



***Pembrokeshire County Council***

***2022 Annual Progress Report***

***September 2022***

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# Pembrokeshire County Council 2022 Air Quality Progress Report

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: September, 2022

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## Executive Summary: Air Quality in Our Area

### Air Quality in Pembrokeshire County Council

Pembrokeshire County Council's monitoring network in 2021 reports no exceedances of the NO<sub>2</sub> annual mean AQS (Air Quality Strategy) objective of 40 µg/m<sup>3</sup> reported throughout Pembrokeshire. The maximum reported concentration was located at PCC45 of 36 µg/m<sup>3</sup>, this monitoring station is situated along Main Street, located within the Pembroke Air Quality Management Area (AQMA). The remaining monitoring stations reported concentrations well below the AQS objective.

During 2021, all passive NO<sub>2</sub> monitoring locations recorded an increase in annual mean concentrations from 2020, with an average increase of 3.2 µg/m<sup>3</sup> 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<sub>2</sub> concentrations have fallen. During 2021 there were reduced enforced restrictions, therefore, 2021 was subject to pre pandemic traffic volumes. Despite this, there is still no reported exceedances of the annual mean NO<sub>2</sub> AQS objective of 40 µg/m<sup>3</sup> within Pembrokeshire.

Pembrokeshire County Council currently have two declared AQMAs (Haverfordwest and Pembroke). Details of these AQMAs can be found on the [UKAir](#) website and the [Welsh Government Website](#). All AQMAs have been declared due to exceedances of the NO<sub>2</sub> 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, Pembroke AQMA has been compliant for two years and Haverfordwest AQMA has been compliant for five years. Despite recent compliance, a number of monitoring locations within the Pembroke AQMA have shown to be increasing near to 40 µg/m<sup>3</sup> over the past five years, notably PCC5 (1.0m from nearest relevant exposure) and PCC26 (at a location of relevant exposure). Therefore to ensure that continual compliance is achieved, the Council do not intend to revoke this AQMA. If concentrations continue to rise, then the Council will carry out an investigation to understand why this is occurring and how this can be mitigated.

No diffusion tube monitoring sites reported an annual mean NO<sub>2</sub> concentration greater than 60 µg/m<sup>3</sup>, therefore in accordance with LAQM.TG(22)<sup>1</sup> it is not believed that there have been any exceedances of the 1-hour NO<sub>2</sub> AQS objective in these areas. Additionally, the automatic monitoring station located in Narberth (PEMB) reported no 1-hour NO<sub>2</sub> concentrations greater than 200 µg/m<sup>3</sup>.

The Narberth automatic monitoring station reports PM<sub>10</sub> and PM<sub>2.5</sub> compliance with both the annual and 24-hour AQS objectives continuing to be maintained.

## **Actions to Improve Air Quality**

Pembrokeshire County Council continue to have two AQMA's declared for exceedances of the NO<sub>2</sub> annual mean AQS objective. An Action Plan has been developed to assist with the control and management of air quality, with the main focus on reducing annual mean NO<sub>2</sub> concentrations. The Council continues to review the monitoring network in order to deploy new monitoring sites where it is expected that there may either be exceedances or in areas where congestion occurs.

## **Local Priorities and Challenges**

Pembrokeshire County Council continues to monitor NO<sub>2</sub> concentrations throughout the County, and in particular within the two AQMAs. The Council intends to revoke the AQMAs once annual mean NO<sub>2</sub> concentrations have remained below 36 µg/m<sup>3</sup> for three consecutive years in order to ensure that compliance is maintained. Concentrations in previous years have been observed to be increased at some locations in the Pembroke AQMA, if this continues in future years then an investigation will be undertaken to determine the cause of this. The Council also intends to continue progressing with air quality measures stated in their action plan to improve air quality within the County and wider area.

## **How to Get Involved**

Specific information on Air Quality in Pembrokeshire can be accessed via [Pembrokeshire County Council's website](#). The [Welsh Air Quality website](#) details all Welsh automatic air

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<sup>1</sup> [LAQM Technical Guidance LAQM.TG22](#)

quality monitoring data with information and links to other sources of air quality data, including educational resources for schools. [UK-AIR](#) provides information on the national UK air quality information.

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# 1 Actions to Improve Air Quality

## 1.1 Previous Work in Relation to Air Quality

A summary of the reports produced on air quality by Pembrokeshire County Council to date are accessible on the Pembrokeshire County Council [website](#), via previous Annual Status Reports (APR), which summarise previous year air quality reports.

### Annual Progress Report 2021 Summary

**2021** The monitoring network within Pembrokeshire reported an overall increase in NO<sub>2</sub> concentrations, with 44 out of 45 non automatic sites undergoing and increase from 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<sub>2</sub> concentrations, 2021 did not experience a near full year of government lockdown, therefore was subject to increased levels of traffic volume from 2020, therefore reflecting pre-pandemic traffic volumes. Despite this, both Haverfordwest and Pembroke AQMAs continue to report compliance, with Haverfordwest reporting five year compliance and Pembroke three year full compliance. Monitoring location PCC45 has shown to be consistently showing high levels of NO<sub>2</sub> over the past five years, therefore, there is currently no intention to revoke Pembrokeshire's AQMAs.

## 1.2 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 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 Pembrokeshire County Council can be found in Table 1.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at the [Council's website](#), and [UK-AIR](#).

Table 1.1 – Declared Air Quality Management Areas

AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	City / Town	Description	Action Plan
<b>Haverford – West</b>	NO <sub>2</sub> annual mean	There has been noticeable improvement in air quality in the AQMA for several years, with the last reported exceedance being in 2016 (40.3 µg/m <sup>3</sup> ). Some locations have had increasing NO <sub>2</sub> concentrations over the past 5 years, but still compliant. A large decrease at all sites has been observed in 2020.	Haverfordwest	The main road network through the town comprising mixed commercial residential areas.	Action Plan 2014 Updated 2019
<b>Pembroke</b>	NO <sub>2</sub> annual mean	There has been overall improvement in air quality in the AQMA for several years, with the last exceedance being in 2018 (41.2 µg/m <sup>3</sup> ). Most sites are well below the AQS objective, however one (PCC45) has remained between 36-40 µg/m <sup>3</sup> . A large decrease at all sites has been observed in 2020.	Pembroke	Part of the main road network through the town, the main shopping high street with a mix of commercial and residential property.	Action Plan 2014 Updated 2019

AQMA boundary maps within Pembrokeshire County Council can be viewed in Appendix D.

### **1.3 Implementation of Action Plans**

Pembrokeshire County 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.

AQAPs 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.

Pembrokeshire County Council continue to progress with measures set out in Table 1.2, normal operations follow after minimal progress was made within 2020 due to the impact of COVID – 19, there have been no significant updates to current measures within 2021, overall, the current strategies are ongoing developments.

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	Air Quality Action Plan 2017	Parking Restrictions Pembroke AQMA	County Council	2014	Updated 2019	NO <sub>2</sub> Levels	Compliance e with NO <sub>2</sub> objective in AQMA	Reduction of NO <sub>2</sub> levels but cannot patrol 7 days a week	Compliance with NO <sub>2</sub> objective achieved but <36ug/m <sup>3</sup> required for three consecutive years	Ongoing	Reduction of initial exceedances that led to AQMA declaration
2	LINC	Bwcabus service	Partnership Carmarthenshire, Ceredigion, Pembrokes hire Authority's	Pre 2017	2017 to 2020 RDP	None	n/a	Used by public in other areas	n/a	Ongoing	Remove private vehicles from roads
3	Active Travel Consultation	Walking and cycling	County Council	2017 public consultation	2017	None	n/a	Ongoing	n/a	15 year programme	To ensure planners consider needs of walkers and cyclists and encourage active travel
4	Chimney Links, Fishguard	To alleviate traffic congestion and improve public transport in town centre	County Council	Pre 2017	2017	n/a	n/a	Completed	Completed, traffic diverted from narrow street areas reducing congestion	Completed	Alleviate vehicle congestion and associated emissions within town centre

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
5	Quality Partnership Scheme	Improve the quality and service provided by bus operators	Welsh Government	Pre 2017	2017	n/a	Contributes to reduced emissions	Funding received	n/a	Ongoing	Encourage use of public transport reducing private vehicle use
6	Review of Local Development Plan	Statutory requirement	County Council	2017	2019	n/a	Air quality considerations within planning consultation phase	Public Consultation	Ongoing, extended delivery agreement due to COVID-19	2022	Relevant departments can comment in relation to developments and air quality Specifically.
7	Enforcement Actions	Statutory requirement	Local Authority	Statutory obligation	Statutory obligation	Increase in enforcement action implemented	To mitigate emissions from burning trade wastes	Ongoing	High profile local businesses burning trade wastes. Persons/businesses contacted via informative letters detailing relevant legislation and enforcement actions.	Ongoing	Protection of public health and the environment



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
8	Funding Boost	Transport Schemes	Welsh Government	Pre 2018	2018	n/a	n/a	n/a	n/a	Ongoing	Develop cycle/pedestrian routes, electric car charging facilities, transport data studies to deliver sustainable transport initiatives
9	Pedestrianisation Scheme Consultation	To remove annual variation to start finish dates in Tenby	Local Authority	Pre 2018	2018	n/a	n/a	Ongoing strategy	Ongoing annual scheme	Ongoing	Questionnaire e to assess public interest in development and possible permanent pedestrianisation of Tenby Centre
10	Website Development	Maps and detailed information of cycle routes around county to website	Local Authority	Pre 2018	2018	n/a	n/a	Ongoing	Ongoing	Ongoing	Information source for cyclists includes traffic free sections of cycle path routes

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
11	Coastal Bus Service Provision	To provide access for tourists, walkers, and residents in coastal communities	Local Authority and Pembrokes hire Coast National Park	Pre 2015	Pre 2015	Increase in passenger figures	n/a	Ongoing	n/a	Ongoing	Remove private vehicles from road use
12	Vehicle Idling Prevention	To prevent emissions to air from idling vehicles	Local Authority	Pre 2018	2018	Taxi rank in AQMA well within NO2 objective	Yes	Ongoing	Annual Mean Objective for NO <sub>2</sub> met	Ongoing	Taxi firms contacted directly via Licensing regime, Annual Mean NO <sub>2</sub> Objective met
13	Greening Pembroke Town Centre	To mitigate air borne pollution and protect public health	Local Authority	2019	2020	n/a	Yes	Application stage	n/a for return	n/a	n/a

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
14	Greening Haverfordwest Town Centre	To mitigate air borne pollution and protect public health	Local Authority	2019	2020	n/a	Yes	Application stage	n/a	n/a	n/a
15	Carbon Neutral Pembrokeshire	Combat Climate Change	Local Authority	2019	Carbon Neutral by 2030 survey	Cardiff University and Coastal Communities Adapting Together charged with project	Possible	Questionnaire provided	Collation of responses has not yet taken place	n/a	Joint benefits of CO <sub>2</sub> and NO <sub>2</sub> , many measures to reduce CO <sub>2</sub> focus on changing mode of transport

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

### **2.1 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.

Pembrokeshire County Council undertook automatic (continuous) monitoring at one site during 2021. Table 2.1 presents the details of the site. National monitoring results are available at both the [Welsh Air Quality Forum](#) and [UK-AIR](#). This monitoring site is part of, and managed by, the [Automatic Urban and Rural Network](#) (AURN).

Maps showing the location of the monitoring sites are provided in Figure 2.1 and on the [Welsh Air Quality Forum](#). 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**

Pembrokeshire County Council undertook non-automatic (passive) monitoring of NO<sub>2</sub> at 45 sites during 2021. Table 2.2 presents the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 2.2 – Figure 2.4. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

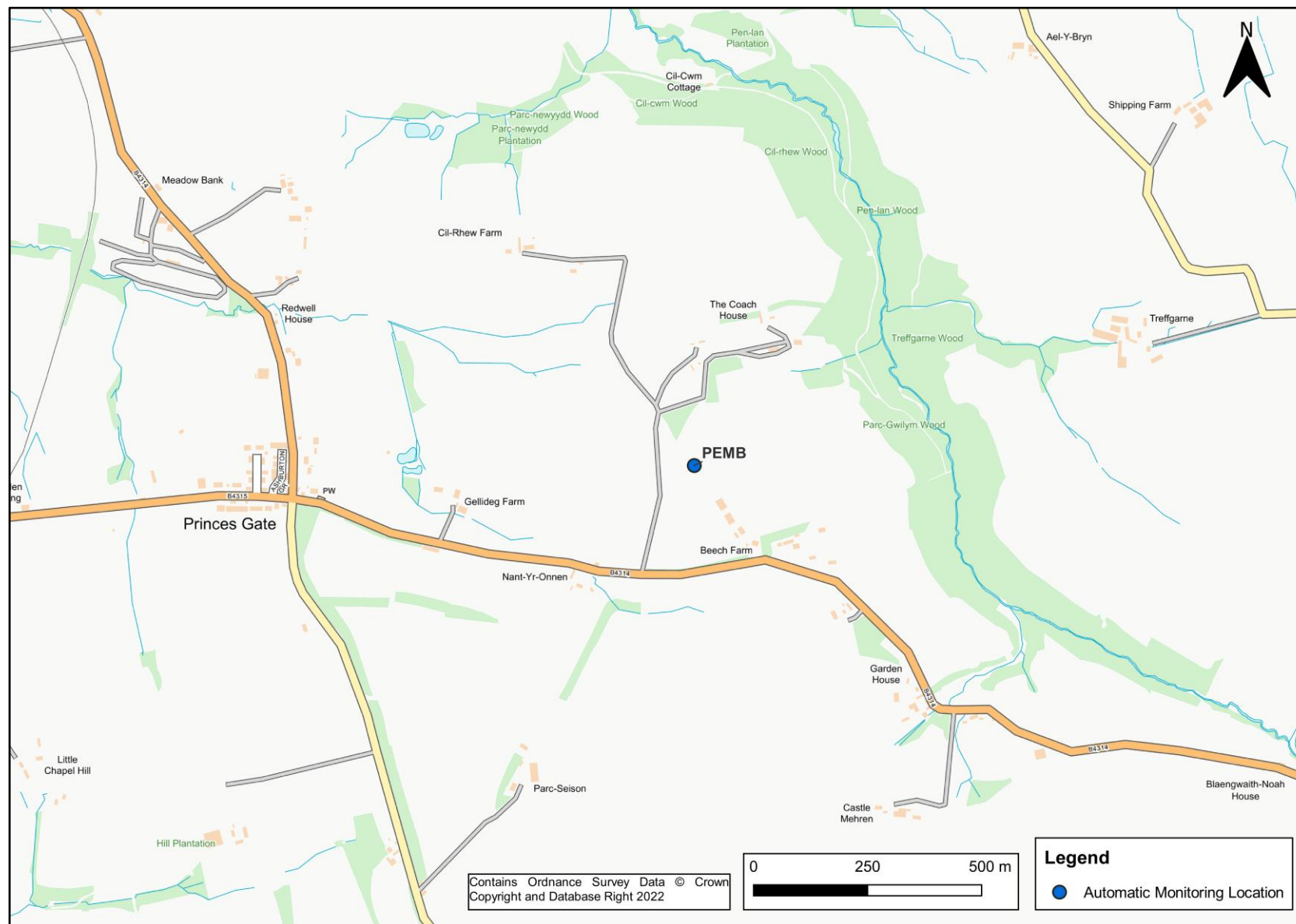
**Table 2.1 – Details of Automatic Monitoring Sites**

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) <sup>(1)</sup>	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
PEMB	Narberth	Rural	N/A	214374	212774	NO <sub>2</sub> , O <sub>3</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub>	API Analysers, Fidas, Echotech Serinus	2.5	N/A	N/A	N/A

**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) <sup>(1)</sup>	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
PCC1	Salutation Square	Roadside	N	195629	215655	2.0	N	N/A	N/A	1.0
PCC2	Picton Place	Roadside	Y - Haverfordwest AQMA	195574	215704	2.0	N	1.0	2.0	1.0
PCC3	Victoria Place	Roadside	Y - Haverfordwest AQMA	195474	215661	2.0	N	1.0	2.0	1.0
PCC4	High St	Roadside	Y - Haverfordwest AQMA	195402	215634	2.0	N	1.0	2.0	1.0
PCC5	High St	Roadside	Y - Haverfordwest AQMA	195312	215605	2.0	N	1.0	2.0	1.0
PCC6	High St	Roadside	Y - Haverfordwest AQMA	195294	215591	2.0	N	1.0	2.0	1.0
PCC7	High St	Roadside	Y - Haverfordwest AQMA	195203	215544	2.0	N	1.0	2.0	1.0
PCC8	High St	Roadside	Y - Haverfordwest AQMA	195159	215494	2.0	N	1.0	2.0	1.0
PCC9	Dark St	Roadside	N	195267	215603	2.0	N	1.0	2.0	1.0
PCC10	Dark St	Roadside	N	195177	215616	2.0	N	1.0	2.0	1.0

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) <sup>(1)</sup>	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
PCC11	Dew St	Roadside	Y - Haverfordwest AQMA	195143	215464	2.0	N	1.0	2.0	1.0
PCC12	Dew St	Roadside	Y - Haverfordwest AQMA	195110	215394	2.0	N	1.0	2.0	1.0
PCC13	Dew St	Roadside	Y - Haverfordwest AQMA	195101	215357	2.0	N	1.0	2.0	1.0
PCC14	Dew St	Roadside	Y - Haverfordwest AQMA	195028	215269	2.0	N	1.0	2.0	1.0
PCC15	Dew St	Roadside	Y - Haverfordwest AQMA	194998	215255	2.0	N	1.0	2.0	1.0
PCC16	Shipmans Lane	Roadside	N	195006	215208	2.0	N	1.0	2.0	1.0
PCC17	Albert St	Roadside	Y - Haverfordwest AQMA	194945	215259	2.0	N	0.0	1.0	1.0
PCC18	Albert St	Roadside	Y - Haverfordwest AQMA	194937	215254	2.0	N	0.0	1.0	1.0
PCC19	Albert St	Roadside	Y - Haverfordwest AQMA	194936	215268	2.0	N	0.0	1.0	1.0
PCC20	Albert St	Roadside	Y - Haverfordwest AQMA	194922	215263	2.0	N	0.0	1.0	1.0
PCC21	Albert St	Roadside	Y - Haverfordwest AQMA	194930	215276	2.0	N	0.0	1.0	1.0



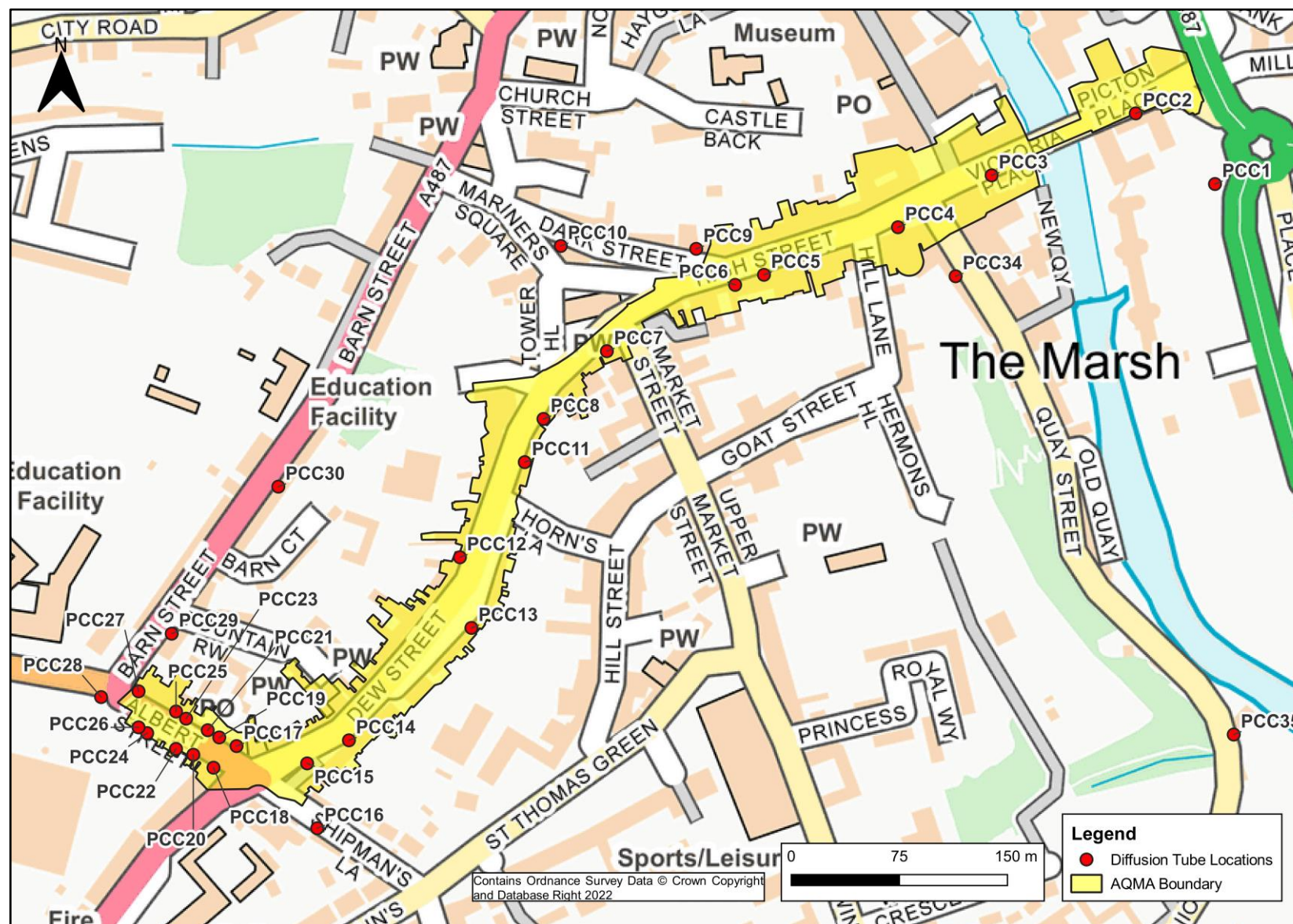
Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) <sup>(1)</sup>	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
PCC22	Albert St	Roadside	Y - Haverfordwest AQMA	194911	215268	2.0	N	0.0	1.0	1.0
PCC23	Albert St	Roadside	Y - Haverfordwest AQMA	194911	215279	2.0	N	0.0	1.0	1.0
PCC24	Albert St	Roadside	Y - Haverfordwest AQMA	194893	215279	2.0	N	0.0	1.0	1.0
PCC25	Albert St	Roadside	Y - Haverfordwest AQMA	194905	215286	2.0	N	0.0	1.0	1.0
PCC26	Albert St	Roadside	Y - Haverfordwest AQMA	194886	215284	2.0	N	0.0	1.0	1.0
PCC27	Albert St	Roadside	Y - Haverfordwest AQMA	194879	215300	2.0	N	0.0	1.0	1.0
PCC28	Albert St	Roadside	N	194856	215299	2.0	N	0.0	1.0	1.0
PCC29	Barn St	Roadside	N	194901	215345	2.0	N	0.0	1.0	1.0
PCC30	Barn St	Roadside	N	194974	215448	2.0	N	0.0	1.0	1.0
PCC31	Merlins Bridge	Roadside	N	194730	214554	2.0	N	n/a	N/A	1.0
PCC32	Merlins Bridge	Roadside	N	194761	214610	2.0	N	n/a	N/A	1.0

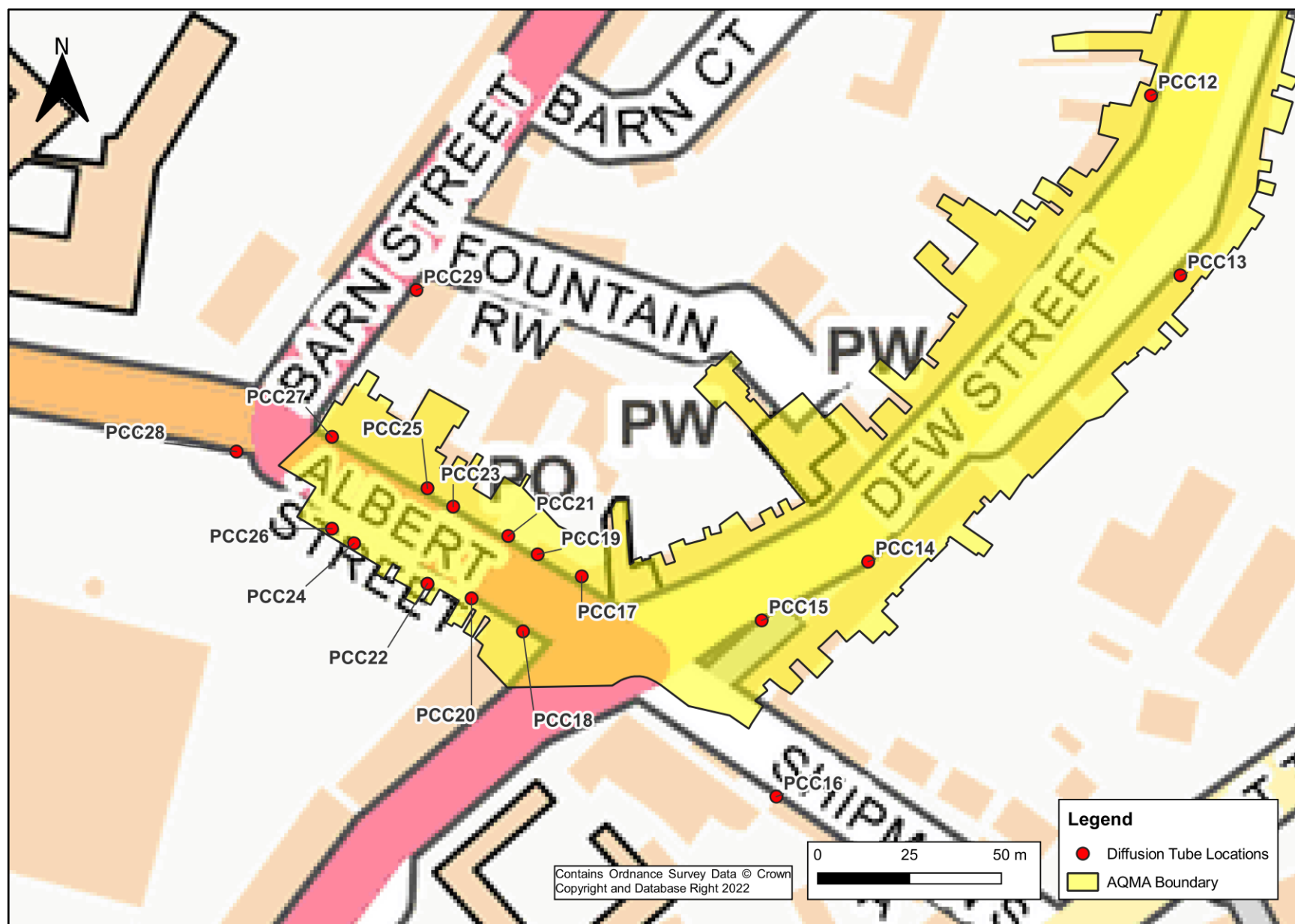
Site ID	Site Name	Site Type	Associated with Named AQMA?	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) <sup>(1)</sup>	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
PCC33	Haroldston Terrace	Roadside	N	194774	214465	2.0	N	n/a	N/A	1.0
PCC34	Quay St	Roadside	N	195453	215594	2.0	N	1.0	2.0	1.0
PCC35	Quay St	Roadside	N	195642	215273	2.0	N	1.0	2.0	1.0
PCC36	High St	Roadside	N	210901	214713	2.0	N	1.0	2.0	1.0
PCC40	Main St	Roadside	N	198244	201554	2.0	N	1.0	2.0	1.0
PCC41	Main St	Roadside	Y - Pembroke AQMA	198274	201547	2.0	N	1.0	2.0	1.0
PCC42	Main St	Roadside	N	198333	201549	2.0	N	1.0	2.0	1.0
PCC43	Main St	Roadside	Y - Pembroke AQMA	198364	201502	2.0	N	1.0	2.0	1.0
PCC44	Main St	Roadside	Y - Pembroke AQMA	198396	201495	2.0	N	1.0	2.0	1.0
PCC45	Main St	Roadside	Y - Pembroke AQMA	198407	201489	2.0	N	1.0	2.0	1.0
PCC46	Main St	Roadside	Y - Pembroke AQMA	198460	201464	2.0	N	1.0	2.0	1.0
PCC47	Main St	Roadside	Y - Pembroke AQMA	198548	201419	2.0	N	1.0	2.0	1.0
PCC48	Main St	Roadside	N	198869	201299	2.0	N	1.0	2.0	1.0

**Notes:**

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

Figure 2.2 – Maps of Non-Automatic Monitoring Sites in Haverfordwest







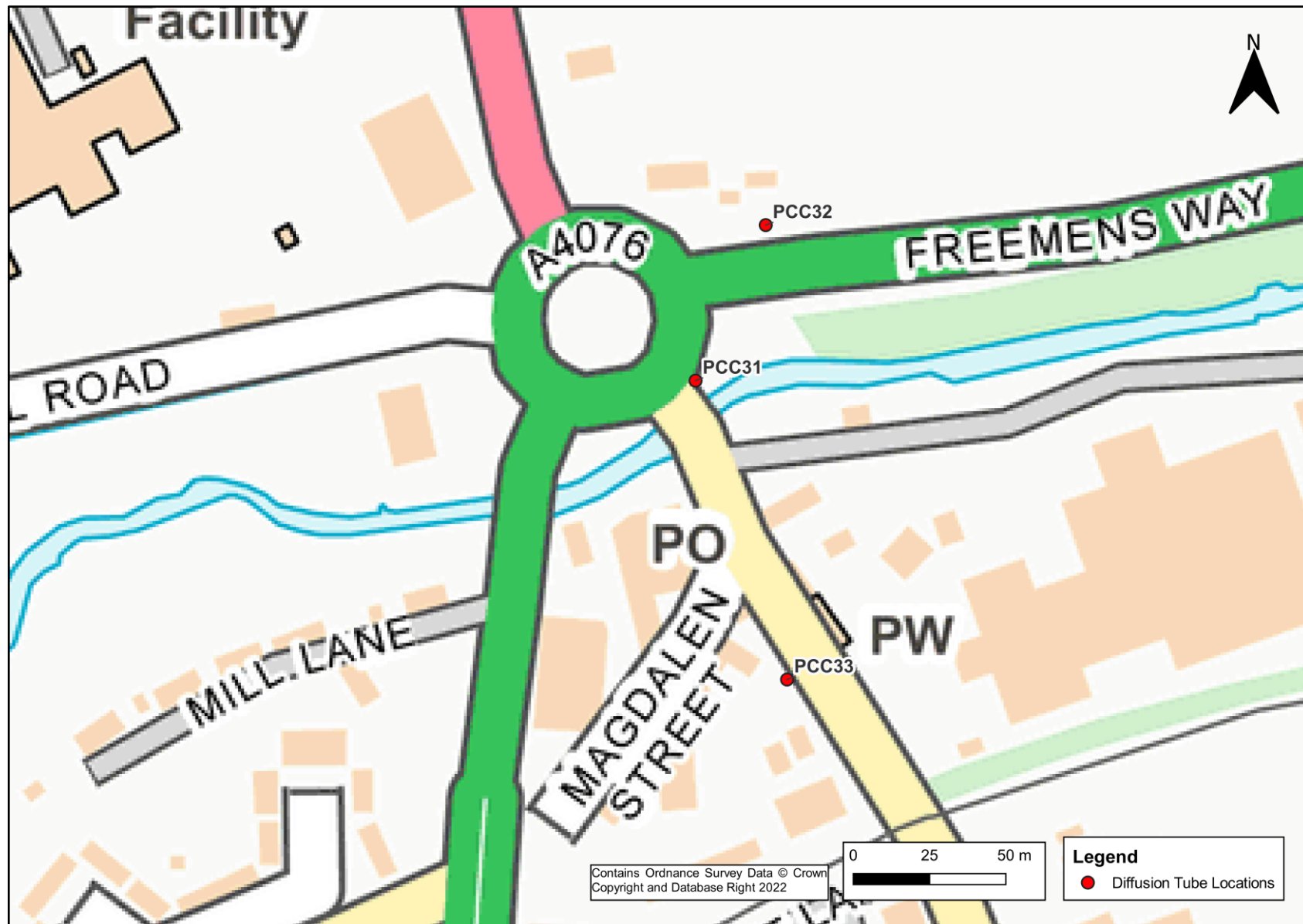


Figure 2.3 – Map of Non-Automatic Monitoring Sites in Pembrokeshire

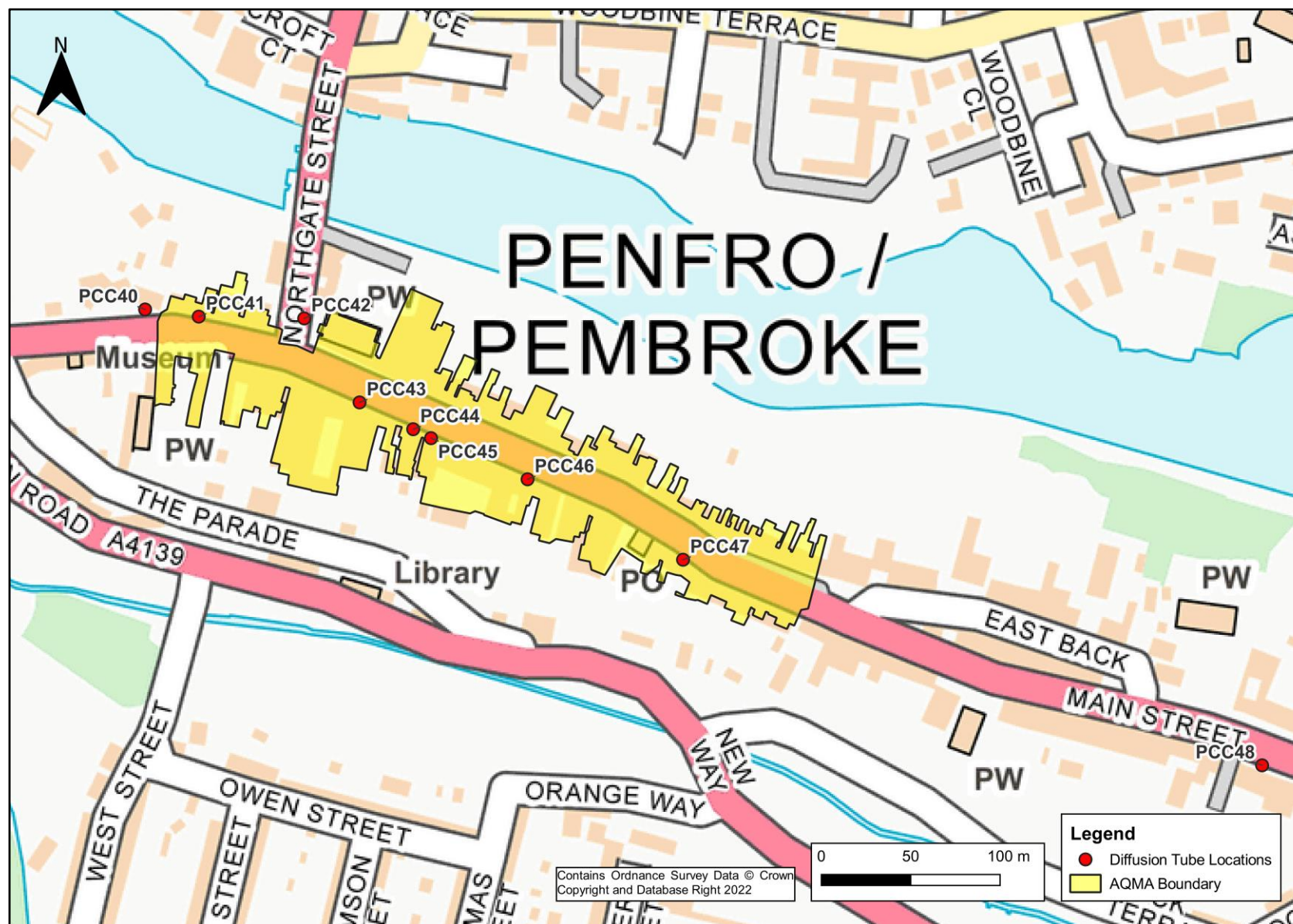
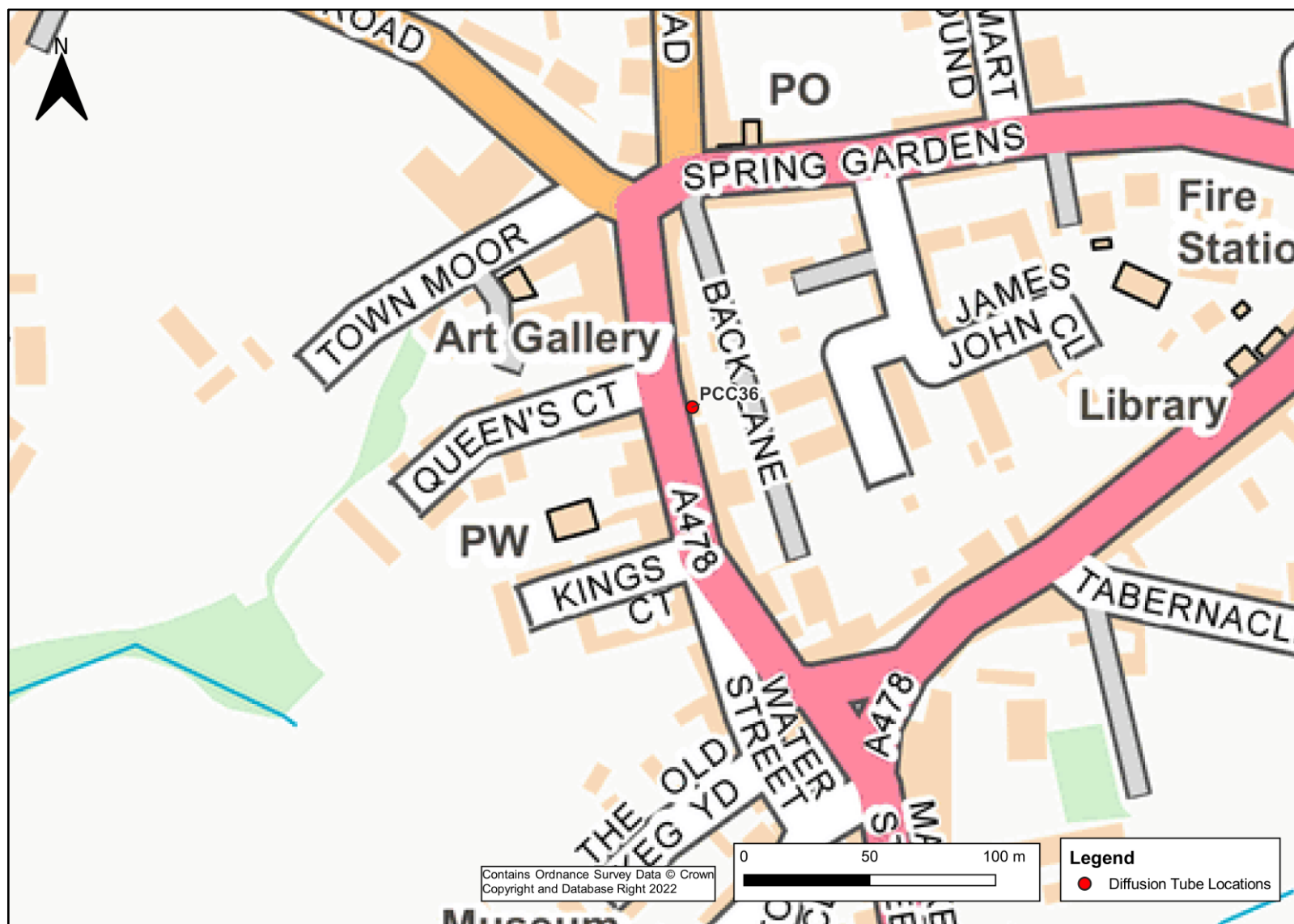
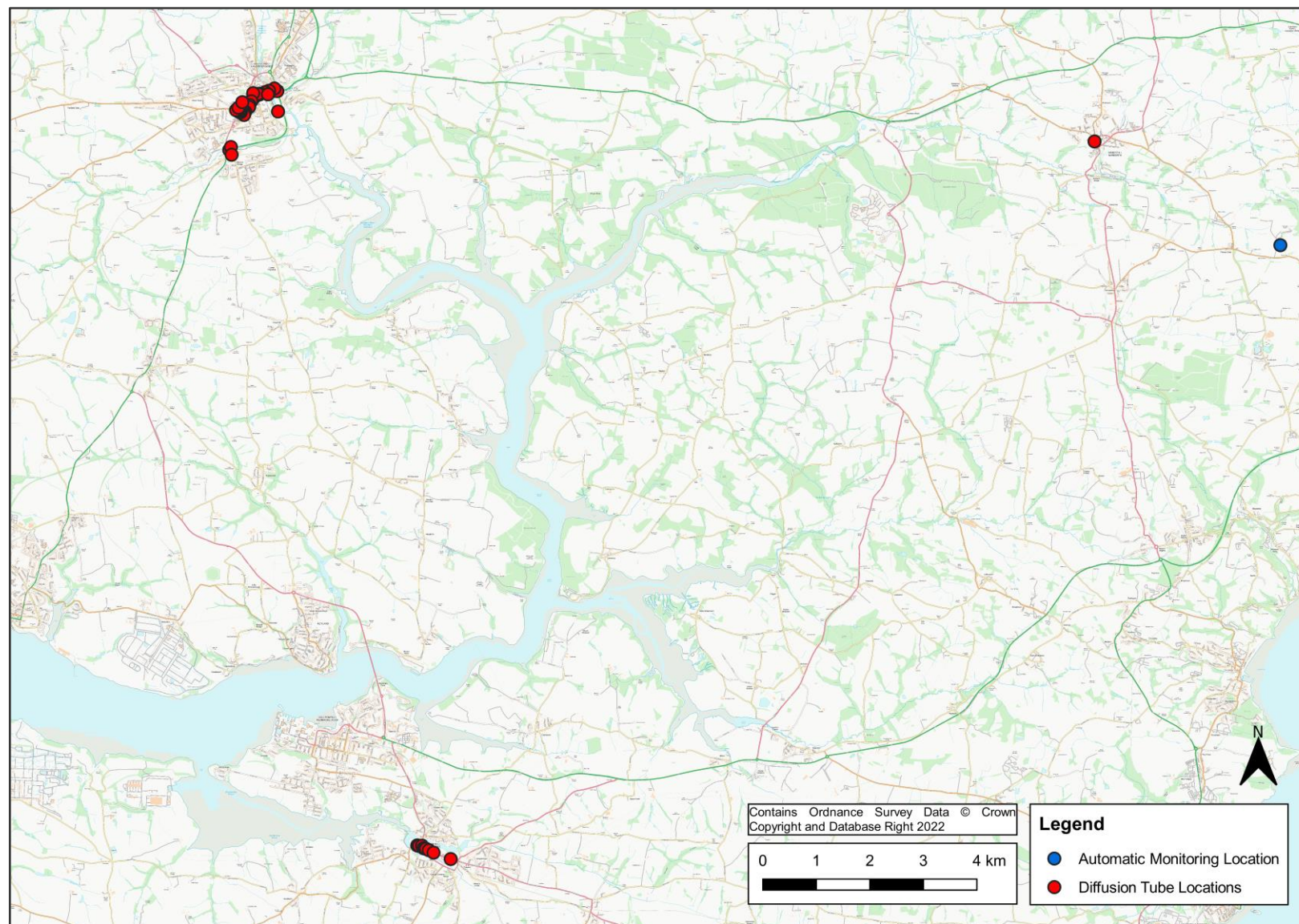


Figure 2.4 – Map of Non-Automatic Monitoring Sites in Narberth





**Figure 2.5 – Spatial Map of Pembrokeshire's Automatic and Non-Automatic Monitoring Network**





## 2.2 2021 Air Quality Monitoring Results

Table 2.3 – Annual Mean NO<sub>2</sub> Monitoring Results (µg/m<sup>3</sup>)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
PEMB	Rural	Automatic	98.3	98.3	3	4	4	3.1	3.1
PCC1	Roadside	Diffusion Tube	100.0	100.0	19.9	20.7	20.2	13.7	17.3
PCC2	Roadside	Diffusion Tube	100.0	100.0	25.8	26.4	25.6	16.2	19.3
PCC3	Roadside	Diffusion Tube	83.3	83.3	24.8	27.1	26.1	15.8	18.9
PCC4	Roadside	Diffusion Tube	100.0	100.0	32.6	30.6	32.1	24.8	26.9
PCC5	Roadside	Diffusion Tube	100.0	100.0	33.4	36.9	38.8	28.9	29.1
PCC6	Roadside	Diffusion Tube	83.3	83.3	32.4	33.6	33.2	24.2	27.9
PCC7	Roadside	Diffusion Tube	100.0	100.0	37.5	35.6	35.4	25.2	29.6
PCC8	Roadside	Diffusion Tube	83.3	83.3	27.8	29.3	28.6	19.9	22.4
PCC9	Roadside	Diffusion Tube	100.0	100.0	22.9	23.1	21.8	16.3	18.5
PCC10	Roadside	Diffusion Tube	100.0	100.0	16.8	15.1	15.7	13.4	12.1
PCC11	Roadside	Diffusion Tube	75.0	75.0	28.3	32.2	29.8	20.3	23.0
PCC12	Roadside	Diffusion Tube	75.0	75.0	27.9	28.2	27.3	20.0	24.0
PCC13	Roadside	Diffusion Tube	83.3	83.3	27.0	28.4	27.2	18.5	22.1
PCC14	Roadside	Diffusion Tube	91.7	91.7	25.1	24.4	24.3	16.5	19.4
PCC15	Roadside	Diffusion Tube	100.0	100.0	28.9	29.6	30.2	19.2	21.6
PCC16	Roadside	Diffusion Tube	100.0	100.0	19.1	19.2	19.3	12.6	13.7
PCC17	Roadside	Diffusion Tube	91.7	91.7	27.6	28.5	23.3	20.5	23.6
PCC18	Roadside	Diffusion Tube	91.7	91.7	37.5	36.0	35.4	24.3	28.4
PCC19	Roadside	Diffusion Tube	100.0	100.0	24.6	25.6	24.1	16.7	20.3
PCC20	Roadside	Diffusion Tube	100.0	100.0	38.6	35.1	36.5	26.1	30.4
PCC21	Roadside	Diffusion Tube	100.0	100.0	18.2	17.6	17.2	11.6	14.6
PCC22	Roadside	Diffusion Tube	100.0	100.0	35.0	35.8	35.8	24.7	29.2
PCC23	Roadside	Diffusion Tube	75.0	75.0	26.3	28.0	26.1	18.5	21.9
PCC24	Roadside	Diffusion Tube	100.0	100.0	35.4	34.8	34.7	23.3	28.1
PCC25	Roadside	Diffusion Tube	100.0	100.0	21.9	24.0	22.7	16.1	20.0
PCC26	Roadside	Diffusion Tube	100.0	100.0	35.0	35.5	37.1	22.6	27.7
PCC27	Roadside	Diffusion Tube	75.0	75.0	22.3	24.5	23.9	16.3	18.8
PCC28	Roadside	Diffusion Tube	66.7	66.7	16.6	19.5	20.2	13.8	16.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
PCC29	Roadside	Diffusion Tube	100.0	100.0	22.0	22.8	21.9	15.5	19.8
PCC30	Roadside	Diffusion Tube	91.7	91.7	15.5	15.7	14.7	10.3	11.8
PCC31	Roadside	Diffusion Tube	100.0	100.0	30.3	29.8	29.9	21.9	27.7
PCC32	Roadside	Diffusion Tube	100.0	100.0	33.1	31.6	33.7	23.4	27.2
PCC33	Roadside	Diffusion Tube	100.0	100.0	21.1	22.1	23.0	16.9	19.8
PCC34	Roadside	Diffusion Tube	100.0	100.0	22.3	21.2	21.1	13.1	16.1
PCC35	Roadside	Diffusion Tube	100.0	100.0	12.5	12.8	12.2	8.2	9.1
PCC36	Roadside	Diffusion Tube	100.0	100.0	20.1	22.8	21.3	15.0	17.9
PCC40	Roadside	Diffusion Tube	100.0	100.0	20.5	20.7	21.0	15.2	17.8
PCC41	Roadside	Diffusion Tube	100.0	100.0	23.8	24.4	24.5	17.2	21.0
PCC42	Roadside	Diffusion Tube	100.0	100.0	19.4	19.7	22.1	14.2	16.7
PCC43	Roadside	Diffusion Tube	100.0	100.0	31.9	31.7	32.5	22.5	26.1
PCC44	Roadside	Diffusion Tube	100.0	100.0	33.3	36.4	35.4	26.1	29.5
PCC45	Roadside	Diffusion Tube	100.0	100.0	38.2	<b>41.2</b>	39.3	29.1	36.0
PCC46	Roadside	Diffusion Tube	100.0	100.0	33.1	35.5	34.3	24.7	29.5
PCC47	Roadside	Diffusion Tube	100.0	100.0	24.8	23.6	23.9	15.7	19.9
PCC48	Roadside	Diffusion Tube	100.0	100.0	12.5	12.1	12.6	8.6	10.4

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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%).

Figure 2.6 – Trends in Annual Mean NO<sub>2</sub> Concentrations at Narberth

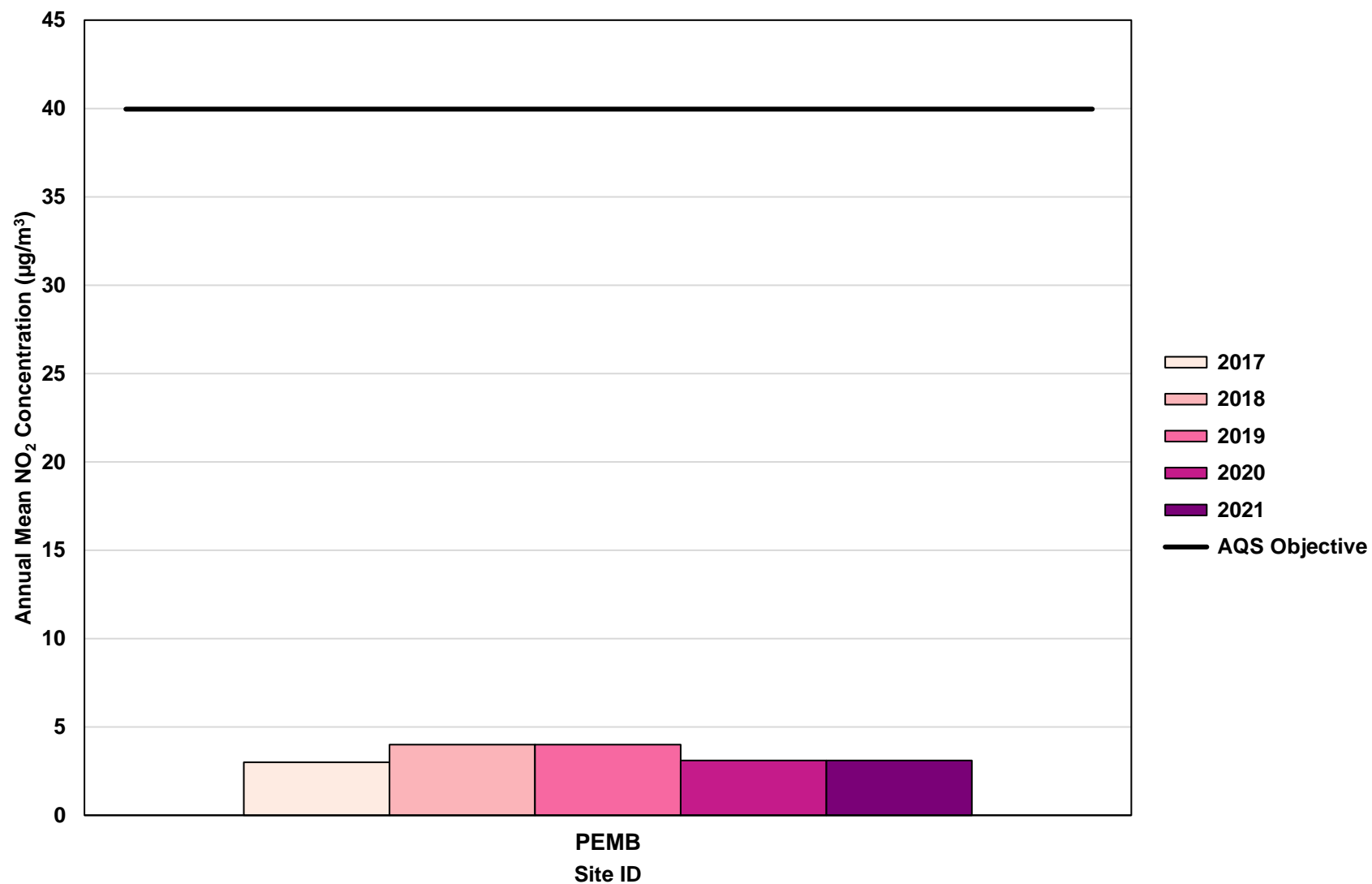


Figure 2.7 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Haverfordwest

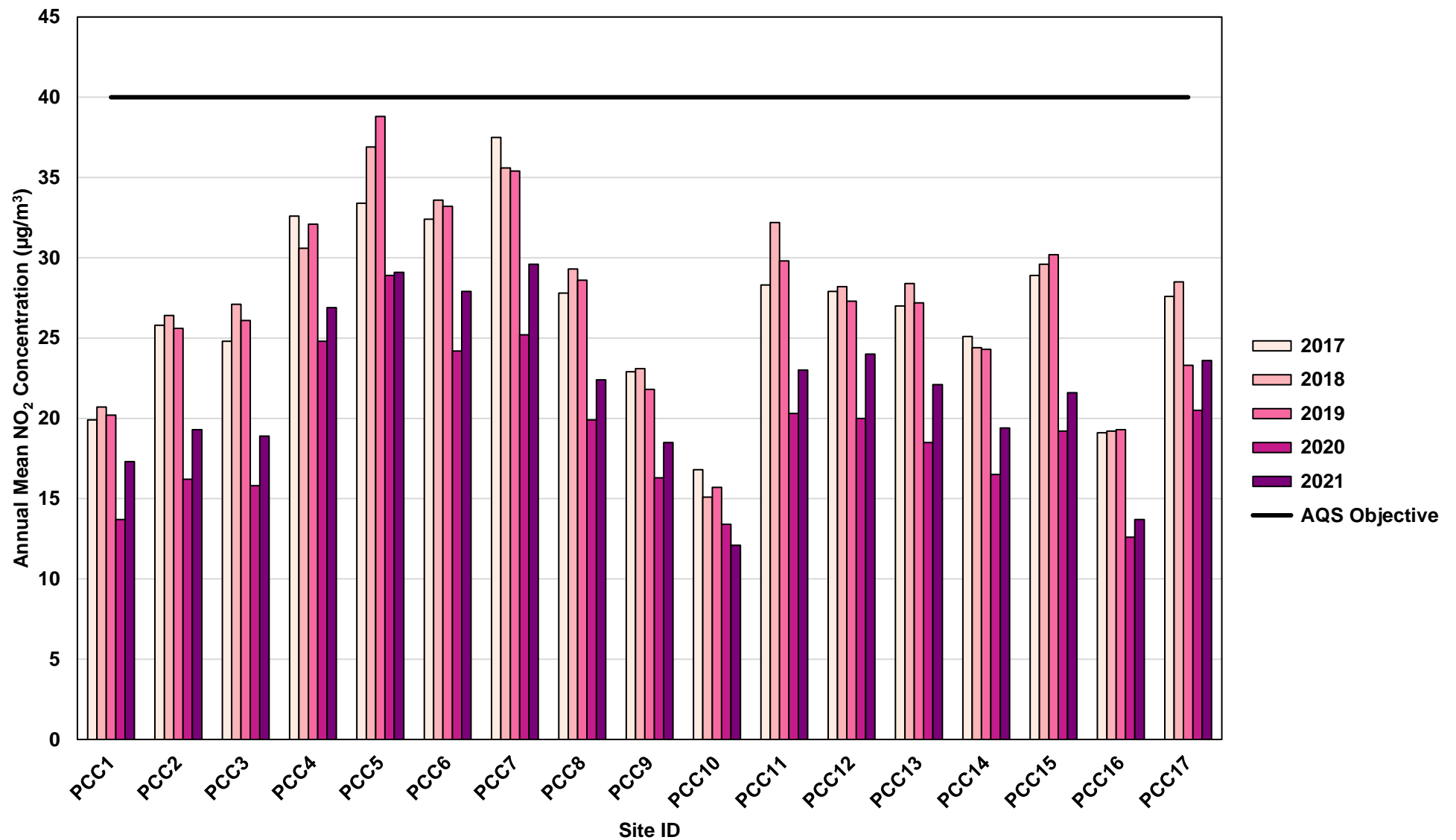


Figure 2.8 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Haverfordwest

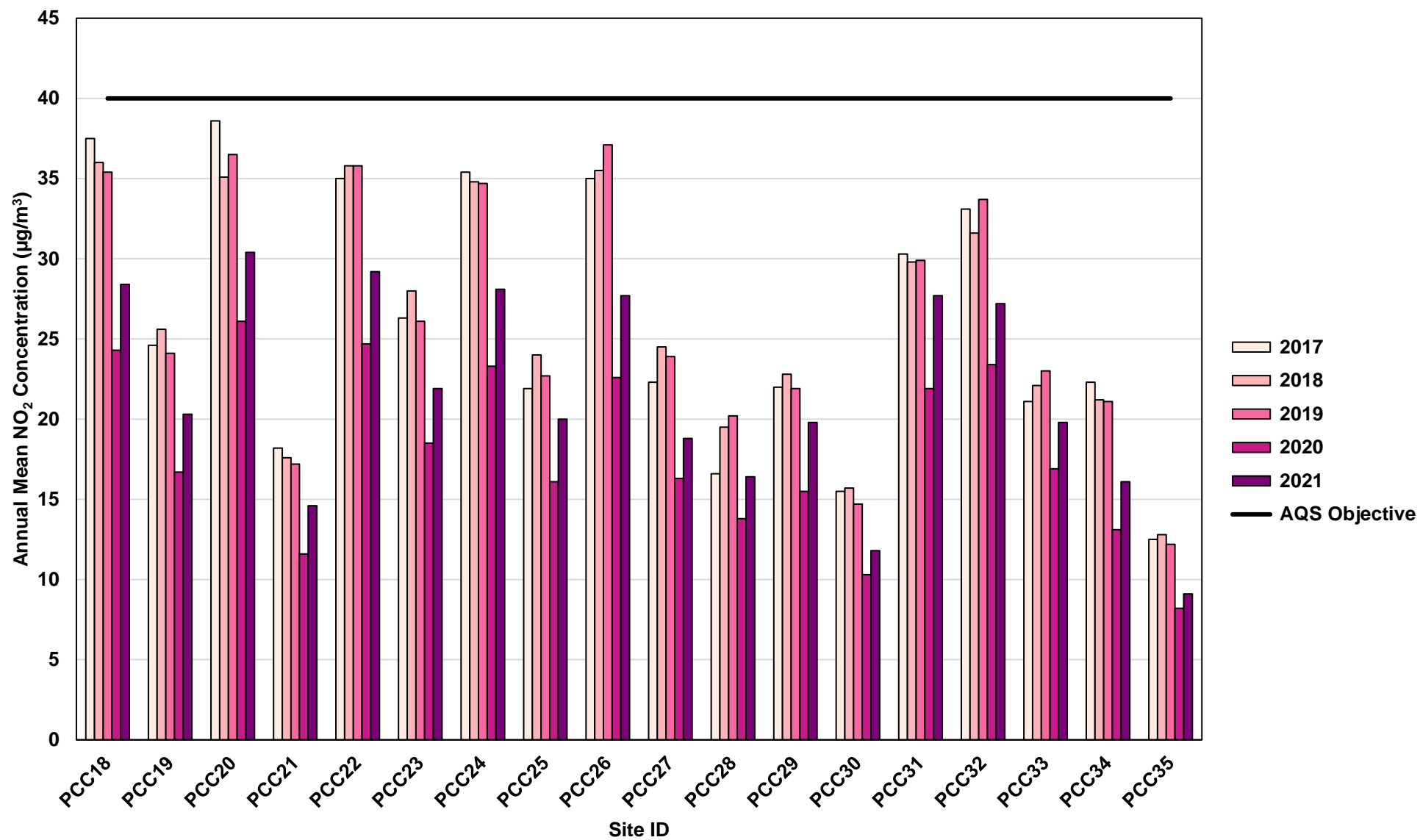
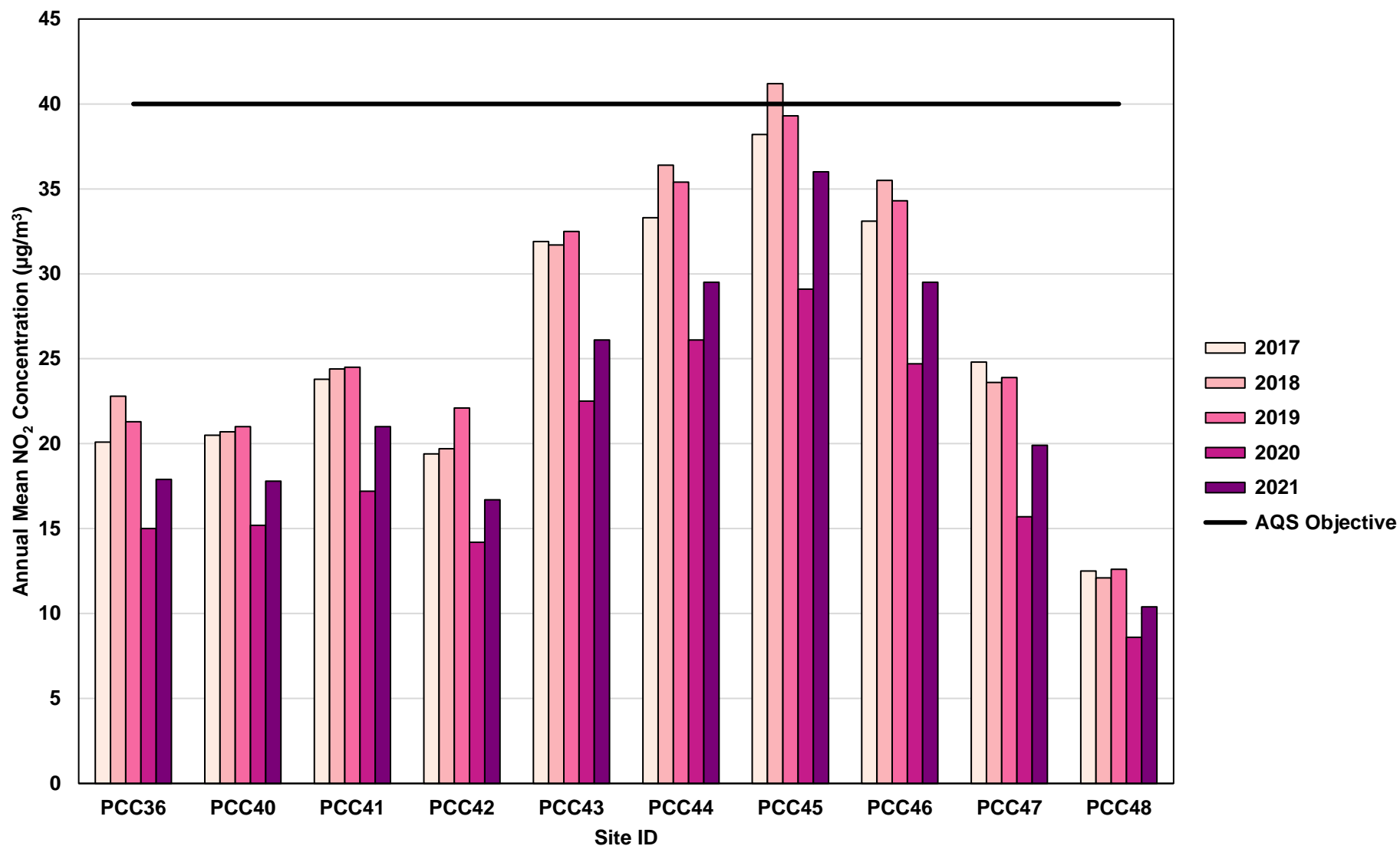


Figure 2.9 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Haverfordwest and Narberth



**Table 2.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m<sup>3</sup>**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
<b>Narberth</b>	Rural	Automatic	98.3	98.3	0	0	0	0	0

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> 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<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Narberth	Rural	98.6	98.6	11	12	11	10.5	10.1

**Notes:**

Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

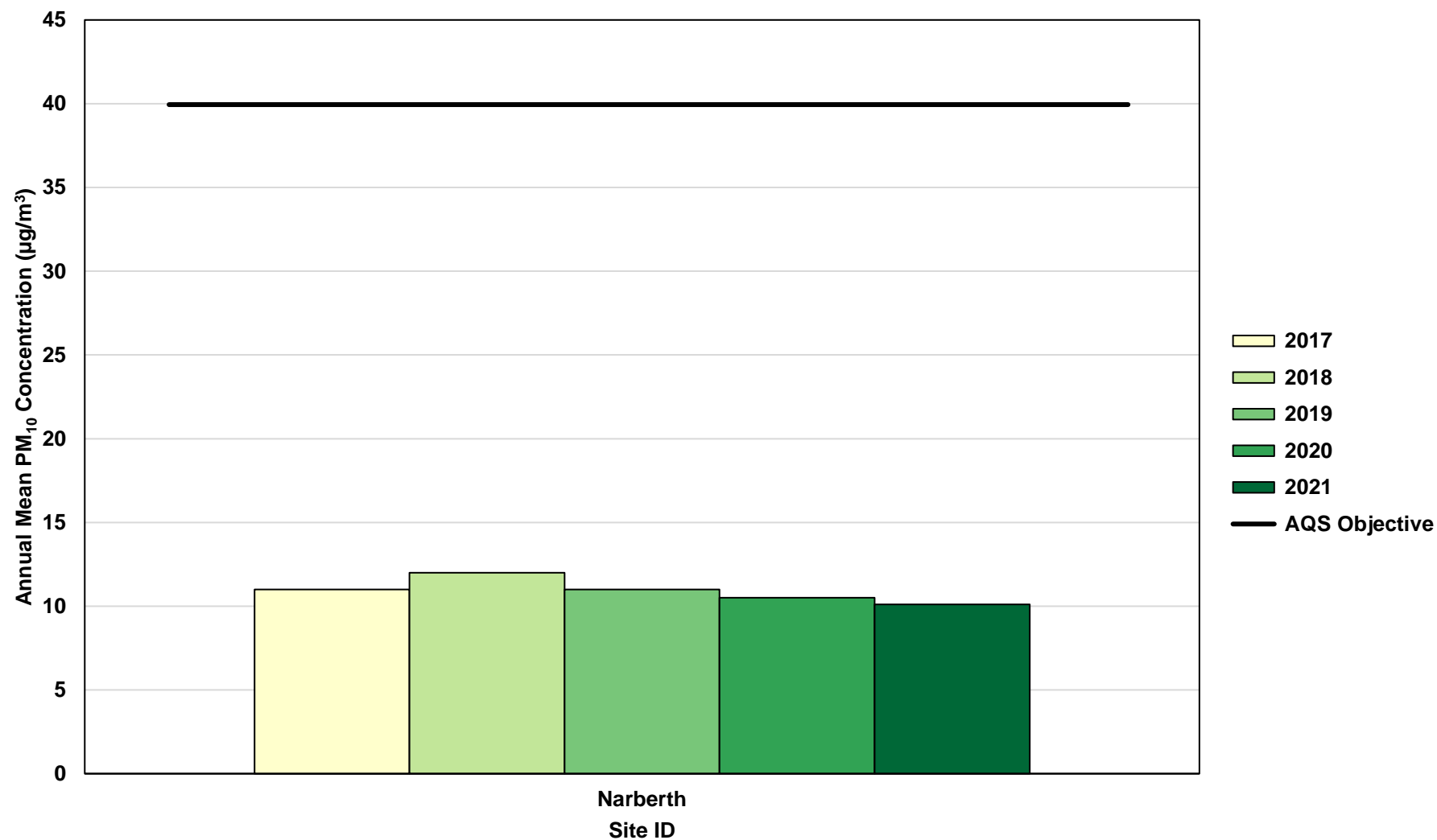
All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(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 2.10 – Trends in Annual Mean PM<sub>10</sub> Concentrations



**Table 2.6 – 24-Hour Mean PM<sub>10</sub> Monitoring Results, Number of PM<sub>10</sub> 24-Hour Means > 50µg/m<sup>3</sup>**

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Narberth	Rural	99.0	99.0	0	0	0	1	0

**Notes:**

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4<sup>th</sup> 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%).

**Table 2.7 – PM<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Narberth	Rural	98.6	98.6	-	6	7	5.9	6

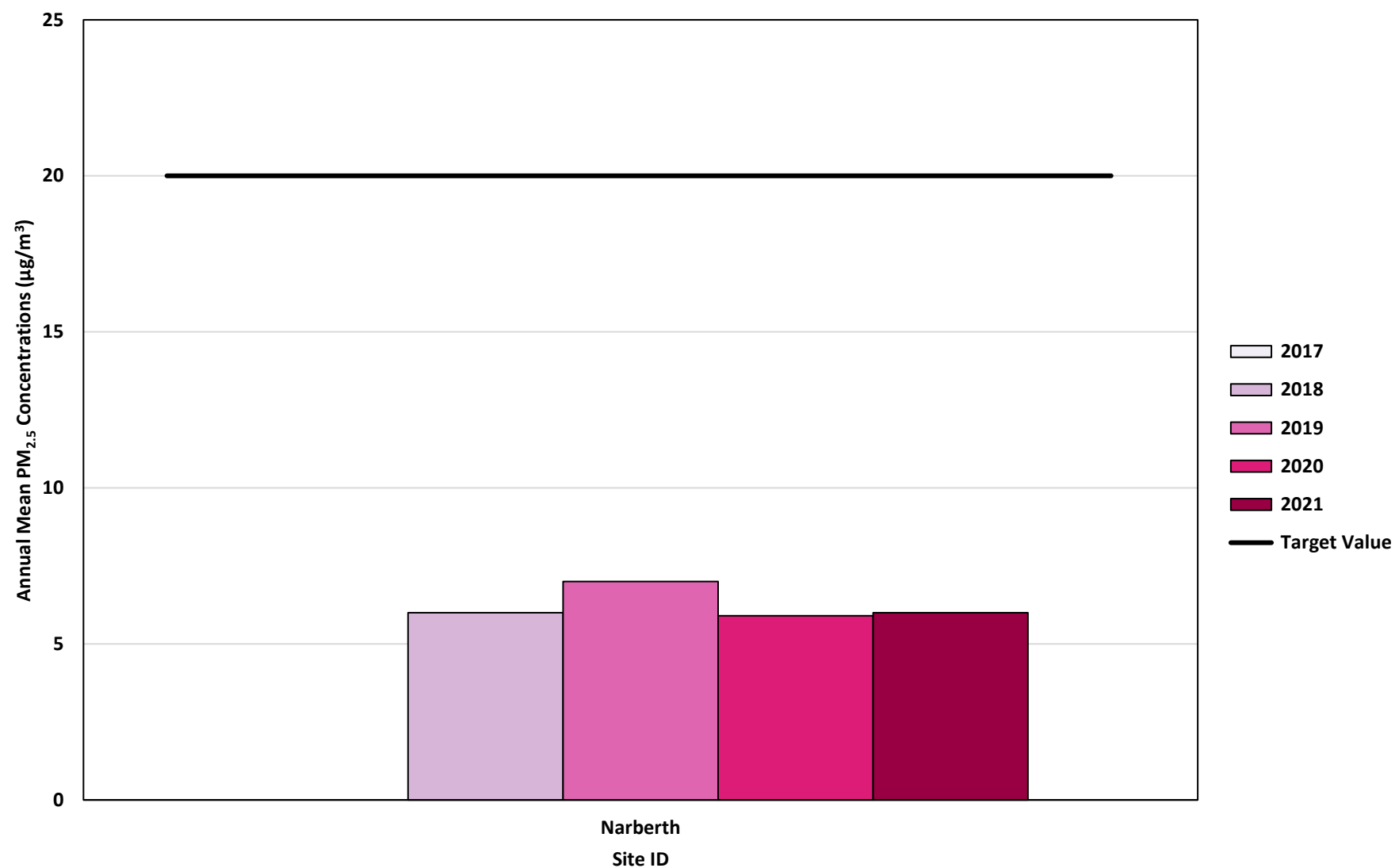
**Notes:**

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 2.11 – Trends in Annual Mean PM<sub>2.5</sub> Concentrations**



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

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

The automatic monitoring station located in Narberth continues to report compliance with the annual mean NO<sub>2</sub> AQS objective, with stable concentrations fluctuating between 3 – 4 µg/m<sup>3</sup>. This is expected due to the rural nature of the monitoring site.

During 2021 there were no exceedances of the NO<sub>2</sub> AQS objective, with the majority of passive monitoring sites recording concentrations well under the objective. From 2020 – 2021, 44 sites reported increases in NO<sub>2</sub>. The maximum NO<sub>2</sub> annual mean concentration in 2021 was 36 µg/m<sup>3</sup>, reported at PCC45 which is located along Main St within the Pembroke AQMA. At this site there was an average increase of 3.2 µg/m<sup>3</sup> in 2021 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.

Both Haverfordwest and Pembroke AQMAs continue to report compliance, with Haverfordwest reporting five years of compliance and Pembroke reporting three years of full compliance. However, monitoring location PCC45 has shown to be increasing near to 40 µg/m<sup>3</sup> over the past five years. In addition, 44 sites have shown an increase in concentrations within 2021 compared to 2020. Therefore, there is currently no intention to revoke both AQMAs. 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 decreases are reported at PCC45, Pembrokeshire may look to initiate the revocation process of Haverfordwest AQMA.

There are no passive monitoring sites where the NO<sub>2</sub> annual mean is greater than 60 µg/m<sup>3</sup>, therefore in accordance with Defra LAQM.TG(22)<sup>1</sup> there are no sites likely to be at risk of exceeding the 1-hour mean AQS objective.

As all annual mean NO<sub>2</sub> concentrations reported below 36 µg/m<sup>3</sup>, fall-off with distance correction calculations have not been carried out. One monitoring site had a data capture in between 25-75% (PCC28 – 66.7%), annualisation was carried out in accordance with LAQM.TG(22)<sup>1</sup>.

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

During 2021 the Narberth automatic monitoring site recorded PM<sub>10</sub> concentrations well below the 40 µg/m<sup>3</sup> PM<sub>10</sub> AQS objective. There is a minor reduction of 0.4 µg/m<sup>3</sup> from 2020, 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 50 µg/m<sup>3</sup> in 2021, therefore compliance to the 24-hour AQS objective.

Data capture at Narberth automatic monitoring station in 2021 was greater than 75%, therefore annualisation was not required to be carried out, in accordance with LAQM.TG(22)<sup>1</sup>.

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

During 2021 the Narberth automatic monitoring site recorded PM<sub>2.5</sub> concentrations well below the PM<sub>2.5</sub> AQS target. There is a minor increase of 0.1 µg/m<sup>3</sup> from 2020, 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<sub>2.5</sub>, however concentrations continue to remain low and consistent.

### 2.3.4 Ozone (O<sub>3</sub>)

The number of 8-hour mean O<sub>3</sub> concentrations greater than 100 µg/m<sup>3</sup> reported at the Narberth automatic monitoring location in 2021 was 10. There is no LAQM air quality objective for O<sub>3</sub>, however this does exceed the UK National air quality objective of 100 µg/m<sup>3</sup> not to be exceeded more than 10 times a year.

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

For SO<sub>2</sub>, the number of 15-minute mean concentrations greater than 266µg/m<sup>3</sup>, 1-hour mean concentrations greater than 350µg/m<sup>3</sup>, and 24-hour mean concentrations greater than 125 µg/m<sup>3</sup> reported at the Narberth automatic monitoring location in 2021 were all 0. There are three LAQM air quality objectives for SO<sub>2</sub>, and Pembrokeshire is compliant for all 3 air quality objectives.

## **2.4 Summary of Compliance with AQS Objectives as of 2021**

Pembrokeshire County Council has examined the results from monitoring in the county, concentrations are all below the relevant objectives, therefore no further action is required.

### 3 New Local Developments

Pembrokeshire County Council confirms that there are no new or newly identified local developments which may have an adverse impact on air quality within the Local Authority area within 2021.

Pembrokeshire County Council confirms that all the following have been considered:

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

#### **Marine Energy Project**

A £60 million 'Marine Energy Project' that will help tackle climate change while reviving Pembrokeshire's economy in the wake of COVID – 19 has been given approval. The UK and Welsh Government have now approved the business case for the Pembroke Dock Marine project, which is expected to generate £73.5 million a year to the Swansea Bay City Region's economy. The project consists of four elements, inclusive of a large facility, up to 90 km<sup>2</sup> Pembrokeshire Demonstration Zone delivered by Wave Hub Limited that will enable the deployment of future energy generating technologies, including floating wind. In addition to this, the redevelopment of land at Pembroke Dock, led by the Port of Milford Haven, to deliver the infrastructure needed by the industry as it continues to mature.

#### **3.1 Road Traffic Sources (and Other Transport)**

There has been no identification of any new road traffic and other transport sources of concern since the last APR.

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

There has been no identification of any new industrial, fugitive or uncontrolled sources and/or commercial sources of concern since the last air quality assessment.



### **3.3 Other Sources**

Pembrokeshire County Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Pembrokeshire County Council confirms that all the following have been considered:

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

## 4 Policies and Strategies Affecting Airborne Pollution

### 4.1 Local / Regional Air Quality Strategy

Pembrokeshire County Council provide annual reports to the Wales Climate Change Strategy to assist in assessing sector specific emission reduction targets specifically energy and/or green-house gas emissions from the public sector in Wales in relation to the Authority's;

- Housing stock.
- Non-domestic buildings.
- Fleet vehicles and transport provisions.

Encompassing emissions from energy use in buildings, community wide emissions from private sector housing, fleet transport and business travel. The data is compiled and returned as;

- Utility supplier information.
- Annual Welsh Assembly Government Returns.
- Carbon Reduction Commitment Energy Efficiency Scheme returns.
- Annual surveys.
- Internal Business Plan reporting.
- Returns from site managers.

Other reporting indicators to assist strategy development are;

- Welsh Assembly Government National Strategic Indicator EEF/002a (NS18a) (NSPI19) for percentage reduction in carbon emissions in the council's non-domestic public stock.
- Internal local indicator HC HC2 for percentage reduction in carbon emissions in the council's non-domestic public stock since 2003.
- Welsh Assembly Government National Strategic Indicator EEF/002bi (NS18bi) for percentage reduction in energy use in the housing stock; and
- Transport emissions reporting.

In 2014 local authorities were advised by the Welsh Assembly Government that the European Commission had formally launched infraction proceedings against the UK for breaching nitrogen dioxide limit values under the EU Air Quality Directive 2008/50.

Pembrokeshire County Council, along with all local authorities, completed a log sheet as requested to assist with the development of a National Air Quality Plan to resolve the nitrogen dioxide exceedance.

In July 2017 the UK Government announced that new petrol and diesel cars and vans will be phased out by 2040 in a bid to tackle air pollution with a £255m fund to help councils tackle emissions from diesel vehicles as part of a £3bn package of spending on air quality. The Party of Wales aim to phase out the sale of new petrol and diesel only cars and vans in Wales by 2027.

## 4.2 Air Quality Planning Policies

Pembrokeshire County Council, Carmarthenshire County Council, Ceredigion County Council and Powys County Council have developed and published the [Mid and West Wales Air Quality: A Guide for Developers](#) guidance document in 2012. This a reference document intended for use by developers and advisers who may be involved in the assessment of air quality at proposed developments. This document details the information required by the Local Planning Authority in order to accurately assess the impact of a planning application on air quality. This document was last updated in 2012.

The guidance focuses on:

- Pollutants regulated under the LAQM regime, as well as PM<sub>2.5</sub>;
- Impacts of traffic emissions;
- Impacts of emissions from biomass boilers; and
- The assessment and control of dust impacts during construction.

Where a proposed development is likely to give have significant negative air quality impacts on the surrounding areas or is in an area of existing poor air quality, the planning process required an air quality assessment to be carried out. Additionally, measures to reduce and minimise any adverse impacts are also to be required.

The guidance also aims to provide advice on describing air quality impacts and assessing their significance.

It is highly recommended that dialogue between the developers, planners, and pollution control officers begins as early as possible. Failure to provide adequate supporting information with the planning application may result in significant delays in the planning process, or planning permission may be refused by the Local Planning Authority.

### 4.3 Local Transport Plans and Strategies

The [Joint Transport Plan for South West Wales 2015 – 2020](#) is in effect as the Local Transport Plan initiative. This also details medium and long-term projects and aspirations spanning to 2030.

The Local Transport Plan is intended to “improve transport and access within and beyond the region to facilitate economic regeneration, reduce deprivation and support the development and use of sustainable and healthier modes of transport”. The primary objectives are detailed as follows:

1. To improve the efficiency and reliability of the movement of people and freight within and beyond South West Wales to support economic growth in the Swansea Bay City Region.
2. To improve access for all to a wide range of services and facilities including employment and business, education and training, health care, tourism and leisure activities.
3. To improve the sustainability of transport by improving the range and quality of, and awareness about, transport options, including those which improve health and wellbeing.
4. To improve integration between policies, service provision and modes of transport in South West Wales.
5. To implement measures which will protect and enhance the natural and built environment and reduce the adverse impact of transport on health and climate change.
6. To improve road safety and personal security in South West Wales.

#### 20mph Speed Programme

In addition to the Joint Transport Plan, Pembrokeshire are introducing 20mph restricted areas within the County from September 2023, the restricted roads are defined as, roads that have lampposts placed no more than 200 yards apart, including typical residential and built up areas of high pedestrian activity.

The first phase of the [20mph speed programme](#) has been set up in eight communities across Wales for an initial trial, within Pembrokeshire, the trial area selected community is located within St Dogmaels.

### **Vehicle Idling Initiative**

The partnership initiative supported by Pembrokeshire County Council was initiated within Neyland School, Neyland School have environmental champions who patrol the school parking areas at drop off and pick up asking vehicles to turn their engines off whilst waiting. Pembrokeshire County Council also funded the inclusion of signs to support the school.

## **4.4 Active Travel Plans and Strategies**

Pembrokeshire County Council details information on [Active Travel Plans](#) currently in place on their website. These are important for joint wins in promoting healthier lifestyles alongside reducing the negative impacts of traffic upon neighbourhoods and communities.

Pembrokeshire County Council will take part in Clean Air Day 2022, consisting of a no idling initiative with local schools and the production of banners to locate outside schools to educate parents/drivers taking children to school. More details are provided on their website: [Pupils lead project to get parents to switch off car engines at the school gates - Pembrokeshire County Council](#).

## **4.5 Local Authorities Well-being Objectives**

Information on Pembrokeshire County Council's [Well-Being Plan](#) and objectives are available to view on their [website](#). This sets out how the Public Services Board will work together to improve the well-being of people and communities in Pembrokeshire both now, and in the future.

## **4.6 Green Infrastructure Plans and Strategies**

Pembrokeshire County Council's [Green Infrastructure Plans](#) are available on their website. These are intended to guide Green Infrastructure improvements within settlements, to be used by public, private and voluntary sector bodies.

## 4.7 Climate Change Strategies

Pembrokeshire County Council's [Climate Change Strategies](#) are available on their website. The plan is designed to outline work Pembrokeshire County Council has currently undertaken to steer Pembrokeshire County Council towards becoming net zero-carbon by 2030.

## **5 Conclusion and Proposed Actions**

### **5.1 Conclusions from New Monitoring Data**

The passive NO<sub>2</sub> monitoring data from 2021 shows that 44 out of 45 monitoring locations underwent an increase in concentrations from 2020, with an average increase of 3.2 µg/m<sup>3</sup>. Despite this, all annual mean NO<sub>2</sub> concentrations have complied with the NO<sub>2</sub> annual mean AQS objective. The overall increase is mostly likely attributed to the impacts COVID-19 influences across 2020 and 2021. Concentrations prior to 2020 report significantly more stable NO<sub>2</sub> concentrations.

Monitored NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations at the Narberth automatic monitoring station continue to report annual means well below the AQS annual mean objectives for NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> (3.1 µg/m<sup>3</sup>, 10.1 µg/m<sup>3</sup> and 6 µg/m<sup>3</sup>), and short term SO<sub>2</sub> AQS objectives. In regard to the short term AQS objective for NO<sub>2</sub>, in which the 200µg/m<sup>3</sup> must not be exceeded more than 18 times/year, and the PM<sub>10</sub> AQS objective whereby there should be no more than 35 24-hour mean concentrations greater than 50 µg/m<sup>3</sup>, there were no exceedances reported in both pollutants in 2021. The Narberth automatic monitoring station is a rural background site, therefore stable low concentrations amongst all pollutants, is expected to meet AQS objectives on yearly reporting.

### **5.2 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. The 'Marine Energy Development: Pembroke Dock Marine ' is a long term development that has 4 elements, of which includes multiple phases of construction: Marine Energy Test Area, Marine Energy Engineering Centre of Excellence, Port Developments and a Pembrokeshire Demonstration Zone.

### **5.3 Other Conclusions**

The existing diffusion tube network within Pembrokeshire 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. In relation to both designated AQMAs, Haverfordwest has now reported compliance for five years, and Pembroke has reported three years of compliance. Despite this, since concentrations have increased from 2020, and that monitoring locations within both AQMAs in 2019 (pre-pandemic) display concentrations within 10% of the AQS objective, halts the potential revocation process of both AQMAs. The Council will continue to use its monitoring network to closely monitor concentrations at these locations.

### **5.4 Proposed Actions**

Pembrokeshire County Council will continue to actively monitor NO<sub>2</sub> concentrations, reviewing the diffusion tube network where necessary. Whilst annual mean NO<sub>2</sub> 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

- Pembrokeshire County Council's Progress Report 2021
- Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance LAQM.TG(22) 2022
- Welsh Air Quality Forum data downloads.
- Mid and West Wales Air Quality: A Guide for Developers (2012)
- Joint Transport Plan for South West Wales 2015 – 2020
- Local Air Quality Management in Wales. Policy Guidance June 2017

## **Appendices**

Appendix A: Monthly Diffusion Tube Monitoring Results

Appendix B: A Summary of Local Air Quality Management

Appendix C: Air Quality Monitoring Data QA/QC

Appendix D: AQMA Boundary Maps

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

**Table A.1 – Full Monthly Diffusion Tube Results for 2021 ( $\mu\text{g}/\text{m}^3$ )**

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.84) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
PCC1	20.0	25.0	18.6	20.8	19.1	17.6	18.8	16.8	24.2	21.2	25.4	20.0	20.6	17.3	n/a
PCC2	23.2	19.1	22.3	20.3	22.9	19.0	21.4	22.1	28.2	27.5	24.0	25.4	23.0	19.3	n/a
PCC3	21.4	21.2		18.0	19.1		17.8	21.3	26.9	27.2	26.0	26.5	22.5	18.9	n/a
PCC4	30.8	23.8	31.3	30.2	32.2	25.5	33.5	29.3	35.6	36.9	44.8	30.5	32.0	26.9	n/a
PCC5	30.4	30.7	33.6	33.1	39.1	30.4	36.2	30.4	40.7	35.9	42.6	32.9	34.7	29.1	n/a
PCC6	33.0	33.0	33.4		35.0	26.7	30.9	31.7	38.0	35.1	35.6		33.2	27.9	n/a
PCC7	31.2	38.1	31.1	32.0	32.7	29.2	34.5	33.9	47.1	38.8	37.7	37.2	35.3	29.6	n/a
PCC8	24.2	35.0		27.9	30.2	26.4		28.1	7.4	29.1	27.8	30.5	26.7	22.4	n/a
PCC9	24.0	23.0	20.6	20.3	15.3	18.3	18.2	21.9	26.6	25.1	26.6	23.8	22.0	18.5	n/a
PCC10	8.6	20.3	16.8	13.9	10.9	12.4	13.2	14.9	19.5	13.7	14.8	13.5	14.4	12.1	n/a
PCC11	24.7	33.8	29.3	28.6	30.0		26.6	6.1	37.3		30.0		27.4	23.0	n/a
PCC12	24.5		27.4		26.7		29.4	25.9	31.4	29.2	35.8	27.2	28.6	24.0	n/a
PCC13	25.2	27.7	24.3	26.2	24.2	21.6	24.9	24.8	33.3	27.8	29.6	26.0	26.3	22.1	n/a
PCC14	23.9	25.7	22.4	21.4	21.6	18.6	20.5	21.1	27.7	25.7		25.5	23.1	19.4	n/a
PCC15	24.3	26.4	23.1	25.0	23.2	21.3	24.2	21.0	31.1	27.7	33.5	28.0	25.7	21.6	n/a
PCC16	18.8	1.8	16.3	16.8	17.7	14.3	15.7	12.2	19.8	19.6	23.4	19.6	16.3	13.7	n/a
PCC17	24.3	27.2	25.7		22.8	25.1	29.2	26.0	35.3	29.5	36.4	28.1	28.1	23.6	n/a
PCC18	35.9	30.0	33.4	28.3	33.7	25.7	34.8	31.1	37.6	37.7	45.0	33.1	33.9	28.4	n/a
PCC19	20.4	23.7	22.9	23.8	22.7	38.8	13.2	21.9	28.4	24.2	28.0	22.4	24.2	20.3	n/a
PCC20	31.4	32.3	34.9	27.3	36.0	29.6	36.8	33.5	45.4	43.9	45.0	37.5	36.1	30.4	n/a
PCC21	18.7	16.4	15.9	13.4	14.3	12.0	27.5	14.1	17.4	19.8	21.3	17.4	17.4	14.6	n/a
PCC22	36.7	33.1	29.5	27.4	35.7	29.2	33.6	33.5	42.7	41.8	41.8	31.7	34.7	29.2	n/a
PCC23	24.0	27.4		26.3	24.0	25.3	23.5	24.8	30.2	29.6			26.1	21.9	n/a
PCC24	33.4	22.1	31.6	28.1	37.3	29.5	32.7	32.2	41.9	40.0	38.9	33.9	33.5	28.1	n/a
PCC25	22.0	32.2	21.8	24.2	20.9	21.1	23.2	20.5	26.2	24.2	27.8	21.7	23.8	20.0	n/a
PCC26	28.5	32.4	31.1	26.0	31.2	27.8	31.8	30.7	41.8	40.3	39.7	34.4	33.0	27.7	n/a
PCC27	24.6	23.8	15.8	24.0	20.2	18.3		22.9	29.7	22.1			22.4	18.8	n/a

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.84) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
PCC28	20.3	18.0		19.3	17.6	16.3	22.0	18.0		19.4			18.9	16.4	n/a
PCC29	22.4	25.3	22.0	21.9	24.0	19.8	22.4	22.9	27.3	27.1	25.0	23.3	23.6	19.8	n/a
PCC30	15.9	18.6	13.2	12.5	13.1	11.5	10.4	10.3		16.0	16.7	16.0	14.0	11.8	n/a
PCC31	30.9	30.3	29.0	31.6	35.4	32.1	33.0	30.0	39.1	34.4	34.9	35.7	33.0	27.7	n/a
PCC32	32.0	30.0	36.2	28.6	30.2	27.2	29.5	28.9	38.1	39.5	37.1	30.8	32.3	27.2	n/a
PCC33	24.9	26.1	23.0	25.9	23.4	21.2	19.3	20.2	26.0	23.2	25.6	24.7	23.6	19.8	n/a
PCC34	21.3	18.6	17.9	16.5	16.9	15.0	16.7	17.3	21.2	22.3	25.4	20.6	19.1	16.1	n/a
PCC35	12.3	12.4	9.8	9.8	9.0	8.3	8.5	9.0	11.9	12.7	14.0	12.4	10.8	9.1	n/a
PCC36	20.5	22.5	20.4	26.8	19.0	21.2	21.7	19.1	23.2	19.0	21.7	20.8	21.3	17.9	n/a
PCC40	20.9	19.3	24.4	21.5	19.9	20.4	23.4	20.1	20.1	22.9	24.0	17.6	21.2	17.8	n/a
PCC41	19.6	24.1	29.1	29.0	21.0	24.1	25.3	22.3	30.7	25.0	29.2	19.9	24.9	21.0	n/a
PCC42	19.6	25.9	21.6	25.8	19.4	19.3	19.5	16.9	20.7	15.4	15.5	18.6	19.9	16.7	n/a
PCC43	32.0	32.7	33.8	31.4	28.2	27.8	30.3	29.2	33.7	33.0	31.5	28.8	31.0	26.1	n/a
PCC44	36.6	41.9	39.2	39.8	31.0	31.4	34.2	30.8	40.2	31.4	32.9	31.4	35.1	29.5	n/a
PCC45	42.7	44.3	48.6	46.1	39.1	40.8	40.9	41.2	49.8	40.2	44.9	35.5	42.8	36.0	n/a
PCC46	35.2	34.0	41.0	33.5	33.1	28.5	33.6	33.6	39.6	39.1	37.5	32.9	35.1	29.5	n/a
PCC47	28.7	23.8	26.5	24.0	22.1	19.4	22.0	18.7	25.6	24.3	26.5	22.4	23.7	19.9	n/a
PCC48	15.1	14.1	13.7	13.1	9.9	9.7	9.9	10.4	12.4	14.5	12.4	12.8	12.3	10.4	n/a

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 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  $\mu\text{g}/\text{m}^3$  (micrograms per cubic metre,  $\text{mg}/\text{m}^3$  for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

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

<b>Pollutant</b>	<b>Air Quality Objective: Concentration</b>	<b>Air Quality Objective: Measured as</b>	<b>Date to be achieved by</b>
<b>Nitrogen Dioxide (NO<sub>2</sub>)</b>	200µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
<b>Nitrogen Dioxide (NO<sub>2</sub>)</b>	40µg/m <sup>3</sup>	Annual mean	31.12.2005
<b>Particulate Matter (PM<sub>10</sub>)</b>	50µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean	31.12.2010
<b>Particulate Matter (PM<sub>10</sub>)</b>	40µg/m <sup>3</sup>	Annual mean	31.12.2010
<b>Sulphur dioxide (SO<sub>2</sub>)</b>	350µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
<b>Sulphur dioxide (SO<sub>2</sub>)</b>	125µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
<b>Sulphur dioxide (SO<sub>2</sub>)</b>	266µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
<b>Benzene</b>	16.25µg/m <sup>3</sup>	Running annual mean	31.12.2003
<b>Benzene</b>	5µg/m <sup>3</sup>	Annual mean	31 12 2010
<b>1,3 Butadiene</b>	2.25µg/m <sup>3</sup>	Running annual mean	31.12.2003
<b>Carbon Monoxide</b>	10.0mg/m <sup>3</sup>	Maximum Daily Running 8-Hour mean	31.12.2003
<b>Lead</b>	0.25µg/m <sup>3</sup>	Annual Mean	31.12.2008

## Appendix C: Air Quality Monitoring Data QA/QC

### QA/QC of Diffusion Tube Monitoring

Pembrokeshire County Council's diffusion tubes in 2020 were supplied and analysed by Gradko International Ltd., using the 20% Triethanolamine (TEA) in water preparation method. Gradko's laboratory is UKAS accredited, participating in the AIR-PT Scheme for NO<sub>2</sub> tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO<sub>2</sub> concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. In the latest available AIR-PT results, for testing carried out in 2020, AIR PT AR036 (January – February 2020) and AIR PT AR040 (September – October 2020), Gradko scored 75%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of  $< \pm 2$ .

All local authority co-location studies which use tubes supplied by Gradko with the 20% TEA in water preparation method in 2021 were rated as 'good', as shown by the precision summary results. This precision reflects the laboratory's performance and consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Tubes are considered to have a "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more monitoring periods during a year is less than 20%.

Monitoring in 2021 was completed in adherence with the 2021 [Diffusion Tube Monitoring Calendar](#), whereby most changeovers were completed within  $\pm 2$  days of the specified date.

### Diffusion Tube Annualisation

[LAQM.TG\(22\)](#) states that annualisation is required for any site which has a data capture of less than 75%, but greater than 25%. Passive monitoring site PCC28 recorded a data capture of 66.7% in 2021, therefore required annualisation. Annualisation was completed using version 2.0 of the 'Diffusion Tube Data Processing Tool'. Two continuous background monitoring locations were used:

- Cwmbran Crownbridge; and
- Narberth

The Cwmbran Crownbridge monitoring station was located outside the 50 mile radius due to limited AURN sites within the preferred radius, the sites selected to annualise the data were Narberth and Cwmbran Crownbridge.

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.1 presents the annualisation summary, taken from the 'Diffusion Tube Data Processing Tool'.

**Table C.1 – Annualisation Summary (concentrations presented in  $\mu\text{g}/\text{m}^3$ )**

Site ID	Annualisation Factor Narberth	Annualisation Factor Cwmbran Crownbridge	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
PCC28	1.0167	1.0492	1.0330	18.9	19.5

### Diffusion Tube Bias Adjustment Factors

Pembrokeshire County Council have applied a national bias adjustment factor of 0.84 to the 2021 monitoring data. A summary of bias adjustment factors used by Pembrokeshire County Council over the past five years is presented in Table C.2.

No co-location studies are carried out by Pembrokeshire County Council therefore only the national factor could be applied. The national factor for Gradko 20% TEA in water, as presented in the [Diffusion Tube Bias Factors Spreadsheet](#) v06\_22, is 0.84 based on 34 studies.

**Table C.2 – Bias Adjustment Factor**

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	06/22	0.84
2020	National	06/21	0.81
2019	National	03/20	0.93
2018	National	03/19	0.93
2017	National	03/18	0.89

### NO<sub>2</sub> Fall-off with Distance from the Road

No diffusion tube NO<sub>2</sub> monitoring locations within Pembrokeshire County Council required distance correction during 2021.



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

The Narberth automatic monitoring location is part of the Automatic Urban and Rural Network (AURN). The Council carries out LSO duties, including calibration, in accordance with the AURN standards. Site audits and maintenance are provided by Ricardo E&E.

### **PM<sub>10</sub> and PM<sub>2.5</sub> Monitoring Adjustment**

The type of PM<sub>10</sub> monitor utilised within Pembrokeshire County Council does not require the application of a correction factor.

### **Automatic Monitoring Annualisation**

All automatic monitoring locations within Pembrokeshire County Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

### **NO<sub>2</sub> Fall-off with Distance from the Road**

No automatic NO<sub>2</sub> monitoring locations within Pembrokeshire County Council required distance correction during 2021.

## Appendix D: AQMA Boundary Maps

Figure D.1 – Map of the Haverfordwest AQMA Boundary

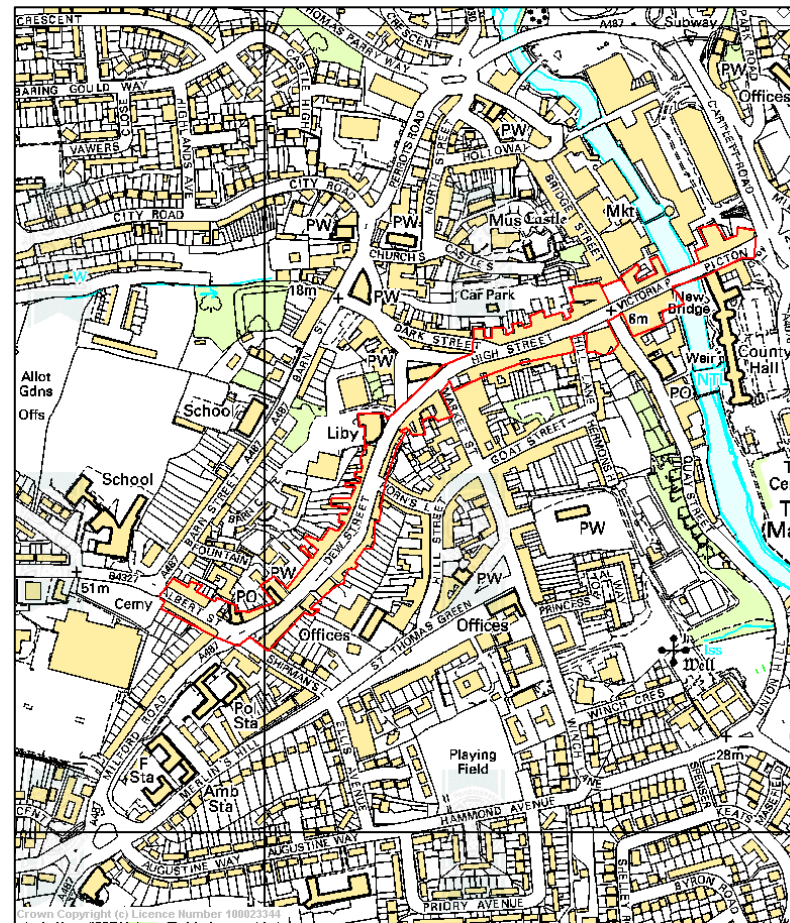
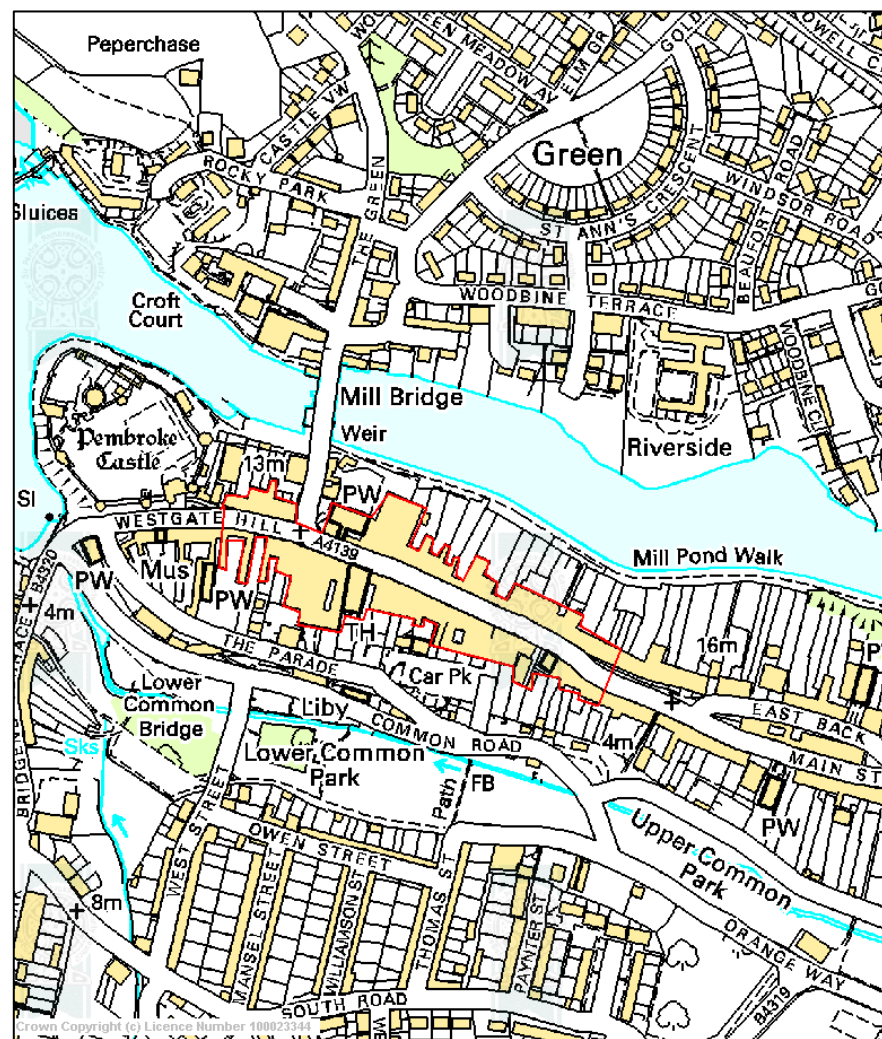


Figure D.2 – Map of the Pembroke AQMA Boundary



## 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
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
O <sub>3</sub>	Ozone
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide