



2022 Air Quality Annual Status Report (ASR)

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

Date: July 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Derby

Air pollution is associated with several 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 ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Derby City Council declared two Air Quality Management Areas (AQMAs) because of exceedances in the annual mean nitrogen dioxide (NO₂) objective, predominantly due to road traffic emissions. The extent of the AQMAs can be viewed at <http://derby.maps.gov.uk>. Derby was identified as one of several Local Authorities that needed air quality measures to be put in place, due to the outcome of the national air quality model (PCM) which predicted exceedances of the EU Limit Value for NO₂.

As discussed in previous reports, work continues to be done to re-design the boundaries of the inner/outer ring road AQMA. The new boundaries are due to be formally amended, subject to local consultation and approval.

As in previous years, under the Local Air Quality Management (LAQM) regime, the main air pollutants of concern in Derby continue to be nitrogen dioxide (NO₂) and fine particulate matter (PM_{2.5}). The NO₂ monitoring data from 2021 generally show an increasing trend in NO₂ concentrations across Derby, when compared with 2020 data. It is

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

noted, however, that air pollutant concentrations were impacted by the national restrictions in place during 2020 because of the global Covid-19 pandemic. Fewer restrictions were in place throughout 2021.

When comparing 2021 data with pre-pandemic data from 2019, there were only two exceedances of the annual mean NO₂ concentration during 2021, compared to five exceedances in 2019.

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 Strategy⁵ sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero⁶ 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.

Work on air quality improvement measures in the City has started to gather pace again since the ending of Covid lockdown restrictions. The Derby/Derbyshire Air Quality Working Group (AQWG) is now back meeting regularly and a number of significant sustainable transport projects are now in the planning and in some cases, implementation, stage under the Transforming Cities Fund (TCF) and Future Transport Zones (FTZ) work programmes.

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

Conclusions and Priorities

There were two exceedances of the NO₂ annual mean objective limit recorded in Derby during 2021.

As in 2020, SS1 narrowly exceeded the annual mean NO₂ objective limit of 40µg/m³ with an annual mean NO₂ concentration of 40.8µg/m³. SS1 is located at traffic lights on Stafford Street within the No.1 Ring Roads AQMA and is therefore exposed to pollutants from queuing traffic. It also experiences a street canyon effect.

NR2 exceeded the annual mean NO₂ objective limit of 40µg/m³ with an annual mean NO₂ concentration of 42.1µg/m³. This monitor is located on Nottingham Road in Chaddesden.

As stated in previous reports, the boundary of the inner/outer ring road AQMA is out of date and work is being undertaken to re-design the boundaries of this AQMA. The new boundaries are due to be formally amended, subject to local consultation and approval.

There are several major upcoming developments that may influence local air quality including:

- Work has begun on the former Celanese SmartParc development site. Over the coming years, this will create a large-scale food manufacturing and R&D hub which could generate a number of new vehicle trips; however, the impact is considered insignificant when considered against the former use of this site as a large
- The Derby Triangle commercial site within the Wyvern area of the city is now reaching an advanced stage of development. This site has the potential to create new HGV trips, primarily impacting the A52, Nottingham Road and the Wyvern area.
- There continues to be significant development within Infinity Park Derby and the surrounding Infinity Garden Village growth zone in the south of the city. This is being serviced by a new junction off the A50 and could therefore significantly affect traffic flows into and out of the city. Early AQ modelling suggests that the new junction will provide net air quality improvements, however.

Local Engagement and How to get Involved

The Council remain actively involved in the *Derby and Derbyshire Air Quality Working Group*, the *East Midlands Air Quality Network* and the local *Active Travel and Green Forums*. In 2020, Covid-19 meant that these groups were not as active as usual. In 2021, activity has once again increased amongst these groups.

The Derby City Council website includes further details of how to get involved in Air Quality here: <https://www.derby.gov.uk/transport-and-streets/air-quality-in-derby/>

Active public consultations can be found here: <https://www.derby.gov.uk/council-and-democracy/consultations/your-city-your-say-latest-consultations/>.

Derby City Council will again be promoting awareness of air quality issues on National Clean Air Day on 17th June 2022. We encourage people to visit <https://www.cleanairday.org.uk/> for useful resources and information on how to get involved.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Protection Team of Derby City Council with the support and agreement of the following officers and departments:

- Traffic and Transport
- Public Health
- Climate Change Team

This ASR has been approved by Place and Community Development Councillor, Matthew Eyre.

This ASR has been signed off by Robyn Dewis, Director of Public Health.

If you have any comments on this ASR, please send them to Karl Suschitzky at:

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1 Local Air Quality Management

This report provides an overview of air quality in Derby 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 Derby City Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

Air Quality Management Areas

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

A summary of AQMA declared by Derby City Council can be found in Table 2.1. The table presents a description of the two AQMA that are currently designated within Derby City Council. Appendix D: Map(s) of Monitoring Locations and AQMA provides maps of AQMA and the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designations relate to annual mean exceedances of NO₂.

Derby City Council are in the process of developing new boundaries for these AQMA.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
No.1 Ring Roads	Declared 01/08/2001, Amended 01/09/2002 and 23/10/2006	NO2 Annual Mean	An AQMA encompassing the Inner and Outer Ring-Roads in the city, as well as some sections radial roads and the entire length of Osmaston Road.	NO	63.6µg/m ³	40.8µg/m ³	Derby City Council Air Quality Action Plan 2020	The AQAP is available here .
No.2 A52	Declared 01/08/2001, Amended 01/09/2002 and 23/10/2006	NO2 Annual Mean	Sections of the A52, Derby Road and Nottingham Road in Spondon.	YES	40.6µg/m ³	42.2µg/m ³	Derby City Council Air Quality Action Plan 2020	The AQAP is available here .

☒ Derby City Council confirm the information on UK-Air regarding their AQMA(s) is up to date.

☒ Derby City Council confirm that all current AQAPs have been submitted to Defra.

Progress and Impact of Measures to address Air Quality in Derby City Council

Defra's appraisal of last year's ASR can be found in Table 2.3.

Derby City Council has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 36 measures are included within Table 2.2, with the type of measure and the progress Derby City Council have made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in Derby City Council's updated Air Quality Action Plan (2020). Key completed measures are:

- Local Cycling and Walking Infrastructure Plan (LCWIP)
- Cleaner Taxis Project
- Capability Programme
- Anti-idling Enforcement
- Derby Roadside NO2 Local Air Quality Plan - Traffic Management Scheme
- Updated Air Quality Action Plan (AQAP)
- Air Quality Awareness Raising
- Local Growth Fund (LGF)
- Derby bus station vehicular entrance/exit upgrades
- City Centre to Derby Rail Station Access Improvement Scheme
- DRT - Demand Responsive Bus Service linking Infinity Park with Key Employment Sites
- Pentagon Island - Spondon (Nottm Rd) cycleway
- Traffic light priority at Key Junctions
- Continued funding of the 'Workplace Travel Service' business support and grants package

Derby City Council expects the following measures to be completed over the course of the next reporting year:

- AQ and Planning
- National Bus Strategy
- e-Scooter Hire Trial

Derby City Council's priorities for the coming year are:

- Transport Planning and Infrastructure
- Promoting Travel Alternatives
- Promoting Low Emission Transport

The principal challenges and barriers to implementation that Derby City Council anticipates facing are trying to balance the delivery of the various programmes in Table 2.2 with other priorities.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Local Cycling and Walking Infrastructure Plan (LCWIP)	Transport Planning and Infrastructure	Cycle network	2019	2022	DCiC, NCiC, DfT	D2N2 Funding (to create Plan)	NO	Funded	£50k - £100k	Implementation	Reduced vehicle emissions from mode shift.	Completion of Plan	Completed (subject to public consultation)	Matters arising public consultation
2	Updated Council Staff and Fleet Travel Plans and updated Cleaner Fleet Policy	Promoting Travel Alternatives	Workplace Travel Planning	2019	2023	DCiC	LA - existing budget	NO	Funded	< £10k	Planning	Reduced vehicle emissions	# of low emission vehicles in Council grey fleet and # business mode shift journeys	Development Phase initiated in June 2019 and Cleaner Fleet Strategy now approved by Cabinet	Plans have stalled due to Covid priorities. Needs to be re-focused.
3	Cleaner Taxis Project	Promoting Low Emission Transport	Taxi Licensing conditions	2018	2020	DCiC, Derby Taxi Trade and Unions	Clean Air Fund bid unsuccessful. Possible use of Transforming Cities Fund and/or Future Transport Zones funding to progress.	NO	Partially Funded		Aborted	Reduced vehicle emissions	# of taxis meeting minimum NOx emissions standards	Taxi Licensing Strategy approved, but with later implementation date. Taxi fleet emission study complete.	Progress currently on hold due to partial funding and other priorities. Some aspects being delivered through TCF.
4	Capability Programme	Promoting Travel Alternatives	Workplace Travel Planning	2021	2022	DCiC	LA and Partners through Access Fund, Local Growth Fund and Capability Fund.	NO	Funded		Completed	Reduced vehicle emissions	Capability Fund analysis	Project complete and M&E completed	Complete
5	EV Charging Infrastructure	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2023	DCiC, NCC, OLEV, EV Charging Providers	Various schemes under TCF and FTZ programmes.	NO	Funded		Planning	Reduced vehicle emissions	# New EV Charge Points	Ongoing installation of EV points under framework with BP Pulse.	Needs to be Supported by EV Charging Planning Policy (local and government). Concerns over future costs of maintaining publicly owned EV infrastructure, especially in light of Covid-19 financial recovery.

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6	Anti-idling Enforcement	Traffic Management	Anti-idling enforcement	2020	2023	DCiC, schools	LA Enforcement. Use of DEFRA funding for comms campaign?	NO	Partially Funded		Planning	Reduced vehicle emissions	New expanded PPO enforcement service operational, then # of Notices Served	Report complete and awaiting Cabinet consideration, but on hold.	Question over whether remit of PPO Service can include anti-idling. Funding and resource not yet allocated for publicity campaign and designation of anti-idling zones.
7	Area and Regional Coordination of AQ Measures through AQWG and EMAQN	Other	Other	2016		Derbyshire and other East Midlands Authorities	Using existing DCC funding to work with Derbyshire and other East Midlands Authorities	NO	Funded		Completed	Wide range of measures proposed under Work Plan	AQWG Work Plan Implementation and annual reporting to Health Protection Board and Health and Well-being Boards	Operational since 2016	Slowed down due to Covid-19 priorities. Needs re-energising in 2021.
8	AQ and Planning	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance		2022	DCiC, EMAQN	LA resourced	NO	Funded		Planning	Ensuring AQ is at the heart of planning decisions. To assist EV charging implementation under EV schemes being taken forward under TCF/FTZ.	Completion of Local Plan AQ Policy and subsequently, completion of Supplementary Planning Guidance (or Developer's Guide) on AQ and EV Charging Policy. Also developing specific Planning Guidance on Derby Local Roadside NO2 Plan TMS.	EMAQN template produced for use in DCC Policy.	Policy being taken forward, however currently resource-constrained due to other Local Plan commitments.
9	Derby Roadside NO2 Local Air Quality Plan - Traffic Management Scheme	Traffic Management	UTC, Congestion management, traffic reduction	2020	2022	DCiC and JAQU	Subject to DEFRA Funding	YES	Funded	> £10 million	Implementation	Reduction in annual average NO2 along Stafford Street to below 40µgm3 by 2020 (reduction of 9.4µgm-3 NO2 based on 2020 baseline)	Compliance with EU Limit Values	Infrastructure complete. UTMC system - Ian Butler	Implementation going ahead, subject to ongoing government advice.

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10	National Bus Strategy	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2021	2022	DCiC and Local Bus Service Providers	Requirement on all LAs	NO	Funded	£1 million - £10 million	Planning	To be determined.	Completion of Bus Partnership Scheme	Draft Enhanced Partnership Agreement due with DfT by end of June 2022. Second draft Bus Service Improvement Plan (BSIP) by October 2022.	Indicative funding award of £7.4m
11	Updated Air Quality Action Plan (AQAP)	Other	Other	2019	2020	DCiC	LA funded	NO	Funded	£10k - 50k	Completed	Variety of measures proposed following source apportionment modelling across AQMAs	Completion of AQAP	Completed and approved by Cabinet in November 2020.	Resource/staff constraints and ownership of measures following completion of Plan.
12	Air Quality Awareness Raising	Public Information	Via other mechanisms			DCiC Comms	LA Delivery using DEFRA Implementation Funding (£450k)	YES	Funded	£100k - £500k	Implementation	Indirect reductions in pollutant concentrations due to behavioural change resulting from information. Hard to quantify.	# stakeholders actively engaged, assessed via click-through rates and average view length time on social media and web pages and # mailshots/ letters	Taxi engagement workshop and Clean Air Day events complete. Ongoing updating of website and connecting Derby site including useful info and signposting.	Currently insufficient staff to deliver funding. Funding includes revenue, so hoping to appoint new comms/marketing officer/s?
13	Investigate the potential for promoting low emission freight initiatives in Derby	Promoting Low Emission Transport	Other			DCiC, DCC	Derby City Council / Derbyshire County Council	NO	Not Funded		Planning	Unknown	Unknown	Council to consider options for supporting a freight consolidation centre and promoting Eco Stars	Resource constrained. Possibly not deemed a priority. Departmental ownership and resource allocation required.
14	Review Derby Bonfire Enforcement Policy	Other	Other		2021	DCiC	Derby City Council / PHE	NO	Partially Funded	£10k - 50k	Planning	NO2 and PM2.5 emissions reduction. Hard to quantify.	Completion of Policy.	Political discussion initiated. Next stage is to draft a new policy and undertake public engagement.	Some equalities issues to consider and conflicts with Bonfire Night celebrations. Political/public pressure needs to be considered fully.

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15	Transforming Cities Fund (TCF) implementation	Alternatives to private vehicle use	Other	2020	2023	DCiC jointly with NCiC and private partners	Derby CC delivery jointly with Nottingham CC - £161m awarded under TCF.	NO	Funded	> £10 million	Planning	Emission reductions to be modelled for certain projects. Hard to quantify in some cases.	Large variety of measures being delivered under TCF. See further items for individual scheme details.	See extensive work programme	See extensive work programme
16	Future Transport Zones (FTZ) Programme	Transport Planning and Infrastructure	Other	2020	2024	DCiC jointly with NCiC	Derby CC delivery jointly with Nottingham CC - £16.7m awarded under FTZ Fund.	NO	Funded	> £10 million	Planning	Emission reductions to be modelled for certain projects. Hard to quantify in some cases.	E.g., No. of people using data platform, MaaS app and mobility hubs.	See extensive work programme	See extensive work programme
17	Moving Derby Forward Programme (Covid-19 emergency transport measures)	Traffic Management	Other	2020	2021	DCiC, DfT	DfT Emergency Active Travel Fund - £238k from tranche 1. More funding being delivered under tranche 2.	NO	Funded	£100k - £500k	Implementation	Emergency measures, so focus is on implementation rather than theoretical measurement.	Completion of programme. No. of people using new cycle lanes and No. of converted trips to cycling/walking from car. Amount of reallocated road space	Dave Dowbenko update re Tranche 2	
18	Creation of Air Quality Project Board	Policy Guidance and Development Control	Other policy		2021	DCiC	Derby CC	NO	Funded	< £10k	Planning	Not possible to calculate.	Creation of Board and board meeting programme completed. First meeting taken place.	Board member selection process initiated.	Challenge to get buy-in and commitment from relevant senior officers.
19	Local Growth Fund (LGF)	Alternatives to private vehicle use	Other	2020	2022	DCiC, NCiC, DCC and NCC	Local Growth Fund (LGF) £50k per year until March 2023	NO	Funded	£100k - £500k	Completed	Emission reductions from mode change trips	M&E Report now available	Complete	
20	Beat the Street	Promoting Travel Alternatives	Promotion of walking	2021	2021	Move More Derby, DCC, Intelligent Health	National Lottery, Sport England	NO	Funded	£50k - £100k	Completed	Reduced vehicle emissions	6 month follow up survey to be sent in September this year which will look at long term behaviour.	28,227 participants (10.7% of Derby population) took part between 31/03/21 and 12/05/21. 81 out of 82 schools took part.	

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21	e-Scooter Hire Trial	Promoting Low Emission Transport	Other	2021	2022	DCC, Wind Mobility	TCF	NO	Funded		Implementation	Reduced vehicle emissions	No. of users and scooter miles covered.	First tranche of scooters now available to key workers. Trial extended to November 2022	Cost of use of scooters may be a barrier. E-scooters have become political.
22	eRT link Cathedral Quarter to Pride Park	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2020	2023	DCC and Private Partners	TCF	NO	Funded	> £10 million	Planning	Reduced vehicle emissions by encouraging use of low emission public transport	Completion of infrastructure. No. of users. Also, traffic modelling proposed to determine queuing reduction.	Draft report due end of June 2022.	
23	P&R Smart Hubs, bus lanes and cycle lanes	Transport Planning and Infrastructure	Bus route improvements	2020	2024	DCC and Private Partners	FTZ	NO	Funded	£1 million - £10 million	Planning	Reduced vehicle emissions	Completion of hubs	A52 Megaloughton Lane - Land now purchased and Feasibility Study being prepared. Early-stage discussions on potential 6 Streets Community Hub.	
24	Derby Strategic corridors	Transport Planning and Infrastructure	Bus route improvements	2020	2023	DCC, Bus Providers and Private Partners	TCF	NO	Funded	£1 million - £10 million	Planning	Reduced bus emissions	Benefits and Outcomes Measures Report	Draft reports for corridor improvements issued for review. Work has started on mapping and packaging the remaining routes of the network.	
25	Public Realm work within the key areas of the city centre (The Spot and Victoria and Albert Street)	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	2020	2023	DCC and Private Partners	TCF	NO	Funded	£1 million - £10 million	Planning	Reduced vehicle emissions	Benefits and Outcomes Measures Report	Design work ongoing	
26	Derby bus station vehicular entrance/exit upgrades	Transport Planning and Infrastructure	Bus route improvements	2020	2023	DCC	TCF	NO	Funded	£1 million - £10 million	Planning	Reduced bus emissions	Benefits and Outcomes Measures Report	3 Elements to this: Displays and Kiosks, NPIF and Morledge Junction. All aspects progressing, but no firm	

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														completion dates.	
27	City Centre to Derby Rail Station Access Improvement Scheme	Transport Planning and Infrastructure	Cycle network	2020	2023	DCC	TCF	NO	Funded	£1 million - £10 million	Planning	Reduced vehicle emissions by encouraging walking and cycling	Benefits and Outcomes Measures Report	Scoping Report now complete. Draft design stage. Business Case Report due in July.	
28	DRT - Demand Responsive Bus Service linking Infinity Park with Key Employment Sites	Transport Planning and Infrastructure	Bus route improvements	2020	2023	DCC/Private Bus Company	Private Bus Companies with DCC support using TCF Funding	NO	Funded	£1 million - £10 million	Planning	Reduced vehicle emissions	Benefits and Outcomes Measures Report	Under feasibility. No completion date available at this point.	
29	Strategic cycle link (Derby)	Transport Planning and Infrastructure	Cycle network	2020	2023	DCC	TCF	NO	Funded	£1 million - £10 million	Planning	Reduced vehicle emissions by encouraging cycling	Benefits and Outcomes Measures Report	Scheme now progressing on amended programme.	
30	City centre - Mickleover cycle route	Transport Planning and Infrastructure	Cycle network	2020	2023	DCC with private partners	TCF	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions by encouraging cycling	Benefits and Outcomes Measures Report	Partly constructed	
31	Pentagon Island - Spondon (Nottm Rd) cycleway	Transport Planning and Infrastructure	Cycle network	2020	2023	DCC	TCF	NO	Funded	£1 million - £10 million	Planning	Reduced vehicle emissions by encouraging cycling	Benefits and Outcomes Measures Report	Draft design stage. Public consultation on route designs now complete.	
32	City Centre - Raynesway (A52) cycleway	Transport Planning and Infrastructure	Cycle network	2020	2023	DCC	TCF	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions by encouraging cycling	Benefits and Outcomes Measures Report	Partially constructed	
33	Traffic light priority at Key Junctions	Transport Planning and Infrastructure	Bus route improvements	2020	2023	DCC/Bus Partners	TCF	NO	Funded	£1 million - £10 million	Planning	Reduced bus emissions	Benefits and Outcomes Measures Report	Pentagon Island Scheme now complete. Work programme being developed to progress bus priority scheme at existing signalised junctions through the use of Trapeze system (planning stage).	

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
34	Smart Ticketing	Transport Planning and Infrastructure	Bus route improvements	2020	2023	DCC with public transport partners	TCF/FTZ	NO	Funded	£100k - £500k	Planning	Improved journey planning and increase in use of sustainable transport modes	Benefits and Outcomes Measures Report	Final report submitted. Exploring software solution.	
35	Continued funding of the 'Workplace Travel Service' business support and grants package	Promoting Travel Alternatives	Workplace Travel Planning	2021	2022	DCC		NO	Funded	£100k - £500k	Completed	Travel grants for businesses to encourage staff to use sustainable transport modes	Monitoring and Evaluation Report	Completed. Seeking funding to extend programme.	
36	Zero Emission Bus Regional Areas (ZEBRA)	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2021		DCC	ZEBRA Fund	NO	Not Funded		Aborted	No. of Zero Emission Buses purchased	Successful bid first step	Bid not progressed.	

Table 2.3 – Responses to DEFRA Comments on Derby City Council's ASR 2020

The Council are commended for a well-structured, detailed report which provides all the information specified in the Guidance.

No.	Comments from DEFRA on Derby City Council's ASR 2020	Response (if required)
1	The Council are commended on how they present their response to last year's appraisal comments with the use of a table. All comments made in the previous appraisal have been addressed.	Derby City Council will continue to use this format for presenting responses to comments made by DEFRA.
2	A review of AQMA designations for AQMA No.2 do not appear to be present despite the AQMA not recording any exceedances of the NO ₂ annual mean objective in 5 years. It is advised that the Council undertake and present a review of this AQMA and discuss whether changes need to be made to the designation.	Now that the A52 Congestion Scheme is complete and we are back to 'normal' traffic flows post-covid, a review of this AQMA will be undertaken in 2022.
3	The Council have stated that the current boundaries of AQMA No.1 are out of date and are to be amended. Should amendments be made to the AQMA boundaries, these changes will need to be reflected in an updated AQAP.	Amendments to the current boundaries of this AQMA are ongoing.
4	The discussion around pollutant trends is limited and focussed on AQMA 1. It would be beneficial for the Council to include a discussion on pollutant trends in AQMA 2 as well as at sites outside of the AQMAs.	Pollutant trends in AQMA 1, AQMA 2 and outside of AQMAs is included in 3.1.3 below.

5	The Council are encouraged to continue to work closely with Derbyshire County Council via the Air Quality Working Group (AQWG) to implement measures to reduce PM _{2.5} emissions.	The Derby/Derbyshire AQWG is now active again, with regular discussions and an associated work plan highlighting ways in which we can reduce PM _{2.5} emissions and population exposure.
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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.

Furthermore, the Environment Act 2021 requires government to set targets for fine particulate matter (PM_{2.5}), and consultation is currently ongoing to set this target. Whilst more detail will become available once the guidance is published, it is widely thought that a PM_{2.5} objective level of 10µg/m³ will be set.

Derby City Council already implements the following measures that are designed to address the emission of PM_{2.5}, such as:

- The enforcement of a city-wide smoke control area, a zero-tolerance approach to the burning of trade waste and a general policy to discourage bonfires and take enforcement action where necessary;
- Ensure the submission and agreement of Construction Management Plans with detailed dust management measures, by planning condition/s for all significant developments in the City;
- Reinforcing DEFRA's 'Burn Better' campaign, with details and links on the Council website and periodic social media updates at certain times of year.

Vehicle brake and tyre wear is a well-known source of PM_{2.5} emissions, therefore, it is acknowledged that schemes and projects, such as Cycle Derby, personal and employee Personalised Travel Planning (PTP) and other work to encourage the shift from road traffic to walking/cycling is an important part of local action to reduce PM_{2.5}. The Council advocate that centrally led work to encourage the manufacturing industry to implement significant improvements in tyre and brake materials to minimise, or even avoid, wear, is a vital part of the programme to reduce PM_{2.5}.

Derby City Council continues to work closely with Derbyshire County Council via the Air Quality Working Group (AQWG) to develop measures aimed at reducing PM_{2.5} across the County. This Group reports annually on air quality to the Health Protection Board and the

City's Health and Well Being Board and has developed an Action Plan to address the PM_{2.5} targets under the Public Health Outcomes Framework.

Derby City Council outline several measures for managing PM_{2.5} in our AQAP, including regulating emissions from small combustion sources, Derby being a smoke control area, and expanding the remit of the Public Protection team to include further smoke enforcement.

Derby City Council are also working on the development of an up-to-date Bonfire Policy aimed at discouraging bonfires more widely, possibly through greater enforcement. The existing Bonfire Policy will be reviewed in the Air Quality Action Plan.

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

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

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Automatic (continuous) monitoring is now carried out under the AURN Network (managed by Bureau Veritas on behalf of DEFRA) at the Derby St Alkmund's Way site with data available for 2021. Table A.1 in Appendix A shows the details of the automatic monitoring sites. National monitoring results are available at https://uk-air.defra.gov.uk/networks/site-info?uka_id=UKA00630.

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. The site is part of the AURN and has been calibrated by DEFRA to national standards.

3.1.2 Non-Automatic Monitoring Sites

Derby City Council undertook non- automatic (i.e., passive) monitoring of NO₂ at 70 sites during 2021. Table A.2 in Appendix A presents the details of the non-automatic sites. There were no new monitoring sites added in 2021.

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.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare 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 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.

As in 2020, an exceedance of the air quality objective was recorded at SS1. The monitor is located at traffic lights on Stafford Street within the No.1 Ring Roads AQMA, meaning that it is exposed to the pollutants from queuing traffic.

NR2 exceeded the annual mean NO₂ objective limit of 40µg/m³ with an annual mean NO₂ concentration of 42.1µg/m³.

For sites outside of these AQMAs, there have been no exceedances of the annual mean NO₂ objective limit of 40µg/m³ since 2019. At all sites where exceedances were recorded in 2019, there has been a reduction in recorded NO₂ concentrations since then, which remains the case in 2021 when COVID-19 lockdown restrictions had eased.

As stated in previous reports, the boundary of the inner/outer ring road AQMA is out of date and work is being undertaken to re-design the boundaries of this AQMA. The new boundaries are due to be formally amended, subject to local consultation and approval.

As there are no NO₂ annual mean concentrations of more than 60µg/m³, it is likely that there are no exceedances of the 1-hour mean objective for NO₂.

3.1.4 Particulate Matter (PM₁₀)

Derby City Council have not undertaken any PM₁₀ monitoring since 2013. These data have been presented in previous reports and are not repeated here; measured concentrations were well below the relevant objectives.

3.1.5 Particulate Matter (PM_{2.5})

Derby City Council does not currently monitor PM_{2.5} concentrations and currently has no plans to do so in the future. This position is subject to change depending upon the outcome of the new Environment Act 2021 PM_{2.5} target. We do also note possible proposals to install a new PM_{2.5} monitor under the AURN network in 2022.

3.1.6 Sulphur Dioxide (SO₂)

Derby City Council does not currently monitor SO₂ concentrations and currently has no plans to do so in the future.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
AURN	St Alkmund's Way AURN	Roadside	435763	336306	NO ₂	Yes - Derby NO ₂ AQMA No.1 Ring Roads	Chemiluminescent	N/A	3.7	1.2

Notes:

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

(2) N/A if not applicable

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
AB1	201 Abbey Street	Roadside	434846	335657	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
AR1	189/191 Ashbourne Road	Roadside	433633	336850	NO ₂	N	0.0	4.0	No	1.8
AR2	259 Ashbourne Road	Roadside	433459	336918	NO ₂	N	N/A	14.5	No	1.8
AR3	148 Ashbourne Road	Roadside	433796	336786	NO ₂	N	0.0	3.0	No	1.8
AR4	Millgate, Ashbourne Road	Roadside	434307	336565	NO ₂	Y - No.1 Ring Roads	0.0	4.0	No	1.8
AS1	Kenneth House, Agard Street	Roadside	434545	336570	NO ₂	Y - No.1 Ring Roads	0.0	2.5	No	1.8
AS2	Centro West, Agard Street	Roadside	434579	336571	NO ₂	N	0.0	4.2	No	1.8
AS3	8/10 Agard Street	Roadside	434712	336490	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
BR1	Bass Recreation Ground/The Holmes	Urban Background	435764	336306	NO ₂	N	N/A	4.0	No	1.8
BUR1	220 Burton Road	Roadside	434785	335241	NO ₂	Y - No.1 Ring Roads	0.0	3.0	No	1.8
BUR2	114a Burton Road	Roadside	435025	335508	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
CAV1	171/182 Cavendish Court	Roadside	434820	336505	NO ₂	N	0.0	15.0	No	1.8

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)
CC1	Casteward Court, Traffic Street	Roadside	435725	335802	NO ₂	Y - No.1 Ring Roads	0.0	35.0	No	1.8
CH1	Council House	Urban Centre	435496	336294	NO ₂	N	N/A	>50	No	1.8
CM1	Victoria Street/Corn Market	Roadside	435262	336157	NO ₂	N	N/A	5.0	No	1.8
CR1	49 Derby Road, Chellaston	Roadside	437814	330456	NO ₂	N	0.0	7.0	No	1.8
DER1	198 Derby Road	Roadside	438942	335864	NO ₂	N	0.0	2.0	No	1.8
DR1	Duffield Road/North Street	Roadside	434814	337041	NO ₂	Y - No.1 Ring Roads	2.0	4.0	No	1.8
DR2	5 Duffield Road	Roadside	434937	336916	NO ₂	Y - No.1 Ring Roads	0.0	4.0	No	1.8
EG1	Eastgate (Pentagon)	Roadside	436064	336487	NO ₂	N	N/A	3.0	No	1.8
FG1	100A Friar Gate	Roadside	434718	336375	NO ₂	Y - No.1 Ring Roads	0.0	11.5	No	1.8
FG2	63 Friar Gate	Roadside	434450	336523	NO ₂	Y - No.1 Ring Roads	0.0	4.9	No	1.8
FG3	Friargate / Bridge Street corner	Roadside	434497	336510	NO ₂	Y - No.1 Ring Roads	0.0	7.0	No	1.8
GC1	23 Gilbert Close	Roadside	439776	335696	NO ₂	Y - No.2 A52	0.0	10.0	No	1.8
HL1	109 Highfield Lane	Roadside	437382	336044	NO ₂	N	2.0	19.0	No	1.8

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)
HS1	16/18 Harrow Street	Roadside	437196	334410	NO ₂	Y - No.1 Ring Roads	0.0	8.0	No	1.8
KL1	10 Kirkleys Ave North	Roadside	440206	335650	NO ₂	Y - No.2 A52	0.0	10.0	No	1.8
KL2	27 Kirkleys Ave South	Roadside	440198	335611	NO ₂	Y - No.2 A52	0.0	12.0	No	1.8
KR1	8 Kedleston Road (Chriopodist)	Roadside	434775	337086	NO ₂	N	0.0	8.0	No	1.8
LR1	938 London Road	Roadside	437676	334090	NO ₂	Y - No.1 Ring Roads	0.0	3.0	No	1.8
LR2	1178 (1170) London Road	Roadside	438162	333654	NO ₂	Y - No.1 Ring Roads	0.0	5.0	No	1.8
LW1	18 Leeway	Roadside	439647	335575	NO ₂	Y - No.1 Ring Roads	0.0	9.8	No	1.8
ML1	25 Morledge	Roadside	435477	336176	NO ₂	Y - No.2 A52	N/A	11.0	No	1.8
MR1	14 Mansfield Road	Roadside	435439	336817	NO ₂	N	0.0	3.0	No	1.8
NR1	24 Nottingham Road	Roadside	439899	335348	NO ₂	Y - No.1 Ring Roads	0.0	5.7	No	1.8
NR2	203/201 Nottingham Road	Roadside	436700	336637	NO ₂	Y - No.2 A52	0.0	2.0	No	1.8
NR3	123 Nottingham Road	Roadside	435795	336625	NO ₂	Y - No.1 Ring Roads	0.0	3.0	No	1.8
NR4	63 Nottingham Road	Roadside	435586	336642	NO ₂	Y - No.1 Ring Roads	0.0	3.0	No	1.8

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)
NS1	32 Newdigate Street	Roadside	435091	333526	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
NS2	80 Newdigate Street	Roadside	435022	333581	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
OPR1	523 Osmaston park Road	Roadside	436809	332826	NO ₂	Y - No.1 Ring Roads	0.0	3.0	No	1.8
OPR2	104 Osmaston Park Road	Roadside	435716	333327	NO ₂	Y - No.1 Ring Roads	0.0	4.5	No	1.8
OR1	831 Osmaston Road	Roadside	436992	332713	NO ₂	Y - No.1 Ring Roads	0.0	10.0	No	1.8
OR2	29 Ivy Square off Osmaston Road	Roadside	436046	334857	NO ₂	Y - No.1 Ring Roads	0.0	6.0	No	1.8
OR3	114 Osmaston road	Roadside	435534	335467	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
OR4	59 Osmaston Road	Roadside	435440	335717	NO ₂	Y - No.1 Ring Roads	0.1	2.0	No	1.8
PL1	26 / 24a Penny Long Lane	Urban Background	434364	337881	NO ₂	Y - No.1 Ring Roads	10.0	N/A	No	1.8
RS1	150 Radbourne Street	Roadside	433118	336650	NO ₂	N	0.0	4.0	No	1.8
RT1	Royal Telegraph Pub	Roadside	435653	335706	NO ₂	N	0.0	2.0	No	1.8
RW1	7 Raynesway	Roadside	438535	333508	NO ₂	Y - No.1 Ring Roads	0.0	8.0	No	1.8
SMC1	St Marys Court 1	Roadside	435203	336779	NO ₂	Y - No.1 Ring Roads	0.0	3.0	No	1.8

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)
SMC2	St Marys Court 2	Roadside	435249	336785	NO ₂	Y - No.1 Ring Roads	0.0	12.8	No	1.8
SR1	1 Station Road	Roadside	439789	335412	NO ₂	N	0.0	8.0	No	1.8
SS1	Stafford Street Burleigh Mews Flats	Roadside	434748	336352	NO ₂	Y - No.2 A52	0.0	4.0	No	1.8
SS2	Roman House, Stafford Street	Roadside	434766	336329	NO ₂	Y - No.1 Ring Roads	0.0	7.1	No	1.8
SS3	46 Stafford Street	Roadside	434703	336213	NO ₂	N	0.0	5.2	No	1.8
SS4	59a Stafford Street	Roadside	434688	336155	NO ₂	N	0.0	2.0	No	1.8
ST1	64 St Thomas Road	Roadside	435294	334202	NO ₂	N	0.0	3.9	No	1.8
UNR2	414 Uttoxeter New Road	Roadside	433190	335380	NO ₂	N	0.0	7.7	No	1.8
UNR3	431 Uttoxeter New Road	Roadside	433186	335327	NO ₂	Y - No.1 Ring Roads	0.0	9.0	No	1.8
UNR4	266 Uttoxeter New Road	Roadside	433786	335778	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
UNR5	199 Uttoxeter New Road	Roadside	433887	335804	NO ₂	Y - No.1 Ring Roads	0.0	2.0	No	1.8
UNR6	126 Uttoxeter New Road	Roadside	434227	335958	NO ₂	N	0.0	10.0	No	1.8

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)
UNR7	Rowleys Mill Flats, Uttoxeter New Road	Roadside	434461	336041	NO ₂	N	0.0	4.9	No	1.8
UOR1	208 Uttoxeter Old Road	Roadside	433877	335850	NO ₂	Y - No.1 Ring Roads	0.0	4.0	No	1.8
UOR2	Corner of Uttoxeter Old Rd/James Close	Roadside	434182	336329	NO ₂	N	0.0	4.3	No	1.8
UOR3	122/124 Uttoxeter Old Road	Roadside	434109	336255	NO ₂	N	0.0	1.8	No	1.8
UOR4	Ashbourne Court, Uttoxeter Old Road	Roadside	434310	336533	NO ₂	N	0.0	2.5	No	1.8
WH1	115 Windmill Hill Lane	Roadside	433161	336692	NO ₂	Y - No.1 Ring Roads	0.0	8.2	No	1.8
WR1	124 Walbrook Road	Roadside	434852	334055	NO ₂	N	0.0	3.9	No	1.8

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
AURN	435763	336306	Roadside	89	89	37	36	35	26	26

☒ 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 (annualised, as required), i.e., prior to any fall-off with distance correction.

Notes:

The annual mean concentrations are presented as µg/m³.

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

All means have been “annualised” as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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%).

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
AB1	434846	335657	Roadside	92.3	90.9	29.0	29.0	29.0	24.0	27.6
AR1	433633	336850	Roadside	100.0	100.0	42.0	43.0	38.0	30.8	31.1
AR2	433459	336918	Roadside	100.0	100.0		31.0	29.0	22.2	22.3
AR3	433796	336786	Roadside	100.0	100.0	29.0	29.0	27.0	20.5	21.3
AR4	434307	336565	Roadside	100.0	100.0	33.0	32.0	29.0	24.5	24.8
AS1	434545	336570	Roadside	92.3	91.5		32.0	32.0	25.1	25.5
AS2	434579	336571	Roadside	100.0	100.0			28.0	23.6	25.6
AS3	434712	336490	Roadside	100.0	100.0	35.0	31.0	32.0	20.3	22.3
BR1	435764	336306	Urban Background	100.0	100.0		37.0	39.0	28.4	31.5
BUR1	434785	335241	Roadside	100.0	100.0	33.0	31.0	32.0	25.2	28.1
BUR2	435025	335508	Roadside	90.4	92.0	32.0	33.0	30.0	28.8	27.6
CAV1	434820	336505	Roadside	92.3	90.4	26.0	23.0	23.0	17.8	18.6
CC1	435725	335802	Roadside	90.4	92.3		25.0	28.0	18.8	20.1

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
CH1	435496	336294	Urban Centre	90.4	92.3	29.0	25.0	25.0	19.9	19.1
CM1	435262	336157	Roadside	73.1	76.9	26.0	23.0	22.0	16.8	17.4
CR1	437814	330456	Roadside	100.0	100.0				13.8	16.3
DER1	438942	335864	Roadside	100.0	100.0	30.0	29.0	28.0	24.6	24.9
DR1	434814	337041	Roadside	100.0	100.0	27.0	26.0	27.0	19.9	22.0
DR2	434937	336916	Roadside	100.0	100.0	29.0	29.0	27.0	21.7	23.8
EG1	436064	336487	Roadside	100.0	100.0	45.0	43.0	40.0	31.1	35.3
FG1	434718	336375	Roadside	100.0	100.0			28.0	21.5	23.3
FG2	434450	336523	Roadside	100.0	100.0			31.0	23.3	26.2
FG3	434497	336510	Roadside		92.0	33.0	35.0	33.0	25.1	27.5
GC1	439776	335696	Roadside	100.0	100.0	27.0	25.0	24.0	18.7	19.8
HL1	437382	336044	Roadside	100.0	100.0	30.0	24.0	26.0	21.3	21.3
HS1	437196	334410	Roadside	100.0	100.0	32.0	30.0	29.0	22.8	26.2
KL1	440206	335650	Roadside	100.0	100.0	29.0	25.0	24.0	19.4	20.0

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
KL2	440198	335611	Roadside	100.0	100.0	25.0	22.0	21.0	16.7	18.3
KR1	434775	337086	Roadside	100.0	100.0	31.0	29.0	27.0	20.9	23.1
LR1	437676	334090	Roadside	100.0	100.0	44.0	40.0	42.0	35.1	38.8
LR2	438162	333654	Roadside	100.0	100.0	35.0	33.0	33.0	26.2	28.2
LW1	439647	335575	Roadside	100.0	100.0		23.0	23.0	19.3	20.3
ML1	435477	336176	Roadside	100.0	100.0	38.0	34.0	34.0	25.1	26.0
MR1	435439	336817	Roadside	92.3	91.5	31.0	27.0	28.0	21.5	25.7
NR1	439899	335348	Roadside	100.0	100.0		34.0	37.0	32.2	35.4
NR2	436700	336637	Roadside	100.0	100.0	48.0	45.0	44.0	36.2	42.1
NR3	435795	336625	Roadside	100.0	100.0	32.0	30.0	29.0	23.2	23.2
NR4	435586	336642	Roadside	100.0	100.0	33.0	30.0	29.0	24.8	25.2
NS1	435091	333526	Roadside	90.4	92.0	38.0	37.0	31.0	25.6	34.0
NS2	435022	333581	Roadside	69.2	64.0	36.0	38.0	33.0	29.2	33.6
OPR1	436809	332826	Roadside	100.0	100.0	27.0	27.0	27.0	20.6	23.1

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
OPR2	435716	333327	Roadside	90.4	92.3	36.0	36.0	37.0	29.5	33.6
OR1	436992	332713	Roadside	100.0	100.0	26.0	24.0	24.0	19.9	22.1
OR2	436046	334857	Roadside	100.0	100.0	34.0	33.0	31.0	26.5	28.0
OR3	435534	335467	Roadside	100.0	100.0	37.0	35.0	34.0	29.2	31.7
OR4	435440	335717	Roadside	90.4	92.0	31.0	28.0	29.0	22.4	26.6
PL1	434364	337881	Urban Background	100.0	100.0	16.0	15.0	15.0	11.1	11.8
RS1	433118	336650	Roadside	100.0	100.0	28.0	25.0	24.0	18.8	19.9
RT1	435653	335706	Roadside	84.6	82.4	38.0	36.0	33.0	24.0	28.9
RW1	438535	333508	Roadside	100.0	100.0	32.0	31.0	31.0	25.4	27.3
SMC1	435203	336779	Roadside	100.0	100.0	40.0	38.0	37.0	28.5	30.7
SMC2	435249	336785	Roadside	90.4	92.0		25.0	25.0	19.9	25.8
SR1	439789	335412	Roadside	100.0	100.0	36.0	32.0	29.0	21.9	24.8
SS1	434748	336352	Roadside	92.3	92.3	48.0	45.0	45.0	40.1	40.8
SS2	434766	336329	Roadside	90.4	92.3			28.0	21.9	25.6

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
SS3	434703	336213	Roadside	100.0	100.0			27.0	23.1	26.6
SS4	434688	336155	Roadside	92.3	90.7	36.0	37.0	34.0	28.1	32.1
ST1	435294	334202	Roadside	100.0	100.0			37.0	28.8	36.0
UNR2	433190	335380	Roadside	100.0	100.0		28.0	27.0	21.9	22.6
UNR3	433186	335327	Roadside	100.0	100.0	48.0	44.0	27.0	21.9	23.2
UNR4	433786	335778	Roadside	92.3	91.5	40.0	37.0	36.0	27.8	31.7
UNR5	433887	335804	Roadside	100.0	100.0	35.0	33.0	32.0	27.1	29.7
UNR6	434227	335958	Roadside	100.0	100.0			26.0	20.8	23.3
UNR7	434461	336041	Roadside	100.0	100.0		23.0	22.0	18.5	21.2
UOR1	433877	335850	Roadside	100.0	100.0			28.0	23.5	24.0
UOR2	434182	336329	Roadside	100.0	100.0			23.0	18.6	19.4
UOR3	434109	336255	Roadside		76.4			28.0	23.9	23.4
UOR4	434310	336533	Roadside	100.0	100.0			31.0	25.2	28.0
WH1	433161	336692	Roadside	100.0	100.0			26.0	19.9	23.1

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
WR1	434852	334055	Roadside	100.0	100.0			30.0	23.5	25.7

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

☒ Diffusion tube data has been bias adjusted.

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

Notes:

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

Exceedances of the NO₂ annual mean objective of $40\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO₂ annual means exceeding $60\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 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 NO₂ Concentrations Measured in No.1 Ring Road AQMA

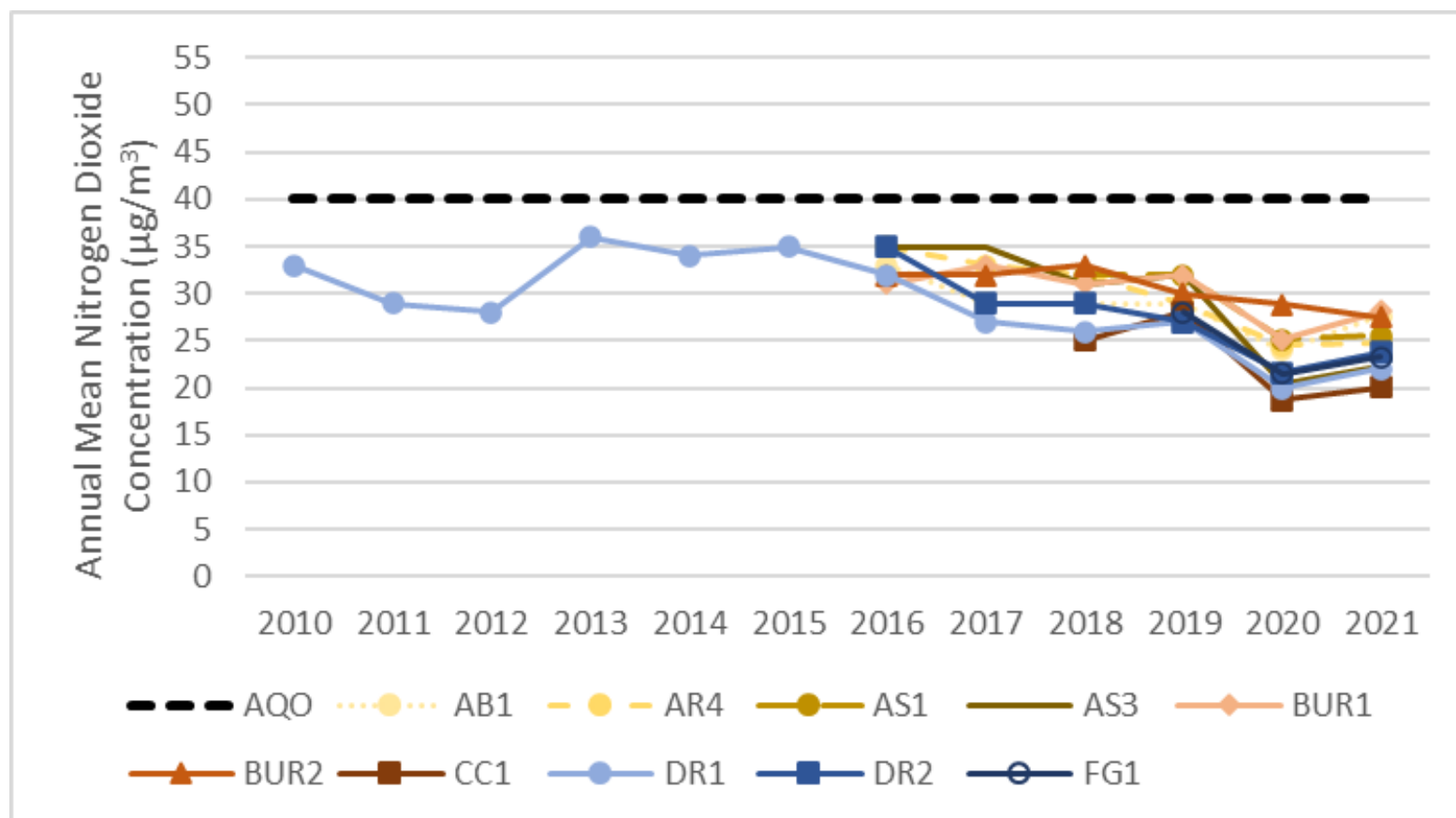


Figure A.2 – Trends in Annual Mean NO₂ Concentrations Measured in No.1 Ring Road AQMA continued

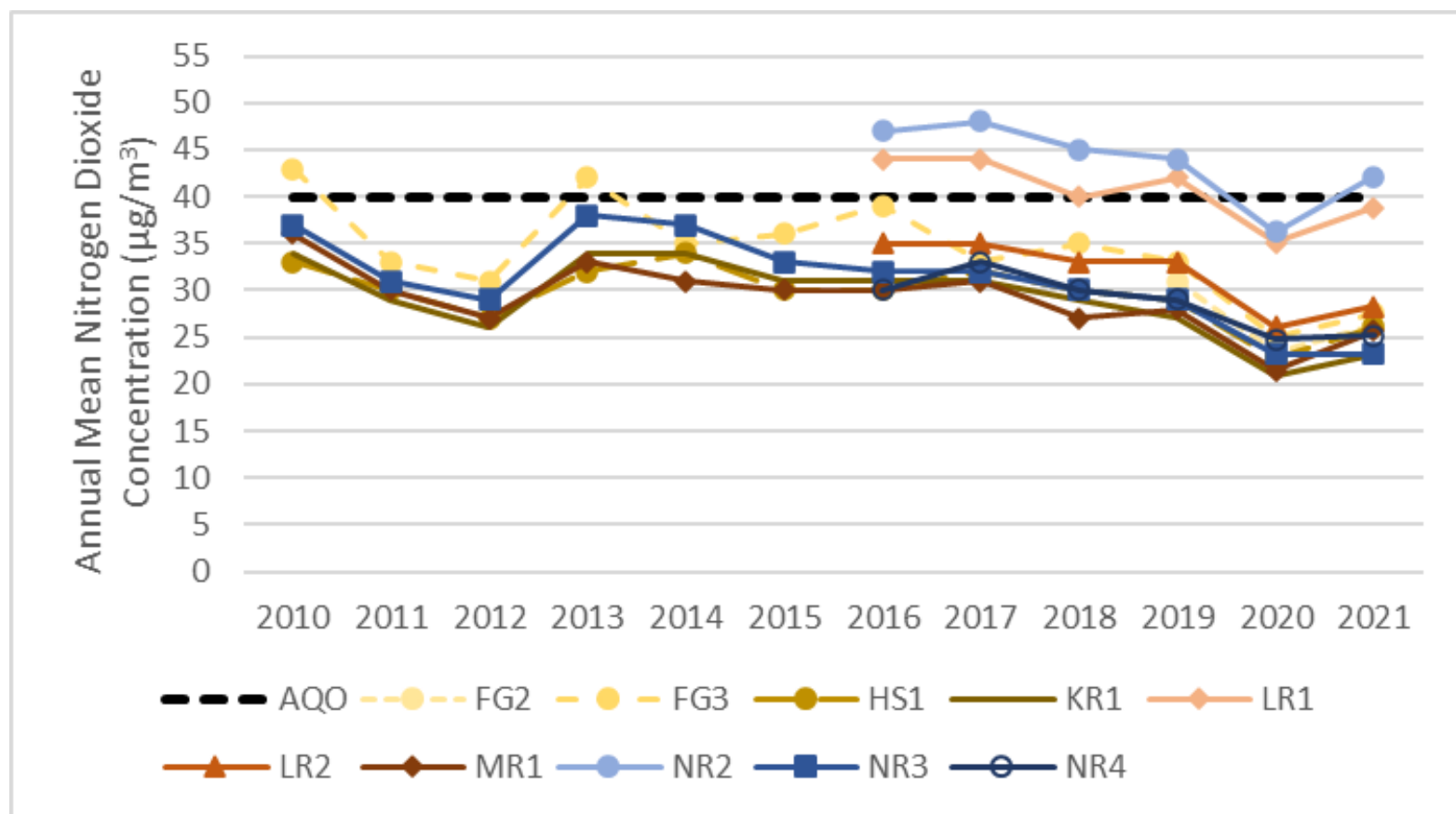


Figure A.3 – Trends in Annual Mean NO₂ Concentrations Measured in No.1 Ring Road AQMA continued

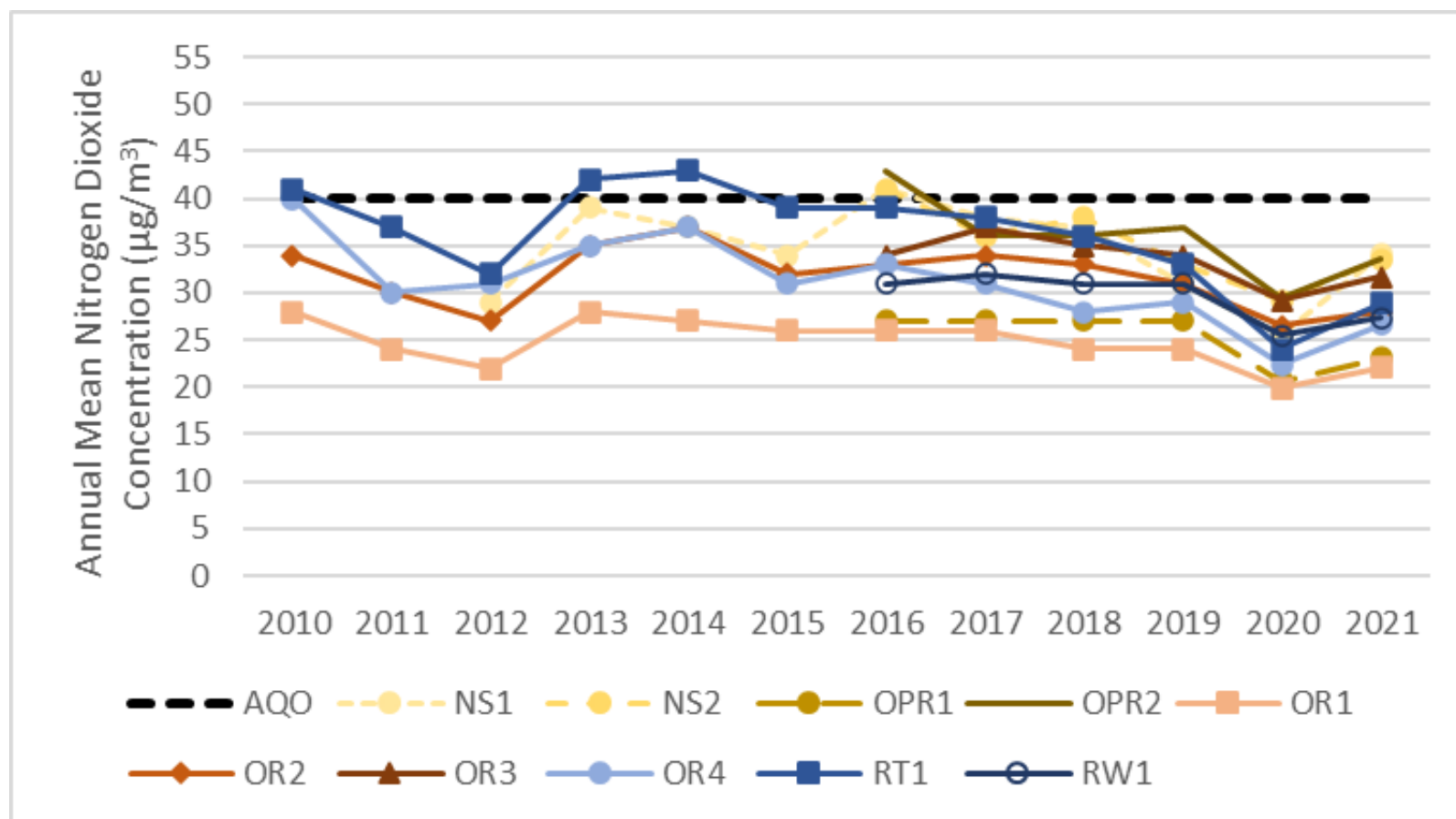


Figure A.4 – Trends in Annual Mean NO₂ Concentrations Measured in No.1 Ring Road AQMA continued

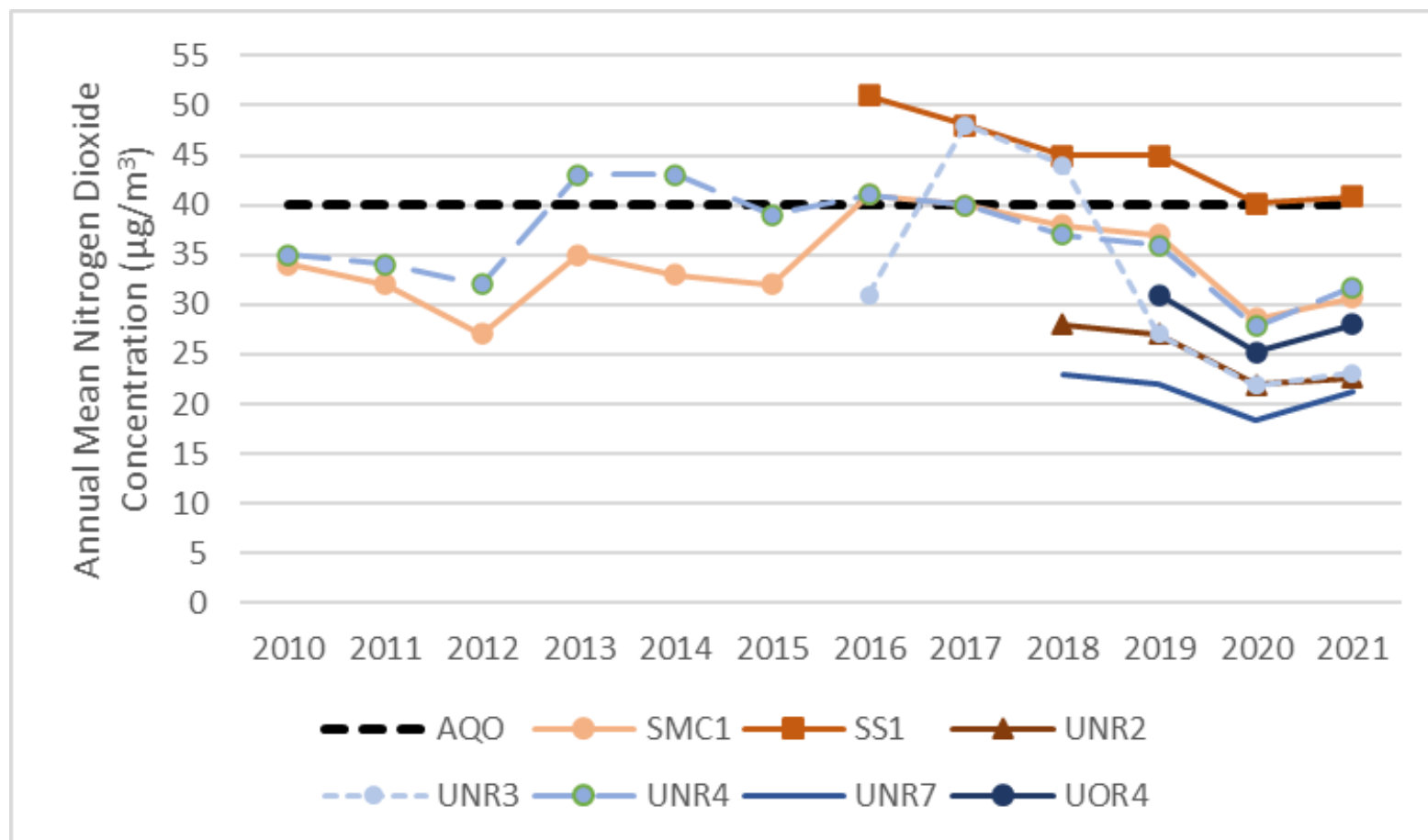


Figure A.5 – Trends in Annual Mean NO₂ Concentrations Measured in No.2 A52 AQMA

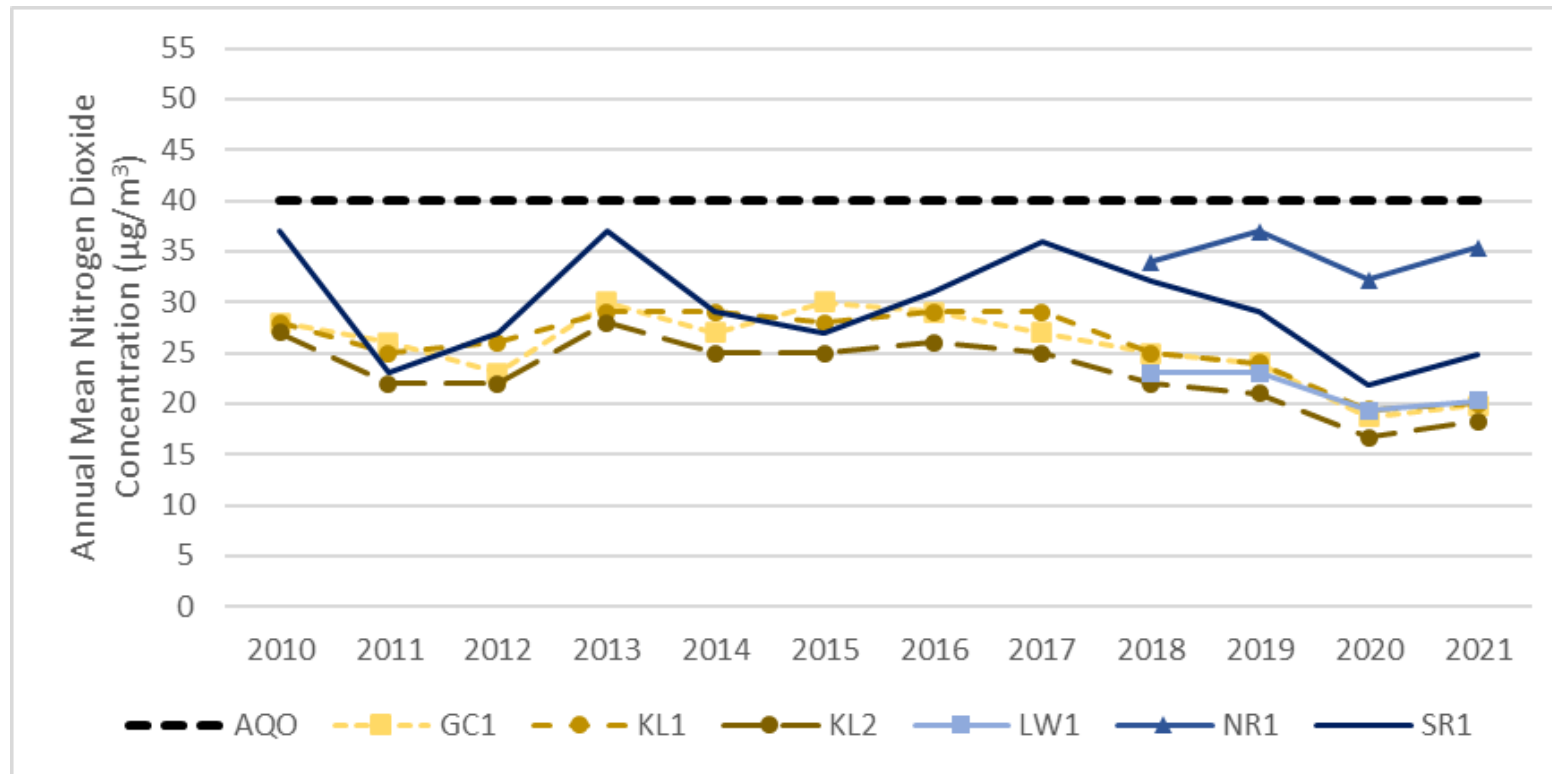


Figure A.6 – Trends in Annual Mean NO₂ Concentrations Measured outside of AQMAs – West Derby

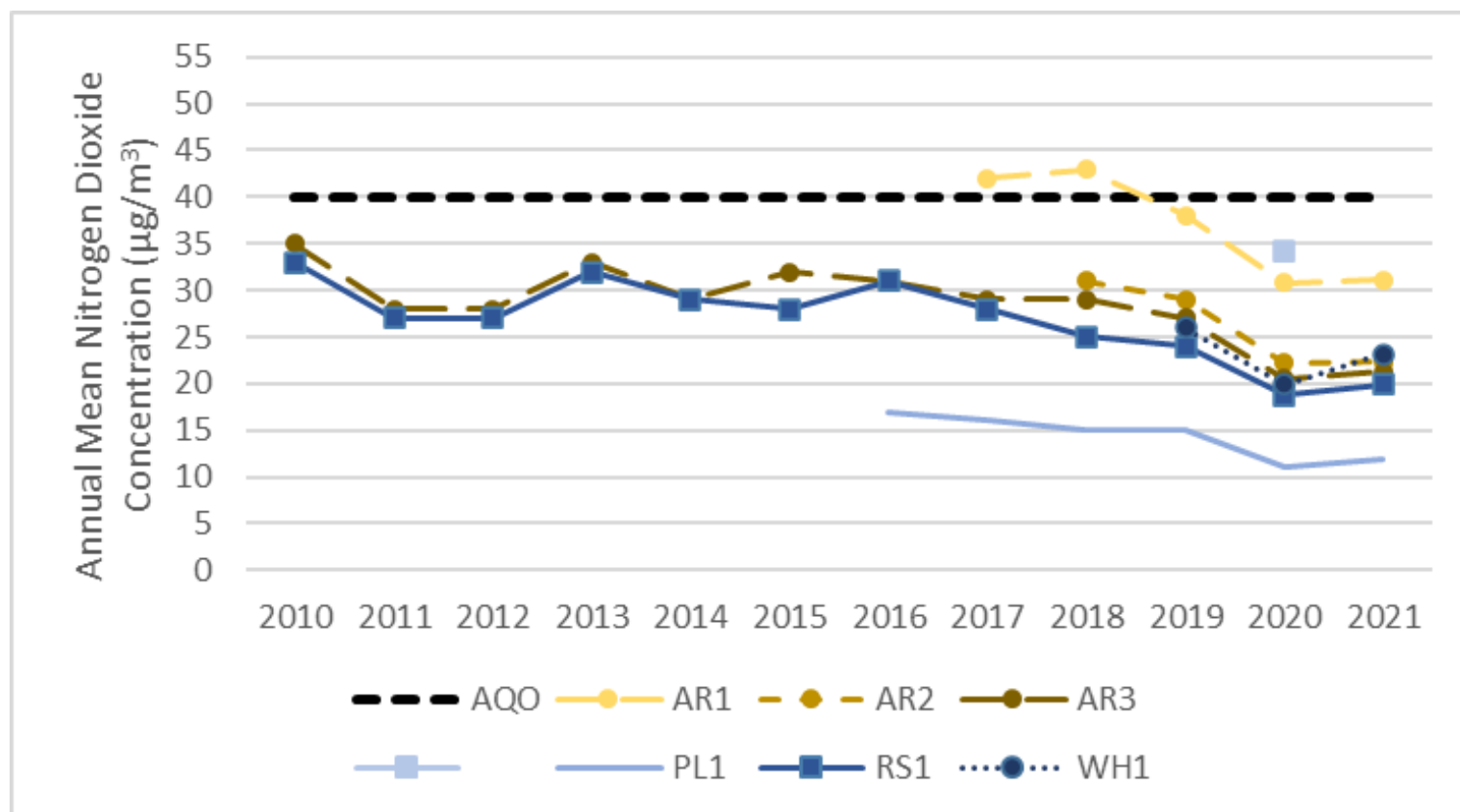


Figure A.7 – Trends in Annual Mean NO₂ Concentrations Measured outside of AQMAs – West of Inner Ring Road/Uttoxeter Road

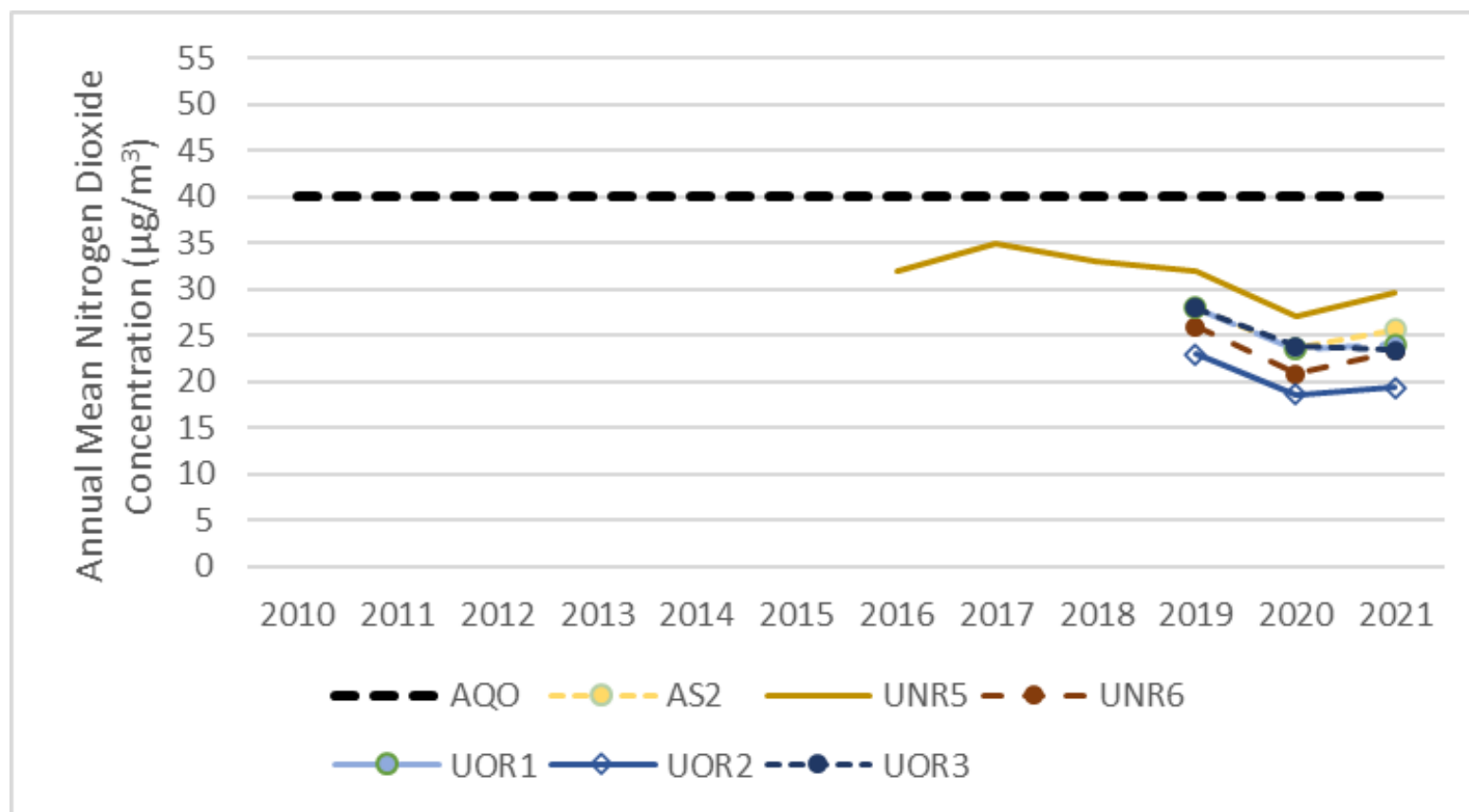


Figure A.8 – Trends in Annual Mean NO₂ Concentrations Measured outside of AQMAs – Inner Ring Road

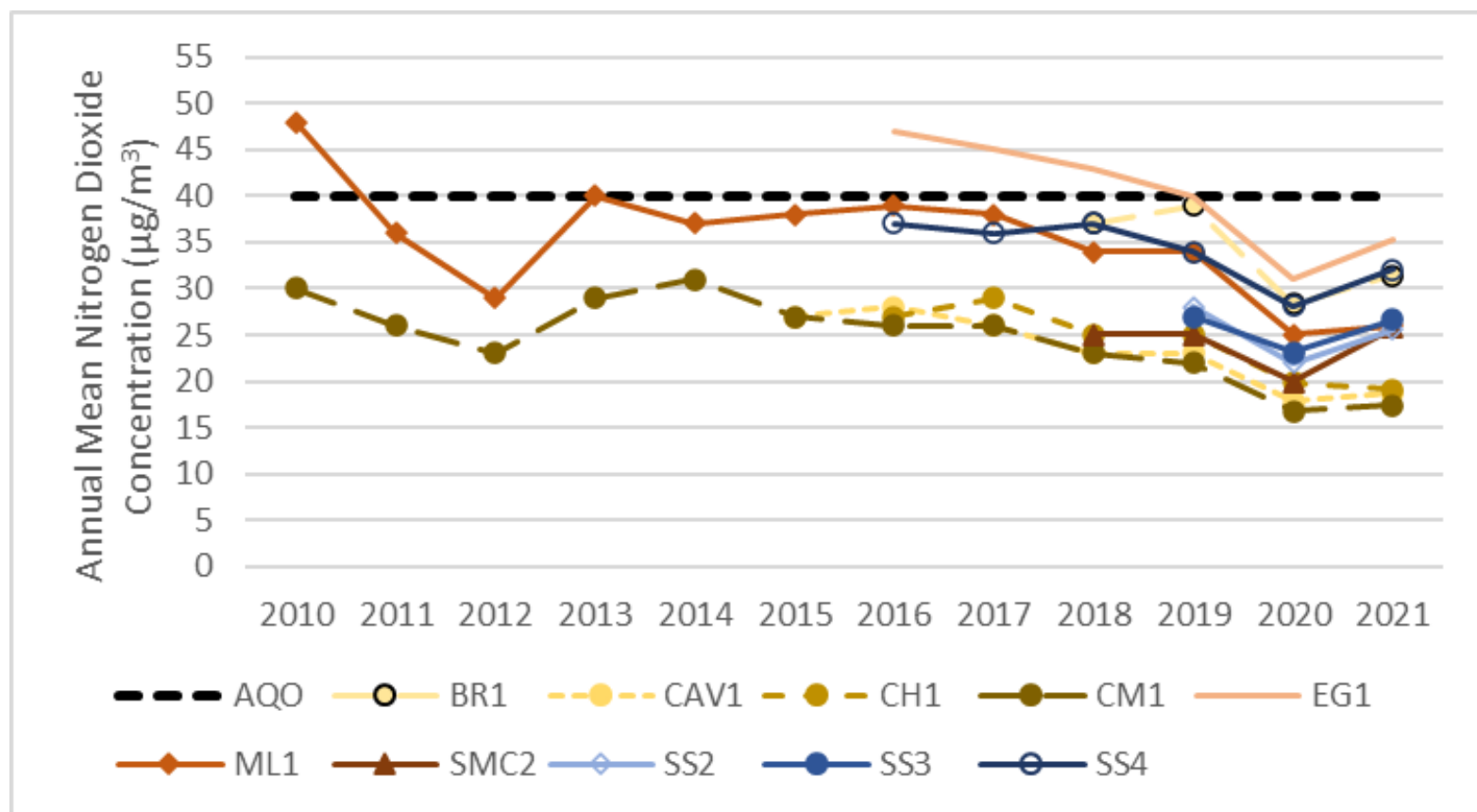


Figure A.9 – Trends in Annual Mean NO₂ Concentrations Measured outside of AQMAs – East and South Derby

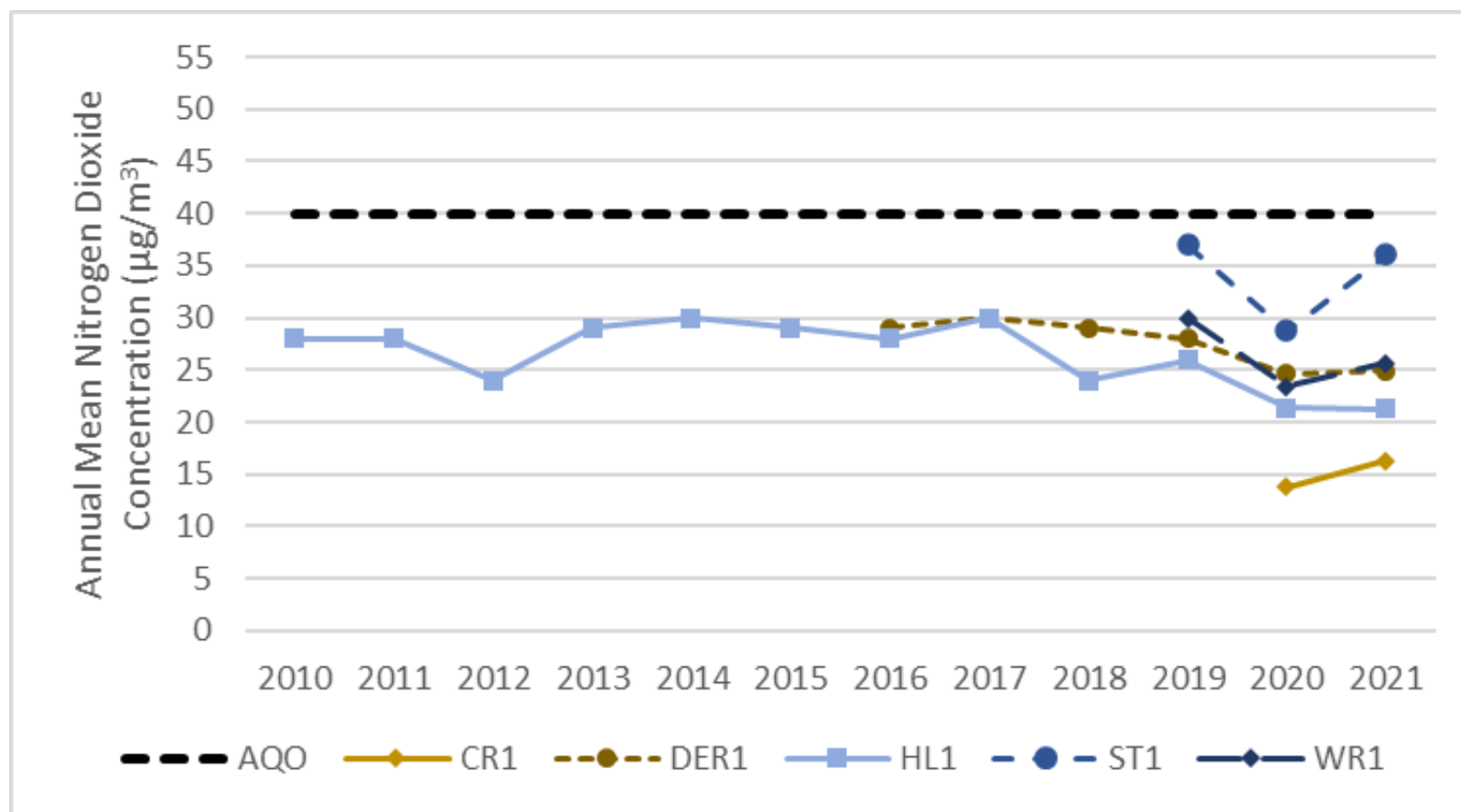


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
AURN	435763	336306	Roadside	89	89	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO₂ 2021 Diffusion Tube Results (µg/m³)

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 (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
AB1	434846	335657	25.5	38.1		50.2	36.5	37.5	33.1	31.1	31.0	30.6	33.1	42.4	35.4	27.6	-	
AR1	433633	336850	47.8	33.1	33.6	43.7	43.5	36.0	40.0	36.0	47.2	24.8	49.2	43.8	39.9	31.1	-	
AR2	433459	336918	31.3	26.3	33.9	37.3	31.9	26.7	30.1	18.6	29.8	14.0	36.3	27.4	28.6	22.3	-	
AR3	433796	336786	35.0	32.1	19.9	33.0	26.3	22.0	23.9	22.7	29.1	15.8	33.1	34.2	27.3	21.3	-	
AR4	434307	336565	40.4	32.2	29.8	33.2	32.1	23.2	29.6	23.9	33.4	19.0	44.5	40.5	31.8	24.8	-	
AS1	434545	336570	36.1	33.3	32.3	30.1	30.1		28.4	20.9	43.3	21.9	40.9	42.9	32.7	25.5	-	
AS2	434579	336571	36.3	28.7	29.0	47.3	33.1	32.1	32.1	33.8	34.6	16.1	35.7	35.6	32.9	25.6	-	
AS3	434712	336490	35.1	35.0	27.9	31.1	25.8	23.0	23.4	21.6	31.7	16.1	37.8	34.3	28.6	22.3	-	
BR1	435764	336306	45.1	41.1	41.1	40.8	34.6	30.3	29.5	33.1	39.4	48.5	51.4	49.3	40.4	31.5	-	
BUR1	434785	335241	40.9	37.8	33.2	37.4	32.8	30.3	32.2	29.8	42.3	39.0	35.9	40.6	36.0	28.1	-	
BUR2	435025	335508	42.5	35.0	31.4	36.7	32.5	32.1		28.1	31.7	39.2	37.6	41.8	35.3	27.6	-	
CAV1	434820	336505	31.0	27.1	21.4	24.5	20.1	18.9	15.4	16.6	28.4	28.2		31.2	23.9	18.6	-	
CC1	435725	335802	34.2	25.3	22.3		20.5	18.1	18.4	16.4	33.0	29.4	31.4	34.0	25.7	20.1	-	
CH1	435496	336294	35.8	29.5	23.1	19.6	20.3	17.5	17.3	16.8	27.3		30.7	31.6	24.5	19.1	-	
CM1	435262	336157	27.5	23.4	18.6		17.0	19.5	16.3	17.3			32.0	29.0	22.3	17.4	-	
CR1	437814	330456	27.9	22.5	18.9	26.5	17.7	17.0	16.7	15.9	20.3	17.0	24.9	25.2	20.9	16.3	-	
DER1	438942	335864	40.9	33.4	21.9	32.6	25.0	25.3	25.0	22.1	36.2	40.4	42.5	38.3	32.0	24.9	-	
DR1	434814	337041	33.3	29.2	25.3	26.8	26.9	23.1	23.6	22.5	32.3	29.7	30.6	35.7	28.3	22.0	-	

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 (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DR2	434937	336916	35.9	33.4	26.8	33.6	26.4	25.5	25.8	24.9	31.6	35.6	37.6	29.6	30.6	23.8	-	
EG1	436064	336487	49.8	43.0	43.3	53.5	41.5	43.9	45.9	33.2	45.2	43.9	53.1	47.4	45.3	35.3	-	
FG1	434718	336375	34.3	38.9	29.5	27.6	32.5	25.8	17.3	21.8	26.9	29.4	35.9	38.4	29.9	23.3	-	
FG2	434450	336523	38.1	34.3	29.1	40.0	28.6	27.9	31.4	31.8	37.5	20.1	42.5	41.4	33.6	26.2	-	
FG3	434497	336510	41.5	39.9	34.8	43.2	30.9	32.4	28.5	32.4	40.2	19.2	45.0		35.3	27.5	-	
GC1	439776	335696	32.1	29.1	22.7	24.5	21.1	19.4	19.8	18.2	27.0	28.0	30.4	32.5	25.4	19.8	-	
HL1	437382	336044	39.6	25.7	28.8	17.2	18.9	17.5	17.3	18.7	30.1	35.9	37.0	40.4	27.3	21.3	-	
HS1	437196	334410	37.5	34.0	29.3	25.0	29.9	25.2	28.4	26.2	37.4	41.1	45.9	42.6	33.5	26.2	-	
KL1	440206	335650	33.1	27.0	22.7	21.9	22.7	21.7	18.6	18.3	29.0	28.4	32.4	32.4	25.7	20.0	-	
KL2	440198	335611	31.1	23.1	21.8	25.3	19.9	20.0	17.7	16.4	23.6	22.7	32.6	27.0	23.4	18.3	-	
KR1	434775	337086	31.9	24.5	26.1	32.7	24.0	30.3	26.4	19.1	37.1	36.1	34.1	32.7	29.6	23.1	-	
LR1	437676	334090	60.0	48.8	39.9	49.8	45.1	41.9	42.5	40.8	57.8	49.7	60.7	60.4	49.8	38.8	-	
LR2	438162	333654	42.9	38.8	26.7	37.6	33.6	30.1	32.9	27.8	42.3	38.1	43.1	40.7	36.2	28.2	-	
LW1	439647	335575	35.7	21.9	26.5	23.7	21.3	19.3	21.0	20.7	26.2	30.1	35.9	29.4	26.0	20.3	-	
ML1	435477	336176	39.9	37.6	28.7	33.2	32.5	25.8	27.2	28.9	38.0	29.4	36.8	41.6	33.3	26.0	-	
MR1	435439	336817	34.5	34.6	28.0	35.7	27.9		25.6	26.5	37.5	41.2	33.7	37.2	32.9	25.7	-	
NR1	439899	335348	54.5	39.9	47.9	41.6	40.8	40.8	39.5	37.8	48.1	48.5	52.7	51.8	45.3	35.4	-	
NR2	436700	336637	65.6	46.7	48.7	58.1	47.5	43.3	50.5	47.9	58.4	54.9	65.6	60.9	54.0	42.1	-	
NR3	435795	336625	31.9	33.5	26.7	30.0	28.5	24.9	22.6	22.8	32.0	34.2	31.6	38.4	29.8	23.2	-	
NR4	435586	336642	42.3	37.3	29.4	31.0	32.1	28.0	26.3	24.9	33.6	33.3	29.0	40.1	32.3	25.2	-	
NS1	435091	333526	45.6	48.1	40.3	59.2	43.2	41.5		37.7	41.9	37.0	42.5	43.0	43.6	34.0	-	

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 (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
NS2	435022	333581	46.6	47.2	36.5	51.6			43.5		44.6	39.2		44.8	44.3	33.6	-	
OPR1	436809	332826	32.0	31.4	25.1	36.8	28.4	26.1	25.1	21.6	34.0	29.3	32.8	32.8	29.6	23.1	-	
OPR2	435716	333327	53.4	41.9	37.2		43.7	35.3	36.2	35.2	46.2	45.7	50.1	48.7	43.1	33.6	-	
OR1	436992	332713	34.7	31.4	24.8	31.5	23.8	22.6	23.2	26.1	29.2	26.6	34.4	31.2	28.3	22.1	-	
OR2	436046	334857	43.4	32.2	30.9	35.7	30.9	32.0	33.3	27.0	42.6	37.7	37.8	47.0	35.9	28.0	-	
OR3	435534	335467	40.4	42.1	39.3	37.8	41.7	33.2	37.8	31.1	46.2	47.9	43.4	46.1	40.6	31.7	-	
OR4	435440	335717	40.0	34.4	26.1	36.6	31.9	26.4		27.4	37.9	36.5	35.3	42.3	34.1	26.6	-	
PL1	434364	337881	23.1	16.5	12.6	14.4	10.4	11.0	10.2	10.2	13.4	18.3	20.1	22.1	15.2	11.8	-	
RS1	433118	336650	25.9	25.1	23.3	29.2	22.2	22.3	24.6	21.9	27.4	26.9	31.2	26.8	25.6	19.9	-	
RT1	435653	335706	42.4	37.8		43.2		31.2	30.9	29.4	40.5	36.6	33.7	45.4	37.1	28.9	-	
RW1	438535	333508	40.2	40.0	30.2	35.4	32.4	30.2	32.0	30.9	36.3	32.5	39.4	40.7	35.0	27.3	-	
SMC1	435203	336779	45.7	36.4	37.9	43.3	41.8	36.0	35.2	28.5	44.1	42.9	38.4	41.5	39.3	30.7	-	
SMC2	435249	336785	35.1	31.0	76.8	26.2	24.8	20.6		20.4	31.2	32.6	31.2	34.6	33.1	25.8	-	
SR1	439789	335412	49.6	36.3	34.9	34.2	21.7	22.0	21.5	19.0	29.5	29.6	39.3	43.6	31.8	24.8	-	
SS1	434748	336352	52.7	46.1	43.7	52.1	51.7	49.9	56.0	44.7		57.3	64.5	57.2	52.4	40.8	-	
SS2	434766	336329	34.4	36.1	25.6	39.2	29.0	31.1	30.3	29.4	35.5		32.1	38.5	32.8	25.6	-	
SS3	434703	336213	40.0	33.8	31.6	34.1	22.4	29.0	26.8	24.5	35.6	37.4	36.6	57.4	34.1	26.6	-	
SS4	434688	336155	37.9	45.6	34.2	48.8	40.5	36.7	36.1		45.3	42.3	39.3	46.1	41.2	32.1	-	
ST1	435294	334202	49.0	42.5	43.7	55.8	42.7	43.9	47.3	34.5	48.1	43.4	56.5	46.8	46.2	36.0	-	
UNR2	433190	335380	34.4	25.9	20.1	28.4	25.5	24.8	24.9	22.4	30.6	35.3	35.8	39.6	29.0	22.6	-	
UNR3	433186	335327	28.4	27.4	31.0	34.2	26.2	27.3	25.4	23.3	29.4	28.7	40.9	34.1	29.7	23.2	-	

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 (0.78)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
UNR4	433786	335778	46.5	40.4	36.1	47.7		36.9	37.5	34.2	42.0	37.4	46.6	42.4	40.7	31.7	-	
UNR5	433887	335804	41.7	44.4	32.4	32.8	33.6	31.2	29.3	26.6	44.1	42.0	37.7	60.6	38.0	29.7	-	
UNR6	434227	335958	33.8	26.7	24.2	34.2	23.5	25.5	27.9	24.1	33.4	30.8	37.8	36.5	29.9	23.3	-	
UNR7	434461	336041	34.9	29.3	21.8	31.5	24.3	22.1	25.2	19.9	25.9	25.2	33.1	32.9	27.2	21.2	-	
UOR1	433877	335850	35.6	32.4	29.5	30.9	20.7	24.7	24.9	24.8	35.4	35.8	40.7	34.2	30.8	24.0	-	
UOR2	434182	336329	33.3	24.1	20.3	28.8	19.7	20.2	18.8	17.8	24.9	28.7	29.9	31.4	24.8	19.4	-	
UOR3	434109	336255	25.3	30.2	31.5	31.5	25.4	26.5		21.2	35.6		42.6		30.0	23.4	-	
UOR4	434310	336533	43.0	36.5	34.3	35.4	25.1	28.5	29.9	30.0	39.3	38.6	45.6	44.3	35.9	28.0	-	
WH1	433161	336692	36.8	35.4	24.7	32.8	26.4	27.0	25.2	21.0	30.3	28.5	36.5	31.2	29.7	23.1	-	
WR1	434852	334055	41.8	32.3	34.4	36.4	30.0	28.7	27.0	27.2	31.3	29.8	37.2	38.8	32.9	25.7	-	

☒ All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.

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

☐ Local bias adjustment factor used.

☒ National bias adjustment factor used.

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

☒ Derby City Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

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**.

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 Derby City Council During 2021

As in 2020, Derby City Council has not identified any new sources relating to air quality within the reporting year of 2021, other than the major developments listed in the Executive Summary. However, there are plans for the incinerator plant, which has not been operational for three years, to be brought back into operation in the future.

Additional Air Quality Works Undertaken by Derby City Council During 2021

Derby City Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

Derby City Council's diffusion tube supplier, SOCOTEC Didcot, have supplied the following information regarding QA/QC:

- Tube Type: 50% TEA: 50% Acetone
- Uncertainty: "Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance" categorises diffusion tubes as an indicative method, and as such the uncertainty is defined as $\pm 25\%$. During in field intercomparisons, SOCOTEC's diffusion tubes perform at $\pm 10\%$ uncertainty.
- Quality Control: A quality control (QC) sample of known concentration is run with the samples. The data generated is then assessed using a Shewhart control chart to determine the process is under statistical control.
- Confidence Intervals: $2\sigma \pm 1.67\%$ $3\sigma \pm 2.51\%$
- LAQM Annual Status Report 2021 48

- Limit of Detection: The analytical limit of detection is 0.03µg NO₂. Over a 4-week exposure this would equate to 0.6µg/m³, or 0.3ppb.
- Quality Assurance: The manufacture and analysis of NO₂ diffusion tubes is covered by SOCOTEC's UKAS accreditation.
- SOCOTEC's laboratory has taken part in the AIR (previously WASP) proficiency scheme since its inception. To achieve the highest ranking of "Satisfactory", a laboratory must achieve a z-score of <2. For 2020, SOCOTEC had an average z-score of 0.42.
- SOCOTEC bought in ISO Guide 34 and ISO/IEC 17025 certified standards, which are used to prepare calibration and QC standards.
- 2% of tubes are checked for blankness during manufacture to ensure there is no contamination introduced during the manufacturing process.
- The method meets the requirements laid out in DEFRA's "Diffusion Tubes for Ambient NO₂ Monitoring: A Practical Guidance."

Derby City Council's diffusion tube supplier did not change during 2021. There were no supply issues with SOCOTEC during 2021.

Diffusion tube monitoring dates deviated slightly from the 2021 Diffusion Tube Monitoring Calendar due to the practicality and feasibility of diffusion tube installations.

Diffusion Tube Annualisation

Missing diffusion tubes meant that one monitoring location did not achieve the minimum data requirements (75%) during 2021. The data for this site (NS2) have therefore been adjusted to an annual mean, based on the ratio of concentrations during the short-term monitoring period to those over the 2021 calendar year. Annualisation has utilised data from the four closest urban background monitoring sites whose data are available from the Automatic Urban and Rural Network (AURN; <https://uk-air.defra.gov.uk>) where there was sufficient annual data capture (>85%); these sites are listed in Table C.2. The Diffusion Tube Data Processing Tool was utilised to annualise the data from NS2.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under

or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance regarding 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.

Derby City Council have applied a national bias adjustment factor of 0.78 to the 2021 monitoring data. A summary of bias adjustment factors used by Derby City Council over the past four years is presented in Table C.1. The national bias adjustment factor for the 50% TEA in acetone method for SOCOTEC Didcot is 0.78; available at <https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>).

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.78
2020	National	03/21	0.77
2019	National	03/19	0.75
2018	National	03/18	0.77
2017	National	03/17	0.77

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within Derby City Council required distance correction during 2021.

QA/QC of Automatic Monitoring

The automatic monitor in Derby City Council's administrative area is managed by Bureau Veritas and run by DEFRA. Derby City Council is not involved with QA/QC of the monitor.

Automatic Monitoring Annualisation

The automatic monitoring location within Derby City Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 33% do not require annualisation.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No automatic NO₂ monitoring locations within Derby City Council required distance correction during 2021.

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Stoke-on-Trent Centre	Annualisation Factor Burton-on-Trent Horninglow	Annualisation Factor Leicester University	Annualisation Factor Nottingham Centre	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
NS2	0.9902	0.9358	1.0017	0.9655	0.9733	44.3	43.1	

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

Maps of monitoring locations and AQMAs within the Derby City Council administrative area are available at: <http://maps.derby.gov.uk>.

Please select the menu in the top left-hand corner > Air Quality Management Data > 'Air Quality Management Areas' and 'Air Quality Monitoring Data- 2020' to show locations of monitors in relation to AQMAs.

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

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/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	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.