2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June, 2023

Exeter City Council

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Report Reference Number	ASR 2022
Date	June 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Exeter

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 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Public Health England's Public Health Outcomes Framework tool shows that in Exeter in 2021 the fraction of mortality attributable to particulate air pollution was 5.0%. This is just below the regional figure for the south west (5.1%) and below the national level of 5.5%. Exeter therefore has levels of particulate matter which are causing harm, but this problem is less severe than in 75% the country (Exeter sits on the 25th percentile nationally). The data is available at this link.

Exeter City Council has a monitoring network that is designed to identify the areas with the highest levels of nitrogen dioxide, at the locations where the objectives apply. Most of the monitoring sites are therefore on residential properties in close proximity to the busiest roads and junctions in the city. The results of the monitoring conducted by the City Council

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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, January 2023

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

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is not generally representative of typical or average conditions across the city. Instead it is indicative of the worst case locations.

Prior to 2020 the annual average objective was regularly exceeded at a number of places in the city. These were at Alphington Street and along the Heavitree corridor into the city. The highest levels measured have typically been on the Heavitree corridor, at East Wonford Hill. Here levels historically were close to or above the level which indicates an exceedance of the hourly objective.

The measured results for 2022 can be found in Table A.3 of this report. Trends in annual nitrogen dioxide concentrations can also be seen in Figure A.1. These show that in 2022 levels of nitrogen dioxide were below the objective at every site except East Wonford Hill. The significant fall seen in 2020 as a result of a reduction in traffic flows during COVID-19 rebounded in 2021 but not back to pre-pandemic levels. There was then a further fall in concentrations seen at most sites in 2022. This is likely to have been caused by a combination of traffic flows still being slightly below those seen before Covid, the ongoing improvement in vehicle emissions technologies and measures taken by the City Council and partners to implement the Air Quality Action Plan.

No sites had levels in 2022 between 35 and 40 μg/m^3 (i.e. close to but not above the objective level of 40). Most locations along the busy routes into and around the city had concentrations of nitrogen dioxide in the range between 25 and 35 μg/m^3 during last year.

As you move away from busy roads, levels fall below 25 μg/m^3. In 2022, levels in these areas were typically between 10 and 15 μg/m^3 for purely suburban streets and between 15 and 20 μg/m^3 for local through routes. The majority of the population of Exeter therefore live in locations with concentrations of nitrogen dioxide well below the objective, but a very small number are still exposed at home to levels above the objective. No schools in Exeter experience levels above the objective.

The data shows that no locations measured an exceedence of the proxy for the hourly nitrogen dioxide objective in 2022 (an annual average of 60μg/m^3).

2020 was exceptional, in terms of the change in traffic flows, so the Council had no plans to amend the AQMA as a result of the changes to NO_2 concentrations seen in that year. The last Annual Status Report (published in 2022) also recommended that longer term trends were monitored to confirm which exceedences have indeed been permanently resolved. There will also always be natural variation between years as a result of local small changes in traffic flows (road works etc) and weather patterns. This makes

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identifying any trend difficult over short periods of time even where other factors are stable.

It seems highly likely that previous exceedences at the Blackboy Road / Pinhoe Road junction (DT42 and DT43) have been permanently resolved given that they had fallen below 40 µg/m^3 in 2018 and therefore have been below the objective for 5 years. Other sites (Alphington Street DT19, Livery Dole DT52, Satutary Mount DT54, Fore Street Heavitree inbound DT56 and Honiton Road DT58) were above the objective in 2019 but have not been since. This means that there have now been three years of results at these sites which are below the objective level. However two of these were affected by Covid and lockdowns. The Council does not therefore intend to review the AQMA order or AQMA boundary until 2024 when the current AQAP terminates. Before this date, action to improve air quality will continue to be focussed on those areas within the AQMA where exceedences have been measured recently (East Wonford Hill). A complete review will commence in 2024 together with the necessary reports and consultation for an amended AQMA (if required) and subsequently a new AQAP.

The Annual Status Report also summarises the results of particulate pollution measurements (PM_{10} and $PM_{2.5}$). No areas in the city are thought to exceed the current objectives for this type of air pollution.

The annual average EU limit value for $PM_{2.5}$ is 25 $\mu g/m^3$ and there is no suggestion that this level is being exceeded in Exeter. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 introduce a target for national government of 10 µg/m³ as an annual mean, to be achieved by 2040. Currently it seems likely that large parts of Exeter meet this level (based on national modelling) but areas close to specific sources may not. The Regulations also introduce a population exposure reduction target for national government; that there is at least a 35% reduction in population exposure by the end of 31st December 2040, as compared with the average population exposure in the three-year period from 1st January 2016 to 31st December 2018.

There were no measured exceedences of the PM_{10} air quality objectives in Exeter in 2022. Annual average concentrations rose in 2022 compared to the previous four years. The longer-term trend in annual concentrations is a decline since 2005 or 2006. The data will be monitored over the coming years to identify whether this recent increase is part of an emerging trend or caused by expected inter-annual variability as a result of weather patterns etc.

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The current AQAP covers the period 2019-2024. It was published following a significant consultation and engagement process which reached nearly 3000 people. The plan is available online at this link. Exeter City Council will work with Devon County Council Highways team, neighbouring authorities and Sport England to deliver the measures in this plan.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[5] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, published in 2023, provides more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[6] details 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.

Exeter City Council has taken forward a number of direct measures during the current reporting year of 2021 in pursuit of improving local air quality. Further details are provided later in the report but key completed measures include:

1. Exeter City Council has continued to implement its Physical Activity Strategy. The strategy focusses on getting the least active members of the community moving more (including active travel) with a key focus being to normalise and increase active travel in everyday life. It also prioritises development projects for the Wonford Health & Wellbeing Centre to include a cycling hub on Exeter's Green Circle and family activity trails around the Ludwell valley. It will also implement walking /

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5 Defra. Environmental Improvement Plan 2023, January 2023

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

cycling improvements as part of Newtown Neighbourhood enhancements, strengthening active travel connections with city centre and rest of the cycle network.

2. The Sport England Local Delivery Pilot team has developed and tested the governance and application structure for communities to be able to implement localised, regular closures of roads within their neighbourhoods. For specific periods this will provide sections of roads where the priority will be given to activity (play) rather than travel. The SELDP team was also involved in the school streets projects discussed below.

3. Work was completed to construct a large solar array with battery storage at Water Lane by Exeter City Council. This will power a fleet of electric refuse collection vehicles (the first three were delivered in 2022).

4. Scrutiny of planning applications for air quality impacts, including making objections to developments on air quality grounds where this is justified and the negotiation of mitigation in accordance with Council and national planning policy.

5. From 1st Jan 2020 adopted policy required the Hackney carriage fleet to be 50% Euro 6 wheelchair accessible vehicles and 50% ULEV saloon cars with a stated emission level of 75g km CO_2 or below. This policy continues to be implemented.

6. Three electric refuse collection vehicles joined the Council's fleet in summer 2022.

7. A reduction in NOx emissions from buildings as a result of a variety of measures intended primarily to address fuel poverty and carbon emissions. These include progressing plans for the next phase of PassivHaus standard homes by Exeter City Council, completion of an Extra Care facility and a leisure centre and swimming pool both meeting the PassivHaus standard and continued implementation of district heating schemes to provide heating and hot water to 2800 homes at Monkerton, Tithebarn, Mosshayne, Pinn Court, Park Farm, and Exeter Science Park.

8. A new city centre bus station has been delivered providing improved facilities for public transport users in the city.

9. The City Council were partners with Devon County Council and Co Delivery in a scheme which secured an £80,000 grant from the Department for Transport Energy Saving Trust to expand the capabilities of e-cargo bikes for business travel. Nine electric cargo bikes were secured for use within the partner organisations, Devon

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County Council, Exeter City Council, University of Exeter and Royal Devon & Exeter NHS Foundation Trust (RD&E). These are now all operational including at the City Council where three bikes are used by the Environmental Health and Community Safety team to replace vehicle trips. Four bikes have expanded the eCargo Co Delivery courier service in Exeter, enabling more businesses to deliver goods across the city sustainably. This pilot project seeks to encourage the transition to carbon neutral modes of business travel. It's estimated the scheme will help to save more than 20,000 miles a year that are currently made by petrol and diesel vehicles.

10. Devon County Council published a new Transport Strategy in 2020 with three themes: Greater Connectivity, Greater Places for People and Greater Innovation. Devon County Council are now developing implementation plans and working closely with Exeter City Council to link with the Liveable Exeter sites and Exeter Vision.

    Key targets within the strategy include:

    - 50% of trips by foot or cycle within the city;

    - Removal of air quality exceedances in the city.

11. Devon County Council have consulted on the draft Exeter Local Cycling and Walking Infrastructure Plan. The final plan is expected to be published in 2023.

12. DCC have continued their Travel Planning service provided to new residential developments.

13. Work continues on a new station at Marsh Barton to open in spring 2023.

14. The Okehampton railway line has reopened to daily services. This provides a valuable alternative to car travel for people coming into the city from the area north of Dartmoor and increased service frequency from Crediton. An hourly service operated in 2022. 250,000 journeys were made in the first year of operation, far exceeding forecasts. Funding has also been secured through Levelling Up Fund to deliver an additional 'Parkway-style' station, serving wider rural catchment of West Devon, Torridge and North Cornwall for delivery by March 2025.

15. Pop up measures to facilitate social distancing and active travel were introduced in 2020. The changes included the introduction of a new 5km cross city route (E9 Newcourt/Pynes Hill to City centre), supplemented with new crossings (eg at

Russell Way). Some of these pop-up measures have since been made permanent, such as the road closures and modal filters on Ludwell Lane, Dryden Road and Wonford Road. Work to make the Magdalen Street section permanent commenced in 2022.

16. Permament school streets have been introduced at Whipton Barton School and Ladysmith School.

17. Filtered permeability plans for the whole Heavitree area are still under development although some elements have been delivered already, including the modal filter on Homefield Road and contra-flow cycle lane on Park Place. A decision will be made on an experimental traffic order for the Heavitree area filtered permeability project.

18. A new Park and Change site at the Science Park has been opened. It is currently being used as a Park and Ride for the Nightingale Hospital.

19. The local Co-Cars car club now includes 27 locations including 36 cars and one van (23 of which are electric). Car Clubs are expected to expand further in 2023 with more electric car clubs as part of the Rapid Charging Exeter project.

20. Continued expansion of Co-Bikes (the local on-street e-cycle hire scheme) to now include 26 hire and docking locations.

21. Further development of the cycle network in and around the city, particularly plans for route E4. Detailed design work is underway for the Stoke Hill roundabout and Union Road section. This route will link the new development areas at Monkerton, Tithebarn and Cranbrook with the University. Circa 700m of segregated cycle route on Rifford Road has been approved, which forms part of E12 ('north-south') route and would link the Sweetbrier Lane section through the Wonford area with options to connect into the E9 route or beyond towards the valley park / Exe Estuary.

22. Improved cycle linkages from 'urban fringe settlements' into Exeter cycle network including from Woodbury, form Cranbrook and the Science Park via Langaton Lane and from Ide via Balls Farm Road.

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on average by 35%. Iron Bridge traffic flows have reduced by 30% (from 3,700 to 2,600). Cycle flows on Queen Street have increased by 25% and more than doubled on St David's Hill.

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25. Pinhoe Station interchange has been delivered, with a shuttle bus alongside bike lockers and a new car park to provide an integrated rail hub, linking passengers arriving at Pinhoe to the Science Park, SkyPark, Exeter Gateway logistics park and Exeter Airport.

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

- DEFRA grant funding has been obtained for a project to develop a model of pollution concentrations in the Heavitree corridor which will provide better spatial and temporal resolution than the current monitoring. This will be overlaid with health information, enabling more informed choices by the travelling public.

- Further refinement of the net zero plan for Exeter.

- Implementation of the Transport Strategy by DCC, in conjunction with the Active and Healthy People Programme team.

- Devon County Council's residential travel planning services to be integrated with the Sport England Local Development Pilot work.

- Publication of the Exeter Local Cycling and Walking Infrastructure Plan following consultation in 22/23.

- Sport England Project work will continue; including on the Wonford Health and Wellbeing Centre, Newtown active neighbourhood, enabling road closures for play streets and community events, community builders and social prescribing.

- Work to enable the delivery of a Water Lane low traffic neighbourhood through redevelopment of brownfield land.

- All new vehicles entering the Council's fleet are likely to be electric (unless operational requirements make this impossible).

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- A decision will be made on an experimental traffic order for the Heavitree area filtered permeability project.

- Marsh Barton station to be opened.

- Further improvements will take place to the E4 cycle route linking the new development areas at Monkerton, Tithebarn and Cranbrook with the University. This will make it safer and easier to travel by bike.

- The works to make changes to the cycle provision on Magdalen Road permanent will be completed 22/23.

- £14m of funding (over 3yrs) has been received by Devon County Council for its Bus Service Improvement Plan across the County.

- The Council have received a grant to replace gas boilers with heat pumps at the RAMM and the Riverside leisure centre in a two year project to be completed by April 2025. This will reduce NOx emissions from the old boilers.

- A new Exeter City Council Electric Vehicle Strategy, due to be launched July 2023

- The City Council's car parking will be reviewed during 2023, for implementation in 2024. Changes could include:
  - Introduction of an emissions levy, where diesel and petrol cars pay a small levy when parking in an off-street car park. Income generated would be ring fenced for net zero type activity.
  - Residential bike storage installed in off-street car parks located near residential areas.
  - Review weekend parking, to avoid peak usage on a Saturday.
  - Review off-street parking, to utilise spare capacity to develop mobility hubs, last mile delivery and parcel lockers.

Conclusions and Priorities

Nitrogen dioxide levels in Exeter in 2022 were generally below those measured in 2021 and well below pre-pandemic concentrations such that only one location was above the objective (East Wonford Hill). Trends will be monitored over the coming years to identify

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whether the area of exceedance remains small or whether further post-Covid rebound in traffic might cause an increase in levels during 2023. Exeter City Council does not intend to review the AQMA order or AQMA boundary until 2024 when the current AQAP expires. Before this date action to improve air quality will continue to be focussed on those small areas within the AQMA where exceedences have been measured recently. A complete review will commence in 2024 together with the necessary reports and consultation for an amended AQMA (if required) and subsequently a new AQAP.

No areas in the city are thought to exceed the objectives for particulate air pollution. Measured $PM_{2.5}$ concentrations are below the current objective level and PM_{10} concentrations have shown a general decline since 2006.

The priorities and challenges for 2023 are to implement the DEFRA Air Quality Grant project, Physical Activity Strategy and Transport Strategy, to deliver the Local Cycling and Walking Implementation Plan and to deliver robust planning policy; all in the face of challenging and uncertain conditions.

Local Engagement and How to get Involved

Local air pollution currently has a high profile within the city. For example nearly 3000 people were involved in the consultation on the current AQAP and Devon County Council have committed in their Transportation Strategy to resolve exceedances of the objective.

The Wellbeing Exeter Community Builders are actively engaging with local communities to increase active travel, social inclusion, improve the public realm for walking and cycling and to benefit air quality.

Further enquiries about pollution levels and actions to improve air quality should be made to environmental.protection@exeter.gov.uk

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health & Community Safety Department of Exeter City Council with the support and agreement of the following officers and departments:

Exeter City Council - City Development

Exeter City Council

Exeter City Council – Active and Healthy People Programme

Devon County Council - Highways

This ASR has been approved by:

Service Lead (Environmental Health & Community Safety). Once the report has been checked by DEFRA it will be presented to members at committee.

This ASR has been signed off by the Devon County Council Director of Public Health.

If you have any comments on this ASR please send them for the attention of Alex Bulleid:

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Environmental Health and Community Safety

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1 Local Air Quality Management

This report provides an overview of air quality in Exeter during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Exeter 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

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by Exeter City Council can be found in Table 2.1. The table presents a description of the one AQMA that is currently designated within Exeter. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of the AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO_2 annual mean;
- NO_2 hourly mean.

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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 Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Exeter AQMA	Declared 2007, Amended 2011	NO_2 Annual Mean	An area encompassing the radial routes into the city and other major routes	NO	70 µg/m3	40.6 µg/m3	N/A	Exeter AQAP 2019-2024	www.exeter.gov.uk/airpollution
Exeter AQMA	Declared 2007, Amended 2011	NO_2 1 Hour Mean	An area encompassing the radial routes into the city and other major routes	NO	65 µg/m3	N/A	4 years	Exeter AQAP 2019-2024	www.exeter.gov.uk/airpollution

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

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

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2.2 Progress and Impact of Measures to address Air Quality in Exeter

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

1. The report has been completed to a high standard, with the accuracy of data presented and the discussion included with the report welcomed.

2. Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment and annualisation factors were outlined in detail.

3. The Council has included discussion and review of its AQMAs and monitoring strategy, informed due to the monitoring network and also the AQAP measures. This demonstrates the Councils proactive approach to ensuring good air quality across the district.

4. Council have provided very clear and detailed maps of the diffusion tube monitoring network, this is welcomed. Trends are presented and discussed, and a robust comparison to air quality objectives is provided.

5. Overall, the report is detailed, concise and satisfies the criteria of relevant standards. The Council should continue their good and thorough work.

Exeter City Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Seventeen measures are included within Table 2.2, with the type of measure and the progress Exeter City Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in the Air Quality Action Plan, Physical Activity Strategy and Transportation Strategy. Key completed measures are:

1. Exeter City Council has continued to implement its Physical Activity Strategy. The strategy focusses on getting the least active members of the community moving more (including active travel) with a key focus being to normalise and increase active travel in everyday life. It also prioritises development projects for the Wonford

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- Devon County Council's residential travel planning services to be integrated with the Sport England Local Development Pilot work.

- Publication of the Exeter Local Cycling and Walking Infrastructure Plan following consultation in 22/23.

- Sport England Project work will continue; including on the Wonford Health and Wellbeing Centre, Newtown active neighbourhood, enabling road closures for play streets and community events, community builders and social prescribing.

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- Work to enable the delivery of a Water Lane low traffic neighbourhood through redevelopment of brownfield land.

- All new vehicles entering the Council's fleet are likely to be electric (unless operational requirements make this impossible).

- A decision will be made on an experimental traffic order for the Heavitree area filtered permeability project.

- Marsh Barton station to be opened.

- Further improvements will take place to the E4 cycle route linking the new development areas at Monkerton, Tithebarn and Cranbrook with the University. This will make it safer and easier to travel by bike.

- The works to make changes to the cycle provision on Magdalen Road permanent will be completed 22/23.

- £14m of funding (over 3yrs) has been received by Devon County Council for its Bus Service Improvement Plan across the County.

- The Council have received a grant to replace gas boilers with heat pumps at the RAMM and the Riverside leisure centre in a two year project to be completed by April 2025. This will reduce NOx emissions from the old boilers.

- A new Exeter City Council Electric Vehicle Strategy, due to be launched July 2023

- The City Council's car parking will be reviewed during 2023, for implementation in 2024. Changes could include:
  - Introduction of an emissions levy, where diesel and petrol cars pay a small levy when parking in an off-street car park. Income generated would be ring fenced for net zero type activity.
  - Residential bike storage installed in off-street car parks located near residential areas.
  - Review weekend parking, to avoid peak usage on a Saturday.
  - Review off-street parking, to utilise spare capacity to develop mobility hubs, last mile delivery and parcel lockers.

Exeter City Council's priorities for the coming year are to continue to progress the AQAP, in conjunction with the development and implementation of the city and county's Climate Emergency plans and in the context of economic conditions.

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Exeter City worked to implement these measures in partnership with the following stakeholders during 2021:

- Neighbouring authorities

- Devon County Council

- Sport England

The principal challenges and barriers to implementation that Exeter City Council anticipates facing are further funding constraints within Local Government, available officer time, and public, business and political appetite for measures that may be perceived as potentially harming or delaying economic growth (even if this is not the case).

Progress on the following measures has been slower than expected due to:

- Changes to the proposed planning policy framework because the Greater Exeter Strategic (GESP) Plan is no longer being progressed. The Exeter Plan will shape the future of Exeter for the next 20 years, to 2040, and will be the basis for how the city continues to evolve and meet the needs of the community. The Exeter Plan is the new name for the Local Plan. It will be the main planning document for Exeter, setting out where development should take place and providing the policies which will be used in making decisions on planning applications.

- Bus patronage has not fully recovered to pre pandemic levels. Total patronage on Devon's bus network in 2018/19 (the last year for which data is unaffected by the pandemic) was approximately 23.7 million passenger journeys. There was already a downward trend prior to Covid because this was a 10% reduction on the 2011/12 figure of 26.3 million. In 2019/20 patronage reduced slightly to 23.3 million, partially due to the national lockdown in March 2020, but 2020/21 figures were most markedly impacted, with total patronage falling to just 8.1 million. Passenger numbers improved slightly in 21/22 but whole year figures were below what would otherwise have been expected at just below 15 million. The future of public transport and the measures needed to encourage passengers back safely will be considered in 2023 and beyond in Devon County Council's Bus Service Improvement Plan.

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Exeter City Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in the Exeter AQMA although the impact of financial pressures on local authorities is always uncertain. Progress with implementing the priority measures and all the actions listed in Table 2.2 will be reported on in the next Annual Status Report in 2024 and changes can be made to the AQAP if required by the mechanism of future ASRs.

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Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	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 (green measure)	Filtered permeability projects to be considered for the city with an initial focus on the Heavitree corridor area and including a feasibility study for corridor improvements	Policy Guidance and Development Control	Other policy	2019	2024	DCC via Transport Strategy and Exeter City Futures, Sport England Local Delivery Pilot	SELDP, DCC, Developer Contribitions, Grant Funding where available and ECC	NO	Partially Funded	£50k - £100k	Implementation	The target for design of changes to the Heavitree corridor area will be to eliminate exceedences. Details will be finalised as the design emerges, but it is currently expected that a reduction in emissions of between 39 and 78% will be required	Implementation of scheme(s)	Pop up measures introduced in 2020, including a new 5km cross city route (E9 Newcourt/Pynes Hill to City centre), have been made permanent with road closures and modal filters on Ludwell Lane, Dryden Road and Wonford Road. Work to make the Magdalen Street section permanent commenced on site in 2022. School streets introduced at Whipton Barton School and Ladysmith School. Filtered permeability plans for the whole Heavitree area are under development with some elements delivered (modal filter on Homefield Road and contra-flow cycle lane on Park Place). A decision will be made on an experimental traffic order for the Heavitree area filtered permeability project. A wider package of measures, including play streets is being developed by the Sport England team.	Plans will be developed for individual areas in consultation with communities.

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2 (amber measure)	Consider access restrictions which will reduce the dominance of private cars, including in the city centre	Policy Guidance and Development Control	Other policy	2019	2024	DCC via Transport Strategy and Exeter City Futures	DCC, grant funding as available and developer contributions	NO	Partially Funded	£100k - £500k	Planning	4% reduction in emissions at East Wonford Hill (shared across all measures which will in combination achieve the targeted reduction in private car commutes)	Implementation of scheme(s)	Traffic reduction scheme for Bartholomew Street West implemented and lane closure on Queen Street is being made permanent. Roadside interviews in the city centre undertaken to inform a city centre traffic strategy. Liveable Exeter vision for the city published, which includes development on car parks, and a reduction in road space for cars. Initial work on South Street project is progressing, to include improved cycle routes, and connections between the city centre and the Quay area but requires updating in light of post-Covid changes. Local Walking and Cycling Implementation Plan consulted on in 2022/3.	Consultation and obtaining relevant permissions, consents and traffic orders as well as bringing together necessary funding. Draft City Centre Strategy requires review in light of post Covid changes.

3 (amber measure)	New transport links and Park & Change facilities to make it easier for those living outside the city to choose active and sustainable travel modes	Transport Planning and Infrastructure	Other	2019	Ongoing Programme	DCC via Transport Strategy	DCC, grant funding as available and developer contributions	NO	Partially Funded	£100k - £500k	Implementation	4% reduction in emissions at East Wonford Hill (shared across all measures which will in combination achieve the targeted reduction in private car commutes)	Implementation of schemes	Pinhoe Park and Change delivered as part of residential development in area. Park and Change at Science Park opened. Okehampton line reopened for daily travel and new station being delivered at Marsh Barton. Funding obtained to deliver a new cycle link between Woodbury and Exe Estuary Trail. Modal filter on Langaton Lane approved for construction, delivering quiet lane link between Pinhoe area, Exeter Science Park and wider East Devon strategic employment sites. Balls Farm Road modal filter near Alphington approved and constructed to improve quiet lane linkages between Ide and Exeter. Plans currently being developed for improving bus priority on Cowick Street corridor and New North Road approach to city centre, to be followed by plans for Pinhoe Road and Heavitree corridor.	Consultation and obtaining relevant permissions, consents and traffic orders as well as bringing together necessary funding

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4 (yellow measure)	Changes to parking charges to discourage car travel in peak times, encourage longer stays in the city centre and support other measures in this plan, such as active travel	Traffic Management	Other	2019	2024	ECC via Local Plan	ECC	NO	Not Funded	£100k - £500k	Planning	<1% reduction in emissions. This measure is expected to have an indirect effect on emissions, such that it is not possible to reliably quantify the impact of this measure alone.	Implementation of changes	Changes to parking across Exeter were introduced in 2023, some of the changes are to discourage visitors, shoppers and commuters from parking in the city centre	The need to balance action against any real or perceived impact on local businesses.
5	Maximise efficiency of existing highway network	Transport Planning and Infrastructure	Other	2019	2024	DCC via Transport Strategy and Exeter City Futures	DCC, ECC, grant funding as available and developer contributions	NO	Partially Funded	£500k - £1 million	Planning	TBC, based on predicted changes to traffic parameters provided by DCC as plans for specific locations emerge and are consulted upon	Implementation of scheme(s)	In planning phase	Consultation and obtaining relevant permissions, consents and traffic orders as well as bringing together necessary funding
6 (amber measure)	Access Fund and cycle/walking network, Local Walking and Cycling Infrastructure Plan (LCWIP)	Transport Planning and Infrastructure	Other	2019	2024	DCC via Transport Strategy	Access Fund	NO	Partially Funded	£1 million - £10 million	Planning	4% reduction in emissions at East Wonford Hill (shared across all measures which will in combination achieve the targeted reduction in private car commutes)	Adoption of LCWIP	Planned E4 Cycle Route improvements ongoing (Stoke Hill roundabout and Union Road sections are next to be delivered) and E9 route made permanent. C.700m of segregated cycle route on Rifford Road will be delivered forming part of E12 ('north-south') route. The LCWIP document was released for public consultation in 2022	Consultation and obtaining relevant permissions, consents and traffic orders as well as bringing together necessary funding

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7 (amber measure)	Expand school and community projects, car free events and events promoting active travel, building on the success of the Heavitree pilot	Promoting Travel Alternatives	Other	2019	2024	ECC via Sport England Local Delivery Pilot & Exeter City Futures	Sport England funding	NO	Partially Funded	£50k - £100k	Implementation	4% reduction in emissions at East Wonford Hill (shared across all measures which will in combination achieve the targeted reduction in private car commutes)	School Streets introduced	Trials at three primary schools in 2020, two made permanent (Whipton Barton and Ladysmith). Community Builders and new SELDP local Physical Activity Organisers delivered play street 'non car events'	Plans will be developed in individual areas with local communities.
8 (amber measure)	Use social prescribing and community building to help individuals get and stay active	Public Information	Other	2019	2024	ECC via Sport England Local Delivery Pilot and local Health Service providers	Sport England funding	NO	Partially Funded	£100k - £500k	Implementation	4% reduction in emissions at East Wonford Hill (shared across all measures which will in combination achieve the targeted reduction in private car commutes)	Implementation of scheme	Behaviour change training delivered for all Community Builders and Community Connectors to provide support to people to lead active lifestyles. New social prescribing posts recruited to support health & wellbeing of Children and Young Families.	The Covid recovery plans seek to retain and enhance the increase in activity levels, community activism, volunteering and contact with nature seen during lockdown.
9 (amber measure)	High quality parks, play areas, sport and leisure facilities	Promoting Travel Alternatives	Other	2019	2024	ECC via Physical Activity Strategy, Sport England Local Delivery Pilot & Local Plan	Sport England funding	NO	Partially Funded	£50k - £100k	Planning	4% reduction in emissions at East Wonford Hill (shared across all measures which will in combination achieve the targeted reduction in private car commutes)	Implementation of scheme(s)	Physical Activity Strategy published and flagship programmes in development - Wonford Health & Wellbeing Centre to be delivered first. Focus on sites becoming more accessible for sustainable transport and increased active travel infrastructure	Obtaining necessary permissions and consents, and funding

10 (yellow measure)	Communications plan, to support measures that will achieve modal shift	Public Information	Other	2019	2024	ECC via Sport England Local Delivery Pilot & Exeter City Futures	ECC via existing internal budgets, Sport England Local Delivery Pilot & Exeter City Futures	YES	Partially Funded	£10k - 50k	Implementation	<1% reduction in emissions. The purpose of this measure is to enable the Council to explain why it is taking action. The measure itself is unlikely to have significant impact on its own.		DEFRA grant funding obtained for project to develop air quality information and communications specific to the Heavitree area. Communications strategy also developed through SELDP - 'Let's Move'. Focus on small steps for 'least active' residents and communities to move more in their local neighbourhoods. Walking & Cycling central to this communications strategy	
11 (yellow measure)	Promote and expand Co-Bikes network, and support the roll out of electric car club vehicles to more locations	Promoting Travel Alternatives	Other	2019	2024	DCC, ECC via Transport Strategy, Sport England Local Delivery Pilot & Exeter City Futures	Ongoing programme, dependent on funding availability	NO	Partially Funded	£100k - £500k	Implementation	<1% reduction in emissions. This measure will have indirect benefits for air quality by facilitating active travel and supporting a change in car ownership patterns. It is not possible to reliably model the impact of this measure alone on emissions	Implementation of expansions to schemes, as funding is obtained	Significant upgrades to the Co-Bikes and Co-Cars networks have taken place and are planned	Dependent on funding availability

12 (amber measure)	An improved multi-modal public transport network, incorporating cleaner bus technologies	Transport Planning and Infrastructure	Other	2019	2024	DCC via GESP, Transport Strategy and Exeter City Futures	TBC	NO	Partially Funded	> £10 million	Planning	4% reduction in emissions at East Wonford Hill (shared across all measures which will in combination achieve the targeted reduction in private car commutes). As an example, 33% bus electrification would achieve 5% fall in emissions at East Wonford Hill and 66% electrification would achieve 10% reduction.	Implementation of agreed plans	14 Euro 6 busses have entered the fleet and significant new additions to the city's bus network. Devon County Council's Bus Service Improvement Plan will deliver improved services and access across the County	Dependent on funding availability and future demand for public transport.
13	Developers to mitigate the effects of their development on air quality	Policy Guidance and Development Control	Other policy	2019	2024	ECC via the Exeter Plan	Within existing ECC resources	NO	Funded	£50k - £100k	Planning	The purpose of this measure is to limit the impact of new development. It is not intended to reduce emissions on the current baseline (although some reduction may be achieved as a result in practice)	Developments delivered	Until the Exeter Plan is published, officers will be implementing current policy in a robust manner eg when considering retail park applications and new housing.	The AQAP originally envisaged that this would be delivered by the GESP. However the GESP is no longer being progressed. The Exeter Plan will shape the future of Exeter to 2040, and will be the basis for how the city continues to evolve and meet the needs of the community. It will be the main planning document for Exeter, setting out where development should take place and providing the policies which will be used in making decisions on planning applications.

14	Policies deliver development where private car use is not the only realistic travel choice	Policy Guidance and Development Control	Other policy	2019	2024	ECC via the Exeter Plan	Within existing ECC resources	NO	Funded	£50k - £100k	Planning	The purpose of this measure is to limit the impact of new development. It is not intended to reduce emissions on the current baseline (although some reduction may be achieved as a result in practice)	Developments delivered	Liveable Exeter vision for development in the city which is not reliant on car travel. Until the Exeter Plan is published, officers will be implementing current policy in a robust manner eg when considering retail park applications and new housing.	Work on the Liveable Exeter project continues alongside the Exeter Plan (this has replaced the GESP which may have resulted in some delay from when the AQAP was published). (see measure 13).
15 (yellow measure)	More things to see/do in the City Centre, encouraging longer stays and supporting events which promote sustainable travel, active and healthy lifestyles.	Policy Guidance and Development Control	Other policy	2019	2024	ECC, BID, DCC and developers	TBC once strategy adopted	NO	Partially Funded		Planning	<mark><1% reduction in emissions. This measure will not have a significant direct impact on emissions, but will support the step change in behaviour which will be required to meet the City Council's aspirations for active and healthy travel.</mark>	Completion of Strategy and then implementation	St Sidwells Point leisure centre open. Consultants are reviewing draft City centre Strategy in light of post-Covid changes.	The impact of Covid-19 on the city centre and travel to the city centre will be better understood as the year progresses
16	Better information to raise awareness and improve the level of understanding of air pollution and transport issues within communities	Public Information	Other	2019	2024	ECC	Internal ECC budgets	YES	Partially Funded	£10k - 50k	Planning	Enable the Council to explain why it is taking action. Measure itself is unlikely to have significant impact on its own.		DEFRA grant funding obtained for project to develop air quality information and communications specific to the Heavitree area. Baseline evidence report completed subject to annual review following publication of each year's measurement data and any new research, national guidance etc.	

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17	An air pollution monitoring network that supports the measures in this action plan	Public Information	Other	2019	2024	ECC	Internal ECC budgets or grant funding if available	YES	Funded	< £10k	Implementation	This measure would not in itself deliver reductions in emissions, but would support the other measures in this plan	monitoring equipment operational	Diffusion tube monitoring network remains under review. DEFRA grant funding obtained for project to develop air quality information and communications specific to the Heavitree area which includes use of new sensor technologies.	

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PM$_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), 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.

Public Health England's Public Health Outcomes Framework tool shows that in Exeter in 2021 the fraction of mortality attributable to particulate air pollution was 5.0%. This is just below the regional figure for the south west (5.1%) and below the national level of 5.5%. Exeter therefore has levels of particulate matter which are causing harm, but this problem is less severe than in 75% the country (Exeter sits on the 25th percentile nationally). The data is available at this link.

There is now a capacity for direct monitoring of PM$_{2.5}$ in Exeter, since August 2018, at two roadside sites. This showed PM$_{2.5}$ concentrations of 12.7 μg/m^3 at RAMM and 8.9 μg/m^3 at Alphington Street in 2022. National modelling by PHE (available via the website above) suggests that for 2021 (the most recent data available), the average figure for the city as a whole was 6.2 μg/m^3. The annual average EU limit value for PM$_{2.5}$ is 25 μg/m^3 so there is no suggestion that this level is being exceeded in Exeter. The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 introduce a target for national government of 10 µg/m³ as an annual mean, to be achieved by 2040. Currently it seems likely that large parts of Exeter meet this level (based on the national modelling described above) but areas close to specific sources may not. The Regulations also introduce a population exposure reduction target for national government; that there is at least a 35% reduction in population exposure by the end of 31st December 2040, as compared with the average population exposure in the three-year period from 1st January 2016 to 31st December 2018.

Despite these being targets for central government, Exeter City Council still has a duty to reduce emissions of and exposure to this pollutant. During 2023, Exeter City Council will be taking the measures described in Table 2.2 that will address PM$_{2.5}$ as well as NO$_2$.

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Approximately 60% of Exeter is designated as Smoke Control Areas. Controls on solid fuel combustion appliances and fuels are likely to have restricted $PM_{2.5}$ emissions in these areas to some extent.

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

This section sets out the monitoring undertaken within 2022 by Exeter City Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Exeter City Council undertook automatic (continuous) monitoring at two sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. This page presents automatic monitoring results for Exeter City Council, with automatic monitoring results also available through the UK-Air website.

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

3.1.2 Non-Automatic Monitoring Sites

Exeter City Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 84 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. 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.

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3.2 Individual Pollutants

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

3.1.3 Nitrogen Dioxide (NO$_2$)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted 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 data ratification, 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 2022 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.

Table A.5 in Appendix A compares the ratified continuous monitored 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.

The local bias adjustment figure (0.77) has been used this year. Data capture at the Exeter Roadside (CM1) continuous analyser was good, as were the co-located diffusion tubes precision and bias (Appendix C.3). The national bias factor (0.83) is higher than the local one so if that had been used the final reported concentrations would have been slightly higher. The Council has followed DEFRA guidance in choosing to use the national factor and it is considered robust but the choice of factors does not greatly affect the conclusions drawn.

The data shows that no locations measured an exceedence of the proxy for the hourly objective in 2022 (an annual average of 60µg/m^3).

Only one site exceeded the objective for annual average concentrations. This was East Wonford Hill (DT57) where concentrations were slightly above the limit (40.4 µg/m^3 against an objective of 40). This is within the Exeter AQMA. The general trend in the data for all the monitoring sites is a significant fall in concentrations between 2019 and 2020 with a partial rebound in 2021 and then a further fall in 2022 (see Figure A.1 and the data in

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Table A.4). This can be attributed to changes in traffic flows as a result of COVID-19 and new travel & working behaviours (see table 15.1) as well as ongoing improvements in vehicle emission technologies and the impact of measures in the Air Quality Action Plan.

Table 3.1   Traffic Flow Data (24 hour average)

Site Name	2015	2020	2021	2022	% change from 2015 to 2020	% change from 2015 to 2021	% change from 2015 to 2022
Pinhoe Road (Whipton)	20830	16538	17,218	20,346	-21%	-17%	-2%
Heavitree Road	17507	14832	16,632	18,109	-15%	-5%	3%
Honiton Road	26832	22789	23,936	25,503	-15%	-11%	-5%
Topsham Road (King George)	26057	20702	23,635	24,445	-21%	-9%	-6%
Alphington St	28799	22012	23,401	25,537	-24%	-19%	-11%
Cowick St	14840	10913	11,916	12,530	-26%	-20%	-16%
Total	**134865**	**107786**	**116,738**	**126,470**	**-20%**	**-13%**	**-6%**

2016 count data is shown for Heavitree Road because the 2015 data was faulty

2021 count data for Pinhoe Road is estimated because of incomplete data

2020 was exceptional, in terms of the change in traffic flows, so the Council had no plans to amend the AQMA as a result of changes to NO_2 concentrations seen in that year. The last Annual Status Report (published in 2022) recommended that longer term trends were monitored to confirm which exceedences have indeed been permanently resolved. There will also always be natural variation between years as a result of local small changes in traffic flows (road works etc) and weather patterns which make identifying any trend difficult over short periods of time even where other factors are stable.

It seems highly likely that previous exceedences at the Blackboy Road / Pinhoe Road junction (DT42 and DT43) have been permanently resolved given that they had fallen below 40 µg/m^3 in 2018 and therefore have been below the objective for 5 years. Other sites (Alphington Street DT19, Livery Dole DT52, Satutary Mount DT54, Fore Street Heavitree inbound DT56 and Honiton Road DT58) were above the objective in 2019 but have not been since. This means that there have now been three years of results that are below the objective level. However two of these were affected by Covid and lockdowns. The Council does not therefore intend to review the AQMA order or AQMA boundary until 2024 when the current AQAP expires. Before this date action to improve air quality will continue to be focussed on those small areas within the AQMA where exceedences have been measured recently (East Wonford Hill). A complete review will commence in 2024

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together with the necessary reports and consultation for an amended AQMA (if required) and subsequently a new AQAP.

There was one change to the monitoring network in 2022. This was the addition of a diffusion tube at Bonhay Road (DT85). This is beside a road where traffic sometimes queues and below a railway over-bridge. It is a location where traffic flows might increase as a result of vehicles displaced from the city centre by changes to Queen Street. It was included to monitor trends, rather than to identify any expected exceedence of the objective.

No further changes to the monitoring network are planned for 2023. The Council considers that it has good coverage of all areas where exceences might occur at a relevant location as well as any areas which might be expected to see significant traffic growth (as a result of new development etc). Monitoring is focused at expected hot spots and relevant worst-case locations. No further revision to the monitoring network is therefore currently proposed in order to identify suspected exceedences, although regular review of the network will continue to ensure that monitoring is taking place at all areas of potential exceedance at locations of relevant exposure.

3.1.4 Particulate Matter (PM$_{10}$)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM$_{10}$ annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM$_{10}$ daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

There were no measured exceedences of the PM$_{10}$ air quality objectives in Exeter in 2022. Data capture at CM1 (RAMM) was below 75% (because of equipment breakdowns) and therefore annualisation was required. Annual average concentrations rose in 2022 compared to the previous four years. The longer-term trend in annual concentrations is a decline since 2005 or 2006. The data will be monitored over the coming years to identify whether this recent increase is part of an emerging trend or caused by expected inter-annual variability as a result of weather patterns etc.

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There were two exceedences of an hourly mean of 50µg/m^3 in 2022 at RAMM. The 90.4th percentile of hourly results has also been calculated because of the low data capture. This is below 50 µg/m^3. No hourly levels at CM2 (Alphington Street) were over 50µg/m^3.

3.1.5 Particulate Matter (PM$_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored PM$_{2.5}$ annual mean concentrations for the past five years.

There were no measured exceedences of the PM$_{2.5}$ air quality objectives in Exeter in 2022. Data capture at CM1 (RAMM) was below 90% and therefore annualisation was required. There is no obvious trend in concentrations over the period when data has been collected.

3.1.6 Ozone (O$_3$)

Table A.9 in Appendix A compares the ratified ratified continuous monitored O$_3$ 8-hour mean concentrations for the past 5 years with the air quality objective of 100µg/m^3, not to be exceeded more than 10 times per year.

Although not a local air pollutant, Exeter City Council has the facility to measure ozone (O$_3$) levels. Table A.9 in Appendix A compares the ratified continuous monitored O$_3$ concentrations for 2022 with the nationally applied air quality objective for this pollutant. In 2020, the number of occasions when there was an 8 hour running mean of >100 micrograms per cubic meter increased significantly. This could have been caused by the interaction between NOx and ozone in the atmosphere. With lower concentrations of NO being emitted during lockdowns, less ozone would be converted to oxygen (O$_2$). There were no exceedances in 2022. As stated above, ozone is not a local air pollutant so Exeter City Council is not responsible for reporting on, or mitigating, exceedances of this objective. This is the responsibility of DEFRA.

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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)
CM1	Exeter Roadside	Kerbside	291939	92830	NO2; O3; PM10; PM2.5	YES AQMA 1	Chemiluminescent; UVA; Optical Light Scattering	0	1	1.7
CM2	Alphington Street	Roadside	291670	91773	PM10; PM2.5	YES AQMA 1	Optical Light Scattering	12	3	1.7

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

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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)
DT1	High Street /Castle Street	Kerbside	292199	92814	NO2	YES, Exeter AQMA	50.0	0.5	No	2.0
DT2	Longbrook Street	Kerbside	292315	93016	NO2	NO	0.0	1.0	No	1.7
DT3	New North Road	Kerbside	292185	93049	NO2	YES, Exeter AQMA	0.0	1.0	No	2.0
DT4	Queen Street	Kerbside	291779	93011	NO2	YES, Exeter AQMA	0.0	1.5	No	2.0
DT5, DT6	RAMM 2	Kerbside	291944	92826	NO2	YES, Exeter AQMA	0.0	1.0	Yes	1.7
DT7	High Street Guildhall	Roadside	291984	92626	NO2	YES, Exeter AQMA	0.0	2.0	No	2.0
DT8	North Street	Kerbside	291895	92569	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT9	South Street	Roadside	291943	92511	NO2	YES, Exeter AQMA	4.0	2.5	No	2.0
DT10	Market Street	Kerbside	291833	92433	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT11	Magdalen Street	Kerbside	292291	92292	NO2	YES, Exeter AQMA	6.0	2.0	No	1.7
DT12	Magdalen Street façade	Kerbside	292422	92320	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT13	Archibald Road	Roadside	292590	92743	NO2	NO	0.0	1.5	No	1.7
DT14	Heavitree Road inbound	Roadside	292832	92731	NO2	YES, Exeter AQMA	0.0	10.0	No	2.0
DT15	Heavitree Road outbound	Kerbside	292703	92807	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT16	Holloway Street	Kerbside	292378	92039	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7

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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)
DT17	Carder's Court, Shilhay	Roadside	291699	92091	NO2	NO	0.0	15.0	No	1.7
DT18	Rear of Gervase Avenue	Roadside	291657	91973	NO2	YES, Exeter AQMA	5.0	18.0	No	2.0
DT19	Alphington Street	Kerbside	291669	91812	NO2	YES, Exeter AQMA	0.0	1.0	No	2.0
DT20	Alphington Road inbound	Roadside	291532	91349	NO2	YES, Exeter AQMA	0.0	2.0	No	1.7
DT21	Queen's Road	Urban Background	291460	91390	NO2	NO	8.0	2.0	No	1.7
DT22	Alphington Road outbound	Roadside	291509	91151	NO2	YES, Exeter AQMA	0.0	8.0	No	1.7
DT23	Alphington Road outer	Roadside	291518	90813	NO2	YES, Exeter AQMA	15.0	2.0	No	1.7
DT24	Church Road Alphington	Roadside	291691	90425	NO2	YES, Exeter AQMA	0.0	1.5	No	1.7
DT25	Church Road II	Kerbside	291767	90160	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT26	Alphington Cross	Roadside	291520	90531	NO2	YES, Exeter AQMA	0.0	1.8	No	1.7
DT27	Cowick Street (Cowick Lane)	Kerbside	290864	91725	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT28	Cowick Street (inbound)	Roadside	291249	91874	NO2	YES, Exeter AQMA	0.0	4.0	No	1.7
DT29	Cowick Street (outbound)	Roadside	291376	91944	NO2	YES, Exeter AQMA	0.0	1.5	No	1.7
DT30	Cowick Street (Exe Bridges)	Roadside	291500	92055	NO2	YES, Exeter AQMA	0.0	2.0	No	1.7
DT31	Okehampton Street	Roadside	291351	92169	NO2	YES, Exeter AQMA	0.0	4.0	No	1.7
DT32	Station Road	Roadside	290826	93598	NO2	NO	0.0	2.1	No	1.7

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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)
DT33	Bonhay Road (St Clements Lane)	Roadside	291253	93299	NO2	YES, Exeter AQMA	0.0	2.0	No	2.0
DT34	Red Cow Village	Kerbside	291242	93483	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT35	Red Cow II	Kerbside	291272	93468	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT36	Cowley Bridge Road	Roadside	291054	94399	NO2	YES, Exeter AQMA	0.0	4.0	No	1.7
DT37	Pennsylvania Road	Roadside	292391	93291	NO2	NO	0.0	1.0	No	1.7
DT38	York Road School	Roadside	292469	93245	NO2	NO	3.5	2.5	No	1.7
DT39	York Road	Kerbside	292579	93146	NO2	NO	1.5	0.1	No	1.7
DT40	Union Road	Roadside	293047	93877	NO2	NO	0.0	1.0	No	1.7
DT41	Pinhoe Road inbound	Roadside	293405	93395	NO2	YES, Exeter AQMA	0.0	3.0	No	1.7
DT42	Pinhoe Road (Polsloe Road)	Kerbside	293251	93375	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7
DT43	Blackboy Road (Polsloe Road)	Roadside	293227	93356	NO2	YES, Exeter AQMA	0.0	2.0	No	1.7
DT44	Beacon Heath	Kerbside	295068	94487	NO2	NO	10.0	1.0	No	1.7
DT45	Venny Bridge	Kerbside	295888	94101	NO2	NO	8.0	1.0	No	1.7
DT46	Pinhoe	Kerbside	296418	94470	NO2	NO	20.0	0.1	No	1.7
DT47	Langaton Lane	Urban Background	296984	94327	NO2	NO	12.0	0.5	No	1.7
DT48	Pinn Lane	Roadside	296494	93782	NO2	NO	9.5	1.0	No	2.0
DT49	Pinhoe Road (Fairfield Avenue)	Roadside	295413	93689	NO2	YES, Exeter AQMA	0.0	5.0	No	1.7
DT50	East John Walk	Urban Background	293091	92825	NO2	NO	1.5	N/A	No	1.7
DT51	Magdalen Road (Barrack Road)	Kerbside	293448	92419	NO2	YES, Exeter AQMA	0.0	1.0	No	1.7

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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)
DT52	Livery Dole	Roadside	293418	92497	NO2	YES, Exeter AQMA	0.0	1.5	No	1.7
DT53	Rowancroft	Kerbside	293533	92473	NO2	YES, Exeter AQMA	0.0	0.2	No	2.0
DT54	Salutary Mount	Roadside	293738	92396	NO2	YES, Exeter AQMA	4.5	1.5	No	1.7
DT55	Fore Street Heavitree outbound	Roadside	293781	92409	NO2	YES, Exeter AQMA	6.0	4.0	No	1.7
DT56	Fore Street Heavitree inbound	Roadside	294043	92359	NO2	YES, Exeter AQMA	0.0	2.0	No	1.7
DT57	East Wonford Hill	Roadside	294410	92310	NO2	YES, Exeter AQMA	0.0	2.0	No	1.7
DT58	Honiton Road	Roadside	295203	92378	NO2	YES, Exeter AQMA	20.0	1.5	No	2.0
DT59	Honiton Road façade	Roadside	295191	92395	NO2	NO	0.0	15.0	No	1.7
DT60	Sidmouth Road lamp post	Roadside	295466	92365	NO2	YES, Exeter AQMA	7.0	2.0	No	2.0
DT61	Sidmouth Road Middlemoor	Roadside	295636	92232	NO2	YES, Exeter AQMA	0.0	10.0	No	1.7
DT62	Newcourt Way	Roadside	295710	90571	NO2	NO	17.0	2.0	No	2.0
DT63	Topsham Road (Countess Wear)	Roadside	294694	90001	NO2	YES, Exeter AQMA	0.0	5.0	No	2.0
DT64	Bridge Road (Countess Wear)	Roadside	294652	89974	NO2	NO	0.0	15.0	No	1.7
DT65	High Street Topsham	Kerbside	296415	88477	NO2	NO	0.0	1.0	No	1.7
DT66	Topsham Road (Tollards Road)	Roadside	294227	90435	NO2	YES, Exeter AQMA	0.0	1.5	No	1.7

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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)
DT67	Topsham Road (Barrack Road)	Roadside	293213	91245	NO2	YES, Exeter AQMA	0.0	10.0	No	1.7
DT68	Riverside Valley Park	Urban Background	292291	91678	NO2	NO			No	2.0
DT69	Cowick Barton Playing Fields	Urban Background	291016	91304	NO2	NO			No	1.7
DT70	Exwick Playing Fields	Urban Background	291298	92593	NO2	NO			No	2.0
DT71	Heavitree Pleasure Ground	Urban Background	294387	92611	NO2	NO			No	2.0
DT72	Ladysmith School/Pretoria Road	Roadside	293617	93090	NO2	NO	1.5	1.5	No	1.7
DT73	Pennsylvania	Urban Background	293052	94185	NO2	NO	6.0	2.0	No	2.0
DT74	Northernhay Gardens	Urban Background	292056	93043	NO2	NO			No	2.0
DT75	Chudleigh Road	Roadside	291721	89727	NO2	YES, Exeter AQMA	0.0	4.0	No	2.0
DT76	Mill Lane	Urban Background	291555	90449	NO2	NO	8.5	1.0	No	2.0
DT77	Sidwell Street	Kerbside	292553	93082	NO2	YES, Exeter AQMA	6.0	1.0	No	2.0
DT78	Station Road Pinhoe	Other	296415	94165	NO2	NO	1.5	1.5	No	1.7
DT79	Tithebarn Link Road	Roadside	296827	93886	NO2	NO	2.0	2.0	No	2.0
DT80	Exeter Road	Roadside	295967	88876	NO2	NO	14.5	3.0	No	2.0
DT81	St. Leonards Road	Roadside	292637	91991	NO2	NO	0.0	2.0	No	1.7

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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)
DT82	Newtown	Urban Background	292847	92911	NO2	NO	0.0	3.5	No	2.0
DT83	New Bridge St	Roadside	291655	92258	NO2	YES, Exeter AQMA	0.0	2.0	No	2.0
DT84	Lower Coombe St	Roadside	291897	92217	NO2	NO	2.0	10.0	No	1.7
DT85	Bonhay Road Bridge	Kerbside	291375	92935	NO2	YES, Exeter AQMA	2.0	2.0	No	1.7

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.

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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 2022 (%) [2]	2018	2019	2020	2021	2022
CM1	291939	92830	Kerbside		97.2	29.1	29	18.8	19.2	17.9

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **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.TG22 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%).

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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 2022 (%) [2]	2018	2019	2020	2021	2022
DT1	292199	92814	Kerbside		100.0	29.2	26.5	17.0	20.9	15.8
DT2	292315	93016	Kerbside		100.0	25.2	26.4	17.5	21.4	19.2
DT3	292185	93049	Kerbside		92.3	25.9	27.8	18.8	22.6	20.3
DT4	291779	93011	Kerbside		92.3	23.1	23.8	16.2	19.0	16.7
DT5, DT6	291944	92826	Kerbside		90.4	29.3	27.5	18.5	21.3	17.9
DT7	291984	92626	Roadside		100.0	26.0	22.6	15.7	20.4	18.2
DT8	291895	92569	Kerbside		92.0	33.9	35.7	22.6	27.9	24.1
DT9	291943	92511	Roadside		100.0	29.1	28.5	18.7	24.2	20.7
DT10	291833	92433	Kerbside		100.0	30.8	29.5	18.6	23.4	20.9
DT11	292291	92292	Kerbside		100.0	29.4	28.9	19.5	24.7	22.7
DT12	292422	92320	Kerbside		92.3	31.1	29.3	20.0	23.8	23.1
DT13	292590	92743	Roadside		100.0	21.6	19.6	13.2	16.8	15.3
DT14	292832	92731	Roadside		100.0	20.3	19.0	13.2	16.5	14.7

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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 2022 (%) [2]	2018	2019	2020	2021	2022
DT15	292703	92807	Kerbside		92.0	34.5	31.4	22.3	28.0	24.1
DT16	292378	92039	Kerbside		100.0	34.2	29.3	21.3	26.6	22.1
DT17	291699	92091	Roadside		100.0	22.4	21.4	15.5	18.3	15.8
DT18	291657	91973	Roadside		100.0	22.3	22.7	15.8	19.2	17.6
DT19	291669	91812	Kerbside		100.0	**47.0**	**42.0**	28.5	35.7	33.4
DT20	291532	91349	Roadside		100.0	33.6	31.3	22.4	27.4	24.5
DT21	291460	91390	Urban Background		100.0	15.3	12.7	9.1	11.7	10.2
DT22	291509	91151	Roadside		90.4	29.0	26.2	17.7	21.2	20.8
DT23	291518	90813	Roadside		100.0	27.3	23.4	15.3	20.6	18.8
DT24	291691	90425	Roadside		100.0	28.0	23.4	18.3	24.3	18.6
DT25	291767	90160	Kerbside		100.0	26.1	23.5	16.2	19.8	21.1
DT26	291520	90531	Roadside		90.7	31.3	30.2	20.4	25.6	22.6
DT27	290864	91725	Kerbside		100.0	39.9	38.7	26.8	31.6	30.3
DT28	291249	91874	Roadside		100.0	23.9	21.1	15.6	19.9	17.6

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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 2022 (%) [2]	2018	2019	2020	2021	2022
DT29	291376	91944	Roadside		100.0	**43.4**	34.4	24.3	29.8	28.9
DT30	291500	92055	Roadside		72.8	33.2	30.1	22.1	28.2	26.9
DT31	291351	92169	Roadside		100.0	25.2	24.3	17.3	20.6	18.9
DT32	290826	93598	Roadside		100.0	25.4	25.4	17.7	21.2	20.5
DT33	291253	93299	Roadside		100.0	30.9	26.8	19.2	24.7	22.0
DT34	291242	93483	Kerbside		90.4	38.3	36.0	26.5	32.1	29.9
DT35	291272	93468	Kerbside		92.3	31.4	31.1	21.5	26.0	23.2
DT36	291054	94399	Roadside		100.0	33.8	32.5	22.9	27.5	26.6
DT37	292391	93291	Roadside		100.0	28.6	28.4	18.3	23.2	21.8
DT38	292469	93245	Roadside		92.3	29.7	27.7	18.1	23.0	20.9
DT39	292579	93146	Kerbside		92.3	38.9	36.2	23.3	31.2	28.0
DT40	293047	93877	Roadside		100.0	28.0	26.4	16.7	21.0	19.4
DT41	293405	93395	Roadside		100.0	31.2	29.8	20.9	24.0	22.5
DT42	293251	93375	Kerbside		83.0	37.2	35.9	25.6	30.6	28.2

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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 2022 (%) [2]	2018	2019	2020	2021	2022
DT43	293227	93356	Roadside		100.0	28.2	25.7	19.2	23.5	20.8
DT44	295068	94487	Kerbside		100.0	20.3	17.8	13.6	15.1	13.7
DT45	295888	94101	Kerbside		100.0	19.1	18.0	14.2	16.6	15.4
DT46	296418	94470	Kerbside		92.3	24.8	23.1	18.4	21.8	18.8
DT47	296984	94327	Urban Background		92.3	18.7	17.9	13.3	15.1	12.8
DT48	296494	93782	Roadside		100.0	19.3	17.6	12.8	15.5	14.4
DT49	295413	93689	Roadside		100.0	19.7	17.9	12.6	15.8	16.0
DT50	293091	92825	Urban Background		100.0	14.5	14.0	9.7	11.6	10.5
DT51	293448	92419	Kerbside		100.0	39.7	35.5	24.3	29.4	27.8
DT52	293418	92497	Roadside		100.0	**48.7**	**42.6**	31.1	34.9	32.5
DT53	293533	92473	Kerbside		100.0	**46.4**	38.5	27.4	32.1	27.4
DT54	293738	92396	Roadside		100.0	**53.6**	**43.4**	32.7	37.3	33.8
DT55	293781	92409	Roadside		100.0	31.2	26.7	19.8	23.4	20.8
DT56	294043	92359	Roadside		100.0	**43.4**	**40.3**	29.0	32.2	30.8

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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 2022 (%) [2]	2018	2019	2020	2021	2022
DT57	294410	92310	Roadside		100.0	**61.9**	**53.5**	38.2	**42.2**	**40.6**
DT58	295203	92378	Roadside		100.0	**50.6**	**47.3**	33.2	35.4	31.9
DT59	295191	92395	Roadside		100.0	24.5	20.4	14.8	16.0	15.0
DT60	295466	92365	Roadside		100.0	37.0	30.7	23.5	26.8	25.2
DT61	295636	92232	Roadside		100.0	24.2	21.8	15.5	19.2	17.6
DT62	295710	90571	Roadside		100.0	19.2	16.3	11.5	14.7	13.7
DT63	294694	90001	Roadside		83.0	27.0	25.4	18.1	20.7	17.5
DT64	294652	89974	Roadside		100.0	22.6	20.6	17.8	16.9	15.7
DT65	296415	88477	Kerbside		100.0	27.9	24.4	17.2	22.1	18.8
DT66	294227	90435	Roadside		100.0	39.7	36.4	25.0	30.0	28.1
DT67	293213	91245	Roadside		100.0	25.6	21.5	15.9	19.1	19.3
DT68	292291	91678	Urban Background		100.0	13.7	13.8	9.4	11.7	10.0
DT69	291016	91304	Urban Background		100.0	11.5	11.2	7.6	9.3	8.9
DT70	291298	92593	Urban Background		100.0	17.5	16.1	12.3	15.9	14.0

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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 2022 (%) [2]	2018	2019	2020	2021	2022
DT71	294387	92611	Urban Background		66.8	11.2	10.5	7.6	9.1	8.8
DT72	293617	93090	Roadside		92.3		14.2	10.6	12.2	10.6
DT73	293052	94185	Urban Background		100.0		10.2	7.5	8.3	7.9
DT74	292056	93043	Urban Background		47.5		11.4	8.3	10.7	8.4
DT75	291721	89727	Roadside		100.0		15.8	11.1	13.7	12.7
DT76	291555	90449	Urban Background		92.3		14.7	9.6	12.3	11.3
DT77	292553	93082	Kerbside		100.0		31.1	18.6	23.8	20.6
DT78	296415	94165	Other		92.3		15.1	10.6	13.4	12.6
DT79	296827	93886	Roadside		100.0		19.5	14.5	17.3	15.5
DT80	295967	88876	Roadside		100.0		19.8	14.3	16.4	16.7
DT81	292637	91991	Roadside		100.0		15.6	11.2	13.9	12.2
DT82	292847	92911	Urban Background		100.0			10.8	12.6	12.1
DT83	291655	92258	Roadside		80.8			19.5	24.0	22.6
DT84	291897	92217	Roadside		100.0			15.5	18.6	15.5

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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 2022 (%) [2]	2018	2019	2020	2021	2022
DT85	291375	92935	Kerbside		100.0					27.1

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **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 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.TG22 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%).

Exeter City Council

Figure A.1 – Trends in Annual Mean NO_2 Concentrations
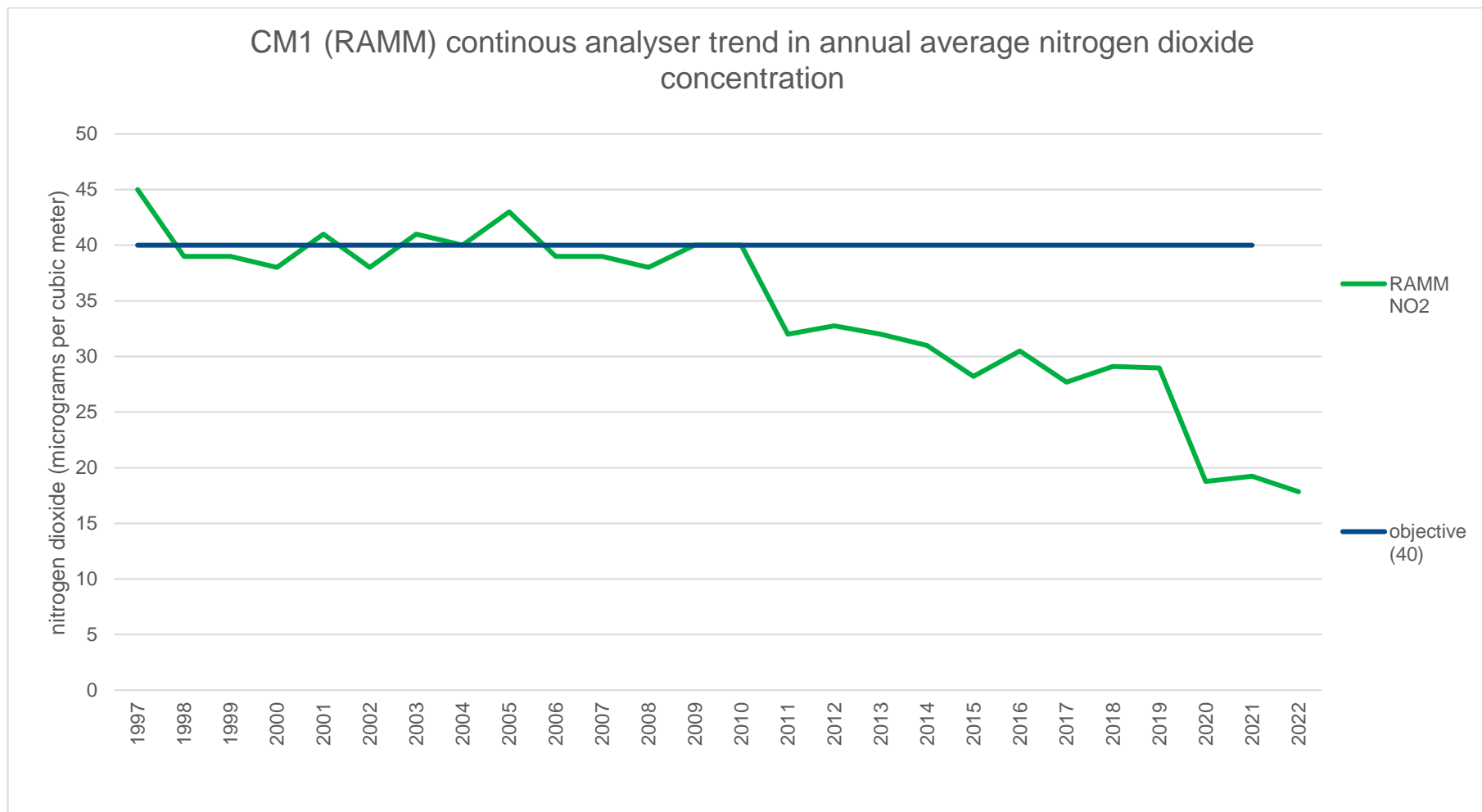
This figure presents NO_2 annual mean concentrations at the RAMM continuous monitoring site between years 1997 and 2022. There are no exceedances of the annual mean objective in 2022. There is a general trend of reduction since 2010.

Exeter City Council

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites in City Centre Area
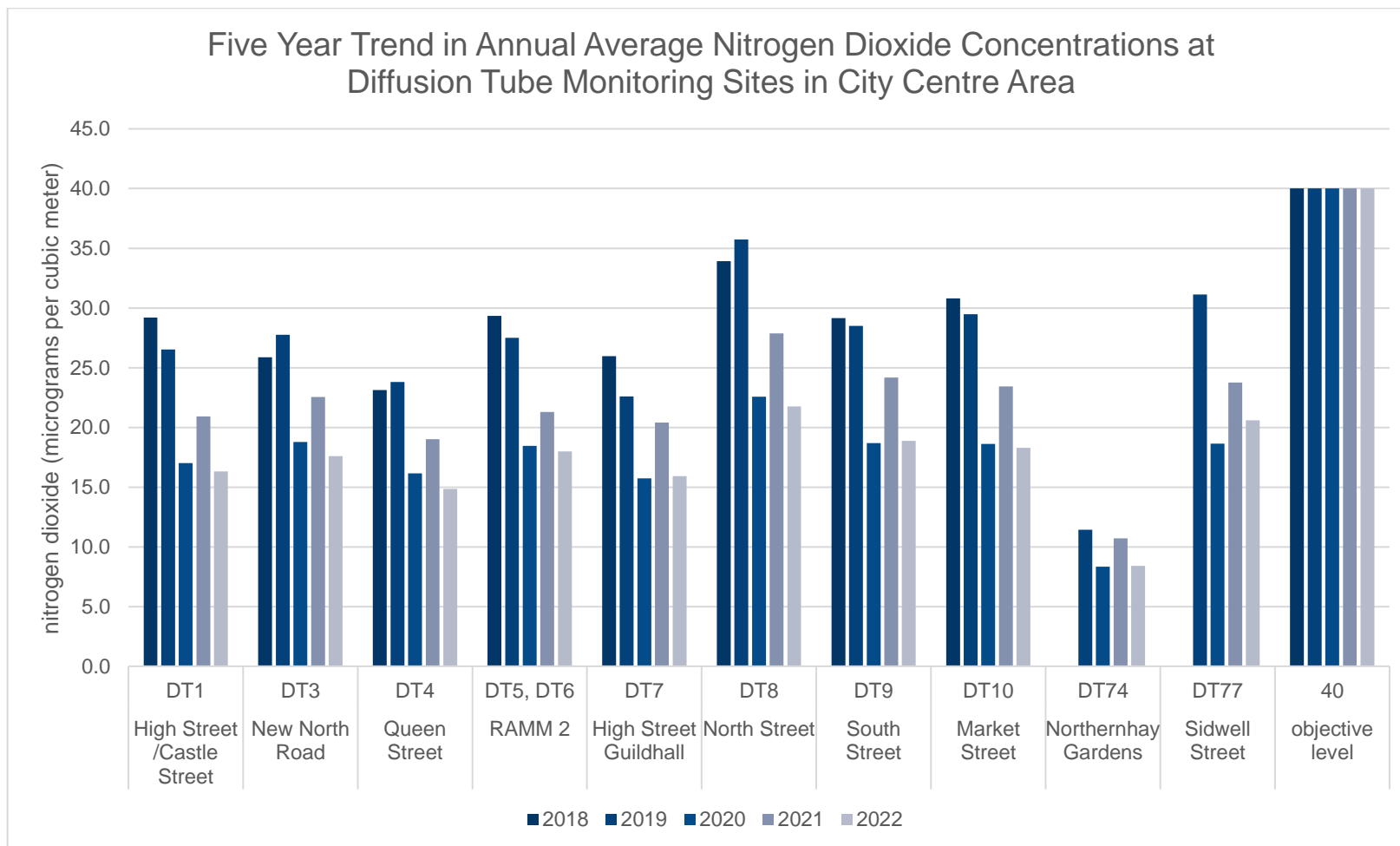
This figure presents NO$_2$ annual mean concentrations for sites in the city centre between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.

Exeter City Council

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites along the Topsham Road Corridor
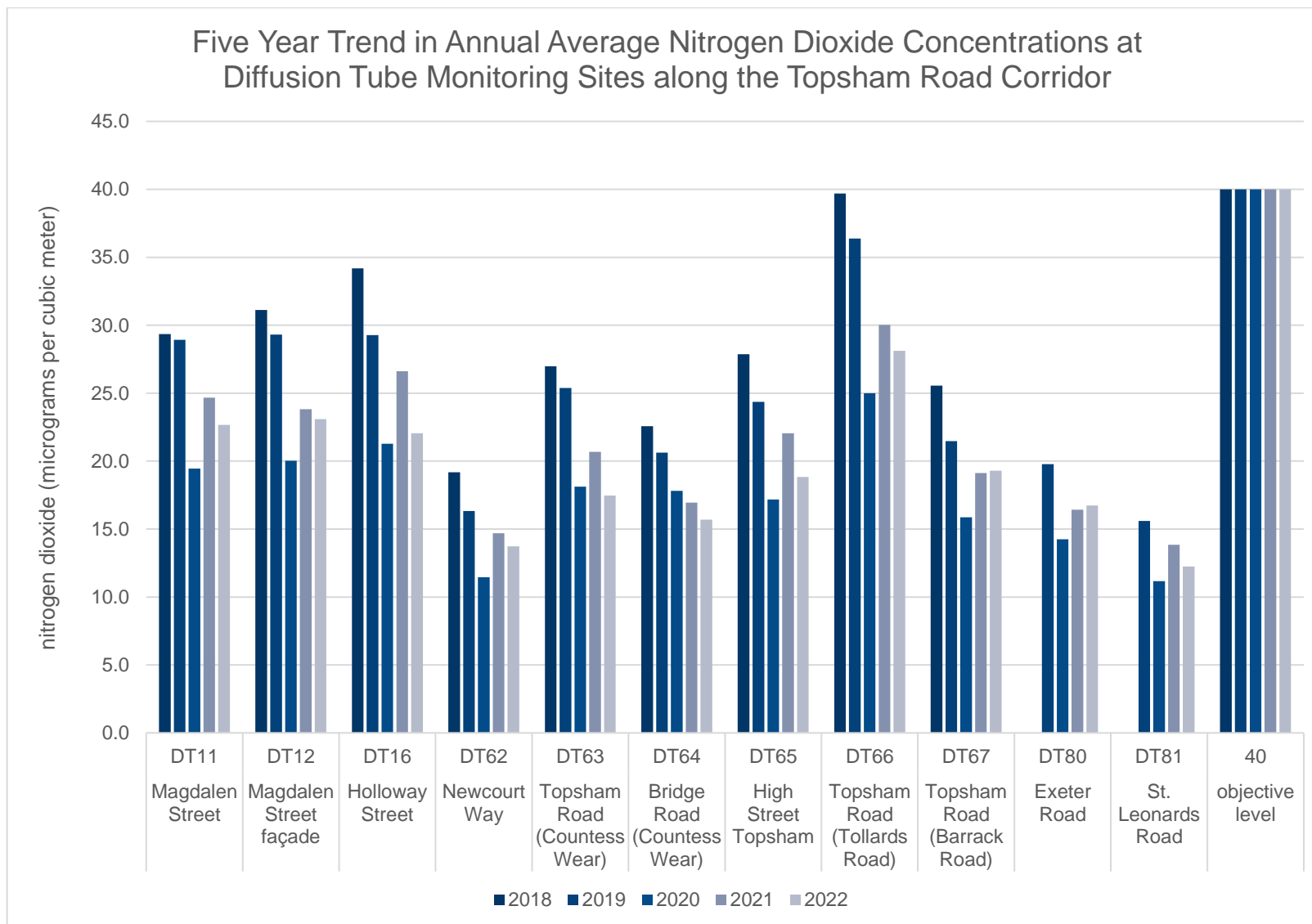
This figure presents NO$_2$ annual mean concentrations for sites along the Topsham Road corridor between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites along the Heavitree Corridor
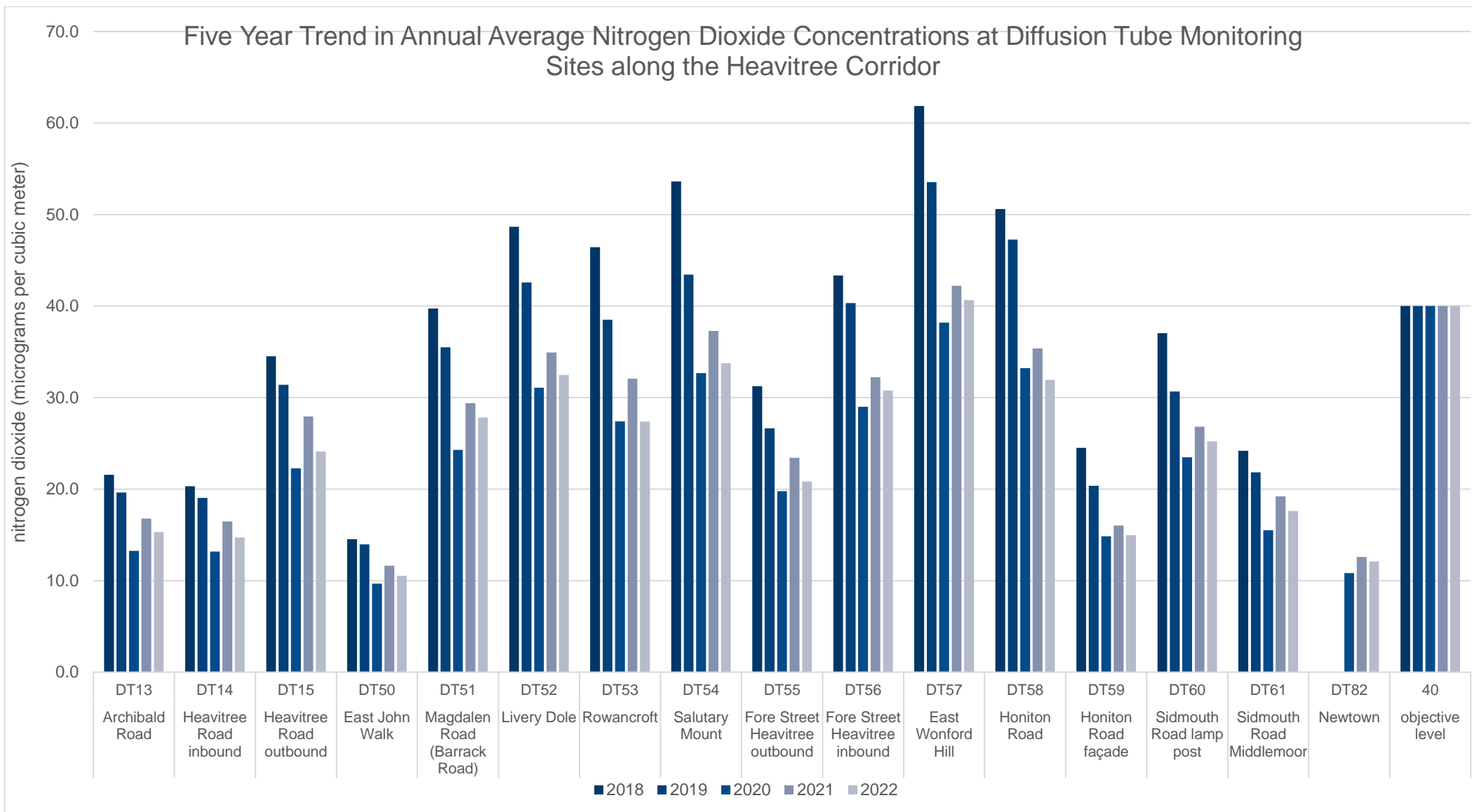
This figure presents NO₂ annual mean concentrations for sites along the Heavitree corridor between years 2018 to 2022. There is one exceedances of the annual mean objective in 2022 at DT57 (East Wonford Hill) and there is a general trend of reduction across the sites.

Exeter City Council

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites along the Alphington Corridor

This figure presents NO₂ annual mean concentrations for sites along the Alphington corridor between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.
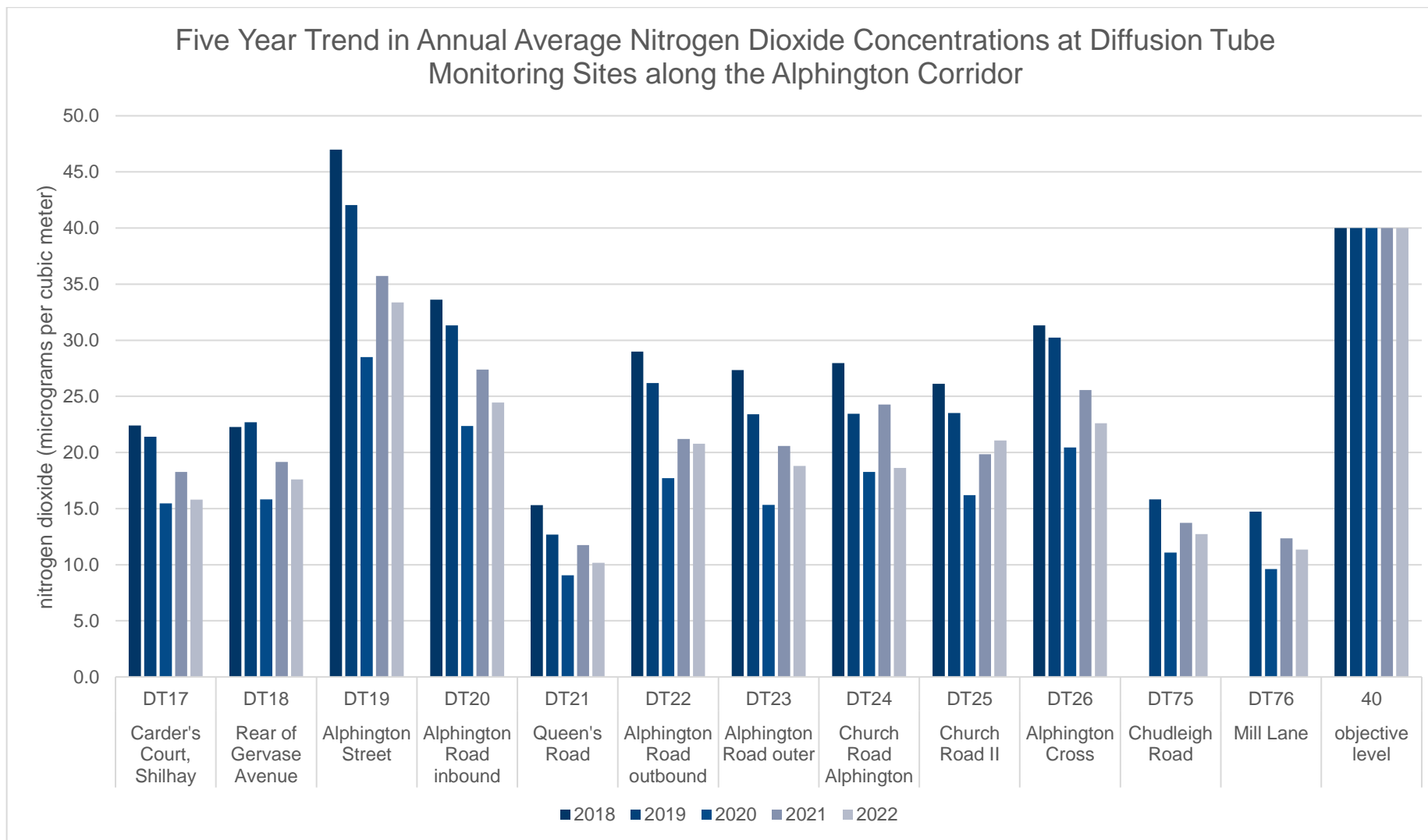
Exeter City Council

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites along the Cowick Street Corridor

This figure presents NO$_2$ annual mean concentrations for sites along the Cowick Street corridor between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.
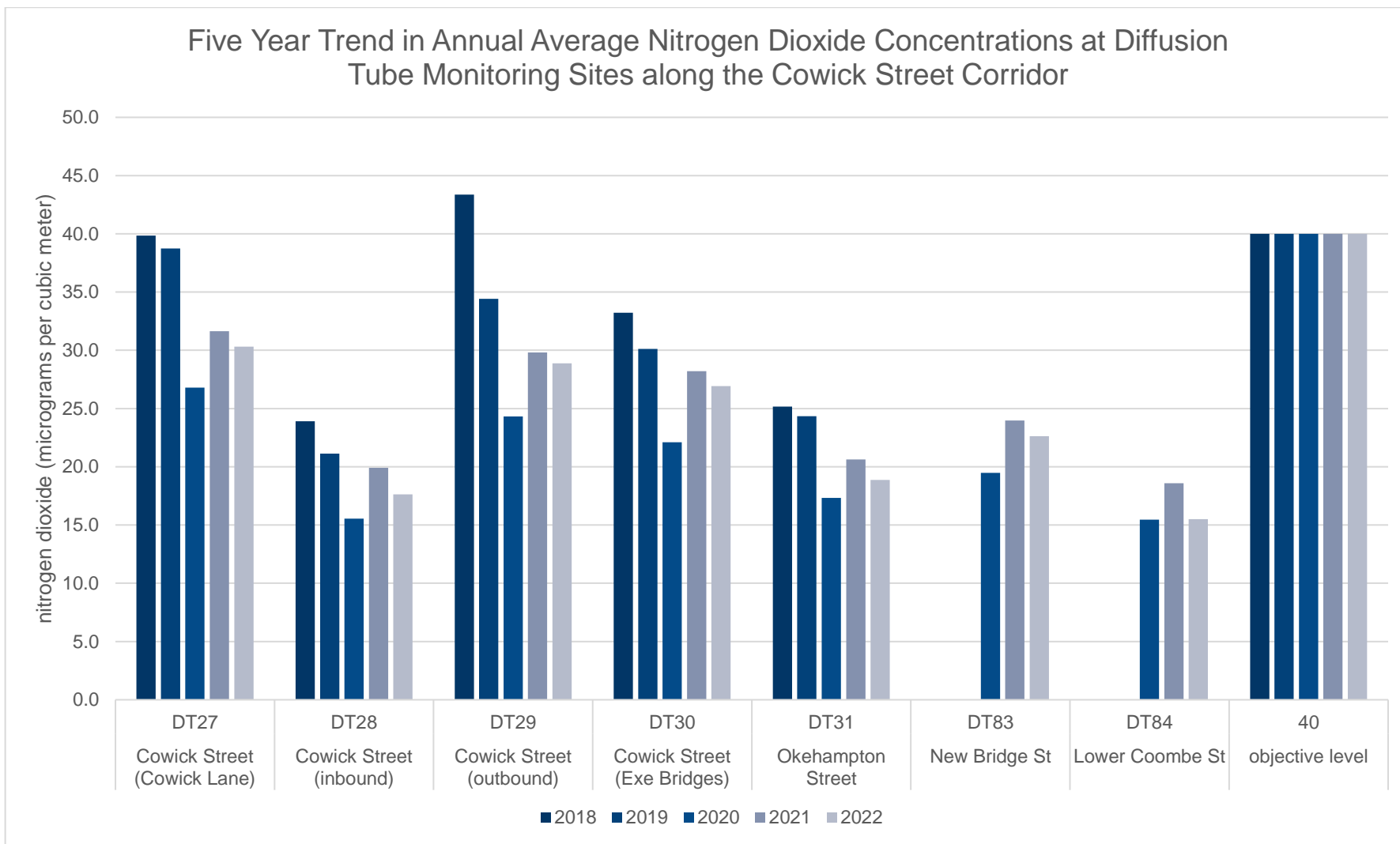
This figure presents NO$_2$ annual mean concentrations for sites in the St David's area between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.
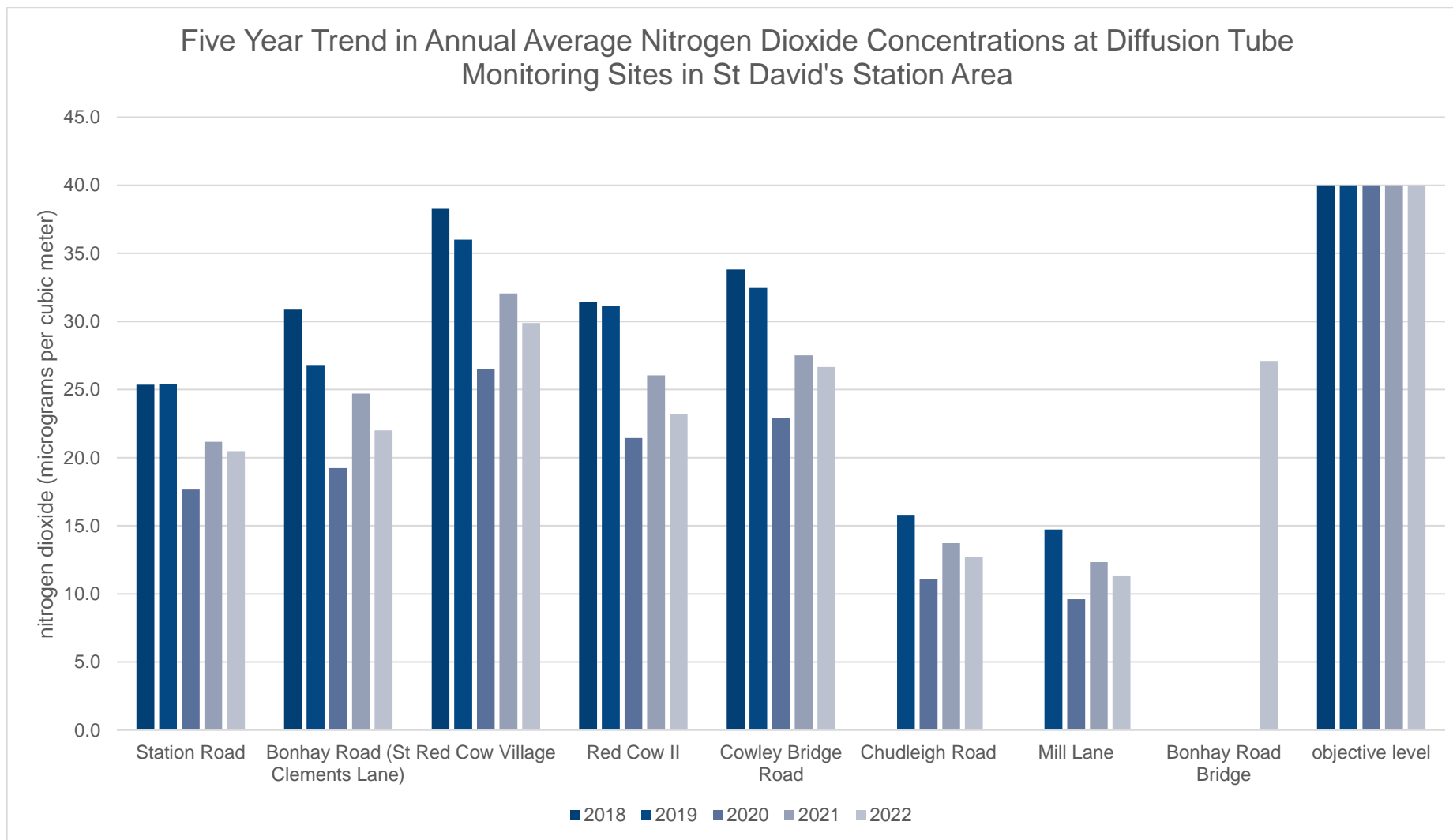
Exeter City Council

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites along Pennsylvania Corridor

This figure presents NO$_2$ annual mean concentrations for sites in the Pennsylvania area between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.

Exeter City Council

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites along Pinhoe Corridor

This figure presents NO₂ annual mean concentrations for sites along the Pinhoe corridor between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.
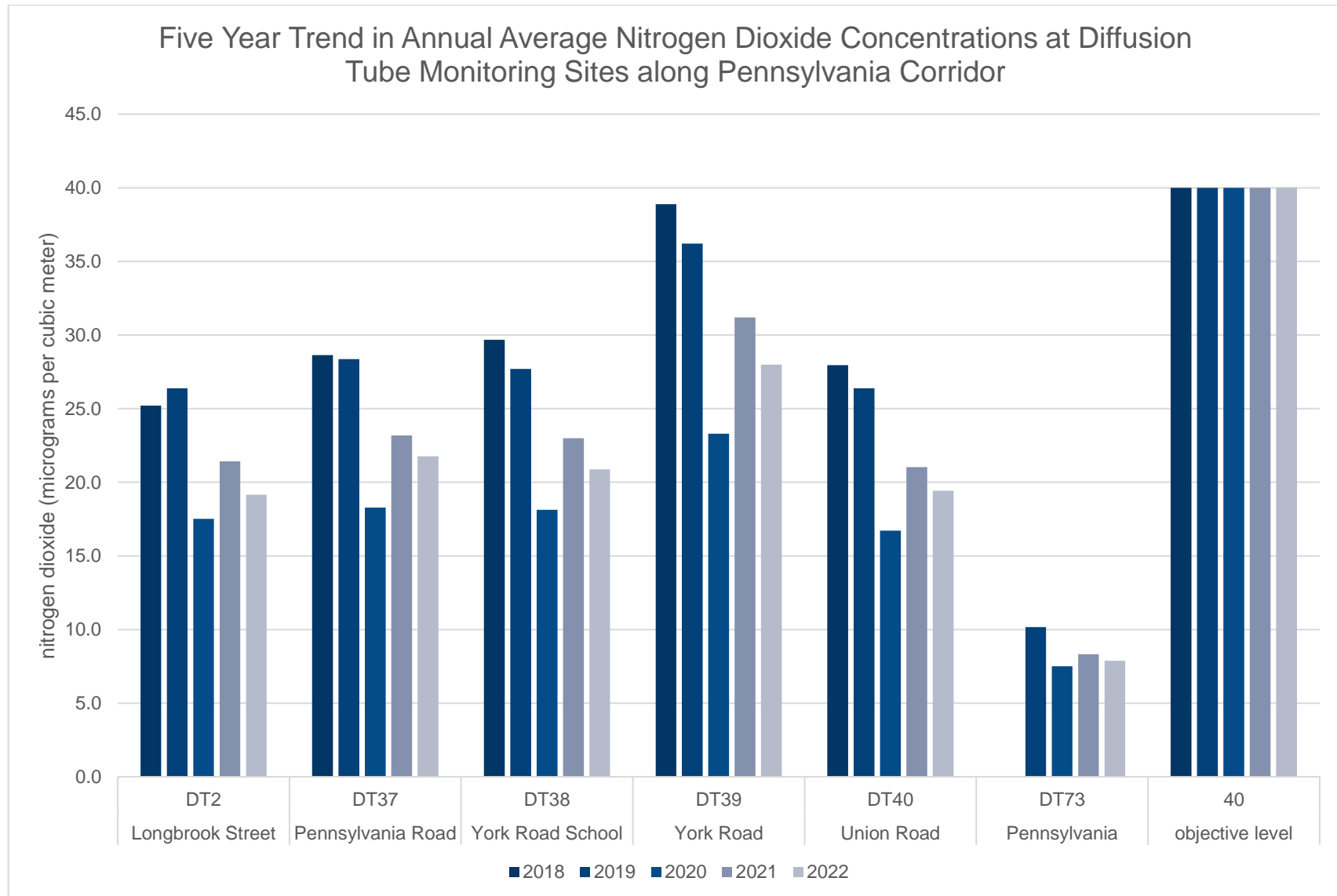
Exeter City Council

Five Year Trend in Annual Average Nitrogen Dioxide Concentrations at Diffusion Tube Monitoring Sites in Public Open Space

This figure presents NO₂ annual mean concentrations for sites in public open space between years 2018 to 2022. There are no exceedances of the annual mean objective in 2022 and there is a general trend of reduction experienced across the sites.
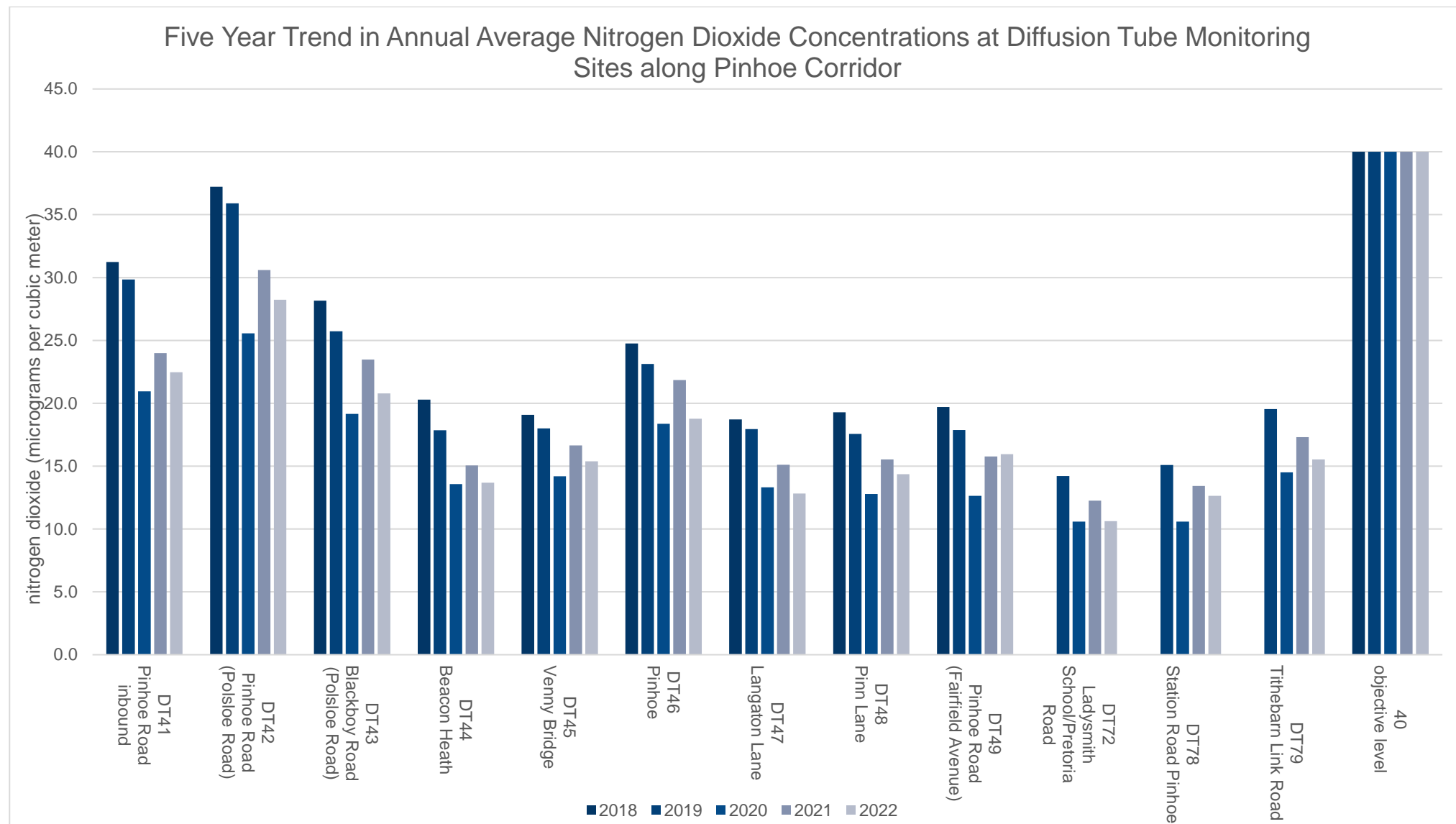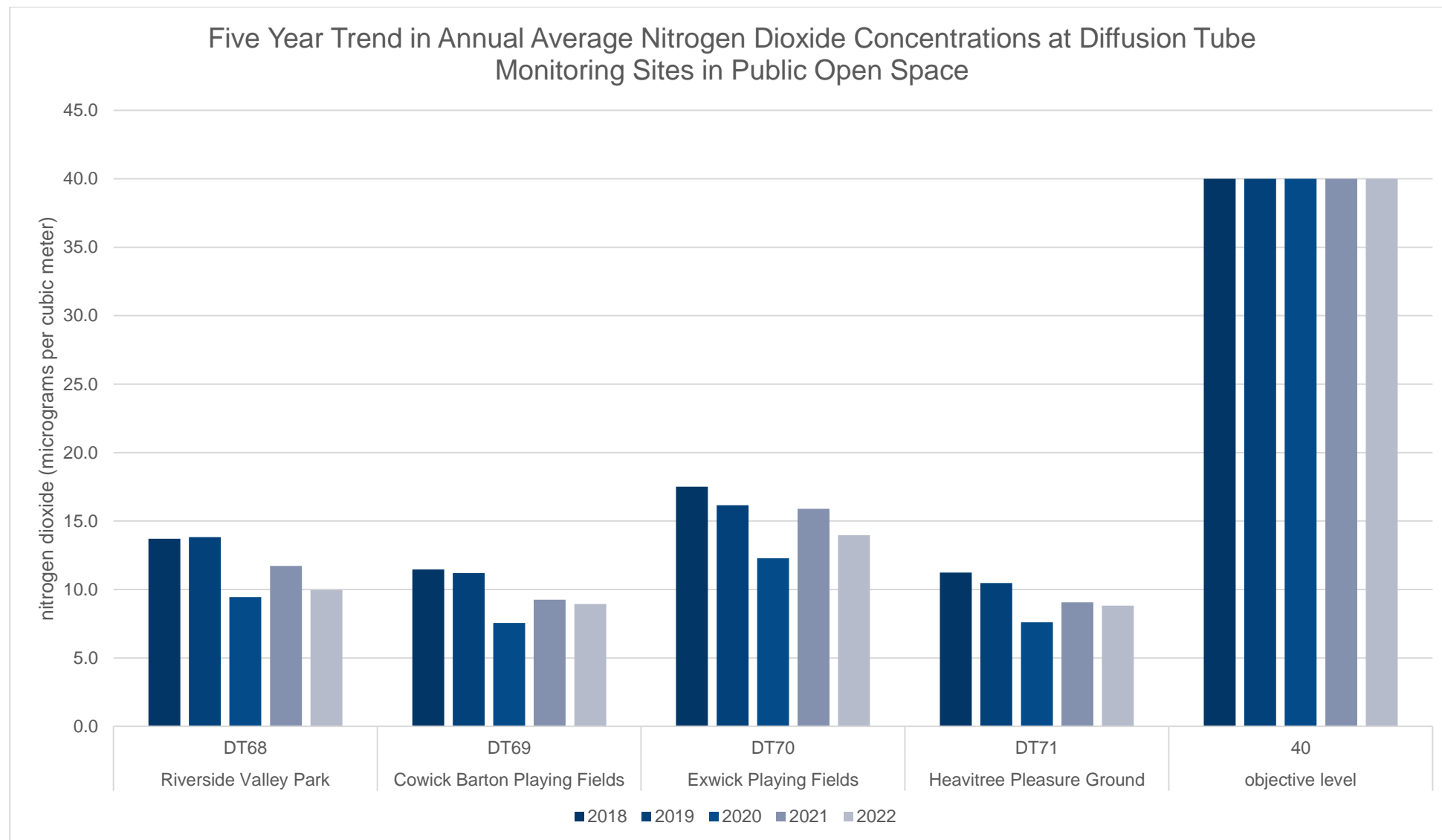
Exeter City Council

Table A.5 – 1-Hour Mean NO$_2$ Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
CM1	291939	92830	Kerbside		97.2	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO$_2$ 1-hour mean objective (200µg/m^3 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%).

Exeter City Council

Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
CM1	291939	92830	Kerbside		54.8	17.7	15.8	14.1	13.9	17.1 (19.22 annualised)
CM2	291670	91773	Roadside		99	16.7	15.1	11.5	12.0	14.7

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (annualised result shown in brackets)**

Notes:

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

Exceedances of the PM_{10} annual mean objective of $40\mu g/m^3$ are shown in **bold**.

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

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

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

Exeter City Council

Figure A.2 – Trends in Annual Mean PM$_{10}$ Concentrations
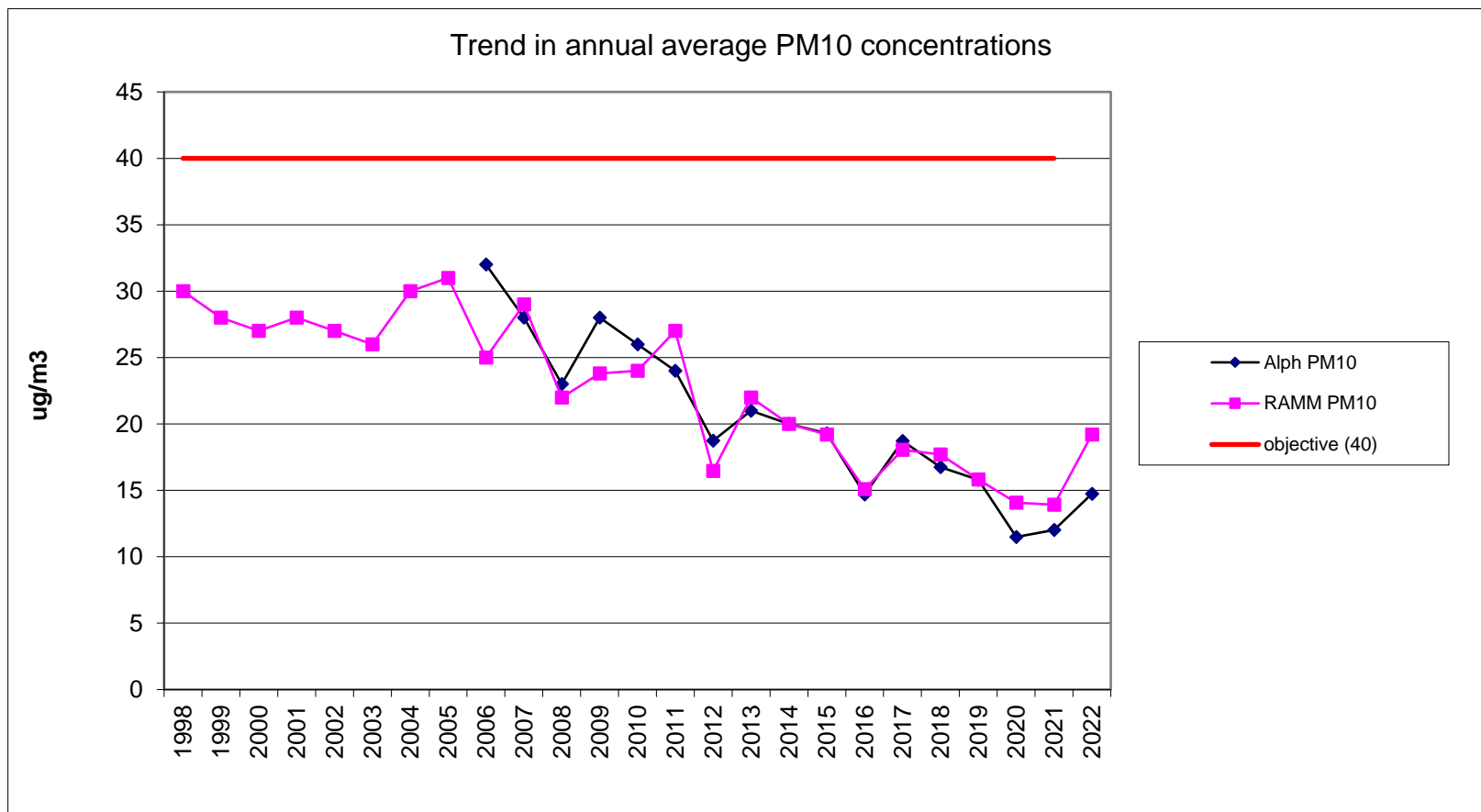
This figure presents PM$_{10}$ annual mean concentrations for the two monitoring sites in Exeter between years 1998 and 2022. There are no exceedances of the annual mean objective in 2022 although concentrations have increased since 2021. Otherwise there is a general trend of reduction experienced across both sites.

Exeter City Council

Table A.7 – 24-Hour Mean PM$_{10}$ Monitoring Results, Number of PM$_{10}$ 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
CM1	29193	92830	Kerbside		54.8	0 (28.8)	0 (21.2)	1	1	2 (29.9)
CM2	291670	91773	Roadside		99	1	4	0 (19.2)	0	1

Notes:

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

Exceedances of the PM$_{10}$ 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

Exeter City Council

Table A.8 – Annual Mean PM$_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
CM1	291939	92830	Kerbside		54.8		10	8.6	8.4	11.1 (12.7 annualised)
CM2	291670	91773	Roadside		99	9	9.5	6.8	7.5	9

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22 (annualised data in brackets)**

Notes:

The annual mean concentrations are presented as µg/m^3.

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

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

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

Exeter City Council

Figure A.3 – Trends in Annual Mean PM$_{2.5}$ Concentrations
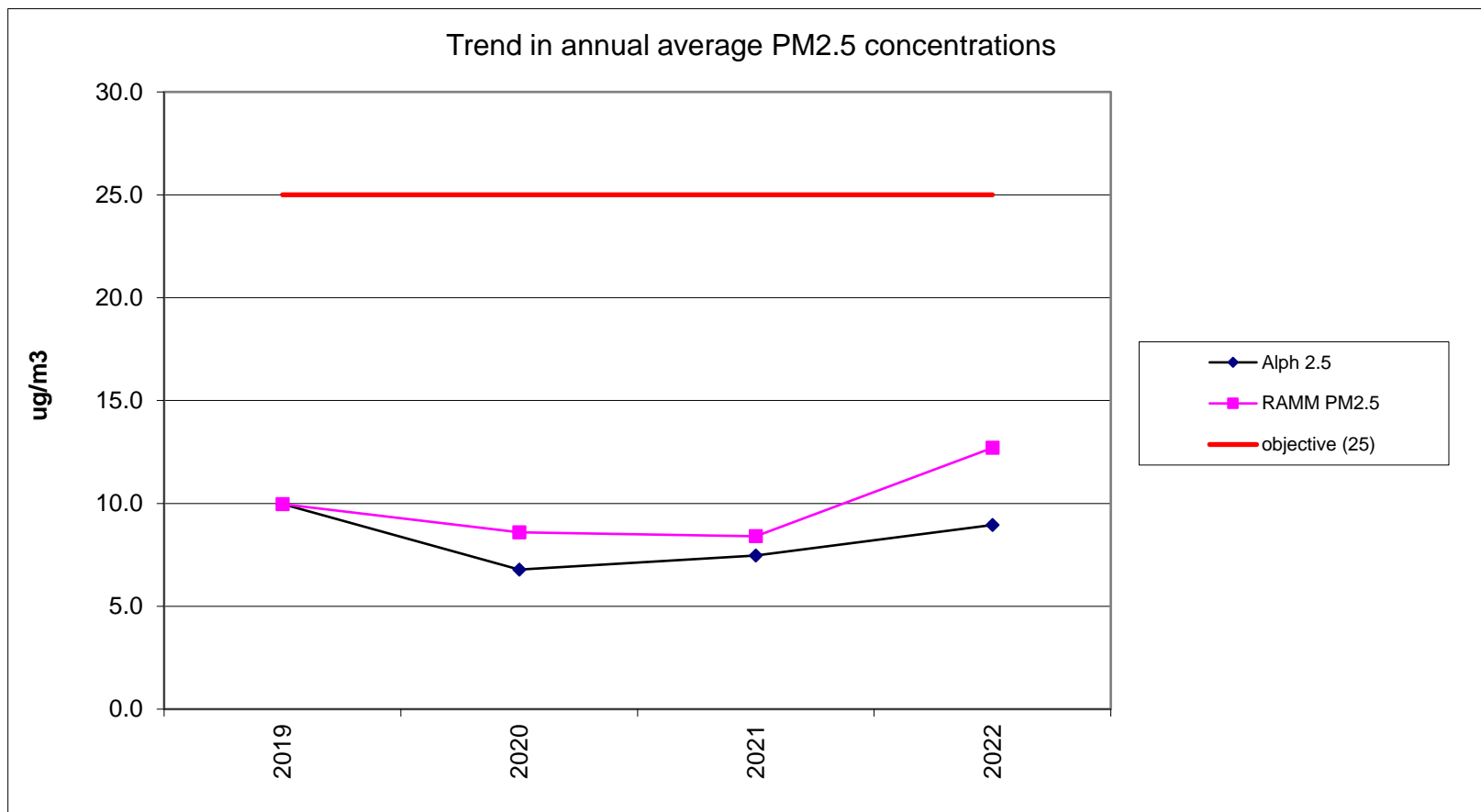
This figure presents PM$_{2.5}$ annual mean concentrations for the two monitoring sites in Exeter between years 2019 and 2022. There are no exceedances of the annual mean objective in 2022 although concentrations have increased since 2021. There is no clear trend over the four year period.

Exeter City Council

Table A.9 – O₃ 2022 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018 O_3 8-hour mean > 100 ($\mu g/m^3$)	2019 O_3 8-hour mean > 100 ($\mu g/m^3$)	2020 O_3 8-hour mean > 100 ($\mu g/m^3$)	2021 O_3 8-hour mean > 100 ($\mu g/m^3$)	2022 O_3 8-hour mean > 100 ($\mu g/m^3$)
CM1	291939	92830	Kerbside		97.1	12	11	87	0	0

Notes:

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

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

Exeter City Council

Figure A.4 – Trends in Annual Mean O₃ Concentrations

Trend in annual average ozone concentration
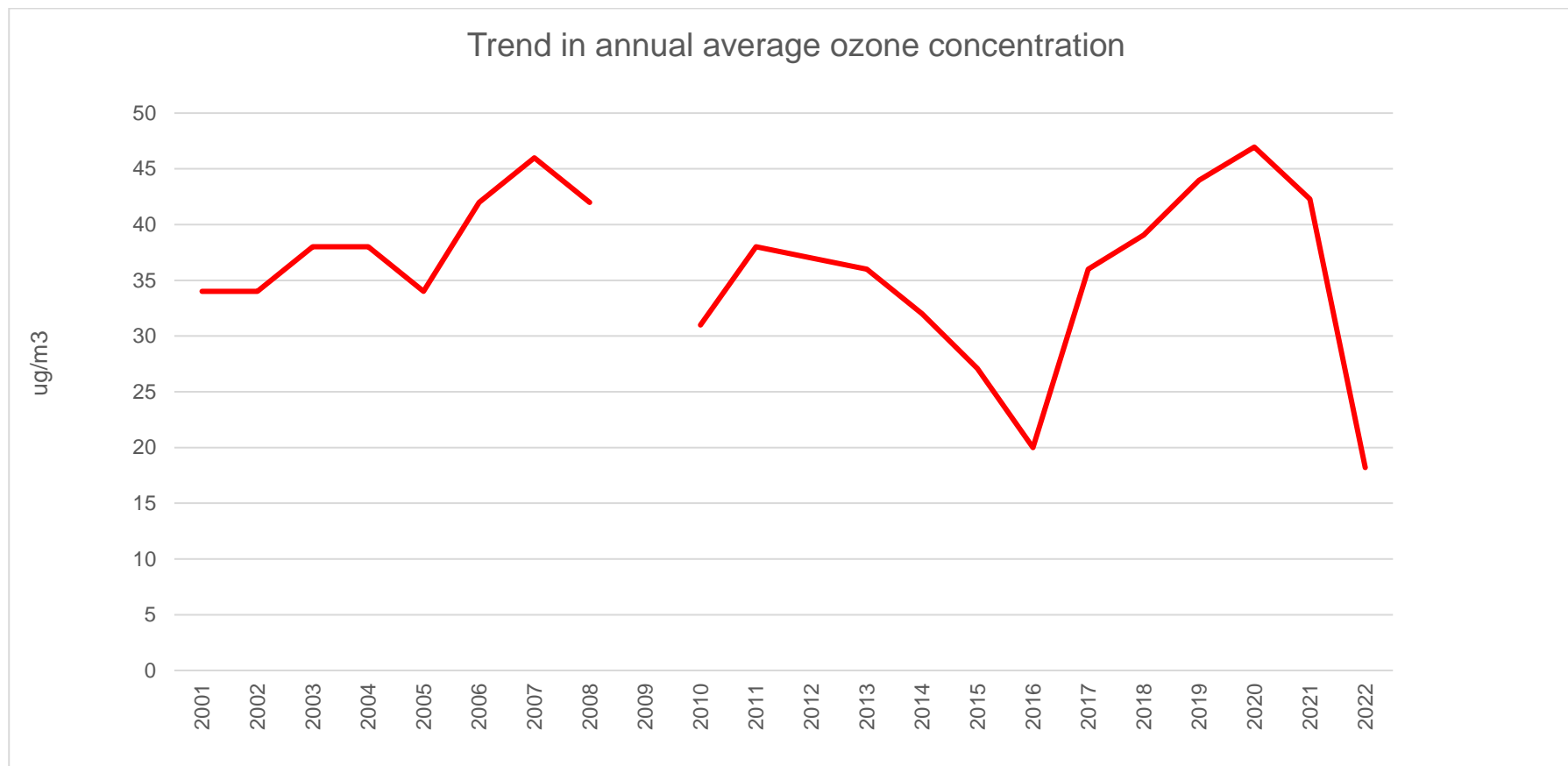
This figure presents O₃ annual mean concentrations between years 2001 and 2022. (Note that there is no local air quality objective for annual mean O₃ concentrations so this data is presented for information only). There is no clear trend over the entire period although concentrations have fallen since 2020.

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO$_2$ 2022 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT1	292199	92814	32.5	12.3	23.6	20.1	17.5	13.9	15.0	19.2	17.5	18.6	24.6	29.1	20.3	15.8	-	
DT2	292315	93016	32.4	27.1	26.2	23.6	19.8	18.4	17.6	22.5	22.7	25.9	31.4	29.1	24.7	19.2	-	
DT3	292185	93049	31.5	28.5	26.4	21.5	22.7	20.9	22.6	24.3		26.2	33.1	30.0	26.2	20.3	-	
DT4	291779	93011	31.7	21.7	16.6	20.8	16.1		16.0	18.8	20.4	21.3	26.4	26.9	21.5	16.7	-	
DT5	291944	92826	32.9	18.6	27.8	22.1	16.8	17.9	18.4	22.4	24.6		24.2	29.2	-	-	-	Duplicate Site with DT5 and DT6 - Annual data provided for DT6 only
DT6	291944	92826	34.2	19.9	27.5	21.0	17.8	17.6	18.6	24.2	22.0		21.5	28.7	23.1	17.9	-	Duplicate Site with DT5 and DT6 - Annual data provided for DT6 only
DT7	291984	92626	31.6	37.8	24.0	20.6	15.9	16.7	16.2	21.2	20.6	22.4	27.3	27.9	23.5	18.2	-	
DT8	291895	92569		29.9	31.4	30.5	26.5	28.4	30.2	30.8	33.6	31.2	35.3	34.8	31.1	24.1	-	
DT9	291943	92511	36.7	24.7	28.2	22.9	24.1	22.4	22.9	24.1	27.2	25.5	30.8	31.6	26.8	20.7	-	
DT10	291833	92433	37.2	24.9	31.6	24.3	20.9	20.8	21.4	26.0	27.2	29.0	30.3	29.5	26.9	20.9	-	
DT11	292291	92292	40.9	28.3	31.0	28.2	21.9	21.7	22.6	28.6	27.1	30.0	34.4	36.3	29.2	22.7	-	
DT12	292422	92320	44.1	28.5	29.2	25.0	23.3		22.2	26.0	25.4	25.1	42.2	36.5	29.8	23.1	-	
DT13	292590	92743	29.9	19.5	23.5	18.7	13.6	12.1	13.8	18.1	18.5	19.7	23.3	26.2	19.7	15.3	-	
DT14	292832	92731	30.6	15.5	21.4	19.0	14.1	13.5	14.3	18.0	19.0	17.0	20.8	24.9	19.0	14.7	-	
DT15	292703	92807		28.8	37.9	33.0	24.0	26.0	26.1	32.5	33.0	29.9	34.9	36.2	31.1	24.1	-	
DT16	292378	92039	41.3	26.3	31.5	26.3	22.9	23.3	24.1	27.4	27.9	26.1	31.9	32.3	28.4	22.1	-	
DT17	291699	92091	29.4	21.8	20.7	19.1	16.4	15.7	15.5	18.4	16.5	19.6	25.7	25.7	20.4	15.8	-	
DT18	291657	91973	30.0	22.7	22.6	19.6	18.2	15.4	20.0	22.9	23.3	23.3	27.2	27.2	22.7	17.6	-	

Exeter City Council

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT19	291669	91812	43.8	35.5	46.4	43.9	35.5	37.0	42.3	52.1	45.2	42.1	47.6	45.1	43.0	33.4	-	
DT20	291532	91349	39.5	34.0	29.4	29.1	25.8	25.9	29.2	32.5	31.9	30.5	36.4	34.3	31.5	24.5	-	
DT21	291460	91390	16.3	10.6	16.4	13.1	8.6	8.6	9.6	13.4	12.4	13.3	15.5	19.5	13.1	10.2	-	
DT22	291509	91151	29.5	21.2	34.2	28.3	20.2	21.5	23.0	31.3	26.2		30.2	29.3	26.8	20.8	-	
DT23	291518	90813	28.3	18.2	32.5	24.0	18.5	19.9	20.1	25.2	23.3	25.5	24.7	30.7	24.2	18.8	-	
DT24	291691	90425	31.5	22.3	28.1	23.0	19.0	19.3	19.0	25.4	24.5	22.1	25.0	29.0	24.0	18.6	-	
DT25	291767	90160	34.3	30.6	27.5	24.4	23.0	23.8	23.0	27.2	25.4	27.7	28.7	30.6	27.2	21.1	-	
DT26	291520	90531	39.6	32.4	28.5	27.4	25.6	25.8	25.8	28.1	23.4	27.5	36.6		29.2	22.6	-	
DT27	290864	91725	40.9	39.6	39.3	35.9	34.0	33.9	34.2	39.9	36.4	42.6	49.9	42.8	39.1	30.3	-	
DT28	291249	91874	31.6	18.4	25.2	23.2	17.8	17.2	17.7	24.1	22.6	22.0	26.0	27.1	22.7	17.6	-	
DT29	291376	91944	42.9	35.2	36.0	38.9	31.1	30.6	31.0	42.8	36.9	41.6	42.0	38.1	37.3	28.9	-	
DT30	291500	92055	45.6	36.3		32.5		28.1	30.3	35.1	33.6	32.5	38.4		34.7	26.9	-	
DT31	291351	92169	29.3	22.7	27.2	23.6	20.2	20.4	20.9	24.9	24.4	23.5	28.4	26.7	24.3	18.9	-	
DT32	290826	93598	30.0	27.9	29.2	24.2	22.4	20.5	22.1	25.5	23.3	29.1	32.7	30.0	26.4	20.5	-	
DT33	291253	93299	40.1	28.0	28.9	28.0	24.4	22.4	23.8	26.8	29.8	24.7	33.4	30.2	28.4	22.0	-	
DT34	291242	93483	44.8	36.2	37.4	36.0	34.4	33.1	36.5	39.1	40.3		47.6	38.8	38.6	29.9	-	
DT35	291272	93468	33.9	34.3	30.8	27.0	27.1	27.1	28.3	29.7	28.4	32.1		31.0	30.0	23.2	-	
DT36	291054	94399	39.8	36.1	37.1	30.8	27.6	26.8	29.2	32.8	33.1	38.7	46.7	33.7	34.4	26.6	-	
DT37	292391	93291	38.3	26.2	33.2	25.2	23.3	19.1	21.5	27.9	26.4	30.1	32.3	33.5	28.1	21.8	-	
DT38	292469	93245	33.1	26.1	29.6	23.3	23.7		21.2	23.2	23.7	26.6	32.6	33.0	26.9	20.9	-	
DT39	292579	93146	51.9	34.0	39.7	37.0	28.2		28.0	31.2	31.9	32.7	40.8	41.8	36.1	28.0	-	

Exeter City Council

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT40	293047	93877	32.9	20.4	29.8	22.9	20.2	17.8	20.4	26.1	23.9	29.4	29.0	28.1	25.1	19.4	-	
DT41	293405	93395	26.1	33.0	31.1	27.5	24.5	23.4	23.8	28.8	27.6	32.1	36.8	33.1	29.0	22.5	-	
DT42	293251	93375	45.3	36.2	40.7	35.3	32.7	30.5	32.3	38.9	35.4	37.0			36.4	28.2	-	
DT43	293227	93356	39.1	28.7	26.7	23.1	21.4	21.1	20.2	24.2	25.4	26.0	30.8	35.1	26.8	20.8	-	
DT44	295068	94487	23.7	19.0	18.1	15.1	14.5	13.1	13.9	15.7	16.2	18.4	22.8	21.3	17.7	13.7	-	
DT45	295888	94101	26.1	18.4	21.7	18.3	18.4	16.6	15.3	18.2	17.3	20.1	24.6	23.2	19.8	15.4	-	
DT46	296418	94470	33.7		20.5	20.6	21.3	19.9	20.5	20.8	22.5	23.9	32.4	30.3	24.2	18.8	-	
DT47	296984	94327	19.5	15.5		17.3	12.8	12.9	13.1	18.3	14.3	17.5	19.5	21.1	16.5	12.8	-	
DT48	296494	93782	25.2	16.9	19.3	15.7	14.2	12.7	12.5	18.1	16.8	20.2	25.0	25.7	18.5	14.4	-	
DT49	295413	93689	29.9	17.8	46.9	18.5	13.2	11.6	12.1	18.3	16.1	16.6	21.4	24.6	20.6	16.0	-	
DT50	293091	92825	21.5	12.8	15.6	12.2	10.0	8.3	8.8	11.2	11.7	13.7	16.9	20.2	13.6	10.5	-	
DT51	293448	92419	55.3	31.1	47.1	36.8	27.2	26.4	27.3	39.1	35.5	33.2	33.9	37.6	35.9	27.8	-	
DT52	293418	92497	54.9	49.1	39.3	37.8	36.3	34.5	38.3	37.9	39.2	40.1	50.2	45.2	41.9	32.5	-	
DT53	293533	92473	49.9	38.8	39.7	33.4	27.7	27.8	28.3	32.8	34.9	33.6	39.2	37.6	35.3	27.4	-	
DT54	293738	92396	52.6	48.5	43.4	40.9	41.4	38.8	37.4	44.4	38.0	47.2	48.6	41.3	43.5	33.8	-	
DT55	293781	92409	36.6	25.2	27.7	26.3	23.7	19.7	20.5	26.5	26.1	27.0	31.2	32.3	26.9	20.8	-	
DT56	294043	92359	48.9	44.2	37.7	33.9	35.5	34.8	34.1	40.3	31.4	46.1	47.6	41.4	39.7	30.8	-	
DT57	294410	92310	56.6	58.4	49.2	53.0	54.3	46.8	47.2	54.4	48.4	51.8	58.4	50.7	52.4	**40.6**	-	
DT58	295203	92378	45.9	45.9	43.1	39.1	34.6	35.3	36.3	41.5	39.4	39.8	47.8	45.7	41.2	31.9	-	
DT59	295191	92395	26.9	18.0	22.7	18.4	13.7	13.7	14.5	20.2	16.4	18.8	23.4	24.8	19.3	15.0	-	
DT60	295466	92365	40.1	30.2	38.9	36.0	26.5	26.5	25.1	34.9	30.2	30.9	33.3	37.7	32.5	25.2	-	

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DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT61	295636	92232	30.4	20.5	27.5	21.5	19.1	16.7	19.9	21.8	21.7	22.8	25.8	25.0	22.7	17.6	-	
DT62	295710	90571	26.3	14.8	21.0	16.9	13.7	11.5	13.7	19.4	17.1	15.6	18.9	23.7	17.7	13.7	-	
DT63	294694	90001		24.8	15.4		18.2	19.4	21.2	22.5	23.5	24.0	27.8	28.4	22.5	17.5	-	
DT64	294652	89974	32.7	17.0	21.0	19.2	14.1	14.1	15.9	19.9	20.1	18.5	23.1	27.3	20.2	15.7	-	
DT65	296415	88477	35.4	19.0	28.4	24.1	19.6	18.9	20.8	27.8	24.5	20.9	23.0	29.0	24.3	18.8	-	
DT66	294227	90435	46.2	34.6	36.8	33.1	27.1	31.9	32.4	38.7	36.6	37.5	42.4	37.9	36.3	28.1	-	
DT67	293213	91245	31.6	19.8	31.8	24.4	19.9	19.2	20.7	25.8	23.4	27.5	26.5	28.1	24.9	19.3	-	
DT68	292291	91678	21.0	11.8	9.3	12.8	9.0	7.6	9.4	11.4	13.2	13.5	15.9	19.3	12.9	10.0	-	
DT69	291016	91304	19.6	9.0	15.2	10.5	6.8	7.2	7.1	10.4	10.4	11.2	12.9	18.1	11.5	8.9	-	
DT70	291298	92593	27.3	12.4	22.1	17.2	13.2	12.6	14.6	19.3	19.7	16.9	19.2	21.7	18.0	14.0	-	
DT71	294387	92611	17.0		12.0	9.3			1.8		15.0	10.9	21.6	15.7	12.9	8.8	-	
DT72	293617	93090	23.5	13.6		11.7	10.2	9.1	9.4	11.7	12.9	14.1	17.2	17.2	13.7	10.6	-	
DT73	293052	94185	15.5	9.6	12.9	8.5	6.6	6.2	5.9	7.8	8.2	12.2	13.0	15.7	10.2	7.9	-	
DT74	292056	93043		11.8	14.1	11.0			8.2	10.5	10.8				11.1	8.4	-	
DT75	291721	89727	25.3	13.9	19.8	15.7	11.2	10.9	12.8	17.1	15.1	15.4	17.1	22.7	16.4	12.7	-	
DT76	291555	90449	23.4	13.9	16.4	14.8	10.8		10.7	9.6	13.6	11.0	17.1	19.8	14.6	11.3	-	
DT77	292553	93082	38.7	26.1	27.7	23.8	22.6	19.8	20.9	23.7	23.6	27.9	33.1	31.2	26.6	20.6	-	
DT78	296415	94165	22.2	16.8	18.5	16.2	13.4	12.6	12.4	16.0	13.3	17.0		20.9	16.3	12.6	-	
DT79	296827	93886	25.6	17.3	23.4	19.9	14.3	14.1	14.0	20.7	17.8	20.6	24.0	28.5	20.0	15.5	-	
DT80	295967	88876	32.2	19.8	25.1	20.2	15.6	13.2	15.7	21.3	21.5	23.4	24.3	26.6	21.6	16.7	-	
DT81	292637	91991	26.6	14.4	18.4	13.9	11.3	10.9	11.0	13.4	14.4	14.2	18.9	22.2	15.8	12.2	-	

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DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.78	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT82	292847	92911	23.6	17.9	16.3	13.3	10.4	8.8	10.0	12.3	13.4	15.9	20.5	24.6	15.6	12.1	-	
DT83	291655	92258	39.1	28.0	32.1			20.3	23.5	27.9	28.8	27.6	31.1	33.6	29.2	22.6	-	
DT84	291897	92217	32.3	19.5	21.5	20.4	15.0	14.6	16.5	19.0	22.3	16.0	19.1	23.9	20.0	15.5	-	
DT85	291375	92935	44.6	39.3	37.8	31.8	29.6	29.1	31.2	35.2	35.2	31.6	37.9	36.5	35.0	27.1	-	

☒ **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.TG22.**

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **Exeter City Council confirm that all 2022 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.

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

New or Changed Sources Identified Within Exeter During 2022

Exeter City Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Exeter City Council During 2022

Exeter City Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Exeter City Council uses Gradko diffusion tubes (20% TEA in water). Gradko laboratories (GRADKO International Ltd., St. Martins House, 77 Wales Street, Winchester, Hants. SO23 0RH) hold UKAS accreditation, follow the procedures set out in the Harmonisation Practical Guidance and their performance was satisfactory in the centralised AIR NO_2 PT scheme for quality assurance and quality control.

The tube exposure period used generally follows the Diffusion Tube Monitoring Calendar provided by the Air Quality Support Helpdesk, i.e. an exposure time of 4 or 5 weeks, with an allowed variation in exposure time of $\pm$ 2 days. During 2022, the monitoring was completed in adherence with the 2022 Diffusion Tube Monitoring Calendar.

The tubes are stored in a fridge before they are exposed. Location sites and fixings follow the recommendations in the DEFRA practical guidance on the use of diffusion tubes for NO_2 monitoring, published in 2008. Two tubes are collocated with the continuous analyser at the Royal Albert Memorial Museum (RAMM), Queen Street (Exeter Roadside).

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Data from the tubes are ratified and suspect data rejected by Exeter City Council, following the procedure in the DEFRA practical guidance. Random checks of the data in the reporting spreadsheet are also undertaken to ensure that no mistakes were made when inputting the data. Analysis of the data from the two tubes that are co-located with the continuous analyser shows that these have overall good precision.

Diffusion Tube Annualisation

Data capture from the diffusion tubes at Heavitree pleasure Grounds (DT71) and Northernhay Gardens (DT74) were below 75% (67% and 48% respectively) so these have been annualised using the LAQM Diffusion Tube Data Processing Tool. Annualisation factors were gained using data from nearby AURN sites Exeter Roadside, Honiton and Plymouth Centre. Details of the calculation method undertaken are provided in Table C.1.

Table C.1 – Annualisation Summary (concentrations presented in µg/m³)

Site ID	Annualisation Factor Exeter Roadside	Annualisation Factor Honiton	Annualisation Factor Plymouth Centre	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
DT71	0.8941	0.8258	0.9217	-	0.8805	12.9	11.4
DT74	1.0358	0.8808	1.0241	-	0.9802	11.1	10.8

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.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. 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.

Exeter City Council have applied a local bias adjustment factor of 0.77 to the 2022 monitoring data. This means that the diffusion tubes over-estimate actual concentrations when compared to the reference method. This factor is derived from the co-located diffusion tubes at the RAMM continuous analyser (CM1). The national bias adjustment

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factor is similar, at 0.83, which has been obtained from the spreadsheet version 03/22, for Gradko diffusion tubes (20% TEA in water).

The local factor was chosen because the Exeter RAMM co-located tubes show good overall precision and data capture and are thought to be representative of local conditions.

A summary of bias adjustment factors used by Exeter City Council over the past five years is presented in

Table C.2. This has always been the local factor, except in 2018 and 2021 when data capture for the continuous analyser was low.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	0.77
2021	National	03/22	0.84
2020	Local	-	0.74
2019	Local	-	0.89
2018	National	03/19	0.93

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	11				
Bias Factor A	0.77 (0.74 - 0.81)				
Bias Factor B	29% (23% - 35%)				
Diffusion Tube Mean (µg/m³)	23.1				
Mean CV (Precision)	3.7%				
Automatic Mean (µg/m³)	17.8				
Data Capture	98%				
Adjusted Tube Mean (µg/m³)	18 (17 - 19)				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2022 diffusion tube results.

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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.

No diffusion tube NO$_2$ monitoring locations within Exeter required distance correction during 2022.

QA/QC of Automatic Monitoring

Neither of the two PM analysers are part of the national network, however recommended QA/QC procedures from the AURN Local Site Operator's manual are followed. Horiba also service each analyser every six months.

Live PM10 and PM2.5 data is available at this page.

The PM data is collected, validated and ratified by Exeter City Council. Validation involves checking the data daily for instrumentation errors etc. and then visually screening the data on a weekly basis to mark any obviously spurious or unusual measurements. The Council also undertakes data ratification on an approximately three monthly basis as well as following site services. This involves:

- o Comparison of data with other pollutants and other appropriate AURN network sites (roadside sites and other sites in the south west),
- o Final checking and deletion of data marked as possibly erroneous,
- o Removal of data from unrepresentative periods of operation (e.g. road works in immediate vicinity of site etc. where data is shown or believed to have been affected),
- o Adjustment for issues identified during services etc.

The NO$_2$ data from Exeter Roadside is collected and ratified by the AURN. Network data from the site can be found at this link. It is ratified every 3 months by NETCEN, and is reported in the QA / QC Data Ratification Report for the Automatic Urban Network. Data capture from the NO$_2$ analyser was 97.2% in 2022.

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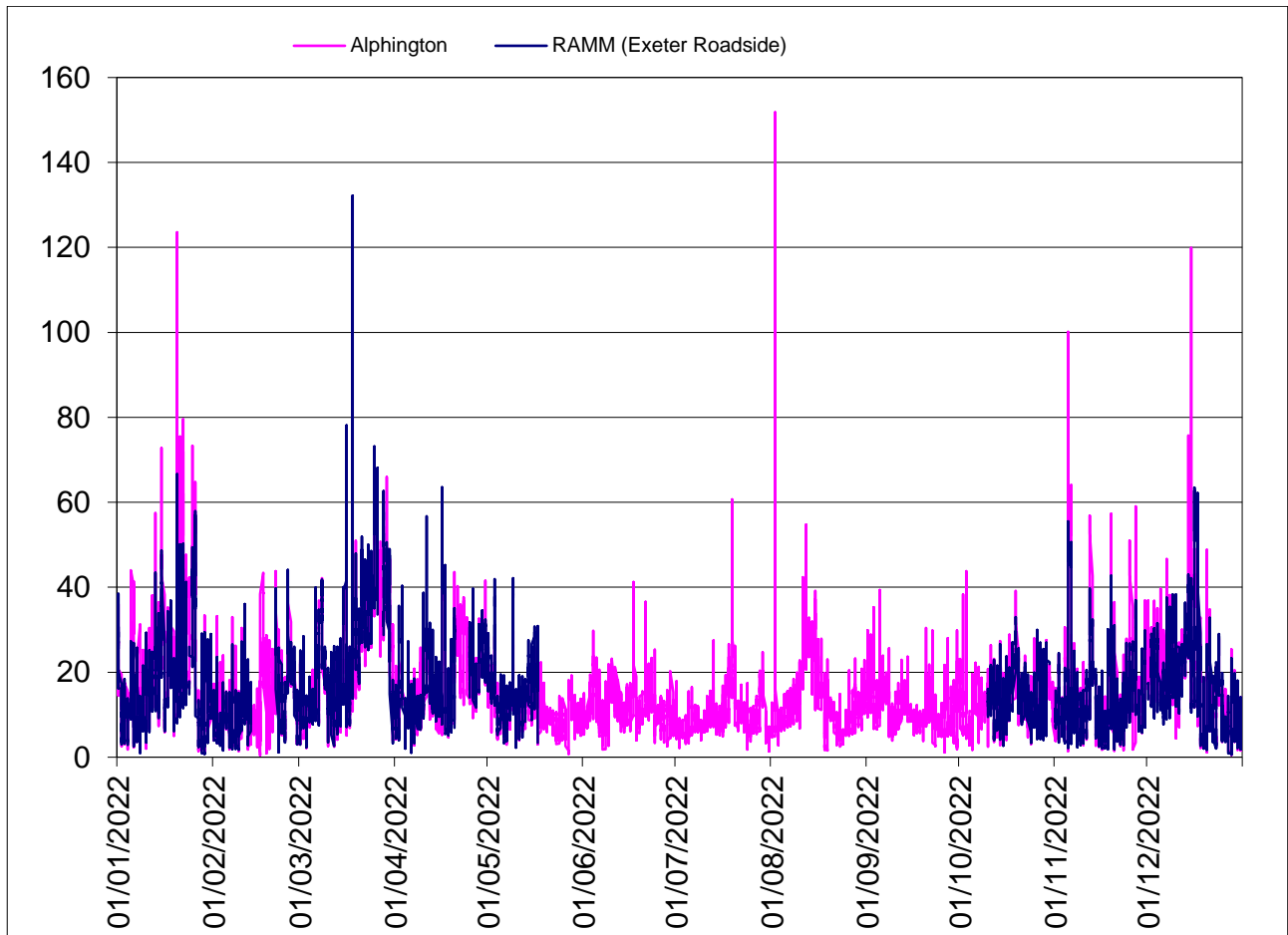Plots of hourly average values for nitrogen dioxide, PM$_{10}$ and PM$_{2.5}$ are shown below in figures C.1, C.2 and C.3.

Figure C.1   Hourly NO$_2$ data from Exeter Roadside (RAMM) (μg/m^3)
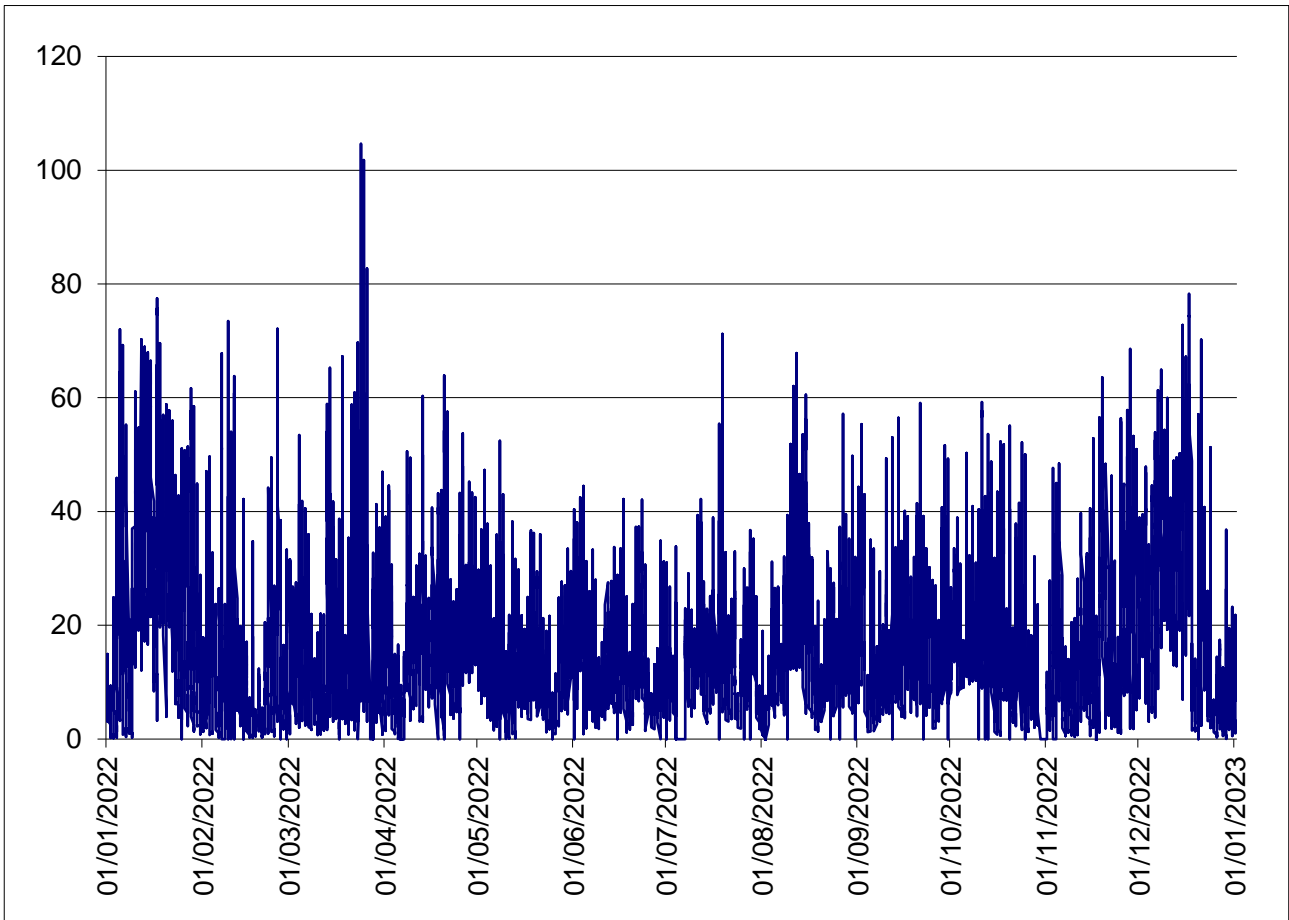
This graph shows the hourly NO$_2$ data from the RAMM continuous analyser.
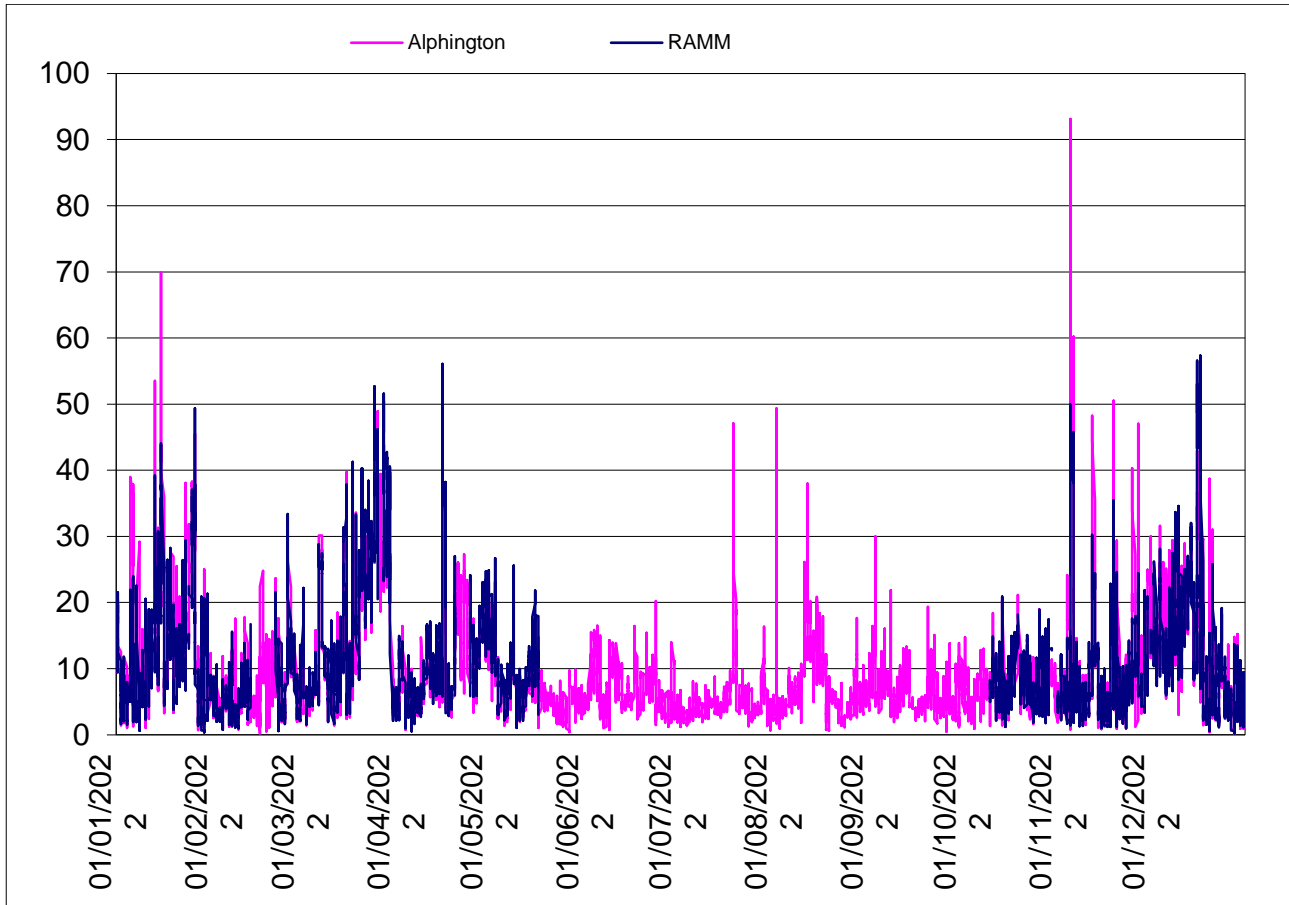
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Figure C.2   Hourly PM$_{10}$ data from Exeter Roadside (RAMM) and Alphington Street (μg/m^3)

This graph shows the hourly PM$_{10}$ data from the RAMM and Alphington Street continuous analysers.

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Figure C.3　Hourly PM$_{2.5}$ data from Exeter Roadside (RAMM) and Alphington Street (μg/m^3)

This graph shows the hourly PM$_{2.5}$ data from the RAMM and Alphington Street continuous analysers.

PM$_{10}$ and PM$_{2.5}$ Monitoring Adjustment

The type of PM$_{10}$/PM$_{2.5}$ monitors utilised within Exeter City Council do not require the application of a correction factor.

Automatic Monitoring Annualisation

Data capture from the PM10 and PM2.5 continuous analyser at RAMM (Exeter Roadside CM1) was below 75% (55%) so these have been annualised using the method described in the Technical Guidance. Annualisation factors were gained using data from Alphington Street and from nearby AURN sites at Saltash Callington Road and Plymouth Centre for PM10. For the annualisation of PM2.5, Christchurch Barrack Road was also used. The sites chosen were identified as being within 50 miles of CM1, and with a data capture of over 75%. The lack of sites meeting these criteria means that both urban background

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(Plymouth Centre) and urban traffic (Alphington Street, Saltash and Christchurch) sites had to be used. A non-AURN site (Alphington Street) was included because of its local relevance. The annualisation factors for each site chosen are similar for all the sites except Saltash (PM2.5 only). Details of the calculation method undertaken are provided in Tables C.4 and C.5.

Table C.4 – PM10 Annualisation Summary (concentrations presented in µg/m³)

Site ID	Annualisation Factor Plymouth Centre	Annualisation Factor Saltash Callington Road	Annualisation Factor Alphington Street	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
CM1	1.13	1.10	1.13	-	1.12	17.1	19.2

Table C.5 – PM2.5 Annualisation Summary (concentrations presented in µg/m³)

Site ID	Annualisation Factor Plymouth Centre	Annualisation Factor Saltash Callington Road	Annualisation Factor Alphington Street	Annualisation Christchurch Barrack Road	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
CM1	1.19	1.05	1.20	1.21	1.15	11.1	12.69

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.
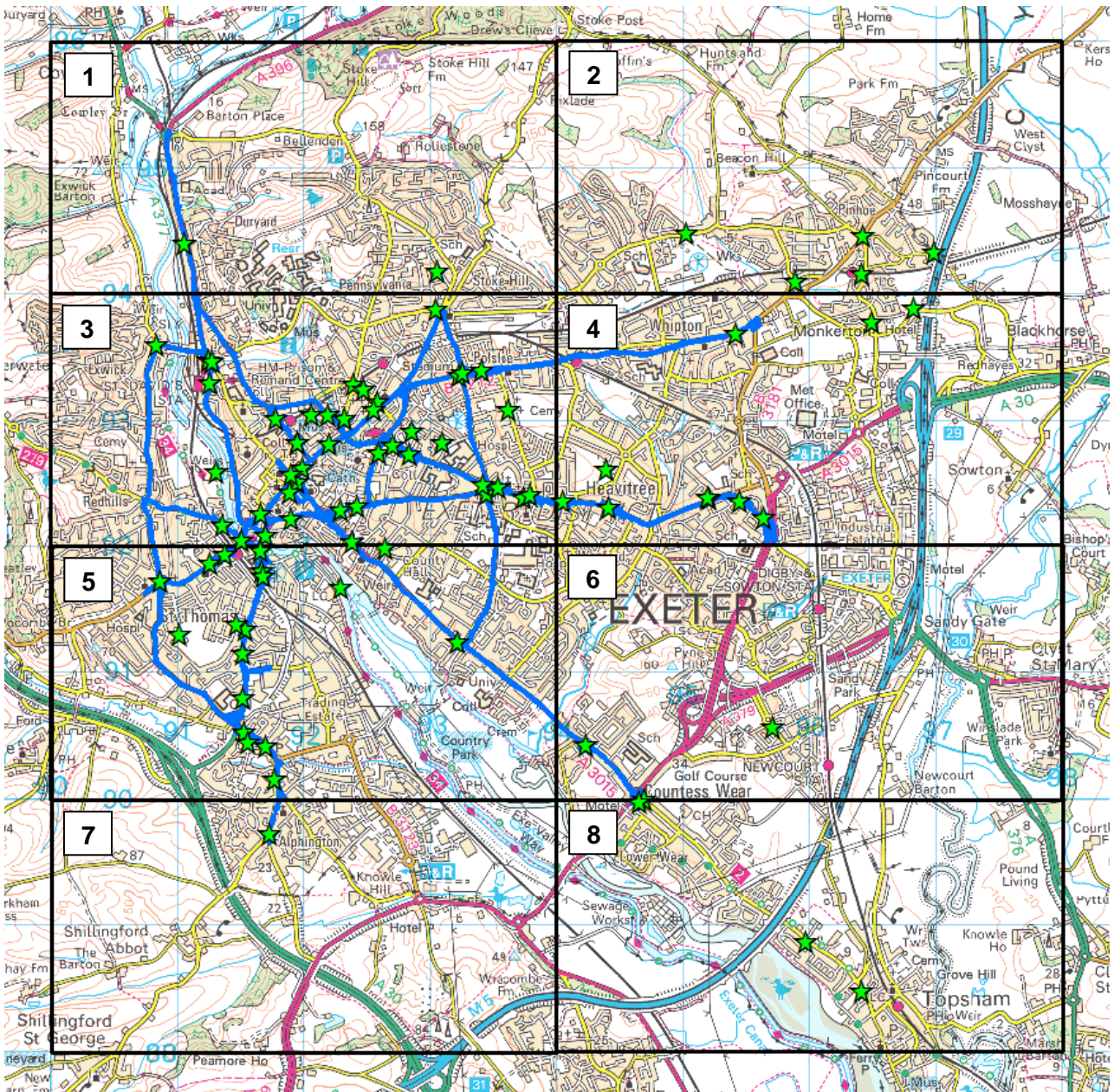
No automatic NO₂ monitoring locations within Exeter required distance correction during 2022.

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

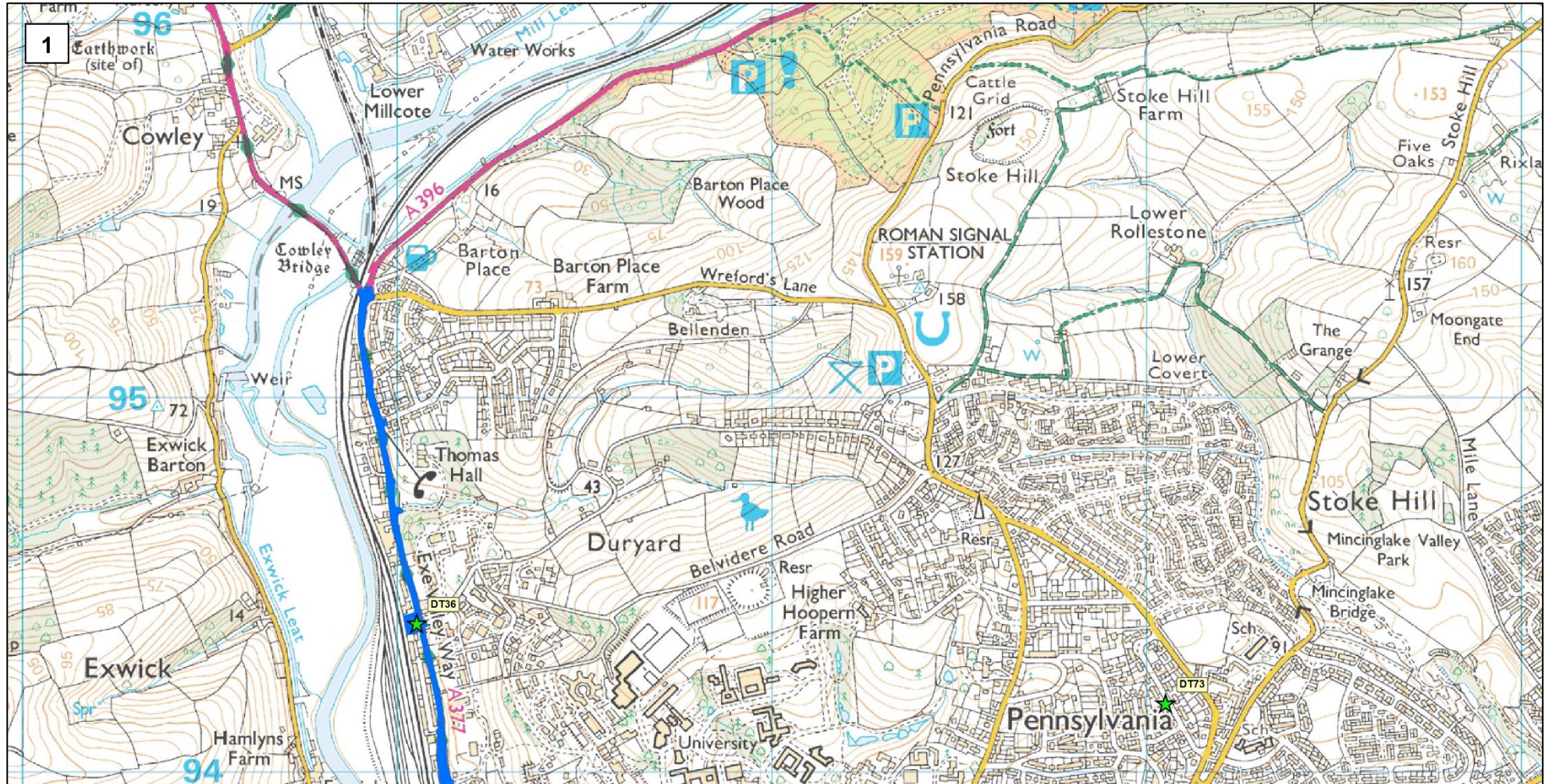Figure D.1 – Map of Non-Automatic Monitoring Site

The monitoring locations and 2022 data can also be viewed using an online map here.
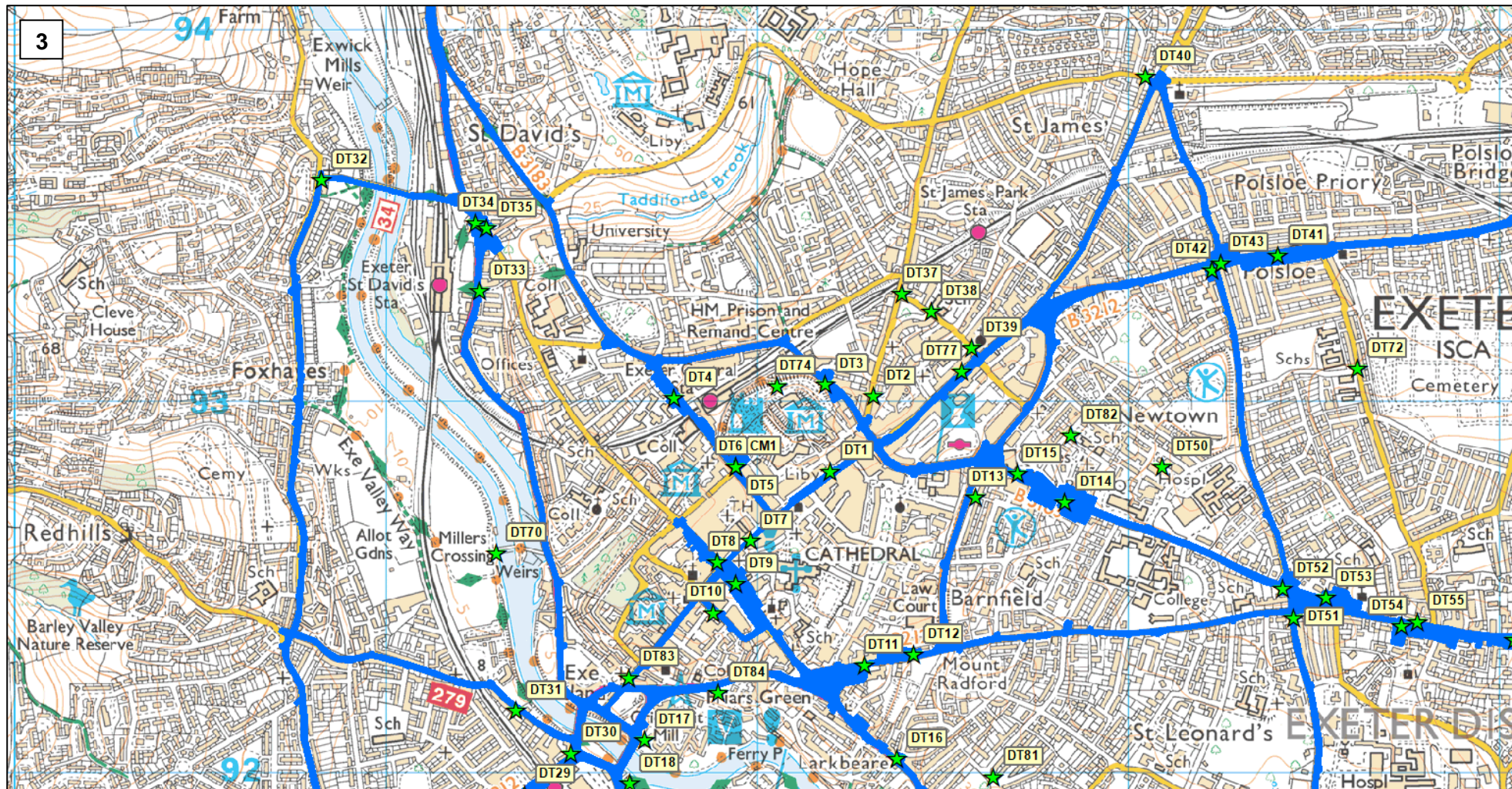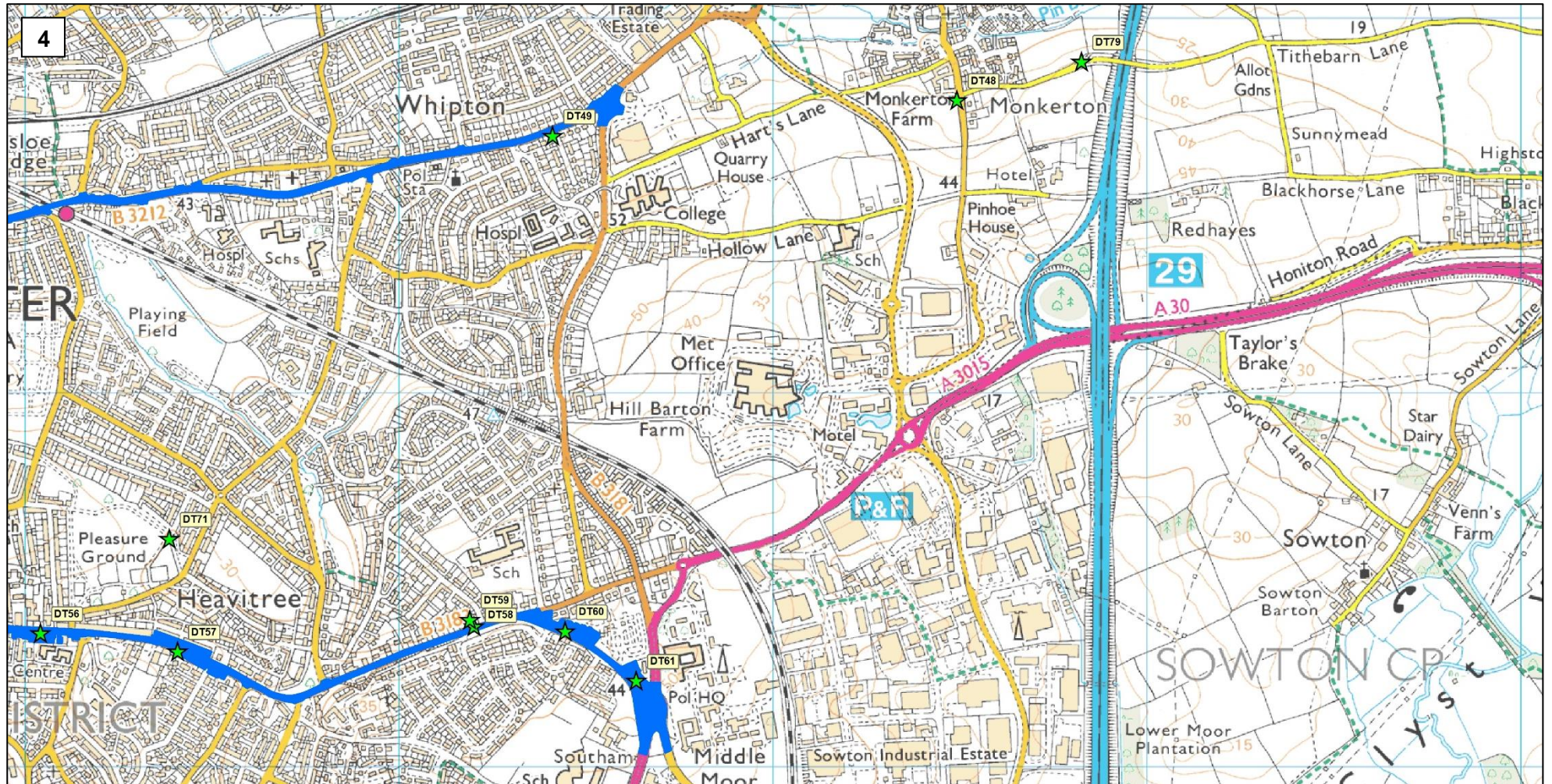
Monitoring location = ★
AQMA = ▬

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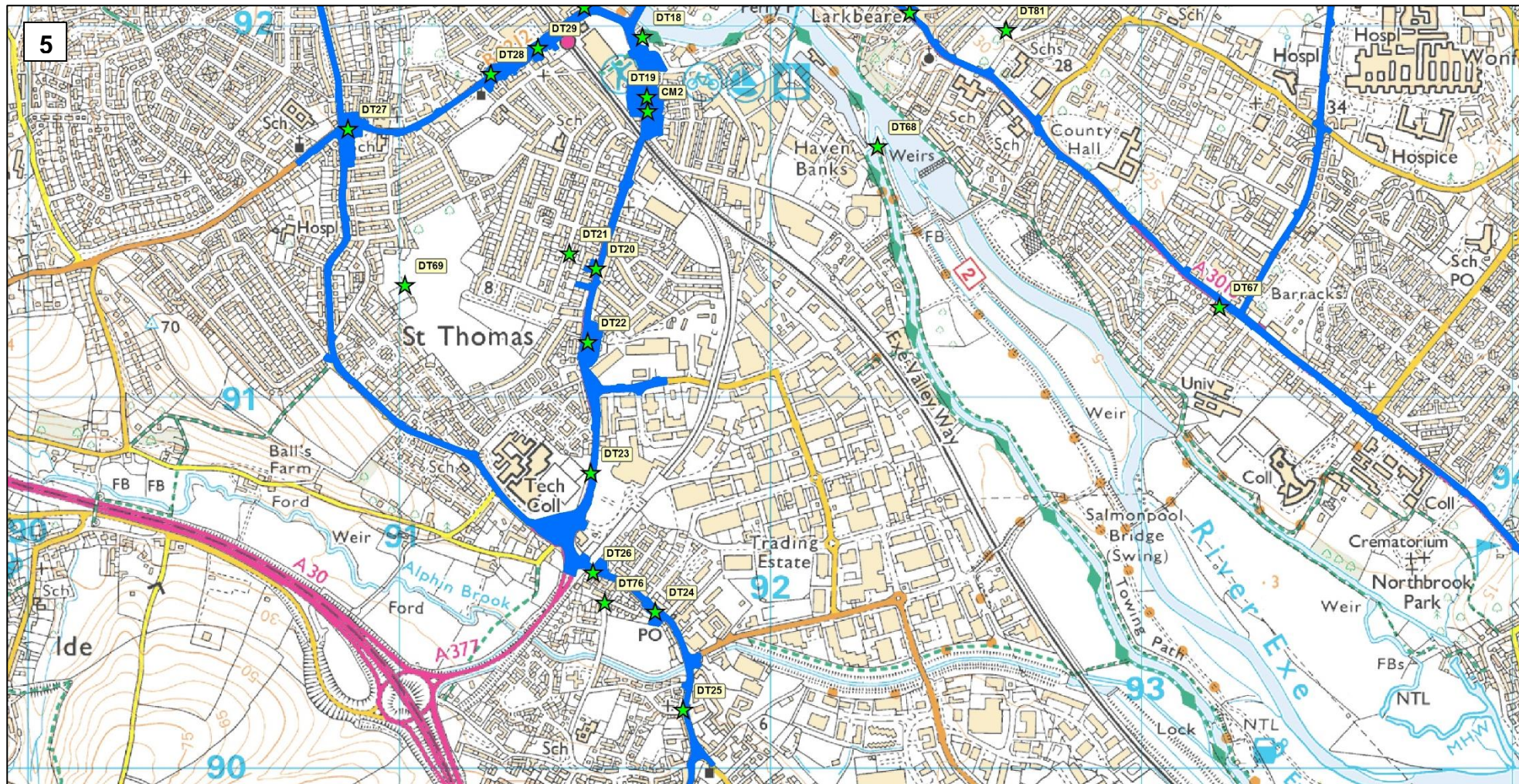
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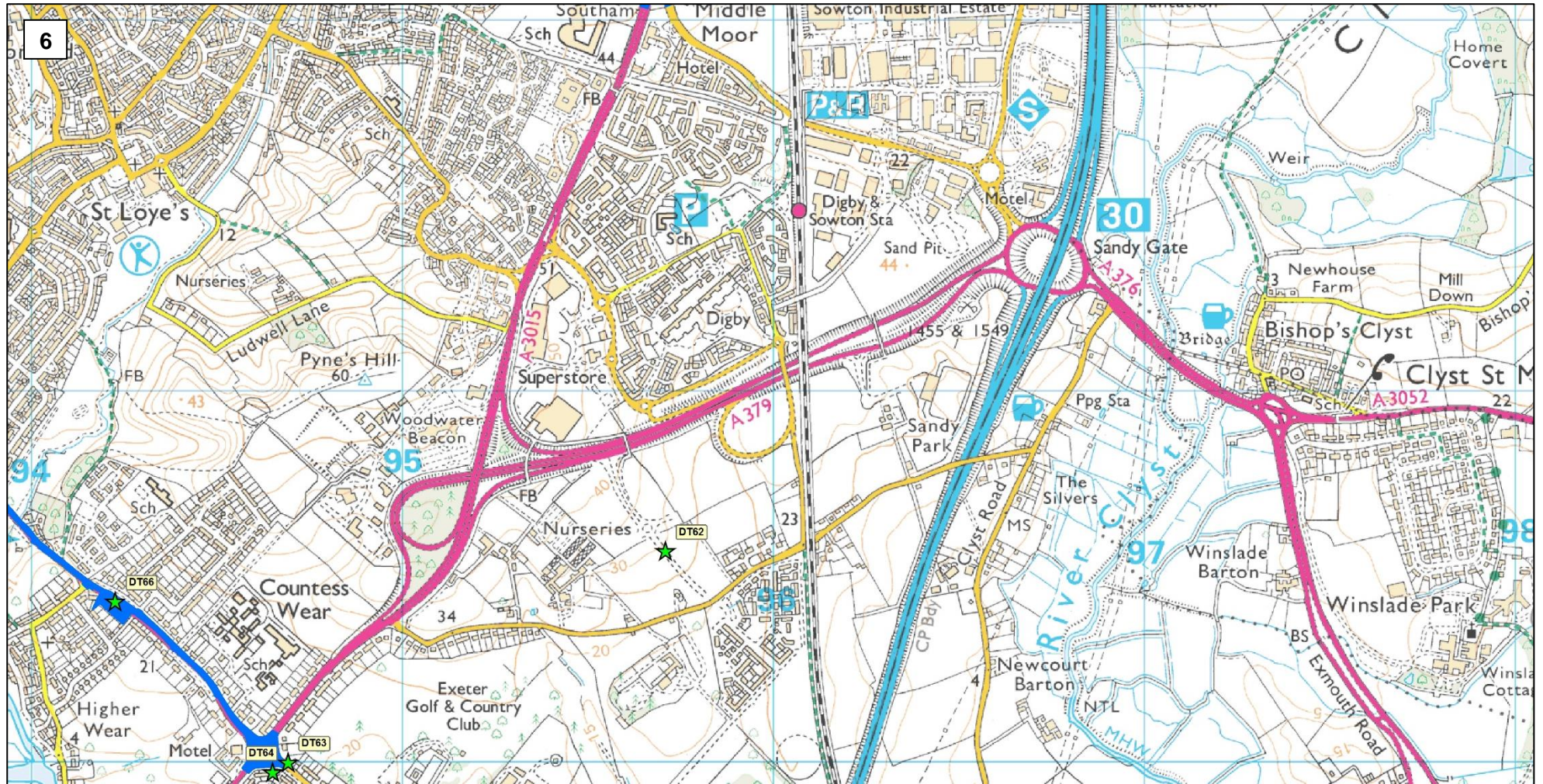
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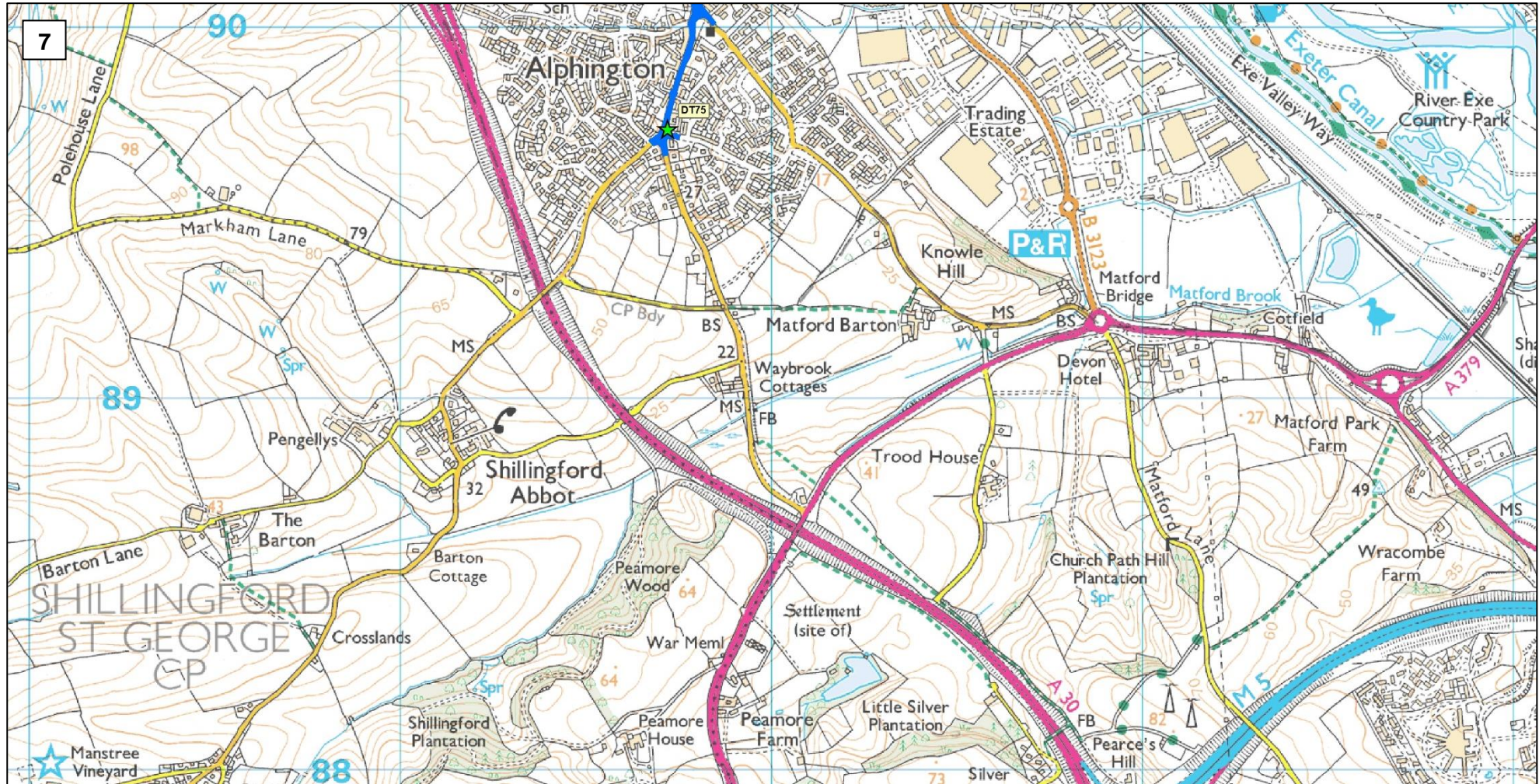
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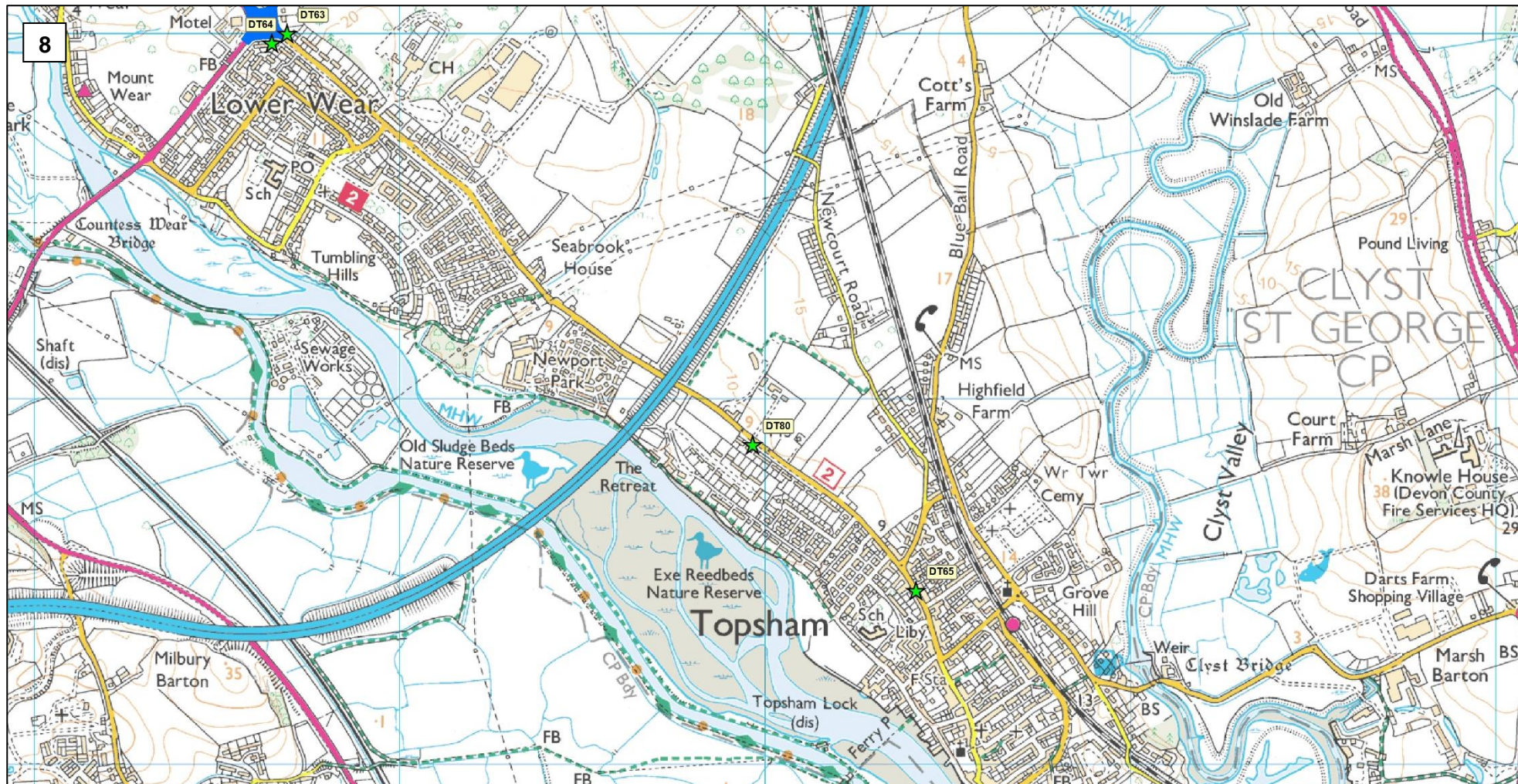
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Appendix E: Summary of Air Quality Objectives in England

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

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

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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
O_3	Ozone
DCC	Devon County Council
ECC	Exeter City Council
GESP	Greater Exeter Strategic Plan
ECF	Exeter City Futures
SELDP	Sport England Local Delivery Pilot

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References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.

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- Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users 2008
- National bias adjustment factor spreadsheet.
- Devon Local Transport Plans.