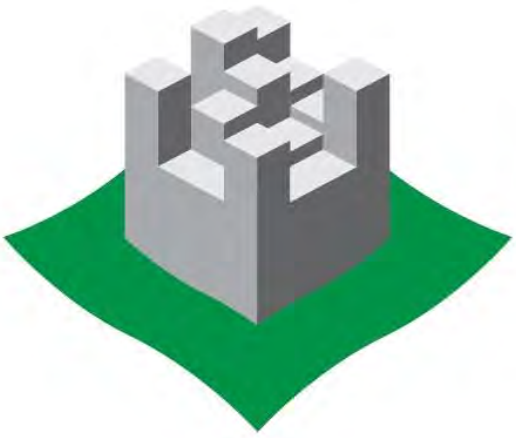

Exeter City Council

2021 Air Quality Annual Status Report (ASR)

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

Date: June, 2021

Exeter City Council

Information	Exeter City Council Details
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Report Reference Number	ASR 2020
Date	June 2021

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 (Public Health England, Air Quality: A Briefing for Directors of Public Health, 2017 and Defra, Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006).

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages (from Defra's Air quality appraisal: damage cost guidance, July 2020), with a total estimated healthcare cost to the NHS and social care of £157 million in 2017 (Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018).

Public Health England's Public Health Outcomes Framework tool shows that in Exeter in 2017 the fraction of mortality attributable to particulate air pollution was 4.4%. This is equal to the regional figure for the south west (4.4%) and below the national level of 5.1%. Exeter therefore has levels of particulate matter which are causing harm, but this problem is less severe than in nearly 75% of the country.

Indicator	Period	Exeter			Region	England	England		
		Recent Trend	Count	Value	Value	Value	Worst/ Lowest	Range	Best/ Highest
Fraction of mortality attributable to particulate air pollution	2017	–	-	4.4%	4.4%	5.1%	2.5%		7.1%
Air pollution: fine particulate matter New data	2019	–	-	7.4	7.3	9.0	12.4		3.8

Data from Public Health England

There are two national objectives for levels of nitrogen dioxide. These are for the average level over a whole year, which should be below 40 μg/m^3, and the average level for one hour, which should be below 200 μg/m^3. It is not easy to measure the average level for one hour, so a proxy has been developed by the Department for Environment, Food and Rural Affairs (DEFRA) which is that the average over a whole year should be below 60 μg/m^3. The annual average objective applies to residential, hospital and educational sites.

The hourly average objective applies to these sites and to busy streets and workplaces as well.

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

In recent years the annual average objective has not been met at a number of places in the city. These are Alphington Street and along the Heavitree corridor into the city. The highest levels are measured on the Heavitree corridor, at East Wonford Hill. Here levels have historically been close to or above the level which indicates an exceedance of the hourly objective.

The measured results for 2020 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 2020 levels of nitrogen dioxide at every site, including East Wonford Hill fell to below the objective levels. This significant fall was caused by a reduction in traffic flows as a result of COVID-19.

Some sites have levels between 35 and 40 $\mu g/m^3$ (i.e. are close to but not above the objective level of 40). In 2020 this was the case only at East Wonford Hill, with all other sites having levels below 35. Most locations along the busy routes into and around the city had concentrations of nitrogen dioxide in the range between 25 and 35 $\mu g/m^3$ during last year.

As you move away from busy roads, levels in previous years have fallen below 25 $\mu g/m^3$. In 2020, levels in these areas were typically between 10 and 15 $\mu g/m^3$ for purely suburban streets and between 15 and 20 $\mu g/m^3$ for local through routes. The majority of the population of Exeter therefore live in locations with concentrations of nitrogen dioxide well below the objective (especially in 2020), but a small number have previously been exposed at home to levels above the objective. No schools in Exeter experience levels above the objective.

NO_2 levels in Exeter have at most sites have fallen since a peak in 2009 but have been broadly stable in the four years prior to 2020. 2020 was exceptional, in terms of the

reduction in traffic flows during some parts of the year. This resulted in noticeable reductions in nitrogen dioxide concentrations at all sites. Trends in air quality generally take several years to emerge even in normal times, because of the annual variability caused by weather. What the long term impact of COVID-19 will be on air quality is uncertain. As trends do appear, any necessary changes to the AQMA orders or Air Quality Action Plan (AQAP) will be reported in future Annual Status Reports.

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 objectives for this type of air pollution. Measured $PM_{2.5}$ concentrations were well below the relevant objective level and PM_{10} concentrations have shown a steady decline since 2006.

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, Exeter City Futures and Sport England to deliver the measures in this plan.

Actions to Improve Air Quality

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

The 2019 DEFRA Clean Air Strategy sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero (DfT, The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018) sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Key completed actions in 2020 include:

1. Exeter City council has published a Physical Activity Strategy, underpinned by a communications strategy which was tested during the COVID 19 pandemic. The strategy focusses on getting the least active members of the community moving more (including active travel) with a key focus being to increase active travel. It also

prioritises development projects for the Wonford Health & Wellbeing Centre and Exeter Arena Sports Village. Both projects are aimed at increased cycling and promoting active travel in everyday life.

2. In 2020, a consultation in the Newtown area engaged with the local community to discuss and explore perceptions towards walking and cycling. This initial consultation along with baseline research work will be expanded over 2021 to include a further consultation on specific highway improvements/interventions that enable and encourage more people to use active travel modes within the Newtown area.
3. The Sport England Local Delivery Pilot team has developed 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 as such the number of vehicles moving during this time will be reduced. The SELDP team was also involved in the school streets projects discussed in point 11 below.
4. The Council has radically altered the way in which staff work as a result of the pandemic, which has accelerated a move toward home and agile working that is expected to remain. This will reduce staff travel to work in the long term, not just during the pandemic restrictions.
5. Extension of the Council's monitoring network to include 3 new sites representative of exposure in city centre locations. Exceedances of the objective are not expected at any of these sites, but they do expand understanding of concentrations away from the identified hot spots.
6. Work started on site at Water Lane, where the Council is building a large solar array with battery storage which would be able to power a fleet of electric refuse collection vehicles.
7. 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.

8. 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.
9. 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, construction 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 and Park Farm, and Exeter Science Park.
10. Work on the new bus station continued, which will provide improved facilities for public transport users in the city.
11. The City Council is partners with Devon County Council and Co Delivery in a scheme which secured £80,000 of grant monies from the Department for Transport Energy Saving Trust to expand the capabilities of e-cargo bikes for business travel. Nine electric cargo bikes have been secured for use within the partner organisations, Devon County Council, Exeter City Council, University of Exeter and Royal Devon & Exeter NHS Foundation Trust (RD&E). The City Council has three bikes which are used by the Environmental Health and Community Safety team to replace vehicle trips. An additional four bikes will be used to expand 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.
12. Pop up measures to facilitate social distancing and active travel were introduced in 2020. The changes include 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 already been made permanent, such as the Homefield Road modal filter in Heavitree
13. New school streets trialled at Whipton Barton School and Redhills. Whipton Barton is to be made permanent and a trial will also be done at Ladysmith School in 2021.

14. Publication by Devon County Council of a new Transport Strategy with three themes:

    Greater Connectivity: Focusing on travel into the city from outside, this theme will provide a consistent standard of frequency of both rail and interurban bus routes and deliver strategic cycle trails between key settlements. To capture those from the rural hinterland with limited sustainable travel choices, there will be a Park and Ride on all key corridors into the city.

    Greater Places for People: This focuses on increasing the number of trips made on foot or by bike within the city and urban bus corridors. This will be done through enhancing pedestrian/cycling networks to connect residential areas and villages on the edge of the city to economic hubs, reallocating road space for walking and cycling, creating more attractive public spaces and working with operators to provide a reliable low carbon network of buses.

    Greater Innovation: DCC will work with private sector partners to test and implement innovative technology solutions to make travel easier, encourage mode shift and help the city's transport networks operate more flexibly and efficiently. A key aspiration will be the development of a new zero emission transport subscription service. This platform will join up an electric vehicle car club, the UKs largest on street electric cycle hire network and proposed low carbon bus services.

    Key targets within the strategy include:

    - 50% of trips by foot or cycle within the city;
    - Removal of air quality exceedances in the city.

15. Work completed on a new Park and Change site at the Science Park. However this will not be opened until Government advice not to use public transport is lifted.
16. Work commenced on a new station at Marsh Barton.
17. Work has commenced to re-open the Okehampton railway line to daily services. This will provide a valuable alternative to car travel for people coming into the city from the area north of Dartmoor and increased service frequency from Crediton.
18. The local Co-Cars car club now includes 30 cars, 5 of which are electric. Car Clubs have been impacted by social distancing requirements, but is expected to expand

the scheme further in 2021 with more electric car clubs as part of the Rapid Charging Exeter project.

19. Continued expansion of Co-Bikes (the local on-street e-cycle hire scheme) and usage of the network has increased by more than 500%. In last 12 months, Devon County Council and Co-Bikes have significantly increased the city network with new docking stations at Ikea, Sidwell St and Cowick St and expanded charging stations at County Hall and Cranbrook.(in total an extra 30 docks). They have also trialled new dockless sites to provide additional capacity alongside the growing docked network (Magdalen Road, Digby Park and Ride and Topsham). Over the next year further expansion will take place and additional bikes will be put in.
20. Further development of the cycle network in and around the city, particularly route E4. Construction on Pinhoe Road, Exhibition Way, Exhibition Fields and new bridge over Summer Lane were completed and design work for Stoke Hill and Union Road is progressing.
21. New cycle parking provision in the city's parks and open spaces (funded by DCC).
22. DCC continued to undertake aspects of residential Travel Planning such as were consistent with social distancing requirements. Staff have engaged a total of around 1600 homes so far. Visits to homes will re-commence in 2021.

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

- Delays to the adoption of the GESP. The Transportation Strategy describes what the future of transport in Exeter should look like, but without a matching local plan in all the District Council areas, the necessary contributions and infrastructure will have to be negotiated on a site by site basis as each application is decided.
- Science Park Park & Change. This has not yet opened because of restrictions on use of public transport. It is expected to open in 2021.
- Use of public transport has reduced significantly as a result of the pandemic. The future of public transport and the measured needed to encourage passengers back safely will be considered in 2021 and beyond.
- Home visits as part of the DCC Residential Travel Planning service were paused in 2020. They will restart in 2021.

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Exeter City Council will continue to work with partners on implementing the actions in the AQAP over the course of the next reporting year, particularly:

- Implementation of the agreed programme of Sport England work.
- Further development of the net zero plan for Exeter, in conjunction with Exeter City Futures.
- Implementation of the Transport Strategy by DCC.
- Further improvements 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 make journeys by bike.
- New Park and Change sites, the new station at Marsh Barton and the re-opening of the Okehampton rail line for daily services. This will provide sustainable and active travel options for those travelling in to the city from outside and those travelling locally within it.

Conclusions and Priorities

No exceedances of the objective levels were measured at any sites in Exeter in 2020. The impact of the reduction in traffic flows as a result of COVID-19 can be seen as a significant fall in NO_2 concentrations at all monitoring sites. Concentrations are expected to rise again in 2021 so no changes to the AQMA are proposed at this stage.

Exeter City Council's priorities for the coming year are to continue to progress the AQAP, in conjunction with the development of the city and county's Climate Emergency plans and in the context of Covid-19 recovery.

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 recovery (even if this is not the case).

Local Engagement and How to get Involved

Local air pollution currently has a high profile within the city. For example it is one of Exeter City Futures 12 goals, 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.

Exeter City Futures welcomes proposals from community and interest groups who wish to improve air quality in their local area. 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 benefit air quality.

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

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Tables

1 Local Air Quality Management

This report provides an overview of air quality in Exeter during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by 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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMA declared by Exeter City Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within the city.

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 1-hour 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	Name and Date of AQAP Publication	Web Link to AQAP
Exeter AQMA	Declared 2007, Amended 2011	NO2 Annual Mean	An area encompassing the radial routes into the city and other major routes	NO	70 µg/m3	N/A	Exeter AQAP 2019-2024	www.exeter.gov.uk/airpollution
Exeter AQMA	Declared 2007, Amended 2010	NO2 1 Hour Mean	An area encompassing the radial routes into the city and other major routes	NO	65 µg/m3	N/A	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.**

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

Defra's appraisal of last year's ASR concluded 'the report is well structured, detailed, and provides the information specified in the Guidance' and goes on to the following bullet points:

1. The Council have provided a detailed update on progress made on their AQAP measures. They have discussed which key measures have been completed within the reporting year and what barriers to implementation they anticipate facing in the coming year with respects to there other measures. The Council anticipate funding to be the main barrier to implementation. The Council are encouraged to continue providing updates to their measure so that progress can be easily tracked.
2. There have been ten new diffusion tube sites added to the monitoring network in 2019 and a further three have been added in 2020. The 10 new tubes added in 2019 are located in areas where new housing is being developed. It is encouraging to see that the Council are mindful of the potential impact new developments may have on air quality. The Council have continued to demonstrate that they are taking an active approach to reviewing and amending their monitoring program where deemed appropriate. The Council are encouraged to do this on a regular basis to ensure monitoring is taking place at all areas of potential exceedance at locations of relevant exposure.
3. The Council have provided a very clear and concise discussion on pollutant trends within the city. Comparisons in NO_2 concentrations have been made between reporting years and the Council have not only considered the impacts of anthropogenic activities (i.e. emissions from roads) but also the impacts of meteorological variation on air quality. This is encouraging to see and demonstrates the Council's wider understanding on the various factors that may influence air quality.
4. It would be beneficial for the Council to also present diffusion tube concentrations in graphs. It is appreciated at the Council have many monitoring locations, so focus could be made in presenting NO_2

concentrations only within the AQMA. This way NO_2 trends within the AQMA can be made visual and easier to understand for the reader.

Graphs for all monitoring sites have been included in addition to data tables in this year's report.

Exeter City Council has taken forward a number of direct measures during the current reporting year of 2020 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 that the council and partners have made during 2020. 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 published a Physical Activity Strategy, underpinned by a communications strategy which was tested during the COVID 19 pandemic. The strategy focusses on getting the least active members of the community moving more (including active travel) with a key focus being to increase active travel. It also prioritises development projects for the Wonford Health & Wellbeing Centre and Exeter Arena Sports Village. Both projects are aimed at increased cycling and promoting active travel in everyday life.
2. In 2020, a consultation in the Newtown area engaged with the local community to discuss and explore perceptions towards walking and cycling. This initial consultation along with baseline research work will be expanded over 2021 to include a further consultation on specific highway improvements/interventions that enable and encourage more people to use active travel modes within the Newtown area.

23. The Sport England Local Delivery Pilot team has developed 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 as such the number of vehicles moving during this time will be reduced. The SELDP team was also involved in the school streets projects discussed in point 11 below.

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24. The Council has radically altered the way in which staff work as a result of the pandemic, which has accelerated a move toward home and agile working that is expected to remain. This will reduce staff travel to work in the long term, not just during the pandemic restrictions.

25. Extension of the Council's monitoring network to include 3 new sites representative of exposure in city centre locations. Exceedances of the objective are not expected at any of these sites, but they do expand understanding of concentrations away from the identified hot spots.

26. Work started on site at Water Lane, where the Council is building a large solar array with battery storage which would be able to power a fleet of electric refuse collection vehicles.

27. 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.

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30. Work on the new bus station continued, which will provide improved facilities for public transport users in the city.

31. The City Council is partners with Devon County Council and Co Delivery in a scheme which secured £80,000 of grant monies from the Department for Transport Energy Saving Trust to expand the capabilities of e-cargo bikes for business travel. Nine electric cargo bikes have been secured for use within the partner organisations, Devon County Council, Exeter City Council, University of Exeter and Royal Devon & Exeter NHS Foundation Trust (RD&E). The City Council has three

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Key targets within the strategy include:

- 50% of trips by foot or cycle within the city;
- Removal of air quality exceedances in the city.

35. Work completed on a new Park and Change site at the Science Park. However this will not be opened until Government advice not to use public transport is lifted.
36. Work commenced on a new station at Marsh Barton.
37. Work has commenced to re-open the Okehampton railway line to daily services. This will provide a valuable alternative to car travel for people coming into the city from the area north of Dartmoor and increased service frequency from Crediton.
38. The local Co-Cars car club now includes 30 cars, 5 of which are electric. Car Clubs have been impacted by social distancing requirements, but is expected to expand the scheme further in 2021 with more electric car clubs as part of the Rapid Charging Exeter project.
39. Continued expansion of Co-Bikes (the local on-street e-cycle hire scheme) and usage of the network has increased by more than 500%. In last 12 months, Devon County Council and Co-Bikes have significantly increased the city network with new docking stations at Ikea, Sidwell St and Cowick St and expanded charging stations at County Hall and Cranbrook.(in total an extra 30 docks). They have also trialled new dockless sites to provide additional capacity alongside the growing docked network (Magdalen Road, Digby Park and Ride and Topsham). Over the next year further expansion will take place and additional bikes will be put in.
40. Further development of the cycle network in and around the city, particularly route E4. Construction on Pinhoe Road, Exhibition Way, Exhibition Fields and new bridge over Summer Lane were completed and design work for Stoke Hill and Union Road is progressing.
41. New cycle parking provision in the city's parks and open spaces (funded by DCC).
42. DCC continued to undertake aspects of residential Travel Planning such as were consistent with social distancing requirements. Staff have engaged a total of around 1600 homes so far. Visits to homes will re-commence in 2021.

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Exeter City Council will continue to work with partners on implementing the actions in the AQAP over the course of the next reporting year, particularly:

- Implementation of the agreed programme of Sport England work:
    - Supporting Ride-On cycling to deliver free public Dr-Bike sessions in the City Centre, enabling members of the public to get a bike maintenance check and therefore ride it more frequently;
    - Delivering 5 Cycle Celebration events across the city (and Cranbrook). These events will enable members of the community to try cycling, to re-engage with cycling or to just meet up with other people around the shared aspect of community activity. The longer-term output of these events will be to inspire the community to take up cycling or perhaps return to cycling, thereby having the potential to reduce the number of local journeys made by car.
    - Tour of Britain – by supporting a stage of this cycling event in Exeter we will be helping to inspire the next generations of cyclists and also encourage greater participation within the sport through our connections with British Cycling.
- Further development of the net zero plan for Exeter, in conjunction with Exeter City Futures.
- Implementation of the Transport Strategy by DCC.
- Further improvements 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 make journeys by bike.
- New Park and Change sites, the new station at Marsh Barton and the re-opening of the Okehampton rail line for daily services. This will provide sustainable and active travel options for those travelling in to the city from outside and those travelling locally within it.

Exeter City Council's priorities for the coming year are to continue to progress the AQAP, in conjunction with the development of the city and county's Climate Emergency plans and in the context of Covid-19 recovery.

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 recovery (even if this is not the case).

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

- Delays to the adoption of the GESP. The Transportation Strategy describes what the future of transport in Exeter should look like, but without a matching local plan in all the District Council areas, the necessary contributions and infrastructure will have to be negotiated on a site by site basis as each application is decided.
- Science Park Park & Change. This has not yet opened because of restrictions on use of public transport. It is expected to open in 2021.
- Use of public transport has reduced significantly as a result of the pandemic. The future of public transport and the measured needed to encourage passengers back safely will be considered in 2021 and beyond.
- Home visits as part of the DCC Residential Travel Planning service were paused in 2020. They will restart in 2021.

Exeter City Council anticipates that the measures stated above and in **Error! Reference source not found.** will achieve compliance in the Exeter AQMA although the full impact of Covid-19 and recovery (including financial pressures on local authorities) is not yet understood. 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 2022 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	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1 (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	Rolling Programme	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 cycle routes and road closures in Heavitree and around the RD&E hospital were introduced in 2020 and have already been made permanent in some cases. A trial School Street at Ladysmith school commenced in 2021. A wider package of measures, including play streets is being developed and consultation on the next stage is expected in 2021.	Plans will be developed for individual areas in consultation with communities. New temporary road closures have also taken place in 2020 to enable social distancing.

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Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
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	Ongoing Programme, next phases to be implemented 2021	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 temporary lane closure on Queen Street in place. 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.	Consultation and obtaining relevant permissions, consents and traffic orders as well as bringing together necessary funding. New temporary road closures have also taken place in 2020 to enable social distancing.
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 under construction. Park and Change at Science Park completed but not yet in use.	Consultation and obtaining relevant permissions, consents and traffic orders as well as bringing together necessary funding

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Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
4 (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	2021	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	This was being actively pursued with ECCs equipment providers but future structure of parking charges and plans for city centre car parks are being considered post Covid.	Covid recovery plans will develop and evolve throughout 2021 and beyond.
5	Maximise efficiency of existing highway network	Transport Planning and Infrastructure	Other	2019	Ongoing programme	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	Ongoing, as DCC have current plans for upgrades to cycling and walking infrastructure which will evolve as the LCWIP develops	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 and E9 route introduced. The next phase of works are being planned. The LCWIP document will be consulted on in 2021	Consultation and obtaining relevant permissions, consents and traffic orders as well as bringing together necessary funding
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	Ongoing programme, which evolves as previous events and projects are evaluated	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 intriduced	Trials at three primary schools in 2020, one made permanent so far (Whipton Barton). Community Builders and newly appointed SELDP local Physical Activity Organisers planning play street 'non car events'	Plans will be developed in individual areas with local communities. Increased community cohesion and activism as a result of covid may benefit this work.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
8 (amber measure)	Use social prescribing and community building to help individuals get and stay active	Public Information	Other	2019	Ongoing programme, which evolves as previous events and projects are evaluated	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	Behvaiour change training delivered for all Community Builders and Community Connectors to provide supprot to people to lead active lifestyles. New social prescribing posts recruited to support health & wellbeing of Children and Young Families. Exeter Community Wellbeing Programme established in resposne to COVID-19 supporting c. 3000 residents in need of support during pandemic	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	Ongoing programme	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 prigrammes in development - Wonford Health & Wellbeing Centre and Exeter Arena Sports Village now in feasibility stage. Focus on sites becoming more accessible for sustainable transport and increased active travel infrastructure	Obtaining necessary permissions and consents, and funding

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Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
10 (yellow measure)	Communications plan, to support measures that will achieve modal shift	Public Information	Other	2019	Ongoing (iterative process of developing and implementing communications / messages)	ECC via Sport England Local Delivery Pilot & Exeter City Futures	ECC via existing internal budgets, Sport England Local Delivery Pilot & Exeter City Futures	NO	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.		Communications strategy developed through SELDP - 'Let's Move'. Focus on small steps for 'least active' residents and communities to move more in their local nieghbourhoods. Walking & Cycling central to this communciations 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	Ongoing programme	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	DCC have planned upgrades to the Co-Bikes network. Bikes and docking stations upgraded in 2020 and more planned for 2021. Ongoing expansion of car network.	Dependent on funding availability

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
12 (amber measure)	An improved multi-modal public transport network, incorporating cleaner bus technologies	Transport Planning and Infrastructure	Other	2019	Ongoing programme	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. Plans to be reviewed and recommenced post Covid restrictions on public transport use.	Dependent on funding availability and future demand for public transport (related to covid-19 recovery)
13	Developers to mitigate the effects of their development on air quality	Policy Guidance and Development Control	Other policy	2019	Ongoing	GESP team, ECC via GESP & Local Plan	Resourced by the GESP authorities	NO	Partially 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 GESP is published, officers will be implementing current policy in a robust manner eg when considering retail park applications and new housing.	The GESP timetable has been subject to some delay from when the AQAP was published. The Transportation Strategy describes what the future of Transport in Exeter should look like, but without a matching local plan in all the District Council areas, the necessary contributions and infrastructure will have to be negotiated on a site by site basis as each application is decided.

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Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
14	Policies deliver development where private car use is not the only realistic travel choice	Policy Guidance and Development Control	Other policy	2019	Ongoing	GESP team, ECC via GESP & Local Plan	Resourced by the GESP authorities	NO	Partially 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.	Work on the Liveable Exeter project continues but the GESP timetable has been subject to 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	Ongoing programme	ECC via Local Plan	TBC once strategy adopted	NO	Partially Funded		Planning	<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.	Completion of Strategy and then impelementation	St Sidwells Point leisure centre development commenced. Consultants appointed to produce City Centre Strategy	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	Ongoing (iterative process of developing and implementing communications / messages).	ECC	Internal ECC budgets	NO	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.		Baseline evidence report completed and will be subject to annual review following publication of each year's measurement data and any new research, national guidance etc.	Future communications may be brought under the umbrella of the Net Zero plans

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Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
17	An air pollution monitoring network that supports the measures in this action plan	Public Information	Other	2019	Ongoing evolution of network may be required, as needs change	ECC	Internal ECC budgets or grant funding if available	NO	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	4 new diffusion tube monitoring sites added to the network in 2020. The potential benefits of new sensor technologies has being evalutaed, but no projects have currently been identified where these types of equipment would provide added value.	

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

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

Public Health England's Public Health Outcomes Framework tool shows that in Exeter in 2017 the fraction of mortality attributable to particulate air pollution was 4.4%. This is equal to the regional figure for the south west (4.4%) and below the national level of 5.1%. Exeter therefore has levels of particulate matter which are causing harm, but this problem is less severe than in nearly 75% of the country.

Indicator	Period	Exeter			Region	England	England		
		Recent Trend	Count	Value	Value	Value	Worst/ Lowest	Range	Best/ Highest
Fraction of mortality attributable to particulate air pollution	2017	–	-	4.4%	4.4%	5.1%	2.5%		7.1%
Air pollution: fine particulate matter New data	2019	–	-	7.4	7.3	9.0	12.4		3.8

Data from Public Health England

There is now a capacity for direct monitoring of $PM_{2.5}$ in Exeter, since August 2018. This showed $PM_{2.5}$ concentrations of 8.6 µg/m^3 at RAMM and 6.8 µg/m^3 at Alphington Street. The national modelling by PHE shown above suggests that for 2019 (the most recent data available), the average figure for the city as a whole was similar at 7.4 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. However the council still has a duty to reduce emissions of and exposure to this pollutant.

During 2021, Exeter City Council will be taking the measures described in Table 2.2 that will address $PM_{2.5}$ as well as NO_2.

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 2020 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 2016 and 2020 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 2 sites during 2020. 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, 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 83 sites during 2020. 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 and at this link. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_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 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 2020 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 data shows that no locations measured an exceedence of the annual objective or the proxy for the hourly objective in 2020. This is as a result of a significant fall in concentrations between 2019 and 2020. This can be attributed to the fall in traffic flows as a result of lockdowns and COVID-19.

It should also be noted that the local Exeter bias adjustment figure used this year is lower than in previous years, which does reduce the final reported concentrations. Use of the national bias adjustment factor would only result in one location with concentrations above the objective level (East Wonford Hill DT57) so the choice of factors does not greatly affect the conclusions drawn. The Council has followed DEFRA guidance in choosing to use the local factor and it is considered robust.

2020 can be seen as exceptional, in terms of the change in traffic flows so the Council has no plans to amend the AQMA as a result of the changes to NO_2 concentrations seen this year. However, there was a trend up to 2019 of a gradually reducing number of sites which were failing to meet the objective, such as the Blackboy Road / Pinhoe Ropad junction. If

this trend continues in 2021 it might then be possible to conclude with reasonable safely that the exceedences at locations such as this have been resolved.

Areas of exceedence along the Heavitree corridor are expected to return in 2021 where congestion and poor dispersion combine to create specific local conditions that cause higher pollution levels. The extent of these areas is smaller than the extent of the AQMA, however Exeter City Council has no current plans to amend the AQMA and reduce the area included. The AQMA boundary was originally drawn to include a larger area than just the strict areas of exceedence (Exeter City Council 2011). The rationale for this boundary remains sound although the situation will be kept under review.

Figure A.1 and the data in Table A.4 shows that NO_2 levels in Exeter at most sites were broadly stable from 2016 to 2019, which followed a decrease from 2009 levels. There will 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. Any long term trends which develop will necessitate updates to the AQAP, which will be reported in future Annual Status Reports.

In 2020 the Council added three new diffusion tube locations to its network. These were intended to provide additional data on concentrations at or close to relevant receptors between the existing sites and allow us to better understand concentrations around the city centre. As expected, no exceedences of the objectives occurred at any of these new sites.

Exeter City Council has always chosen to focus monitoring 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.

3.2.2 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.

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There were no measured exceedences of the PM_{10} air quality objectives in Exeter in 2020. Annual average concentrations have been broadly consistent, with some interannual variability, and there was just one exceedence of an hourly mean of 50µg/m^3 in 2020 (at RAMM). The long-term trend in annual concentrations is a decline since 2005 or 2006.

3.2.3 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 2020.

3.2.4 Ozone (O_3)

Table A.9 in Appendix A presents the 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 2020 with the nationally applied air quality objective for this pollutant. (In 2016, the data capture was low (below 90%) and so the 97th percentile of 8-hour running means is also shown for comparison with the objective). The objective was exceeded in Exeter in 2019, which may be a result of the fine summer. 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). 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.

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	NO_2; O3; PM_{10}; $PM_{2.5}$	YES	Chemiluminescent; UVA; Optical Light Scattering	0	1	1.7
CM2	Alphington Street	Roadside	291670	91773	PM_{10}; $PM_{2.5}$	NO	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

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

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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)
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
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

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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)
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	290830	96598	NO2	NO	0.0	2.1	No	1.7
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

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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)
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
DT52	Livery Dole	Roadside	293418	92497	NO2	YES, Exeter AQMA	0.0	1.5	No	1.7

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)
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

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)
DT66	Topsham Road (Tollards Road)	Roadside	294227	90435	NO2	YES, Exeter AQMA	0.0	1.5	No	1.7
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	N/A	N/A	No	2.0
DT69	Cowick Barton Playing Fields	Urban Background	291016	91304	NO2	NO	N/A	N/A	No	1.7
DT70	Exwick Playing Fields	Urban Background	291298	92593	NO2	NO	N/A	N/A	No	2.0
DT71	Heavitree Pleasure Ground	Urban Background	294387	92611	NO2	NO	N/A	N/A	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	N/A	N/A	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

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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)
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
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

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (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 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	291939	92830	Kerbside		98.6	30.5	27.7	29.1	29.0	18.8

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

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

Notes:

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

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

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

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

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

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

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
DT1	292199	92814	Kerbside		97.2	26.8	28.0	29.2	26.5	17.0
DT2	292315	93016	Kerbside		97.2	25.5	25.9	25.2	26.4	17.5
DT3	292185	93049	Kerbside		97.2	26.3	26.5	25.9	27.8	18.8
DT4	291779	93011	Kerbside		97.2	23.2	24.3	23.1	23.8	16.2
DT5, DT6	291944	92826	Kerbside		97.2	29.5	27.9	29.3	27.5	18.5
DT7	291984	92626	Roadside		97.2	25.2	24.4	26.0	22.6	15.7
DT8	291895	92569	Kerbside		97.2	33.4	35.7	33.9	35.7	22.6
DT9	291943	92511	Roadside		97.2	31.1	31.5	29.1	28.5	18.7
DT10	291833	92433	Kerbside		97.2	29.6	31.0	30.8	29.5	18.6
DT11	292291	92292	Kerbside		97.2	28.1	29.2	29.4	28.9	19.5
DT12	292422	92320	Kerbside		88.2	30.1	31.8	31.1	29.3	20.0
DT13	292590	92743	Roadside		97.2	22.5	20.8	21.6	19.6	13.2
DT14	292832	92731	Roadside		97.2	21.0	19.6	20.3	19.0	13.2

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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 2020 (%) [2]	2016	2017	2018	2019	2020
DT15	292703	92807	Kerbside		97.2	36.4	34.1	34.5	31.4	22.3
DT16	292378	92039	Kerbside		97.2	33.4	31.3	34.2	29.3	21.3
DT17	291699	92091	Roadside		97.2	22.4	22.0	22.4	21.4	15.5
DT18	291657	91973	Roadside		97.2	23.4	23.4	22.3	22.7	15.8
DT19	291669	91812	Kerbside		97.2	**40.3**	**40.8**	**47.0**	**42.0**	28.5
DT20	291532	91349	Roadside		97.2	32.9	33.9	33.6	31.3	22.4
DT21	291460	91390	Urban Background		97.2	14.2	13.7	15.3	12.7	9.1
DT22	291509	91151	Roadside		97.2	27.5	26.8	29.0	26.2	17.7
DT23	291518	90813	Roadside		97.2	24.8	23.4	27.3	23.4	15.3
DT24	291691	90425	Roadside		90.1	25.8	29.1	28.0	23.4	18.3
DT25	291767	90160	Kerbside		97.2	26.9	25.6	26.1	23.5	16.2
DT26	291520	90531	Roadside		97.2		32.7	31.3	30.2	20.4
DT27	290864	91725	Kerbside		97.2	37.0	37.0	39.9	38.7	26.8
DT28	291249	91874	Roadside		97.2	23.0	20.7	23.9	21.1	15.6

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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 2020 (%) [2]	2016	2017	2018	2019	2020
DT29	291376	91944	Roadside		97.2	33.6	33.6	**43.4**	34.4	24.3
DT30	291500	92055	Roadside		90.1	31.7	32.0	33.2	30.1	22.1
DT31	291351	92169	Roadside		97.2	24.3	24.6	25.2	24.3	17.3
DT32	290830	96598	Roadside		97.2		27.1	25.4	25.4	17.7
DT33	291253	93299	Roadside		97.2	29.4	28.7	30.9	26.8	19.2
DT34	291242	93483	Kerbside		97.2	37.7	38.0	38.3	36.0	26.5
DT35	291272	93468	Kerbside		97.2	31.7	31.9	31.4	31.1	21.5
DT36	291054	94399	Roadside		97.2	31.5	32.3	33.8	32.5	22.9
DT37	292391	93291	Roadside		97.2	28.0	26.7	28.6	28.4	18.3
DT38	292469	93245	Roadside		97.2	29.1	28.4	29.7	27.7	18.1
DT39	292579	93146	Kerbside		97.2	36.2	37.6	38.9	36.2	23.3
DT40	293047	93877	Roadside		97.2	26.4	24.0	28.0	26.4	16.7
DT41	293405	93395	Roadside		97.2	31.2	30.2	31.2	29.8	20.9
DT42	293251	93375	Kerbside		97.2	**42.1**	**41.2**	37.2	35.9	25.6

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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 2020 (%) [2]	2016	2017	2018	2019	2020
DT43	293227	93356	Roadside		97.2	30.9	29.2	28.2	25.7	19.2
DT44	295068	94487	Kerbside		97.2	19.7	19.7	20.3	17.8	13.6
DT45	295888	94101	Kerbside		97.2	18.8	18.5	19.1	18.0	14.2
DT46	296418	94470	Kerbside		97.2	27.4	23.3	24.8	23.1	18.4
DT47	296984	94327	Urban Background		89.8	18.1	15.7	18.7	17.9	13.3
DT48	296494	93782	Roadside		97.2	17.4	17.2	19.3	17.6	12.8
DT49	295413	93689	Roadside		97.2	19.7	18.9	19.7	17.9	12.6
DT50	293091	92825	Urban Background		97.2	15.3	14.5	14.5	14.0	9.7
DT51	293448	92419	Kerbside		97.2	36.9	37.2	39.7	35.5	24.3
DT52	293418	92497	Roadside		87.6	**46.8**	**49.9**	**48.7**	**42.6**	31.1
DT53	293533	92473	Kerbside		97.2	39.8	**43.5**	**46.4**	38.5	27.4
DT54	293738	92396	Roadside		89.8	**49.7**	**52.7**	**53.6**	**43.4**	32.7
DT55	293781	92409	Roadside		97.2	31.4	30.0	31.2	26.7	19.8
DT56	294043	92359	Roadside		88.2	38.5	**40.9**	**43.4**	**40.3**	29.0

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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 2020 (%) [2]	2016	2017	2018	2019	2020
DT57	294410	92310	Roadside		97.2	**57.9**	**59.0**	**61.9**	**53.5**	38.2
DT58	295203	92378	Roadside		97.2	**49.9**	**49.3**	**50.6**	**47.3**	33.2
DT59	295191	92395	Roadside		97.2	20.1	19.7	24.5	20.4	14.8
DT60	295466	92365	Roadside		97.2	35.0	35.8	37.0	30.7	23.5
DT61	295636	92232	Roadside		97.2	22.0	23.3	24.2	21.8	15.5
DT62	295710	90571	Roadside		97.2	17.8	20.2	19.2	16.3	11.5
DT63	294694	90001	Roadside		97.2	24.6	25.0	27.0	25.4	18.1
DT64	294652	89974	Roadside		97.2	20.5	19.9	22.6	20.6	17.8
DT65	296415	88477	Kerbside		97.2	24.3	26.9	27.9	24.4	17.2
DT66	294227	90435	Roadside		97.2	34.9	35.4	39.7	36.4	25.0
DT67	293213	91245	Roadside		89.8	25.0	23.4	25.6	21.5	15.9
DT68	292291	91678	Urban Background		97.2			13.7	13.8	9.4
DT69	291016	91304	Urban Background		97.2			11.5	11.2	7.6
DT70	291298	92593	Urban Background		97.2			17.5	16.1	12.3

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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 2020 (%) [2]	2016	2017	2018	2019	2020
DT71	294387	92611	Urban Background		87.6			11.2	10.5	7.6
DT72	293617	93090	Roadside		97.2				14.2	10.6
DT73	293052	94185	Urban Background		87.6				10.2	7.5
DT74	292056	93043	Urban Background		78.5				11.4	8.3
DT75	291721	89727	Roadside		97.2				15.8	11.1
DT76	291555	90449	Urban Background		97.2				14.7	9.6
DT77	292553	93082	Kerbside		97.2				31.1	18.6
DT78	296415	94165	Other		97.2				15.1	10.6
DT79	296827	93886	Roadside		97.2				19.5	14.5
DT80	295967	88876	Roadside		97.2				19.8	14.3
DT81	292637	91991	Roadside		97.2				15.6	11.2
DT82	292847	92911	Urban Background		97.2					10.8
DT83	291655	92258	Roadside		97.2					19.5
DT84	291897	92217	Roadside		97.2					15.5

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

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

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

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

The graphs below show the five year trends in annual average nitrogen dioxide concentrations at the RAMM continuous analyser and then each of the diffusion tube monitoring sites. The diffusion tubes sites are grouped roughly by geographic location. Each graph shows the objective level of 40 micrograms per cubic meter.

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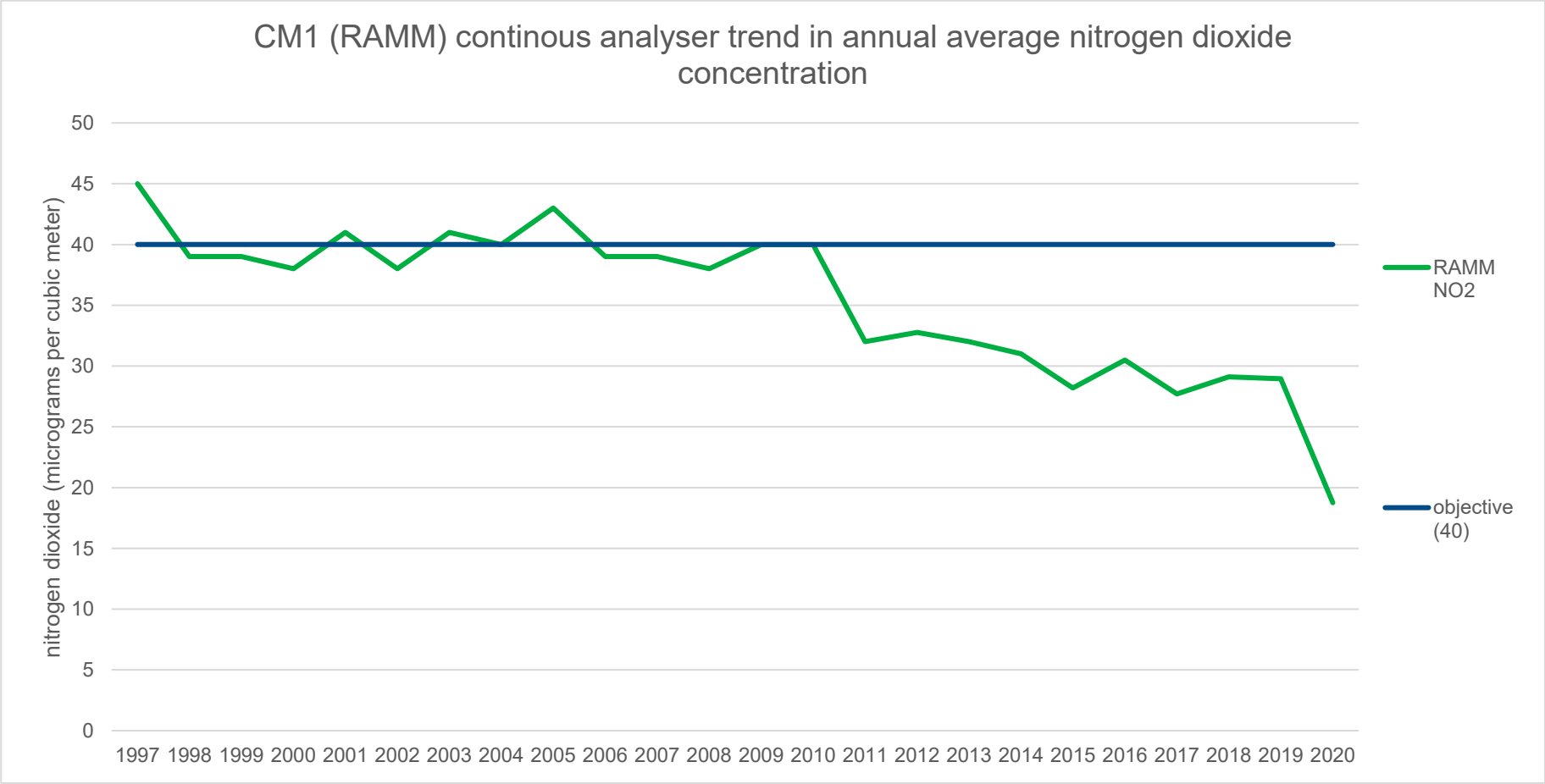
The first graph shows concentrations at the RAMM continuous analyser since monitoring commenced in 1997. Levels fluctuated around the objective of 40 micrograms per cubic meter until 2009, since when they have fallen below the objective.



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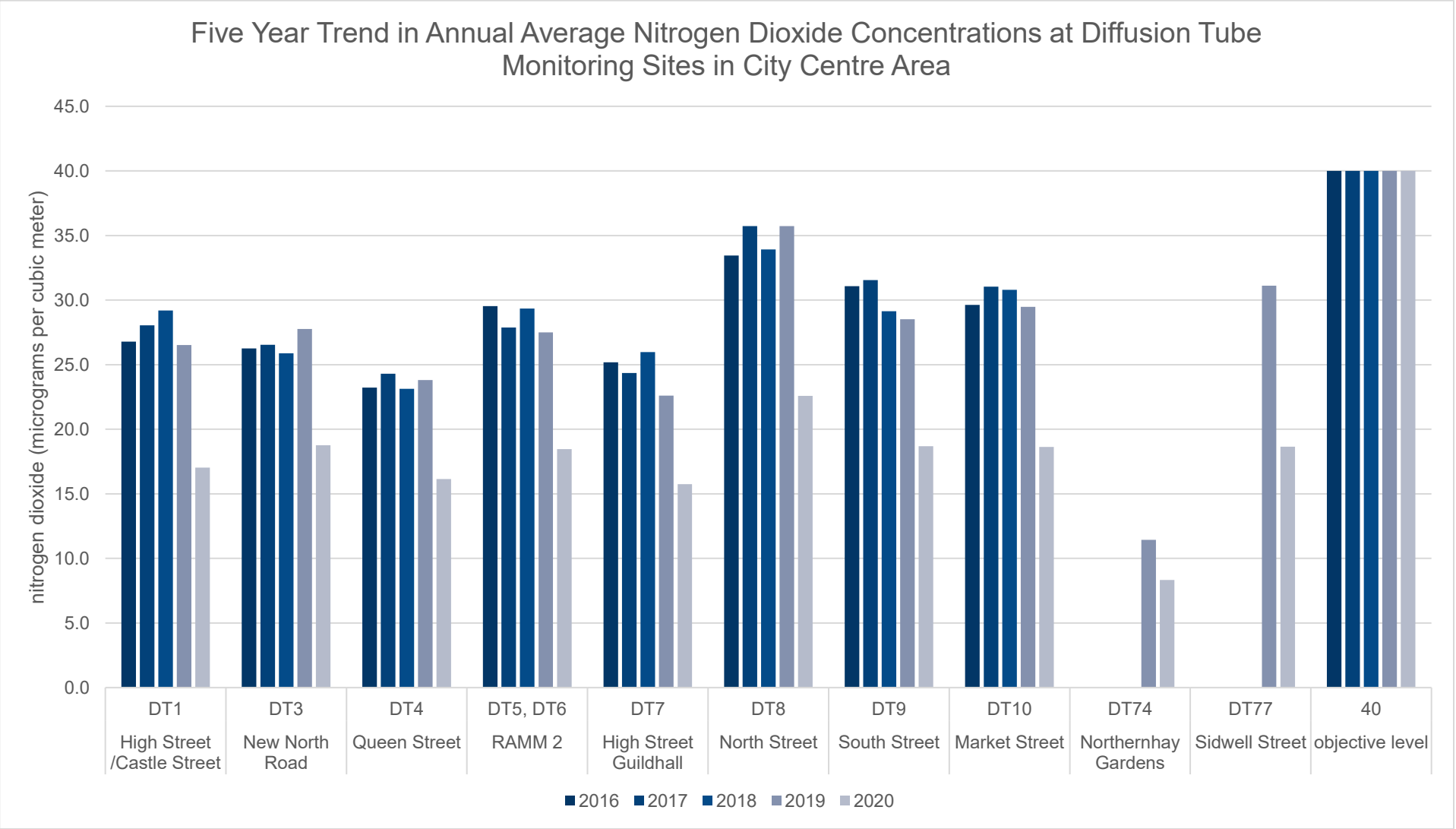
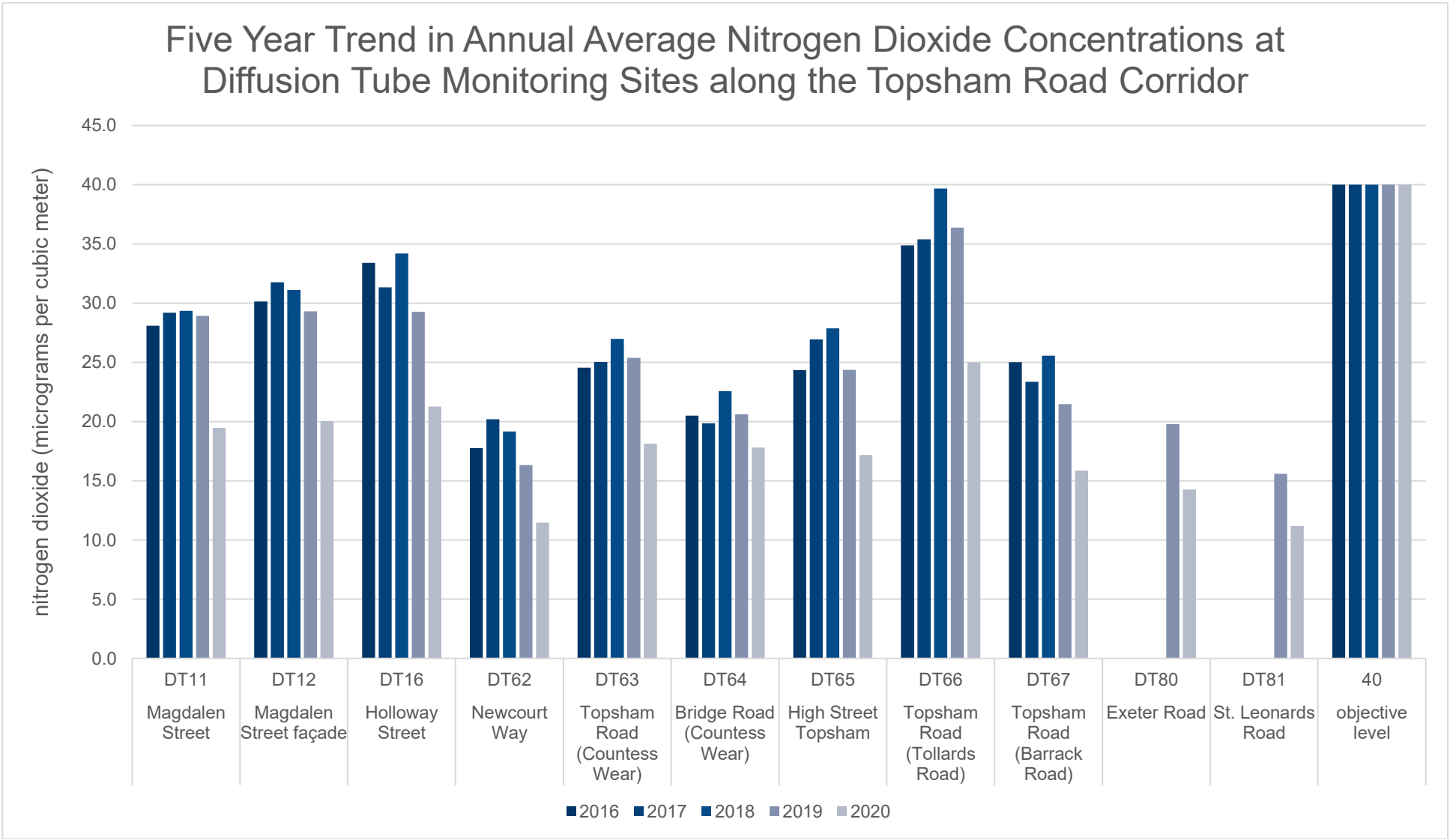
This graph shows the five year trend in concentrations at monitoring sites in the city centre. Concentrations fluctuated slightly between 2016 and 2019, with no long term trend. There was a significant fall in 2020.



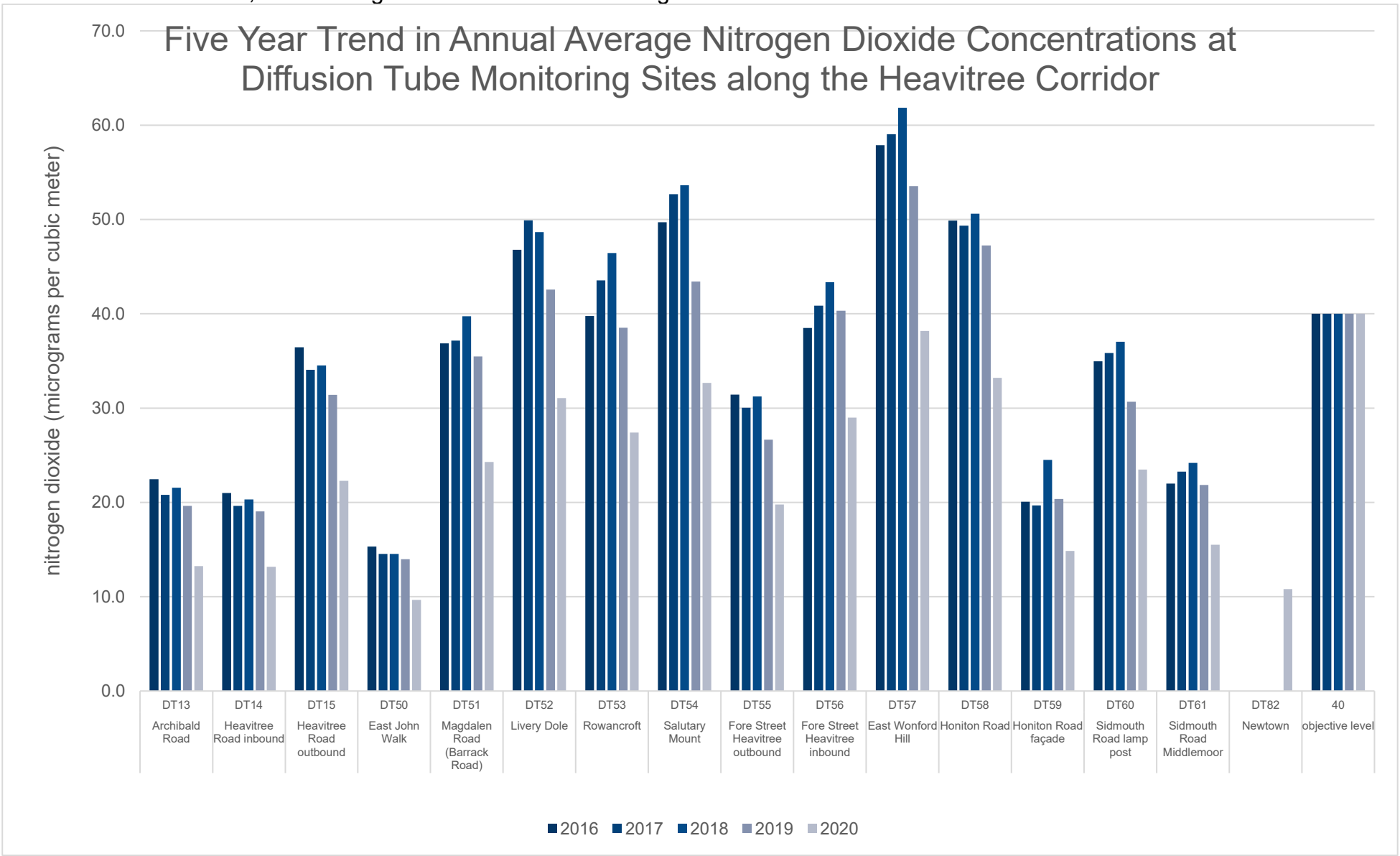
Exeter City Council

This graph shows the five year trend in concentrations at monitoring sites along the Topsham corridor. Concentrations fluctuated slightly between 2016 and 2019, with no clear long term trend. There was a significant fall in 2020.



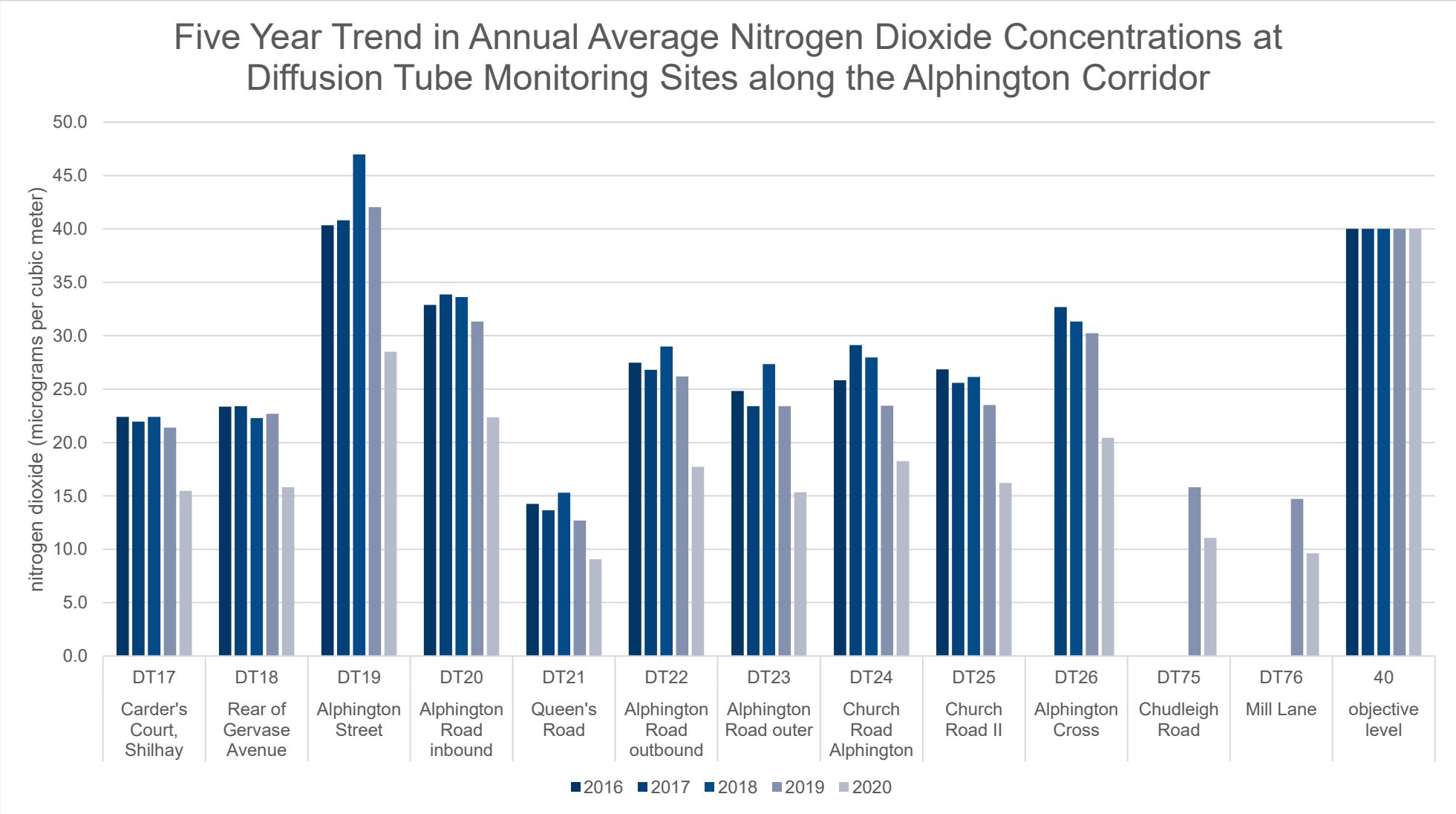
Exeter City Council

This graph shows the five year trend in concentrations at monitoring sites along the Heavitree corridor. Concentrations fluctuated slightly between 2016 and 2019, with no long term trend. There was a significant fall in 2020.



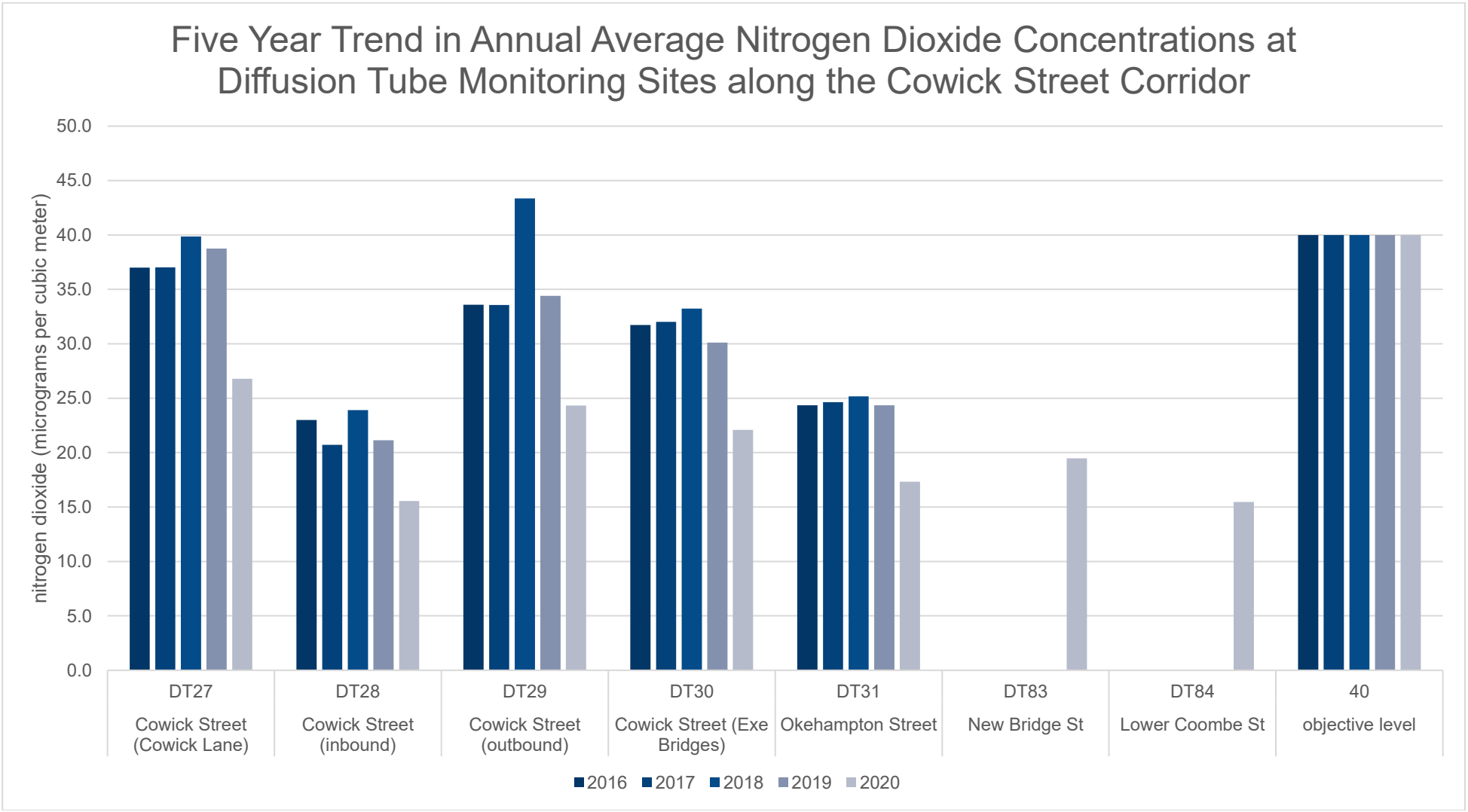
Exeter City Council

This graph shows the five year trend in concentrations at monitoring sites along the Alphington corridor. Concentrations fluctuated slightly between 2016 and 2019, with no long term trend. There was a significant fall in 2020.

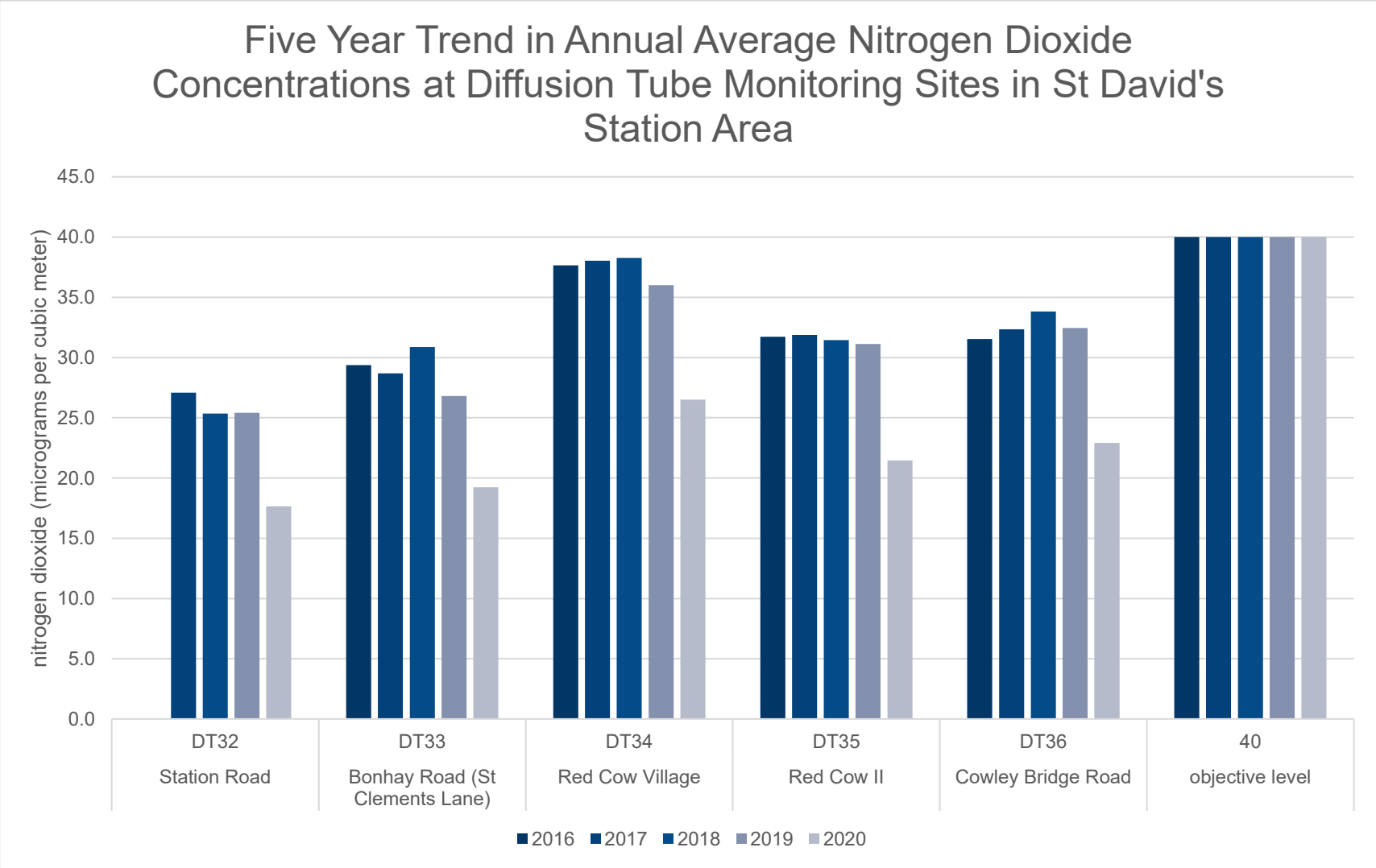


Exeter City Council

This graph shows the five year trend in concentrations at monitoring sites along the Cowick Street corridor. Concentrations fluctuated slightly between 2016 and 2019, with no long term trend. There was a significant fall in 2020.

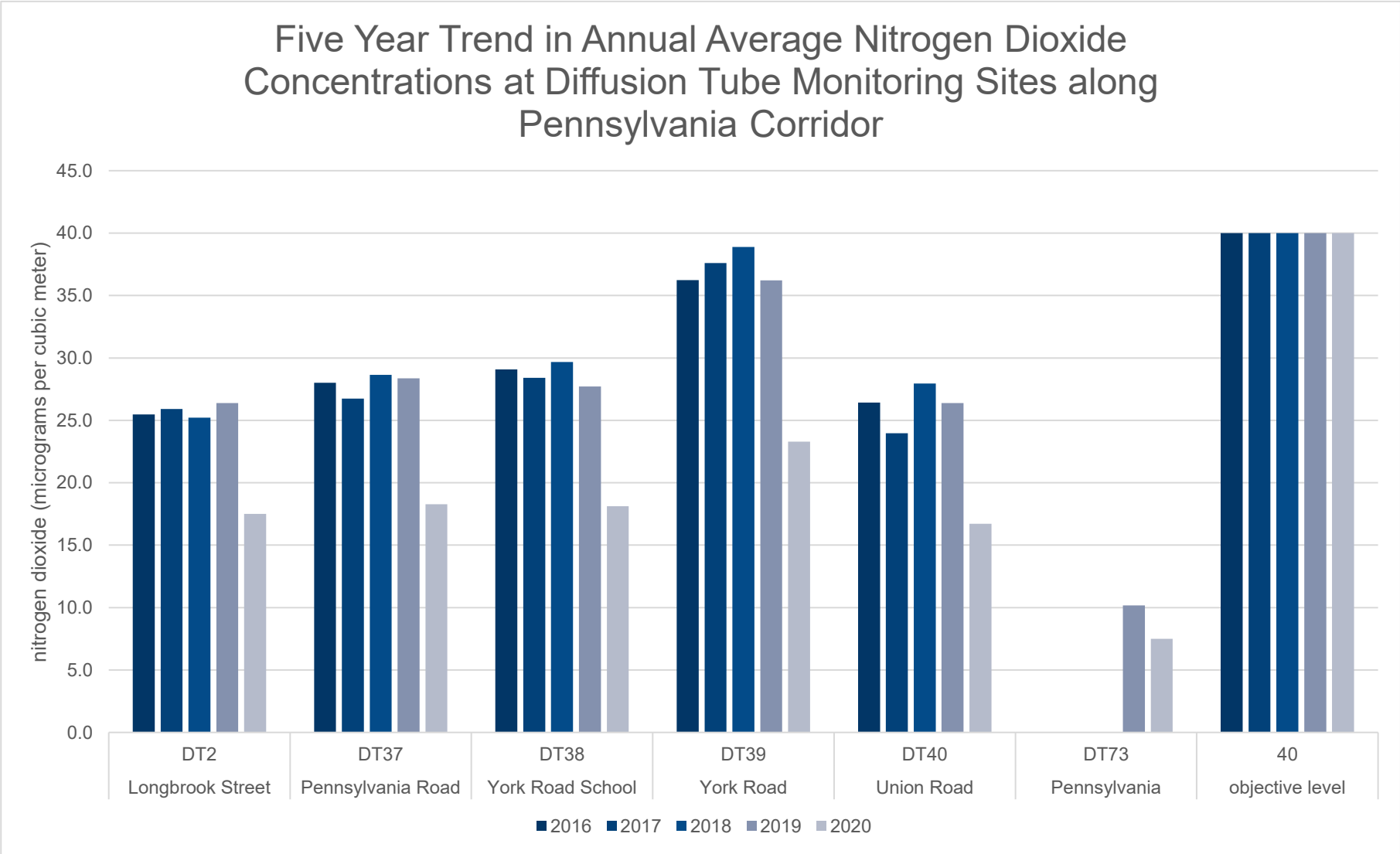


This graph shows the five year trend in concentrations at monitoring sites in the St Davids Station area. Concentrations fluctuated slightly between 2016 and 2019, with no long term trend. There was a significant fall in 2020.



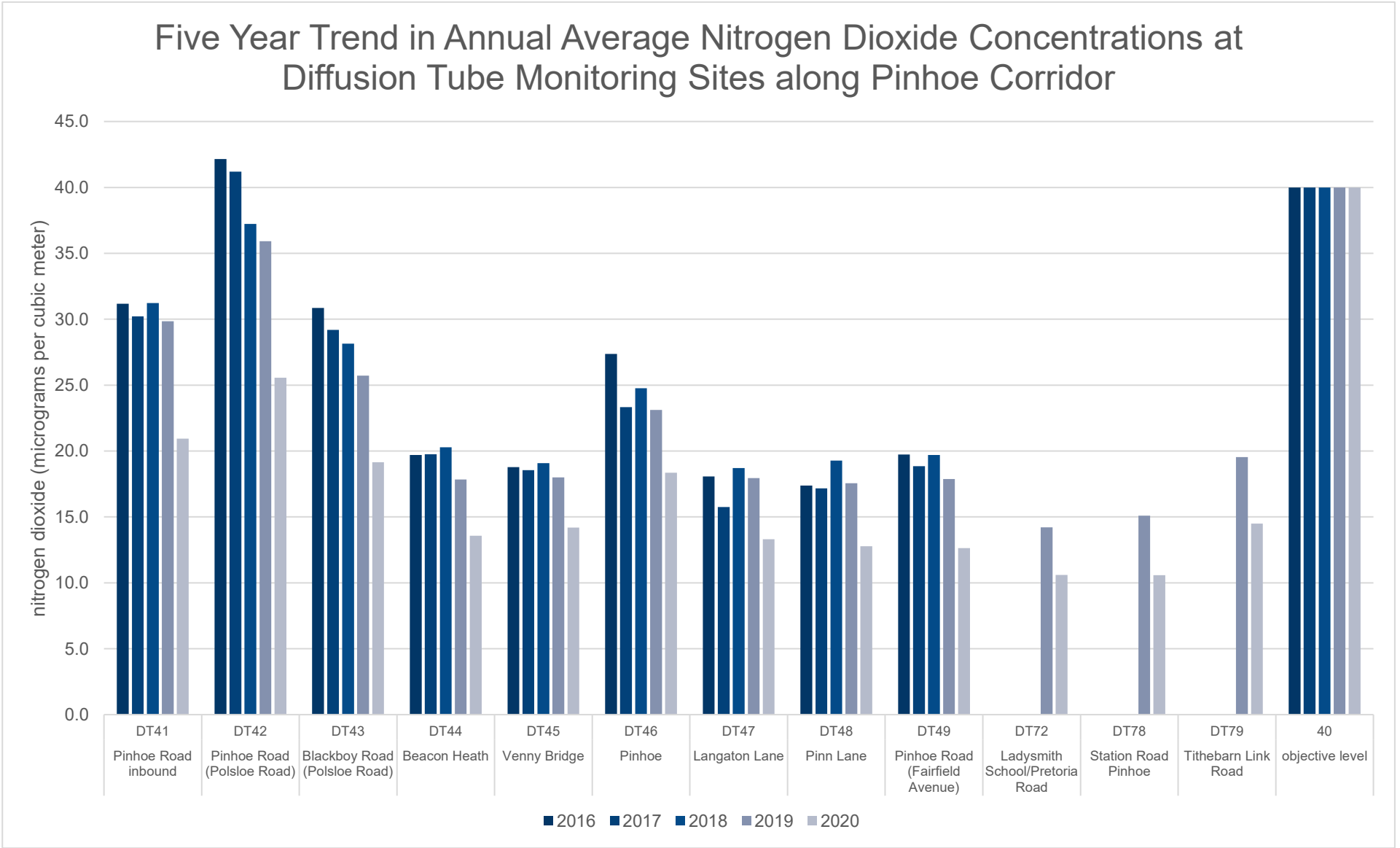
Exeter City Council

This graph shows the five year trend in concentrations at monitoring sites along the Pennsylvania corridor. Concentrations fluctuated slightly between 2016 and 2019, with no long term trend. There was a significant fall in 2020.



Exeter City Council

This graph shows the five year trend in concentrations at monitoring sites along the Pinhoe corridor. Concentrations fluctuated slightly between 2016 and 2019, with no long term trend. There was a significant fall in 2020.



Exeter City Council

This graph shows the five year trend in concentrations at monitoring sites in public open space. Concentrations fluctuated slightly between 2018 and 2019. There was a significant fall in 2020.

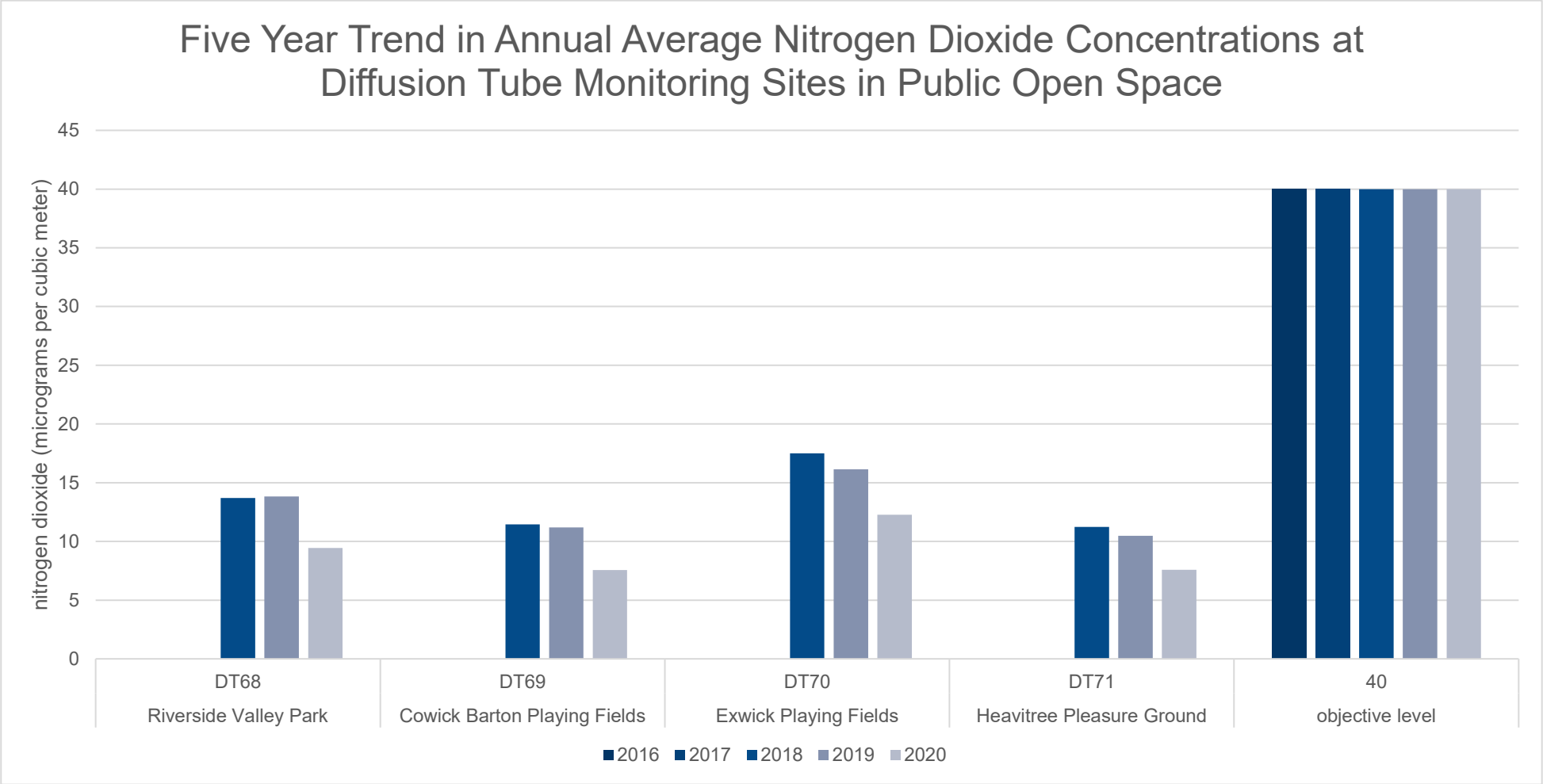


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	291939	92830	Kerbside		98.6	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%).

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 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	291939	92830	Kerbside		99.95	15	18	17.7	15.83	14.07
CM2	291670	91773	Roadside		80.9	15	19	16.7	15.10	11.49

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

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.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

This graph shows the trend in mean PM_{10} concentrations since 1998. These have fallen, particularly since 2005.

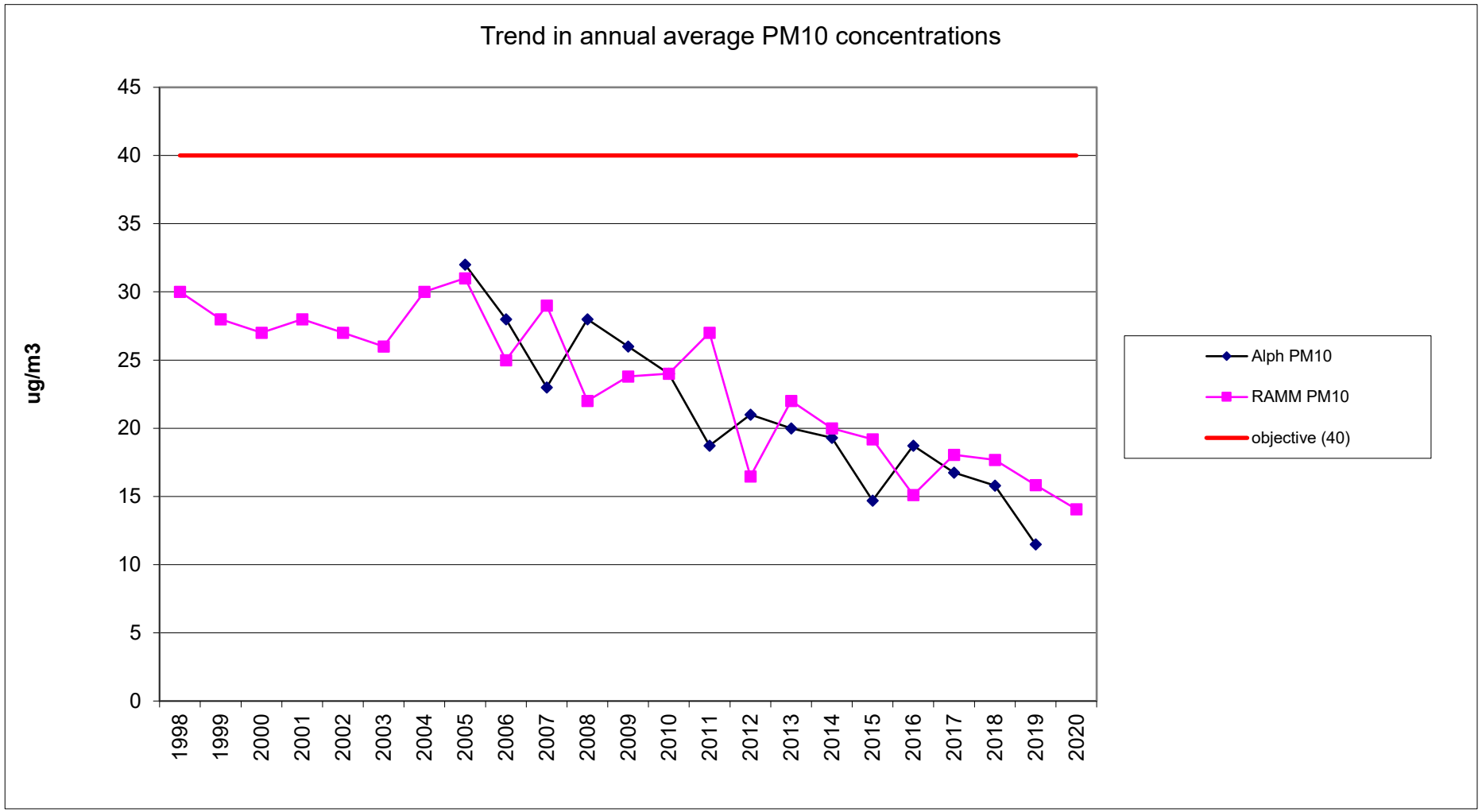


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	291939	92830	Kerbside		99.95	0	1	0 (28.8)	0 (21.2)	1
CM2	291670	91773	Roadside		80.9	0 (23.7)	2	1	4	0 (19.2)

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%).

Table A.8 – Annual Mean $PM_{2.5}$ 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 2020 (%) (2)	2016	2017	2018	2019	2020
CM1	291939	92830	Kerbside		99.95				9.97	8.6
CM2	291670	91773	Roadside		80.9			9.02	9.48	6.78

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

Notes:

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

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

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

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

Table A.9 – O_3 2020 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 2020 (%) [2]	2016 O_3 8-hour mean > 100 (µg/m^3)	2017 O_3 8-hour mean > 100 (µg/m^3)	2018 O_3 8-hour mean > 100 (µg/m^3)	2019 O_3 8-hour mean > 100 (µg/m^3)	2020 O_3 8-hour mean > 100 (µg/m^3)
CM1	291939	92830	Kerbside		98.3	0 (58.0)	0	12	11	87

Notes:

If the period of valid data is less than 85%, the 97th percentile of 8-hour running means is provided in brackets.

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.74	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT1	292199	92814	30.2	27.4	22.1	18.8		17.1	13.0	18.1	24.9	24.4	33.1	28.2	23.0	17.0	-	
DT2	292315	93016	37.0	30.6	20.9	15.5		17.5	16.8	20.6	24.5	26.1	30.9	27.1	23.6	17.5	-	
DT3	292185	93049	35.4	35.1	21.7	17.0		20.5	20.4	24.3	26.4	25.1	31.3	29.4	25.3	18.8	-	
DT4	291779	93011	30.9	22.1	20.0	16.4		17.5	14.4	21.5	24.3	25.2	27.3	24.4	21.8	16.2	-	
DT5	291944	92826	33.8	27.3	22.4	17.3		16.9	17.7	24.3	29.5	29.8	31.2	28.8	-	-	-	Duplicate Site with DT5 and DT6 - Annual data provided for DT6 only
DT6	291944	92826	36.4	27.1	22.1	16.7		16.9	17.9	24.6	29.9	28.8	31.6	30.1	24.9	18.5	-	Duplicate Site with DT5 and DT6 - Annual data provided for DT6 only
DT7	291984	92626	31.0	22.6	21.6	18.6		15.5	11.3	18.0	22.2	23.1	29.5	23.6	21.3	15.7	-	
DT8	291895	92569	41.9	35.9	25.0	19.7		24.1	24.9	31.2	33.9	33.7	38.3	35.5	30.5	22.6	-	
DT9	291943	92511	31.9	29.2	21.2	15.9		20.0	19.9	24.3	28.3	29.3	32.9	31.1	25.2	18.7	-	
DT10	291833	92433	37.3	28.1	21.9	17.2		19.7	17.7	26.8	26.2	28.0	32.5	27.4	25.1	18.6	-	
DT11	292291	92292	39.1	30.1	21.3	16.0		19.4	17.7	25.9	29.0	31.3	33.5	33.4	26.3	19.5	-	
DT12	292422	92320	40.2	36.7	22.8	19.9		21.3	19.9	23.9	30.1	28.3	36.0		27.0	20.0	-	
DT13	292590	92743	27.8	20.7	15.9	13.9		12.8	10.4	15.7	20.0	20.3	25.2	18.9	17.9	13.2	-	
DT14	292832	92731	24.9	16.2	16.7	13.0		12.6	10.5	15.9	20.0	23.1	23.3	22.3	17.8	13.2	-	
DT15	292703	92807	39.2	31.3	26.3	23.3		26.2	21.5	28.6	34.7	31.3	39.6	35.1	30.1	22.3	-	
DT16	292378	92039	41.0	31.0	24.0	17.7		19.6	20.0	27.4	34.3	31.8	36.8	40.9	28.7	21.3	-	
DT17	291699	92091	28.4	24.2	19.8	13.3		14.5	16.2	19.4	23.5	25.2	23.4	26.4	20.9	15.5	-	
DT18	291657	91973	29.2	26.5	18.8	14.0		15.7	14.8	21.3	23.8	24.2	26.7	25.2	21.3	15.8	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.74	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT19	291669	91812	40.4	34.5	33.2	30.3		34.7	30.5	44.3	45.3	42.1	49.2	43.6	38.5	28.5	-	
DT20	291532	91349	38.5	32.6	25.9	18.9		23.1	25.4	30.9	34.1	35.1	36.8	37.9	30.2	22.4	-	
DT21	291460	91390	17.7	9.6	12.3	9.5		8.8	5.4	11.5	11.9	13.8	17.7	17.5	12.2	9.1	-	
DT22	291509	91151	31.0	21.4	21.1	19.2		23.0	15.4	26.7	26.6	24.3	32.0	25.8	23.9	17.7	-	
DT23	291518	90813	28.6	19.4	18.3	15.5		15.6	11.1	22.4	21.1	22.2	29.4	27.6	20.7	15.3	-	
DT24	291691	90425		32.2	21.2	15.5		19.8	19.9	22.4	29.7	29.7	33.1	29.3	24.6	18.3	-	
DT25	291767	90160	32.2	20.8	20.2	15.4		16.2	14.1	21.9	24.4	23.8	27.7	28.4	21.9	16.2	-	
DT26	291520	90531	36.8	37.7	24.5	16.1		20.4	21.8	26.1	32.2	31.4	34.1	31.1	27.6	20.4	-	
DT27	290864	91725	49.0	45.6	31.1	25.7		30.7	26.7	36.6	37.1	35.9	44.8	43.2	36.2	26.8	-	
DT28	291249	91874	29.3	19.6	20.3	15.2		16.0	14.0	19.9	25.1	22.7	26.4	26.4	21.0	15.6	-	
DT29	291376	91944	41.1	36.2	30.3	26.2		28.3	21.7	33.2	36.6	32.9	41.1	38.8	32.8	24.3	-	
DT30	291500	92055	39.8	36.3	26.9	20.5		23.8	24.5	30.2		32.7	33.5	36.4	29.8	22.1	-	
DT31	291351	92169	29.0	29.4	22.2	17.2		19.3	16.7	22.4	27.7	24.3	28.8	25.3	23.4	17.3	-	
DT32	290830	96598	33.3	29.1	18.2	16.9		20.8	16.2	24.1	24.8	25.8	30.7	28.6	23.8	17.7	-	
DT33	291253	93299	36.5	30.8	23.6	17.9		19.2	18.1	23.9	33.5	28.0	31.5	29.8	26.0	19.2	-	
DT34	291242	93483	44.7	44.0	28.3	25.4		29.0	27.4	37.4	43.1	39.6	44.8	39.9	35.8	26.5	-	
DT35	291272	93468	39.5	36.0	23.8	18.6		21.9	20.9	29.3	34.9	33.2	36.6	32.6	29.0	21.5	-	
DT36	291054	94399	44.1	42.2	27.2	20.1		24.3	20.2	27.6	35.3	31.4	39.5	37.7	30.9	22.9	-	
DT37	292391	93291	36.8	26.7	21.4	17.2		20.0	14.4	22.7	24.8	29.6	34.9	28.5	24.7	18.3	-	
DT38	292469	93245	38.1	27.9	21.5	16.8		18.5	15.1	21.0	29.1	28.8	33.2	26.4	24.5	18.1	-	
DT39	292579	93146	40.0	32.7	26.9	21.3		24.0	21.6	29.3	41.0	37.5	42.2	37.4	31.4	23.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.74	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT40	293047	93877	29.7	26.1	19.6	17.3		19.4	14.5	22.8	24.2	24.2	30.5	24.6	22.6	16.7	-	
DT41	293405	93395	39.9	35.2	24.1	20.5		23.8	18.5	25.5	29.0	30.9	37.1	33.6	28.3	20.9	-	
DT42	293251	93375	46.9	39.9	30.5	23.0		28.9	24.0	35.3	38.5	37.2	43.8	40.0	34.5	25.6	-	
DT43	293227	93356	34.9	34.9	17.0	17.3		20.5	22.0	23.4	30.5	28.9	33.6	31.5	25.9	19.2	-	
DT44	295068	94487	25.6	24.1	15.8	12.2		14.5	11.6	17.1	18.1	20.4	24.3	22.7	18.3	13.6	-	
DT45	295888	94101	24.9	22.4	16.9	14.4		14.8	13.7	18.2	22.3	19.2	27.2	21.8	19.2	14.2	-	
DT46	296418	94470	35.4	33.1	20.9	11.0		18.1	20.0	22.7	28.6	28.3	33.7	31.0	24.8	18.4	-	
DT47	296984	94327	28.2	19.5	15.0	10.9		13.7		16.5	16.6	19.1	24.4	21.9	18.0	13.3	-	
DT48	296494	93782	23.5	19.6	16.3	11.1		13.4	9.7	16.1	17.3	18.6	24.0	23.6	17.3	12.8	-	
DT49	295413	93689	26.1	18.9	16.4	12.9		12.9	9.2	15.0	19.4	18.5	21.8	20.0	17.1	12.6	-	
DT50	293091	92825	20.5	15.1	13.2	9.1		8.2	6.8	10.1	13.1	15.0	19.1	16.4	13.0	9.7	-	
DT51	293448	92419	40.2	35.0	33.9	23.7		27.9	20.5	29.9	34.4	34.0	44.6	40.8	32.8	24.3	-	
DT52	293418	92497	51.3	61.5	36.7	27.8		31.5	34.4	39.6	50.4		51.1	48.4	41.9	31.1	-	
DT53	293533	92473	48.5	45.9	30.6	28.9		27.9	29.3	35.5	45.1	38.7	42.1	43.9	37.0	27.4	-	
DT54	293738	92396	53.0	53.6	37.6	29.3		38.1		48.4	46.8	43.4	52.0	50.0	44.1	32.7	-	
DT55	293781	92409	26.8	31.6	23.3	17.4		20.2	17.9	23.1	28.7	27.4	32.1	49.5	26.7	19.8	-	
DT56	294043	92359	51.2	53.8	37.7	24.8		34.4	28.4	37.8	39.0	41.1	53.4		39.2	29.0	-	
DT57	294410	92310	66.3	68.2	40.9	38.2		46.7	42.5	55.3	54.1	53.4	58.9	55.2	51.6	38.2	-	
DT58	295203	92378	53.8	52.0	41.3	31.5		38.1	36.6	47.1	45.6	49.0	56.1	50.4	44.8	33.2	-	
DT59	295191	92395	27.8	20.7	19.9	16.7		16.6	11.9	18.5	22.3	21.1	25.0	22.8	20.0	14.8	-	
DT60	295466	92365	41.8	32.8	30.0	26.6		26.8	21.3	30.2	37.9	31.4	39.5	35.9	31.7	23.5	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.74	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT61	295636	92232	29.2	22.0	18.3	15.3		18.3	14.8	20.0	23.6	21.1	26.7	25.7	20.9	15.5	-	
DT62	295710	90571	22.9	14.1	13.9	11.8		11.7	9.4	13.6	17.9	16.8	22.8	18.8	15.5	11.5	-	
DT63	294694	90001	30.6	31.0	22.1	15.9		19.6	20.9	22.6	30.1	27.0	31.6	25.1	24.5	18.1	-	
DT64	294652	89974	36.0	24.6	21.2	16.5		17.4	18.2	20.2	28.2	29.4	31.5	28.0	24.0	17.8	-	
DT65	296415	88477	29.6	19.9	21.0	19.5		20.3	16.8	24.4	29.8	23.0	28.5	25.9	23.2	17.2	-	
DT66	294227	90435	46.0	37.3	29.1	23.5		29.5	26.9	33.6	37.1	38.4	40.0	37.7	33.8	25.0	-	
DT67	293213	91245	27.7	19.1	19.2	15.9		18.8		21.8	20.7	22.5	27.0	25.3	21.4	15.9	-	
DT68	292291	91678	18.8	11.8	13.1	8.9		9.5	6.6	11.0	12.5	14.6	20.6	15.3	12.8	9.4	-	
DT69	291016	91304	16.1	8.8	10.3	7.2		7.4	4.8	8.8	10.4	9.0	16.0	15.4	10.2	7.6	-	
DT70	291298	92593	20.4	14.3	17.2	13.0		12.3	9.6	16.2	19.3	17.9	22.9	21.1	16.6	12.3	-	
DT71	294387	92611	17.1	11.2	10.1	7.4		6.8	5.4	8.7	10.2		14.8	13.3	10.2	7.6	-	
DT72	293617	93090	22.1	16.3	13.5	9.0		9.5	8.1	11.9	14.3	16.6	20.8	19.0	14.3	10.6	-	
DT73	293052	94185	16.6	11.5	9.2	7.1			4.5	8.4	8.6	10.9	14.5	12.1	10.1	7.5	-	
DT74	292056	93043		13.1		8.7		8.1	5.8	9.9	12.1	12.7	17.5	14.8	11.3	8.3	-	
DT75	291721	89727	22.3	12.5	14.8	11.1		11.5	10.3	14.7	16.2	16.1	19.2	18.2	14.9	11.1	-	
DT76	291555	90449	21.9	13.7	13.0	9.8		9.3	8.6	12.6	13.1	8.9	16.4	18.4	13.0	9.6	-	
DT77	292553	93082	34.8	34.5	26.3	17.8		15.8	17.1	22.4	28.4	25.1	32.1	28.8	25.2	18.6	-	
DT78	296415	94165	13.9	18.0	14.1	11.3		10.5	8.8	13.7	16.4	15.4	21.2	16.3	14.3	10.6	-	
DT79	296827	93886	27.4	20.3	16.9	14.3		20.0	10.5	18.2	20.9	19.3	27.4	23.9	19.6	14.5	-	
DT80	295967	88876	26.5	19.7	17.3	14.2		14.7	14.3	17.9	23.7	21.3	24.5	22.3	19.2	14.3	-	
DT81	292637	91991	23.2	15.4	14.5	9.8		10.2	8.3	11.9	15.7	16.4	22.3	22.0	15.1	11.2	-	

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DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted 0.74	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT82	292847	92911	22.4	18.7	13.5	9.5		9.0	7.8	11.4	14.3	17.5	21.6	19.2	14.6	10.8	-	
DT83	291655	92258	34.0	28.4	22.5	19.5		20.9	20.0	25.3	30.0	29.6	32.1	32.6	26.3	19.5	-	
DT84	291897	92217	26.4	24.2	18.1	14.1		14.0	15.1	19.8	25.9	25.3	24.4	27.6	20.9	15.5	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

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

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **Exeter City Council confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Exeter City Council During 2020

Exeter City Council has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Exeter City Council During 2020

Exeter City Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

Exeter City Council uses Gradko diffusion tubes (20% TEA in water). Gradko (GRADKO International Ltd., St. Martins House, 77 Wales Street, Winchester, Hants. SO23 0RH) laboratories 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 timetable 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 2020, it was not possible to follow this all year because Gradko stopped sending out new tubes for a period. The following adjustments were made, to allow the Council to obtain continuous data throughout the year with only minor adjustments to the exposure calendar and remaining within guidance for tube use:

- January: tubes exposed as per calendar
- February: tubes exposed as per calendar

- March: tubes were put out as per the calendar but were left out 2 weeks beyond the calendar collection date. This meant an exposure period of 6 weeks, which is still within guidelines for use of diffusion tubes.
- April: the tubes were put out 2 weeks later than expected and were left out for six weeks, covering the second half of April and all of May. These tubes were collected on the date when the May tubes should have been collected.
- May: data was obtained for May as described above.
- June: tubes exposed as per calendar
- July: tubes exposed as per calendar
- August: tubes exposed as per calendar
- September: tubes exposed as per calendar
- October: tubes exposed as per calendar
- November: tubes exposed as per calendar
- December: tubes exposed as per 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).

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

All diffusion tube monitoring locations within Exeter City Council recorded data capture of 75% therefore it was not required to annualise any monitoring data.

Exeter City Council

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. 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 0.74 to the 2020 monitoring data (Table C.2). 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 factor is 0.81 which has been obtained from the spreadsheet version 03/21, for Gradko diffusion tubes (20% TEA in water) using 18 studies.

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.1. This has always been the local factor, except in 2018 when data capture for the continuous analyser was low.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	Local	-	0.74
2019	Local	-	0.89
2018	National	03/19	0.93
2017	Local	-	0.85
2016	Local	-	0.87

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube

Exeter City Council

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 City Council required distance correction during 2020.

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. Data capture at the Alphington Street site for both PM_{10} and $PM_{2.5}$ was affected by instrument malfunction in 2020, which took longer than normal to resolve as a result of lockdown. This can clearly be seen in C.4.3 and C.4.4. The data for Alphington Street was above 75% however so did not require annualisation.

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:

- Comparison of data with other pollutants and other appropriate AURN network sites (roadside sites and other sites in the south west),
- Final checking and deletion of data marked as possibly erroneous,
- 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),
- 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 91% in 2019.

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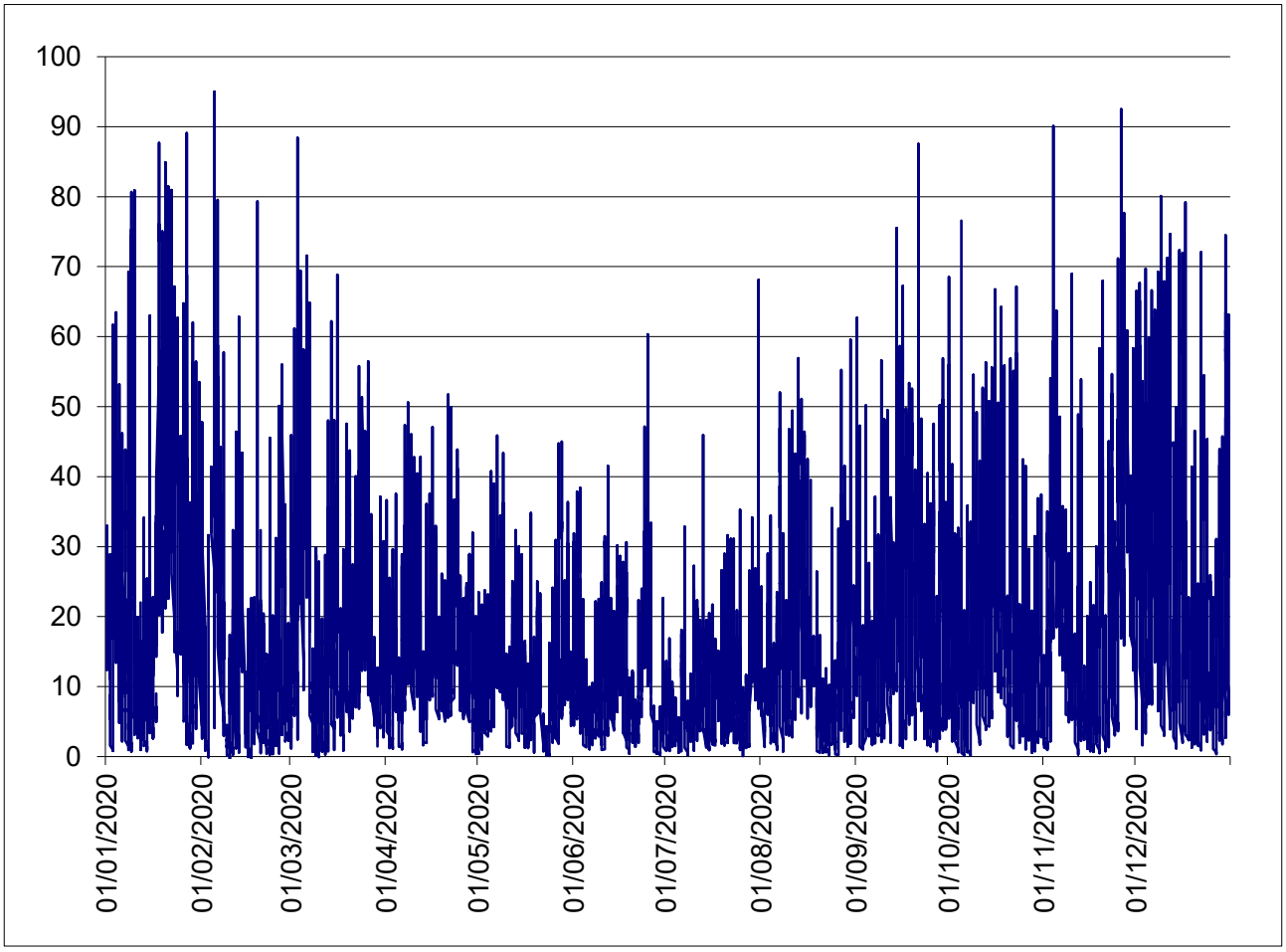
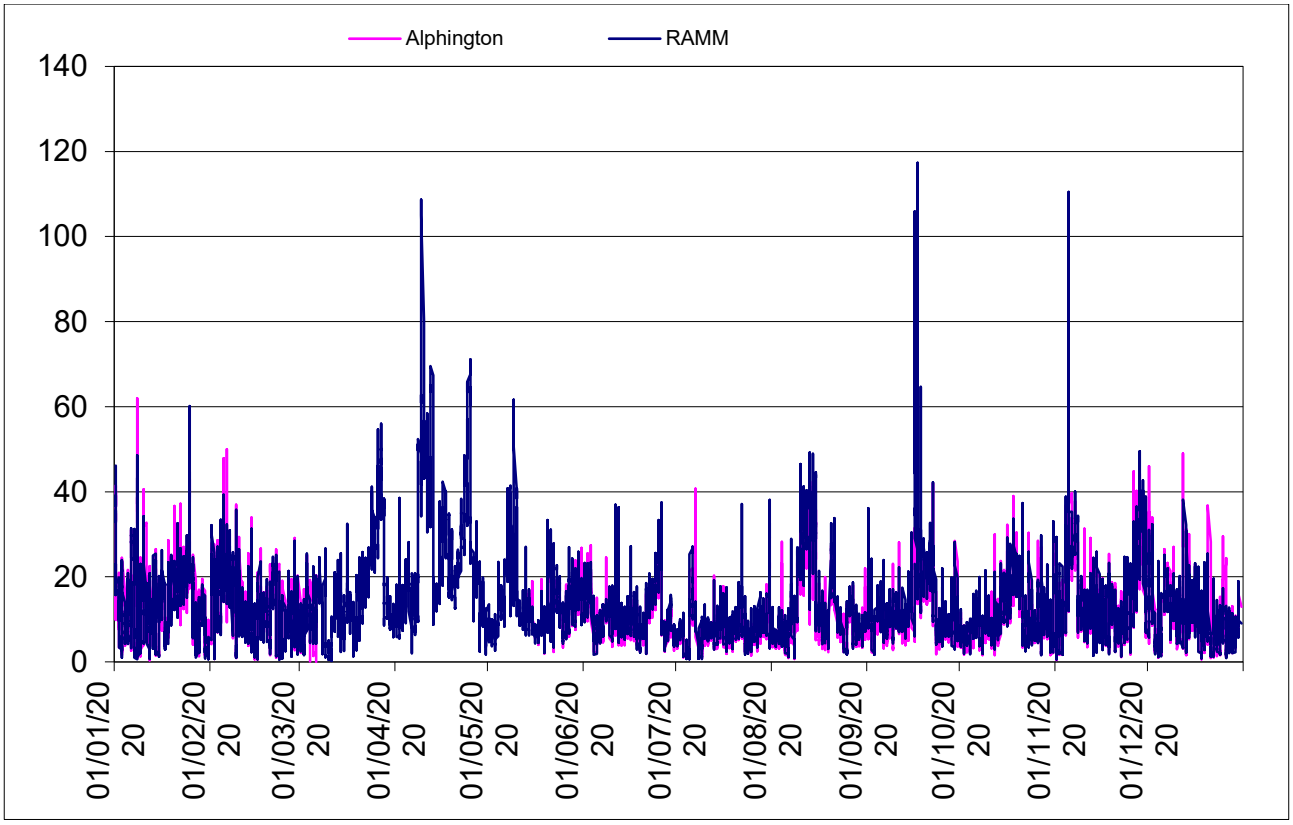
Plots of hourly average values for nitrogen dioxide, PM_{10} and $PM_{2.5}$ are shown below in figures C.1, C.2 and C.3.

Figure C.1 Hourly NO_2 data from Exeter Roadside (RAMM) ($\mu g/m^3$)



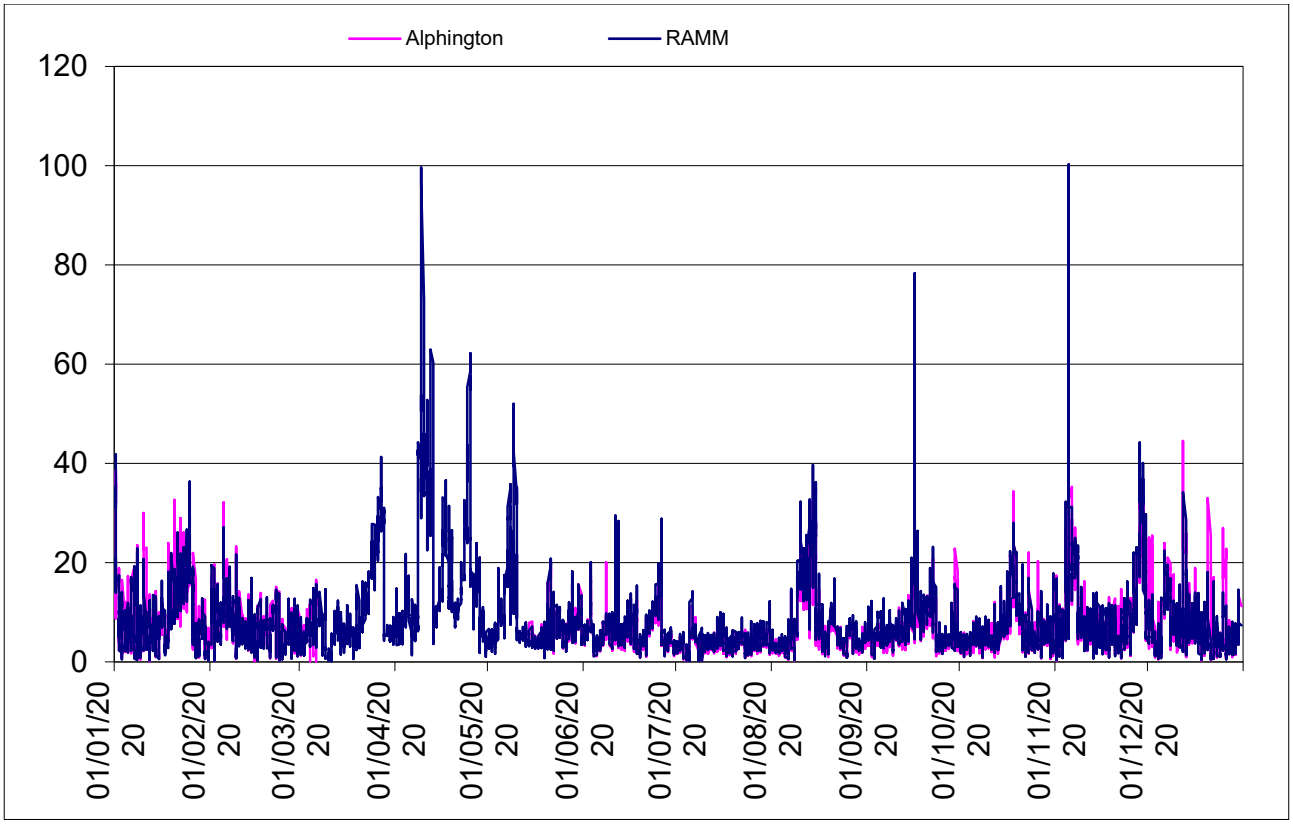
This graph shows the hourly NO_2 data from the RAMM continuous analyser.

Figure C.2 Hourly PM_{10} data from Exeter Roadside (RAMM) ($\mu g/m^3$)



This graph shows the hourly PM_{10} data from the RAMM continuous analyser.

Figure C.3 Hourly $PM_{2.5}$ data from Exeter Roadside (RAMM) ($\mu g/m^3$)



This graph shows the hourly $PM_{2.5}$ data from the RAMM continuous analyser.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The type of PM_{10}/$PM_{2.5}$ monitors utilised within Exeter do not required the application of a correction factor.

Automatic Monitoring Annualisation

All automatic monitoring locations within Exeter City Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the 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 automatic NO_2 monitoring locations within Exeter City Council required distance correction during 2020.

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Table C.2 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1
Periods used to calculate bias	11
Bias Factor A	0.74 (0.69 - 0.81)
Bias Factor B	35% (24% - 46%)
Diffusion Tube Mean (µg/m^3)	25.5
Mean CV (Precision)	1.7%
Automatic Mean (µg/m^3)	18.9
Data Capture	99%
Adjusted Tube Mean (µg/m^3)	19 (18 - 21)
	Good Overall Precision
	Good Overall Data Capture
Combined Local Bias Adjustment Factor	**0.74**

Notes:

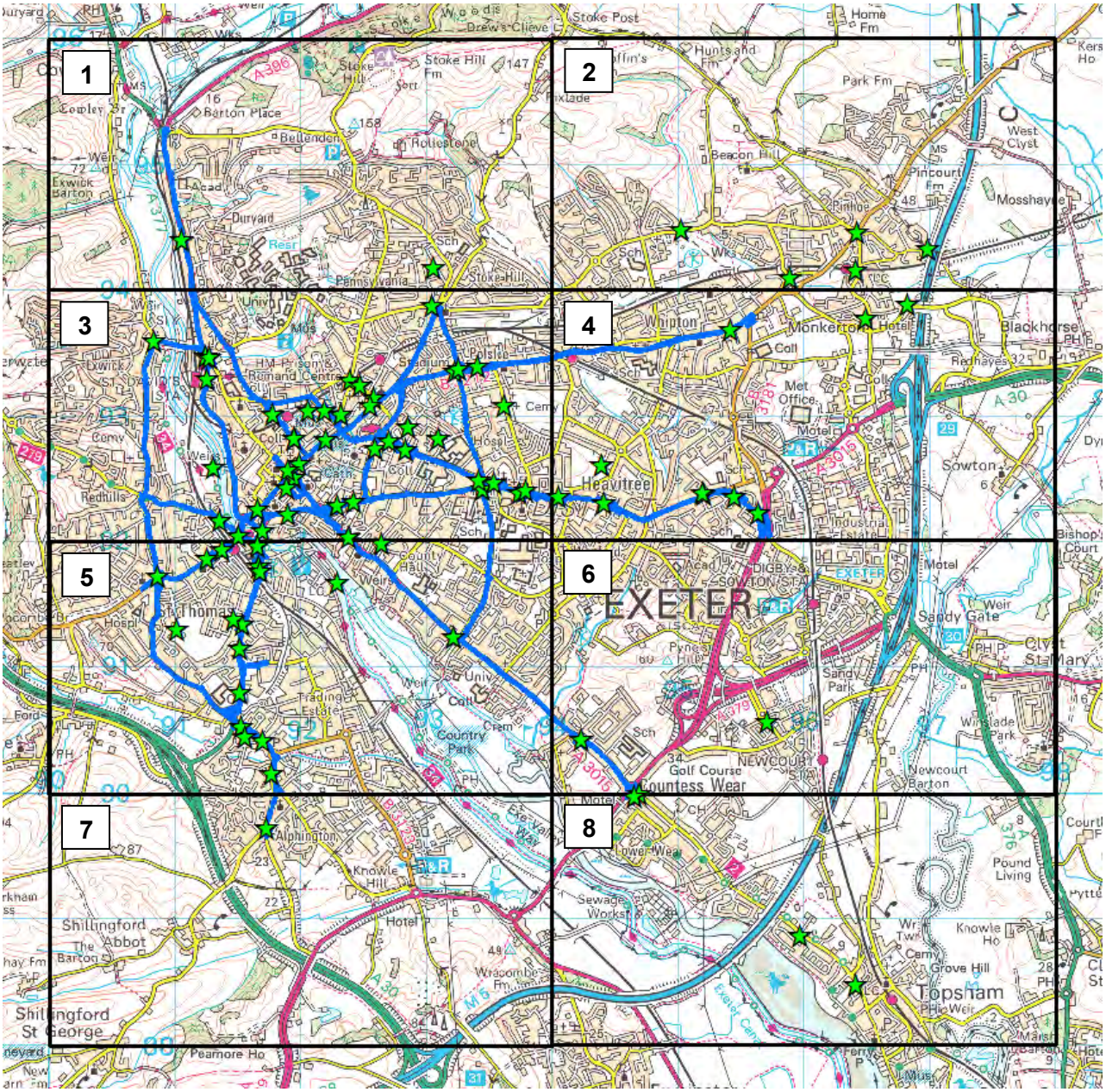
A single local bias adjustment factor has been used to bias adjust the 2020 diffusion tube results.

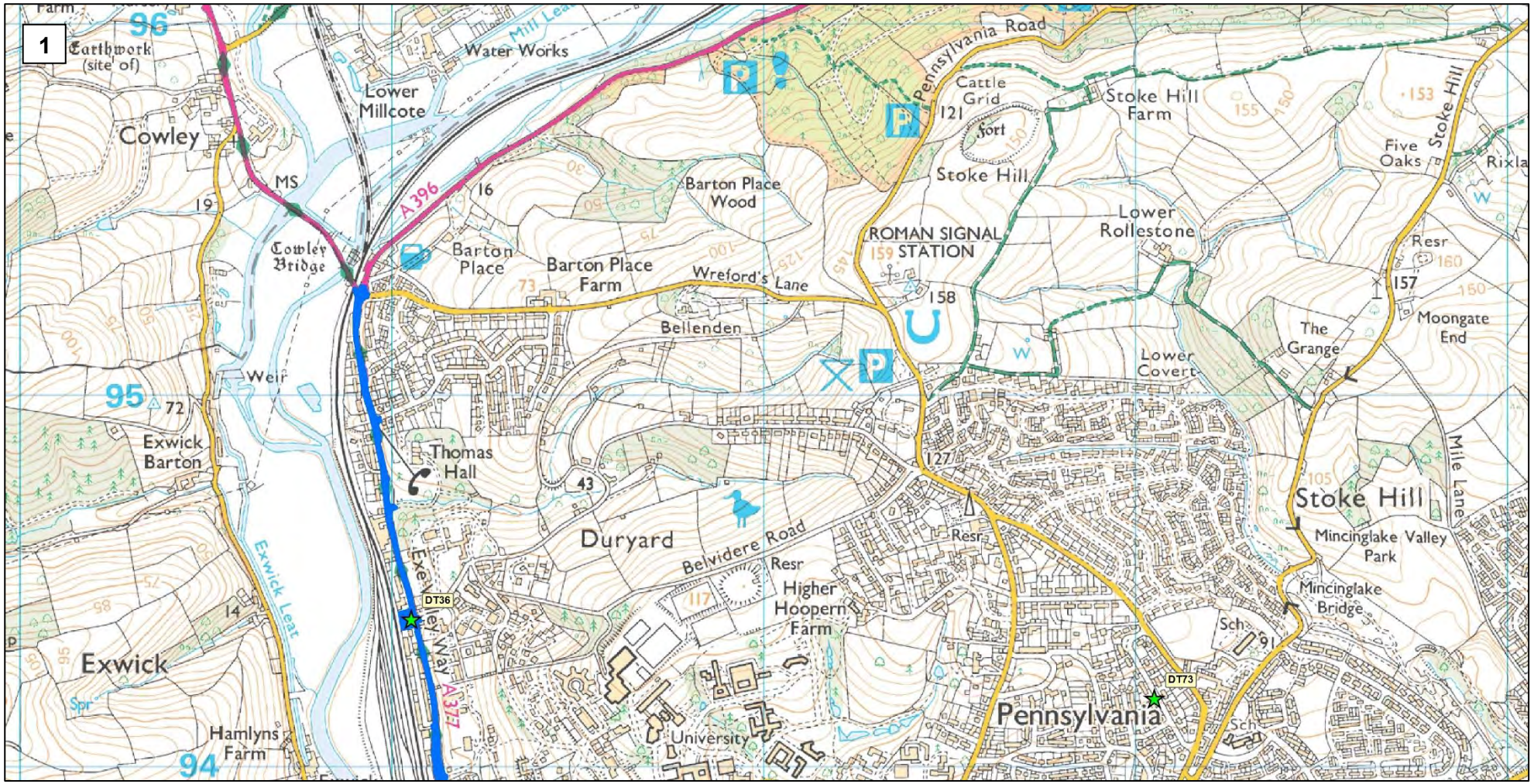
Appendix D: Map(s) of Monitoring Locations and AQMAs

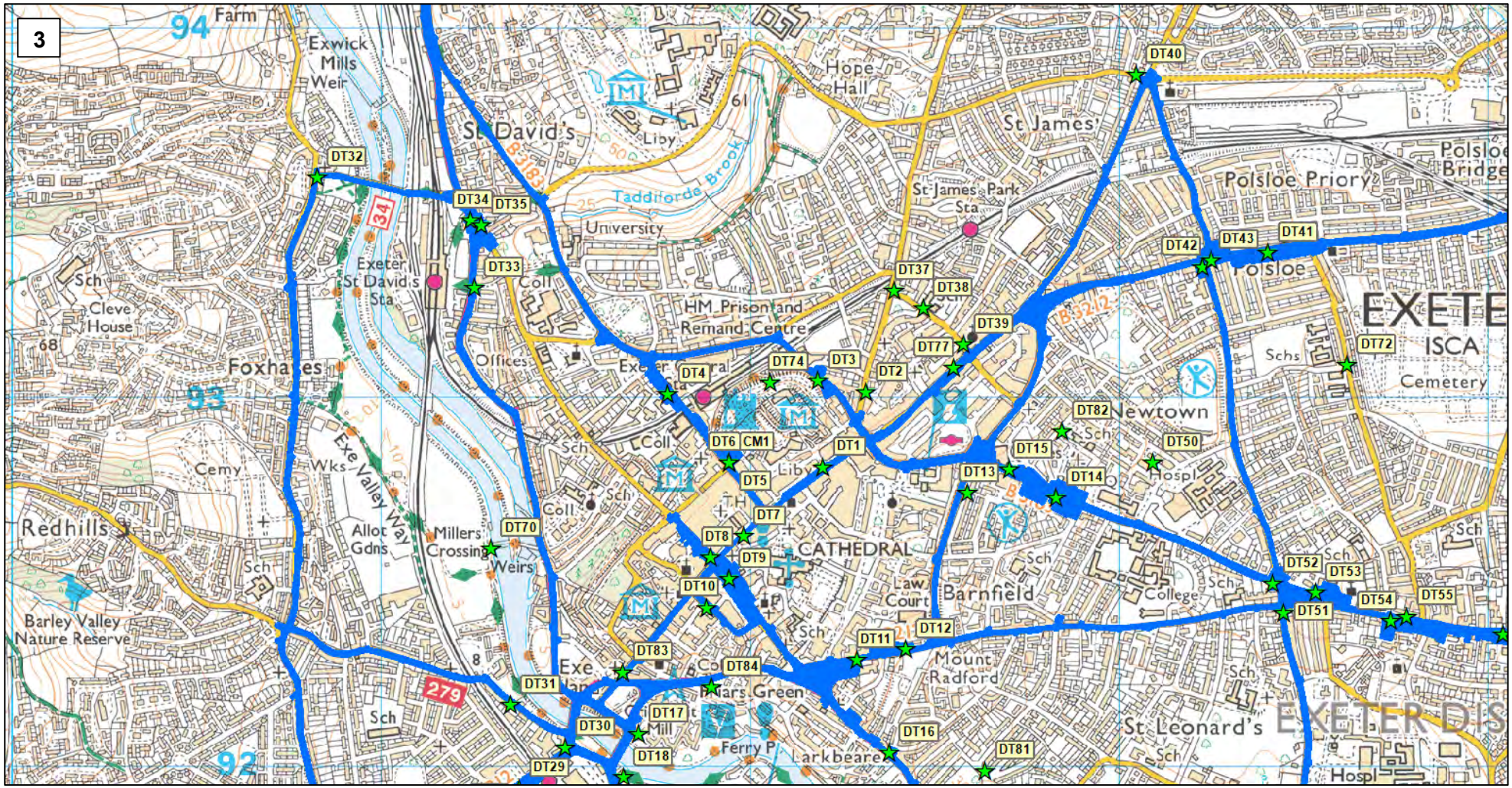
Figure D.1 – Map of Non-Automatic Monitoring Site

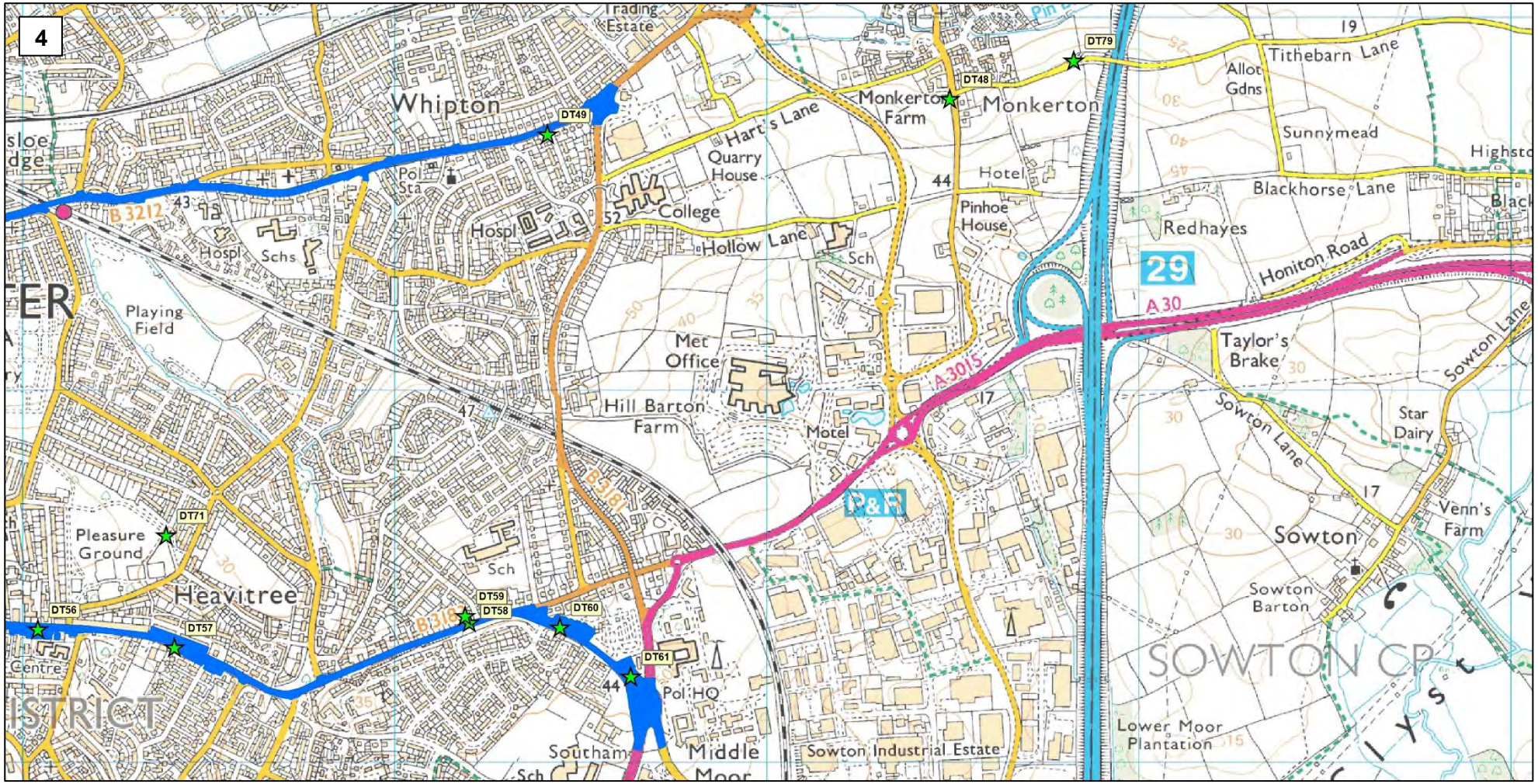
The monitoring locations and 2020 data can also be viewed using an online map here.

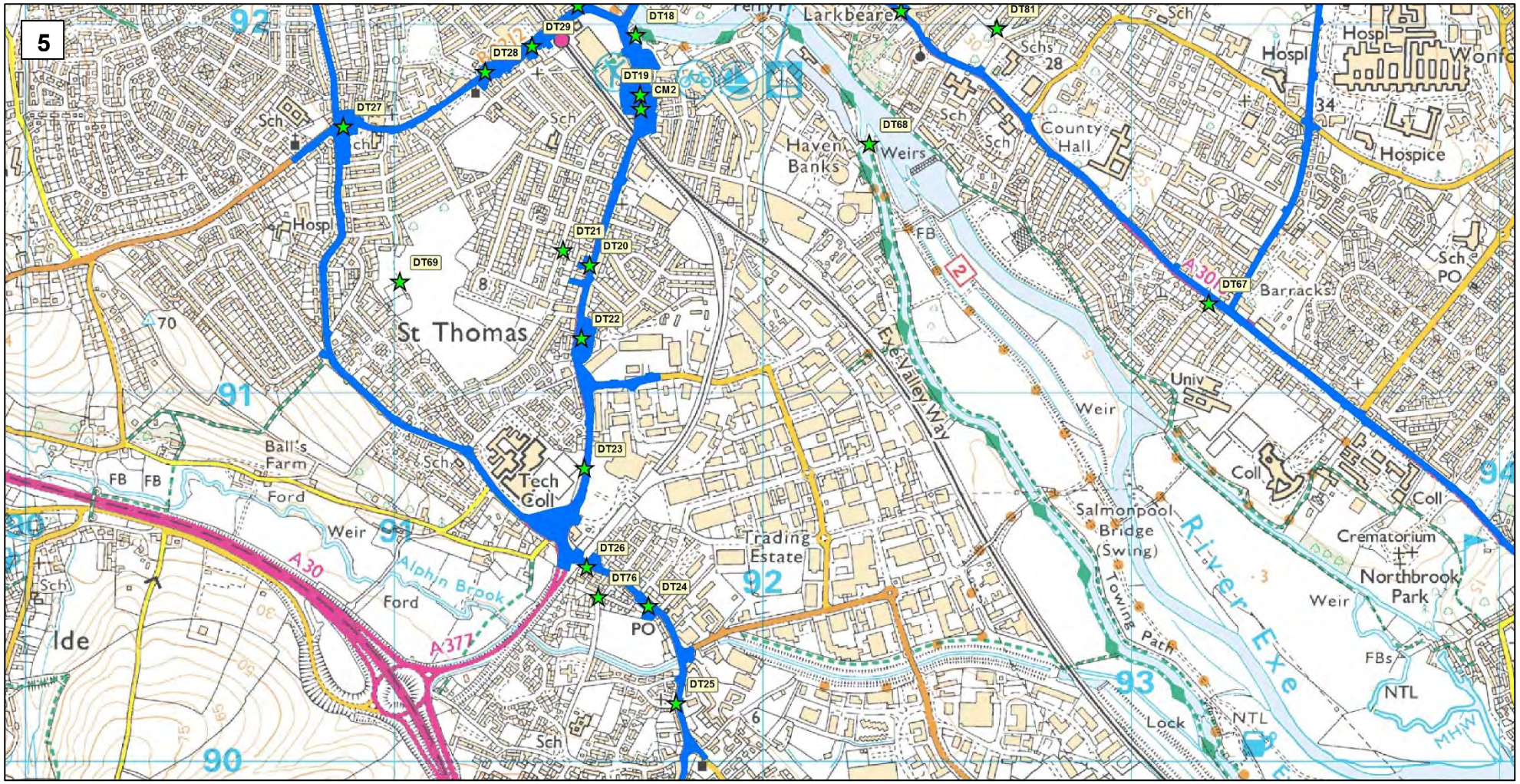
Monitoring location = ★
AQMA = ▬

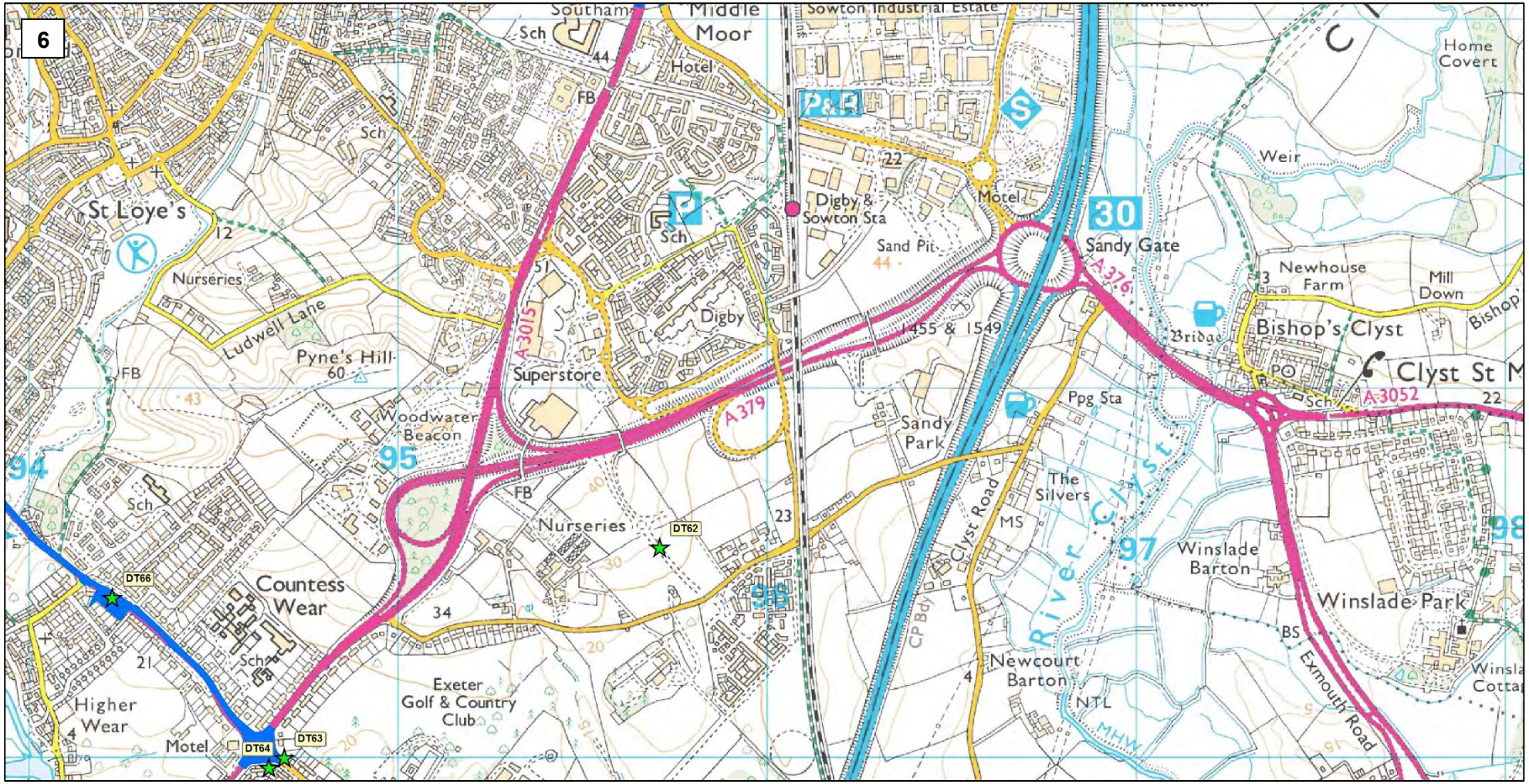


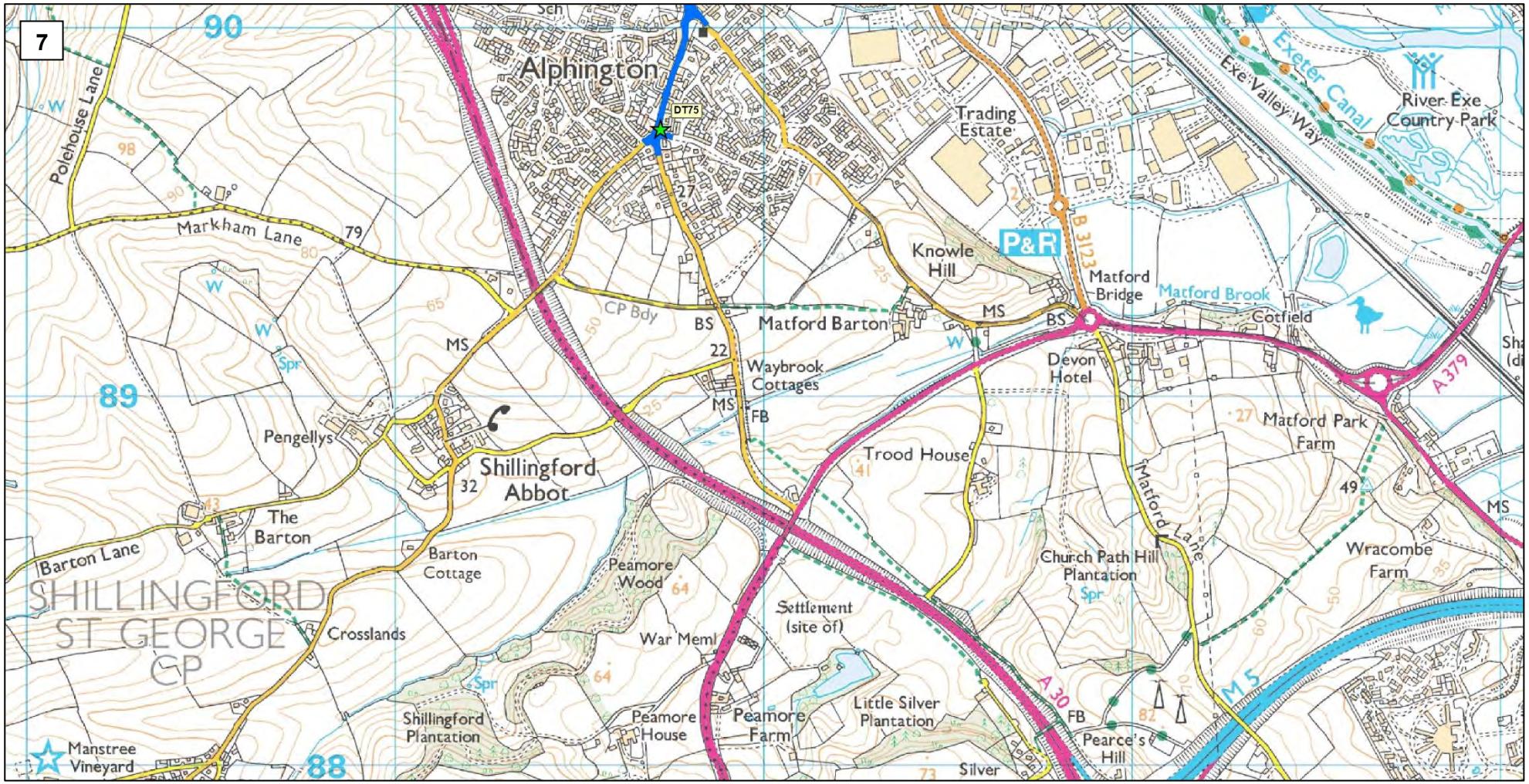


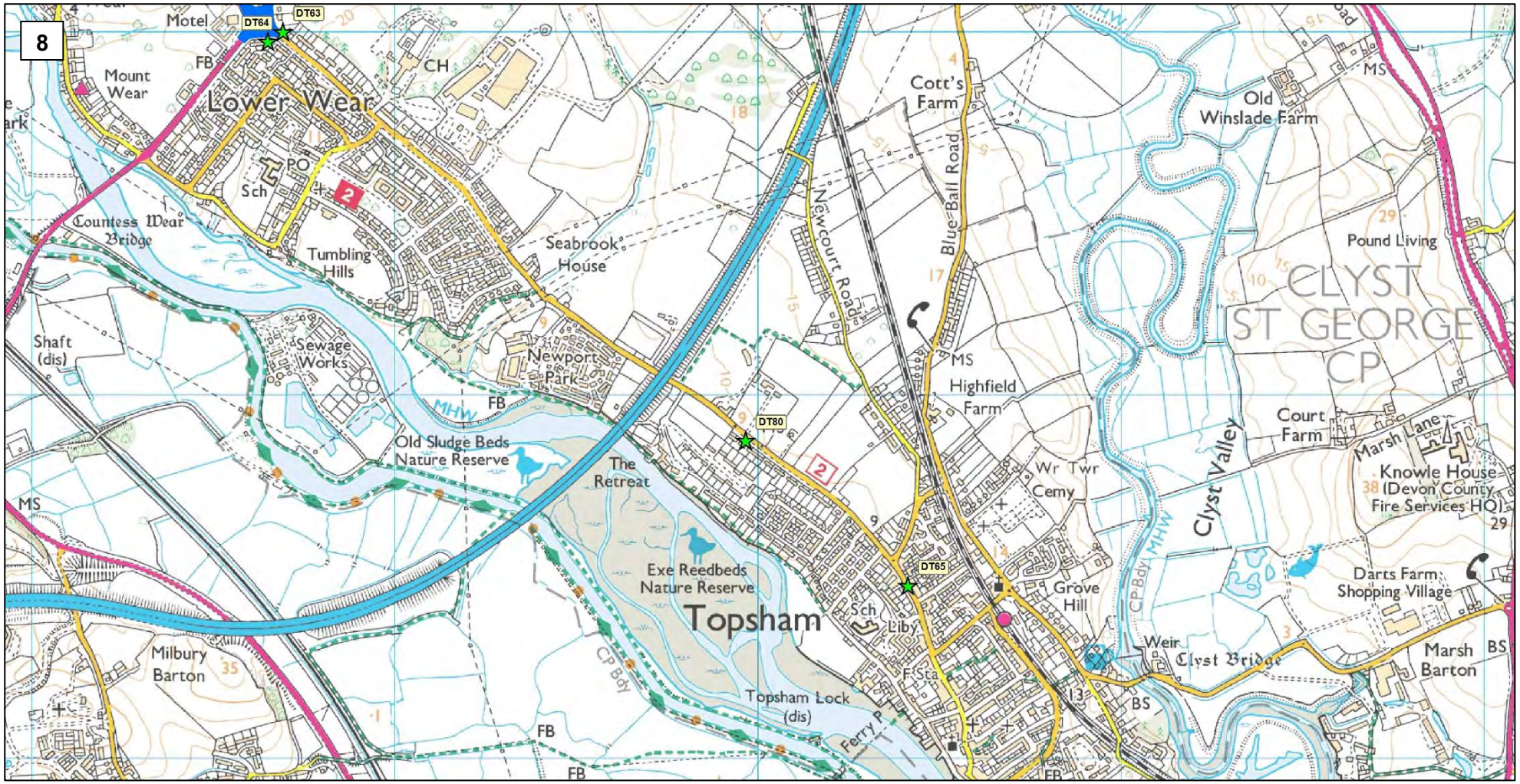












Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England1

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

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

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data (reported by the Prime Minister's Office at the COVID-19 briefing on the 31st of May 2020) suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG) has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages (Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020). During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$

concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Exeter

COVID-19 related impacts on monitored concentrations and traffic numbers within the AQMA and particularly along the Heavitree corridor (where the greatest exceedances were seen prior to 2020) are presented below.

Yearly traffic flows were around 15-25% down on previous years (table F.1), with the greatest reduction seen during the first lockdown in April 2020 (flows down 60%). Typical levels of traffic returned in August and September.

Annual average nitrogen dioxide concentrations fell by between 14 and 40% when compared to an average for the previous five years (2015 to 2019). The average change was a 31% reduction. This is greater than the fall in traffic flows (Table F.1), which suggests that the impact of reducing traffic flows is not just in the reduction in vehicles but also in the consequent impact on congestion. When there are fewer vehicles on the road, there is less congestion and emissions per vehicle are reduced as driving is smoother and speeds more constant.

Table F.1 Traffic flow data for 2015 and 2020

Site Name	AAWT (24hr)		
	2015	2020	% change
Pinhoe Road (Whipton)	20830	16538	-21%
Heavitree Road*	17507	14832	-15%
Honiton Road	26832	22789	-15%
Topsham Road (King George)	26057	20702	-21%
Alphington St	28799	22012	-24%
Cowick St	14840	10913	-26%
Total	**134865**	**107786**	**-20%**

*2016 count data instead because 2015 data was faulty

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In 2020, no exceedences of the objective level were seen in Exeter for the first time. This has given both the City and County Council's useful evidence in relation to the annual mean objective being achievable, and the changes that are necessary to achieve this.

Opportunities Presented by COVID-19 upon LAQM within Exeter

COVID-19 has presented opportunities during 2020 which are described below:

- Temporary Cycle Lanes, School Streets and road closures. A number of temporary improvements were implemented by Devon County Council. Due to high usage and positive feedback many of these either have been or will be progressed to become permanent features.
- Engagement with support groups and individuals during 2020 has increased. This will support the community building work that is being led by the SELDP team.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Exeter City Council

The following challenges and/or constraints have been experienced in relation to LAQM within 2020 that can be attributed to the pandemic. For each challenge and/or constraint an impact rating has been stated in line with guidance presented within the LAQM Impact Matrix provided within Table F.2.

- The implementation of measures around public and shared transport (such as Park and Change and Co-Cars) and travel planning visits to new homes have been delayed as a result of social distancing restrictions. These are all expected to recommence in 2021. **Small to Medium Impact**
- As with previous years, a local bias adjustment factor has been utilised to adjust the diffusion tube results for 2020. The factor is lower than in previous years, but data capture was good and the tubes showed good overall precision. There is no reason therefore to conclude that the local adjustment factor is any less reliable than normal. **No Impact**
- During 2020, the diffusion tube calendar had to be adjusted and repairs to the Alphington Street continuous analyser were delayed as a result of COVID-19.

However data capture in all cases remained above 75% and so no data required annualisation. QA/QC procedures were otherwise maintained and tubes continued to be stored correctly. **No Impact to Small Impact**

The impacts as presented above are aligned with the criteria as defined in Table F.2, with professional judgement considered as part of their application.

Table F.2 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

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 Highways England
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

References

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- Exeter City Council 2019. Exeter Air Quality Action Plan 2019-2023.
- Exeter City Council 2019. Exeter Air Quality Annual Status Report.
- Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users 2008
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- Devon Local Transport Plans.