Swansea Council

Annual Progress Report 2022

Bureau Veritas

April 2023

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Document Control Sheet

Identification	
Client	Swansea Council
Document Title	2022 Annual Progress Report
Bureau Veritas Ref No.	AIR16023404/UK/v1.0

Contact Details		
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Configuration				
Version	**Date**	**Author**	**Reason for Issue/Summary of Changes**	**Status**
v1.0	21/04/2023	J Mistry	Draft for Comment	Draft
v2.0	26/04/2023	J Mistry	Incorporated Client Comments	Issue

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Swansea Council 2022 Air Quality Progress Report

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: April, 2023

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Report Reference Number	AIR16023404v1.0
Date	April 2023

Executive Summary: Air Quality in Our Area

Air Quality in Swansea Council

This report contains the latest air quality monitoring results within the City and County of Swansea. The conclusions reached are that the objectives for benzene, lead and sulphur dioxide will be met and that there is no requirement to proceed further with these pollutants.

During 2021, all passive NO_2 monitoring locations recorded an increase in annual mean concentrations from 2020, with an average increase of 4.1 µg/m^3 across all monitoring sites. This is believed to be due to the impacts of the COVID-19 pandemic in 2020, whereby the Welsh Government enforced lockdowns and advised home working where possible. As such, as traffic levels decreased, NO_2 concentrations have fallen. During 2021 there were reduced enforced restrictions, therefore, 2021 was subject to pre pandemic traffic volumes. Despite this, there are still no reported exceedances of the annual mean NO_2 AQS objective of 40 µg/m^3 within Swansea.

Swansea Council currently have one declared AQMA (Swansea AQMA 2010). Details of the AQMA can be found on the UKAir website and the Welsh Government Website. The AQMA has been declared due to exceedances of the NO_2 annual mean AQS objective. All AQMA boundaries are either close to, or have busy roads within them, recognising the influence vehicle emissions have upon local air quality. Regardless of increases in concentrations from 2020, parts of Swansea's AQMA have been compliant for five years including the town of Hafod for two full years. To ensure that continual compliance is achieved, the Council do not intend to revoke this AQMA at this moment in time. If concentrations continue to remain stable, then the Council may carry out the revocation process.

No diffusion tube monitoring sites reported an annual mean NO_2 concentration greater than 60µg/m^3, therefore in accordance with LAQM.TG(22) it is not believed that there have been any exceedances of the 1-hour NO_2 AQS objective in these areas. Additionally, the automatic monitoring stations located in Swansea all reported no concentrations above the 1-hour NO_2 AQS objective of 200 µg/m^3.

All automatic monitoring stations reports PM_{10} and $PM_{2.5}$ compliance with both the annual and 24-hour AQS objectives continuing to be maintained.

Ozone is monitored at four sites within Swansea. Compliance with the 8-hour mean UK objective (not set in regulation) has been observed during 2021 at all sites.

Actions to Improve Air Quality

Swansea Council takes an active role within the Welsh Air Quality Forum https://airquality.gov.wales/ and is taking part in collaborative discussions with Swansea University to work together towards carrying out research into areas of 'public health interest' for all parties.

Collaborative works have led to Swansea Council being involved in a research project looking at the digital environment in the City Centre; focusing on the collection of Air Quality, Noise and Parking data.

Local Priorities and Challenges

Swansea Council will continue to undertake monitoring at the fixed locations for pollutants reported upon in this report. The assessment of locations for NO_2 diffusion tube monitoring will continue to be carried out, sites returning low concentrations will be closed down in order to allow new sites to be created to enable Swansea Council to enhance their quantitative data.

Swansea Council is reviewing their action plan to consider the impact of the Coronavirus Pandemic and ongoing compliance. Swansea Council will continue to work towards achieving Welsh Governments aims to maintain compliance and further reduce public health exposure

How to Get Involved

Swansea Council publishes its real-time monitoring data on their website http://swansea.airqualitydata.com/ and data can be downloaded from this site; a review of this site is scheduled.

Also, Swansea Council's data can be viewed and downloaded via the Welsh Air Quality Forum website https://airquality.gov.wales/.

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1 Actions to Improve Air Quality

Previous Work in Relation to Air Quality

The local authority review and assessment process is multi-staged. This Authority carried out its first stage review in 1999. The conclusion reached was to progress to a second and third stage review for Benzene, Particulate Matter (PM_{10}), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2).

In between these stages the authority had to deal with and resolve a burning, disused coal spoil tip at the former Brynlliw Colliery site. This absorbed most resources available between 1999 and 2000.

Section 83(1) of the Environment Act 1995 requires the Authority to designate Air Quality Management Areas (AQMAs) in areas where it is likely that the standards for any of the identified pollutants would be exceeded. As a result of the detailed work carried out in the authorities' third stage review and assessment it was found that areas of the Hafod were likely to fail the NO_2 annual mean objective of 40µg/m^3 by the compliance date of 31st December 2005.

On the 12th September 2001 the Authority declared The Hafod Air Quality Management Area (NO_2), cited as the City & County of Swansea (Hafod Air Quality Management Area (NO_2)) Order 2001. The Order came into force on the 14th September 2001. Appendix D contains a map indicating the AQMA area.

The Stage 4 review required under Section 84(1) of the Environment Act 1995 confirmed the earlier findings and that the declaration of the Hafod AQMA was justified as several locations were projected to fail the nitrogen dioxide (NO_2) annual mean objective in 2005.

Section 84 of the Environment Act 1995 requires the formulation of a written plan in pursuit of the achievement of air quality standards and objectives within the designated AQMA and has become known as the "Action Plan". The City and County of Swansea have undertaken a considerable amount of feasibility and infrastructure work in formulating its Action Plan taking a few years to produce the completed Action Plan in December 2004.

In 2004, the authority commenced works on the second round of review and assessment. In accordance with the policy and technical guidance documents, the second round of review and assessment was carried out in two stages;

• An Updating and Screening Assessment (USA) - intended to identify aspects that have changed since the first round of review and assessment (from 1999 in Swansea's case) and identify those that require further assessment; namely

• A Detailed Assessment of those pollutants that have been identified as requiring further work and investigation

Swansea Council currently has one active AQAP (The City and County of Swansea (Hafod Air Quality Management Area (NO_2))Order 2001). This is currently outdated and Swansea council are currently in the process of updating the AQAP.

A summary of the reports produced on air quality by Swansea Council to date are accessible on the Swansea government website (https://swansea.gov.uk/laqmreports?lang=en), via previous Annual Progress Reports (APRs), which summarise previous year air quality reports.

Annual Progress Report 2021 Summary

During 2020**,** the monitoring network within Swansea reported an overall decrease in NO_2 concentrations, with 207 non-automatic sites undergoing a decrease 2020. This increase is most likely attributed to the impacts of the COVID-19 pandemic in 2020, whereby the Welsh Government enforced lockdowns and advised home working where possible. As such, traffic levels decreased, as did NO_2 concentrations, this has also resulted in limited initiatives being progressed. All sections of the Swansea AQMA continued to report compliance. Swansea Council will continue to use their monitoring network to oversee concentrations under non lockdown circumstances.

Air Quality Management Areas

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

A summary of AQMAs declared by Swansea Council can be found in Table 1.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online on the UKAir website.

Table 1.1 – Declared Air Quality Management Areas

AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	City / Town	Description	Action Plan
Swansea AQMA 2010	NO_2 Annual Mean	The 2021 monitoring results indicates increases to pre pandemic traffic levels.	Hafod Sketty Fforestfach	Elevated annual mean NO_2 concentrations across all sites was due to COVID – 19 lockdowns in 2020. Although increases occurred, all sections of the AQMA reported compliance.	https://swansea.gov.uk/media/4052/Air-Quality-Action-Plan/pdf/Air_Quality_Action_Plan.pdf?m=1635522507237

AQMA boundary maps within Swansea Council can be viewed on the LAQM website and are included in Appendix D.

Implementation of Action Plans

Swansea Council has taken forward a number of measures during 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 1.2. More detail on these measures can be found in the Air Quality Action Plan relating to any designated AQMAs.

Air Quality Action Plans are continuously reviewed and updated whenever deemed necessary, but no less frequently than once every five years. Such updates are completed in close consultation with local communities.

Table 1.2 – Progress on Measures to Improve Air Quality

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1	Nowcaster Model	Pollution reduction by prediction and behaviour change	Swansea Council	2004	2017	-	e.g. 27% Reduction in Road NOx required Neath Road	Model Complete	Due to resource restriction and the pandemic no further works have been able to be carried out	Unknown – funding dependant	Effects of Nowcaster Model to be verified with traffic flow data and NO_2 Concentrations
3	Nowcaster Model Output Progression	Pollution reduction by prediction and behaviour change	Swansea Council	2017	2018/19	-	CHERISH-DE application accepted Awaiting next stage	Pilot study carried out – Data analysis carried out by Swansea University.	Collaborative working with Swansea University Psychology Department to look at behavioural change approach with messages.	March 2020	-
4	Collaborative Research Studies	Pollution reduction by prediction and behaviour change	Swansea University	2018	-	-	-	Ongoing work stream – has not begun to date as funding applications have been unsuccessful	Application bids for funding with collaborative partners to undertake work looking at behavioural change at congested areas	-	-
5	Morfa Distributor Road	Infrastructure change	Swansea Council	-	August 2017	-	Road Complete	-	Effects on Traffic Flow to be assessed alongside NO_2 concentration	04/08/2017	Pollutant Concentration reduced and AADT decreased
6	Green infrastructure	Exposure reduction, enhancing greenery	Swansea Council	-	2018-20	-	-	Green Screen installed at the junction of Fabian Way and Port Tennant Road	Installed at the end of March 2020. Real Time data being captured for analysis at a later date	March 2020	-

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
7	UK Prevention Research Partnership Bid	Collaborative Working	School of Management Bay Campus Swansea University Fabian Bay, Swansea	2017	2018	-	Expression of interest to apply submitted	Unsuccessful	-	-	-
8	LDP Policy RP	Policy	Swansea Council	-	2018	-	Creation of specific Air Pollution Policy within the LDP	Adopted	-	-	-
9	Highway Infrastructure Works	Infrastructure	Swansea Council	2018	-	-	-	Ongoing involvement when schemes required.	-	-	-
10	Council Vehicle Fleet	Reduced Emission	Swansea Council	-	-	-	-	Ongoing	Increase in electric vehicles and newer diesel vehicles within the council fleet	-	-
11	Welsh Government LAQM Support Grant	Green Infrastructure	Swansea Council	2021	2022	-	-	Grant application submitted to Welsh Government and awaiting outcome	Grant application approved for two projects at Primary Schools in Swansea. Monitoring equipment installed and green screens purchased	April 2024	-
12	Welsh Government LAQM Support Grant	Engine idling and behaviour change	Swansea Council	2021	2022	-	-	Grant application submitted to Welsh Government and awaiting outcome	Engine idling study carried out in July 2022. Will be reported upon in the next APR	May 2023	-
13	Welsh Government LAQM Support Grant	City Centre AQ monitoring network and bus transport	Swansea Council	2021	2022	-	-	Grant application submitted to Welsh Government and awaiting outcome	Network has been installed and data collection commenced	April 2024	-

2 Air Quality Monitoring Data and Comparison with Air Quality Objectives

Summary of Monitoring Undertaken in 2021

2.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how results compare with the objectives.

Swansea Council undertook automatic (continuous) monitoring at 12 sites during 2021. Table 2.1 presents the details of the sites. National monitoring results are available at https://uk-air.defra.gov.uk/data/,https://airquality.gov.wales/maps-data/measurements/downloadsubmit-data and http://swansea.airqualitydata.com/

Maps showing the location of the monitoring sites are provided in Figure 2.1. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

2.1.2 Non-Automating Monitoring Sites

Swansea Council undertook non-automatic (passive) monitoring of NO_2 at 191 sites during 2021, within 2021 21 sites were decommissioned. Table 2.2 presents the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 2.2 – Figure 2.10. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

Table 2.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with (Named) AQMA?	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	Monitoring Technique	Inlet Height (m)	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
CM1	Swansea Roadside AURN	Roadside	Swansea AQMA 2010	265299	194470	NO_2, PM_{10}, $PM_{2.5}$	Chemiluminescence and BAM1020	2.0	16.5	22	4.5
CM2	Morriston Groundhog	Roadside	Swansea AQMA 2010	267210	197674	NO_2, PM_{10} and Ozone	Chemiluminescence, UV Absorption and BAM1020	2.0	22	27	5.0
CM3	Swansea Cwm Level Park	Urban Background	Swansea AQMA 2010	265912	195890	NO_2 and Ozone	Chemiluminescence, UV Absorption	1.5	-	-	78
CM4	Swansea Hafod DOAS	Roadside	Swansea AQMA 2010	Transmitter 265927 Receiver 265991	Transmitter 194453 Receiver 194706	NO_2, Ozone and Benzene	Differential Optical Absorption Spectrometry	4.0	0	1.5	1.5
CM5	Swansea St Thomas DOAS	Roadside	-	266199	193657	NO_2, SO_2, Ozone and Benzene	Differential Optical Absorption Spectrometry	4.0	7.5	0.2	7.3
CM6	Fforestfach Cross	Roadside	Swansea AQMA 2010	263236	195489	PM_{10}	EBam	3.0	22	25	3
CM7	Uplands Crescent	Roadside	-	264078	192888	PM_{10}	EBam	3.0	13	14	1
CM8	Sketty Cross	Roadside	Swansea AQMA 2010	262681	192871	PM_{10}	EBam	3.0	15	16	1
CM9	Westway Quadrant Bus Station	Roadside	-	265256	192731	PM_{10}	EBam	3.0	13	15	2
CM11	Swansea Station Court High Street	Roadside	Swansea AQMA 2010	265705	193686	NO_2	Chemiluminescence	1.5	3	5	2
CM12	Morfa Road	Roadside	Swansea AQMA 2010	265905	193733	NO_2	Chemiluminescence	1.5	0	6	6
CM13	Junction Port Tennant	Roadside	-	266670	193179	$PM_{2.5}$ and NO_2	Chemiluminescence and BAM1020	1.5	9	12	3

Notes:

(1) 0m indicates that the sited monitor represents exposure and as such no distance calculation is required.

Figure 2.1 – Map of Automatic Monitoring Sites

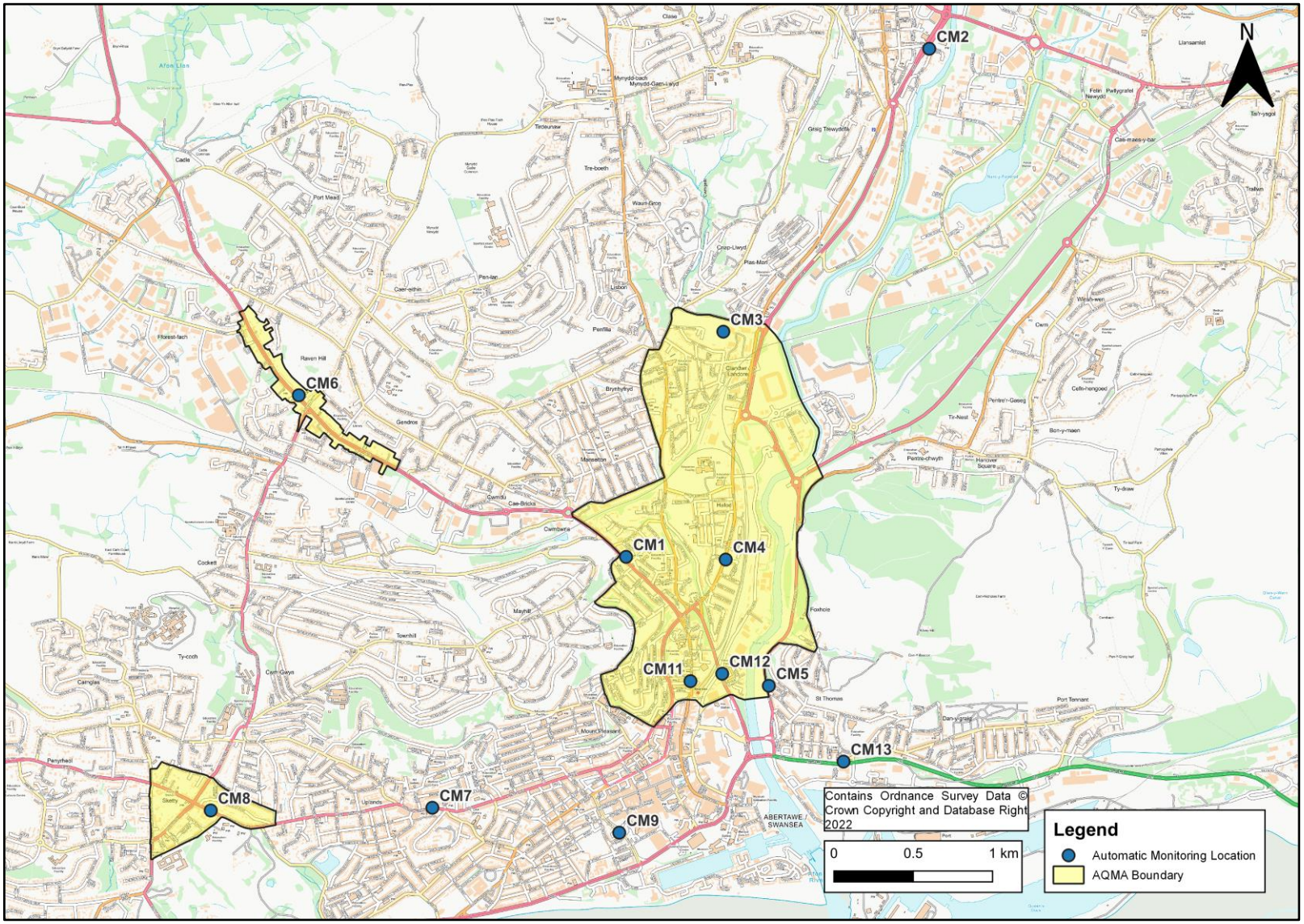


Table 2.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
5	Gower Road	Roadside	Y	262548	192943	3.0	No	-	-	-
6	Vivian Road	Roadside	Y	262612	192995	3.0	No	-	-	-
7	Goer Road	Roadside	Y	262691	192852	3.0	No	-	-	-
8	Carmarthen Road	Roadside	Y	262990	195820	3.0	No	4.5	-	2.5
10	Carmarthen Road	Roadside	Y	263219	195513	3.0	No	-	-	-
11	Ravenhill Road	Roadside	Y	263344	195474	3.0	No	-	-	-
12	Carmarthen Road	Roadside	Y	263680	195103	3.0	No	-	-	-
16	Oystermouth Road	Roadside	N	265339	192534	3.0	No	-	-	-
18	Cwm Level Road	Roadside	Y	265526	195807	3.0	No	-	-	-
19	Dyfatty Street	Roadside	Y	265597	194061	3.0	No	-	-	-
20	Carmarthen Road	Roadside	Y	265594	194175	3.0	No	-	-	-
22	Pentreharne Road	Roadside	Y	265682	195374	3.0	No	-	-	-
26	Neath Road	Roadside	Y	265876	194318	3.0	No	-	-	-
27	Neath Road	Roadside	Y	265922	194428	3.0	No	-	-	-
29	Neath Road	Roadside	Y	265973	195222	3.0	No	-	-	-
32	Pentreguinea Road	Roadside	N	266209	193867	3.0	No	-	-	-
33	Pentreguinea Road	Roadside	N	266236	193488	3.0	No	-	-	-
35	Delhi Street	Roadside	N	266314	193298	3.0	No	-	-	-
36	Delhi Street	Roadside	N	266455	193300	3.0	No	-	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
40	Pentrepoeth Road	Roadside	N	266951	198278	3.0	No	-	-	-
41	Woodfield Road	Roadside	N	266953	198085	3.0	No	-	-	-
43	Clase Road	Roadside	N	267093	198063	3.0	No	-	-	-
44	Ian's Walk	Roadside	N	267639	199543	3.0	No	-	-	-
45	Glyncollen Drive	Roadside	N	267661	199451	3.0	No	-	-	-
48	Bevans Row	Roadside	N	268011	193101	3.0	No	-	-	-
50	Nantyffin Road	Roadside	N	268530	197419	3.0	No	-	-	-
54	Peniel Green Road	Roadside	N	268693	197416	3.0	No	-	-	-
55	Peniel Green Road	Roadside	N	268789	197420	3.0	No	-	-	-
56	Ynysallan Road	Roadside	N	269306	198661	3.0	No	166.0	-	2.0
58	Uplands Crescent	Roadside	N	264000	192800	3.0	No	8.0	-	4.0
59	Hafod Post Office	Roadside	Y	265918	194463	3.0	No	-	-	-
61	Helens Road	Roadside	N	264959	192878	3.0	No		-	
63	De La Beche Road	Roadside	Y	262675	192775	3.0	No	6.0	-	2.0
64	Gower Road	Roadside	Y	262719	192840	3.0	No	1.0	-	5.5
65	Gower Road	Roadside	Y	262735	192855	3.0	No	-	-	-
66	Sketty Road	Roadside	Y	262802	192829	3.0	No	-	-	-
67	Newcut Road	Roadside	Y	265901	193677	3.0	No	5.0	-	2.0
68	Orchard Street	Roadside	N	265573	193432	3.0	No	-	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
70	Copper Quarter	Roadside	N	266649	195435	3.0	No	7.0	-	2.0
75	Uplands Crescent	Roadside	N	264072	192869	2.0	No	-	-	-
84	Gower Road	Roadside	Y	262714	192839	2.0	No	-	-	-
85	Gower Road	Roadside	Y	262702	192847	2.0	No	-	-	-
86	Gower Road	Roadside	Y	262704	192865	2.0	No	-	-	-
87	De La Beche Road	Roadside	Y	262697	192798	2.0	No	-	-	-
88	Gower Road	Roadside	Y	262605	192916	2.0	No	-	-	-
89	Vivian Road	Roadside	Y	262587	192956	2.0	No	-	-	-
90	Vivian Road	Roadside	Y	262631	192996	2.0	No	-	-	-
91	Gower Road	Roadside	Y	262534	192950	2.0	No	-	-	-
94	Ravenhill Road	Roadside	N	263444	195572	2.0	No	-	-	-
95	Carmarthen Road	Roadside	N	262815	196090	2.0	No	-	-	-
96	Carmarthen Road	Roadside	N	262922	195590	2.0	No	-	-	-
97	Carmarthen Road	Roadside	Y	262946	195902	2.0	No	-	-	-
98	Carmarthen Road	Roadside	Y	263142	195548	2.0	No	-	-	-
99	Carmarthen Road	Roadside	Y	263387	195332	2.0	No	-	-	-
104	Nantyffin Road	Roadside	N	268538	197389	2.0	No	-	-	-
110	Cefn Glas	Roadside	N	267369	199521	2.0	No	-	-	-
115	Mansel Street	Roadside	N	265031	193097	2.0	No	-	-	-
116	Mansel Street	Roadside	N	265192	193138	2.0	No	-	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
117	De La Beche Road	Roadside	N	265288	193211	2.0	No	-	-	-
118	Alexandra Road	Roadside	N	265483	193385	2.0	No	-	-	-
119	Pleasant Street	Roadside	N	265522	193390	2.0	No	-	-	-
121	High Street	Roadside	Y	265697	193679	2.0	No	-	-	-
122	High Street	Kerbside	N	265694	193505	3.0	No	-	-	-
123	High Street	Roadside	N	265655	193423	2.0	No	-	-	-
124	High Street	Kerbside	N	265651	193253	2.0	No	-	-	-
125	High Street	Kerbside	N	265642	193148	3.0	No	3.0	-	1.0
126	The Kingsway	Roadside	N	265475	193144	2.5	No	-	-	-
128	The Kingsway	Roadside	N	265297	193085	2.0	No	-	-	-
129	Christina Street	Roadside	N	265153	193098	2.0	No	-	-	-
131	Dilwyn Street	Roadside	N	265137	192846	2.0	No	-	-	-
132	Westway	Roadside	N	265229	192753	3.0	No	-	-	-
134	Dilwyn Street	Roadside	N	265113	192903	2.0	No	-	-	-
180	Loughor Road	Roadside	N	259064	197781	3.0	No	-	-	-
182	Loughor Road	Roadside	N	259050	197790	3.0	No	-	-	-
197	Alexandra Road	Roadside	N	258797	198701	3.0	No	-	-	-
198	Alexandra Road	Roadside	N	258811	198701	3.0	No	-	-	-
206	Newton Road	Roadside	N	261565	188211	3.0	No	-	-	-
207	Newton Road	Roadside	N	261561	188222	3.0	No	-	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
208	Newton Road	Roadside	N	261541	188215	3.0	No	-	-	-
209	Newton Road	Roadside	N	261534	188198	3.0	No	-	-	-
210	Newton Road	Roadside	N	261516	188207	3.0	No	-	-	-
211	Newton Road	Roadside	N	261501	188188	3.0	No	-	-	-
212	Newton Road	Roadside	N	261486	188200	3.0	No	-	-	-
213	Newton Road	Roadside	N	261490	188186	3.0	No	-	-	-
240	Neath Road	Roadside	N	266169	195995	3.0	No	-	-	-
242	High Street	Roadside	N	265655	193423	3.0	No	-	-	-
243	Courtney Street	Roadside	N	265474	194949	3.0	No	-	-	-
244	Courtney Street	Roadside	Y	265466	194930	3.0	No	-	-	-
247	Courtney Street	Roadside	Y	265394	194899	3.0	No	-	-	-
249	Courtney Street	Roadside	Y	265326	194871	3.0	No	-	-	-
256	Mansel Terrace	Roadside	-	264995	194777	3.0	No	-	-	-
275	Pentremawr Road	Roadside	Y	265658	194856	3.0	No	3.0	-	1.0
276	Pentremawr Road	Roadside	Y	265610	194871	2.0	No	-	-	-
277	Pentremawr Road	Roadside	Y	265596	194875	2.0	No	-	-	-
278	Pentremawr Road	Roadside	Y	265573	194882	2.0	No	-	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
279	Llangyfelach Road	Roadside	Y	265555	194926	2.0	No	-	-	-
280	Llangyfelach Road	Roadside	Y	265537	194980	2.0	No	2.0	-	1.0
281	Llangyfelach Road	Roadside	Y	265542	194872	2.5	No	3.0	-	1.0
282	Llangyfelach Road	Roadside	Y	265540	194840	2.5	No	3.0	-	1.0
284	Llangyfelach Road	Roadside	N	265452	195899	2.0	No	-	-	-
285	Martin Street	Roadside	N	266955	197415	2.0	No	-	-	-
286	Martin Street	Roadside	N	266938	197377	2.0	No	-	-	-
287	High Street	Roadside	Y	265715	193902	2.0	No	-	-	-
288	High Street	Roadside	Y	265698	193878	2.0	No	-	-	-
289	High Street	Roadside	Y	265702	193842	2.0	No	-	-	-
291	Wern Terrace	Roadside	N	267952	193121	2.0	No	-	-	-
295	High Street Gorseinon	Roadside	N	258998	198698	3.0	No	1.5	-	1.0
296	High Street Gorseinon	Roadside	N	259054	198679	2.0	No	-	-	-
323	Port Tennant Road	Roadside	N	266765	193224	2.0	No	-	-	-
331	High Street	Roadside	N	265741	193545	2.0	No	-	-	-
334	High Street	Kerbside	N	265688	193483	2.0	No	-	-	-
335	High Street	Kerbside	N	265682	193461	2.0	No	-	-	-
336	High Street	Roadside	N	265664	193395	2.0	No	-	-	-
337	High Street	Roadside	N	265637	193335	2.0	No	3.5	-	1.0
338	High Street	Kerbside	N	265651	193331	2.0	No	-	-	-
339	High Street	Kerbside	N	265652	193313	2.0	No	-	-	-
340	High Street	Kerbside	N	265632	193292	2.0	No	5.0	-	3.0
341	High Street	Kerbside	N	265635	193224	2.0	No	3.0	-	1.5

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
342	Castle Street	Kerbside	N	265655	193197	2.0	No	3.5	-	1.0
343	Castle Street	Kerbside	N	265640	193173	2.0	No	-	-	-
346	Castle Street	Kerbside	N	265681	193096	2.0	No	-	-	-
347	Orchard Street	Roadside	Y	265562	193518	2.0	No	-	-	-
348	Orchard Street	Roadside	Y	265572	193549	2.0	No	-	-	-
349	Orchard Street	Roadside	Y	265578	193576	2.0	No	-	-	-
350	Orchard Street	Roadside	Y	265577	193606	2.0	No	-	-	-
356	Grove Place	Roadside	N	265471	193359	2.0	No	-	-	-
362	Westway	Kerbside	N	265271	192774	2.0	No	-	-	-
363	Westway	Kerbside	N	265287	192797	2.0	No	-	-	-
364	Westway	Kerbside	N	265301	192814	2.0	No	-	-	-
373	Mill Street	Kerbside	N	258859	196513	2.0	No	-	-	-
375	Mill Street	Roadside	N	258798	196371	2.0	No	-	-	-
376	Mill Street	Roadside	N	258765	196368	2.0	No	-	-	-
377	Sterry Road	Roadside	N	258763	196317	2.0	No	-	-	-
385	Pentrepoeth Road	Roadside	N	267001	198231	2.0	No	-	-	-
386	Copper Quarter	Roadside	N	266698	195334	3.0	No	3.5	-	1.5
388	Bevans Row	Roadside	N	267964	193076	2.0	No	-	-	-
390	Wern Terrace	Roadside	N	267974	193132	2.0	No	-	-	-
391	High Street	Roadside	N	259467	198509	2.0	No	-	-	-
394	De La Beche Road	Roadside	Y	262445	192645	2.0	No	-	-	-
396	De La Beche Road	Roadside	Y	262370	192609	2.0	No	-	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
398	Mynydd Garllwyn Road	Roadside	N	265584	197442	2.0	No	149.0	-	1.5
399	Mynydd Garllwyn Road	Roadside	N	265224	197412	2.0	No	9.0	-	1.5
401	Llangyfelach Road	Kerbside	N	265243	197312	2.0	No	4.5	-	1.5
403	Dillwyn Street	Roadside	N	265115	192895	5.0	No	-	-	-
404	Pontardualis Road	Roadside	N	261713	199051	2.0	No	17.0	-	-
406	Morfa Terrace	Roadside	Y	265973	195222	2.0	No	-	-	-
407	Llangyfelach Road	Roadside	Y	265539	195664	2.0	No	-	-	-
408	Port Tennant Road	Roadside	N	266655	193177	2.0	No	2.0	-	1.5
412	Victoria Road	Kerbside	N	258957	196766	2.0	No	-	-	-
413	Victoria Road	Roadside	N	258950	196721	2.0	No	-	-	-
415	Danycoed	Kerbside	N	270242	197671	2.0	No	16.5	-	0.5
416	Birchgrove road	Kerbside	N	270487	197805	2.0	No	7.0	-	0.5
417	Birchgrove road	Kerbside	N	270485	197705	2.0	No	5.0	-	-
418	Birchgrove road	Kerbside	N	270449	197600	2.0	No	19.0	-	-
419	Birchgrove road	Kerbside	N	270475	197714	2.0	No	5.5	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
422	Victoria Road	Kerbside	N	260149	195425	2.0	No	3.0	-	0.5
423	Victoria Road	Kerbside	N	260136	195411	2.0	No	20.0	-	2.0
424	Cwm Road	Kerbside	Y	265536	194752	2.0	No	23.0	-	1.0
425	Llangyfelach Road	Kerbside	Y	265509	194748	2.5	No	4.0	-	1.0
426	New Cut Road	Kerbside	N	265960	193609	2.5	No	6.0	-	3.0
427	Swansea Road	Kerbside	N	261994	197782	2.5	No	33.5	-	3.0
428	Gorseinon Road	Kerbside	N	261518	198929	2.5	No	13.5	-	3.0
429	Sterry Road	Roadside	N	258827	196293	2.5	No		-	
430	Mynydd Newydd Road	Kerbside	N	263930	196601	2.5	No	26.0	-	0.5
431	Mynydd Newydd Road	Kerbside	N	264029	196852	2.5	No	12.5	-	0.5
432	Llangyfelach Road	Kerbside	N	265345	195645	2.5	No	10.5	-	2.5
433	Llangyfelach Road	Roadside	N	265543	195621	2.5	No	-	-	-
434	Llangyfelach Road	Kerbside	N	265530	195679	2.5	No	-	-	-
435	Gors Avenue	Kerbside	N	263104	194457	2.5	No	5.0	-	1.0
436	Gors Avenue	Kerbside	N	263005	194476	2.5	No	7.5	-	0.5
437	Bevans Row	Kerbside	N	267986	193103	2.5	No	14.5	-	2.0
438	Brunel Way	Roadside	N	266541	195495	2.5	No	-	-	-
439	Glanmor Road	Roadside	N	262949	193293	2.5	No	-	-	-

Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) (1)	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
440	Glanmor Road	Roadside	N	262905	193293	2.5	No	-	-	-
441	Broadway Road	Roadside	N	262903	193379	2.5	No	12.5	-	2.5
442	Townhill Road	Roadside	N	263004	193454	2.5	No	30.0	-	11.5
444	Cockett Road	Roadside	N	262991	193759	2.5	No	19.0	-	1.0
445	Vivian Road	Roadside	N	262879	193408	2.5	No	41.0	-	2.5
446	Vivian Road	Roadside	N	262838	193374	2.5	No	19.5	-	4.5
447	Tycoch Road	Roadside	N	262709	193311	2.5	No	11.5	-	2.0
448	Vivian Road	Roadside	N	262788	1932813	2.5	No	10.5	-	4.0
449	Vivian Road	Roadside	N	262761	193228	2.5	No	9.5	-	4.0
450	Oystermouth School	Roadside	N	262812	193293	2.5	No	8.0	-	1.0
451	Oytermouth School	Roadside	N	261220	188184	2.5	No	10.0	-	1.5
452	Castle Road	Roadside	N	261163	188175	2.5	No	17.1	-	4.8
453	Llangyfelach Road	Roadside	N	261221	188298	2.5	No	5.0	-	0.5
454	Llangyfelach Road	Roadside	N	265548	195679	2.5	No	4.5	-	0.5
455	Llangyfelach Road	Roadside	N	265516	195729	2.5	No	4.5	-	1.0
458	Cockett Road	Roadside	N	262941	193459	2.5	No	22.5	-	2.5
459	Neath Road	Kerbside	N	267019	197407	2.5	No	-	-	-
460	Ystrad Road	Kerbside	N	262084	196454	2.5	No	-	-	-

Notes:

(1) 0m indicates that the sited monitor represents exposure and as such no distance calculation is required.

Figure 2.2 – Spatial Map of Non-Automatic Monitoring Sites

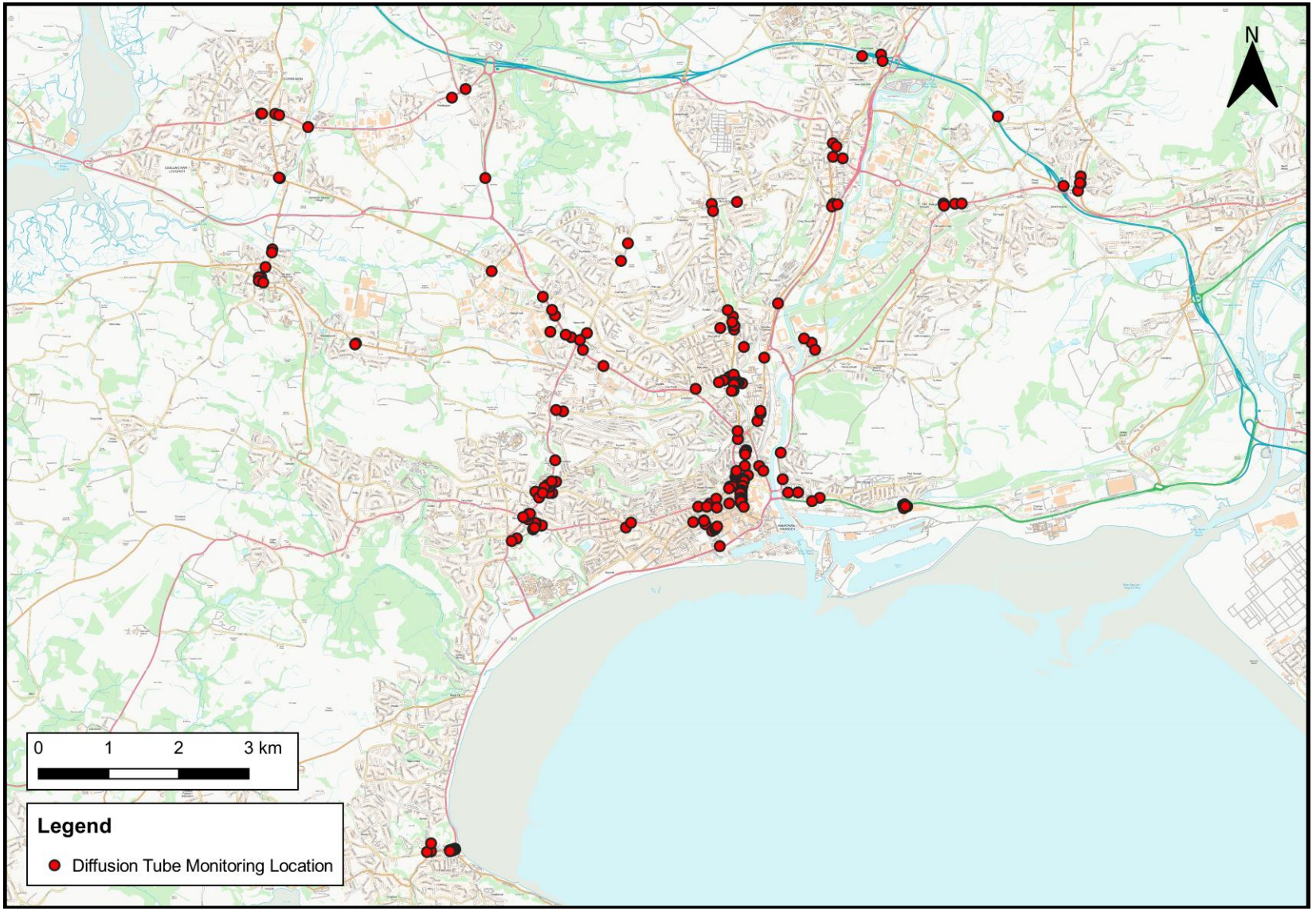


Figure 2.3 – Map of Non-Automatic Monitoring Sites (Gorseinon and Gowerton)

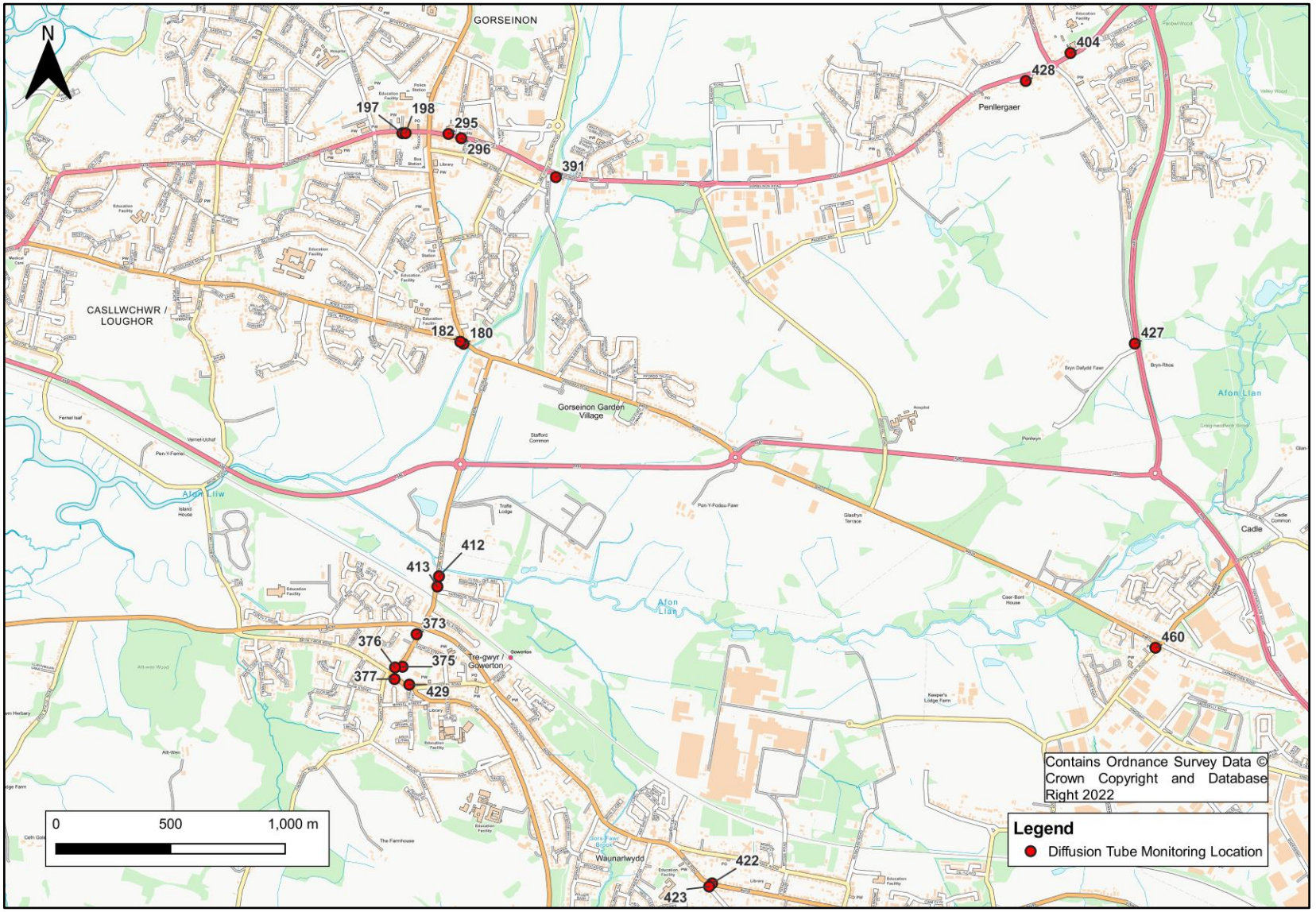


Figure 2.4 – Map of Non-Automatic Monitoring Sites (Fforestfach)

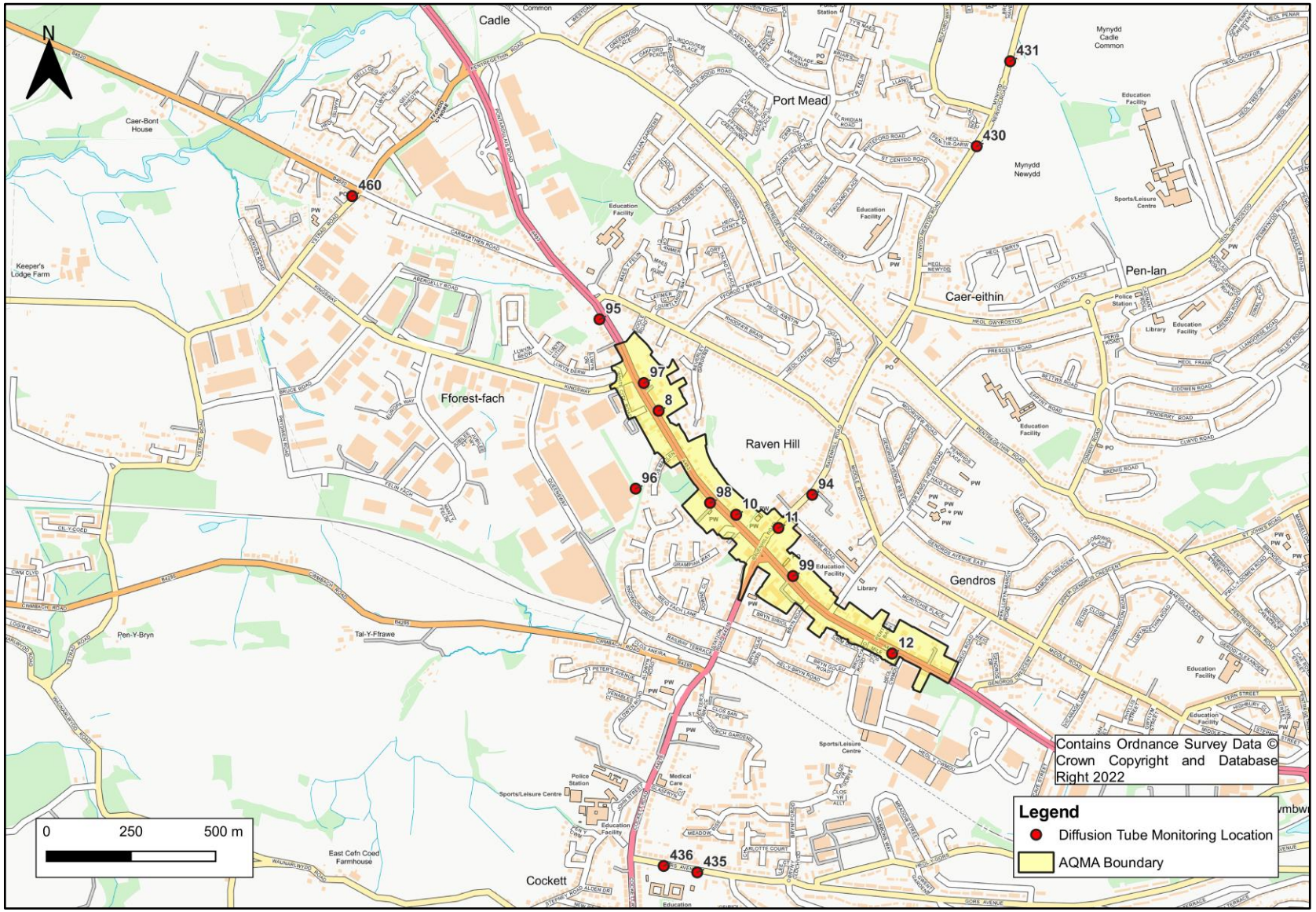


Figure 2.5 – Map of Non-Automatic Monitoring Sites (Hafod and Landore)

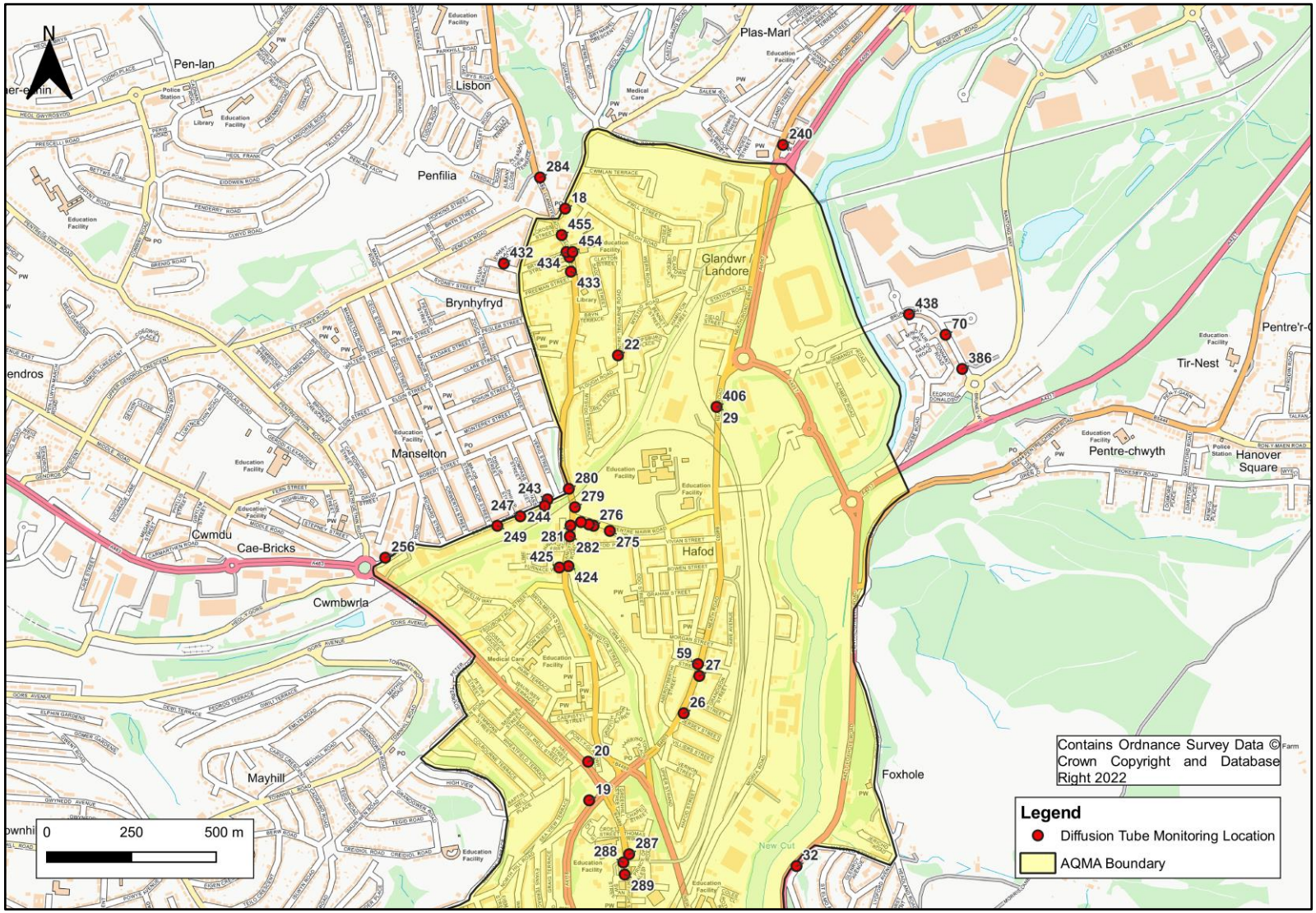


Figure 2.6 – Map of Non-Automatic Monitoring Sites (St Thomas and City Centre)

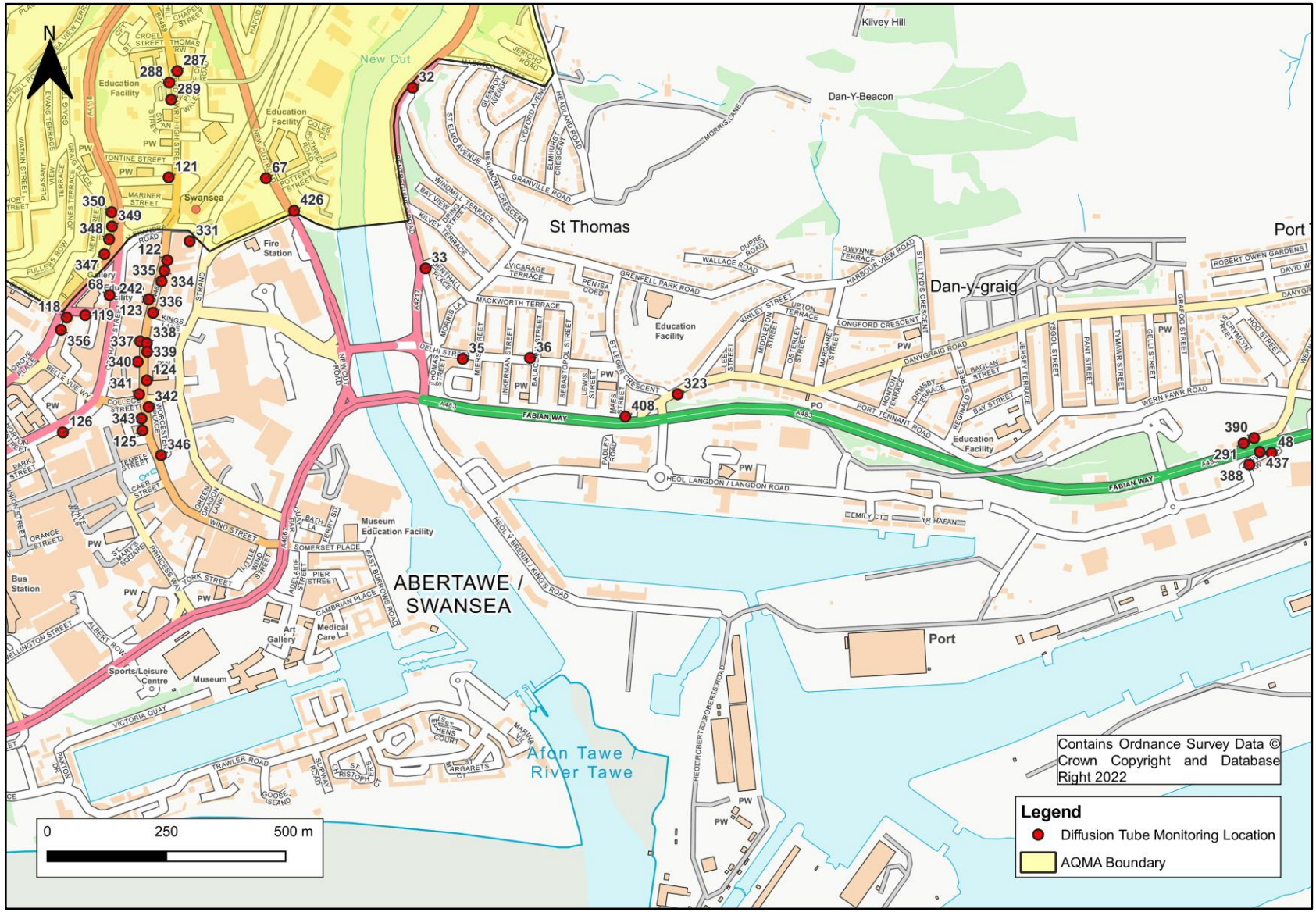


Figure 2.7 – Map of Non-Automatic Monitoring Sites (Uplands and City Centre West)

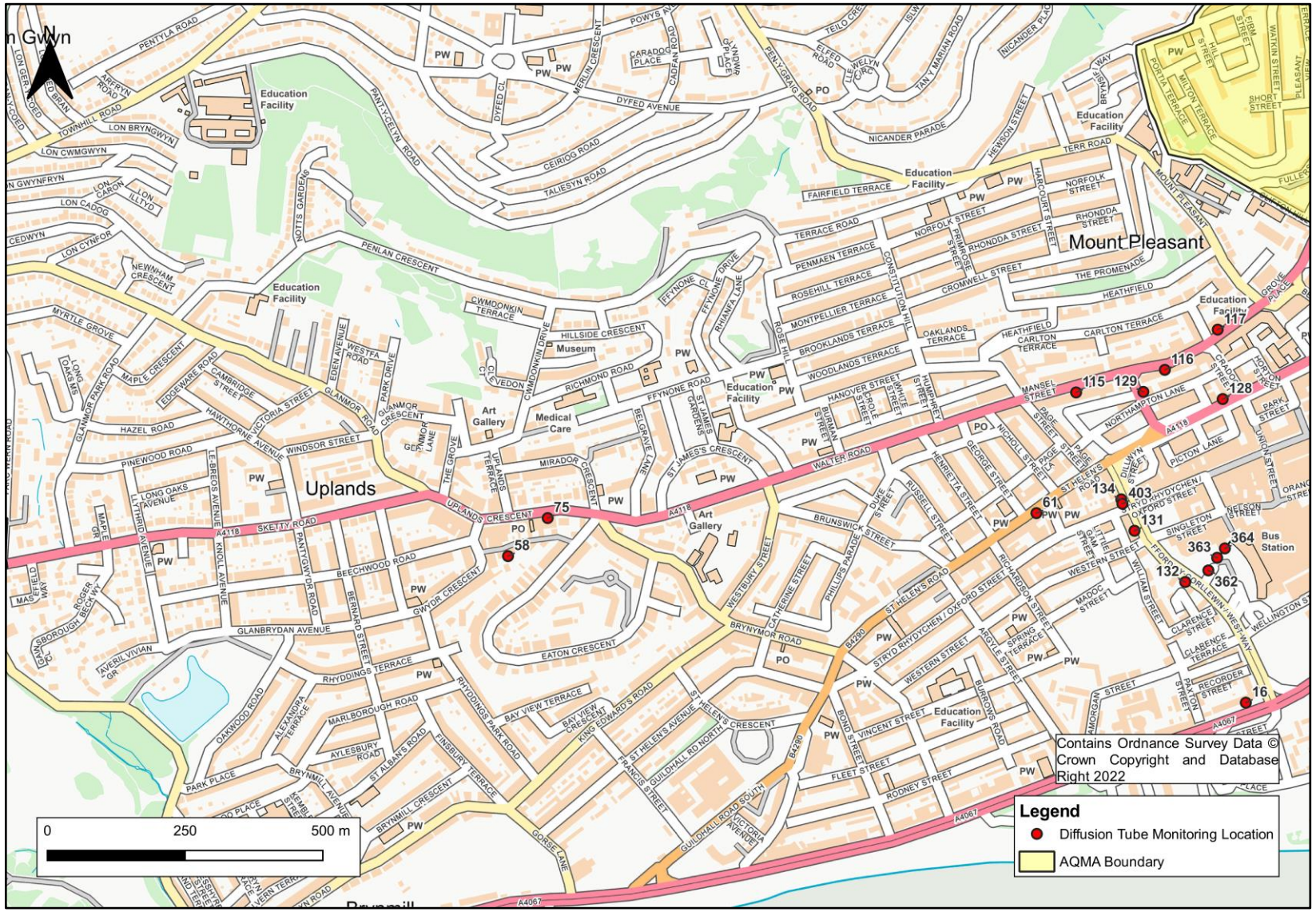


Figure 2.8 – Map of Non-Automatic Monitoring Sites (Sketty)

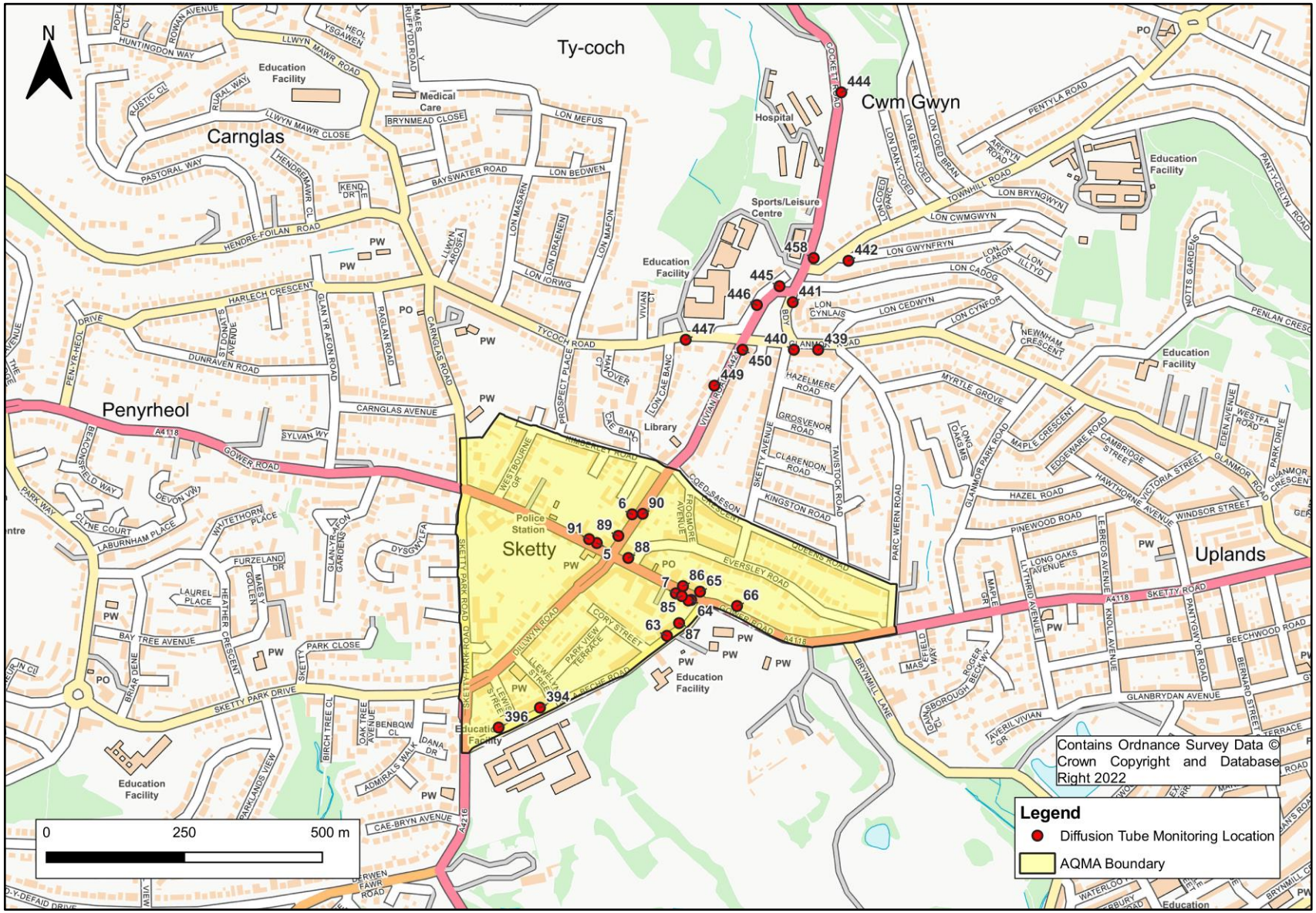


Figure 2.9 – Map of Non-Automatic Monitoring Sites (The Mumbles)

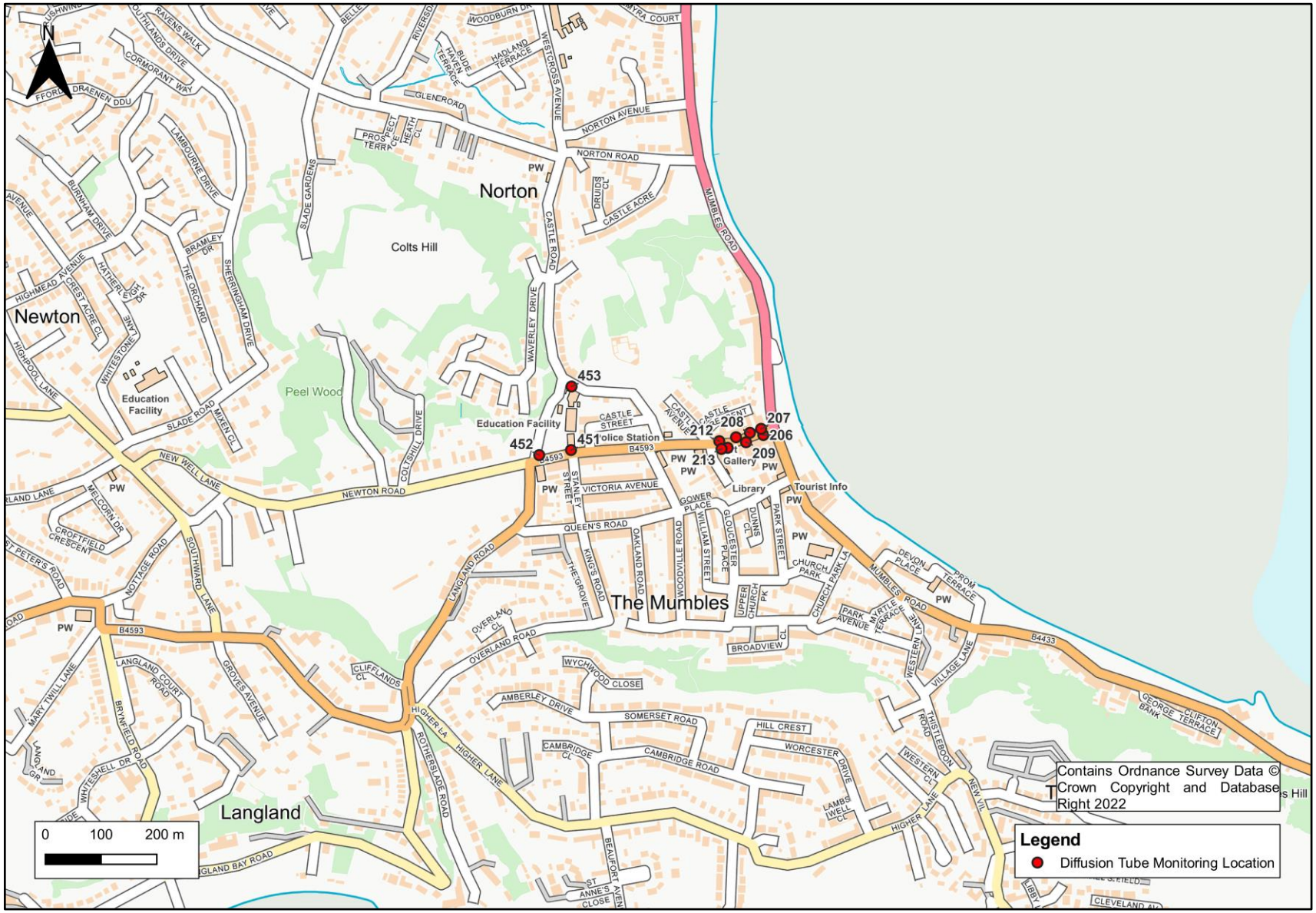
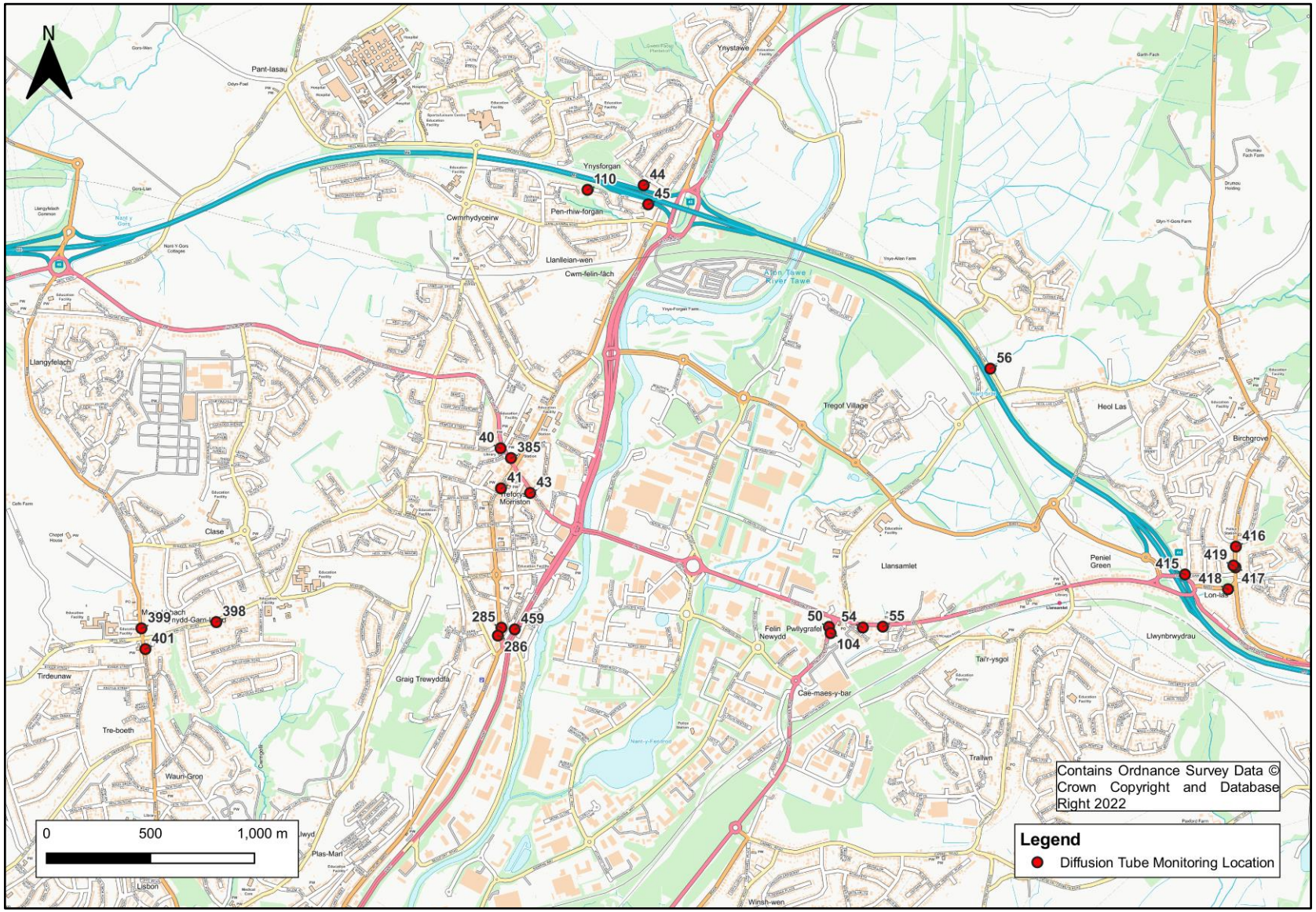


Figure 2.10 – Map of Non-Automatic Monitoring Sites (North Swansea)



2021 Air Quality Monitoring Results

Table 2.3 – Annual Mean NO_2 Monitoring Results ($\mu g/m^3$)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	Automatic	98.4	98.4	20 (24.41)[4]	18.7 (23.50)[4]	24.1	17.6	19.2
CM2	Roadside	Automatic	57.8	57.8	20.6 (29.14)[4]	18.1 (23.50)[4]	23.5	11.4	21.3
CM3	Urban Background	Automatic	94.6	94.6	13.4	14.5	13.1	10.5	11.3
CM4	Roadside	Automatic	89.3	89.3	**40.0**	37.3	34.8	28.8	31.4
CM5	Roadside	Automatic	69.5	69.5	32.2	30.3	34.6	25.6	35.0
CM11	Roadside	Automatic	84.9	84.9	**44 (47.20)[4]**	39 (**45.87)[4]**	**44.5**	31.2	35.3
CM12	Roadside	Automatic	91.8	91.8	25.7	26.2	27.0	21.7	26.2
CM13	Roadside	Automatic	88.2	88.2	N/A	27 (34.50)[4]	28.5	10.8	23.8
5	Roadside	Passive	100.0	100.0	28.4	25.5	24.3	16.2	20.4
6	Roadside	Passive	100.0	100.0	23.1	21.4	20.6	14.8	18.8
7	Roadside	Passive	100.0	100.0	39.1	34.2	33.8	24.2	29.5
8	Roadside	Passive	82.7	82.7	34.6	33.6	37.1	26.7	33.2
10	Roadside	Passive	57.5	57.5	20.8	19.8	18.5	13.6	18.7
11	Roadside	Passive	92.3	92.3	30.3	28.4	27.8	20.4	24.7
12	Roadside	Passive	100.0	100.0	34.8	33.2	33.8	24.3	30.5
16	Roadside	Passive	84.7	84.7	26.6	23.6	23.3	16.5	22.1
18	Roadside	Passive	100.0	100.0	37.1	36.1	36.6	28.5	32.7
19	Roadside	Passive	100.0	100.0	38.3	36.7	35.2	24.5	29.1
20	Roadside	Passive	92.3	92.3	29.9	29.3	28.4	20.6	25.9
22	Roadside	Passive	92.1	92.1	26.8	24.8	22.4	17.8	21.3
26	Roadside	Passive	100.0	100.0	29.5	27.7	28.1	21.7	27.4
27	Roadside	Passive	100.0	100.0	29.3	28.9	28.9	21.8	27.0
29	Roadside	Passive	80.8	80.8	30.1	24.3	25.4	18.6	22.5
32	Roadside	Passive	90.4	90.4	26.7	26.1	26.9	19.8	22.8
33	Roadside	Passive	82.7	82.7	26.6	25.3	25.1	19.8	23.7

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
35	Roadside	Passive	76.7	76.7	27.8	27.0	27.4	20.6	25.0
36	Roadside	Passive	65.5	65.5	24.9	22.8	22.6	18.0	21.2
40	Roadside	Passive	82.7	82.7	22.1	20.4	19.9	14.3	17.7
41	Roadside	Passive	92.3	92.3	26.8	28.1	27.4	22.8	26.1
43	Roadside	Passive	92.3	92.3	28.6	27.7	26.4	20.9	25.2
44	Roadside	Passive	90.4	90.4	23.9	21.0	21.7	15.5	18.5
45	Roadside	Passive	80.8	80.8	23.3	22.9	23	18.2	21.4
48	Roadside	Passive	100.0	100.0	17.4	18.2	16.9	12.3	15.2
50	Roadside	Passive	75.1	75.1	30.8	28.7	26.3	21.4	24.6
54	Roadside	Passive	90.4	90.4	26.6	26.3	24.5	19.7	23.6
55	Roadside	Passive	90.4	90.4	25.9	26.4	24.6	19.5	25.2
56	Roadside	Passive	100.0	100.0	15.8	27.5	27.7	23.1	24.0
58	Roadside	Passive	92.3	92.3	27.4	24.6	30.0	20.2	25.4
59	Roadside	Passive	100.0	100.0	39.6	35.0	36.2	27.6	34.6
61	Roadside	Passive	92.3	92.3	27.9	26.0	27.5	20.5	25.3
63	Roadside	Passive	100.0	100.0	16.5	15.8	18.0	11.9	15.0
64	Roadside	Passive	82.7	82.7	26.9	31.1	32.1	19.2	24.7
65	Roadside	Passive	100.0	100.0	21.5	20.6	19.2	13.8	16.2
66	Roadside	Passive	92.3	92.3	24.1	20.5	20.6	16.5	19.4
67	Roadside	Passive	73.2	73.2	32.4	34.1	38.5	26.5	31.0
68	Roadside	Passive	100.0	100.0	28.3	25.1	26.5	18.8	23.8
70	Roadside	Passive	75.1	75.1	20.2	18.1	22.8	16.9	19.5
75	Roadside	Passive	100.0	100.0	30.4	28.0	27.2	21.2	23.2
84	Roadside	Passive	80.8	80.8	27.5	24.7	24.5	18.1	21.0
85	Roadside	Passive	100.0	100.0	29.1	26.1	24.6	18.9	21.1
86	Roadside	Passive	75.1	75.1	22.6	19.1	19.6	14.0	17.7
87	Roadside	Passive	90.4	90.4	17.1	14.3	14.4	9.3	12.1
88	Roadside	Passive	84.7	84.7	26.1	23.0	24.2	16.2	19.8
89	Roadside	Passive	100.0	100.0	18.0	17.0	16.8	12.5	16.1
90	Roadside	Passive	100.0	100.0	24.5	23.6	23.1	16.2	19.4
91	Roadside	Passive	82.7	82.7	25.5	25.2	21.3	15.0	18.8
94	Roadside	Passive	84.7	84.7	22.8	21.0	21.2	15.8	19.0
95	Roadside	Passive	100.0	100.0	21.2	18.5	17.9	13.5	17.8
96	Roadside	Passive	67.1	67.1	22.3	20.3	19.1	15.7	18.0
97	Roadside	Passive	90.4	90.4	28.2	26.0	24.7	19.5	22.0
98	Roadside	Passive	92.3	92.3	27.3	27.3	26.7	19.1	22.8

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
99	Roadside	Passive	90.4	90.4	27.0	23.8	23.1	16.1	19.7
104	Roadside	Passive	92.3	92.3	22.1	22.0	20.6	17.4	19.9
110	Roadside	Passive	100.0	100.0	20.5	19.7	18.7	14.2	17.1
115	Roadside	Passive	90.4	90.4	30.6	29.0	27.5	18.1	23.4
116	Roadside	Passive	84.7	84.7	33.1	32.0	28.9	21.6	29.5
117	Roadside	Passive	90.4	90.4	30.1	30.5	29.1	21.2	25.9
118	Roadside	Passive	100.0	100.0	24.8	25.8	24.2	16.1	18.7
119	Roadside	Passive	65.5	65.5	27.9	28.3	26.5	16.8	17.6
121	Roadside	Passive	92.3	92.3	38.6	38.3	39.9	26.0	31.4
122	Roadside	Passive	90.4	90.4	25.9	29.0	28.5	19.7	24.0
123	Roadside	Passive	92.3	92.3	36.1	36.6	34.1	23.6	30.6
124	Roadside	Passive	92.3	92.3	32.4	33.1	33.3	21.0	27.4
125	Roadside	Passive	90.4	90.4	32.0	32.3	37.0	24.5	30.4
126	Roadside	Passive	100.0	100.0	27.6	26.1	28.8	20.1	24.4
128	Roadside	Passive	92.1	92.1	30.6	29.3	23.2	16.3	19.6
129	Roadside	Passive	100.0	100.0	30.4	29.7	27.8	19.2	23.4
131	Roadside	Passive	100.0	100.0	29.8	30.7	29.7	22.1	29.4
132	Roadside	Passive	80.8	80.8	26.7	25.8	24.5	17.8	23.3
134	Roadside	Passive	80.8	80.8	33.5	31.6	32.7	22.6	29.9
180	Roadside	Passive	80.8	80.8	24.4	24.7	23.8	17.5	22.2
182	Roadside	Passive	75.1	75.1	24.2	20.9	21.8	16.6	18.3
197	Roadside	Passive	100.0	100.0	28.1	26.6	25.9	18.4	22.7
198	Roadside	Passive	92.3	92.3	28.2	26.5	27.2	19.9	21.8
206	Roadside	Passive	84.7	84.7	34.0	30.4	30.0	22.4	26.3
207	Roadside	Passive	90.4	90.4	29.7	27.0	26.5	19.4	23.1
208	Roadside	Passive	92.3	92.3	29.2	28.6	26.0	19.3	23.9
209	Roadside	Passive	92.3	92.3	30.5	29.3	27.3	18.8	24.7
210	Roadside	Passive	100.0	100.0	26.6	25.8	25.8	16.4	21.8
211	Roadside	Passive	75.1	75.1	26.2	25.6	23.5	17.4	22.0
212	Roadside	Passive	100.0	100.0	17.8	19.4	17.7	12.8	15.8
213	Roadside	Passive	82.7	82.7	27.1	25.6	24.7	16.5	18.1
240	Roadside	Passive	92.1	92.1	26.2	25.4	24.3	18.6	22.9
242	Roadside	Passive	75.1	75.1	32.1	33.2	32.5	21.4	30.1
243	Roadside	Passive	100.0	100.0	32.1	28.6	27.9	22.0	26.5
244	Roadside	Passive	75.1	75.1	34.0	35.8	33.3	27.7	32.3
247	Roadside	Passive	73.2	73.2	25.5	26.0	24.0	19.6	20.9

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
249	Roadside	Passive	73.2	73.2	25.7	25.0	23.3	18.8	21.9
256	Roadside	Passive	82.7	82.7	32.5	31.7	31.0	23.8	27.2
275	Roadside	Passive	100.0	100.0	18.2	17.6	19.6	14.8	19.2
276	Roadside	Passive	92.1	92.1	30.6	25.7	24.2	19.4	24.2
277	Roadside	Passive	92.3	92.3	29.2	27.6	26.0	20.3	24.2
278	Roadside	Passive	82.7	82.7	26.6	27.9	25.0	20.2	23.7
279	Roadside	Passive	100.0	100.0	**41.3**	37.5	34.0	22.6	31.1
280	Roadside	Passive	84.7	84.7	31.3	31.6	31.1	24.1	27.8
281	Roadside	Passive	92.3	92.3	28.5	27.6	32.1	23.2	29.6
282	Roadside	Passive	100.0	100.0	28.3	25.9	32.8	25.9	29.4
284	Roadside	Passive	92.1	92.1	26.1	25.0	22.5	19.2	22.3
285	Roadside	Passive	84.4	84.4	26.7	26.5	26.2	20.2	23.5
286	Roadside	Passive	100.0	100.0	26.9	26.6	24.3	19.4	22.0
287	Roadside	Passive	82.7	82.7	24.5	24.0	23.7	17.4	24.2
288	Roadside	Passive	92.3	92.3	23.6	26.8	27.2	18.6	23.5
289	Roadside	Passive	82.7	82.7	27.7	26.9	27.3	20.2	26.4
291	Roadside	Passive	92.3	92.3	35.6	32.3	33.2	23.3	28.0
295	Roadside	Passive	92.3	92.3	26.8	23.7	27.1	19.5	22.9
296	Roadside	Passive	100.0	100.0	31.3	28.2	27.6	19.5	26.4
323	Roadside	Passive	100.0	100.0	29.6	26.4	27.3	19.1	23.9
331	Roadside	Passive	100.0	100.0	30.6	32.5	30.0	21.2	27.1
334	Roadside	Passive	84.4	84.4	25.8	27.2	27.2	18.2	23.1
335	Roadside	Passive	84.7	84.7	24.1	25.4	24.8	17.5	23.2
336	Roadside	Passive	92.3	92.3	30.4	30.0	28.4	21.3	24.1
337	Roadside	Passive	92.1	92.1	31.6	29.1	35.6	25.9	26.4
338	Roadside	Passive	84.4	84.4	29.6	29.9	28.7	20.9	25.4
339	Roadside	Passive	92.3	92.3	30.9	33.1	32.7	23.4	28.1
340	Roadside	Passive	100.0	100.0	**41.0**	**41.3**	39.6	26.3	32.5
341	Roadside	Passive	90.4	90.4	32.6	31.0	34.8	25.1	31.2
342	Roadside	Passive	82.7	82.7	27.6	28.7	34.4	22.4	29.0
343	Roadside	Passive	90.4	90.4	29.2	26.1	26.0	18.2	24.0
346	Roadside	Passive	92.3	92.3	28.3	29.8	28.8	17.8	23.5
347	Roadside	Passive	92.3	92.3	27.5	25.7	24.1	17.8	23.4
348	Roadside	Passive	100.0	100.0	28.7	28.0	27.0	19.8	25.8
349	Roadside	Passive	73.2	73.2	28.8	26.8	25.8	19.4	26.6
350	Roadside	Passive	100.0	100.0	33.2	31.1	28.8	23.4	30.9

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
356	Roadside	Passive	100.0	100.0	25.0	27.5	24.5	17.3	20.8
362	Roadside	Passive	82.7	82.7	35.1	34.3	31.4	19.8	28.8
363	Roadside	Passive	84.7	84.7	28.4	27.0	26.5	15.0	23.7
364	Roadside	Passive	100.0	100.0	32.6	32.7	30.0	19.3	27.2
373	Roadside	Passive	100.0	100.0	28.5	27.3	25.2	18.4	23.6
375	Roadside	Passive	100.0	100.0	14.7	14.4	13.4	11.2	12.6
376	Roadside	Passive	100.0	100.0	25.0	24.8	23.6	18.8	23.6
377	Roadside	Passive	100.0	100.0	29.9	28.2	26.8	20.9	24.5
385	Roadside	Passive	100.0	100.0	21.8	20.6	21.0	16.1	19.4
386	Roadside	Passive	92.3	92.3	22.9	22.3	24.8	17.5	22.3
388	Roadside	Passive	92.3	92.3	17.2	16.0	16.2	11.1	13.0
390	Roadside	Passive	100.0	100.0	30.8	29.7	27.4	20.7	24.3
391	Roadside	Passive	76.7	76.7	24.3	22.4	24.2	18.6	21.8
394	Roadside	Passive	100.0	100.0	16.2	14.0	14.4	9.9	11.3
396	Roadside	Passive	92.3	92.3	18.4	16.2	17.0	11.5	13.3
398	Roadside	Passive	92.3	92.3	11.1	10.6	16	13.3	13.9
399	Roadside	Passive	92.3	92.3	17.5	19.1	26.6	18.4	22.8
401	Roadside	Passive	82.7	82.7	22.2	21.5	23.9	18.7	21.1
403	Roadside	Passive	80.8	80.8	32.1	29.6	30.0	19.8	26.5
404	Roadside	Passive	100.0	100.0	19.1	19.6	25.7	18.2	23.6
406	Roadside	Passive	92.3	92.3	33.5	30.9	29.1	26.4	29.3
407	Roadside	Passive	90.4	90.4	20.8	19.4	18.3	14.5	18.1
408	Roadside	Passive	92.3	92.3	35.9	30.7	32.2	22.1	27.4
412	Roadside	Passive	92.3	92.3	21.8	21.5	21.1	17.1	20.7
413	Roadside	Passive	84.4	84.4	24.4	24.3	23.8	17.9	23.8
415	Roadside	Passive	90.4	90.4	-	29.6	25.9	21.1	23.3
416	Roadside	Passive	100.0	100.0	-	20.3	18.2	14.9	16.2
417	Roadside	Passive	100.0	100.0	-	24.5	22.7	16.8	18.3
418	Roadside	Passive	100.0	100.0	-	24.6	21.0	16.9	20.2
419	Roadside	Passive	90.4	90.4	-	24.4	22.9	17.9	21.4
422	Roadside	Passive	82.5	82.5	-	18.1	16.9	12.3	14.7
423	Roadside	Passive	100.0	100.0	-	13.6	11.6	9.4	11.4
424	Roadside	Passive	100.0	100.0	-	23.3	20.5	16.3	18.5
425	Roadside	Passive	100.0	100.0	-	24.1	25.9	18.7	21.7
426	Roadside	Passive	84.7	84.7	-	-	33.1	26.0	29.8
427	Roadside	Passive	100.0	100.0	-	-	37.2	30.0	35.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
428	Roadside	Passive	100.0	100.0	-	-	12.7	9.7	12.5
429	Roadside	Passive	100.0	100.0	-	-	18.3	13.4	17.7
430	Roadside	Passive	100.0	100.0	-	-	12.1	10.0	10.8
431	Roadside	Passive	82.7	82.7	-	-	14.0	10.6	10.7
432	Roadside	Passive	75.1	75.1	-	-	17.6	13.7	15.8
433	Roadside	Passive	73.2	73.2	-	-	18.9	14.4	16.0
434	Roadside	Passive	100.0	100.0	-	-	23.4	18.0	22.0
435	Roadside	Passive	100.0	100.0	-	-	18.4	12.0	15.1
436	Roadside	Passive	100.0	100.0	-	-	17.8	14.4	16.5
437	Roadside	Passive	100.0	100.0	-	-	27.0	18.4	22.2
438	Roadside	Passive	82.7	82.7	-	-	21.3	15.8	18.7
439	Roadside	Passive	59.5	59.5	-	-	20.0	13.7	15.9
440	Roadside	Passive	59.5	59.5	-	-	19.7	13.3	16.8
441	Roadside	Passive	59.5	59.5	-	-	28.4	18.3	19.0
442	Roadside	Passive	59.5	59.5	-	-	22.7	16.9	17.6
444	Roadside	Passive	59.5	59.5	-	-	25.5	24.2	22.7
445	Roadside	Passive	59.5	59.5	-	-	35.9	23.5	24.8
446	Roadside	Passive	59.5	59.5	-	-	32.9	13.7	24.3
447	Roadside	Passive	51.8	51.8	-	-	19.9	16.8	13.5
448	Roadside	Passive	59.5	59.5	-	-	24.7	15.9	21.7
449	Roadside	Passive	49.9	49.9	-	-	22.9	18.6	26.1
450	Roadside	Passive	51.8	51.8	-	-	24.5	14.1	23.0
451	Roadside	Passive	100.0	100.0	-	-	-	10.4	16.2
452	Roadside	Passive	90.4	90.4	-	-	-	6.4	13.8
453	Roadside	Passive	100.0	100.0	-	-	-	16.3	7.2
454	Roadside	Passive	92.3	92.3	-	-	-	18.1	19.0
455	Roadside	Passive	100.0	100.0	-	-	-	16.2	23.2
456	Roadside	Passive	-	-	-	-	-	13.9	-
457	Roadside	Passive	-	-	-	-	-	20.0	-
458	Roadside	Passive	49.9	49.9	-	-	-	33.4	23.3
459	Roadside	Passive	75.1	75.1	-	-	-	11.7	39.3
460	Roadside	Passive	90.4	90.4	-	-	-	20.1	17.2

Notes:

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) Concentrations that have been distance corrected.

Figure 2.11 – Trends in Annual Mean NO_2 Concentrations at Automatic Monitoring Sites

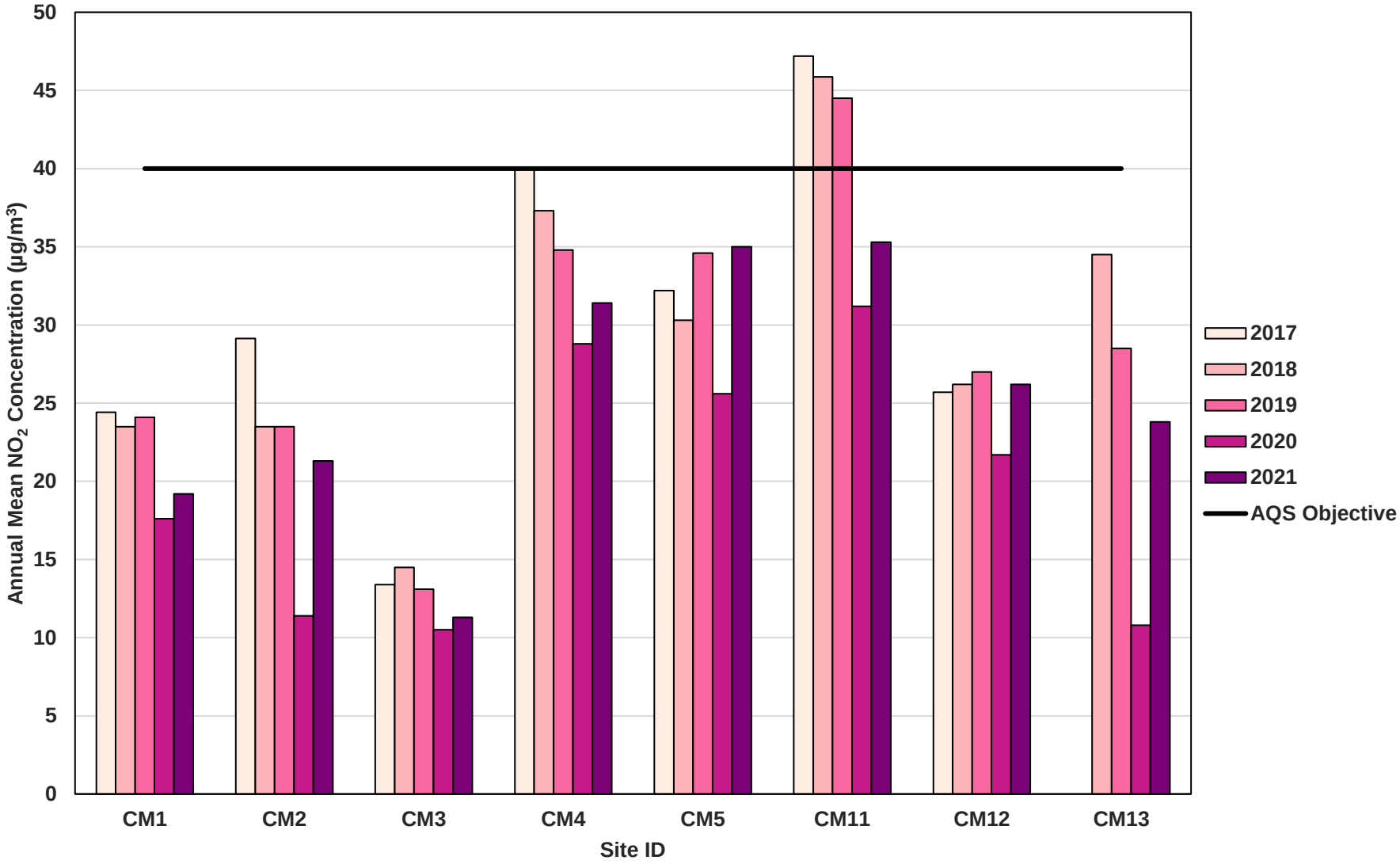


Figure 2.12 – Trends in Annual Mean NO_2 concentrations in Hafod and Landore

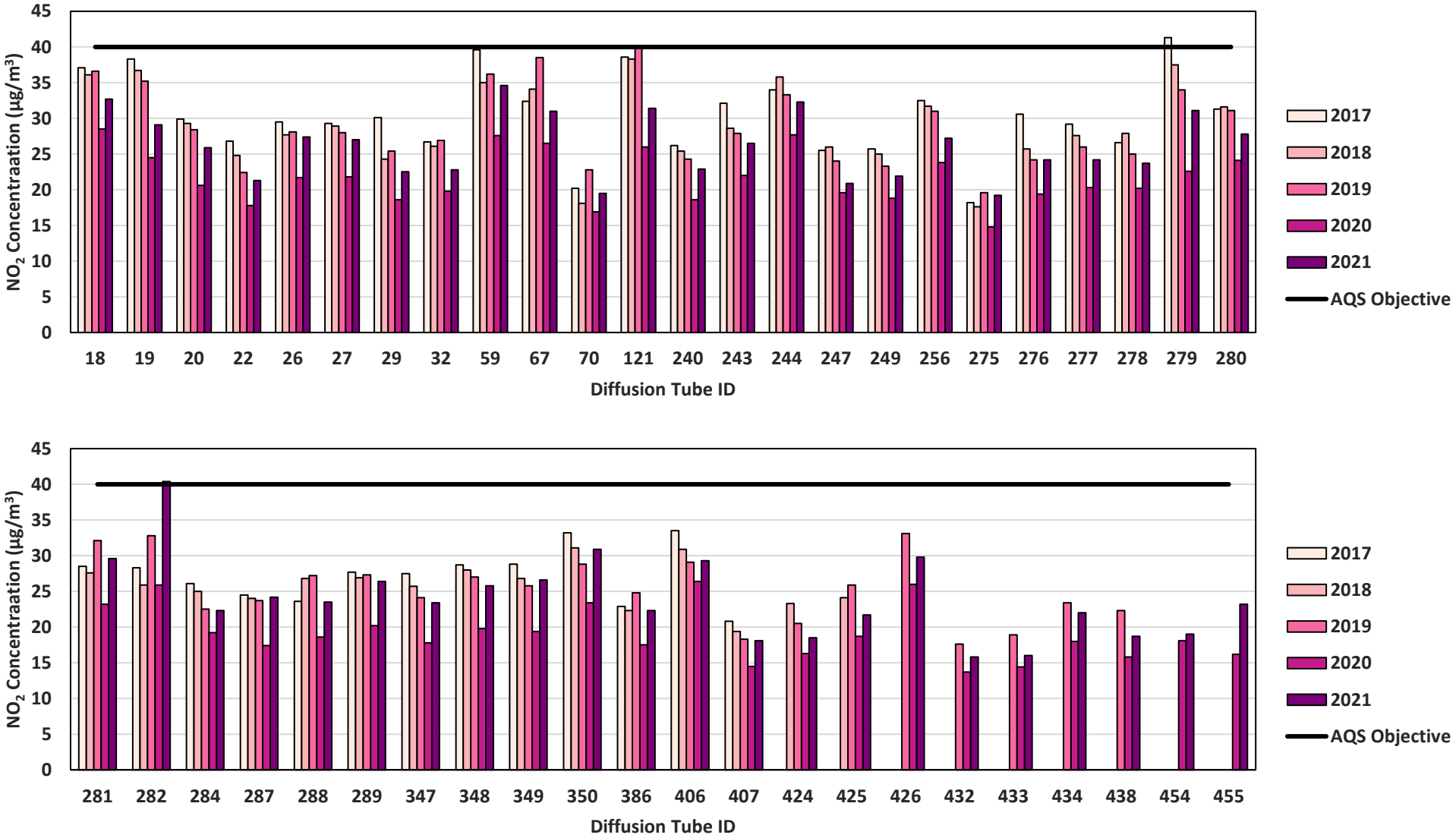


Figure 2.13 – Trends in Annual Mean NO_2 concentrations in Fforestfach

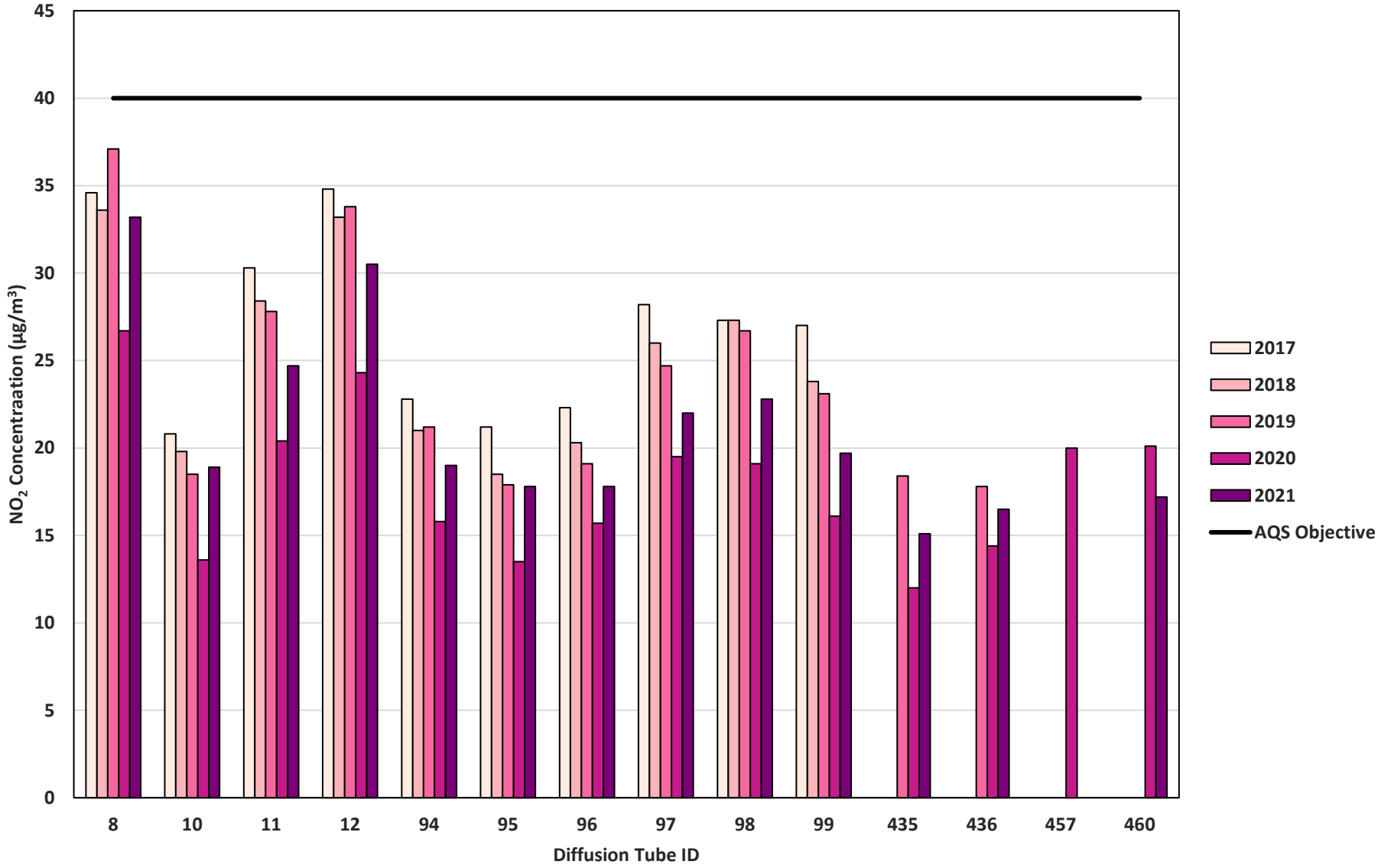


Figure 2.14 – Trends in Annual Mean NO_2 concentrations in Sketty

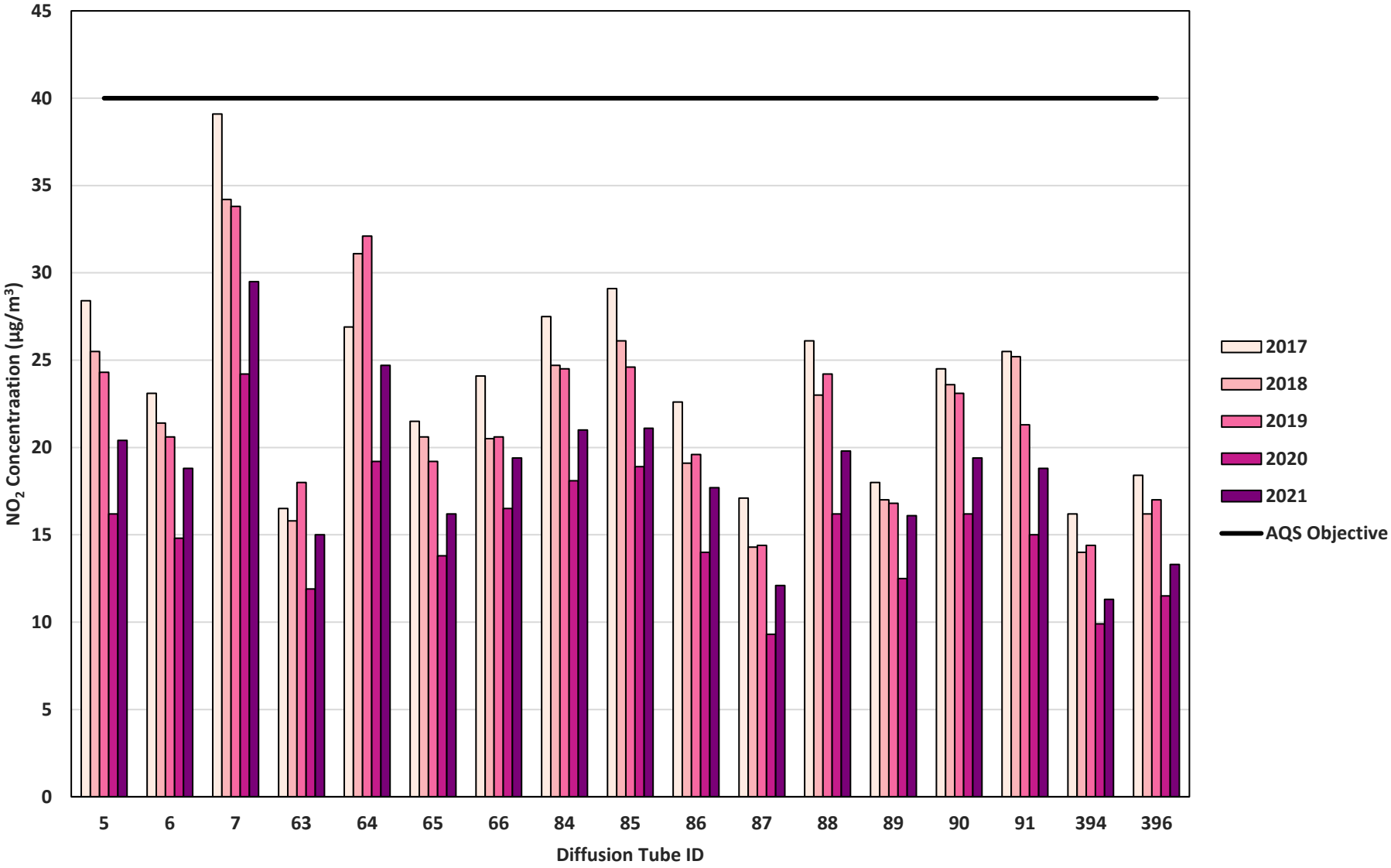


Figure 2.15 – Trends in Annual Mean NO_2 concentrations in St Thomas

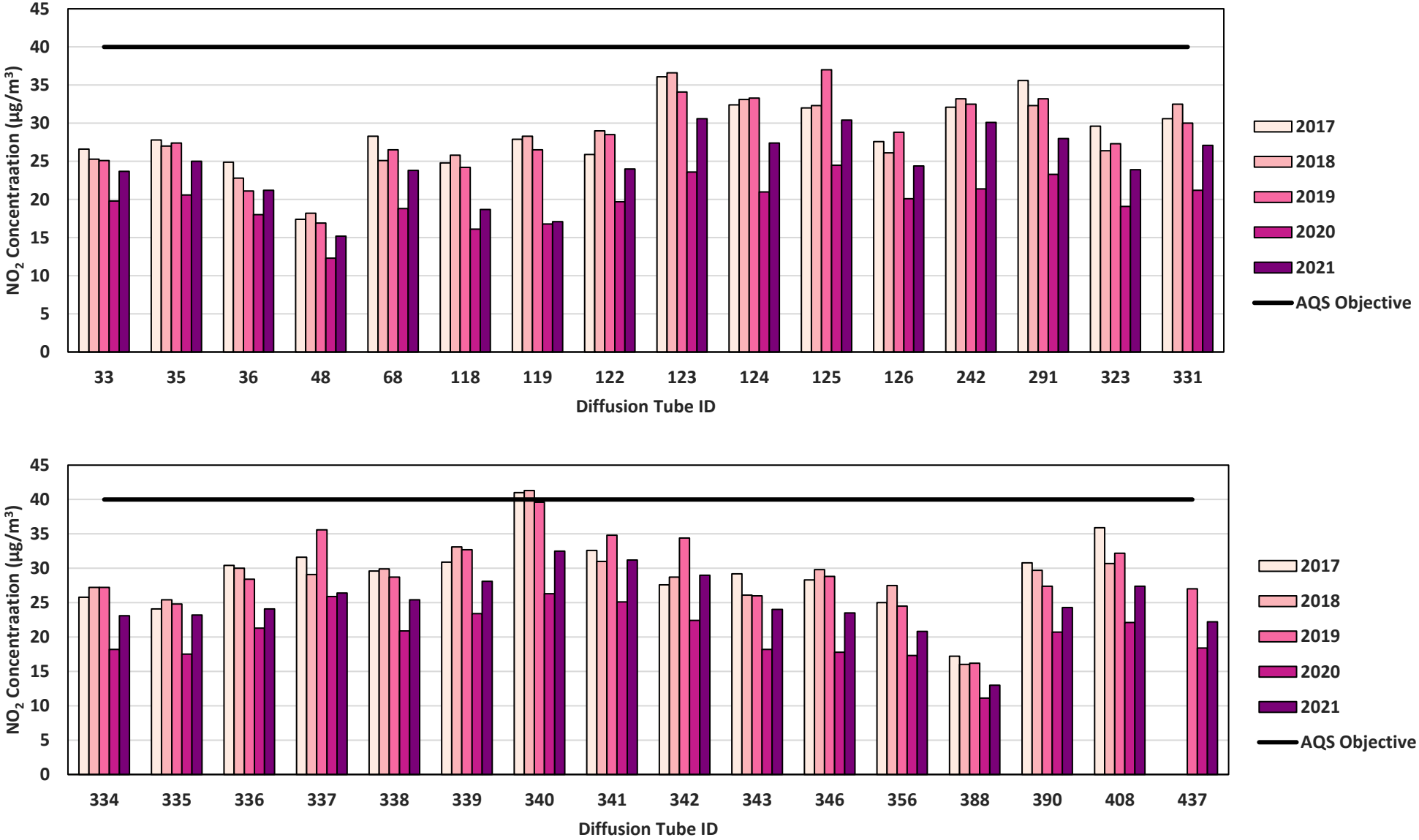


Figure 2.16 – Trends in Annual Mean NO_2 concentrations in Uplands and City Centre West

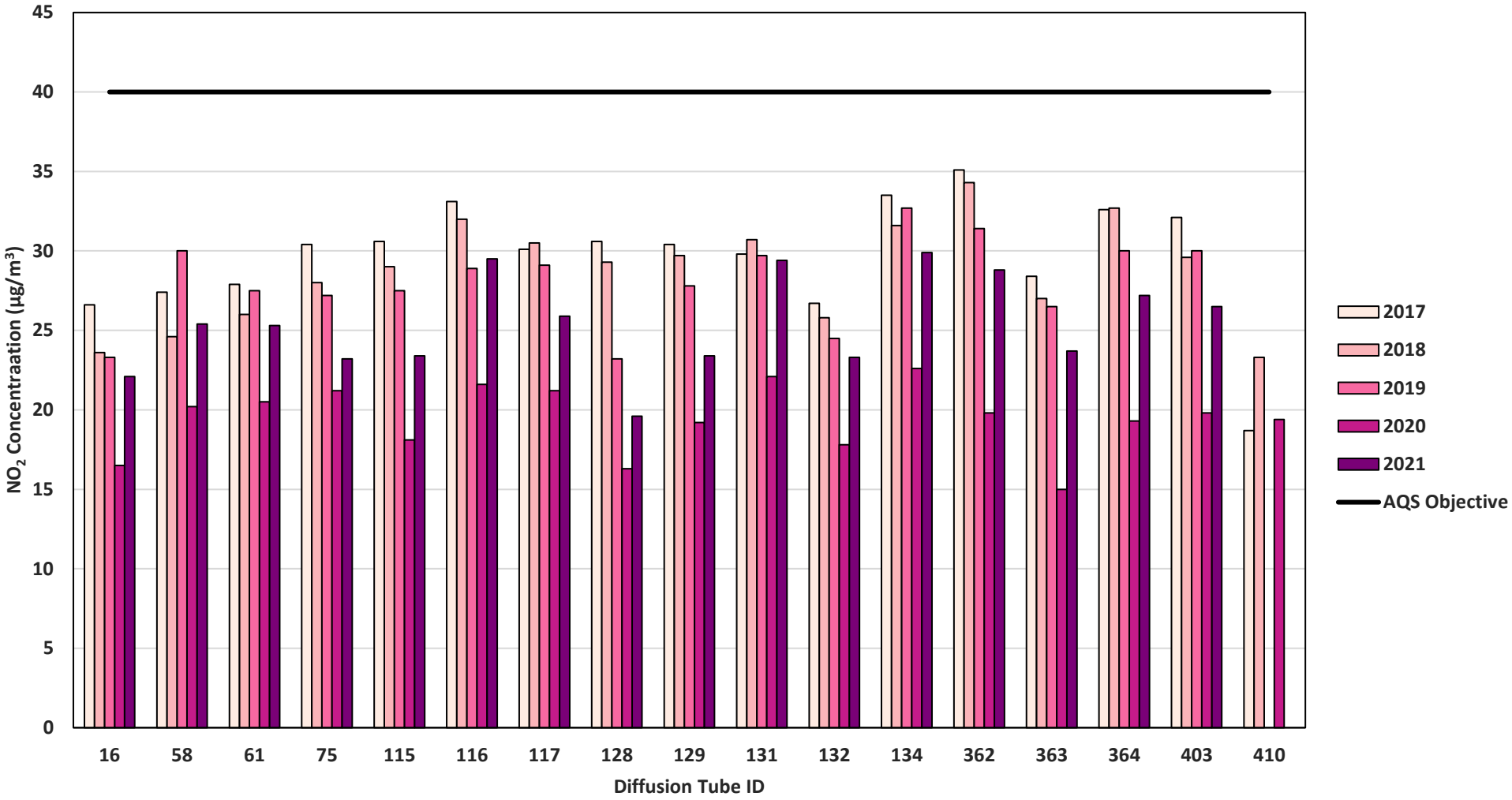


Figure 2.17 – Trends in Annual Mean NO_2 concentrations in North Swansea

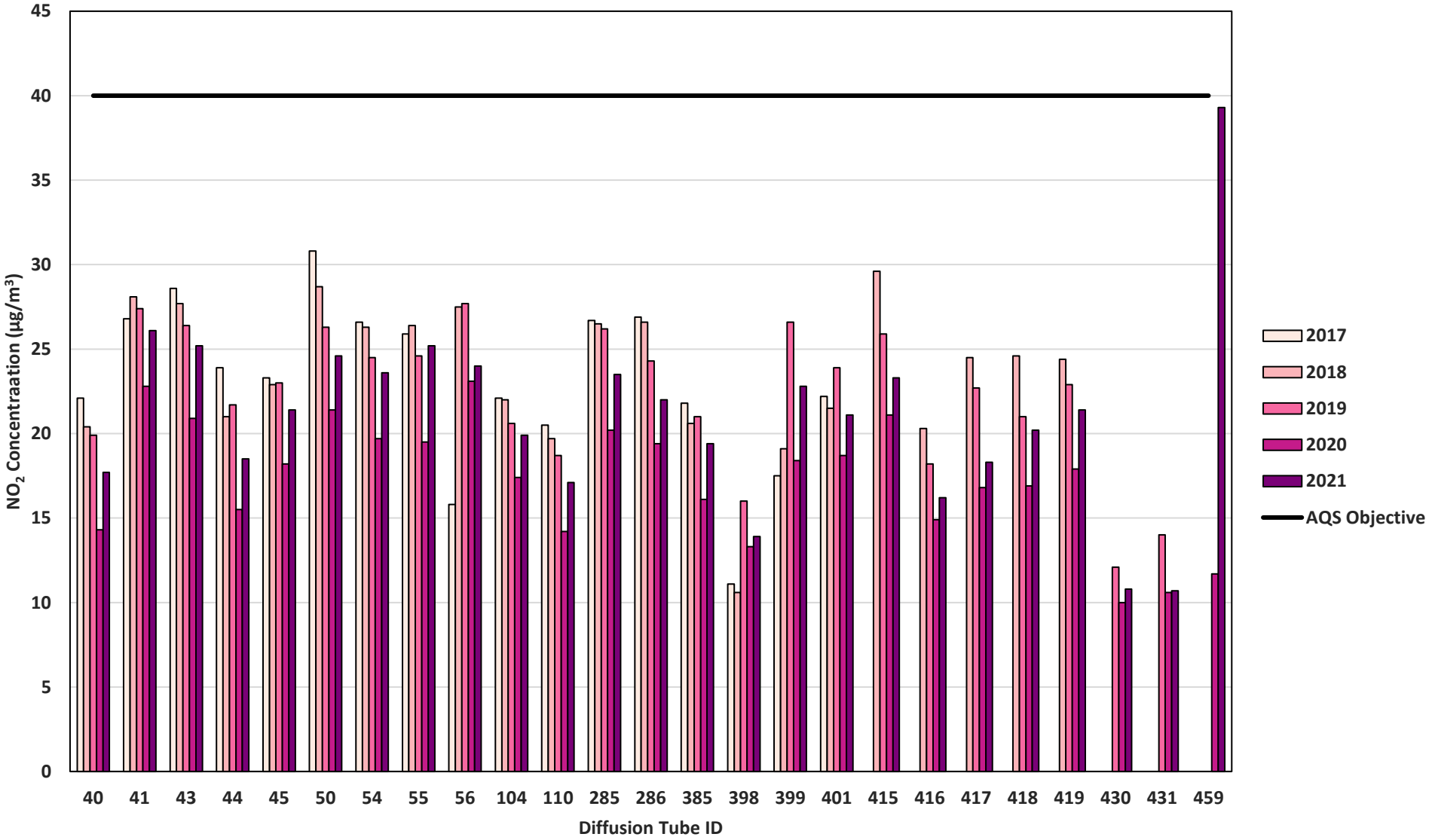


Figure 2.18 – Trends in Annual Mean NO_2 concentrations in Gorseinon and Gowerton

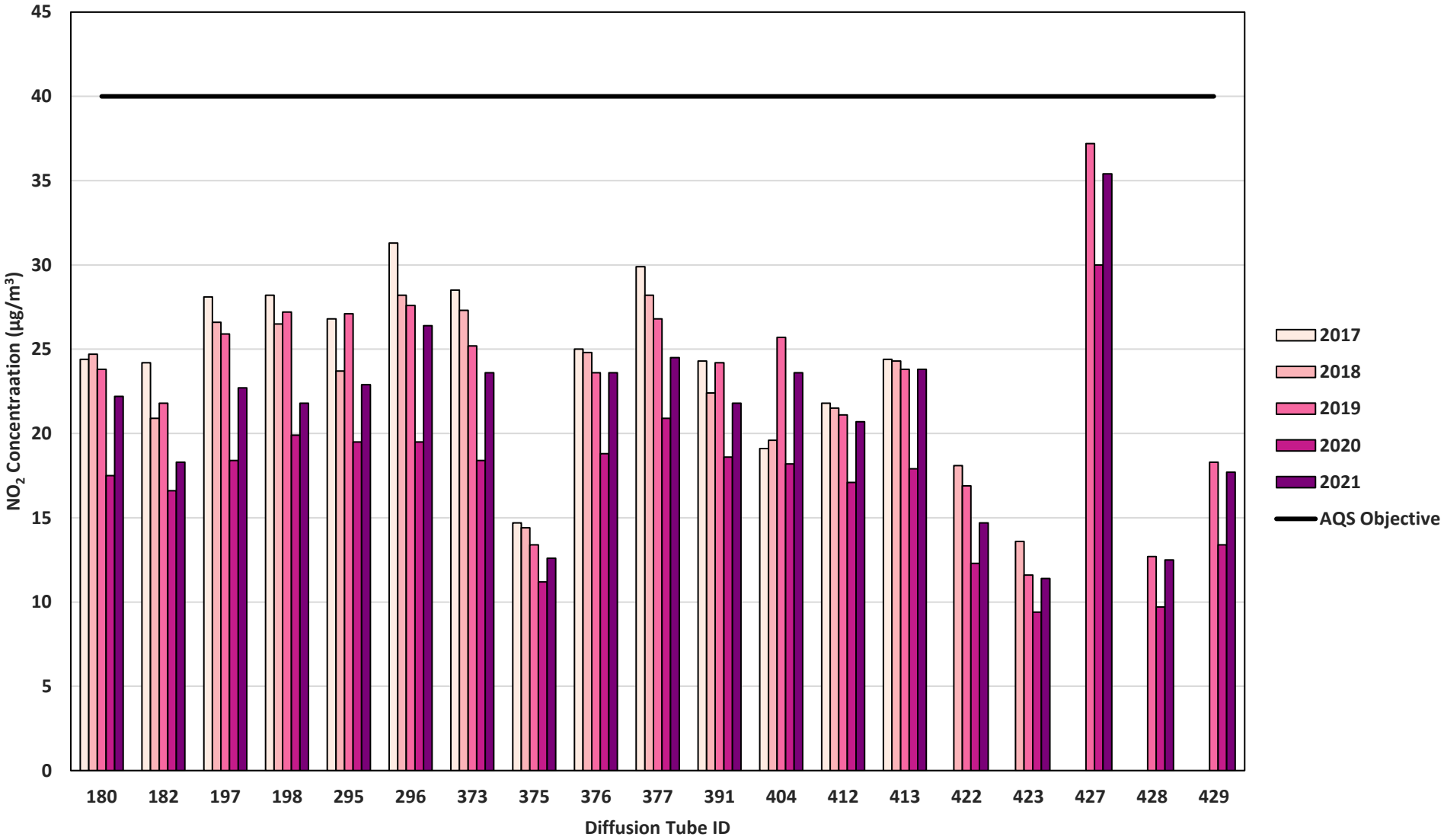


Figure 2.19 – Trends in Annual Mean NO_2 concentrations at New Diffusion Tube Sites

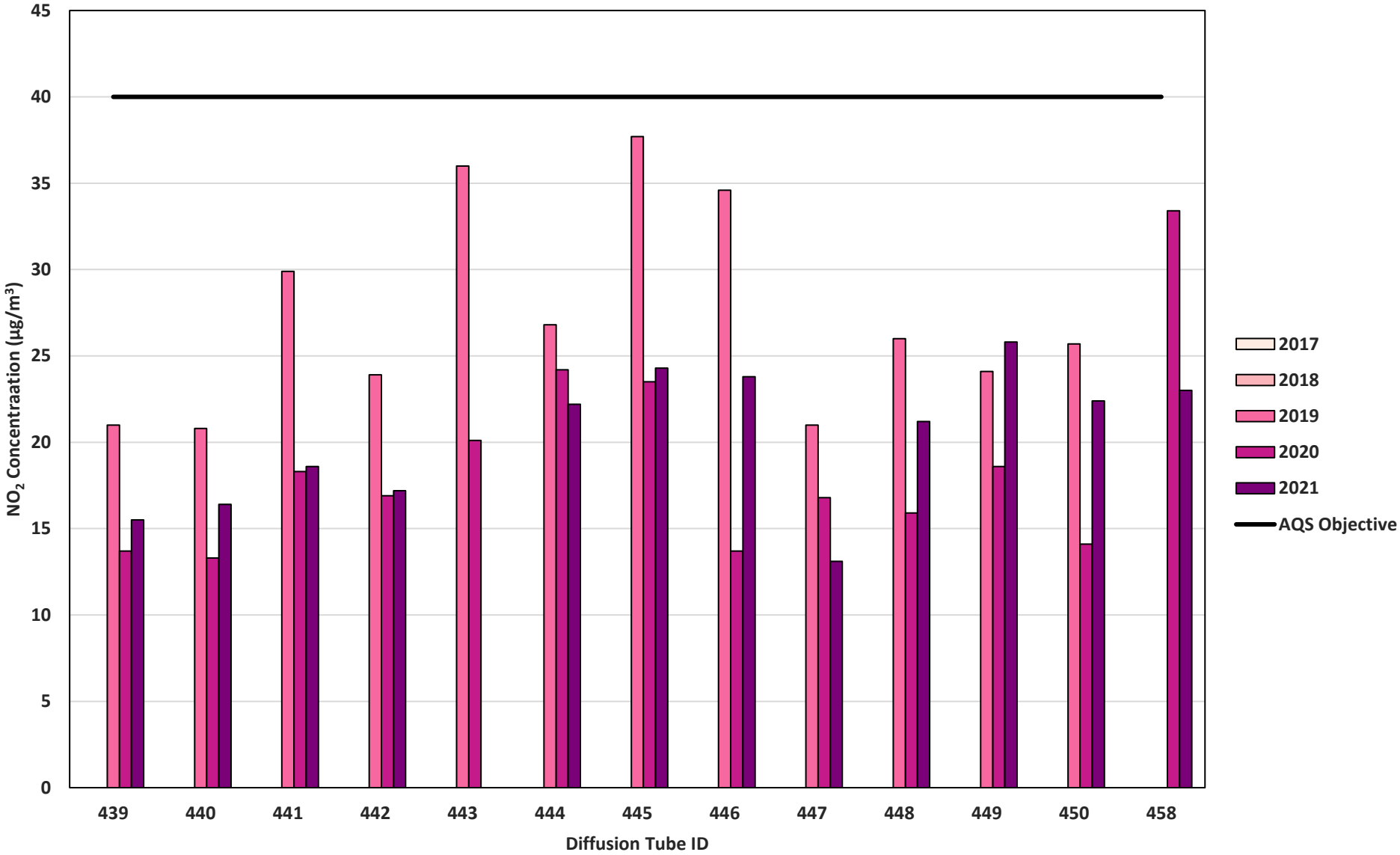


Figure 2.20 – Trends in Annual Mean NO_2 concentrations in The Mumbles

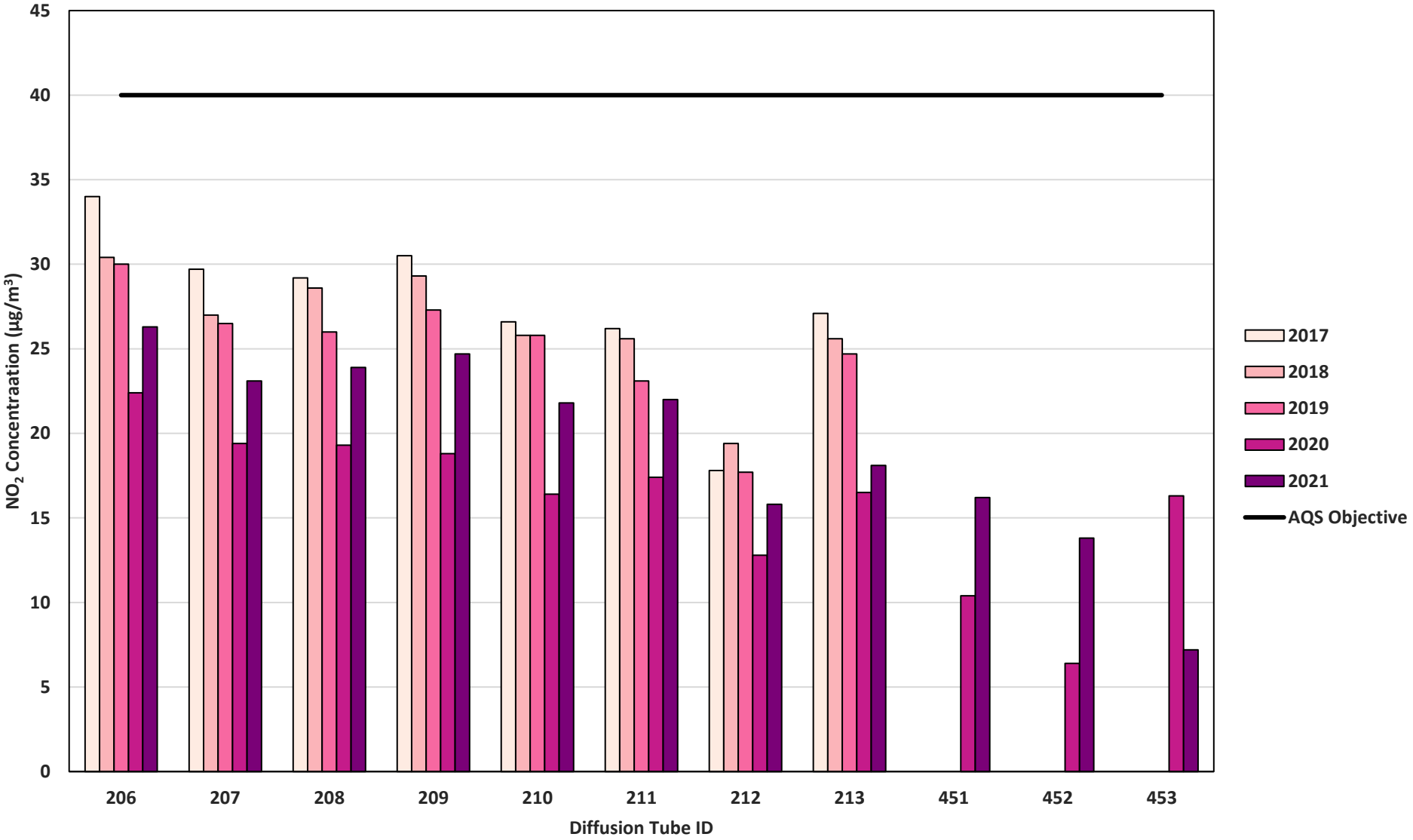


Figure 2.21 – Trends in Annual Mean NO_2 concentrations in Blackpill

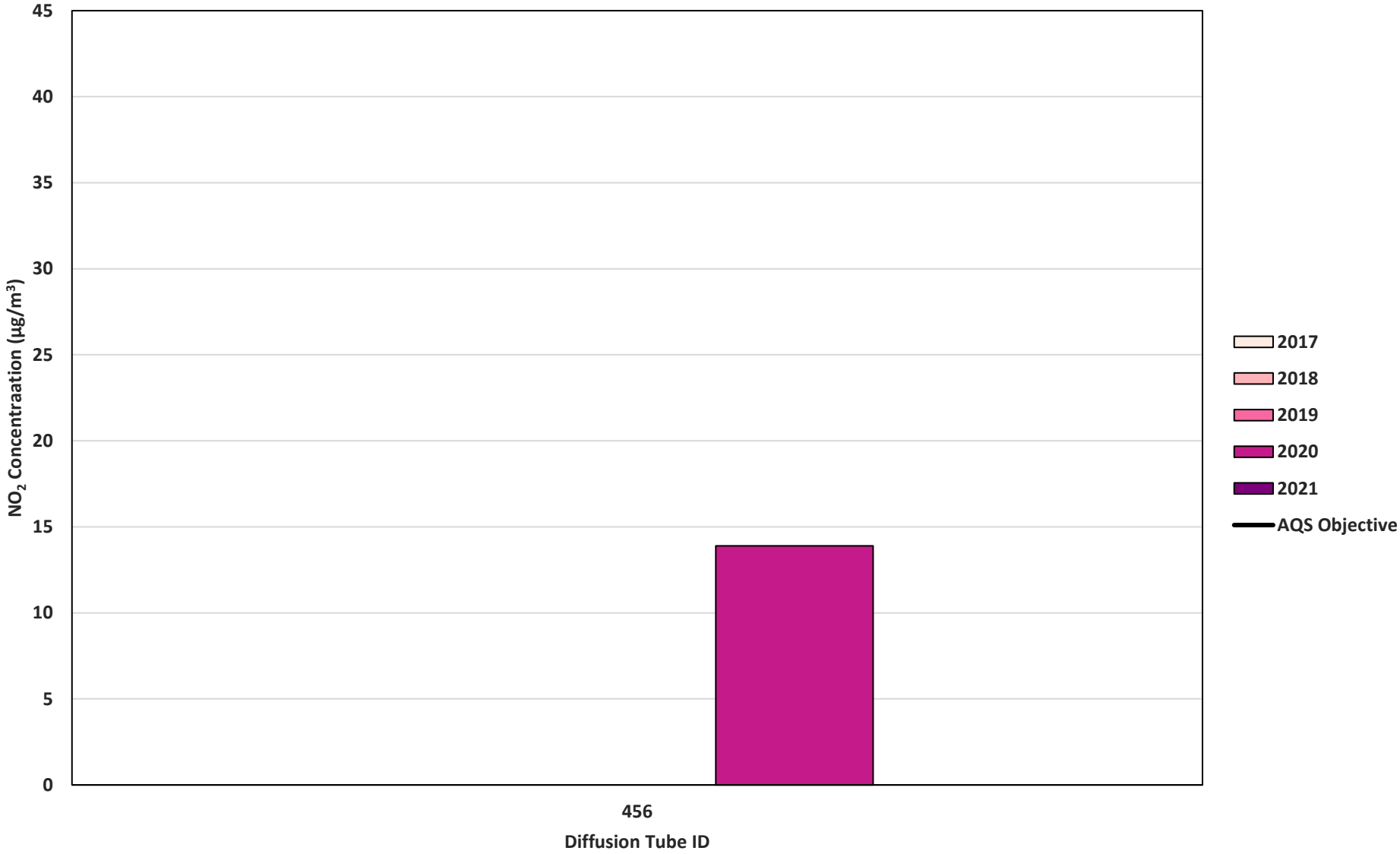


Table 2.4 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	98.4	98.4	0	**0**	0	0	0
CM2	Roadside	57.8	57.8	0	0	0	3	0
CM3	Urban Background	94.6	94.6	1	0	0	1	0
CM4	Roadside	89.3	89.3	0 (69.69)	1 (34.60)	0	0	0
CM5	Roadside	69.5	69.5	0	0	0	0	0 (97)
CM11	Roadside	84.9	84.9	-	0 (35.69)	0 (100)	0	0
CM12	Roadside	91.8	91.8	0	0	0	1	0 (109)
CM13	Roadside	88.2	88.2	0	0	1	0	0

Notes:

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

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

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

Table 2.5 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	83.1	83.1	18.9	19.7	18.4	18.3	18.1
CM6	Roadside	54.6	54.6	10.6	9.9(3)	17.4	17.7	15.8(3)
CM7	Roadside	82.2	82.2	11.1	12.5(3)	15.1	15.6	15.3
CM8	Roadside	96.0	96.0	11.4	14.7(3)	18.6	15.9	14.5
CM9	Roadside	52.5	52.5	9.7	11.4	16.0	18.3	14.5(3)

Notes:

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

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

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

(3) All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 2.22 – Trends in Annual Mean PM_{10} Concentrations

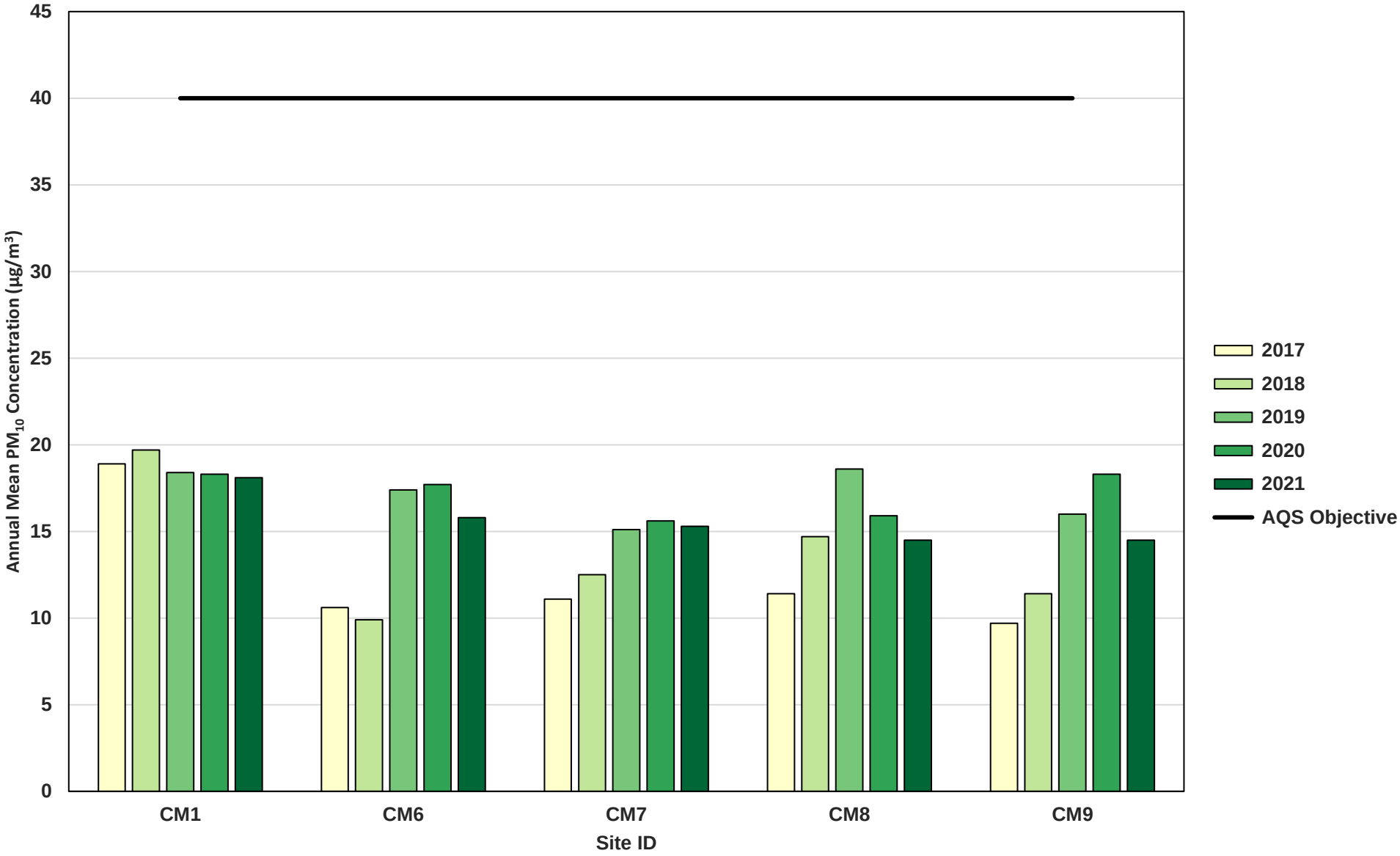


Table 2.6 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	83.1	83.1	1	0	2	1	4
CM6	Roadside	54.6	54.6	0	0 (15.03)	0	1	1 (23.2)
CM7	Roadside	82.2	82.2	0	0 (18.55)	0	0 (25.0)	1
CM8	Roadside	96.0	96.0	0	0 (22.63)	3	0 (22.4)	1
CM9	Roadside	52.5	52.5	0	0 (17.83)	0 (22.8)	0	1 (21.1)

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

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

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

Figure 2.23 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3

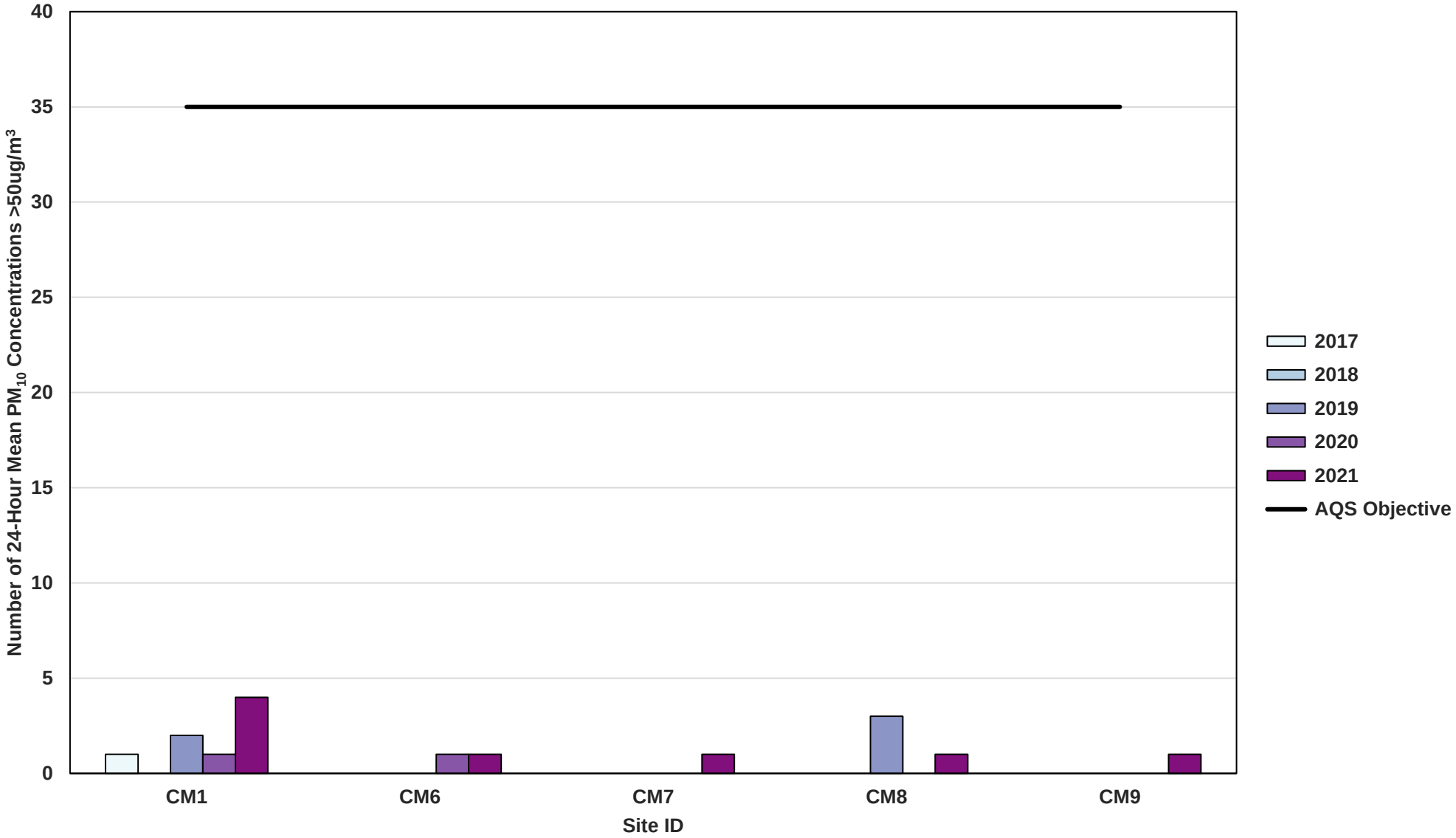


Table 2.7 – $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	86.6	86.6	14.6	12.9	9.9	7.9	9.1
CM2	Roadside	78.9	78.9	10.0	10.9	9.3	11.4	11.8
CM13	Roadside	87.2	87.2	-	7.3(3)	9.5(3)	10.8	11.0

Notes:

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure 2.24 – Trends in Annual Mean $PM_{2.5}$ Concentrations

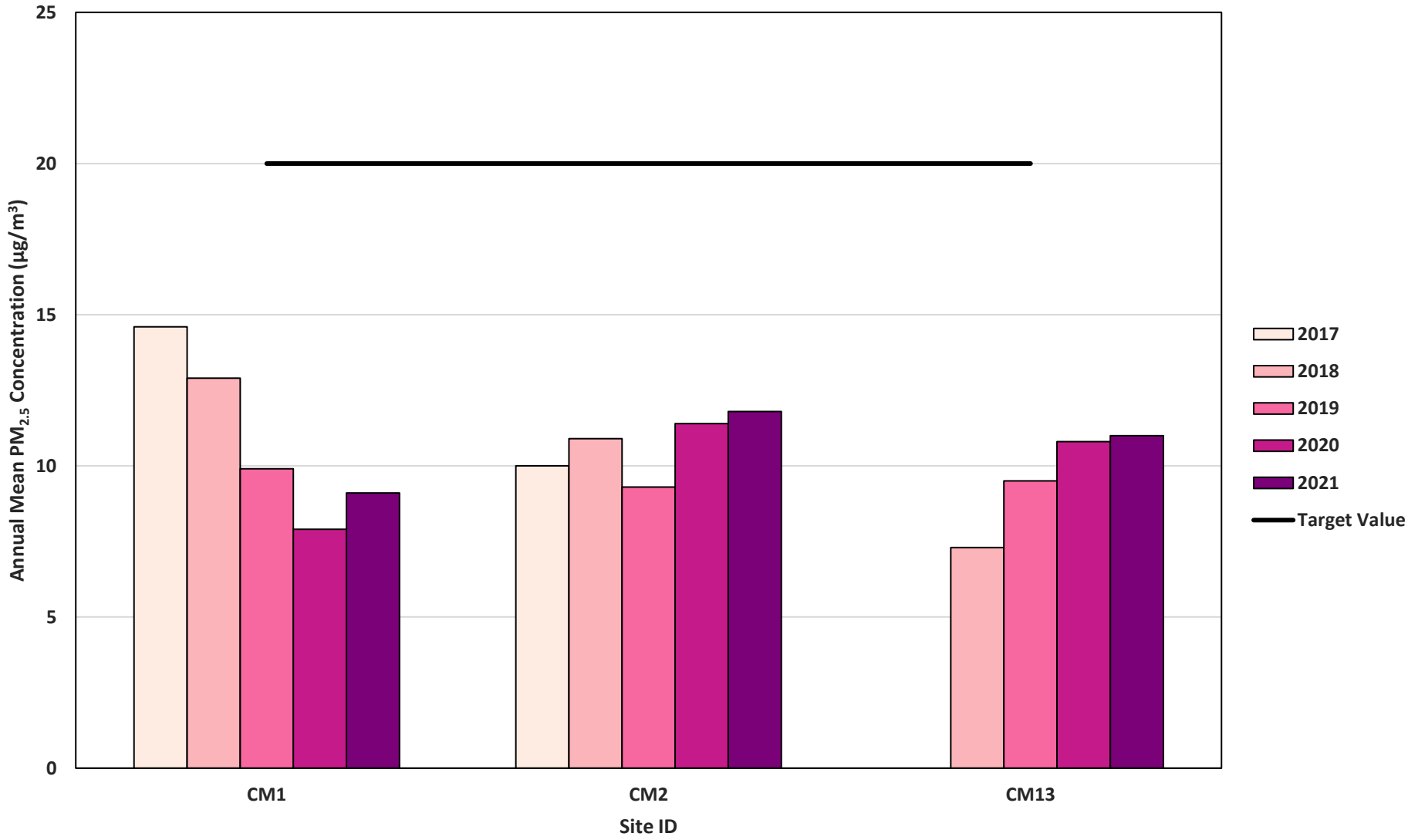


Table 2.8 – Results Automatic Ozone Monitoring, Number of 8-Hour Means > 100µg/m^3

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM2	Roadside	52.7	52.7	-	-	7	13	1
CM3	Urban Background	96.6	96.6	-	-	2	3	2
CM4	Roadside	90.6	90.6	-	-	1	1	0
CM5	Roadside	69.1	69.1	-	-	49	14	0

Notes:

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

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

Table 2.9 – Results Automatic Sulphur Dioxide Monitoring

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	1-hour Means> 350µg/m^3	24-hour Means> 125µg/m^3
CM5	Roadside	82.1%	82.1%	0	0

Comparison of 2021 Monitoring Results with Previous Years and the Air Quality Objectives

2.1.3 Nitrogen Dioxide (NO_2)

The automatic monitoring stations located in Swansea continues to report compliance with the annual mean NO_2 AQS objective.

During 2021 there were no exceedances of the NO_2 AQS objective, with the majority of passive monitoring sites recording concentrations well below the objective. From 2020 – 2021, 187 sites reported increases in NO_2. The maximum NO_2 annual mean concentration in 2021 was 39.3µg/m^3, reported at Site ID: 459 which is located along the A4067. At this site there was an increase of 27.6µg/m^3 compared to 2020. This is likely influenced by the result of the COVID-19 pandemic, with traffic levels increasing in 2021 compared to lows within 2020.

All sections of the Swansea AQMAs continue to report compliance, with AQMA sections within Sketty and Fforestfach reporting five years of compliance and Hafod reporting two years of full compliance. In addition, 183 sites have shown an increase in concentrations within 2021 compared to 2020. Therefore, there is currently no intention to revoke Swansea AQMA. Monitoring data will continue to be reviewed at this site over the subsequent years, and in the event of continual increases and exceedances, further assessment will be completed. If monitored data shows a consistent decrease, Swansea may look to initiate the revocation process of Swansea AQMA.

There are no passive monitoring sites where the NO_2 annual mean is greater than 60 µg/m^3, therefore in accordance with Defra LAQM.TG(22) there are no sites likely to be at risk of exceeding the 1-hour mean AQS objective.

One site reported a concentration within 10% of the NO_2 AQS objective, fall-off with distance correction calculations was carried out in accordance to LAQM.TG(22). After distance correction calculations, Site ID: 459 reported a concentration of 21.2 µg/m^3, which is below 10% of the AQS for NO_2 . Sixteen monitoring sites had a data capture in between 25-75% and therefore, annualisation was carried out in accordance with LAQM.TG(22) and can be seen in Table C.2.

2.1.4 Particulate Matter (PM_{10})

During 2021, all automatic monitoring sites recorded PM_{10} concentrations well below the 40 µg/m^3 PM_{10} AQS objective. There is a minor reduction in all monitors since 2020, with an average decrease of 9%, overall, the annual mean concentration remains relatively stable and consistent over the last five years.

There was no 24-hour mean concentrations in excess of 50µg/m^3 in 2021, therefore compliance to the 24-hour AQS objective.

Data capture at two automatic monitoring stations (CM6 and CM9) in 2021 had a data capture between 25% and 75%, annualisation was carried out in accordance with LAQM.TG(22) and can be seen in Table C.4

2.1.5 Particulate Matter ($PM_{2.5}$)

During 2021 all automatic monitoring sites recorded $PM_{2.5}$ concentrations well below the $PM_{2.5}$ AQS target. There is a minor increase amongst all monitoring sites since 2020, with an average increase of 7%, but overall, the annual mean concentrations remains relatively stable and consistent over the last five years. There is no LAQM air quality objective for $PM_{2.5}$, however concentrations continue to remain low and consistent.

2.1.6 Other Pollutants Monitored (Sulphur Dioxide (SO_2) and Ozone (O_3))

The St Thomas automatic monitor recorded no exceedances of the SO_2 AQS objectives in 2021.

The maximum number of 8-hour mean O_3 concentrations greater than 100 µg/m^3 reported at the Swansea Cwm Level Park automatic monitoring location in 2021 was 2. There is no LAQM air quality objective for O_3, however this does not exceed the UK National air quality objective of 100 µg/m^3 not to be exceeded more than 10 times a year.

Summary of Compliance with AQS Objectives as of 2021

Swansea Council has examined the results from monitoring in the Swansea district. Concentrations across the monitoring networking showed full compliance with the AQS objective, with only one site within 10% of the NO_2 AQS objective at 459 with concentration

39.3 µg/m^3. The remaining sites displayed concentrations well below the NO_2 AQS objective.

3 New Local Developments

Table 3.1 shows the planning applications received in 2020 and 2021 that may have an effect on Air Quality Objective concentrations within the area.

Table 3.1 – Planning Application

App Ref No.	Location	Description
2020/0097/FUL	Land North Of Jockey Street Swansea SA1 1NS	Construction of a 328 bed high rise purpose built student accommodation with associated car parking, access and infrastructure works  2020_0097_FUL-AIR_QUALITY_ASSESSMENT-
2021/1415/FUL	180 High Street City Centre Swansea SA1 1NL	Construction of building (demolition already agreed) up to 11 storeys comprising purpose-built managed student accommodation, known as Ty Nant (Unique Use); associated amenity space; cycle and car parking; landscaping; and access from Powell Street  2021_1415_FUL-AIR_QUALITY_REPORT-1223

Road Traffic Sources (and Other Transport)

None

Industrial / Fugitive or Uncontrolled Sources / Commercial Sources

There have been no new Industrial Installations installed since the last assessment.

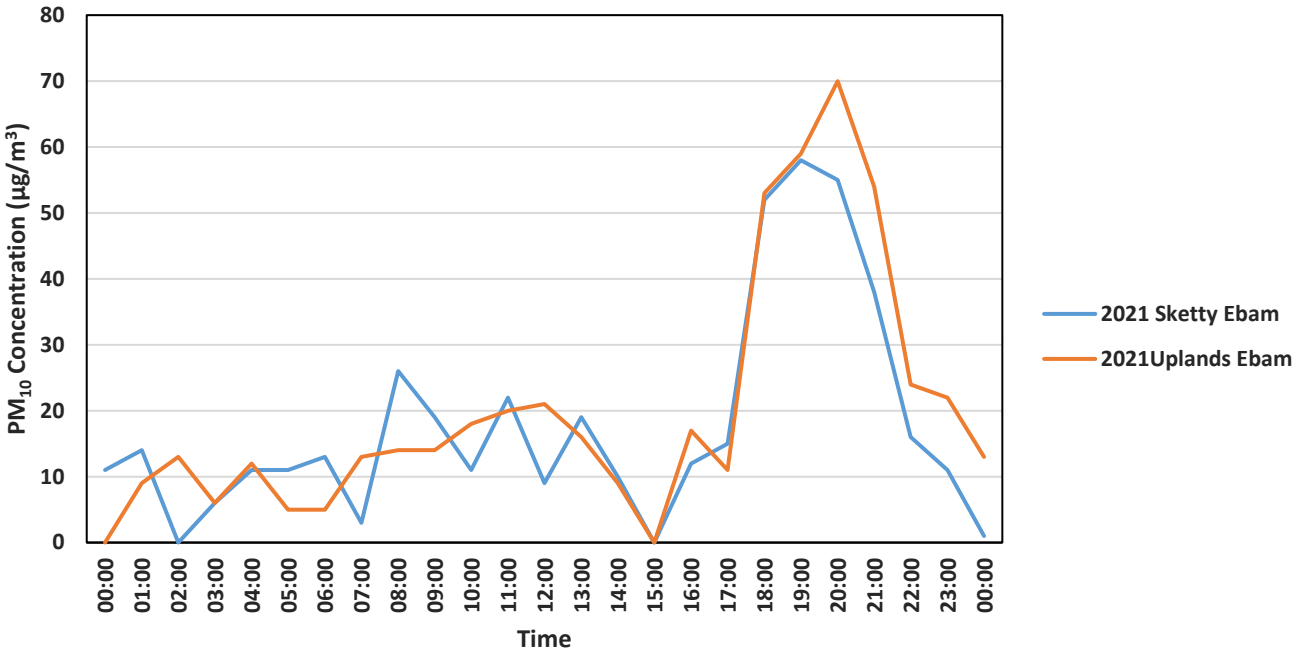
There are no new potential sources of fugitive or uncontrolled particulate matter since the last assessment.

Other Sources

During bonfire night, particulate monitors in Swansea often record elevated concentrations as a result of Firework displays in the city.

Figure 3.1 shows the peaks recorded in 2021 on bonfire night (5th November 2021).

Figure 3.1 – Diurnal PM_{10} Concentration on the 5th November 2021



4 Policies and Strategies Affecting Airborne Pollution

Local / Regional Air Quality Strategy

None

Air Quality Planning Policies

The Swansea Local Development Plan (LDP) was adopted on the 28th February 2019. Under the provisions of the Planning (Wales) Act, the LDP forms the statutory development plan for Swansea Council. It will be used as the primary material consideration to inform decisions on planning applications and development proposals.

https://www.swansea.gov.uk/ldp

Within the LDP are the following policies regarding Air, Noise and Light Pollution:

RP 1: Safeguarding Public Health and Natural Resources

Development will not be permitted that would result in significant risk to: life; human health and wellbeing; property; controlled waters; or the natural and historic environment, particularly in respect of:

i. Air, noise or light pollution;
ii. Flood risk;
iii. The quality or quantity of water resources;
iv. Land contamination;
v. Land instability or subsidence;
vi. Sustainable development of mineral resources; and,
vii. Sustainable waste management.

Development will not be permitted if judged to have a significant adverse effect on the integrity of any European Designated Sites, either alone or in combination with other plans or projects

RP 2: Noise Pollution

Where development could lead to exposure to a source of noise pollution it must be demonstrated that appropriate mitigation measures will be implemented, and incorporated into the design of the development to minimise the effects on existing and future occupants. Noise sensitive developments will not be permitted unless effective and appropriate mitigation is carried out to prevent exposure to existing noise generating uses. Development will not be permitted if it would cause, or result in, a significant increase in levels of environmental noise in an identified Noise Action Planning Priority Area, or would have unacceptable impacts on an identified Quiet Area or the characteristics of tranquillity that led to the designation of a Quiet Area.

RP 3: Air and Light Pollution

Where development could lead to exposure to a source of air or light pollution it must be demonstrated that appropriate mitigation measures will be implemented, and incorporated into the design of the development to minimise the effects on existing and future occupants.

Local Transport Plans and Strategies

LAQM.TG(22) paragraphs 4.30 – 4.31 indicates guidance on the inclusion within Progress Reports to those measures within the Local Transport Plan (LTP) that specifically relate to bringing about air quality improvements. Within Wales, the LPT had been replaced with the Regional Transport Plan (RTP). The South West Wales Integrated Transport Consortium (SWWITCH) was one of the four transport consortia in Wales which were required to produce a Regional Transport Plan. The SWWITCH consortia region relevant to the City & County of Swansea included a partnership with the neighbouring authorities of Neath Port Talbot County Borough Council, Carmarthenshire County Council and Pembrokeshire County Council. Unfortunately, the Welsh Assembly withdrew funding for the consortia from the end of the 2013/14 financial year. All staff had been redeployed following the withdrawal of funding. However, the Welsh Assembly Government reverted back to LTPs for 2015 - 2020. The new LTP was adopted in January 2015. Details of the adopted plan can be found at http://www.swansea.gov.uk/localtransportplan

Active Travel Plans and Strategies

The Active Travel (Wales) Act (2013) places a legal duty upon local authorities in Wales to map, plan for and promote active travel journeys.

The Active Travel (Wales) Act is a landmark piece of Welsh legislation brought forward in 2013 which aims to make it easier for people to walk and cycle in Wales, specifically to promote walking and cycling as viable modes of transport for everyday journeys such as to the shops, work or college.

The Integrated Network Map - Approved by the Welsh Government in February 2018. This map show the routes which the Council intends to deliver over the next fifteen years (up to 2033) https://www.swansea.gov.uk/media/25625/Integrated-Network-Map-Consultation-Report/pdf/Integrated_Network_Map_Consultation_Report_-_October_2017_3.pdf.

The Existing Route Map and Integrated Network Map will be reviewed and updated periodically in conformity to the requirements of the Act. The Council also prepares annual reports which are submitted to the Welsh Government to monitor the costs and use of Active Travel within the City & County of Swansea. These reports can also be found in the downloads section https://www.swansea.gov.uk/activetravelact

Local Authorities Well-being Objectives

The Corporate Plan describes the council's vision for Swansea, our 6 key council priorities (well-being objectives and improvement objectives) and our organisation values and principles that will underpin the delivery of our priorities and overall strategy.

The Corporate Plan has been refreshed for 2018/22. This follows the production by the Public Service Board (PSB) of its Well-being Plan, a review of progress and an assessment of the evidence, looking at how we can close any gaps and further maximise our contribution to the national goals.

A summary of the Council's well-being statement was updated and incorporated into the refreshed Corporate Plan 2018/22.

Note - the Council is rolling forward its five year Corporate Plan into 2019/20 following a review of our Well-Being Objectives

Our priorities for 2018 - 2022 that are set out within our Corporate Plan are:

- Safeguarding people from harm - so that our citizens are free from harm and exploitation
- Improving Education and Skills - so that every child and young person in Swansea gains the skills and qualifications they need to succeed in life
- Transforming our Economy and Infrastructure - so that Swansea has a thriving mixed use City Centre and a local economy that will support the prosperity of our citizens
- Tackling Poverty - so that every person in Swansea can achieve his or her potential
- Maintaining and enhancing Swansea's natural resources and biodiversity - so that we maintain and enhance biodiversity, reduce our carbon footprint, improve our knowledge and understanding of our natural environment and benefit health and well-being
- Transformation and Future Council development - so that we and the services that we provide are sustainable and fit for the future
- This discharges our duties under the Well-Being of Future Generations (Wales) Act 2015 and Local Government Measure (Wales) 2009 to set Well-being Objectives and Improvement Objectives.

Our priorities show the council's contribution to Wales' 7 national goals described within the Well-Being of Future Generations Act (the 'Act') and describes how we will maximise this contribution to the national goals and to the social, cultural, environmental and economic well-being of Swansea by working in line with the sustainability principles set out within the Act.

Green Infrastructure Plans and Strategies

Swansea Central Area: Regenerating our City for Wellbeing and Wildlife

The green infrastructure strategy, published jointly by Swansea Council and Natural Resources Wales, is designed to bring more nature into the Swansea Central Area.

Green Infrastructure - commonly referred to as GI - is the term used to describe all the green space, soil, vegetation and water that provide the ecosystem services that make places more liveable. This includes, for example, streets trees, green roofs and walls, natural play spaces, wildlife / nature gardens, pollinator corridors, landscaping, drainage and air quality management solutions.

The vision is for a city with high quality multifunctional green infrastructure, which delivers resilience, prosperity, nature, health, wellbeing and happiness to the citizens and visitors of Swansea.

The 5 Principles of Green Infrastructure to be applied to achieve this vision:

1. Multifunctional - making sure that all GI in the city centre provides as many benefits as possible. For example, it may reduce pollution and/or flooding, offer shelter and/or food for native animals (birds, insects and/or small mammals), provide shade during hot summer days, and create attractive pleasant and/or calming spaces for people to meet, relax and play.

2. Adapted for climate change - absorbing water to reduce flooding, providing summer cooling and accommodating wildlife. GI also helps mitigate climate change by capturing and locking up carbon.

3. Healthy - helping our physical and mental health by absorbing pollution, providing clean air, clean water, food and space to exercise, socialise and play and space to have contact with nature.

4. Biodiverse - supporting a wide variety of native species providing shelter and food and creating green corridors across the city centre linking to existing strategic wildlife corridors.

5. Smart and Sustainable - providing solutions, techniques and technologies that are low maintenance and reduce pollution and waste and maximise the use of recycled or sustainably sourced materials.

Success will be measured via a number of performance indicators which will work towards targets to double (from 13% to 26%) GI by 2030 and to increase tree canopy cover to 20-25% by 2044.

The strategy is designed to support the Local Development Plan and the application of the Statutory SuDS Standard 2019. It also delivers the council's duties under the Well-being of Future Generations (Wales) Act 2015 and Environment (Wales) Act 2016 through the Council's Well-being Objective: Maintaining and enhancing Swansea's natural resources and biodiversity and, the Swansea Public Service Board's Working with Nature Objective.

https://www.swansea.gov.uk/climateactiongreeninfrastructure

Climate Change Strategies

Climate Change and Nature Strategy 2022 - 2030

Introduction

Climate change is the long-term alteration of temperature and typical weather patterns largely caused by human activity, like burning fossil fuels, like natural gas, oil, and coal. Burning these materials releases what are known as greenhouse gases into the atmosphere. Human health and well-being is vulnerable to such change. This shift is expected to cause fluctuating weather- heat and fire, drought and flood, an increase in waterborne diseases, poor air quality, threats to wildlife and loss of food sources.

The image below shows how the temperatures across Wales are already increasing year on year, setting a clear trend towards a hotter climate which will bring significant consequences.

We all have a responsibility to act now. A public sector target of 2030, ahead of the Welsh Government's target of 2050 for the whole of Wales, will give us our best chance of keeping global warming below 1.5°C.

This is the tipping point at which the climate impacts we're already experiencing will go from bad to potentially catastrophic. We'll see natural systems cross danger points, triggering lasting changes such as extreme storms, heatwaves, mass loss of natural habitats and species.

It is also recognised that our wellbeing and that of future generations are dependent upon the state of the natural environment. Our natural environment in Wales is under considerable pressure from over exploitation, habitat loss, pollution, climate change as well as invasive non-native species.

So, what are Swansea Council doing about it?

Legislation, Regulation and Policy

There is a range of well publicised legislation and policy helping to drive this change:

Globally

The international Paris Accord 2015 which seeks to keep global temperature increases well below 2 degrees.

The IPPC (Intergovernmental Panel on Climate Change) - In their Climate Change 2021 report, conclude that:

- There is still time to limit the worst effects of climate change
- Stabilising the climate will require the globe to reach net-zero CO_2 emissions by 2050
- Human activities have already caused around 1.1°C warming
- The planet's climate is warming faster than anything experienced
- Every part of our planet is already seeing multiple and increasing changes in their climate systems
- Global warming is very likely to reach 1.5°C by 2040
- Climate change is intensifying the water cycle affecting rainfall patterns
- Coastal areas will see continued sea-level rise throughout the 21st century
- Further warming will amplify impacts on frozen regions
- The ocean is warming and acidifying.

Locally

Following the Notice of Motion on Climate Change Emergency presented to Council on 27th June 2019, the Authority reaffirms its commitment to:

- Call upon the UK and Welsh governments to provide us with the necessary powers and resources to ensure Swansea Council becomes net zero by 2030.
- Publicise climate emergency and promote a greater awareness of the truth of climate change amongst the local population aiming for a county wide target of net zero by 2050
- Work with relevant experts in research and development to:
    - Review our current strategies and action plans for addressing climate change.

- Identify any further policy changes or actions which we could undertake, within the scope of our powers and resources, to meet the challenge of climate emergency.
- Seek the help of local partners such as Swansea University and other research bodies to, within one year, produce a report to share with the community, explaining work already underway and achievements already made, as well as targets for the future.
- Update on further work undertaken by the Council in this area on an annual basis through the Council Annual Review of Performance Report section on corporate objective - Maintaining and enhancing Swansea's natural resources and biodiversity.

- The Council undertook a citizen's survey in March 2021, with excellent response, but the key message taken on board is 'Go Faster, Go Further'.
- Climate change survey 2021 – results

- 967 people were surveyed and 93% were concerned about climate change
- A Twitter check of 396 people found 66% were concerned about climate change

The journey so far

- Swansea Council have achieved a great deal over several years to mitigate the impacts of Climate Change such as:
- Swansea Council procures its energy using Crown Commercial Services Framework Agreements, via the National Procurement Service (NPS), for its energy supplies. All electricity procured via the NPS framework is from 100% renewable energy sources; 41% sourced from Wales (Apr 20 - Mar 21); Gas - Total Gas and Power (TGP) procured as new gas supplier (from Apr 21), registered interest in purchasing 'Green Gas'- dependant on viability and cost impact.

- Refit Low Carbon Programme - Swansea Council is participating in the Welsh Government supported Refit Low Carbon Programme to implement energy efficiency saving opportunities in non-domestic buildings. A £1.3 million interest free loan has been secured from Welsh Government Wales Funding Programme (Salix) to deliver a Refit Cymru (Energy Efficiency) Phase 1 project comprising over 18 buildings which is projected to save an estimated 400 tCO2e every year. Quantifying the energy savings delivered by the Energy Conservation Measures (ECMs) will be validated using the Measurement and Verification (M and V) process.

- Carbon Reduction Retrofit (phase 2): Working towards developing a business case to implement Energy Conservation Measures for Education Services - Schools.
- Swansea Council with the support of Welsh Government Energy Services are progressing towards the development of a 3MW Ground Mounted Solar PV farm located on a capped waste land filled area. It is predicted over the asset lifespan (35 years) that 101,302,731 kWh of renewable energy will be generated equating 28,454 t/CO2. Part of this capital expenditure cost could be recovered as it would create revenue for the Authority, in the form of either Power Purchase Agreements (PPA) or private wire connection. There is the potential opportunity of extending the Solar PV site in future years as current additional waste land is capped.
- Public Sector Hub: Cabinet are considering moving from the Civic Centre to a new public sector hub in the heart of the city centre as part of Swansea Bay Central Phase 2, the £1bn project to revitalise the St David's area of the city centre. This is an opportunity for the Authority to show its commitment towards meeting its net zero carbon aspirations by 2030 incorporating renewable technologies into the design specifications.
- Progressing work towards a world-leading Swansea Bay Tidal Lagoon, estimated electricity generation of 504,854 MWh, equating to carbon emission savings of 94,913 mT CO2e.

Swansea Council Net Zero Carbon by 2030

Swansea Council is monitoring its emissions and reporting annually to Welsh Government. It is taking all possible action to achieve net zero as demonstrated in the action plan:

Buildings and Energy

- Decarbonise our public estate by reviewing our asset management strategy.
- Reduce the energy consumed across the council's buildings and estate.
- Encourage employee behaviour change through training and process improvement
- Decarbonise street lighting with more LED's
- Ensure all new buildings are constructed to the highest possible sustainability standards.
- Fleet and Mobile Equipment
- Transition the Council's fleet to zero emission equivalents in accordance with the Welsh Government's expectation of light commercial vehicles by 2025 and other vehicles by 2030

- Establish a fleet vehicle charge point infrastructure that supports this transition
- Optimise fleet vehicle use and efficiency
- Establish integrated data systems for GHG measurement
- Revise and approve the appropriate supporting policies, procedures and working practices
- Decarbonise Grey Fleet travel
- Decarbonise mobile plant equipment

Land Use

- LDP policy reviewed to protect land soils and habitats rich in carbon
- Increase terrestrial Central Area GI to 26%
- Tree planting areas mapped county wide1000s new trees planted
- 30% of protected sites (local nature reserves, etc.) in positive management for biodiversity

Waste

- Encourage circular economy values within Swansea Council - to minimise and prevent - reduce, reuse, recycle,
- Reduce operational single use plastics wherever possible
- Reduce operational waste e.g., food, paper
- Encourage operational recycle and repair.
- Reduce Construction Waste

New Ways of Working

- Develop emissions data monitoring processes
- Reduce commuting miles
- Deliver agile working policy
- Develop staff active travel plan
- Implement Healthy Travel Charter in Swansea Council
- Develop an Electric Vehicle Charging Strategy

Supply Chain

- Commit to Net Carbon Zero in our supply chain by 2050
- Through forward planning and innovation develop new specifications for our contracts that deliver Net Carbon Zero

- Map and monitor our progress, with appropriate prioritisation and target setting

Sustainable Transport Strategy

A great deal of positive work has been carried out in this area to date with all activity becoming part of this overarching strategy. This includes how the council deals with its Council fleet, the grey fleet (personal mileage by employees), its emissions from street lighting, the continued promotion of active travel and the development of a local and regional sustainable public transport system.

Some specifics include:

- Continuation of planning for, and improving the active travel network. Refresh of the current Active Travel maps and consult on potential new routes for development, though a new Active Travel Network Map in 2021.
- Increase levels of active travel though promotion, engagement and encouragement of active travel with the general public, businesses, communities and educational establishments, through a behaviour change campaign, Swansea Bayways.
- Further roll out of EV charging infrastructure.
- Continue to deliver a 5 % year on year reduction in council fleet emission via its green fleet strategy.
- The development of the ULEV strategy will support further emissions reductions. Targets will gradually increase over time up to 10% per annum to align with technological advances in coming years.
- Seek to embed the reductions in grey fleet mileage which achieved 50% and 1 million miles less in 2020/21 to date.
- South West Wales Metro - Continue the development of business cases for investment in active travel, bus and rail projects across the region.
- Investigate low-emission public transport alternatives through work with partners, such as Transport for Wales and First Cymru to establish how vehicle emissions could be reduced in the future.

Wider communication and engagement.

This will be established through a variety of routes:

- The Swansea Charter: Climate Change and Nature Action underpins the path to A Net Zero Swansea.
- The ultimate aim is 2050 Net Zero - City and County of Swansea (all emissions)

- A key milestone will be 2030 Net Zero - Swansea Council (in scope organisational emissions)
- Business, Citizens, the Council, Community, Partners, Government, Youth and the Voluntary sector all play their part. 'It is everyone's business'
- There will be a continued commitment to engage with local people, groups and businesses and help them be smarter and better prepared for the impacts of climate change and nature recovery. This will be enhanced via the Climate and Nature Charter and online pledge wall.
- Swansea Council recognises that it must lead by example and use its 'Sphere of Influence' to reach out to as many citizens and businesses as possible. The Leader and Cabinet Members have signed the charter, and a more generic version for Swansea Citizens and public sector, business, charities, schools, groups etc. will be used, alongside the more simplistic pledge wall as mechanisms to seek wider buy in across the whole city and county.

Involving partners will be paramount to success, and will help support Swansea Council's ambition to lead by example. Agreed strategies will provide structure and governance to ensure delivery.

Listening to and acting on community groups, school groups ideas will help shape the strategy.

Swansea council will commit to making long term and embedded behaviour change via training and support not only within its own authority but also across the City and County, for all citizens. We want everyone to shape Swansea's vision for reaching net zero carbon.

We can make changes on a huge scale if we all make small changes to how we move, shop, eat, think and live, together.

Reducing emissions and recovering nature needs businesses and households to change. We must use more renewable energy sources such as wind, solar and geothermal. We also have to change how we use energy, by cutting down on the power we use. We need to be more mindful of food sources, the nature surrounding us, its recovery and how our communities need to adapt for the future.
Swansea Council cannot make Swansea net zero carbon on its own. We need everyone in Swansea to act now and consider what they can do to reduce their impact on the planet. We all need to take action at home, in the workplace, and across the county as a whole.

The Council is well placed to work with others. We can make the most of Swansea's collective potential and create solutions together. There will need to be major investments. We will have to make changes to existing systems of how we use and interact with energy. We must change how we live our lives. We will have to redefine how we manage and interact with our environment.

Above all, to meet this challenge, we need collective leadership and shared ambition.

5 Conclusion and Proposed Actions

Conclusions from New Monitoring Data

The passive NO_2 monitoring data from 2021 shows that concentrations at 185 out of 191 monitoring locations increased from 2020 levels, with an average increase of 23%. The overall increase is mostly likely attributed to the impacts of COVID-19 across 2020 and 2021. Concentrations prior to 2020 report significantly more stable NO_2 concentrations.

Monitored NO_2, PM_{10} and $PM_{2.5}$ concentrations at all automatic monitoring stations continue to report annual means well below the AQS annual mean objectives for NO_2, PM_{10} and $PM_{2.5}$. In regard to the short term AQS objective for NO_2, in which the 200µg/m^3 must not be exceeded more than 18 times/year, and the PM_{10} AQS objective whereby there should be no more than 35 24-hour mean concentrations greater than 50µg/m^3, there were no exceedances reported in both pollutants in 2021.

Conclusions relating to New Local Developments

Ongoing implementation and development of local strategies, as detailed in Table 1.2, will continue to assist in reducing pollutant concentrations and emissions. The Council also continues to request air quality assessments for new planning applications where relevant, to ensure that there is no significant degradation of air quality or that no new sensitive receptors are being introduced into areas of existing poor air quality.

Other Conclusions

The existing diffusion tube network within Swansea allows the council to closely monitor hotspot areas and help highlight areas of concern, the monitoring network in 2021 has shown compliance across all monitoring locations within the Swansea AQMA. In relation to the designated AQMA, monitoring results show full compliance within Swansea AQMA and has now reported compliance for over 3 years. Despite this, since concentrations have increased from 2020, and monitoring locations within both AQMAs in 2019 (pre-pandemic) display concentrations within 10% of the AQS objective, there is no intention to start a revocation process. The Council will continue to use its monitoring network to closely monitor concentrations at these locations.

Proposed Actions

Swansea Council will continue to actively monitor NO_2 concentrations, reviewing the diffusion tube network where necessary. Whilst annual mean NO_2 concentrations increased during 2021, this is believed to have been influenced by COVID - 19 during 2020, therefore the Council do not intend to revoke any AQMAs. If concentrations in future years continue to remain low and well below the AQS objective, then the Council will pursue revocation of these AQMAs where appropriate.

References

I. Technical Guidance LAQM.TG(22)

II. Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138)

III. Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298)

IV. City & County of Swansea Progress Report 2020/2021

Appendices

Appendix A: Monthly Diffusion Tube Monitoring Results

Appendix B: A Summary of Local Air Quality Management

Appendix C: Air Quality Monitoring Data QA/QC

Appendix D: AQMA Boundary Maps

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

Table A.1 – Full Monthly Diffusion Tube Results for 2021 (µg/m^3)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
5	29.4	28.1	24.8	20.1	14.5	19.3	25.1	22.7	29.3	28.4	39.0	32.1	26.1	20.4	
6	26.8	18.9	21.0	23.3	24.3	19.3	27.8	19.1	24.5	24.3	35.4	23.5	24.0	18.8	
7	39.8	34.8	31.8	34.8	36.3	34.3	32.7	31.8	42.7	40.6	47.2	44.2	37.6	29.5	
8	46.5	44.1	39.4	46.9	-	23.7	44.0	34.0	45.4	43.2	55.8	-	42.3	33.2	
10	-	-	29.7	-	18.5	15.7	16.0	14.3	20.8	22.4	-	-	19.6	18.7	
11	33.4	32.4	26.6	36.1	29.0	28.2	28.7	25.2	37.2	33.5	-	35.5	31.4	24.7	
12	38.8	36.2	40.4	39.7	34.0	34.5	38.3	29.9	41.1	44.7	53.0	36.0	38.9	30.5	
16	32.3	28.3	-	27.9	26.8	23.1	23.5	21.7	34.1	25.8	38.1	27.8	28.1	22.1	
18	50.9	37.4	32.4	49.7	31.5	40.1	40.1	32.3	46.0	40.5	49.9	48.8	41.6	32.7	
19	42.2	33.3	38.6	45.6	-	38.6	37.8	25.0	46.0	40.9		23.3	37.1	29.1	
20	41.9	39.8	31.3	30.6	31.1	26.1	26.0	26.2	37.6	38.6	46.6	20.4	33.0	25.9	
22	36.3	28.6	25.8	24.5	19.9	18.9	21.3	17.9	28.5	34.6	36.9	32.0	27.1	21.3	
26	39.9	42.1	30.9	35.6	-	26.6	27.8	26.1	36.7	34.9	44.3	39.3	34.9	27.4	
27	-	44.8	32.6	35.6	28.9	27.7	28.8	24.1	37.0	37.3	42.7	39.2	34.4	27.0	
29	47.4	27.4	24.1	27.7	24.2	26.5	22.0	21.6	26.8	31.6	33.9	30.7	28.7	22.5	
32	31.9	28.0	24.3	29.9	15.6	25.9	26.9	27.7	35.5	30.7	40.3	32.8	29.1	22.8	
33	42.9	21.8	31.8	30.0	22.6	22.0	18.9	24.5	34.3	-	53.5	-	30.2	23.7	
35	41.0	34.4	30.4	31.1	30.5	24.7	29.3	23.4	32.2	30.8	43.1	-	31.9	25.0	
36	36.9	25.8	24.9	26.5	26.6	20.0	20.2	-	18.6	-	42.2	28.3	27.0	21.2	
40	-	24.3	20.6	36.7	-	16.9	19.9	11.2	22.8	23.3	-	26.9	22.5	17.7	
41	39.4	-	28.0	-	29.4	-	29.9	25.6	34.1	37.6	36.3	-	32.5	26.1	
43	39.7	33.9	27.5	30.9	-	25.8	29.1	21.8	31.7	36.7	44.3	-	32.1	25.2	
44	29.4	26.2	22.9	19.7	16.5	-	17.8	18.0	25.3	26.7	27.9	29.3	23.6	18.5	
45	33.9	28.8	25.4	31.9	24.8	23.5	23.6	20.7	27.5	27.3	-	32.6	27.3	21.4	
48	23.7	21.6	19.3	16.1	16.0	13.3	13.9	15.7	22.3	-	29.6	22.3	19.4	15.2	
50	40.8	35.5	30.9	29.1	30.2	24.9	24.5	20.5	33.4	-	43.6	-	31.3	24.6	
54	32.7	32.7	29.9	29.6	31.4	21.7	27.0	21.6	29.7	33.6	37.7	34.1	30.1	23.6	

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
55	38.9	34.5	-	27.2	30.0	-	-	21.1	31.8	32.6	38.7	34.2	32.1	25.2	
56	43.6	35.2	33.1	28.3	18.7	20.8	26.8	23.5	32.7	31.2	42.0	-	30.5	24.0	
58	37.7	32.5	34.0	32.4	30.7	26.0	-	25.4	35.3	33.2	34.4	35.3	32.4	25.4	
59	49.4	45.4	42.6	46.0	42.0	36.3	41.2	34.8	40.8	44.4	59.4	47.6	44.2	34.6	
61	37.3	39.4	30.7	32.9	29.2	26.0	27.7	24.5		31.5	38.0	37.7	32.3	25.3	
63	23.2	18.6	15.8	19.5	16.3	36.0	14.3	7.7	18.9	16.7	24.1	19.1	19.2	15.0	
64	41.8	29.8	27.4	-	35.8	21.4	28.4	22.5	33.0	34.4	-	40.5	31.5	24.7	
65	23.2	22.8	16.3	22.5	19.5	16.7	18.0	17.9	21.0	19.6	26.8	23.6	20.7	16.2	
66	26.3	22.8	-	24.2	24.0	18.7	20.8	18.6	26.7	26.5	38.4	25.6	24.8	19.4	
67	54.8	32.2	-	46.6	35.4	30.9	31.6	27.1	39.8	-	57.7	-	39.6	31.0	
68	28.1	29.1	24.5	25.2	27.4	26.9	34.8	27.8	34.2	35.1	38.3	32.8	30.3	23.8	
70	16.0	28.7	24.2	-	24.4	-	21.4	20.7	28.9	26.7	-	32.3	24.8	19.5	
75	34.3	29.6	30.5	27.3	24.4	25.3	28.7	27.1	33.7	6.8	47.5	39.1	29.5	23.2	
84	31.6	23.6	25.2	24.6	26.7	21.0	24.9	23.2	31.2		36.2	-	26.8	21.0	
85	32.1	27.6	28.3	24.2	26.7	20.3	9.7	28.9	30.2	29.4	35.2	30.5	26.9	21.1	
86	25.4	23.4	17.1	22.3	19.4	15.4	-	-	-	24.0	29.8	26.4	22.6	17.7	
87	19.4	14.1	13.9	15.7	11.4	10.8	-	9.7	15.3	13.7	22.4	23.8	15.5	12.1	
88	31.6	24.4	24.0	23.6		17.8	23.2	18.6	29.9	29.4	-	30.4	25.3	19.8	
89	22.1	21.6	17.9	19.9	19.3	35.8	17.8	10.0	20.8	17.0	21.1	23.4	20.6	16.1	
90	21.8	28.7	22.5	24.0	26.7	21.9	23.5	17.8	28.5	24.4	28.6	28.2	24.7	19.4	
91	26.5	25.3	19.4	-	17.2	18.4	22.3	-	27.8	23.9	33.8	25.0	24.0	18.8	
94	28.3	25.6	-	24.9	23.9	19.9	21.4	17.1	26.3	28.0	-	27.1	24.2	19.0	
95	32.8	19.1	31.3	19.7	18.4	15.9	17.4	14.3	22.4	26.5	27.9	27.0	22.7	17.8	
96	-	23.5	19.8	22.2	-	19.9	19.2	-	24.3	21.1	29.9	-	22.5	18.0	
97	34.4	30.0	22.2	32.9	28.5	11.5	25.2	23.5	31.3	30.0	39.1	-	28.1	22.0	
98	32.6	33.3	28.2	29.3	29.3	17.6	25.8	24.9	32.9	29.6	-	36.4	29.1	22.8	
99	34.1	23.8	23.6	24.3	22.7	15.2	23.4	17.0	26.3	-	38.8	27.3	25.1	19.7	
104	30.9	33.7	-	24.7	24.2	16.5	19.9	15.6	24.8	28.0	28.1	32.7	25.4	19.9	
110	28.9	24.1	22.5	25.5	17.7	16.7	17.2	14.9	22.2	21.4	30.4	19.7	21.8	17.1	
115	28.0	32.4	27.7	27.8	29.6	24.6	-	24.3	31.9	30.0	35.9	36.1	29.8	23.4	
116	38.1	34.3	-	29.8	32.0	30.4	34.8	-	42.4	45.9	46.2	41.8	37.6	29.5	
117	39.1	30.4	29.4	32.3	29.8	26.3	27.4	26.8	37.5	36.2	48.7		33.1	25.9	
118	29.2	24.5	21.0	19.9	20.1	13.7	16.8	15.8	22.0	29.5	30.1	43.4	23.8	18.7	
119	31.0	23.7	22.0	23.0	17.8	17.6	16.2	-	23.7	-	-	-	21.9	17.1	
121	46.6	36.4	35.2	40.5	41.6	15.6	37.1	37.7	-	44.2	60.8	44.7	40.0	31.4	

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
122	35.6	20.7	27.6	29.6	25.3	30.6	24.4	27.9	38.5	-	44.3	31.6	30.6	24.0	
123	41.3	37.4	31.6	40.9	37.9	32.1	41.6	43.4	41.4	39.1	-	42.1	39.0	30.6	
124	38.5	36.0	-	31.4	29.2	15.9	31.3	32.2	46.0	39.7	46.9	36.9	34.9	27.4	
125	42.4	24.0	30.5	40.4	39.8	21.6	37.2	35.4	54.0	46.4	55.1	-	38.8	30.4	
126	32.7	29.6	27.2	30.0	32.3	27.5	24.5	19.0	34.3	36.3	42.3	37.7	31.1	24.4	
128	-	24.4	20.1	24.4	20.5	18.3	24.1	19.0	32.1	25.2	36.0	30.1	24.9	19.6	
129	39.0	32.5	28.4	30.6	22.4	22.4	23.8	19.9	34.9	30.3	40.4	32.8	29.8	23.4	
131	40.7	32.6	33.1	26.6	37.2	31.5	32.8	32.5	50.9	39.4	51.7	40.3	37.4	29.4	
132	36.1	35.6	27.0	-	27.7	25.3	26.3	20.6	36.3	26.2	35.8	-	29.7	23.3	
134	41.9	34.1	33.2	34.3	43.1	30.6	34.3	32.2	50.4	-	46.6	-	38.1	29.9	
180	24.7	27.3	29.6	-	23.6	22.0	18.9	30.5	36.0	37.7	33.2	-	28.4	22.2	
182	27.2	25.1	-	-	-	20.4	21.8	16.7	9.1	26.7	33.8	28.9	23.3	18.3	
197	35.1	27.9	26.9	25.0	19.4	22.3	24.0	20.8	30.3	45.1	34.0	36.4	28.9	22.7	
198	38.3	33.9	26.3	21.6	27.0	20.7	22.5	19.1	30.8	31.1		34.1	27.8	21.8	
206	33.4	29.4	33.3	37.6		33.1	30.4	-	45.0	34.7	30.5	28.3	33.6	26.3	
207	33.3	28.6	27.5	16.7	30.8	30.2	31.2	21.7	28.7	-	40.4	35.5	29.5	23.1	
208	27.2	27.3	28.9	33.6	29.5	-	29.0	25.3	33.0	28.5	45.1	28.2	30.5	23.9	
209	32.3	28.8	26.4	29.2	31.5	43.5	33.5	27.4	33.8	29.4	-	30.2	31.5	24.7	
210	28.5	23.3	25.3	25.9	28.9	37.1	27.3	25.0	28.1	23.2	33.9	27.0	27.8	21.8	
211	29.2	31.2	-	31.9	-	25.0	27.8	19.2	29.8	26.2	31.6	-	28.0	22.0	
212	22.8	19.4	17.3	25.6	15.8	19.8	18.9	16.7	19.9	18.9	26.4	20.8	20.2	15.8	
213	26.8	28.8	23.0	24.8		19.1	23.1	19.0	26.9	9.9	29.9	-	23.1	18.1	
240	-	30.9	27.7	29.9	26.6	23.5	23.4	22.8	34.0	33.0	35.6	34.3	29.2	22.9	
242	39.0	33.0	31.1	37.0	33.5	-	-	-	42.0	40.5	48.5	40.9	38.4	30.1	
243	39.9	31.2	34.6	31.9	32.8	27.2	27.4	24.6	37.0	34.7	47.9	35.9	33.8	26.5	
244	45.6	44.4	36.0	-	36.6		32.8		42.1	45.9	43.7	44.0	41.2	32.3	
247	36.3	34.4	25.2	31.6	10.6	23.6	24.7	20.8	-	-	33.2	-	26.7	20.9	
249	36.6	34.6	25.3	27.3	24.0	21.2	-	18.9	30.4	32.6	-	-	27.9	21.9	
256	41.9	34.7	31.0	-	33.8	31.4	30.3	25.5	39.4	42.4	-	36.6	34.7	27.2	
275	30.9	29.1	23.7	22.9	19.5	38.1	17.8	11.9	18.6	20.9	33.2	27.8	24.5	19.2	
276	-	32.7	33.7	25.2	32.2	23.7	25.3	22.3	39.5	33.2	37.3	34.3	30.9	24.2	
277	35.3	34.3	26.8	28.2	32.2	24.9	27.8	23.6	40.4	33.6	-	31.8	30.8	24.2	
278	35.7	34.5	25.5	25.6	25.1	33.4	29.4	21.7	-	34.2	36.5	-	30.2	23.7	
279	45.2	37.8	26.4	36.3	36.1	34.2	33.9	32.5	51.8	42.2	54.7	45.2	39.7	31.1	
280	42.0	45.9	34.1	19.4	-	31.0	31.0	27.4	-	33.0	47.9	42.4	35.4	27.8	

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
281	45.1	-	37.9	38.7	30.9	16.1	34.6	15.6	53.4	46.2	53.4	43.6	37.8	29.6	
282	47.8	36.8	38.8	38.2	32.7	31.4	32.2	31.1	-	38.3	38.4	47.2	37.5	29.4	
284	-	28.1	23.2	27.5	26.3	25.4	28.8	21.1	33.6	31.1	36.6	30.6	28.4	22.3	
285	-	33.3	21.5	27.8	25.5	21.8	24.2	-	33.2	31.7	42.9	37.3	29.9	23.5	
286	34.1	31.4	25.3	27.0	27.1	21.1	18.6	15.8	30.5	29.3	40.3	36.2	28.1	22.0	
287	35.7	32.8	23.4	32.3	-	24.4	-	20.3	31.4	30.3	42.2	35.9	30.9	24.2	
288	38.9	29.6	27.3	25.8	26.2	-	25.7	20.8	32.7	26.7	42.1	33.4	29.9	23.5	
289	44.1	33.4	34.2	33.9	30.7	-	26.3	23.6	33.0	33.6	43.5	-	33.6	26.4	
291	42.1	32.8	36.3	33.1	-	19.0	30.2	31.5	42.0	30.9	56.0	38.5	35.7	28.0	
295	38.1	28.7	28.3	28.8	24.7	-	23.6	21.2	25.5	28.9	37.7	35.5	29.2	22.9	
296	39.2	36.2	31.5	30.8	33.6	32.2	29.8	25.1	34.4	35.2	38.0	38.4	33.7	26.4	
323	37.7	29.0	28.6	28.7	25.4	25.3	24.7	21.6	31.9	31.8	42.7	38.0	30.5	23.9	
331	35.6	32.9	30.9	34.5	32.0	32.7	30.5	30.5	44.6	32.7	43.2	34.0	34.5	27.1	
334	-	29.9	-	26.4	23.9	26.8	23.3	23.2	37.6	31.7	40.2	31.2	29.4	23.1	
335	30.7	29.7	23.1	28.4	-	-	27.2	23.9	35.7	25.1	41.7	30.6	29.6	23.2	
336	38.0	31.3	27.5	32.7	29.4	17.8	28.9	28.5	38.9	32.3	-	32.6	30.7	24.1	
337	-	37.2	33.3	28.5	38.9	34.9	25.8	38.9	52.9	38.5	3.3	38.5	33.7	26.4	
338	-	-	27.4	32.3	27.4	29.0	27.6	24.5	39.2	34.5	52.8	29.2	32.4	25.4	
339	40.4	35.8	28.9	30.8	32.5	33.8	34.0	31.3	49.1	35.0	-	42.6	35.8	28.1	
340	40.3	36.2	33.8	39.1	40.8	16.2	36.6	38.3	61.3	48.6	57.9	48.1	41.4	32.5	
341	42.0	37.7	35.2	38.2	40.8	35.6	37.6	34.0	46.2	38.8	51.9	-	39.8	31.2	
342	37.8	35.1	31.3	40.8	36.6	33.0	36.5	25.9	52.0	-	-	40.7	37.0	29.0	
343	34.3	20.7	26.2	30.0	28.5	30.6	26.8	22.0	38.5	30.7	47.7	-	30.5	24.0	
346	33.7	24.4	25.2	31.2	28.8	29.0	25.0	27.0	40.7	32.9	-	31.9	30.0	23.5	
347	36.2	33.5	-	29.3	28.5	20.9	25.0	22.8	29.4	28.0	40.2	34.3	29.8	23.4	
348	36.7	34.1	30.9	32.5	30.1	26.5	27.9	26.4	36.4	34.6	42.7	36.4	32.9	25.8	
349	36.7	-	31.2	33.1	33.2	26.8	-	28.3	36.7	36.2	43.5	-	34.0	26.6	
350	44.9	35.0	36.7	36.5	37.4	31.2	36.9	33.8	42.5	42.1	51.9	44.2	39.4	30.9	
356	32.3	33.6	25.7	25.9	20.3	19.1	24.9	15.6	28.2	25.4	32.8	34.3	26.5	20.8	
362	39.7	30.5	27.2	35.7	37.3	33.4	36.0	30.3	46.8	36.7	43.2	44.6	36.8	28.8	
363	33.9	27.6	25.4	31.4	32.7	26.6	28.7	22.9	39.9	33.2	-	-	30.2	23.7	
364	38.8	29.6	22.9	37.2	35.9	-	30.6	31.0	47.3	35.9	-	37.6	34.7	27.2	
373	36.5	16.2	30.0	32.5	29.9	26.4	30.1	24.9	28.6	28.5	42.9	34.2	30.1	23.6	
375	19.8	18.2	15.2	15.9	14.7	11.1	13.3	11.0	15.6	15.7	23.5	18.8	16.1	12.6	
376	29.1	28.8	29.6	35.5	33.8	25.7	26.4	24.2	31.0	27.7	36.8	32.3	30.1	23.6	

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
377	34.9	34.6	30.7	33.3	18.5	23.9	29.4	24.5	36.0	33.9	41.2	34.7	31.3	24.5	
385	33.7	25.3	34.0	23.8	1.1	21.9	19.4	18.5	24.1	24.7	30.3	39.4	24.7	19.4	
386	32.2	29.4	28.4	25.9	25.2	20.0	23.4	23.7		32.8	40.2	31.9	28.5	22.3	
388	25.0	-	13.4	13.8	13.4	9.5	12.5	11.7	19.9	16.6	25.7	20.7	16.6	13.0	
390	36.3	31.4	31.3	28.1	29.5	17.3	25.7	25.3	33.9	33.0	43.7	36.4	31.0	24.3	
391	-	28.5	30.3	21.3	-	-	25.4	23.3	29.5	26.2	35.6	30.3	27.8	21.8	
394	18.5	16.0	14.2	14.6	14.3	8.0	11.8	8.5	16.3	12.5	23.3	14.9	14.4	11.3	
396	21.8	16.2	17.7	16.9	17.5	12.4	14.5	12.2	18.5	19.1	-	19.3	16.9	13.3	
398	22.7	20.3	17.0	17.2	16.9	14.7	19.1	8.9	20.4	18.2	-	19.2	17.7	13.9	
399	33.0	33.8	22.4	30.6	-	26.1	25.4	19.1	29.0	32.6	36.0	31.7	29.1	22.8	
401	33.9	23.5	21.8	30.4	27.6	21.3	30.9	20.8	29.0	-	-	30.0	26.9	21.1	
403	35.4	31.4	21.2	-	32.7	28.7	30.6	27.1	45.7	36.1	48.7	-	33.8	26.5	
404	34.6	33.8	31.7	21.2	31.8	8.1	28.0	27.9	34.1	32.6	39.3	37.4	30.0	23.6	
406	34.9	44.8	38.6	37.4	38.0	31.8	31.7	29.9	-	45.7	49.7	27.9	37.3	29.3	
407	28.9	23.2	21.6	20.1	20.7	26.2	17.5	14.5	21.9	-	31.5	28.1	23.1	18.1	
408	37.6	28.4	31.9	29.0	34.6	-	31.0	27.6	37.5	35.1	50.9	40.5	34.9	27.4	
412	31.6	23.0	23.9	34.3	24.1	19.0	21.6	19.4	-	27.9	37.6	27.4	26.3	20.7	
413	-	33.1	26.2	34.3	-	24.9	29.1	23.4	31.8	31.5	36.5	32.7	30.3	23.8	
415	37.8	27.9	30.0	-	18.9	22.4	25.8	23.7	30.2	37.9	37.6	33.9	29.6	23.3	
416	25.9	22.0	18.5	18.3	18.6	13.6	16.3	18.2	20.8	22.4	28.6	23.9	20.6	16.2	
417	27.0	25.2	23.2	23.7	19.6	18.9	20.8	13.3	24.9	22.7	33.7	26.6	23.3	18.3	
418	32.2	18.1	24.9	24.9	20.7	26.1	20.8	19.1	27.0	27.7	38.2	30.0	25.8	20.2	
419	33.2	33.8	25.3	26.0	23.8	20.5	25.3	19.6	27.5	31.7	32.9	-	27.2	21.4	
422	-	22.2	12.3	23.0	16.3	34.0	11.1	12.5	19.0	12.4	24.5	-	18.7	14.7	
423	17.4	11.9	19.0	16.1	10.2	9.9	13.6	8.1	12.4	19.6	18.9	17.7	14.6	11.4	
424	31.3	30.8	23.2	20.3	25.4	21.9	16.0	14.5	24.7	20.8	29.8	25.0	23.6	18.5	
425	38.5	26.8	26.3	22.7	18.2	24.5	25.5	20.8	36.5	17.8	38.6	35.1	27.6	21.7	
426	56.1	-	38.4	24.7	37.5	33.4	33.5	30.0	43.1	39.0		43.9	38.0	29.8	
427	44.4	50.6	34.4	43.0	49.1	44.6	46.0	11.2	58.9	58.7	54.6	45.8	45.1	35.4	
428	19.2	16.9	11.3	14.5	10.6	33.6	10.3	10.2	14.6	13.3	21.8	15.0	15.9	12.5	
429	29.0	22.3	20.2	21.2	30.9	16.5	18.1	15.2	21.7	19.6	30.1	25.8	22.6	17.7	
430	18.0	15.6	14.4	12.6	12.3	10.1	11.1	4.3	11.5	15.5	21.1	19.1	13.8	10.8	
431	15.1	16.2	15.8	13.9	12.1	11.0	13.8	5.0	15.0	18.1	-	-	13.6	10.7	
432	27.2	-	18.4	19.4	11.1	-	15.8	12.2	17.6	-	36.0	24.1	20.2	15.8	
433	30.1	22.3	21.7	-	11.0	15.5	18.3	16.0		-	24.7	23.7	20.4	16.0	

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
434	35.7	28.4	27.2	30.9	26.5	22.7	23.8	17.1	28.0	27.2	37.7	30.8	28.0	22.0	
435	26.5	23.1	19.0	17.6	18.3	12.4	14.6	12.3	19.4	20.0	24.7	23.5	19.3	15.1	
436	25.0	22.9	17.7	35.4	10.8	15.2	16.9	15.7	18.9	20.1	28.7	24.5	21.0	16.5	
437	32.6	29.5	18.3	22.8	27.9	22.2	24.3	26.5	30.4	27.8	43.0	34.5	28.3	22.2	
438	30.8	27.5	23.7	24.5	21.6	20.1	20.7	19.4	26.0	23.6	-	-	23.8	18.7	
439	-	21.2	17.3	19.3	-	17.4	17.5	14.3	-	-	-	25.5	18.9	15.9	
440	-	23.0	11.3	38.6	-	15.1	17.2	12.5	-	-	-	22.5	20.0	16.8	
441	-	27.0	19.6	24.1	-	17.5	23.0	19.2	-	-	-	28.0	22.6	19.0	
442	-	20.5	14.3	22.3	-	20.2	22.0	19.1	-	-	-	28.2	20.9	17.6	
444	-	25.2	23.5	29.1	-	27.7	27.9	27.5	-	-	-	28.6	27.1	22.7	
445	-	38.3	20.4	36.4	-	27.8	29.6	21.6	-	-	-	33.0	29.6	24.8	
446	-	36.4	16.3	35.2	-	28.1	29.9	24.6	-	-	-	32.5	29.0	24.3	
447	-	19.1	11.8	19.6	-	14.7	14.7	-	-	-	-	21.5	16.9	13.5	
448	-	29.7	24.3	28.5	-	23.9	22.9	22.9	-	-	-	28.6	25.8	21.7	
449	-	23.0	69.6	-	-	23.3	22.6	15.6	-	-	-	29.5	30.6	26.1	
450	-	34.1	21.6	32.8	-	-	28.1	21.8	-	-	-	32.5	28.5	23.0	
451	24.1	19.4	17.9	21.3	22.0	18.2	22.2	16.9	20.4	15.7	26.0	23.0	20.6	16.2	
452	18.5	18.8	16.8	17.6	14.6	30.2	16.6	13.8	16.3	7.7	22.1	-	17.5	13.8	
453	14.0	11.8	7.5	9.8	7.7	7.2	6.7	6.1	8.3	7.9	10.6	12.2	9.2	7.2	
454	36.2	27.4	24.3	24.6	20.5	16.4	18.7	16.6	25.3	27.5		28.4	24.2	19.0	
455	36.6	29.0	28.9	32.7	21.2	24.6	23.7	26.5	30.2	29.5	40.1	32.4	29.6	23.2	
458	-	28.7	19.4	-	-	28.4	29.8	23.6	-	-	-	33.8	27.3	23.3	
459	60.8	-	49.1	49.0	42.3	48.9	50.7	41.8	54.8	53.8	-	-	50.1	39.3	
460	30.6	21.0	24.4	24.2	19.3	18.4	17.5	14.1	21.7	18.0	32.1	-	21.9	17.2	

Notes:

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

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

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

(2) Distance corrected to the nearest relevant public exposure

Appendix B: A Summary of Local Air Quality Management

Purpose of an Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment Act 1995, as amended by the Environment Act 2021, and associated government guidance. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas and to determine whether or not the air quality objectives are being achieved. Where exceedances occur, or are likely to occur, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) within 18 months of declaration setting out the measures it intends to put in place in pursuit of the objectives. Action plans should then be reviewed and updated where necessary at least every five years.

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

Air Quality Objectives

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in Table B.1.

The table shows the objectives in units of micrograms per cubic metre µg/m^3 (milligrams per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

Table B.1 – Air Quality Objectives Included in Regulations for the Purpose of LAQM in Wales

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as	Date to be achieved by
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2010
Particulate Matter (PM_{10})	40µg/m^3	Annual mean	31.12.2010
Sulphur dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	16.25µg/m^3	Running annual mean	31.12.2003
Benzene	5µg/m^3	Annual mean	31 12 2010
1,3 Butadiene	2.25µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0mg/m^3	Maximum Daily Running 8-Hour mean	31.12.2003
Lead	0.25µg/m^3	Annual Mean	31.12.2008

Appendix C: Air Quality Monitoring Data QA/QC

QA/QC of Diffusion Tube Monitoring

Swansea Council employs the services of SOCOTEC, formerly ESG Didcot for the diffusion tube network. The method used is 50% TEA in acetone and the Bias factor for 2021 was 0.77 (spreadsheet version 03/23).

Diffusion Tube Annualisation

The LAQM.TG(22) states that annualisation is required for any site which has a data capture of less than 75%, but greater than 25%. Annualisation was completed using version 1.3 of the 'Diffusion Tube Data Processing Tool'. The following diffusion tubes required annualisation: 10, 41, 96, 119, 439, 440, 441,442, 444, 445 ,446, 447, 448, 449, 450, 458. Table C.2 presents the annualisation summary.

Three continuous background monitoring locations were used, the four locations within a 50 mile radius selected to annualise the data are:

- Cardiff Centre;

- Cwmbran Crownbridge; and

- Newport

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Swansea Council have applied a local bias adjustment factor of 0.78 to the 2021 monitoring data. A summary of bias adjustment factors used by Swansea Council over the past five years is presented in Table C.1.

Swansea Council has been carrying out a local tri-location study for many years. The locally derived bias factor has been utilised in the reports since it began and so, for consistency of approach, the factor will continue to be used.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	Local	-	0.78
2020	Local	-	0.78
2019	Local	-	0.72
2018	Local	-	0.72
2017	Local	-	0.74

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table C.4

The annual mean NO_2 concentration was corrected for distance to relevant exposure at three diffusion tube sites (282, 450 and 459). These diffusion tubes were subject to the fall-off with distance correction due to the annual mean concentrations greater than 36 µg/m^3 and the site not located at a point of relevant exposure. After distance correction calculations, sites 282 and 459 reported concentrations below 10% of the NO_2 AQS, with 450 within 10% at 37.9 µg/m^3.

QA/QC of Automatic Monitoring

Swansea AURN

This calibration data is automatically logged as invalid by the analyser. In addition, officers from this authority performed routine fortnightly manual calibrations. The analyser is subjected zero cylinder generated zero air to assess the analyser's response to zero air. The analyser is also subjected to traceable calibration gases at a known concentration and the response of the analyser recorded. All manual calibration data is then forwarded to

Ricardo to perform data management procedures. The data is then further subjected to full network QA/QC procedure's undertaken by Ricardo on behalf of the Department of Environment, Food and Rural Affairs (DEFRA). The station is serviced and maintained twice yearly by Enviro Technology Services Plc. In addition, the authority has a 5 day call out response for any on-site equipment problems with Enviro Technology Services Plc. All equipment on site is fully audited twice yearly by Ricardo together with the calibration gases stored on site.

Swansea Morriston Roadside

This calibration data is automatically logged as invalid by the data-logger. In addition, officers from this authority perform routine fortnightly manual calibrations. The analysers are subjected to scrubbed internal generated zero air to assess the analyser's response to zero air. The analysers are also subjected to traceable calibration gases at a known concentration and the response of the analyser and data-logger is recorded. All manual calibration data is recorded as invalid data by the data-logger and is removed from any subsequent analysis.

The station is operated and calibrated in accordance with the UK National Network Local Site Operators manual. The station is serviced and maintained twice yearly by Enviro Technology Services Ltd. In addition, the authority has a 5 day call out response for any on-site equipment problems with Enviro Technology Services Plc. Since the awarding of the contract by the Welsh Assembly Government to Ricardo (formally AEA Energy & Environment) to run the Welsh Air Quality Forum in April 2004, all equipment on site will be fully audited yearly by Ricardo AEA together with the calibration gases stored on site. The L40 span gas cylinders are replaced on a regular basis and are to a certified and traceable standard.

Swansea Cwm Level Park

The API gas analysers have been configured so that a daily automatic calibration is carried out (between 00:30 hours and 01:00 hours). This calibration data is automatically logged as invalid by the data-logger. In addition, officers from this authority perform routine monthly manual calibrations. The analysers are subjected to scrubbed internal generated zero air to assess the analyser's response to zero air.

The NOx analyser is subjected to traceable calibration gas at a known concentration and the response of the analyser and data-logger is recorded. The internal span calibration is used with the ozone analyser. All manual calibration data is recorded as invalid data by the data-logger and is removed from any subsequent analysis.

The station is operated and calibrated in accordance with the UK National Network Local Site Operators manual. The station is serviced and maintained twice yearly by Enviro Technology Services Ltd. In addition, the authority has a 5 day call out response for any on-site equipment problems with Enviro Technology Services Plc. Since the awarding of the contract by the Welsh Assembly Government to Ricardo to run the Welsh Air Quality Forum in April 2004, all equipment on site will be fully audited yearly by Ricardo AEA, together with an audit of the calibration gases stored on site. Data is re-scaled by Ricardo following the authority supplying routine monthly calibration reports. The L10 span gas cylinders (NO) will be replaced on a regular basis and are to a certified and traceable standard.

Swansea Hafod DOAS

- QA/QC for NO, Nitrogen Dioxide and Ozone

If (C1 >0 and C3 > 10) then result: = C1 else result: = C0

C0 – Null value

C1 – Pollutant Concentration

C2 – Standard Deviation of pollutant

C3 – Light Level of pollutant

- QA/QC for Benzene

If (C1 >0 and C3 > 40) then result: = C1 else result: = C0

C0 – Null value

C1 – Pollutant Concentration

C2 – Standard Deviation of pollutant

C3 – Light Level of pollutant

It should be noted that the data presented here represents the spatial average over the whole of the 250-meter measurement path and not a "point measurement" as seen within other "traditional or conventional" monitoring equipment/locations. It should also be noted that the DOAS methodology of monitoring does not comply with the EU Directive methods of measurement (chemiluminescent for NO2, UV fluorescence for SO_2 etc.) at present but the system has achieved MCERTS certification and TUV certification.

The station is now subject to Xenon lamp changes on a quarterly basis, with zero and span calibrations now taking place on an annual basis. These works are undertaken by Enviro Technology Plc, the UK distributor for Opsis of Sweden.

Swansea St Thomas DOAS

All individual measurement points that have not met the QA/QC conditions (detailed below) are replaced with null values within the new dataset. The user can then compile 5 minute means from the validated dataset and undertake analysis.

- QA/QC for SO2, Nitrogen Dioxide and Ozone

If (C1 >0 and C3 > 10) then result: = C1 else result: = C0

C0 – Null value

C1 – Pollutant Concentration

C2 – Standard Deviation of pollutant

C3 – Light Level of pollutant

- QA/QC for Benzene

If (C1 >0 and C3 > 40) then result: = C1 else result: = C0

C0 – Null value

C1 – Pollutant Concentration

C2 – Standard Deviation of pollutant

C3 – Light Level of pollutant

The station is subject to Xenon lamp changes on a 6 monthly basis with zero and span calibrations now taking place on a yearly basis. These works are undertaken by Enviro Technology Plc, the UK distributor for Opsis of Sweden. The frequency of lamp change differs to that of the Hafod DOAS as this station does not measure the NO channel and as such does not suffer the drop off/degradation in lamp intensity during the 5th and 6th months of operation. Changing the Xenon lamps every 6 months does not invoke any data issue concerns at this site.

Swansea Station Court High Street

In addition, officers from this authority perform routine fortnightly manual calibrations. The analyser is subjected to scrubbed internal generated zero air to assess the analyser's response to zero air. The NOx analyser is subjected to traceable calibration gas at a known

concentration and the response of the analyser and data-logger is recorded. All manual calibration data is recorded as invalid data by the data-logger and is removed from any subsequent analysis.

The station is operated and calibrated in accordance with the UK National Network Local Site Operators manual. The station is serviced and maintained twice yearly by Enviro Technology Services Ltd. In addition, the authority has a 5 day call out response for any on-site equipment problems with Enviro Technology Services Plc. At present, the data is collected by the Welsh Air Quality Forum, but it does not form part of the QA/QC contract with Ricardo. The L10 span gas cylinder (NO) will be replaced on a regular basis and is to a certified and traceable standard.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The MetOne PM_{10} units are indicative measurements and no adjustment factors have been applied.

The Bam1020 PM_{10} data reported in the document has been ratified as part of the AURN network and so Swansea Council has not applied any factors to the dataset.

The Bam1020 $PM_{2.5}$ data is reported from a SMART Bam and so no offset is applied.

Automatic Monitoring Annualisation

The LAQM.TG(22) states that annualisation is required for any site which has a data capture of less than 75%, but greater than 25%. Four automatic monitoring sites recorded below the acceptable data capture in 2021 for NO_2 and PM_{10}, therefore required annualisation. Annualisation was carried out for the annual mean NO_2 at Swansea Morriston Roadside and Swansea St Thomas DOAS (with data captures of 57.8% and 69.5% for each pollutant, respectively) and PM_{10} at Fforestfach Ebam and Westway Ebam (with data captures of 54.6% and 52.5% for each pollutant, respectively). Four continuous background monitoring locations were used, the three locations within a 50 mile radius were selected to annualise the data:

- Cardiff Centre;
- Cwmbran Crownbridge;
- Newport; and
- Narberth

These continuous background monitoring sites were applicable to use as they all had >85% data capture and therefore could be used for annualisation. Table C.3 and Table C.4 presents the annualisation summary.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Swansea Council required distance correction during 2021.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3) for Passive Monitoring

Site ID	Annualisation Factor Cardiff Centre	Annualisation Factor Cwmbran Crownbridge	Annualisation Factor Newport	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
10	1.2152	1.2448	1.1844	1.2148	19.6	23.8	
41	1.0197	1.0412	1.0090	1.0233	32.5	33.3	
96	1.0186	1.0194	1.0168	1.0183	22.5	22.9	
119	1.0661	0.9840	1.0257	1.0253	21.9	22.4	
439	1.0602	1.0700	1.0777	1.0693	18.9	20.2	
440	1.0602	1.0700	1.0777	1.0693	20.0	21.4	
441	1.0602	1.0700	1.0777	1.0693	22.6	24.2	
442	1.0602	1.0700	1.0777	1.0693	20.9	22.4	
444	1.0602	1.0700	1.0777	1.0693	27.1	28.9	
445	1.0602	1.0700	1.0777	1.0693	29.6	31.6	
446	1.0602	1.0700	1.0777	1.0693	29.0	31.0	
447	1.0160	1.0026	1.0324	1.0170	16.9	17.2	
448	1.0602	1.0700	1.0777	1.0693	25.8	27.6	
449	1.0666	1.1034	1.0983	1.0894	30.6	33.3	
450	1.0201	1.0301	1.0401	1.0301	28.5	29.3	
458	1.0666	1.1034	1.0983	1.0894	27.3	29.7	

Table C.3 – Annualisation Summary for Automatic Monitors for Annual Mean NO_2

Site ID	Annualisation Factor Cardiff Centre	Annualisation Factor Narberth	Annualisation Factor Newport	Average Annualisation Factor	Raw Data Annual Mean (ug/m^3)	Annualised Annual Mean (ug/m^3)	Comments
CM6	1.0153	0.9247	0.9433	0.9611	16.5	15.8	
CM9	1.0102	0.9153	0.9373	0.9542	15.2	14.5	

Table C.4 – Annualisation Summary for Automatic Monitors for Annual Mean PM_{10}

Site ID	Annualisation Factor Cardiff Centre	Annualisation Factor Cwmbran Crownbridge	Annualisation Factor Newport	Average Annualisation Factor	Raw Data Annual Mean (ug/m^3)	Annualised Annual Mean (ug/m^3)	Comments
CM2	0.9054	0.8889	0.9097	0.9013	23.6	21.3	
CM5	1.0967	1.1437	1.0766	1.1057	31.7	35.0	

Table C.5 – Local Bias Adjustment Calculations

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2
Periods used to calculate bias	11	11
Bias Factor A	0.74 (0.67 - 0.83)	0.83 (0.73 - 0.96)
Bias Factor B	34% (20% - 49%)	21% (4% - 38%)
Diffusion Tube Mean (µg/m^3)	26.7	13.6
Mean CV (Precision)	5.8%	6.0%
Automatic Mean (µg/m^3)	19.9	11.2
Data Capture	100%	100%
Adjusted Tube Mean (µg/m^3)	20 (18 - 22)	11 (10 - 13)

Notes:

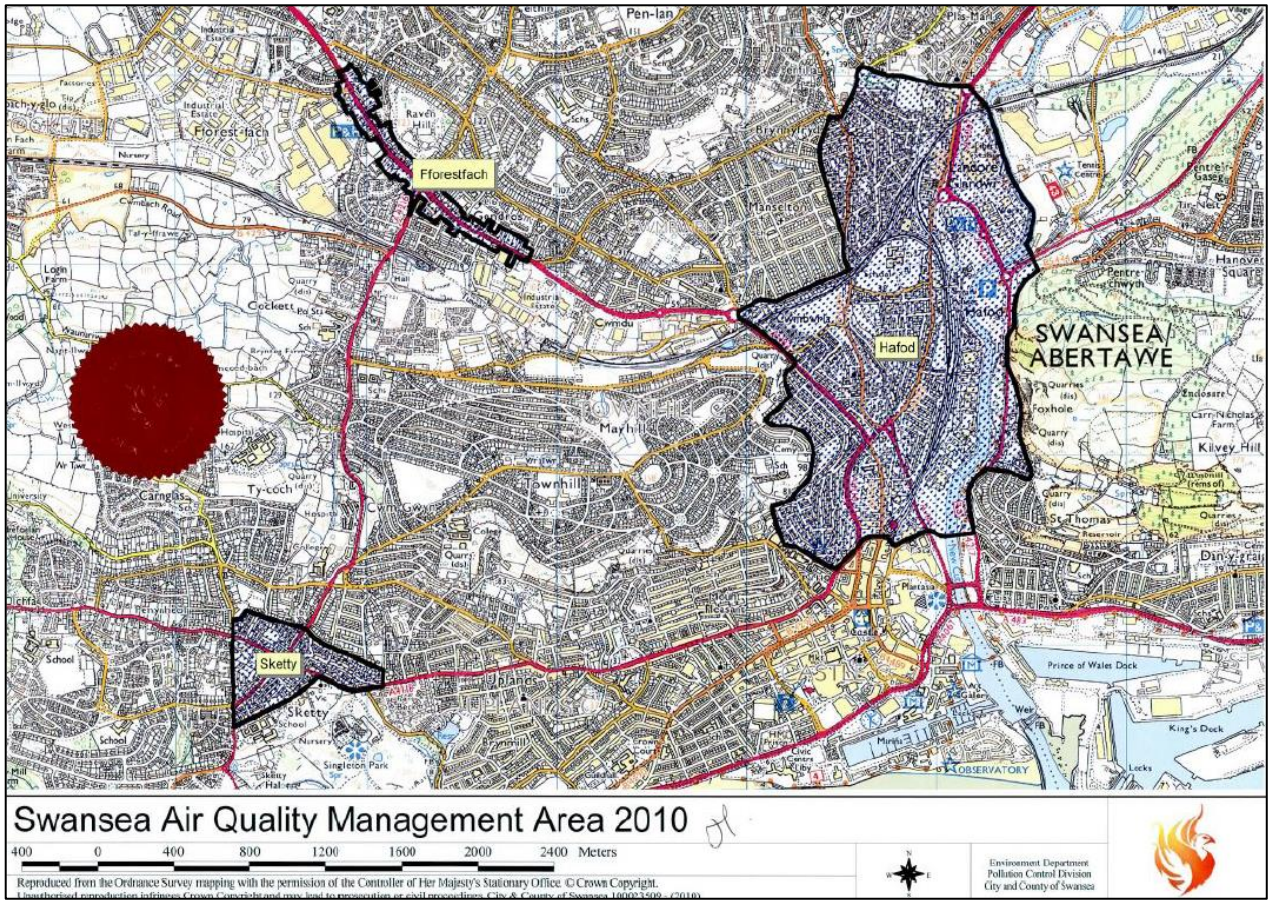
A combined local bias adjustment factor of 0.78 has been used to bias adjust the 2021 diffusion tube results.

Table C.1 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
459	1.9	30.8	39.3	11.2	21.2	

Appendix D: AQMA Boundary Maps

Figure D.1 – Swansea AQMA 2010



Glossary of Terms

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