0.81)	2016 (Bias Adjustment Factor = 0.78)
WBC-001	Roadside	N	29.9	19.8	17.9	18.4	27.8
WBC-010	Suburban	N	15.9	13.6	13.1	12.2	13.2
WBC-015	Roadside	N	18.8	18.7	15.8	15.7	16.4
WBC-018	Roadside	N	19.5	18.5	18.8	17	16.9
WBC-019	Roadside	N	23.7	22.3	21.6	20.1	21.4
WBC-020	Intermediate	N	27.2	26.3	25.6	24.2	25.5
WBC-021	Roadside	N	21.2	19.6	22.3	18.8	19.9
WBC-022	Intermediate	N	16.7	16.8	17.3	16.4	16.3
WBC-030	Roadside	N	29.2	36.5	39.9	36.9	35.8
WBC-031	Roadside	N	<b>40.9</b>	33.7	33.9	37.5	35.9
WBC-032	Roadside	N	37.9	28.1	27.6	25.7	29.1
WBC-033	Roadside	N	23	20.9	20.2	17.8	19.2
WBC-034	Roadside	N	13.8	16.5	15.2	14.5	14.6
WBC-036	Roadside	N	24.2	22.5	21.6	19.6	20.0
WBC-037	Roadside	N	24.6	23	21.7	24.3	22.3
WBC-039	Roadside	N	-	-	-	-	19.7
WBC-040	Roadside	N	9.9	14.6	13.3	11.4	11.9
WBC-041	Roadside	N	15.0	15.5	16.5	14.3	15.2
WBC-042	Roadside	N	-	25.9	23	24.6	25.6
WBC-043	Roadside	N	-	-	25.6	19.1	17.9
WBC-044	Roadside	N	-	-	-	22.7	23.6
WBC-045	Roadside	N	-	-	-	18.8	19.8
WBC-046	Roadside	N	-	-	-	22.4	24.1
WBC-047	Roadside	N	-	-	-	-	21.2
AURN	Roadside	N	18.8	22.6	17.2	15.6	16.7

## Appendix C: Full Monthly Diffusion Tube Results for 2016

Table C.1- Full Monthly Diffusion Tube Results for 2016: Isle of Anglesey County Council

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	DT1	53.1	56.9	45.3	54.6	50.1	50	44.7	51.5	41.2	56.8	54.7	52	50.9
DT2	29.2	36.7	27.6	31.2	31.8	24.1	-	-	-	-	-	-	30.1	23.5
DT3	-	-	-	-	-	-	8.6	7.6	9.6	18.8	17.8	10.7	12.2	9.5
DT4	-	62.9	54.8	52.8	49.8	54.5	56.2	65.5	58.1	56.5	60.6	65.1	57.9	<b>45.2</b>
DT5	-	13.3	12.8	13.3	12.0	8.1	-	11.1	12.8	13.3	14.6	13.8	12.5	9.8
DT6	-	15.3	17.4	14.1	12.9	11.6	11.9	13.9	14.2	17.6	14.2	15.7	14.4	11.3
DT7	-	18.2	24.4	22.2	21.9	22.5	17.8	21.7	19.2	19.5	9.3	19.1	19.6	15.3
DT8	-	13.4	15.8	13.5	13.5	11.6	8.0	10.7	10.9	14.7	15.7	11.7	12.7	9.9
DT9	-	10.0	16.4	12.8	11.2	12.0	11.1	12.8	11.2	12.4	13.1	10.5	12.1	9.5
DT10	-	7.4	12.6	9.6	8.6	6.7	7.0	7.4	8.9	11.8	10.7	8.6	9.0	7.0
DT11	-	13.1	16.4	12.7	15.5	12.3	10.0	12.3	12.7	11.00	13.5	14.4	13.1	10.2
DT12	-	11.7	15.6	12.2	11.8	9.7	8.5	9.5	10.2	15.4	12.6	9.4	11.5	9.0
DT13	-	6.0	12.5	8.8	10.1	5.3	5.0	7.3	8.3	13.2	10.4	7.9	8.6	6.7
DT14	-	17.0	18.3	17.3	18.6	13.3	9.6	12.8	14.4	22.1	18.2	17.2	16.3	12.7
DT15	-	15.3	17.5	16.8	15.8	-	8.9	11.7	12.8	16.0	16.0	12.2	14.3	11.2

Results in bold exceed the annual mean NO<sub>2</sub> AQS objective of 40µg/m<sup>3</sup>

Table C.2- Full Monthly Diffusion Tube Results for 2016: Conwy County Borough Council

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	CBC-001	22.2	21.7	28.7	25.2	31.1	24.7	11.8	17.2	21.5	30.8	34.3		
CBC-034	-	-	27.5	22.3	23.9	26.9	19.4	24.5	29.3	27.3	36.4	32.9	27.0	21.1
CBC-004	11.7	12.3	16	10.9	17.6	10.4	5.8	8.1	9	18.5	20.6	16.8	13.1	10.3
CBC-016	8.4	12.2	14	11.8	11.1	9.4	7.7	7.2	9.2	14	18.2	16.4	11.6	9.1
CBC-017	16.8	21	23.7	23.8	26.7	27.7	12.7	18.5	21.9	35.1	35.1	30	24.4	19.0
CBC-018	23.6	27.7	23.5	26.8	26.2	23	25.1	26.4	30.4	25.5	34.1	29.8	26.8	20.9
CBC-026	29.8	33.9	36.8	36.4	42.4	32.6	24.1	25.4	35.9	46.7	42.4	41.1	35.6	27.8
CBC-025	23.2	19.9	20.3	20.9	20.6	16.5	17	17.6	19.7	21.5	20.9	22.6	20.1	15.6
CBC-031	24.3	19.5	30.8	27.9	27.9	22.7	21.6	21.9	28.3	29.5	35.4	33.5	26.9	21.0
CBC-032	19.4	22.8	28.7	24.4	26.5	24.2	16.3	19	22.1	27.5	32.1	28.5	24.3	18.9
CBC-021	18.5	18.2	24.8	22.7	28.5	25.8	18.1	22.5	22.6	21.9	26.6	22.1	22.7	17.7
CBC-022	22.3	22.4	30.9	25.4	27.6	26.2	20.8	21.3	26.6	25.8	36.6	31.9	26.5	20.7
CBC-033	14.3	14.8	22.1	16.1	21.7	16.1	8.6	11.1	14.1	25.5	26.3	22.2	17.7	13.8
CBC-027	17.7	19.3	21.8	16.2	19.3	16.3	14.9	14.4	17.6	27.6	13.3	28.3	18.9	14.7
CBC-029	11.6	16.8	16.6	11.1	20.5	12.8	10.9	12.4	16.5	-	-	-	14.4	11.2

Table C.3- Full Monthly Diffusion Tube Results for 2016: Denbighshire County Council

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	DBK1	21.5	29.5	33.4	28.1	24	30.4	21.7	26.8	27.5	41.5	37.2		
DBR2	30.4	35.7	38.2	31.1	32.5	29.2	27.7	29.2	30.7	39.9	41.9	39.3	33.8	26.4
DBB3	12.2	15.1	14.6	12.5	10.5	7.6	6.6	8.1	9.4	16.4	19.4	18.1	12.5	9.8
DBB4	14.4	15.2	14.6	14.8	10.7	8	7.1	8.4	9	19.6	20.9	15.9	13.2	10.3

North Wales Combined Authority

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	DBR5	15.2	23.3	25	23.2	21.1	20.9	14.1	16.9	14.1	20.7	26.3	18.4	19.9
DBR48	31.2	42	40.8	44.8	37.3	30.2	19.9	24.2	27.5	-	44.3	34.9	34.3	26.7
DBR23	21	29	25.4	25.9	20.7	19.8	16.2	16.7	18.8	24.7	35	32.7	23.8	18.6
DBR8	19.2	24.2	23.6	21.6	18.9	15.8	14.3	13.5	17	20.7	27.6	21.7	19.8	15.5
DBR9	29.3	32.2	31.9	29.4	25.9	19.5	18.8	19.9	26.1	29.5	34.6	28	27.1	21.1
DBR10	20.3	23.6	23.5	20	18.2	13.6	11.8	15.9	17.4	25.8	27.8	29.9	20.7	16.1
DBR24	42.5	47.2	51.3	46.3	44	39.4	33.6	33	33.3	41	55	-	42.4	33.1
DBR54	17.5	20.4	22.2	19.9	16.2	12.9	16.7	12.2	13.8	18.3	-	23.7	17.6	13.7
DBR20	15.7	27.6	27.5	30.4	30.2	24.4	20.8	20.7	23.7	31.8	18.9	33	25.4	19.8
DBR43	-	11.4	51.2	46.4	42.5	37.9	35.1	33.3	36	37.8	29.9	48.2	37.2	29.1
DBR44	-	39.2	34.5	37.9	35.8	27.3	25.6	24.3	27.6	34.5	24.5	41.2	32.0	25.0
DBR45	27.7	33	34.3	32.5	32	27.7	21.4	23	28.7	36.4	22	39.8	29.9	23.3
DBR37	32.4	42.5	43.4	42.5	37.7	39.8	26.2	28.2	28.6	36	23.1	29.3	34.1	26.6
DBR38	23.6	24.4	24.6	22.2	22.4	18.8	17.7	19.2	20.3	26.3	14.8	23.7	21.5	16.8
DBR52	30.7	31.7	32.8	36	32.3	27.3	21	22.4	26	33.3	38.8	39.2	31.0	24.1
DBR53	41.6	49	46.7	-	35.1	37.2	30.2	29.4	34.9	37.1	51.4	47	40.0	31.2
DBR31	25.1	28.4	28.4	23.3	23.5	17.9	15.2	14.3	18.9	28.6	35.4	32.5	24.3	18.9
DBR32	24.3	30	28	28.7	23.9	21.4	16.6	17.6	19.5	22.9	32.3	25.9	24.3	18.9
DBR33	39.2	40.1	36.5	39	32.4	25.8	24.8	-	32.6	39.4	38.5	49	36.1	28.2
DBR34	20.4	20.6	19.7	20.1	18.9	14.5	10.7	12.5	16.7	22	29	28.3	19.5	15.2
DBR49	19.5	21.9	26.3	24.3	22.6	19.9	14.5	16.2	19.2	27.2	26.4	25.7	22.0	17.1
DBR50	18.6	25	28	6.1	21.8	19.5	12.8	16.5	16.4	25.8	31	25.3	20.6	16.0

Table C.4- Full Monthly Diffusion Tube Results for 2016: Gwynedd Council

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	GCC 002	11.8	29.5	37.1	35.9	38.2	31.0	34.0	35.6	38.6	39.2	44.6		
GCC 003	9.5	13.7	13.9	10.8	11.5	-	-	-	-	-	-	-	11.9	10.9
GCC 005	11.3	26.9	30.1	25.9	45.4	29.6	29.0	32.0	35.0	-	35.4	29.5	30.0	27.6
GCC 008	11.9	26.7	26.3	24.9	28.9	18.0	18.0	20.1	27.5	28.1	37.0	30.5	24.8	22.8
GCC 011	15.9	-	25.0	21.6	-	25.1	25.3	19.8	35.5	36.0	-	29.2	25.9	23.8
GCC 012	14.5	27.4	29.6	28.6	35.8	25.6	21.9	26.6	32.7	39.9	37.6	30.5	29.2	26.9
GCC 013	11.6	22.4	22.5	21.4	28.0	21.0	20.2	21.9	32.1	28.0	33.3	23.4	23.8	21.9
GCC 015	14.0	22.5	24.4	19.1	28.3	24.5	26.6	28.1	43.4	33.9	31.4	27.1	26.9	24.8
GCC 037	9.7	30.8	-	23.9	-	0.5	27.5	27.6	-	-	38.3	-	26.3	24.2
GCC 038	17.7	30.3	28.1	29.6	36.0	26.4	-	-	31.9	41.5	38.6	-	31.1	28.6
GCC 039	16.1	26.9	31.1	30.0	43.6	26.0	-	30.1	34.2	40.1	-	-	30.9	28.4
GCC 040	10.8	22.3	21.3	21.1	18.9	19.2	21.4	19.7	23.5	20.9	25.8	24.8	20.8	19.1

\*Unusually low value assumed to be error/fault with tube. Omitted when calculating mean.

Table C.5- Full Monthly Diffusion Tube Results for 2016: Flintshire Council

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	Site 1	31.1	28.7	41	30	36	34.5	19	20.7	27.1	40.7	44.1		
Site 2	29.7	28.3	27.5	26.1	25.4	18.8	15.1	17.7	-	33.8	33	35.7	26.5	20.6
Site 3	45.6	54.4	-	37.6	38	-	20.9	-	31.3	53	54.1	54.4	43.3	33.7
Site 4	19.4	36.3	26.3	21.9	19.5	19.1	14.8	15.5	16.5	26.9	32.2	27.8	23.0	18.0
Site 5/9/10	38.5	29.0	49.6	41.1	47.6	41.1	30.9	-	-	-	-	-	39.7	31.0
Site 6	13.8	44.1	-	16.3	14.9	13.8	5.9	-	11.5	20.4	19	19.3	17.9	14.0

North Wales Combined Authority

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	Site 7	19.5	12.8	21.9	18.4	20.6	16.6	11.6	13.3	17.5	26.7	27.8	24.7	19.3
Site 8	18.6	20.4	21.6	20.1	18.9	14.7	9.1	10.9	13.7	24.8	25.7	23.9	18.5	14.5
Site 11/47	40.3	50.9	55.9	53.7	47.4	45.4	37.2	38.1	36.7	50.7	44.3	47.1	45.6	35.6
Site 12/13	44.7	39.6	50.6	40.2	43.2	35.3	39.4	34.6	38.7	48.3	55.6	53.9	43.7	34.0
Site 14	12.5	48.8	15.8	12	13.3	10.7	-	6.5	6.9	18.4	18	16.8	16.3	12.7
Site 15	33.6	13.4	41.5	38.7	39.4	-	-	-	28.2	36.1	46	44.6	35.7	27.9
Site 16	36.4	44.5	39.6	35.4	32.2	29.7	24.8	24.1	29.2	36	39.9	39.4	34.3	26.7
Site 17	31.7	40.7	33.1	38	38.8	33.9	-	-	-	41.2	44.1	35.5	37.4	29.2
Site 18	19.5	33	20.9	16.5	18.2	10.7	4.9	9.6	-	25.3	20.6	25.2	18.6	14.5
Site 19	25	21.7	81.4	28.8	29.9	27	18.8	17.7	26.1	36.6	38	33.1	32.0	25.0
Site 20	30.8	32.4	37.5	32	31.7	27.9	18.7	23.4	22.9	33.9	36.9	31.6	30.0	23.4
Site 21	18.4	37.2	20.5	16.4	15.8	13.6	9.4	10.3	14.8	23.4	25.1	28.7	19.5	15.2
Site 22	30.7	18.7	26.6	24	24.7	11.8	14.3	17.4	18.6	32.3	33.8	32.9	23.8	18.6
Site 23	-	26.8	35	30.6	33.7	25.4	24	20.8	-	36.4	40.3	39.8	31.3	24.4
Site 24/51	48.9	39.7	45.8	37.4	41.5	38.6	32.3	33.4	39.6	41.3	-	51.1	40.3	31.4
Site 25	26.8	51.6	28.6	24.5	26.3	18.6	13.7	16.1	20.2	29.9	38.3	32.7	27.3	21.3
Site 26	26	30.5	22.4	18.7	18.3	13	8.3	12.1	14	28.7	29.6	29.1	20.9	16.3
Site 27	30.5	24.7	-	23	26.7	24.6	18.4	21.1	26.1	38.9	39.2	27.7	27.4	21.3
Site 28	25.1	19.4	20	17	16.2	12.1	10.6	11.7	18.9	23.2	26.7	37.7	19.9	15.5
Site 29	25.1	22.7	25.3	23.3	21.6	16.6	11.6	15.1	19	27.9	35.3	33.4	23.1	18.0
Site 30	26.3	25.2	37.8	34.7	34.2	29.6	23.7	22.9	27.8	40	43.7	37.3	31.9	24.9
Site 31	29.9	38.7	30	27.3	27	23.7	19.1	22.8	25.8	39.2	42.1	37.2	30.2	23.6
Site 32	19.4	34.2	27.3	25.1	23.9	24.2	18.3	19.6	22.2	31	35	30.7	25.9	20.2
Site 33	38	26.7	39.4	33.7	35.6	28.9	24.5	24.9	29.9	42.2	47.4	42.8	34.5	26.9
Site 34	29.4	43.8	34.2	28.1	36.7	27.8	24.7	23.4	28.4	35.7	39.6	37.1	32.4	25.3
Site 35	25.2	36.7	31.5	27.5	27	22.7	16.6	16.6	23.4	24	38	33.6	26.9	21.0

North Wales Combined Authority

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
	Site 36	29.8	32.7	35.1	32.1	25.3	24.5	19.1	21.4	24.8	38.8	34.8	38.8	29.8
Site 37	56.3	33.1	37.7	35.3	31.7	29.5	20.2	21.4	26.3	36.9	40.8	35.9	33.8	26.3
Site 38	35.1	37.7	22.2	20.6	22.4	17.3	11.5	13.9	19.8	28.8	32.1	32.3	24.5	19.1
Site 39	25.7	28.2	25	24.9	25.4	21.5	12.2	12.5	15	24.2	28.1	22.2	22.1	17.2
Site 40	19.6	28.8	25.9	23.6	23.1	16.5	11.2	12.5	17.8	-	31.7	26.7	21.6	16.8
Site 41	14.3	26.6	17.3	14.5	15.7	12.1	7.2	8.2	10.9	19.2	23.3	15.2	15.4	12.0
Site 42	14.9	16.5	18.2	20.2	12.6	15.5	6.7	8.3	12.2	20.6	23.9	20.2	15.8	12.3
Site 43	12.5	19	11.9	11.2	9.7	7.9	4.1	6.5	8.3	16.7	17.4	17.1	11.9	9.2
Site 44	-	13.5	34.5	39.1	35.2	33.1	25.5	27.5	28.8	42.2	47.6		32.7	25.5
Site 45	26.1	27.4	24.9	21	23.9	16.9	12.8	15.1	19.1	26.4	31	29.6	22.9	17.8
Site 46	14.7	20.3	23.5	23	2.5	-	0.9	9.8	12.7	24.3	2	45.1	16.3	12.7
Site 48	24.9	33.6	32.6	7.8	-	8.4	-	17.6	19.4	31.4	35.6	29.2	24.1	18.8
Site 49	26	29.1	28.1	18.8	22.2	18	13.9	15.1	17.5	28.3	-	-	21.7	16.9
Site 50	-	22.4	22.9	24.5	25.2	22.3	8.4	12.6	17.2	29.6	29.3	24	21.7	16.9
Site 52	45	51.9	48.1	39.4	36.1	36.6	33.4	33.4	41.4	45.1	-	51.1	42.0	32.7
Site 53	23.1	25	22.5	20.2	20	16.9	14	14.5	15.8	26.4	30.2	26.9	21.3	16.6
Site 54	37	40.6	36.1	34.7	34.5	30.7	25.3	25.9	26.3	33.7	47.2	38	34.2	26.7
Site 55	16.6	19.1	15.1	15.5	13.7	12.1	-	-	11	23	22.5	21.1	17.0	13.2
Site 56	15.4	20.1	18.9	15.3	12.4	-	-	8.1	10.7	19	22.4	24.2	16.7	13.0
Site 57	17.1	23.7	18.5	-	17	17.3	9.2	9.7	16.1	23.3	-	-	16.9	13.2
Site 58	-	-	-	-	-	-	30.9	20.2	25.2	40.0	34.2	38.3	31.5	24.5



Table C.6- Full Monthly Diffusion Tube Results for 2016: Wrexham County Borough Council

ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )													Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted	
	WBC-001	33.8	41.1	38.6	38.4	38.2	32.7	18.3	25.1	30.1	37.3	50.9			43.6
WBC-010	23.0	23.2	2.3	29.2	12.5	12	13.1	14.4	11.1	16.6	23.4	22.3	16.9	13.2	
WBC-015	20.1	22.2	26.1	19.6	19.2	17.3	12.4	14.4	14.8	30.0	28.5	28.0	21.1	16.4	
WBC-018	22.2	24.1	23.4	17.3	21.9	23.1	13.6	16.3	19.0	23.0	32.8	23.0	21.6	16.9	
WBC-019	29.0	26.9	31.0	-	22.8	20.3	25.4	17.4	18.5	31.5	38.6	40.4	27.4	21.4	
WBC-020	31.4	33.0	39.6	34.3	33.3	29.4	21.9	23.6	24.6	37.7	47.4	36.4	32.7	25.5	
WBC-021	25.6	35.4	29.9	23.1	21.1	20.5	15	16	19.1	27.0	38.1	35.5	25.5	19.9	
WBC-022	22.3	21.7	22.4	19.9	19.2	15.3	12.7	15.9	16.7	21.6	37.5	25.0	20.9	16.3	
WBC-030	41.4	47.7	45.5	46.1	55.4	53.2	43.3	16.3	38.4	53.4	56.5	53.6	45.9	35.8	
WBC-031	54.5	56.5	54.5	55.8	49.7	43.4	38.6	37.8	37.7	21.0	55.7	47.8	46.1	35.9	
WBC-032	32.4	43.8	51.0	43.3	39.1	33	21.2	24.7	25.8	42.2	52.1	38.4	37.3	29.1	
WBC-033	21.4	26.4	30.8	20.0	24.9	20.5	13.7	15.7	17.7	31.4	38.9	33.6	24.6	19.2	
WBC-034	21.7	17.3	18.1	14.7	18.1	21.6	10.9	16.3	14.7	24.8	20.6	25.2	18.7	14.6	
WBC-036	20.2	28.2	28.4	29.1	21.6	27.6	13.1	20.6	23.9	27.7	40.5	26.5	25.6	20.0	
WBC-037	23.1	32.5	34.8	27.6	30.1	24.8	18.9	18.3	21.3	33.2	44.6	34.3	28.6	22.3	
WBC-039	22.5	26.7	32.5	32.9	25.8	17.4	17.5	19.5	20.1	29.3	-	34.0	25.3	19.7	
WBC-040	14.1	17.5	19.1	15.8	13.9	13.6	9	10.8	10.4	17.6	23.2	18.2	15.3	11.9	
WBC-041	16.4	18.9	28.9	16.8	18.4	23.7	12.4	10.1	7.7	29.7	24.2	26.2	19.5	15.2	
WBC-042	28.7	24.1	38.2	38.9	37.1	29	24.6	32.8	27.3	35.1	42.2	35.9	32.8	25.6	
WBC-043	23.5	27.6	28.9	25.3	20.1	6.6	14.4	16	18.5	26.4	35.5	32.2	22.9	17.9	
WBC-044	29.3	30.3	38.0	29.7	31.7	25.7	18.9	20.8	22.8	34.5	38.7	42.9	30.3	23.6	
WBC-045	18.4	29.5	31.0	28.4	30.4	27.8	14.1	18.6	16.9	31.7	30.6	27.6	25.4	19.8	
WBC-046	28.2	25.0	35.6	33.9	29.5	1.2	60.3	23.3	22.0	30.9	38.2	42.6	30.9	24.1	
WBC-047	-	-	-	-	-	-	-	28.3	30.9	31.0	26.8	29.8	29.4	22.9	
AURN	19.3	21.8	27.7	21.5	21.7	17.5	10.0	14.4	17.1	26.8	29.9	29.6	21.4	16.7	