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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Report Reference Number	BDC/SNC ASR 2022
Date	30 June 2021

Executive Summary: Air Quality in Our Area

Air Quality in South Norfolk and Broadland

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[1,2].

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

Generally, the air quality in both South Norfolk and Broadland is good with no recorded exceedance of air quality objectives. The main pollutant of concern is nitrogen dioxide (NO_2) primarily arising from road traffic. – particularly in the suburb areas surrounding Norwich and in our market towns.

Neither district has any designated Air Quality Management Areas (AQMAs).

Monitoring for NO_2 by diffusion tube takes place at 30 locations in South Norfolk and 29 in Broadland.

We work closely with colleagues in Public Health and the Norfolk Environmental Protection Air Quality subgroup. We consider the impact of existing local industrial processes. We also consider new developments to ensure that local air quality is protected and monitored via the planning process.

A detailed assessment is not required for any pollutants and the Council will progress to the next Annual Status report for 2023.

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[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

[3] Defra. Air quality appraisal: damage cost guidance, July 2021

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

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[5] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[6] 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.

The councils consider the impact of existing local industrial processes through the LAPPC and LA-IPPC regimes and also consider new developments to ensure that local air quality is considered in the planning process.

The councils also seek to support grant applications from Norfolk County Council for projects that could improve air quality. While these grant applications are mainly focused on Norwich City the proposals may yield improvements within our districts, for example through improved public transport.

Conclusions and Priorities

All of our results for both authorities are below the air quality objectives as such a detailed assessment is not required for any pollutants and the Council will progress to the next Annual Status report for 2023.

The levels are higher than the previous year (2020 monitoring year) during which levels reduced significantly due to the reduced vehicle usage as a result of the Covid-19 pandemic.

The location of air quality monitoring points is continually being reviewed and tubes will be relocated as appropriate. In addition, further monitoring points will be added if required.

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[5] Defra. Clean Air Strategy, 2019

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

We have undertaken some proactive education work focussing on burning wood as a secondary heating source and will continue to inform our residents about this over the next 12 months.

Air Quality is also identified in our Council's Environmental Strategies with the following actions identified:

- Proactive work with our partners and other stakeholders aiming to achieve a positive change to air quality, this could include, working with universities, bus, coach and taxi companies, haulage companies, schools and car sharing clubs.
- Raise awareness of air quality amongst our local businesses and residents.
- Pre-planning application support in more applications.
- Develop supplementary planning documents for air quality.

Local Engagement and How to get Involved

For further information on air quality please contact us at:

cpandeq@southnorfolkandbroadland.gov.uk

If the public would like to find out more about air quality in general there are a number of resources available. These include:

https://uk-air.defra.gov.uk/ (UK government air quality)

www.airqualityengland.co.uk (A quick reference to air quality information for a variety of local authority areas across England)

www.metoffice.gov.uk/guide/weather/air-quality (Met Office air quality web page)

People can help improve air quality by:

- Walking and cycling instead of driving where possible,
- If using a car don't leave the engine running in queues or while waiting for someone.
- Looking for sustainable home energy suppliers who don't use fossil fuel.
- Avoiding burning at home
- Planting more trees and greenery

Local Responsibilities and Commitment

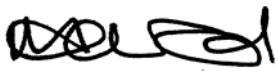
This ASR was prepared by the Environmental Protection Department of South Norfolk and Broadland Councils with the support and agreement of the following officers and departments:

List officers/departments involved in the preparation of the ASR

Will Gorrod - Environmental Management Officer

Alison Old - Senior Environmental Management Officer

This ASR has been approved by:



Nick Howard – Head of Regulatory Services:

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Will Gorrod at:

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1 Local Air Quality Management

This report provides an overview of air quality in South Norfolk and Broadland 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 South Norfolk and Broadland 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.

2 Actions to Improve Air Quality

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.

South Norfolk and Broadland Councils currently does not have any declared AQMAs. For reference, maps of the Broadland and South Norfolk Council monitoring locations are available in Appendix D.

2.1 Progress and Impact of Measures to address Air Quality in Broadland and South Norfolk

Defra's appraisal of last year's ASR concluded:

"On the basis of the evidence provided by the local authorities the conclusions reached are considered acceptable for all sources and pollutants, with the provisos listed in the commentary below. Following the completion of this report, Broadlands and South Norfolk District Council should submit an Annual Status Report in 2022.

Commentary

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

1. The Councils have provided a very detailed ASR, with pollutant trends, measures and activity within Broadlands and South Norfolk discussed extensively. The inclusion of an extensive number of graphs is to be commended. This demonstrates the Councils' active engagement in trying to understand and tackle air quality issues within their regions. The Councils are encouraged to continue their good work in future ASRs.

2. Though there is no formal requirement for the Councils to produce a list of air quality measures due to the absence of an AQMA, the Councils are still actively

implementing air quality measures within their areas. In addition to this, the Councils also provide updates on the progress of these measures, as well as providing a discussion of the challenges and barriers they anticipate facing with respect to the implementation of their measures. It is encouraging to see that the Councils are taking such an active role in tackling air quality.

3. It is very encouraging to see that the Councils have continued to review and update the locations of their monitoring sites; adding a further 7 tubes in the last reporting year. This is to be commended and demonstrates the Councils' active engagement with understanding and tackling air quality issues within their jurisdictions. The Councils are encouraged to continue to review their monitoring network and make amendments where they deem appropriate.

4. There are some minor errors in the tables and report formatting:
   - in table A1, the distance to relevant exposure and kerb are missing for DT30;
   - in table B1, IDs for DT1, DT2 and DT5 are completely or partially missing;
   - in table B2, there is an extra empty column;
   - there are a few reference errors throughout the report where the "Error! Reference source not found" message can be seen instead of a cross reference link.

   These errors are minor but should be corrected in future reports.

5. The Councils have a number of measures in place to address $PM_{2.5}$ which demonstrates their commitment to working with Public Health England to address this pollutant. It would be useful if the Councils could make reference to the Public Health Outcomes Framework and their relevant local indicator for $PM_{2.5}$ in this section of the report

Table 2.1 – 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	Energy Efficiency of New Build Properties	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2005	-	Property Developers	Property Developers				On going	N/A	Reduction of energy bills and energy use	Implemented	Reduction of energy bills and energy use
2	Energy efficiency information for residents	Public Information	Via leaflets	2001	-	Broadland and South Norfolk DC's	Broadland and South Norfolk DC's				On going	N/A	Reducing emissions and energy use	Providing information when requested	Reducing emissions and energy use
3	authority for the E.C.O (Energy Company Obligation) scheme	Public Information	Other	2013	-	Broadland and South Norfolk DC's and All L.A's	Broadland and South Norfolk DC's and All L.A's		-		On going	N/A	Reducing emissions and energy use	Providing information when requested	Reducing emissions and energy use
4	Health Improvement Grants	Other	Other	2018	-	Broadland and South Norfolk DC's	Broadland and South Norfolk DC's				On going	N/A	Reducing emissions and energy use and improving residents health and well being	On going	Reducing emissions and energy use and improving resident's health and well being
5	Warm Homes Fund	Other	Other	2018	-	Broadland District Council and some housing associations	Broadland District Council and some housing associations				On going	N/A	Reducing emissions and energy use and improving residents health and well being	Planning	Reducing emissions and energy use and improving residents health and well being
6	Greater Norwich Air Quality Working Group	Other	Other	2018	-	Broadland District Council, South Norfolk Council, Norwich City Council, Norfolk County Council	Broadland District Council, South Norfolk Council, Norwich City Council, Norfolk County Council				On going	N/A	Collaborative working to improve air quality within the Greater Norwich Area through various projects and initiavtives	Planning	Collaborative working to improve air quality within the Greater Norwich Area through various projects and initiatives
7	Construction of the remaining section of the Norwich Northern Distributor	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access	2018	-	Norfolk County Council	Norfolk County Council				Complete	N/A	Individual up take	Planning	Re-routing traffic from Norwich outer ring-road and join Norwich Southern by-pass to key routes north of Norwich
8	Community Rail Partnerships	Promoting Travel Alternatives	Promote use of rail and inland waterways	1997	-	Norfolk Community Rail Partnership	Norfolk Community Rail Partnership, Local Rail Operator				On going	N/A	Individual up take	On going	Reducing emissions and congestion
9	Norfolk Bus Charter	Promoting Alternatives to private vehicle use	Low Emissions Strategy	2018	-	Norfolk County Council	Norfolk County Council				On going	N/A	Collaborative working to improve air quality within the Greater Norwich Area through various projects and initiatives	On going	Reducing emissions and congestion, promoting healthier living

2.2 $PM_{2.5}$ – 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.

Broadland and South Norfolk District Councils are taking the following measures to address $PM_{2.5}$:

- The Councils continue to ensure regular two-way engagement with representatives of the Office for Health Improvement and Social Care, and the Director of Public Health at Norfolk County Council.
- The Councils are building stronger working relationships with Public Health including encouraging active travel (walking, cycling) to reduce local vehicle use.
- We work with local industrial processes as part of our duties under the Integrated Pollution Prevention and Control Regulations to ensure local air quality is safeguarded.
- We review planning applications for new developments to ensure local air quality is considered via the planning regime.

Although there is no legal requirement for Local Authorities to monitor for PM2.5 Broadland District Council and South Norfolk District Council have both referred to the DEFRA background concentration data to consider PM2.5 levels across the districts. The data has been used to assess if the background concentrations are above the EU threshold. The next step will be to determine whether there is a need to carry out monitoring for PM2.5.

The Environment Bill was passed in 2020 and subsequent Environment Act 2021 has been published. The Environment Act 2021 establishes a legally binding duty on government to bring forward at least two new air quality targets in secondary legislation by 31 October 2022. This duty sits within the environmental target's framework outlined in the Environment Act (Part 1).

The proposed air quality targets are:

- Annual Mean Concentration Target ('concentration target') - a maximum concentration of 10µg/m^3 to be met across England by 2040
- Population Exposure Reduction Target ('exposure target') - a 35% reduction in population exposure by 2040 (compared to a base year of 2018).

In 2021 South Norfolk and Broadland Councils made a bid for funding from the DEFRA Air quality grant. This funding bid was to facilitate the purchase of low cost monitors that could detect PM 2.5. Unfortunately, the Councils were unsuccessful in the funding bid. Whilst low cost monitors do not have the standard of sensors necessary for use in the ASR, they have been identified as a viable option for indicative monitoring. Indicative monitoring would increase capability within the councils and provide valuable insight into future monitoring opportunities.

In 2022 South Norfolk Council partnered with the environmental monitoring and technology company “PlanetWatch” to launch a new pilot project in Long Stratton. PlanetWatch has provided the council with several of its innovative low cost monitors, each capable of providing “near-live” data about the amount of Nitrogen Dioxide and Particulate Matter in the air (including $PM_{2.5}$). This is a trial of these units but it is hoped that we can start to gather $PM_{2.5}$ data and build a business case for purchasing such monitors in the future.

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

This section sets out the monitoring undertaken within 2021 by South Norfolk and Broadland Councils 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.

Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

South Norfolk and Broadland Councils undertook non- automatic (i.e. passive) monitoring of NO_2 at 59 sites during 2021 (30 in South Norfolk and 29 in Broadland). Table A. in Appendix A presents the details of the non-automatic sites.

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.

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.

3.1.2 Nitrogen Dioxide (NO_2)

Error! Reference source not found. and Table A. in Appendix A compare the ratified and a djusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. 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).

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.

Error! Reference source not found. in Appendix A compares the ratified continuous m onitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

There are no exceedances of the air quality objectives.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites – South Norfolk

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT1	1- 46a OLD NEWMARKET RD,CRING	Suburban	619245	305653	NO2	No	1.0	12.0	No	1.5
DT2	2- 131 LONGWATER LANE,COSTESSEY	Suburban	616934	310462	NO2	No	1.0	23.0	No	1.5
DT3	3- 90 THE STREET,PORINGLAND	Suburban	626790	302088	NO2	No	1.0	9.0	No	1.5
DT4	4-87 DENMARK ST,DISS	Suburban	611943	279567	NO2	No	1.0	2.0	No	1.5
DT5	5-131 VICTORIA RD,DISS	Suburban	636210	298771	NO2	No	1.0	3.0	No	1.8
DT6	6-21 CHURCH PLAIN, LODDON	Suburban	619725	292748	NO2	No	3.0	2.0	No	1.5
DT7	7- A140 LONG STRATTON	Roadside	611100	301436	NO2	No	1.0	1.0	No	2.1
DT8	8- FAIRLAND ST,WYMONDHAM	Kerbside	625438	306163	NO2	No	26.0	1.0	No	2.1
DT9	9- KIRBY BEDON ROAD, BIXLEY	Kerbside	612514	302653	NO2	No	1.0	23.0	No	2.1
DT10	10- 209 NORWICH RD,WYMONDHAM	Suburban	618138	305619	NO2	No	1.0	22.0	No	1.5

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) [1]	Distance to kerb of nearest road (m) [2]	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT11	11- 2 THICKTHORN COTTAGES	Rural	611529	300995	NO2	No	13.0	1.0	No	1.5
DT12	12- RIGHTUP LANE,WYMONDHAM	Suburban	612704	302788	NO2	No	1.0	19.0	No	2.1
DT13	13-233 NORWICH RD,WYMONDHAM	Suburban	611367	301622	NO2	No	1.0	6.0	No	1.5
DT14	14- 28 NORWICH RD,WYMONDHAM	Suburban	624476	283267	NO2	No	1.0	3.0	No	1.5
DT15	15- HARLESTON (HOTEL)	Roadside	614902	278861	NO2	No	17.0	1.0	No	2.1
DT16	16- DISS ROAD,SCOLE	Roadside	616984	311560	NO2	No	18.0	1.0	No	1.8
DT17	17-LONGWATER LANE (NEAR TO SCHOOL)	Roadside	619714	292717	NO2	No	2.0	1.0	No	2.1
DT18	18- LS CHINESE	Roadside	619731	292745	NO2	No	2.0	1.0	No	2.1
DT19	19- LS TRAFFIC LIGHT EAST	Roadside	619643	292348	NO2	No	1.0	8.0	No	2.1
DT20	20- LS FUNERAL DIRECTORS	Suburban	619685	292629	NO2	No	1.0	2.0	No	1.5
DT21	21- LS SOUTHBOUND 60 MTRS	Suburban	619711	292720	NO2	No	3.0	1.0	No	1.5
DT22	22- LS SWAN LANE CO-OP CHEM	Roadside	618991	309891	NO2	No	1.0	15.0	No	2.1
DT23	23- 3 NORWICH ROAD,COSTESSEY	Suburban	611325	301191	NO2	No	1.0	8.0	No	2.1

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DT24	24- 14 STATION RD,WYMONDHAM	Suburban	619821	293028	NO2	No	8.0	1.0	No	2.1
DT25	25- BUS STOP,NWH RD, STRATTON	Roadside	619772	305851	NO2	No	18.0	1.0	No	2.1
DT26	26- NEWMARKET ROAD,CRINGLEFORD	Roadside	616852	310342	NO2	No	1.0	20.0	No	1.5
DT27	27-THE ROUND HOUSE, COSTESSEY	Roadside	617170	311659	NO2	No	1.0	2.0	No	1.5
DT28	28- 10 WEST END,COSTESSEY	Suburban	624633	283505	NO2	No	1.0	1.0	No	1.5
DT29	29- 25 BROAD ST,HARLESTON	Suburban	611785	279593	NO2	No	1.0	7.0	No	1.5
DT30	30 - Morrisons/Parsons Diss	Roadside	611779	279590	NO2	No	2.0	1.0	No	1.5

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

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BN4	BN4 Hillside Avenue, Thorpe St Andrew	Suburban	626918	308740	NO2	No	11.0	1.0	No	3.0
BN6	BN6 Breck Road, Sprowston	Suburban	626317	311012	NO2	No	1.0	4.0	No	2.5
BN10	BN10 Yarmouth Road, Thorpe St Andrew	Roadside	625369	308438	NO2	No	13.0	1.0	No	3.0
BN11	BN11 Reepham Road, Hellesdon	Suburban	621651	311632	NO2	No	3.0	4.0	No	2.0
BN12	BN12 10 Boundary Road, Hellesdon	Suburban	621698	311569	NO2	No	1.0	6.0	No	2.0
BN13	BN13 214 Milecross Lane, Hellesdon	Suburban	621814	311648	NO2	No	1.0	1.0	No	2.0
BN15	BN15 Norwich Road, Wroxham Library Wroxham	Roadside	630114	318015	NO2	No	16.0	2.0	No	2.0
BN18	BN18 Middletons Lane, Hellesdon	Roadside	620186	311834	NO2	No	4.0	1.0	No	3.0
BN19	BN19 187 Yarmouth Road/Pound Lane, Thorpe St Andrew	Suburban	627490	308775	NO2	No	1.0	6.0	No	2.0
BN20	BN20 The Street, Acle	Kerbside	640166	310354	NO2	No	1.0	1.0	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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BN21	BN21 Plumstead Road, Thorpe End	Roadside	627743	310905	NO2	No	21.0	1.0	No	2.0
BN22	BN22 Wroxham Road, Sprowston	Suburban	624065	311161	NO2	No	35.0	1.0	No	3.0
BN24	BN24 127 Fifers Lane, Hellesdon	Suburban	621465	312666	NO2	No	15.0	1.0	No	1.5
BN25	BN25 Market Place, Aylsham	Kerbside	619321	326913	NO2	No	1.0	8.0	No	1.5
BN26	BN26 172 Plumstead Road East	Suburban	626308	310096	NO2	No	1.0	19.0	No	1.5
BN27	BN27 300 Wroxham Road, Sprowston	Suburban	625504	312473	NO2	No	1.0	18.0	No	3.0
BN28	BN28 73 Holt Road, Hellesdon	Suburban	621212	312970	NO2	No	1.0	21.0	No	1.5
BN29	BN29 27 High Street, Cawston	Roadside	613459	323916	NO2	No	1.0	1.0	No	2.5
BN30	BN30 Salhouse Road, Sprowston	Roadside	626171	311059	NO2	No	13.0	1.0	No	3.0
BN31	BN31 Chartwell Road, Old Catton	Roadside	623069	311327	NO2	No	8.0	1.0	No	2.0
BN32	BN32 Longfields Road, Thorpe St Andrew	Roadside	627038	309912	NO2	No	7.0	1.0	No	2.0
BN33	BN33 Beighton White House, Beighton	Roadside	637749	309865	NO2	No	21.0	2.0	No	2.0

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BN34	BN34 Cromer Road, Hellesdon	Kerbside	621713	311699	NO2	No	6.0	1.0	No	2.0
BN35	BN35 373 Drayton High Road, Hellesdon	Suburban	620205	311723	NO2	No	1.0	8.0	No	2.0
BN36	BN36 Norwch Road, Wroxham	Kerbside	629892	317484	NO2	No	16.0	1.0	No	2.0
BN37	BN37 Vane Close, Thorpe St Andrew	Kerbside	627597	309179	NO2	No	5.0	1.0	No	2.0
BN38	BN38 60 HOLT ROAD, HORSFORD	Suburban	619440	315702	NO2	No	5.0	1.0	No	2.0
BN39	BN39 Market Place, Reepham	Kerbside	609932	322874	NO2	No	2.0	1.0	No	2.5
BN40	BN40 Station Road Coltishall	Kerbside	626935	320407	NO2	No	20.0	1.0	No	2.5

Table A.3 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3) – South Norfolk

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2017	2018	2019	2020	2021
DT1	619245	305653	Suburban	88.21917808	88.2	21.2	19.7	19.9	14.0	14.4
DT2	616934	310462	Suburban	88.21917808	88.2	21.6	20.1	19.1	13.9	14.7
DT3	626790	302088	Suburban	88.21917808	88.2	20.0	18.6	18.2	12.6	13.4
DT4	611943	279567	Suburban	88.21917808	88.2	26.7	24.8	21.5	18.7	22.1
DT5	611943	279567	Suburban	88.21917808	88.2	28.2	26.2	26.9	19.5	21.9
DT6	636210	298771	Suburban	88.21917808	88.2	20.2	18.8	19.8	13.2	13.0
DT7	619725	292748	Roadside	88.21917808	88.2	37.2	34.6	35.3	24.6	27.3
DT8	611100	301436	Kerbside	88.21917808	88.2	22.0	20.5	22.9	15.3	15.7
DT9	625438	306163	Kerbside	88.21917808	88.2	24.9	23.2	23.9	17.1	17.9
DT10	612514	302653	Suburban	88.21917808	88.2	16.5	15.3	15.7	10.3	10.5
DT11	618138	305619	Rural	88.21917808	88.2	14.9	13.9	15.0	10.3	10.8
DT12	611529	300995	Suburban	88.21917808	88.2	21.2	19.7	22.7	17.2	18.8
DT13	612704	302788	Suburban	88.21917808	88.2	16.1	15.0	14.2	10.2	10.6

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2017	2018	2019	2020	2021
DT14	611367	301622	Suburban	88.21917808	88.2	16.2	15.1	15.9	11.9	12.0
DT15	624476	283267	Roadside	88.21917808	88.2	26.2	24.4	29.8	19.8	21.4
DT16	614902	278861	Roadside	88.21917808	88.2	26.2	24.4	20.5	14.0	14.5
DT17	616984	311560	Roadside	88.21917808	88.2				21.7	22.4
DT18	619714	292717	Roadside	88.21917808	88.2	26.6	24.7	25.3	18.0	20.4
DT19	619731	292745	Roadside	88.21917808	88.2	34.3	31.9	38.4	23.3	24.4
DT20	619643	292348	Suburban	88.21917808	88.2	31.0	28.8	26.7	19.6	21.0
DT21	619685	292629	Suburban	88.21917808	88.2	28.5	26.5	27.9	21.1	23.4
DT22	619711	292720	Roadside	78.35616438	78.4	20.5	19.1	20.8	15.0	15.5
DT23	618991	309891	Suburban	88.21917808	88.2	15.6	14.5	15.2	10.8	10.8
DT24	611325	301191	Suburban	88.21917808	88.2	16.1	15.0	16.8	11.1	12.9
DT25	619821	293028	Roadside	88.21917808	88.2	29.0	27.0	28.1	19.8	21.2
DT26	619772	305851	Roadside	88.21917808	88.2	24.1	22.4	20.7	14.0	14.0
DT27	616852	310342	Roadside	88.21917808	88.2	25.4	23.6	16.2	10.5	12.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2017	2018	2019	2020	2021
DT28	617170	311659	Suburban	88.21917808	88.2				10.1	11.2
DT29	624633	283505	Suburban	88.21917808	88.2	24.2	22.5	35.1	21.8	27.6
DT30	611785	279593	Roadside	88.21917808	88.2				15.8	19.4

Table A.4– Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3) – Broadland

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2017	2018	2019	2020	2021
BN4	626918	308740	Suburban	90.1369863	90.1	13.6	14.3	12.9	9.4	9.9
BN6	626317	311012	Suburban	90.1369863	90.1	13.5	13.6	14.4	8.6	10.0
BN10	625369	308438	Roadside	90.1369863	90.1	19.8	18.7	21.4	16.5	19.3
BN11	621651	311632	Suburban	90.1369863	90.1	34.0	29.6	28.0	21.0	25.0
BN12	621698	311569	Suburban	90.1369863	90.1	30.0	29.4	29.6	19.7	21.6
BN13	621814	311648	Suburban	90.1369863	90.1	23.4	22.8	24.0	15.8	18.8
BN15	630114	318015	Roadside	90.1369863	90.1	15.6	22.0	22.0	14.3	15.7
BN18	620186	311834	Roadside	90.1369863	90.1	18.1	26.0	23.8	12.4	14.1
BN19	627490	308775	Suburban	90.1369863	90.1	31.8	27.2	26.3	16.7	19.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2017	2018	2019	2020	2021
BN20	640166	310354	Kerbside	81.91780822	81.9		22.5	21.1	15.5	16.9
BN21	627743	310905	Roadside	90.1369863	90.1		18.7	18.2	10.2	11.6
BN22	624065	311161	Suburban	83.01369863	83.0		31.7	32.4	21.7	26.3
BN24	621465	312666	Suburban	90.1369863	90.1		18.1	18.7	12.2	13.8
BN25	619321	326913	Kerbside	90.1369863	90.1		21.7	16.8	9.6	10.8
BN26	626308	310096	Suburban	90.1369863	90.1			15.1	10.8	12.2
BN27	625504	312473	Suburban	90.1369863	90.1			24.4	19.5	20.4
BN28	621212	312970	Suburban	90.1369863	90.1			16.2	9.5	11.4
BN29	613459	323916	Roadside	90.1369863	90.1			17.1	12.5	14.5
BN30	626171	311059	Roadside	90.1369863	90.1			22.9	15.2	16.7
BN31	623069	311327	Roadside	90.1369863	90.1				24.0	28.4
BN32	627038	309912	Roadside	80.2739726	80.3				8.8	10.6
BN33	637749	309865	Roadside	90.1369863	90.1				14.7	17.5
BN34	621713	311699	Kerbside	90.1369863	90.1				25.4	30.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2017	2018	2019	2020	2021
BN35	620205	311723	Suburban	90.1369863	90.1				14.3	19.0
BN36	629892	317484	Kerbside	90.1369863	90.1				17.8	21.5
BN37	627597	309179	Kerbside	90.1369863	90.1				10.0	11.0
BN38	619440	315702	Suburban	83.83561644	83.8				13.0	14.7
BN39	609932	322874	Kerbside	47.39726027	47.4					14.6
BN40	626935	320407	Kerbside	21.09589041	21.1					11.6

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

☒ **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 µg/m^3.

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

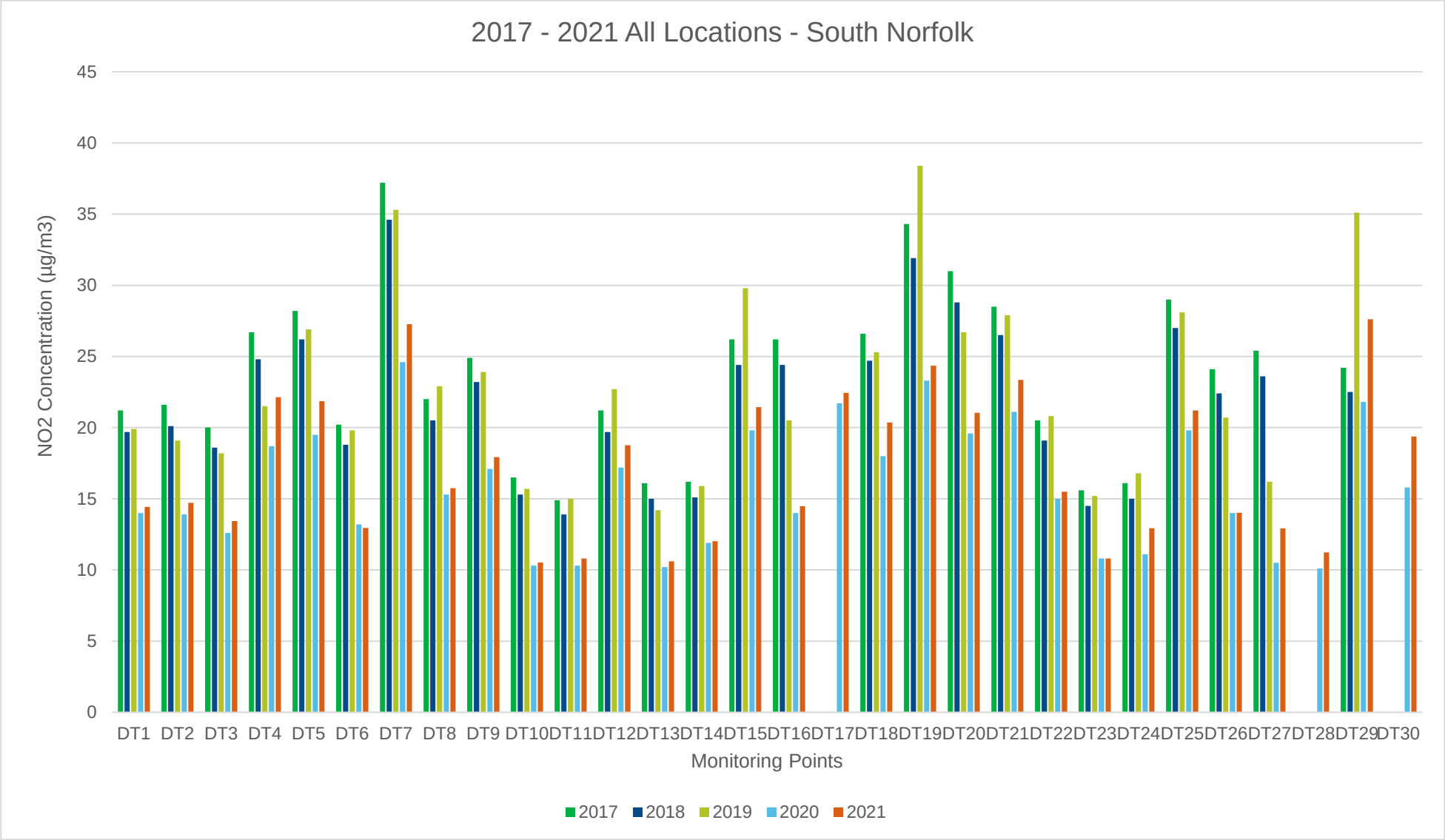
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

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

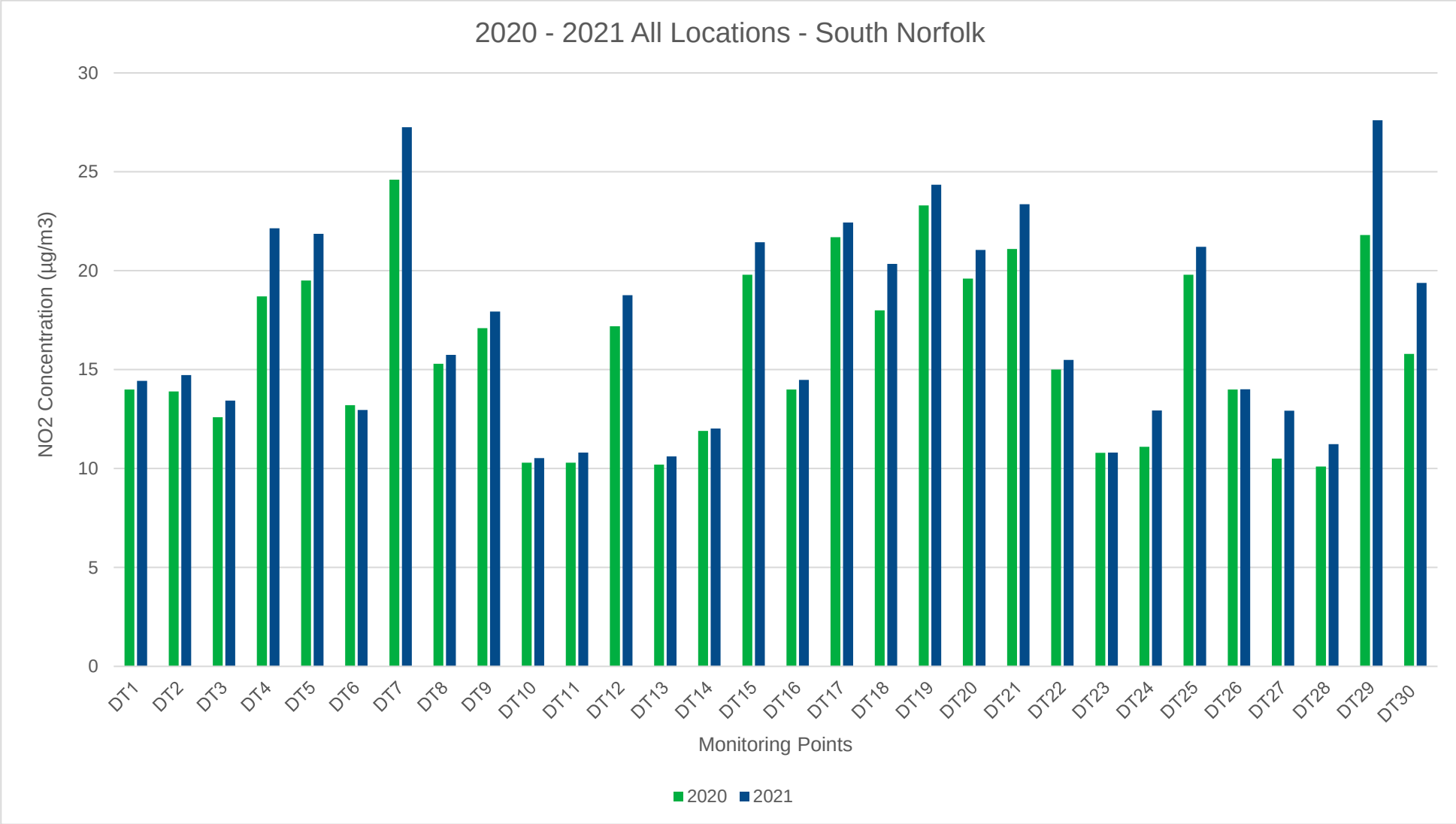
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations – South Norfolk

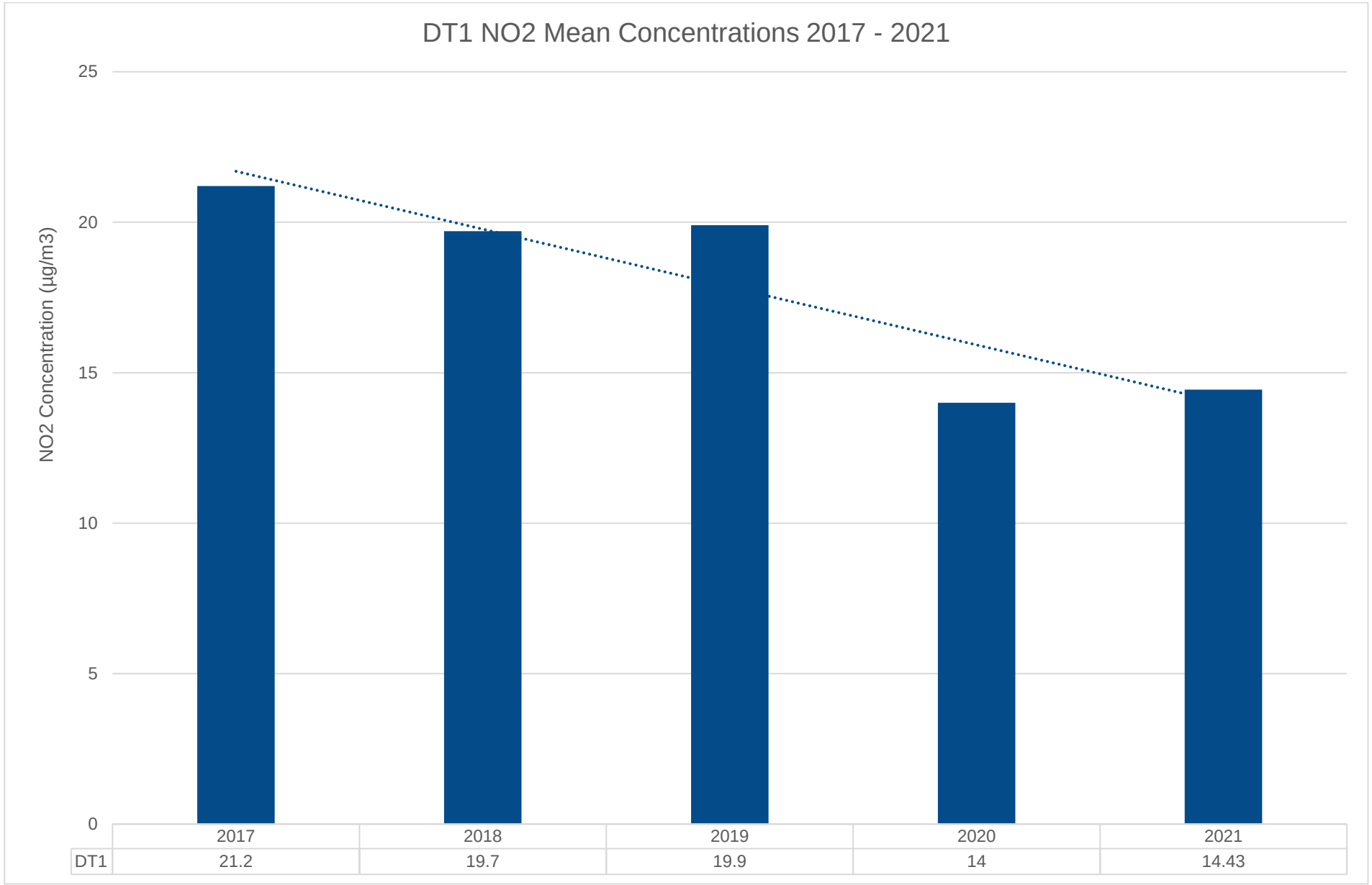
Concentrations recorded at South Norfolk Sites 2017-2021



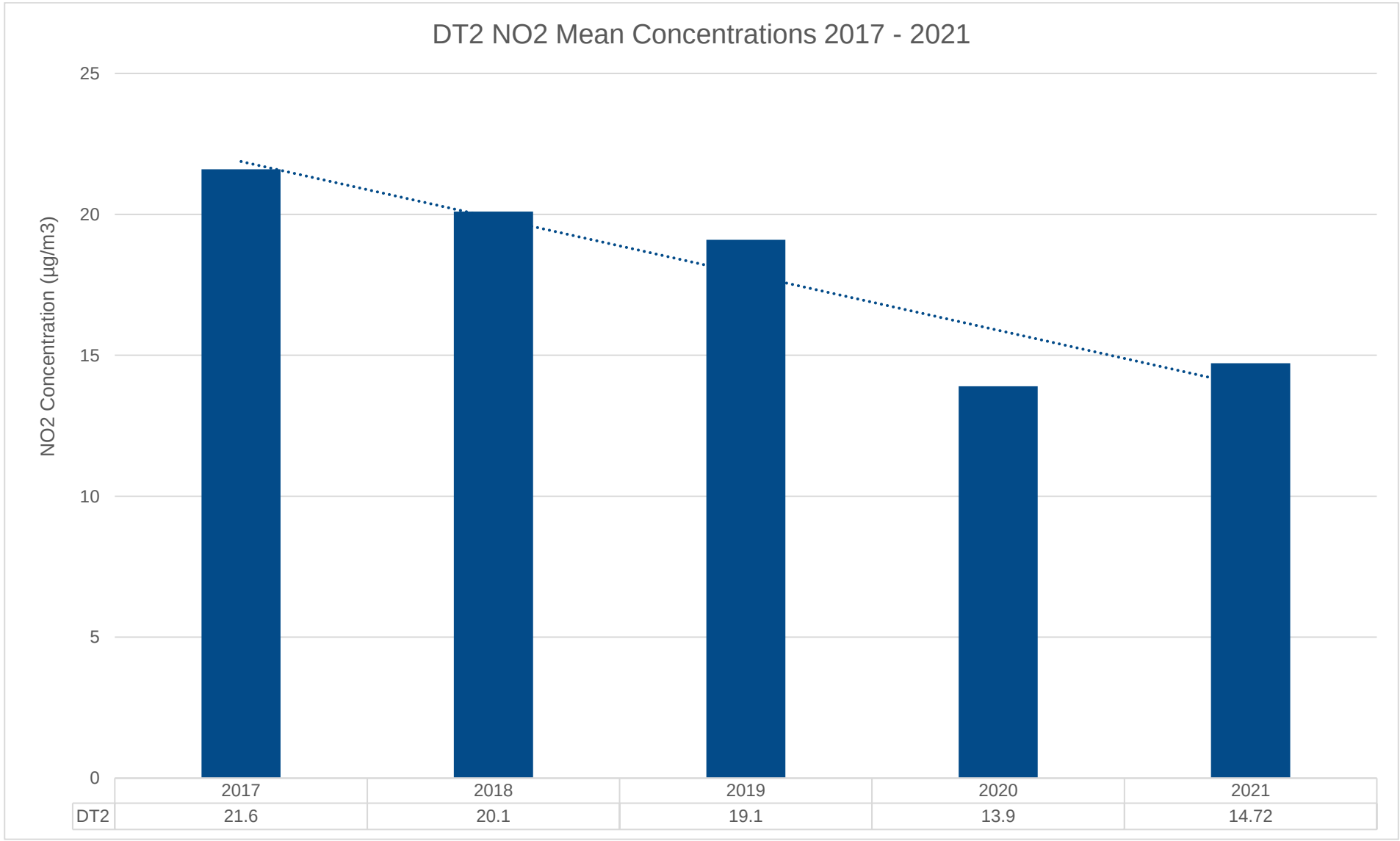
Comparison of results for 2020 and 2021



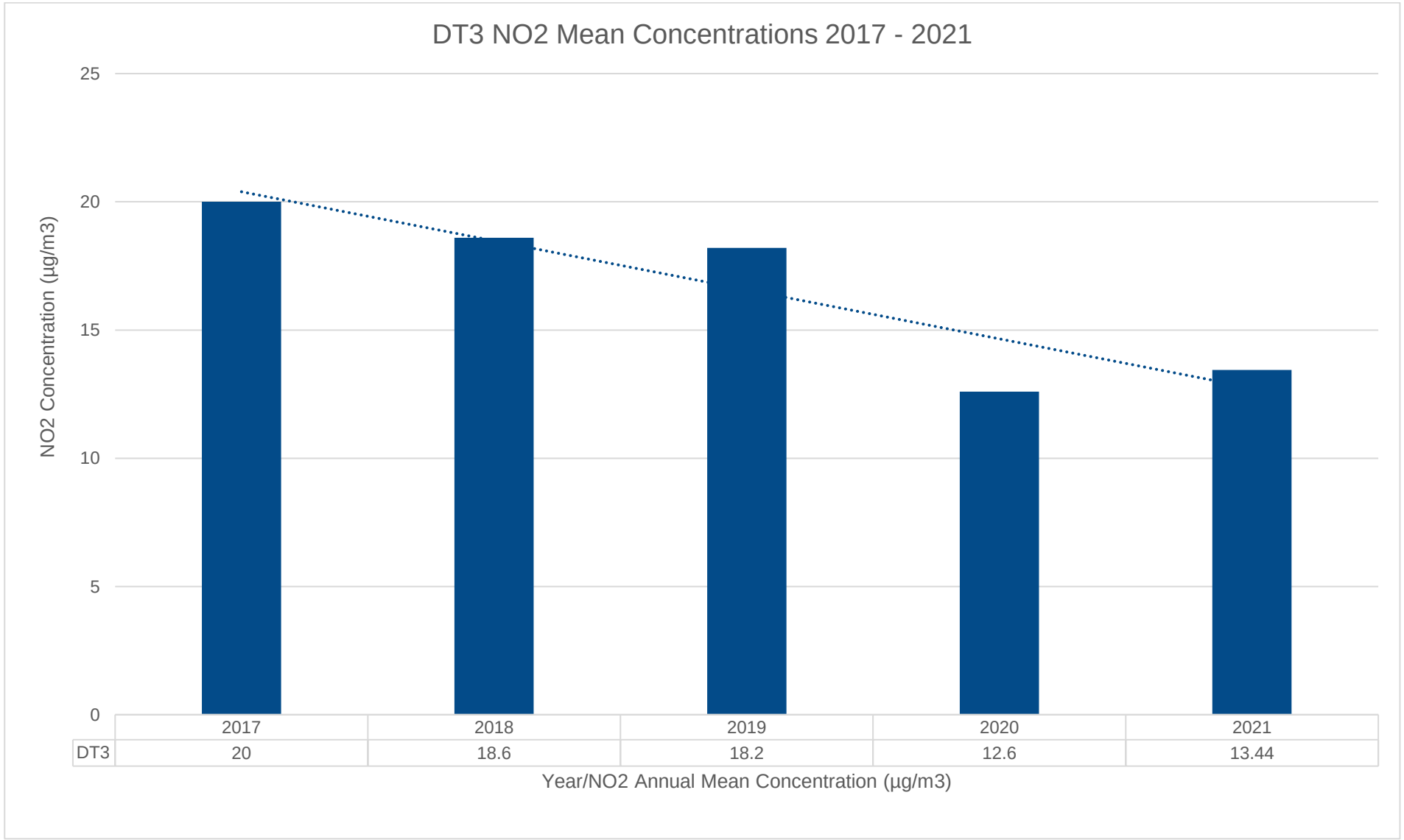
DT1


DT1 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT1
21.2
19.7
19.9
14
14.43

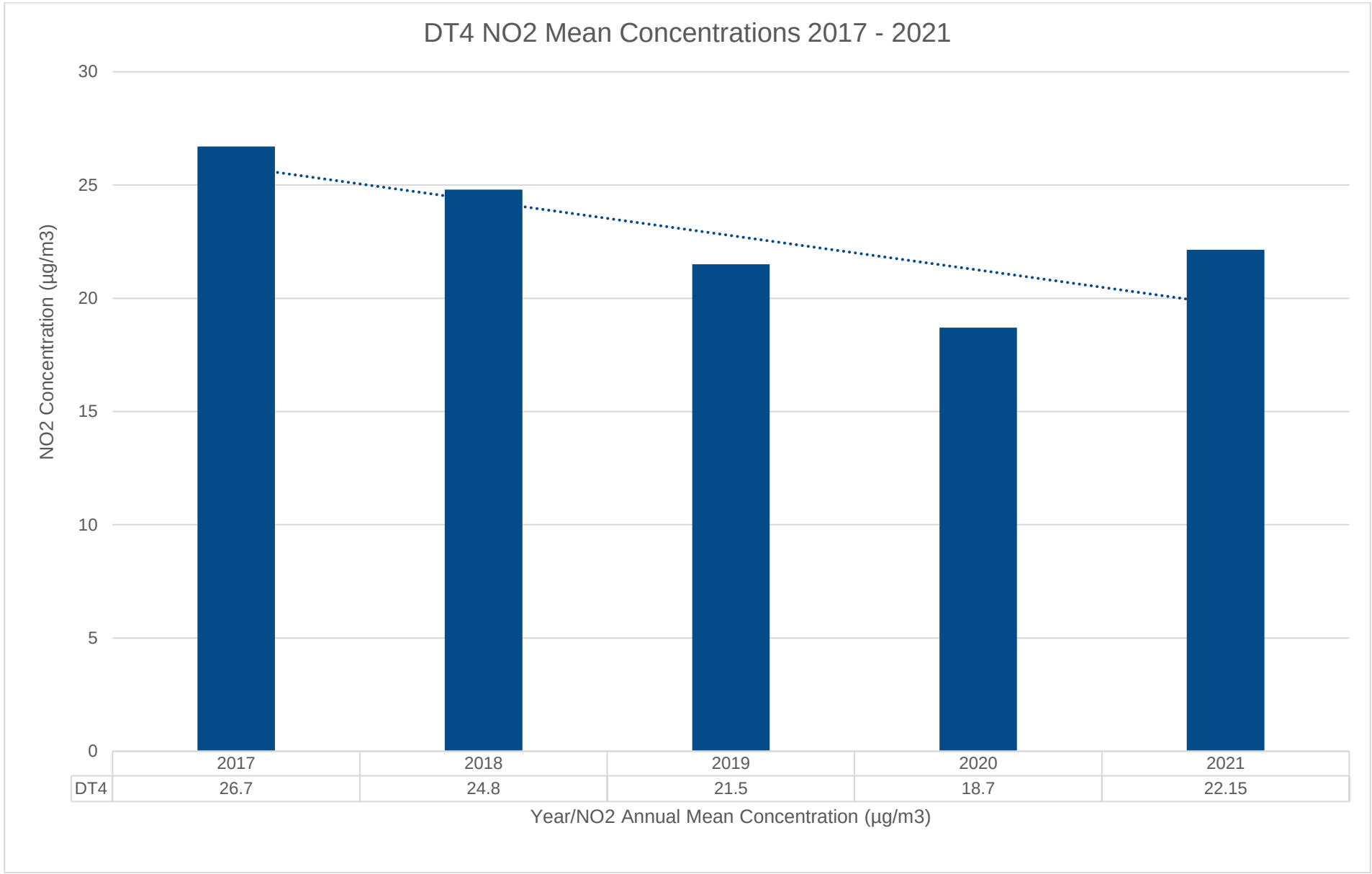
DT2


DT2 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT2
21.6
20.1
19.1
13.9
14.72

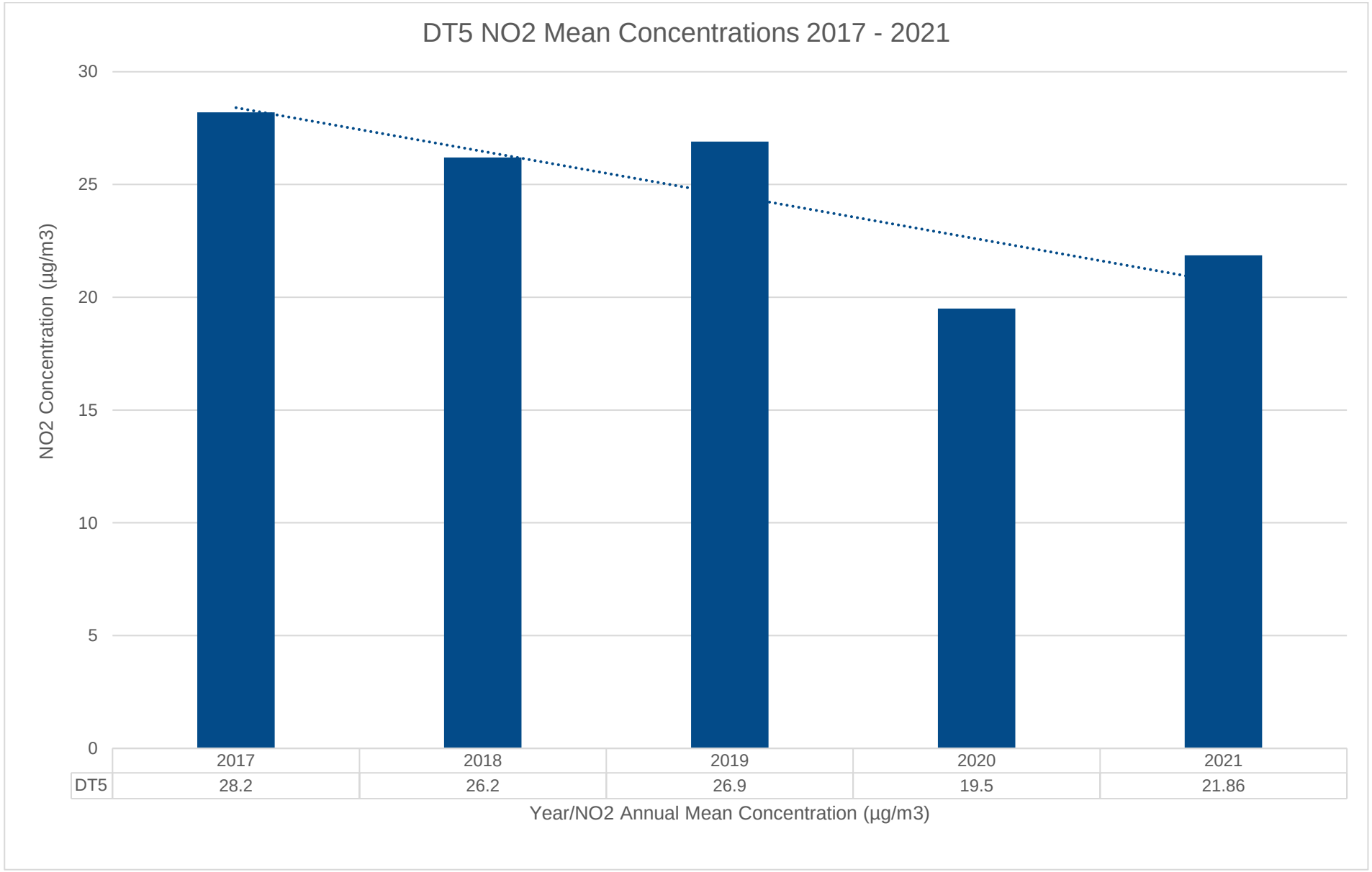
DT3


DT3 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT3
20
18.6
18.2
12.6
13.44
Year/NO2 Annual Mean Concentration (µg/m3)

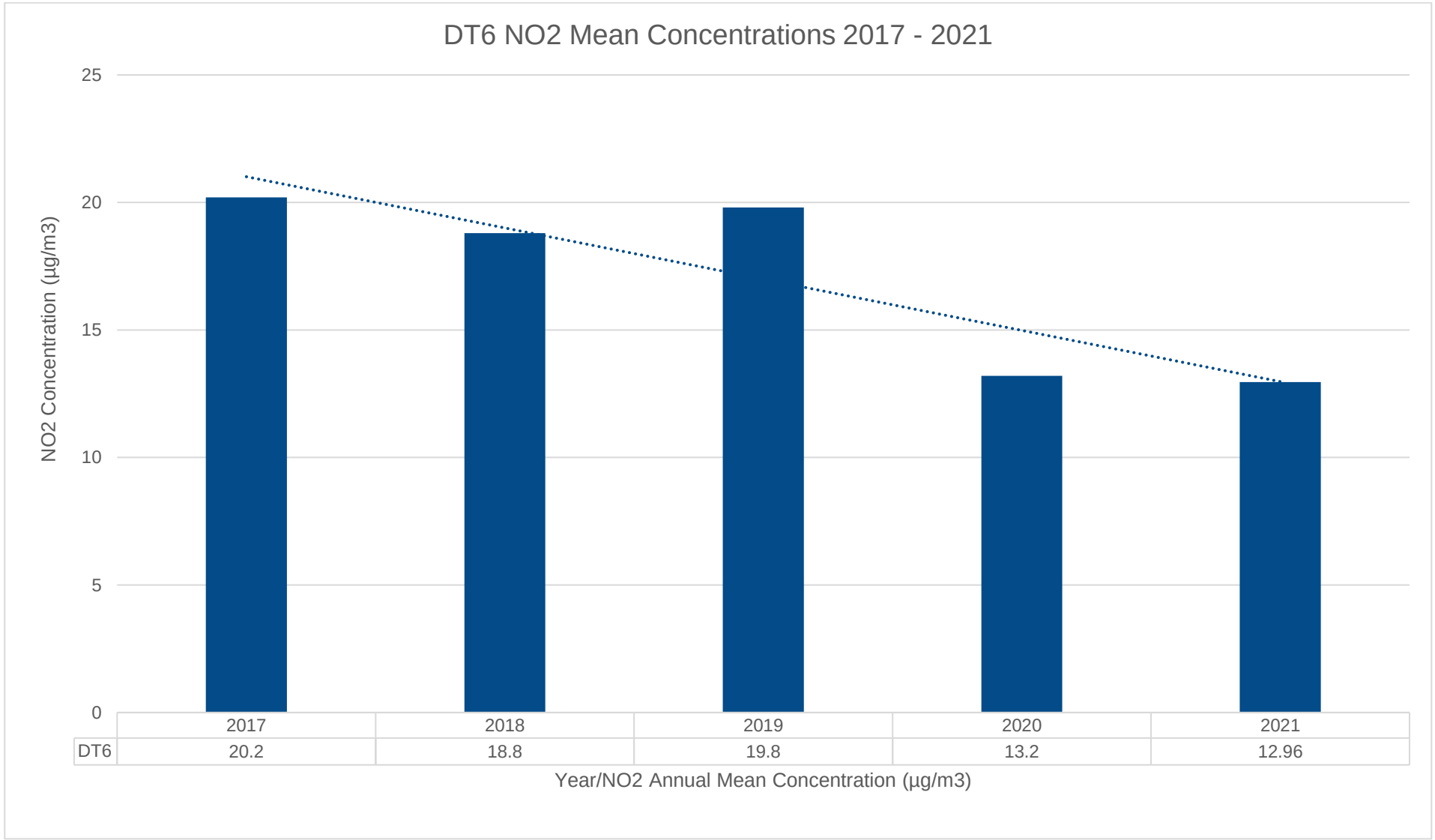
DT4


DT4 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT4
26.7
24.8
21.5
18.7
22.15
Year/NO2 Annual Mean Concentration (µg/m3)

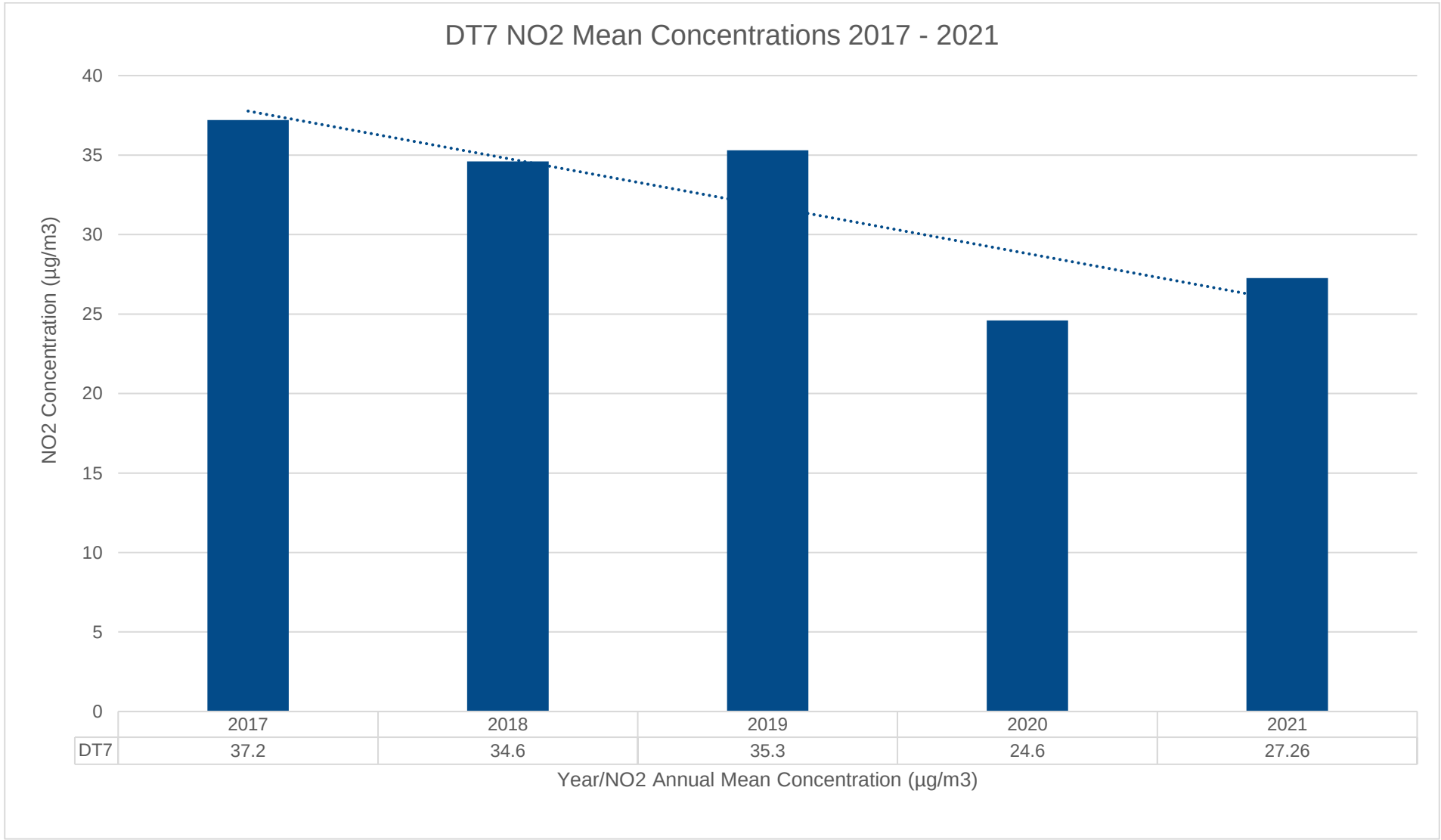
DT5


DT5 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT5
28.2
26.2
26.9
19.5
21.86
Year/NO2 Annual Mean Concentration (µg/m3)

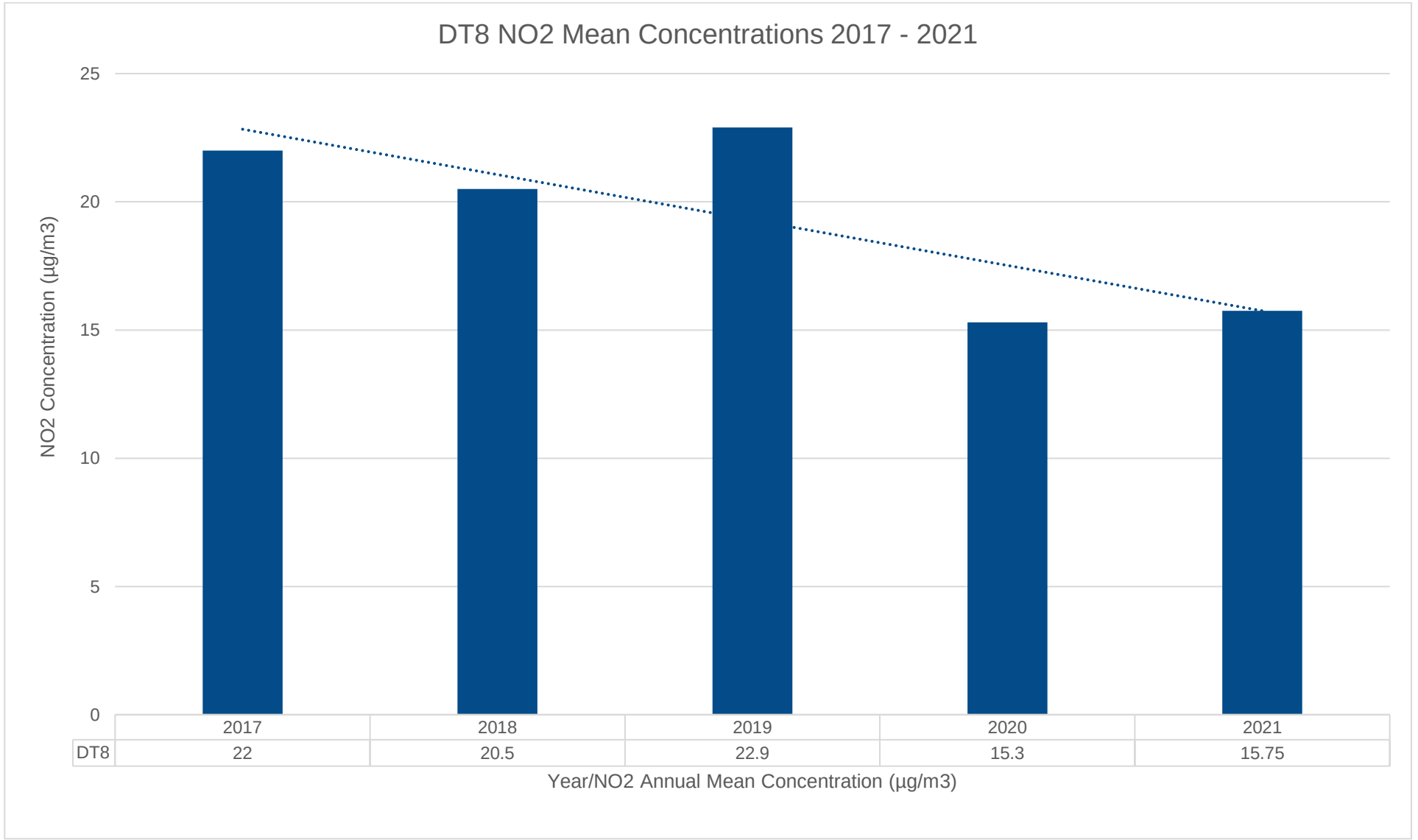
DT6


DT6 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT6
20.2
18.8
19.8
13.2
12.96
Year/NO2 Annual Mean Concentration (µg/m3)

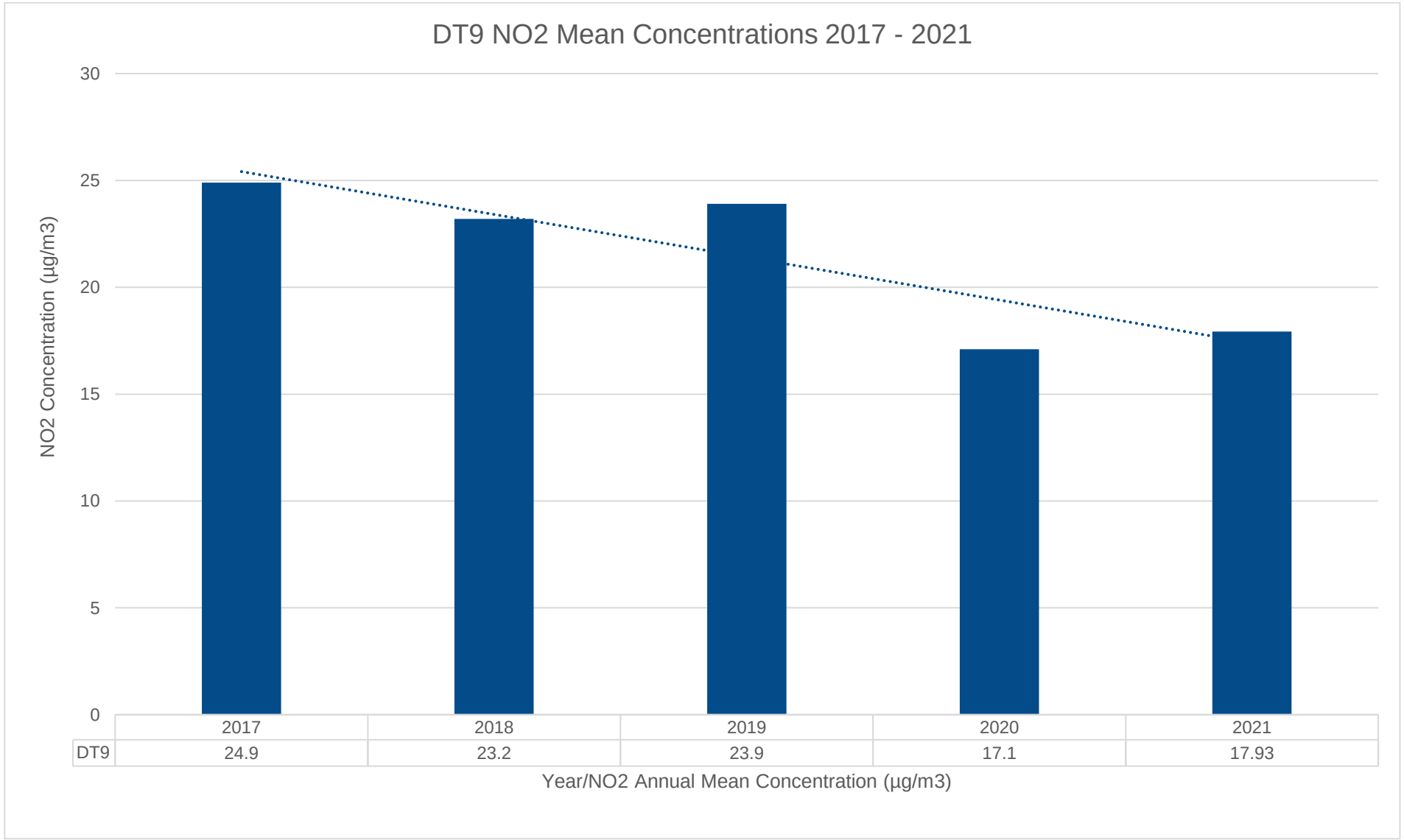
DT7


DT7 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT7
37.2
34.6
35.3
24.6
27.26
Year/NO2 Annual Mean Concentration (µg/m3)

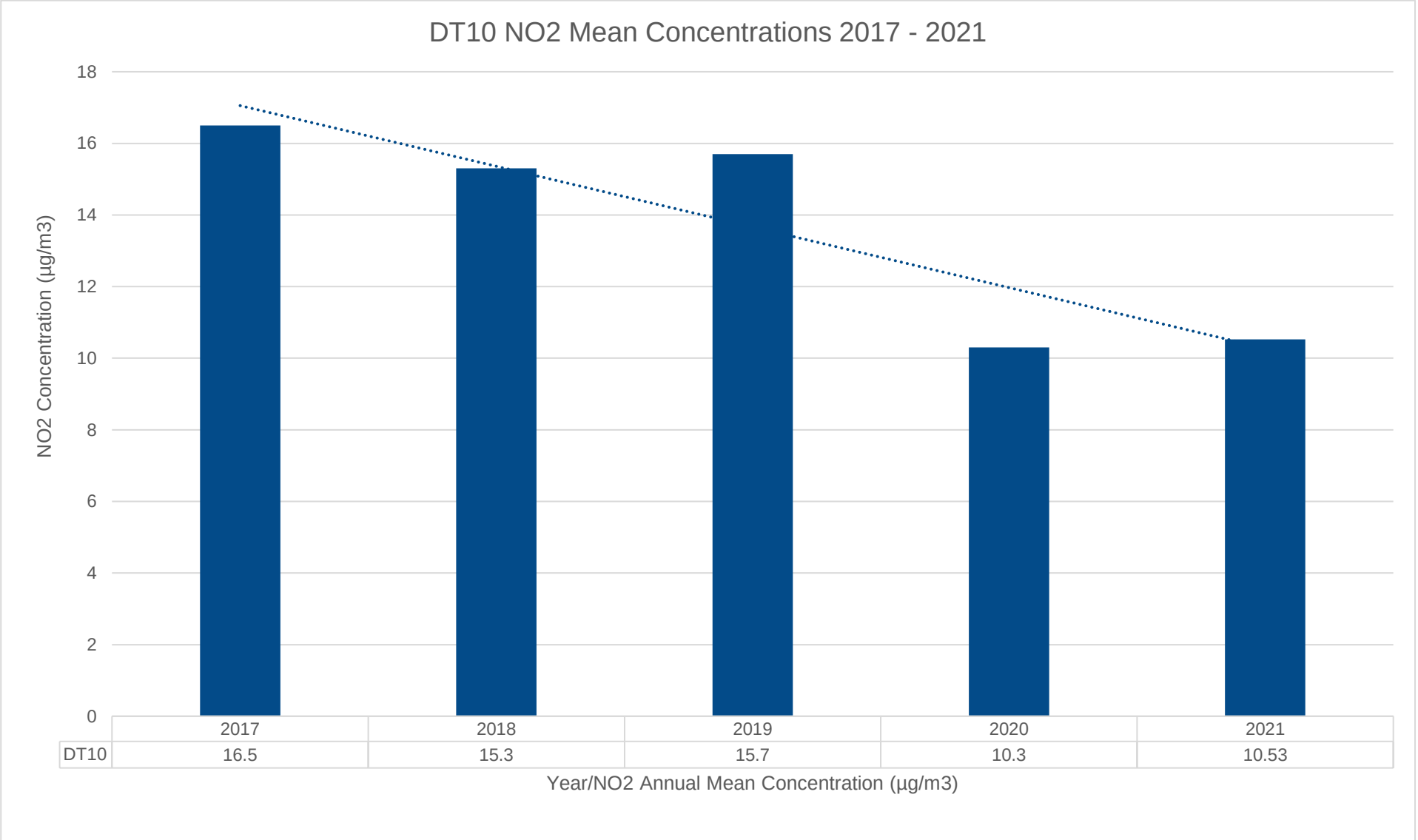
DT8


DT8 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT8
22
20.5
22.9
15.3
15.75
Year/NO2 Annual Mean Concentration (µg/m3)

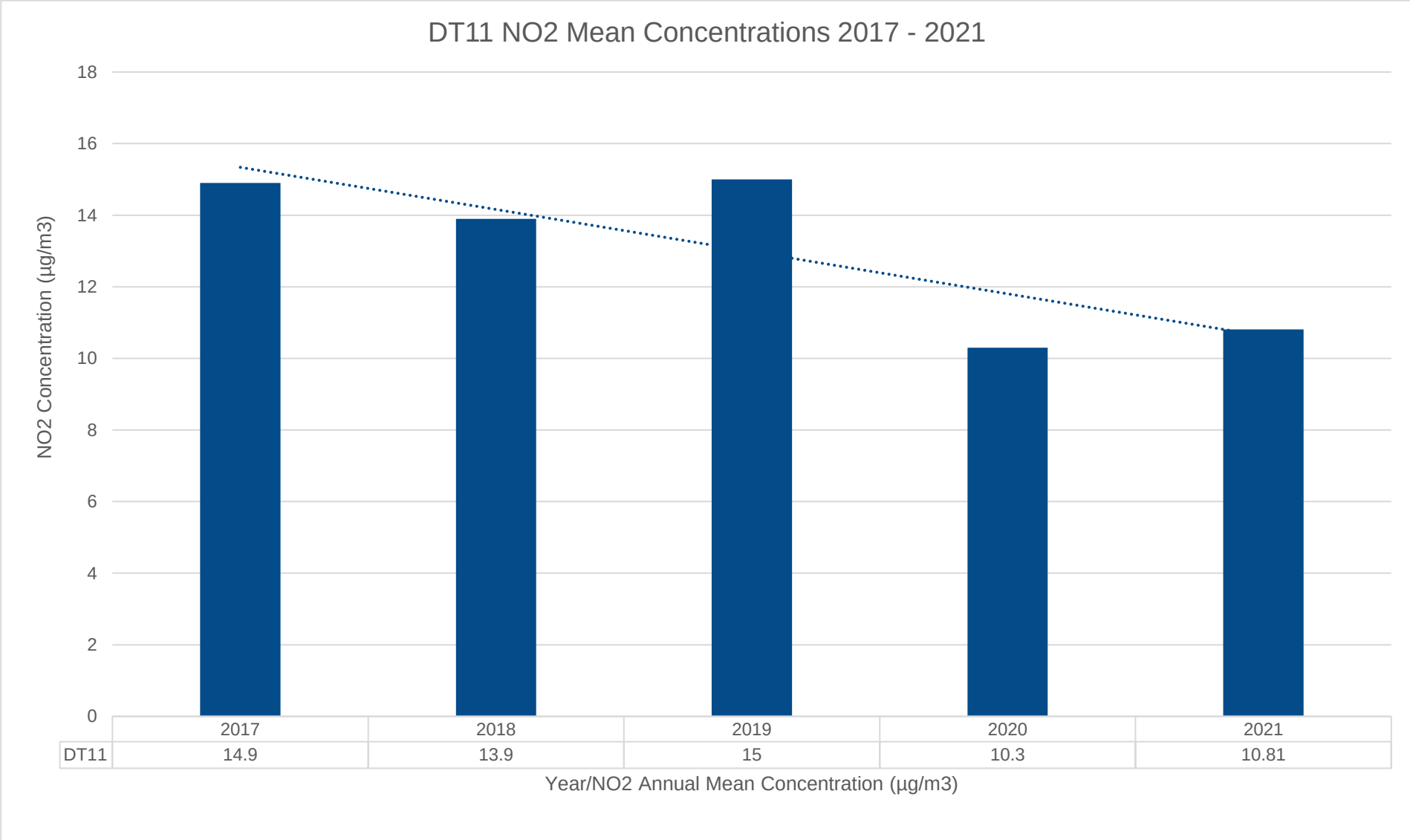
DT9


DT9 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT9
24.9
23.2
23.9
17.1
17.93
Year/NO2 Annual Mean Concentration (µg/m3)

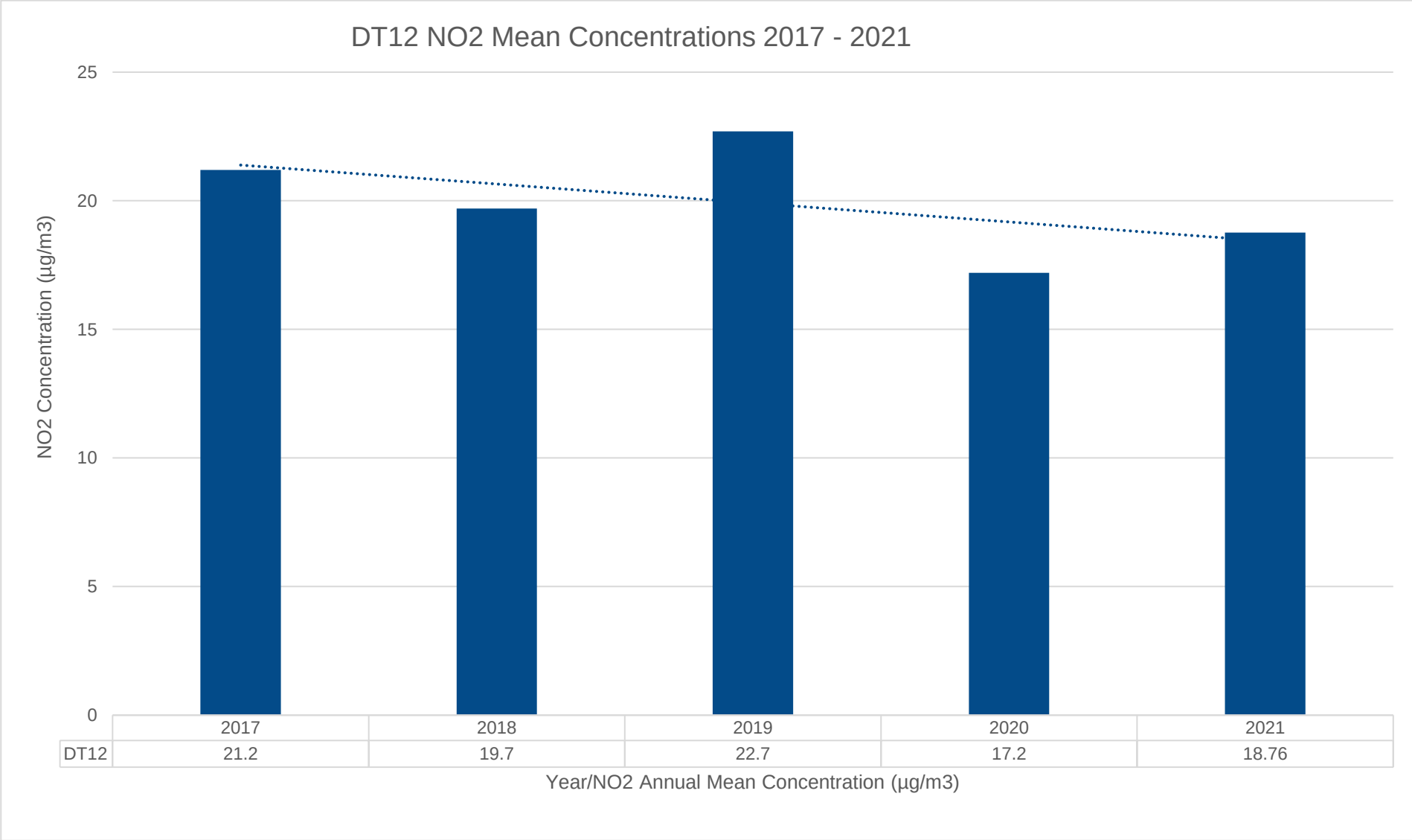
DT10


DT10 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
DT10
16.5
15.3
15.7
10.3
10.53
Year/NO2 Annual Mean Concentration (µg/m3)

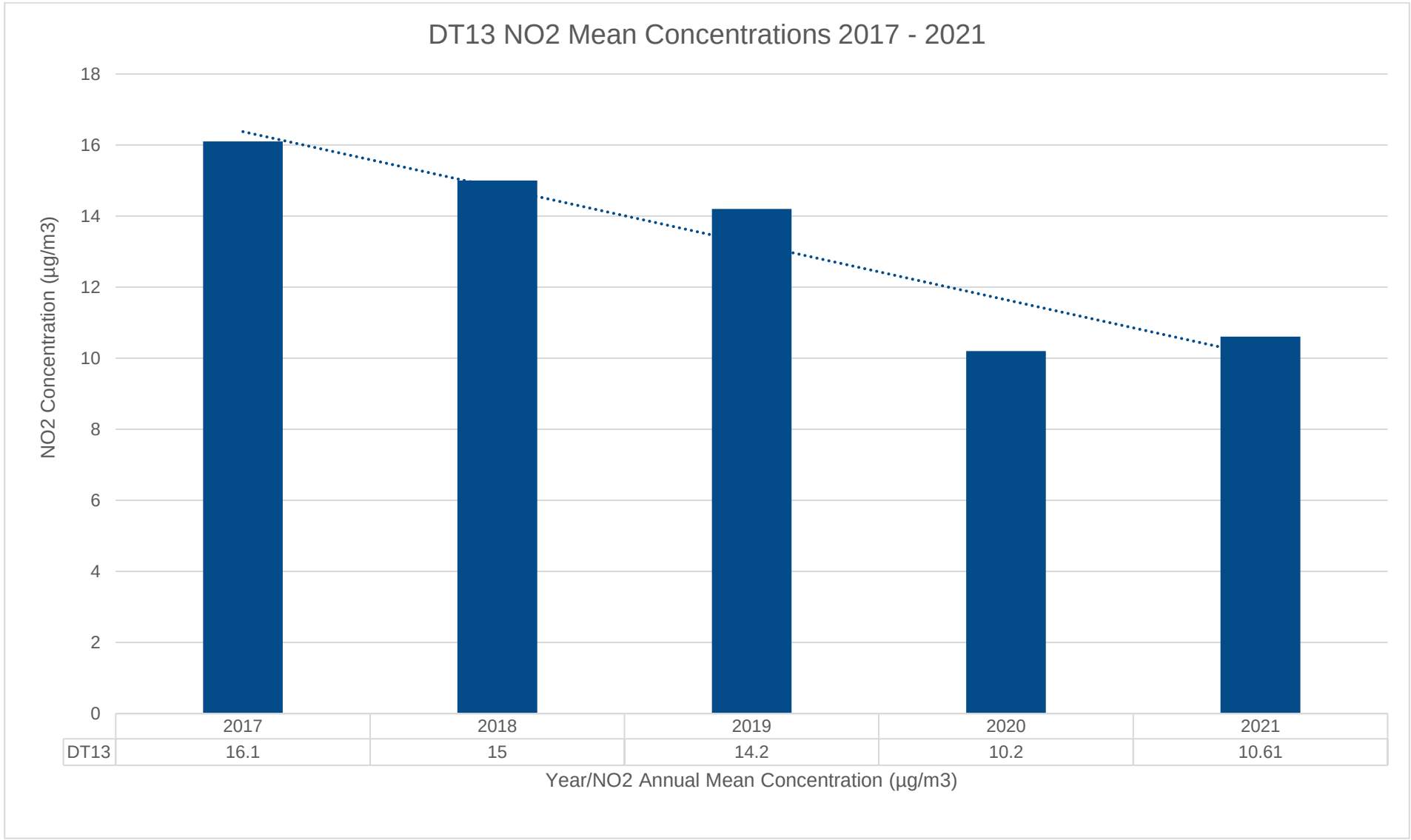
DT11


DT11 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
DT11
14.9
13.9
15
10.3
10.81
Year/NO2 Annual Mean Concentration (µg/m3)

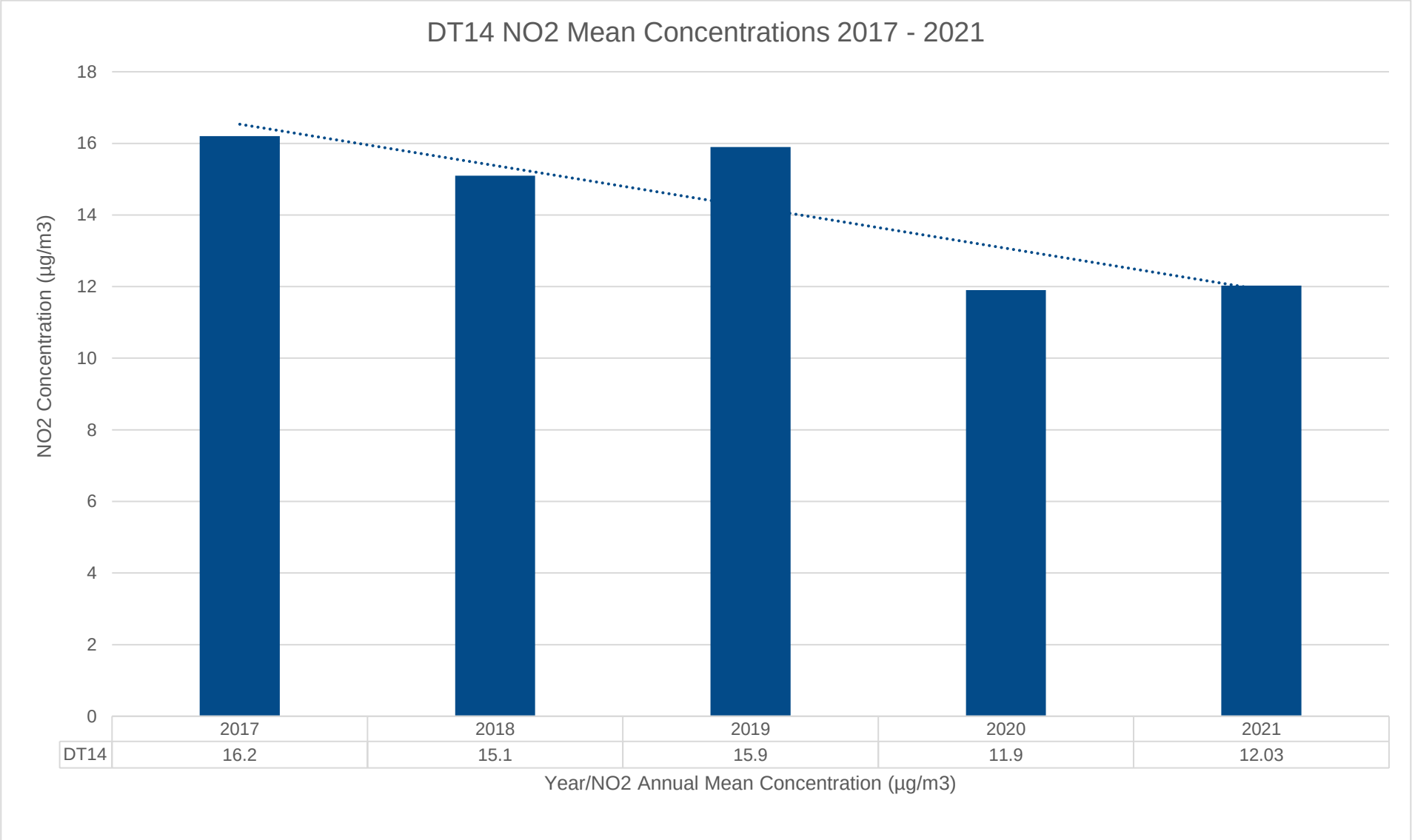
DT12


DT12 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT12
21.2
19.7
22.7
17.2
18.76
Year/NO2 Annual Mean Concentration (µg/m3)

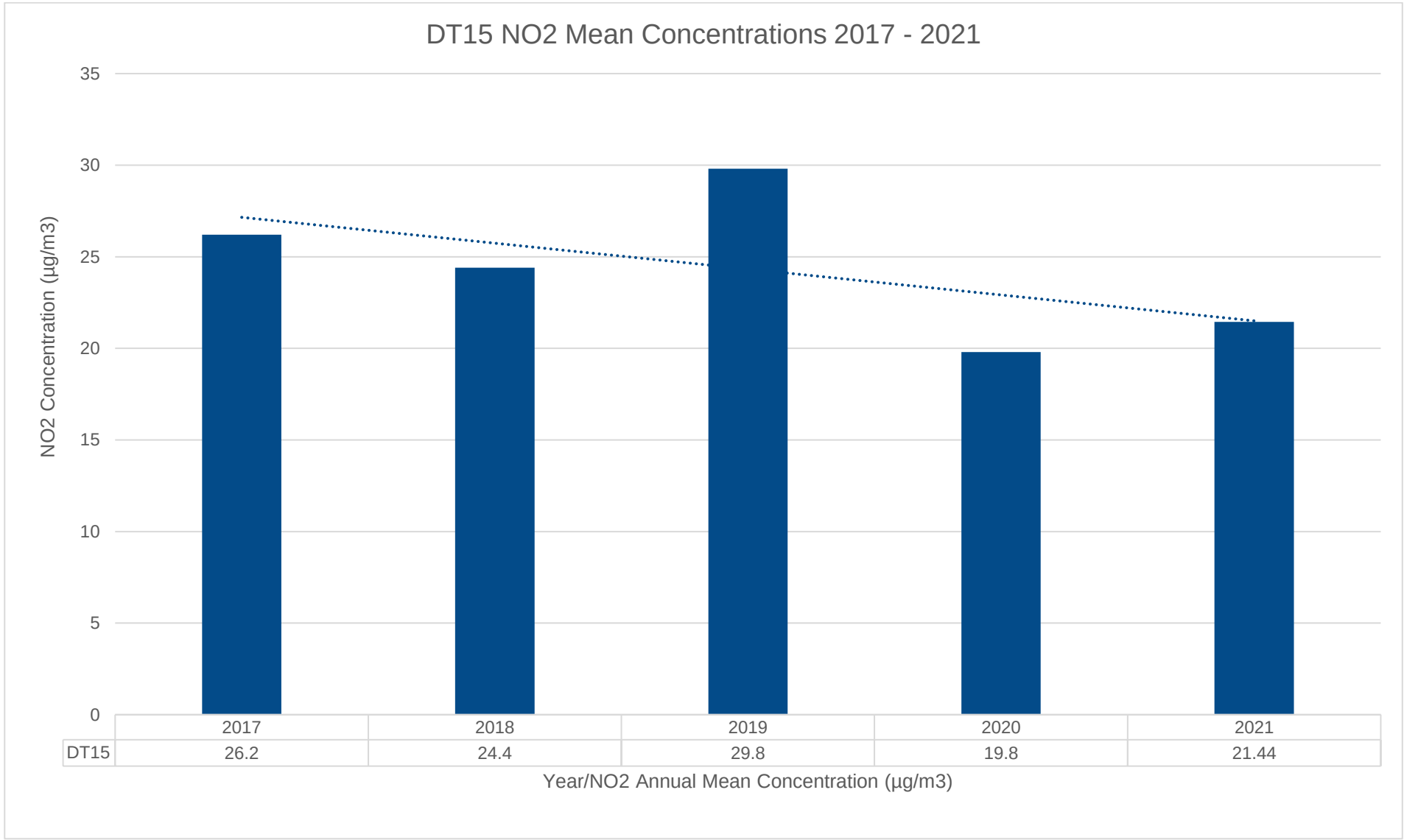
DT13


DT13 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
DT13
16.1
15
14.2
10.2
10.61
Year/NO2 Annual Mean Concentration (µg/m3)

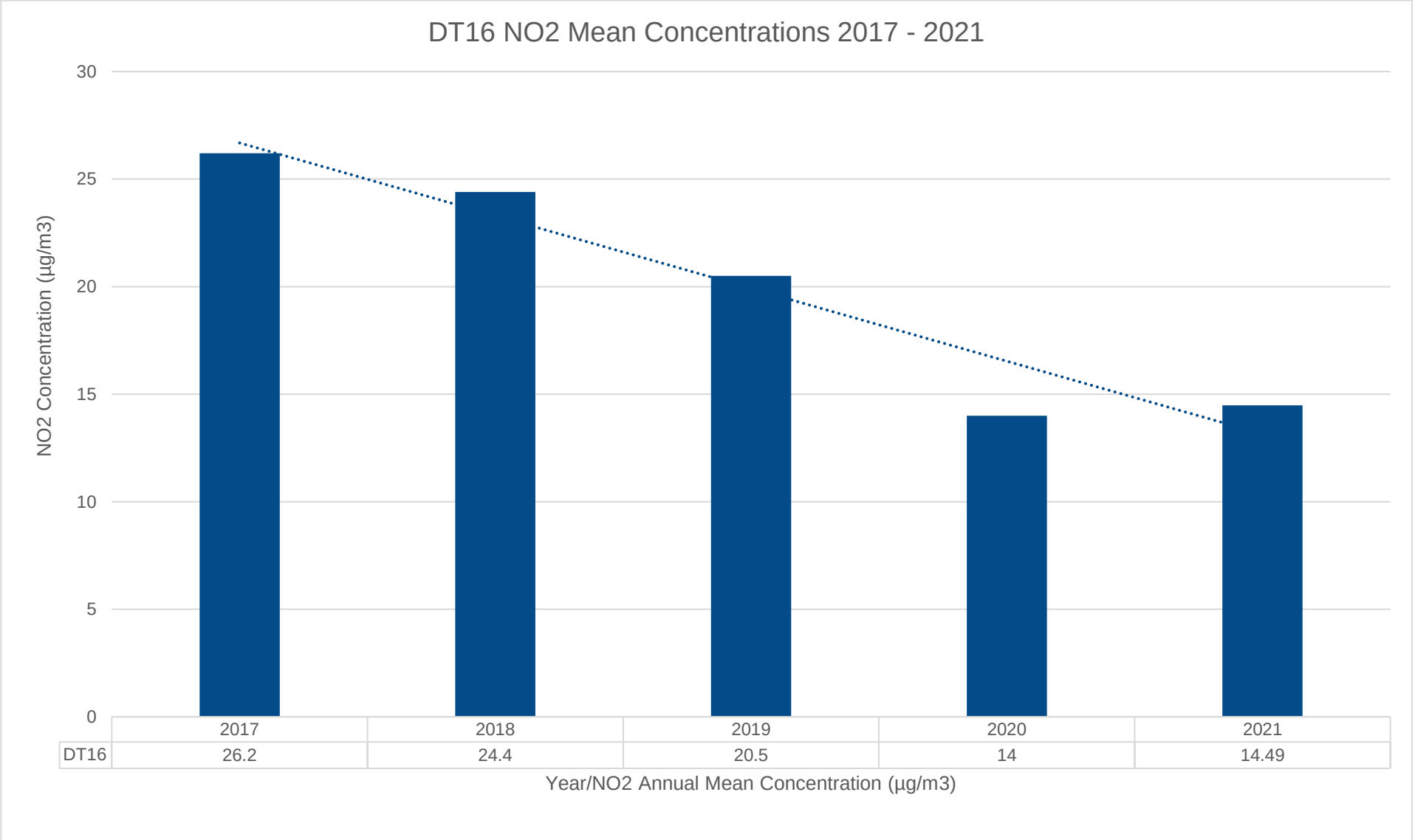
DT14


DT14 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
DT14
16.2
15.1
15.9
11.9
12.03
Year/NO2 Annual Mean Concentration (µg/m3)

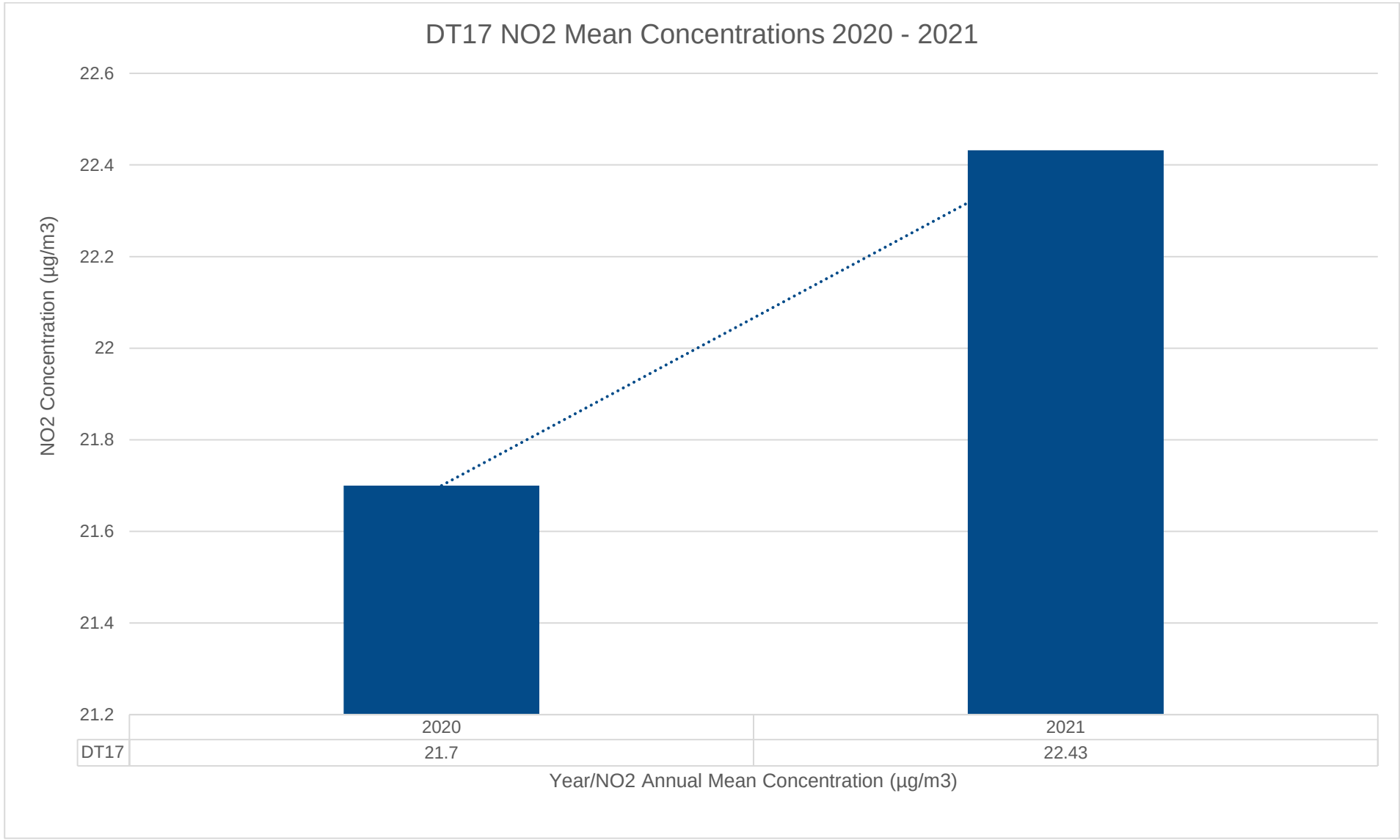
DT15


DT15 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT15
26.2
24.4
29.8
19.8
21.44
Year/NO2 Annual Mean Concentration (µg/m3)

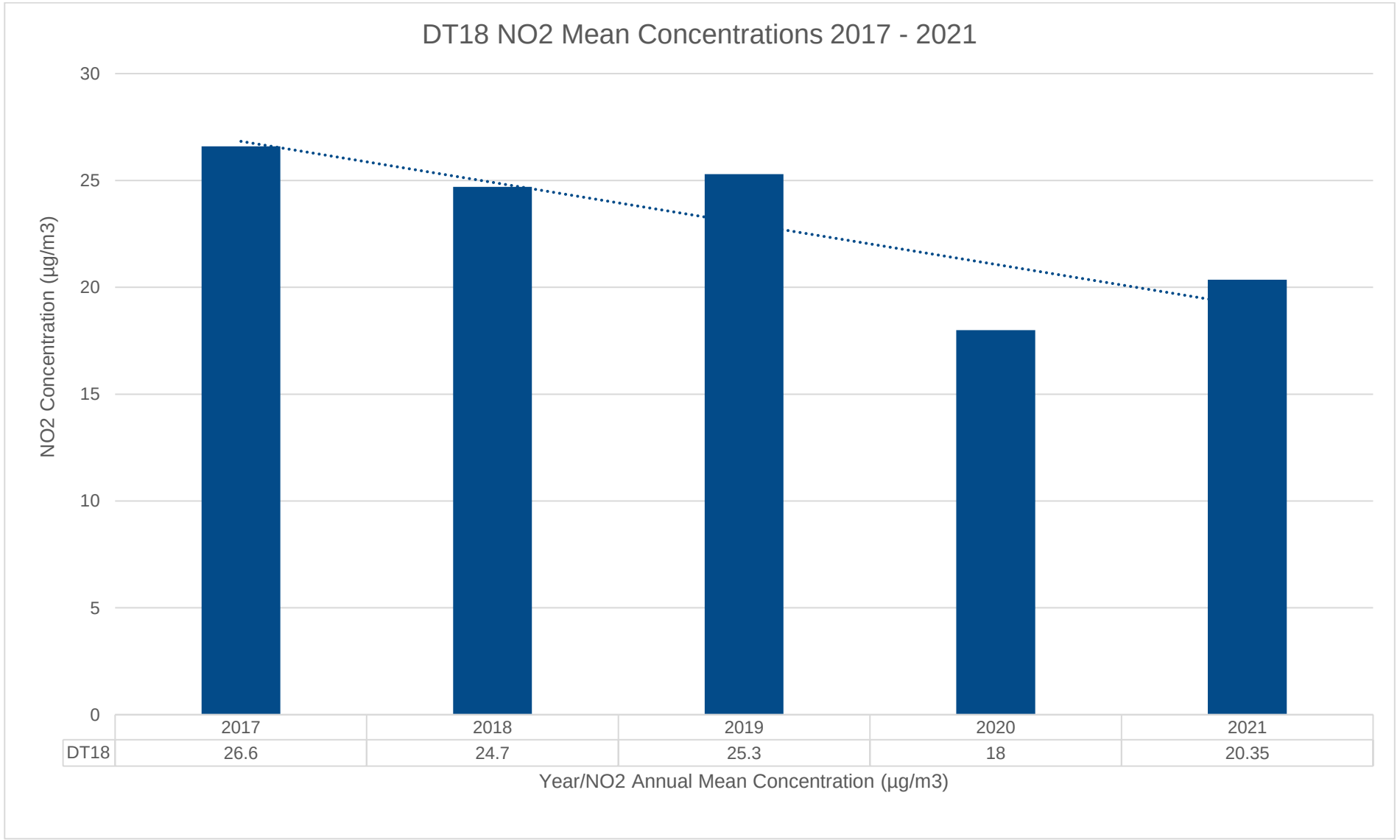
DT16


DT16 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT16
26.2
24.4
20.5
14
14.49
Year/NO2 Annual Mean Concentration (µg/m3)

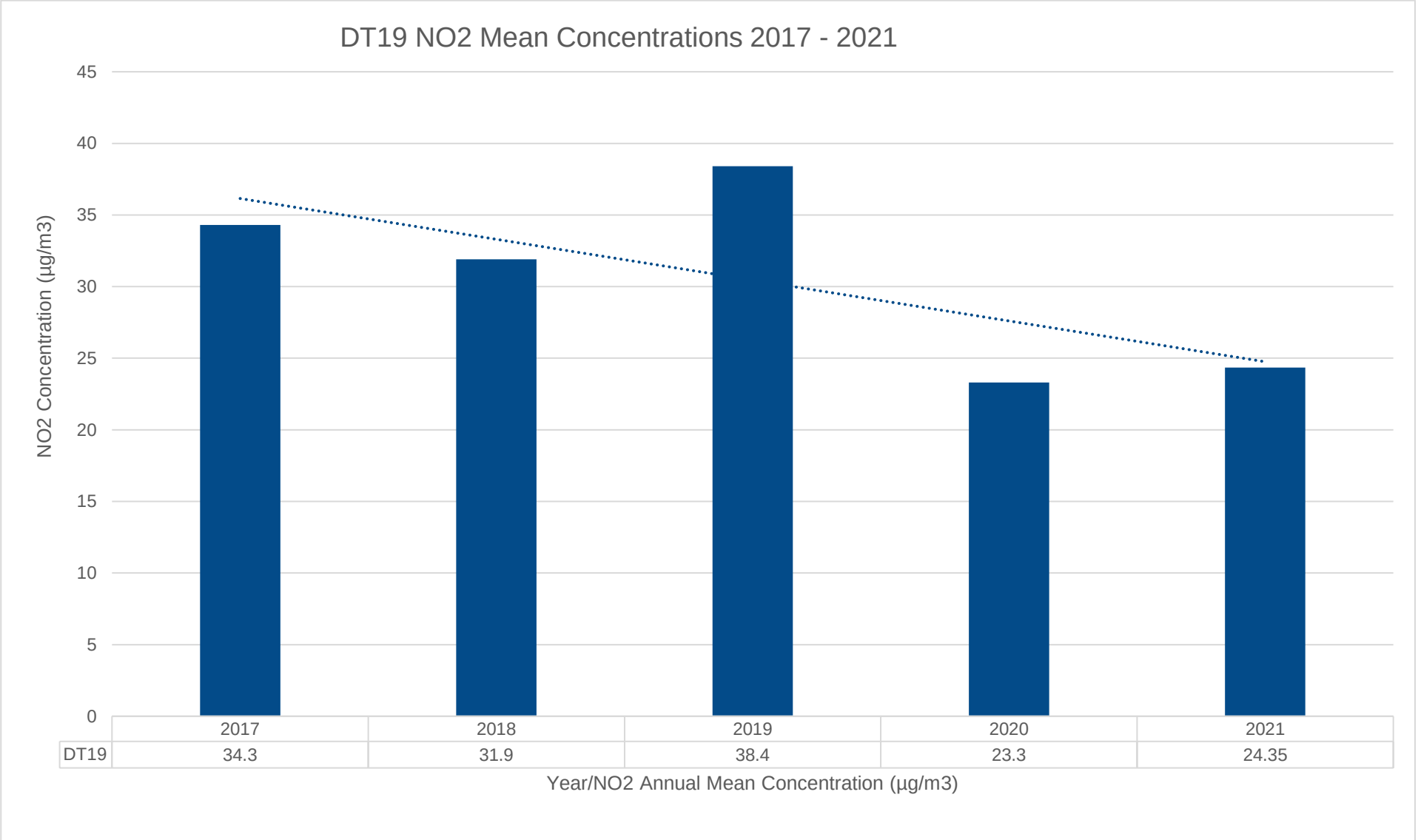
DT17


DT17 NO2 Mean Concentrations 2020 - 2021
22.6
22.4
22.2
22
21.8
21.6
21.4
21.2
NO2 Concentration (µg/m3)
2020
2021
DT17
21.7
22.43
Year/NO2 Annual Mean Concentration (µg/m3)

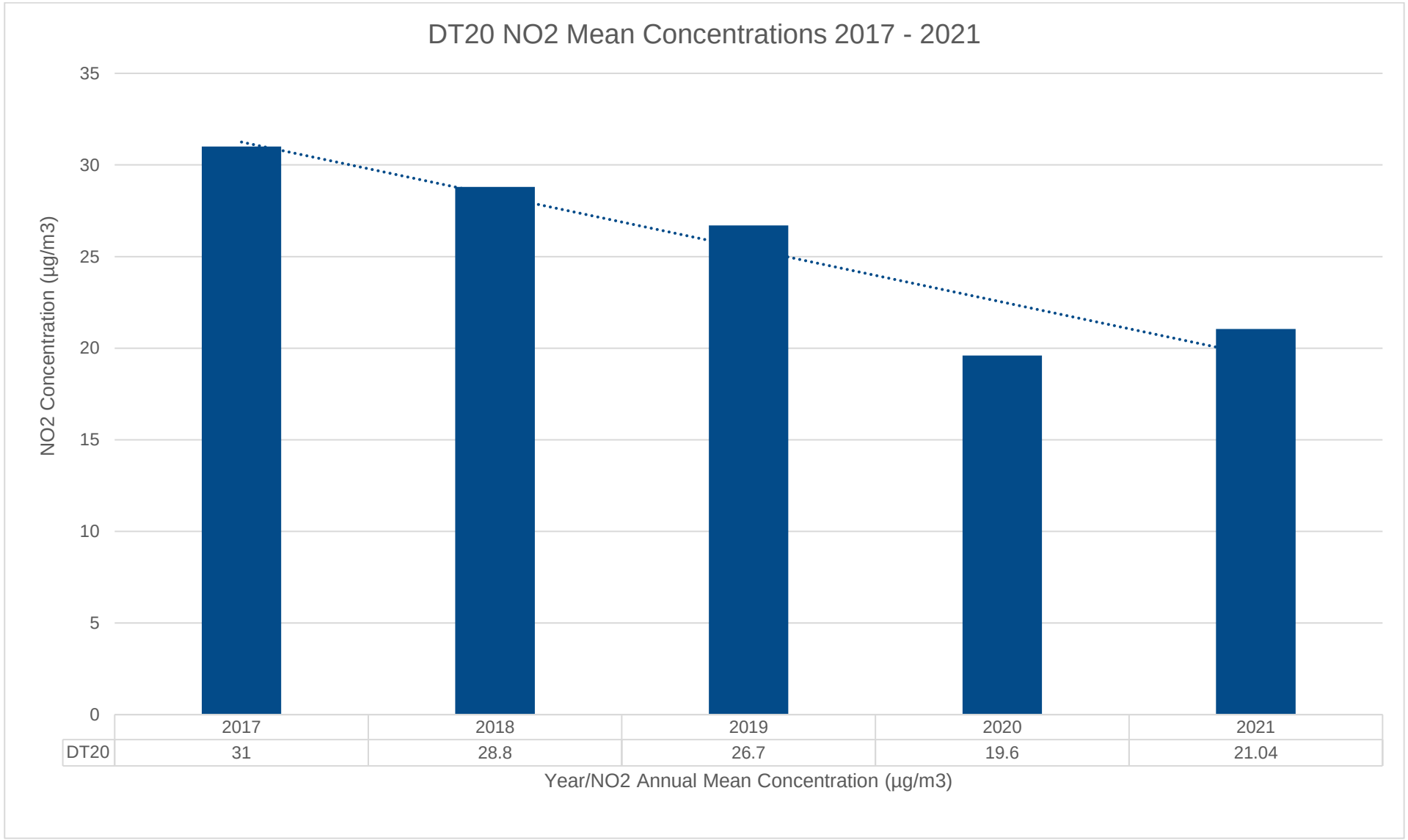
DT18


DT18 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT18
26.6
24.7
25.3
18
20.35
Year/NO2 Annual Mean Concentration (µg/m3)

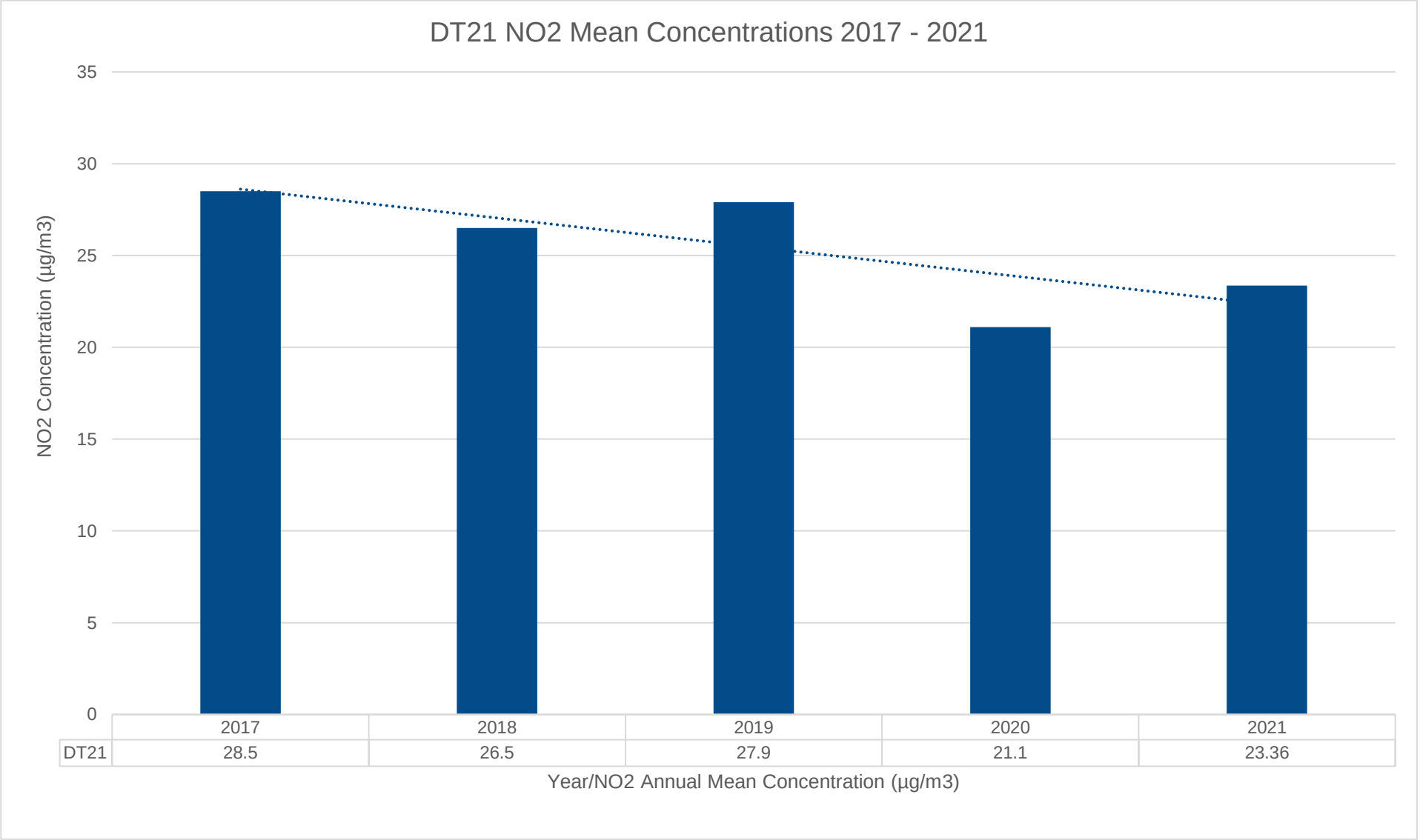
DT19


DT19 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
45
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT19
34.3
31.9
38.4
23.3
24.35
Year/NO2 Annual Mean Concentration (µg/m3)

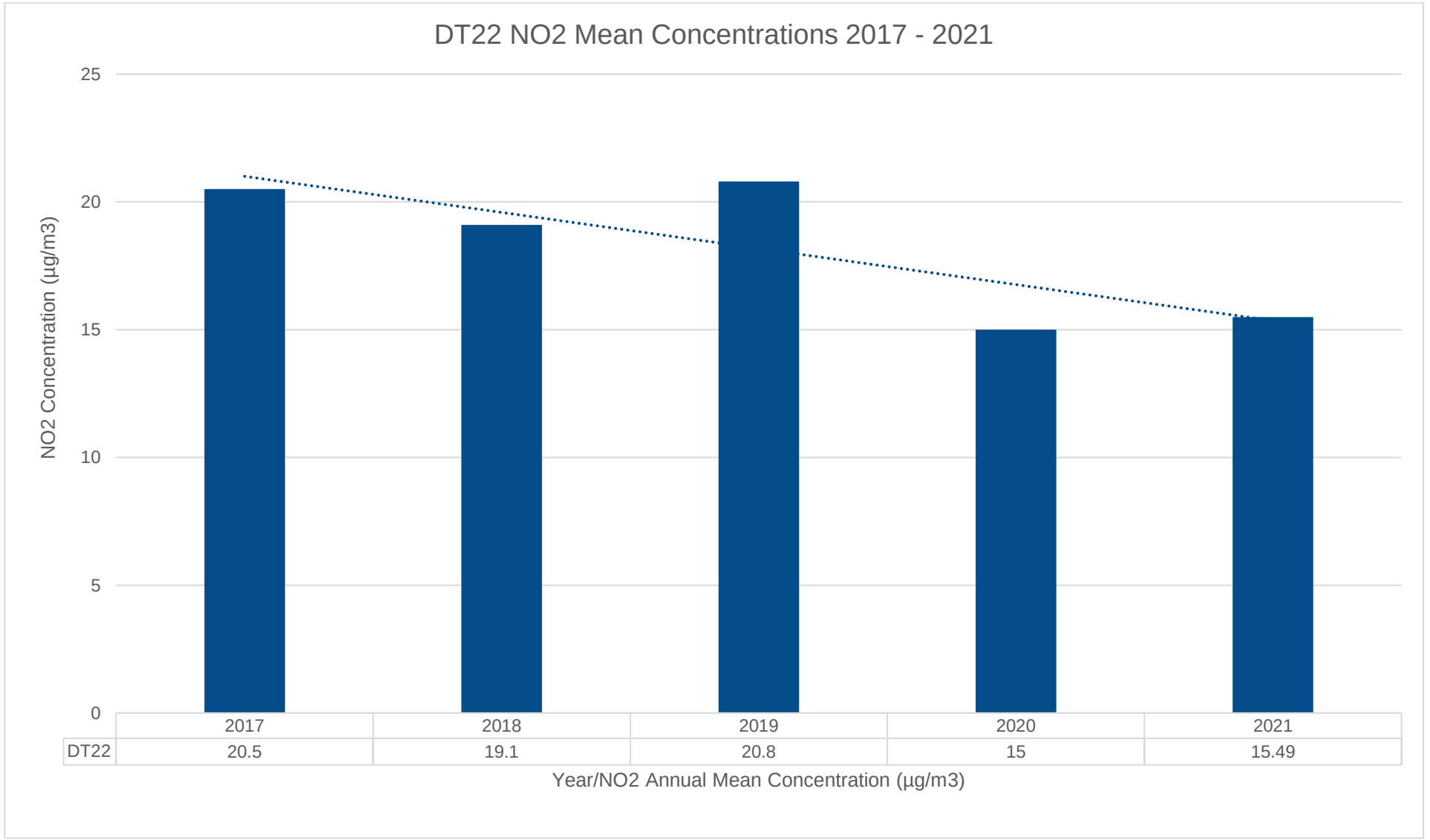
DT20


DT20 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT20
31
28.8
26.7
19.6
21.04
Year/NO2 Annual Mean Concentration (µg/m3)

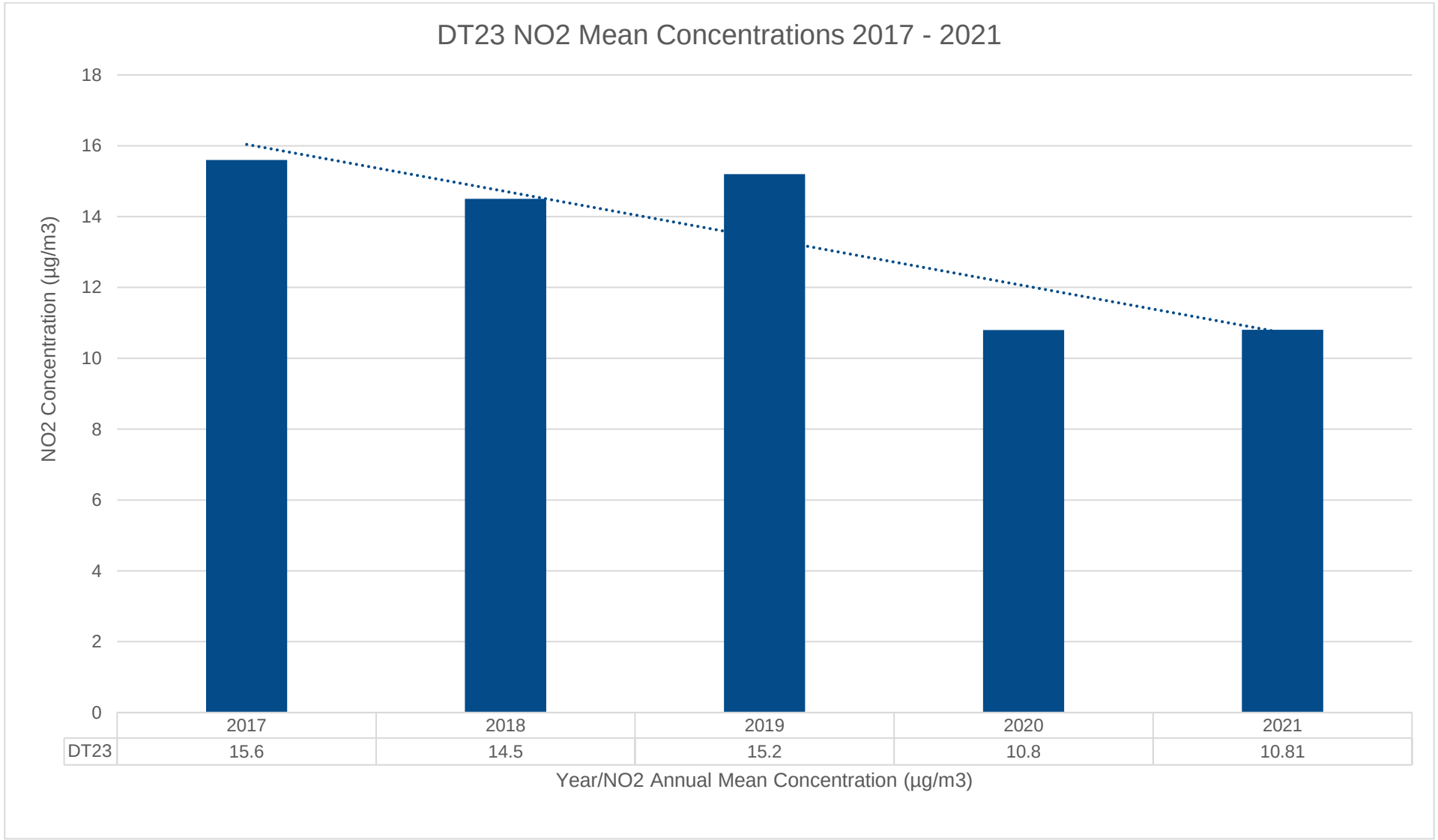
DT21


DT21 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT21
28.5
26.5
27.9
21.1
23.36
Year/NO2 Annual Mean Concentration (µg/m3)

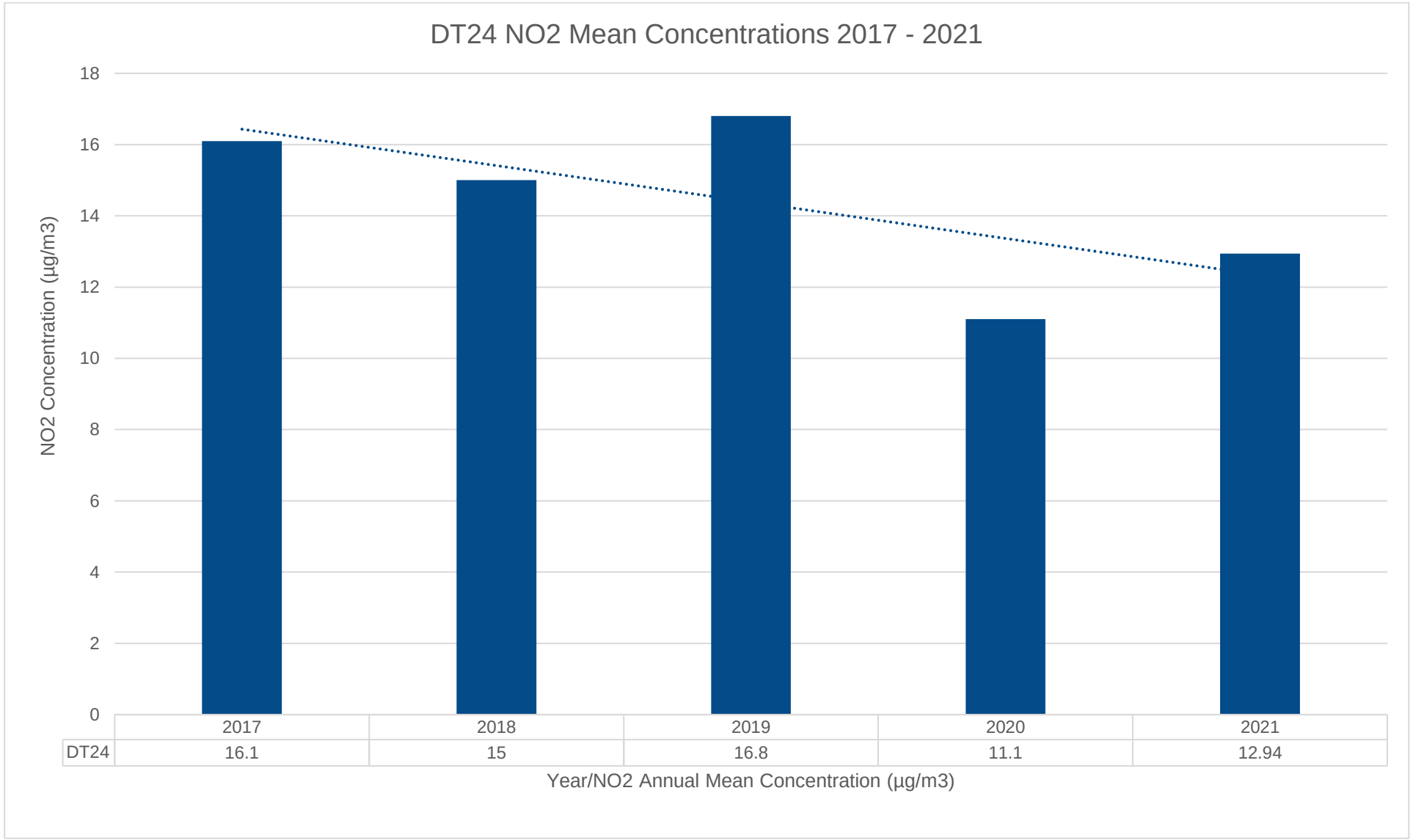
DT22


DT22 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT22
20.5
19.1
20.8
15
15.49
Year/NO2 Annual Mean Concentration (µg/m3)

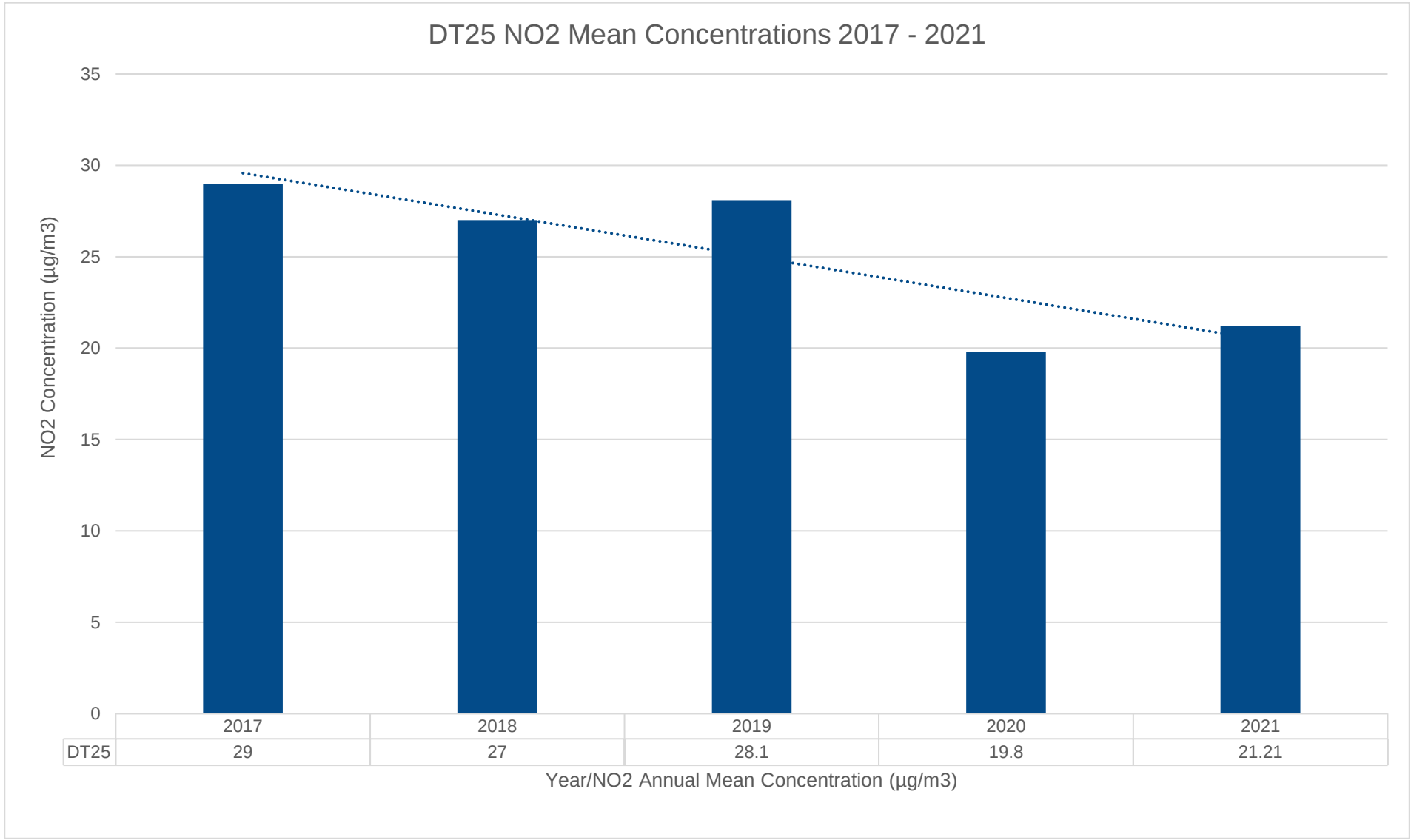
DT23


DT23 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
DT23
15.6
14.5
15.2
10.8
10.81
Year/NO2 Annual Mean Concentration (µg/m3)

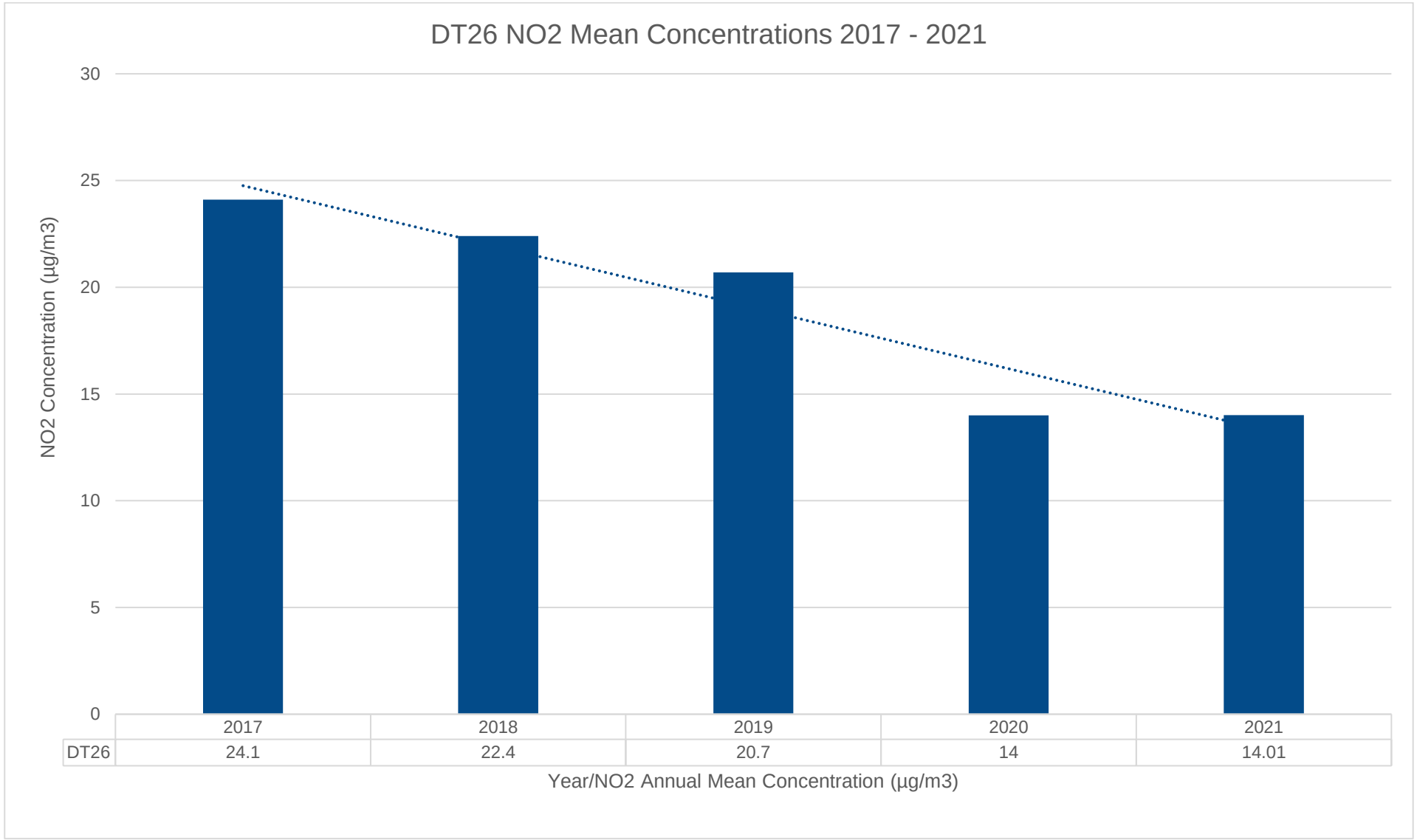
DT24


DT24 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
DT24
16.1
15
16.8
11.1
12.94
Year/NO2 Annual Mean Concentration (µg/m3)

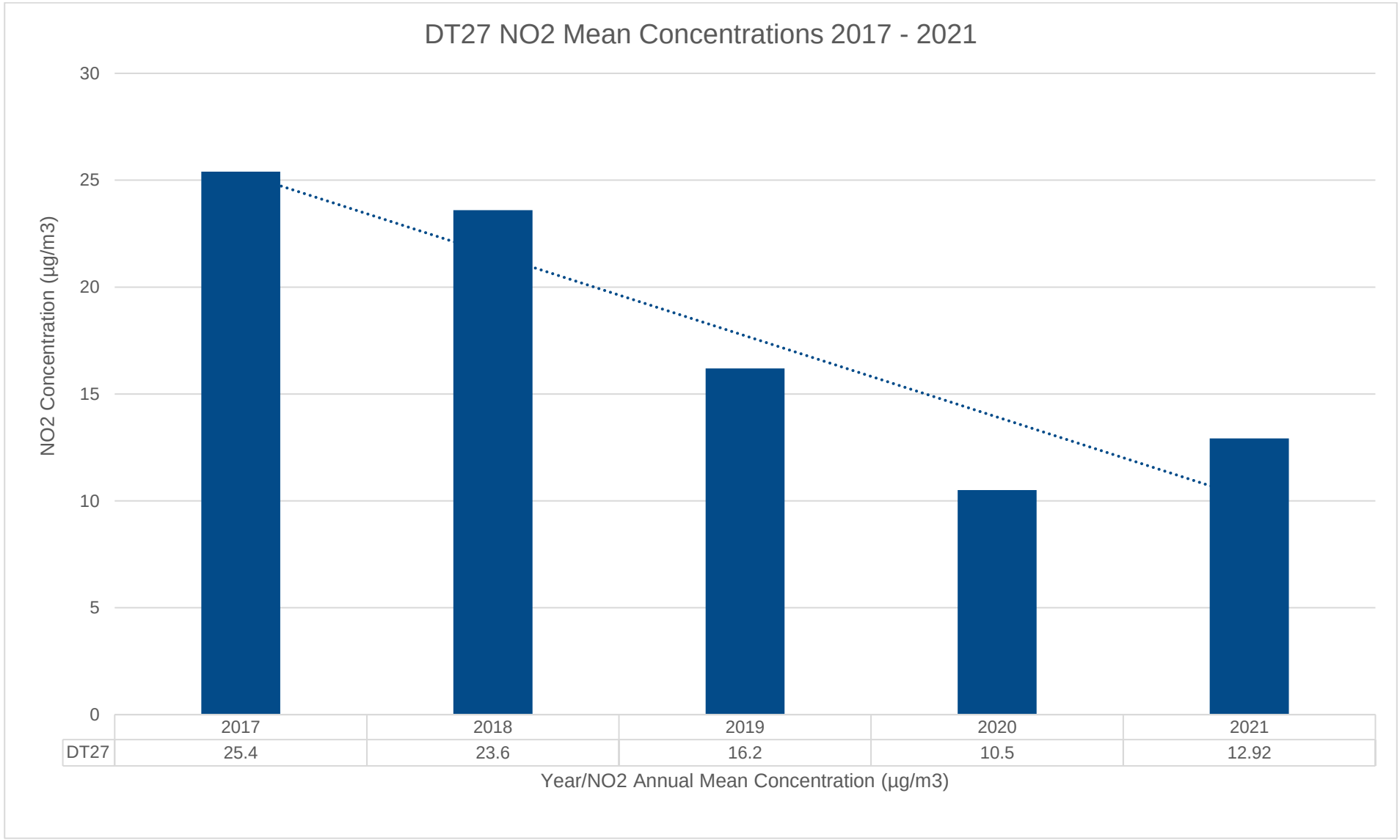
DT25


DT25 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT25
29
27
28.1
19.8
21.21
Year/NO2 Annual Mean Concentration (µg/m3)

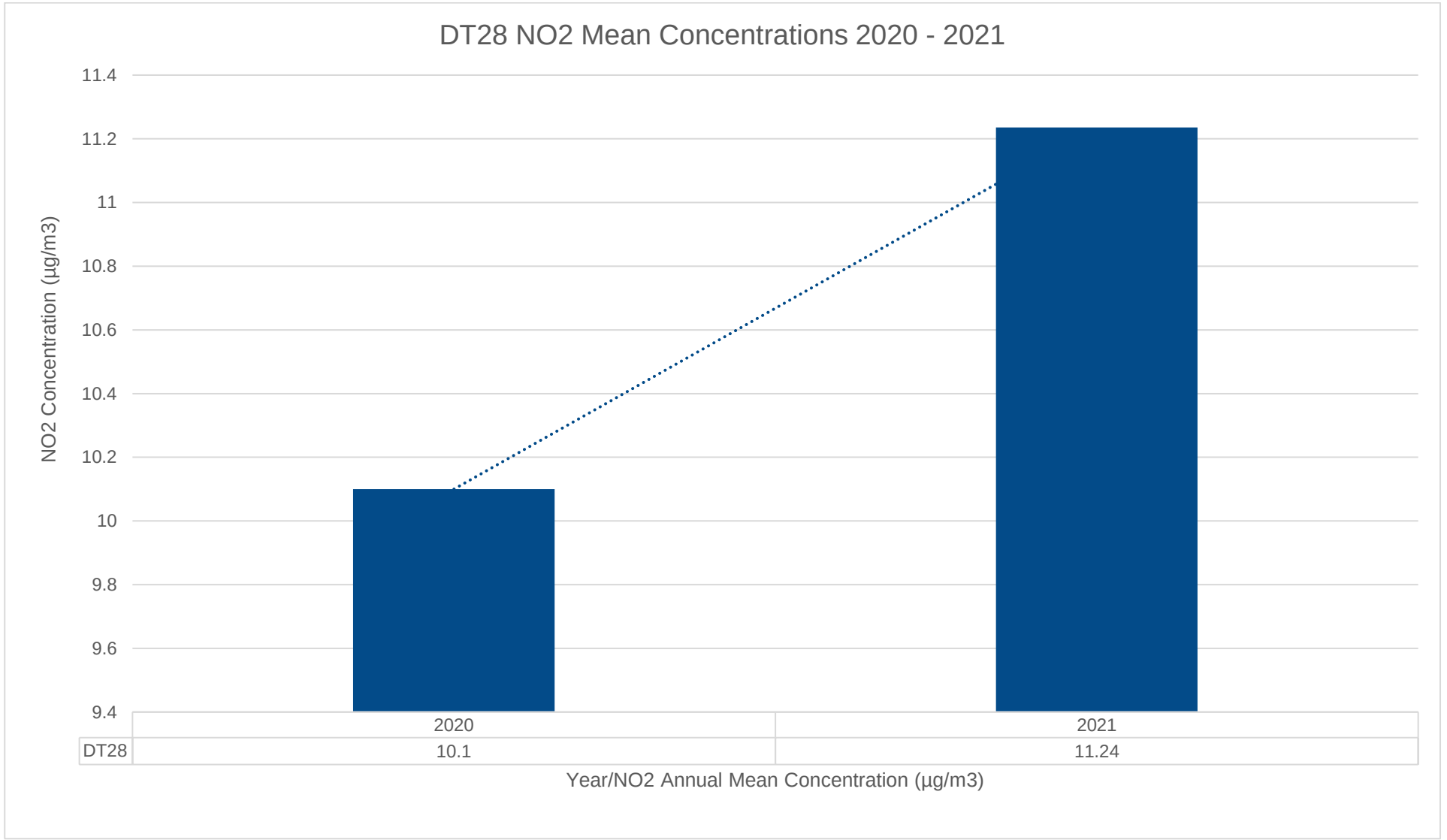
DT26


DT26 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT26
24.1
22.4
20.7
14
14.01
Year/NO2 Annual Mean Concentration (µg/m3)

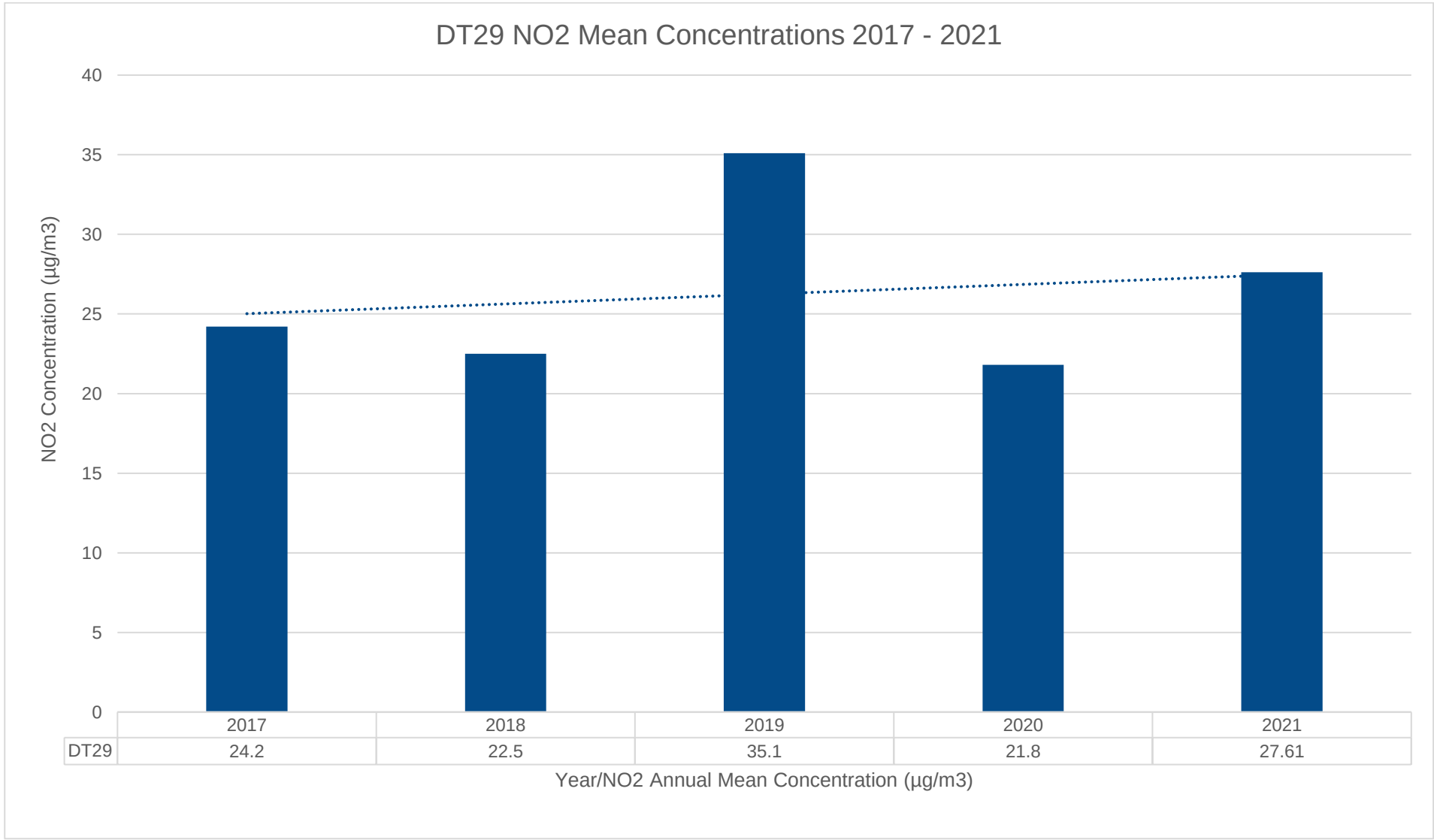
DT27


DT27 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT27
25.4
23.6
16.2
10.5
12.92
Year/NO2 Annual Mean Concentration (µg/m3)

DT28


DT28 NO2 Mean Concentrations 2020 - 2021
11.4
11.2
11
10.8
10.6
10.4
10.2
10
9.8
9.6
9.4
NO2 Concentration (µg/m3)
2020
2021
DT28
10.1
11.24
Year/NO2 Annual Mean Concentration (µg/m3)

DT29


DT29 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
DT29
24.2
22.5
35.1
21.8
27.61
Year/NO2 Annual Mean Concentration (µg/m3)

DT30

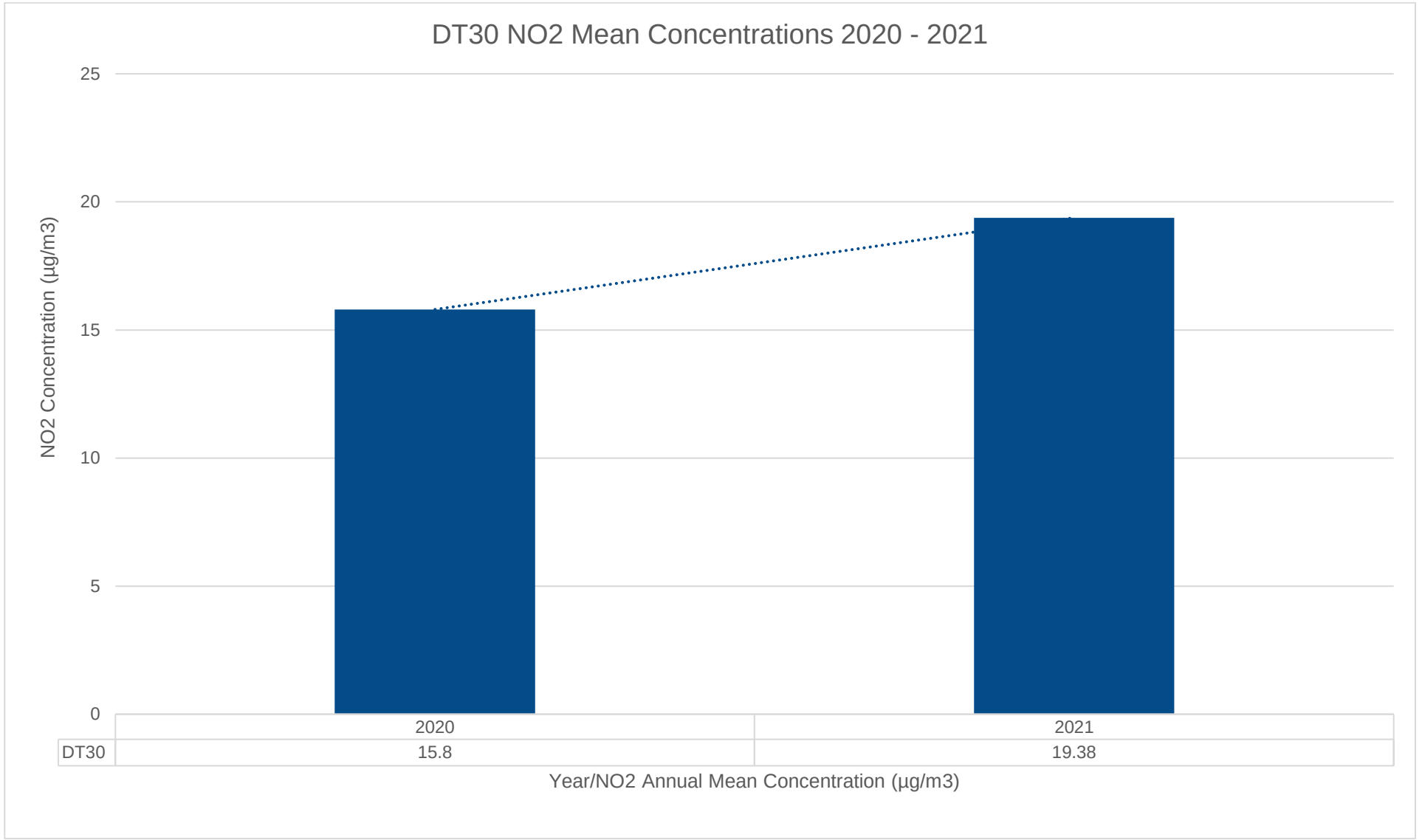
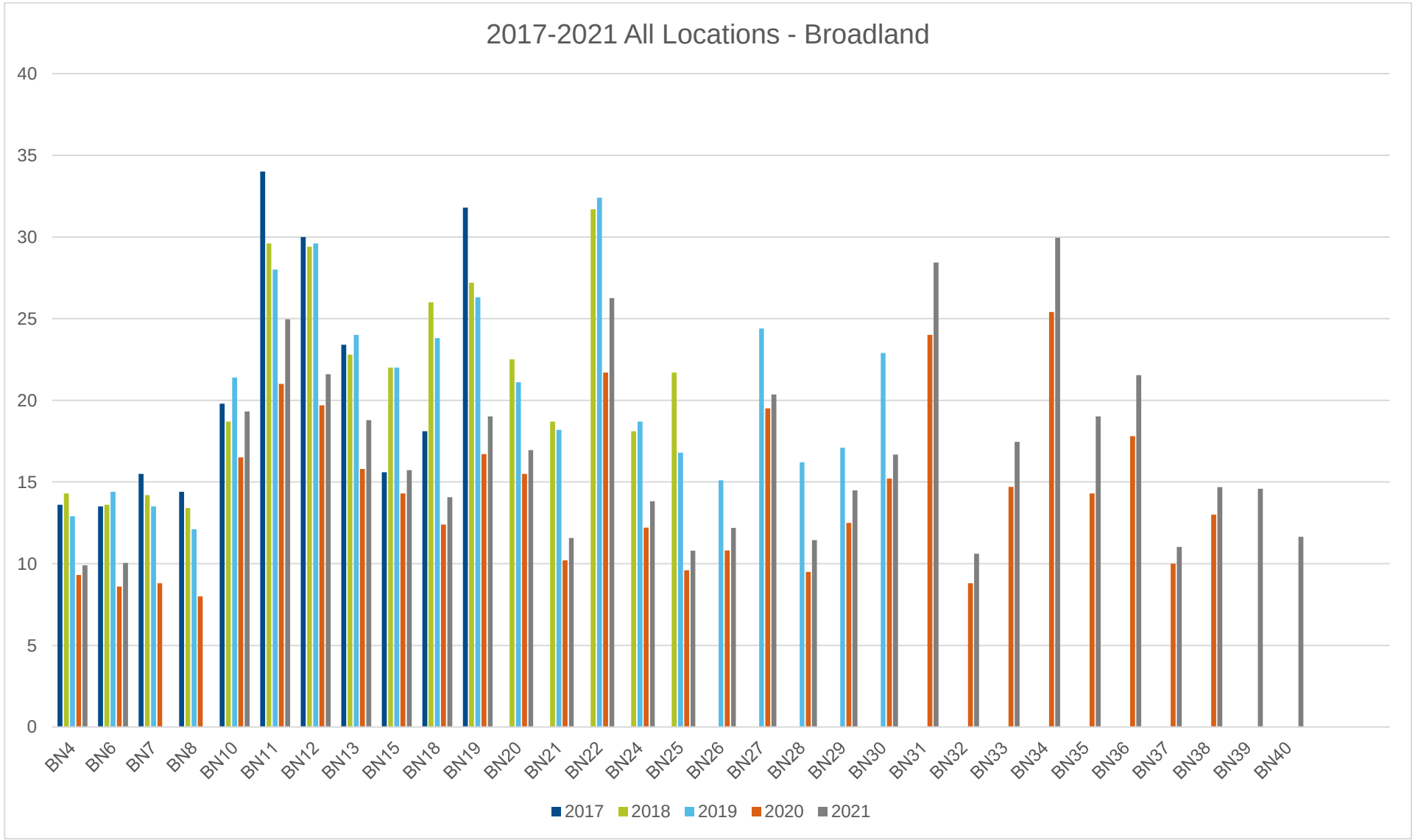
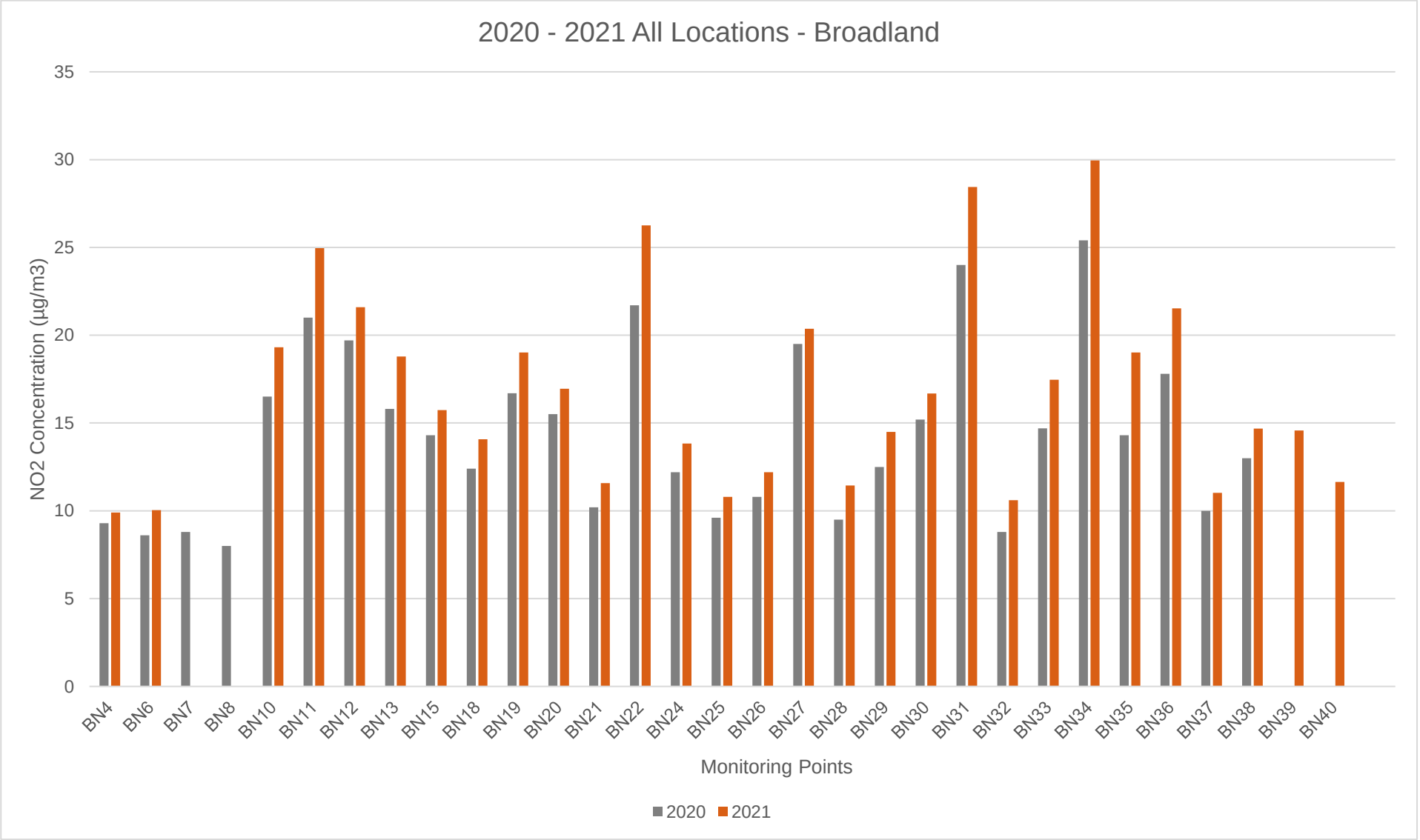

DT30 NO2 Mean Concentrations 2020 - 2021
25
20
15
10
5
0
NO2 Concentration (µg/m3)
2020
2021
DT30
15.8
19.38
Year/NO2 Annual Mean Concentration (µg/m3)

Figure A.2 – Trends in Annual Mean NO_2 Concentrations - Broadland

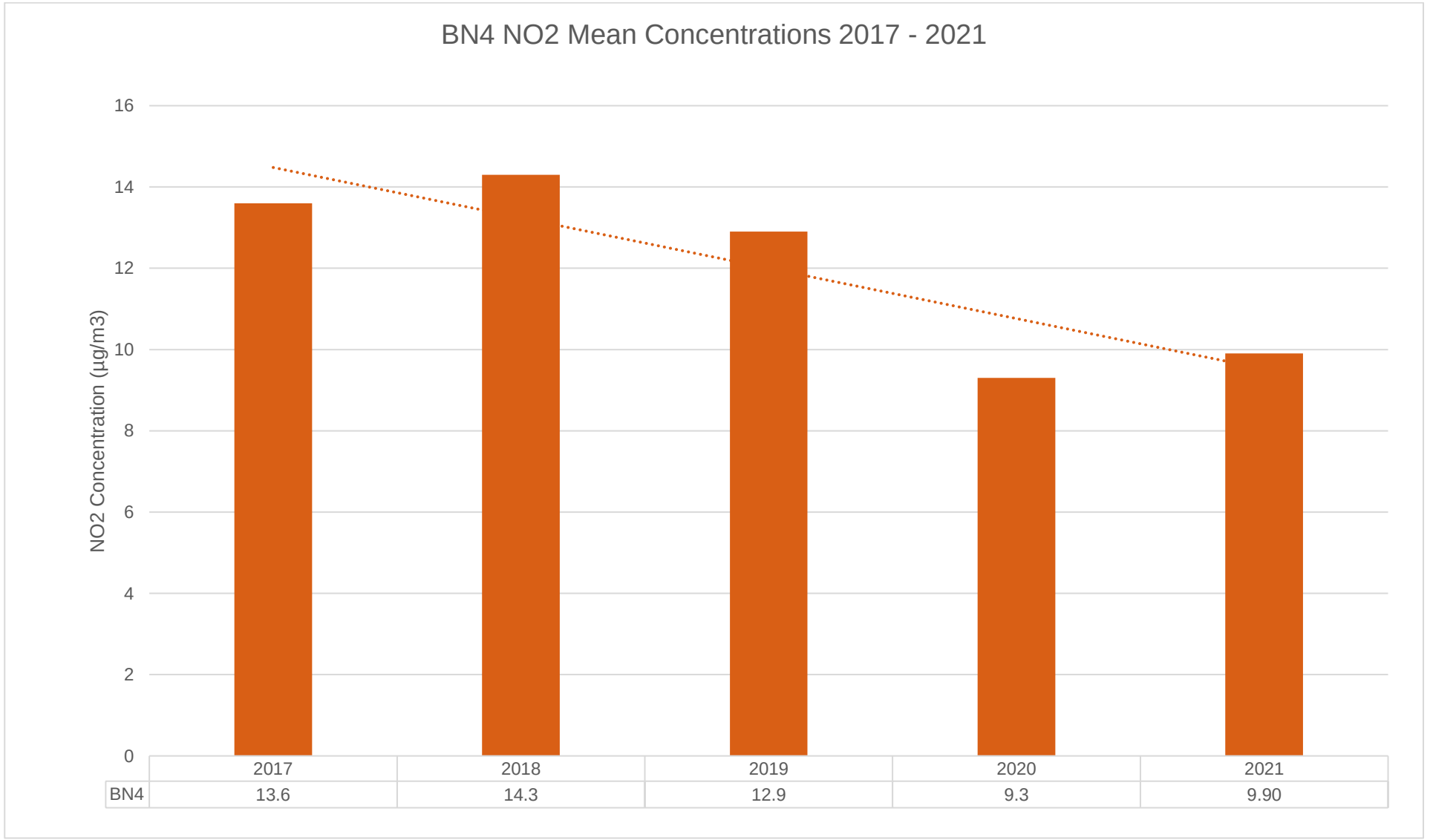
Concentrations recorded at Broadland sites 2017-2021



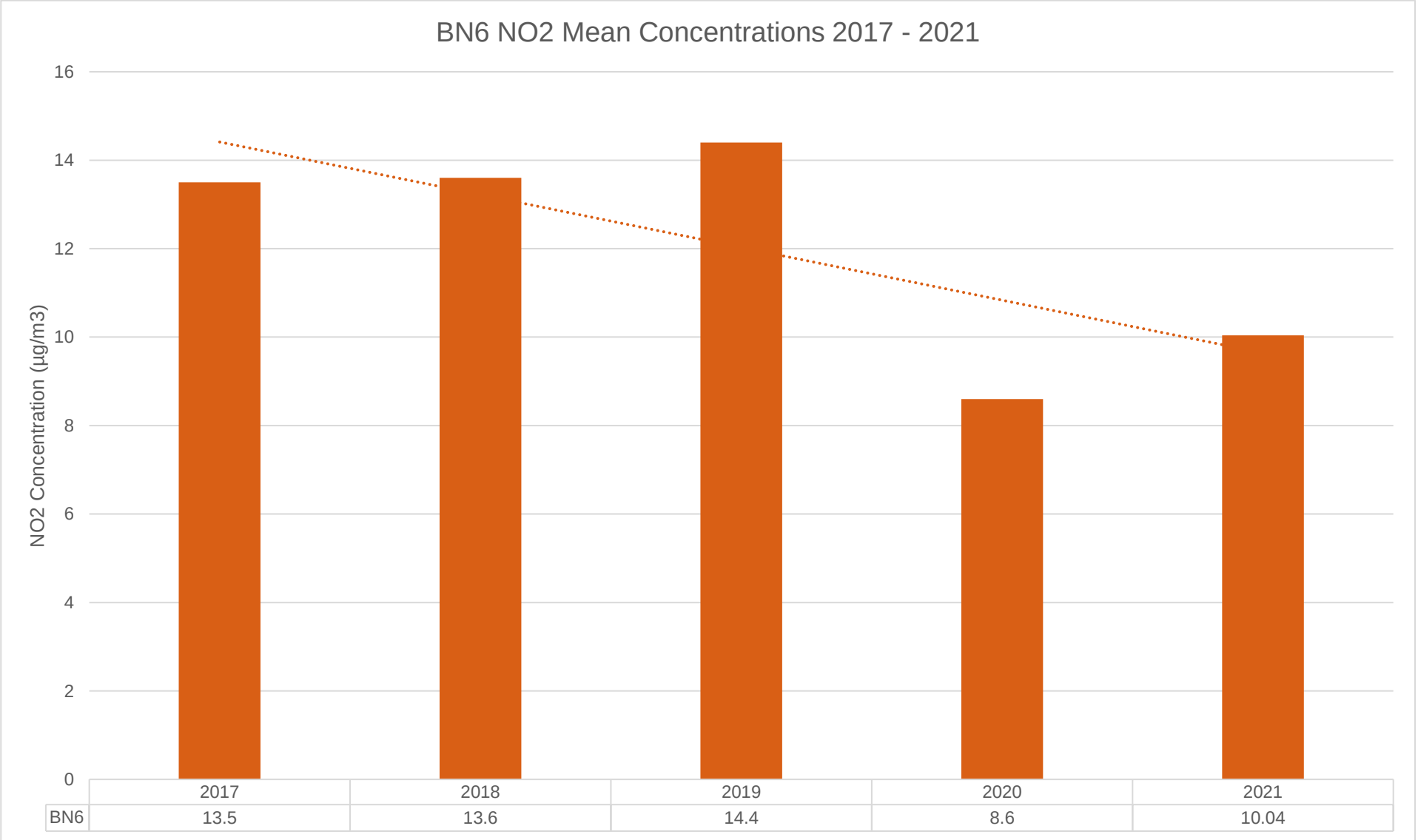
Concentrations recorded at Broadland sites 2020-2021



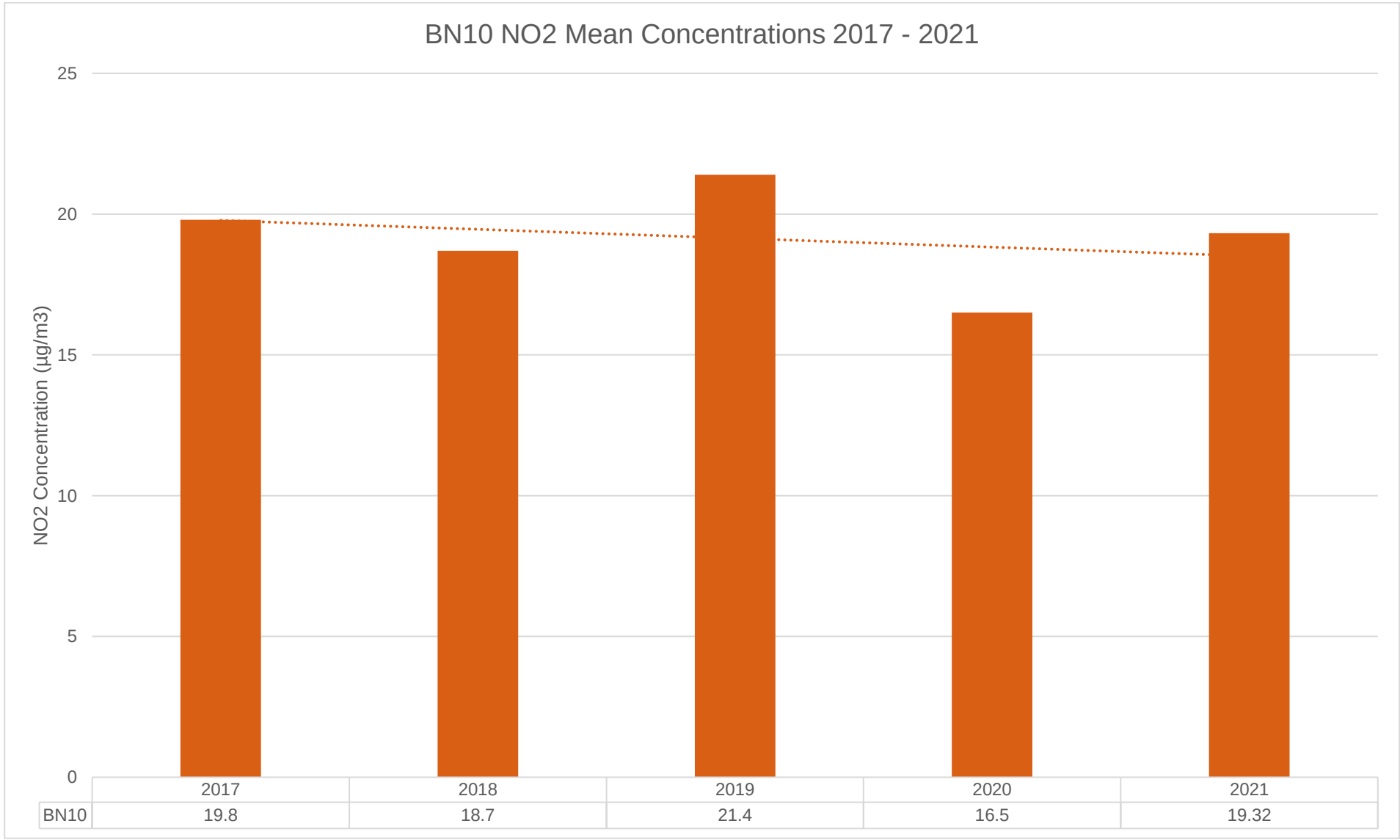
BN4


BN4 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
BN4
13.6
14.3
12.9
9.3
9.90

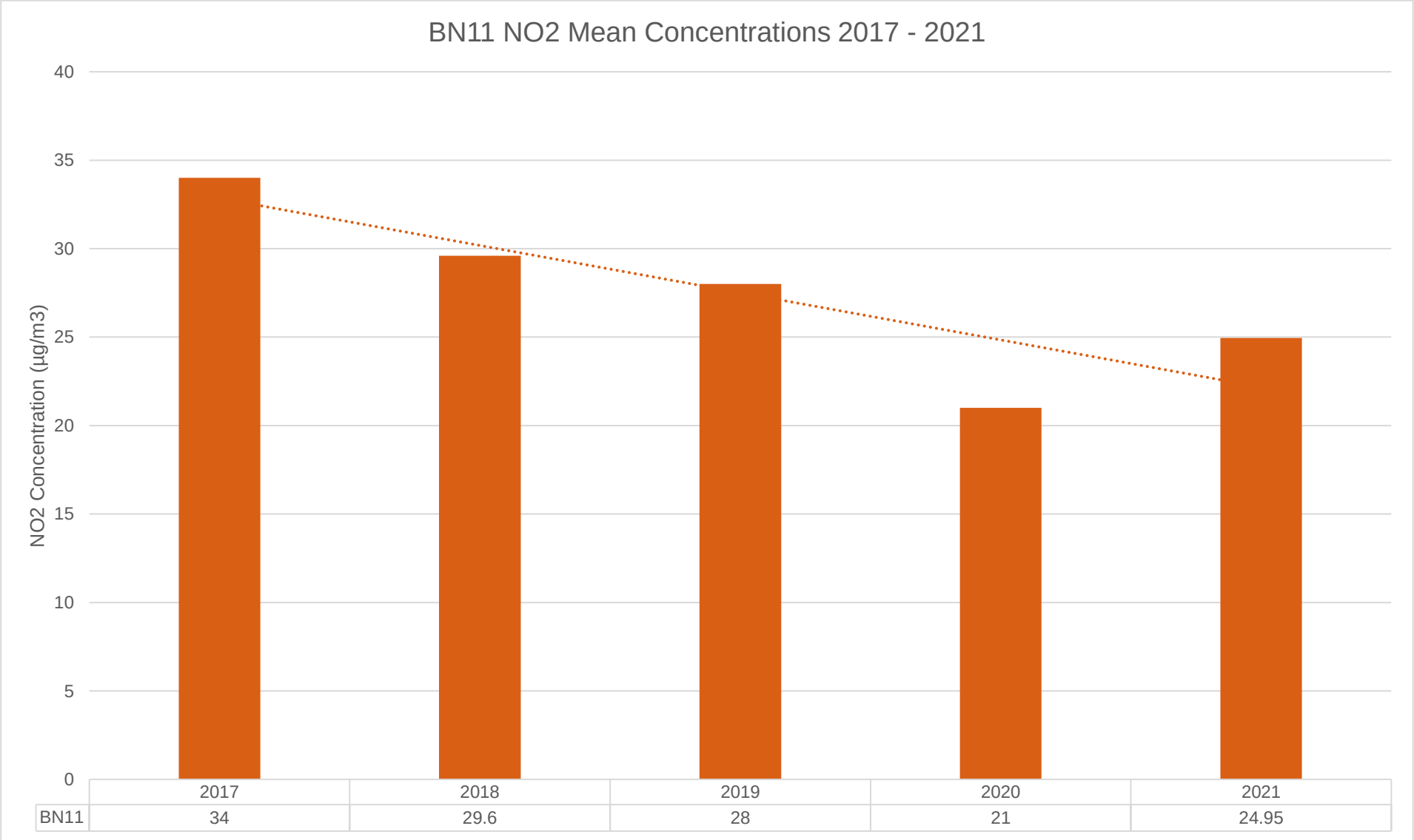
BN6


BN6 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
16
14
12
10
8
6
4
2
0
2017
2018
2019
2020
2021
BN6
13.5
13.6
14.4
8.6
10.04

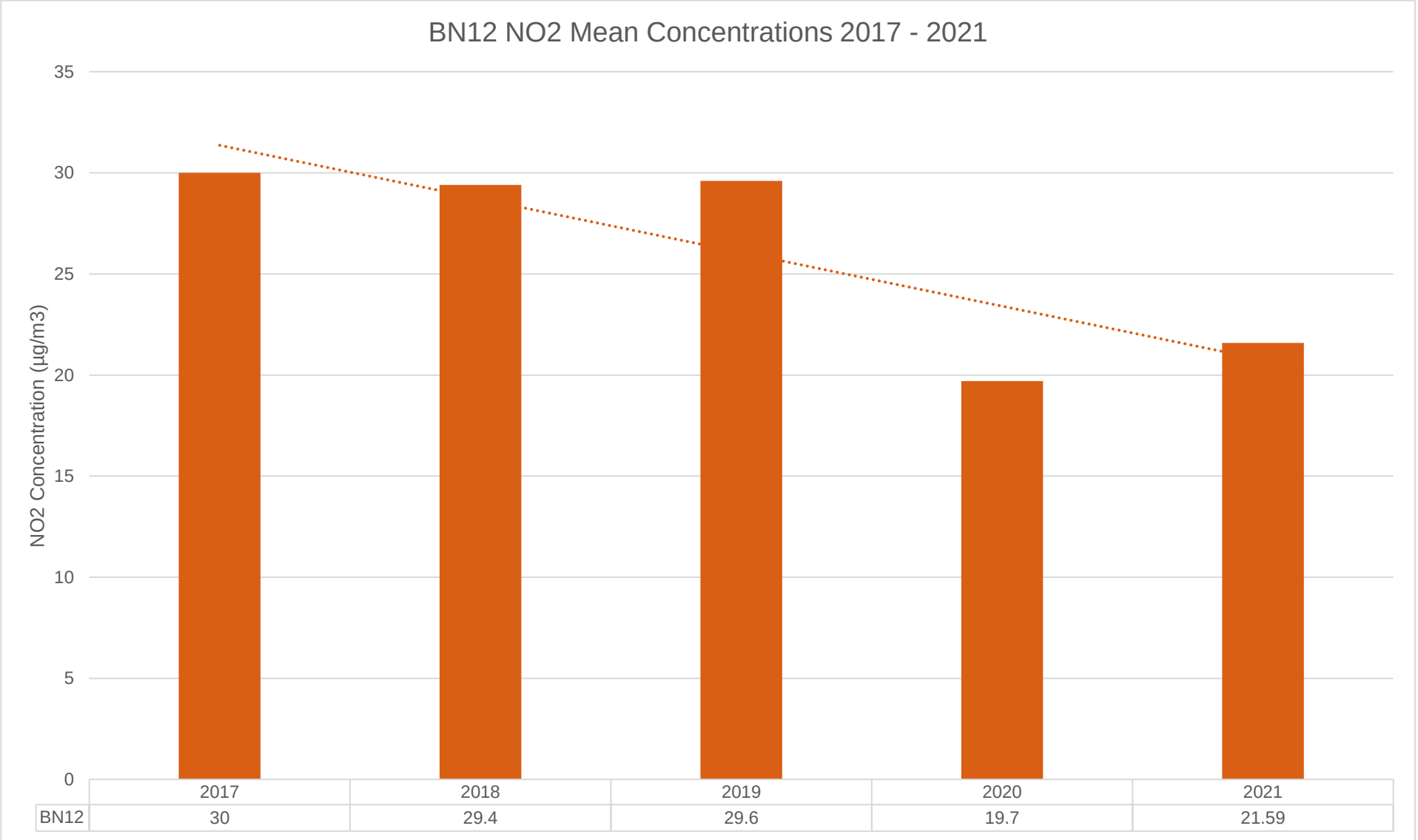
BN10


BN10 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
BN10
19.8
18.7
21.4
16.5
19.32

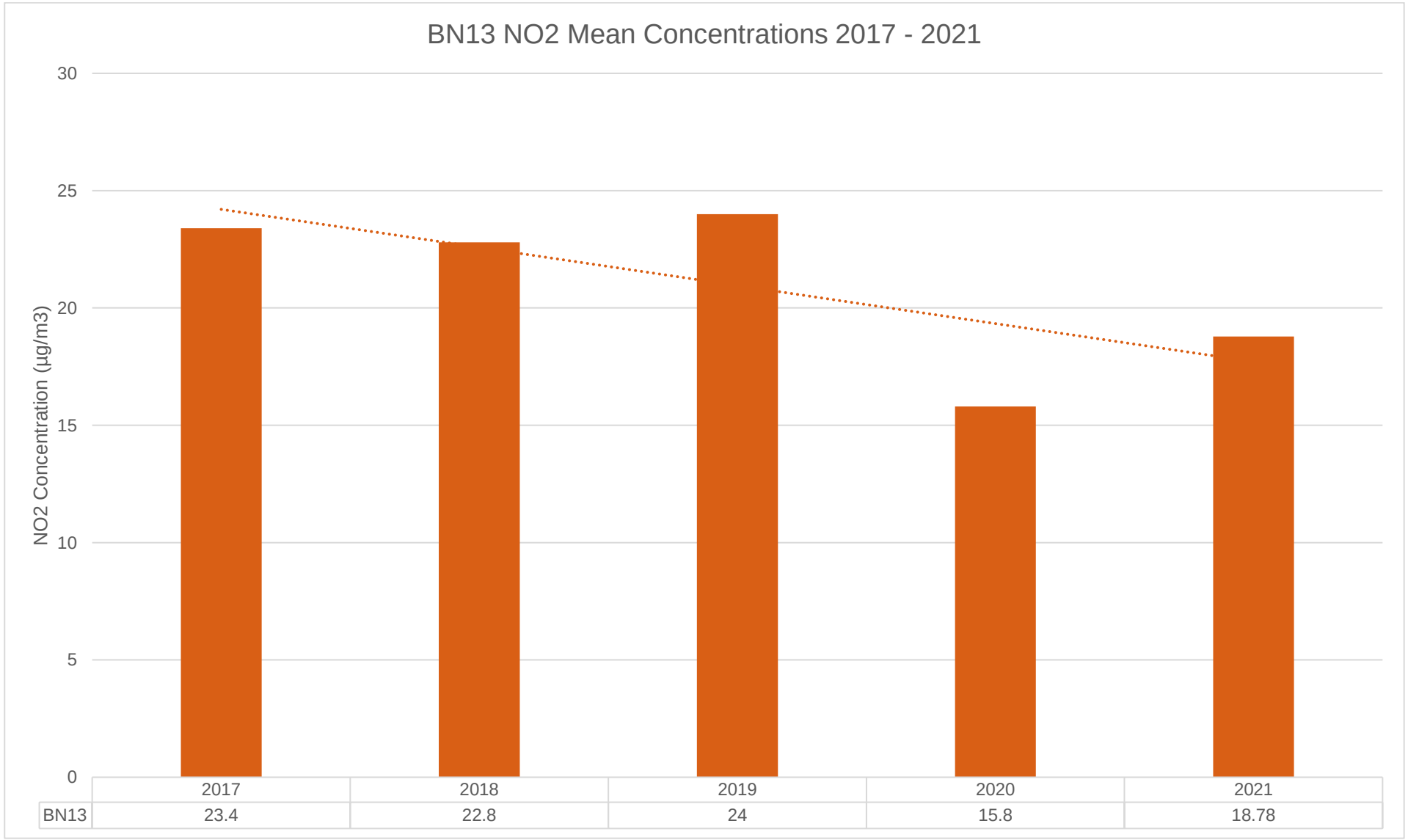
BN11


BN11 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
40
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
BN11
34
29.6
28
21
24.95

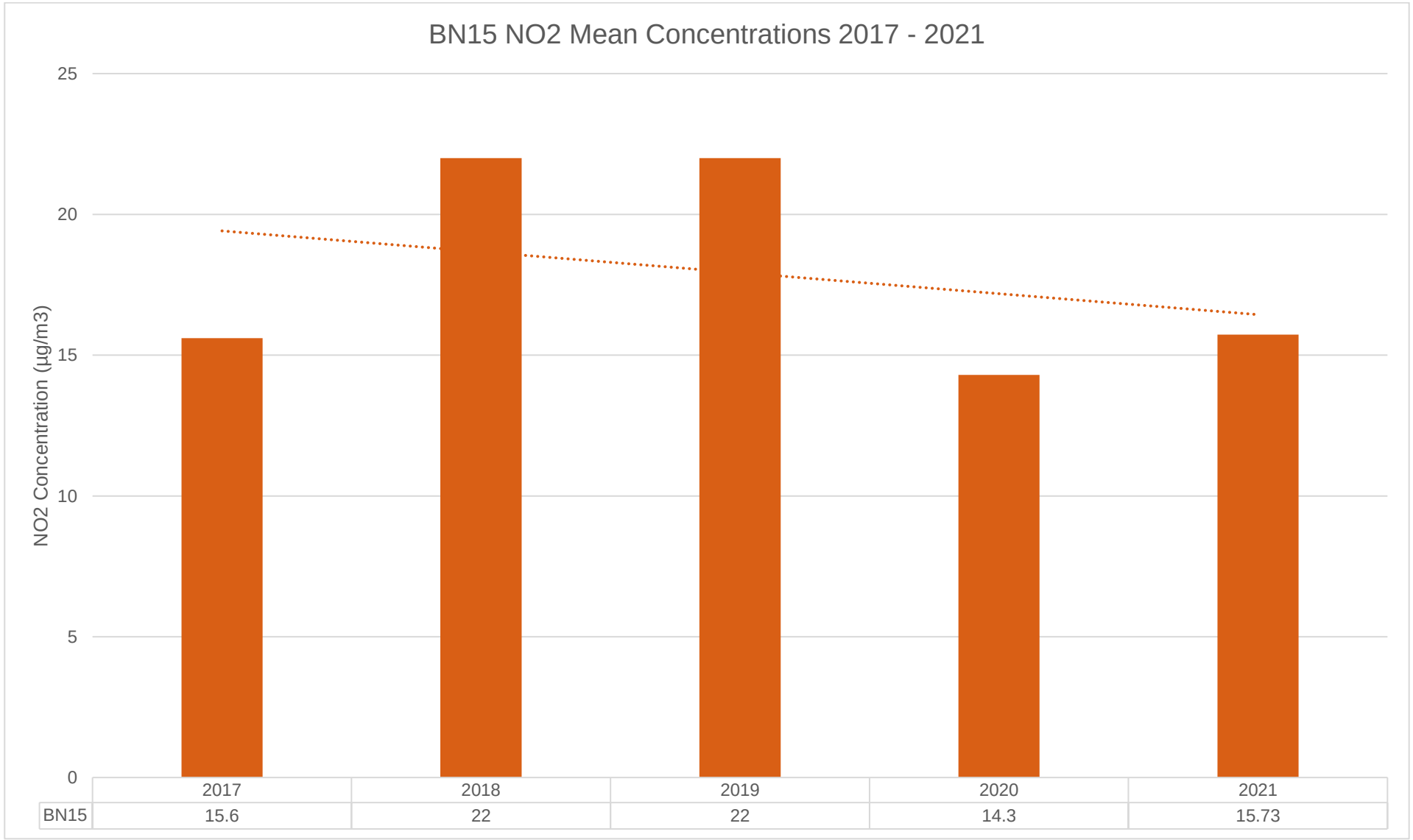
BN12


BN12 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
BN12
30
29.4
29.6
19.7
21.59

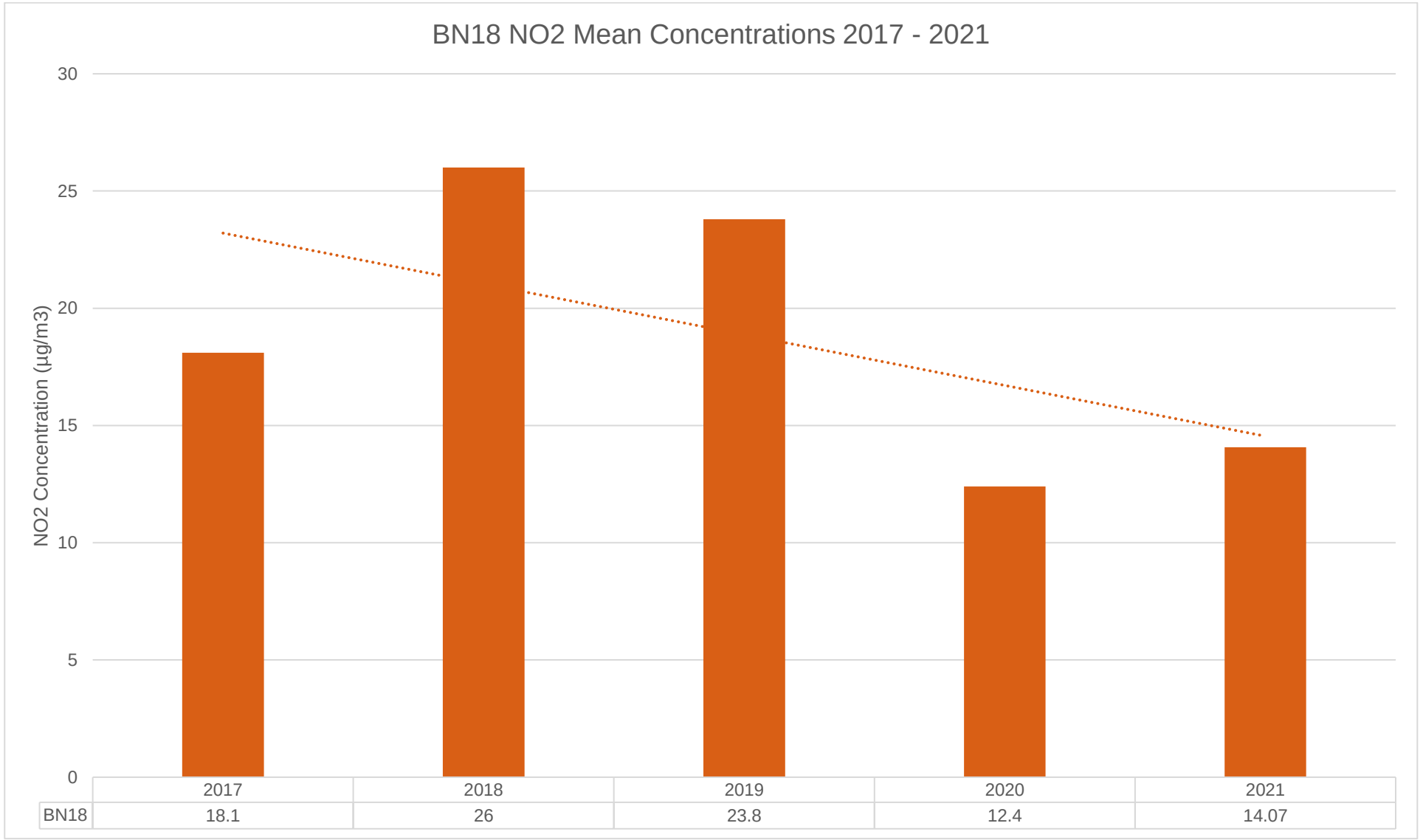
BN13


BN13 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
BN13
23.4
22.8
24
15.8
18.78

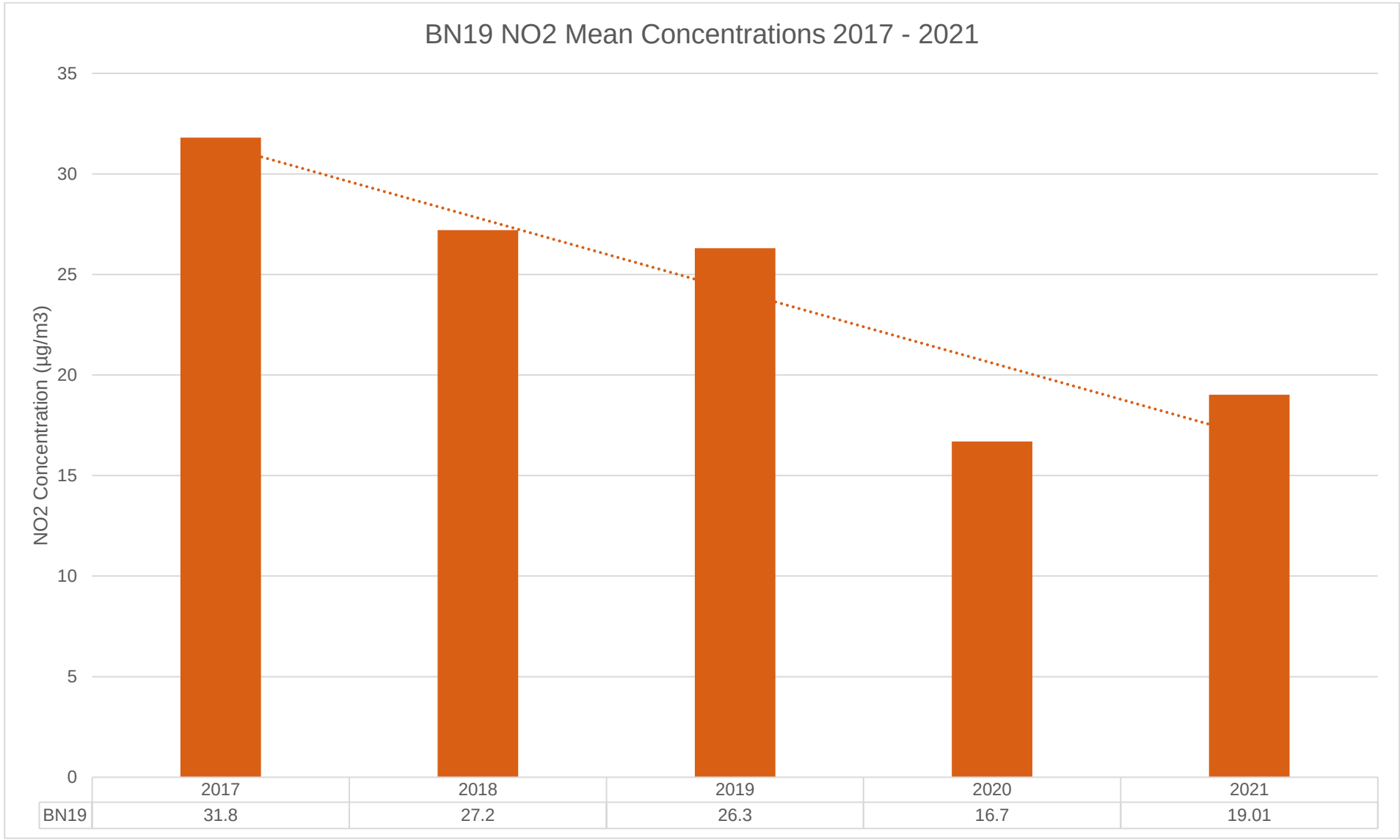
BN15


BN15 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2017
2018
2019
2020
2021
BN15
15.6
22
22
14.3
15.73

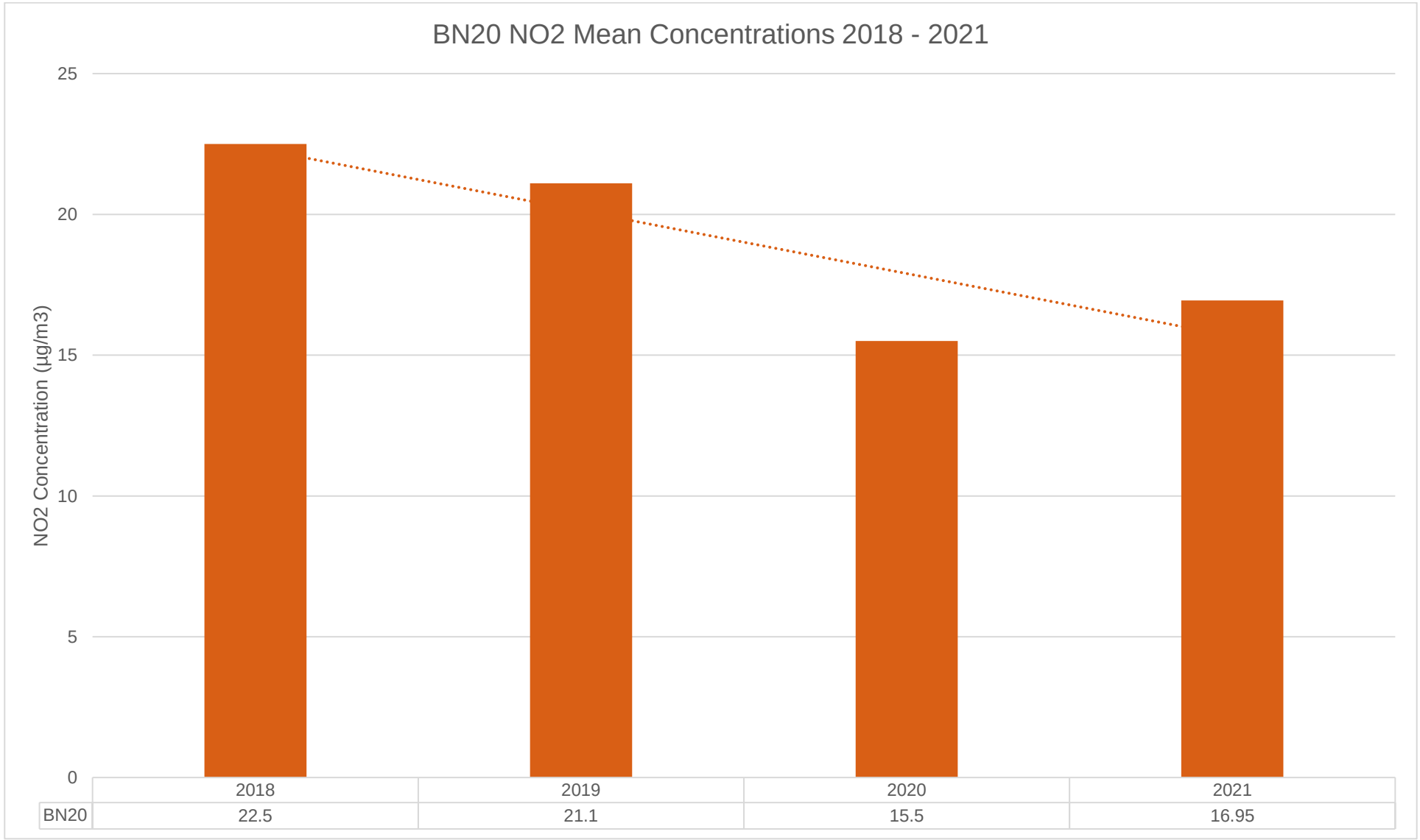
BN18


BN18 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
BN18
18.1
26
23.8
12.4
14.07

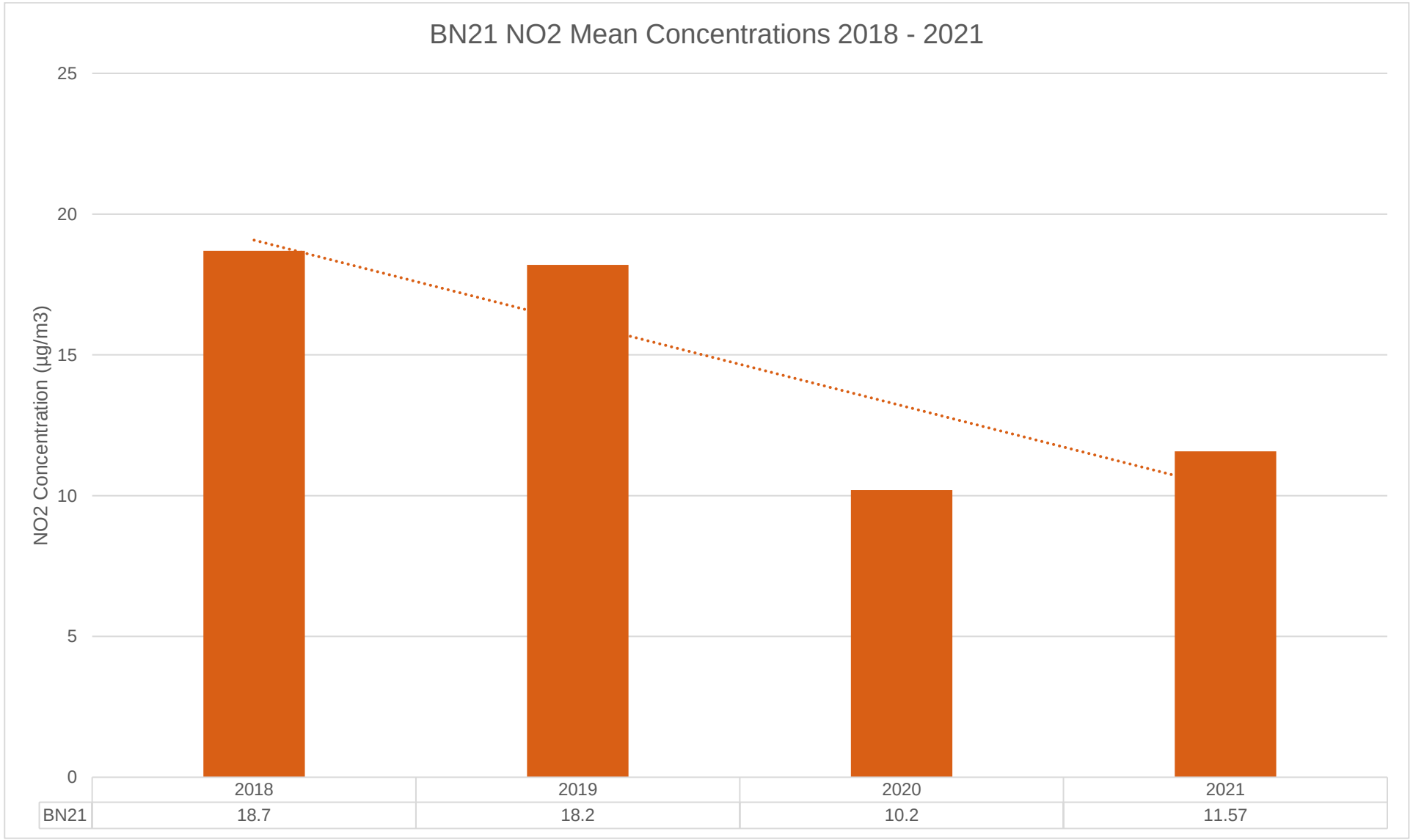
BN19


BN19 NO2 Mean Concentrations 2017 - 2021
NO2 Concentration (µg/m3)
35
30
25
20
15
10
5
0
2017
2018
2019
2020
2021
BN19
31.8
27.2
26.3
16.7
19.01

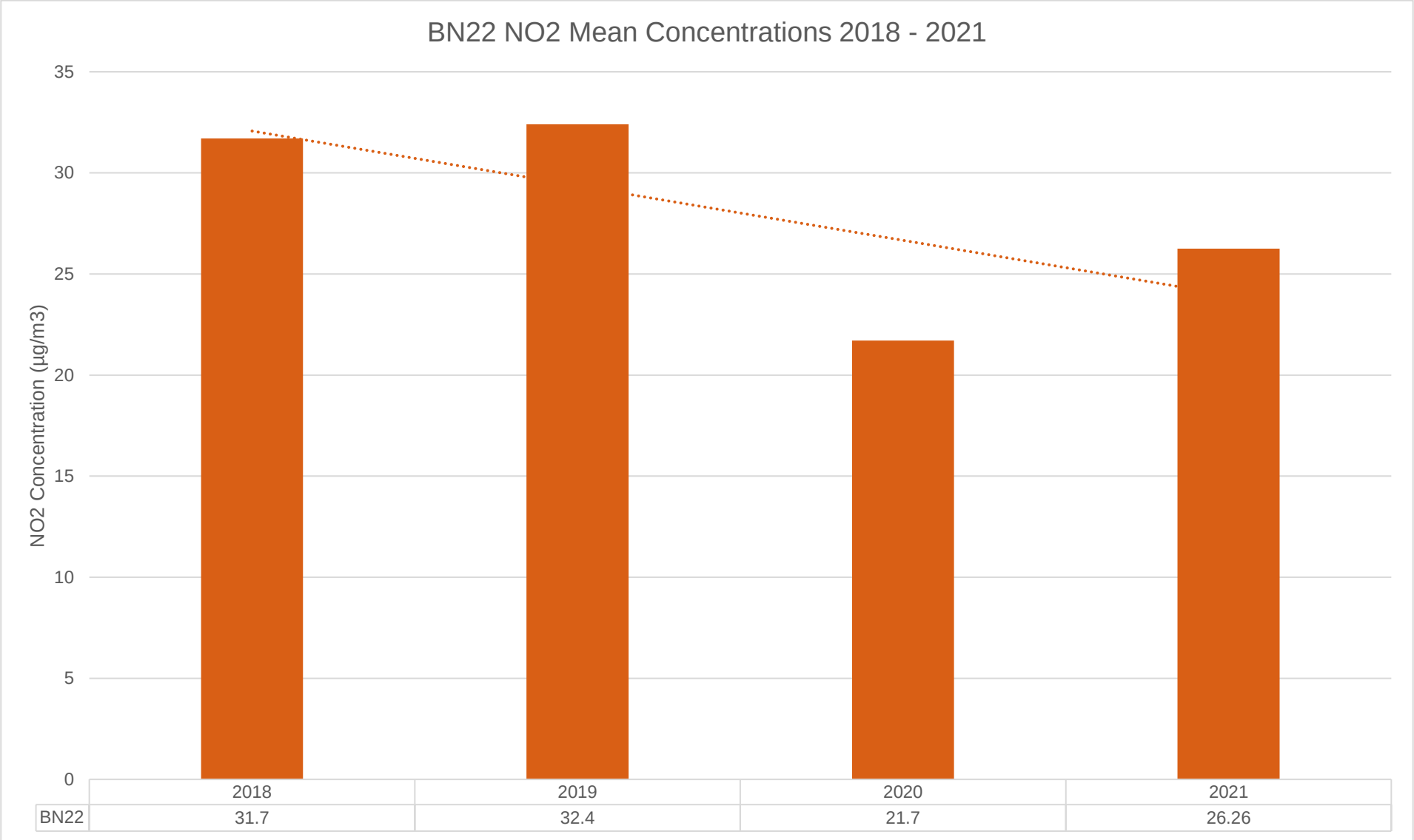
BN20


BN20 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2018
2019
2020
2021
BN20
22.5
21.1
15.5
16.95

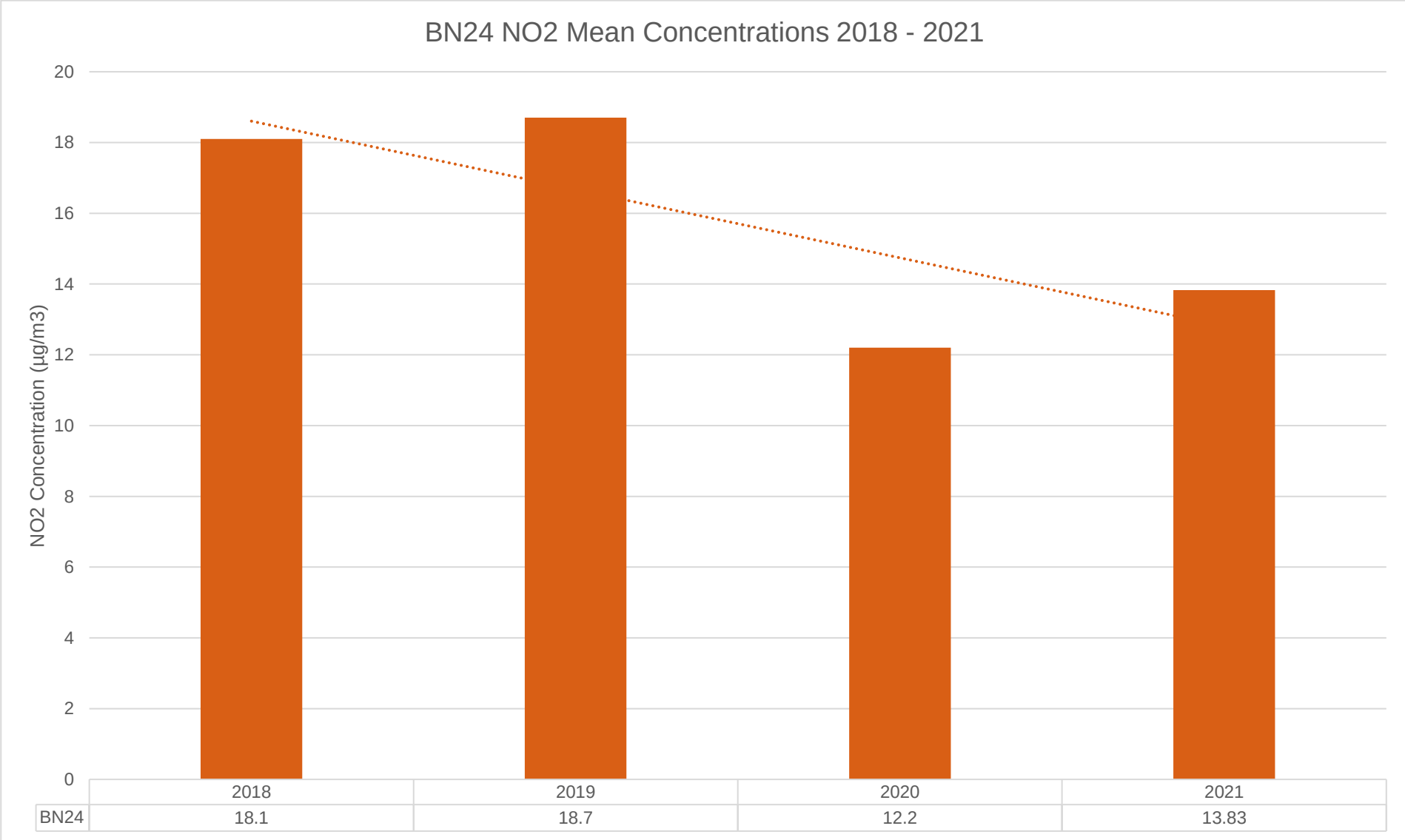
BN21


BN21 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2018
2019
2020
2021
BN21
18.7
18.2
10.2
11.57

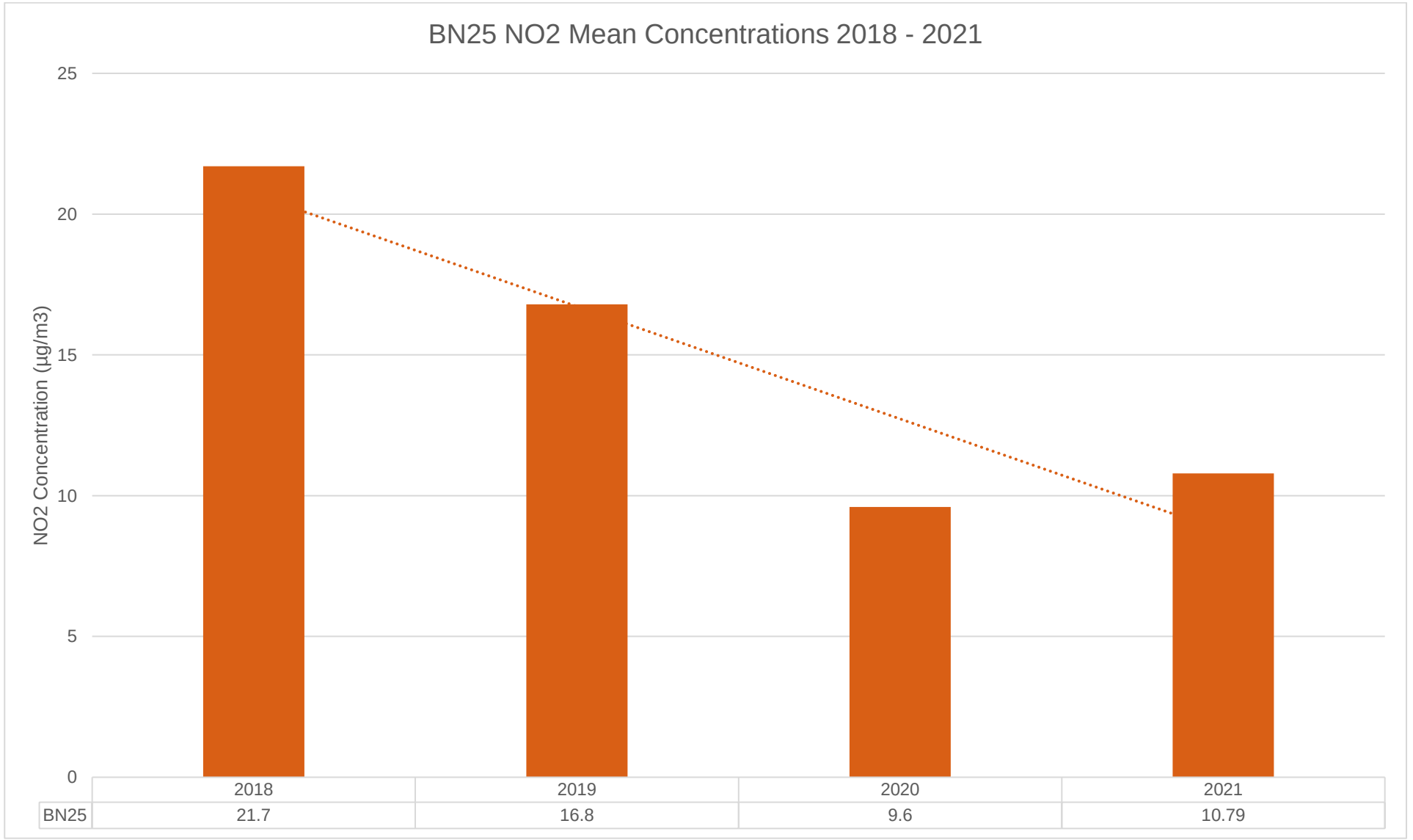
BN22


BN22 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
35
30
25
20
15
10
5
0
2018
2019
2020
2021
BN22
31.7
32.4
21.7
26.26

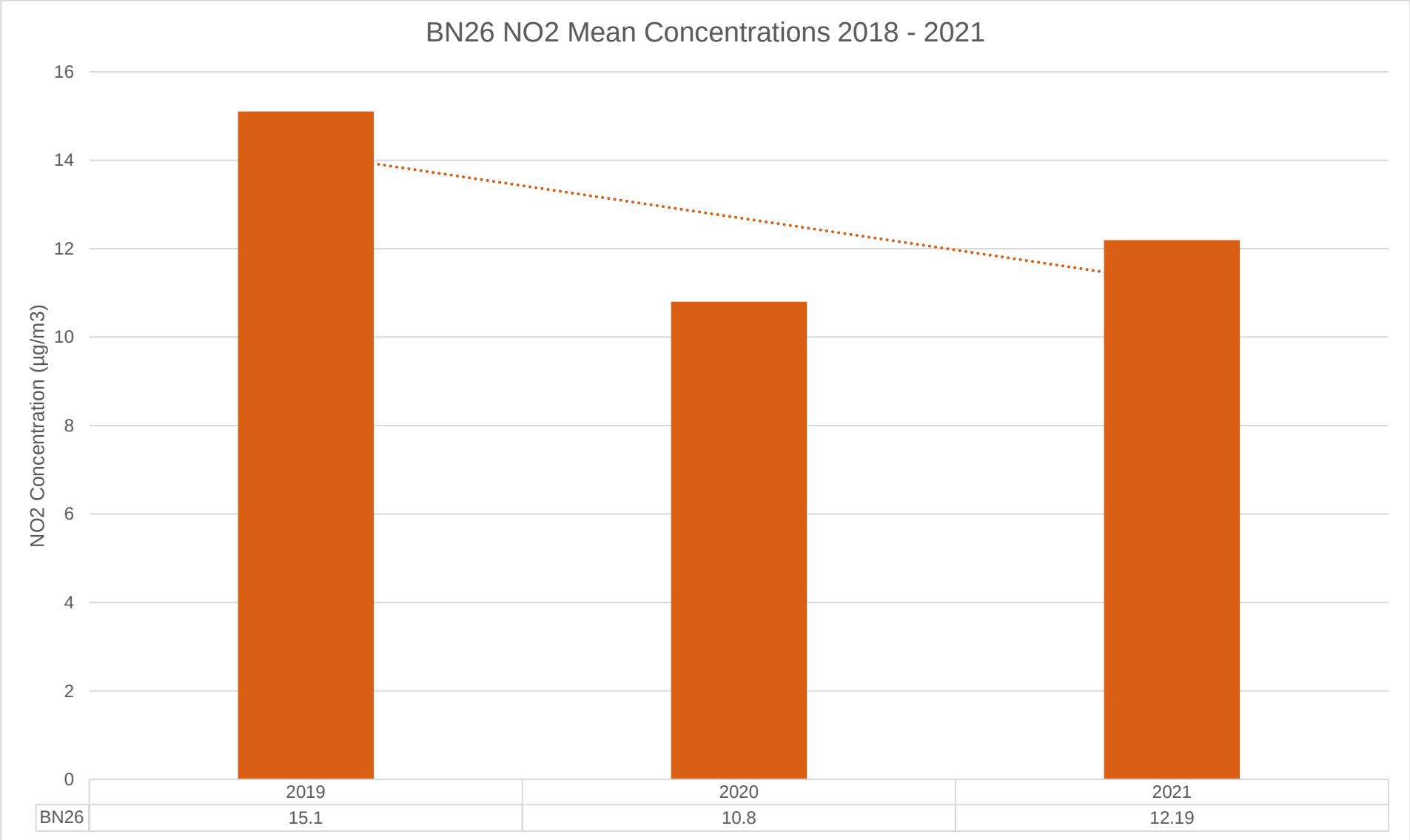
BN24


BN24 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
20
18
16
14
12
10
8
6
4
2
0
2018
2019
2020
2021
BN24
18.1
18.7
12.2
13.83

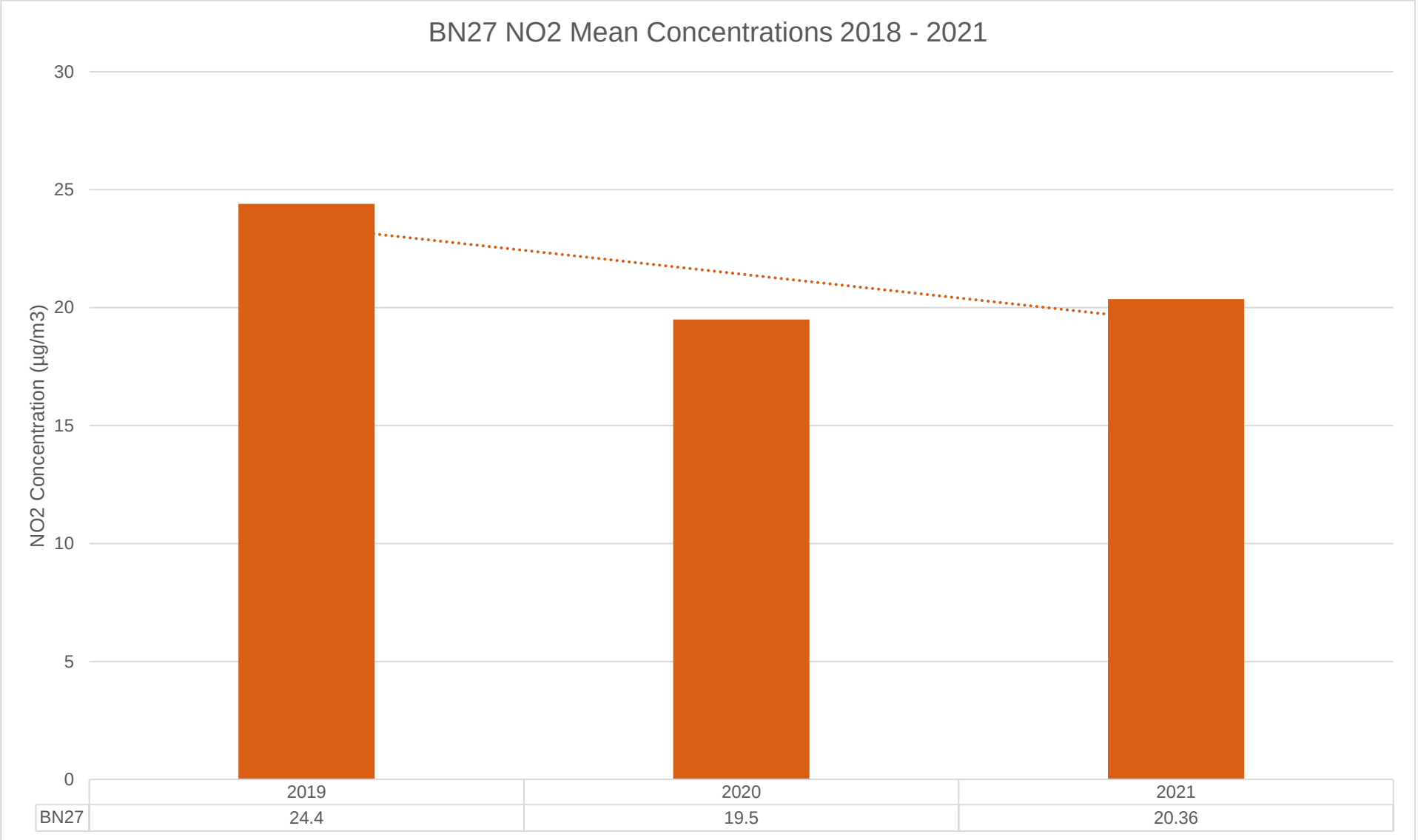
BN25


BN25 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2018
2019
2020
2021
BN25
21.7
16.8
9.6
10.79

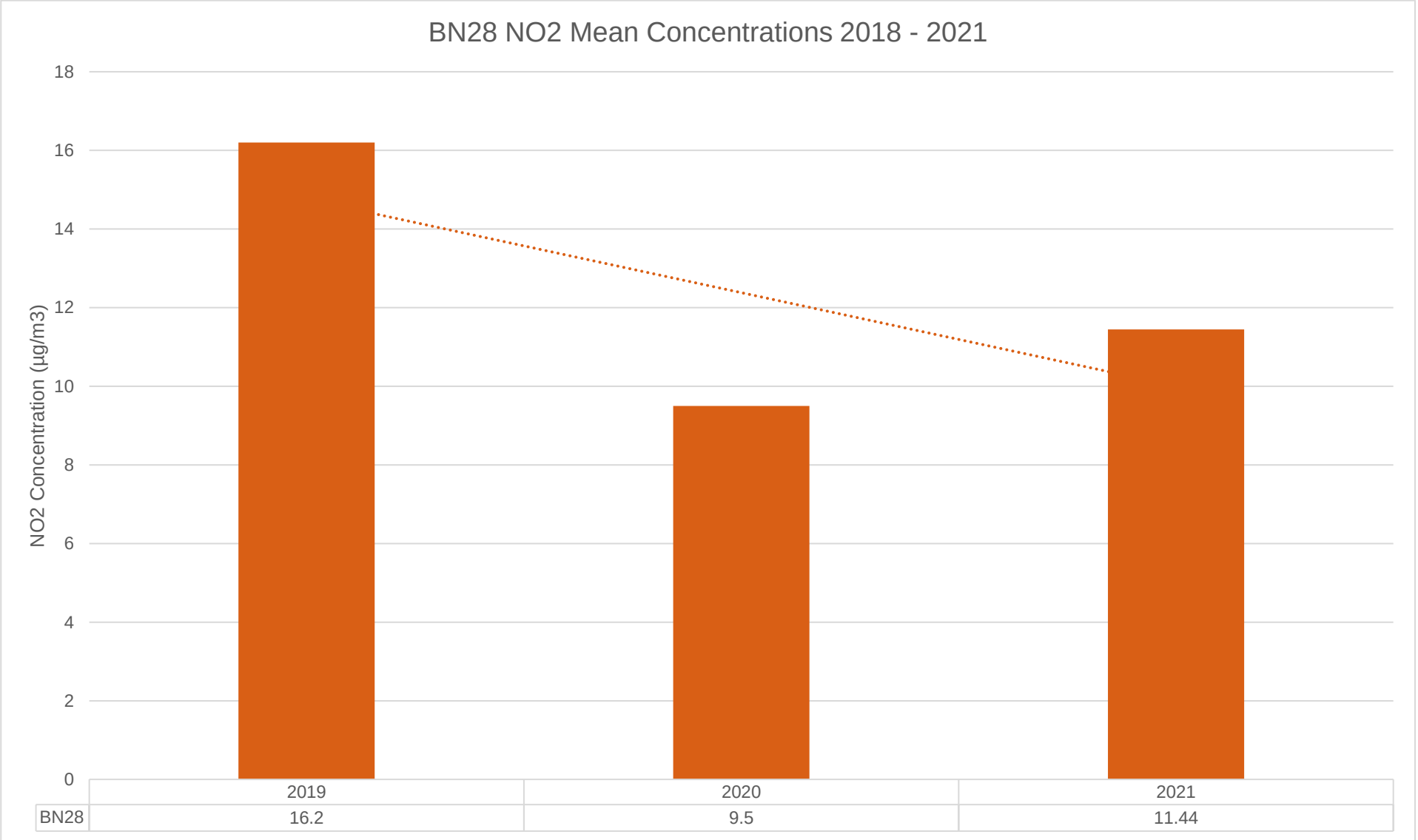
BN26


BN26 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
16
14
12
10
8
6
4
2
0
2019
2020
2021
BN26
15.1
10.8
12.19

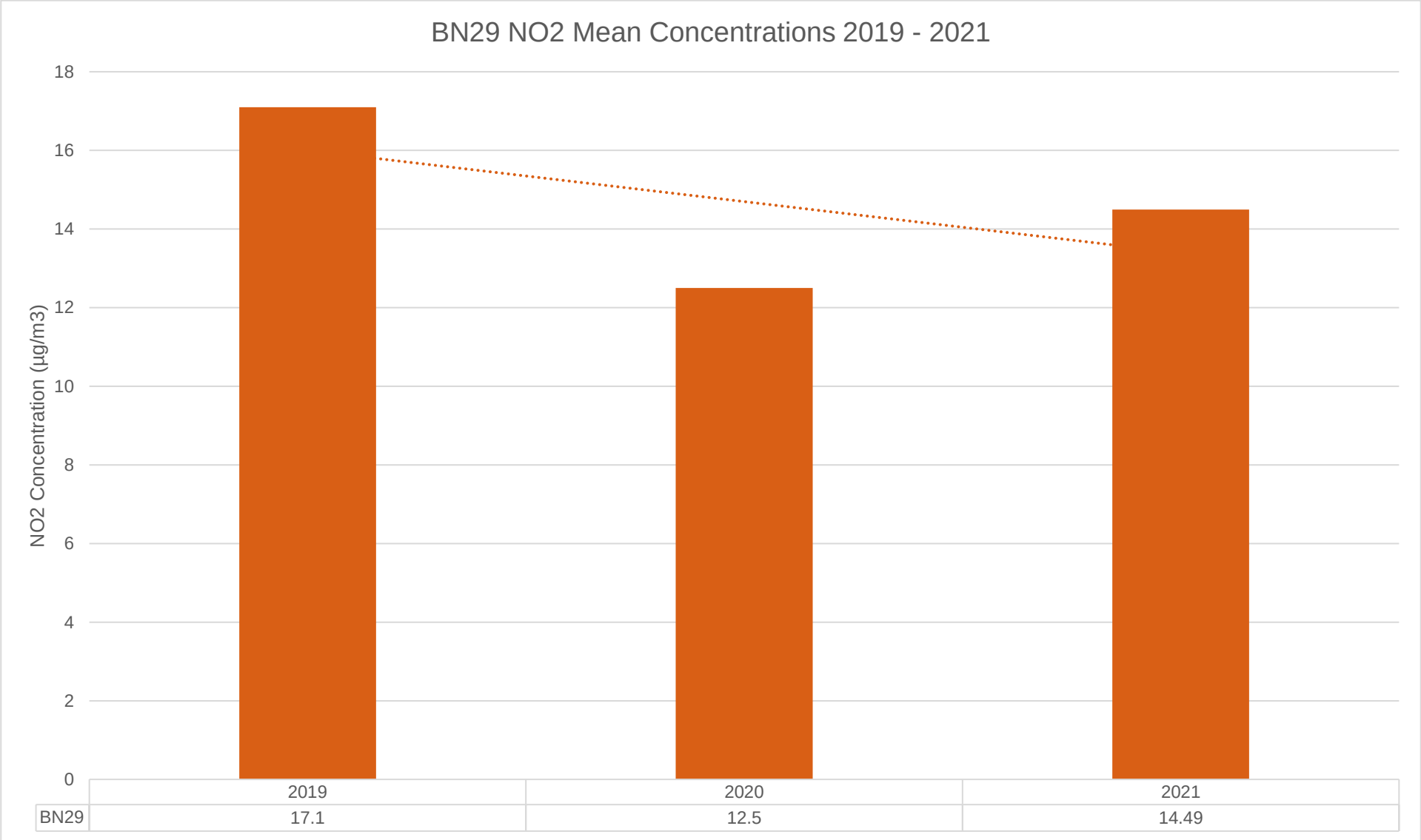
BN27


BN27 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
30
25
20
15
10
5
0
2019
2020
2021
BN27
24.4
19.5
20.36

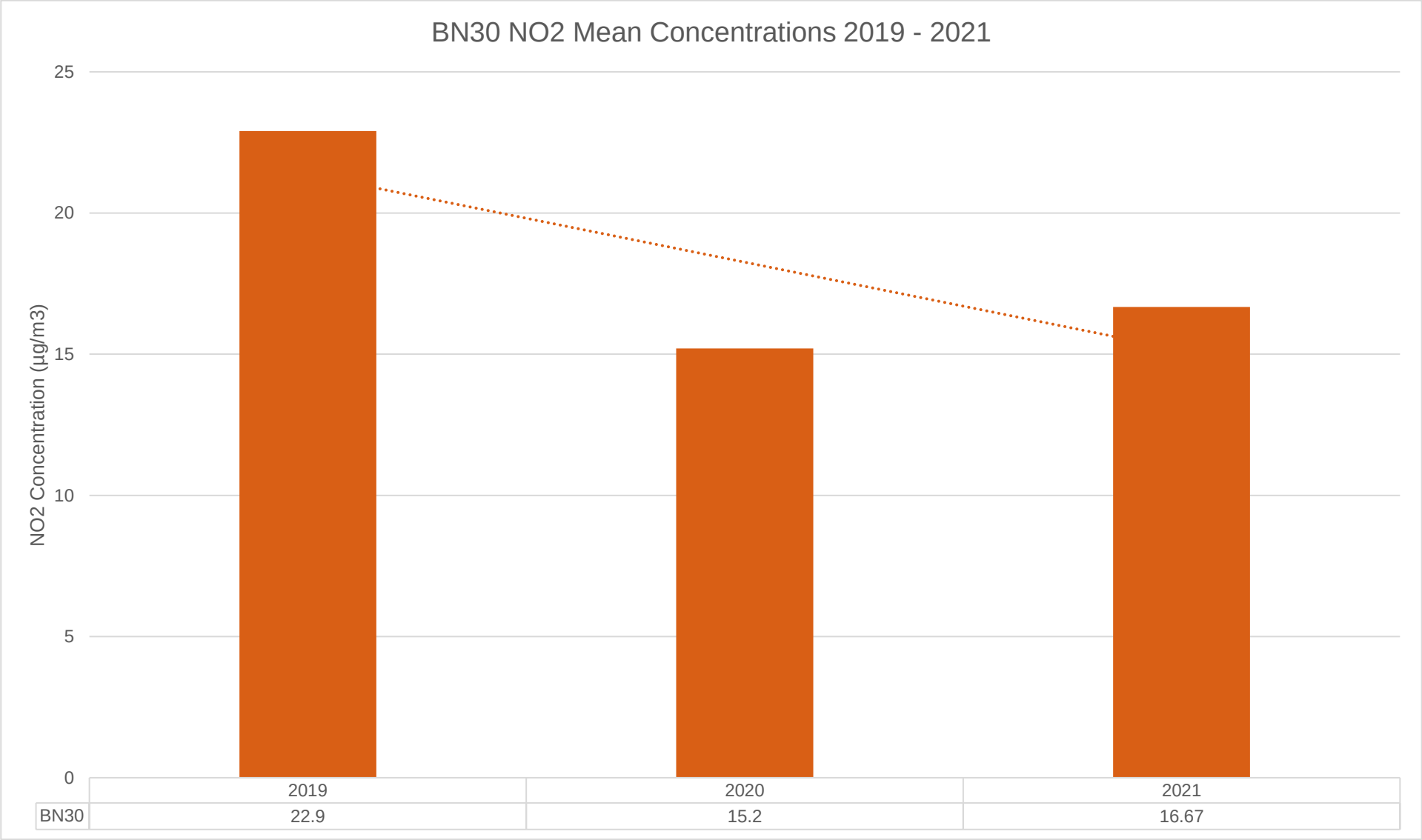
BN28


BN28 NO2 Mean Concentrations 2018 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2019
2020
2021
BN28
16.2
9.5
11.44

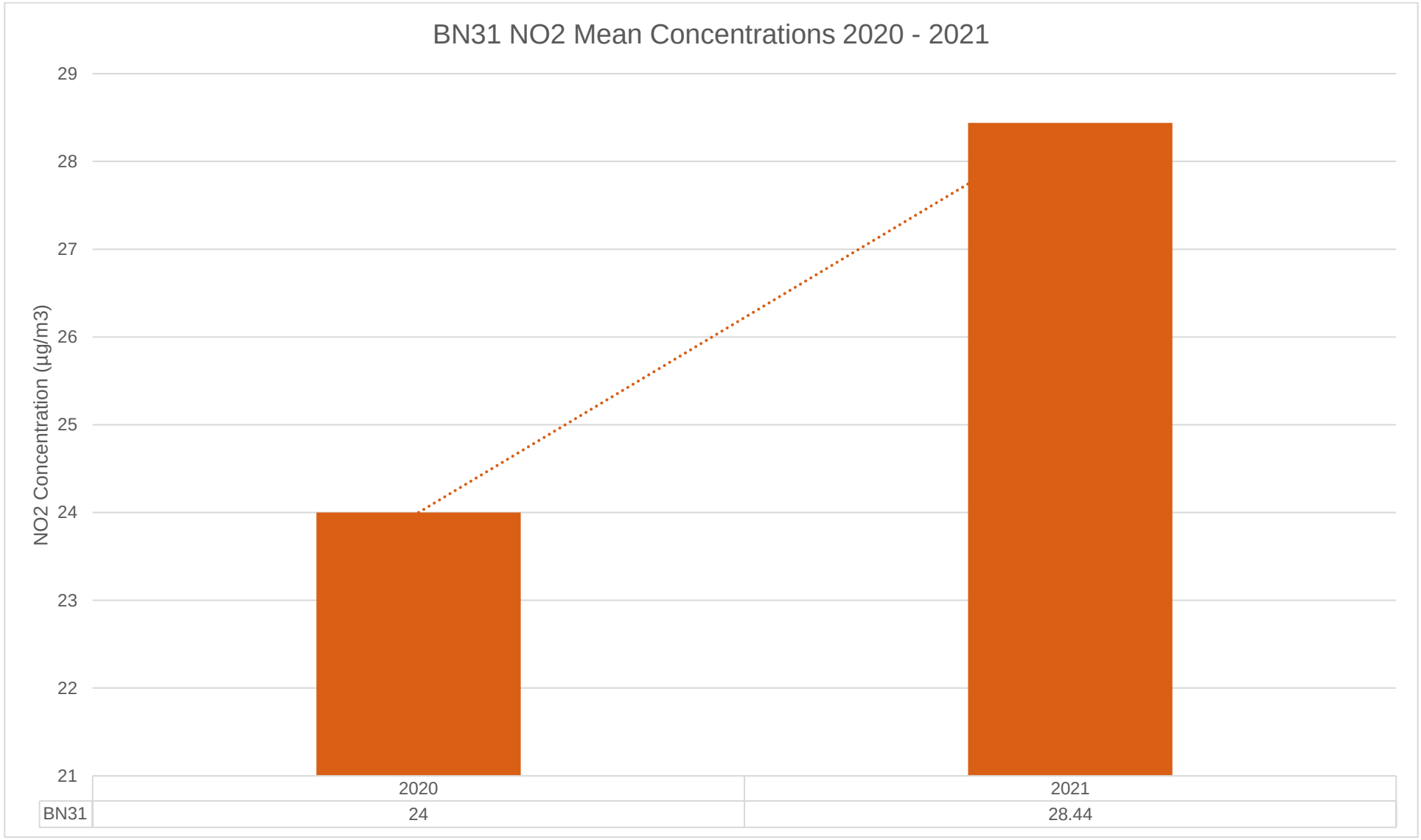
BN29


BN29 NO2 Mean Concentrations 2019 - 2021
NO2 Concentration (µg/m3)
18
16
14
12
10
8
6
4
2
0
2019
2020
2021
BN29
17.1
12.5
14.49

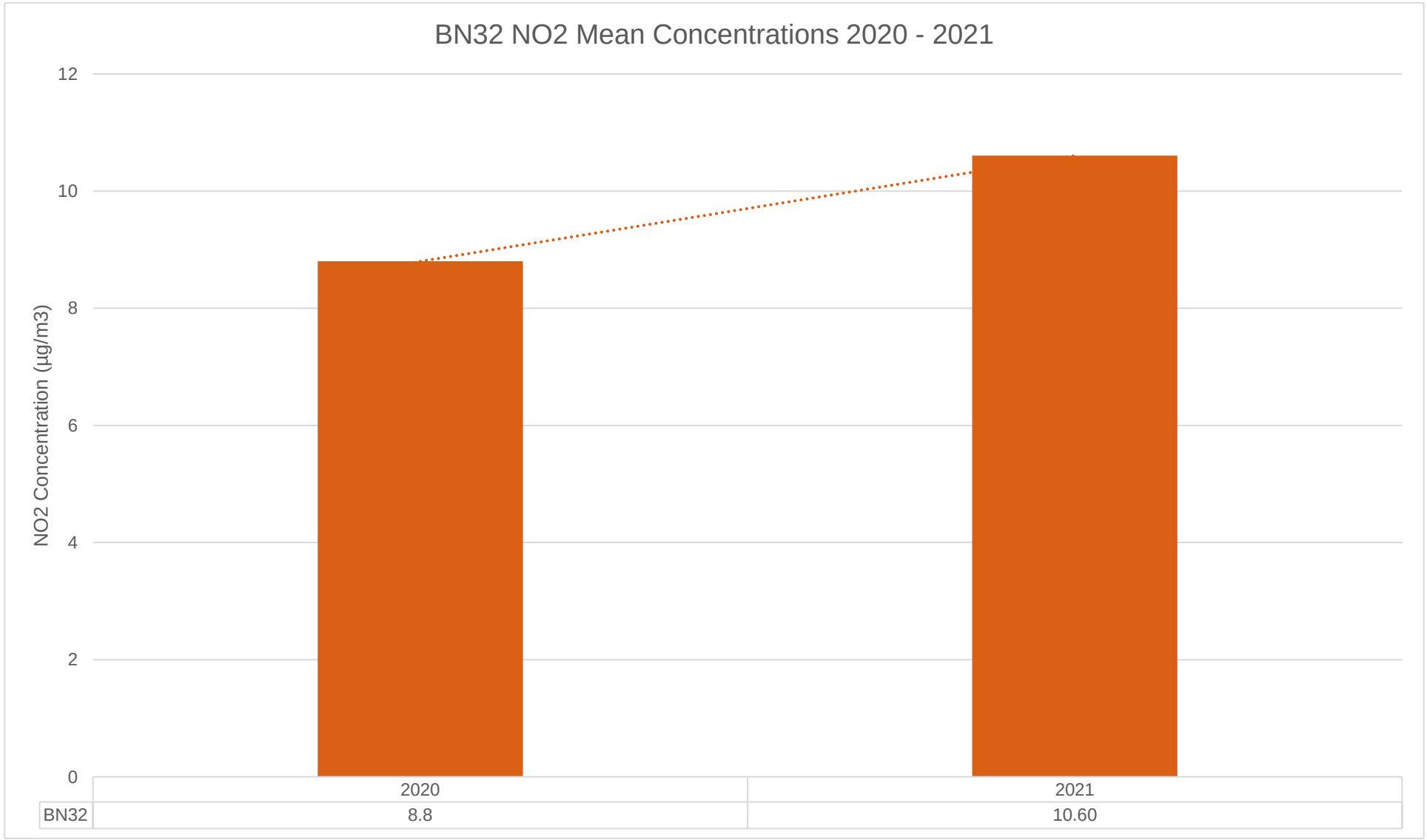
BN30


BN30 NO2 Mean Concentrations 2019 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2019
2020
2021
BN30
22.9
15.2
16.67

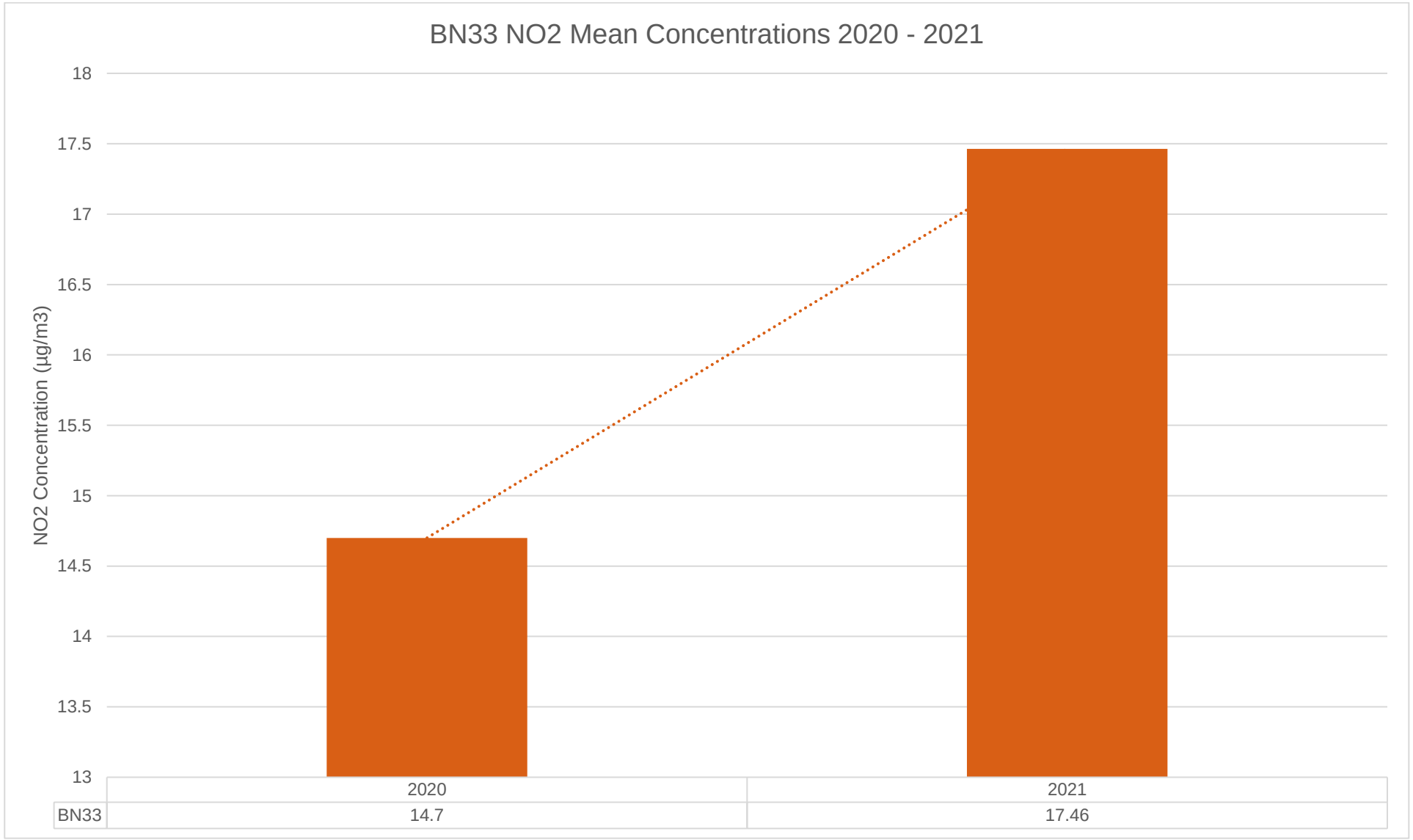
BN31


BN31 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
29
28
27
26
25
24
23
22
21
2020
2021
BN31
24
28.44

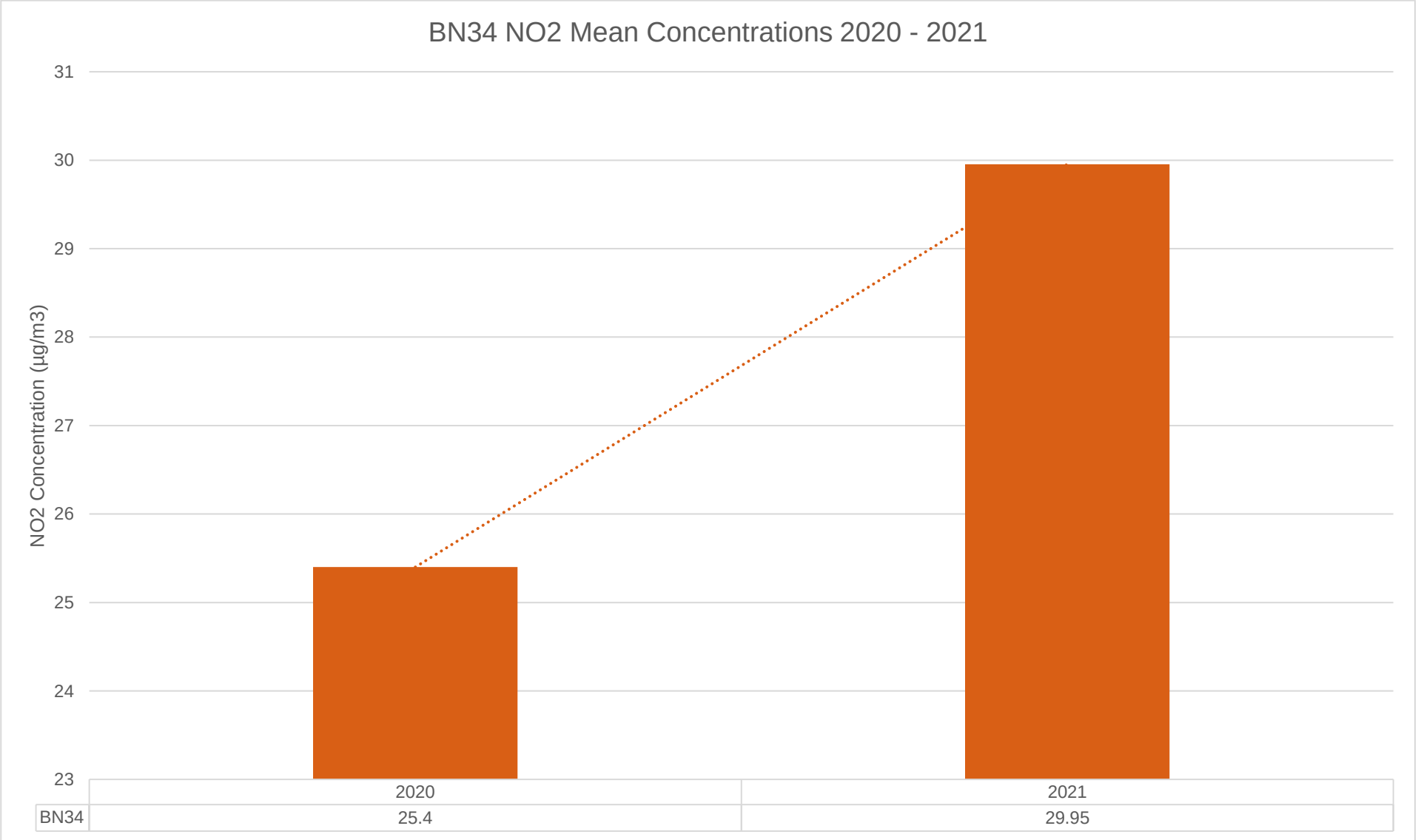
BN32


BN32 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
12
10
8
6
4
2
0
2020
2021
BN32
8.8
10.60

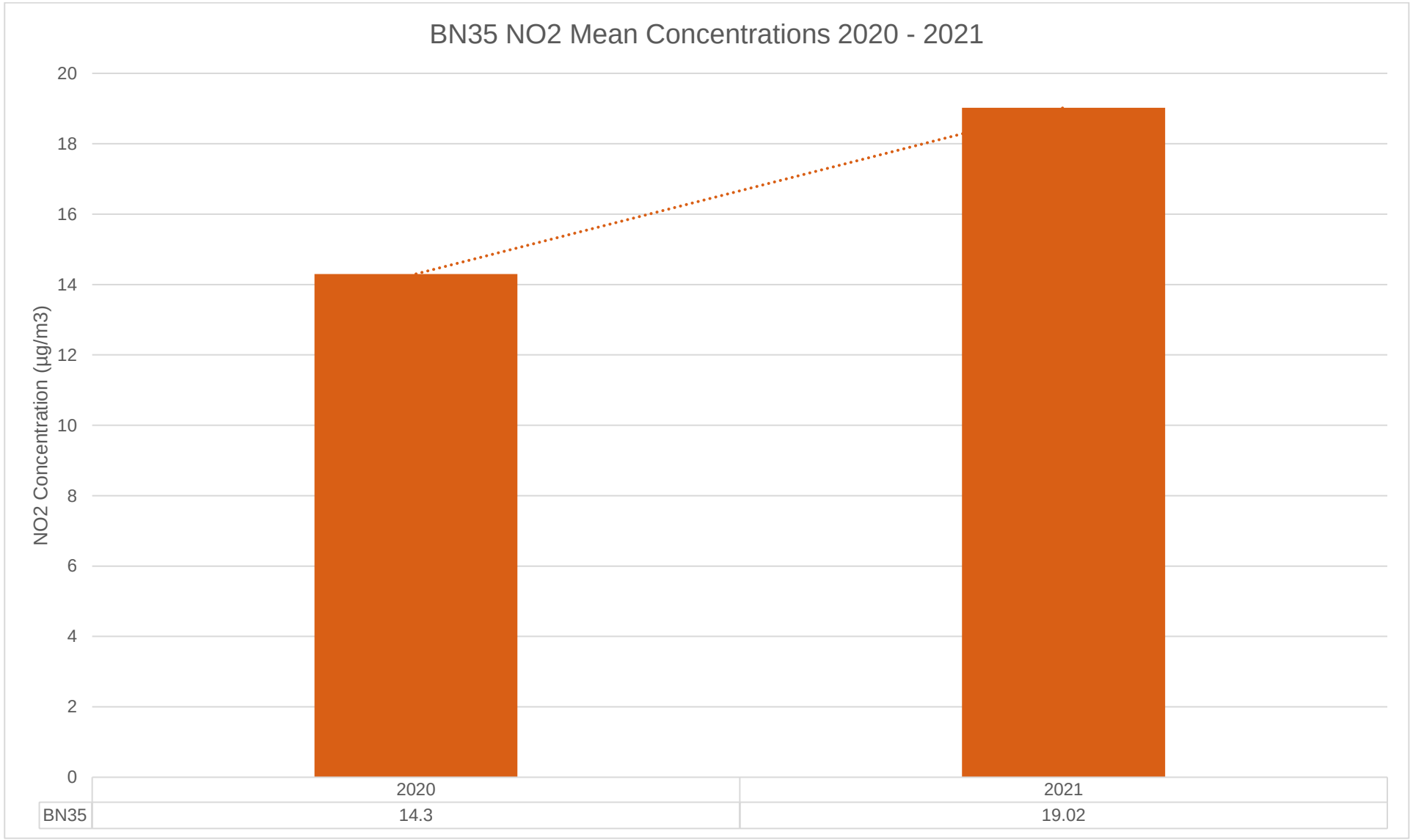
BN33


BN33 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
18
17.5
17
16.5
16
15.5
15
14.5
14
13.5
13
2020
2021
BN33
14.7
17.46

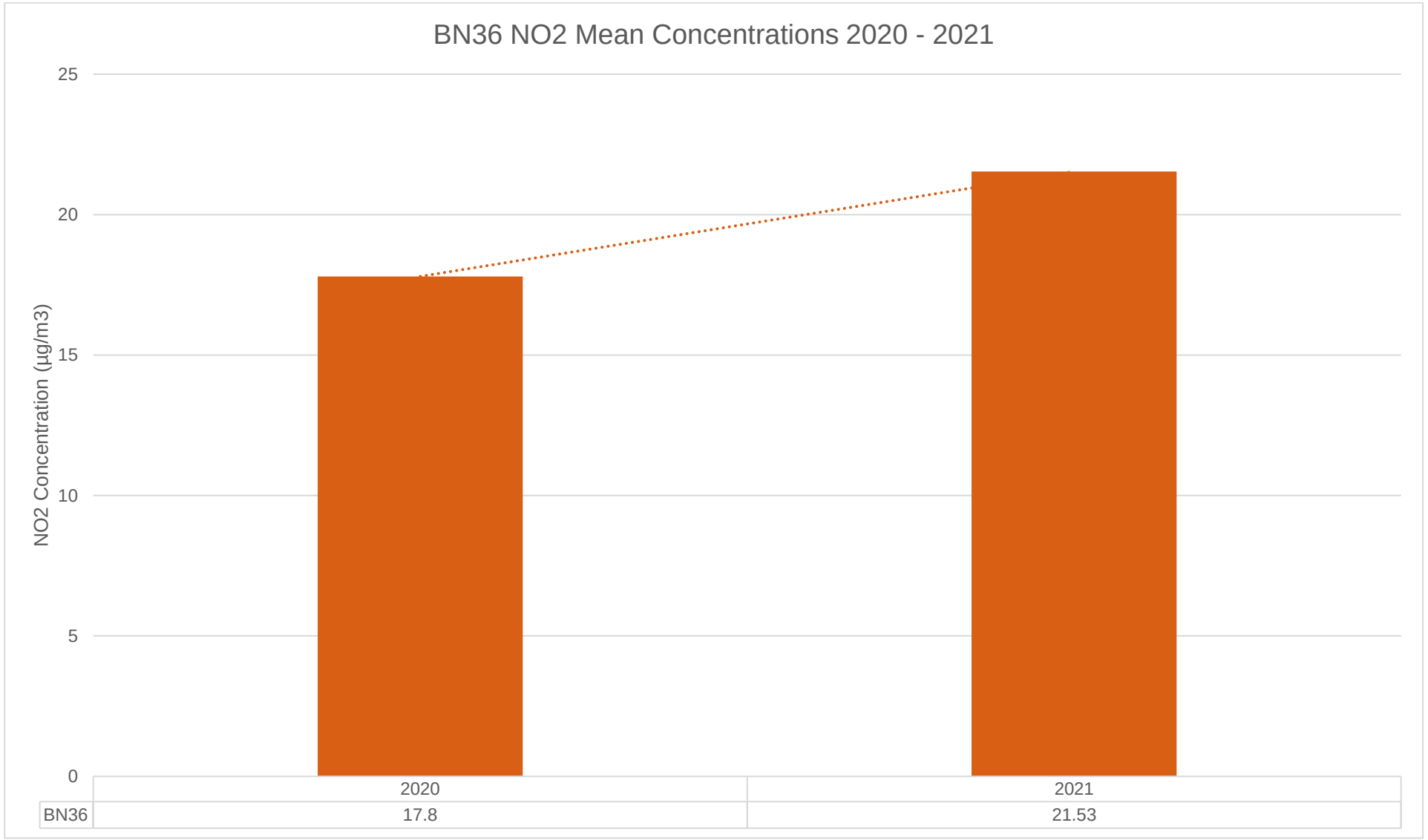
BN34


BN34 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
31
30
29
28
27
26
25
24
23
2020
2021
BN34
25.4
29.95

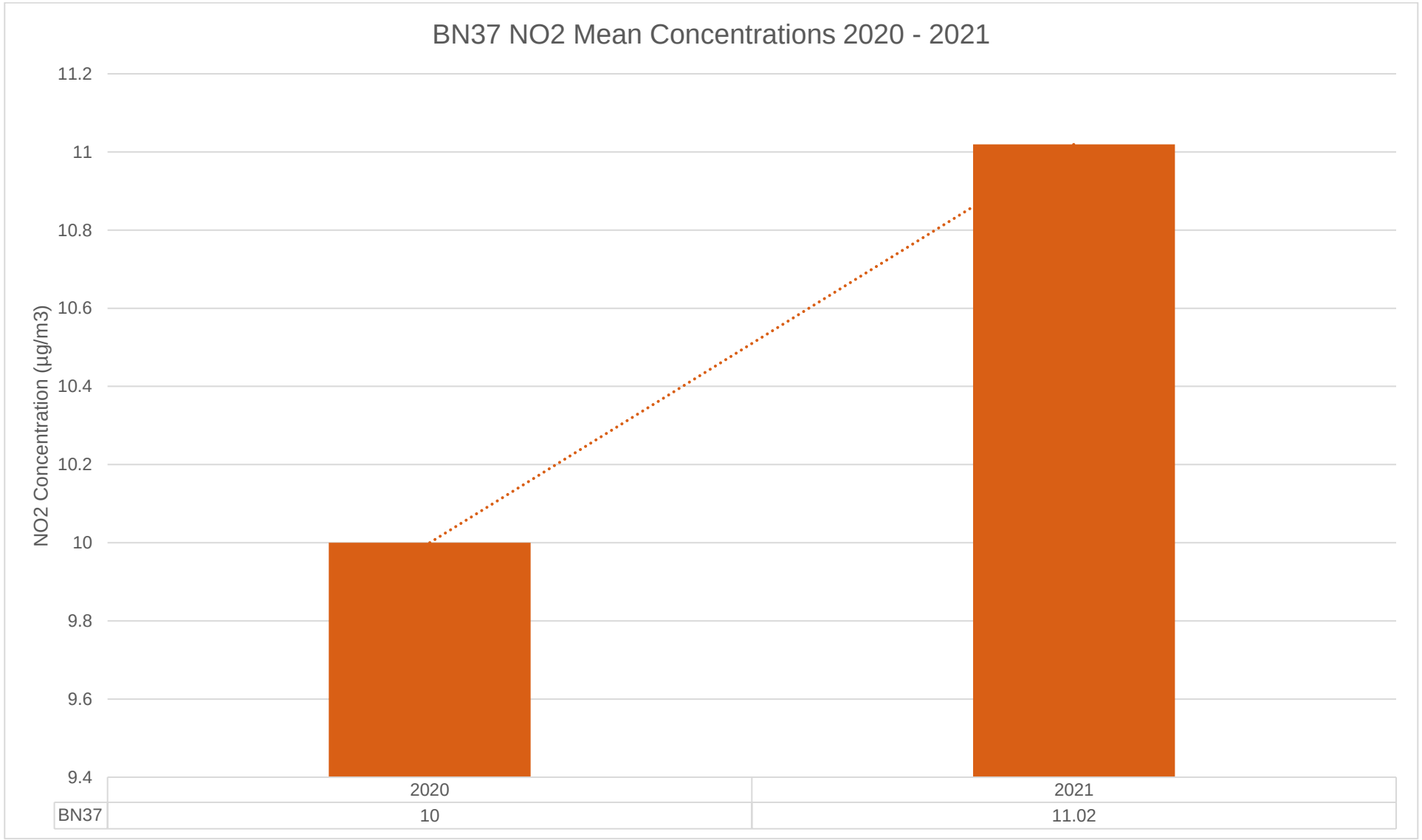
BN35


BN35 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
20
18
16
14
12
10
8
6
4
2
0
2020
2021
BN35
14.3
19.02

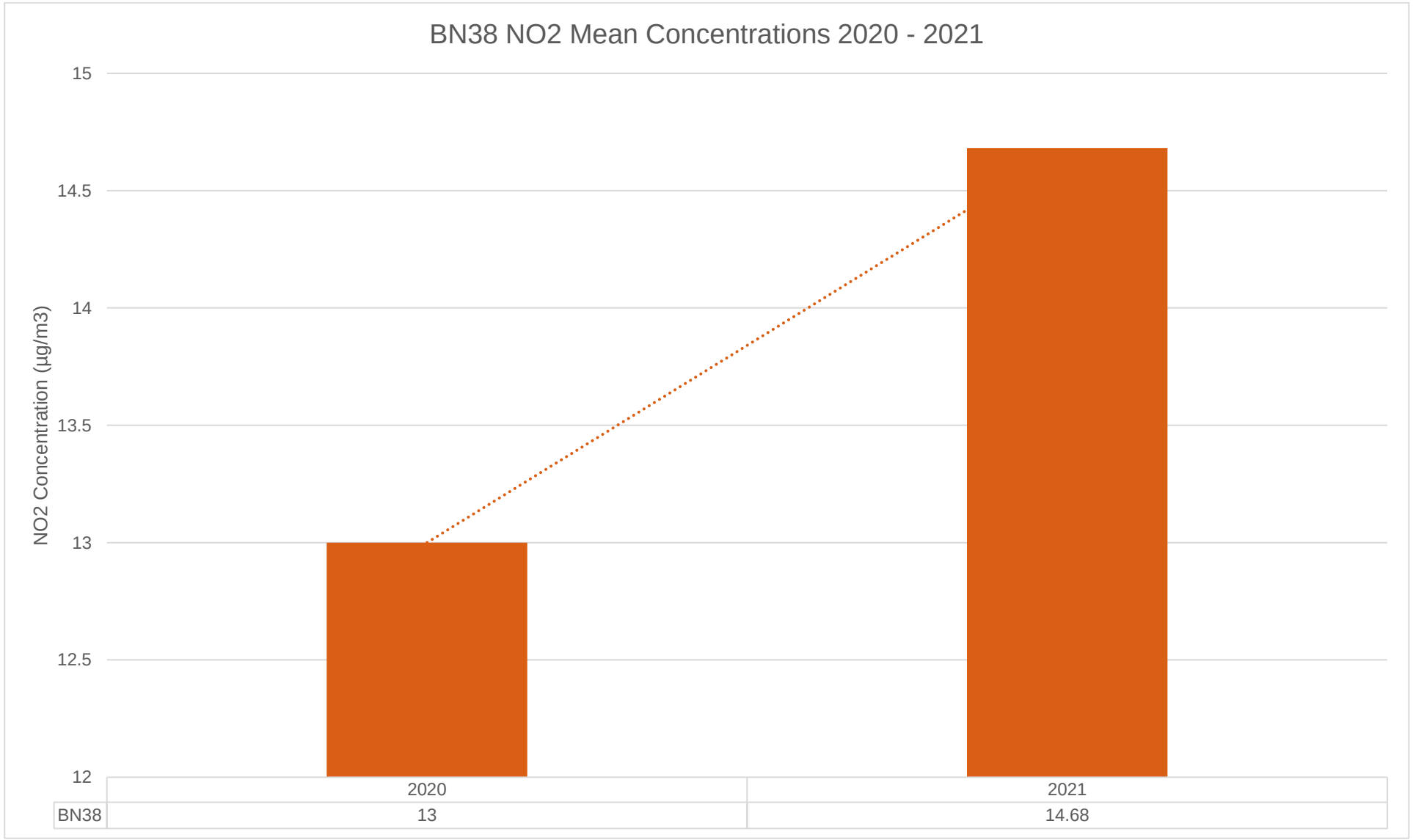
BN36


BN36 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
25
20
15
10
5
0
2020
2021
BN36
17.8
21.53

BN37


BN37 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
11.2
11
10.8
10.6
10.4
10.2
10
9.8
9.6
9.4
2020
2021
BN37
10
11.02

BN38


BN38 NO2 Mean Concentrations 2020 - 2021
NO2 Concentration (µg/m3)
15
14.5
14
13.5
13
12.5
12
2020
2021
BN38
13
14.68

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3) – South Norfolk

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure
DT1	619245	305653		17.0	16.0	19.0	13.0	12.0	16.0	16.0	20.0	22.0	21.0	20.0	17.2	14.4	-
DT2	616934	310462		17.0	18.0	17.0	12.0	11.0	16.0	15.0	21.0	24.0	24.0	22.0	17.5	14.7	-
DT3	626790	302088		16.0	17.0	18.0	11.0	11.0	13.0	15.0	18.0	21.0	21.0	19.0	16.0	13.4	-
DT4	611943	279567		29.0	25.0	34.0	21.0	26.0	23.0	27.0	23.0	29.0	28.0	29.0	26.4	22.1	-
DT5	611943	279567		26.0	25.0	30.0	23.0	23.0	22.0	26.0	27.0	29.0	28.0	30.0	26.0	21.9	-
DT6	636210	298771		14.0	14.0	14.0	9.0	9.0	9.0	11.0	18.0	24.0	29.0	26.0	15.4	13.0	-
DT7	619725	292748		35.0	33.0	37.0	25.0	28.0	30.0	32.0	33.0	38.0	37.0	34.0	32.5	27.3	-
DT8	611100	301436		29.0	18.0	23.0	13.0	14.0	15.0	20.0	17.0	20.0	20.0	23.0	18.7	15.7	-
DT9	625438	306163		26.0	21.0	18.0	16.0	16.0	17.0	22.0	22.0	27.0	29.0	27.0	21.3	17.9	-
DT10	612514	302653		14.0	11.0	17.0	9.0	10.0	9.0	14.0	12.0	15.0	14.0	16.0	12.5	10.5	-
DT11	618138	305619		13.0	13.0	15.0	9.0	9.0	11.0	15.0	14.0	14.0	14.0	17.0	12.9	10.8	-
DT12	611529	300995		24.0	24.0	24.0	17.0	18.0	18.0	24.0	24.0	26.0	27.0	24.0	22.3	18.8	-
DT13	612704	302788		13.0	13.0	13.0	9.0	8.0	10.0	12.0	15.0	16.0	16.0	17.0	12.6	10.6	-
DT14	611367	301622		15.0	14.0	16.0	10.0	12.0	10.0	14.0	15.0	17.0	18.0	20.0	14.3	12.0	-
DT15	624476	283267		26.0	27.0	32.0	22.0	22.0	23.0	27.0	25.0	26.0	24.0	29.0	25.5	21.4	-
DT16	614902	278861		20.0	19.0	20.0	13.0	13.0	9.0	17.0	18.0	22.0	22.0	22.0	17.2	14.5	-
DT17	616984	311560		26.0	29.0	31.0	22.0	19.0	21.0	26.0	32.0	32.0	33.0	27.0	26.7	22.4	-
DT18	619714	292717		26.0	26.0	31.0	20.0	24.0	20.0	26.0	23.0	26.0	24.0	23.0	24.2	20.4	-
DT19	619731	292745		31.0	29.0	36.0	26.0	28.0	29.0	34.0	13.0	36.0	32.0	32.0	29.0	24.4	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure
DT20	619643	292348		28.0	26.0	29.0	21.0	19.0	22.0	24.0	24.0	28.0	31.0	29.0	25.1	21.0	-
DT21	619685	292629		32.0	30.0	34.0	19.0	26.0	25.0	31.0	24.0	34.0	27.0	29.0	27.8	23.4	-
DT22	619711	292720		21.0	18.0	24.0	14.0	16.0	16.0	20.0		20.0	18.0	20.0	18.4	15.5	-
DT23	618991	309891		14.0	12.0	15.0	10.0	9.0	10.0	12.0	15.0	14.0	15.0	18.0	12.9	10.8	-
DT24	611325	301191		18.0	16.0	20.0	11.0	14.0	11.0	17.0	14.0	17.0	17.0	18.0	15.4	12.9	-
DT25	619821	293028		26.0	26.0	27.0	19.0	19.0	23.0	26.0	26.0	32.0	31.0	28.0	25.3	21.2	-
DT26	619772	305851		18.0	17.0	18.0	13.0	13.0	13.0	16.0	19.0	19.0	1.0	36.0	16.7	14.0	-
DT27	616852	310342		18.0	15.0	20.0	12.0	17.0	11.0	18.0	12.0	15.0	16.0	18.0	15.4	12.9	-
DT28	617170	311659		15.0	11.0	14.0	9.0	9.0	11.0	13.0	15.0	18.0	18.0	18.0	13.4	11.2	-
DT29	624633	283505		35.0	33.0	39.0	29.0	29.0	28.0	33.0	29.0	37.0	36.0	39.0	32.9	27.6	-
DT30	611785	279593		22.0	20.0	25.0	17.0	17.0	17.0	22.0	21.0	25.0	26.0	48.0	23.1	19.4	-

Table B.2 – NO_2 2021 Diffusion Tube Results (µg/m^3) – South Norfolk

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure
BN4	626918	308740		14.0	10.0	13.0	7.0	7.0	8.0	9.0	14.0	15.0	18.0	18.0	11.8	9.9	-
BN6	626317	311012		15.0	12.0	1.0	16.0	6.0	7.0	9.0	14.0	18.0	20.0	17.0	12.0	10.0	-
BN10	625369	308438		23.0	21.0	30.0	16.0	20.0	19.0	24.0	21.0	25.0	32.0	26.0	23.0	19.3	-
BN11	621651	311632		30.0	28.0	34.0	23.0	24.0	24.0	30.0	33.0	41.0	34.0	31.0	29.7	25.0	-
BN12	621698	311569		29.0	25.0	35.0	18.0	22.0	20.0	27.0	26.0	27.0	28.0	29.0	25.7	21.6	-
BN13	621814	311648		24.0	22.0	23.0	17.0	15.0	19.0	19.0	28.0	30.0	27.0	26.0	22.4	18.8	-
BN15	630114	318015		20.0	17.0	29.0	16.0	19.0	18.0	24.0	18.0	23.0	22.0	1.0	18.7	15.7	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure
BN18	620186	311834		20.0	19.0	14.0	12.0	12.0	12.0	14.0	20.0	21.0	22.0	22.0	16.8	14.1	-
BN19	627490	308775		24.0	25.0	33.0	16.0	18.0	18.0	26.0	21.0	25.0	27.0	20.0	22.6	19.0	-
BN20	640166	310354		24.0	20.0		16.0	14.0	17.0	19.0	21.0	26.0	25.0	24.0	20.2	16.9	-
BN21	627743	310905		15.0	13.0	15.0	9.0	9.0	11.0	13.0	15.0	18.0	18.0	19.0	13.8	11.6	-
BN22	624065	311161		33.0	31.0	41.0	25.0	27.0	23.0	31.0	30.0	36.0		40.0	31.3	26.3	-
BN24	621465	312666		21.0	17.0	21.0	11.0	12.0	12.0	15.0	18.0	18.0	20.0	19.0	16.5	13.8	-
BN25	619321	326913		14.0	11.0	15.0	10.0	10.0	11.0	13.0	14.0	15.0	14.0	16.0	12.8	10.8	-
BN26	626308	310096		17.0	14.0	15.0	10.0	11.0	11.0	13.0	15.0	18.0	20.0	19.0	14.5	12.2	-
BN27	625504	312473		27.0	25.0	3.0	19.0	23.0	23.0	30.0	27.0	31.0	34.0	29.0	24.2	20.4	-
BN28	621212	312970		16.0	13.0	17.0	10.0	11.0	11.0	15.0	13.0	15.0	15.0	16.0	13.6	11.4	-
BN29	613459	323916		18.0	14.0	24.0	14.0	15.0	13.0	19.0	16.0	19.0	19.0	21.0	17.3	14.5	-
BN30	626171	311059		16.0	21.0	23.0	15.0	15.0	19.0	15.0	14.0	25.0	30.0	31.0	19.9	16.7	-
BN31	623069	311327		39.0	31.0	46.0	27.0	27.0	27.0	33.0	31.0	39.0	40.0	38.0	33.9	28.4	-
BN32	627038	309912		14.0	11.0	13.0	8.0		8.0	9.0	13.0	17.0	18.0	18.0	12.6	10.6	-
BN33	637749	309865		22.0	22.0	26.0	15.0	16.0	16.0	21.0	20.0	24.0	27.0	24.0	20.8	17.5	-
BN34	621713	311699		34.0	31.0	47.0	27.0	30.0	32.0	42.0	37.0	38.0	42.0	36.0	35.7	30.0	-
BN35	620205	311723		24.0	23.0	31.0	16.0	21.0	17.0	25.0	22.0	24.0	26.0	23.0	22.6	19.0	-
BN36	629892	317484		28.0	23.0	33.0	20.0	24.0	19.0	26.0	25.0	27.0	32.0	28.0	25.6	21.5	-
BN37	627597	309179		16.0	13.0	13.0	9.0	8.0	9.0	10.0	15.0	17.0	20.0	18.0	13.1	11.0	-
BN38	619440	315702		21.0	16.0	21.0	14.0	13.0	14.0	16.0	19.0		23.0	20.0	17.5	14.7	-
BN39	609932	322874							13.0	17.0	16.0	18.0	20.0	20.0	17.1	14.6	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure
BN40	626935	320407										13.0	16.0	15.0	14.7	11.6	-

CLICK HERE THEN PASTE COMPLETED DATA ROWS FROM LAQM DATA PROCESSING TOOL (IF UTILISED)

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1 (confirm by selecting in box).**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16 (confirm by selecting in box).**

☐ **Local bias adjustment factor used (confirm by selecting in box).**

☒ **National bias adjustment factor used (confirm by selecting in box).**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column (confirm by selecting in box).**

☒ **<Local Authority> confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System (confirm by selecting in box).**

Notes:

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

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

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 South Norfolk and Broadland Councils During 2022

South Norfolk and Broadland has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by South Norfolk and Broadland Councils During 2022

South Norfolk and Broadland has not completed any additional works within the reporting year of 2021

QA/QC of Diffusion Tube Monitoring

The supplier used for diffusion tube preparation and analysis within 2021 was Gradko International Ltd and the method of preparation was 20% TEA in water.

The diffusion tube monitoring calendar was not followed due to staffing shortages in January leading to a delay in monitoring at the beginning of the year – this has been rectified and we are now monitoring in accordance with the calendar.

Diffusion Tube Annualisation

Two sites required annualisation in 2021. These are BN39 and BN40. These sites required annualisation as they are new sites introduced during the monitoring period.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.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_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

South Norfolk and Broadland Councils have applied a national bias adjustment factor of 0.84 to the 2021 monitoring data. A summary of bias adjustment factors used by South Norfolk and Broadland Councils over the past five years is presented in Table C.1.

Table C.1 – 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	03/20	0.93
2018	National	03/19	0.93
2017	National	03/18	0.89

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1. and B.2. No diffusion tube NO_2 monitoring locations within South Norfolk and Broadland required distance correction during 2021.

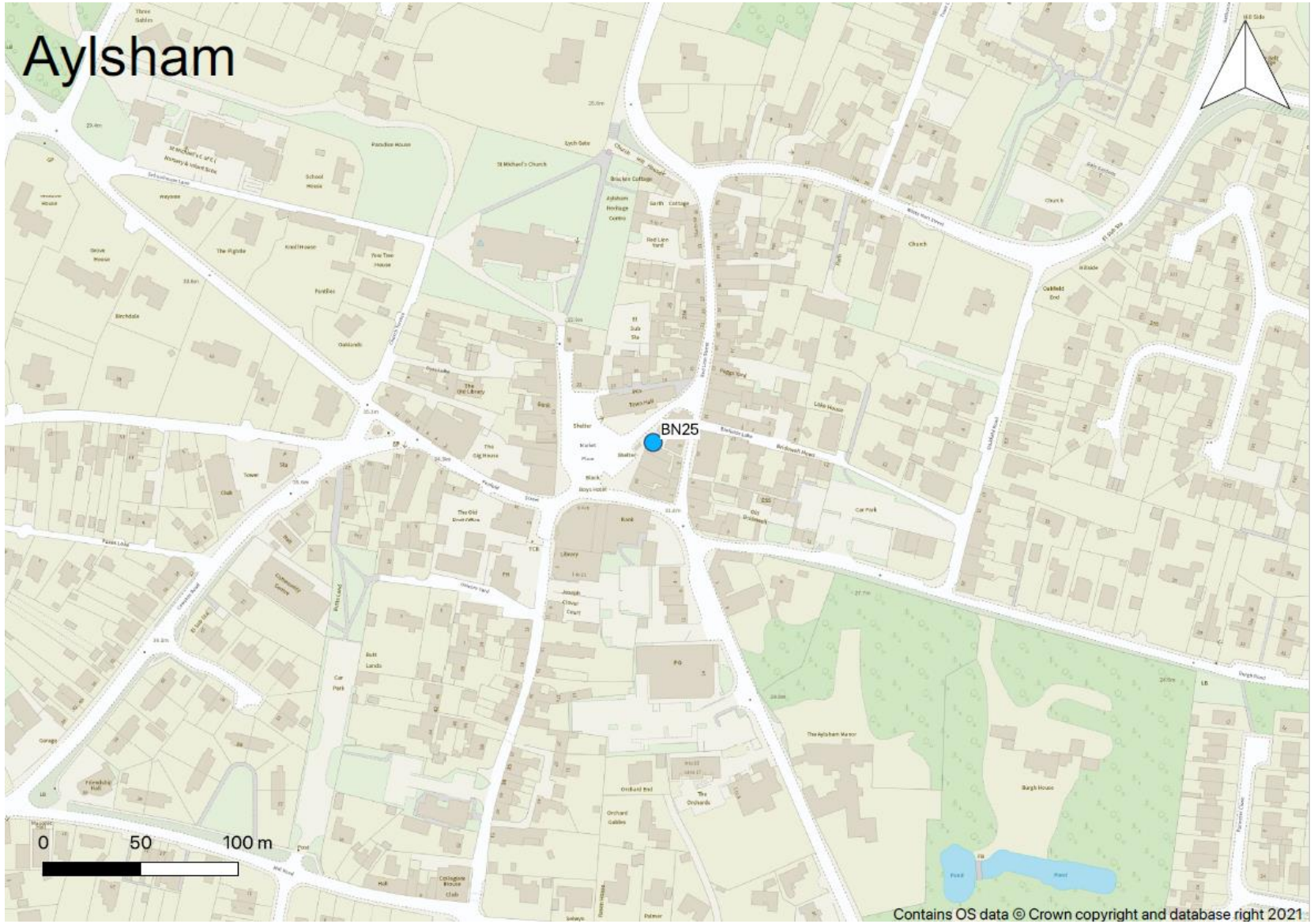
Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

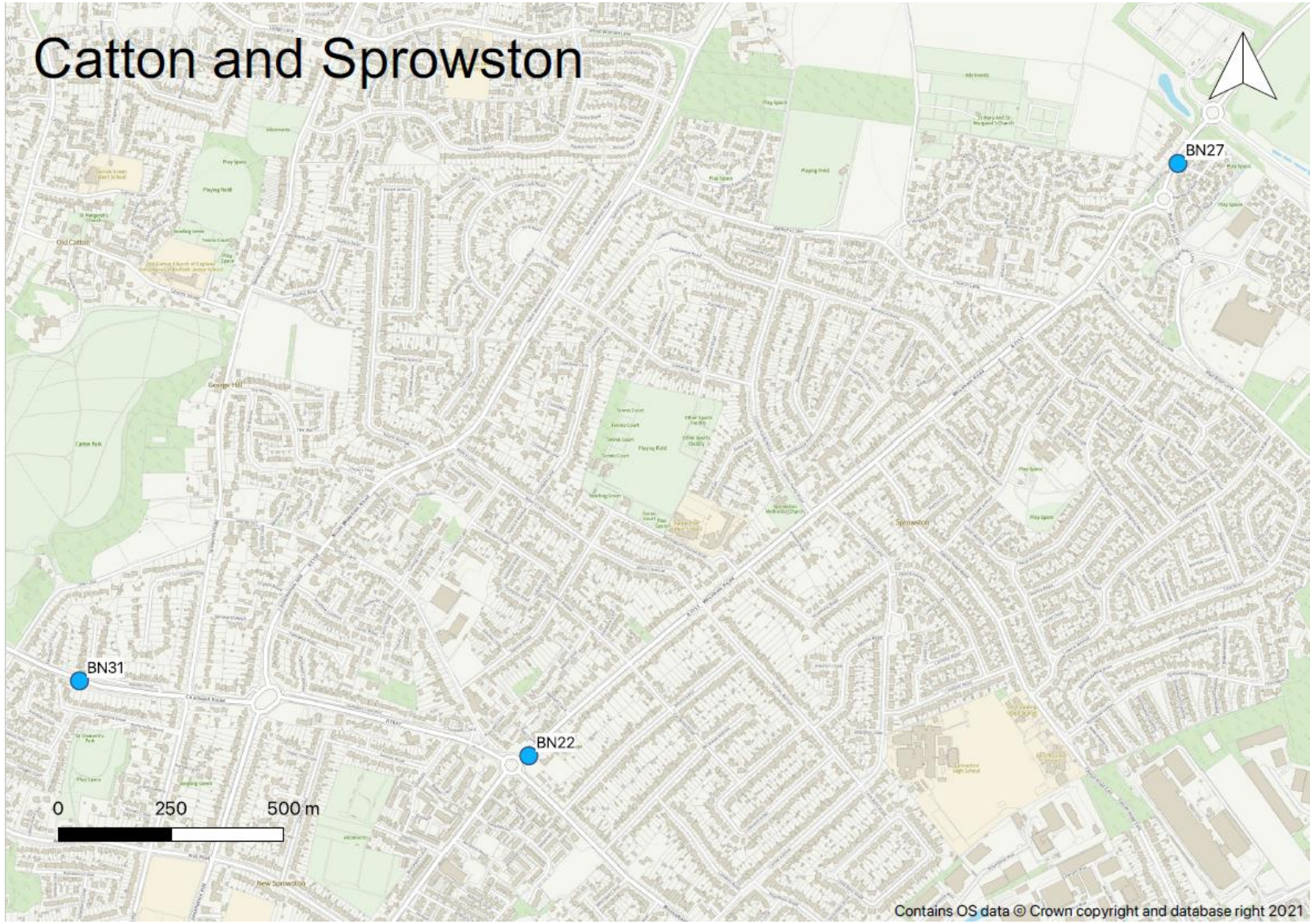
Site ID	Annualisation Factor Norwich Castle Meadow	Annualisation Factor Great Yarmouth South Denes	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
BN39	1.0231	1.0065	1.0148	17.1	17.4
BN40	1.0288	0.8511	0.9400	14.7	13.9

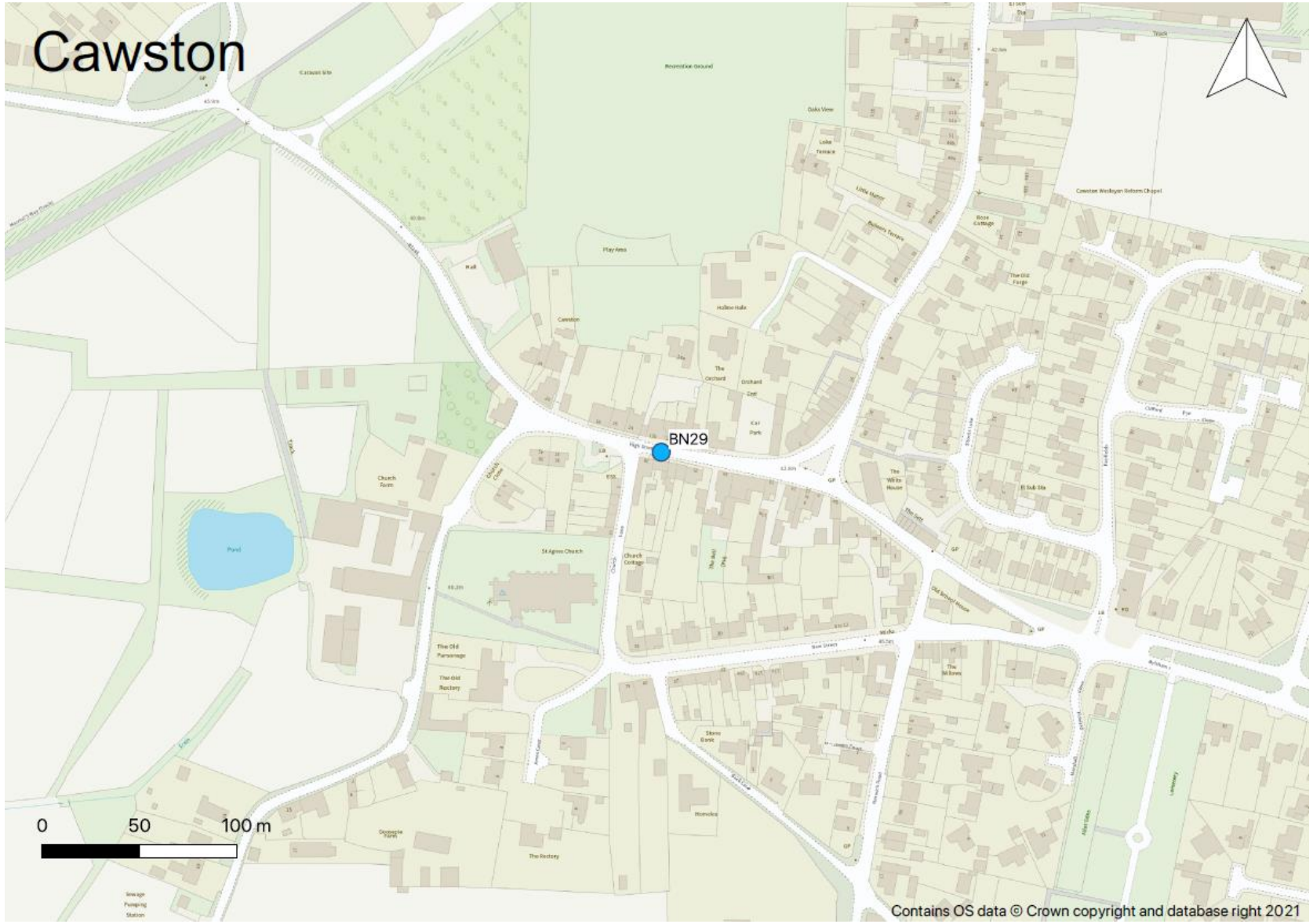
Appendix D: Map(s) of Monitoring Locations and AQMAs


A47 Thickthorn and Cringleford
DT25
DT10
0
250
500 m
Contains OS data © crown copyright and database rights 2021


A47/A146 and Poringland
DT8
DT3
0
750
1,500 m
Contains OS data © crown copyright and database rights 2021

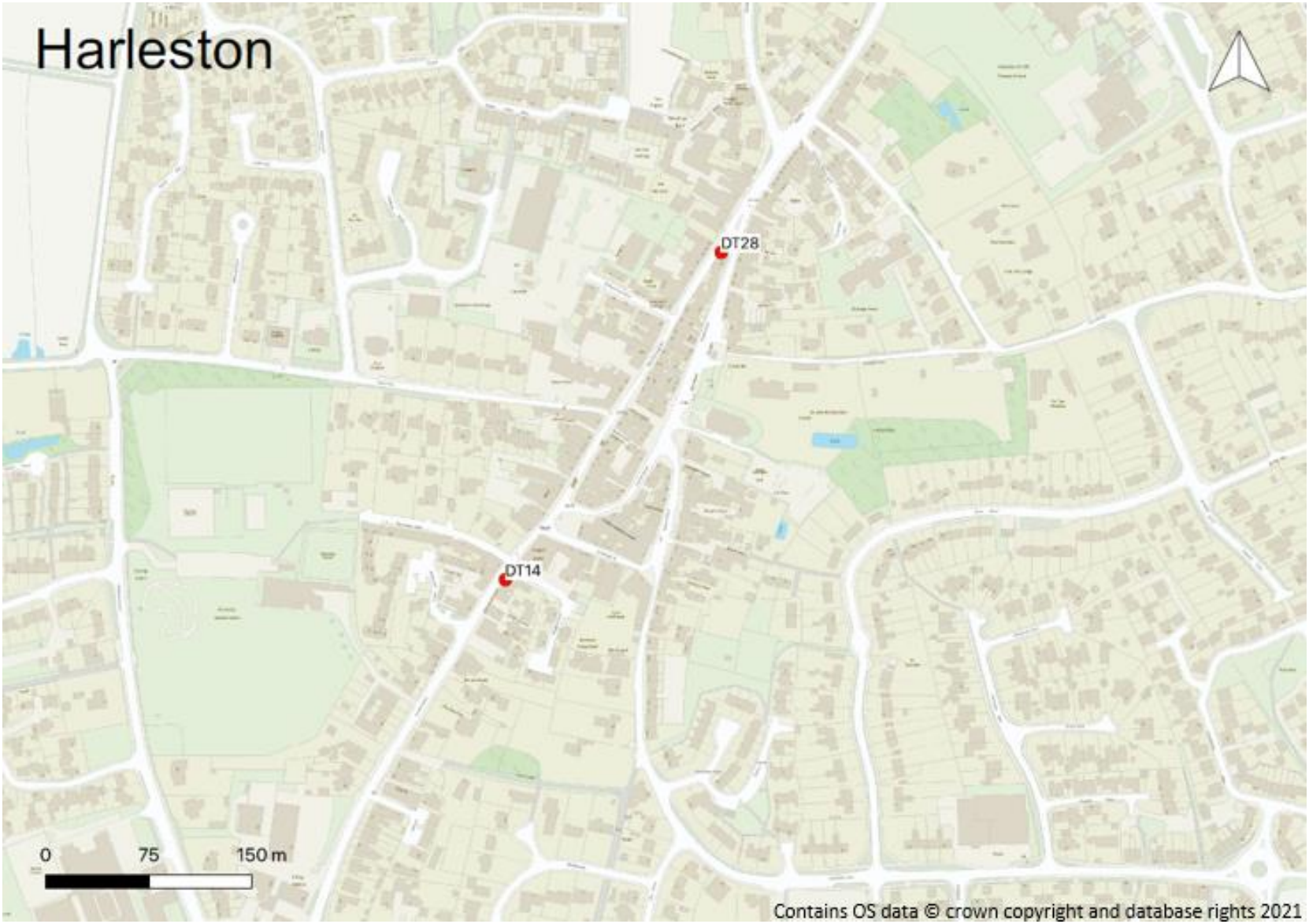

Aylsham
BN25
0
50
100 m
Contains OS data © Crown copyright and database right 2021


Catton and Sprowston
BN27
BN31
BN22
0
250
500 m
Contains OS data © Crown copyright and database right 2021


Cawston
BN29
0
50
100 m
Contains OS data © Crown copyright and database right 2021

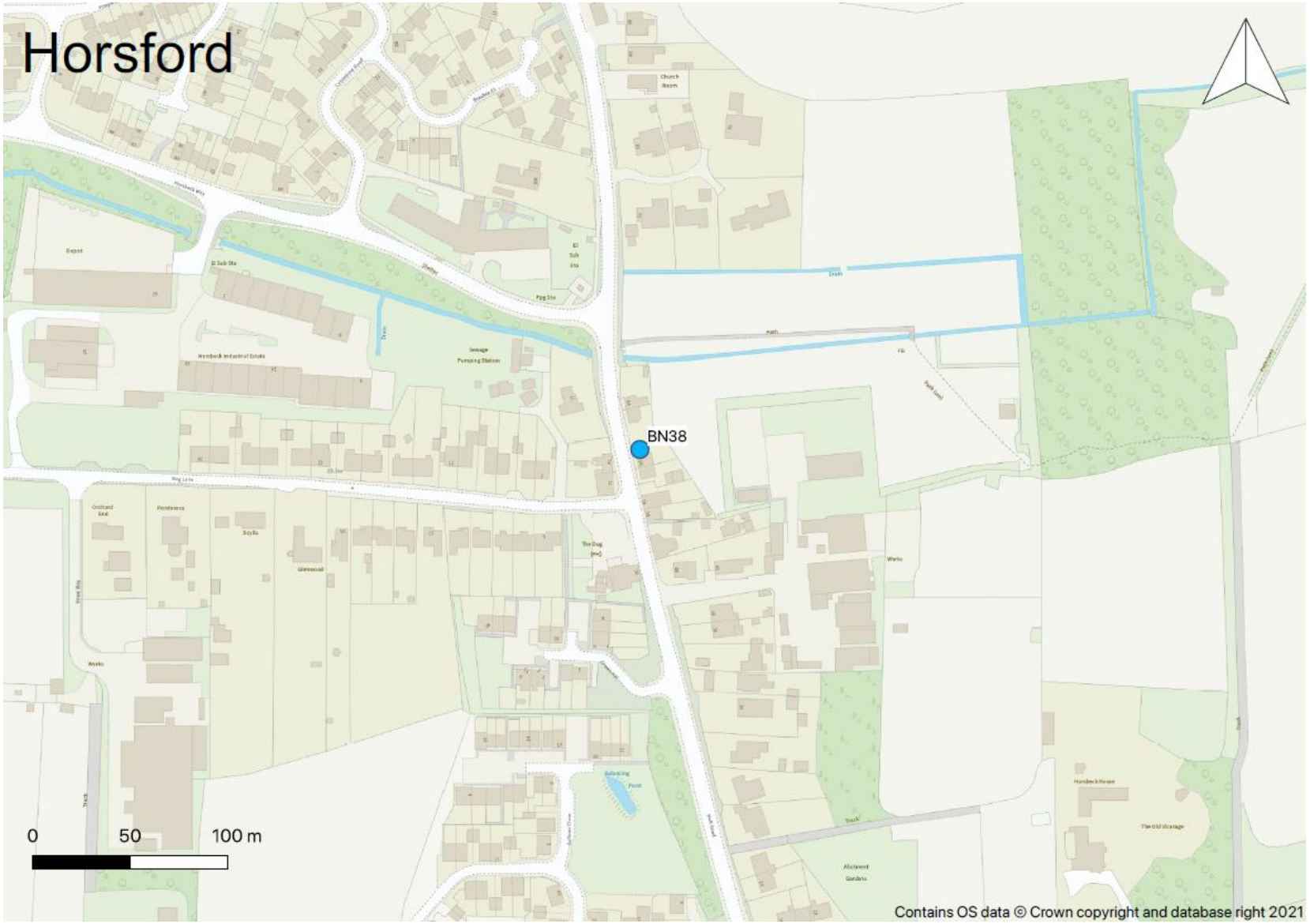

Costessey
DT27
DT16
DT2
DT26
DT22
0
250
500 m
Contains OS data © crown copyright and database rights 2021


Diss and Scole
DT29
DT4
DT15
0
250
500 m
Contains OS data © crown copyright and database rights 2021


Harleston
DT28
DT14
0
75
150 m
Contains OS data © crown copyright and database rights 2021

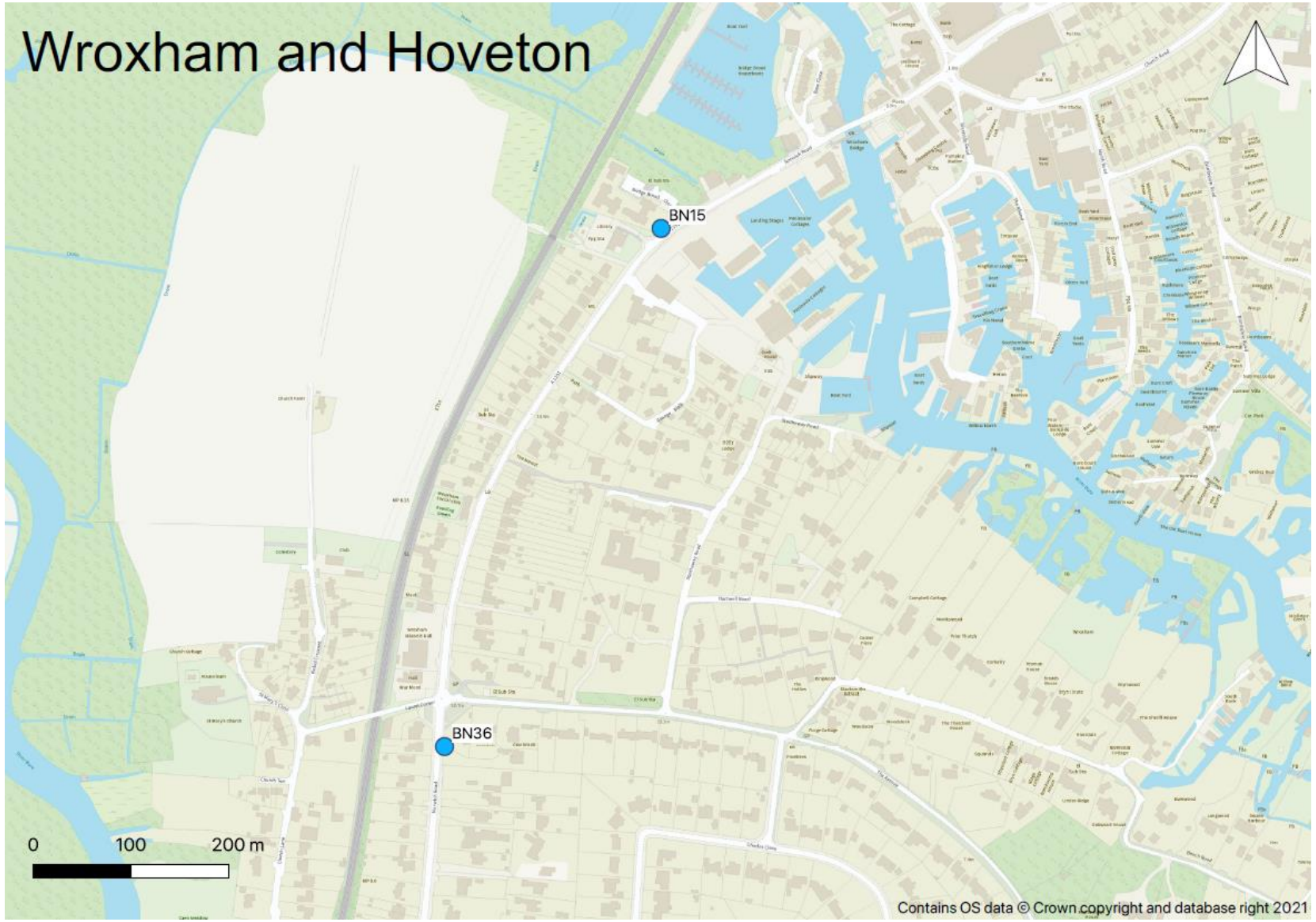

Heartsease and Thorpe St Andrew
BN30
BN6
BN21
BN26
* BN8
BN32
BN37
BN19
BN10
0
250
500 m
*Decommissioned in 2021
Contains OS data © Crown copyright and database right 2021

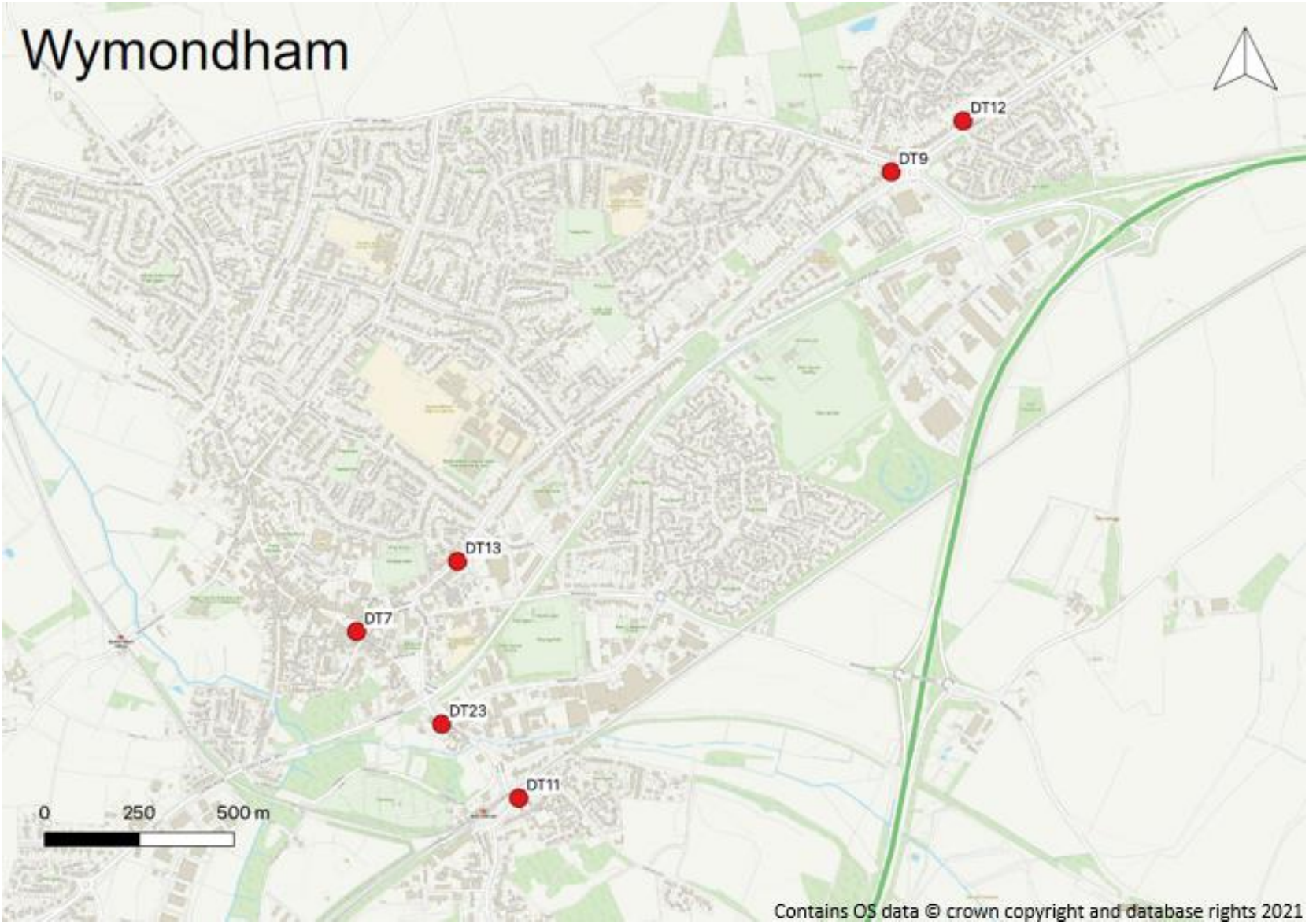

Hellesdon and Mile Cross
BN24
* BN7
BN18
BN35
BN34
BN13
BN11
BN12
0 100 200 m
*Decommissioned in 2021
Contains OS data © crown copyright and database rights 2021


Horsford
BN38
0
50
100 m
Contains OS data © Crown copyright and database right 2021


Loddon
DT5
0
25
50 m
Contains OS data © crown copyright and database rights 2021


Long Stratton
DT24
DT6
DT18
DT21
DT17
DT20
0
75
150 m
Contains OS data © crown copyright and database rights 2021


Wroxham and Hoveton
BN15
BN36
0
100
200 m
Contains OS data © Crown copyright and database right 2021


Wymondham
DT12
DT9
DT13
DT7
DT23
DT11
0
250
500 m
Contains OS data © crown copyright and database rights 2021


Reepham
N
Chimes Way
Old Brewery Ln
Ollands Rd
Smuggler's Ln
B1145
B1145
B1145
BN39
Market Pl
Church Hill
Norwich
Park Ln
Back St
School Rd
Church St
Ewing Cl
Sun Barn Rd
Park Ln
School Rd
100m
©google 2022


Coltishall
N
BN40
B1150
Station Rd
High St
Westbourne Rd
Ling Way
The Hill
The Hill
The Hill
Rectory Rd
Rectory Rd
Rectory Rd
Potspoon Hole
Seven Acres Ln
Great Hautbois Rd
Great Hautbois Rd
Great Hautbois Rd
River Bure
Buxton Rd
Glebe Way
Norwich Rd
B1354
Coltishall
Wroxham Rd
Kings Rd
White Lion Rd
Church Loke
Horstead
250m
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Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

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
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

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.