SOUTHAMPTON
CITY COUNCIL

2018 Air Quality Annual Status Report (ASR)

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

June 2019

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Executive Summary: Air Quality in Our Area

Air Quality in Southampton

Background

The City of 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 km^2. Southampton has a population of 254,275 (Mid-Year Estimate 2016). The city is served by transport infrastructure links, including a regional airport just outside the city's northern boundary, the M3, M27 and M271 motorways, a major cruise, container and vehicle port and a main line railway to London, the north and the south coast.

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 and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

As a result of identified local air quality issues through continued monitoring and assessment, Southampton has declared 10 Air Quality Management Areas (AQMAs) to date. 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 (NO_2) (40µg/m^3). Southampton also monitors particulate matter (both PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2) and ozone (O_3). Please see below a link to the SCC website which has maps of the AQMAs and descriptions.

http://www.southampton.gov.uk/planning/air-quality-planning/air-quality-management-areas.aspx

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Air Quality Management in Southampton

Local Air Quality Management (LAQM) is overseen by SCC's Scientific Service, including monitoring pollution, bidding for funds from Defra and other sources and implementing air quality improvement measures. SCC is a unitary authority and therefore the local transport authority. SCC's Scientific Service works closely with the Strategic Transport department 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.

Local NO_2 Plan

SCC were directed in December 2017 to develop a local plan that would bring about compliance with the EU Ambient Air Quality (EU AAQD) limit value for annual mean nitrogen dioxide within the shortest possible time, termed the Local NO_2 Plan. SCC will be assessing whether there is a need to introduce a charging Clean Air Zone (CAZ) or if compliance can be achieved more quickly through "non-charging" CAZ measures through a CAZ feasibility study. This feasibility study will include transport and air quality modelling to inform the final Local NO_2 Plan and will be undertaken in accordance with the government's CAZ Framework. This feasibility study will conclude in 2018/19, the outcome will be reported in the Annual Status Report 2019 (ASR 2019).

Air Pollution Sources

Industry, emissions from homes and road transport all contribute significantly to poor air quality in Southampton. Defra have identified that nationally, road transport contributes to 60% of nitrogen oxide (NO_x) emissions on average, a precursor for nitrogen dioxide. Of that 60%, diesel cars were the most significant contributor (35%), followed by vans (22%) and heavy goods vehicles (18%) and buses (16%)[4]. A study in Southampton undertaken in 2015 identified road transport was the most significant contributor to emissions of modelled NO_x (a precursor to the pollutant nitrogen dioxide, NO_2). Figure 2 shows an example location and the breakdown of sources by vehicle type, background and industry contribution (note: this is due to be updated with data obtained through the CAZ feasibility study and will be reported in the 2019 ASR).

[4] UK Plan for tackling roadside nitrogen dioxide concentrations (Defra, July 2017)

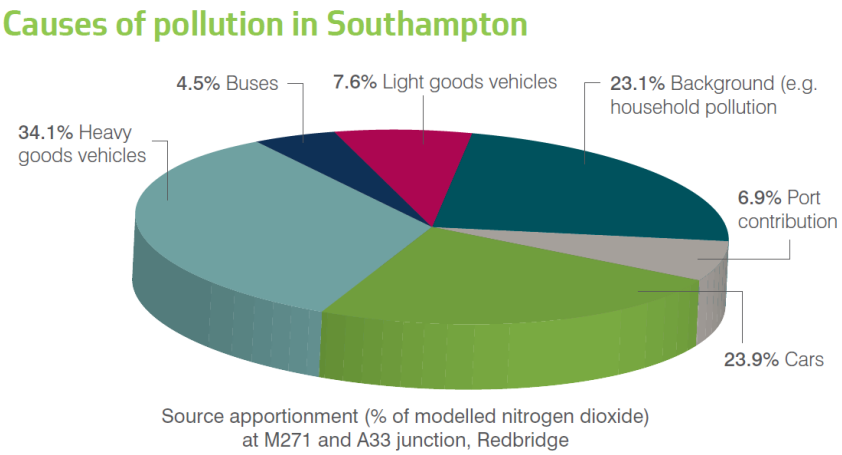

Figure 1 Source apportionment modelled NO_x (% of modelled nitrogen dioxide) at M271 and A33 junction, Redbridge (SCC Low Emission Zone Study 2015)

LAQM Pollution trends in Southampton

- There are 10 exceedances of the NO_2 annual mean UK objective at relevant receptors in 2017.
- One of these exceedances is outside of any AQMA and has been exceeding for the previous two years. SCC will consider the need to amend the nearby AQMA during 2018 to include the new exceedance location.
- No exceedances of objectives are reported for hourly mean NO_2, PM_{10} or SO_2.

Strategies

To accelerate the improvement in air quality, SCC has introduced the Clean Air Strategy 2016-2025 (November 2016). This strategy details the ways in which SCC will work 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. The Strategy outlines the following activities that will be pursued to achieve its objectives:

- A Clean Air Partnership with city businesses, organisations and neighbouring authorities that will identify and promote good practice and cooperation.
- New advice and requirements to new developments to promote sustainable/active, uptake of low emission vehicles and improve the standard of non-road construction machinery.

- A Communications campaign to raise awareness about clean travel/vehicle choices amongst businesses and the public.
- Introduce the concept of a CAZ in the city to help raise awareness amongst vehicle users of the measures that can be taken to improve the emissions they produce.
- Update the Quality Bus Partnership (QBP) to renew and establish emission standards amongst the bus fleet.
- Establish a Freight Quality Partnership (FQP) to promote and support a continuous improvement in emission standards in the CAZ.
- Promote businesses and organisations to assess their delivery practices and identify opportunities to introduce cleaner more effective practices including freight consolidation and ultra-low emission vehicles for final stage delivery.
- Investigate opportunities to improve the number of ultra-low emission taxis operating within the city and provide infrastructure to promote and incentivise the uptake of such vehicles.
- Identify a package of incentives for users of ultra-low emission vehicles and work in partnership with parking providers to establish standards for electric vehicle charging and a strategy for their introduction.
- Work with the port owners and operators to identify opportunities to introduce clean technologies amongst their non-road fleet and ships.
- Combining the work of the Sustainable Transport project and its MyJourney branding with the CAZ to provide clarity on transport options and emissions.

In 2017, a ten year strategy to improve cycling rates in Southampton was launched. The SCC Cycling Strategy 2017-2027. 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 a three year delivery plan, this sets out how SCC intends to spend confirmed funds and resources on the activities and schemes in the Strategy.

Figure 2 Relevant strategies and plans for managing air quality in Southampton

Clean Air Zone Feasibility Study

The UK Plan for tackling roadside nitrogen dioxide concentrations published by Defra in July 2017 identified Southampton as an area that is identified as having a persistent exceedance of the EU ambient air quality directive for the nitrogen dioxide limit value (40µg/m^3 annual mean) at locations relevant to this directive. As a result, SCC have been directed to undertake a feasibility study to assess the need for a Clean Air Zone in the city in accordance with the Clean Air Zone Framework[5]. Southampton City Council will progress this work and will report the findings to the Secretary of State for Environment, Food and Rural Affairs for approval.

The findings of this feasibility study, included updated source apportionment of NO_x emissions and air quality dispersion modelling will be reported in SCC's 2019 Annual Status Report.

[5] Clean Air Zone Framework (Defra, May 2017)

Actions to Improve Air Quality

Core Actions

The core actions undertaken in 2017 are as follows:

- Access Fund supported - In early 2017, Southampton City Council was awarded £2.2m from the Department for Transport's Access Fund to deliver its bid titled "Southampton: Driving our Cycling Ambition into Local Towns, Schools, Colleges and Workplaces". The Access Fund project runs between April 2017 and March 2020 and will build on the existing MyJourney programme.
- SCC and Global Action Plan spearheaded the inaugural National Clean Air Day, a major communications campaign to raise awareness of air pollution, the issues and solutions. Birmingham City Council, Derby City Council, Leeds City Council, Manchester City Council and Nottingham City Council were also focus cities for the day. Locally, this was supported locally by the environment centre, West Quay, the University Hospital Southampton and a number of other local organisations and groups. A list of national organisations supporting the day can be found here. SCC saw over 2,000 local people engaged directly through events and activities. Lamp post banners promoting NCAD across the city created an opportunity to see (OTS) of around 45,000 and ITV Meridian and BBC Solent coverage led to a local reach in the region of over 500,000 across South Hampshire.
- Clean Air Zone feasibility commencement. This will assess the need for a Clean Air Zone in the city by undertaking transport and air quality dispersion modelling. It will also assess the economic and distributional impacts of the proposed options.
    - *Note: This study will focus on the EU limit value for nitrogen dioxide and is a separate regime to local air quality management and UK air quality objectives reported on in this document.*
- SCC Clean Air Strategy (2016-2025) and Cycling Strategy launched (2017-2027).
- Low Emission Taxi Incentive Scheme launch (the first event for the Clean Air Partnership/Network prior to the official launch).

- Green Fleet Event – An event held in summer 2017 in association with Green Fleet to showcase electric vehicle technology and infrastructure.
- Procurement of publically accessible Electric Vehicle (EV) charge points and EV's for SCC staff has commenced, the charge points and vehicles are expected to be available in early 2018 (via the electric vehicle action plan funding secured in 2017).
- airAlert continuation (air pollution warning system) – Eastleigh Borough Council also joined the airAlert scheme in November 2016, enabling the service to reach a broader audience in the region.
- SCC have bid for funding from the Clean Bus Technology Fund to retrofit 145 operational buses to Euro VI standard or equivalent.
- SCC have bid for funding from the CAZ Early Measures to implement cycling infrastructure improvements on the A33 Western Approach.
- SCC have bid for funding to deliver infrastructure improvements on the A33/A35 Millbrook Roundabout from DfT's Local Highways Major Maintenance Challenge Fund Tranche 2A with anticipated benefits to the A33/A35 Western Approach AQMA.
- Continued air quality monitoring, review and assessment. A new Redbridge AURN site was installed in 2017. This replaced a monitor that was operational until 2015.

Conclusions and Priorities

Air quality monitoring in 2017 identified nine exceedances within existing AQMAs at relevant sensitive receptors. One exceedance was identified outside of existing AQMAs at New Road. This exceedance is currently at a commercial property, and will be reviewed in 2018. Consideration will be given to extending the existing New Road AQMA to include any new exceedances of the annual mean NO_2 objective.

The Air Quality Action Plans (AQAP) are due to be updated, however SCC will await the outcome of the Clean Air Zone feasibility study before progressing as this will determine the core actions for air quality in 2019/20 and the following years. There will also be a formal consultation on Clean Air Zone proposals which can inform a revised AQAP.

The priority for the coming year is to undertake the Clean Air Zone feasibility study to determine the extent and nature of a Clean Air Zone required in Southampton to meet EU limit values for NO_2 within the shortest possible time.

Other priorities will be:

- Delivering funded schemes to ensure ongoing improvements to air quality. The Air Quality Action Plan (dated from 2007) will be updated following completion of the Clean Air Zone feasibility.
- Delivery of the Early Measures cycling funding on the western approach will also be undertaken as a priority. This is due to the nature of funding requiring rapid implementation to ensure the benefits are realised prior to the CAZ plan being implemented.
- Engaging stakeholders about the CAZ feasibility work and potential social/economic impacts and developing a mitigation plan in the event a charging CAZ is pursued.
- The smart motorways, western and eastern approach roadworks may occur concurrently which could have significant impacts on travel behaviour. Therefore it will be a priority to understand and mitigate against potential negative impacts of this work.
- Ever increasing public awareness and media attention must ensure effective communications plan in place.

Local Engagement and How to get Involved

Stakeholder Engagement

Funding has been received to introduce a Clean Air Partnership that will encourage stakeholders to engage on air quality and promote sharing of best practice in reducing emissions of pollutants. This will be implemented in 2018.

SCC officers attended the following groups in 2017 to provide updates on air quality and receive feedback on schemes being implemented or possible future proposals:

- Cycling Groups - Quarterly Cycle Forum. A forum to engage with cycle campaigners but also the wider community. The forum is used to review scheme designs and highlight issues that need further attention

- Workplace Travel Planners Network - 6 weekly meeting. The Travel Planners Network were informed of the CAZ consultation. The network is used as a way of sharing best practice for travel planning and introduce support and incentives to help key contacts improve sustainable travel I their workplace
- South Hampshire Bus Operators Association – Engaging with bus operators.
- Taxi and Private Hire Drivers Event – Launching the low emission taxi incentive scheme and discussing CAZ proposals and opportunities for electric taxis.
- Licensed Transport Forum (Eastleigh Borough Council) in relation to the low emission taxi incentive scheme
- Chamber of Commerce in relation to CAZ proposals
- Chartered Institute of Logistics (Central Southern Group) in relation to CAZ proposals

Officers also engage with government officials, local authorities (through the Environmental Control Advisory Committee air quality sub-group) and other local organisations throughout the year.

SCC monitor the progress of stakeholder and public engagement. In 2014 and again in 2017, SCC asked the public through the People's Panel Questionnaire about their views on air quality in the city. Between the two surveys, there is a clear increase in understanding of air quality. This is likely due in part to the increased national press as a result of SCC's requirement to assess the need for a Clean Air Zone, but also the comprehensive air quality communication work undertaken by Southampton City Council through Local Sustainable Transport Fund (LSTF) and the continuation in the form of the Access Fund (MyJourney brand).

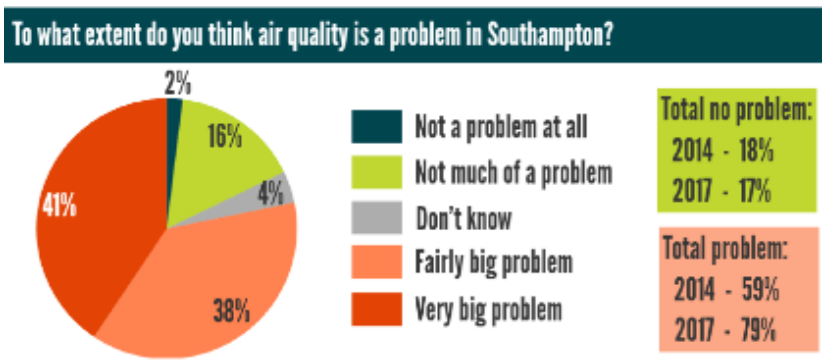

Figure 3 the understanding of air quality as an issue in the city between 2014 and 2017 for SCC's People Panel respondents

Future Engagement

SCC are required to consult on the proposals for a Clean Air Zone as part of the feasibility study. This is anticipated to commence in 2018. Results will be reported in the 2019 Annual Status Report.

How can you get involved?

The most effective way for the public to get involved with improving air quality in Southampton is to choose active and sustainable travel where possible. More information on this can be found at the MyJourney website which gives information on public transport, walking and cycling and other opportunities. For specific air quality inquiries please contact air.quality@southampton.gov.uk.

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:

- Clean Air Southampton: https://cleanairsouthampton.com/
- Sustrans: https://www.sustrans.org.uk/
- The Environment Centre: http://www.environmentcentre.com/about-us/contact-us/

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1 Local Air Quality Management

This report provides an overview of air quality in Southampton City Council during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Southampton City Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=252 – see full list at http://uk-air.defra.gov.uk/aqma/list. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
No. 1 Bevois Valley	Declared July 2005	NO_2 Annual Mean	Southampton	An area including a number of properties from Charlotte Place Roundabout to Bevois Valley Road	NO	50	µg/m^3	44.4	µg/m^3	SCC AQAP	Adopted 2008	Link
No. 2 Bitterne Road West	Declared July 2005, extended in 2012	NO_2 Annual Mean	Southampton	An area including a number of properties from Northam Road and along Bitterne Road West	NO	37	µg/m^3	41.2	µg/m^3	SCC AQAP	Adopted 2008	Link
No 3. Winchester Road	Declared July 2005, reduced in size in 2006 after Further Assessment	NO_2 Annual Mean	Southampton	An area including residential properties at the Winchester Road/Hill Lane Junction	NO	35	µg/m^3	-	µg/m^3	SCC AQAP	Adopted 2008	Link

No. 4 Town Quay to Platform Road	Declared July 2005, increased in size in 2006 after Further Assessment	NO_2 Annual Mean	Southampton	An area including a number of properties from Town Quay to Platform Road	NO	48	µg/m^3	40.0	µg/m^3	SCC AQAP	Adopted 2008	Link
No. 5 Redbridge to Millbrook Road West	Declared July 2005, merged into one AQMA in 2012 after Further Assessment	NO_2 Annual Mean	Southampton	An area including a number of properties along Redbridge/ Millbrook Road	YES	45	µg/m^3	40.8	µg/m^3	SCC AQAP	Adopted 2008	Link
No. 6 Romsey Road	Declared July 2005, increased in size in 2012 after a Detailed Assessment	NO_2 Annual Mean	Southampton	An area including a number of properties along Romsey Road from Teboura Way to Shirley High Street	NO	44	µg/m^3	43.0	µg/m^3	SCC AQAP	Adopted 2008	Link

No. 8 Commercial Road	Declared July 2008	NO_2 Annual Mean	Southampton	An area including a number of properties along Commercial Road at the junction with Cumberland	NO	45	µg/m^3	43.1	µg/m^3	SCC AQAP	Adopted 2008	Link
No. 9 Burgess Road	Declared April 2012	NO_2 Annual Mean	Southampton	An area including a number of properties along Burgess Road at the junction with The Avenue	NO	47	µg/m^3	40.4	µg/m^3			
No. 10 New Road	Declared April 2012	NO_2 Annual Mean	Southampton	An area including a number of properties along New Road	NO	42	µg/m^3	37.3	µg/m^3			

No. 11 Victoria Road	Declared April 2012	NO2 Annual Mean	Southampton	An area encompassing a number of properties along Victoria Road at the junction with Portsmouth Road	NO	43	µg/m^3	44.9	µg/m^3			

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

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

Defra's appraisal of last year's ASR concluded that based on the evidence provided, the conclusions reached are acceptable for all sources and pollutants. The key suggestions were to:

Revise and update the Air Quality Action Plan – This will be done following the outcome of the Clean Air Zone feasibility study as this will have provide clarity on the direction SCC takes in improving air quality in the city.

Monitor within the Winchester Road AQMA – SCC will implement monitoring within the Winchester Road AQMA to determine whether it should be revoked, amended or continued.

Continue to monitor at N173 4 New Road to determine need for AQMA amendment – A continued exceedance was reported at this location. Amendment of the existing AQMA will be considered following the outcome of the CAZ feasibility study and a further year of monitoring.

Southampton City Council has taken forward a number of direct measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

- National Clean Air Day held in June 2017.
- EV charge point and SCC fleet vehicle procurement commencement.
- Clean Air Zone feasibility study commencement.
- Soft launch of Clean Air Network with full launch in early 2018.

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

- Clean Air Zone feasibility study
- Full launch of Clean Air Network
- Anti-idling campaign
- National Clean Air Day

- Procurement of first EV's for SCC fleet vehicles
- Introduction of free toll for EV's on Itchen Bridge and 90% discount on city centre car park season ticket for EV's
- Statutory consultation on Clean Air Zone feasibility study findings

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

- Completing the Clean Air Zone feasibility study and undertaking the statutory consultation on the study findings.
- Delivering funded schemes to ensure ongoing improvements to air quality. The Air Quality Action Plan (dated from 2007) will be updated following completion of the Clean Air Zone feasibility.
- Delivery of the Early Measures cycling funding on the western approach will also be undertaken as a priority. This is due to the nature of funding requiring rapid implementation to ensure the benefits are realised prior to the CAZ plan being implemented.
- Engaging stakeholders about the CAZ feasibility work and potential social/economic impacts and developing a mitigation plan in the event a charging CAZ is pursued.
- The smart motorways, western and eastern approach roadworks may occur concurrently which could have significant impacts on travel behaviour. Therefore it will be a priority to understand and mitigate against potential negative impacts of this work.
- Ever increasing public awareness and media attention must ensure effective communications plan in place.

The principal challenges and barriers to implementation that Southampton City Council anticipates facing are delivering improvements in air quality 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 and it is hoped to mitigate this through the CAZ work and continued Access Fund/MyJourney delivery for sustainable and active travel in and around the city.

A further challenge is ensuring all residents and organisations in Southampton understand the role that they play in reducing air pollution. Whilst the council are able to influence air quality to some extent, it is important that the population seek active and sustainable travel options where possible to reduce their impact. The council will support this by introducing the Clean Air Partnership/Network in the coming year and continuing to promote the MyJourney active and sustainable travel programme.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Southampton City Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of all AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	SCC, Defra, JAQU, DfT, New Forest District Council. Funded by JAQU	2018-2019	2019-2020	1. Achieve EU Directive 2. Accelerated uptake vehicles compliant with euro 6 emission standard	Compliance annual mean EU Ambient Air Quality Directive (40 µg/m3 at EU Directive locations)	Working group established. Consultant secured and technical assessment commenced. Staff resource secured.	2020	SCC are required to assess the need for a Clean Air Zone in the city. Resources will need to be secured for the delivery of the CAZ infrastructure and supporting measures.
2	My Journey	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	SCC, DfT, £2.2 million awarded from DfT Access Fund, HCC, Sustrans , neighbouring local authorities, Eastleigh Borough Council	2016	2017-2020	Reduction in car journeys in the city	Indiscernible (note: work is underway to develop a method of estimating AQ improvement from Access Fund measures with the University of Southampton)	The 'MyJourney' active travel behaviour change programme has run for 7 years achieving 52% awareness of the MyJourney brand based on 2500 survey responses. The campaign has won 2 communications awards. 55 events have been staged. The MyJourney website continues to offer journey planning tool and live bus and train travel info with over 1.3 million site visits. 35 employers and 50 schools engaged.	2020	SCC have been awarded £2.2 million from the DfT Access Fund to deliver the My Journey sustainable travel behaviour change programme to 2020. Match funding by local authorities and partners takes the total funding to over £3.1m.

3	Freight consolidation and efficiency	Freight and Delivery Management	Freight Consolidation Centre	SCC, Meachers	2012	2014-2020	Reduction in HGV movements in the city. Use of SDC	< 1µgm3	Carnival UK operate a consolidation service via Meachers, our own Records management service have also switched to the SDC, and a proportion of deliveries to the IOW are now being consolidated. 9 DSPs have been conducted for key organisations in the city including the General Hospital. Efforts are now being made to take the recommendations in the DSPs forward to implementation.	SCC support to December 2018.	Work is ongoing to increase uptake of the service. University is continuing to roll out delivery servicing plans for major organisations in the city. Existing users include Southampton University, Southampton Solent University, New Forest District Council, Southampton General Hospital and Southampton City Council. In October 2016 St Mary's Hospital (Isle of Wight) signed an agreement to utilise the SDC.
4	Local planning policies (citywide)	Policy Guidance and Development	Air Quality Planning and Policy Guidance	SCC	August 2016 – March 2017	April –May 2017	Impact of development on local air quality	< 1µgm3	Specification for supplementary planning document being drafted. Discussions underway with neighbouring authorities regarding wider adoption.	2019	
3	Workplace and School Travel Plan	Promoting Travel Alternatives	School Travel Plans	SCC	2010	ongoing	100% of schools have travel plans in place	< 1µgm3	2 FTE workplace travel advisors in post from October 2017 1.6 FTE School Travel Plan Coordinators in post from July 2017 developing, monitoring and	Ongoing	30 schools have signed up to the STARS school travel plan programme Through this programme over 1400 bikes have been fixed, 230

									evaluating school travel plans using the STARS accreditation online toolkit.		Bike-it events have been staged, and 35,000 positive cycling and scooting experiences have been delivered. 23,000 pupils walk to school at least once a week and a 12% increase in cycling to school rates for those schools participating in 'Bike-it'. Lordshill school closed off a road to simulate traffic free environment.
4	City Car Club	Alternatives to private vehicle use	Car Clubs	SCC	2014	2015-2018	usage of car club	< 1µgm3	Over the course of the My Journey programme 3 separate direct mail promotional campaigns advertising the Car Club and offering discounted membership have been run. Workplace travel officer is working to promote car club to employers	Ongoing	Enterprise Car Rentals have taken over ownership of the city car club with work being undertaken to expand the number of cars available throughout the city, and the number of registered users.
5	Establish Clean Air Network	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and	SCC, The Port, business stakeholders, Southampton University, local air pollution pressure groups, Environment Centre	Decembe r 2016-July 2017	2018	Organisations signed-up to CAN and pledges made and delivered. Events held.	Indiscernible	A third party, the Environment Centre, has been commissioned to deliver the CAN. Draft terms of reference have been provided. The first CAN event for taxi drivers held in December 2017.	2017-2018	Partnership of LAs, private sector companies pledging to deliver improvements and demonstrate progress by achieving agreed targets and exchange best

			improve air quality						Official launch expected in 2018.		practice. Soft launch in late 2017, Full launch planned for 2018
5	Cycle Lane/ Routes Provision	Transport Planning and Infrastructure	Cycle network	SCC	2012	2013-2018	Use of cycle route, private vehicles removed from road	< 1µgm3	A 10 year cycle strategy has been adopted identifying the investment required along the key cycle commuter routes into the city centre. First Avenue and Third Avenue and the Avenue cycle lanes completed	SCN1 2019, other routes as funding secured	SCC have bid for £1m to deliver SCN1 cycle route enhancements (A33 Western Approach) aligned with an AQMA and the PCM EU AAQD exceedance location.
6	Air alert	Public Information	Other	SCC	2009	2010-2016	Users, alerts issued, satisfaction survey.	Reduced exposure by susceptible and/or vulnerable service users	461 users subscribed to the service by the end of 2017, 210 air alerts issued since 2010. 8 alerts for “High”, 202 “Moderate”.	completed	Eastleigh council joined air alert in November 2016. Clean Air Network will be used to communicate service
7	Electric Vehicle Action Plan (EVAP)	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	SCC	2016	2017	Number of new public charging points installed over life of programme. Number of electric vehicles in SCC Fleet	tbc	£980k funding secured for recharge infrastructure, council fleet upgrades and promotional activity around EV’s in the city.	30 EV charge points: 2018 First SCC fleet replacement: 2018	Publically accessible EV charge point procurement and SCC fleet vehicle replacement procurement commence.
9	National Clean Air Day June 2017	Public Information	Other	SCC, Global Action Plan	Jan-June 2017	2017	public awareness raising	na	Air Quality Events took place at the General Hospital, West Quay Shopping Centre, Schools and Sure Start Centres	2017	Successful day raising awareness of air pollution in Southampton.
10	M271 Redbridge junction	Traffic Management	Strategic highway improvements	Highways England	2016	2019	Traffic flow improved	tbc	Outline proposal published. Mitigation opportunities being debated	2019	Multi million pound Highways England infrastructure improvement

	capacity work										project to be undertaken with changes modelled to improve traffic flows
11	Eco Driver Training and telematics for Council Fleet	Vehicle Fleet Efficiency	Driver training and ECO driving aids	SCC	2016	2017-19	reduce fuel usage by 10%	TBC following scheme design/planning	£99k grant applied for November 2016	2019	Grant funding awarded by Defra 31.1.17. Scheme to be rolled out for the next 3 financial years.
12	Bus Priority measures	Traffic Management	Bus route improvements	SCC	2014	2015-2017	Bus patronage	< 1µgm3	Bus priority programme in progress with 42 junction improvements identified continue to be delivered	ongoing	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.
13	Improving Bus Journey Time Reliability	Traffic Management	Bus route improvements	SCC	2014	2015-2018	Bus time reliability/ Bus patronage	< 1µgm3	Bus lane enforcement cameras installed in 2016	ongoing	Alongside targeted interventions to deliver journey time savings of 9.5 seconds per bus per junction, cameras have been installed to penalise motorists using dedicated bus lanes in the city, slowing up buses along key routes. Delivering economic benefit, improving punctuality and journey times, whilst reducing emissions.

14	Straddle Carrier to Trial and monitor hybrid power	Promoting Low Emission Plant	Other measure for low emission fuels for stationary and mobile sources	SCC	2015	2016-17	1 Straddle Carrier fitted with hybrid technology, report produced	TBC following feasibility study	Funding secured, Ricardo appointed.	ongoing	Funding for the pilot secured. Trial timeframe to be agree with DP World Project review meetings to be convened.
15	City-wide fleet compositio n survey	Vehicle Fleet Efficiency	Other	SCC	Q1-3 2016	December 2016	Survey completion	N/A	ANPR camera survey completed in December 2016 to calculate emission standard of current vehicles using main roads	Q1 2017	Preparatory survey for implementation of CAZ
16	Cleaner Air Strategy publication	Policy Guidance and Development Control	Low Emissions Strategy	SCC	2016	2016	Publication date	N/A	Clean Air Strategy adopted in November 2016 and published on the council website.	2016	Published
17	Website and comms	Public Information	Via the Internet	SCC	2016	2017	Comms plan published	N/A	Webpages updated with CAZ information	ongoing	A communications and marketing strategy for Clean Air to be developed. 2 AQ Communications Strategy workshops held with key stakeholders to begin to shape this strategy.
18	Procure low emission vehicles in Council and partner fleets	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	SCC	Oct-Dec 2016	2017-20	Number of Low Emission Vehicles in council Fleet	< 1µgm3	CVTF funding re-deployed for investment in the council fleet for the conversion of vehicles to electric where appropriate. A fleet review is currently underway to identify the vehicles suitable for replacement.	Ongoing replacement	Procurement of SCC EV replacement vehicles commenced. First delivery expected early 2018.

19	Anti-idling campaign / enforcement	Traffic Management	Anti-idling enforcement	SCC	2017	2018	Number of engagements during campaign	Emissions reduced at point of idling (indiscernible reduction)	Campaign being planned, funding secured via the DEFRA National Air Quality Grant fund for the National Clean Air Day	2018	Campaign scheduled for the beginning of 2018. Enforcement mechanism to be explored.
20	Retrofit for buses: SCRT for older buses. Thermal management for Euro 5	Vehicle Fleet Efficiency	Vehicle	SCC	2015-16	2019	Trial result published, commitment from bus operators to retrofit	Up to 99 % reduction in NOx and PM emissions. Source apportionment of bus/coach estimated up to 38%.	Bid to JAQU CBTF submitted November 2017	2019	SCC submitted a bid to JAQU to retrofit 145 operational buses through the Clean Bus Technology Fund.
23	EV car clubs	Alternatives to private vehicle use	Car Clubs	SCC	2016	2017-18	Usage of cars	Dependent on uptake	Discussion with Enterprise Car Rentals over the deployment of EV's as part of the existing car club fleet	2019/20	On street infrastructure will need to be provided and managed. SCC access to the Hampshire EV charging framework will progress this.
24	Low emission vehicles supported in DSP work	Freight and Delivery Management	Delivery and Service plans	SCC	2016	2017	Electric delivery vehicle in use	Dependent on uptake	DSPs conducted for major organisations in the city identify and advocate electric vehicles where appropriate as a means of achieving commercial efficiencies	2018/19	9 DSPs delivered. Additional resource required to aid implementation. This will be considered as part of CAZ.
25	Port booking scheme to incentivise low emission trucks	Promoting Low Emission Transport	Priority parking for LEV's	ABP.DP world	2017	2018-20	Emissions reductions from port related HGVs	CAZ feasibility study will establish concentrations attributable to HGV's associate	Planning phase	2020	Discussion with stakeholders ongoing, to be considered as part of CAZ..

								with port activity.			
26	Green Wall Alongside A33	Other	Other	SCC, The Port	2016	2018-20	Impact on cycle rates (due to improved aesthetics). NO2 concentrations .	Indiscernible	in the planning phase	2018	Barrier to implementation: Land ownership issues. Resource dedicated to overcoming this issue.
27	Eastern Access Highway Scheme	Transport Planning and Infrastructure	Other	SCC, DfT	2016-18	2020-22	Scheme complete	TBC	in the planning phase	Q4 2022	Funding may not be secured. Objections during consultation
28	Millbrook Roundabout A33/ A35 Capacity	Transport Planning and Infrastructure	Other	SCC. DfT	20	2017/18	Traffic flow/capacity in roundabout vicinity. Monitored NO2 levels.	TBC	Bid submitted 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.	2018/20	

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

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

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

- The airAlert 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 Sussex Air and Kings College London, with the support of our public health colleagues and the NHS.
- 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 Clean Air Zone feasibility study will include estimated emissions for larger particulates (PM_{10}) from activity in the city which can be used as a proxy for determining the scale of $PM_{2.5}$ emissions.
- $PM_{2.5}$ is monitored in Southampton at the City Centre AURN Urban Centre station. $PM_{2.5}$ decreased substantially in 2016 compared to previous years. In 2011 it was 16 µg/m^3 but it has decreased steadily to 11.2 µg/m^3 in 2017.

$PM_{2.5}$ and Health

Based on national estimates, exposure to particulate matter in Southampton is estimated to contribute to 110 early deaths each year. Public Health England provide a Public health Indicator for $PM_{2.5}$ at a local authority level as a fraction of the mortality attributable to particulate air pollution. This enables local authorities to assess their local figure and take appropriate action to try to reduce it.

In Southampton Public Health England estimated the fraction of mortality at 6.2% attributable to particulate air pollution. This was slightly higher than the South East

England figure of 5.2% and Hampshire at 5%. As a regional city the slightly higher figure is to be expected, compared to rural Hampshire.

Local hot-spots

Background pollutant maps provided electronically by Defra (Defra,2016(c)) also give a basic local background concentration for $PM_{2.5}$. This information may show areas of higher $PM_{2.5}$ concentrations which Southampton City Council could assess to determine if there are local particulate issues where specific measures could be implemented to reduce particulate emissions.

The above noted methods will be used to establish local $PM_{2.5}$ annual mean concentrations, identify the local health burden of particulate matter and identify any local hot spot areas for particulate matter that have not been identified to date. This will enable Southampton City Council to establish baseline figures for $PM_{2.5}$ with the aim to improve on the established baseline, including the possibility of setting targets for a measured reduction in the near future, and to target resources to assess and improve any identified hot spot areas for $PM_{2.5}$. This data will be updated on an annual basis, and therefore provide some guidance of whether implemented measures are reducing local $PM_{2.5}$ concentrations.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Southampton City Council undertook automatic (continuous) monitoring at 4 sites during 2017. Table A.1 in Appendix A shows the details of the sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. National monitoring results are available at https://uk-air.defra.gov.uk/.

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.

Data from the automatic monitoring sites in Southampton can be found at: www.southampton.my-air.uk

3.1.2 Non-Automatic Monitoring Sites

Southampton City Council undertook non- automatic (passive) monitoring of NO_2 at 65 sites during 2017. Table A.2 in Appendix A shows the details of the 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.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction (graphs do not show distance corrected values and distance corrections have only been applied to monitoring sites where the annual mean concentration is within 10% of the annual mean NO2 objective (i.e. 40 µg/m^3). Where distance correction has been applied, the value is shown in Appendix B with calculations in Appendix C. Further details on all adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200 µg/m^3, not to be exceeded more than 18 times per year.

AQMA No. 1 Bevois Valley

There is one exceedance of the annual mean NO_2 objective at N107 Cranbury Place. The concentration at the monitoring location is 45.3 µg/m^3. When corrected for distance (see appendix C) the concentration at N107 remains in exceedance at 44.4 µg/m^3.

CM4 Onslow Road has exceeded the annual mean NO_2 objective for the previous 5 years and exceeded in 2017 (43.0 µg/m^3). There is no relevant receptor on the same side of the road as the automatic monitoring station though this location is useful to indicate the likelihood of exceedance at relevant receptors on the opposite side of the road.

Hourly data is recorded at CM4, there were no occasions where the hourly mean was above 200 µg/m^3 , below the 1-hour mean objective (200 µg/m^3 not to be exceeded more than 18 times per year).

AQMA No. 2 Bitterne Road West

There is one exceedance of the annual mean NO_2 objective in AQMA No 2. Bitterne Road West at N174 166A Bitterne Road West (41.2 µg/m^3). Other locations within this AQMA did not exceed in 2017. All locations are representative of a relevant receptor.

AQMA No. 4 Town Quay to Platform Road

There is one exceedance of the annual mean NO_2 objective in AQMA No 4. Town Quay to Platform Road in 2017 at N170 Union Castle House (2). This location however does not represent a relevant receptor and it is not possible to correct for distance. N120 6-9 Canute Road, which does represent a relevant receptor, is at the objective value at 40.0 µg/m^3, and therefore the AQMA should be maintained.

AQMA No. 5 Redbridge Road to Millbrook Road West

There is one exceedance of the annual mean NO_2 objective for N130 367A Millbrook Road West (40.8 µg/m^3) which is representative of a relevant receptor.

N152 M271 is also in exceedance of the objective but can't be corrected for distance due to the distance from the nearest relevant receptor and the barriers between the monitoring site and receptor of a large fence and mound of earth. However it is reasonable to predict that due to the distance and known fall off of NO_2 with distance from the kerbside that it is unlikely the nearest receptor would exceed. N153 Coniston Road is located on the same road as the nearest receptor to N152, and recorded 29.8 µg/m^3 which lends support to this conclusion.

Despite the difficulty in predicting concentrations at a relevant receptor, this site should be maintained as it provides a good indication of trends from the national road network in Southampton.

AQMA No. 6 Romsey Road

There is one exceedance of the annual mean NO_2 objective for N169 150 Romsey Road (43.0 µg/m^3) which is representative of a relevant receptor. This location is closer to the junction than both N131 and N151 which are not exceeding and have reduced since 2013. This may be a result of queuing traffic at this junction that does not extend to the two locations further away, this will be investigated further.

AQMA No. 8 Commercial Road

Both N140 Commercial Road and N180 Opposite Commercial Road require correcting for distance. The graph shows the data at the monitoring site. When corrected for distance, the annual mean NO_2 at N140 is 43.1 µg/m^3 which exceeds the objective. N180 is 38.9 µg/m^3 which is below the objective (see appendix C).

More data is required to indicate a trend from N180, but the site and the nearest relevant receptor are both currently within the AQMA.

AQMA No. 9 Burgess Road

There is one exceedance of the annual mean NO_2 objective in 2017 in AQMA No. 9 Burgess Road at N138 66 Burgess Road (40.4 µg/m^3).

AQMA No. 10 New Road

N166 14 New Road, within AQMA No. 10, is not exceeding the annual mean NO_2 objective. This result has been annualised (see appendix C). It is not recommended to revoke this AQMA despite three years of data indicating compliance with the objective as a nearby location (N172 4 New Road, see figure 19) is exceeding the annual objective and in 2016 the concentration was 39.8 µg/m^3 which is close to the objective. N172 is not currently at a sensitive receptor as the closest building is a commercial building. SCC will consider whether, due to permitted development rules which mean this property could become a residential, and therefore a sensitive receptor, it is appropriate to include within AQMA No. 10.

AQMA No. 11 Victoria Road

There is one exceedance of the annual mean NO_2 objective within AQMA No. 11 Victoria Road at the CM6 Victoria Road automatic monitoring station (42.2 µg/m^3). This is representative of the nearest receptor as it is in line with the adjacent building façade. The data capture at CM6 was below the threshold required for unadjusted reporting and therefore the data is annualised (see appendix C).

In comparison, N117 Victoria Road (Lamp post) shows a slight fall in concentrations, measuring 34.2 µg/m^3 in 2017, the lowest value for the past five years. This also does not exceed 60 µg/m^3 in 2017, the value used to indicate potential exceedance of the hourly mean NO_2 objective.

Hourly data is recorded at CM6, there were 9 occasions where the hourly mean was above 200 µg/m^3 (the valid data capture of less than 85% required the 99.8th percentile to be calculated, this was 178) which is below the 1-hour mean objective (200 µg/m^3 not to be exceeded more than 18 times per year).

Bitterne Park (Outside AQMA)

Both N100 6 Sandringham Road and N171 132 Newton Road are below the annual mean NO_2 objective (16.7 µg/m^3 and 18.8 µg/m^3 respectively). These locations are considered background.

Redbridge (Outside AQMA)

An exceedance of the annual mean NO_2 objective in 2017 at N101 Redbridge School Fence is reported. Advice from Defra has been to regard this as a relevant receptor as it is at the fence of a local school where children are likely to spend a significant portion of time. This location is on the boundary of the existing AQMA No. 5 Redbridge Road to Millbrook Road West. Continued monitoring here will identify a need to amend the existing AQMA and include the entirity of the school within the AQMA. N178 2 Gover Road, CM7 A33 AURN and N186 Redbridge Causeway 2 are all below the annual mean objective.

Concentrations at N185 Redbridge Causeway 1, N184 Redbridge New AMS are not at relevant receptors. Corrections are not applied due to the distance between kerb and receptor (29m and 20m respectively). It is not anticipated that the closest receptors would exceed the objective due to this distance.

The Redbridge area has been identified by Defra's national pollution climate mapping model (PCM) to persistently exceeding EU limit levels for annual mean nitrogen dioxide and will therefore be subject to further assessment. The outcome of this study will inform the approach taken to reducing NO_2 levels at this location specifically but also provide opportunity for reductions across the city.

Hourly data is recorded at CM7, there were no occasions where the hourly mean was above 200 µg/m^3 , below the 1-hour mean objective (200 µg/m^3 not to be exceeded more than 18 times per year). This data is shown in figure 16.

Portswood (Outside AQMA)

All locations in Portswood that are outside of the Bevois AQMA No. 1 are below the annual mean objective for NO_2. Concentrations do not exceed 60 µg/m^3 in 2017, the value used to indicate potential exceedance of the hourly mean NO_2 objective. There is a slight reduction in concentrations at most locations with variablity between years. N165 8 The Broadway shows a significant reduction in concentrations between 2013/14 and 2015. The result in 2013 was annualised and based on 33% data capture which could increase uncertainty in this value. Continued monitoring here will identify whether this was an anomoly isolated to those years.

Romsey Road (Outside AQMA)

All locations in Romsey Road that are outside of the Romsey Road AQMA are below the annual mean objective for NO_2.

In 2016, N168 23 Romsey Road exceeded the annual mean NO_2 objective (40.6 µg/m^3), but in 2017 is below the objecitve (35.9 µg/m^3). An additional years monitoring is required to confirm the continuation of compliance here as exceedance here has also been measured in 2013 and 2014.

Shirley High Street (Outside AQMA)

All locations in Shirley High Street that are outside of the Romsey Road AQMA are below the annual mean objective for NO_2.

Six Dials Area (Outside AQMA)

N172 4 New Road is exceeding the annual mena NO_2 objective in 2017. This location is not representative of a relevant receptor due to the nature of the buildings use (commercial premises). However, due to the proximity to the existing AQMA and permitted development rules, SCC will continue to monitor at this location and consider amending the existing AQMA to include this property should this trend continue.

Hourly data is recorded at CM1, there were no occasions where the hourly mean was above 200 µg/m^3 , below the 1-hour mean objective (200 µg/m^3 not to be exceeded more than 18 times per year). The data is shown in figure 20.

Northam (Outside AQMA)

Neither N144 208 Northam Road (36.4 µg/m^3) or N146 222 Northam Road (30.2 µg/m^3) are exceeding the annual mean NO_2 objective.

Town Quay (Outside AQMA)

Neither N154 Ocean Boulevard (33.8 µg/m^3) or N157 222 Admiralty House (27.8 µg/m^3) are exceeding the annual mean NO_2 objective.

Both locations saw a drop in concentrations between 2014 and 2015. Traffic flow adjacent to N154 Ocean Boulevard reduced significantly following a major road project in the vicinity. All through traffic uses Platform Road, which is now two way traffic with 2 lanes in each direction. Before the scheme, Platform Road was one way westbound, with all eastbound traffic using Queens Terrace and Orchard Place. This scheme was detailed further in the SCC 2014 Air Quality Progress Report and Detailed Assessment (May 2015). The data from 2017 indicates the trend in improved concentrations has continued.

Woolston (Outside AQMA)

N158 24 Portsmouth Road and N159 35 Portsmouth Road are below the annual mean NO_2 objective.

Burgess Road (Outside AQMA)

N173 19A Burgess Road is below the annual mean NO_2 objective.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

Both CM1 (16.8 µg/m^3) and CM7 (19.4 µg/m^3) did not exceed the PM_{10} annual mean objective in 2017 (40 µg/m^3).

Figure 27 shows the daily mean PM_{10} compared to the objective daily mean (50 µg/m^3 not to be exceeded more than 35 times per year). CM1 exceeded 50 µg/m^3 on one occasion in 2017, and CM7 exceeded on three occasions, both below the objective.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

There is currently no UK objective for annual mean $PM_{2.5}$ though monitoring is undertaken in Southampton at the Southampton Centre AURN. Concentrations at this location in 2017 were 11.2 µg/m^3.

3.2.4 Sulphur Dioxide (SO_2)

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2017 with the air quality objectives for SO_2.

There were no exceedances in 2017 of the 15-minute, daily or hourly objectives for SO_2 at CM1 Southampton Centre AURN.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In 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 Centre	442579	112248	NO2, PM10 (FDMS), PM2.5 (FDMS), SO2, Benzene, O3	NO	Chemiluminescence (NO2), FDMS (PM10 and PM2.5), ultra-violet fluorescence (SO2), pumped diffusion tube sampler (benzene)	27	20.7	2.5
CM4	Onslow Road	Roadside	442304	112771	NO2	YES	Chemiluminescence	N/A	2	1.3
CM6	Victoria Road	Roadside	443751	111123	NO2	YES	Chemiluminescence	1	3	1.3
CM7	A33 AURN	Roadside	437809	113560	NO2, PM10	NO	Chemiluminescence, FDMS TEOM	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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
N100	6 Sandringham Road	Urban Background	444387	114453	NO2	NO	N/A	N/A	NO	1
N101	Redbridge School Fence	Roadside	437548	113719	NO2	NO	0	6.3	YES	2.3
N102	64 Burgess Road	Roadside	441676	115280	NO2	YES	0	7.1	NO	1.6
N103	485 Millbrook Road	Roadside	438808	112903	NO2	YES	0	12.1	NO	1.6
N104	Regents Park Junction	Roadside	439222	112850	NO2	YES	2.4	12	NO	3
N106	2 Romsey Road, Oakhill	Roadside	439752	113984	NO2	NO	0	4.4	NO	2.6
N107	Cranbury Place	Roadside	442364	112890	NO2	YES	0.5	1.8	NO	2.1
N109	72 Bevois Valley	Roadside	442585	113248	NO2	YES	0.5	3.6	NO	2.4
N110	Brintons Road 1	Urban Background	442579	112248	NO2	NO	27	20.7	YES	3.2
N111	Brintons Road 2	Urban Background	442579	112248	NO2	NO	27	20.7	YES	3.2
N112	Brintons Road 3	Urban Background	442579	112248	NO2	NO	27	20.7	YES	3.2
N113	206 Bitterne Road	Roadside	444124	113288	NO2	YES	0.7	5.1	NO	2.2
N114	Bitterne Library	Roadside	444131	113322	NO2	YES	1.9	3.2	NO	3.2
N115	54 Redbridge Road	Roadside	437939	113474	NO2	YES	0	8.7	NO	1.7

N116	57 Redbridge Road	Roadside	437952	113407	NO2	YES	0	12.9	NO	1.8
N117	Victoria Road (Lamp Post)	Roadside	443752	111121	NO2	YES	0.8	2.8	YES	2.7
N118	3 Rockstone Lane	Roadside	442472	113065	NO2	YES	3.7	3.8	NO	2.4
N120	6-9 Canute Road	Roadside	442716	111019	NO2	YES	0	3.8	NO	2.6
N122	151 Paynes Road	Roadside	440000	112633	NO2	YES	0	12.7	NO	1.7
N123	102 St Andrews Road	Roadside	442348	112305	NO2	NO	0	3.5	NO	3.3
N124	305 Millbrook Road	Roadside	439741	112753	NO2	YES	0	9.5	NO	2
N125	Princes Court	Roadside	443125	112641	NO2	YES	0	5.7	NO	2.5
N126	107 St Andrews Road	Roadside	442365	112286	NO2	NO	1.7	2	NO	2.7
N129	South West House	Roadside	442554	111021	NO2	YES	0	2.5	NO	2.9
N130	367A Millbrook Road	Roadside	439346	112821	NO2	YES	0	8.1	NO	2.3
N131	142 Romsey Road	Roadside	439378	114185	NO2	YES	0	4.8	NO	2.1
N133	539 Millbrook Road	Roadside	438609	113020	NO2	YES	0	33	NO	1.8
N134	435 Millbrook Road West Ladbrokes	Roadside	438980	112861	NO2	YES	0	11.5	NO	3.2
N138	66 Burgess Road	Roadside	441697	115288	NO2	YES	0	2.3	NO	1.5
N179	5 Commercial Road	Roadside	441628	112332	NO2	YES	1.7	1.9	NO	3.2
N141	Town Quay Road	Kerbside	441923	110990	NO2	YES	0	3.2	NO	2.6
N143	102 Romsey Road	Roadside	439457	114150	NO2	NO	0	5.8	NO	1.9

N144	208 Northam Road	Roadside	443147	112709	NO2	NO	0	5	NO	2.5
N146	222 Northam Road	Roadside	443164	112741	NO2	NO	0	11.5	NO	1.8
N149	44B Burgess Road	Roadside	441552	115247	NO2	YES	0	2.6	NO	2.2
N151	134 Romsey Road	Roadside	439394	114176	NO2	YES	0	5	NO	1.8
N152	M271	Roadside	437327	113848	NO2	YES	18	4.8	NO	2.5
N153	Coniston Road	Roadside	437324	113859	NO2	YES	N/A	16	NO	1.8
N154	Oceana Boulevard DG5	Roadside	442240	111087	NO2	NO	0.9	1.5	NO	2.4
N157	Admiralty House	Roadside	442375	110970	NO2	NO	0	17.1	NO	2.5
N158	24 Portsmouth Road	Roadside	443807	111123	NO2	NO	0	4.7	NO	2.6
N159	35 Portsmouth Road	Roadside	443740	111147	NO2	NO	0	3.2	NO	2.7
N160	2 Dorset Street	Roadside	442218	112881	NO2	NO	0.3	2.2	NO	2.9
N161	30 Addis Square	Roadside	442705	114129	NO2	NO	0	6	NO	2.7
N162	263A Portswood Road	Roadside	442872	114336	NO2	NO	0	3.7	NO	2.6
N163	285 Portswood Road	Roadside	442948	114381	NO2	NO	0	9.5	NO	2
N164	168 Portswood Road(Int.Food)	Roadside	442809	114241	NO2	NO	0	5.3	NO	2.9
N165	8 The Broadway	Roadside	442766	114181	NO2	NO	0	5.5	NO	2.6
N166	14 New Road	Roadside	442251	112129	NO2	YES	0	1.5	NO	2.8
N167	13 Romsey Road	Roadside	439759	114011	NO2	NO	0	5.8	NO	2.5

N168	23 Romsey Road	Roadside	439737	114025	NO2	NO	0	4.5	NO	1.8
N169	150 Romsey Road	Roadside	439361	114195	NO2	YES	0	4.4	NO	0.9
N170	Union Castle House (2)	Roadside	442482	111003	NO2	YES	N/A	2.6	NO	2.5
N171	132 Newton Road	Urban Background	444203	114672	NO2	NO	0	N/A	NO	2
N172	4 New Road	Roadside	442207	112126	NO2	NO	0	2	NO	2.9
N173	19A Burgess Road	Roadside	440962	115112	NO2	NO	0	6.9	NO	1.4
N174	166A Bitterne Road West	Roadside	443959	113315	NO2	YES	0	6.7	NO	2.7
N175	38 Shirley High Street	Roadside	439959	113737	NO2	NO	0	8.8	NO	2.6
N176	Salisbury Arms, Shirley High Street	Roadside	439772	113952	NO2	NO	0	13.3	NO	2.2
N177	95 Shirley High Street (Windsor Castle Pub)	Roadside	439844	113907	NO2	NO	0	4.5	NO	2.6
N178	2 Gover Road	Roadside	437265	113682	NO2	NO	0	8.8	NO	2.1
N180	Opposite 5 Commercial Road	Roadside	441633	112318	NO2	YES	1	2.9	NO	2.4
N184	Redbridge New AMS	Roadside	437809	113560	NO2	NO	15	5.3	YES	2.7
N185	Redbridge Causeway 1	Roadside	437167	113713	NO2	NO	29.2	2.4	NO	2.5
N186	Redbridge Causeway 2	Roadside	437126	113701	NO2	NO	7.5	2.9	NO	2.3

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2013	2014	2015	2016	2017
CM1	Urban Centre	Automatic	93	93	31.3	31.6	32.0	33.0	29.6
CM4	Roadside	Automatic	97	97	40.5	41.3	39.6	45.7	43.0
CM6	Roadside	Automatic	73	73	43.0	43.9	42.0	43.4	42.2
CM7	Roadside	Automatic	99	99				43.0	39.9
N100	Urban Background	Diffusion Tube	100	100	20.4	20.5	17.2	18.6	16.7
N101	Roadside	Diffusion Tube	100	100				54.3	48.2
N102	Roadside	Diffusion Tube	100	100	33.3	33.3	29.8	33.5	30.9
N103	Roadside	Diffusion Tube	100	100	32.3	34.9	31.7	33.7	31.5
N104	Roadside	Diffusion Tube	100	100	41.2	42.3	38.4	40.3	35.6
N106	Roadside	Diffusion Tube	100	100	39.9	43.6	37.9	39.9	36.3
N107	Roadside	Diffusion Tube	100	100	51.0	50.5	53.7	52.7	45.3
N109	Roadside	Diffusion Tube	92	92	41.2	38.9	37.2	40.0	36.6
N110	Urban Background	Diffusion Tube	100	100	29.5	29.2	25.4	26.5	27.7
N111	Urban Background	Diffusion Tube	100	100	29.4	29.2	25.9	27.0	27.5
N112	Urban Background	Diffusion Tube	92	92	28.6	29.2	26.1	26.2	27.8
N113	Roadside	Diffusion Tube	100	100	39.9	37.9	34.9	38.2	35.2

N114	Roadside	Diffusion Tube	100	100	39.7	39.5	32.8	35.9	34.4
N115	Roadside	Diffusion Tube	100	100	37.5	40.5	36.4	38.4	35.9
N116	Roadside	Diffusion Tube	100	100	42.1	41.9	38.1	40.5	34.3
N117	Roadside	Diffusion Tube	92	92	43.0	42.5	36.4	36.1	34.2
N118	Roadside	Diffusion Tube	92	92	38.4	38.2	34.8	37.1	34.1
N120	Roadside	Diffusion Tube	100	100	44.8	43.8	38.0	40.3	40.0
N122	Roadside	Diffusion Tube	100	100	30.4	32.6	31.5	32.8	31.6
N123	Roadside	Diffusion Tube	100	100	38.1	36.2	32.8	35.5	30.3
N124	Roadside	Diffusion Tube	92	92	39.9	41.1	37.3	40.2	35.5
N125	Roadside	Diffusion Tube	100	100	42.6	40.7	35.3	38.7	34.5
N126	Roadside	Diffusion Tube	100	100	39.4	36.9	32.8	36.4	32.3
N129	Roadside	Diffusion Tube	92	92	35.7	32.0	28.8	30.7	30.2
N130	Roadside	Diffusion Tube	100	100	42.2	46.6	44.8	44.9	40.8
N131	Roadside	Diffusion Tube	100	100	40.4	41.6	37.9	38.2	35.2
N133	Roadside	Diffusion Tube	100	100	31.5	32.4	30.7	31.4	29.4
N134	Roadside	Diffusion Tube	100	100	41.2	39.6	37.6	41.2	36.1
N138	Roadside	Diffusion Tube	100	100	44.5	49.8	43.8	46.8	40.4
N140	Roadside	Diffusion Tube	100	100	50.1	55.6	49.6	49.0	45.4

N141	Kerbside	Diffusion Tube	100	100	40.7	43.9	30.5	36.8	33.0
N143	Roadside	Diffusion Tube	100	100	36.9	40.1	34.4	37.3	36.2
N144	Roadside	Diffusion Tube	92	92	34.4	33.5	31.8	36.4	36.4
N146	Roadside	Diffusion Tube	100	100	29.1	31.1	28.7	30.5	30.2
N149	Roadside	Diffusion Tube	100	100	34.3	36.1	32.5	31.4	28.5
N151	Roadside	Diffusion Tube	100	100	40.2	42.8	37.4	40.0	37.6
N152	Roadside	Diffusion Tube	100	100	58.4	56.9	49.1	52.2	45.8
N153	Roadside	Diffusion Tube	100	100	31.7	37.7	31.2	33.7	29.8
N154	Roadside	Diffusion Tube	92	92	40.6	40.8	32.9	33.9	33.8
N157	Roadside	Diffusion Tube	75	75	35.0	34.8	27.8	28.5	27.8
N158	Roadside	Diffusion Tube	100	100	28.3	37.6	36.6	40.4	36.6
N159	Roadside	Diffusion Tube	100	100	32.3	29.3	25.9	32.7	31.9
N160	Roadside	Diffusion Tube	92	92	33.7	32.0	32.6	33.0	32.6
N161	Roadside	Diffusion Tube	100	100	37.0	35.2	32.5	35.4	30.4
N162	Roadside	Diffusion Tube	83	83	44.3	41.9	37.7	37.1	37.4
N163	Roadside	Diffusion Tube	100	100	31.6	32.6	27.8	31.4	28.7
N164	Roadside	Diffusion Tube	100	100	40.8	39.0	32.3	35.7	32.4
N165	Roadside	Diffusion Tube	100	100	49.3	57.2	32.3	34.0	31.4

N166	Roadside	Diffusion Tube	67	67	40.7		38.1	39.8	37.3
N167	Roadside	Diffusion Tube	100	100	38.1	38.0	33.5	36.3	34.5
N168	Roadside	Diffusion Tube	100	100	43.0	43.3	36.4	40.6	35.9
N169	Roadside	Diffusion Tube	100	100		36.6	40.6	42.5	43.0
N170	Roadside	Diffusion Tube	92	92		43.8	38.7	41.7	40.1
N171	Urban Background	Diffusion Tube	92	92		23.1	17.2	20.1	18.8
N172	Roadside	Diffusion Tube	92	92			42.9	45.1	42.1
N173	Roadside	Diffusion Tube	100	100			27.3	31.0	28.1
N174	Roadside	Diffusion Tube	100	100			37.6	42.8	41.2
N175	Roadside	Diffusion Tube	92	92			39.0		38.9
N176	Roadside	Diffusion Tube	100	100			38.0	43.1	35.5
N177	Roadside	Diffusion Tube	100	100			36.7	38.8	37.5
N178	Roadside	Diffusion Tube	100	100			25.9	27.0	24.5
N180	Roadside	Diffusion Tube	83	83				39.0	39.7
N184	Roadside	Diffusion Tube	83	83				42.7	41.8
N185	Roadside	Diffusion Tube	100	100				53.9	50.2
N186	Roadside	Diffusion Tube	92	92				39.4	39.0

☒ Diffusion tube data has been bias corrected

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

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

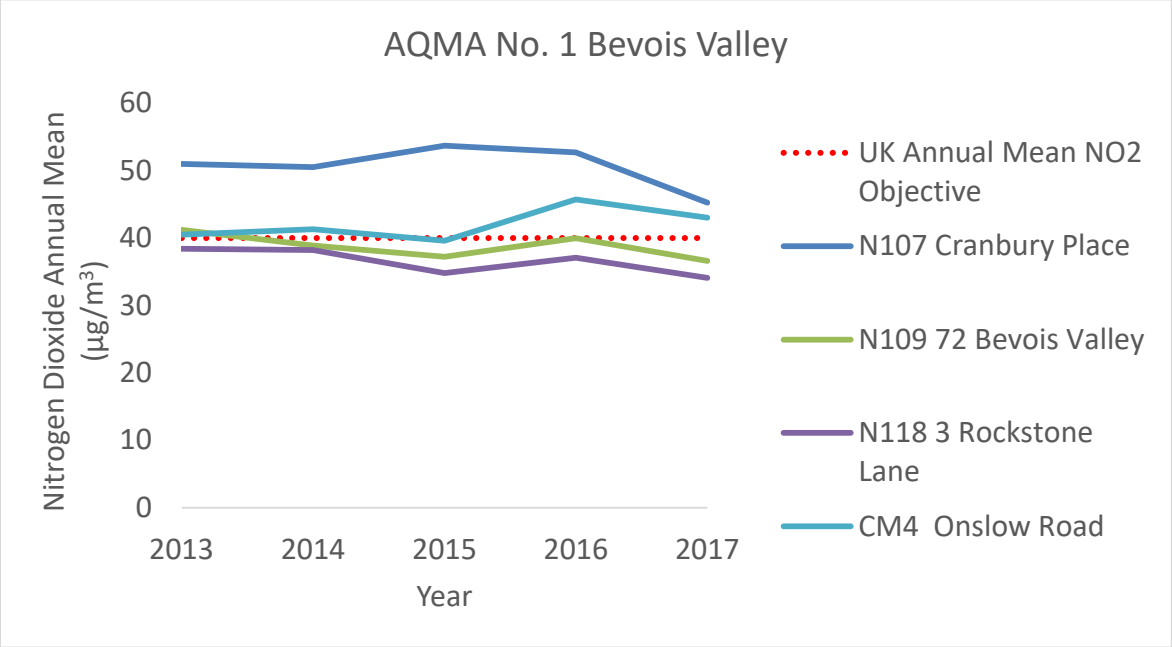
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

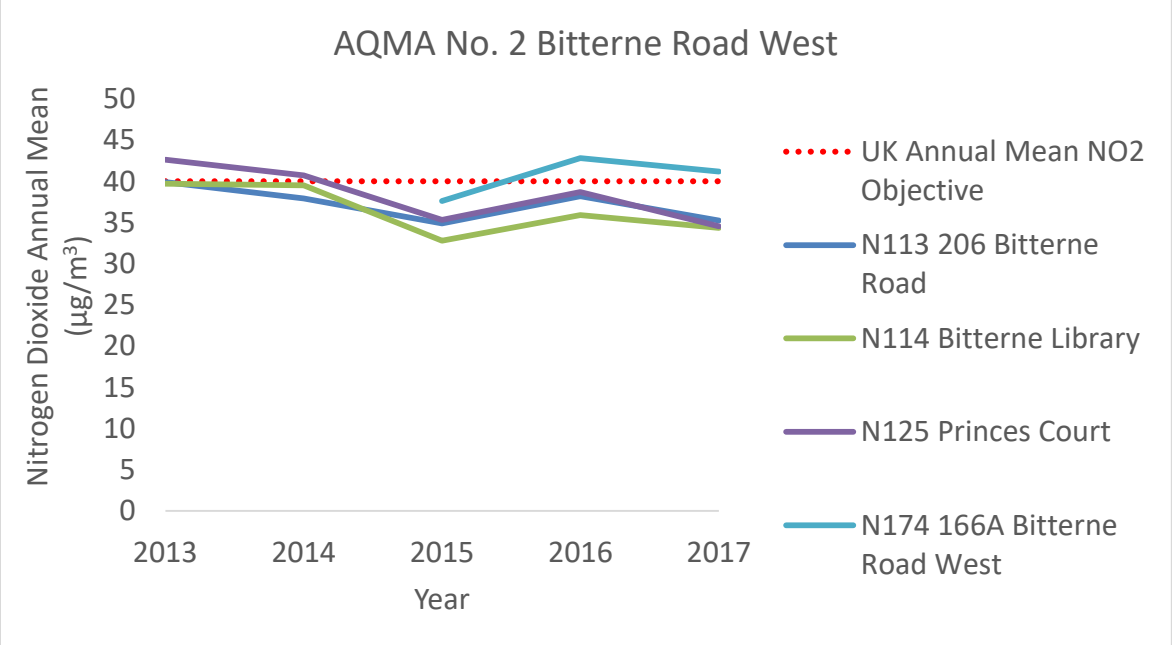
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

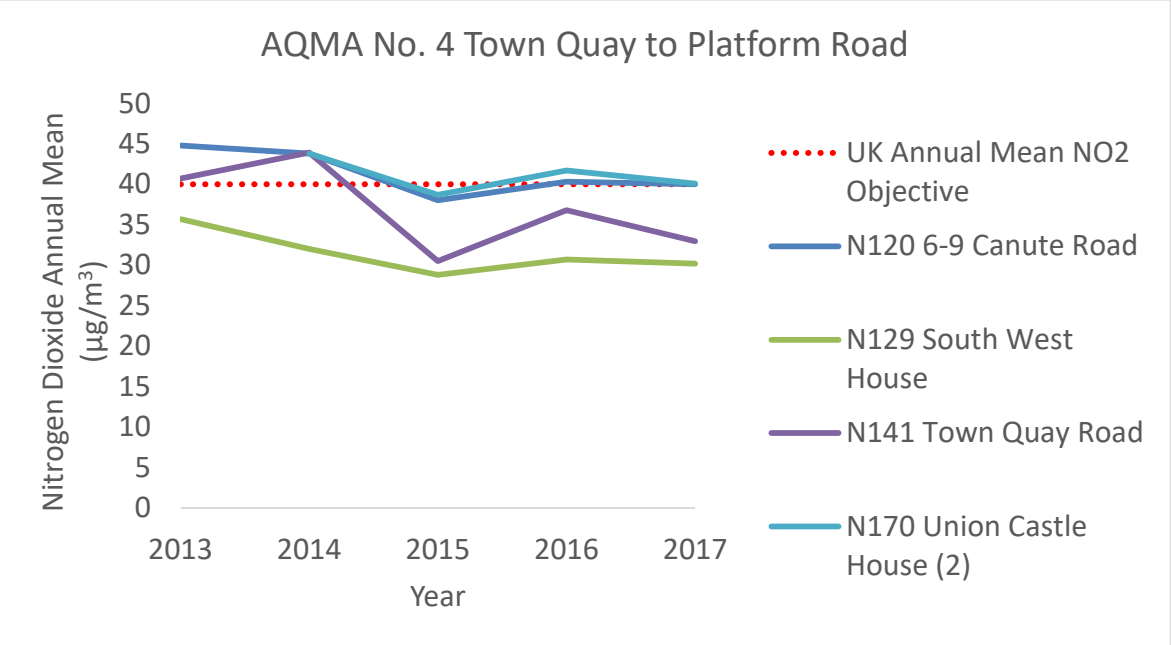
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

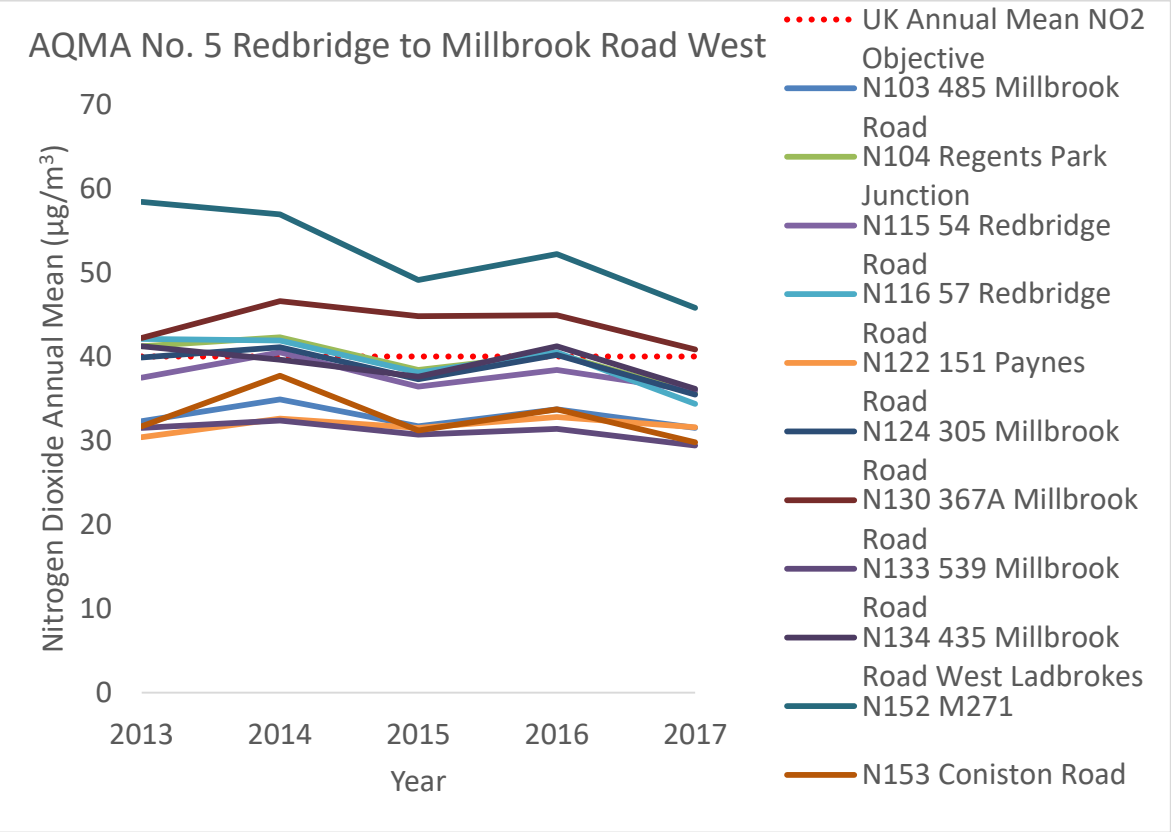
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

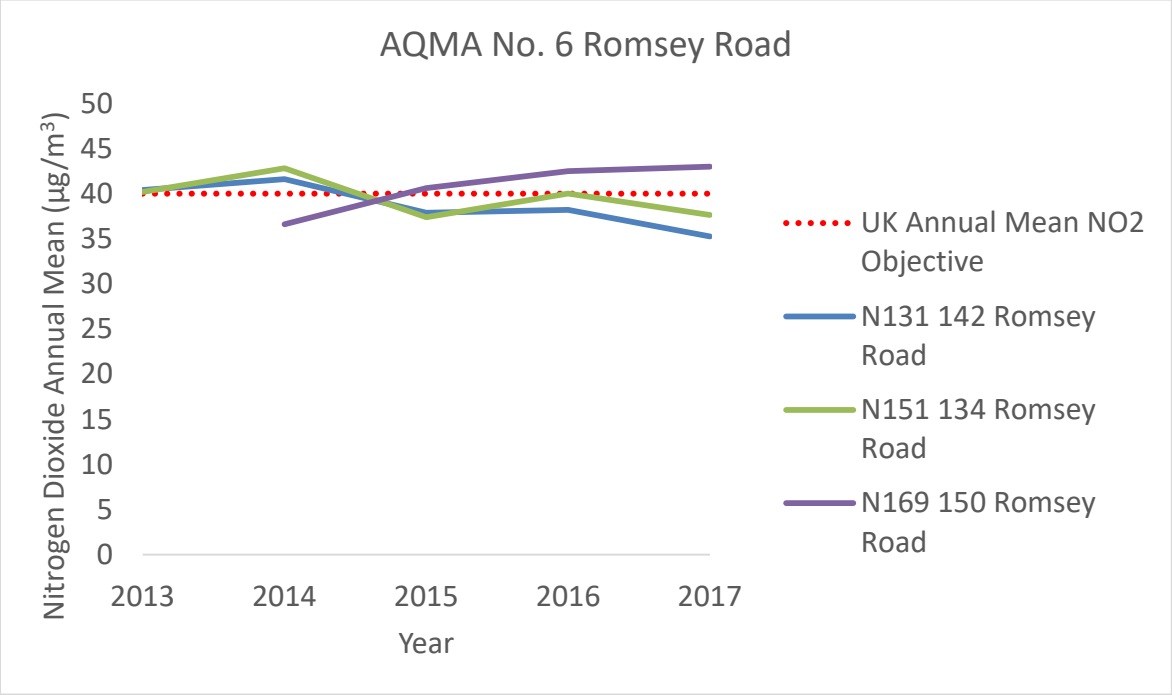
Figure A.1 – Trends in Annual Mean NO_2 Concentrations

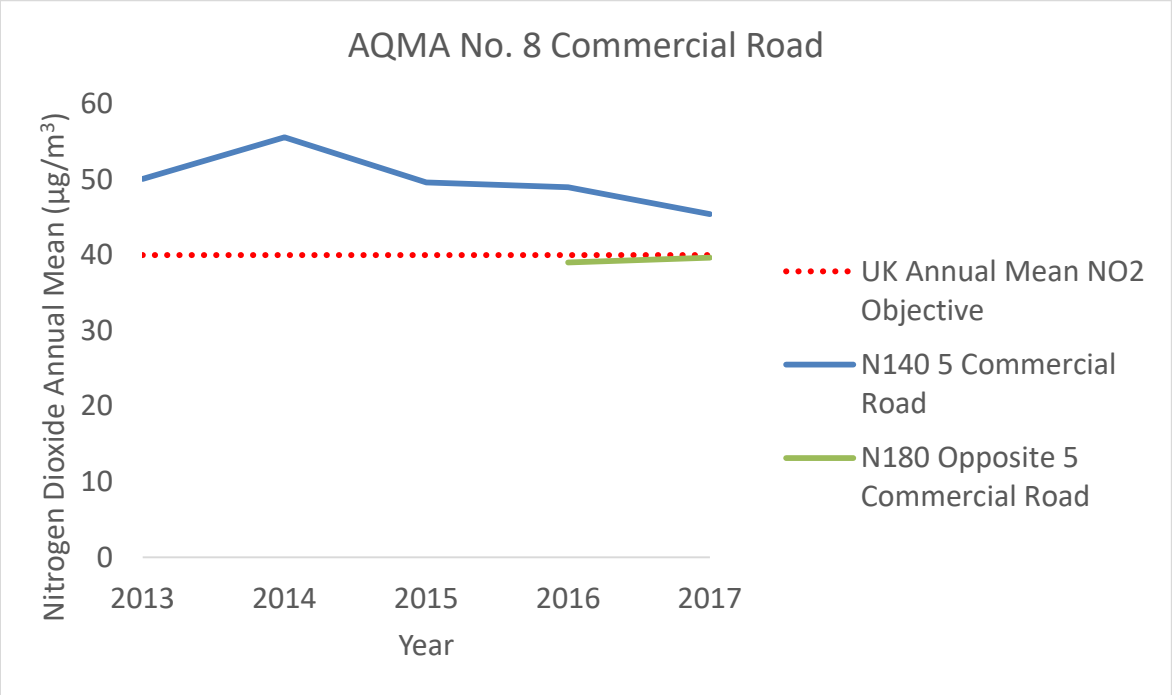


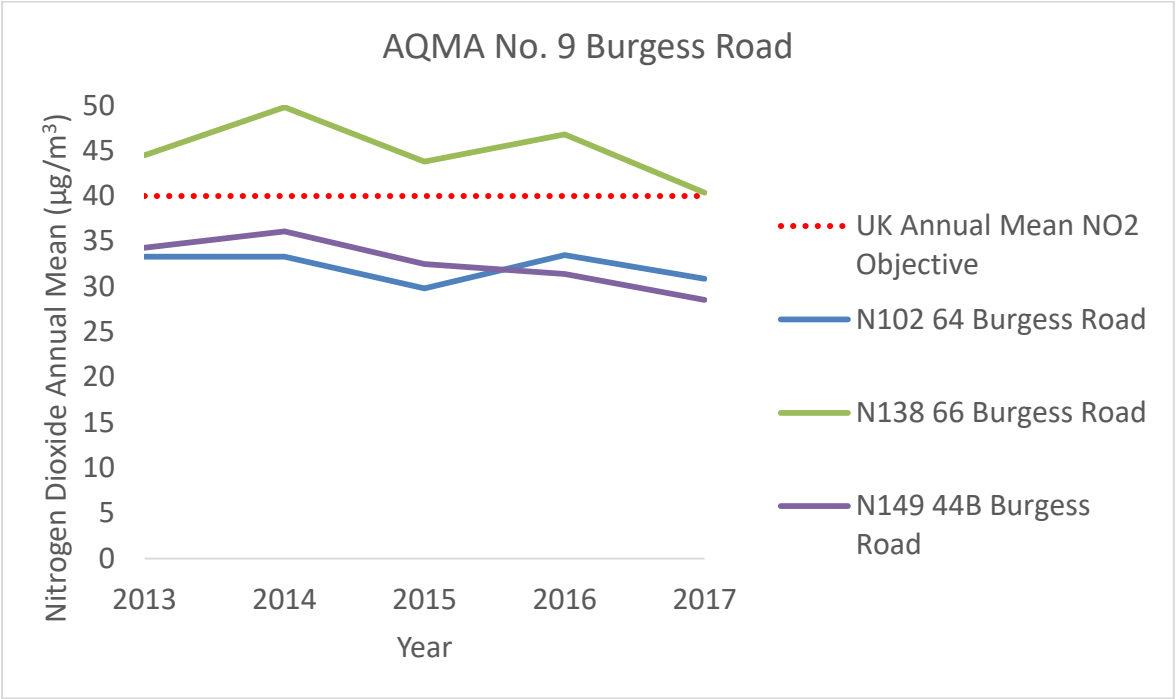


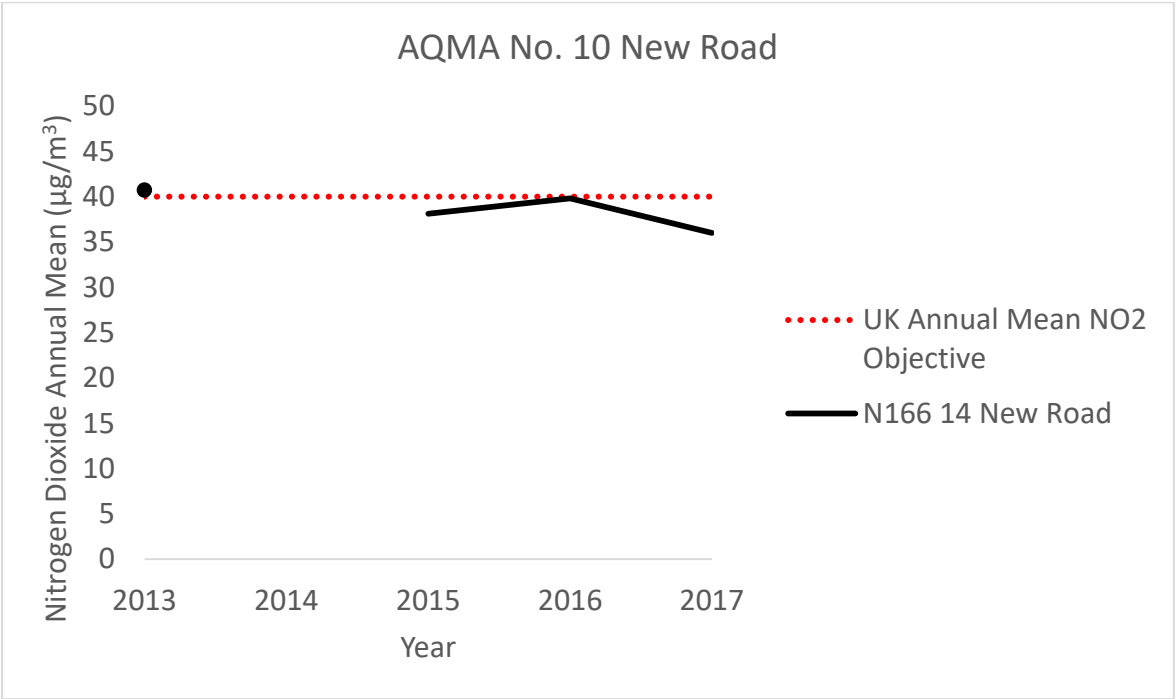

AQMA No. 4 Town Quay to Platform Road
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N120 6-9 Canute Road
N129 South West House
N141 Town Quay Road
N170 Union Castle House (2)

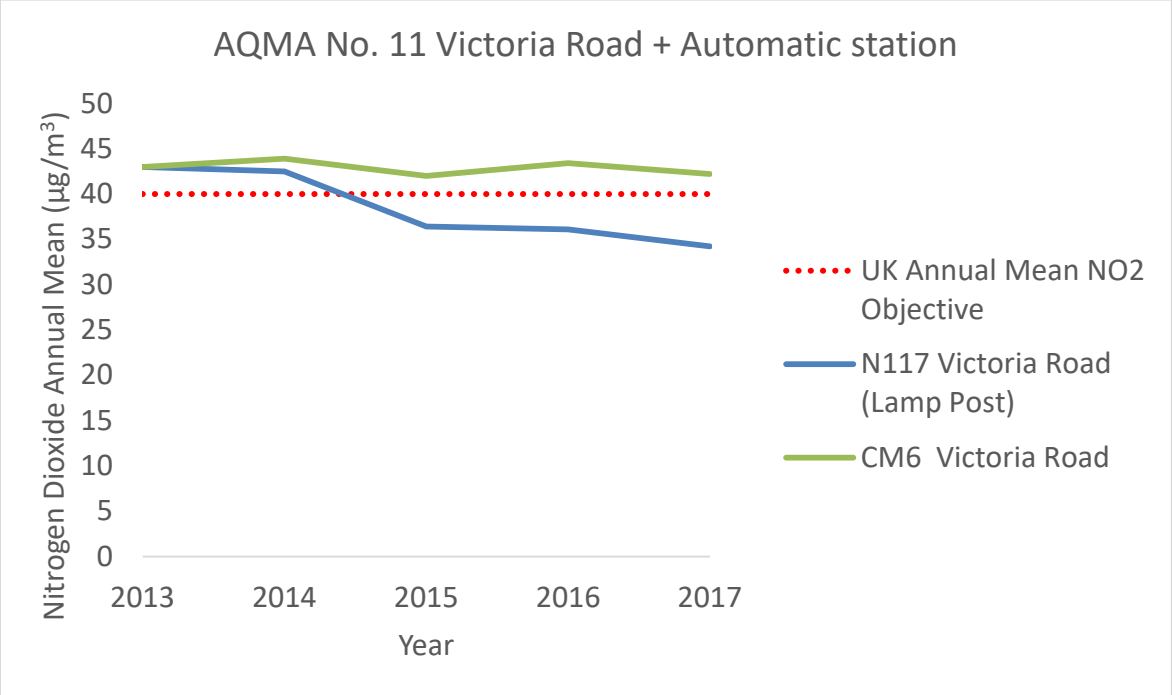

AQMA No. 5 Redbridge to Millbrook Road West
Nitrogen Dioxide Annual Mean (µg/m³)
70
60
50
40
30
20
10
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N103 485 Millbrook Road
N104 Regents Park Junction
N115 54 Redbridge Road
N116 57 Redbridge Road
N122 151 Paynes Road
N124 305 Millbrook Road
N130 367A Millbrook Road
N133 539 Millbrook Road
N134 435 Millbrook Road West Ladbrokes
N152 M271
N153 Coniston Road

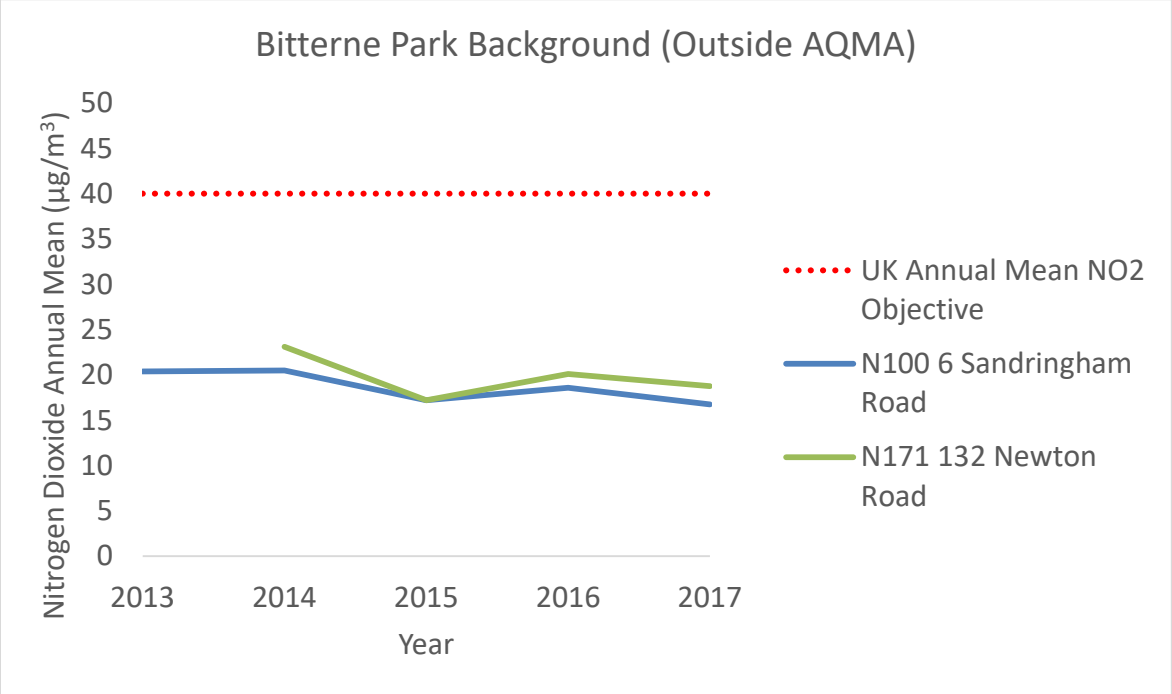

AQMA No. 6 Romsey Road
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N131 142 Romsey Road
N151 134 Romsey Road
N169 150 Romsey Road

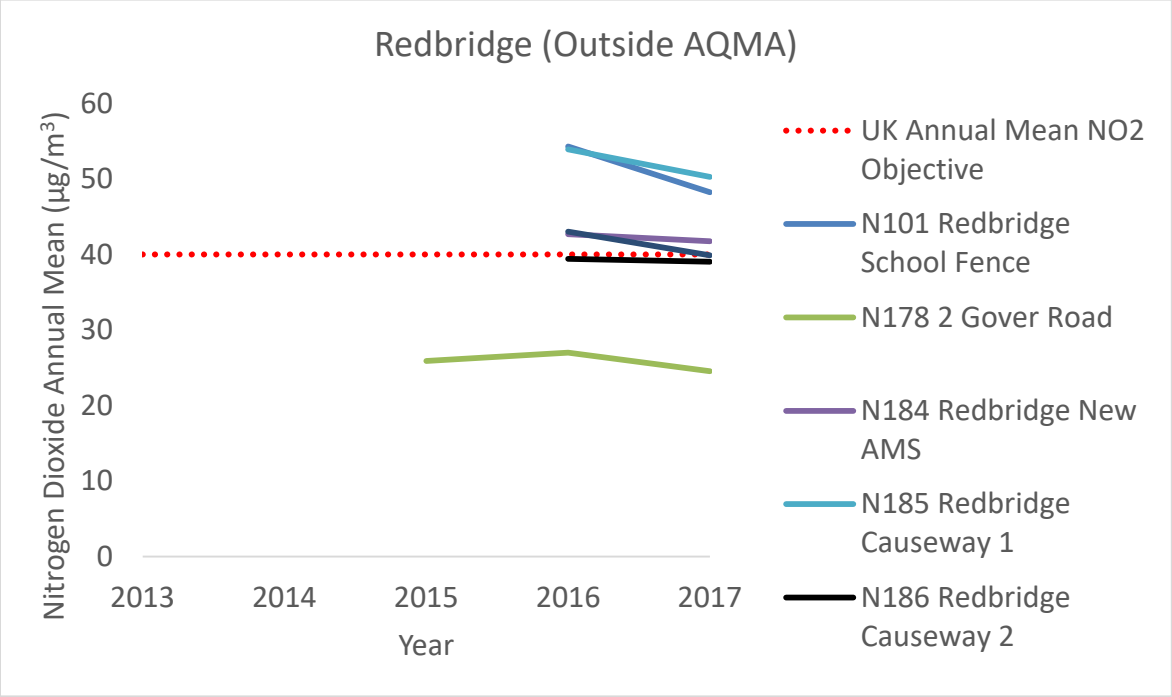

AQMA No. 8 Commercial Road
Nitrogen Dioxide Annual Mean (µg/m³)
60
50
40
30
20
10
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N140 5 Commercial Road
N180 Opposite 5 Commercial Road

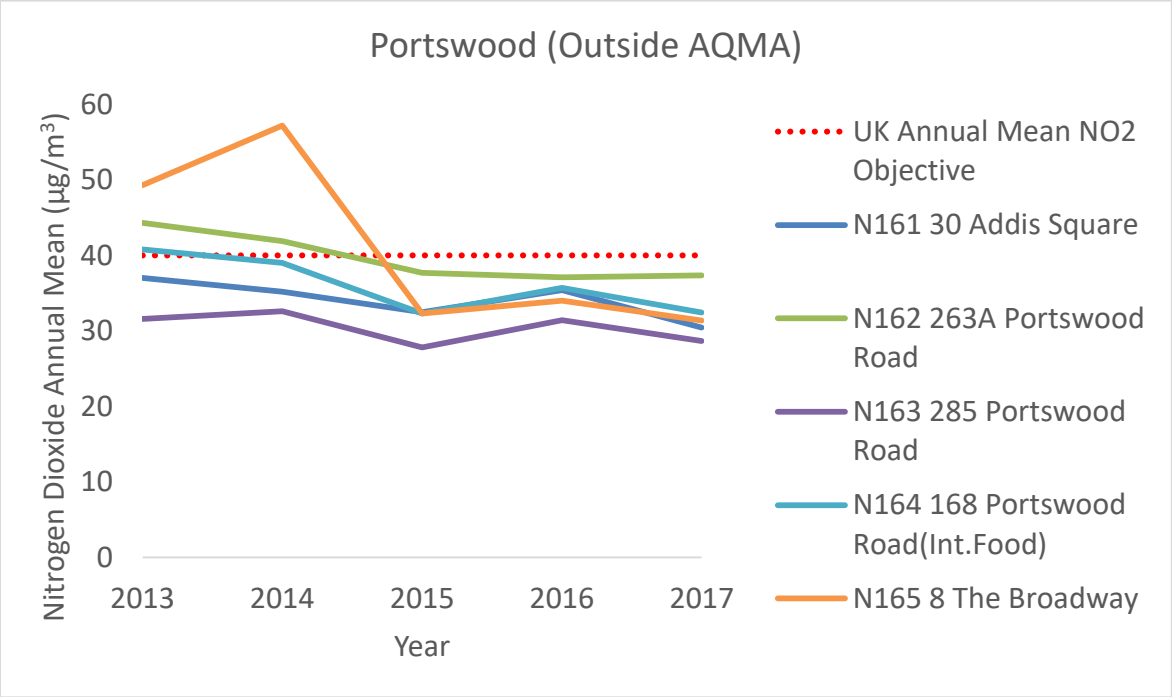

AQMA No. 9 Burgess Road
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N102 64 Burgess Road
N138 66 Burgess Road
N149 44B Burgess Road

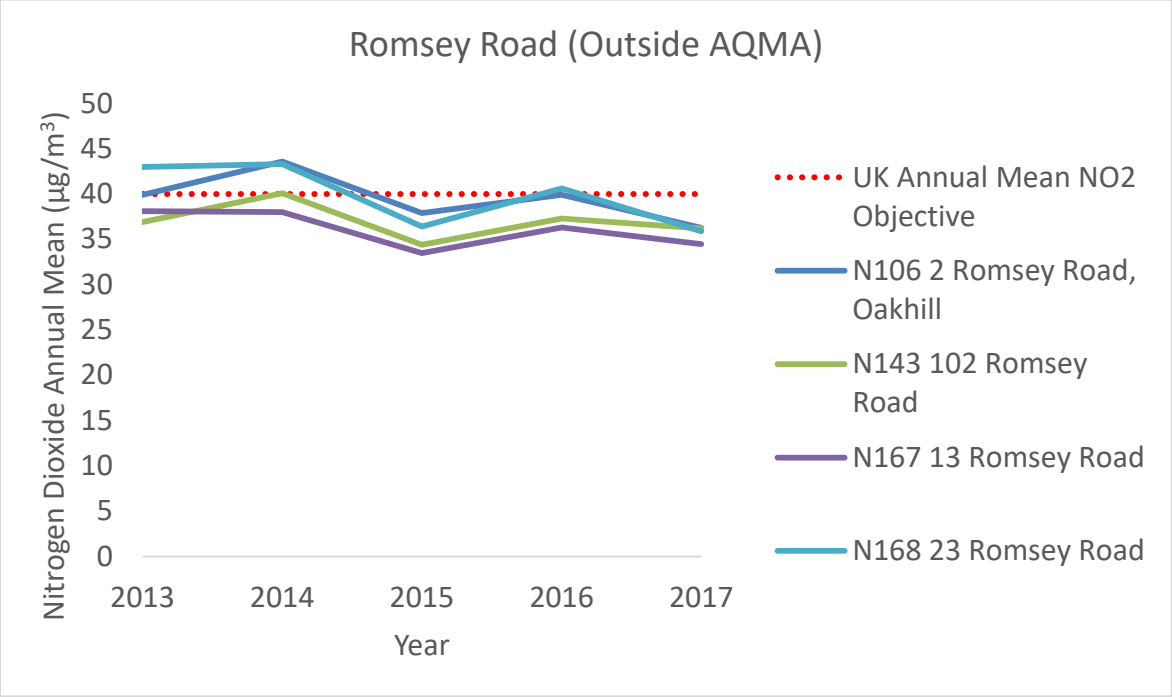

AQMA No. 10 New Road
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N166 14 New Road

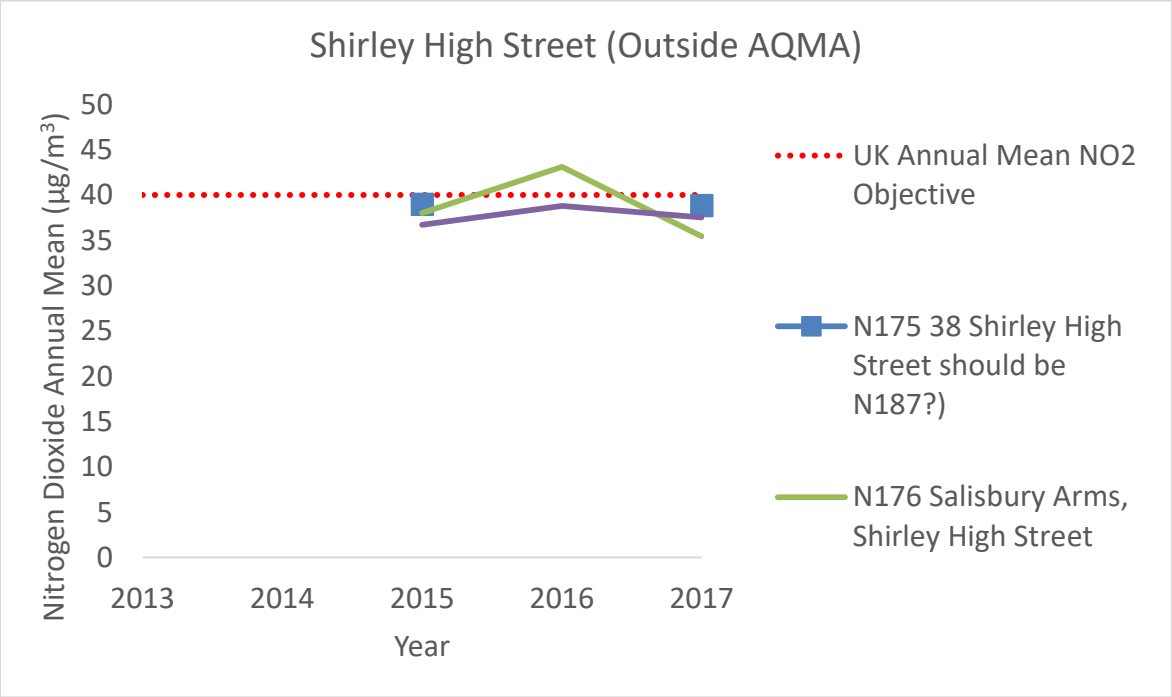

AQMA No. 11 Victoria Road + Automatic station
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N117 Victoria Road (Lamp Post)
CM6 Victoria Road

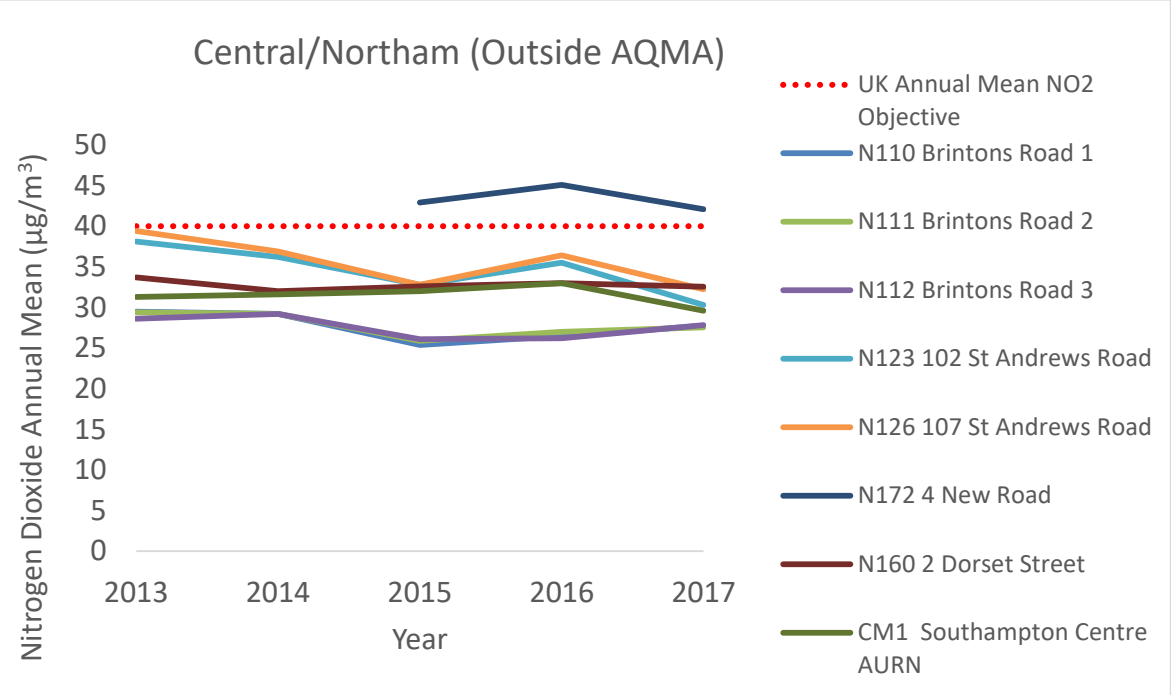

Bitterne Park Background (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N100 6 Sandringham Road
N171 132 Newton Road

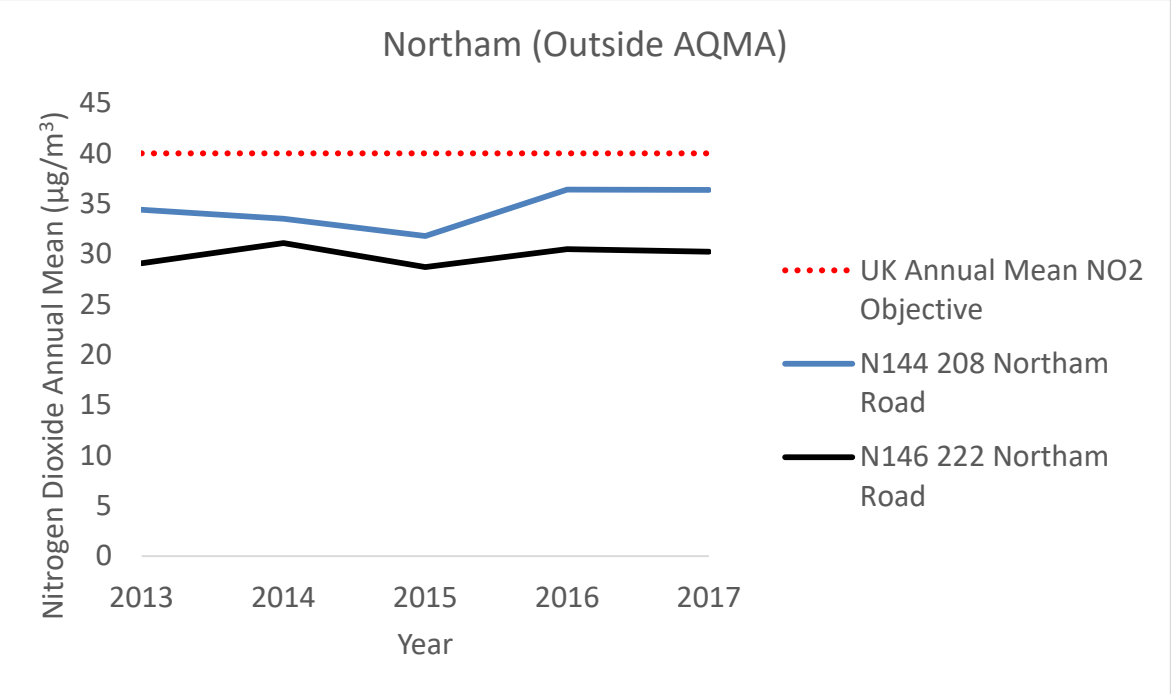

Redbridge (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
60
50
40
30
20
10
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N101 Redbridge School Fence
N178 2 Gover Road
N184 Redbridge New AMS
N185 Redbridge Causeway 1
N186 Redbridge Causeway 2

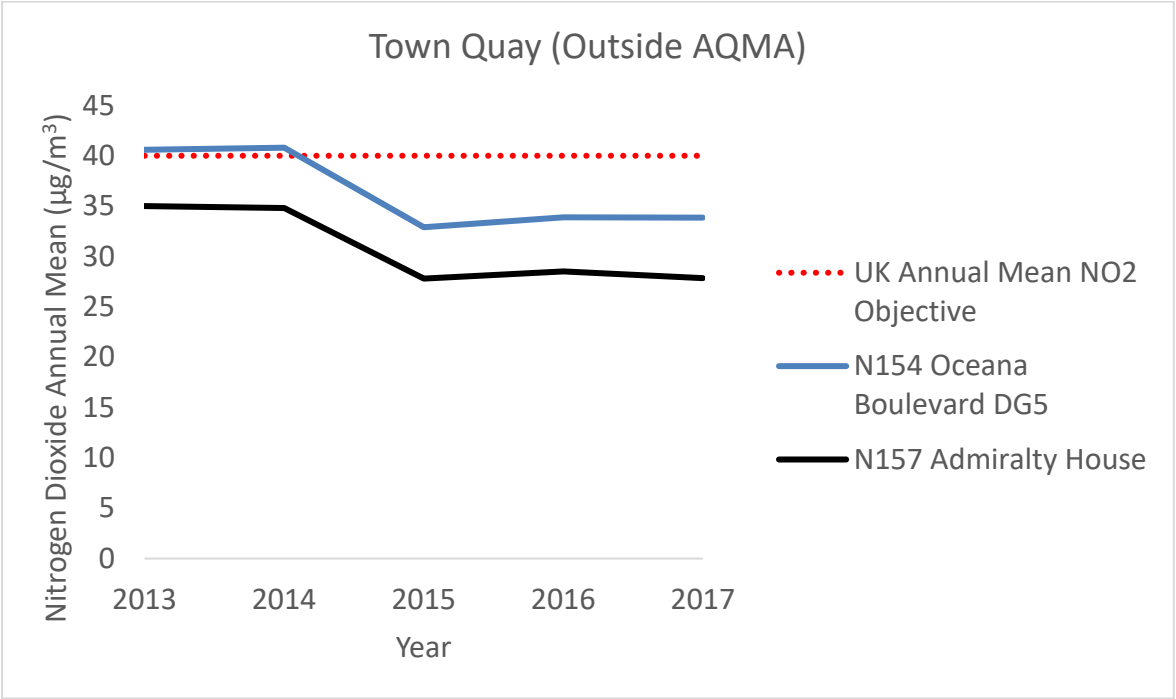

Portswood (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
60
50
40
30
20
10
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N161 30 Addis Square
N162 263A Portswood Road
N163 285 Portswood Road
N164 168 Portswood Road(Int.Food)
N165 8 The Broadway

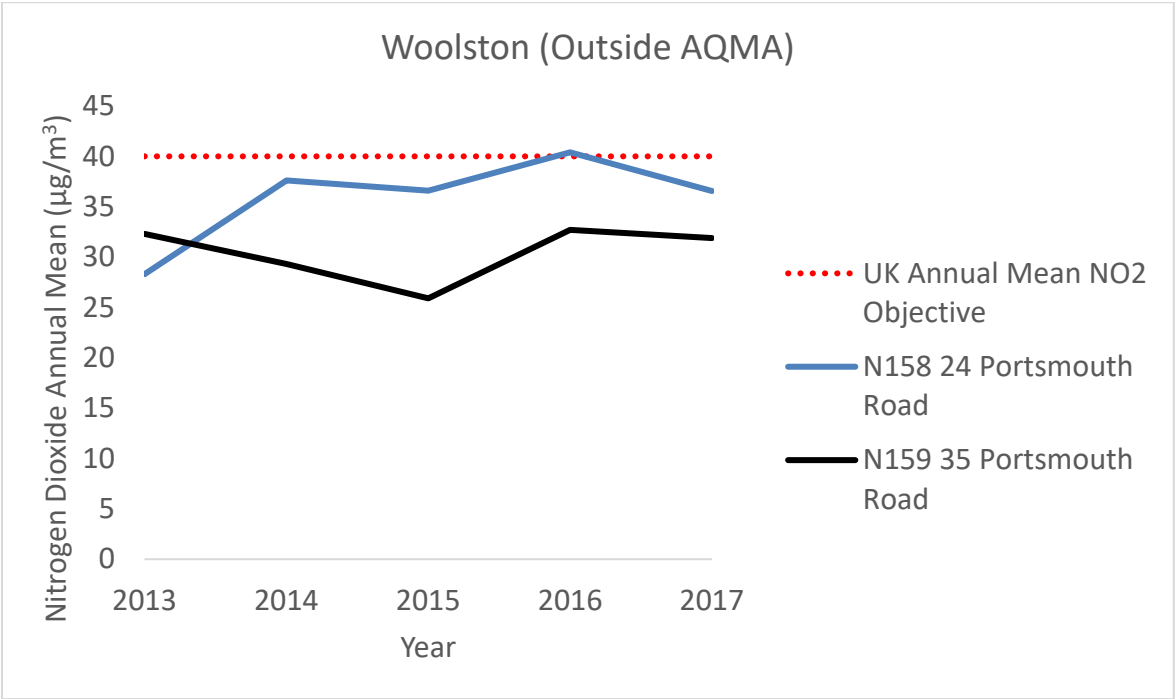

Romsey Road (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N106 2 Romsey Road, Oakhill
N143 102 Romsey Road
N167 13 Romsey Road
N168 23 Romsey Road


Shirley High Street (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N175 38 Shirley High Street should be N187?)
N176 Salisbury Arms, Shirley High Street


Central/Northam (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
50
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N110 Brintons Road 1
N111 Brintons Road 2
N112 Brintons Road 3
N123 102 St Andrews Road
N126 107 St Andrews Road
N172 4 New Road
N160 2 Dorset Street
CM1 Southampton Centre AURN


Northam (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N144 208 Northam Road
N146 222 Northam Road


Town Quay (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N154 Oceana Boulevard DG5
N157 Admiralty House


Woolston (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N158 24 Portsmouth Road
N159 35 Portsmouth Road

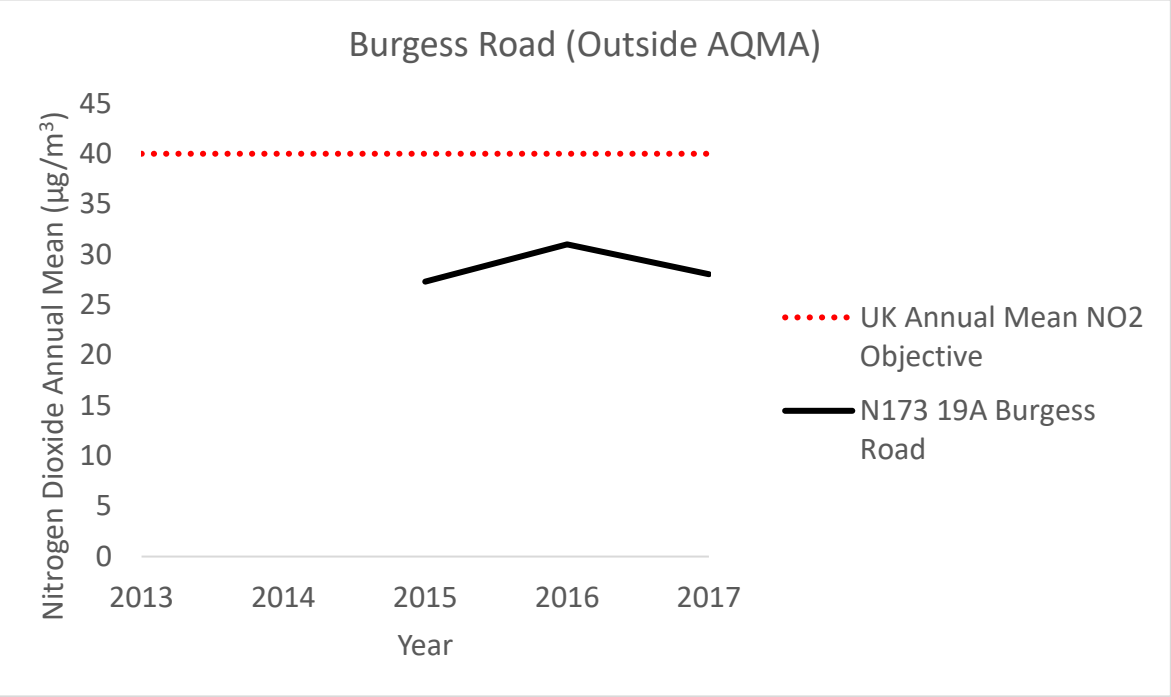

Burgess Road (Outside AQMA)
Nitrogen Dioxide Annual Mean (µg/m³)
45
40
35
30
25
20
15
10
5
0
2013
2014
2015
2016
2017
Year
UK Annual Mean NO2 Objective
N173 19A Burgess Road

Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1 Hour Means > 200µg/m^3 (3)				
					2013	2014	2015	2016	2017
CM1	Urban Centre	Automatic	93	93	0	0	3	0 (111)	0
CM4	Roadside	Automatic	97	97	0	2	0 (118)	6	0
CM6	Roadside	Automatic	73	73	1	5 (152)	5	8 (185)	9 (178)
CM7	Roadside	Automatic	93	93				0	0

Notes:

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(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%).

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

Figure A.2 – Trends in Number of NO_2 1-Hour Means > 200 µg/m^3

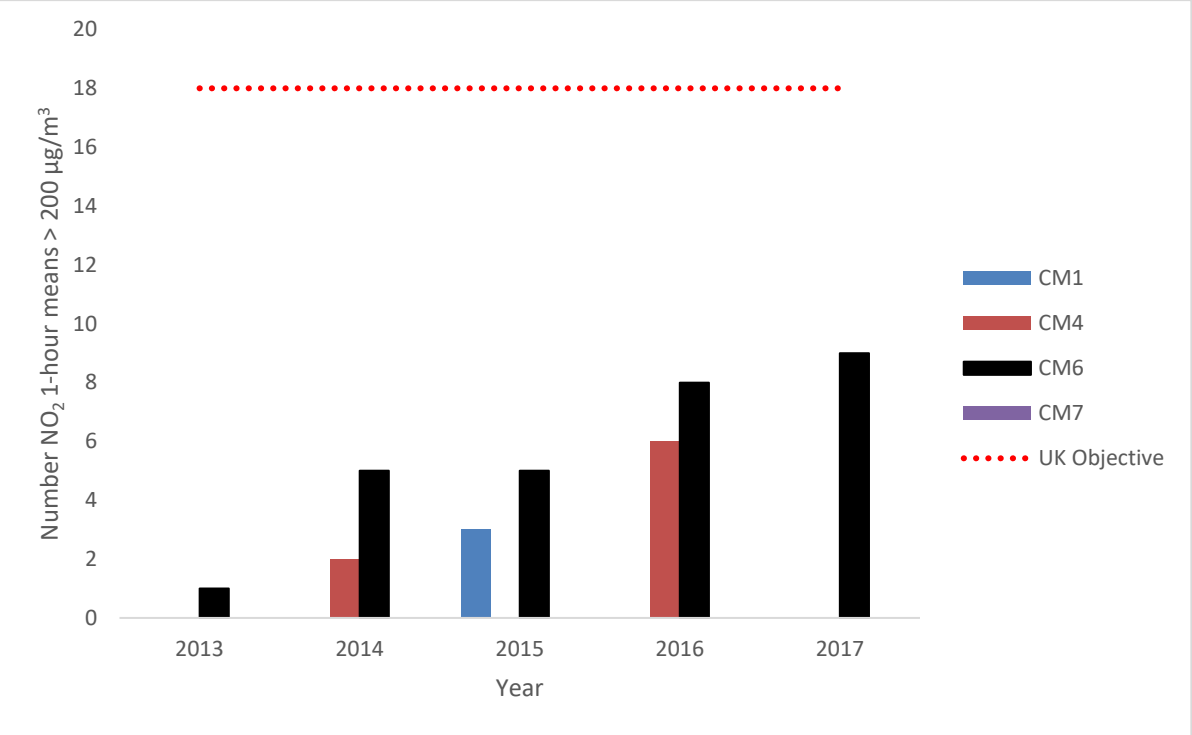


Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2013	2014	2015	2016	2017
CM1	Urban Centre	86	86	21.0	20.9	16.5		16.8
CM7	Roadside	93	93				21.7	19.4

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

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

(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%).

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.3 – Trends in Annual Mean PM_{10} Concentrations

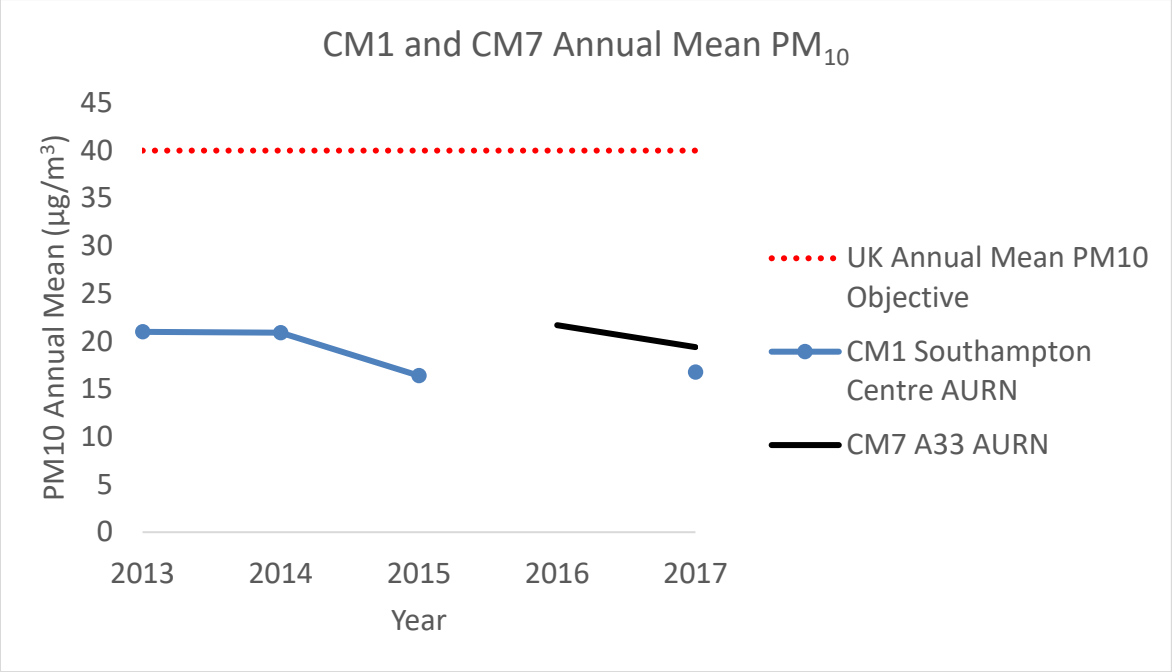


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} 24 Hour Means > 50µg/m^3 (3)				
				2013	2014	2015	2016	2017
CM1	Urban Centre	85.8	85.8	3	5	4	0 (26.6)	1
CM7	Roadside	89.3	89.3				2 (33.3)	2

Notes:

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

(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%).

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

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results >50µg/m^3

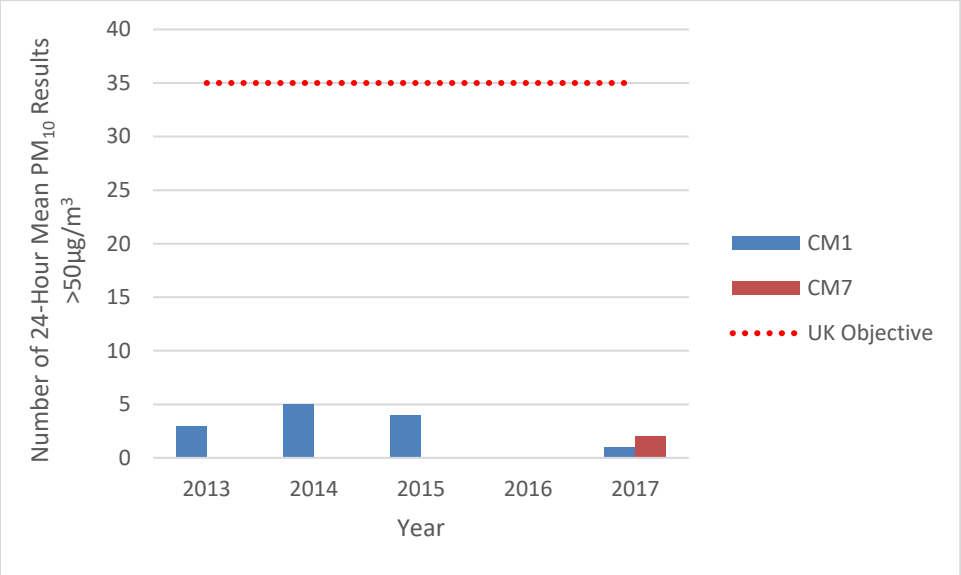


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2013	2014	2015	2016	2017
CM1	Urban Centre	89	89	15.0	14.7	10.0		11.2

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

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

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

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

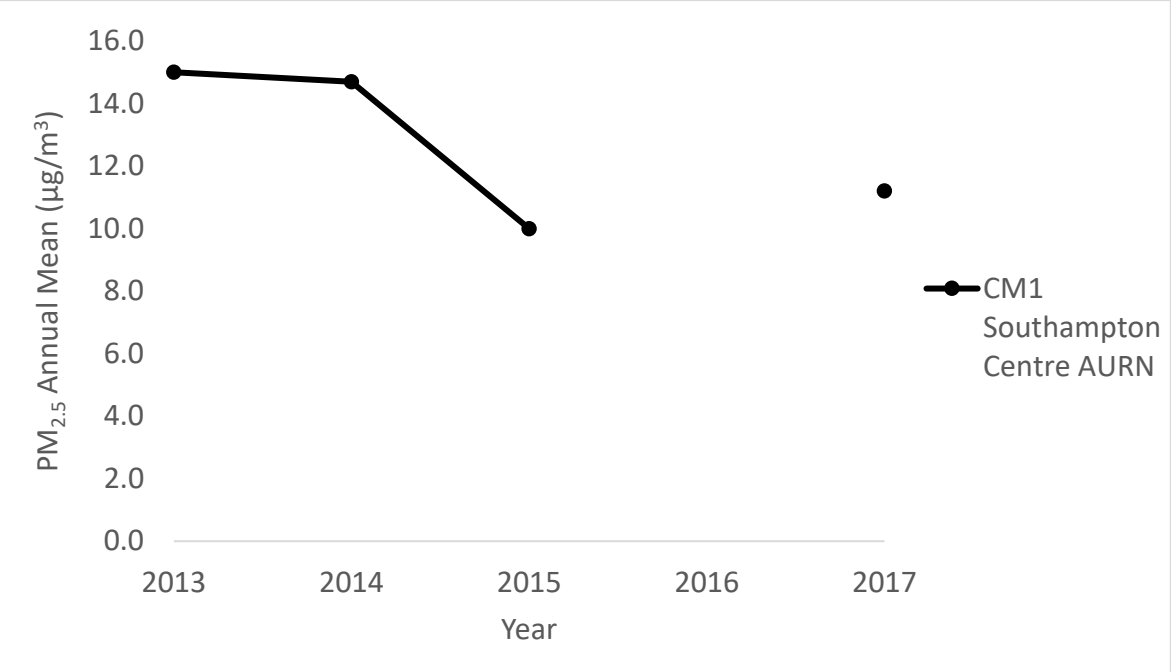


Table A.8 – SO_2 Monitoring Results

Site ID	Site Type	Valid Data Capture for monitoring Period (%) [1]	Valid Data Capture 2017 (%) [2]	Number of Exceedances 2017 (percentile in bracket) [3]		
				15 minute Objective (266 µg/m^3)	1 hour Objective (350 µg/m^3)	24 hour Objective (125 µg/m^3)
CM1	Urban Centre	90	90	0	0	0

Notes:

Exceedances of the SO_2 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)

(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%).

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

Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2017

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Time Weighted Annual Mean		
													Raw Data	Bias Adjusted (0.87) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
N100	33.2	22.5	19.6	15.1	14.8	13.4	16.2	15.1	14.7	22.1	26.2	20.9	19.2	16.7	
N101	75.1	54.4	67.6	50.5	46.7	35.8	47.4	50.6	57.6	57.5	64.9	57.4	55.4	**48.2**	
N102	52.6	57.1	37.2	27.8	32.8	29.9	27.0	27.7	32.4	35.3	39.9	32.3	35.5	30.9	
N103	49.6	37.6	42.8	30.7	35.0	29.5	30.6	32.5	35.4	39.1	35.5	38.3	36.2	31.5	
N104	58.2	50.5	39.6	37.1	46.5	36.4	40.7	34.7	42.6	42.2	41.7	25.0	41.0	35.6	
N106	52.8	41.3	49.0	38.1	43.0	40.2	41.3	40.1	36.9	43.9	40.0	35.2	41.7	36.3	
N107	68.8	65.8	53.0	43.2	51.5	42.2	50.4	49.6	52.0	56.1	62.6	32.6	52.0	**45.3**	**44.4**
N109	61.6	54.3	42.4	38.4	44.1	32.2	36.5	35.7		42.6	44.1	38.4	42.1	36.6	36.4
N110	47.0	36.3	32.2	24.7	31.9	24.0	28.1	27.9	31.5	35.5	31.8	37.0	31.9	27.7	
N111	46.5	36.4	29.1	25.3	31.2	25.0	28.8	27.9	33.9	34.5	34.3	32.7	31.7	27.5	
N112	48.4	38.4	29.2	25.9	33.7	26.3	27.5	29.7	31.0		33.9	34.6	32.0	27.8	
N113	50.3	41.2	41.2	41.3	31.8	37.4	34.5	34.2	36.1	43.8	52.2	40.4	40.5	35.2	
N114	53.7	40.3	44.4	35.6	35.8	40.4	33.8	32.0	35.6	40.5	42.5	38.4	39.5	34.4	
N115	45.8	48.1	51.3	36.5	44.5	46.8	38.1	32.7	36.5	40.4	39.1	36.1	41.3	35.9	
N116	51.6	40.0	36.4	40.7	44.0	31.6	38.2	36.0	38.1	38.0	43.1	38.1	39.5	34.3	

N117	50.1	39.4	40.9	34.6	36.8	40.9	34.5	37.3	36.7		43.2	38.4	39.4	34.2	
N118	60.4	51.2	38.5	34.9	39.8	26.2	32.1		35.3	41.7	41.1	37.0	39.2	34.1	
N120	61.6	42.7	44.9	47.3	44.4	43.1	41.8	43.0	41.8	47.1	49.1	45.2	46.0	**40.0**	
N122	44.5	37.5	42.2	30.5	34.5	29.7	30.6	33.7	33.5	36.5	41.1	42.2	36.3	31.6	
N123	54.3	38.8	40.2	32.6	39.1	27.6	31.5	13.8	37.1	39.0	38.4	33.9	34.9	30.3	
N124	53.6		38.5	37.9	42.8	36.4	38.8	35.9	36.0	41.1	47.7	39.9	40.7	35.5	
N125	55.8	38.6	41.2	40.2	35.0	43.1	33.7	34.3	33.4	34.9	43.4	41.1	39.7	34.5	
N126	55.3	42.6	34.1	35.9	35.6	30.8	33.3	32.3	30.5	40.8	42.6	36.3	37.1	32.3	
N129	45.8	34.2	31.2		33.6	37.9	29.5	30.6	29.9	34.9	37.9	35.7	34.7	30.2	
N130	53.6	48.5	52.2	38.2	51.2	44.9	43.7	38.7	53.0	47.6	48.1	46.7	46.9	**40.8**	
N131	52.9	41.2	48.1	42.4	42.8	26.8	41.9	37.3	34.2	41.5	40.2	39.8	40.5	35.2	
N133	43.9	35.1	37.5	29.7	33.7	28.3	30.4	29.1	34.1	36.3	37.4	32.1	33.8	29.4	
N134	55.7	41.4	48.6	43.1	44.1	34.5	35.3	35.1	40.8	40.2	41.5	40.7	41.5	36.1	
N138	67.5	33.3	56.3	39.2	54.6	44.7	46.7	42.6	40.7	43.8	51.2	41.5	46.4	**40.4**	
N140	61.3	55.8	63.2	46.2	54.7	44.3	52.1	48.6	54.4	52.7	53.3	39.9	52.2	**45.4**	**43.1**
N141	48.6	37.1	38.5	43.8	41.1	41.9	33.2	33.5	28.2	34.9	41.8	30.9	37.9	33.0	
N143	48.6	41.2	46.4	40.2	40.4	36.4	37.7	36.0	43.3	42.7	46.7	40.8	41.6	36.2	
N144	52.4		43.1	38.0	32.1	44.5	36.0	36.7	35.4	43.1	49.0	47.5	41.8	36.4	
N146	44.8	35.3	33.7	30.7	31.8	34.8	30.0	29.0	32.9	34.9	40.3	38.5	34.7	30.2	
N149	51.2	41.1	36.2	24.1	29.6	29.3	30.7	28.5	20.2	37.5	38.2	31.7	32.8	28.5	
N151	48.5	40.5	47.5	42.6	44.0	42.4	40.9	39.6	37.9	42.9	48.3	44.5	43.3	37.6	
N152	64.9	51.7	54.7	54.6	53.2	46.4	48.7	50.2	49.9	52.4	57.8	46.8	52.6	**45.8**	
N153	47.5	36.1	36.8	30.6	42.1	30.2	35.5	33.8	29.5	30.0	29.7	31.0	34.3	29.8	
N154	50.6	34.6	39.2	32.6	33.9	39.6		37.6	34.3	39.2	46.5	37.8	38.9	33.8	
N157	41.8		32.5	28.1	25.4	29.7	27.7			32.7	37.9	31.2	32.0	27.8	
N158	51.0	45.5	40.2	37.8	44.1	41.5	33.7	36.8	40.5	43.0	45.8	45.5	42.0	36.6	
N159	48.5	36.0	35.8	40.6	33.5	32.3	30.2	33.6	37.3	38.2	43.1	29.4	36.6	31.9	

N160	52.6	40.4	34.5	31.4	34.6	22.1	29.1	26.7		52.8	35.7	59.7	37.4	32.6	
N161	54.3	40.9	35.5	36.0	28.7	29.1	28.2	31.6	31.7	31.2	42.2	34.8	35.0	30.4	
N162	60.8	44.0	32.8	40.7		43.0		37.0	42.9	43.4	45.4	45.8	42.9	37.4	
N163	45.2	38.0	43.2	31.2	28.0	28.7	24.4	25.0	29.2	36.5	36.5	32.3	33.0	28.7	
N164	56.5	46.0	41.1	32.2	35.2	34.7	34.8	31.8	34.0	37.8	38.2	30.2	37.3	32.4	
N165	55.7	39.7	38.1	33.1	36.7	32.1	34.9	28.1	33.4	38.6	37.3	31.7	36.1	31.4	
N166	59.0		40.8	34.4	41.1	34.8	33.6	37.9	39.1					36.0	
N167	56.1	38.6	43.8	48.0	40.3	33.5	30.2	33.2	33.5	35.7	45.9	36.4	39.6	34.5	
N168	61.4	35.8	46.1	48.0	42.4	33.6	32.1	33.3	36.4	37.8	49.5	39.0	41.3	35.9	
N169	61.9	47.2	56.3	47.2	53.5	43.3	50.5	43.3	49.3	48.6	49.5	44.9	49.4	**43.0**	
N170	57.7	44.7	48.9	46.4	41.6	44.8	38.9	42.3	43.5	46.6	50.3		46.1	**40.1**	
N171	34.6	23.8	21.7	16.1	16.3	14.7	14.1	14.5	16.6	22.1		47.2	21.6	18.8	
N172	62.5	55.7	55.8	42.7	50.8	39.7	33.6	50.0	47.8		53.5	44.7	48.4	**42.1**	
N173	44.6	36.9	34.3	26.6	33.6	27.9	31.1	29.8	30.3	33.8	34.2	28.3	32.2	28.1	
N174	58.1	45.8	48.7	44.5	45.9	54.8	42.5	39.0	41.8	48.2	50.5	46.0	47.3	**41.2**	
N175	62.7	44.4	42.3	40.2	41.3	42.4		41.0	36.9	45.3	48.5	46.3	44.7	38.9	
N176	61.9	41.2	49.0	41.5	47.3	33.6	33.7	36.1	33.1	38.4	40.8	33.9	40.7	35.5	
N177	62.1	49.2	38.6	44.5	48.7	35.7	40.6	38.1	36.5	38.1	43.4	42.6	43.1	37.5	
N178	38.6	29.3	32.3	26.0	34.2	24.3	27.0	24.1	24.9	28.1	26.6	24.5	28.2	24.5	
N180	66.9		45.3	35.4	46.3	38.8	41.0		48.4	47.7	46.2	40.2	45.6	39.7	38.9
N184		56.0		38.0	46.9	40.3	41.2	37.0	39.8	80.7	56.3	46.6	48.0	**41.8**	
N185	70.0	70.2	61.1	58.8	53.0	37.3	50.7	55.7	49.4	48.3	71.1	68.4	57.8	**50.2**	
N186	62.8		41.1	53.3	48.4	36.0	35.0	43.9	39.5	42.2	50.0	41.1	44.9	39.0	

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **Where applicable, data has been distance corrected for relevant exposure**

Notes:

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

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

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC of Diffusion Tube Monitoring

Southampton use Gradko International Ltd for the supply and analysis of diffusion tubes. They are a UKAS accredited laboratory and has been rated 'good' through the Workplace Analysis Scheme for Proficiency (WASP) as determined by the health and safety laboratory. Gradko International Ltd. also follows procedures set out in the Technical Guidance LAQM.TG16.

SCC undertake diffusion tube monitoring and subsequent review and assessment of data in accordance with the LAQM TG16.

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 webpages[6].

CM4 and CM6 are supported by Kings College London's (KCL) Environmental Research Group which includes six-monthly UKAS-accredited, to ISO 17025, independent equipment audits by NPL which exceed AURN standards. Audit results used extensively in measurement ratification. King's 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 standards (for example, NO_2 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

[6] https://uk-air.defra.gov.uk/assets/documents/Data_Validation_and_Ratification_Process_Apr_2017.pdf

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 SO_2 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.

KCL 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 on site fault investigation.

Data is disseminated via www.southampton.my-air.uk. AURN data and information can be found here: https://uk-air.defra.gov.uk/networks/network-info?view=aurn.

Time Weighted Average

The exposure dates for 2017 did not follow the LAQM calendar recommendation and therefore require averaging using the time weighted method rather than the simple average calculation. This is in accordance with LAQM technical guidance paragraph 7.189. Data for AURN sites was obtained from Defra's AURN data selector website[7].

2017 Annualisation

Sites where there is less than 75% data capture require annualisation. This is therefore required for the following sites:

- N166 14 New Road – 8 months data (66% data capture)
- CM6 Victoria Road – 73% data capture

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

2017 - N166 14 New Road NO_2 Annualisation

Table 3 N166 NO_2 New Road Annualisation

Background Site	Annual Mean 2017 (Am)	N166 Period Mean (Pm)	Ratio (Am/Pm)
Southampton Centre AURN	30.2	27.7	1.092
Portsmouth AURN	19.1	17.6	1.084
Bournemouth AURN	12.5	11.4	1.095
Chilbolton AURN	11.3	12.0	0.941
Average (R_a)			1.053

Time weighted annual average NO_2 concentration: 39.3
Annualised: 39.3 x 1.053 = 41.4
Bias adjusted: 41.4 x 0.87 = **36.0 µg/m^3**

2017 - CM6 Victoria Road NO_2 Annualisation

Table 4 CM6 NO_2 Victoria Road Annualisation

Background Site	Annual Mean 2017 (Am)	CM6 Period Mean (Pm)	Ratio (Am/Pm)
Southampton Centre AURN	29.6	28.8	1.030
Portsmouth AURN	12.7	12.8	0.988
Bournemouth AURN	19.2	19.2	0.998
Chilbolton AURN	11.2	12.1	0.925
Average (R_a)			1.005

Annual average NO_2 concentration: 42.0
Annualised: 42.0 x 1.005 = **42.2 µg/m^3**

[7] https://uk-air.defra.gov.uk/data/data_selector

2016 Annualisation

Annualisation for 2016 have been reviewed and updated here. PM_{10} for CM1 Southampton Centre AURN was not annualised due to insufficient monitoring data (i.e. less than 3 months monitoring data), having only captured 31%.

2016 - CM1 Southampton Centre AURN NO_2

CM1 Southampton Centre was annualised with NO_2 hourly data from AURN background sites at Bournemouth (97% data capture), Chilbolton (89% data capture) and Portsmouth (94% data capture).

Background Site	Annual Mean 2017 (Am)	CM6 Period Mean (Pm)	Ratio (Am/Pm)
Bournemouth AURN	13.9	14.0	0.993
Chilbolton AURN	14.3	15.9	0.899
Portsmouth AURN	20.0	20.3	0.985
Average (R_a)			0.959

Annual average NO_2 concentration: 34.4
Annualised: 34.4 x 0.959 = **33.0 µg/m³**

2016 - CM7 A33 Redbridge Road AURN PM_{10}

CM7 Annualisation for 2016 undertaken for this 2017 report and shown below. In 2016, data capture at CM7 was 68%. Reading New Town is within the LAQM TG(16) recommended 50 miles, however Eastbourne is beyond this at approximately 75 miles. This is due to insufficient data capture, i.e. below 85% at Chilbolton (82%), Portsmouth (67%) and Oxford St Ebbes (21%) for hourly measured PM10 in 2016. This annualisation factor is not significantly different, this approach is therefore considered appropriate.

Table 5 CM7 PM_{10} 2016 Annualisation

Background Site	Annual Mean 2017 (Am)	CM6 Period Mean (Pm)	Ratio (Am/Pm)
Reading New Town AURN	13.2	13.5	0.976
Eastbourne AURN	17.8	17.2	1.034
Average (R_a)			1.005

Annual average NO_2 concentration: 21.6
Annualised: 21.6 x 1.005 = **21.7 µg/m³**

Diffusion Tube Bias Adjustment Factors

The nitrogen dioxide diffusion tubes were supplied and analysed by Gradko International Ltd. The preparation method used for the diffusion tubes was 20% TEA (triethanolamine) in water. The national bias adjustment factor for Gradko using the preparation method of 20% TEA in water (2017) was 0.87. The use of the national bias adjustment was chosen at it is consistent with previous Southampton City Council ASR reporting.

The Southampton City Council bias adjustment factor was calculated from the Southampton Centre AURN urban centre location and is not considered representative of the wider survey that is primarily roadside locations (LAQM technical guidance paragraph 7.198).

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/19

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2019

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1:	Step 2:	Step 3:	Step 4:
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[3]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2017		Overall Factor[3] (39 studies)				Use		0.87

Figure 4 National diffusion tube bias adjustment factor spreadsheet

Distance Correction

Paragraph 7.78 of the LAQM technical guidance requires the use of the NO_2 fall-off with distance from calculator available at the LAQM website[8] where diffusion tubes do not represent exposure. All locations that are above annual objective and are not representative of exposure should be corrected for distance. It is also recommended that locations within 10% of the annual objective (i.e. above 36 µg/m^3) and are not representative of exposure should be corrected for distance. The following sites for 2017 require correction for distance:

- N107 Cranbury Place - Above annual objective and not representative of exposure.

[8] https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

- N109 72 Bevios Valley – Within 10% of the annual objective and not representative of exposure.
- N140 5 Commercial Road - Above annual objective and not representative of exposure.
- N180 Opposite 5 Commercial Road - Within 10% of the annual objective and not representative of exposure.

N152 M271 has not been corrected for distance to relevant exposure as the distance is above 20m and between the two locations is a verge, fence and trees. It is therefore not considered appropriate to apply this calculation.

N170 Union Castle House and N184 Redbridge Road Automatic Monitoring Station have not been corrected for distance as there is no relevant exposure with in 20m.

N185 Redbridge Causeway 1 has not been corrected for distance as the relevant exposure is at a different elevation to the diffusion tube and is beyond 20m.

N186 Redbridge Causeway 2 has not been corrected for distance due to the difference in elevation of the tube and the relevant exposure. There is also a row of trees between the two locations.

The background value used for the corrections is 29.7 µg/m^3 (93% data capture) from the City Centre AURN urban background 2017 annual mean as this site is similarly located on the west side of Southampton and best represents background conditions. The AURN background NO_2 concentration is higher than the LAQM background maps for all locations corrected and therefore also represents a worst case scenario.

Distance Correction Calculations:

Enter data into the pink cells

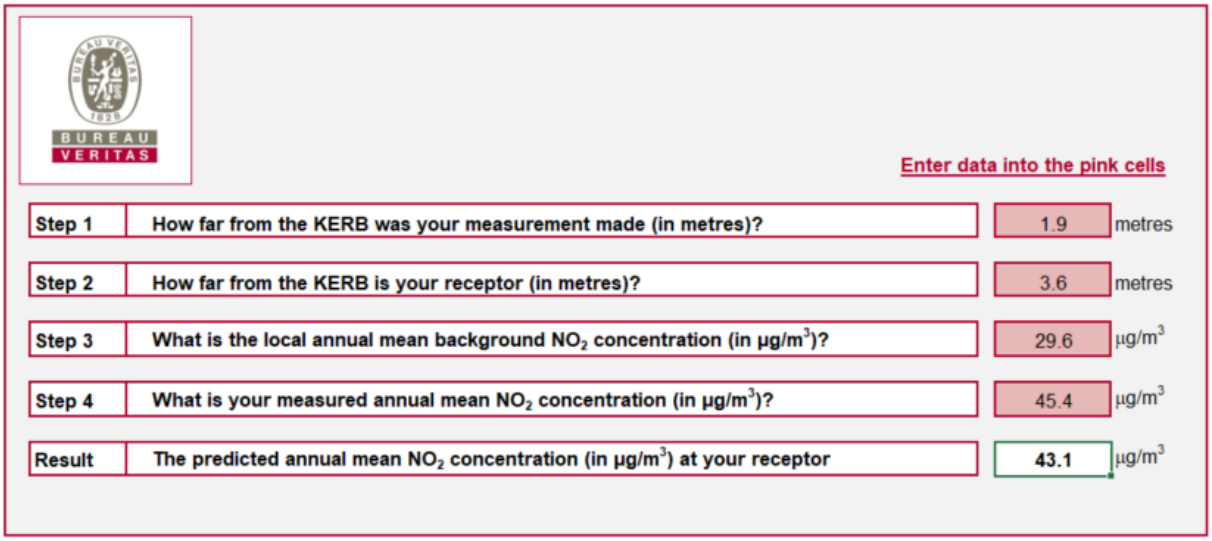
Step 1	How far from the KERB was your measurement made (in metres)?	1.8	metres
Step 2	How far from the KERB is your receptor (in metres)?	2.3	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	29.6	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	45.3	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	44.4	µg/m^3

Figure 5 N107 Cranbury Place NO_2 fall off with distance from road calculation

Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	3.6	metres
Step 2	How far from the KERB is your receptor (in metres)?	4.1	metres
Step 3	What is the local annual mean background NO_2 concentration (in µg/m^3)?	29.6	µg/m^3
Step 4	What is your measured annual mean NO_2 concentration (in µg/m^3)?	36.6	µg/m^3
Result	The predicted annual mean NO_2 concentration (in µg/m^3) at your receptor	36.4	µg/m^3

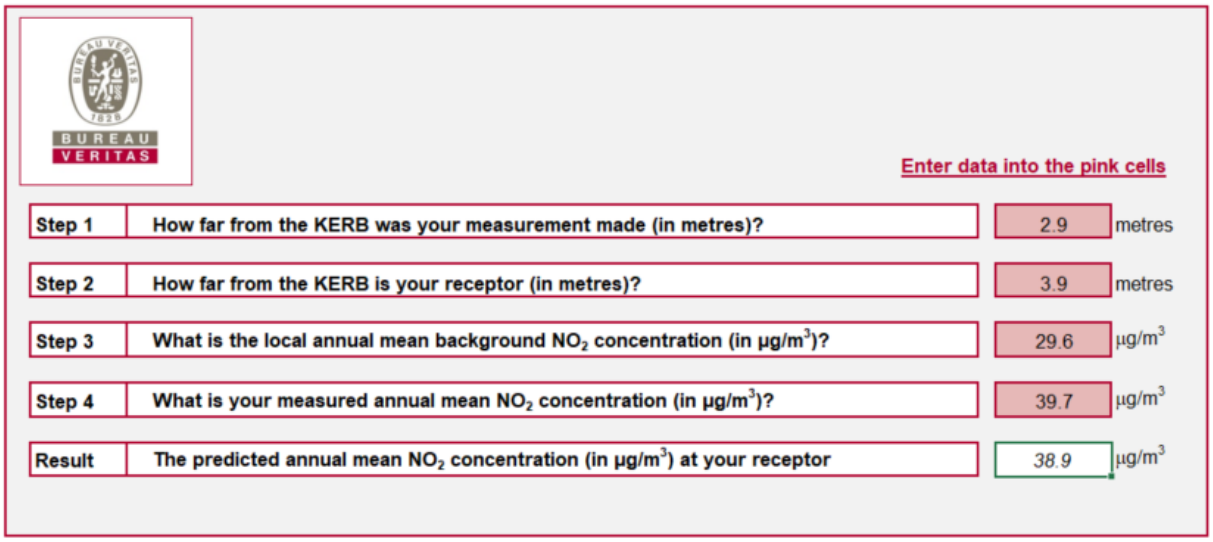
Figure 6 N109 72 Bevois Valley NO_2 fall off with distance from road calculation



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	1.9	metres
Step 2	How far from the KERB is your receptor (in metres)?	3.6	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	29.6	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	45.4	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	43.1	$\mu g/m^3$

Figure 7 N140 5 Commercial Road NO_2 fall off with distance from road calculation



Enter data into the pink cells

Step 1	How far from the KERB was your measurement made (in metres)?	2.9	metres
Step 2	How far from the KERB is your receptor (in metres)?	3.9	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	29.6	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	39.7	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	38.9	$\mu g/m^3$

Figure 8 N180 Opposite 5 Commercial Road NO_2 fall off with distance from road calculation

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

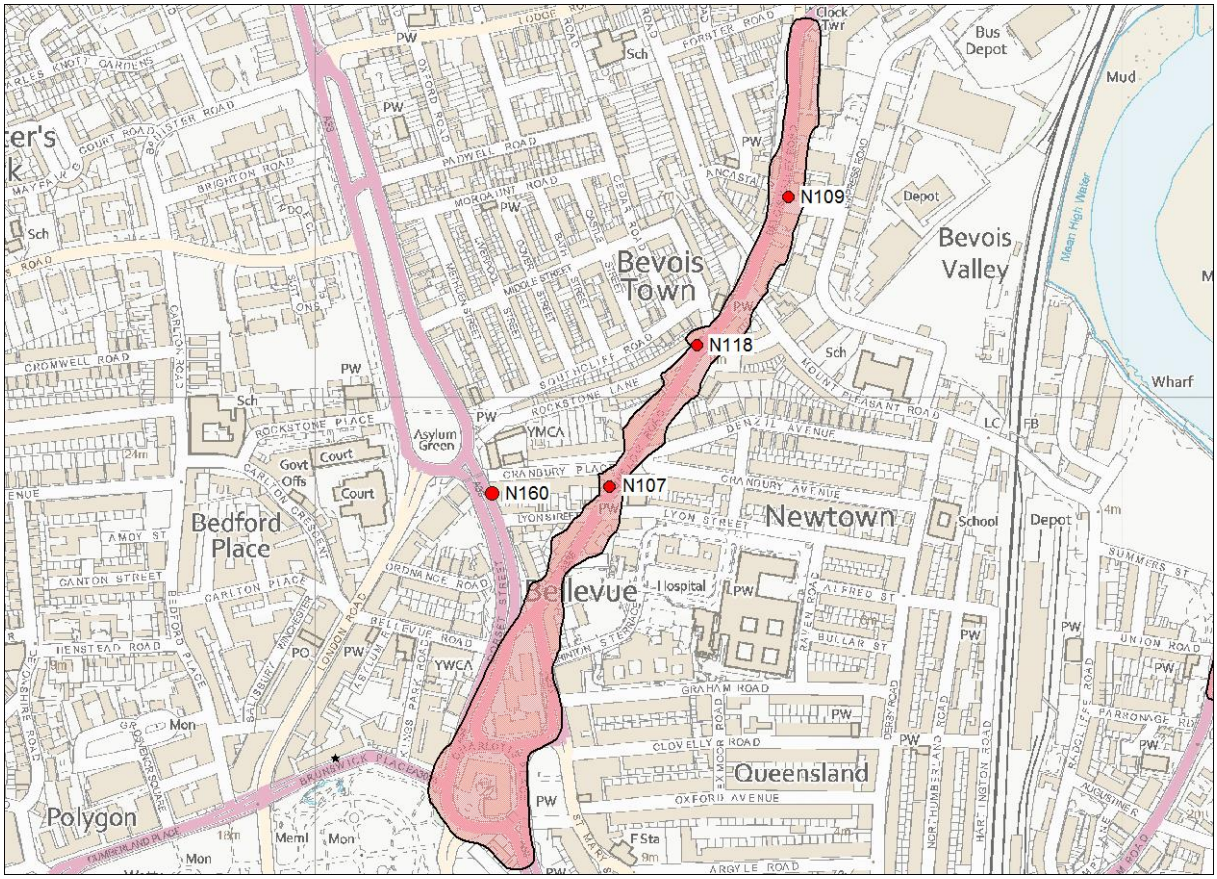


Figure 9 AQMA No. 1 Bevois Valley boundary and NO_2 diffusion tube locations

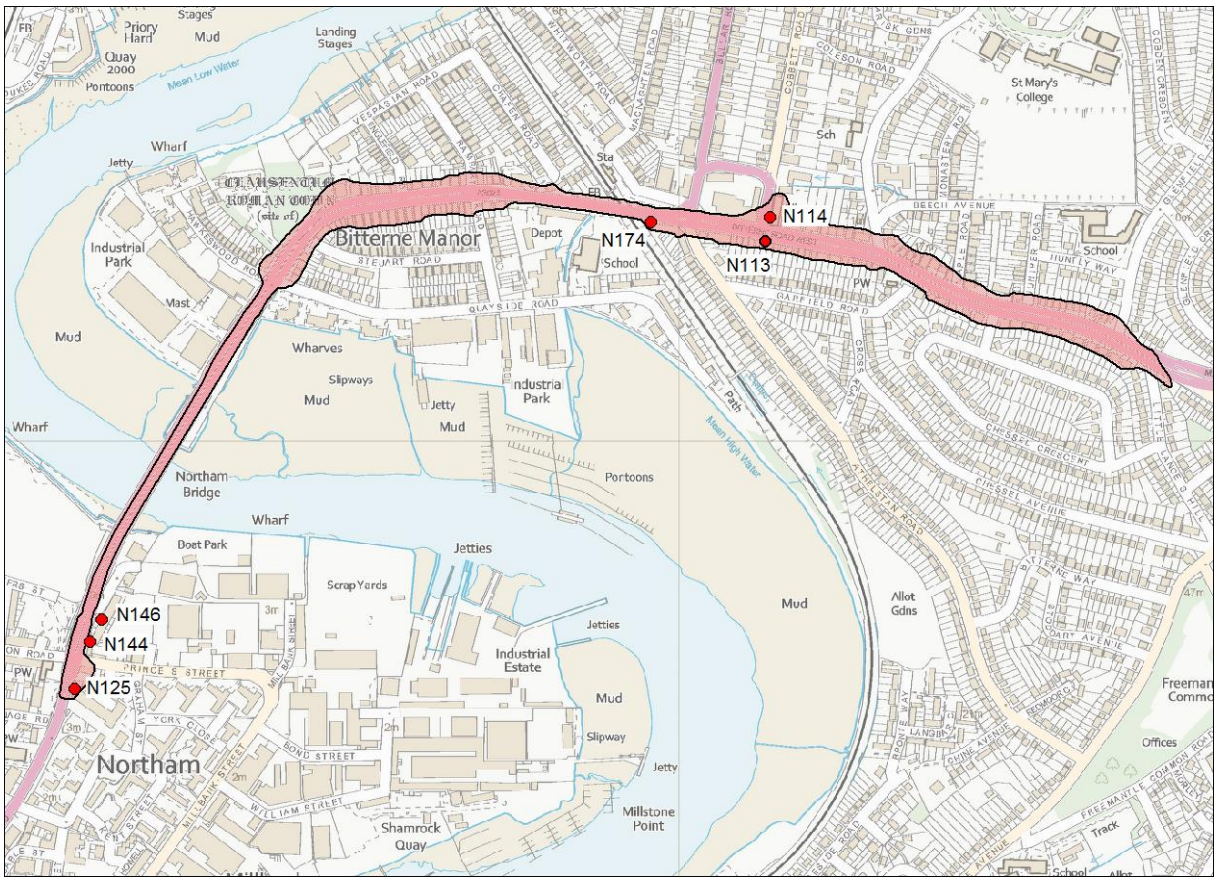


Figure 10 AQMA No. 2 Bitterne Road boundary and NO_2 diffusion tube locations

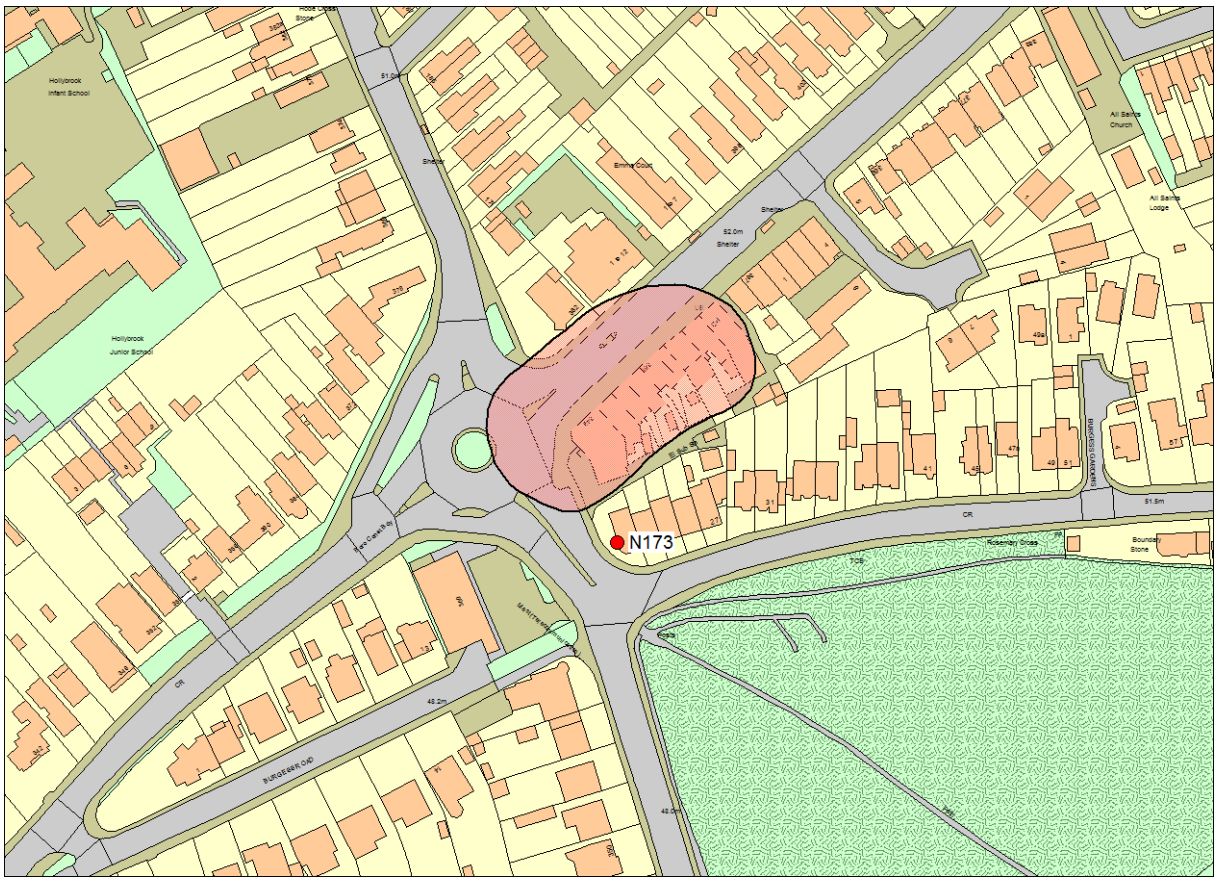


Figure 11 AQMA No. 3 Winchester Road boundary and NO_2 diffusion tube locations

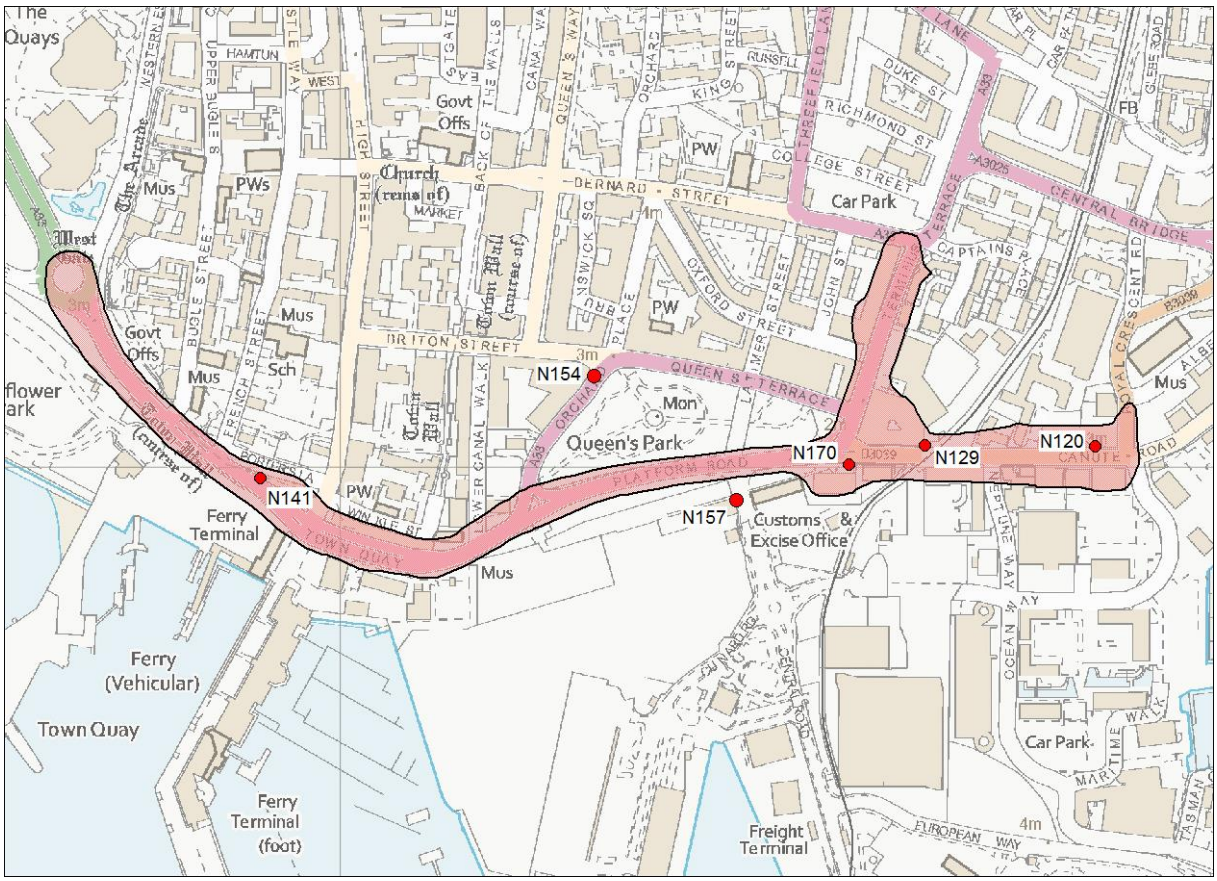


Figure 12 AQMA No. 4 Town Quay boundary and NO_2 diffusion tube locations

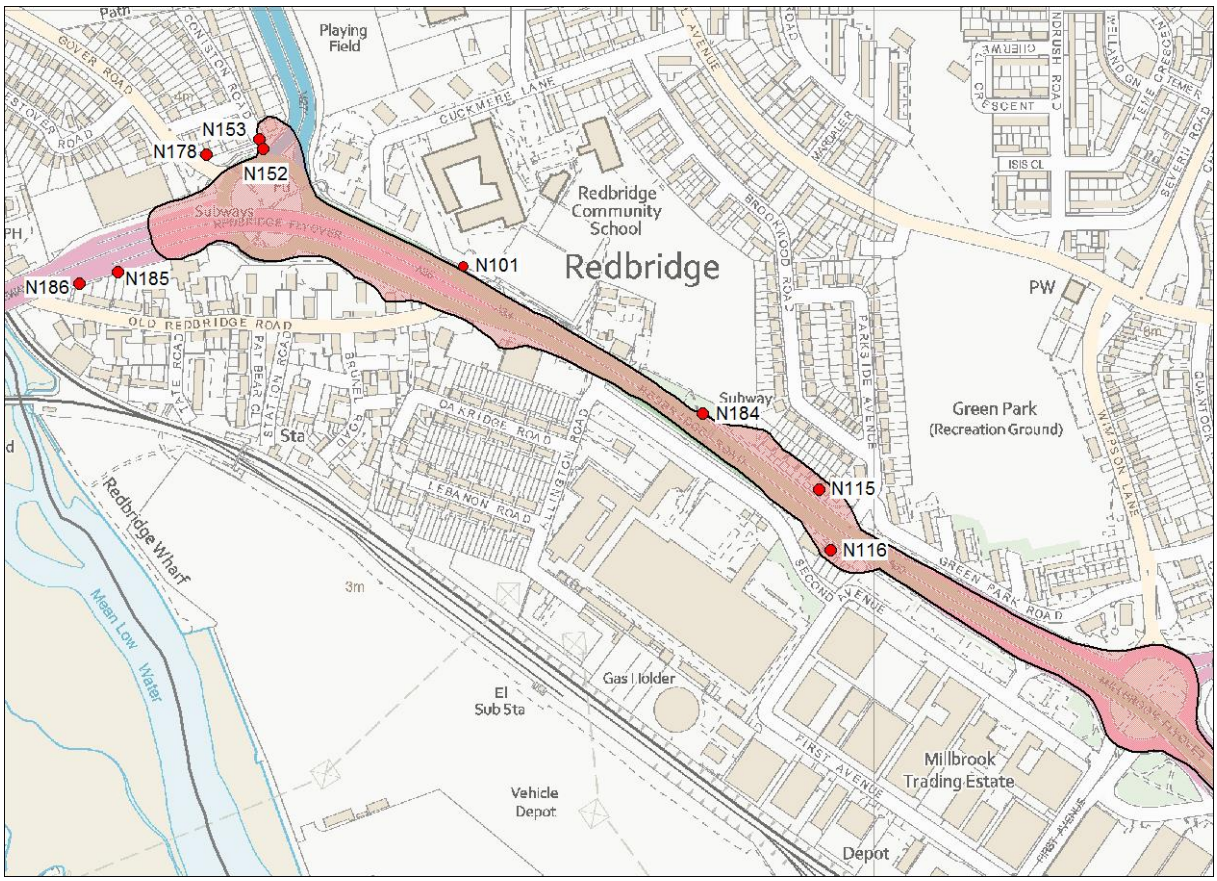


Figure 13 AQMA No. 5 (1) Redbridge Road to Millbrook Flyover boundary and NO_2 diffusion tube locations

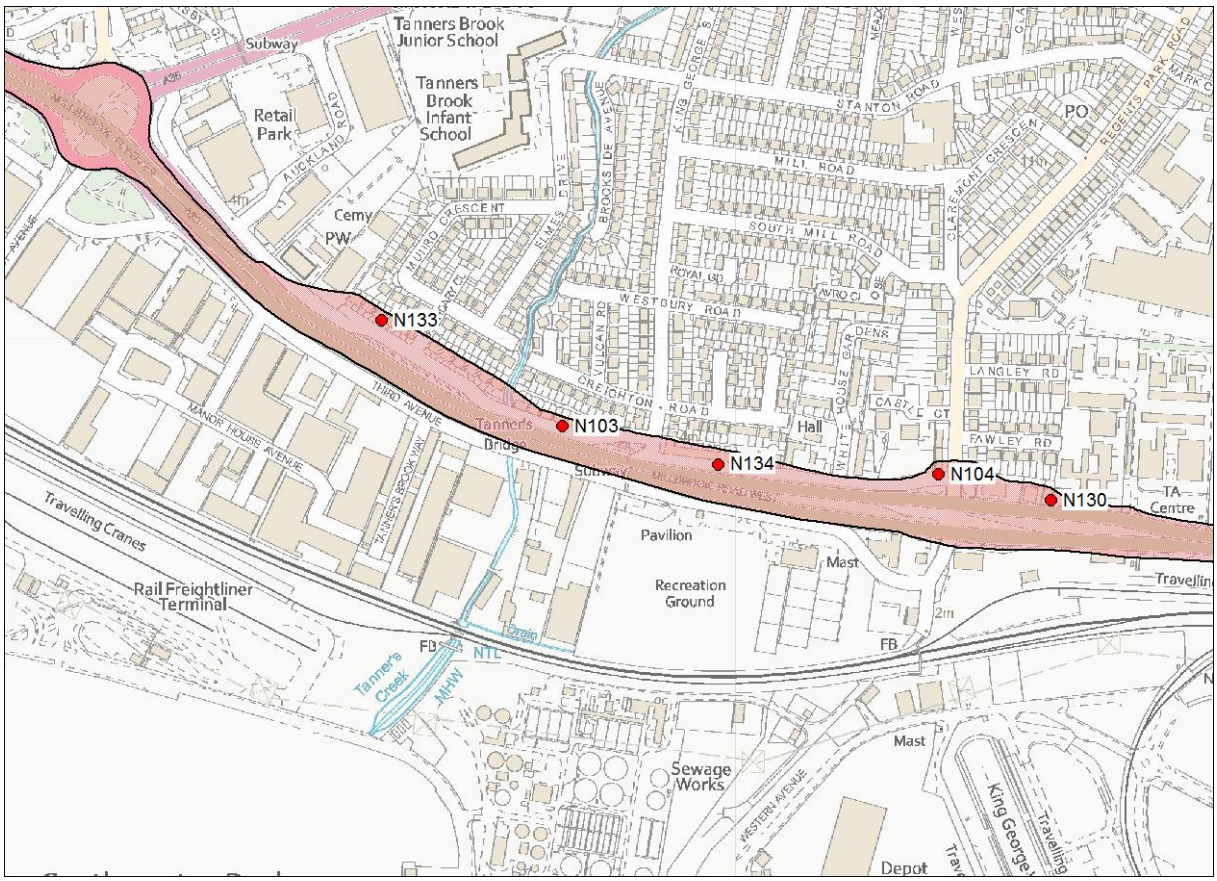


Figure 14 AQMA No. 5 (2) Millbrook Flyover to Millbrook Road West boundary and NO_2 diffusion tube locations

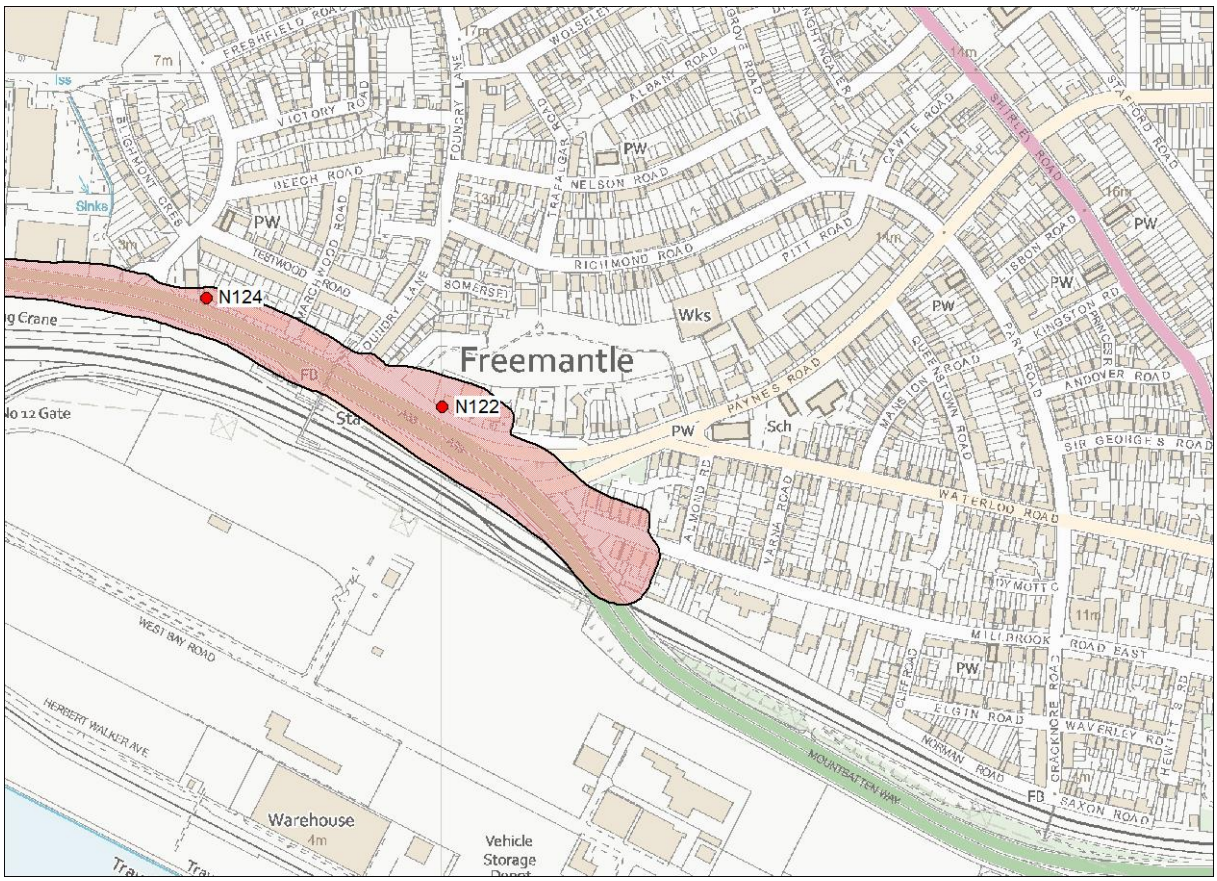


Figure 15 AQMA No. 5 (3) Millbrook Road West to Mountbatten Way boundary and NO_2 diffusion tube locations

Figure 16 AQMA No. 6 Romsey Road boundary and NO_2 diffusion tube locations

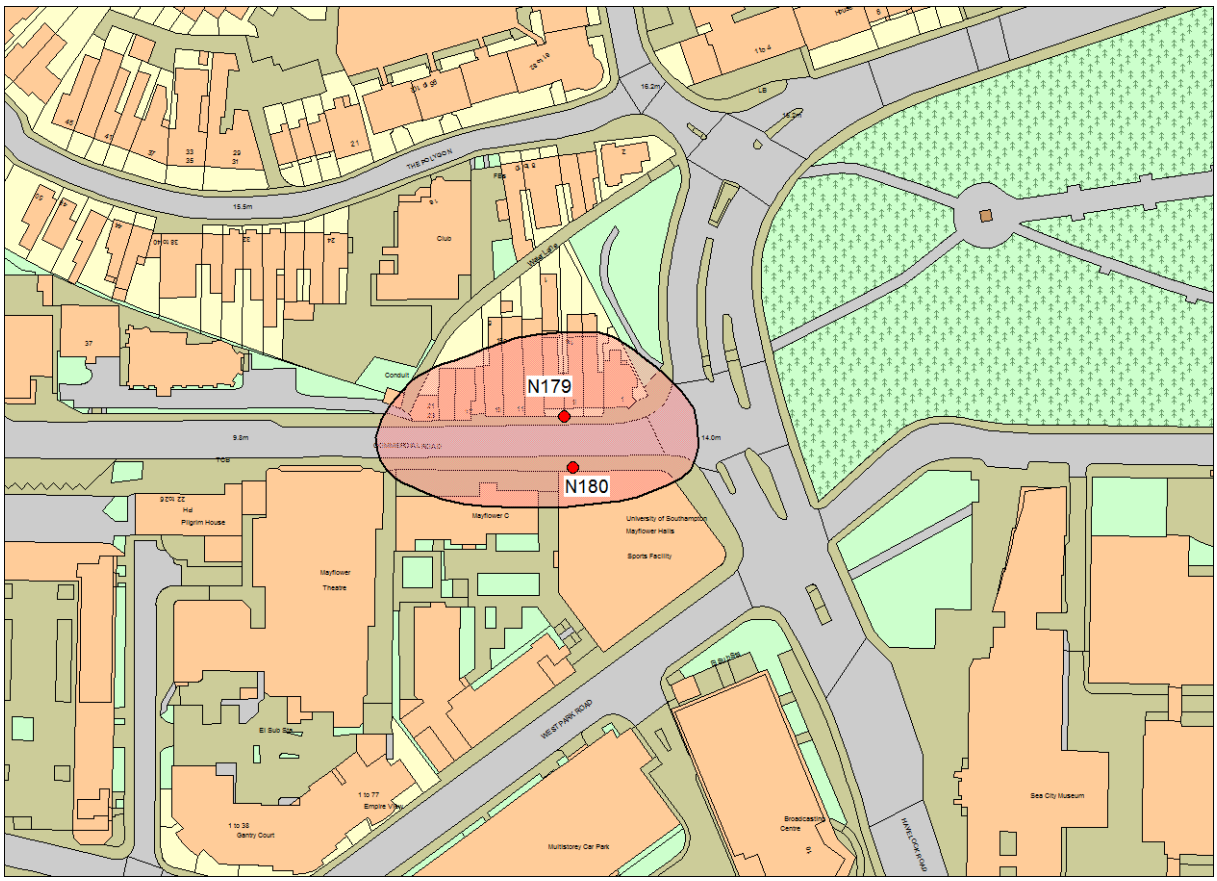


Figure 17 AQMA No. 8 Commercial Road boundary and NO_2 diffusion tube locations

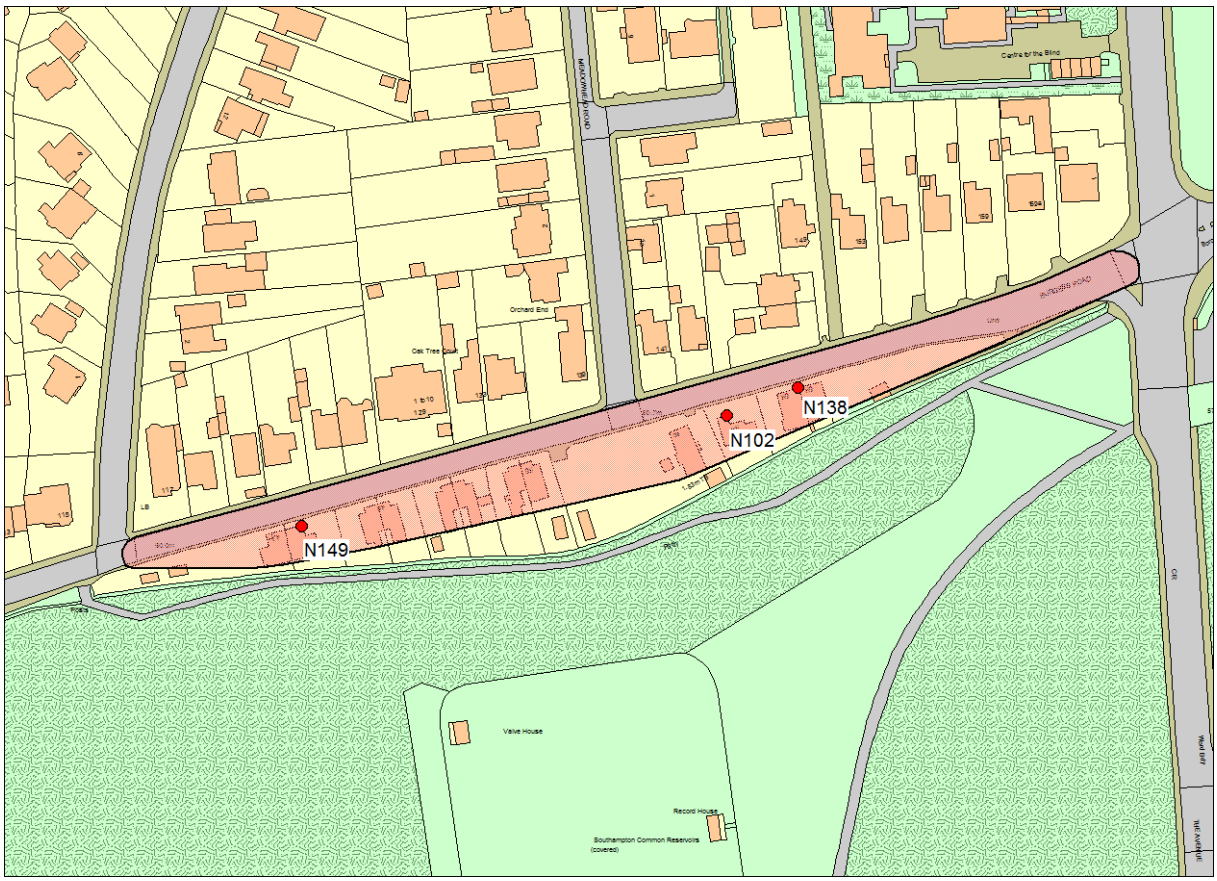


Figure 18 AQMA No. 9 Burgess Road boundary and NO_2 diffusion tube locations

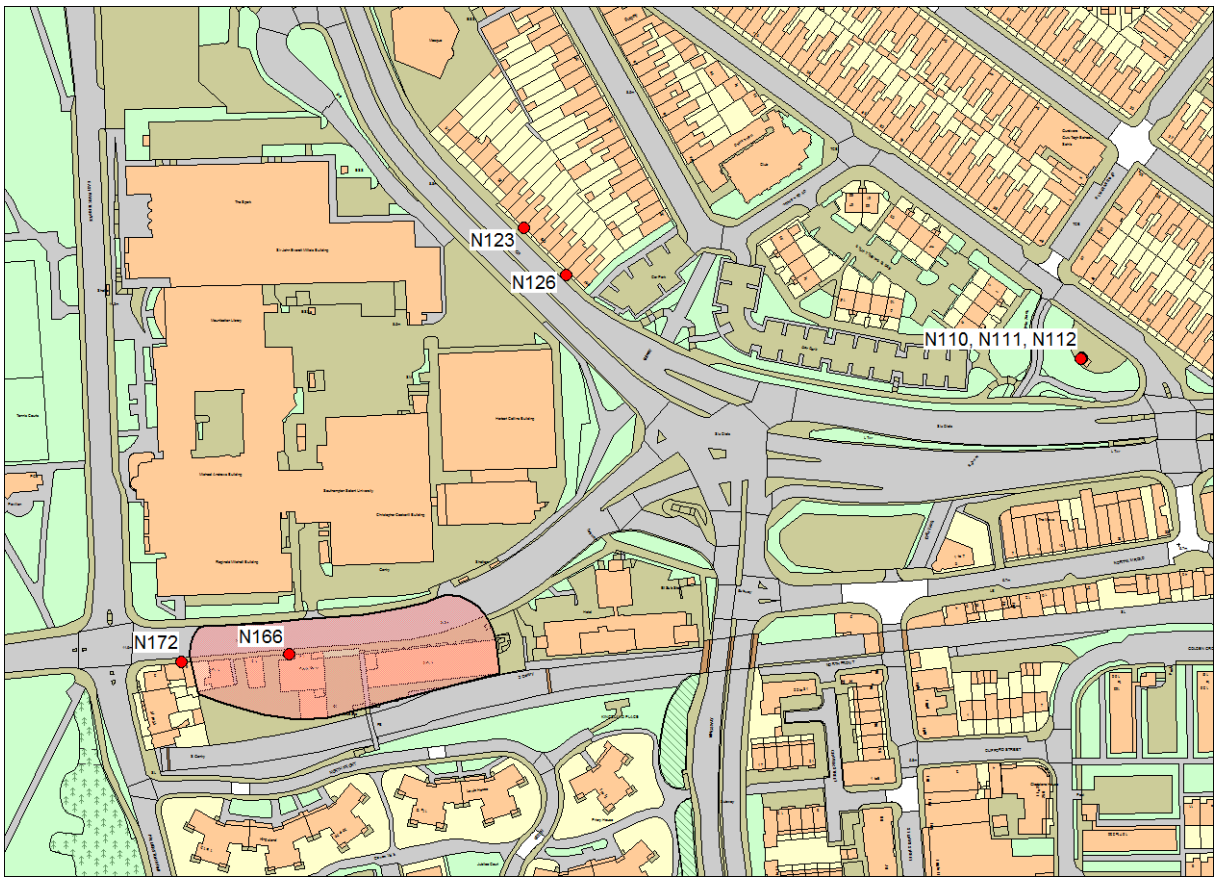


Figure 19 AQMA No. 10 New Road boundary and NO_2 diffusion tube locations

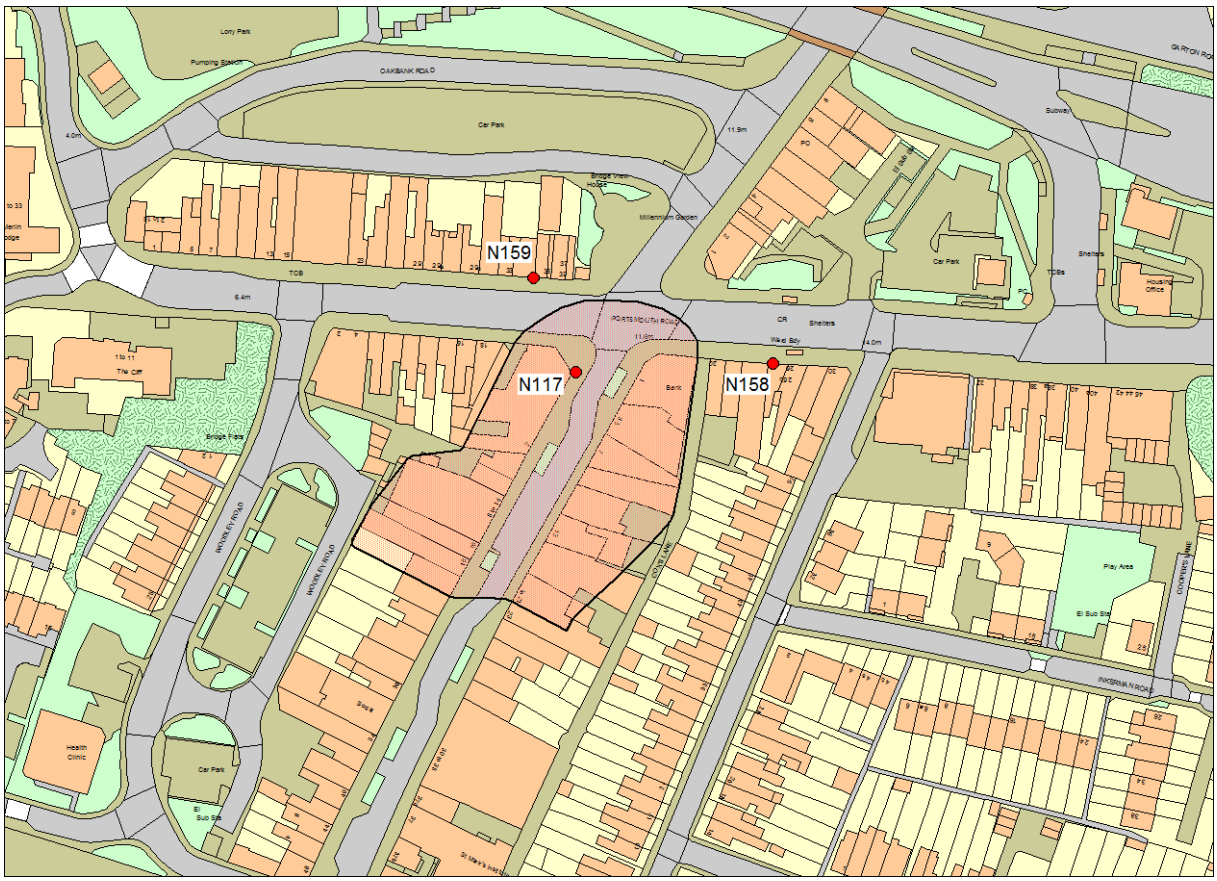


Figure 20 AQMA No. 11 Victoria Road boundary and NO_2 diffusion tube locations

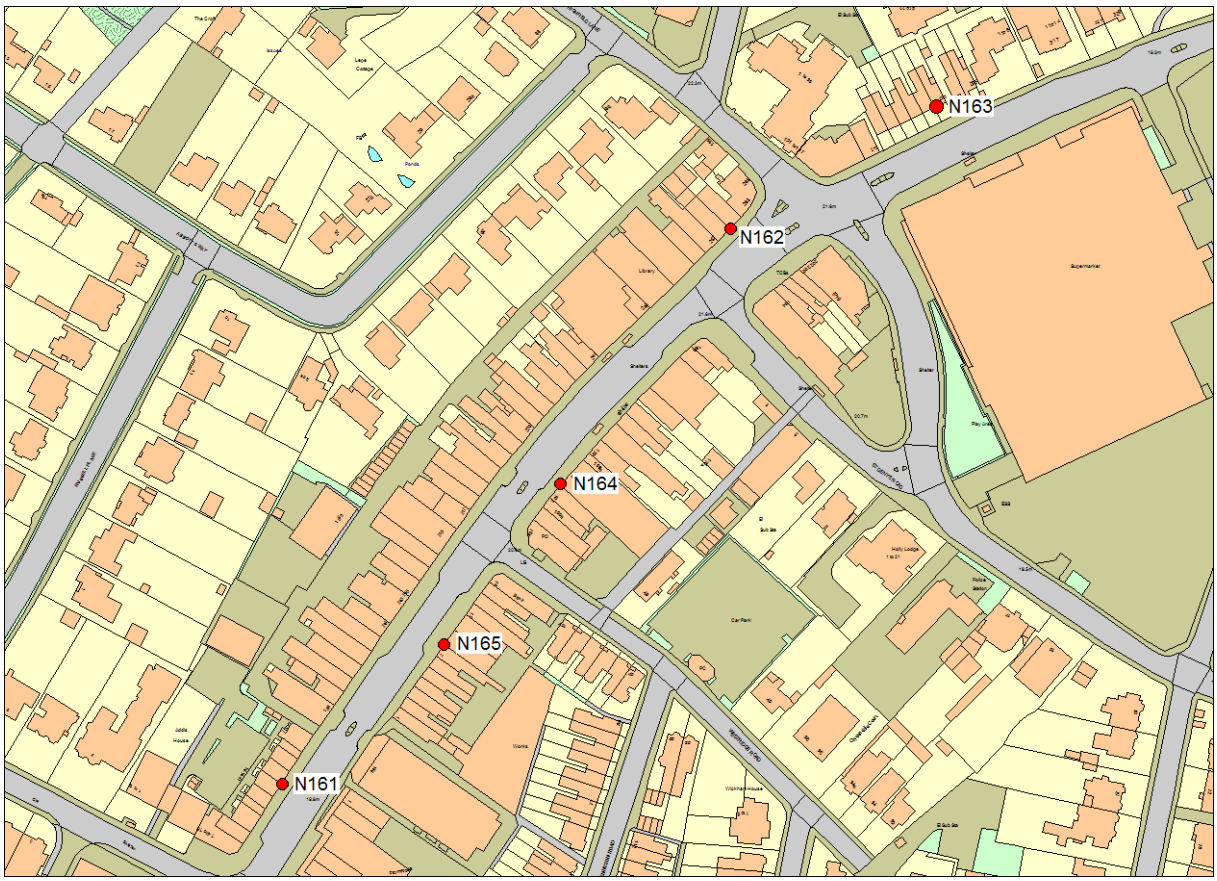


Figure 21 Portswood High Street NO_2 diffusion tube locations

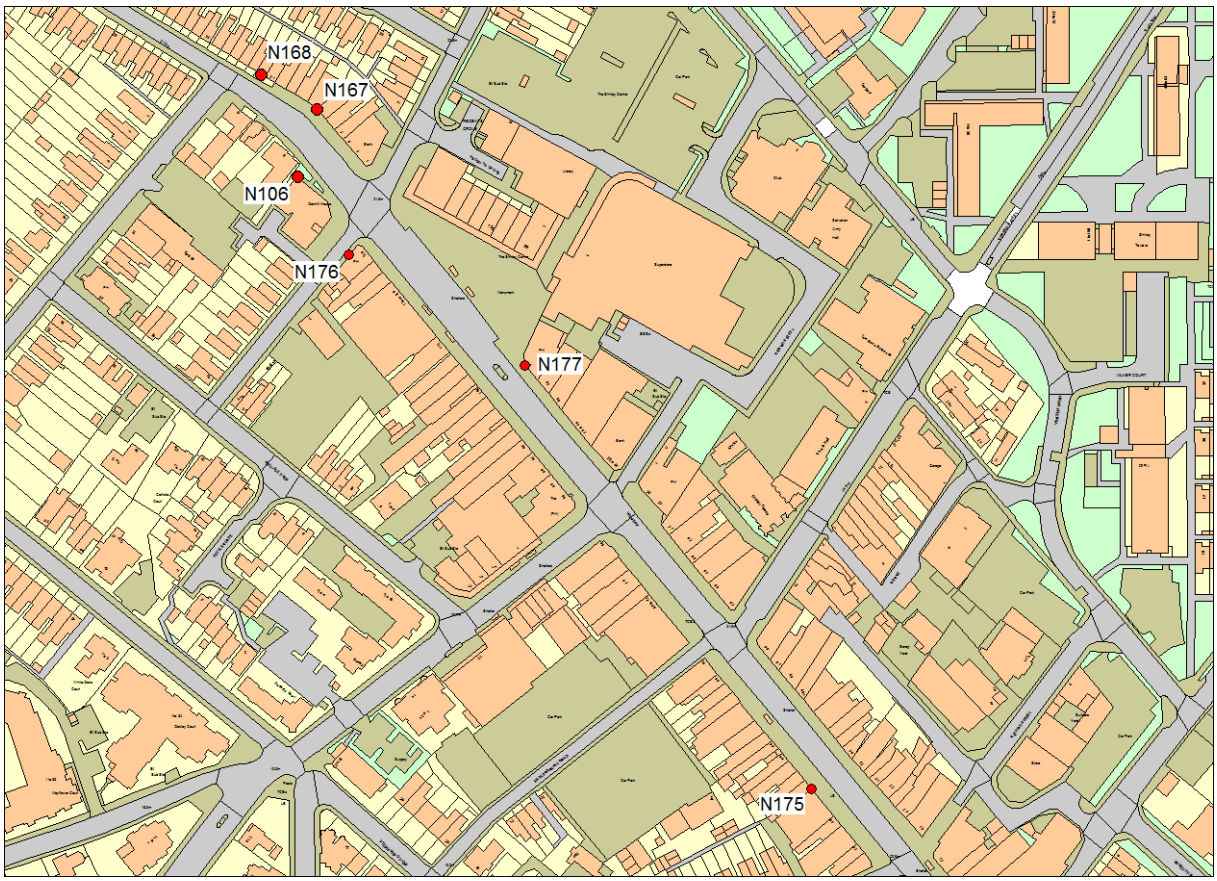


Figure 22 Shirley High Street NO_2 diffusion tube locations

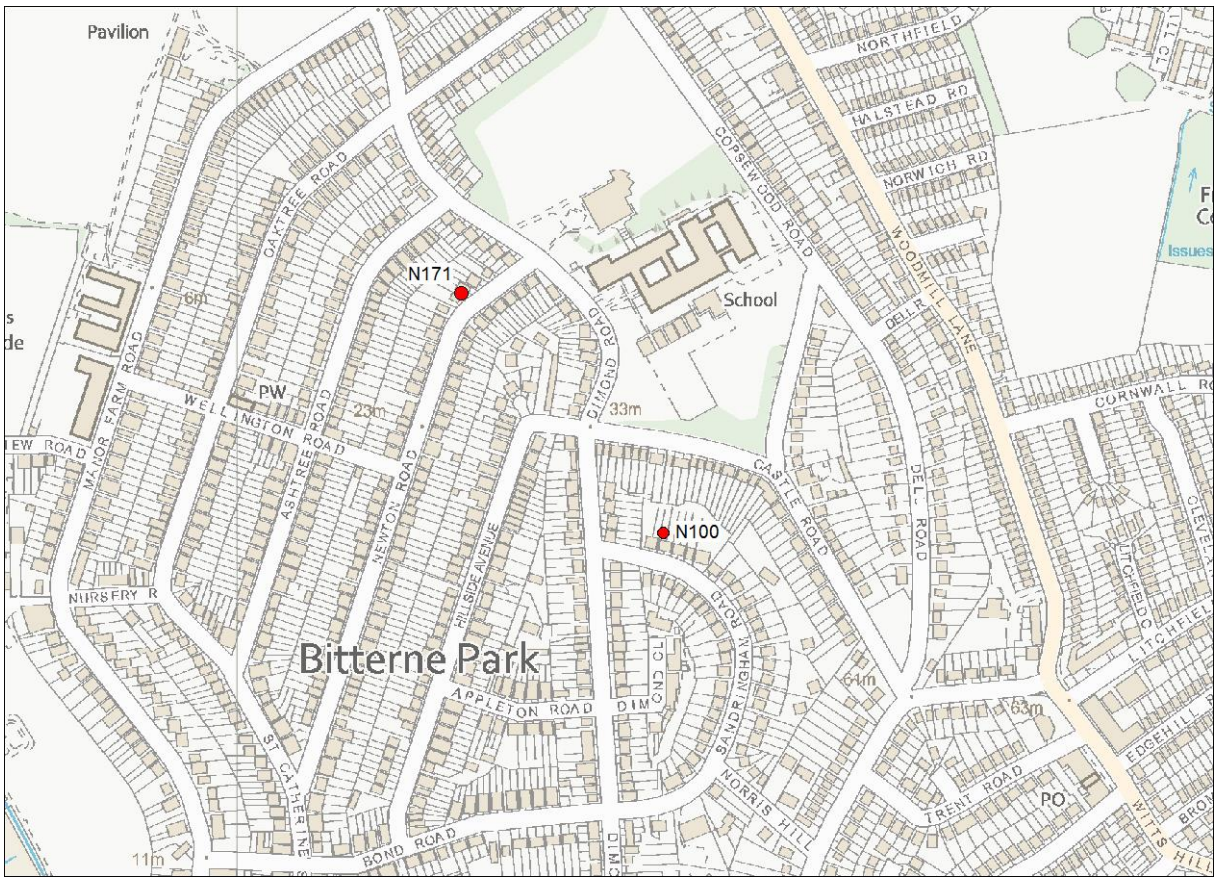


Figure 23 Bitterne Park NO_2 diffusion tube locations

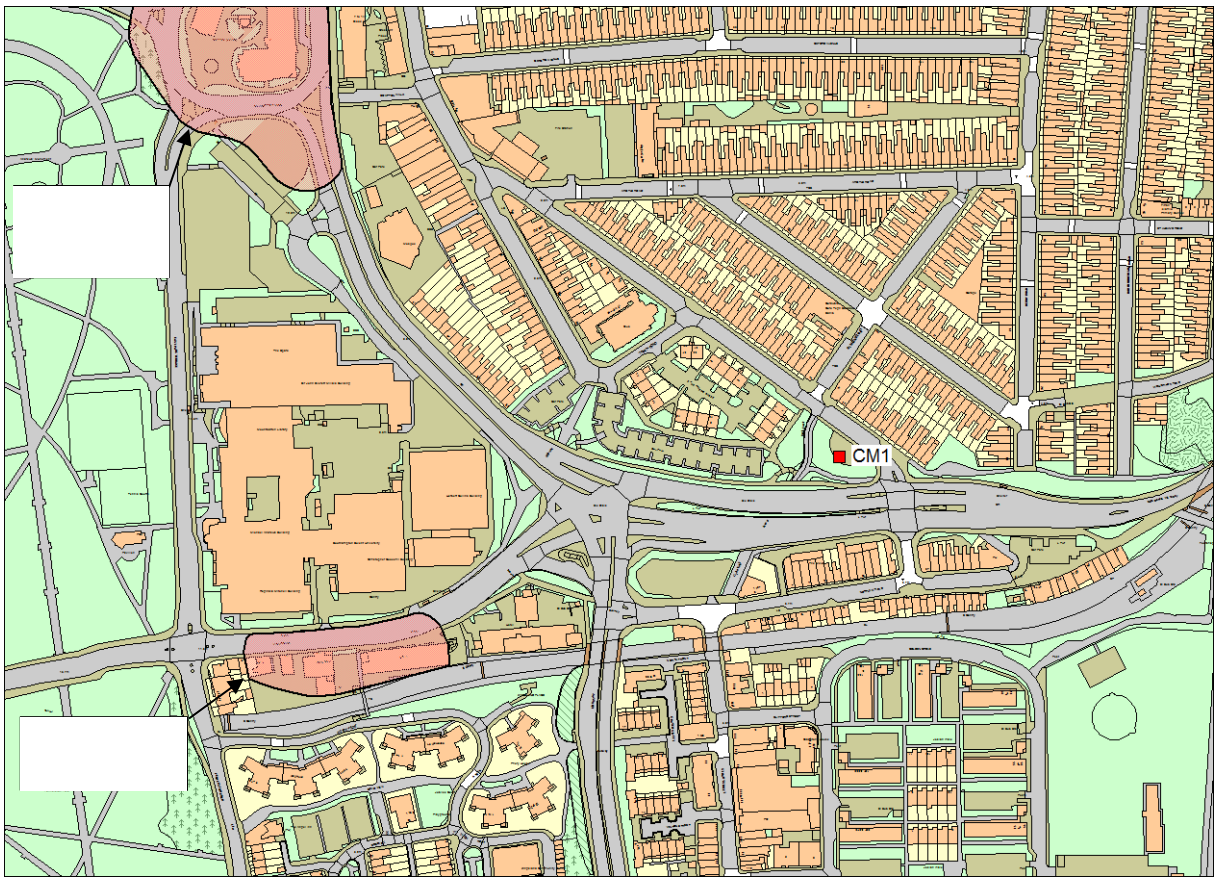


Figure 24 CM1 Brintons Road AURN automatic monitoring station with AQMA No. 10 New Road boundary and south boundary of AQMA No. 1 Bevois Valley

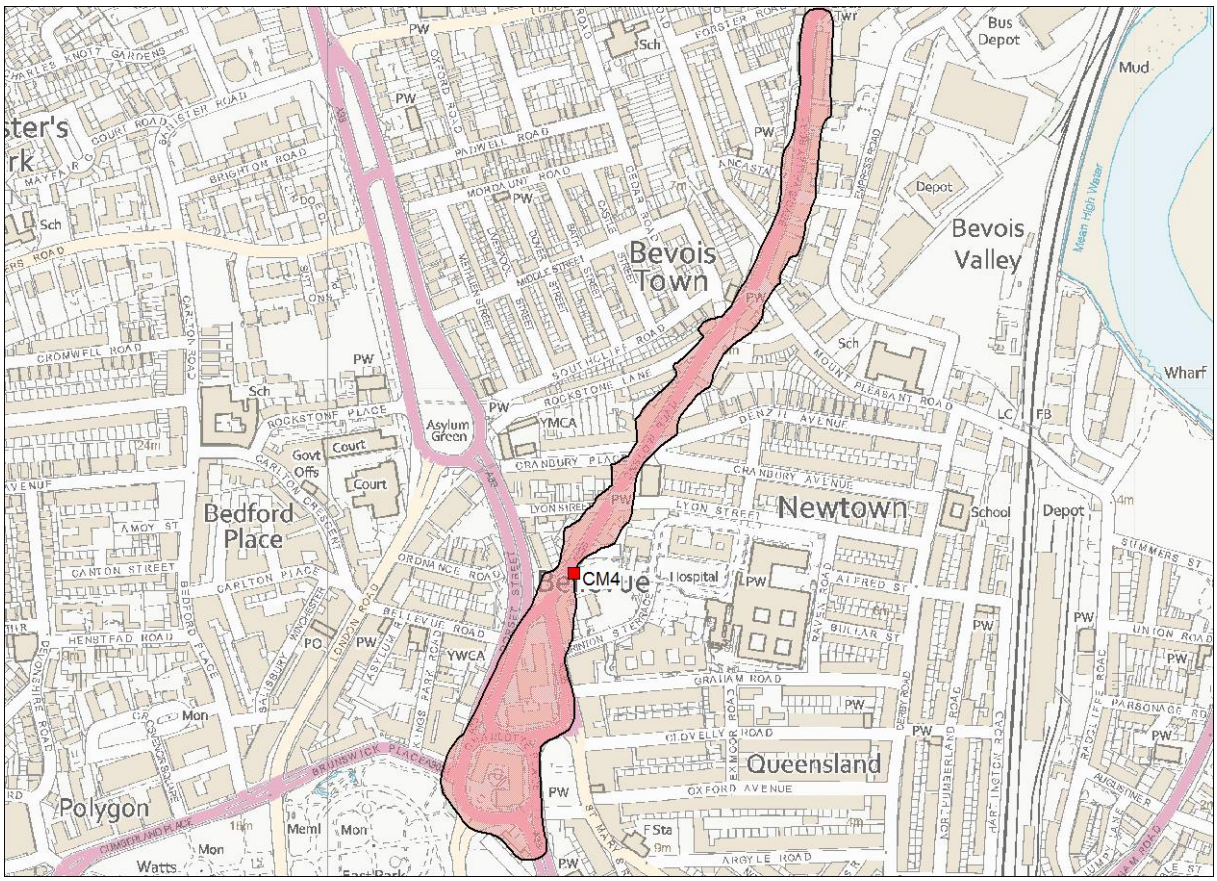


Figure 25 CM4 Onslow Road automatic monitoring station and AQMA No. 1 Bevois Valley boundary

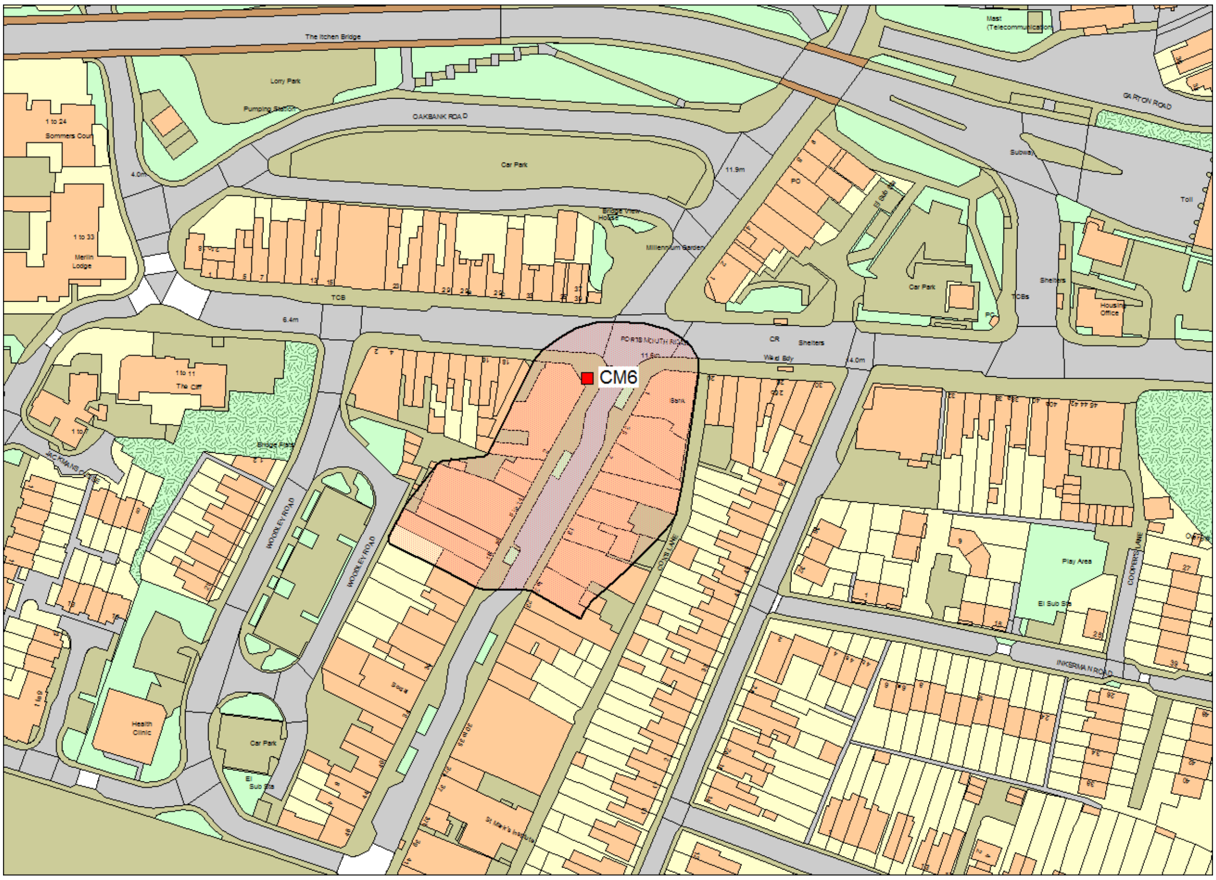


Figure 26 CM6 Victoria Road automatic monitoring station and AQMA No. 11 Victoria Road boundary

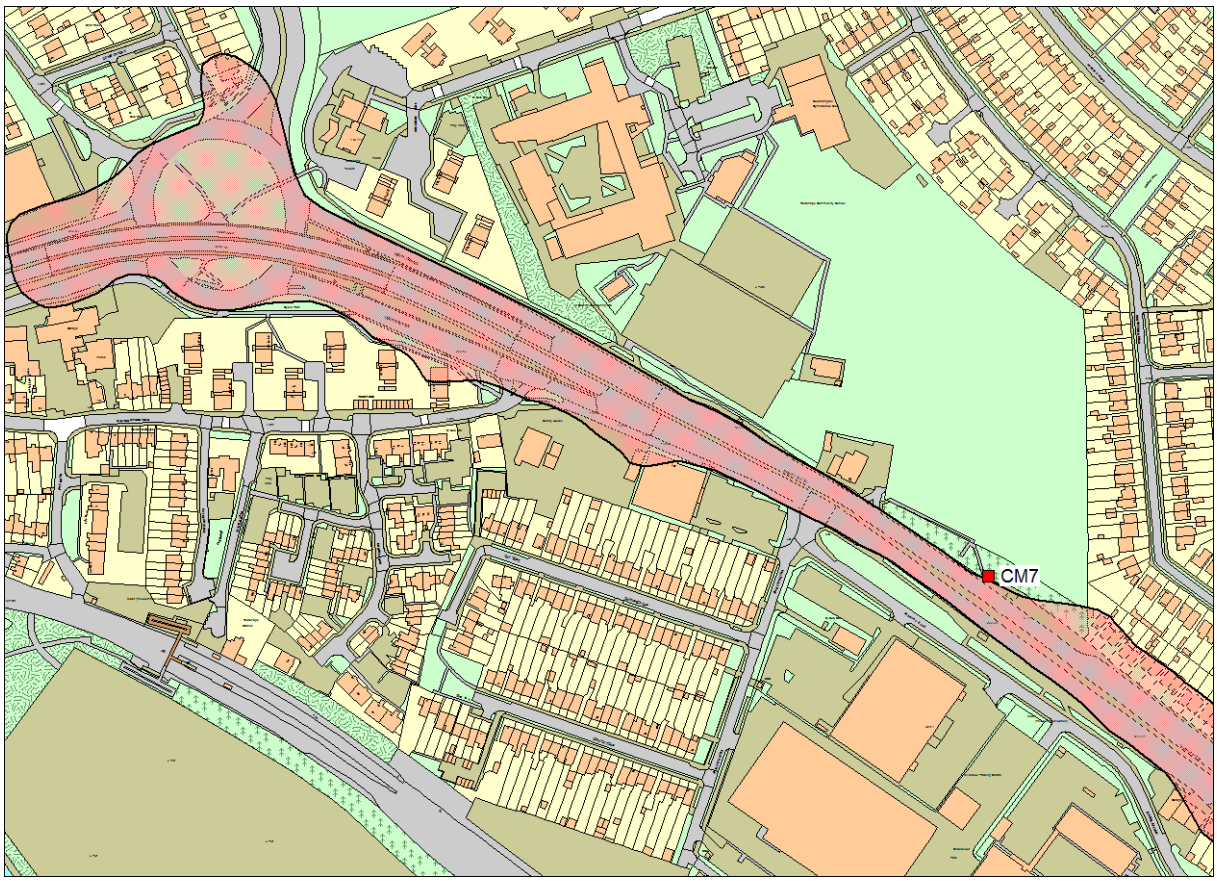


Figure 27 CM7 A33 AURN automatic monitoring station and west boundary of AQMA No. 5 Redbridge Road to Millbrook Flyover

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[9]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) 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