



# North Devon District Council

Annual Status Report 2022

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# 2022 Air Quality Annual Status Report (ASR)

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

Date: June 2022

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## Executive Summary: Air Quality in Our Area

### Air Quality in North Devon

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas<sup>1,2</sup>.

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages<sup>3</sup>, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017<sup>4</sup>.

The air quality in North Devon is generally good, owing to the large area of rural land. However, the primary pollutants are produced from vehicle emissions, with NO<sub>2</sub> being the main pollutant of concern. The concentration of NO<sub>2</sub> has been routinely monitored by North Devon District Council at 28 sites using passive diffusion tubes. Concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> are also of concern, and have been monitored by the Barnstaple A39 automatic monitoring station, which forms part of the Automatic Urban and Rural Network (AURN).

North Devon District Council currently have one declared Air Quality Management Area, which is located in Braunton and includes the B3231. The AQMA (North Devon AQMA No.1) was declared in 2011 as a result of exceedances of the NO<sub>2</sub> annual mean AQS objective of 40 µg/m<sup>3</sup>. As a result, an Air Quality Action Plan has been developed by North Devon District Council and relevant stakeholders to outline measures to be implemented that will reduce NO<sub>2</sub> concentrations, and achieve compliance with the annual mean objective, in the AQMA.

A map and statistics of the North Devon AQMA No.1 can be seen on the [UK-Air website](#).

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<sup>1</sup> Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

<sup>2</sup> Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, July 2021

<sup>4</sup> Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

During 2021, there were no exceedances of the NO<sub>2</sub> annual mean objective at any of the 28 diffusion tube sites. Across the entire diffusion tube network, the average NO<sub>2</sub> annual mean was 18.8 µg/m<sup>3</sup> – a 6% increase from that recorded in the previous year (17.8 µg/m<sup>3</sup>). The maximum concentration recorded at a single diffusion tube site was 31.4 µg/m<sup>3</sup> at Site B12, with the concentration at the site within the AQMA recording an annual mean NO<sub>2</sub> concentration of 27.2 µg/m<sup>3</sup> (site 13). From the automatic monitoring of PM<sub>10</sub> and PM<sub>2.5</sub> at the Barnstaple A39 site, the annual mean objective was not exceeded for both pollutants. The PM<sub>10</sub> annual mean concentration was 13.2 µg/m<sup>3</sup>, whilst the annual mean of PM<sub>2.5</sub> was 8.2 µg/m<sup>3</sup>; both these concentrations are lower than that recorded in the previous year.

## Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy<sup>5</sup> sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero<sup>6</sup> sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Concentrations of air pollutants across the majority of North Devon continue to be below the air quality objectives. Due to increased development and vehicle numbers within the district, North Devon District Council will continue to liaise with relevant stakeholders to protect and improve local conditions and the North Devon AQMA No.1 will remain in place. However, as the concentration within the AQMA has been below 36 µg/m<sup>3</sup> since 2019, North Devon District Council intend to review the current AQMA designation. This is because, TG(16) states that:

*“The revocation of an AQMA should be considered following three consecutive years of compliance with the relevant objectives as evidenced through monitoring”.*

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<sup>5</sup> Defra. Clean Air Strategy, 2019

<sup>6</sup> DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Despite the three year period including 2020 concentrations which were impacted by the Covid-19 restrictions, the AQMA designation is still to be reviewed because, according to the LAQM Covid-19 Supplementary Guidance, it is suggested that:

*“Where 2020 is one of many (i.e. at least three) consecutive years of compliance, this may still be considered for revocation where the supporting evidence is considered suitably robust”.*

The 2016 AQAP remains the main document designed to improve air quality within the AQMA and the wider district area. The measures that are documented within the AQAP and Table 2.2 have been designed to reduce NO<sub>2</sub> concentrations within the North Devon AQMA No.1. Where possible, these measures have been progressed throughout 2021.

In April 2021, a Technical Working Group meeting took place with representatives from North Devon District Council, Devon County Council and now Braunton Parish Council in attendance. The meetings are used as both an ideas platform for possible new measures, and also to inform upon developments relating to the current measures. Actions for relevant parties are assigned where appropriate to enable the development of measures, and updates are provided on each measure at the next subsequent meeting.

During the meeting, the group discussed the launch of a communications campaign to promote sustainable travel. This measure is intended to reduce the number of trips taken by private vehicles and increase the proportion of journeys that are made by either using public transport, or walking and cycling. Progress on the modelling exercise to inform the decision about the implementation of MOVA was also discussed. MOVA (‘Microprocessor Optimised Vehicle Actuation’) is a control system that is responsive to traffic conditions. The system assesses the traffic flows approaching on each arm of the junction and then calculates which arm should be allocated what green time and seeks to determine a set of signal timings which will maximise the throughput of the junction under current conditions. This is beneficial in terms of air pollution as it can prevent the unnecessary stopping and starting of vehicles. In the Technical Working Group meeting held in February 2020, it was noted that a junction modelling assessment was needed to quantify the benefit that MOVA will have to the AQMA. However, during the April 2021 meeting it was advised that no progress had been made with this by DCC; an update is expected to be provided at the next meeting.

A further Technical Working Group meeting was also held on 28<sup>th</sup> July 2021. During this meeting it was confirmed that the Parish Council have signed the Deed of Declaration to install the control box for the new pedestrian crossing on Chaloners Road. This measure is

again hoped to promote more active forms of travel, by providing safer crossings for people walking around North Devon.

North Devon District Council have also adopted an Air Quality Supplementary Planning Document (SPD) along with Torridge District Council on 5<sup>th</sup> October 2021. This SPD sets out how North Devon District Council will consider the potential for new developments to affect air quality adversely, which types and scales of planning applications require an air quality impact assessment and, if so, what an air quality impact assessment should include.

Monitoring of NO<sub>2</sub> is to continue within the AQMA designation and across the district so that concentration trends can continue to be identified and any decisions on the possible revocation of the AQMA are based upon long term trends in NO<sub>2</sub> concentrations. Particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) will continue to be monitored by the AURN (Barnstaple A39) site.

## Conclusions and Priorities

Throughout 2021, there were no exceedances of any NO<sub>2</sub>, PM<sub>10</sub> or PM<sub>2.5</sub> AQS objective across North Devon. The NO<sub>2</sub> annual mean concentration was therefore not exceeded within the North Devon AQMA No.1. However, despite compliance with the AQS objective over the last five years, North Devon District Council do not intend to revoke the AQMA at present; primarily, this is due to uncertainties in the NO<sub>2</sub> concentrations caused by Covid-19 restrictions. Since 2019, the concentration in the AQMA has been more than 10% below the AQS objective of 40 µg/m<sup>3</sup>. In 2021, the maximum NO<sub>2</sub> annual mean concentration recorded at a diffusion tube site (31.4 µg/m<sup>3</sup>) was greater than that recorded in the previous year (29.3 µg/m<sup>3</sup>), and is likely reflective of less Covid-19 restrictions in 2021 than in 2020.

During 2021, the maximum NO<sub>2</sub> annual mean concentration varied throughout the district, but was still below the AQS objective (40 µg/m<sup>3</sup>) in each geographic area. These maximum annual mean concentrations recorded in Barnstaple (22.9 µg/m<sup>3</sup>), Bickington (25.6 µg/m<sup>3</sup>), Braunton (31.4 µg/m<sup>3</sup>) and Ilfracombe (17.4 µg/m<sup>3</sup>) were however all greater than that recorded in the previous reporting year. This is likely a response to the increased travel activity in 2021 than in 2020, as opposed to an actual rise. For example, relative to 2019 (i.e. not impacted by COVID-19 restrictions), the maximum concentration in 2021 is lower.

Over the course of the coming year, North Devon District Council's main priority is to launch a communications campaign that promotes sustainable travel, support DCC where they can in their progression of the MOVA proposals, and begin reviewing the AQAP as recommended by DEFRA. This is significant as road transport is a major source of air



pollution in North Devon, particularly in the AQMA. To illustrate, a source appointment exercise identified that 90.52% of total NO<sub>x</sub> present in the AQMA is attributable to road sources. Therefore, the campaign to promote sustainable travel is intended to encourage greater use of public transport or active travel (i.e. walking/cycling).

## Local Engagement and How to get Involved

Air quality continues to move up the political agenda and concern has grown amongst the public as a result of a greater understanding of the issues associated with poor air quality. Industry, agriculture, transport, planning and individuals are being encouraged to look at interventions, behavioural changes and practical actions to improve air quality. It is important that the issue of poor air quality is addressed at all scales, from an international overview down to a single individual, as everyone can take action towards improving air quality.

Due to the significant contribution of the road transport sector to air pollution in North Devon, the simplest way for the public to get involved with improving air quality would be to look at alternatives to the way they usually travel. The following are some suggested alternatives to private vehicle use, that would have a positive impact on improving air quality:

- Public Transport Use: Using public transport (i.e. bus/train) reduces the number of private vehicles on the road. This also reduces congestion, which prevents the idling and stopping/starting of vehicles that would otherwise occur.
- Active Travel: Choosing to walk or cycle a journey reduces the number of vehicles on the road. This is important for short distance journeys where the use of a private vehicle may not necessarily be needed. Walking and cycling also has health benefits.
- Lift Sharing: When a journey is too long to walk/cycle, an individual should try to share the journey with someone else who is taking the same route. This can be promoted via travel plans through the workplace and within schools.
- Fuel Efficient Vehicles: Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel-efficient cars are available and all have different benefits by reducing the amount of emissions being released.

## Local Responsibilities and Commitment

This ASR was prepared by the Bureau Veritas on behalf of North Devon District Council with the support and agreement of the following officers and departments:

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# 1 Local Air Quality Management

This report provides an overview of air quality North Devon during 2021. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by North Devon District Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1 – Air Quality Objectives in England.

## 2 Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by North Devon District Council can be found in Table 2.1. The table presents a description of the one AQMA that is currently designated within North Devon District Council. Appendix D: Maps of Monitoring Locations and AQMAs provides maps of the AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation is for NO<sub>2</sub> annual mean.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
North Devon AQMA No.1	11/07/2011	NO <sub>2</sub> Annual Mean	An area encompassing the B3231 in Braunton between the junction of the square in the middle of the village and the village green.	NO	44.4 µg/m <sup>3</sup>	27.2 µg/m <sup>3</sup>	North Devon District Council – Air Quality Action Plan May 2016	<a href="#">North Devon District Council – Air Quality Action Plan May 2016</a>

- North Devon District Council confirm the information on UK-Air regarding their AQMA(s) is up to date.
- North Devon District Council confirm that all current AQAPs have been submitted to Defra.

## 2.2 Progress and Impact of Measures to address Air Quality in North Devon

Defra's appraisal of last year's ASR concluded that the report is well structured, detailed, and provides all the information specified in the guidance. In addition, the appraisal stated:

*"Trends are presented for all locations and discussed within the AQMA but not really within the rest of the district, aside from comparisons to the standards. Deeper discussions on the trends throughout the district should be included and used to inform any future actions".*

- Both long-term (2017-2021) and short-term (2020-2021) trends have been discussed in the 2022 ASR. These trends have been analysed according to geographic area to provide a comparison of air quality in different parts of North Devon District Council.

*"A very detailed account of QA/QC procedures has been included. This is commended and demonstrates adherence to the standards and methodologies prescribed within TG.16".*

- Details of the QA/QC procedure for both the automatic and passive monitoring is included in the 2022 ASR. This includes choice of background monitoring stations for annualisation, the bias adjustment factor applied and ratification of monitoring data.

*"As the last AQAP was published in 2016, it needs to be reviewed as soon as possible. Moreover, the "Year the Measure was Introduced", "Defra AQ Grant Funding" and "Funding Status" columns in the report aren't filled for any actions and the "Estimated Cost of Measure" is only filled for one. This should be amended in next year's ASR".*

- Details of each measure missing in last year's ASR are included in the 2022 ASR. North Devon District Council also plan to begin reviewing the AQAP during 2022.

*"Tube labels in Figures D.2 and D.3 would be easier to read if they were as big as in the other maps".*

- All figures presented in the 2022 ASR have same size labels that are easy to read.

North Devon District Council has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 15 measures are included within Table 2.2, with the type of measure and the progress North Devon District Council have made during the reporting year of 2021 presented. Where there have been, or continue to



be, barriers restricting the implementation of the measure, these are also presented within Table 2.2. More detail on these measures can be found in the [2016 North Devon AQAP](#).

Key completed measures listed in the Air Quality Action Plan are:

- Redirecting traffic along A399.
- Implementing school and work travel plans.
- Developing a [supplementary planning document](#) for air quality.
- Installation of a “Park & Change” facility at Chivenor.

North Devon District Council expects the following measures to be completed over the course of the next reporting year:

- Launch of the communications campaign to promote sustainable travel.
- Upgrade of the pedestrian crossing near the library, including the installation of traffic lights.

The principal challenges and barriers to implementation that North Devon District Council anticipates facing are:

- The availability and association prioritisation of funding. This has caused progress to be slower than expected on the upgrading of the traffic signals at “The Square” to MOVA (‘Microprocessor Optimised Vehicle Actuation’). An update on DCC’s progress with this measure is however expected to be provided in the next Technical Working Group meeting.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Upgrading of the traffic signals at "The Square" to "MOVA" (Microprocessor Optimised Vehicle Actuation).	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	2025	DCC (Potential s106 funding)	DCC (Potential s106 funding)	NO	Partially Funded	£50k - £100k	Planning	0 – 2 µg/m <sup>3</sup>	Improved traffic flows / less congestion	Discussions have continued between DCC and BPC regarding implementation of the measure in a way which obtains both BPC and Community support	Resolution now achieved in regard to BPC's acceptance of NDC's monitoring data as presented to Defra. To be delivered in 4/5 years' time unless alternative funding can be obtained in the meantime.
2	Consider the implementation of a comprehensive one way system around the village and / or the pedestrianisation of Caen Street	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	N/A	DCC	DCC	NO	Not Funded	< £10k	Planning	N/A	Reduced traffic volume on Caen Street	Feasibility report completed	Discontinued due to high costs predicted, land ownership and planning barriers. However, some smaller scale measures discussed regarding increased passing places on Braunton Burrows to reduce traffic on the B3231 Saunton Road.
3	Review all pedestrian movements around the village, to identify the optimal type and location of signals / crossings to maximise traffic flow. This review should include - but not be limited to - the consideration of amending signal / crossing timings, resisting / removal of the crossing outside The George Hotel, crossing patrol associated with Caen Primary School	Traffic Management	UTC, Congestion management, traffic reduction	2021	2021	DCC	DCC	NO	Not Funded	< £10k	Planning	0 – 1 µg/m <sup>3</sup>	Improved traffic routing	Consideration to changing the zebra crossing on Chaloners Road to a signal controlled crossing.  Area close to the zebra crossing on Saunton Road is to be reviewed in terms of safety.	The proposed change of the Zebra Crossing on Chaloners Road to a signal controlled crossing is supported by DCC and BPC.  Opinions to be sought from nearby schools in terms of access and potential benefits.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
4	Improving parking management, including the prevention of parking associated with blocking bus stops	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	Ongoing	BPC / DCC	BPC / DCC	NO	Not Funded	< £10k	Planning	Assessed by monitoring on relevant road links.	Improved flow of key road links	DCC have provided a summary list of options for consideration by BPC, who have responded with their views	Agreement to be reached between DCC and BPC concerning which measures from DCC's summary list are to be implemented
5	Installation of a delivery hub	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	Ongoing	DCC	DCC	NO	Not Funded	£10k - £50k	Planning	Unknown at this stage, can be assessed if the no loading restrictions are developed.	Routing of delivery vehicles	DCC have provided a summary list of options for consideration by BPC, who have responded with their views.  Options developed to extend the times of non-loading restrictions, possible implementation of pay and display parking to create more turnover and increase the availability of spaces for vehicles to find spaces.	Discussions continue between DCC and BPC on how to implement between no loading zones or creating a formal delivery Hub outside of the AQMA by road widening measures.
6	Redirecting traffic along A399	Traffic Management	UTC, Congestion management, traffic reduction	2020	Completed	DCC	DCC	NO	Funded	£10k - £50k	Completed	No significant change in NO <sub>2</sub> concentration at diffusion tube monitoring sites 14 and 15	Routing of vehicles	Electronic signage has been installed to redirect traffic at peak flow times	N/A
7	Off peak delivery times	Traffic Management	UTC, Congestion management, traffic reduction	Ongoing	TBC	DCC	DCC	NO	Not Funded	< £10k	Planning	0 – 1 µg/m <sup>3</sup>	Number of Delivery vehicles and the times they work within	DCC have provided a summary list of options for consideration by BPC, who have responded with their views	Agreement to be reached between DCC and BPC concerning which how best to implement
8	Improving Public Transport	Traffic Management	Other	Ongoing	Ongoing	DCC	DCC	NO	Partially Funded	£10k - £50k	Implementation	Assessed by monitoring on transport road links	Numbers of vehicles upgraded	Upgrades to the bus fleet operating on main services through the villages were introduced in 2012/13.  Further upgrades have been identified through contributions from planned developments over the local plan period	Bus operators travelling through Braunton have been prioritised for improvements in emission standards
9	Fleet partnerships - working with local companies to encourage lower emissions fleet vehicles	Freight and Delivery Management	Route Management Plans/Strategic Routing strategy for HGV's	Ongoing	Ongoing	DCC	DCC	NO	Partially Funded	< £10k	Implementation	0 – 1 µg/m <sup>3</sup>	Introduction in lower emission vehicles in fleet	Bus service improvements from Westward Ho! to Ilfracombe are linked with planned development in the Bideford area	Bus operators travelling through Braunton have been prioritised for improvements in emission standards
10	Implementing school / work travel plans	Traffic Management	Strategic highway improvements, Reprioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2020	Completed	DCC	DCC	NO	Funded	< £10k	Completed	Unknown at this stage, information on specific travel plans would need to be known first	Reduction of personal travel and uptake in more sustainable travel modes	Confirmed that it would not be possible to embed a requirement for sustainable travel plans into current/future planning policy. A travel plan would be sought from any developer for any planning application which was deemed applicable.	DCC confirmed applications to be assessed on a case by case basis

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
11	Developing a supplementary planning document for air quality	Freight and Delivery Management	Quiet & out of hours delivery	2019	2019/2020	NDC	NDC	NO	Funded	< £10k	Completed	Control of future emissions	Numbers of planning applications assessed in terms of AQ	Preparation of an Air Quality Supplementary Planning Document (SPD) has been completed and was formally adopted by NDC in June 2020 (and subsequently by Torridge DC) following consultation in autumn 2019.	Formally adopted in June 2022
12	Producing travel packs for holiday accommodation	Alternatives to private vehicle use	Other	Ongoing	Ongoing	NDC	NDC	NO	Partially Funded	< £10k	Implementation	Assessed by monitoring on transport road links	Numbers using public transport	Project commenced in April 2019	N/A
13	Installation of a "Park + Change" facility at Chivenor	Promoting Travel Alternatives	Workplace Travel Planning	2020	Completed	NDC	NDC	NO	Funded	£10k - £50k	Completed	Assessed by monitoring on transport road links	Number using the facility	Construction has been completed; facility open late 2021	N/A
14	Communications campaign	Public Information	Via the Internet	2022	Ongoing	NDC	NDC	NO	Not Funded	< £10k	Planning	Unknown at this stage, depending on success of campaign and resultant uptake of sustainable travel	Engagement with online posts and increase in use of public transport or active forms of travel (i.e. cycling and walking).	Launch of campaign discussed at the Technical Working Group meeting held in April 2021.	Engagement with communications
15	Upgrade of pedestrian crossing near the library, including the installation of traffic lights	Promoting Travel Alternatives	Promotion of walking	2022	Ongoing	BPC / NDC	BPC / NDC	NO	Partially Funded	< £10k	Implementation	Control of future emissions	Footfall on roads near the crossing at the library	Pedestrian crossing due to be upgraded later this year	N/A

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

North Devon District Council is taking the following measures to address PM<sub>2.5</sub>:

- Regular inspections of industrial processes permitted by North Devon Council where combustion and non-combustion processes could lead to anthropogenic emissions of PM<sub>2.5</sub>.
- Implementing the action plan measures listed in Table 2.2. Although the measures have been specifically designed to reduce NO<sub>2</sub> concentrations within the AQMA, a number of initiatives are related to transport sources and therefore will typically have a simultaneous positive effect on the reduction of PM<sub>2.5</sub> emissions as well.

The current Defra 2021 background maps for North Devon District Council (2018 based) show that all background concentrations of PM<sub>2.5</sub> are well below the annual mean objective for PM<sub>2.5</sub>. The highest concentration is predicted to be 10.8 µg/m<sup>3</sup>, within the 1km x 1km grid square with the grid reference of 269500, 125500 that is set to the west of South Molton containing both farmland and industrial/commercial usage. The Barnstaple A39 AURN monitoring station has recorded an annual mean PM<sub>2.5</sub> concentration of around 8 µg/m<sup>3</sup> over the last five years, indicating the overall low concentration of PM<sub>2.5</sub> in the area.

Measures that reduce the concentration of PM<sub>2.5</sub> are of particular importance due to the health impact of PM<sub>2.5</sub>. For example, as shown in the Public Health Outcomes Framework data tool compiled by Public Health England (PHE), the fraction of mortality attributable to PM<sub>2.5</sub> across England is 5.1%. In North Devon, this value is slightly lower at 3.5%.

North Devon District Council are therefore committed to implementing measures that will cause the level of PM<sub>2.5</sub> to decrease further and stay below any objective. Once the implications of the new Environmental Bill for PM<sub>2.5</sub> on local authorities are clear, North Devon District Council will review the current measures that are in place to reduce PM<sub>2.5</sub> and take further action if deemed necessary.

## 3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2021 by North Devon District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

### 3.1 Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

North Devon District Council undertook automatic (continuous) monitoring at one site during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring site. The automatic monitoring site in North Devon is part of the Automatic Urban and Rural Network (AURN), and the data is therefore publicly available on the [UK-Air Website](#) (Barnstaple A39).

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

#### 3.1.2 Non-Automatic Monitoring Sites

North Devon District Council undertook non-automatic (i.e. passive) monitoring of NO<sub>2</sub> at 28 sites during 2021. This is the same number as in 2020, providing a direct comparison of the reported NO<sub>2</sub> levels. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D: Maps of Monitoring Locations and AQMAs. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

### 3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

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

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

Across the entire diffusion tube network, the average NO<sub>2</sub> annual mean concentration was 18.8 µg/m<sup>3</sup>, with the highest annual mean NO<sub>2</sub> concentration being 31.4 µg/m<sup>3</sup> at Site B12. Compared to last year, the average NO<sub>2</sub> annual mean concentration was 6% higher than in 2020 (17.8 µg/m<sup>3</sup>), and is likely reflective of increased travel activity due to less Covid-19 restrictions. The annual mean concentration at the diffusion tube site located within the AQMA ('North Devon AQMA No. 1') was below the annual mean air quality objective in 2021 with a concentration of 27.2 µg/m<sup>3</sup> being recorded at Site 13. Despite being below the annual mean objective for the last five years, North Devon District Council do not intend to revoke this AQMA yet due to the recent reductions being attributed to the Covid-19 pandemic.

However, as the concentration within the AQMA has been below 36 µg/m<sup>3</sup> since 2019, North Devon District Council do intend to review the current AQMA designation. This is because, TG(16) states that:

*"The revocation of an AQMA should be considered following three consecutive years of compliance with the relevant objectives as evidenced through monitoring".*

And:

*"There should not be any declared AQMAs for which compliance with the relevant objective has been achieved for a consecutive five-year period".*

The LAQM Covid-19 Supplementary Guidance, suggests that:

*"Where 2020 is one of many (i.e. at least three) consecutive years of compliance, this may still be considered for revocation where the supporting evidence is considered suitably robust".*

No single diffusion tube recorded a NO<sub>2</sub> annual mean greater than 60 µg/m<sup>3</sup>. Therefore, although not directly measured, it can be assumed that the 1-hour objective for NO<sub>2</sub> was not likely to have been exceeded within North Devon during 2021.

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

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

**Error! Reference source not found.** in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>.

**Error! Reference source not found.** in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than 35 times per year.

During 2021, there were no exceedances of both the PM<sub>10</sub> annual mean and the 24-hour mean. The annual mean PM<sub>10</sub> concentration was 13.2 µg/m<sup>3</sup>, a decrease of 1 µg/m<sup>3</sup> from the 14.2 µg/m<sup>3</sup> recorded in the previous reporting year. Therefore, with the exception of 2019 (16.6 µg/m<sup>3</sup>), the PM<sub>10</sub> concentration at the Barnstaple A39 site has been decreasing over the last five years.

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

**Error! Reference source not found.** in Appendix A presents the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past five years.

During 2021, there were no exceedance of the PM<sub>2.5</sub> annual mean objective. The annual mean PM<sub>2.5</sub> concentration was 8.2 µg/m<sup>3</sup>, a slight decrease from the 8.4 µg/m<sup>3</sup> recorded in the previous year. Over the last five years, the PM<sub>2.5</sub> annual mean concentration has remained well below the air quality objective.



## Appendix A: Monitoring Results

**Table A.1 – Details of Automatic Monitoring Sites**

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
Barnstaple 1	AURN – Barnstaple A39 (UKA00574)	Roadside	257048	132591	PM <sub>10</sub> , PM <sub>2.5</sub>	No	BAM 1020 Heated	20	3	3.5

**Notes:**

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

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
Site 1	Pilton Causeway, Barnstaple	Kerbside	255774	133732	NO <sub>2</sub>	No	7.0	1.0	No	2.6
Site 2	Rolle Street, Barnstaple	Kerbside	255556	133583	NO <sub>2</sub>	No	2.2	1.3	No	2.5
Site 4	Lower Sticklepath Roundabout, Barnstaple	Kerbside	255651	132808	NO <sub>2</sub>	No	34.0	2.8	No	2.8
Site 5	Sticklepath School, Barnstaple	Kerbside	254197	132354	NO <sub>2</sub>	No	2.0	1.7	No	2.7
Site 6	Cedars Roundabout, Barnstaple	Urban Background	253886	132394	NO <sub>2</sub>	No	25.0	1.6	No	2.5
Site 7	Newport Road, Barnstaple	Kerbside	256706	132253	NO <sub>2</sub>	No	0.5	1.2	No	2.6
Site 8	South Street, Newport	Kerbside	256683	132130	NO <sub>2</sub>	No	2.5	1.2	No	2.4
Site 9	Castle Street, Barnstaple	Kerbside	255661	133179	NO <sub>2</sub>	No	0.0	1.7	No	2.4
Site 10	Alexandra Road, Barnstaple	Kerbside	256186	133164	NO <sub>2</sub>	No	2.2	1.6	No	2.5
Site 11	Belle Meadow Road, Barnstaple	Kerbside	255967	132985	NO <sub>2</sub>	No	12.0	1.6	No	2.5
Site 12	The Square, Braunton - Café Bistro	Kerbside	248731	136617	NO <sub>2</sub>	No	0.0	6.0	No	2.3
Site 13	The London Inn, Braunton	Kerbside	248732	136592	NO <sub>2</sub>	Yes	0.0	1.1	No	2.4
Site 14	Traffic Lights, Church Street, Ilfracombe	Kerbside	251533	147330	NO <sub>2</sub>	No	0.5	1.6	No	2.6
Site 15	High Street, Ilfracombe	Kerbside	251971	147689	NO <sub>2</sub>	No	0.0	2.5	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
Site 17	Picston House, Bickington	Kerbside	253595	132433	NO <sub>2</sub>	No	10.2	2.8	No	2.7
Site 18	Babbages, Bickington	Kerbside	253053	132541	NO <sub>2</sub>	No	6.5	0.6	No	2.7
Site B1	Exeter Road 1, Braunton - Vellator	Kerbside	249042	135903	NO <sub>2</sub>	No	11.0	1.3	No	2.7
Site B2	Exeter Road 2, Braunton - Wingate	Kerbside	248969	136060	NO <sub>2</sub>	No	6.8	2.9	No	2.7
Site B3	Exeter Road 3, Braunton - Parklyn	Kerbside	248863	136403	NO <sub>2</sub>	No	3.9	1.7	No	2.4
Site B4	Exeter Road 4, Braunton - Kaya	Kerbside	248766	136437	NO <sub>2</sub>	No	6.1	2.6	No	2.3
Site B5	Exeter Road 5, Braunton - Paint a Pot	Kerbside	248862	136372	NO <sub>2</sub>	No	3.9	0.5	No	2.5
Site B6	South Street 1, Braunton - Barton Lane	Kerbside	248716	136067	NO <sub>2</sub>	No	7.0	0.0	No	3.0
Site B7	South Street 2, Braunton - Village End	Kerbside	248787	136498	NO <sub>2</sub>	No	2.4	0.0	No	2.8
Site B8	Chaloners Road, Braunton - Parish Hall	Kerbside	248791	136621	NO <sub>2</sub>	No	30.0	1.3	No	2.4
Site B9	Caen Gardens, Braunton - J Benning	Kerbside	248615	136596	NO <sub>2</sub>	No	0.0	3.8	No	2.7
Site B10	Saunton Road 1, Braunton - Field Lane	Kerbside	248417	136610	NO <sub>2</sub>	No	3.4	1.5	No	2.5
Site B11	Saunton Road 2, Braunton - Sharlands	Kerbside	248363	136630	NO <sub>2</sub>	No	9.8	1.4	No	3.9
Site B12	Caen Street - Salt	Kerbside	248771	136591	NO <sub>2</sub>	No	0.6	1.0	No	2.3

**Notes:**

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

(2) N/A if not applicable.

**Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)**

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Site 1	255774	133732	Kerbside	92.3	92.3	22.7	27.8	25.6	20.4	22.9
Site 2	255556	133583	Kerbside	92.3	92.3	26.2	26.6	23.8	20.4	20.8
Site 4	255651	132808	Kerbside	92.3	92.3	19.9	21.2	22.1	18.5	20.3
Site 5	254197	132354	Kerbside	92.3	92.3	22.8	23.9	23.9	20.8	21.2
Site 6	253886	132394	Urban Background	92.3	92.3	16.4	18.9	15.7	14.0	13.9
Site 7	256706	132253	Kerbside	92.3	92.3	25.3	26.4	25.8	22.3	22.7
Site 8	256683	132130	Kerbside	84.6	84.6	28.0	22.1	26.0	19.2	18.5
Site 9	255661	133179	Kerbside	92.3	92.3	14.0	15.6	13.7	10.7	11.6
Site 10	256186	133164	Kerbside	92.3	92.3	25.6	25.7	25.2	21.5	21.7
Site 11	255967	132985	Kerbside	92.3	92.3	26.1	26.1	21.3	19.6	19.8
Site 12	248731	136617	Kerbside	92.3	92.3	39.4	39.9	30.0	18.8	20.0
Site 13	248732	136592	Kerbside	92.3	92.3	30.0	36.5	31.1	26.4	27.2
Site 14	251533	147330	Kerbside	75.0	75.0	17.1	20.6	18.5	14.9	17.4
Site 15	251971	147689	Kerbside	82.7	82.7	18.0	-	17.6	15.1	14.6
Site 17	253595	132433	Kerbside	92.3	92.3	29.5	32.8	26.5	23.5	25.6
Site 18	253053	132541	Kerbside	84.6	84.6	22.7	29.6	18.3	15.1	16.5
Site B1	249042	135903	Kerbside	92.3	92.3	14.4	17.1	19.7	17.4	19.1
Site B2	248969	136060	Kerbside	92.3	92.3	15.4	17.8	16.1	13.7	14.3
Site B3	248863	136403	Kerbside	67.3	67.3	19.9	22.0	20.2	15.9	17.9
Site B4	248766	136437	Kerbside	82.7	82.7	15.1	16.8	16.0	11.1	13.0
Site B5	248862	136372	Kerbside	84.6	84.6	36.7	36.4	35.2	26.4	29.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Site B6	248716	136067	Kerbside	84.6	84.6	10.4	11.0	10.0	8.1	8.6
Site B7	248787	136498	Kerbside	51.9	51.9	14.3	17.7	13.1	11.0	12.2
Site B8	248791	136621	Kerbside	92.3	92.3	18.9	26.6	22.3	18.7	19.8
Site B9	248615	136596	Kerbside	92.3	92.3	14.0	14.6	12.4	10.9	11.1
Site B10	248417	136610	Kerbside	92.3	92.3	22.5	25.8	23.5	18.9	20.0
Site B11	248363	136630	Kerbside	92.3	92.3	18.2	21.1	18.0	14.9	15.9
Site B12	248771	136591	Kerbside	92.3	92.3	-	-	36.1	29.3	31.4

☒ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

☒ Diffusion tube data has been bias adjusted.

☒ Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.

#### Notes:

The annual mean concentrations are presented as  $\mu\text{g}/\text{m}^3$ .

Exceedances of the NO<sub>2</sub> annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

NO<sub>2</sub> annual means exceeding  $60\mu\text{g}/\text{m}^3$ , 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.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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 A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Barnstaple

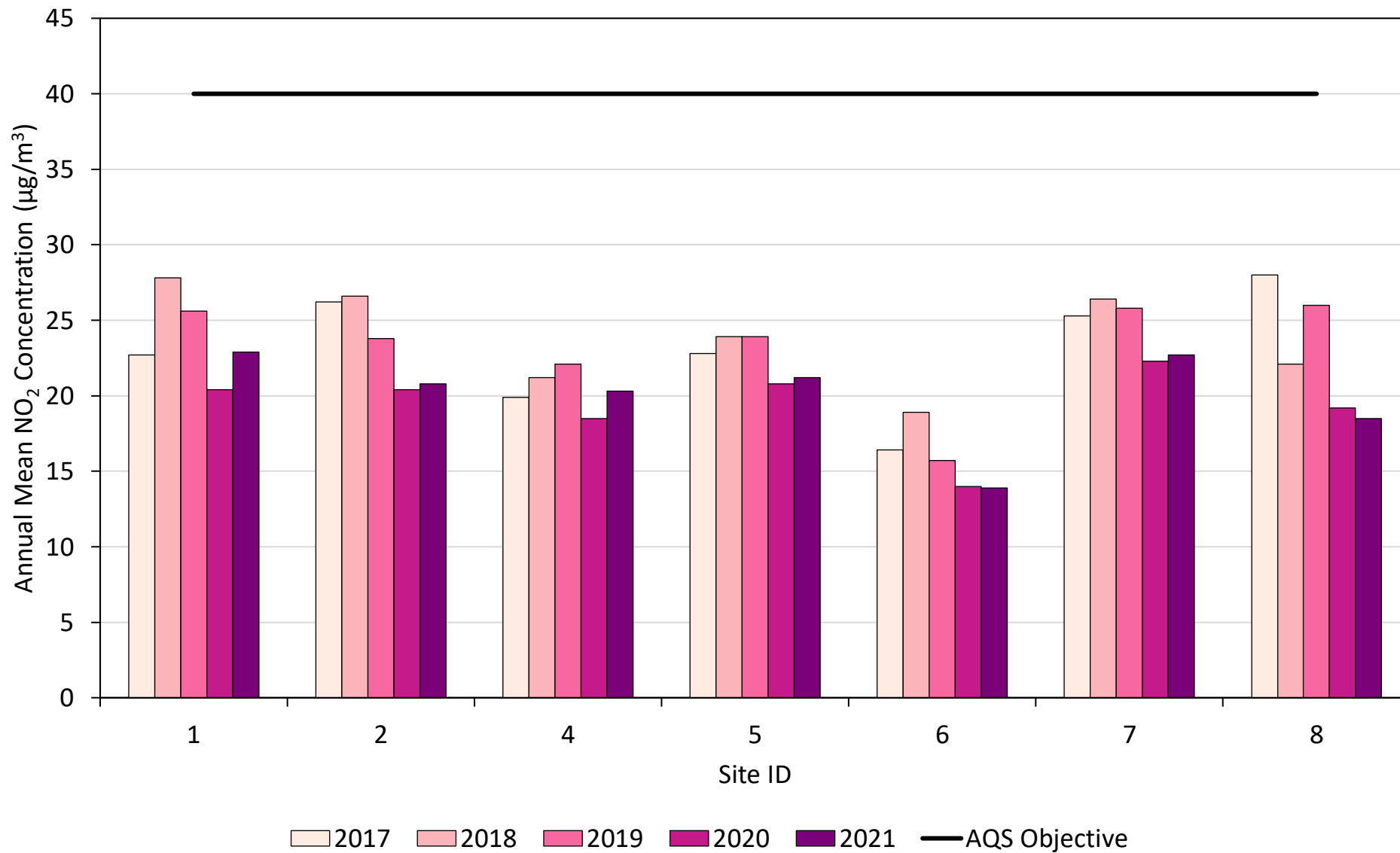


Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Braunton, Barnstaple and Ilfracombe



Figure A.3 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Braunton and Barnstaple

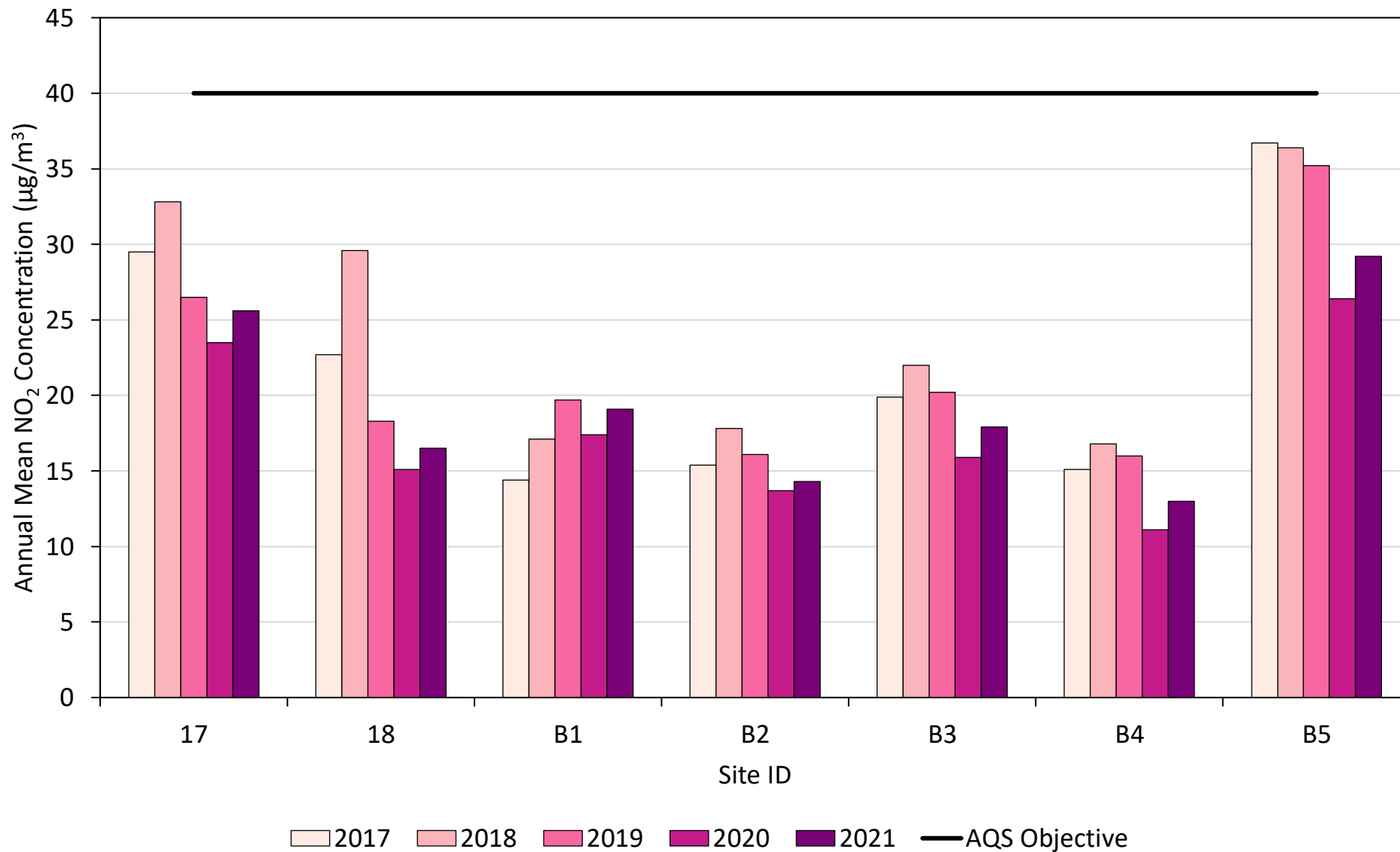
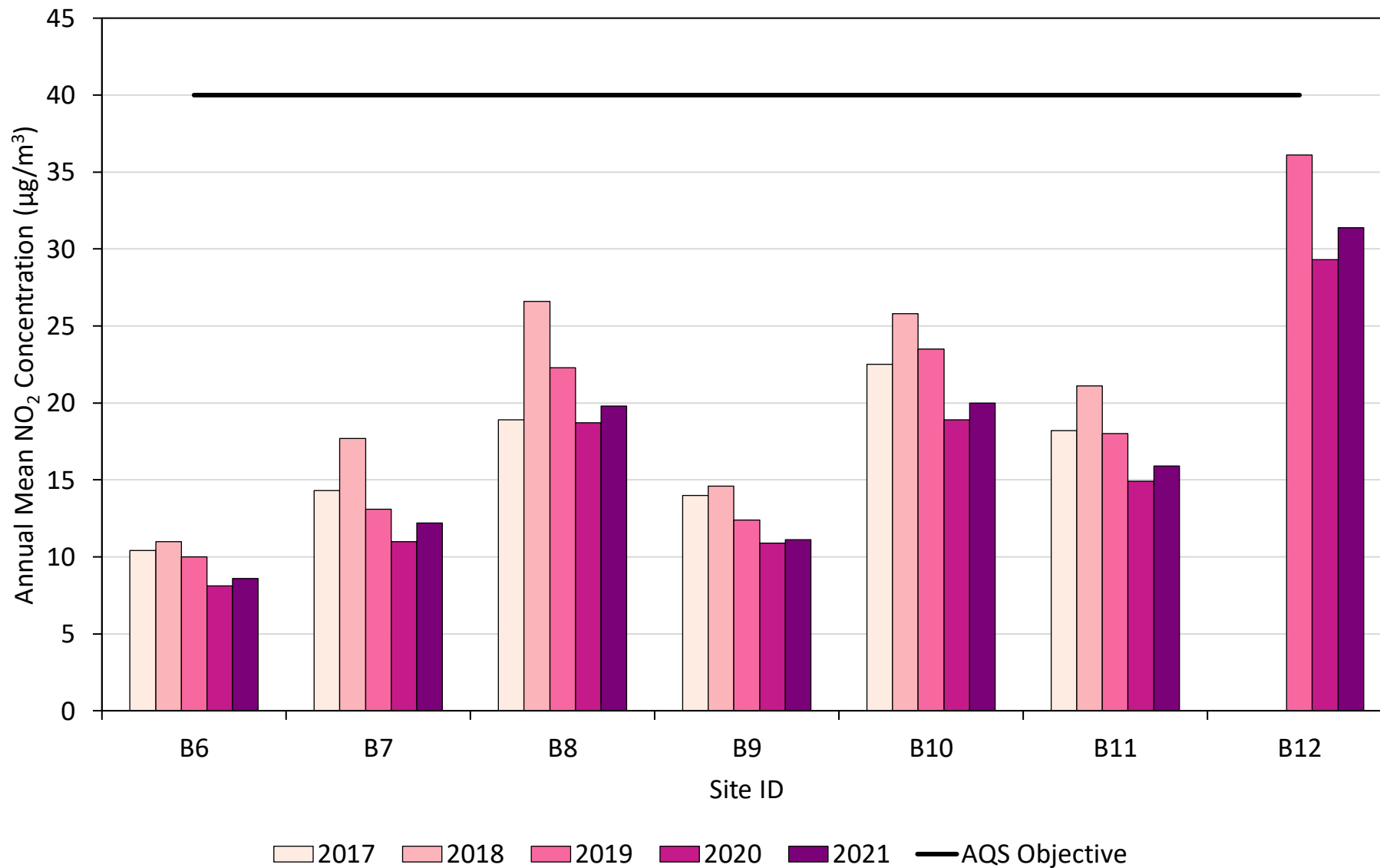




Figure A.4 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Braunton and Barnstaple



**Table A.4 – Annual Mean PM<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Barnstaple 1	257048	132591	Roadside	82.4	82.4	15.6	14.9	16.6	14.2	13.2

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

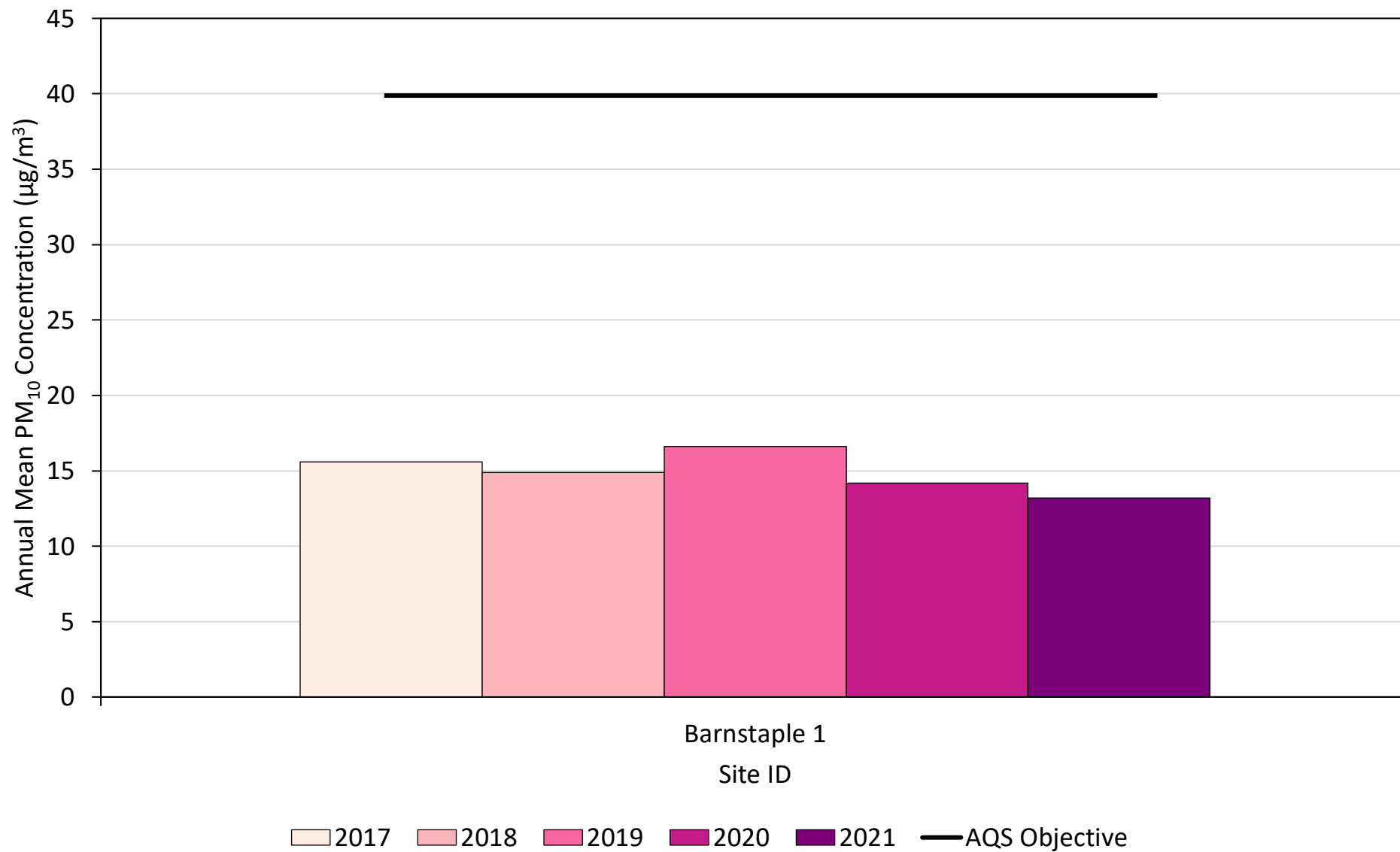
Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

All means have been “annualised” as per LAQM.TG16 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 A.5 – Trends in Annual Mean PM<sub>10</sub> Concentrations



**Table A.5 – 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	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Barnstaple 1	257048	132591	Roadside	82.4	82.4	0 (28.5)	0 (22.1)	2	0	1

**Notes:**

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m<sup>3</sup> have been recorded.

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 90.4th 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%).

**Table A.6 – Annual Mean PM<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2021 (%) <sup>(2)</sup>	2017	2018	2019	2020	2021
Barnstaple 1	257048	132591	Roadside	83.1	83.1	7.8	6.9	8.1	8.4	8.2

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

**Notes:**

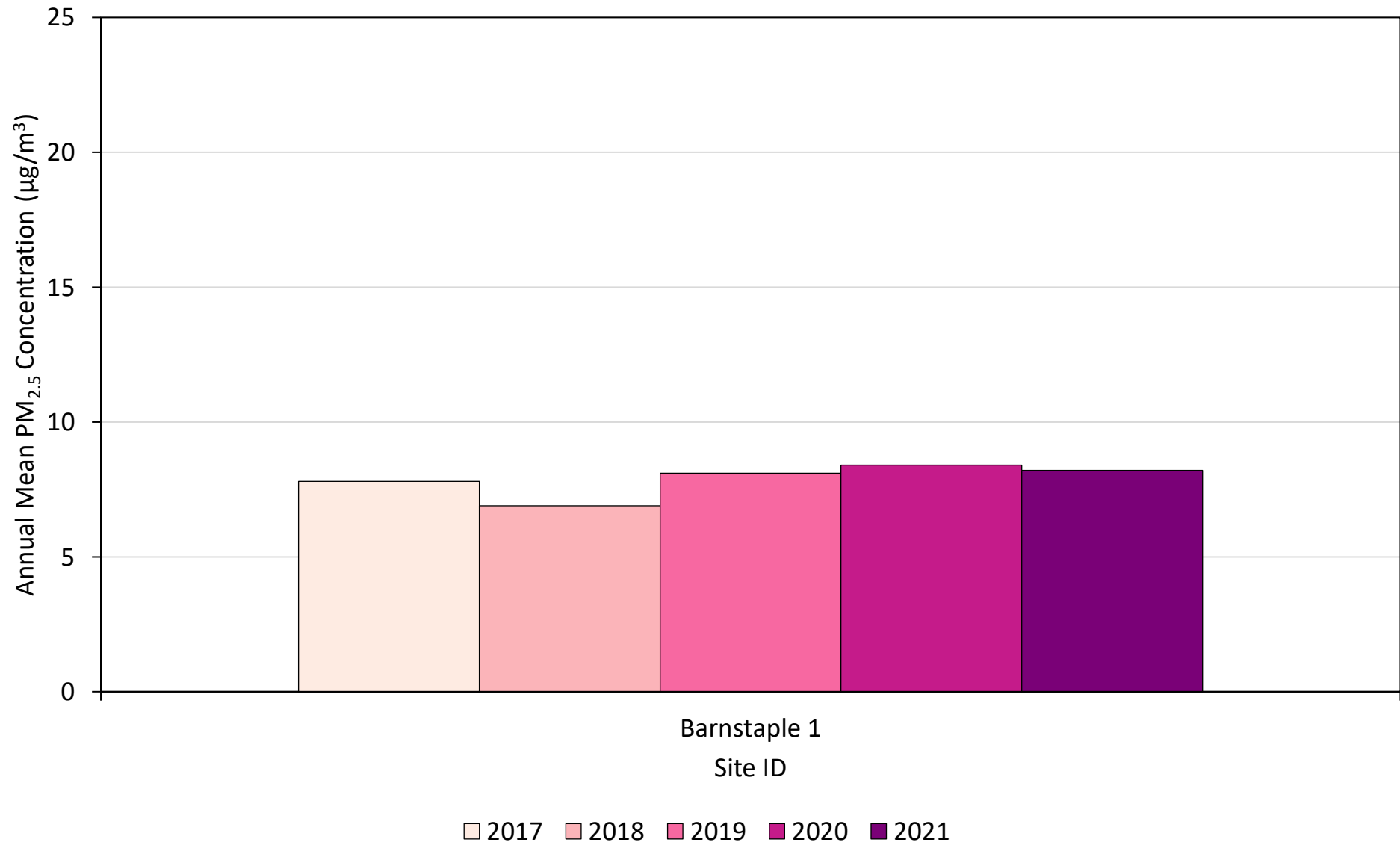
The annual mean concentrations are presented as µg/m<sup>3</sup>.

All means have been “annualised” as per LAQM.TG16 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 A.6 – Trends in Annual Mean PM<sub>2.5</sub> Concentrations**



## Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO<sub>2</sub> 2021 Diffusion Tube Results (µg/m<sup>3</sup>)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Site 1	255774	133732		31.9	23.9	31.6	28.1	23.9	24.1	23.7	31.5	26.8	31.9	23.0	27.2	22.9		
Site 2	255556	133583		23.5	23.6	24.4	24.1	23.1	22.7	21.8	26.7	25.7	35.0	23.0	24.8	20.8		
Site 4	255651	132808		28.6	20.2	24.5	25.2	20.0	18.4	19.6	26.2	26.1	31.7	25.4	24.1	20.3		
Site 5	254197	132354		28.1	26.2	24.5	26.5	21.3	25.1	22.5	27.9	25.2	26.7	24.4	25.3	21.2		
Site 6	253886	132394		19.1	16.9	15.2	16.8	12.8	15.6	14.0	17.8	16.4	21.0	17.5	16.6	13.9		
Site 7	256706	132253		26.1	29.5	24.6	27.2	22.3	25.2	22.6	30.3	29.5	35.2	26.1	27.1	22.7		
Site 8	256683	132130		21.4	24.9	22.3	22.5	21.1	20.8	20.5	23.1	23.9	-	20.4	22.1	18.5		
Site 9	255661	133179		16.7	12.6	13.4	13.7	9.7	11.3	10.8	14.9	14.6	19.3	15.0	13.8	11.6		
Site 10	256186	133164		25.4	25.2	22.9	26.3	18.4	22.8	21.4	28.3	29.0	37.4	26.9	25.8	21.7		
Site 11	255967	132985		25.4	23.5	22.8	23.5	20.4	22.9	18.5	25.8	21.2	32.2	24.3	23.6	19.8		
Site 12	248731	136617		28.3	21.0	23.4	25.2	21.4	23.2	21.3	27.8	22.1	27.3	21.8	23.8	20.0		
Site 13	248732	136592		33.5	28.1	30.5	37.2	31.4	33.8	31.0	38.0	31.6	32.0	30.0	32.4	27.2		
Site 14	251533	147330		22.9	19.9	22.4	19.8	19.1	23.3	20.0	23.8	15.1	-	-	20.7	17.4		
Site 15	251971	147689		16.8	19.9	12.6	17.4	14.7	18.9	20.6	17.8	18.2	17.7	-	17.4	14.6		
Site 17	253595	132433		29.0	34.8	34.2	28.9	30.7	31.0	28.8	32.2	27.2	37.8	23.0	30.5	25.6		
Site 18	253053	132541		21.6	23.2	19.9	19.3	16.2	14.7	-	24.3	16.4	25.1	18.0	19.6	16.5		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
Site B1	249042	135903		20.2	21.6	22.0	23.3	23.6	23.4	21.5	26.2	22.0	27.8	19.1	22.7	19.1		
Site B2	248969	136060		18.9	17.3	18.0	17.7	14.8	16.5	15.6	18.6	14.8	20.9	15.3	17.1	14.3		
Site B3	248863	136403		17.6	21.1	23.7	-	23.1	25.7	-	25.7	-	28.5	18.6	23.0	17.9		
Site B4	248766	136437		16.9	13.2	-	15.2	15.4	15.2	13.2	19.2	14.3	19.7	13.6	15.5	13.0		
Site B5	248862	136372		27.3	32.2	33.3	-	40.9	42.2	39.8	37.9	30.8	36.7	27.9	34.8	29.2		
Site B6	248716	136067		12.0	9.9	10.2	-	8.6	9.7	9.2	11.3	9.1	13.0	10.5	10.3	8.6		
Site B7	248787	136498		-	-	15.3	-	12.8	-	14.4	-	11.1	16.1	13.9	13.9	12.2		
Site B8	248791	136621		24.3	20.8	21.9	22.4	22.7	23.7	23.6	27.4	25.7	26.7	20.8	23.6	19.8		
Site B9	248615	136596		13.1	12.0	13.1	12.2	13.2	14.5	14.4	15.4	11.0	14.6	12.3	13.2	11.1		
Site B10	248417	136610		20.5	23.2	26.2	24.2	22.6	28.0	26.8	30.5	18.0	24.7	18.9	23.9	20.0		
Site B11	248363	136630		20.5	19.3	19.0	20.1	18.7	20.3	18.0	21.1	14.2	20.4	18.3	19.0	15.9		
Site B12	248771	136591		37.3	35.7	38.2	39.9	41.7	41.6	33.5	40.8	32.0	41.4	31.2	37.4	31.4		

All erroneous data has been removed from the NO<sub>2</sub> diffusion tube dataset presented in Table B.1.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

Local bias adjustment factor used.

National bias adjustment factor use.

Where applicable, data has been distance corrected for relevant exposure in the final column.

North Devon District Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

#### 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**.

See Appendix C for details on bias adjustment and annualisation.



## **Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC**

### **New or Changed Sources Identified Within North Devon During 2021**

North Devon District Council considered a total of 630 planning applications during 2021 for potential environmental impacts, including in relation to air quality. Where relevant, an air quality has been requested and mitigation measures have been agreed via the planning conditions (having regard to relevant standards and national good practice guidance). An Air Quality Impact Assessment (AQIA) was required to be prepared for a total of 12 planning applications received during 2021. Each of these related to either housing developments that exceeded the traffic related AQIA threshold in North Devon District Council's Air Quality Supplementary Planning Document or the large construction site threshold of 4 hectares. A decision on the level of air quality assessment and mitigation needed have taken account of the guidance contained in the EPUK and IAQM document 'Land-Use Planning and Development Control: Planning for Air Quality' and the 'North Devon District Council Air Quality Supplementary Planning Document'.

### **Additional Air Quality Works Undertaken by North Devon District Council During 2021**

North Devon District Council has not completed any additional works within the reporting year of 2021.

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

Gradko International Ltd supply and analyse North Devon District Council's diffusion tubes, which are prepared using the 20% TEA in water preparation method. During 2021, Gradko International Ltd reported no results that were of bad precision, whilst 32 sets of results were classified as good precision. This is an indicator of the performance and consistency of Gradko International Ltd in the preparation and analysis of diffusion tubes. During 2021, the diffusion tube monitoring was completed in adherence with the 2021 LAQM diffusion tube

calendar. However, the tubes were not changed at the beginning of January, and the December diffusion tubes were overexposed during into January – this data has been omitted from calculating the annual mean concentration. The decision to remove the overexposed January data is due to the fact that LAQM TG(16) states:

*“If diffusion tubes are left out for significantly longer or shorter periods than the four and five weeks recommended, then the data may not be reliable as the diffusion tube rate may not have been accurately defined”.*

This is further supported by the practical guidance for diffusion tubes which states:

*“Individual exposures should ideally be 2-4 weeks and no longer than 5 weeks and no shorter than 1 week”.*

### Diffusion Tube Annualisation

Annualisation was required for two diffusion tube sites (B3 and B7), as the data capture was less than 75% but greater than 25%. Site B3 had an overall data capture of 67.3%, whilst that of Site B7 was 51.9%. The annualisation process was conducted using an average annualisation factor calculated using the concentration from background monitoring sites that are situated within a 50 mile radius. The two sites that were used are both part of the Automatic Urban and Rural Network (AURN) and include Yarner Wood (rural background) and Honiton (urban background). Raw diffusion tube data was then annualised using the average annualisation factor to provide annualised mean NO<sub>2</sub> concentrations. Details of the calculation method undertaken are provided in Table C.1.

**Table C.1 – Annualisation Summary (concentrations presented in µg/m<sup>3</sup>)**

Site ID	Annualisation Factor Yarner Wood	Annualisation Factor Honiton	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
Site B3	0.9012	0.9541	0.9276	23.0	21.3
Site B7	1.1109	0.9766	1.0438	13.9	14.5

### Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR has 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.TG16 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<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

North Devon District Council have applied a national bias adjustment factor of 0.84 to the 2021 monitoring data (spreadsheet 03/22 – Figure C.1). A summary of bias adjustment factors used by North Devon District Council over the past five years is shown in Table C.2.

**Figure C.1 – National Bias Adjustment Factor Spreadsheet**

National Diffusion Tube Bias Adjustment Factor Spreadsheet				Spreadsheet Version Number: 03/22						
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of June 2022				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods						LAQM Helpdesk Website				
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet						The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.				
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor <sup>3</sup> shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data <sup>2</sup>	If you have your own co-location study then see footnote <sup>1</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
Analysed By <sup>1</sup>	Method <sup>2</sup>	Year <sup>2</sup>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>3</sup>	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2021		Overall Factor <sup>3</sup> (32 studies)				Use	0.84	

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

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.84
2020	National	03/21	0.81
2019	National	09/20	0.93
2018	National	06/19	0.93
2017	National	09/18	0.89

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

No diffusion tube NO<sub>2</sub> monitoring locations within North Devon required distance correction during 2021.

**QA/QC of Automatic Monitoring**

The Barnstaple automatic monitoring site is part of the Automatic Urban and Rural Network (AURN) that is run by the Environment Agency. It is the largest automatic monitoring network within the UK, and is the main network used for compliance reporting against the air quality

objectives. As such, the PM<sub>10</sub> and PM<sub>2.5</sub> monitoring at Barnstaple A39 is completed in line with the operational procedures set out by the Central Management and Coordination Unit (CMCU) for the AURN, with data ratification completed by the Quality Assurance and Control Unit (QA/QC Unit).

Members of the North Devon District Council team regularly attend the monitoring site, acting as the local site operator (LSO) to complete routine site calibrations and maintenance ensuring a consistent, accurate data flow. Equipment servicing is completed every six months by an Equipment Support Unit (ESU) for the site, and the QA/QC Unit completes scheduled site audits in accordance with the AURN Site Operators Manual.

Due to the monitoring site being operated by the Environment Agency, North Devon District Council do not have first-hand access to any data that has been manipulated or removed through the QA/QC procedure completed. The data presented within the 2022 ASR has been downloaded from the [UK-Air website](#) and all is shown as ratified.

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

The PM<sub>10</sub> and PM<sub>2.5</sub> monitors utilised within North Devon District Council do not require the application of a correction factor.

### **Automatic Monitoring Annualisation**

All automatic monitoring locations within North Devon 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 North Devon required distance correction during 2021.

## Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Automatic & Non-Automatic Monitoring Sites in Barnstaple

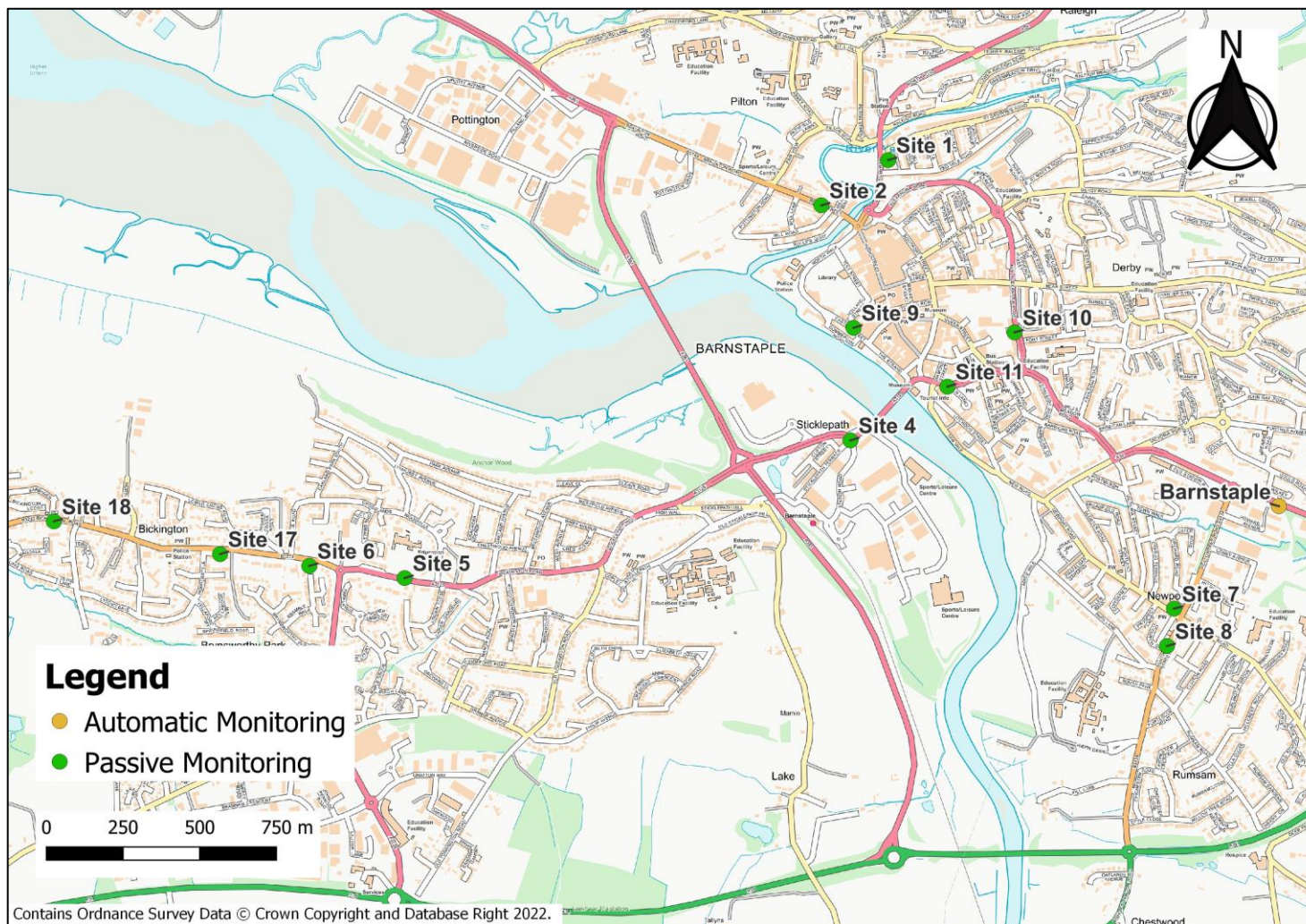


Figure D.2 – Map of Non-Automatic Monitoring Sites in Braunton

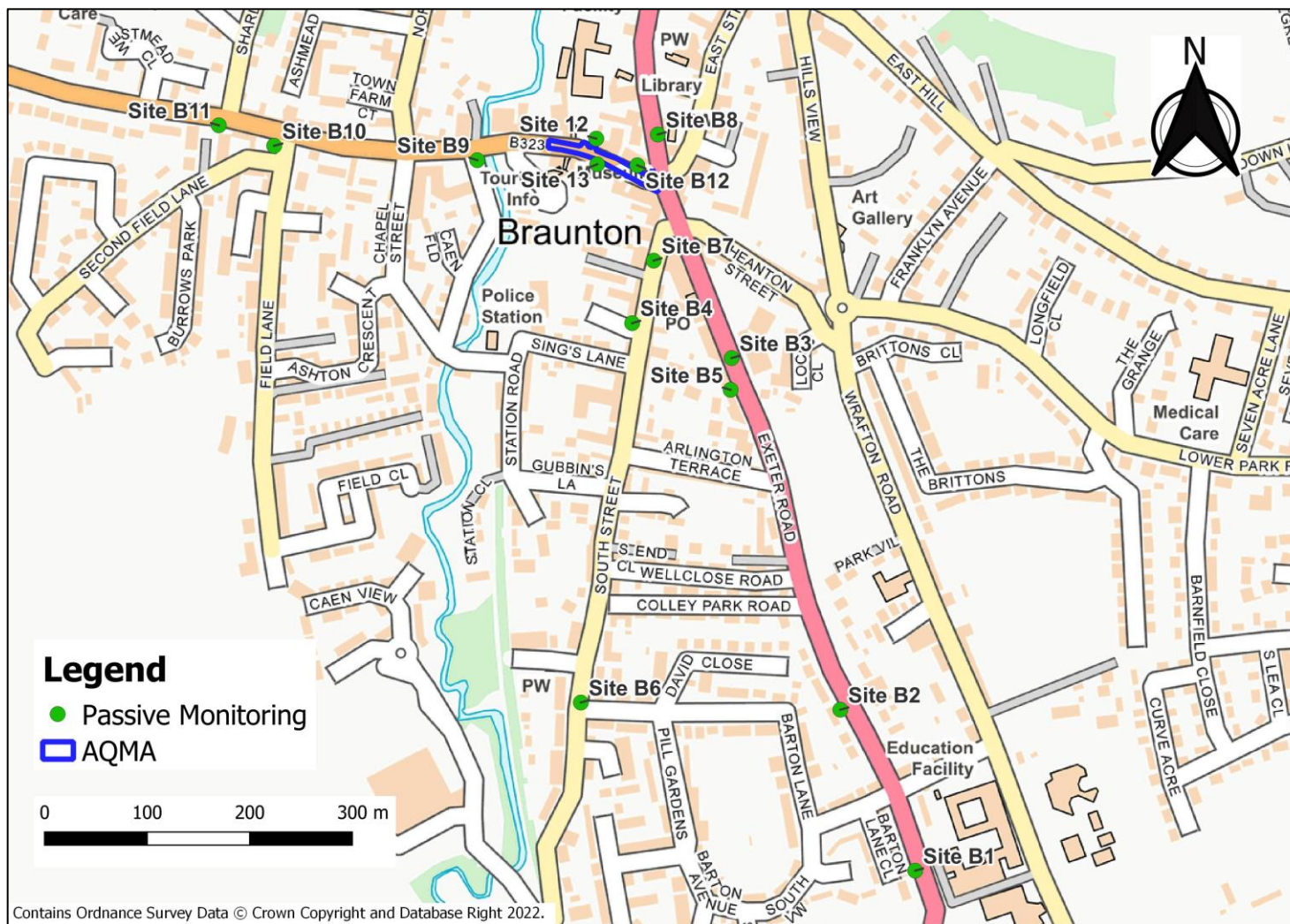
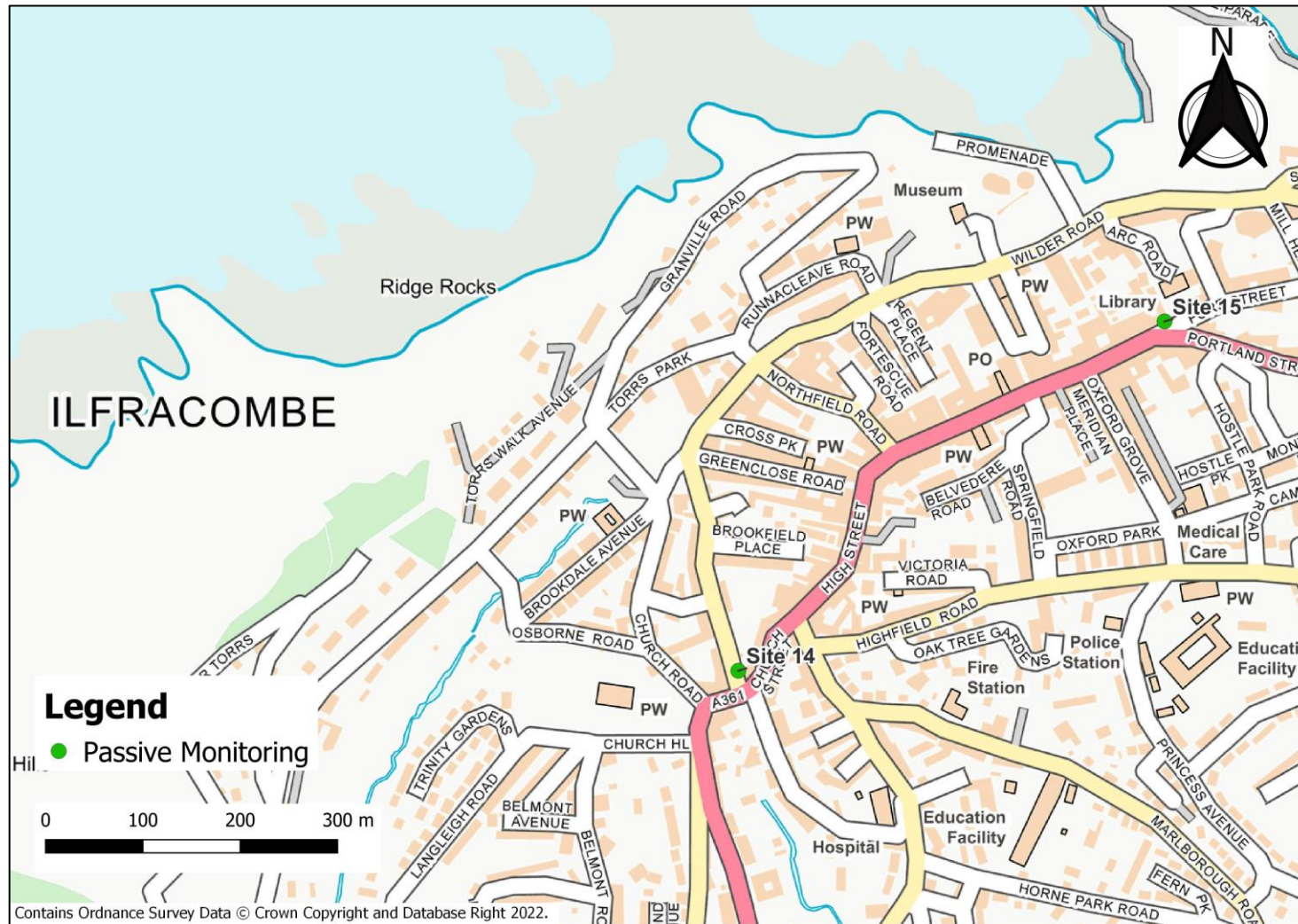


Figure D.3 – Map of Non-Automatic Monitoring Sites in Ilfracombe



## Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England<sup>7</sup>

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO <sub>2</sub> )	40µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM <sub>10</sub> )	40µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	125µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	266µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>7</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).



## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority 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
ASR	Annual Status Report
AURN	Automatic Urban and Rural Network
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
LAQM	Local Air Quality Management
MOVA	Microprocessor Optimised Vehicle Actuation'
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm 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

## References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- North Devon District Council Air Quality Action Plan. 2016.
- Supplementary Planning Document, North Devon and Torridge Local Plan 2011 – 2031: Air Quality Supplementary Planning Document (SPD) Adopted 5<sup>th</sup> October 2020. V1.1. North Devon District Council and Torridge District Council.