



2023 Air Quality Annual Status Report (ASR)

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

Date: June, 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Southampton City Council

Poor air quality is the greatest environmental risk to health globally, and in the UK. Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Southampton is a major coastal city located on the South Coast of England. It is the largest city in Hampshire, covering an area of 52 km². Southampton has a population of 263,800 (2021 Census) and is the third most population dense city in England. The city is served by numerous major transport links, including a regional airport just outside the city's northern boundary, the M3 and M27 Motorways, a major cruise, container and vehicle port and a main line railway to London and along the south coast.

Southampton like all large UK cities experiences high levels of pollution in certain areas of the city. In Southampton, the fraction of mortality caused by particulate matter is attributed to 5.9% of mortality in 2021 compared to the England average of 5.5%⁵.

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

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

³ Defra. Air quality appraisal: damage cost guidance, January 2023

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

⁵ [Public health profiles - OHID \(phe.org.uk\)](https://phe.org.uk/public-health-profiles)

There are pockets of deprivation in the city with 11% of the population living in the top 10% of the most deprived in England. In the most deprived areas of Southampton compared to the least, asthma prevalence is approximately 1.46 times higher and emergency admissions for asthma is approximately 1.92 times higher⁶.

As a result of these high levels of pollution in the city, Southampton has declared 10 Air Quality Management Areas (AQMAs) to date where levels have exceeded statutory air quality objectives in the past.

The location of these AQMA's is shown in figure 1. The AQMA's have been declared for exceedances of the UK objective for annual mean nitrogen dioxide (NO₂) (40µg/m³). Southampton also monitors particulate matter (both PM₁₀ and PM_{2.5}), sulphur dioxide (SO₂) and ozone (O₃), however none of these pollutants have exceeded objectives since monitoring began. The recent introduction of the new air quality objective for PM_{2.5} and future standards may change this, however. For more information on Southampton's AQMAs and monitoring, please visit: [Air quality management areas \(southampton.gov.uk\)](https://www.southampton.gov.uk/air-quality-management-areas) and [Monitoring and reporting \(southampton.gov.uk\)](https://www.southampton.gov.uk/monitoring-and-reporting).

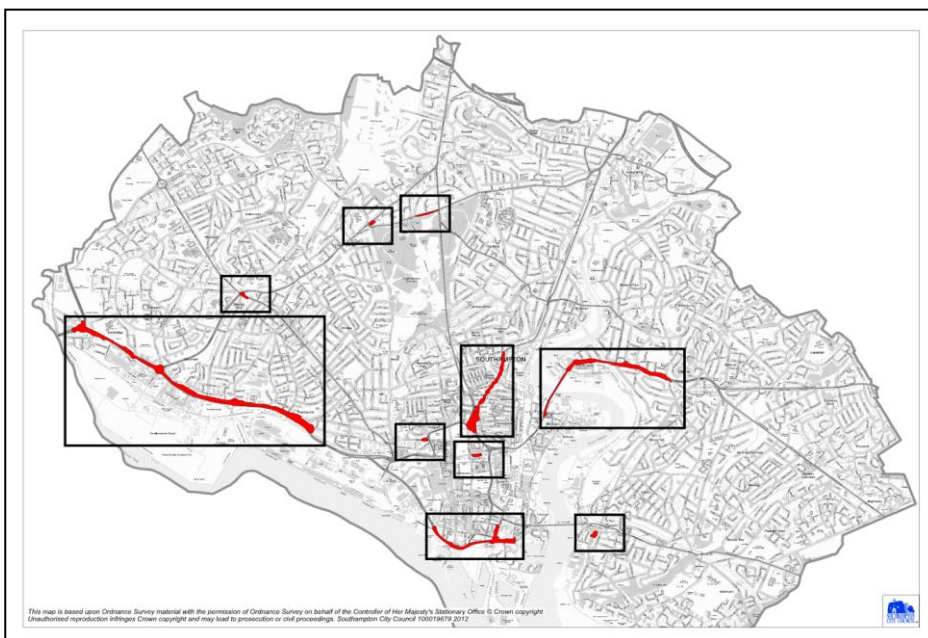


Figure 1 SCC Air Quality Management Areas

⁶ [Health inequalities \(southampton.gov.uk\)](https://www.southampton.gov.uk/health-inequalities)

Air Quality Management in Southampton

Local Air Quality Management (LAQM) duties are shared between Southampton City Council's (SCC's) Scientific Service and the Sustainability teams. These include monitoring, reporting, and evaluating air quality data and delivering measures under the Air Quality Action Plan (AQAP).

SCC is a unitary authority and therefore the local transport authority. Air quality officers work closely with transport teams to ensure that actions to improve the local transport network considers improvements in air quality and identifies opportunities to introduce new, innovative measures that will reduce emissions and promote active and sustainable travel. Much of the progress towards cleaner air has been led by transformational work done through transport programmes.

Sources of Pollution

SCC has undertaken source apportionment studies to understand what the key sources of pollution are in the city. This estimated the contribution of different sources towards levels of nitrogen oxides (NO_x) at several locations in the city. NO_x (also referred to as NO₂) remains the key pollutant of concern in the city as the only pollutant which hasn't met statutory air quality objectives.

Figure 2 provides two locations where source apportionment took place. The results shown that, while lots of different sources contribute towards poor air quality, including industry, the port, and sources from outside the city (background sources), road vehicles contribute the most towards levels of NO_x in these locations. This reflects national data which has long established that road vehicles, and in particular private vehicles, contribute the most to poor air quality. The data also shows how sources differ across two sites. For example, the contribution of buses is markedly higher in Northam Road where buses are relatively more common than Redbridge Road.

Because of this, action to improve air quality principally focus on reducing emissions from road transport. These include measures which encourage more people to walk and cycle, use public transport, or use lower emission vehicles.

There is rapidly growing awareness of the impacts of PM on health. Despite having met air quality objectives for this pollutant, The Council is working to reduce emissions of PM through it's AQAP.

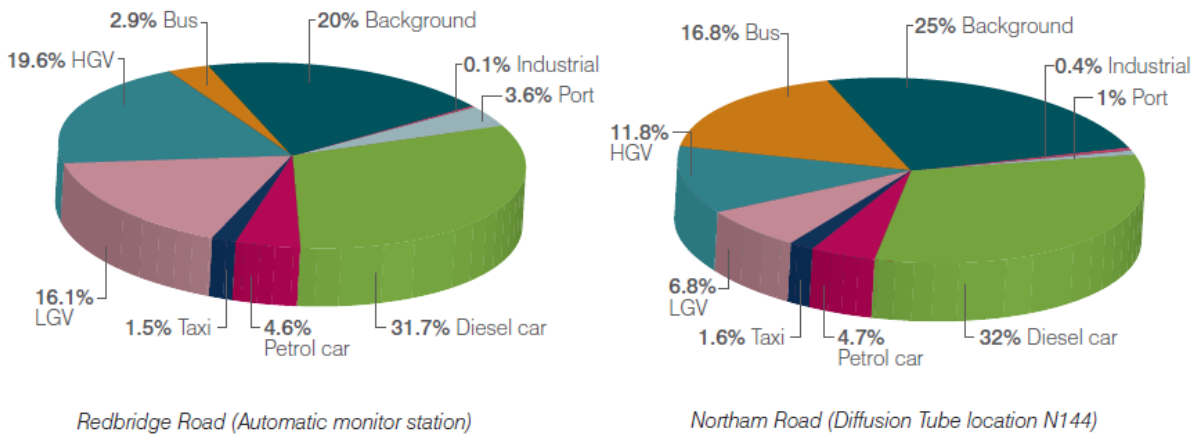
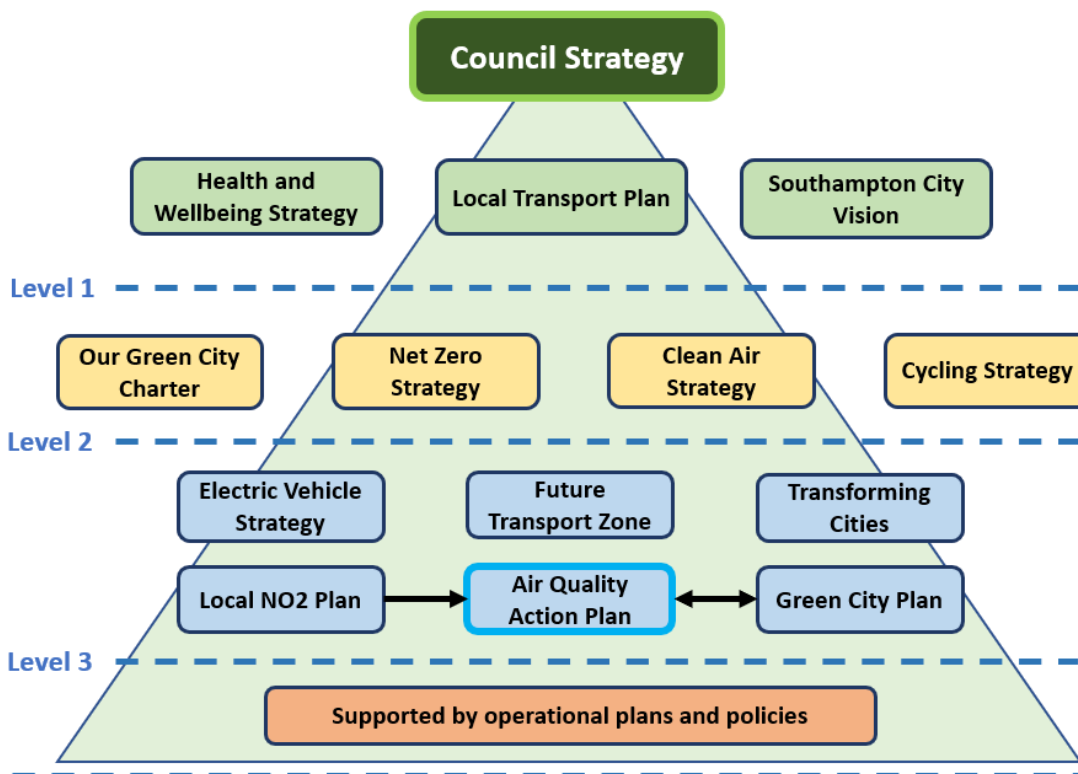


Figure 2 Modelled NOx source apportionment at two monitoring locations (% contribution, 2015)

Related Strategies and Plans

The Council has adopted a series of policies to directly address poor air quality, as well as several other plans which contribute towards cleaner air. These are set out in the below diagram which illustrates the links between these policies.



Air Quality Action Plan

In December 2022, The Council adopted its new [Air Quality Action Plan](#) (AQAP). The Plan sets out The Council's approach to tackling air quality and aims to bring about a continual improvement in the city's air quality, beyond statutory objectives.

The Plan introduces 60 new measures which will be implemented or explored over the next five years, split between the following five priority areas:

1. Empowering Communities
2. Supporting Businesses
3. Active and Sustainable travel
4. Low and Zero Emission Vehicles
5. Monitoring and Planning

Clean Air Strategy

SCC has adopted a [Clean Air Strategy](#) which sets out the council's strategic goals and priorities for improving air quality. The strategy details the ways SCC works together with partners including neighbouring local authorities, public transport operators and local businesses and organisations to identify ways to improve air quality and support ongoing improvements in air quality across the city.

Local NO₂ Plan

SCC was one of the first five local authorities required by the Secretary State to submit a full business case⁷ to assess whether a charging Clean Air Zone was necessary to achieve compliance with the EU (EU Ambient Air Quality Directive 2008) annual mean NO₂ legal limit of 40 µg/m³ in the shortest possible time.

Air quality modelling demonstrated that compliance with NO₂ limits would be achieved at all locations in Southampton in 2020 without a charging Clean Air Zone. Without any intervention, the highest mean average concentration of NO₂ in Southampton is modelled to be 38 µg/m³ on the A3024 Northam Bridge in 2020.

While a charging Clean Air Zone was not needed, a series of non-charging measures were presented to and approved by the Secretary of State as part of the full business case

⁷ https://www.southampton.gov.uk/modernGov/documents/s39821/CAZ_Full_Business_Case.pdf

for achieving compliance in the shortest possible time. These measures are known collectively as 'The Local NO₂ Plan' and consist of:

- Introduction of citywide traffic regulation condition requiring a minimum Euro VI (highest European standard of diesel emissions) equivalent standard for all operational buses.
- The introduction of new taxi and private hire vehicle licensing conditions requiring a minimum euro 6 diesel/euro 4 petrol for newly licensed vehicles in 2020 and for all licensed taxis and private hire vehicles to meet this standard by 2023.
- A framework agreement and subsidies for public authorities to use the Sustainable Distribution Centre to ensure fewer, fuller, and cleaner Heavy Goods Vehicles (HGVs) move around the city. Supported by developing delivery and service plans for organisations so they can understand how to reduce vehicle journeys associated with their business.
- Targeted promotion of active and sustainable travel on the A3024 (location of highest modelled NO₂ concentrations in 2020) through the MyJourney programme.
- Expansion of Low Emission Taxi Incentive Scheme for Southampton licensed taxi and private hire vehicles. Extension to support upgrades to cleaner wheelchair accessible vehicles.
- A free trial scheme for taxi and private hire operators which highlights the benefits of an electric vehicle.
- Two new taxi-only rapid charging points to support uptake of electric vehicles within the taxi and private hire fleet. 8 rapid chargers for open use introduced through 'Hants 2025' scheme.

The Local NO₂ Plan was approved by the Secretary of State in early 2019 and has now been delivered in accordance with the expectations of central government. Minor changes to some measures were necessary due to COVID-19, however these have not had a large impact on the impact the plan has delivered.

The Council is currently monitoring and evaluating the success of the plan as per the requirements of the government's Joint Air Quality Unit (JAQU) and will continue to do so in 2023 to understand implications for compliance with the EU Ambient Air Quality Directive and whether further measures could further improve the likelihood of compliance.

Our Green City Plan

Our Green City Plan is The Council's Sustainability policy which sets out a series of commitments across the sustainability agenda including climate change, ecology, waste, sustainable travel, and air quality.

Several commitments to air quality were made in the plan as well as a commitment to ensure air quality projects maximise co-benefits to other areas of sustainability and vice versa. This commitment and the new projects committed under the plan is further established through the newly adopted Air Quality Action Plan 2023 – 2028.

Electric Vehicle Strategy

The Council have delivered an Electric Vehicle Action Plan which has led to the installation of over 52 fast charge points across the city.

Officers are preparing an Electric Vehicle Strategy which will aim to bring about a step change in the provision of EV infrastructure across the city, including more charging opportunities for residents and visitors outside of the city centre and on-street. This will be done by entering a partnership or concessions arrangement with a provider to ensure future demand for EV's is met. The Council is also exploring all grant opportunities including the government's On-street Residential Charging Scheme (ORCS) and Local Electric Vehicle Infrastructure (LEVI) funding and aims to submit an application to both in 2023.

Under The Local NO₂ Plan and the AQAP to date 2 rapid chargers have been introduced to help support the taxi trade in shifting towards electric vehicles with an additional 8 being introduced for open access under the 'Hants 2025' scheme.

The Council are also investing in electric vehicles in their own fleet with currently over 70 vans in the fleet served by over 30 charge points across the depots.



Figure 3 New electric vehicles in The Council's fleet (left). Lances Hill rapid and fast charger (right).

Connected Southampton 2040 - Our Local Transport Plan

Connected Southampton 2040 was published and adopted in March 2019. It sets out an ambitious long-term strategy supported by a short-term Implementation Plan. The Plan aims to ensure that our transport policies, strategy, and delivery plans better reflects and support bold and ambitious goals for sustainable and clean growth over the next twenty years, including:

- A Zero Emission City
- The Southampton Mass Transit System
- A liveable city centre
- Active Travel Zones
- A network of Park and Ride sites
- Better connectivity.

The plan aspires to help in transforming public transport in the city and create active travel zones where short journeys made by walking and cycling will be the norm. More information can be found at the [Southampton transport website](#).

The Council adopted a [three-year Implementation Plan](#) in 2022 which sets out in further detail how The Council will help people move more sustainably around the city as the city recovers from the pandemic.

Transforming Cities Fund

As part of the 2020 Budget, the Chancellor announced the outcome of the Industrial Strategy's Transforming Cities Fund (TCF). The [joint bid](#) submitted in November 2019 by Southampton City Council and Hampshire County Council for Southampton and Hampshire was awarded £57m of Government funding towards the total £68.5m project and covers the three years to March 2023. The remainder of the funding is coming from local match contributions with the Council and its partners.

This will enable Southampton City Council and Hampshire County Council to deliver joint plans for sustainable and active travel in Southampton and Hampshire in a targeted way. This is a significant level of capital transport funding that will have a transformative impact on people's journeys by bus, walking and cycling.

Key areas in the plan include:

- Accelerating the delivery of the Southampton Cycle Network so that cycle routes are safe and convenient and we can become a true cycling city.
- Developing the Southampton Mass Transit System so we can encourage people to use public transport with priority for buses, new Park & Rides and reducing delays for everyone by using smart technology.
- Starting to change the city centre by making it a better place to walk and cycle, and by creating our gateways into the city at stations, the airport and ferry terminals. This will mean people can easily get between train, ferry, bus, plane, car, and bicycles.

Further information is available on [Transforming Cities \(southampton.gov.uk\)](https://www.southampton.gov.uk)



Figure 4 Portswood road scheme illustration involving reallocation of road space to buses and cycles currently planned through TCF. One example of the scale of work being planned through the programme.

Future Transport Zone

Southampton City Council alongside other organisations in the wider ‘Solent Transport’ group were awarded £29m from the Department for Transport (DfT) to implement innovative future transport solutions around personal mobility and freight movements. The funding means the Solent area will benefit from several innovative transport solutions including smartphone apps for planning and paying for sustainable journeys, e-bike and e-scooter share scheme, and new approaches to freight distribution including drone freight trials for NHS deliveries across the Solent to the Isle of Wight.



Figure 5 Beryl bikes and Voi scooters currently on trial for rental through the FTZ programme.

Cycling Strategy

[SCC Cycling Strategy 2017-2027](#) was launched in 2017 which sets out The Council's plan for improving cycling rates in Southampton over the following 10 years. The Strategy outlines the work that has already been undertaken, sets out a plan of proposed improvements to the cycle network and identifies initiatives to realise the benefits that cycling can bring to the city. This strategy is accompanied by delivery plans which set out how the plan will deliver improvement over three year periods.

Actions to Improve Air Quality

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

The Environmental Improvement Plan⁸ sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM_{2.5} targets. The now published 2023 National Air Quality Strategy provides more information on local authorities' responsibilities to work towards these new targets and reduce PM_{2.5} in their areas. The Road to Zero⁹ details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

We've seen steady improvements in air quality over the last 10 years due to the measures we've implemented, national improvements, and more sudden reductions since 2020 as a result of the COVID19 pandemic. Despite this improvement and relevant objectives being achieved in recent years, The Council remains committed to seeing further improvements in air quality.

At the end of 2022, The Council adopted its new Air Quality Action Plan which builds on work done through the previous Air Quality Action Plan and the Local NO₂ Plan. It also brings together all the work done across the council and city which contributes towards cleaner air. In total, 60 measures are set out which will be explored or delivered in the next five years to help secure a continual improvement in air quality in the city.

A number of these measures will help to address inequalities in exposure and outcomes. These include the schools and healthcare engagement projects which will incorporate air quality and deprivation data to understand where poor air quality has the greatest impact on public health and targeting action there. A commitment under the updated Air Quality Action Plan is to carry out a more detailed mapping exercise to better understand local health inequalities in the city and how they interact with air quality.

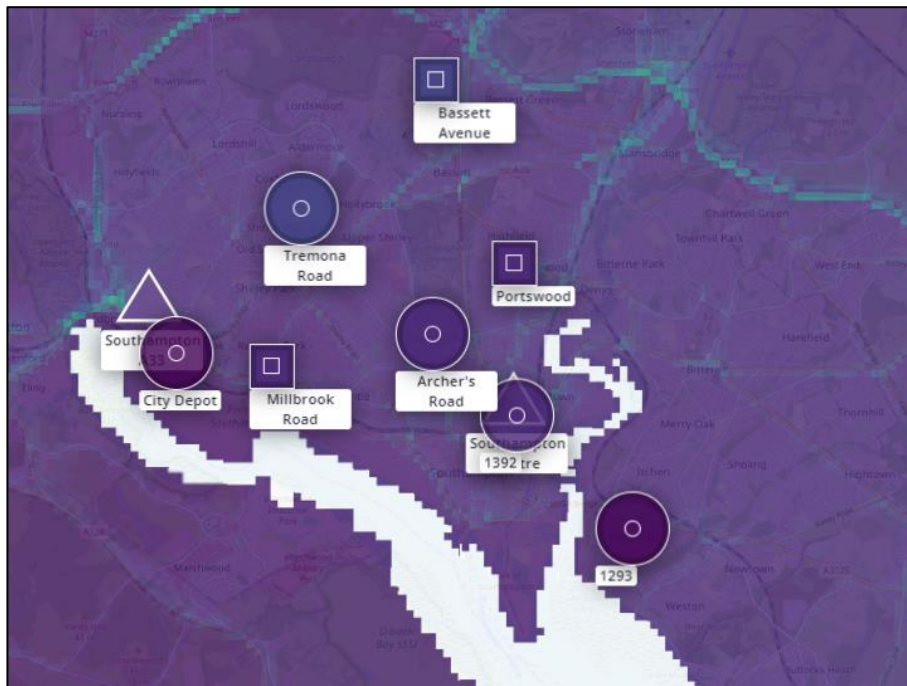
⁸ Defra. Environmental Improvement Plan 2023, January 2023

⁹ DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

This Annual Status Reports provides regular updates on work towards these measures. Table 2.2 provides an update on existing and new measures as they are brought in. For the reporting year of 2022 which this report covers, 50 measures are updated. This will be added to over coming years are more AQAP projects are developed.

Key measures undertaken in 2022 include:

- Developed and adopted The Council's new Air Quality Action Plan.
- Finalised The Local NO₂ Plan and continued the process of monitoring and evaluating its effectiveness.
- Launched the ERDF funded Electric Taxi and Van Lease scheme. 10 vehicles have taken on the scheme so far taking on a 50% cost lease of an EV vehicle. The project also includes installation of 8 new rapid charge points and telematics to support the shift to ultra-low emission vehicles after the offer is discontinued.
- Installed a network of 8 low cost 'Zephyr' monitors across the city to support the monitoring network, focussing on residential areas to better illustrate the impact of wood burning on local communities, supporting the existing wood burning behaviour change campaign. Run in collaboration with neighbouring Hampshire LAs.
- Developed the 'MappAir' model for Southampton using the Zephyr monitors and existing monitors to model in real time NO₂ and PM_{2.5} across the entire city up to 10x10m in spatial resolution. This map will be used for a variety of projects including behaviour change initiatives where the map can be used to help illustrate local pollution issues and encourage measures to reduce exposure to pollution. An extract of the model is shown below:



- Associated British Ports installed two shore-side connections at the Horizon and Mayflower cruise terminals through Local Enterprise Funding. This allows compatible ships to 'plug into' mains power rather than using auxiliary engines while in port. Estimated to result in the equivalent of £10.5 million in air quality benefits, recouping the cost of investment of £7.5m without benefits to fuel savings and GHG savings.
- Taxi licensing condition measure now completed with all vehicles now meeting at least Euro 6 standard, aside from around 10 wheelchair accessible vehicles. The taxi fleet continues to rapidly improve. Now 62% of the fleet are hybrids, 1% are electric, and 37% are new Euro 4 petrol or Euro 6 diesel vehicles meaning the fleet is essentially Clean Air Zone compliant.
- Adopted an Bus Service Improvement Plan to ensure buses operating in Southampton remain compliant with Euro VI standards.
- Secured funding and planning to deliver a schools engagement project launching in January 2023 to increase awareness of pollution in key schools and encourage behaviour change to avoid exposure to pollution. Recruited officer to lead project in new year.

- Secured an extension to the FTZ funded e-scooter hire scheme and procured a provider to deliver a bike hire scheme across the city including e-bikes and normal bikes.
- Delivered year three of Our Green City Plan including launching the Southampton Climate Commission, drafting a Climate Change Strategy for the city, and continuing to roll out key projects for decarbonisation including the Healthy Homes scheme.
- Delivered the third year of the wood burning engagement campaign with the local charity The Environment Centre. The campaign aims to help support residents who burn wood to burn less and burn better.
- Continuing Local NO₂ Plan evaluation to understand impact of The Plan and the pandemic on air quality in the city.

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

- Implementing first year actions in the Air Quality Action Plan including launching schools project, securing funding, and launching healthcare project, finalising try before you buy project and more.
- Continued evaluation of The Local NO₂ Plan including developing new measures to deliver through the Air Quality Action Plan.

The Council's priority for 2023 is to begin delivering on the commitments in the Air Quality Action Plan. This will include delivering a swath of new, innovative air quality measures and integrating new powers under The Environment Act 2021 and new Air Quality Strategy. A priority area of The Plan is ensuring that residents and businesses understand their impact and empowering them to support The Council's aims of continuous improvements in air quality in the city.

At the same time, The Council will continue to evaluate the data to understand the impact of The Local NO₂ Plan and COVID-19 on air quality and continue working with the government's Joint Air Quality Unit.

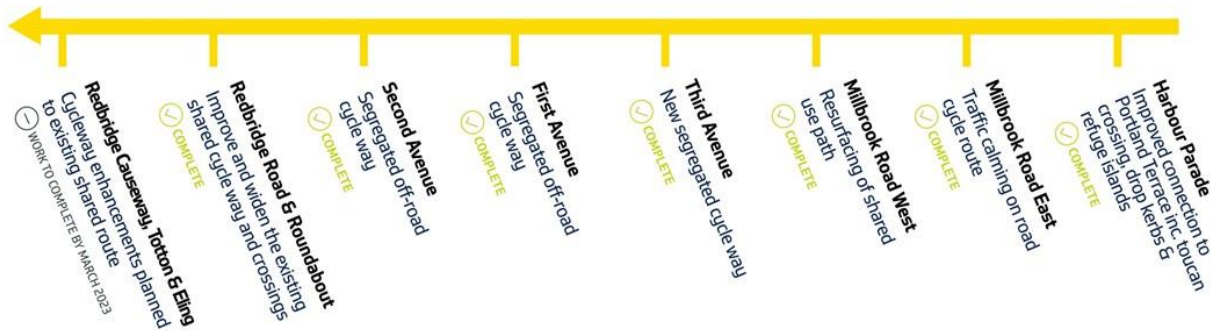
Other Measures

Alongside the Local NO₂ Plan and new AQAP, The Council has implemented several other measures which contribute to improving air quality in the city, including:

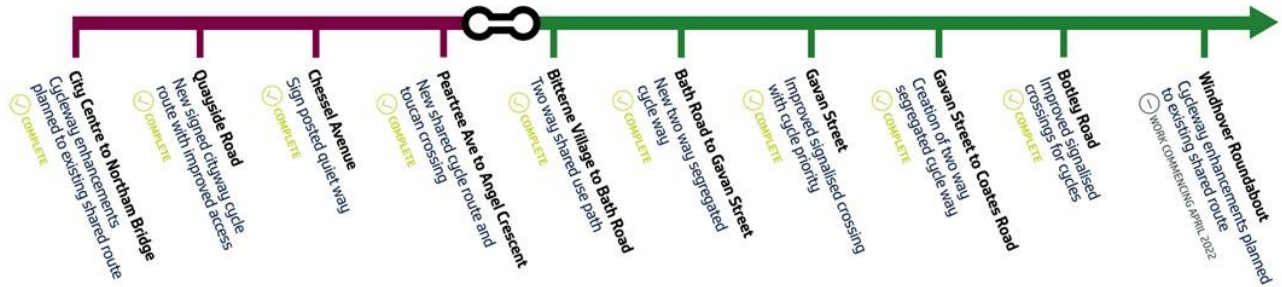
Southampton Cycle Network (SCN) and active travel

- To date, SCN 1 has been completed through NO2 Plan early measures funding, as well as SCN 3, 4 and 5 are completed with 6 underway.

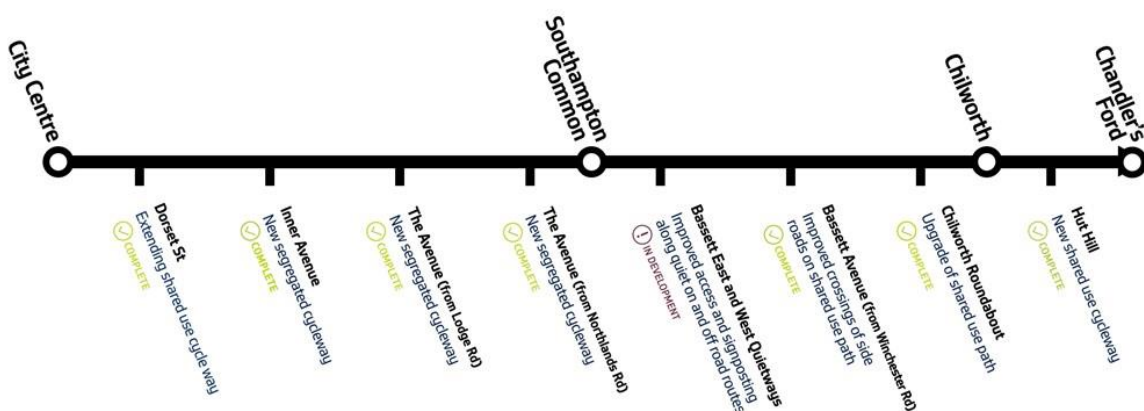
SCN1 WESTERN CYCLE FREEWAY



SCN3 & SCN4 EASTERN CYCLE FREEWAY



SCN5 NORTHERN CYCLE FREEWAY



- MyJourney engagement with communities, businesses, and residents throughout 2022 to encourage active and sustainable travel.
- Implementation of the St. Denys Active Travel Zone, including filtered permeability and community engagement is underway. Development of other Active Travel Zones is underway under the Transforming Cities programme.

- The MyJourney active travel engagement programme continues to deliver effective behaviour change engagement for schools and workplaces.

Public Transport

- Successfully secured £2.7m funding to retrofit Southampton's operational buses with Clean Vehicle Retrofit Accreditation Scheme (CVRAS) accredited technology. Of the 145 buses operating in Southampton which did not meet Euro VI standard, all are now retrofitted to Euro VI equivalent standards.
- Implemented a Bus Service Improvement Plan to commit buses to Euro VI standard, as well as a host of other service and performance criteria including punctuality, Wi-Fi and charging availability etc.
- Implemented park and ride service to University Hospital Southampton during weekdays and to the city centre during some weekends. Trial underway for use of the park and ride for match days to St Marys Stadium.
- Continued to invest in bus lane infrastructure on key routes including Western Approach for park and ride use.
- Extending the age limit for hybrid and electric private hire and hackney carriage vehicles licensed in Southampton from 9 years to 12 allowing cleaner vehicles to stay in the fleet for longer.
- Identifying further opportunities to introduce electric buses into the Southampton fleet.

Transforming Cities Programme

- Delivery of the Transforming Cities Programme is underway. The St. Denys Active Travel Zone has been completed with more zones planned. Other major changes are being planned including change of access to Portswood Broadway to bus lane only, and the creation of a city centre ring road, limiting private vehicle access and encouraging sustainable modes of travel. The Adanac Park travel hub and central station transformation projects are currently under construction.

Future Transport Zone

- The programme continues to deliver significant innovative projects across the Solent region including the e-scooter and bike hire schemes in Southampton. Opportunities for reducing congestion and emissions from freight operations are

also being delivered including use of macro and micro consolidation opportunities as a result of earlier Delivery and Service Planning through The Local NO₂ Plan.

Electric Vehicles

- Continued investment in The Council's fleet with 70 vehicles currently in place and an aim for 90% of the fleet to be electric by 2030.
- Installing 52 new and currently free to use public EV charge points in the city centre. Over 80 total charging points are currently publicly available in Southampton.
- Application for LEVI funding to secure resource and grant for delivering a 'step-change' in electric vehicle charging infrastructure for the city.

Conclusions and Priorities

No exceedances of the annual mean NO₂ objective were monitored in 2022, the third time this has happened since Review and Assessment began. The highest monitored mean concentration of NO₂ in Southampton at a relevant receptor was 35.9 µg/m³ on the residential façade of 367A Millbrook in 2022. Close behind this was the second highest, 34.1 µg/m³ on the residential façade of 66 Burgess Road in 2022. These locations are both within existing AQMAs.

There were a few higher results monitored, but these were not at relevant receptors. For instance, Redbridge Causeway at 38.3 µg/m³ and Vincents Walk Bus Stop at 40.1 µg/m³. 289 Millbrook Road was very high at 46.7 µg/m³, but it is on a post located on the kerb of Millbrook Road. When adjusted for distance to the nearest house it reduces to 30.9 µg/m³.

2022 monitoring results showed broadly similar levels of NO₂ levels, compared 2021 despite moving out of the earlier COVID19 pandemic phases that had included periods of lockdown, as was the case 2021. This indicates that levels of NO₂ have not returned to higher pre-pandemic levels of 2019. The rapid adoption of permanent flexible and home working arrangements in workplaces is likely one of the key reasons for this as a result of smoothed peak time congestion.

In summary, exceedances halved from 8 in 2018 to only 4 in 2019 at relevant receptors, with no monitored exceedances recorded in 2020, 2021 and 2022. Defra guidance suggests that AQMAs are revoked when the highest annual average concentration of NO₂ in an AQMA fall below 36 µg/m³ for a minimum of 3 consecutive years at residential facades. According to this criteria, the following AQMAs have been under consideration for revocation:

- AQMA 2 Bitterne Road
- AQMA 3 Winchester Road
- AQMA 4 Town Quay Road
- AQMA 6 Romsey Road
- AQMA 10 New Road
- AQMA 11 Victoria Road

However, no AQMAs were revoked in previous ASRs on the basis that data from 2020 has been greatly influenced by the impact of COVID19 and subsequent lockdowns. Previous ASRs highlighted the need to consider medium to long-term trends of NO₂ to understand

what the long term impact of COVID19 on concentrations has been. While this 2023 ASR highlights that it is unlikely that concentrations will rebound to concentrations monitored pre-2020, uncertainties such as potential low wind years, increases in development and traffic further changes to working patterns in the city may have an impact.

As such, The Council are taking a conservative approach by only considering AQMAs for revocation that have achieved NO₂ annual means below 36 µg/m³ for a minimum of 5 consecutive years.

Only one AQMA meets this criteria:

- AQMA 10 New Road

Southampton City Council propose to revoke AQMA 10 New Road and will consider revoking further AQMAs in the 2024 ASR if patterns persist.

Priorities for 2023

Now that The Council's new Air Quality Action Plan has been adopted, the clear priority for 2023 will be delivering measures committed for year one. This includes delivering the new healthcare and schools based engagement campaigns and extending them into a wider behaviour change programme, completing the new electric taxi and van try before you buy scheme and a review of air quality planning requirements through The Local Plan. The Air Quality Action Plan integrates new requirements of the Environment Act 2021. It will be a priority for The Council to review opportunities to leverage new powers granted under the act to bring about further improvements.

At the same time, The Council will continue to monitor and evaluate the impact of The Local NO₂ Plan on air quality to ensure it's had the expected impact, and that uncertainties introduced through the COVID-19 pandemic are accounted for.

The Council will also continue to work between teams including public health, transport (including FTZ and TCF programme teams) and planning to ensure projects delivered in each service area can maximise co-benefits for air quality, notably transport decarbonisation, and explore further options for how The Council can improve air quality to help reduce inequalities in exposure and outcomes across population groups.

Local Engagement and How to get Involved

The Council recognise that private vehicles continue to be the key contributor towards poor air quality in the city. As such, residents and visitors have a large impact on the city's air. Switching to more sustainable modes of travel including taking the bus or train, walking, or cycling is still the best way to help work towards clean air. MyJourney provides support to help you start travelling more sustainably. For more information, please visit the [MyJourney](#) website.

If possible, working flexibly or remotely can help ease peak time congestion and pollution in the city, and, if you burn wood in your home, consider ways to burn less and burn better.

You can also get in touch with the following groups that are actively promoting improvements in air quality and the environment more generally in the area:

- The Environment Centre who provide support on clean ways to heat your home and advice on wood burning: [the Environment Centre \(tEC\) – Bringing the benefits of sustainability to everyone](#).
- Sustrans who also provide support on walking and cycling: <https://www.sustrans.org.uk/>

Local Responsibilities and Commitment

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

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George O’Ferrall, Sustainability

Sam Guppy, Environmental Health Team

This ASR has been approved by:

- Councillor Eamonn Keogh - Cabinet Member for Environment and Transport
- Debbie Chase – Director of Public Health

If you have any comments on this ASR, please send them to Simon Hartill at:

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1 Local Air Quality Management

This report provides an overview of air quality in Southampton during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Southampton City Council to improve air quality and any progress that has been made.

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

2 Actions to Improve Air Quality

Air Quality Management Areas

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

A summary of AQMAs declared by Southampton City Council can be found in Table 2.1. The table presents a description of the 10 AQMs that are currently designated within Southampton City Council Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO₂ annual mean

On the basis of consistent compliance with the annual air quality objectives, Southampton City Council propose to revoke New Road AQMA. While improvements have also been monitored in other AQMAs, The Council maintain its commitment to ensure longer term trends in air quality are established before revocation is carried out (for further information see monitoring section).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
No. 1 Bevois Valley	Declared July 2005	NO2 Annual Mean	An area including a number of properties from Charlotte Place Roundabout to Bevois Valley Road	NO	50	36.2	3	SCC AQAP - Adopted 2008	Link
No. 2 Bitterne Road West	Declared July 2005, extended in 2012	NO2 Annual Mean	An area including a number of properties from Northam	NO	37	36.2	3	SCC AQAP - Adopted 2008	Link

			Road and along Bitterne Road West						
No 3. Winchester Road	Declared July 2005, reduced in size in 2006 after Further Assessment	NO2 Annual Mean	An area including residential properties at the Winchester Road/Hill Lane Junction	NO	35	26.7	4	SCC AQAP - Adopted 2008	Link
No. 4 Town Quay to Platform Road	Declared July 2005, increased in size in 2006 after Further Assessment	NO2 Annual Mean	An area including a number of properties from Town Quay to Platform Road	NO	48	30.8	5	SCC AQAP - Adopted 2008	Link
No. 5 Redbridge to Millbrook Road West	Declared July 2005, merged into one AQMA in 2012 after Further Assessment	NO2 Annual Mean	An area including a number of properties along Redbridge/ Millbrook Road	YES	45	35.9	4	SCC AQAP - Adopted 2008	Link

No. 6 Romsey Road	Declared July 2005, increased in size in 2012 after a Detailed Assessment	NO2 Annual Mean	An area including a number of properties along Romsey Road from Teboura Way to Shirley High Street	NO	44	31.8	4	SCC AQAP - Adopted 2008	Link
No. 8 Commercial Road	Declared July 2008	NO2 Annual Mean	An area including a number of properties along Commercial Road at the junction with Cumberland	NO	45	35	3	SCC AQAP - Adopted 2008	Link
No. 9 Burgess Road	Declared April 2012	NO2 Annual Mean	An area including a number of properties along Burgess Road at the junction with The Avenue	NO	47	34.1	3	SCC AQAP - Adopted 2012	Link

No. 10 New Road	Declared April 2012	NO2 Annual Mean	An area including a number of properties along New Road	NO	42	29.2	5	SCC AQAP - Adopted 2012	Link
No. 11 Victoria Road	Declared April 2012	NO2 Annual Mean	An area encompassing a number of properties along Victoria Road at the junction with Portsmouth Road	NO	43	27.5	5	SCC AQAP - Adopted 2012	Link

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

Southampton City Council confirm that all current AQAPs have been submitted to Defra

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

Defra's appraisal of last year's ASR concluded that the report is well structured, detailed, and provides the information specified in the Guidance. The following comments were received to help inform future reports:

1. The report has addressed comments from the previous round of appraisals. The Council's hard work in improving their ASRs is welcomed.
2. Robust and accurate QA/QC procedures were applied and there is clear reasoning and evidence for the calculation of a national bias adjustment factor.
3. The Council have reported the fraction of mortality attributable to particulate air pollution in Southampton City Council in detail, with a clear comparison to the regional and national averages. There is also detailed discussion of measures to tackle PM_{2.5} exposure in the borough. This is encouraged.
4. Some of the policy text, for example around the Environment Act, which was amended in 2021, is now outdated and so could be updated. **SCC Response: Will update in this Report**
5. The Council have provided a clear map of the diffusion tube monitoring network; trends are displayed and discussed in the report, this is welcomed.
6. The text "Error! Bookmark not defined" appears under the contents section of the report. For future ASR reports, The Council is highly encouraged to download the latest version of the Annual Status Report Template on Defra's Website (<https://laqm.defra.gov.uk/air-quality/annual-reporting/annual-status-report-templates-england-exc-london/>), and should check the report for referencing errors. This will ensure that any minor formatting issues are removed from future reports. **SCC Response: Will ensure latest template is downloaded and report checked for referencing errors.**
7. Overall, this report is comprehensive and well detailed. Southampton City Council are committed to improving air quality, with plans to draft an updated AQAP in 2022. Further comments on the progress of this should be included in the 2023 ASR.

Southampton City Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

58 measures are included within Table 2.2, with the type of measure and the progress Southampton City Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in their respective Action Plans. Key completed measures are:

Key measures undertaken in 2022 include:

- Developed and adopted The Council's new Air Quality Action Plan.
- Finalised The Local NO₂ Plan and continued the process of monitoring and evaluating its effectiveness.
- Launched the ERDF funded Electric Taxi and Van Lease scheme. 10 vehicles have taken on the scheme so far taking on a 50% cost lease of an EV vehicle. The project also includes installation of 8 new rapid charge points and telematics to support the shift to ultra-low emission vehicles after the offer is discontinued.
- Installed a network of 8 low cost 'Zephyr' monitors across the city to support the monitoring network, focussing on residential areas to better illustrate the impact of wood burning on local communities, supporting the existing wood burning behaviour change campaign.
- Develop the 'MappAir' model for Southampton using the Zephyr monitors and existing monitors to model in real time NO₂ and PM_{2.5} across the entire city up to 10x10m in spatial resolution. This map will be used for a variety of projects including behaviour change initiatives where the map can be used to help illustrate local pollution issues and encourage measures to reduce exposure to pollution.
- Associated British Ports installed two shore-side connections at the Horizon and Mayflower cruise terminals through Local Enterprise Funding. This allows compatible ships to 'plug into' mains power rather than using auxiliary engines while in port. Estimated to result in the equivalent of £10.5 million in air quality benefits.
- Taxi licensing condition measure now completed with all vehicles now meeting at least Euro 6 standard, aside from around 10 wheelchair accessible vehicles. The

taxi fleet continues to rapidly improve. Now 62% of the fleet are hybrids, 1% are electric, and 37% are new petrol or diesel vehicles.

- Adopted an enhanced partnership agreement to ensure buses operating in Southampton remain compliant with Euro VI standards.
- Secured funding and planning to deliver a schools engagement project in January 2023 to increase awareness of pollution in key schools and encourage behaviour change to avoid exposure to pollution. Recruited officer to lead project in new year. In post for two years.
- Secured an extension to the FTZ funded e-scooter hire scheme and procured a provider to deliver a bike hire scheme across the city including e-bikes and normal bikes.
- Delivered year three of Our Green City Plan including launching the Southampton Climate Commission, drafting a Climate Change Strategy for the city, and continuing to roll out key projects for decarbonisation including the Healthy Homes scheme.
- Delivered the third year of the wood burning engagement campaign with the local charity The Environment Centre. The campaign aims to help support residents who burn wood to burn less and burn better.
- Continuing Local NO₂ Plan evaluation to understand impact of The Plan and the pandemic on air quality in the city.

In December 2022, The Council adopted its new [Air Quality Action Plan](#) (AQAP). The Plan sets out The Council's approach to tackling air quality and aims to bring about a continual improvement in the city's air quality, beyond statutory objectives.

The Plan introduces 60 new measures which will be implemented or explored over the next five years, split between the following five priority areas:

1. Empowering Communities
2. Supporting Businesses
3. Active and Sustainable travel
4. Low and Zero Emission Vehicles
5. Monitoring and Planning

- Southampton City Council expects the following measures to be completed over the course of the next reporting year: Implementing first year actions in the Air Quality Action Plan including launching schools project, securing funding for and launching the healthcare project, finalising try before you buy project and more.
- Evaluation of The Local NO₂ Plan.

Southampton City Council's priorities for the coming year are to begin delivering on the commitments in the Air Quality Action Plan. This will include delivering a swath of new, innovative air quality measures and integrating new powers under The Environment Act 2021 and new Air Quality Strategy. A priority area of The Plan is ensuring that residents and businesses understand their impact and empowering them to support The Council's aims of continued improvements.

At the same time, The Council will continue to evaluate the data to understand the impact of The Local NO₂ Plan and COVID-19 on air quality and continue working with the government's Joint Air Quality Unit.

Southampton City Council worked to implement these measures in partnership with the following stakeholders during 2022:

- Neighbouring local authorities
- University Hospital Southampton
- The University of Southampton
- Associated British Ports
- The Environment Centre
- Earthsense
- Blink Charging
- Government departments including Defra, JAQU and DLUHC.

Southampton City Council anticipates that the measures stated above, in Table 2.2 and those committed through the new Air Quality Action Plan will likely be sufficient to ensure that air quality objectives continue to be met.

The principal challenges and barriers to implementation that Southampton City Council anticipates facing are delivering improvements in air quality commensurate with increasing demand on the local road network, and continued development and regeneration of the city. The council is also mindful of increasing levels of housebuilding outside of the city. As well as this, meteorological factors including potential low wind years will continue to have a sometimes overriding impact on concentrations in the city. It is hoped that these risks

can be mitigated through the Local NO₂ Plan, Air Quality Action Plan, Green City Charter and continued implementation of The Local Transport Plan including major work through the Transforming Cities and Future Transport Zone programmes.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Local NO ₂ Plan	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2019	2022	SCC, Defra, JAQU, DfT, New Forest District Council.	Clean Air Fund and Implementation Fund	NO	Fully funded	£1 million - £10 million	Complete	Helps ensure compliance with annual mean NO ₂ EU Ambient Air Quality Directive (40 µg/m ³ NO ₂ annual average at EU Directive relevant locations)	Series of KPIs associated with each project within programme.	Feasibility study and consultation complete. Full Business Case approved by Defra to implement a non-charging CAZ and Local NO ₂ Plan measures. Plan has been delivered largely to specification and maintains compliance with central government's expectations.	Some changes needed to projects during the COVID-19 pandemic, however delivery in line with central government's expectations maintained.
2	Quality bus partnership agreement and minimum emission standard for buses	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2020	2021	SCC, Local bus operators, DfT	Implementation Fund, Transforming Cities Fund	NO	Fully funded	< £10k	Implementation	Source apportionment of bus/coach estimated up to 38% in some locations with the highest bus movements (based on CBTF upgrades to SCC vehicle fleets). Purpose of condition is to maintain these improvements beyond 2020.	"Compliant" operational buses (meeting minimum Euro VI engines or Clean Vehicle Retrofit Accredited equivalent)	The Quality bus partnership agreement requires vehicles to meet Euro VI equivalent diesel standards in order to use the bus priority network in the city. The agreement will be adopted and funded through SCC and Hampshire County Council's Transforming Cities work.	TRO funded through NO ₂ Plan funding. Informal consultation raised that implementing minimum emission standards through a TRO would be problematic. The agreement provides an opportunity to maintain the public transport service as alongside other routes for pollution reduction including the requirement for monitored anti-idling policies.
3	My Journey			2017	2021			NO			Implementation				

		Promoting Travel Alternatives	Intensive active travel campaign & infrastructure			DfT, SCC, Hampshire County Council, Portsmouth City Council, Eastleigh Borough Council	Active Travel Fund, Access Fund, Transforming Cities Fund		Fully funded to date	£100k - £500k		Not yet quantified	Reduction in car journeys in the city	MyJourney is a long running and successful active and sustainable travel brand operating in the city. Each year dozens of events are held with community groups and schools engaging thousands of city residents with the aim of encouraging modal shift.	
4	Air quality planning policy and The Local Plan	Policy Guidance and Development Control	Air Quality Supplementary Planning Guidance	2017	2023	SCC	Internal	NO	Fully funded	N/A	Implementation	Not yet quantified	Impact of development on local air quality	Informal air quality planning guidance created and used in development control. Draft Local Plan currently going through consultation, to be reviewed in 2023.	Aspects of informal guidance to be adopted formally into upcoming Local Plan review.
5	Cycle Lane/ Routes Provision	Transport Planning and Infrastructure	Cycle network	2013	The Cycling Strategy spans 2017 to 2027 and is supported by 3-year Delivery Plans.	SCC	Early Measures Funding, Active Travel Funding	NO	Partially funded	£1 million - £10 million	Implementation	< 1µgm3	Estimated modal shift towards cycling.	SCC has committed to building 9 Southampton Cycle Network (SCN) routes which will be delivered through various funding sources. To date, SCN 1 has been completed through NO2 Plan early measures funding, as well as SCN 3, 4 and 5 are completed with 6 underway.	A 10 year cycle strategy has been adopted identifying the investment required along the key cycle commuter routes into the city centre.
6	Freight consolidation and efficiency	Freight and Delivery Management	Freight Consolidation Centre	2014	2022-2029	SCC, JAQU	Implementation Fund	NO	Fully funded	£100k - £500k	Implementation	Approx. 0.68 tonnes of NOx and 0.18 tonnes of PM modelled to be saved in 2020.	Reduction in HGV movements in the city. Use of SDC. Reduction in emissions from HGVs operating in Southampton.	Freight consolidation, delivery and service planning and fleet accreditation measures large part of The Local NO2 Plan. Framework delivered for Meachers Global Logistics. Subsidy provided to	Existing framework ends from 2019. A long term framework (up to 10 years) has been established to provide confidence to users that long term provision is available.

														University Hospital Southampton during COVID-19 pandemic to consolidate PPE deliveries.	The Solent Future Transport Zones (FTZ) programme aims to monitor and evaluate the SDC and use learnings to inform a better future arrangement with the centre to improve the effectiveness of consolidation.
7	Shore power for cruise ships	Promoting Low Emission Transport	Other	2019	2020-21	SCC, ABP	Solent Local Enterprise Partnership	NO	Fully funded	£1 million - £10 million	Implementation	If 20% cruise ships plug in by 2020, 12.1% reduction in NOx emissions estimated (based on 90% reduction in NOx emissions when ships accessing shore power), saving 8.34 tonnes of NOx and 0.31 tonnes of PM in 2020. ABP business case estimated 105 t/yr NOx, 4.8t PM2.5 savings.	Number of cruise ships using facility. Pollutant emissions from cruise ships at berth.	Two shore-side power connections installed at the Mayflower and Horizon cruise terminals currently servicing ships with required technology. Between April and October nearly 40 vessels used the plug-in facilities.	ABP continuing to investigate potential for further shore-side power connections. Expected increase in demand over next few years as more ships are built with the required infrastructure.
8	Electric Vehicle Strategy	Promoting Low Emission Transport	Procurng alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2017	2019/20	SCC, DfT	Internal	NO	Partially funded	£100k - £500k	Implementation	Private vehicle and SCC fleet NOx, PM emission reductions	Number of new public charging points installed over life of programme. Number of electric vehicles in SCC Fleet	To date, the council have installed 52 publicly accessible electric vehicle recharging points (EVCPs) including two rapid chargers, currently for taxi and private hire vehicles only.	The council is currently producing its formal Electric Vehicle Strategy document which will be implemented and adopted by the end of 2023 after internal and public consultation. The council has secured funding from the Governments LEVI Fund to increase publicly accessible on-

																	street EV charging in residential and commercial areas of the city in 2024
9	Taxi licensing conditions	Promoting Low Emission Transport	Taxi Licensing conditions	2019	2019/20 (phase 1), 2022/23 (phase 2)	SCC	Internal	NO	Fully funded	N/A	Implementation	Approx. 1.5 tonnes of NOx emissions reduced in 2021. Emission reductions would persist beyond.	Number of licensed taxi and private hire vehicles	Newly licensed vehicles must meet Euro 6 diesel/4 petrol by 2020 and relicensed vehicles will need to meet this standard from 2022. By 2023 all vehicles will meet the standard.	Supported by revised bus lane authorisations allowing only SCC licensed vehicles to access bus lanes. This will encourage operators to remain licensed in Southampton and meet the emission standards required rather than license elsewhere with no minimum emission standard. Bus lane authorisation measure amended as a compromise; implementation delayed, and some taxis known to have licensed elsewhere to circumvent conditions, although difficult to determine beneath COVID19 impacts. Currently 99% of taxi and private hire vehicles meet at least Euro 6 diesel standard.		

10	Low emission taxi incentive scheme	Promoting Low Emission Transport	Taxi emission incentives	2016	2021	SCC, Eastleigh Borough Council, Defra AQ Grant	Clean Air fund, Defra AQ Grant	YES	Fully funded	£100k - £500k	Closed	The existing scheme has £254,880 of Defra Air Quality Grant funding which at the time of scheme inception was anticipated to deliver 1681.5 Kg of NOx per year across Southampton and Eastleigh (£151,624 per tonne NOx per year), a total of 19.2% reduction in estimated total taxi emissions. NO2 Plan additional award expected to achieve 1.08 tonnes of NOx per year reduced emissions.	Alternatively fuelled vehicles in SCC and EBC fleet	Over 200 grants awarded in Southampton and around 30 in Eastleigh to drivers to upgrade Euro 5 or older diesel vehicles with a low emission alternative.	Largely due to this scheme the percentage of hybrid and electric vehicles in the fleet have risen from less than 5% before the scheme was brought in, to over 60% by the end of 2022. The upgraded fleet is estimated to save 7.53 tonnes of NOx per year.
11	Support ABP's Clean Air Strategy	Policy Guidance and Development Control	Low Emissions Strategy	2023	2023	Associated British Ports Southampton	Internal	NO	Fully funded	N/A	Complete	Measures within strategy have significant potential to deliver emissions reductions for NOx and PM.	Emissions from activity within the Port (i.e. shipping, NRMM) and traffic accessing the Port (i.e. freight, cruise traffic).	ABP have adopted their own clean air strategy which sets out the actions they will take to reduce the impact of their operations on air quality, including implementing shore-side power. This strategy is due to be updated early 2023.	Continued working with ABP is committed through the Air Quality Action Plan update - The Council continues to explore opportunities with the port to support both their strategy and the plan.
12	Straddle Carrier to Trial and monitor hybrid power	Promoting Low Emission Plant	Other measure for low emission fuels for stationary and mobile sources	2021	Complete	SCC, ABP, DPworld	Defra Grant	YES	Fully funded	£50k - £100k	Complete	Allows DP World to target fleet of straddle carriers for NOx, NO2, PM emission reductions. ~20% less fuel use with hybrid technology.	1 Straddle Carrier fitted with hybrid technology; report produced	Study complete and has created an inventory of all straddle carriers operating at the Port for DP World. NOx emissions from this study for DP World which measured NOx and NO2 emissions for	DPworld are continuing our investment program in Hybrid Straddle Carriers, with 11 delivered in 2021. DPworld are investigating procuring electric straddle carriers in the near future.

															<p>six types of non-road mobile machinery (NRMM) straddle carrier diesel engines in use at the port of Southampton has been used to inform.</p>	
13	Cleaner Air Strategy publication	Policy Guidance and Development Control	Low Emissions Strategy	2016	2016	SCC	Internal	NO	Fully funded	N/A	Complete	N/A	Publication date	Clean Air Strategy adopted in November 2016 and published on the council website.	The strategy will be reviewed in 2024.	
14	Port booking scheme to incentivise low emission trucks	Promoting Low Emission Transport	Priority parking for LEV's	2020	2020	ABP, DP world	N/A	NO	Fully funded	N/A	Complete	CAZ feasibility study will establish concentrations attributable to HGV's associate with port activity.	Emissions reductions from port related HGVs	Port booking system established including ANPR cameras, charging more polluting vehicles more for delivery slots.	Euro V HGVs and older are being charged £5 per visit to promote the use of newer trucks. This scheme will potentially be enhanced through the new port parking development proposed.	
15	Eastern Access Highway Scheme	Transport Planning and Infrastructure	Other	2020	Q4 2022	SCC, DfT. Highways England	National Productivity Investment Fund	NO	Fully funded	£1 million - £10 million	Complete	Not yet quantified.	Scheme complete	Includes improvements to traffic light signalling, a cycle freeway and other congestion easing measures.		
16	Millbrook Round about A33/ A35 Capacity	Transport Planning and Infrastructure	Other	2017	Complete.	SCC. DfT	DfT Maintenance Challenge Fund	NO	Fully funded	£1 million - £10 million	Complete	Not yet quantified.	Traffic flow/capacity in roundabout vicinity. Monitored NO2 levels.	Scheme to improve capacity at A33/A35 Millbrook roundabout at the Redbridge Road/Millbrook Road AQMA on the Western Approach with anticipated benefits for air quality was completed in April 2019.	Includes improved access to dock gate.	

17	Bus Priority measures	Traffic Management	Bus route improvements	2015	2021	SCC	Transforming Cities Programme	NO	Fully funded	£10k - 50k	Implementation	Not yet quantified.	Bus time reliability/Bus patronage.	Bus priority programme in progress with 42 junction improvements identified continue to be delivered. Junction improvements and virtual priority measures along A3024 between Botley Road and Bitterne Road East were complete December 2019. Measures along Portswood Road now developed and under consultation.	Investment in measures on high frequency city corridors that reduce journey times for buses and design out delays including bus lanes, bus gates, changes to traffic signals and "virtual" priority measures. To be built upon by Transforming Cities work (see below).
18	Retrofit for buses: SCRT for older buses. Thermal management for Euro V	Vehicle Fleet Efficiency	Vehicle	2019	2020	SCC, DfT/JAQU	Clean Bus Technology Fund	NO	Fully funded	£1 million - £10 million	Complete	Up to 99 % reduction in NOx and PM emissions. Source apportionment of bus/coach estimated up to 38% in some locations with the highest bus movements.	Trial result published, commitment from bus operators to retrofit	Clean Bus Technology Fund successful. All 145 buses retrofitted to Euro VI equivalence.	All 145 buses now retrofitted to Euro VI diesel equivalence. Upcoming bus partnership agreement will ensure these standards are maintained by requiring all operational buses in Southampton to meet Euro VI standards in order to use the bus priority network.
19	Procure low emission vehicles in Council and partner fleets	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2017	Ongoing replacement	SCC	Internal	NO	Partially funded	£100k - £500k	Implementation	Reduce NOx/PM emissions from SCC fleet vehicles	Number of Low Emission Vehicles in council Fleet	70 EV vans currently in SCC fleet. 33x EV charge points installed at depots for SCC EV Fleet vehicle use. Further procurement due in line with fleet decarbonisation project.	Some issues associated with power supplies to certain council depots.

20	Delivery and Service Planning for public authorities	Freight and Delivery Management	Delivery and Service plans	2017	2018-21	SCC	Future Transport Zones	NO	Not funded	N/A	Complete	Not yet quantified	Improvement in freight efficiency. Reduction in number of vehicle miles and journey times.	Funding received for DSPs as part of NO2 Plan. 9 DSPs implemented including those with the City's Universities, Carnival UK and commercial hubs across the city.	COVID-19 pandemic severely impacted delivery during 2020 - 2021. All DSPs now delivered, and outcomes being evaluated through The Future Transport Zones programme. Outcomes will include consolidate of deliveries to university halls.
21	Establish Clean Air Network	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2018	Completed. Continued promotion and activity throughout 2018/19.	SCC, The Port, business stakeholders, Southampton University, local air pollution pressure groups, Environment Centre	Internal	NO	Fully funded	N/A	Complete	Indiscernible	Organisations signed-up to CAN and pledges made and delivered. Events held.	Events held throughout 2019 including national Clean Air Day.	Network now closed following implementation of NO2 plan. Work with stakeholders continuing under Air Quality Action Plan and other routes including the Workplace Travel Planners Network and the upcoming Freight Quality Partnership.
22	National Clean Air Day	Public Information	Other	2018	2017 (First NCAD), 2018 (Second), 2019 (Third)	SCC, Global Action Plan	Internal, Defra grant	YES	Fully funded	£100k - £500k	Complete	Private vehicle NOx, PM emission reductions	Number of engagements during campaign	SCC continues to undertake activities each clean air day since its inception.	Virtual Clean Air Day held 2020 - 2021 due to COVID-19. Schools engagement focus in 2022 with targeted comms on social media.
23	M271 Redbridge junction capacity work	Traffic Management	Strategic highway improvements	2019	Complete	Highways England	Government's Roads Investment Strategy 2014	NO	Fully funded	> £10 million	Complete	Not quantified	Traffic flow improvement	Scheme completed.	Includes improved capacity, shared paths, shrub planting and resurfacing with low-noise material.
24	EV parking discounts	Promoting Low Emission Transport	Other	2018	Ongoing	SCC	Internal	NO	Fully funded	N/A	Complete	Reduced emissions from private vehicles	Number of EV parking permits issued	Scheme now closed.	

25	Itchen Toll EV Concessions	Promoting Low Emission Transport	Other	2018	Ongoing	SCC	Internal	NO	Fully funded	N/A	Complete	Reduced emissions from private vehicles	Number of EV pass transactions and smart cities cards issued for EV use	Scheme now closed.	
26	EV car clubs	Alternatives to private vehicle use	Car Clubs	2017	2019/20	SCC	Transforming Cities Fund	NO	Partially funded	£10k - 50k	Planning	Dependent on uptake	Usage of cars	Discussion with Enterprise Car Rentals over the deployment of EV's as part of the existing car club fleet continue. SCC seeking opportunities to align EV car club with internal car rental requirements for staff.	On street infrastructure will need to be provided and managed. This is under review as part of EVAP for 2020/21 and as an element the Council's bid for Transforming Cities Funding
27	ULEV Trials for Taxi and Private Hire Vehicles	Promoting Low Emission Transport	Taxi emission incentives	2019	2019-21	SCC	Implementation Fund	NO	Fully funded	£10k - 50k	Implementation	Reduced emissions from taxi and private hire vehicles	Number of ULEV trial participants	Part of The Local NO2 Plan. 52 drivers took on scheme and received a report setting out the benefits of an EV.	Outputs of telematics fed into 'Try Before You Buy' electric taxi scheme.
28	Eco Driver Training and telematics for Council Fleet	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2017	2020/21	SCC	Internal	NO	Fully funded	£50k - £100k	Planning	To be determined.	reduce fuel usage by 10%	Eco driving measure to be delivered in 2020 as part of fleet management and modernisation plan.	Eco-driver training not yet delivered. Efforts focussed on fast-tracking uptake of electric vehicles in fleet. Driver telematics and eco-safe driving being pursued in 2023 following full business case process.

29	Workplace travel planning	Promoting Travel Alternatives	Workplace Travel Plans	2010	Ongoing	SCC, workplace travel planners network	Active travel Fund, Access Fund, Internal	NO	Fully funded	£100k - £500k	Implementation	< 1µgm3	Workplace travel plans, uptake of sustainable modes of travel	<p>Around 90 workplaces engaged each year with a total audience of over 130,000 employees. staff have been helped to review staff travel, write a Travel Action Plan (TAP) and deliver interventions which enable and encourage active travel. Workplace surveys show that the proportion of those using active travel (walking & cycling) for commuting has increased to 22.3% in 2020.</p> <p>On average 56 organisations attend each event. Our Love to Ride 'Cycle September' campaign achieved; 124 Organisations participating, involving 1716 Cyclists, 193 New Cyclists. We issued 17 Workplace Travel Grants, which benefited 11,707 staff. The workplace team now has a robust engagement reporting tool to help monitor the teams work.</p> <p>Schools engagement 1.6 FTE School Travel Plan Coordinators in post from July</p>	Workplaces programme affected significantly by COVID19 and changes to travel behaviours 2020 - 2021.
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														2017 developing, monitoring, and evaluating school travel plans using the STARS accreditation online toolkit.	
30	School travel planning	Promoting Travel Alternatives	School Travel Plans	2010	ongoing	SCC	Active travel Fund, Access Fund, Internal	NO	Fully funded	£100k - £500k	Implementation	< 1µgm3	100% of schools have travel plans in place	<p>The School Travel team continues to engage with pupils, parents/carers and staff on a large scale in Southampton – around 35 schools in varying capacities. In 2022, Officers delivered 243 events with participation from 17,126 pupils, 787 parents/carers and 889 staff. This is in addition to the ~15,000 pupils that took part in campaign events such as Scooter Challenge, Clean Air Day, Sustrans Big Walk and Wheel, Walk to School Week and Walktober. Southampton's active and sustainable modal share of 69% for journeys to school (engaged schools) is still considerably higher than the</p>	<p>Engagement with schools at the start of 2022 was challenging at points as some schools were still wary of having visitors on site after Covid restrictions were lifted. Other schools were focusing on pupils catching up on learning so in person events were difficult to book in.</p> <p>A significant reduction in funding from central government will continue to leave the School Travel team under resourced to work with all Southampton Schools and deliver new School Street trials.</p>

														national average of 51% for primary age pupils. Southampton City Council has continued to expand the School Streets programme with 7 new schools trialling a timed road closure outside of their school gate and a camera enforced bus gate/School Street being delivered at Cantell School. Early data shows that the massive reduction in traffic outside of these schools is well supported and has met the aims of improving road safety, reducing pollution and increasing active/sustainable travel to school.	
31	Website and comms	Public Information	Other	2017	Ongoing	SCC	Internal	NO	Fully funded	N/A	Complete	N/A	Comms plan published	Ongoing website updates with information on CAZ consultation and local NO ₂ plan measures.	Air quality pages linked with a new Green City site which will also provide updates on wider sustainability initiatives across the city. Air quality pages updated to improve visibility.
32	City-wide fleet composition survey	Vehicle Fleet Efficiency	Other	2016	Complete (2017)	SCC	Implementation Fund, internal	NO	Fully funded	£50k - £100k	Complete	N/A	Survey completion	Three ANPR surveys completed as part of Local NO ₂ Plan monitoring and evaluation.	Surveys continue to inform ongoing monitoring and evaluation work.

33	Domestic solid fuel burning engagement programme	Public information	Other	2021	2021	SCC, third party partner	Defra AQ fund	YES	Fully funded	£100k - £500k	Implementation	Conservative estimate PM savings – PM2.5 = 8.6 tonnes a year, PM10 = 9 tonnes across partner LA boundaries per year. Assumes greater uptake of eco-label stoves as a result of the campaign.	Number of leaflet drops, number of face to face engagements.	Project funded through 2019/20 and later extended 2020/21 Defra air quality grant. Aims to encourage residents across Hampshire to burn less and burn better.	Project entering third year of implementation. Continuing to monitor Green status in Defra quarterly returns following limited engagement during the pandemic. Average 10,000 engagements across social media and face-to-face engagements per quarter.
34	Green City Charter (GCC) and Green City Plan	Other	Other	2020	2030	SCC, Green City signatories	Internal	NO	Fully funded	£1 million - £10 million	Implementation	Indiscernible. Series of projects.	Implementation of Green City Plan. KPIs given in plan. Number of signatories.	The Green City programme is The Council's environmental sustainability policy covering all aspects of the agenda including air quality, ecology, climate change and waste. The programme has delivered a series of projects to date including rapidly increasing the tree and meadow cover across the city, a new ethical and sustainable procurement policy and a retrofitting scheme for housing, as well as formalised Net Zero targets.	The GCC came about as a result of the CAZ consultation where a large appetite for collective action towards improving various aspects of the environment was identified. The Charter includes a series of commitments SCC has for air quality alongside wider sustainability/ environmental topics including sustainable transport and energy and climate change. The Green City Plan sets out further measures we will take to achieve them. Several new measures air quality measures have been committed under

															the plan; these are included in this table. The charter and plan also set out SCC's ambition to go further than statutory requirements and represents a refocussing on public health. This is now linked to through the updated Air Quality Action Plan.
35	Transforming Cities	Traffic management, Promoting Low Emission Transport, Promoting alternatives to private vehicles	Strategic Highways improvement	2020	2023	SCC, Hampshire County Council	Transforming Cities Fund	NO	Fully funded	> £10 million	Implementation	Not yet quantified. Likely significant long term benefit	Implementation of measures as set out in bid.	£5.7m awarded in January 2019 as part of Tranche 1 and a further £57m in March 2020 in Tranche 2.	The programme aims to bring about large scale infrastructure projects to promote active and sustainable travel including four radial bus corridors, park and ride facilities, local mobility hubs, smart technology, improvements to the SCN, active travel zones and improved bus interchanges.
36	Air Quality Action Plan 2023 - 2028	Traffic management, Promoting Low Emission Transport, Promoting alternatives to private vehicles etc.	Various	2022	2026	SCC, delivery partners	Internal	NO	Partially funded	£100k - £500k	Implementation	To be determined.	Implementation of measures as set out in action plan.	Updated Air Quality Action Plan (AQAP) now adopted as council policy. The Plan includes 60 new measures with the aim of securing continued improvement in the city's air quality.	~40 measures are set to be delivered in 2023 including the air quality engagement programme.
37	Port Rail terminal extension	Freight and Delivery Management	Other	2019	2021	Network Rail, ABP	National Rail funds	NO	Fully funded	> £10 million	Complete	20% more goods transport by rail.	N/A	Complete	

38	Low cost monitor network	Monitoring and Modelling	Other	2021	2023	SCC, delivery partner, partnering local authorities	Defra AQ grant	YES	Not funded	£100k - £500k	Planning	Primary aim of the project is to enhance wood burning public engagement campaign which targets emissions of PM fractions.	Implementation of low-cost monitors	Network of 18 low cost 'Zephyr' monitors delivered across Hampshire including 8 in Southampton. These monitor PM fractions, O3 and NO2 in near-real time. Monitors link to 'MappAir' portal which includes modelling capabilities, allowing air quality across the whole city to be mapped up to a 10x10m resolution.	This network of low cost monitors and modelling will be used through the air quality engagement programme including wood burning, schools and healthcare projects to support positive behaviour change.
39	Future Transport Zone	Freight and Delivery Management, Promoting Low Emission Transport, Promoting alternatives to private vehicles	Freight consolidation, micro-mobility, Mobility as a Service	2021	2024	SCC and Solent Transport, Funded by DfT	Future Transport Zones	NO	Fully funded	> £10 million	Planning	Not determined	Included in related documents	Bid successful, FTZ programme team fully established to deliver large programme of innovative transport projects across the Solent region providing substantial co-benefits for air quality.	FTZ delivery ongoing until June 2025
40	Active Travel Zones	Promoting alternatives to private vehicles, transport planning and infrastructure, Public information	Intensive active travel campaign and infrastructure	2020	2022	SCC – Transforming Cities Fund, Active Travel Fund 2	Transforming Cities Fund, Active Travel Fund	NO	Fully funded	£1 million - £10 million	Implementation	Estimated ~20% reduction of traffic within an ATZ	Included in related documents	St Denys Active Travel Zone (ATZ) near completed with permanent modal filter due in summer 2023. Woolston ATZ due to being construction in 2023. Highfield ATZ currently undergoing consultation - to line up with Portswood Road changes.	
41	Local Mobility Hubs	Promoting alternatives to private vehicles, Transport Planning and Infrastructure	Car Clubs, Other	2024	2026	SCC	Transforming Cities Fund	NO	Fully funded	£500k - £1 million	Planning	Not determined	Included in related documents	Albion Place mobility hub under construction.	

42	Transforming Cities Fund corridor improvements	Promoting alternatives to private vehicles, Transport Planning and Infrastructure	Strategic highway improvements, Re-prioritising road space away from cars, inc. Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2021	2016	SCC	Transforming Cities Fund	NO	Fully funded	£500k - £1 million	Implementation	Not determined	Included in related documents	Improvements complete at Northam Road, West Quay Road and Bevois Valley. Further schemes planned and underway on key transport corridors including Western approach, Avenue, Swaythling-Portswode and Woolston.	
43	City Centre Transformation	Traffic management, Transport Planning and Infrastructure	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2022	2026	SCC	Transforming Cities Fund	NO	Fully Funded	> £10 million	Initiation	Not determined	Included in related documents	£18.5m investment in city centre. Northern Ring Road Phase 1 improvements complete (except for EV charging infrastructure). Central Station South Side scheme currently under construction.	All City Centre schemes (except for central station scheme) are subject to DfT Change Control. Work is ongoing to ensure a satisfactory package of measures / schemes is submitted to DfT to unlock the total funding amount.
44	M27/M3 Travel Demand Management Project	Promoting alternatives to private vehicles, transport planning and infrastructure, Public information	Intensive active travel campaign and infrastructure	2019	2021/22	SCC, Portsmouth City Council, Hampshire County Council, Highways England	Highways England contribution	NO	Fully funded	£1 million - £10 million	Complete	Not determined	Included in related documents	£1.7 m funding awarded by Highways England to SCC and other partners.	Implementation somewhat limited due to COVID19 pandemic.
45	Hants 2025 e-taxi and van trial	Public information, promoting low emission transport	Taxi incentives	2022	2023	SCC, Department for Levelling Up, Housing and Communities, ERDF funding	European Regional Development Fund	NO	Fully funded	£1 million - £10 million	Implementation	60kg reduction in NOx estimated	GHG savings, vouchers provided, number of charge points installed, NOx reduction.	£750,000 of ERDF funding committed to deliver 50% match funded project with SCC and a delivery partner. Involves 50% off lease of EV taxi, private hire vehicle or van, 8 new rapid charge points and access to support and reports for drivers.	Project limited due to compressed timescales. 10 electric vehicles taken on through scheme and 8 rapid chargers expected to be delivered across the city in 2023.

												Other undetermined benefits from modal shift.		deliver project full time.	action to reduce their exposure to pollution and take steps to improve air quality in and around the school. Includes procurement of 8 low-cost monitors and creation of new 'clean air routes' system.
50	Healthcare engagement project	Public information	Face to face, leaflets and other materials etc.	2023	2025	SCC, UHS, GPs	Defra air quality grant 2022/23	Yes	Fully funded	£100k-500k	Planning	Exposure reduction benefits. 210 at risk patients taking on advice to reduce exposure.	Number of GPs trained, number of at risk patients engaged, number of patients taking on advice.	Bid successful to deliver project. Currently planning implementation and procurement of provider to deliver training to GPs to improve patients' awareness of poor air quality and empowering them to take steps to reduce their exposure.	
51	Indoor air quality engagement project	Public information	Face to face, leaflets, and other materials etc.	2023	2024	SCC	Internal	No	Fully funded	£<10k	Planning	To be determined.	N/A	Identifying routes to integrate awareness of best practice for indoor air quality into projects and policy including linking in with housing and public health colleagues.	
52	Integrating public health data into measures	Other	Other	2023	2025	SCC	Internal	No	Fully funded	£<10k	Planning	N/A	N/A	Planning potential mechanisms for integrating public health data (eg. prevalence of lung condition, deprivation etc.) with air quality data to locate locations of highest concern for air quality.	
53	No-idling signage	Traffic management	Anti-idling enforcement	2023	2023	SCC	Internal	No	Fully funded	£<10k	Implementation	To be determined.	Number of signs installed.	Locating 9 no-idling stalls across the city in areas of concern for idling behaviours	

														eg. schools and level crossings.	
54	Freight quality partnership	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2024	2026	SCC, freight quality partnership partners	Future Transport Zones, Local NO2 Plan	No	Partially funded	£50k - £100k	Planning	To be determined	Number of partnered organisations. Number of sessions held.	Planning delivery mechanisms and researching best practice to deliver air quality benefits.	Scheme to promote best-practice in freight operations, including learnings from DSPs, benefits of the SDC and potentially encouraging organisations to invest in electric vehicles.
55	Identify and promote cleaner walking routes	Public information	Other	2024	2024	SCC, delivery partner	Defra air quality grant 2021/22 and 2022/23	Yes	Fully funded	£100k-500k	Planning	To be determined. Associated with NO2 exposure reduction.	Delivery of system. Uptake by stakeholders.	Funding received to deliver clean air routes system from Defra grant for schools project. Understanding ways to implement and integrate with other engagement programme projects.	
56	Enhance use of the park and ride	Alternatives to private vehicle use	Bus based park and ride	2023	2024	SCC	Transforming Cities Fund	No	Fully funded	£1 million - £10 million	Implementation	Not determined	Number of park and ride journeys	Park and ride in place for NHS staff only beginning of 2022. Use extended to allow for access by anyone during weekends. Trial of park and ride for football match days underway.	
57	Green Grid	Other	Other	2024	2024	SCC	Internal	No	Fully funded	£50k - £100k	Implementation	To be determined.	Quantity of green infrastructure planted because of Green Grid policy.	Green grid developed identifying where green infrastructure is most needed. Green Grid policy to be created to integrate the grid into planning process and SCC planting policy.	
58	Enhance enforcement of smoke control areas	Other	Other	2024	2025	SCC	Defra new burdens funding	No	Fully funded	£<10k	Planning	To be determined.	To be determined.	Reviewing routes to enhance monitoring and enforcement of	

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular and respiratory diseases.

Southampton City Council is taking the following measures to address PM_{2.5}:

- The air pollution alert service that warns registered users of predicted moderate/high air pollution alerts helps Southampton residents with respiratory disease to reduce their exposure to pollution, including particulates. The service was developed with AQDM, our data manager, with the support of our public health colleagues and the NHS. The service sends a warning email message the day before predicted moderate or high pollution is forecast by the Met Office. Residents of Southampton can register for free to receive the email alerts on our bespoke monitoring website: <https://www.southamptonair.org.uk/>.
- Southampton also works closely with the Port operator and its customers to identify and support initiatives that will reduce emissions. The Clean Air Network will develop over the coming years to engage with the key stakeholders in the city, including the port.
- The Domestic solid fuel burning engagement campaign commenced in 2020 after a successful Defra Air Quality Grant application. The campaign is delivered across Southampton City, Eastleigh Borough, Winchester City and New Forest District Council with the aim to tackle the transboundary nature of PM_{2.5} pollution. The campaign has now been running for three years and has been successful in engaging thousands of residents across Hampshire through face-to-face engagement events, social media posts and leaflet drops. The campaign was estimated to save around 8.6 tonnes a year of PM_{2.5} due to residents burning less and burning better.
- The Council secured funding to implement a series of 8 low cost ‘Zephyr’ monitors across the city monitoring PM_{2.5} along other pollutants including PM₁₀, NO₂, and O₃. These monitors have dramatically improved the city’s coverage for PM_{2.5} and have

helped improve overall coverage of monitoring in non-main road locations. An innovative 'Mappair' modelling system linked to these monitors and the AURN has also been implemented which models concentrations of PM_{2.5} to a 10x10m resolution. These monitors and system were commissioned to help support the wood burning campaign by providing local data for residents to help them understand the impact of wood burning.

- The Council will seek to utilise 'New Burdens' funding to investigate how the effectiveness of Smoke Control Areas can be improved through communications and enforcement where possible. It is recognised that the updated Environment Act provides more powers to local authorities for enforcing Smoke Control Areas. These will be reviewed in 2023 to understand how they can be used to further discourage the worst of wood burning in the city.
- Measures focused on road transport will also bring about an improvement in PM_{2.5} concentrations as road transport is still a major source of this pollutant.

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

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

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Southampton City Council undertook automatic (continuous) monitoring at 4 sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. The www.southamptonair.org.uk page presents automatic monitoring results for Southampton City Council, with automatic monitoring results also available through the UK-Air website .

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

3.1.2 Non-Automatic Monitoring Sites

Southampton City Council undertook non- automatic (i.e. passive) monitoring of NO₂ at 78 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater

than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

There were no exceedances of the annual mean NO₂ objective monitored in 2022, the third time this has happened since Review and Assessment began. The highest monitored mean concentration of NO₂ in Southampton at a relevant receptor was 35.9 µg/m³ on the residential façade of 367A Millbrook in 2022. Close behind this was the second highest, 34.1 µg/m³ on the residential façade of 66 Burgess Road in 2022. These locations are both within existing AQMAs.

There were a few higher results monitored, but these were not at relevant receptors. For instance, Redbridge Causeway at 38.3 µg/m³ and Vincents Walk Bus Stop at 40.1 µg/m³. 289 Millbrook Road was very high at 46.7 µg/m³, but it is on a post right on the kerb of this busy road. When adjusted for distance to the nearest house it reduces to 30.9 µg/m³.

2022 monitoring results showed broadly similar levels of NO₂ levels, compared 2021. However, NO₂ levels have not returned to the higher pre pandemic levels of 2019.

Working from home has become the new normal for a lot of city workers, reducing the volume of commuter traffic at peak times. It remains to be seen if this trend continues in future years, but it seems likely that working from home and hybrid office/home working will be much more prevalent after 2020/21.

In summary, exceedances halved from 8 in 2018 to only 4 in 2019 at relevant receptors, with no monitored exceedances recorded in 2020, 2021 and 2022. SCC will consider revoking all 10 of the AQMAs in the future once the medium to long-term trend of NO₂ concentrations is confirmed in future ASRs, including the impact COVID19 has had on trends. SCC will follow the LAQM TG 22 Guidance on when to revoke the AQMAs. As the highest NO₂ annual means are monitored with diffusion tubes at residential facades, SCC need to achieve NO₂ means below 36 µg/m³ for a minimum of 3 consecutive years. SCC also needs to take into account that 2020 in particular and 2021 to a lesser extent, were not typical years, due to Pandemic lockdowns; more people working from home, resulting in less traffic.

Currently 6 of Southampton City Council's AQMAs meet the criteria of NO₂ annual means below 36 µg/m³ for a minimum of 3 consecutive years, to be considered for revocation.

These are :

- AQMA 2 Bitterne Road
- AQMA 3 Winchester Road
- AQMA 4 Town Quay Road
- AQMA 6 Romsey Road
- AQMA 10 New Road
- AQMA 11 Victoria Road

However, no AQMAs were revoked in previous ASRs on the basis that data from 2020 has been greatly influenced by the impact of COVID19 and subsequent lockdowns. Previous ASRs highlighted the need to consider medium to long-term trends of NO₂ to understand what the long term impact of COVID19 on concentrations has been. While this 2023 ASR highlights that it is unlikely that concentrations will rebound to concentrations monitored pre-2020, uncertainties such as potential low wind years, increases in development and traffic further changes to working patterns in the city may have an impact.

As such, The Council are taking a conservative approach by only considering AQMAs for revocation that have achieved NO₂ annual means below 36 µg/m³ for a minimum of 5 consecutive years.

Only one AQMA meets this criteria:

- AQMA 10 New Road

Southampton City Council proposes to revoke AQMA 10 New Road, using this more conservative threshold and review all the AQMAs again in the 2024 ASR.

3.1.4 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40µg/m³.

Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

There were no exceedances of the UK objective for the PM₁₀ annual mean concentration or daily mean PM₁₀ in 2022. PM₁₀ stayed broadly similar to previous years. At CM7 Redbridge AURN Automatic Monitoring Station, the annual average for PM₁₀ was 18 µg/m³, increasing slightly from the 17µg/m³ monitored in 2021. At CM1, PM₁₀ increased slightly to 16 µg/m³ in 2022 from 14 µg/m³ in 2021.

The 2 Automatic AURN Monitoring Stations will continue monitoring PM₁₀ in future years, dependent upon national government funding.

3.1.5 Particulate Matter (PM_{2.5})

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

PM_{2.5} annual mean remained the same at CM1, Brintons Road in 2022 as in 2021 at 9ug/m³.

The Automatic AURN Monitoring Station, Brintons Road will continue monitoring PM_{2.5} in future years, dependent upon national government funding.

3.1.6 Sulphur Dioxide (SO₂)

Table A.9 in Appendix A compares the ratified continuous monitored SO₂ concentrations for 2022 with the air quality objectives for SO₂. There were no exceedances of the UK objectives for SO₂ in 2021.

The Automatic AURN Monitoring Station, Brintons Road will continue monitoring sulphur dioxide in future years, dependent upon national government funding.

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	Southampton Centre AURN	Urban Background	442579	112248	NO ₂ , PM ₁₀ (FDMS), PM _{2.5} (FDMS), SO ₂ , Benzene, O ₃	NO	Chemiluminescence (NO ₂), FDMS//Optical light-scattering (PM ₁₀ and PM _{2.5}), ultra-violet fluorescence (SO ₂), pumped diffusion tube sampler (benzene)	27	20.7	2.5
CM4	Onslow Road	Roadside	442304	112771	NO ₂	YES	Chemiluminescence	n/a	2	1.3
CM6	Victoria Road	Roadside	443751	111123	NO ₂	YES	Chemiluminescence	1	3	1.3
CM7	A33 AURN	Roadside	437809	113560	NO ₂ , PM ₁₀	NO	Chemiluminescence, BAM	14.8	5.1	2.5

Notes:

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

(2) N/A if not applicable

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

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)
N100	6 Sandringham Road	Urban Background	444387	114453	NO2	No	N/A	N/A		1.0
N101	Redbridge School Fence	Roadside	437548	113719	NO2	No	0.0	6.3		2.3
N103	485 Millbrook Road	Roadside	438808	112903	NO2	5	0.0	12.1		1.6
N104	Regents Park Junction	Roadside	439222	112850	NO2	5	2.4	12.0		3.0
N106	2 Romsey Road, Oakhill	Roadside	439752	113984	NO2	No	0.0	4.4		2.0
N107	Cranbury Place	Roadside	442364	112890	NO2	1	0.5	1.8		2.1
N109	72 Bevois Valley	Roadside	442585	113248	NO2	1	0.5	3.6		2.4
N110, N111, N112	Brintons Road 3	Urban Centre	442579	112248	NO2	No	27.0	20.7	Yes	3.2

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)
N113	206 Bitterne Road	Roadside	444124	113288	NO2	2	0.7	5.1		2.2
N114	Bitterne Library	Roadside	444131	113322	NO2	2	1.9	3.2		3.2
N115	54 Redbridge Road	Roadside	437939	113474	NO2	5	0.0	8.7		1.7
N116	57 Redbridge Road	Roadside	437952	113407	NO2	5	0.0	12.9		1.8
N117	Victoria Road (Lamp Post)	Roadside	443752	111121	NO2	11	0.8	2.8		2.7
N118	3 Rockstone Lane	Roadside	442472	113065	NO2	1	3.7	3.8		2.4
N120	6-9 Canute Road	Roadside	442716	111019	NO2	4	0.0	3.8		2.6
N122	151 Paynes Road	Roadside	440000	112633	NO2	5	0.0	12.7		1.7
N123	102 St Andrews Road	Roadside	442348	112305	NO2	No	0.0	3.5		3.0
N124	305 Millbrook Road	Roadside	439741	112753	NO2	5	0.0	9.5		2.0
N125	Princes Court	Roadside	443125	112641	NO2	2	0.0	5.7		2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N126	107 St Andrews Road	Roadside	442365	112286	NO2	No	1.7	2.0		2.7
N129	South West House	Roadside	442554	111021	NO2	4	0.0	2.5		2.9
N130	367A Millbrook Road	Roadside	439346	112821	NO2	5	0.0	8.1		2.3
N131	142 Romsey Road	Roadside	439378	114185	NO2	6	0.0	4.8		2.1
N133	539 Millbrook Road	Roadside	438609	113020	NO2	5	0.0	33.0		1.8
N134	435 Millbrook Road West Ladbrokes	Roadside	438980	112861	NO2	5	0.0	11.5		3.2
N138	66 Burgess Road	Roadside	441697	115288	NO2	9	0.0	2.3		1.5
N140	5 Commercial Road	Roadside	441628	112332	NO2	8	2.4	2.2		3.2
N141	Town Quay Road	Roadside	441923	110990	NO2	4	0.0	3.2		2.6

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)
N143	102 Romsey Road	Roadside	439457	114150	NO2	No	0.0	5.8		1.9
N144	208 Northam Road	Roadside	443147	112709	NO2	No	0.0	5.0		1.9
N146	222 Northam Road	Roadside	443164	112741	NO2	No	0.0	11.5		1.8
N149	44B Burgess Road	Roadside	441552	115247	NO2	9	0.0	2.6		2.2
N151	134 Romsey Road	Roadside	439394	114176	NO2	6	0.0	5.0		1.8
N152	M271	Roadside	437327	113848	NO2	5	18.0	4.8		2.5
N158	24 Portsmouth Road	Roadside	443807	111123	NO2	No	0.0	4.7		2.6
N159	35 Portsmouth Road	Roadside	443740	111147	NO2	No	0.0	3.2		2.7
N161	30 Addis Square	Roadside	442705	114129	NO2	No	0.0	6.0		2.7
N162	263A Portswood Road	Roadside	442872	114336	NO2	No	0.0	3.7		2.6

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)
N164	168 Portswood Road(Int.Food)	Roadside	442809	114241	NO2	No	0.0	5.3		2.9
N165	8 The Broadway	Roadside	442766	114181	NO2	No	0.0	5.5		2.6
N166	14 New Road	Roadside	442251	112129	NO2	10	0.0	1.5		2.8
N167	13 Romsey Road	Roadside	439759	114011	NO2	No	0.0	5.8		2.5
N168	23 Romsey Road	Roadside	439737	114025	NO2	No	0.0	4.5		1.8
N169	150 Romsey Road	Roadside	439361	114195	NO2	6	0.0	4.4		0.9
N170	Union Castle House (2)	Roadside	442482	111003	NO2	4	NA	2.6		2.5
N172	4 New Road	Roadside	442207	112126	NO2	No	0.0	2.0		2.9
N174	166A Bitterne Road West	Roadside	443959	113315	NO2	2	0.0	6.7		2.7
N175	38 Shirley High Street	Roadside	439959	113737	NO2	No	0.0	8.8		2.6

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)
N176	Salisbury Arms, Shirley High Street	Roadside	439772	113952	NO2	No	0.0	13.3		2.2
N177	95 Shirley High Street (Windsor Castle Pub)	Roadside	439844	113907	NO2	No	0.0	4.5		2.6
N178	2 Gover Road	Roadside	437265	113682	NO2	No	0.0	8.8		2.1
N184A, N184B, N184C	Redbridge AMS (C)	Roadside	437811	113557	NO2	8	16.0	14.6	Yes	2.4
N185	Redbridge Causeway 1	Roadside	437167	113713	NO2	No	29.2	2.4		2.7
N186	Redbridge Causeway 2	Roadside	437126	113701	NO2	No	7.5	2.9		2.5
N187	Cobden Avenue	Roadside	444102	113872	NO2	No	0.0	7.0		2.3
N188	Blechynden Terrace, Taxi	Roadside	441300	112233	NO2	No	NA	4.0		2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N189	Cumberland House	Roadside	441790	112465	NO2	No	0.0	2.1		2.4
N190	Brunswick Apartments	Roadside	442024	112553	NO2	No	0.0	5.1		2.5
N191	Marlands House	Roadside	441915	112097	NO2	No	2.0	1.3		2.5
N192	Above Bar Street Bus Stop	Roadside	441961	112029	NO2	No	NA	1.3		2.6
N193	Above Bar Street Taxi Rank	Roadside	441975	112031	NO2	No	NA	4.3		2.6
N194	Vincent's Walk Bus Stop	Roadside	442090	111775	NO2	No	NA	4.0		2.6
N195	Bargate Street	Roadside	441945	111655	NO2	No	NA	0.7		2.7
N197	351 Winchester Road	Roadside	440957	115151	NO2	No	0.0	5.5		2.5
N198A, N198B, N198C	Onslow Road (C)	Roadside	442304	112771	NO2	3	NA	2.6	Yes	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)
N199	Dorset Street/Charlottes Place Crossing	Roadside	442210	112583	NO2	1	16.5	3.5		1.8
N200	Northam Bridge South	Roadside	443160	112765	NO2	1	13.9	4.0		2.0
N201	289 Millbrook Road West	Roadside	439759	112738	NO2	No	6.8	1.2		2.0
N202	Redbridge Causeway North	Roadside	437166	113755	NO2	No	NA	1.2		2.0
N204	6 Lodge Road	Roadside	442542	113261	NO2	No	2.2	2.1		2.2
N205	Stags Gate, Lodge Road	Roadside	442101	113438	NO2	No	4.1	2.0		2.6
N206	Charlottes Place	Roadside	442265	112516	NO2	No	5.0	2.2		2.4
N207	205 Waterhouse Lane	Roadside	439698	112806	NO2	No	3.5	4.0		2.0
N208	Sherwood Close	Roadside	441365	115202	NO2	No	11.7	1.9		2.5
N209	40 Burgess Road	Roadside	441246	115138	NO2	No	2.2	1.6		1.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
N210	18 Burgess Road	Roadside	441122	115118	NO2	No	4.0	1.7		2.5
N211	4 Coniston Road	Roadside	437332	113873	NO2	No	0.0	4.2		1.8
N213	277 Portswood Road	Roadside	442935	114374	NO2	No	0.0	9.5		1.5
N214	64 Burgess Road 2019	Roadside	441677	115280	NO2	No	0.0	5.2		2.2
N216	73 Lodge Road	Roadside	442352	113486	NO2	No	1.4	4.3		2.1
N217	11 Saxon Road	Roadside	440751	112188	NO2	No	3.0	1.3		2.5
N218	112 St Denys Road	Roadside	443547	114101	NO2	No	0.5	1.2		2.0

Notes:

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM1	442579	112248	Urban Background		99%	28.9	27.8	22.5	25	24
CM4	442304	112771	Roadside		97.7%	39.9	41.4	31.0	32	31
CM6	443751	111123	Roadside		96.7%	37	36	27.3	33	26
CM7	437809	113560	Roadside		99.0%	35	32.5	26.8	26	28

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

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

Notes:

The annual mean concentrations are presented as µg/m³.

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

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

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

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

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

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

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
N100	444387	114453	Urban Background	100	100.0	17.1	18.1	13.3	17.0	17.0
N101	437548	113719	Roadside	91.6	92.3	42.4	39.2	30.6	34.0	33.4
N103	438808	112903	Roadside	100	100.0	32.0	29.8	23.5	23.7	23.7
N104	439222	112850	Roadside	91.6	90.4	36.4	34.0	30.4	28.5	31.0
N106	439752	113984	Roadside	100	100.0	37.0	35.4	27.7	29.0	27.1
N107	442364	112890	Roadside	100	100.0	48.0	46.5	32.4	36.2	36.2
N109	442585	113248	Roadside	91.6	90.4	39.3	38.0	25.9	30.4	29.4
N110, N111, N112	442579	112248	Urban Centre	97.2	100.0	29.3	28.2	21.9	23.8	22.9
N113	444124	113288	Roadside	100	100.0	32.9	32.7	25.9	29.7	30.4
N114	444131	113322	Roadside	83.3	82.7	33.7	32.8	25.0	27.2	28.2
N115	437939	113474	Roadside	100	100.0	34.4	32.8	26.0	27.0	26.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
N116	437952	113407	Roadside	100	100.0	34.3	32.5	25.9	27.1	26.1
N117	443752	111121	Roadside	100	100.0	33.3	33.7	27.0	29.1	27.5
N118	442472	113065	Roadside	83.3	84.6	36.2	35.0	25.2	28.0	26.7
N120	442716	111019	Roadside	66.6	65.4	37.2	35.8	26.4	30.8	28.0
N122	440000	112633	Roadside	100	100.0	28.2	31.2	23.8	25.9	24.8
N123	442348	112305	Roadside	100	100.0	34.2	32.7	24.2	25.6	26.1
N124	439741	112753	Roadside	100	100.0	34.8	34.7	27.5	27.7	27.1
N125	443125	112641	Roadside	100	100.0	36.2	37.0	26.9	29.2	30.3
N126	442365	112286	Roadside	100	100.0	35.9	32.4	25.0	27.7	28.0
N129	442554	111021	Roadside	91.6	90.4	28.9	29.5	22.0	25.1	24.6
N130	439346	112821	Roadside	100	100.0	42.3	39.2	34.2	36.5	35.9
N131	439378	114185	Roadside	91.6	92.3	37.8	36.5	28.7	29.7	27.6
N133	438609	113020	Roadside	100	100.0	27.7	28.0	23.2	22.6	23.3
N134	438980	112861	Roadside	100	100.0	38.0	33.8	27.4	28.5	29.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
N138	441697	115288	Roadside	100	100.0	47.3	43.1	33.6	36.6	34.1
N140	441628	112332	Roadside	100	100.0	45.2	44.5	33.3	36.0	35.0
N141	441923	110990	Roadside	91.6	92.3	35.2	33.2	25.0	28.1	28.6
N143	439457	114150	Roadside	91.6	90.4	35.5	35.0	27.6	28.4	27.1
N144	443147	112709	Roadside	100	100.0	32.5	30.3	23.7	26.0	26.7
N146	443164	112741	Roadside	100	100.0	27.8	28.1	21.8	23.4	23.1
N149	441552	115247	Roadside	33.3	32.7	31.5	29.7	26.5	29.6	28.3
N151	439394	114176	Roadside	100	100.0	37.0	36.7	29.2	30.5	28.6
N152	437327	113848	Roadside	100	100.0	42.2	39.9	34.1	33.2	33.3
N158	443807	111123	Roadside	100	100.0	34.8	34.6	29.3	30.8	29.0
N159	443740	111147	Roadside	100	100.0	32.1	32.1	27.5	30.4	26.9
N161	442705	114129	Roadside	100	100.0	33.0	28.5	24.1	25.4	25.4
N162	442872	114336	Roadside	100	100.0	37.5	35.1	26.3	28.5	28.5
N164	442809	114241	Roadside	100	100.0	34.2	29.5	23.8	26.2	27.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
N165	442766	114181	Roadside	100	100.0	32.6	30.9	25.3	27.7	28.5
N166	442251	112129	Roadside	91.6	92.3	35.9	33.7	24.9	28.9	29.2
N167	439759	114011	Roadside	91.6	90.4	35.1	35.0	27.7	28.2	26.9
N168	439737	114025	Roadside	100	100.0	36.5	35.1	26.5	28.4	27.3
N169	439361	114195	Roadside	100	100.0	42.8	38.9	33.5	33.1	31.8
N170	442482	111003	Roadside	100	100.0	39.0	37.0	26.8	32.8	30.8
N172	442207	112126	Roadside	100	100.0	41.3	40.2	30.8	31.5	31.9
N174	443959	113315	Roadside	91.6	92.3	41.5	40.7	31.6	33.3	31.5
N175	439959	113737	Roadside	91.6	92.3	38.3	35.5	29.5	28.4	26.7
N176	439772	113952	Roadside	83.3	84.6	35.6	32.1	25.5	27.1	29.3
N177	439844	113907	Roadside	100	100.0	38.6	35.2	26.6	28.9	28.5
N178	437265	113682	Roadside	100	100.0	24.3	24.0	19.2	19.1	19.7
N184A, N184B, N184C	437811	113557	Roadside	100	100.0		34.7	29.6	28.6	30.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
N185	437167	113713	Roadside	66.6	65.4	53.9	43.0	37.7	39.6	38.3
N186	437126	113701	Roadside	58.3	55.8	39.0	35.2	28.5	30.8	27.2
N187	444102	113872	Roadside	91.6	90.4		32.7	26.4	26.3	26.3
N188	441300	112233	Roadside	100	100.0		32.6	27.1	26.7	26.5
N189	441790	112465	Roadside	100	100.0		36.3	27.6	30.5	28.6
N190	442024	112553	Roadside	91.6	92.3		39.0	30.4	30.9	30.1
N191	441915	112097	Roadside	100	100.0		42.5	33.5	33.9	33.0
N192	441961	112029	Roadside	83.3	82.7		41.9	32.9	34.3	32.8
N193	441975	112031	Roadside	100	100.0		35.3	26.3	26.5	26.3
N194	442090	111775	Roadside	91.6	92.3		43.6	38.4	37.0	40.1
N195	441945	111655	Roadside	58.3	55.8		37.7	31.8	31.2	32.4
N197	440957	115151	Roadside	100	100.0		37.5	24.2	26.6	26.7
N198A, N198B, N198C	442304	112771	Roadside	97	100.0		33.4	26.2	28.8	27.9

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
N199	442210	112583	Roadside	100	100.0		35.8	30.9	33.5	31.4
N200	443160	112765	Roadside	100	100.0		30.2	26.9	29.0	28.5
N201	439759	112738	Roadside	100	100.0		55.9	39.6	45.6	46.7
N202	437166	113755	Roadside	100	100.0		46.5	37.8	36.9	37.5
N204	442542	113261	Roadside	100	100.0		35.6	25.2	29.7	29.3
N205	442101	113438	Roadside	91.6	90.4		38.4	26.5	29.4	31.7
N206	442265	112516	Roadside	91.6	92.3		39.4	30.8	32.5	34.6
N207	439698	112806	Roadside	100	100.0		33.5	27.8	26.5	27.7
N208	441365	115202	Roadside	100	100.0		32.6	23.8	27.3	26.0
N209	441246	115138	Roadside	100	100.0		31.7	25.2	26.1	25.5
N210	441122	115118	Roadside	91.6	92.3		38.1	27.7	30.0	28.7
N211	437332	113873	Roadside	91.6	92.3		26.5	21.4	21.0	22.0
N213	442935	114374	Roadside	100	100.0		28.8	22.7	25.1	24.3
N214	441677	115280	Roadside	100	100.0		33.0	25.5	26.8	26.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
N216	442352	113486	Roadside	100	100.0		37.8	25.1	27.9	27.8
N217	440751	112188	Roadside	100	100.0		33.6	28.2	26.8	27.4
N218	443547	114101	Roadside	100	100.0		36.4	26.9	30.6	27.3

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

Diffusion tube data has been bias adjusted.

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

Notes:

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

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

NO₂ annual means exceeding 60 $\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

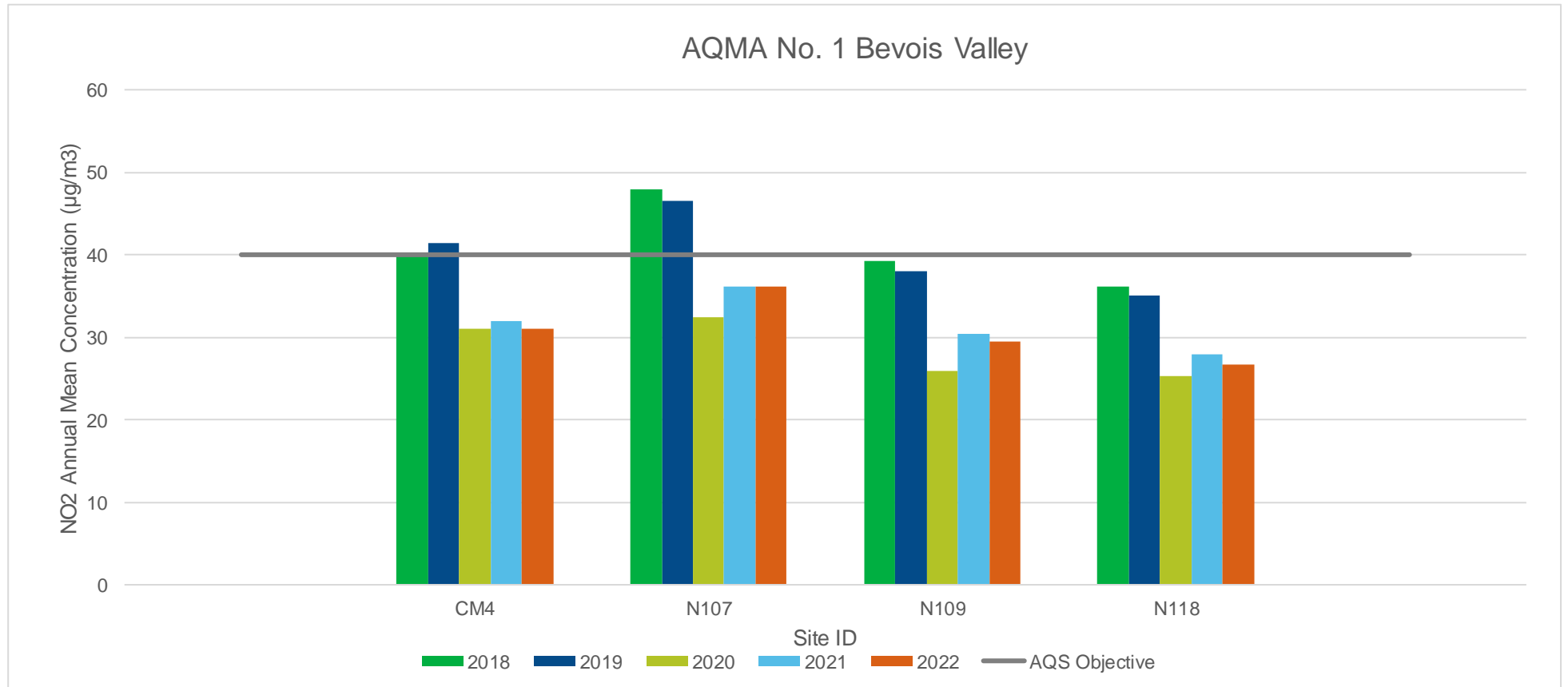
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

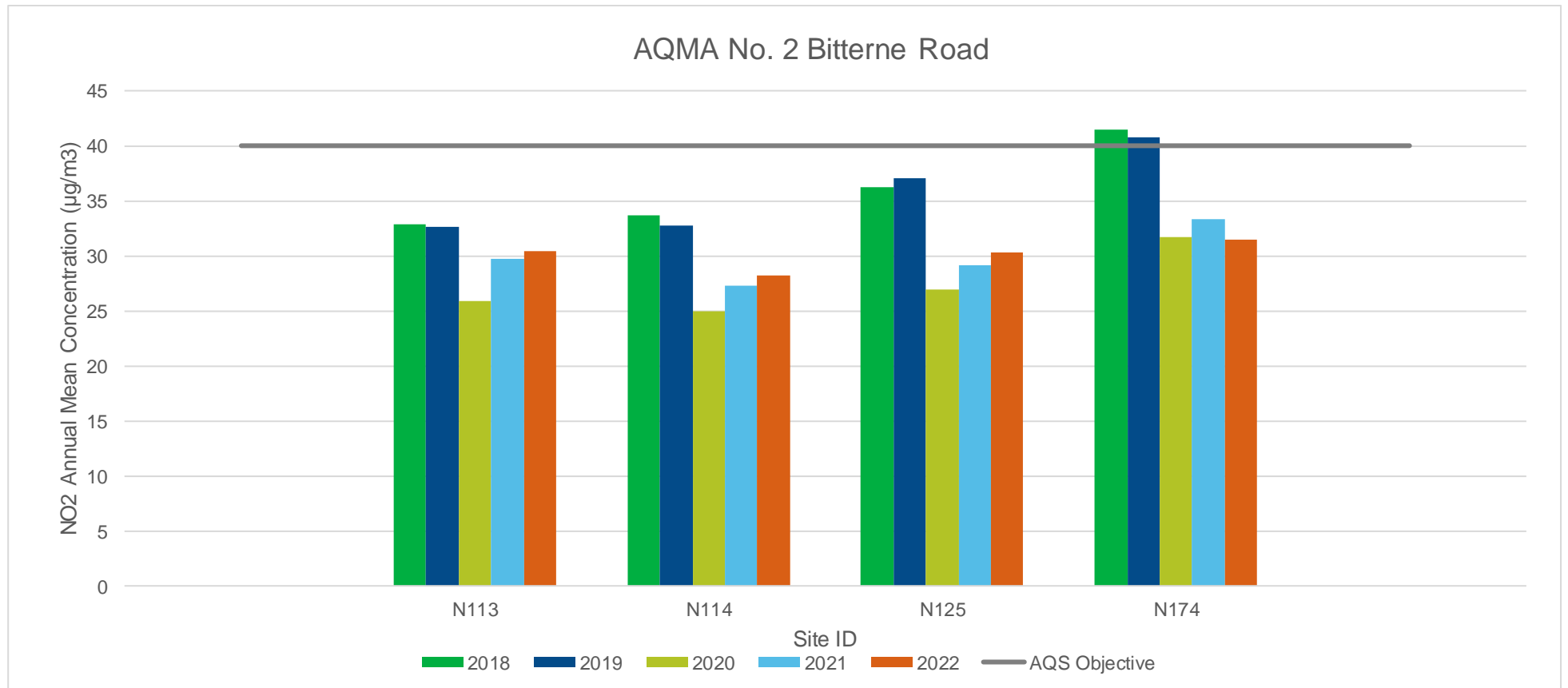
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

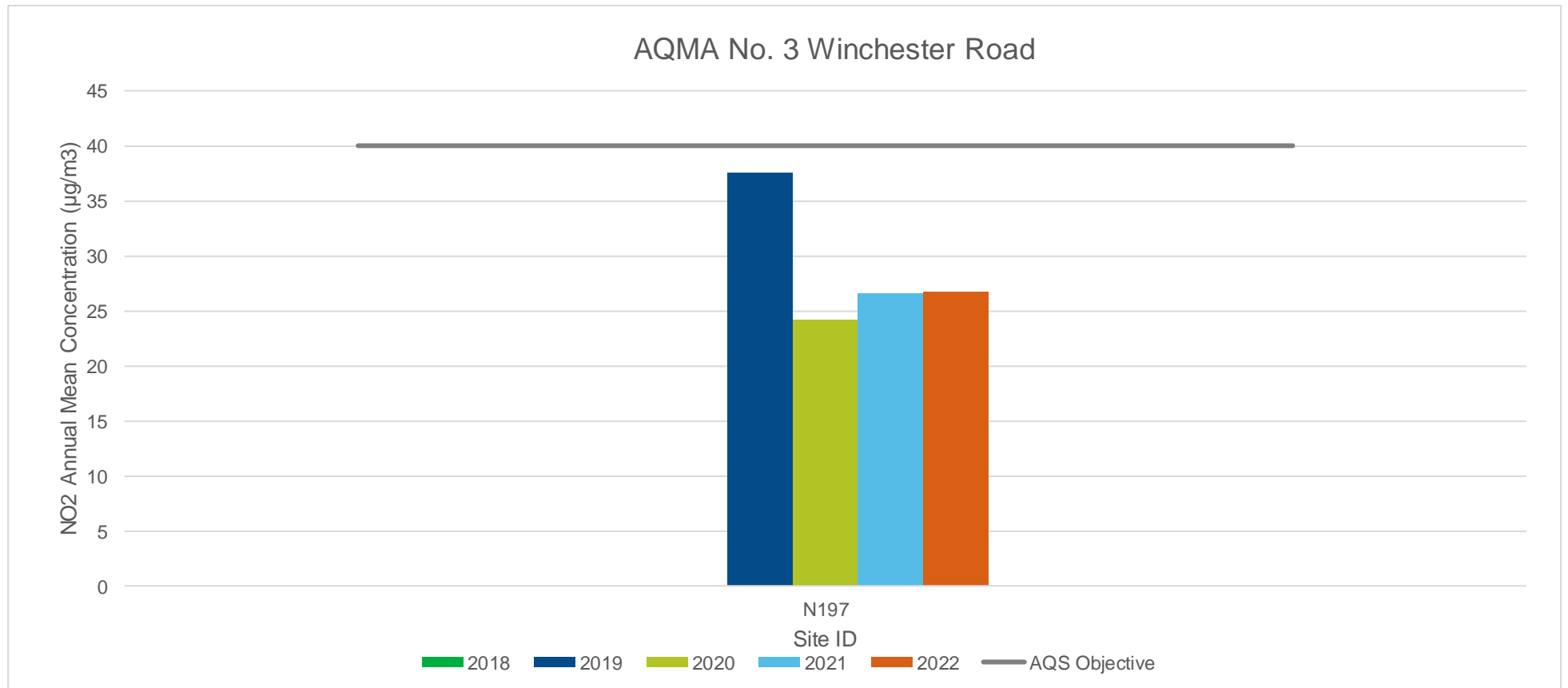
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

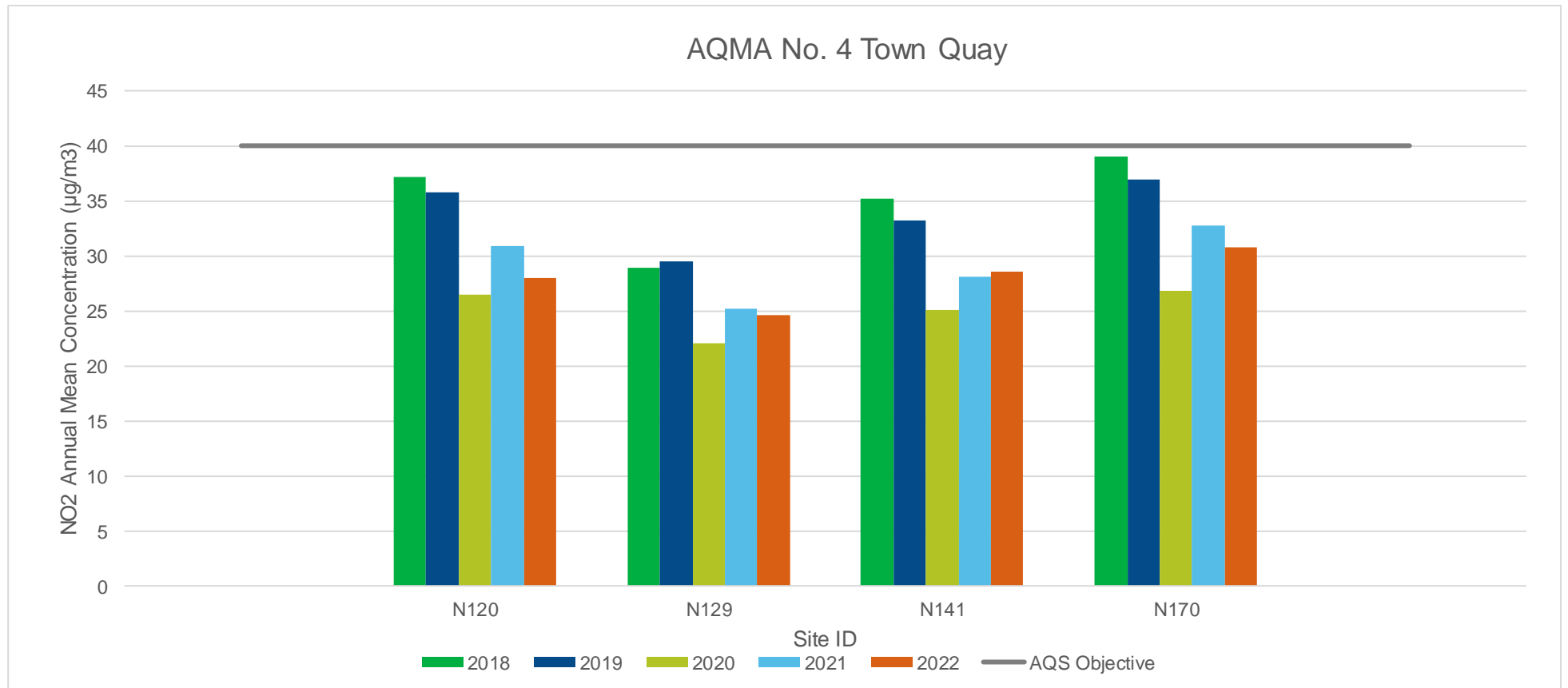
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

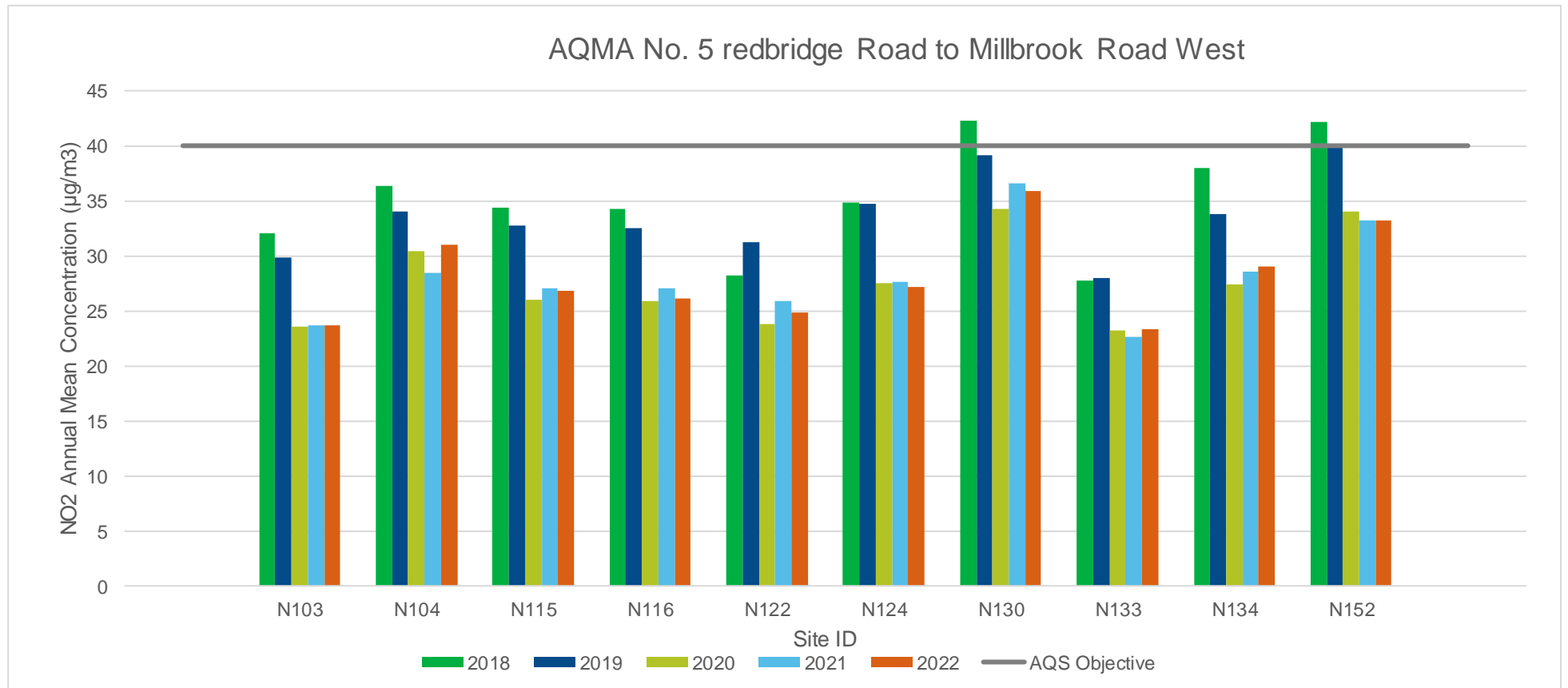
Figure A.1 – Trends in Annual Mean NO₂ Concentrations

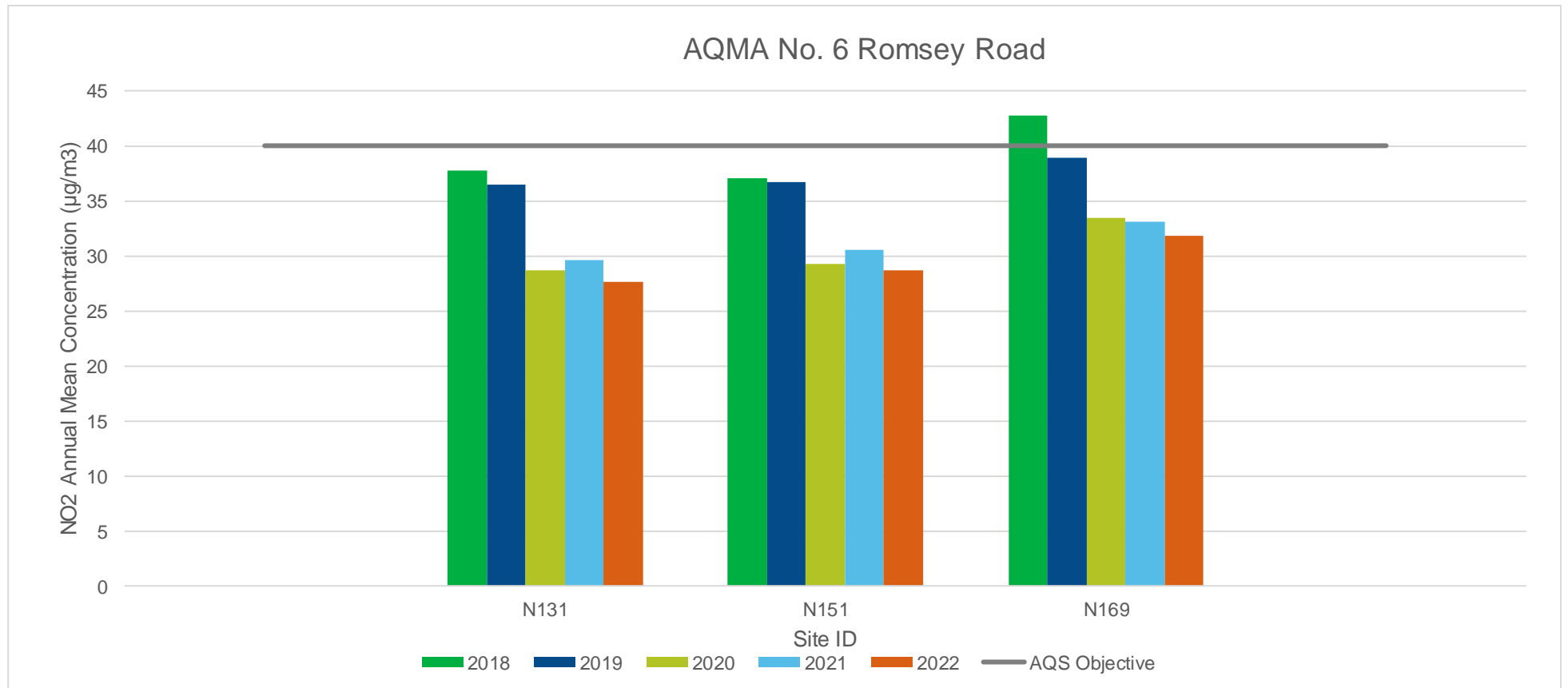


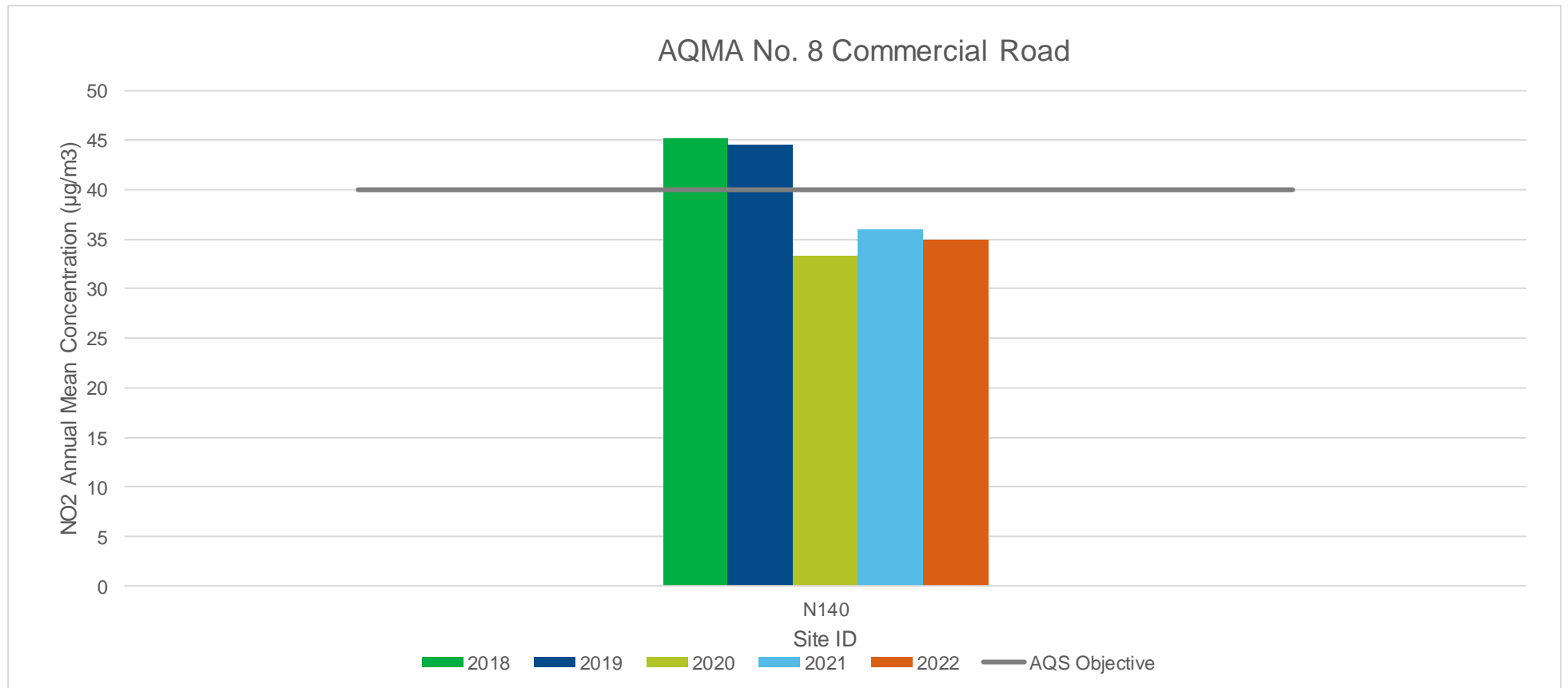


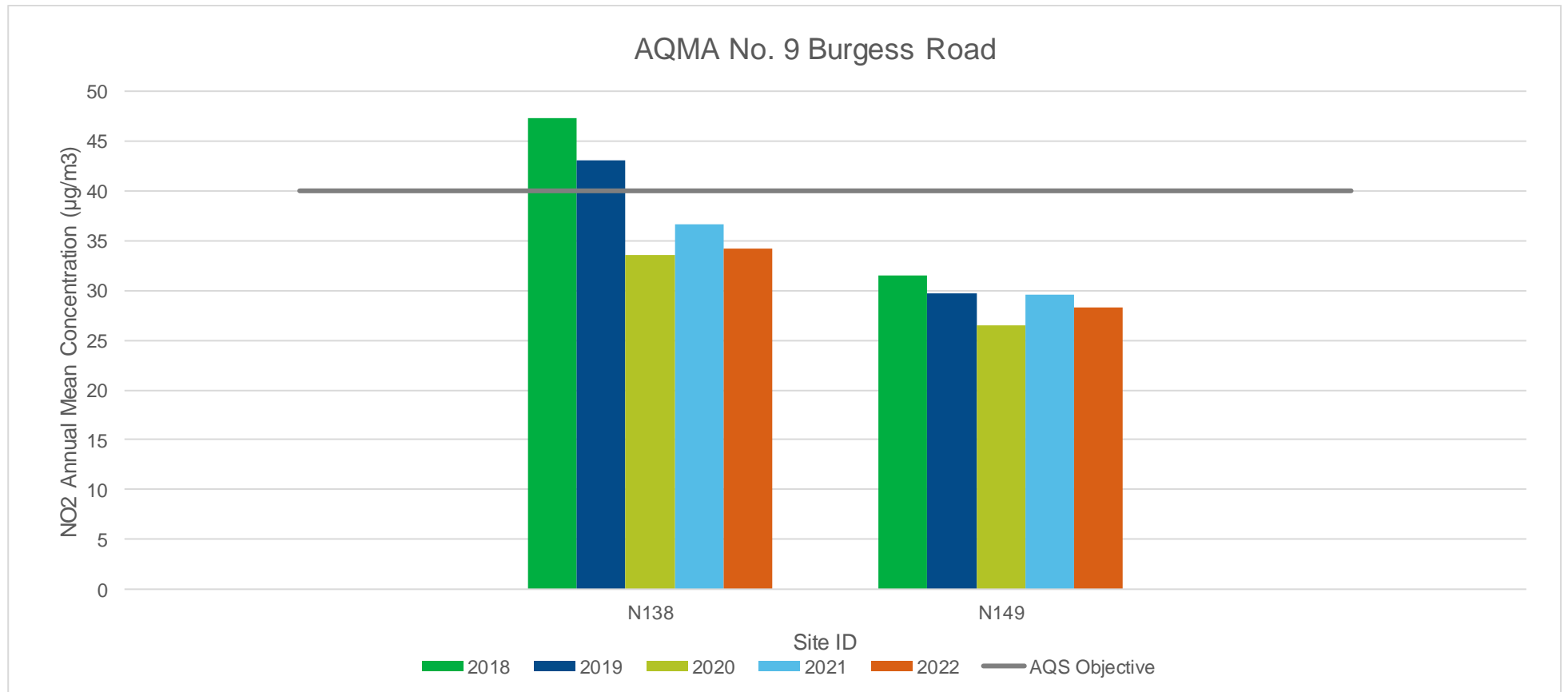


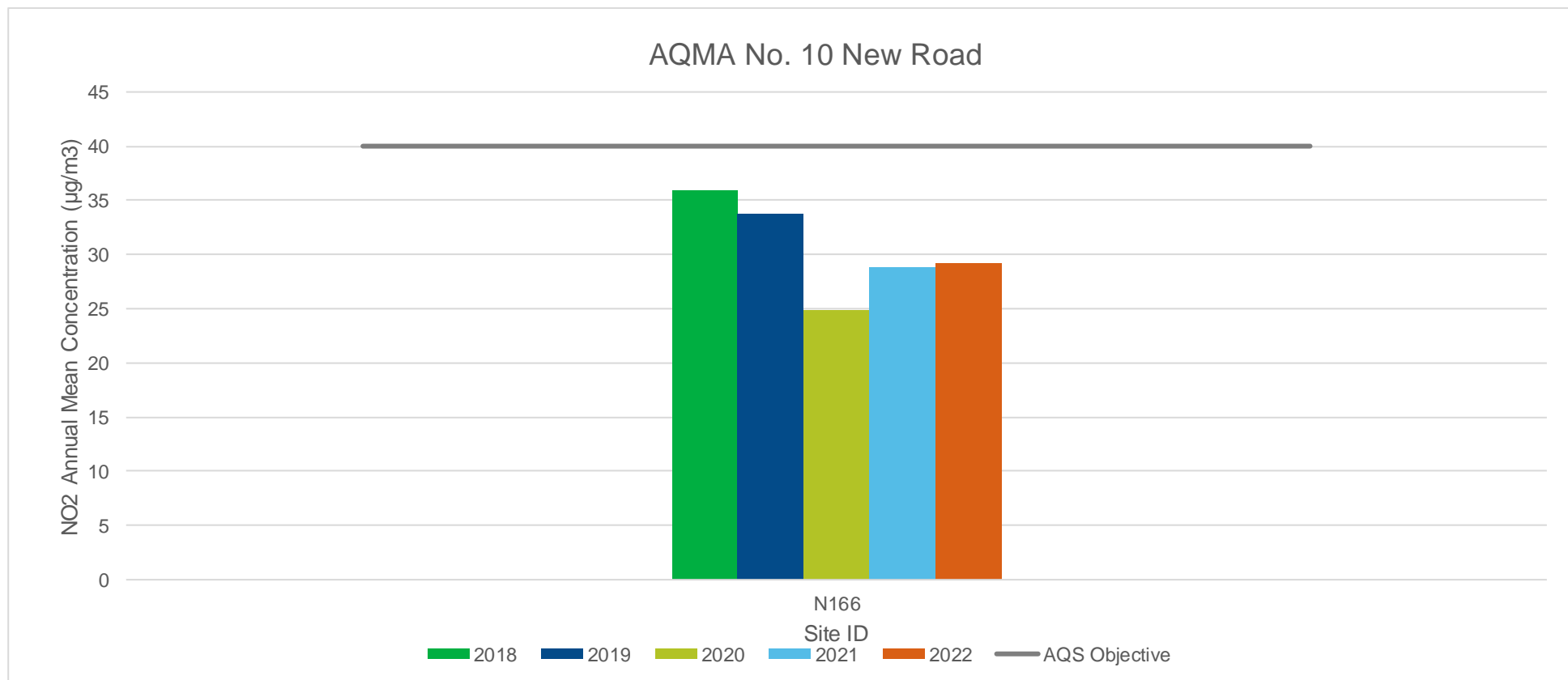












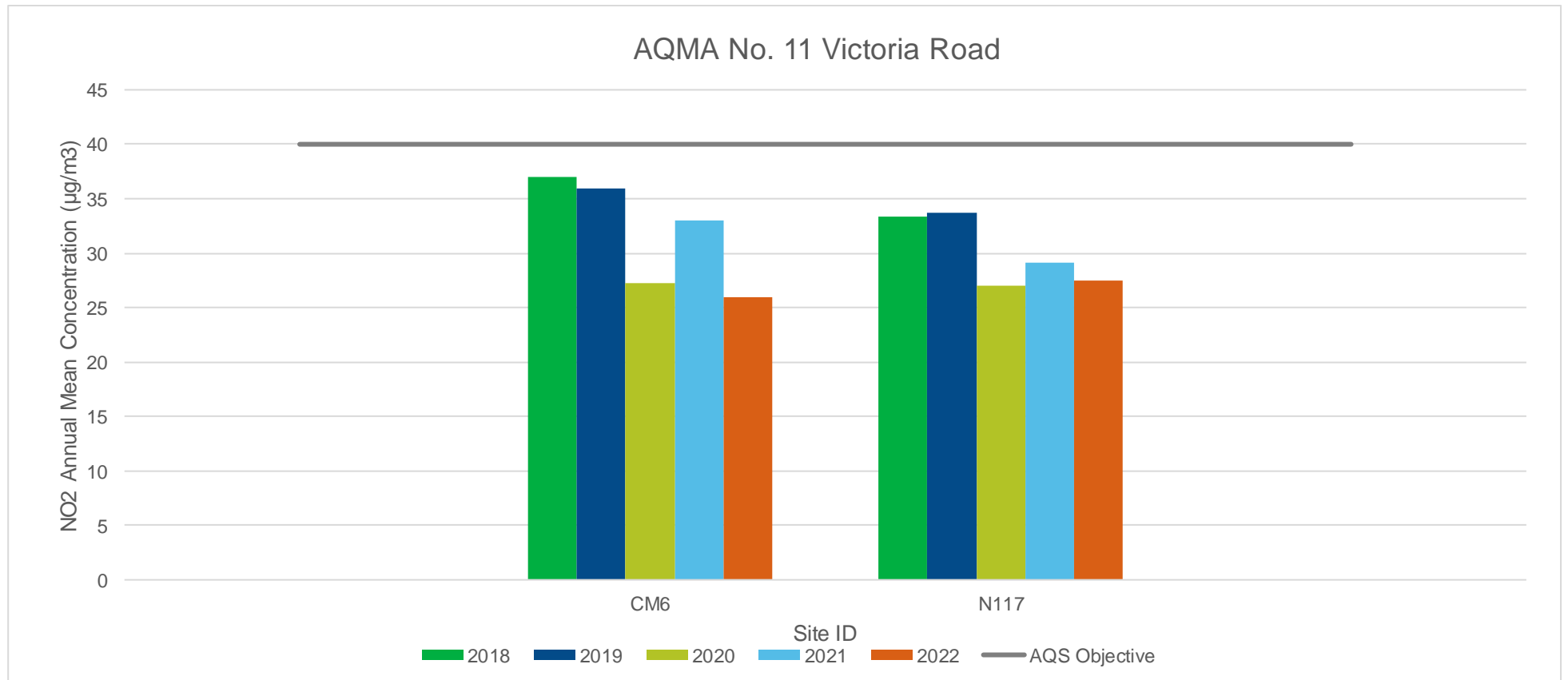


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM1	442579	112248	Urban Background		99%	0	0	0(96)	0	0
CM4	442304	112771	Roadside		97.7%	0	0	0	0	0
CM6	443751	111123	Roadside		96.7%	0	0(133)	0	0	0
CM7	437809	113560	Roadside		99.0%	0	0	0	0	0

Notes:

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

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

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

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

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

Figure A.2 – Trends in Number of NO₂ 1-Hour Means > 200µg/m³

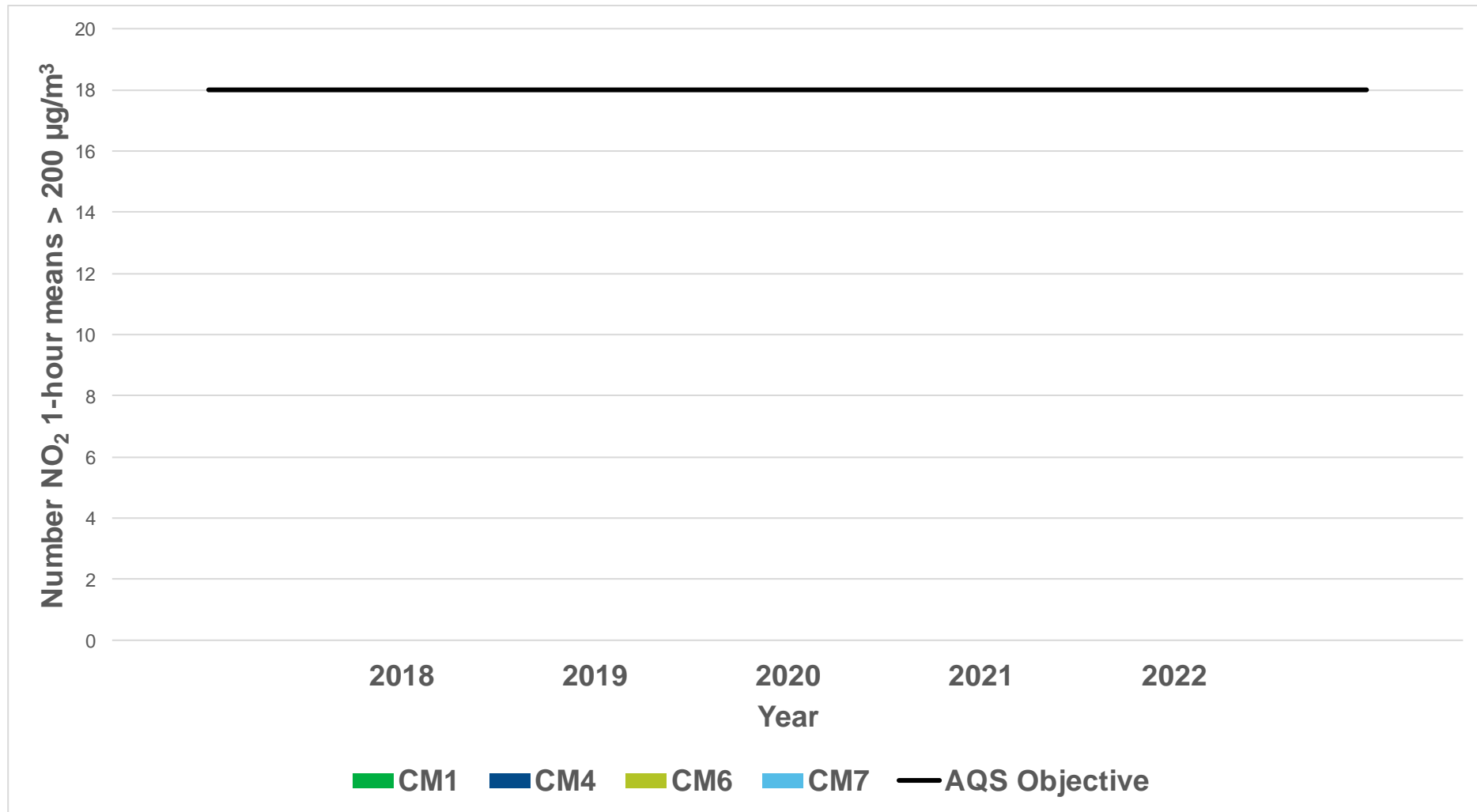


Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM1	442579	112248	Urban Background		100%	19.5	17.1	15	14	16
CM7	437809	113560	Roadside		91%	17.4	16.6	17	17	18

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

Notes:

The annual mean concentrations are presented as µg/m³.

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

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

(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.3 – Trends in Annual Mean PM₁₀ Concentrations

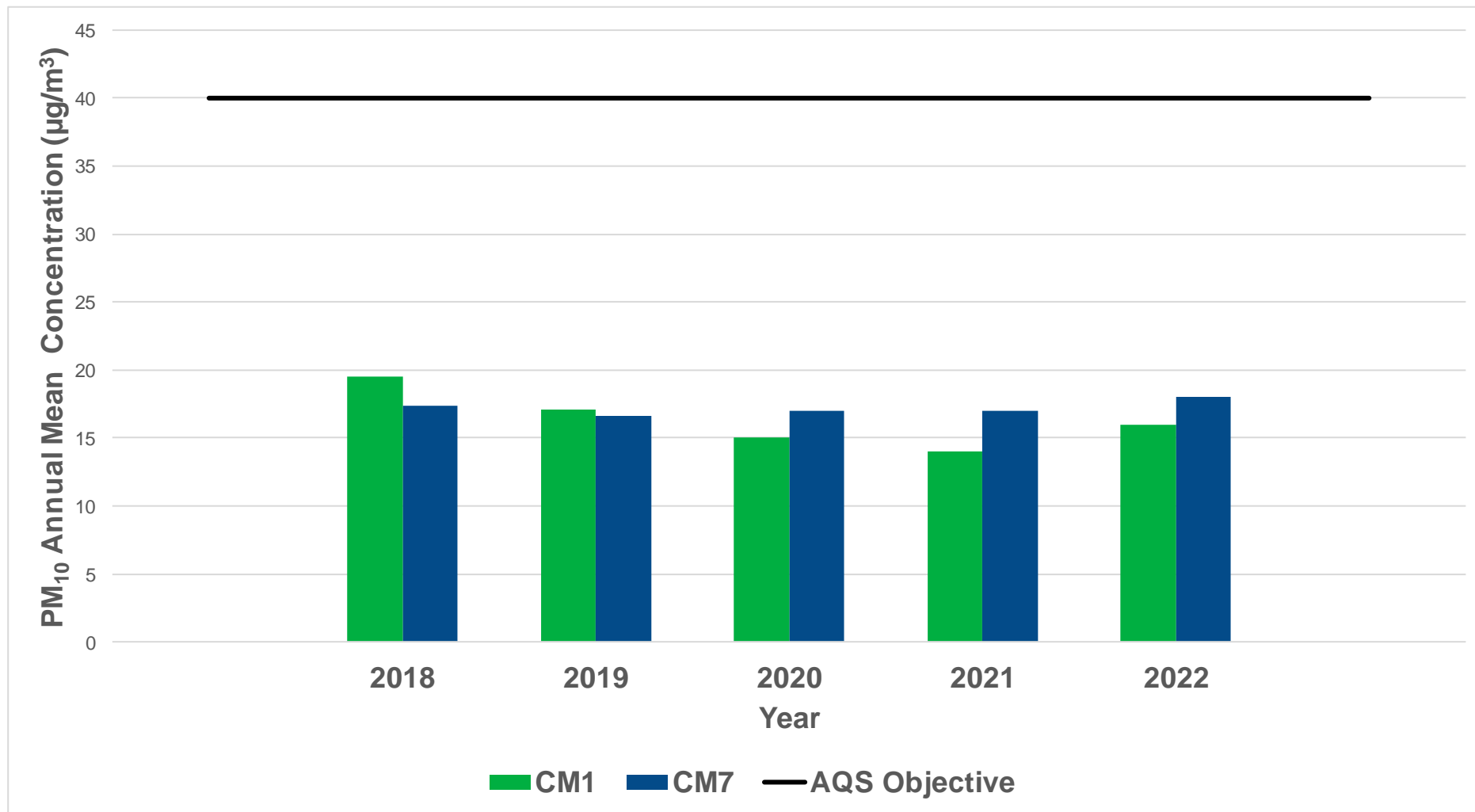


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM1	442579	112248	Urban Background		100%	1 (31.0)	2	1	3	1
CM7	437809	113560	Roadside		91%	0 (27.8)	2	2	2	2

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ 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%).

Figure A.4 – Trends in Number of 24-Hour Mean PM₁₀ Results > 50µg/m³

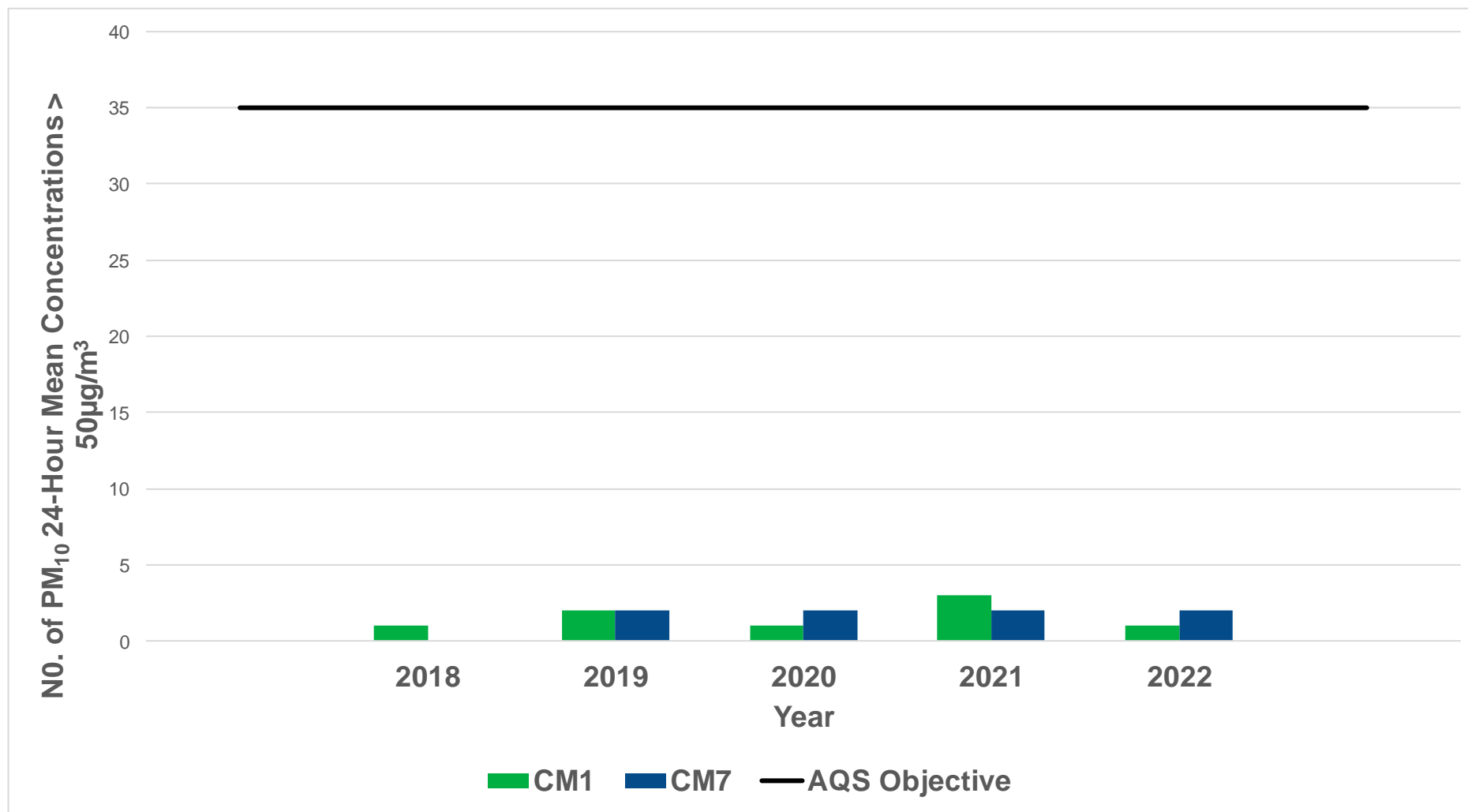


Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
CM1	442579	112248	Urban Background		100%	13.3	9.6	9	9	9

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

Notes:

The annual mean concentrations are presented as µg/m³.

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

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

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

Figure A.5 – Trends in Annual Mean PM_{2.5} Concentrations

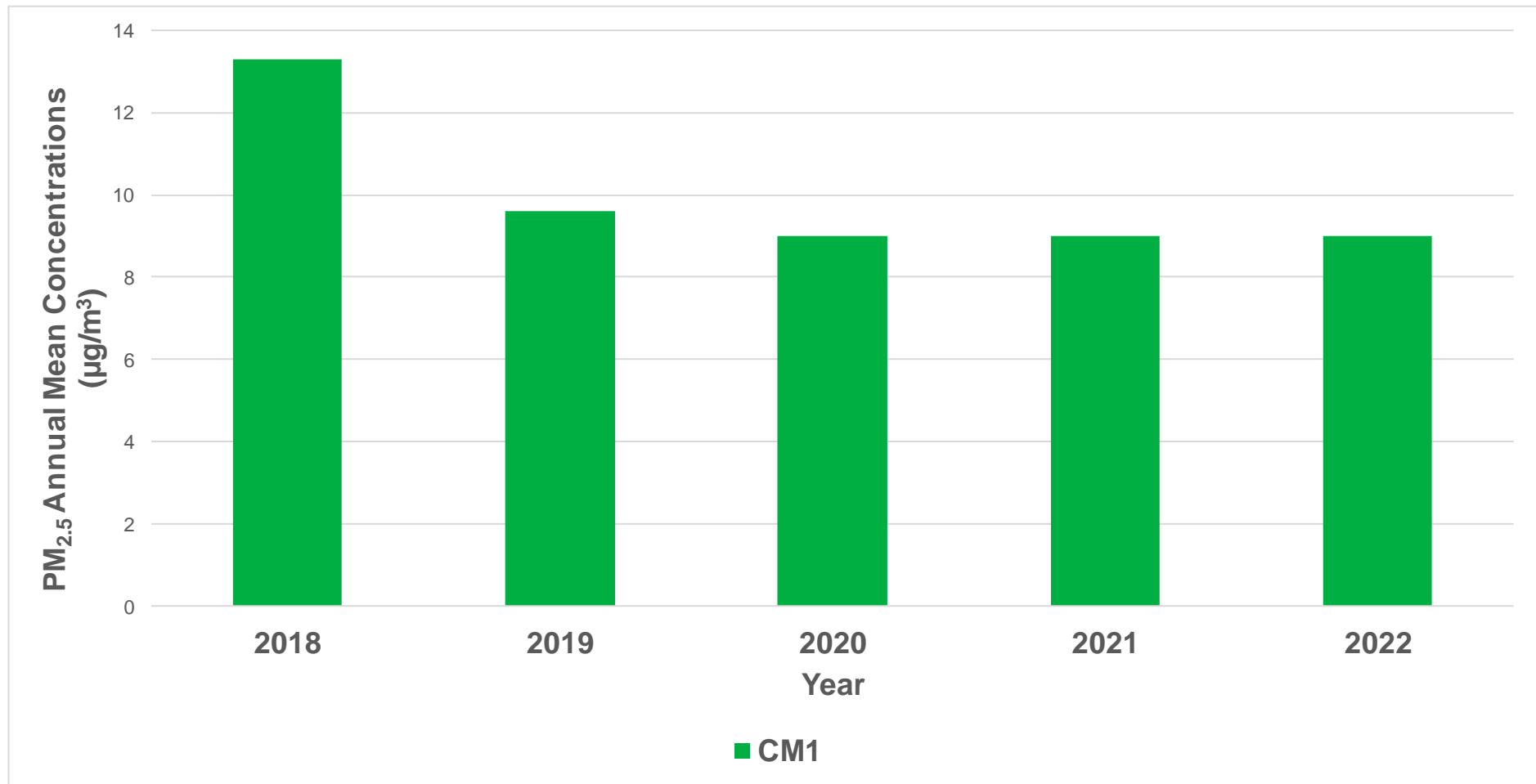


Table A.9 – SO₂ 2022 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2022 (%) ⁽²⁾	Number of 15-minute Means > 266µg/m ³	Number of 1-hour Means > 350µg/m ³	Number of 24-hour Means > 125µg/m ³
CM1	442579	112248	Urban Background		97%	0	0	0

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO₂ objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 2022 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N100	444387	114453	30.6	20.7	24.2	15.3	13.6	13.6	32.8	14.8	15.0	18.5	20.3	26.0	20.4	17.0	-	
N101	437548	113719	41.8		44.8	33.4	34.2	37.0	40.7	42.7	37.0	42.4	49.0	39.1	40.2	33.4	-	
N103	438808	112903	31.8	29.7	32.4	24.2	25.2	25.6	25.4	28.3	25.8	33.4	33.1	27.2	28.5	23.7	-	
N104	439222	112850	35.9	38.0	42.3	29.2		31.5	36.2	38.0	32.4	43.4	43.3	41.0	37.4	31.0	-	
N106	439752	113984	37.7	23.2	38.8	26.9	29.2	30.8	30.9	32.6	31.9	37.6	39.5	33.1	32.7	27.1	-	
N107	442364	112890	58.3	44.3	42.3	40.2	36.7	40.0	40.9	38.9	44.0	40.4	48.2	48.5	43.6	36.2	34.5	
N109	442585	113248	47.3	31.1	44.7		29.0	28.1	22.0	35.3	33.5	35.2	41.1	42.8	35.5	29.4	-	
N110	442579	112248	38.4	27.8	34.3	23.6	20.8	22.2	23.3	25.3	26.6	29.4		31.7	-	-	-	Triplicate Site with N110, N111 and N112 - Annual data provided for N112 only
N111	442579	112248	36.4	30.1	32.8	24.3	19.6	21.1	19.2	23.9	28.2	29.1	29.9	33.2	-	-	-	Triplicate Site with N110, N111 and N112 - Annual data provided for N112 only
N112	442579	112248	37.4	26.0	32.9	24.1	20.6	21.3		23.8	29.7	30.0	31.1	33.0	27.6	22.9	-	Triplicate Site with N110, N111 and N112 - Annual data provided for N112 only
N113	444124	113288	47.2	30.8	35.0	38.4	31.3	32.2	32.3	41.2	37.5	40.5	34.9	38.2	36.6	30.4	-	
N114	444131	113322	37.3	34.7	38.7	29.7			29.6	24.3	30.7	39.3	34.6	41.0	34.0	28.2	-	
N115	437939	113474	31.2	32.9	37.6	28.3	27.3	28.6	32.2	32.6	30.0	40.4	37.4	29.7	32.4	26.9	-	
N116	437952	113407	31.8	28.5	34.9	28.2	27.5	26.0	30.1	33.3	33.5	38.0	36.1	29.7	31.5	26.1	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N117	443752	111121	38.4	36.9	36.3	29.5	28.9	25.5	29.7	32.3	31.1	33.9	35.5	39.3	33.1	27.5	-	
N118	442472	113065	38.9	28.9	39.1	34.7	23.4	24.4			30.3	32.3	32.3	36.9	32.1	26.7	-	
N120	442716	111019	40.8	38.2				33.3		34.0	19.1	39.3	38.1	37.1	35.0	28.0	-	
N122	440000	112633	36.1	32.2	31.3	24.8	27.9	27.5	25.0	28.2	26.9	31.8	36.5	30.6	29.9	24.8	-	
N123	442348	112305	44.2	30.2	35.6	28.6	25.0	25.9	26.2	29.5	32.5	32.2	32.1	35.4	31.5	26.1	-	
N124	439741	112753	35.9	33.4	37.1	29.0	29.9	29.7	30.8	34.7	31.2	35.8	34.9	29.6	32.7	27.1	-	
N125	443125	112641	44.8	28.3	42.6	36.0	30.1	32.1	28.0	37.0	38.8	41.9	40.9	37.7	36.5	30.3	-	
N126	442365	112286	42.8	29.5	51.4	30.6	25.1	26.6	27.6	30.9	35.1	33.9	33.4	37.3	33.7	28.0	-	
N129	442554	111021	34.3	29.8	32.7		23.4	29.0	25.8	28.2	29.6	32.2	29.8	31.9	29.7	24.6	-	
N130	439346	112821	42.6	43.3	44.6	39.8	38.9	43.9	45.1	49.1	42.6	48.1	45.3	35.7	43.2	35.9	-	
N131	439378	114185	36.6	31.0	40.7	30.5	30.0	32.1	31.0	34.4	31.7	35.6		32.7	33.3	27.6	-	
N133	438609	113020	31.0	28.3	32.9	23.4	24.4	26.2	24.7	28.1	26.2	31.9	32.9	26.7	28.1	23.3	-	
N134	438980	112861	40.2	34.5	40.4	30.3	30.3	31.5	33.4	35.9	32.0	37.3	40.3	33.9	35.0	29.1	-	
N138	441697	115288	49.0	35.1	53.2	44.0	37.1	38.4	42.3	42.5	38.6	31.9	40.0	41.5	41.1	34.1	-	
N140	441628	112332	46.2	43.8	48.4	37.3	38.3	37.8	34.1	41.8	37.7	48.6	49.0	43.0	42.2	35.0	-	
N141	441923	110990	37.8		42.2	36.1	30.3	30.9	31.8	39.2	32.0	34.5	30.6	33.2	34.4	28.6	-	
N143	439457	114150	37.2	31.8	36.0	29.5	29.5	30.5	29.7	31.7	31.9		37.8	33.0	32.6	27.1	-	
N144	443147	112709	40.3	31.7	34.2	27.6	27.5	28.8	28.9	28.3	33.1	33.9	31.5	40.8	32.2	26.7	-	
N146	443164	112741	33.3	28.0	32.5	22.7	21.6	21.5	25.6	25.4	28.4	33.0	29.5	32.7	27.8	23.1	-	
N149	441552	115247	45.9	35.0	42.1									42.6	41.4	28.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N151	439394	114176	38.2	34.0	38.0	32.5	31.2	30.6	31.7	36.2	32.4	35.8	38.9	34.4	34.5	28.6	-	
N152	437327	113848	39.4	39.5	46.2	38.3	32.3	37.6	38.6	44.1	36.9	46.2	45.6	36.0	40.1	33.3	-	
N158	443807	111123	43.1	36.2	38.5	31.2	31.0	33.3	34.4	35.0	31.8	36.0	34.7	33.6	34.9	29.0	-	
N159	443740	111147	41.4	31.7	35.6	30.3	29.2	26.4	30.5	31.8	33.7	31.6	34.1	32.9	32.5	26.9	-	
N161	442705	114129	41.2	28.5	34.5	28.7	24.4	24.8	26.3	28.2	33.0	31.4	32.8	33.9	30.7	25.4	-	
N162	442872	114336	42.6	37.3	35.1	30.8	30.4	30.4	24.6	30.3	35.2	37.9	41.6	36.0	34.3	28.5	-	
N164	442809	114241	39.8	29.1	37.4	28.9	27.6	33.5	33.3	33.2	29.9	32.7	32.5	34.1	32.7	27.1	-	
N165	442766	114181	39.2	31.4	38.0	31.6	29.4	32.3	30.4	33.0	32.6	36.8	39.5	37.3	34.3	28.5	-	
N166	442251	112129	44.3		40.7	28.7	27.7	29.5	31.6	35.2	35.5	36.0	37.9	39.6	35.1	29.2	-	
N167	439759	114011	41.6	25.5	36.8	30.8	27.3	26.1	30.8	34.4	33.7	34.5	35.2		32.4	26.9	-	
N168	439737	114025	37.9	25.8	41.4	32.0	27.3	26.3	31.1	35.8	32.9	34.4	35.5	34.5	32.9	27.3	-	
N169	439361	114195	46.2	32.3	43.4	33.0	35.2	37.5	37.0	39.8	35.1	44.2	41.9	34.8	38.4	31.8	-	
N170	442482	111003	46.7	38.2	40.6	36.2	30.8	31.7	30.8	36.6	36.0	38.2	38.1	40.8	37.1	30.8	-	
N172	442207	112126	46.5	40.3	42.8	33.6	33.2	36.3	37.4	35.6	39.0	38.0	41.8	37.4	38.5	31.9	-	
N174	443959	113315	46.2		42.7	33.8	35.7	39.1	40.7	32.8	39.4	35.3	43.0	28.8	38.0	31.5	-	
N175	439959	113737		33.8	34.9	28.2	28.8	29.0	30.0	30.1	30.6	34.9	37.3	36.4	32.2	26.7	-	
N176	439772	113952	38.3		43.9	28.3	26.4	26.9	30.0		51.7	41.8	33.5	32.8	35.4	29.3	-	
N177	439844	113907	35.4	29.3	47.2	29.4	30.1	29.2	30.9	36.4	30.5	40.0	38.3	34.9	34.3	28.5	-	
N178	437265	113682	23.9	19.0	33.7	22.2	19.6	19.9	21.3	24.6	22.2	28.3	26.0	23.7	23.7	19.7	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N184A	437811	113557	33.1	40.1	46.2	29.5	30.8	32.4	34.1	35.0	31.9	44.1	45.7	34.9	-	-	-	Triplicate Site with N184A, N184B and N184C - Annual data provided for N184C only
N184B	437811	113557	40.3	39.6	46.0	27.1	28.4	31.6	33.3	37.0	30.8	43.1	44.5	34.5	-	-	-	Triplicate Site with N184A, N184B and N184C - Annual data provided for N184C only
N184C	437811	113557	39.2	41.3	43.2	21.9	29.5	31.1	34.6	34.9	33.1	44.9	44.4	34.6	36.3	30.1	-	Triplicate Site with N184A, N184B and N184C - Annual data provided for N184C only
N185	437167	113713	47.7	57.4	48.3	45.8	37.7	41.3	48.2	39.0					45.7	38.3	18.5	
N186	437126	113701	42.6	27.5	37.9		25.3	25.2	32.3	38.9					32.8	27.2	-	
N187	444102	113872	39.8	33.9	44.0	27.1	28.1	27.3	31.1	24.7	29.0	30.1	34.1		31.7	26.3	-	
N188	441300	112233	36.5	34.6	41.6	34.6	25.7	26.1	25.6	28.9	28.6	33.2	34.5	32.8	31.9	26.5	-	
N189	441790	112465	40.4	36.3	37.5	34.5	27.6	30.6	28.4	34.0	34.5	36.3	37.0	37.0	34.5	28.6	-	
N190	442024	112553	44.0	36.9		29.8	30.6	31.2	31.9	35.0	37.7	39.6	40.7	41.4	36.3	30.1	-	
N191	441915	112097	45.0	44.6	49.9	33.3	34.7	38.8	35.1	35.6	38.6	40.9	43.6	37.3	39.8	33.0	-	
N192	441961	112029	53.6	40.8	40.8	36.9	33.9	35.6	36.0	36.9	43.7	36.7			39.5	32.8	-	
N193	441975	112031	40.0	33.1	35.7	28.6	26.7	27.6	30.4	29.0	33.2	31.1	31.4	33.1	31.7	26.3	-	
N194	442090	111775	61.2	55.9	46.4	41.7	41.0	45.4	48.2		48.1	44.7	51.1	47.8	48.3	40.1	-	
N195	441945	111655	53.2	37.0	44.5				39.6	34.6	42.3	33.3			40.7	32.4	-	
N197	440957	115151	41.3	28.1	37.1	30.4	29.2	28.2	27.0	28.0	31.0	35.6	35.9	34.0	32.2	26.7	-	
N198A	442304	112771	45.2	37.1	36.4	30.1	28.1	29.8	28.9	28.9	34.2	32.8	25.1	37.6	-	-	-	Triplicate Site with N198A, N198B and N198C - Annual data provided for N198C only
N198B	442304	112771	43.8	36.0	37.0	30.5	27.2		25.9	31.2	33.8	31.6	39.1	38.7	-	-	-	Triplicate Site with N198A, N198B and N198C - Annual data provided for N198C only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
N198C	442304	112771	42.5	36.6	36.2	31.2	30.0	30.2	27.5	30.8	34.0	33.7	38.4	39.4	33.6	27.9	-	Triplicate Site with N198A, N198B and N198C - Annual data provided for N198C only
N199	442210	112583	46.7	34.2	46.2	32.5	27.9	29.9	30.6	34.1	32.9	36.3	39.3	63.8	37.9	31.4	-	
N200	443160	112765	45.1	36.0	37.7	30.5	29.4	32.3	30.0	29.1	35.6	37.8	37.8	30.1	34.3	28.5	-	
N201	439759	112738	74.2	51.5	61.2	51.9	49.4	49.3	50.9	60.5	52.5	60.5	62.8	50.3	56.2	46.7	30.9	
N202	437166	113755	47.5	47.6	46.7	38.6	36.0	42.1	44.5	50.3	40.9	54.5	52.9	41.1	45.2	37.5	-	
N204	442542	113261	47.1	34.0	40.2	30.5	29.0	30.3	31.2	31.2	34.7	34.1	42.0	39.1	35.3	29.3	-	
N205	442101	113438	47.2	41.8	43.1	30.0	32.7	35.4	33.7	32.4	34.2		48.7	41.2	38.2	31.7	-	
N206	442265	112516	56.1		40.6	34.8	35.7	36.1	39.4	40.3	40.3	41.3	44.5	49.1	41.6	34.6	-	
N207	439698	112806	34.8	37.2	36.8	25.2	31.8	30.3	28.0	33.5	28.8	38.8	42.5	33.3	33.4	27.7	-	
N208	441365	115202	42.1	29.8	40.3	26.7	26.0	25.3	26.6	29.3	29.6	29.8	37.6	32.9	31.3	26.0	-	
N209	441246	115138	45.4	33.0	38.3	27.5	24.1	21.7	25.6	27.7	29.4	27.0	32.1	36.4	30.7	25.5	-	
N210	441122	115118	49.8	35.4	40.0	30.8	29.4	28.7		30.2	33.3	29.0	36.4	37.5	34.6	28.7	-	
N211	437332	113873	27.9		34.1	24.2	20.9	22.4	23.4	27.8	22.7	30.9	30.3	27.3	26.5	22.0	-	
N213	442935	114374	37.7	29.9	30.6	26.2	24.8	23.0	30.8	25.3	29.6	29.6	32.3	32.2	29.3	24.3	-	
N214	441677	115280	40.6	30.4	43.4	32.6	26.3	27.9	29.0	32.0	30.0	26.8	32.9	34.8	32.2	26.7	-	
N216	442352	113486	40.3	34.7	40.8	26.5	29.1	30.2	30.3	29.6	29.3	36.4	39.5	34.8	33.5	27.8	-	
N217	440751	112188	39.2	40.2	40.0	26.5	29.8	27.2	27.9	31.6	29.7	37.7	37.3	29.6	33.1	27.4	-	
N218	443547	114101	47.4	32.9	25.6	39.7	28.2	28.8	29.2	33.4	33.4	29.9	35.9	30.4	32.9	27.3	-	

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

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

- Local bias adjustment factor used
- National bias adjustment factor used
- Where applicable, data has been distance corrected for relevant exposure in the final column
- Southampton City Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Southampton City Council During 2022

Southampton City Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by Southampton City Council During 2022

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

QA/QC of Diffusion Tube Monitoring

The determination of NO₂ diffusion tube precision is obtained from the triplicate sites on the sample inlet roof of the CM1 Brintons Road AURN Station, CM7 Redbridge AURN Station and CM4 Onslow road.

Southampton use Gradko International Ltd for the supply and analysis of diffusion tubes. They are a UKAS accredited. SCC use the 20% TEA in water NO_x tubes. No changes in tube or preparation method were made in 2022. The tubes were changed in accordance with the 2022 Diffusion Tube Monitoring Calendar, except for a very small number of occasions due to staffing issues around leave and sickness.

Gradko is accredited to ISO 17025:2017 They follow the procedures set out by the DEFRA Harmonisation Practical Guidance and participate in the AIR PT scheme for NO₂ diffusion tube analysis and annual Inter-Comparison Exercise.

Gradko International Ltd (Trading as Gradko Environmental)

Testing Laboratory No. 2187

Is accredited in accordance with International Standard ISO/IEC 17025:2017

– General Requirements for the competence of testing and calibration laboratories.

Initial Accreditation: 31 January 2001

Certificate Issued: 15 April 2020

This accreditation demonstrates technical competence for a defined scope specified in the schedule to this certificate, and the operation of a management system (refer joint ISO-ILAC-IAF Communiqué dated April 2017). The schedule to this certificate is an essential accreditation document and from time to time may be revised and reissued.

The most recent issue of the schedule of accreditation, which bears the same accreditation number as this certificate, is available from www.ukas.com. This accreditation is subject to continuing conformity with United Kingdom Accreditation Service requirements.

Locations, distances from nearest receptors and distances to relevant receptors for diffusion tubes are annually reviewed to ensure that GIS locations and measurements are accurate and up to date.

QA/QC of Automatic Monitoring

CM1 and CM7 are part of the Automatic Urban and Rural Network (AURN). Details of quality assurance/control at AURN sites can be found at Defra's webpages¹⁰.

CM4 and CM6 are supported by Air Quality Data Management (AQDM) and Envitech Europe Ltd which includes annual UKAS-accredited, to ISO 17025, independent equipment audits by NPL which exceed AURN standards. Audit results used extensively in measurement ratification. AQDM sub-contracts this specialist work to The National Physical Laboratory (NPL), the national measurement standards laboratory for the UK. NPL currently carries out around 180 audits per year under King's contracts. NPL is a world-leading centre of excellence in developing and applying accurate measurement standards. In addition to fulfilling the recommendations of LAQM TG16, NPL's audits meet the testing requirements for air quality measurement methods stipulated in the CEN

¹⁰ https://uk-air.defra.gov.uk/assets/documents/Data_Validation_and_Ratification_Process_Apr_2017.pdf

standards (for example, NO₂ and NO_x: EN 14211:2005) which are specified for compliance with the EU ambient air quality directive (2008/50/EC). This arrangement also ensures equipment testing that is completely independent of the data management unit, the Local Site Operators and the Equipment Support Unit. NPL is accredited by UKAS to ISO 17025 for these measurements (Certificate 0478). The accredited activities at NPL are also covered by the lab-wide Quality Management System which has been certified by Lloyds Register Quality Assurance as conforming to ISO 9001:1994 since June 1996 (Certificate 938168). Their UKAS certificate for this work can be found at the following link:

https://www.ukas.com/wp-content/uploads/schedule_uploads/00001/0478Calibration%20Multiple.pdf

NPL audits comprise:

- Single-point zero and span tests using scrubbed zero air, certified gas cylinders, an ozone generator and reference photometer.
- Multi-point assessment of analyser linearity using diluted high concentration gases, an ozone generator and reference photometer.
- Measurement of NO_x converter efficiency using gas phase titration. NPL is the only UK organisation to hold UKAS accreditation for this test.
- Assessment of analyser zero and span noise.
- Hydrocarbon interference test for SO₂ analysers.
- Drift tests and certification of on-site gas standards. NPL is the only UK organisation to hold UKAS accreditation for this test.
- Leak tests.
- Multi-point verification of micro-balances for TEOMs and FDMSs using four pre-weighed filters.
- Flow checks for particulate analysers.
- Sampling system testing to assess any ambient sample loss in manifolds and inlet lines, as necessitated by recent revisions to CEN standards. NPL is the only UK organisation to hold UKAS accreditation for this test.

AQDM also carry out measurement ratification where measurements collected over a long time period are subject to additional checks; previous validation decisions are reviewed with the benefit of hindsight and using a greater pool of information such as service

records, calibration records and the results of intercalibration/audit. Measurement ratification is in accordance with LAQM TG16.

Local Site Operation (LSO) duties are undertaken by trained SCC staff including fortnightly site visits to perform calibrations and onsite fault investigation.

Servicing and maintenance of the 2 NO_x Analysers was contracted to WCFA in 2022.

Data is disseminated via. [Air Quality in Southampton \(southamptonair.org.uk\)](https://southamptonair.org.uk)

AURN data and information can be found here: <https://uk-air.defra.gov.uk/networks/network-info?view=aurn>.

Diffusion Tube Annualisation

Sites where there is less than 75% data capture require annualization.

Annualisation has been undertaken in accordance with LAQM TG box 7.9 and 7.10.

The Defra Diffusion tube Data Processing Tool was used for the calculation.

Please see Table C1 below

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

Site ID	Annualisation Factor Southampton Centre AURN	Annualisation Factor A33 Redbridge AURN	Annualisation Factor Onslow Road, Southampton	Annualisation Factor Victoria Road, Southampton	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
N120	0.9362	0.9784	0.9568	0.9852	0.9641	35.0	33.7
N149	0.7832	0.8489	0.8277	0.8362	0.8240	41.4	34.1
N185	1.0235	0.9972	1.0214	0.9959	1.0095	45.7	46.1
N186	1.0066	0.9725	1.0193	0.9933	0.9979	32.8	32.8
N195	0.9466	0.9441	0.9851	0.9631	0.9597	40.7	39.0

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Southampton City Council have applied a national bias adjustment factor of 0.83 to the 2022 monitoring data an average of co-location studies. A summary of bias adjustment factors used by Southampton City Council over the past five years is presented in C.2.

The use of the national bias adjustment was chosen as it is consistent with previous Southampton City Council ASR reporting. The 27 Studies include 3 of Southampton's studies.

The average local bias adjustment factor calculated using the CM7 Redbridge AURN, CM1 Brintons Road AURN and CM4 Onslow Road Station Co-Location Triplicate Tube Studies was 0.85, slightly higher than the National Factor of 0.83.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.83
2021	National	09/22	0.84
2020	National	09/21	0.81
2019	National	06/20	0.93
2018	National	06/19	0.92

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3
Periods used to calculate bias	12	12	11
Bias Factor A	0.87 (0.82 - 0.92)	0.77 (0.71 - 0.84)	0.92 (0.88 - 0.96)
Bias Factor B	15% (9% - 21%)	30% (20% - 40%)	9% (4% - 14%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	27.6	36.3	33.5
Mean CV (Precision)	4.1%	4.2%	2.7%
Automatic Mean ($\mu\text{g}/\text{m}^3$)	24.0	28.0	30.8
Data Capture	100%	100%	98%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	24 (23 - 25)	28 (26 - 30)	31 (30 - 32)

NO₂ Fall-off with Distance from the Road

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

Table C.4 – NO₂ Fall off With Distance Calculations (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
N107	1.8	2.3	36.2	6.9	34.5	

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
N185	2.4	31.6	38.3	6.9	18.5	<i>Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.</i>
N201	1.2	8	46.7	6.9	30.9	

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀/PM_{2.5} monitors utilised within Southampton City Council do not require the application of a correction factor.

Automatic Monitoring Annualisation

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

NO₂ Fall-off with Distance from the Road

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

No automatic NO₂ monitoring locations within Southampton City Council required distance correction during 2022.

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

Figure D.1 – AQMA 1 Bevois Valley and NO2 diffusion tube monitoring locations

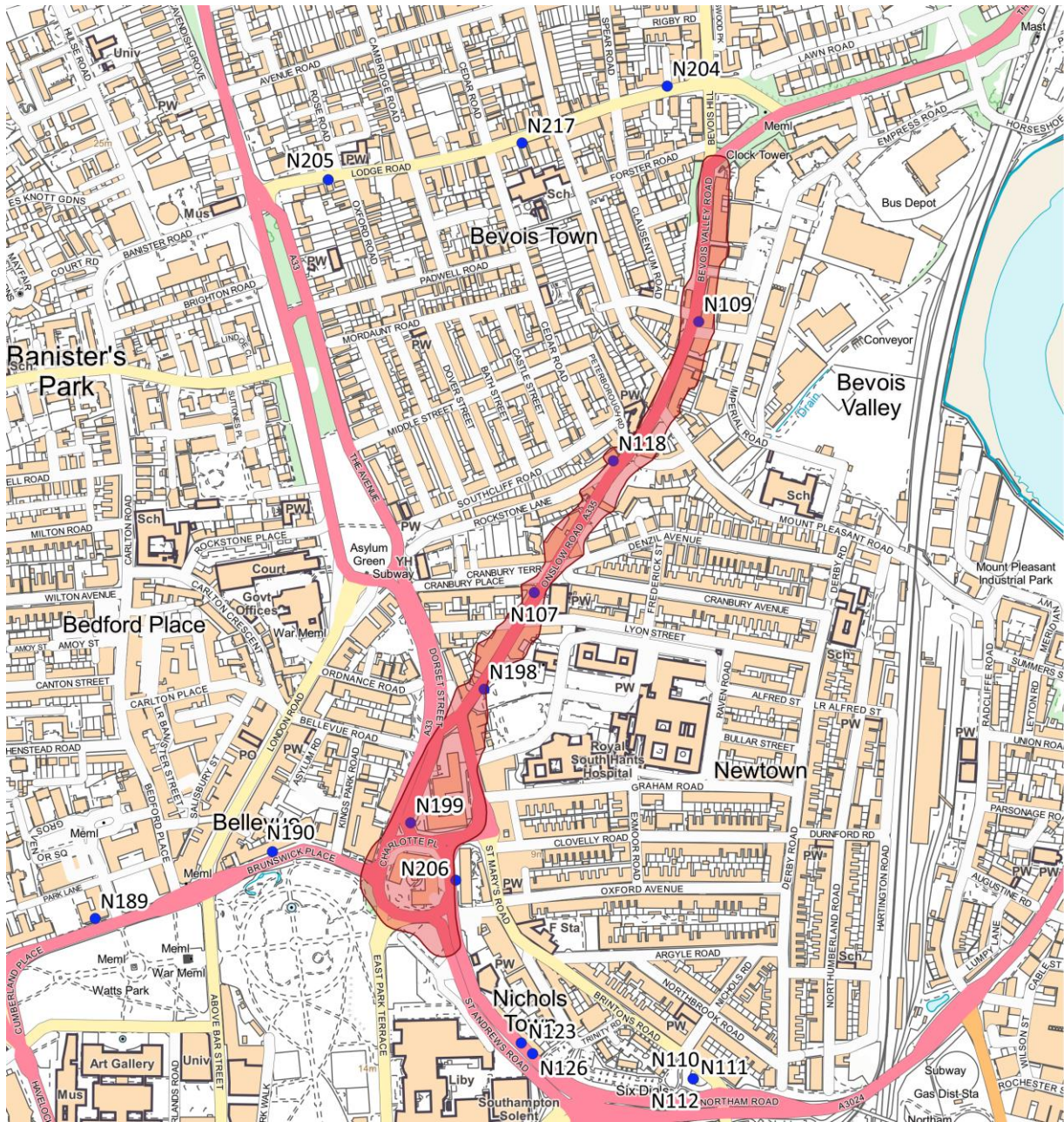


Figure D.2 – AQMA 2 Bitterne Road and NO2 diffusion tube monitoring locations

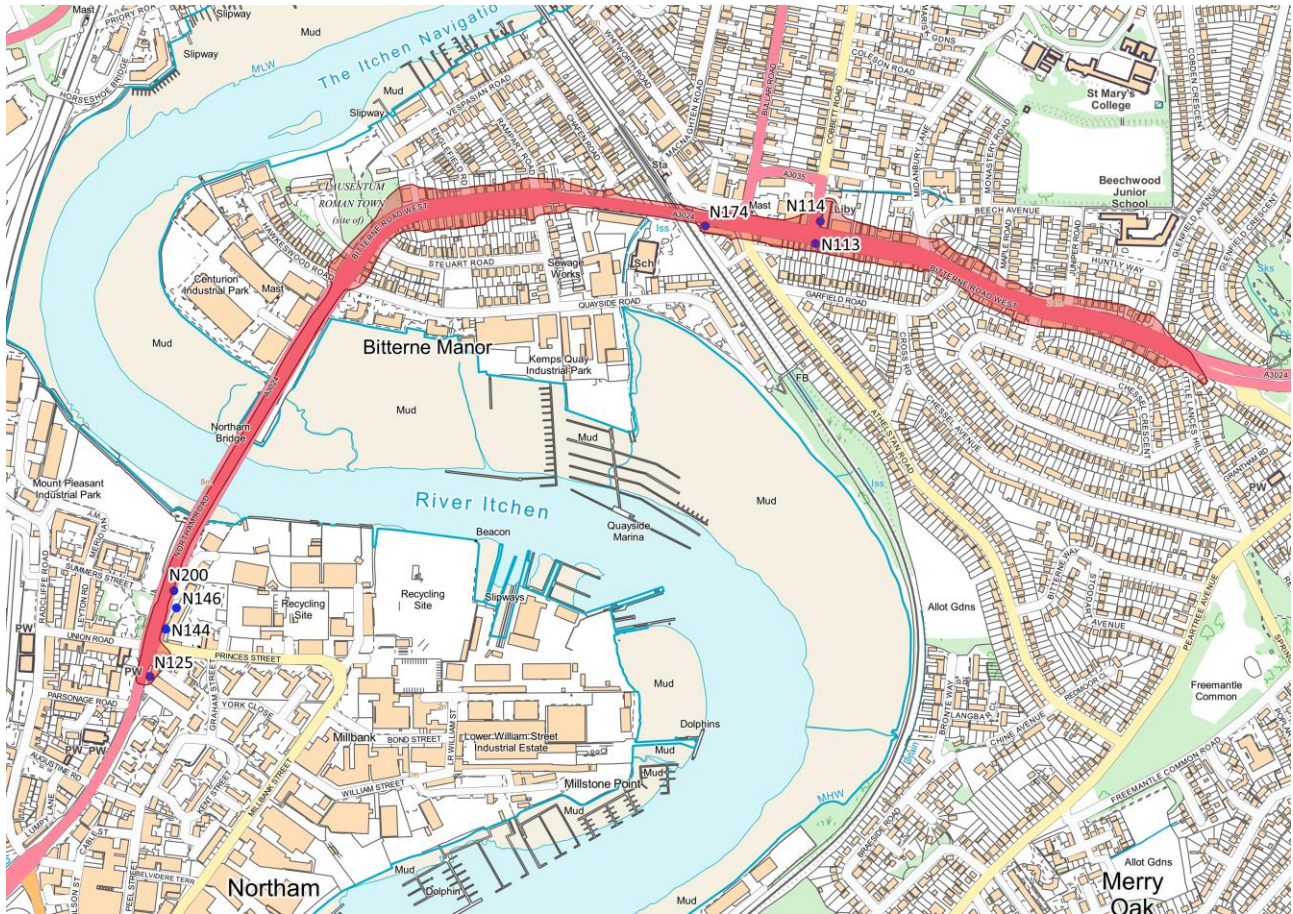


Figure D.3 – AQMA 3 Winchester Road and NO2 diffusion tube monitoring locations

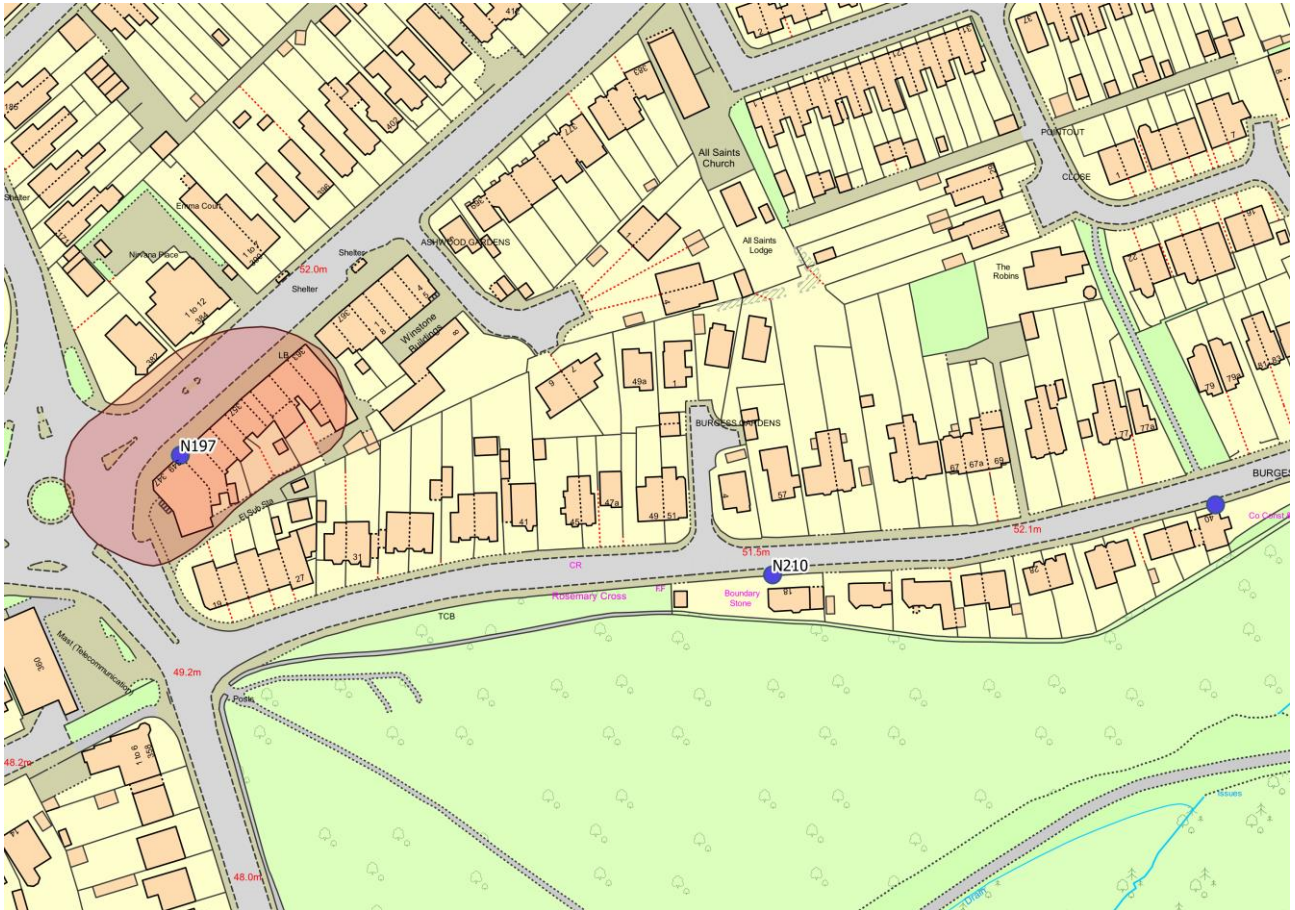


Figure D.4 – AQMA 4 Town Quay Road and NO2 diffusion tube monitoring locations

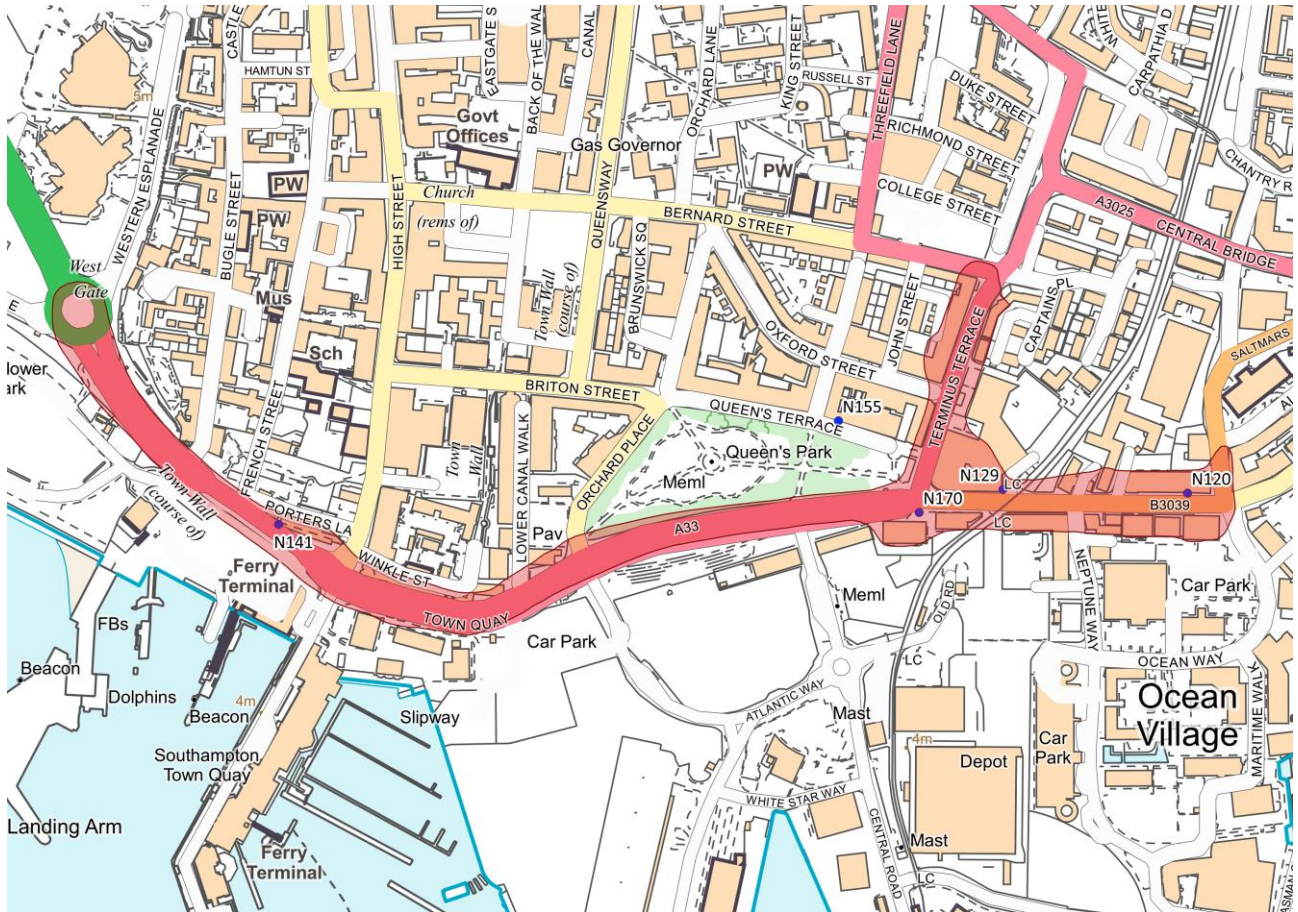


Figure D.5 – AQMA 5a (western section) Redbridge Road and NO2 diffusion tube monitoring locations

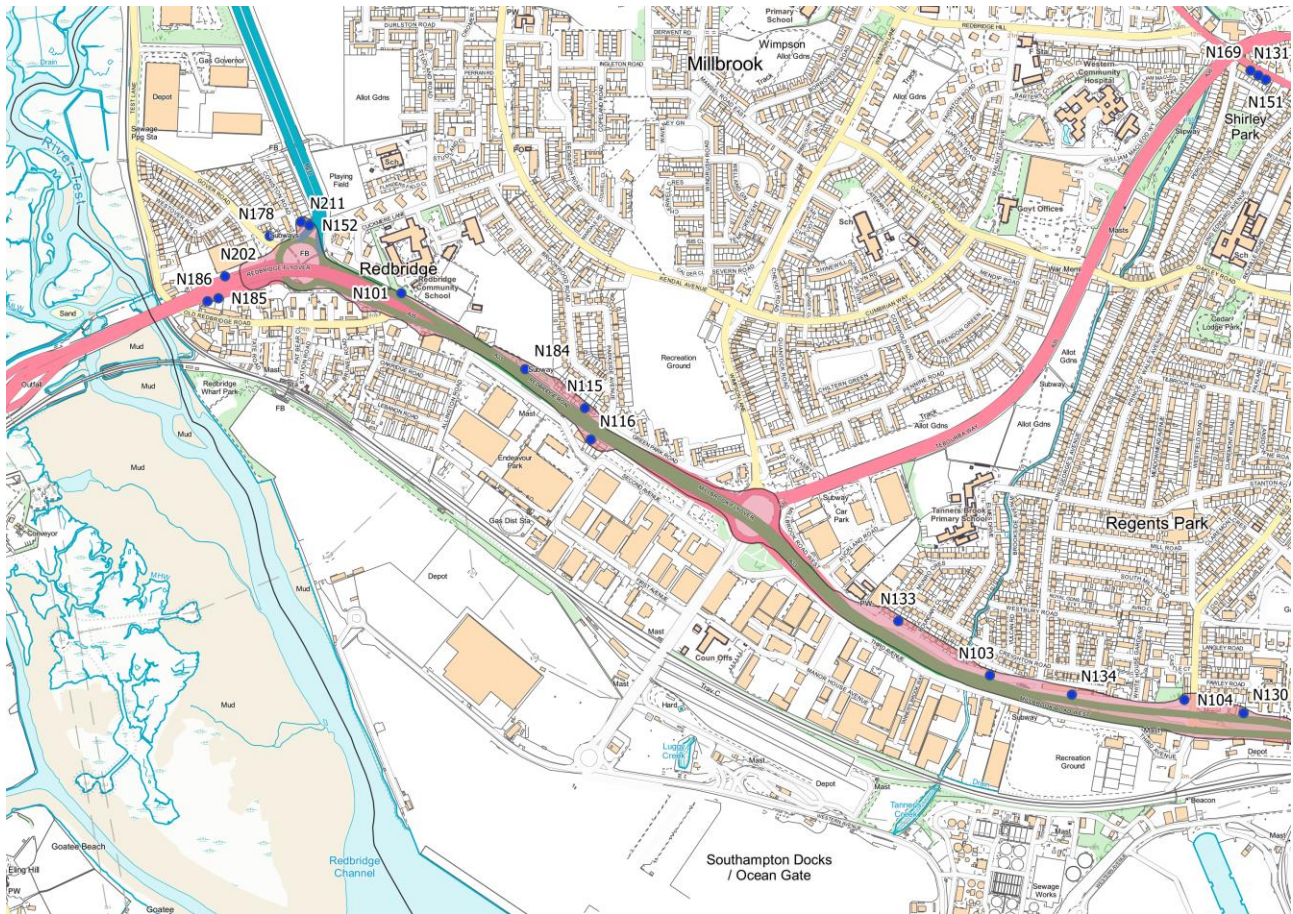


Figure D.6 – AQMA 5b (eastern section) Redbridge Road and NO2 diffusion tube monitoring locations

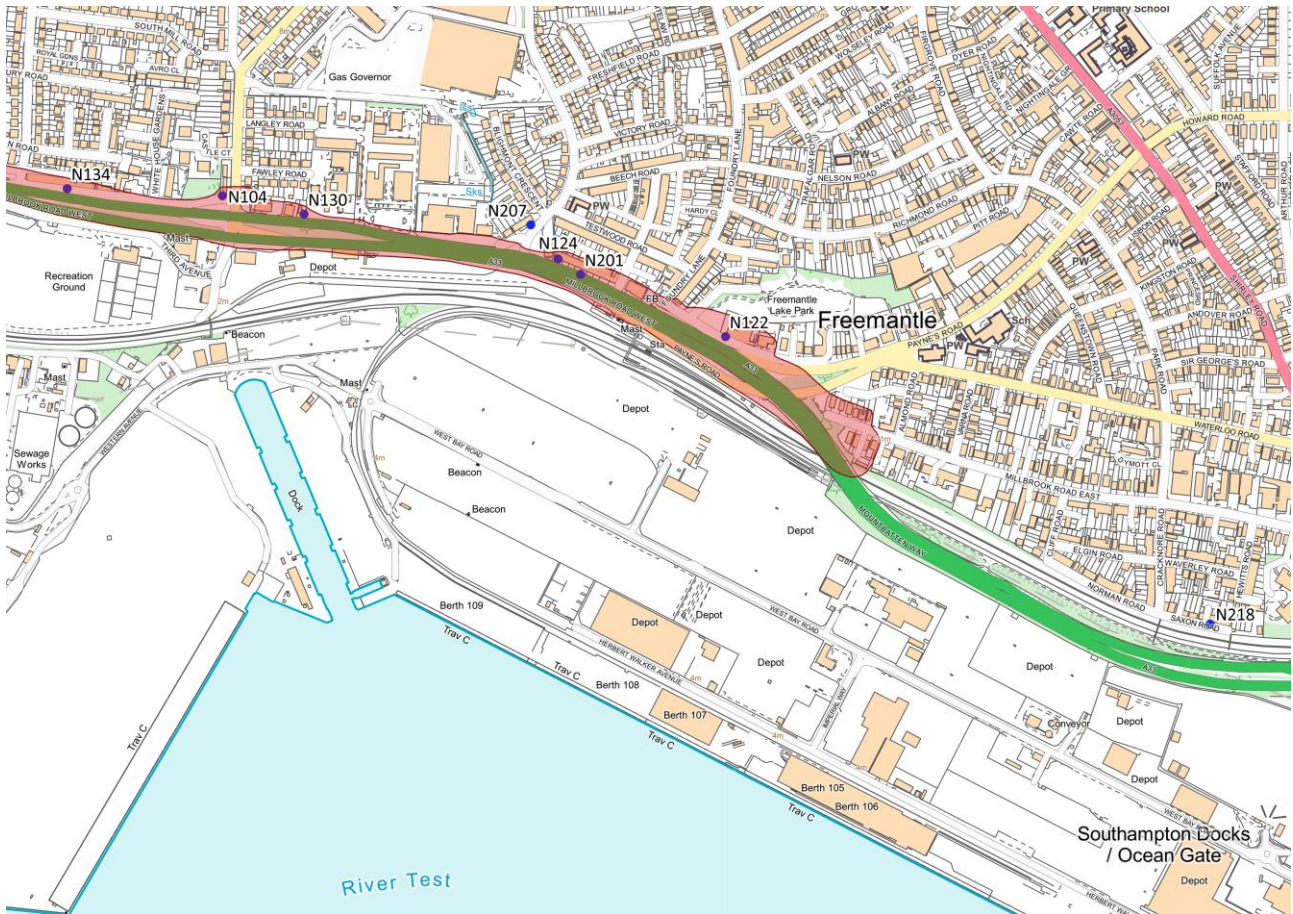


Figure D.7 – AQMA 6 Romsey Road and NO2 diffusion tube monitoring locations

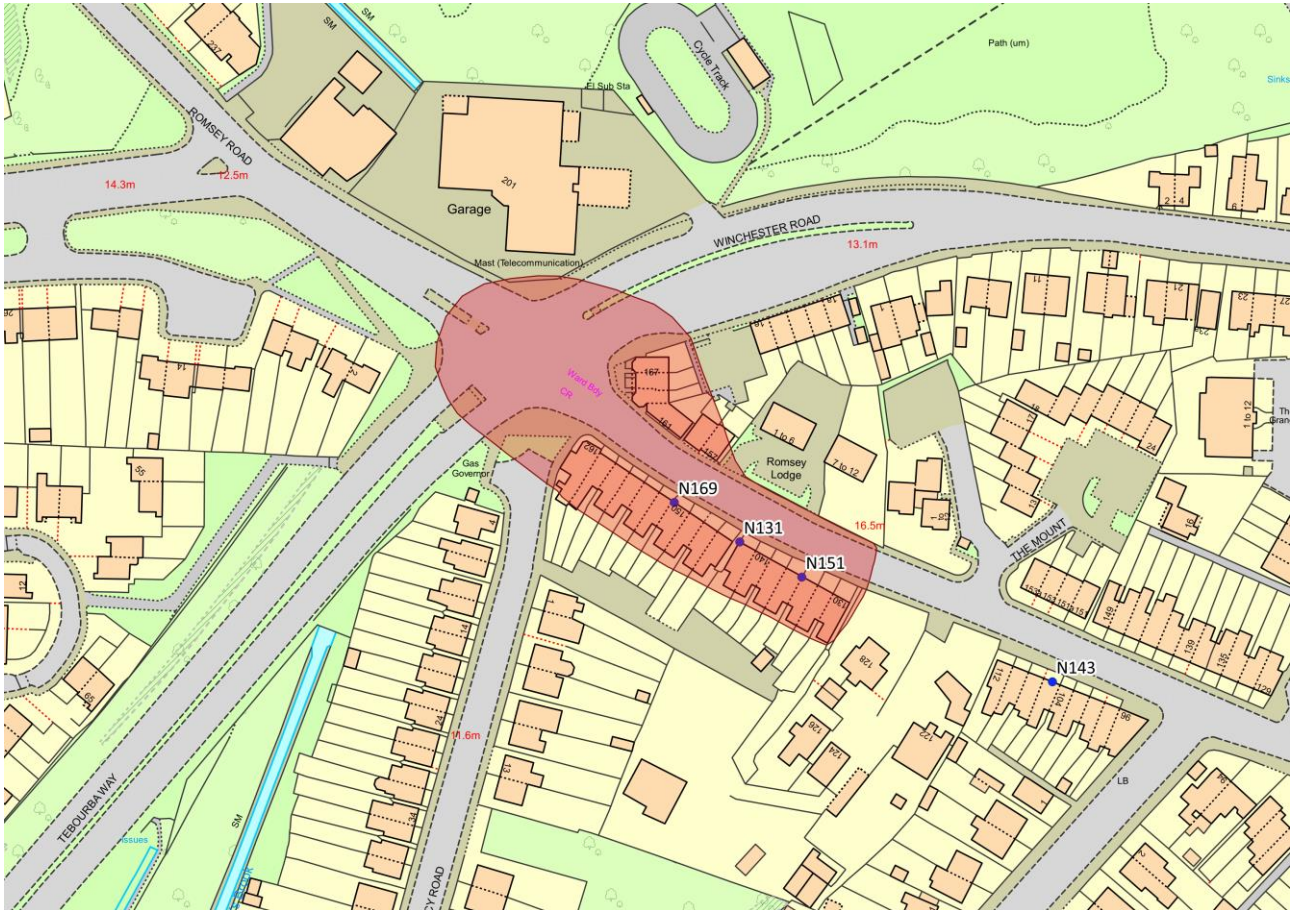


Figure D.8 – AQMA 8 Commercial Road and NO2 diffusion tube monitoring locations

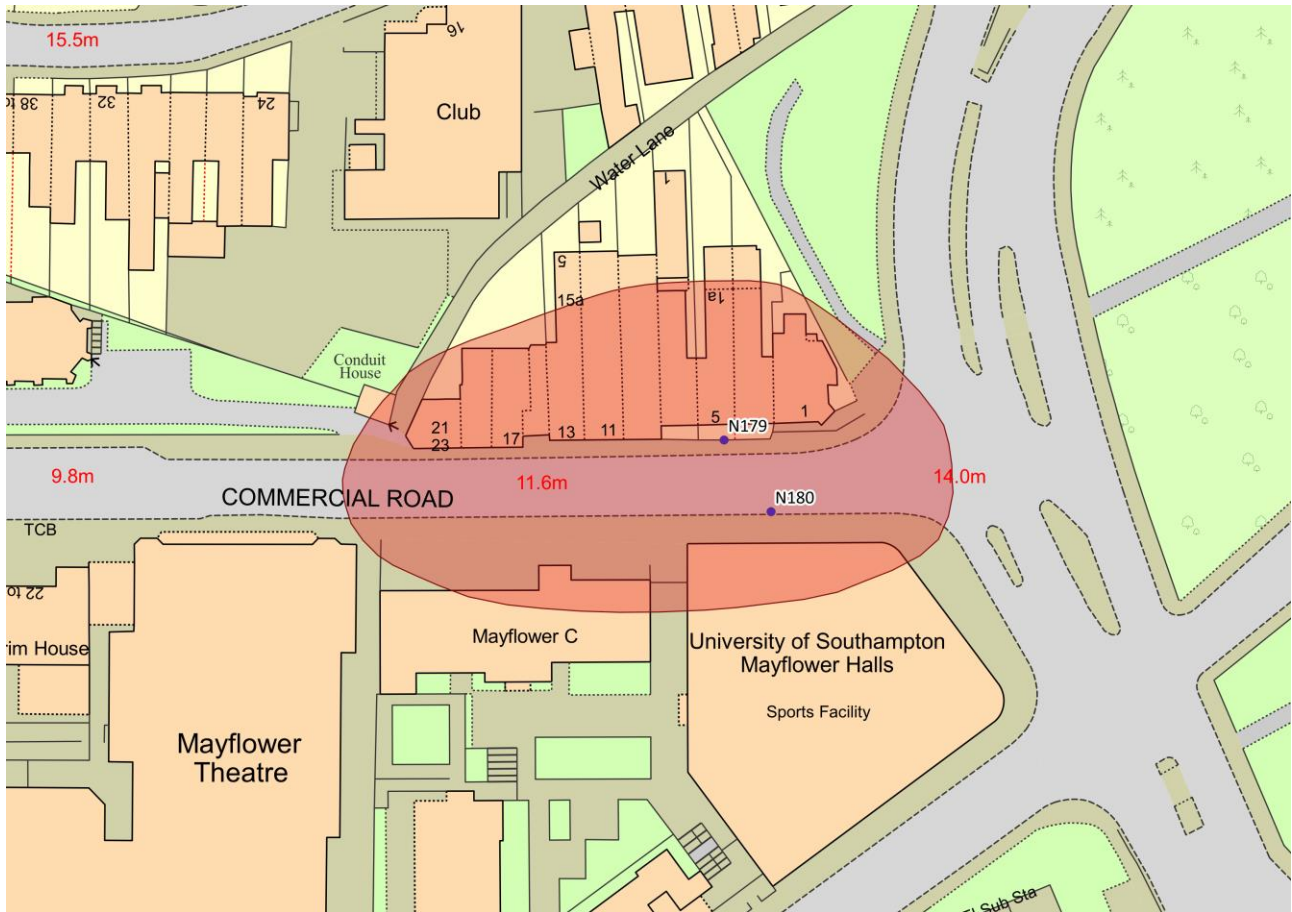


Figure D.9 – AQMA 9 Burgess Road and NO2 diffusion tube monitoring locations



Figure D.10 – AQMA 10 New Road and NO2 diffusion tube monitoring locations

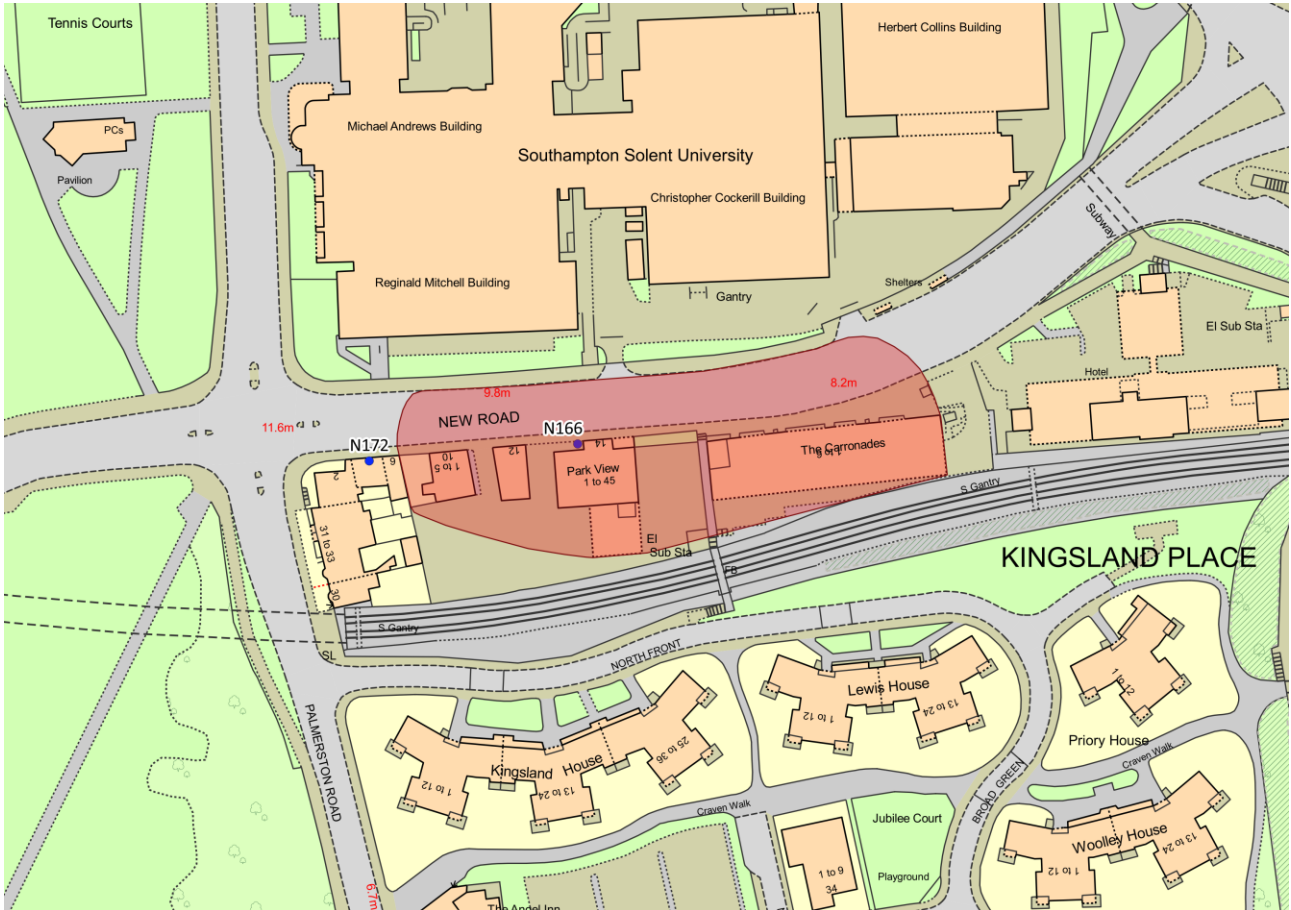


Figure D.11 – AQMA 11 Victoria Road and NO2 diffusion tube monitoring locations

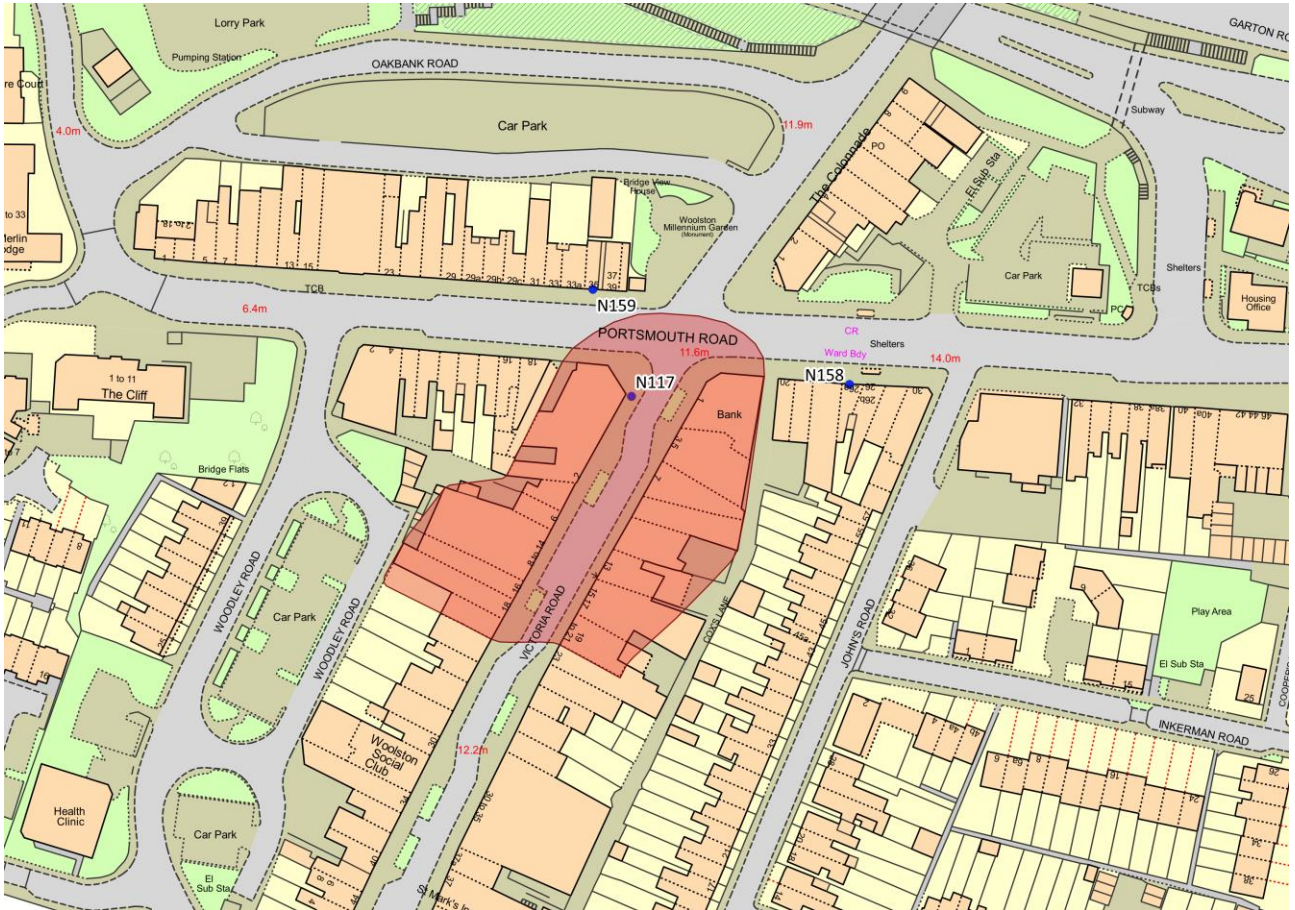


Figure D.12 – Bitterne Park and NO2 diffusion tube monitoring locations

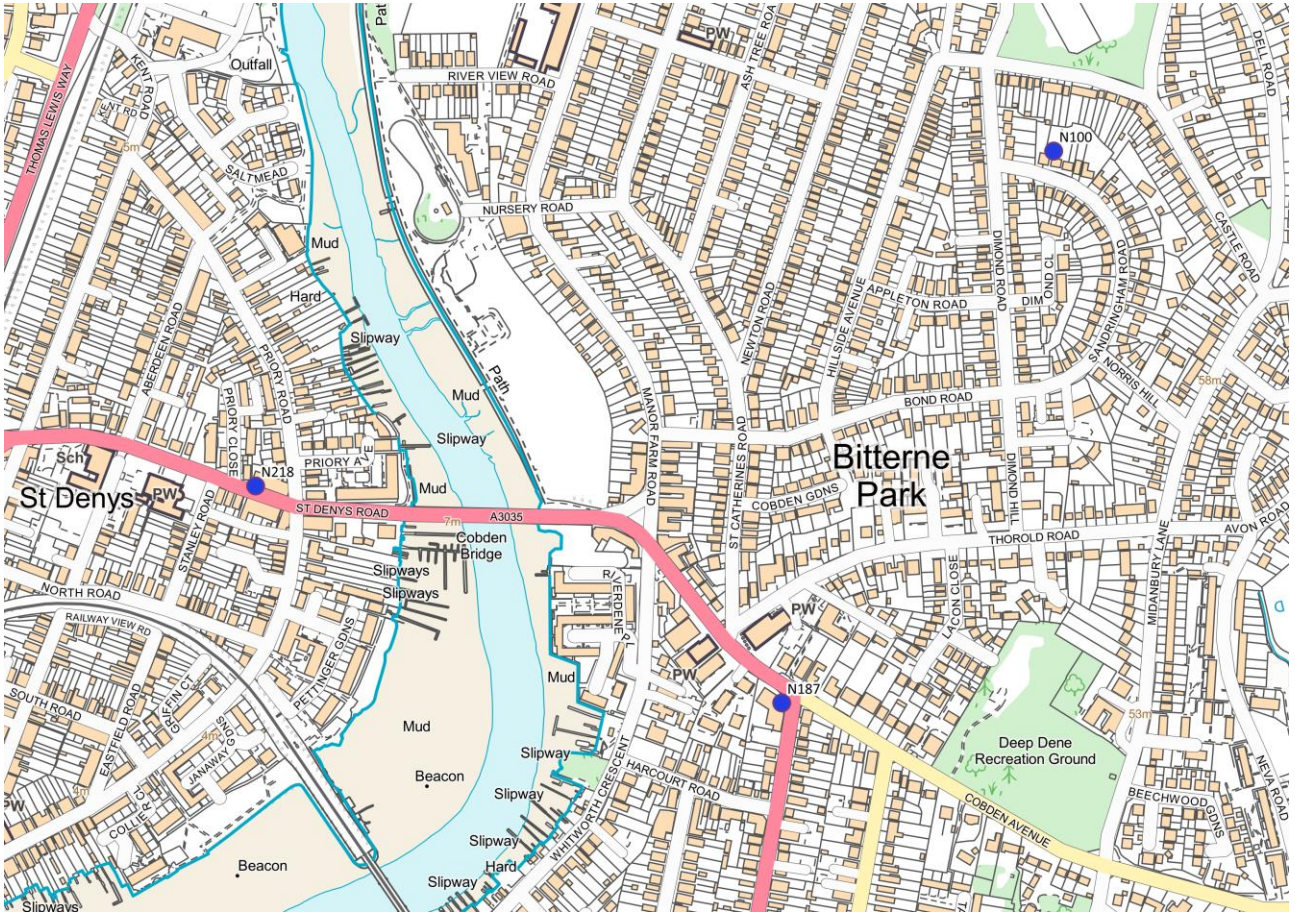


Figure D.13 – City Centre and NO2 diffusion tube monitoring locations

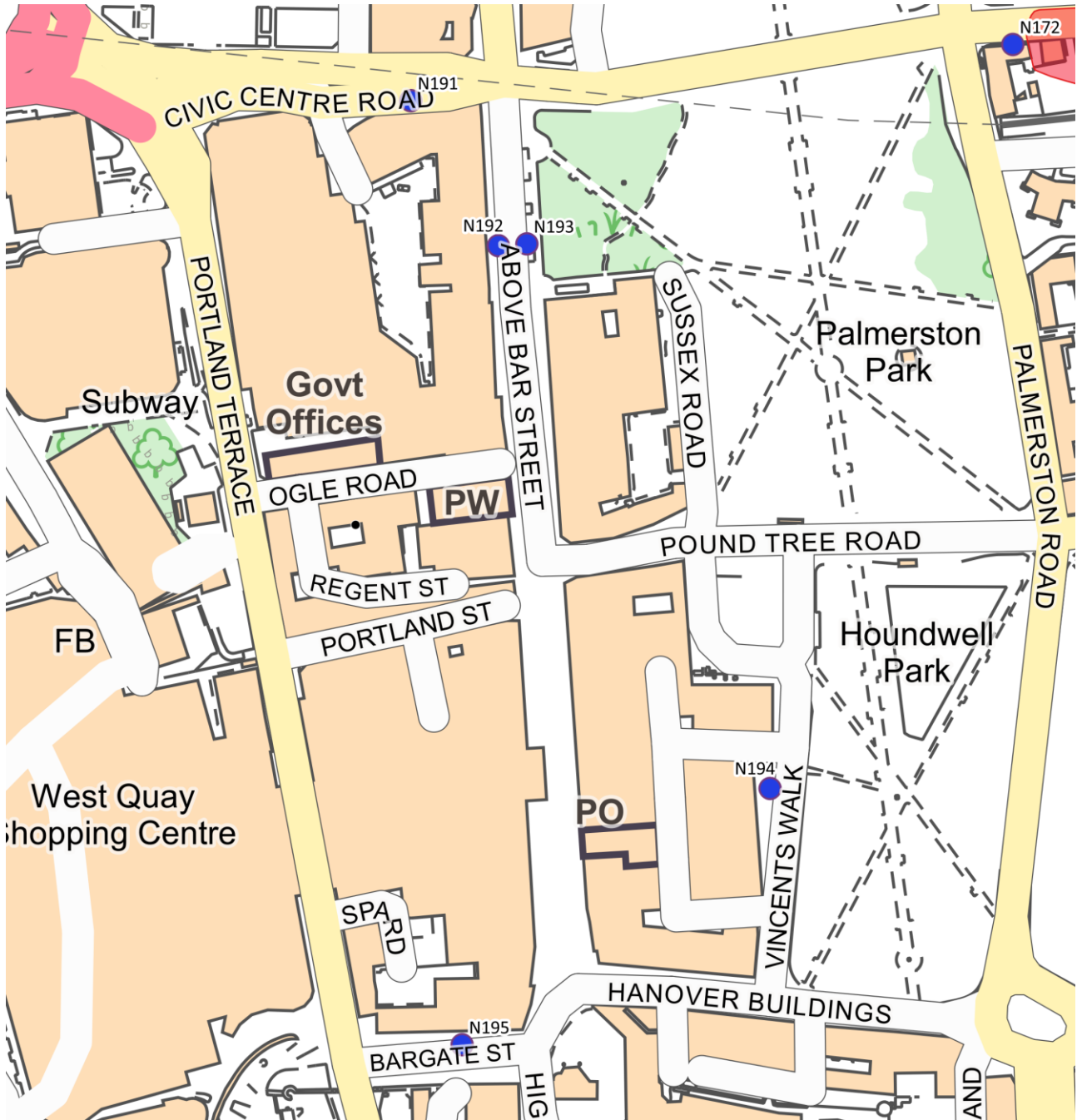


Figure D.14 – City Centre and Continuous Monitoring Station (CM1) location



Figure D.15 – Bevois Valley and Continuous Monitoring Station (CM4) location

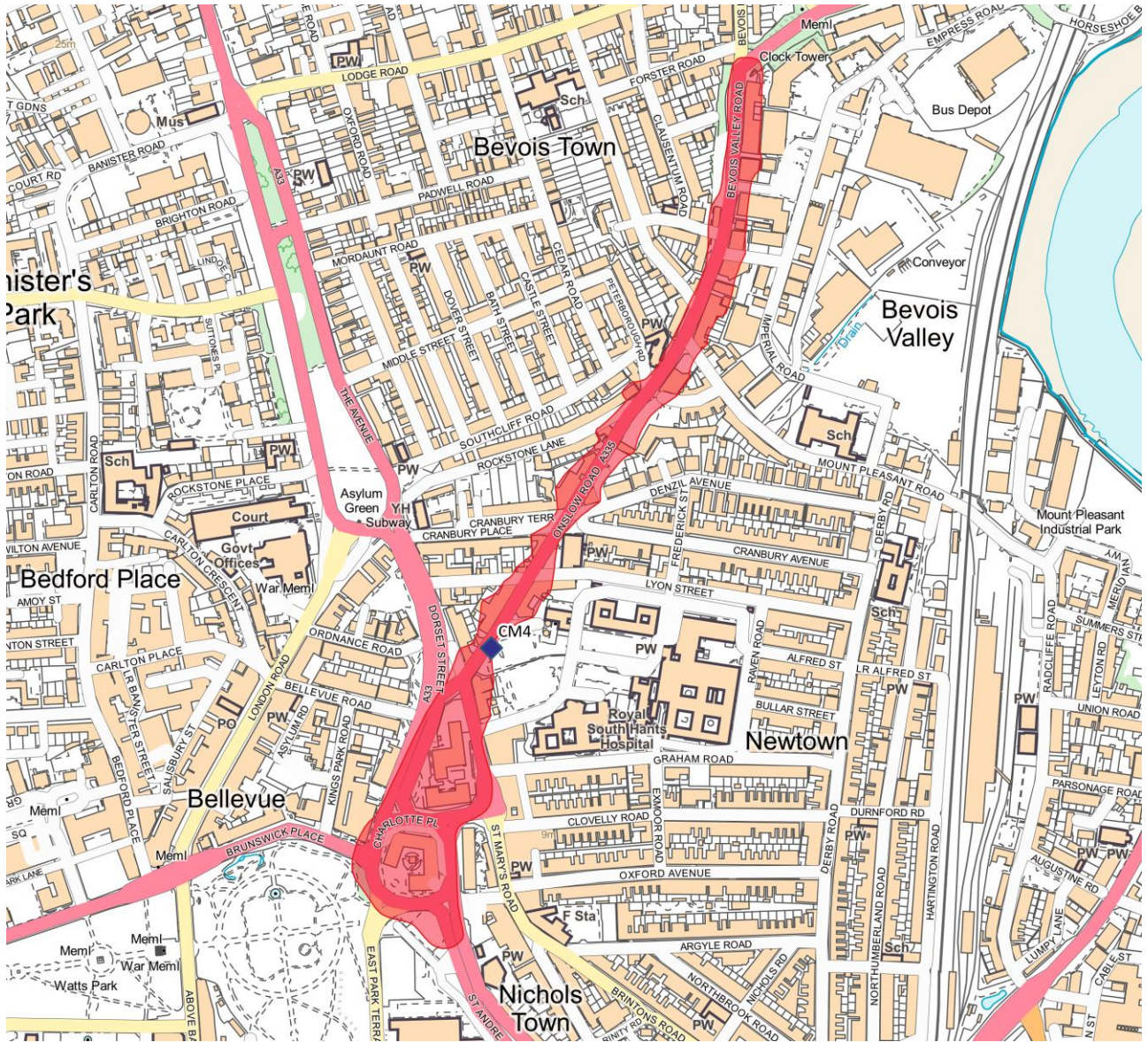


Figure D.16 – Victoria Road and Continuous Monitoring Station (CM6) location



Figure D.17 – Redbridge Road and Continuous Monitoring Station (CM7) location

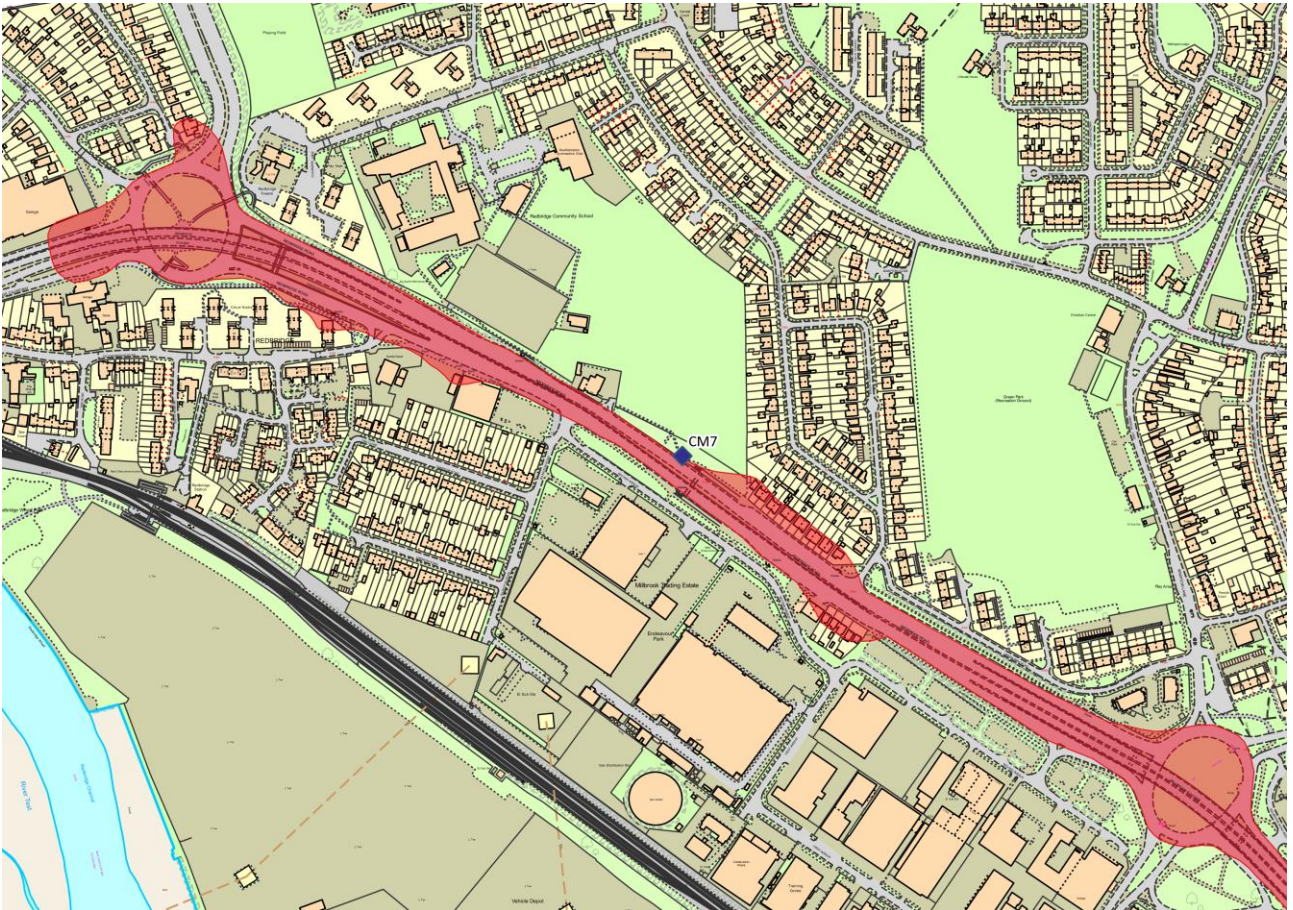


Figure D.18 – Portswood Road NO2 diffusion tube monitoring locations

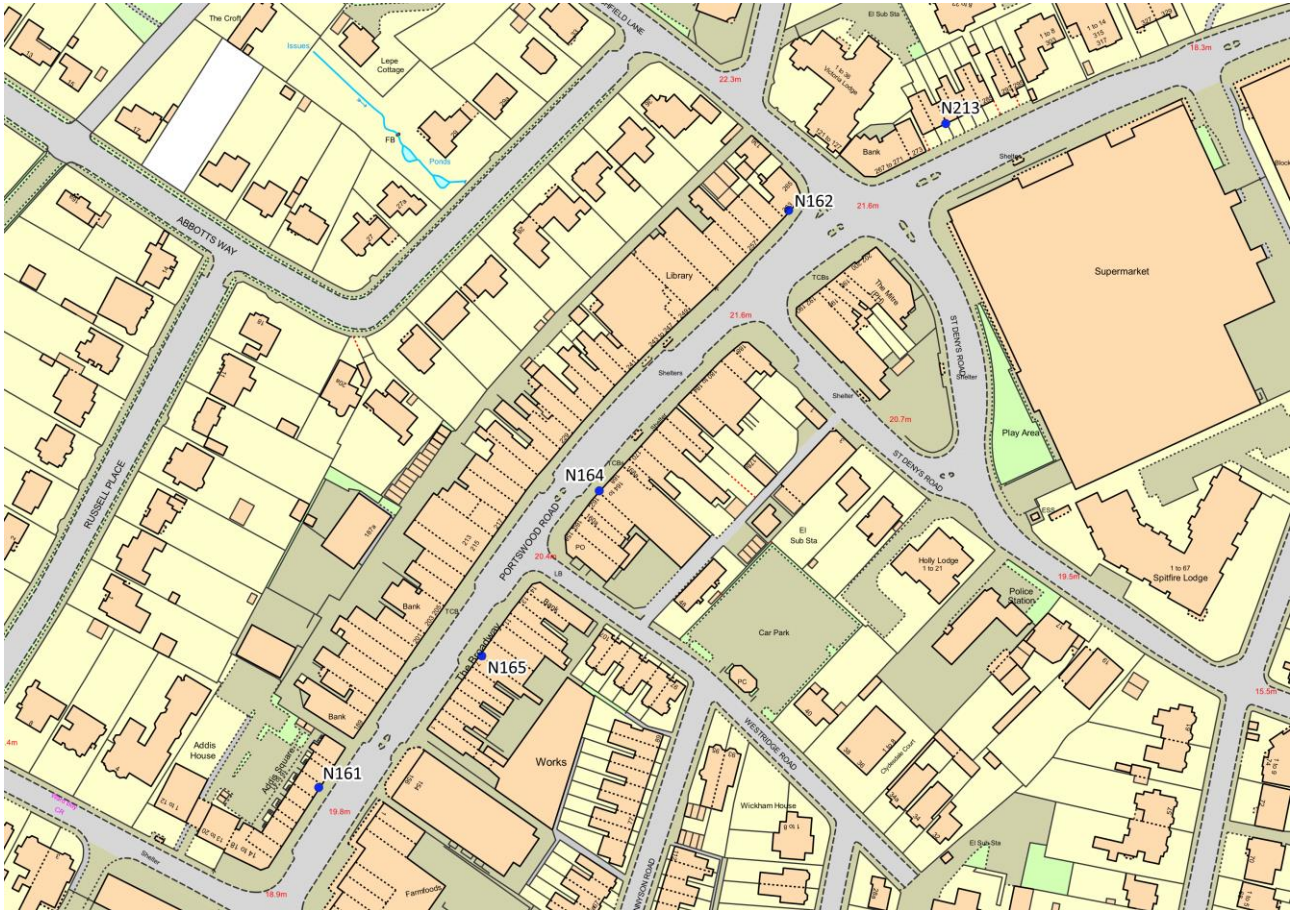


Figure D.19 – Shirley High Street/Romsey Road NO2 diffusion tube monitoring locations

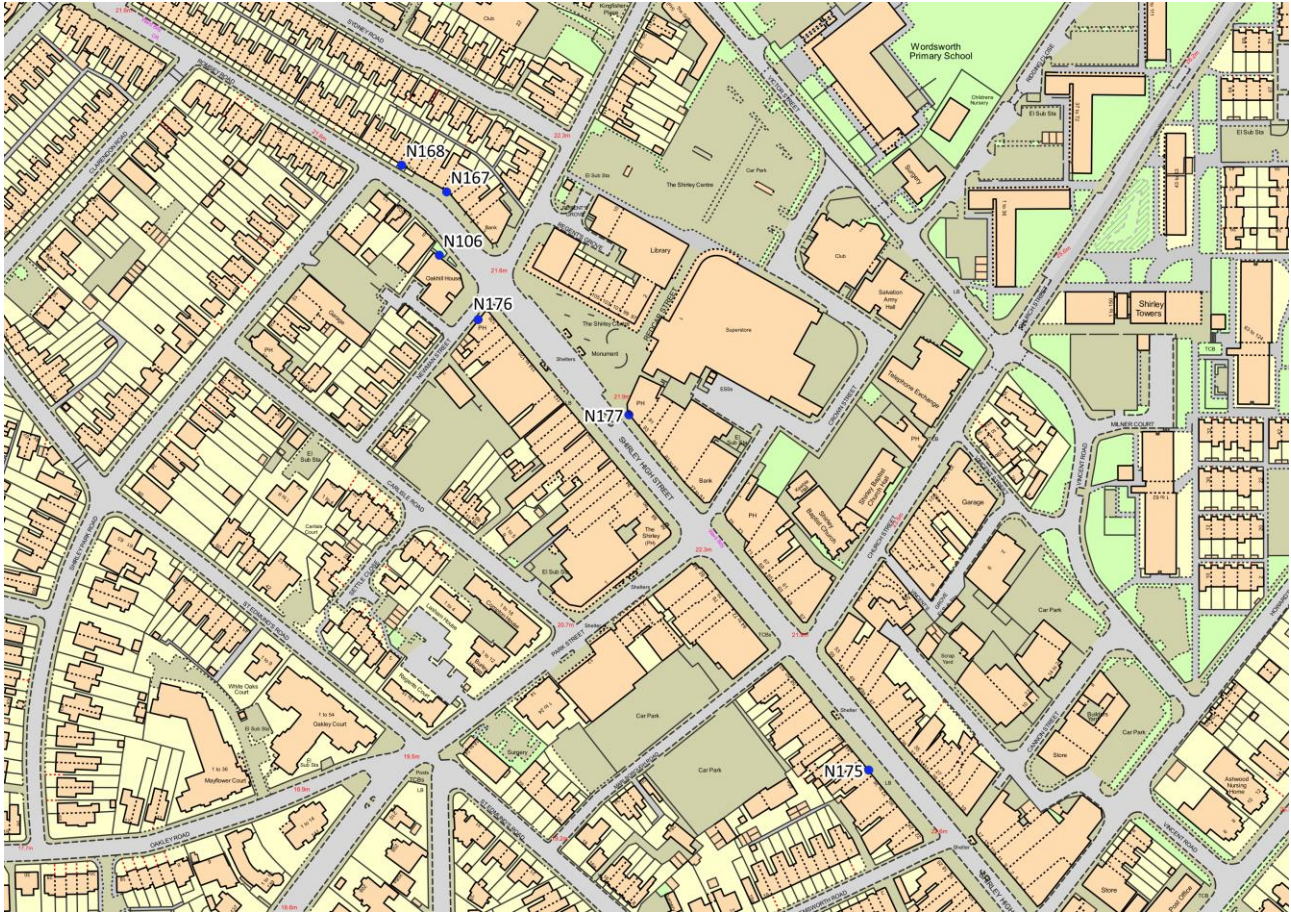
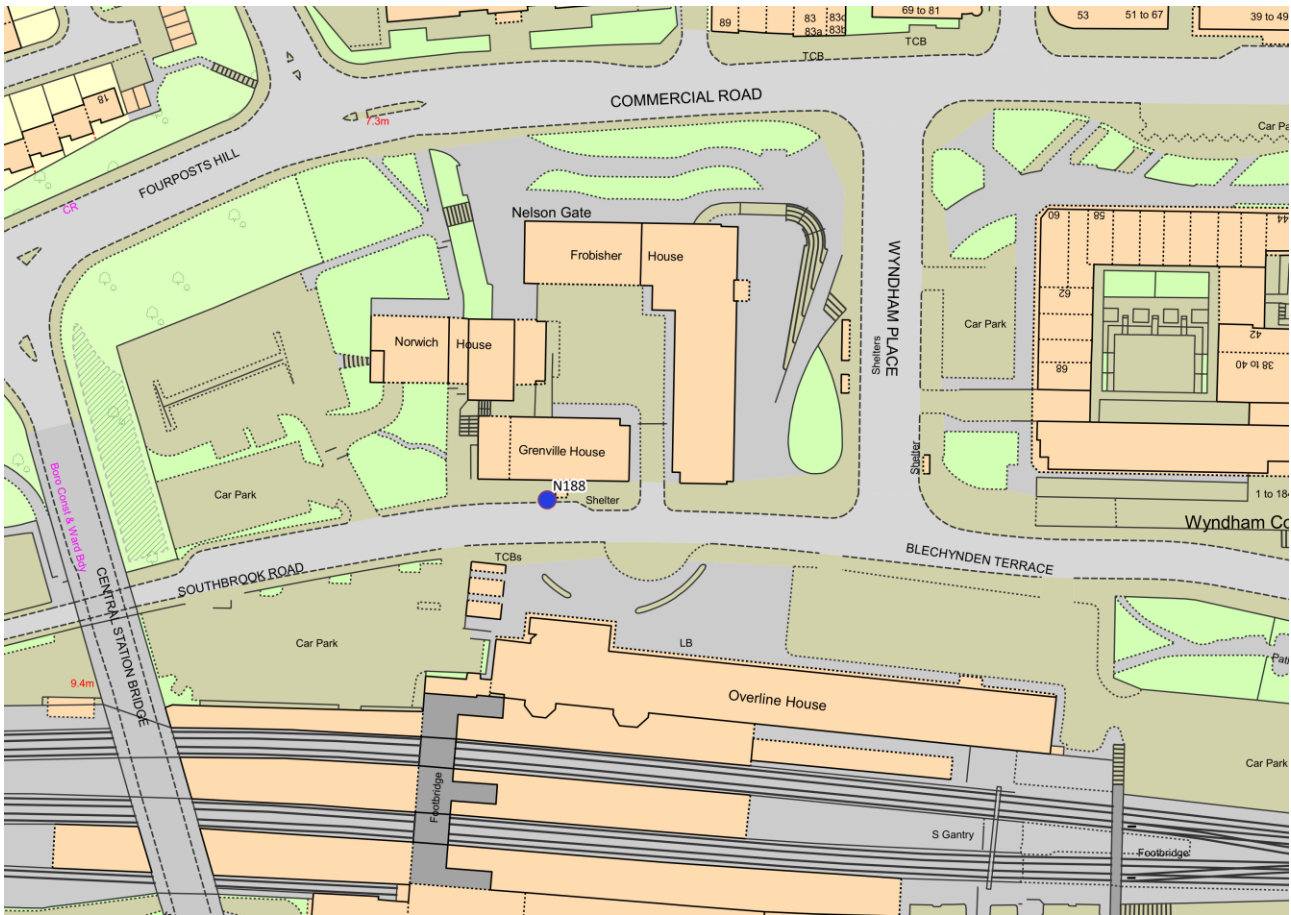


Figure D.20 – Blechynden Terrace (Central Train Station) NO2 diffusion tube monitoring locations



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England¹¹

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

¹¹ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Previous Southampton City Council ASR Reports [Southampton's statutory air quality reports](#)
- Full Business Case for Achieving EU Nitrogen Dioxide Compliance in Southampton in the Shortest Possible Time [Full Business Case v0.1 \(southampton.gov.uk\)](#)
- [Sustainable Distribution Centre \(southampton.gov.uk\)](#)