



North Devon Council Annual Status Report 2020

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2020 Air Quality Annual Status Report (ASR)

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

July, 2020

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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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

North Devon is predominantly rural in nature and is fortunate that air quality across the district is generally good. The main pollutant of local concern is nitrogen dioxide (NO₂), which within North Devon is primarily from vehicles using the road network. In addition to NO₂, particulate matter (PM₁₀ and PM_{2.5}) emissions are also produced from traffic sources.

Since 2000 there has been a council led NO₂ monitoring network running across the district using passive NO₂ diffusion tubes. In addition, there has been an Automatic Urban and Rural Network (AURN) monitor, measuring both PM₁₀ and PM_{2.5}, located within Barnstaple since 2013.

Currently within North Devon there is one Air Quality Management Area (AQMA) situated within Braunton. The sites are located off Saunton Road B3231 in an urban residential area while still close to the village centre. It is a main access route from the west of the village. The AQMA was declared in July 2011 following an exceedance of the annual mean NO₂ objective and subsequently an Air Quality Action Plan (AQAP) has been developed that describes specific measures that have been designed to reduce NO₂ concentrations within the AQMA.

During 2019 there were no exceedances of any air quality objectives at any monitoring sites across North Devon. Since full monitoring of PM₁₀ and PM_{2.5} commenced at the Barnstaple AURN monitor in 2014 there have been no exceedances of the relevant air quality objectives at this location. Within the existing AQMA there have been four

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

² Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

consecutive years where the two NO₂ diffusion tubes have reported annual mean concentrations below the NO₂ annual mean objective, and outside the AQMA there continues to be no concentrations above the annual mean objective. This year neither tube was within 10% of the annual mean objective. The concentration at both Sites 12 and 13 decreased during 2019 when compared to 2018 to well below within 10% of the air quality objective at a location of relevant exposure. It must be noted that site 12 has been relocated from The Square Braunton, to The Square Braunton, Café Bistro – in accordance with advice received from the LAQM Helpdesk. The monitoring location was relocated, still within the AQMA, but at a location more relevant for exposure for the annual mean NO₂ objective. This relocation may therefore be the reason behind the drop in NO₂ levels as in January 2019 the tube was still in its original location and bias adjusted value of 30.0 µg/m³ compared to an average bias adjusted value of 23.1 µg/m³ for the new site over the remaining 11 months. The new site B12 is also within the Braunton AQMA and within its first year of placement recorded a bias adjusted distance corrected value of 33.3 µg/m³. The AQMA should currently remain in force as this is the first year in which this has taken place. If compliance is achieved within the AQMA in 2020 the designation of the AQMA will be reviewed.

Full details of the North Devon monitoring network, including monitoring concentrations are included in Appendix A and Appendix B.

Actions to Improve Air Quality

Concentrations of air pollutants across the majority of North Devon continue to be below the air quality objectives. However Braunton AQMA remains in designation, and with increased development within the district and ever increasing vehicle numbers travelling within the district the council will continue to liaise with relevant stakeholders to protect and improve local conditions.

The 2016 AQAP remains the main document designed to improve local air quality within the Braunton AQMA and across the district. The measures that are documented within the AQAP and Table 2.2 have been designed to reduce NO₂ concentrations within the Braunton AQMA. Where possible these have been developed throughout 2019, and this process will continue as previously documented.

During 2019 there have been four steering group meetings

Representatives from North Devon Council, Devon County Council and now Braunton Parish Council are in attendance at the meetings which are used as both an idea 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 these meetings the group discussed the installation of the MOVA and have designated this with the highest priority as it is believed to have the greatest benefit on improving the air quality in the AQMA. Another topic discussed is the introduction of small one way systems particularly around the village on Braunton Burrows with the view of creating a tourist route and deterring traffic from the centre of the village. The group also discussed the implementation of no loading restrictions on Caen Street being extended to The Square and pedestrian crossing. This is with the view of creating a formal delivery hub outside of the AQMA which will aim to improve air quality within the area by reducing traffic levels and idling vehicles.

Other topics debated but which were already completed or deemed of lower priority due to lesser impacts including the widening of Caen Street car park entrance.

The council are considering submitting application to Defra when the Air Quality Grant programme becomes live in 2020 to facilitate one or more of the current measures that are detailed within the current AQAP. At this stage it is thought that Measure 1 would be best suited for the application.

Monitoring of NO₂ is to continue within the Braunton AQMA 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 NO₂ concentrations. Based upon Defra recommendations, a detailed study of Braunton AQMA will be completed once 5 years of consecutive compliance has been enacted within the AQMA.

Conclusions and Priorities

Within 2019 there continued to be no exceedances of any air quality objectives at any monitoring location across North Devon. There was one NO₂ monitoring site within 2019 that had an annual mean concentration within 10% of the 40µg/m³ objective value (new site B12). Following distance correction to the nearest point of relevant exposure,

Site B12 which is located at the Caen Street - Salt reduced to 33.3 $\mu\text{g}/\text{m}^3$. The 2019 PM_{10} and $\text{PM}_{2.5}$ annual mean concentrations recorded at the Barnstaple automatic monitoring station were 16.6 $\mu\text{g}/\text{m}^3$ and 8.1 $\mu\text{g}/\text{m}^3$ respectively, far below the annual mean objective of 40 $\mu\text{g}/\text{m}^3$ for PM_{10} and annual mean target value of 20 $\mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$.

Following completion of the 2020 ASR, it has been concluded that the current AQMA within Braunton should remain. NO_2 monitoring data within the AQMA continues to be below, and for the first time also below the within 10% of the annual mean objective, therefore the Braunton AQMA should currently remain in force. Within previous years ASR appraisals, Defra have recommended that North Devon look to develop a detailed study of the AQMA to ascertain concentrations throughout the AQMA. If current trends continue, following the completion of monitoring in 2020 there will be five years of compliance with the NO_2 annual mean objective.

Local Engagement and How to get Involved

Air quality continues to move up the political agenda and public concern to grow as there is a greater understanding of the issues and complexities around the quality of the air we all breathe. Industry, agriculture, transport, planning and individuals are being encouraged to look at interventions, behavioural changes and practical actions to improve air quality. These issues need to be addressed at all levels, internationally to individually. In terms of air quality everyone can make a difference.

Due to the main source of air pollution in North Devon originating from transport sources, the simplest way for the public to get involved with helping improving air quality within the area would be to look at alternatives to the way they usually travel.

The following are suggested alternatives to private travel that would contribute to improving the air quality within the district:

- Use public transport where available – This reduces the number of private vehicles in operation reducing pollutant concentration through the number of vehicles and reducing congestion;
- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy.

North Devon Council

- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools; and
- Alternative fuel / more 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.



Clean Air Day 2020 is on the 8th of October 2020 and is a UK wide platform that promotes the benefits of cleaner air through engagement with local communities and schools within the district. Further information in regards to Clean Air Day can be found through the following link - <https://www.cleanairday.org.uk/>. This is normally anticipated to take place during the summer months but has been delayed due to COVID 19 and the subsequent social distancing restrictions that are in place.

Further information on local air quality and useful links can be found on the North Devon Council website at <http://www.northdevon.gov.uk/environment/air-quality/>.

Table of Contents

Executive Summary: Air Quality in Our Area	i
Air Quality in North Devon	i
Actions to Improve Air Quality	ii
Conclusions and Priorities	iii
Local Engagement and How to get Involved	iv
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in North Devon.....	4
2.3 PM _{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations.....	13
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance	15
3.1 Summary of Monitoring Undertaken	15
3.1.1 Automatic Monitoring Sites	15
3.1.2 Non-Automatic Monitoring Sites.....	15
3.2 Individual Pollutants	16
3.2.1 Nitrogen Dioxide (NO ₂).....	16
3.2.2 Particulate Matter (PM ₁₀).....	18
3.2.3 Particulate Matter (PM _{2.5}).....	18
Appendix A: Monitoring Results	19
Appendix B: Full Monthly Diffusion Tube Results for 2019	35
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	37
Appendix D: Maps of Monitoring Locations and AQMAs	44
Appendix E: Summary of Air Quality Objectives in England	49
Glossary of Terms	50
References	51

List of Tables

Table 2.1 – Declared Air Quality Management Areas.....	3
Table 2.2 – Progress on Measures to Improve Air Quality	8
Table 2.3 – Adult Mortality Attributable to PM _{2.5} Pollution.....	13
Table A.1 – Details of Automatic Monitoring Sites.....	19
Table A.2 – Details of Non-Automatic Monitoring Sites	20
Table A.3 – Annual Mean NO ₂ Diffusion Tube Monitoring Results (not distance corrected)	23
Table A.4 – Annual Mean PM ₁₀ Monitoring Results.....	29
Table A.5 – 24-Hour Mean PM ₁₀ Monitoring Results.....	31
Table A.6 – PM _{2.5} Monitoring Results	33
Table B.1 – NO ₂ Monthly Diffusion Tube Results – 2019	35
Table C.1 – AURN Monitoring Stations used for Annualisation	40
Table C.2 – Examples of where the Air Quality Objectives should apply	41
Table C.3 – Diffusion Tube Short Term to Long Term Monitoring Data Adjustment (2019)	43
Table C.4 – NO ₂ Fall-Off with Distance Calculations	43
Table E.1 – Air Quality Objectives in England	49

List of Figures

Figure A.1 – Trends in Annual Mean NO ₂ Concentrations: Barnstaple (not distance corrected)	26
Figure A.2 – Trends in Annual Mean NO ₂ Concentrations: Braunton (not distance corrected)	27
Figure A.3 – Trends in Annual Mean NO ₂ Concentrations: Newport, Ilfracombe, South Moulton and Bickington (not distance corrected).....	28
Figure A.4 – Trends in Annual Mean PM ₁₀ Concentrations	30
Figure A.5 – Trends in Number of 24-Hour Mean PM ₁₀ Results >50µg/m ³	32
Figure A.6 – Trends in Annual Mean PM _{2.5} Concentrations	34
Figure D.1 – Automatic Monitoring Site: Barnstaple	44
Figure D.2 – Diffusion Tube Monitoring Locations: Barnstaple.....	45
Figure D.3 – Diffusion Tube Monitoring Locations: Braunton	46
Figure D.4 – Diffusion Tube Monitoring Locations: Braunton AQMA.....	47
Figure D.5 – Diffusion Tube Monitoring Locations: Ilfrcombe	48

1 Local Air Quality Management

This report provides an overview of air quality in North Devon during 2019. 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 to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found within Table E.1 in Appendix E.

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 must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of the current AQMA declared by North Devon can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <https://www.northdevon.gov.uk/environment/air-quality/>.

Alternatively, see Appendix D: Maps of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
North Devon AQMA No.1	11/07/2011	NO ₂ Annual Mean	Braunton	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 ³	35.2	µg/m ³	North Devon Council – Air Quality Action Plan	May 2016	-

North Devon confirm the information on UK-Air regarding their AQMA is up to date

Notes:

(1) – Annual mean NO₂ concentration from diffusion tube Site B12 located at Caen Street.

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

Defra's appraisal of last year's ASR (2019) is detailed below, with relevant comments:

"The report is well structured, detailed, and provides the information specified in the Guidance.

1. *The report is thorough, comprehensive and follows the most recent template. There is detailed discussion of progress, priorities, and trends in monitoring data throughout.*

Noted - no further comment required.

2. *In the Conclusions and Priorities section, Page iii, paragraph 2 states: "following the completed distance correction the number of recorded exceedances of the objective reduced to one site". This needs amending given that the monitoring results do not indicate any exceedances of the annual mean objective for NO₂.*

This has been updated within the report to state "Following the completed distance correction there were no exceedances of the annual mean NO₂ objective".

3. *Annual mean NO₂ concentrations increased at 23 of the Council's 27 passive monitoring sites in 2018 when compared to 2017, which should be closely monitored and further specific measures to reduce concentrations implemented where significant increases have been identified. The Council are encouraged to discuss the potential reasons for these increases given that no new potential sources of pollution have been identified within the District (Appendix C, paragraph 1).*

This has been discussed further within Section 3.2.1.

4. *The automatic monitoring site has recorded lower annual mean concentrations of PM₁₀ and PM_{2.5} in 2018 compared to 2017.*

The annual mean for both PM₁₀ and PM_{2.5} increased at the Barnstaple monitoring site within 2019, monitoring will continue in 2020 to advise upon if this increase was a single year or an increasing trend.

5. *The Council has listed a number of priorities for the next year and the council should provide an update on the progress of these in the next reporting year. These priorities are appropriate.*

Noted - no further comment required.

6. *The Council intend to consider a detailed assessment prior to revocation of the Braunton AQMA, which is supported.*

In accordance with TG(16) guidance, the Council intend to keep the Braunton AQMA in force until such a time that concentrations are proven to be consistently lower than 36µg/m³. The support for a detailed assessment when required is noted.

7. *One minor error within the excel spreadsheet for Table 2.1 – maximum concentration within the AQMA recorded, but this should be the maximum concentration **at relevant exposure**. Correct concentration reported within the report.*

This has been updated within the 2019 ASR spreadsheet and subsequent 2020 ASR.

8. *It is encouraging to see the Council responding to comments raised in the previous appraisal, as it is an example of good practice.*

Noted - no further comment required.

North Devon has taken forward a number of direct measures during the reporting year of 2019 in pursuit of improving local air quality. Details of all current measures completed, in progress or planned are set out in Table 2.2. The air quality steering group meets every three months to discuss progress of measures and any potential new measures that could be implemented. These meetings will continue for the foreseeable future with actions being assigned to the relevant individual/organisation in terms of developing each specific measures.

More detail on the initial measures developed in response to the AQMA designation can be found in the 2016 North Devon AQAP that is available on the North Devon Council website, <https://www.northdevon.gov.uk/environment/air-quality/>.

Key completed measures are:

- The supplementary planning document for air quality has been completed and will be adopted in 2020
- Circulation of travel information to enable smarter travel choices to be made, including a social media campaign is set to begin within 2019 and continue throughout 2020.

The priorities of the steering group for the coming year are:

- To continue to hold regular meetings with all relevant stakeholders in order to provide updates on the development of action plan measures, and to define actions to take the measures forward;
- Continue to liaise with all stakeholders in to work together to develop further actions designed to reduce pollutant concentrations within Braunton and across the District;
- To consider the appropriateness for the undertaking of a Detailed Assessment in relation to the Braunton AQMA
- Continue to monitor NO₂ concentrations throughout the district in order to assess concentration trends and work towards revocation of the Braunton AQMA.
- Continue to develop the possibility of the installing the Microprocessor Optimized Vehicle Actuation (MOVA) within the autumn of 2020
- Work on plans to implement the update of the current zebra crossing on Chaloners Road to a signal controlled crossing – not only would this reduce safety concerns for the area it is anticipated that traffic flows would be in turn improved and therefore increase in air quality should also follow
- Engage the public and make them aware of the plans to implement the actions detailed in the AQAP. This is to be done by holding an information event in the New Year particularly with the view of discussing the upgrading of the Zebra Crossing on Chaloners Road.
- Continue to work on finding a resolution to the no loading restrictions in place on Caen Street with the view of creating a formal delivery hub near but outside of the AQMA to ease congestion on Caen Street.

In addition, North Devon Council will work in partnership with Devon County Council to install Electric vehicle charging points in Hardaway Head car park (Barnstaple), Wilder Road car park (Ilfracombe) and Central car park (South Molton).

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, currently the Braunton AQMA is to remain in force until such a time that concentrations are proven to be consistently lower than within 10% of the NO₂ annual mean objective, in accordance with LAQM.TG(16) guidance.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion 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		DCC (Potential s106 funding)	DCC (Potential s106 funding)	Improved traffic flows / less congestion	0 - 2µg/m ³	Discussions have continued between DCC and BPC regarding implementation of the measure in a way which obtains both BPC and Community support	TBC	Resolution now achieved in regards to BPC's acceptance of NDC's monitoring data as presented to Defra. Discussions regarding funding and costs now taking place
2	Consider amending the South Street one way system in relation to optimising traffic flow	Traffic Management	UTC, Congestion management, traffic reduction		DCC	DCC	Modelling results	N/A	Cancelled	N/A	Work undertaken identified a possible 5.23% reduction in annual average daily traffic movements on Caen Street. DCC advised that the AQ benefit would be very small.
3	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		DCC	DCC	Reduced traffic volume on Caen Street	N/A	Feasibility report completed	N/A	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
4	Review all pedestrian movements around the village, to	Traffic Management	UTC, Congestion management, traffic reduction		DCC	DCC	Improved traffic routing	0 - 1µg/m ³	Consideration to changing the zebra crossing on Chaloners Road to a signal controlled	Ongoing	The proposed change of the Zebra Crossing on Chaloners Road to a signal controlled

North Devon Council

	<p>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</p>								<p>crossing</p> <p>Area close to the zebra crossing on Saunton Road is to be reviewed in terms of safety</p>		<p>crossing is supported by DCC and BPC.</p> <p>Opinions to be sought from nearby schools in terms of access and potential benefits</p>
5	<p>Improving parking management, including the prevention of parking associated with blocking bus stops</p>	Traffic Management	Emission based parking or permit charges		BPC / DCC	BPC / DCC	Improved flow of key road links	Assessed by monitoring on relevant road links	DCC have provided a summary list of options for consideration by BPC, who have responded with their views	Ongoing	<p>Agreement to be reached between DCC and BPC concerning which measures from DCC's summary list are to be implemented</p>

North Devon Council

6	Installation of a delivery hub	Freight and Delivery Management	Freight Consolidation Centre		DCC	DCC	Routing of delivery vehicles	Unknown at this stage, can be assessed if the no loading restrictions are developed.	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	Ongoing	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
7	Redirecting traffic along A399	Traffic Management	UTC, Congestion management, traffic reduction		DCC	DCC	Routing of vehicles	No significant change in NO ₂ concentration at diffusion tube monitoring sites 14 and 15	Electronic signage has been installed to redirect traffic at peak flow times	Completed	-
8	Off peak delivery times	Freight and Delivery Management	Quiet & out of hours delivery		DCC	DCC	Number of delivery vehicles and the times they work within	0 - 1µg/m ³	DCC have provided a summary list of options for consideration by BPC, who have responded with their views	TBC	Agreement to be reached between DCC and BPC concerning which how best to implement
9	Improving Public Transport	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services		DCC	DCC	Numbers of vehicles upgraded	Assessed by monitoring on transport road links	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	Ongoing	Bus operators travelling through Braunton have been prioritised for improvements in emission standards

North Devon Council

									planned developments over the local plan period		
10	Fleet partnerships - working with local companies to encourage lower emissions fleet vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes		DCC	DCC	Introduction in lower emission vehicles in fleet	0 - 1 µg/m ³	Bus service improvements from Westward Hol to Ifracombe are linked with planned development in the Bideford area	Ongoing	Bus operators travelling through Braunton have been prioritised for improvements in emission standards
11	Implementing school / work travel plans	Promoting Travel Alternatives	School Travel Plans		DCC	DCC	Reduction of personal travel and uptake in more sustainable travel modes	Unknown at this stage, information on specific travel plans would need to be known first	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	Complete	DCC confirmed applications to be assessed on a case by case basis
12	Developing a supplementary planning document for air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		NDC	NDC	Numbers of planning applications assessed in terms of AQ	Control of future emissions	Submitted internally at NDC in February 2019, public consultation will follow once approved	2019/2020	Public consultation complete waiting for required revisions to be completed. This will be adopted once these have been completed
13	Producing travel packs for holiday accommodation	Public Information	To be done electronically via a social media campaign		NDC	NDC	Numbers using public transport	Assessed by monitoring on transport road links	Project commenced in April 2019	Ongoing	-

North Devon Council

14	Installation of a "Park + Change" facility at Chivenor	Alternatives to private vehicle use	Bus based Park & Ride		NDC	NDC	Number using the facility	Assessed by monitoring on transport road links	Construction has been completed but facility is not yet open, is set to open by 2020 / 2021.	Completed	Final checks on facility to be completed before opening
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2.3 PM_{2.5} – 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_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

As detailed in Table A.1, the AURN automatic monitoring station Barnstaple 1 located on Eastern Avenue (A39) within Barnstaple monitors both PM₁₀ and PM_{2.5} using an FDMS and a BAM. The annual mean PM_{2.5} concentration recorded for 2019 was 8.1µg/m³ based upon a data capture of 95.3%. This is a slight increase from the 6.9 µg/m³ recorded last year. All annual mean concentrations recorded have been well below the current 2020 target annual mean objective of 25µg/m³.

The current Defra 2019 background maps, derived from the Pollution Climate Model (PCM) for North Devon Council (2017 based), show that all background concentrations of PM_{2.5} are well below the 2020 annual mean target value for PM_{2.5}. The highest concentration is predicted to be 11.4µg/m³ within the 1 x 1km grid square with the centroid grid reference of 269500, 125500 that is set to the west of South Molton containing both farmland and industrial/commercial usage.

The Public Health Outcomes Framework data tool compiled by Public Health England quantifies the mortality burden of PM_{2.5} within England on a county and local authority scale. Data for 2017 for England, the South West Region and for North Devon Council are presented in Table 2.3 below.

Table 2.3 – Adult Mortality Attributable to PM_{2.5} Pollution

Area	North Devon District	South West Region	England		
			Average	Highest	Lowest
% of Adult Mortality	3.4%	4.4%	5.2%	7.3%	2.4%

It can be seen from Table 2.3 that in 2019 the percentage of adult mortality attributable to PM_{2.5} pollution within North Devon was 1% lower than the average fraction for the

South West Region, and 1.8% lower than the average fraction for England. When compared to 2018 % data; both the South West Region and North Devon have slightly increased by 0.1%.

Due to the health effects attributable to PM_{2.5} pollution through exposure, North Devon Council is continuing to take measures to reduce PM_{2.5} concentrations within the district. There has not been any update to the initiatives taken in 2019 when compared to 2018, these remain as:

- Regular inspections of industrial processes permitted by North Devon Council where combustion and non-combustion processes could lead to anthropogenic emissions of PM_{2.5}; and
- Continuing the implementation works on the action plan measures listed within Table 2.2. Although the measures have been specifically designed to reduce NO₂ concentrations within the AQMA, a number of the initiatives are related to transport sources and therefore will typically have a positive effect on the reduction of PM_{2.5} as well.

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

3.1 Summary of Monitoring Undertaken

North Devon Council has operated an NO₂ diffusion tube monitoring programme since 2000. Currently the network consists of twenty eight monitoring locations, in addition there is an AURN automatic monitoring site located on the A39 within Barnstaple.

3.1.1 Automatic Monitoring Sites

Automatic (continuous) monitoring was undertaken at one site during 2019. This is not a council operated site; it is part of the AURN and is run by the Environment Agency. The Council complete regular Local Site Operator (LSO) duties as instructed through the EA to ensure that the monitor is working to the EU standards required to be included within the AURN.

National monitoring results are available through the Defra UK-AIR website at <https://uk-air.defra.gov.uk/networks/>.

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 Council undertook non- automatic (passive) monitoring of NO₂ at 28 sites during 2019. Site B12 was introduced at Caen Street – Salt within the Braunton area as a new site in 2019. Site 12 at The Square was also relocated due to not being at a location of relevant exposure when assessing the annual mean objective (at a pedestrian crossing), to The Square – Café Bistro where it has remained since January 2019.

Table A.2 in Appendix A shows the details of the sites.

A thorough review of all diffusion tube locations and site details has been completed during 2019 to ensure that all details presented in Table A.2 remain current and correct. It is essential that all monitoring details are correct to determine the concentrations at relevant receptors.

Maps showing the location of the monitoring sites are provided in Appendix D. 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” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented in Table A.3 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). Previously presented data, 2015 – 2018, has been fully accepted by Defra following the appraisal of previously completed ASRs and Progress Reports. The 2019 monitoring data is to be treated as provisional until approved by Defra.

For diffusion tubes, the full 2019 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.

Following the application of a national bias adjustment factor of 0.93 to the raw monitoring data, no diffusion tube sites exceeded the NO₂ annual mean air quality objective in 2019 and there was only one tube within 10% of the annual mean NO₂ objective for 2019 (Site B12). Where a monitoring site is at a location of relevant exposure relating to the NO₂ annual mean objective, and the reported annual mean concentration is above, or within 10% of the objective as per Defra LAQM.TG(16) guidance distance correction should be applied to predict the annual mean concentration at the point of relevant exposure. Relevant locations where the air quality objectives should apply are presented within Table C.2.

As per LAQM.TG(16) guidance, distance correction was completed at Site B12. At this location, the annual mean NO₂ concentrations calculated at the closest relevant receptors were predicted to be far below the annual mean objective - a drop to 33.3ug/m³.

There have not been any annual mean concentrations of NO₂ above the annual mean objective within the existing AQMA in North Devon since 2015, and anywhere outside of the existing AQMA for the 5-year monitoring period presented.

Site 13, which is located at The London Inn within the designated Braunton AQMA, recorded an annual mean of 31.1µg/m³, which was the highest concentration recorded after Site B12. This is a reduction of 5.4µg/m³ from the 2018 value of 36.5µg/m³, and therefore wasn't within 10% of the annual mean objective.

There were no sites where the NO₂ annual mean was greater than 60µg/m³, therefore in accordance with Defra LAQM.TG(16) there are no sites likely to be at risk of exceeding the 1-hour mean objective.

Trend graphs for all monitoring locations presenting up to five years of monitoring data are presented in Appendix A. The results presented within the graphs have been annualised and bias adjusted where applicable, but have not been distance corrected to avoid any confusion with the results presented within the ASR. Distance corrected values are solely presented in Appendix B - these have been calculated using the LAQM NO₂ fall off with distance calculator derived with the calculations utilised presented in Table C.4.

It can be seen within Table A.3 that annual mean NO₂ concentrations increased at 23 of the Council's 27 passive monitoring sites in 2018 when compared to 2017. In relation to the 2019 data it can be seen that 12 of the 27 sites exceed levels presented for 2017. Whilst six of these increases are below 1ug/m³, and none of the 2019 monitoring results exceeded the annual mean objective, the Council will consider further assessment as necessary in the event of future monitoring suggesting any potential significant upward trend in annual mean NO₂ concentrations.

The monitoring data is reviewed each year and any areas whereby continual increases in annual mean NO₂ are identified will should be closely monitored, and further specific measures to reduce concentrations implemented where/if required.

3.2.2 Particulate Matter (PM₁₀)

Table A.4 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40µg/m³, and a five year trend graph for annual mean concentration is presented in Figure A.4.

Table A.5 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³ not to be exceeded more than 35 times per year, A five year trend graph for short term exceedances is presented in Figure A.5.

There was not an exceedance of either the annual mean objective, or the 24-hour short term objective at the Barnstaple automatic monitoring station during 2019. Since monitoring commenced at this site in 2014 there have been no exceedances of either objective recorded at this location.

3.2.3 Particulate Matter (PM_{2.5})

Table A.6 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years, and a five year trend graph for annual mean concentration is presented in Figure A.6.

The annual mean concentration of PM_{2.5} recorded in 2019 at the Barnstaple AURN monitoring station was 8.1µg/m³. This shows a increase of 1.2µg/m³ when compared to the 2018 annual mean concentration, but with the annual mean concentration remaining well below the annual mean target value of 25µg/m³.

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?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
Barnstaple 1	AURN – Barnstaple A39 (UKA00574)	Roadside	257048	132591	PM ₁₀ and PM _{2.5}	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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
Site 1	Pilton Causeway, Barnstaple	Kerbside	255774	133732	NO ₂	NO	7	1.01	NO	2.58
Site 2	Rolle Street , Barnstaple	Kerbside	255556	133583	NO ₂	NO	2.18	1.31	NO	2.49
Site 4	Lower Sticklepath Roundabout, Barnstaple	Kerbside	255651	132808	NO ₂	NO	34	2.8	NO	2.78
Site 5	Sticklepath School, Barnstaple	Kerbside	254197	132354	NO ₂	NO	2	1.7	NO	2.69
Site 6	Cedars Roundabout, Barnstaple	Urban Background	253886	132394	NO ₂	NO	25	1.6	NO	2.53
Site 7	Newport Road, Barnstaple	Kerbside	256706	132253	NO ₂	NO	0.45	1.2	NO	2.6
Site 8	South Street, Newport,	Kerbside	256683	132130	NO ₂	NO	2.5	1.19	NO	2.39
Site 9	Castle Street, Barnstaple	Kerbside	255661	133179	NO ₂	NO	0	1.71	NO	2.43
Site 10	Alexandra Road, Barnstaple	Kerbside	256186	133164	NO ₂	NO	2.2	1.58	NO	2.54
Site 11	Belle Meadow Road, Barnstaple	Kerbside	255967	132985	NO ₂	NO	12	1.6	NO	2.47

Site 12	The Square, Braunton – Café Bistro	Kerbside	248731	136617	NO ₂	NO	0	6.02	NO	2.77
Site 13	The London Inn, Braunton	Kerbside	248732	136592	NO ₂	YES	0	1.07	NO	2.42
Site 14	Traffic Lights, Church Street, Ilfracombe	Kerbside	251533	147330	NO ₂	NO	0.5	1.62	NO	2.58
Site 15	High Street, Ilfracombe	Kerbside	251971	147689	NO ₂	NO	0	2.5	NO	2.95
Site 17	Picston House, Bickington	Kerbside	253595	132433	NO ₂	NO	10.15	2.83	NO	2.66
Site 18	Babbages, Bickington	Kerbside	253053	132541	NO ₂	NO	6.47	0.59	NO	2.66
Site B1	Exeter Road 1, Braunton (Vellator)	Kerbside	249042	135903	NO ₂	NO	10.95	1.28	NO	2.7
Site B2	Exeter Road 2, Braunton (Wingate)	Kerbside	248969	136060	NO ₂	NO	6.8	2.9	NO	2.69
Site B3	Exeter Road 3, Braunton (Parklyn)	Kerbside	248863	136403	NO ₂	NO	3.91	1.7	NO	2.39
Site B4	Exeter Road 4, Braunton (Kaya)	Kerbside	248766	136437	NO ₂	NO	6.06	2.6	NO	2.31
Site B5	Exeter Road 5, Braunton (Paint a Pot)	Kerbside	248862	136372	NO ₂	NO	3.9	0.5	NO	2.47
Site B6	South Street 1, Braunton (Barton Lane)	Kerbside	248716	136067	NO ₂	NO	7	0	NO	2.96
Site B7	South Street 2, Braunton (Village End)	Kerbside	248787	136498	NO ₂	NO	2.4	0	NO	2.79

Site B8	Chaloners Road, Braunton (Parish Hall)	Kerbside	248791	136621	NO ₂	NO	30	1.34	NO	2.43
Site B9	Caen Gardens, Braunton (J Benning)	Kerbside	248615	136596	NO ₂	NO	0	3.8	NO	2.69
Site B10	Saunton Road 1, Braunton (Field Lane)	Kerbside	248417	136610	NO ₂	NO	3.39	1.48	NO	2.53
Site B11	Saunton Road 2, Braunton (Sharlands)	Kerbside	248363	136630	NO ₂	NO	9.8	1.42	NO	3.91
Site B12	Caen Street - Salt	Kerbside	248771	136591	NO ₂	NO	0.56	1	NO	2.29

Notes:

- (1) 0m if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Diffusion Tube Monitoring Results (not distance corrected)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
							2015	2016	2017	2018	2019
Site 1	255774	133732	Kerbside	DT	92	92	26.0	33.2	22.7	27.8	25.6 ⁽⁶⁾
Site 2	255556	133583	Kerbside	DT	100	100	26.6	27.2	26.2	26.6	23.8
Site 4	255651	132808	Kerbside	DT	100	100	22.4	15.2	19.9	21.2	22.1 ⁽⁶⁾
Site 5	254197	132354	Urban Background	DT	100	100	19.9	24.4	22.8	23.9	23.9 ⁽⁶⁾
Site 6	253886	132394	Kerbside	DT	100	100	16.1	18.9	16.4	18.9	15.7
Site 7	256706	132253	Kerbside	DT	100	100	26.6	25.9	25.3	26.4	25.8 ⁽⁶⁾
Site 8	256683	132130	Kerbside	DT	83	83	23.6	24.9	28.0	22.1	26.0
Site 9	255661	133179	Kerbside	DT	100	100	14.0	15.2	14.0	15.6	13.7
Site 10	256186	133164	Kerbside	DT	100	100	26.5	20.6	25.6	25.7	25.2
Site 11	255967	132985	Kerbside	DT	92	92	22.1	25.8	26.1	26.1	21.3
Site 12	248789	136560	Kerbside	DT	100	8	41.0	39.8	39.4	39.9	30.0
Site 12a ⁽⁵⁾	248731	136617	Kerbside	DT	92	83	-	-	-	-	23.1 ⁽¹⁾
Site 13	248732	136592	Kerbside	DT	100	100	30.2	32.5	30.0	36.5	31.1 ⁽⁶⁾
Site 14	251533	147330	Kerbside	DT	100	100	17.2	19.7	17.1	20.6	18.5 ⁽⁶⁾
Site 15	251971	147689	Kerbside	DT	83	83.3	17.1	14.9	18.0	- ⁽⁴⁾	17.6
Site 17	253595	132433	Kerbside	DT	92	92	-	-	29.5	32.8	26.5
Site 18	253053	132541	Kerbside	DT	100	100	-	-	22.7	19.6	18.3
Site B1	249042	135903	Kerbside	DT	100	100	15.5	17.4	14.4	17.1	19.7 ⁽⁶⁾
Site B2	248969	136060	Kerbside	DT	100	100	16.6	16.2	15.4	17.8	16.1 ⁽⁶⁾
Site B3	248863	136403	Kerbside	DT	75	75	19.5	22.7	19.9	22.0	20.2 ⁽⁶⁾
Site B4	248766	136437	Kerbside	DT	92	92	16.1	18.1	15.1	16.8	16.0 ⁽⁶⁾

Site B5	248862	136372	Kerbside	DT	100	100	35.4	38.7	36.7	36.4	35.2
Site B6	248716	136067	Kerbside	DT	50	50	9.4	11.6	10.4	11.0	10.0
Site B7	248787	136498	Kerbside	DT	92	92	13.4	16.9	14.3	17.7	13.1
Site B8	248791	136621	Kerbside	DT	100	100	21.8	21.8	18.9	26.6	22.3 ⁽⁶⁾
Site B9	248615	136596	Kerbside	DT	75	75	16.2	15.5	14.0	14.6	12.4
Site B10	248417	136610	Kerbside	DT	100	100	22.1	27.4	22.5	25.8	23.5 ⁽⁶⁾
Site B11	248363	136630	Kerbside	DT	75	75	18.0	23.0	18.2	21.1	18.0
Site B12	248771	136591	Kerbside	DT	92	92	-	-	-	-	36.1

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

2014 – 2017 monitoring data has previously been accepted by Defra, the 2018 monitoring data will be appraised by Defra following the submission of this ASR.

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) Site 15 recorded a data capture of 0% due to the diffusion tube constantly being removed, for 2019 the location has been changed to a safer location.

(5) Site 12 closed in January 2020 so kept in for 1 month but annualisation not required – relocated to site 12a – 12a to be referred to as Site 12 in future reports.

(6) Sites which exceed the level presented for 2017.

Distance Correction Explanation:

As per TG(16) guidance distance correction has been completed for any annual mean concentrations within 10% of the annual mean objective that are not sited at locations of relevant exposure relating to the annual mean objective as per Box 1.1 of TG(16) (Table C.2). To provide clarity in this matter, all concentrations presented within Table A.3 and Figures A.1 – A.3, and also all data predating 2016 held within any Review and Assessment Reports that have been approved by

Defra, have not been distance corrected. This is to allow trend analysis between concentrations recorded without any further assumptions, such as distance correction, altering the monitored results.

Distance correction has been completed, where required, to all results post 2016 to estimate annual mean NO₂ concentrations at locations of relevant exposure where monitoring sites are not specifically located at points of exposure. For 2019 monitoring results these are presented within Table B.1 in Appendix B.

The data presented in Table A.3 of this ASR presents the data which has been used to inform previous decisions and discussions, and should be used for any future work concerning long term trend analysis. Pre 2014 data, used for the same purpose, is accessible is through the Council's website - <https://www.northdevon.gov.uk/environment/air-quality/>.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations: Barnstaple (not distance corrected)



Figure A.2 – Trends in Annual Mean NO₂ Concentrations: Braunton (not distance corrected)

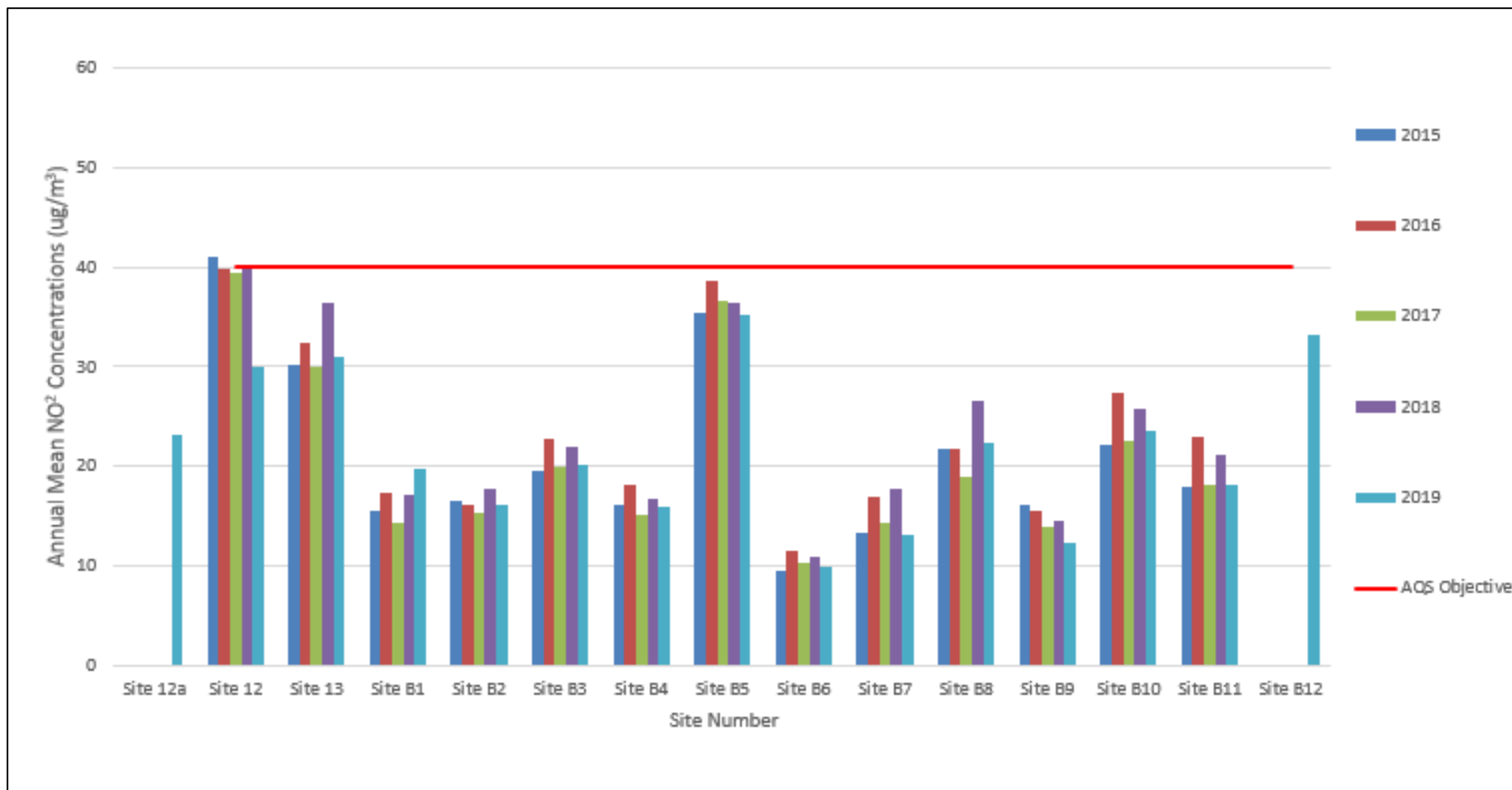


Figure A.3 – Trends in Annual Mean NO₂ Concentrations: Newport, Ilfracombe, South Moulton and Bickington (not distance corrected)

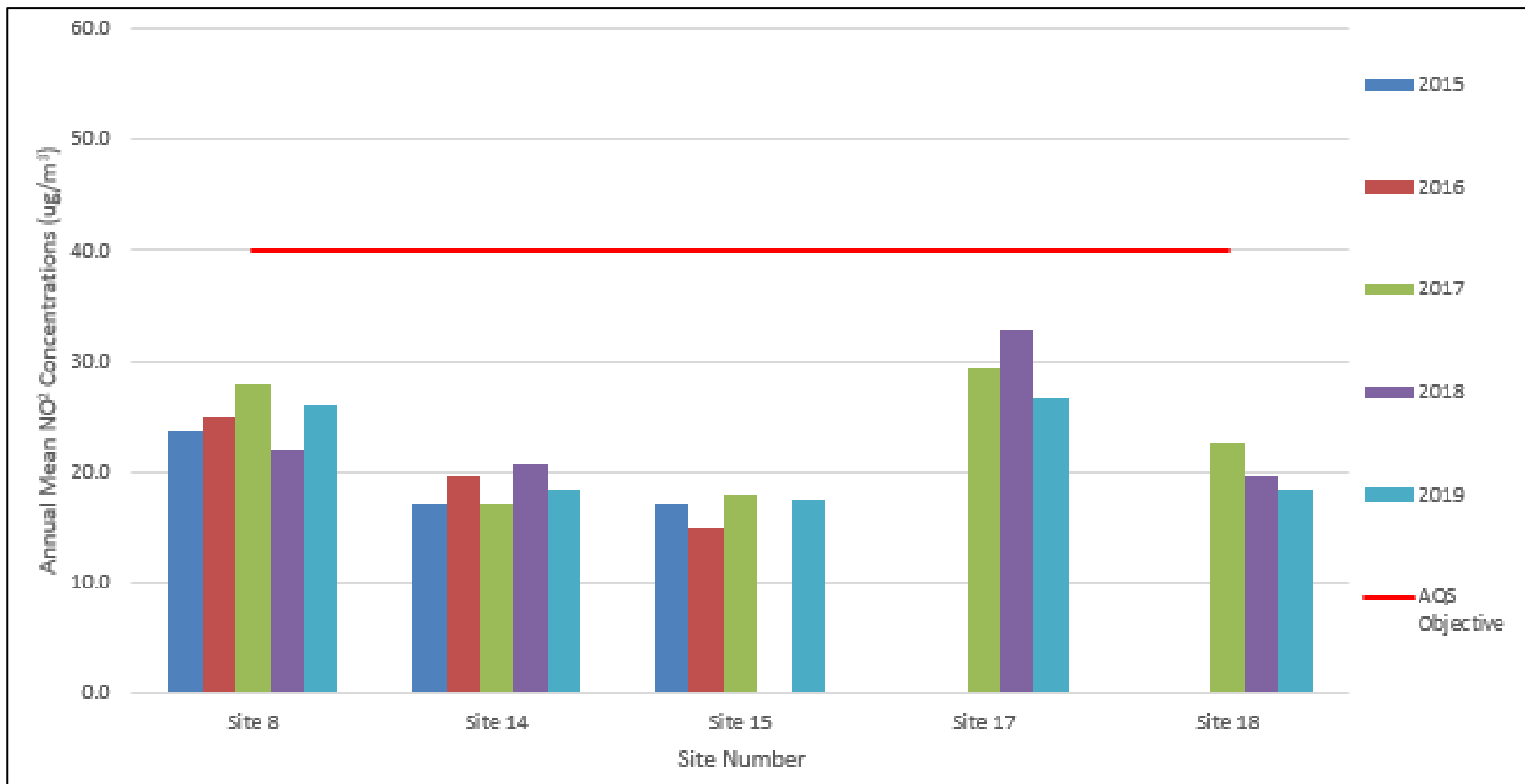


Table A.4 – Annual Mean PM₁₀ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³)				
						2015	2016	2017	2018	2019
Barnstaple 1	257048	132591	Roadside	95.4	95.4	17.7	16.9	15.6	14.9	16.6

Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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

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

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.4 – Trends in Annual Mean PM₁₀ Concentrations

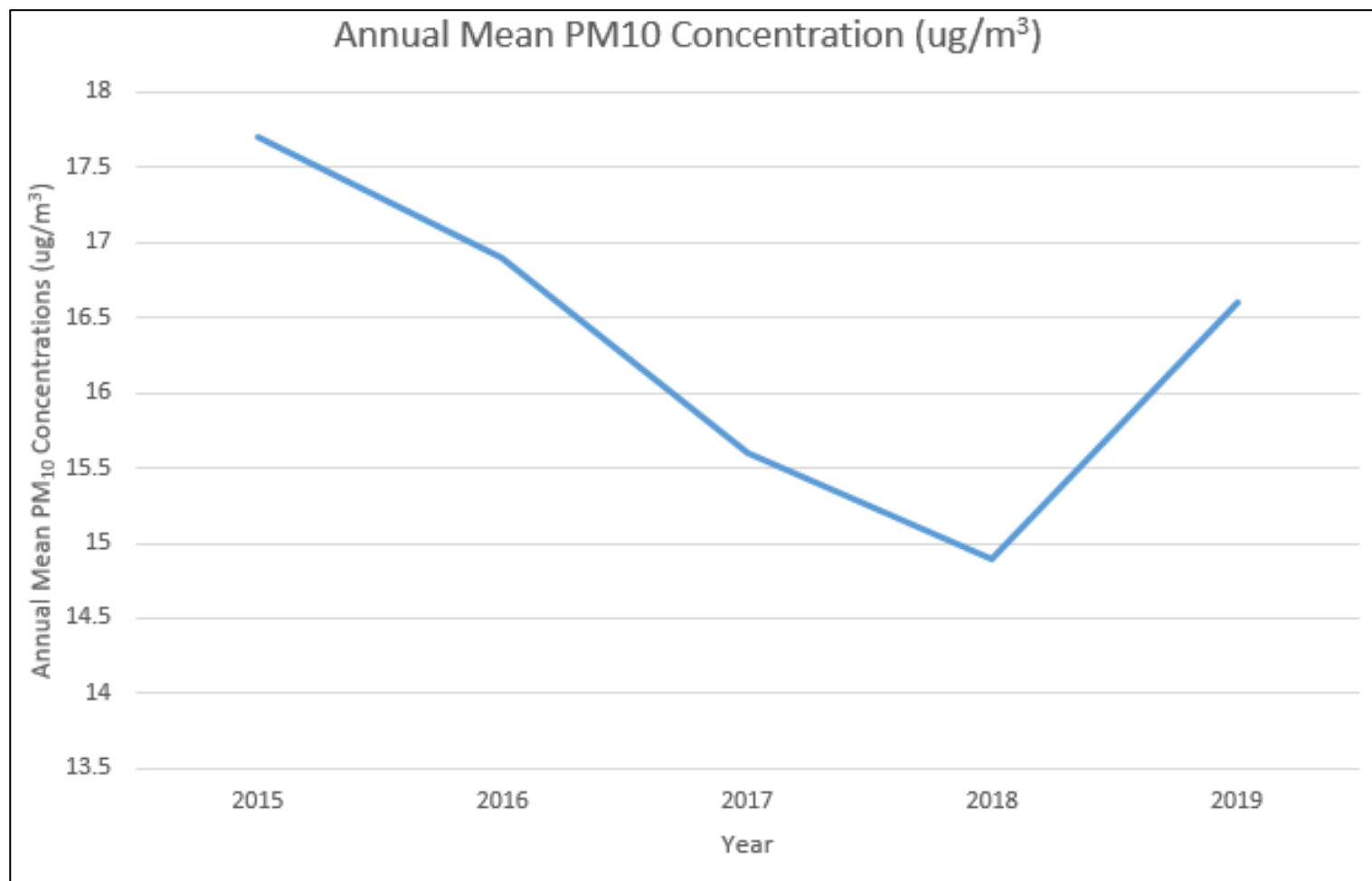


Table A.5 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ^{(1) (4)}	Valid Data Capture 2018 (%) ^{(2) (4)}	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
						2015	2016	2017	2018	2019
Barnstaple 1	257048	132591	Roadside	95.4	95.4	4 (27.7)	0	0 (28.5)	0 (22.1)	2

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

(4) During August 2018 the PM monitor was changed from a TEOM/FDMS to a BAM 1020 Heated monitor, this was due to an AURN upgrade in PM monitors within the network.

Figure A.5 – Trends in Number of 24-Hour Mean PM₁₀ Results >50µg/m³

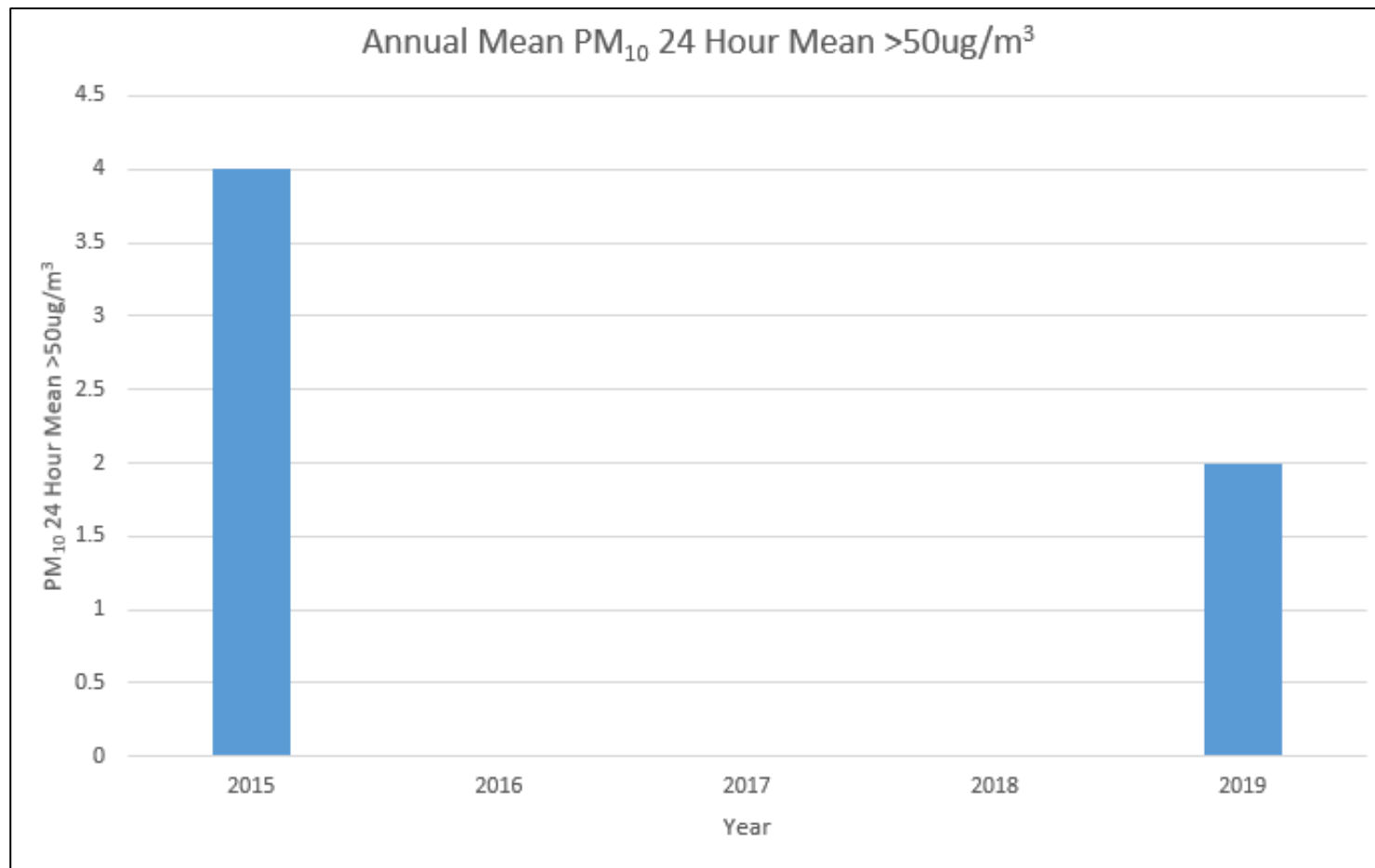


Table A.6 – PM_{2.5} Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
						2015	2016	2017	2018	2019
Barnstaple 1	257048	132591	Roadside	95.3	95.3	9.6	10.7	7.8	6.9	8.1

Annualisation has been conducted where data capture is <75%

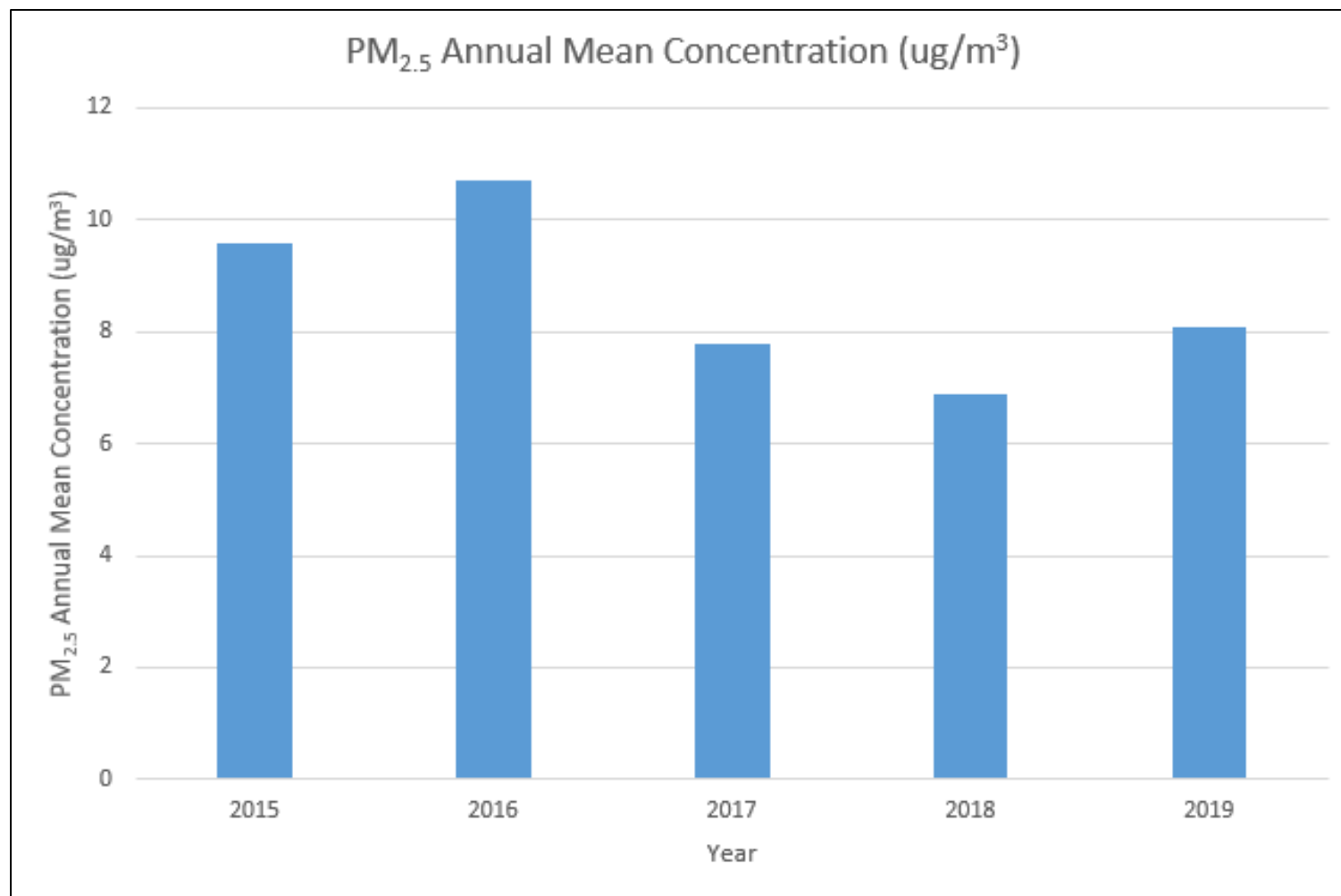
Notes:

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

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

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.6 – Trends in Annual Mean PM_{2.5} Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 – NO₂ Monthly Diffusion Tube Results – 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
1	255774	133732	30.5	31.3	21.4	-	25.1	25.5	21.7	17.2	27.2	31.1	43.4	28.2	27.5	25.6	-
2	255556	133583	31.2	26.7	27.6	26.6	25.7	21.9	23.2	18.9	23.2	25.4	31.9	25.2	25.6	23.8	-
4	255651	132808	25.6	30.1	21.3	26.5	20.8	18.3	19.6	18.6	23.4	21.4	32.0	27.9	23.8	22.1	-
5	254197	132354	24.9	31.4	24.8	29.0	24.2	18.8	19.9	21.5	22.7	28.9	34.3	28.7	25.7	23.9	-
6	253886	132394	17.2	22.3	15.8	17.6	15.1	13.9	13.2	12.7	15.1	18.1	21.7	20.0	16.9	15.7	-
7	256706	132253	35.3	37.9	29.2	28.7	27.6	25.5	25.5	23.8	27.3	0.5	35.9	35.6	27.7	25.8	-
8	256683	132130	29.0	24.8	-	21.3	22.9	19.5	20.2	19.7	24.3	27.4	70.2	-	27.9	26.0	-
9	255661	133179	19.2	17.9	13.1	16.8	13.3	10.5	11.8	11.2	12.2	13.5	19.3	18.0	14.7	13.7	-
10	256186	133164	32.7	38.3	24.5	23.8	20.6	20.9	23.6	22.0	24.0	27.9	34.4	32.3	27.1	25.2	-
11	255967	132985	26.3	26.1	23.7	22.4	21.5	23.2	21.0	20.1	20.0	25.2	-	22.6	22.9	21.3	-
12 ⁽³⁾	248789	136560	32.3	-	-	-	-	-	-	-	-	-	-	-	32.3	30.0	-
12a ³	248731	136617	-	-	22.1	33.0	23.5	22.5	24.1	21.1	21.2	23.8	32.0	25.1	24.8	23.1	-
13	248732	136592	27.9	39.9	28.3	42.6	32.8	29.5	35.4	33.7	28.1	33.9	31.1	38.2	33.4	31.1	-
14	248732	136592	22.0	20.5	19.5	23.7	19.4	18.9	16.6	15.4	17.0	20.2	24.3	20.6	19.8	18.5	-
15	251533	147330	-	-	23.5	16.7	17.9	17.6	17.3	20.4	19.6	17.3	16.9	22.1	18.9	17.6	-

17	251971	147689	-	28.1	30.4	27.0	29.7	30.3	26.9	22.3	28.2	29.3	35.3	26.5	28.5	26.5	-
18	253595	132433	20.9	24.4	19.1	22.8	16.3	16.3	17.0	16.2	18.2	20.7	26.8	17.9	19.7	18.3	-
B1	253053	132541	18.1	25.5	18.6	25.3	20.8	20.1	19.5	17.7	19.4	21.2	24.1	23.5	21.2	19.7	-
B2	249042	135903	21.9	18.2	18.0	17.4	16.0	15.8	14.9	14.9	16.4	17.9	23.4	13.5	17.4	16.1	-
B3	248969	136060	-	21.2	20.4	24.1	22.1	-	22.5	-	18.5	19.5	26.5	20.5	21.7	20.2	-
B4	248863	136403	19.0	18.6	14.2	22.7	13.5	14.4	14.3	-	14.1	18.0	20.7	19.4	17.2	16.0	-
B5	248766	136437	43.6	38.3	41.4	37.5	40.2	39.1	41.6	32.3	33.7	31.7	38.0	36.3	37.8	35.2	-
B6	248862	136372	12.6	11.9	-	-	-	8.5	8.7	7.7	-	-	16.0	-	10.9	7.1	-
B7	248716	136067	17.1	16.3	12.6	18.1	9.3	13.3	11.0	10.3	11.3	15.2	21.0	-	14.1	13.1	-
B8	248787	136498	23.7	30.5	22.7	31.0	22.6	20.4	21.9	21.5	21.3	24.6	26.1	22.0	24.0	22.3	-
B9	248791	136621	14.3	16.7	12.4	-	12.9	12.4	13.6	12.5	12.1	13.2	-	-	13.3	12.4	-
B10	248615	136596	26.1	26.9	24.6	29.5	23.6	24.3	28.0	21.9	20.0	23.4	30.2	25.0	25.3	23.5	-
B11	248417	136610	-	-	17.8	25.6	18.1	16.4	18.1	17.4	16.0	20.7	24.5	-	19.4	18.0	-
B12	248363	136630	-	43.1	36.7	45.0	37.5	38.2	37.5	30.4	35.7	36.9	44.3	41.4	38.8	36.1	33.3

Local bias adjustment factor used

National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

Where applicable, data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

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

(2) Distance corrected to nearest relevant public exposure.

(3) The Sqaure, Braunton site 12 finished and moved to Café Bistro site 12a – not annualised as only 1 month of data

Dashed cells – No monthly results due to diffusion tubes missing.

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

Sources of Pollution

North Devon have not identified any potential new sources within the district as described in Chapter 7, Section 1 of Defra LAQM.TG(16).

A total of 403 planning applications have been considered during 2019 for environmental impacts including on air quality. Where relevant, air quality assessments have been reviewed and / or requested and mitigation measures agreed or secured through the imposition of planning conditions, having regard to relevant standards and national good practice guidance.

Decisions on the level of assessment and mitigation of potential air quality impacts take account of guidance contained in the EPUK & IAQM document: Land-use Planning and Development Control: Planning for Air Quality - January 2017. Also, NDC adopted an Air Quality SPD in June 2020 which contains specific screening criteria for requiring an AQIA.

Diffusion Tube Bias Adjustment Factor

The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The Defra LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, Defra LAQM.TG(16) and the LAQM Helpdesk recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

North Devon Council does not operate any continuous NO₂ monitoring stations within the District and therefore a co-location study is not available to derive a local bias factor, thus the national bias adjustment factor spreadsheet has been used.

North Devon Council

Diffusion tubes for North Devon Council are supplied and analysed by Gradko International Ltd. The tubes were prepared using the 20% TEA in water preparation method. The national bias adjustment factor for Gradko 20% TEA in water is 0.93 for the year 2019 (based on twenty seven studies) as derived from the national bias adjustment factor spreadsheet (version 03/20) as presented in Figure C.1. Following the initial completion of this ASR there have been two further releases of the national bias adjustment spreadsheet with slight changes to the relevant adjustment factor; version 06/20 (0.92) and version 09/20 (0.91). As the factor has reduced slightly the initial factor of 0.93 has been utilised as a precautionary approach to the NO₂ results.

Figure C.1 – Gradko 20% TEA in Water 2019 National Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 03/20				
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 2020 LAQM Helpdesk Website
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods										
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet										
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.										
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ¹ shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ² .	If you have your own co-location study then see footnote ³ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMhelpdesk@uk.bureauveritas.com or 0800 0327953							
Analysed By	Method	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A)
Gradko	20% TEA in water	2019	R	Blackburn with darwen Borough Council	10	29	21	36.9%	G	0.73
Gradko	20% TEA in water	2019	R	Cheshire West and Chester	12	39	38	2.0%	G	0.98
Gradko	20% TEA in water	2019	R	Cheshire West and Chester	11	34	34	-2.1%	G	1.02
Gradko	20% TEA in water	2019	R	Gedling Borough Council	12	32	30	7.3%	G	0.93
Gradko	20% TEA in water	2019	R	NOTTINGHAM CITY COUNCIL	10	37	40	-7.0%	G	1.07
Gradko	20% TEA in water	2019	R	Bedford Borough Council	11	29	29	-1.0%	G	1.01
Gradko	20% TEA in water	2019	R	Bedford Borough Council	12	37	32	13.0%	G	0.89
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	0.85
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	1.08
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	0.81
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	1.12
Gradko	20% TEA in water	2019	KS	Marglebone Road Intercomparison	12	85	65	30.1%	G	0.77
Gradko	20% TEA in water	2019	R	Borough Council of King's Lynn and West Norfolk	9	27	21	28.4%	G	0.78
Gradko	20% TEA in water	2019	R	Lancaster City Council	13	40	34	16.4%	G	0.86
Gradko	20% TEA in water	2019	R	Lancaster City Council	12	31	31	1.6%	G	0.98
Gradko	20% TEA in water	2019	R	Monmouthshire County Council	12	39	39	1.3%	G	0.99
Gradko	20% TEA in water	2019	UC	Belfast City Council	10	29	24	21.8%	G	0.82
Gradko	20% TEA in water	2019	R	Dudley MBC	12	33	32	4.5%	G	0.96
Gradko	20% TEA in water	2019	R	Dudley MBC	12	44	42	3.9%	G	0.96
Gradko	20% TEA in water	2019	UB	Dudley MBC	12	23	19	19.8%	G	0.83
Gradko	20% TEA in water	2019	UB	Eastleigh Borough Council	12	24	26	-7.1%	G	1.08
Gradko	20% TEA in water	2019	R	Gateshead Council	12	34	27	23.7%	P	0.81
Gradko	20% TEA in water	2019	R	Gateshead Council	11	40	44	-10.5%	G	1.12
Gradko	20% TEA in water	2019	R	Gateshead Council	10	32	34	-7.2%	G	1.08
Gradko	20% TEA in water	2019	R	Gateshead Council	12	30	25	18.1%	G	0.85
Gradko	20% TEA in water	2019	R	Thurrock Borough Council	12	29	24	21.6%	G	0.82
Gradko	20% TEA in water	2019	R	Brighton & Hove City Council	11	45	50	-3.3%	G	1.10
Gradko	20% TEA in water	2019		Overall Factor¹ (27 studies)					Use	0.93

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2019 were supplied and analysed by Gradko International Ltd, the tubes were prepared using the 20% TEA in water preparation method. All results have been bias adjusted and annualised where required before being presented in Table A.3.

Gradko is a UKAS accredited laboratory and participates in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO₂ tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ 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, AIR-PT AR031 (April to May 2019), AIR-PT AR033 (July to August 2019) and AIR-PT AR034 (September to October 2019) Gradko has scored 100%, and for AIR-PT AR030 (January to February 2019) Gradko scored 75%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ± 2.

Twenty five out of the twenty seven co-location studies in 2019 were rated as ‘good’ (tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

Short-term to Long-term Data Adjustment

In regards to the 2019 diffusion tube data set, annualisation was required at one diffusion tube location B6. Annualisation has been completed in line with Box 7.9 and Box 7.10 within LAQM.TG(16) and full working details are presented in Table C.3.

Site 12 which was relocated after January 2019 was not annualised as only one month of data capture was available. Annualisation has been completed using the tool released by DEFRA which shows that some councils are already using this straight away.

In completing the annualisation process, data has been taken from a number of automatic monitoring sites that are part of the AURN. In line with LAQM.TG(16) the monitoring sites that have been used lie within a radius of approximately 50 miles of the sites to be annualised and have a data capture of 85% or above.

All monitoring stations that were used are background monitoring stations and as such are not influenced by local sources of air pollution such as road traffic emissions at roadside monitoring sites. The monitoring sites that were used are listed in Table C.1.

Table C.1 – AURN Monitoring Stations used for Annualisation

Pollutant	Background AURN Sites used for Annualisation
NO ₂	<ul style="list-style-type: none"> • Yarner Wood – Rural Background • Honiton – Urban Background

Distance from Road Correction

In line with LAQM.TG(16) distance correction has been applied to NO₂ monitoring sites that have recorded an annual mean concentration above the annual mean objective, or within 10% of the annual mean objective and are not sited at locations of relevant exposure as detailed within Table C.2. There was one site within North Devon’s NO₂ monitoring network that were within 10% of the NO₂ annual mean objective in 2019, Site B12, this was not at relevant exposure.

The NO₂ Fall-Off with Distance Calculator (v4.2) has been used to derive the NO₂ concentration at a location of relevant exposure; the results of the calculations are presented in Table C.4.

Table C.2 – Examples of where the Air Quality Objectives should apply

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
Annual mean	<p>All locations where members of the public might be regularly exposed.</p> <p>Building facades of residential properties, schools, hospitals, care homes etc.</p>	<p>Building facades of offices or other places of work where members of the public do not have regular access.</p> <p>Hotels, unless people live there as their permanent residence.</p> <p>Gardens of residential properties.</p> <p>Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term</p>
24-hour mean and 8-hour mean	<p>All locations where the annual mean objectives would apply, together with hotels.</p> <p>Gardens of residential properties</p>	<p>Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.</p>
1-hour mean	<p>All locations where the annual mean and 24 and 8-hour mean objectives would apply.</p> <p>Kerbside sites (e.g. pavements of busy shopping streets).</p> <p>Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more.</p> <p>Any outdoor locations at which the public may be expected to spend one hour or longer.</p>	<p>Kerbside sites where the public would not be expected to have regular access.</p>

QA/QC of Automatic Monitoring

The Barnstaple automatic monitoring site is part of the UK Automatic Urban and Rural Network (AURN) that is run by the Environmental Agency. It is the largest automatic monitoring network within the UK, and is the main network used for compliance reporting against the Ambient Air Quality Directives. As such the PM₁₀ and PM_{2.5} monitoring is completed in line with the strict operational procedures set out by the Central Management and Co-ordination Unit (CMCU) for the AURN, with data ratification completed by the by Quality Assurance and Control Unit (QA/QC Unit).

North Devon Council regularly attend the monitoring site acting as the Local Site Operators (LSO) to complete routine site calibrations and maintenance ensuring a consistent, accurate data flow. Six monthly equipment servicing is completed by an Equipment Support Unit (ESU) for the site, and the QA/QA unit completed scheduled site operating audits in accordance with the AURN Site Operators Manual.

Due to the monitoring site being operated by the Environmental Agency, North Devon 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 2020 ASR has been downloaded from the UK-Air website and is all shown as ratified.

Table C.3 – Diffusion Tube Short Term to Long Term Monitoring Data Adjustment (2019)

Site ID	Unadjusted Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	Annualisation Factor Yarner Wood	Annualisation Factor Honiton	Average Annualisation Factor	Annualised & Bias Adjusted (0.93) Concentration ($\mu\text{g}/\text{m}^3$)
Site B6	10.9	1.02	0.97	0.99	10.0

Table C.4 – NO₂ Fall-Off with Distance Calculations

Site ID	Distance (m)		NO ₂ Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)		
	Monitoring Site to Kerb	Receptor to Kerb	Background ⁽¹⁾	Monitoring at Site	Predicted at Receptor
Site B12	1	1.56	4.3	36.1	33.3

Notes:

(1) Background NO₂ concentrations have been taken from the 2019 Defra Background Maps for North Devon.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Automatic Monitoring Site: Barnstaple

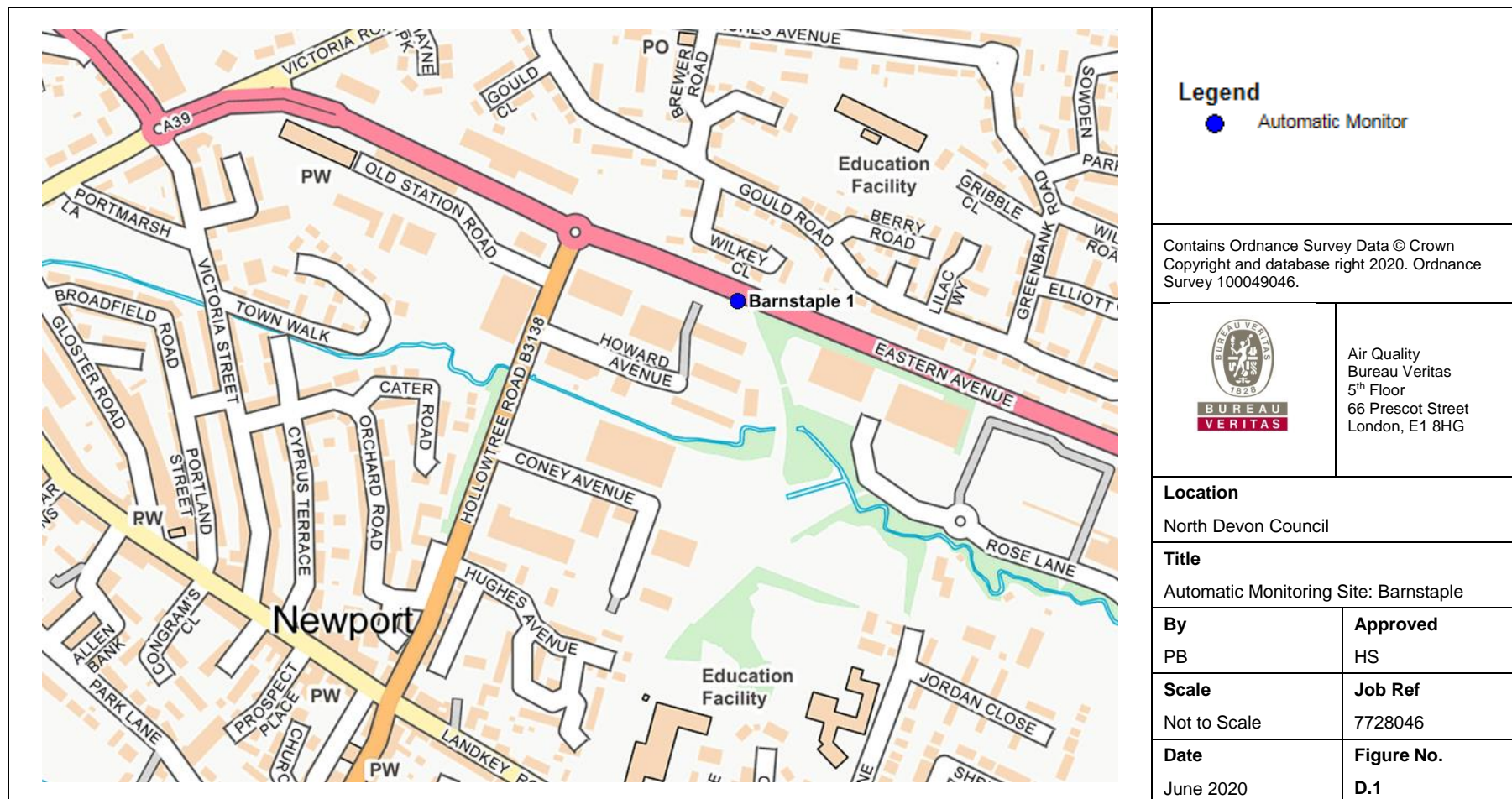


Figure D.2 – Diffusion Tube Monitoring Locations: Barnstaple

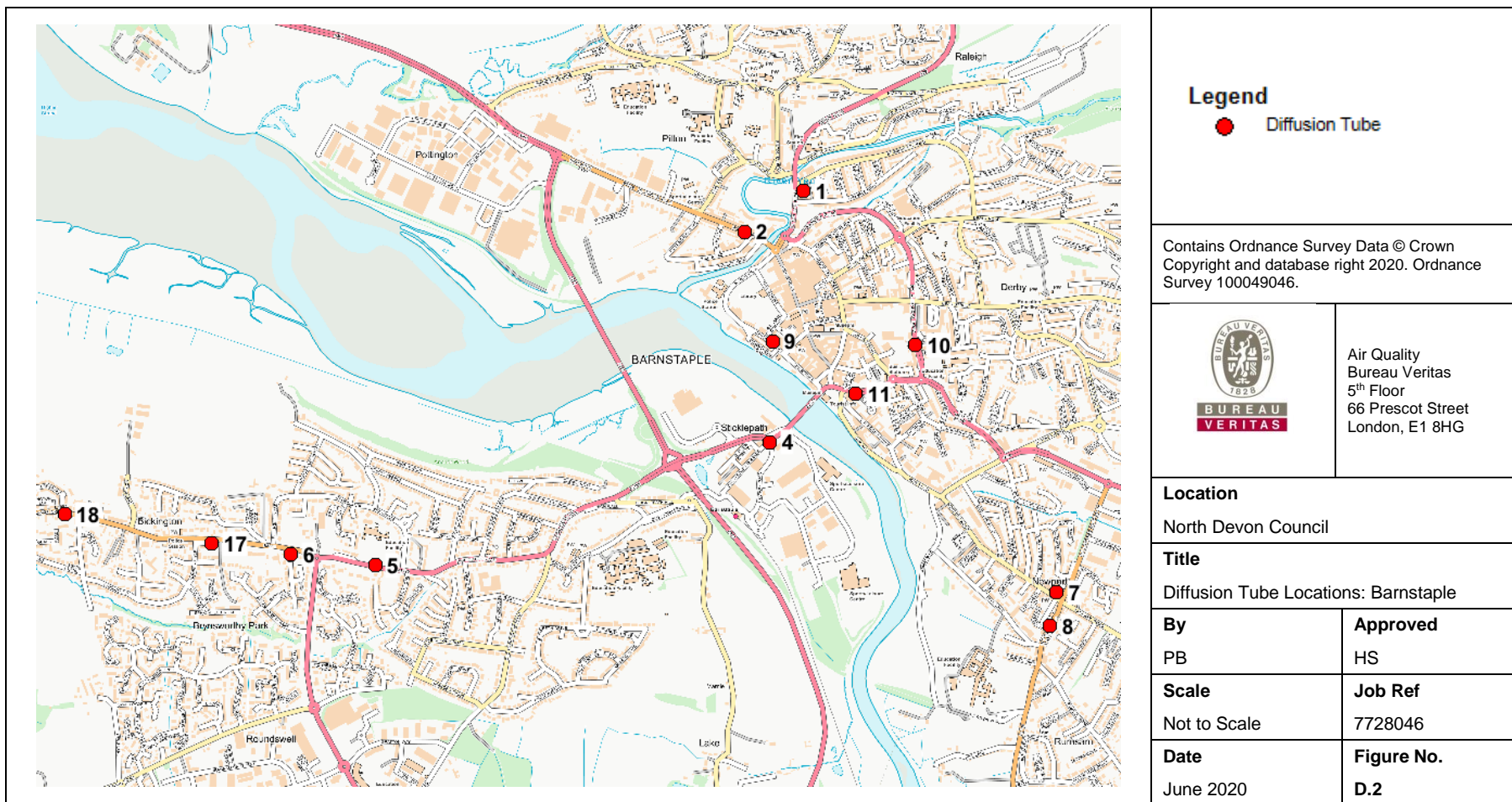


Figure D.3 – Diffusion Tube Monitoring Locations: Braunton

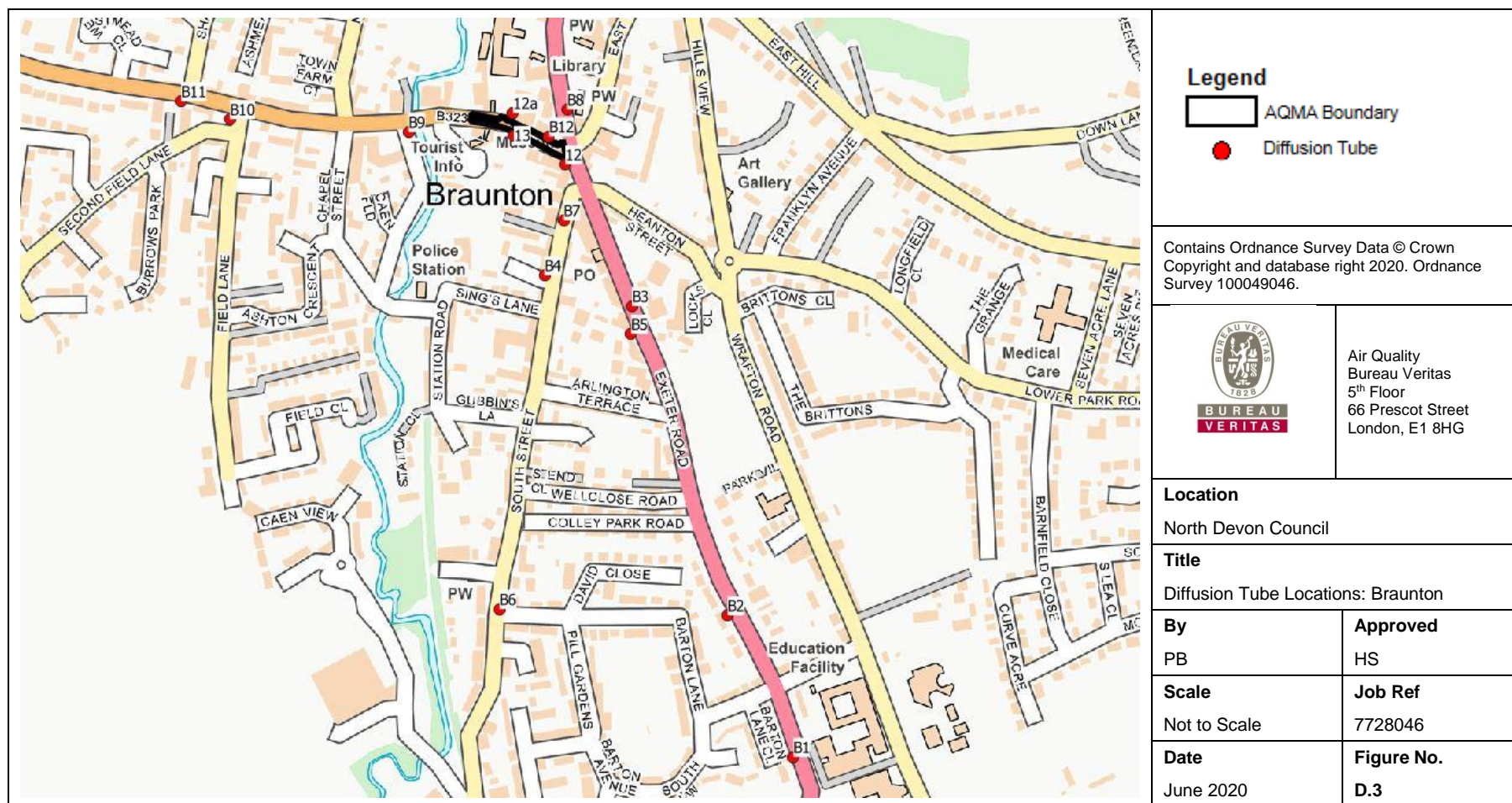


Figure D.4 – Diffusion Tube Monitoring Locations: Braunton AQMA

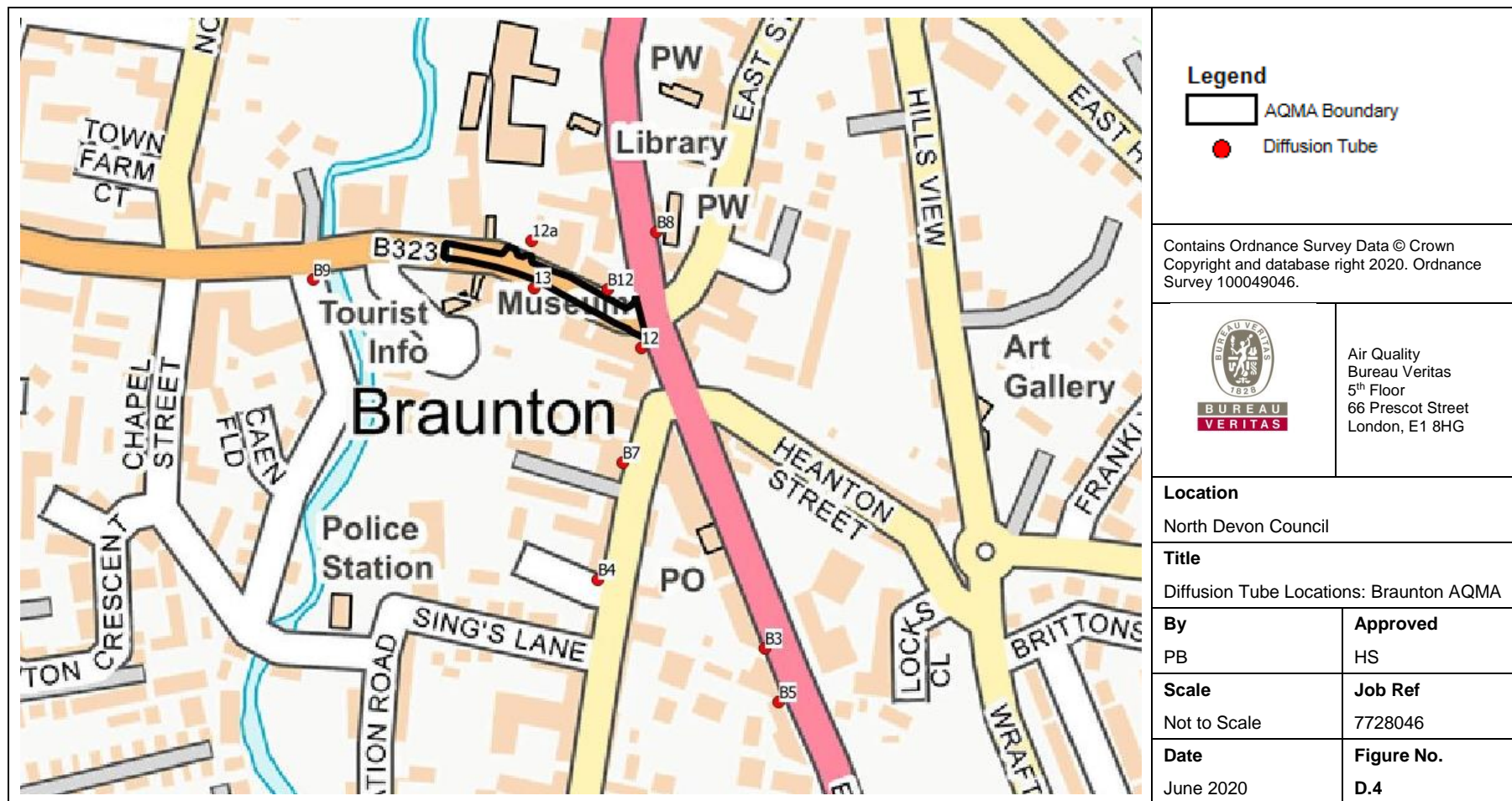
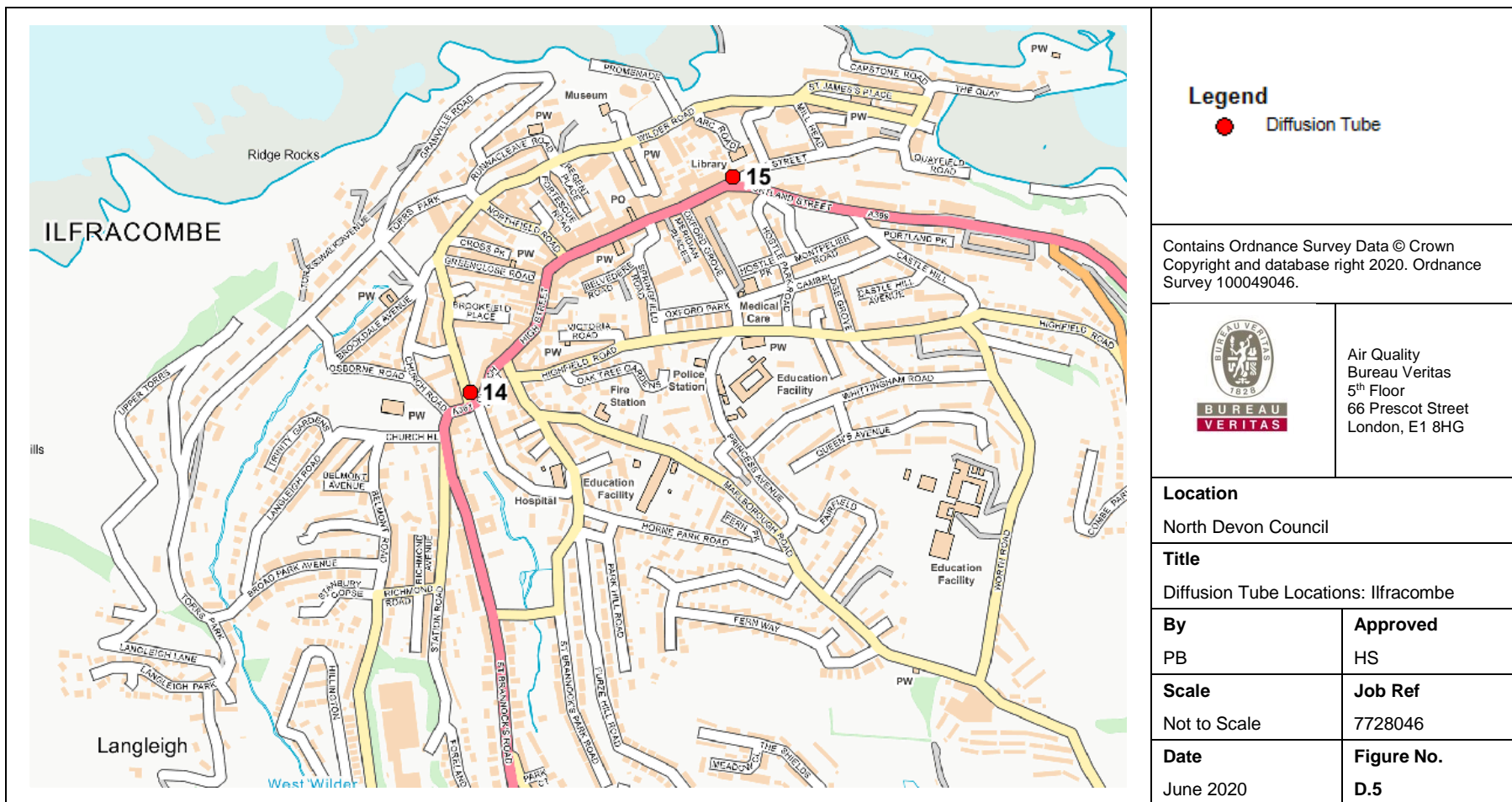


Figure D.5 – Diffusion Tube Monitoring Locations: Ilfracombe



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁴	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁴ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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	Air quality Annual Status Report
AURN	Automatic Urban and Rural Network
BAM	Beta Attenuation Monitor
CMCU	Central Management and Control Unit
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
ESU	Equipment Support Unit
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LSO	Local Site Operator
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control

References

- Local Air Quality Management Technical Guidance LAQM.TG(16). February 2018. 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.PG(16). May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- North Devon Council Air Quality Action Plan, May 2016.
- North Devon Council 2018 Annual Status Report.
- North Devon Council 2019 Annual Status Report.
- National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 03/20 published in March 2020.
- Defra Nitrogen Dioxide fall off with distance calculator, <https://laqm.defra.gov.uk/air-quality-assessment/>
- Defra Background Maps (2017 based), <https://laqm.defra.gov.uk/air-quality-assessment/>
- Public Health England, Public Health Profiles, Fraction of mortality attributable to particulate air pollution (2017), <https://fingertips.phe.org.uk/>