Portsmouth
CITY COUNCIL

2020 Air Quality Annual Status Report (ASR)

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

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1 Executive Summary: Air Quality in Our Area

1.1 The purpose of this report

In accordance with the statutory responsibilities placed upon Portsmouth City Council (PCC) under the Environment Act 1995[1], the primary purpose of this report is to provide the monitoring data for pollutants recorded across Portsmouth during the calendar year of 2019 and to determine whether or not the National Air Quality Objectives[2] (NAQO) are being or are likely to be achieved in Portsmouth.

This report does not seek to provide inclusive detail of all Local Air Quality (LAQ) related activities in Portsmouth during 2019.

This 2020 ASR contains monitored data results for the calendar year 2019. This data is not therefore impacted by the Covid-19 pandemic and any reduction in pollution levels that may have been caused by the decrease in traffic volumes during the various lockdown restrictions.

1.2 Air pollution and its impact upon public health

In March 2020 Public Health England (PHE) published guidance in respect Air Pollution: Applying All Our Health[3]. This guidance stated that the annual mortality of human-made air pollution in the UK is roughly equivalent to between 28,000 and 36,000 deaths every year. It is estimated that between 2017 and 2025 the total cost to the NHS and social care system of air pollutants (fine particulate matter and nitrogen dioxide), for which there is more robust evidence for an association, will be £1.6 billion.

Air pollution can cause and worsen health effects in all individuals, particularly society's most vulnerable populations. Long-term exposure to air pollution has been linked to chronic conditions such as cardiovascular and respiratory diseases as well as lung cancer, leading to reduced life expectancy. Short-term increases in levels of air pollution is associated with a range of health impacts, including lung function,

[1] Environment Act 1995

[2] Air Quality Objectives Update (PDF)

[3] UK Government Guidance - Air pollution: applying All Our Health

exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality.

The health effects of pollutants will depend on many factors as to the level of harm an individual is exposed to. This includes the dose, duration, how an individual comes into contact with the pollutant, in addition to factors such as age, sex, diet, family traits, lifestyle and state of health.

Air quality affects everyone, but there are inequalities in exposure, and air pollution has the greatest impact on the most vulnerable.

Those who are the most susceptible to the effects of air pollution are children, the elderly, those with long-term health conditions, and those living close to main roads where pollution is worst. In Portsmouth there are around:

- 52,200 children aged 19 and under
- 13,800 people aged 65 and over
- 3400 people living with a limiting long term illness[4].

Air pollution can affect the eyes, nose and throat, the heart and associated blood vessels and the lungs and respiratory system. Short-term exposure (over hours or days) can lead to a range of health impacts including lung function, coughing, wheezing and shortness of breath, exacerbation of asthma, increases in respiratory and cardiovascular hospital admissions and mortality. Over long timescales (years or lifetimes) exposure can lead to reduced life expectancy, due to cardiovascular diseases, respiratory diseases, and lung cancer. More recent research has associated air pollution with affecting the brain causing dementia and cognitive decline; diabetes and affecting early life leading to various birth outcomes, for example, low birth weight and developmental problems.

[4] Air pollution: applying All Our Health - GOV.UK (www.gov.uk)

1.3 Update on future air quality related responsibilities

The Environment Bill[5] delivers key aspects of the government's Clean Air Strategy[6] with the aim of maximising health benefits.

The air quality part of the Bill:

- introduces a duty to set a legally-binding target for fine particulate matter, the pollutant of most concern for human health, in addition to at least one further long-term air quality target;
- establishes a clear framework for local action and collaboration on air pollution;
- creates a simpler mechanism for local authorities to tackle smoke emissions – a source of fine particulate matter;
- provides the government with new powers to enforce environmental standards for vehicles.

The European Union (Withdrawal) Act[7] ensures that the whole body of existing EU environmental law continues to have effect in UK law. The national emission ceilings and ambient air quality limits are already set out in UK law. The measures in the Bill will also ensure that environmental ambition and accountability remain at the heart of government now the UK has left the EU, and will provide a clear trajectory for long-term significant environmental improvement.

The Bill will establish a comprehensive legal framework for environmental improvement which will drive action by successive governments, provide a clear framework for public and Parliamentary scrutiny, and chart a clear course for a greener future.

1.4 Latest nitrogen dioxide monitoring data

As reported in last year's report, in 2018 a different assessment regime of the European Union (EU) Directive on Air Quality[8] led to an obligation on PCC to develop

[5] Documents related to the 2020 Environment Bill

[6] Clean Air Strategy 2019

[7] European Union Withdrawal Agreement Act 2020

[8] European Commission Air Quality - Existing Legislation

a plan to tackle exceedances where these have been identified by the Department of Environment Food and Rural Affairs (DEFRA). This was in addition to where we have previously identified pollution hotspots and where we have been monitoring for many years.

Consequently, in 2018 parts of Portsmouth not previously assessed under Local Air Quality Management[9] (LAQM) regime and where there is an absence of long-term public exposure (pavements alongside busy roads with no nearby relevant exposure as identified in the 2016 Local Air Quality Management Technical Guidance (LAQM.TG(16)) became a new focus. The main areas of concern centred around Alfred Road, between Hope Street roundabout and the Queen Street / Anglesea Road / Alfred Road intersection and Mile End Road, between the southern end of the M275 and Church Street roundabout.

In addition to deploying monitoring devices along the above names roads, throughout 2019 PCC has maintained its number of Nitrogen Dioxide Diffusion Tube (NDDT) monitoring locations around the city. The reason for this was twofold, firstly as a consequence of DEFRAs interest in new geographic areas where exposure to NO_2 is possible and secondly to continue to assess the impact of PCCs activities to reduce NO_2 in these areas over the longer-term.

This increased level of monitoring, in new areas not previously targeted, continues to enable a higher resolution picture to be formulated in respect to NO_2 concentrations than that which was available in previous years.

Although PCC already has a significant network for air quality monitoring, that provides evidence of national compliance with a number of EC directives on air quality, the network of devices is being expanded and improved. This work has been configured to provide the greatest density of measurements in key areas across areas of Portsmouth, where the highest risk of air quality exceeding the relevant Directive's limit values coincides with the greatest exposure to pollution.

In December 2019 PCC envisaged that a fifth new PCC continuous air quality monitoring station would be installed within one of the areas of highest pollution

[9] Local Air Quality Management Technical Guidance (TG16) PDF

values i.e. Alfred Road. A new continuous monitoring location had been proposed towards the west-end of Alfred Road alongside St John's Catholic Cathedral. PCC was hoping to have this station operational by now, however the project timetable has had to be extended as a result of the impact of the coronavirus pandemic. We remain hopeful that the new station will be operational early in the New Year of 2021.

This station will provide continuous Nitrogen Dioxide (NO_2) results and Particulate Matter (PM) of 10 micrometers and $PM_{2.5}$ monitoring capabilities. Additionally, PCC is replacing its monitoring devices at the Gatcombe Park sites and adding PM monitoring capabilities to the station located on the corner of Burrfields Road and Copnor Road. It is envisaged that all continuous monitoring stations will be supplied with new communication systems which may, in due course, provide publically available real-time monitoring data.

It is important to note however that PCC has, over the last couple of years, already significantly increased its deployment of NO_2 diffusion tube monitors in areas of concerns in Portsmouth, particularly along the two identified link roads and at all other locations where exceedances, or near exceedances, of the national air quality objectives are being predicted through the Local Air Quality Planning[10] (LAQP) process.

During the creation of the LAQP, PCC has been further encouraged by DEFRA to increase monitoring where levels of exceedance have been modelled to exist until 2022. This rationale is intended to provide the further best evidence needed to quantifiably measure the performance of the LAQP. It also ensures the highest possible level of certainty that the measures deployed are actually achieving the level of pollution reduction modelled in those specific locations.

The government have provided guidance setting out the local air quality monitoring data requirements to safeguard data consistency standards. Our monitoring is required to follow DEFRA's best practice Technical Guidance 2016 (LAQM.TG16) for data quality and needs to be carried out at locations consistent with the siting requirements set out in Annex III of the Ambient Air Quality Directive[11].

[10] Department for Environment Food and Rural Affairs Action Planning

[11] Directive 2008/50/EC of the European Parliament and of the Council

PCC currently has five Air Quality Management Areas (AQMAs) declared on the grounds of monitored or modelled exceedances of the UK annual mean NO_2 NAQO. It is our intention to keep all these areas under review. We have no intention to revoke AQMAs, even where levels were recorded in compliance with the NAQO, although all areas remain under review.

1.5 Progress of measures to improve air quality

Under the terms of the Environment Act 1995, the government has issued a Ministerial Direction to relevant authorities of which PCC is one. This Direction required PCC to develop a LAQP to identify the option which will deliver compliance with legal limits for nitrogen dioxide in the shortest possible time.

In the technical report published alongside the UK Plan, government identified charging Clean Air Zones (CAZ)[12] as the measure, able to be modelled nationally, which would achieve compliance with NO_2 limits in the shortest possible time.

PCC are therefore working closely with Government's Joint Air Quality Unit (JAQU)[13] to develop a plan to ensure that levels of NO_2 in the city are reduced below legal limits in the shortest possible time. This is known as our LAQP.

The process that we have to follow to produce our LAQP has been set out by JAQU and there are a number of documents that we are required to submit to Government for review.

On the 16th July PCC published an update on the progress of the development and delivery of Portsmouth's Clean Air Zone in fulfilment of the Ministerial Direction issued to PCC on 4th October 2018[14].

PCC's Outline Business Case (OBC) made the case for the delivery of measures that would be effective in reducing NO_2 emissions from road traffic sources. The plan was informed by detailed transport and air quality modelling, which demonstrated that non-charging measures would not be sufficient to achieve the reduction of air pollution needed in the city. Therefore options for a charging CAZ were considered.

[12] Clean Air Zone Framework PDF

[13] UK Parliamentary business - Joined up action

[14] Portsmouth City Council Clean Air Zone Update (July 2020) PDF

The final package of measures that were included within the OBC included a Class B CAZ, accompanied by a number of non-charging measures and support packages.

Following submission of the OBC on 31st October 2019, government ministers confirmed approval of the OBC on 25th March 2020. However, not all of the measures proposed by PCC in the OBC were supported, including the proposed improvements to strategic cycling routes in the city and incentives to encourage the use of public transport. These measures were not supported by JAQU because they were considered not to be essential in achieving compliance. JAQU's view was that legal levels of nitrogen dioxide can be reached without these measures. The measures approved by government and which have received funding for delivery are:

- Class B CAZ covering a concentrated area in the southwest of Portsea Island[15] (this will issue a daily charge to the most polluting buses, coaches, taxis, private hire vehicles and heavy goods vehicles for driving within the zone);
- Review of car parking to consider availability and charges;
- Changes to traffic signal timings on Alfred Road;
- Tightening of taxi licensing requirements for taxi and private hire vehicles;
- Financial support towards upgrade or replacement of non-compliant vehicles (funded through a successful bid to the government's Clean Air Fund).

In approving the OBC government have issued PCC with a fourth ministerial direction requiring the council to implement a Class B CAZ and the approved measures as soon as possible and at least in time to bring forward compliance to 2022. Since the OBC was submitted work has continued on the refinement of the proposed measures. This included a public consultation, developing a full business case and on undertaking a procurement process to secure a supplier to design the charging CAZ.

[15] See appendix F

At the point of submitting the OBC for approval, it was anticipated that the FBC would be ready for submission in November 2020, however JAQU have been informed that the submission of the FBC will now be in December 2020.

1.6 Engagement activity

Decision makers

Decision makers both locally and nationally continue to be engaged in the work to improve air quality across the city. Both the Cabinet Members for Traffic & Transport and Environment & Climate Change sit on the Air Quality Improvement Executive Board, and regular briefings are held for all Councillors to update on the work across the Transport department, including measures to improve air quality.

The Members of Parliament for both the north and the south of the city have received briefings on the work that is being undertaken to address air pollution in Portsmouth, and regular updates on the progress of the city's LAQP are provided to JAQU.

Members of the public

The council are continuing to engage with a range of stakeholders on the issue of air pollution and the steps being taken to reduce it. In order to facilitate this engagement activity the council has recruited four engagement officers, whose role it is to contact businesses and individuals about the implementation of the charging CAZ and to support them in taking steps to reduce their own emissions, as well as signposting them towards funding to help them do this. The work of the engagement officers compliments the existing engagement activity related to air quality that is undertaken through the Air Quality Steering Group and the council's Business to Business networking activity.

In the summer of 2020 the council undertook a public consultation to seek views on the operation of the charging CAZ. In total over 2000 individuals and 140 businesses responded to the consultation. As well as the direct responses the consultation also helped to spread the message about work to improve air quality, with promotional activity reaching over 7,500 people. The consultation was also supported by production of an information booklet explaining the health risks of poor air quality and the proposed CAZ, which was distributed to 93,000 households across the city.

Personal action

Air pollution is a global public health risk; more harmful than passive smoking. Long-term exposure is linked to reduced life expectancy, increased cardiovascular disease, poor lung function and mental health issues.

Travel in the city is a major contributor to air pollution and the type of transport we choose for our journeys can help to improve our air quality. The council is making transport improvements to the city including safer cycling routes and facilities to make it easier to choose this way of travelling, improving public transport connectivity with the wider region, and providing electric charging points for residents choosing greener vehicles. We are improving the options for travel and together we can choose a greener, cleaner way of travelling for cleaner air in Portsmouth.

Despite the work that has and continues to be undertaken, the city still faces challenges to reduce the concentrations of harmful pollutants in the air. The responses from a recent consultation into the city's CAZ proposals demonstrated one of the key challenges of addressing air pollution in the city - it can be difficult for individuals to accept that their own actions are part of the problem and therefore changing their own behaviour is part of the solution.

It is therefore important to consider that we all have a part to play in improving the air quality in the city. Below are some suggestions for changes that individuals and businesses across the city could make to keep the air cleaner:

- Think about whether you need to make the journey in a car. The national lockdown measures introduced in response to the coronavirus pandemic have helped many of us to find the great walking and cycling routes that are available around the city to get you from A to B;
- Avoid excessive idling of your car. Switch your engine off when you’re stationary for a minute or so. The easiest place to do this is at traffic lights;
- When you need to change your vehicle, think about a hybrid or electric car.

1.7 Conclusions and priorities

1. NO_2 levels in Portsmouth remain a significant concern.

2. PCC recognises the harm to health created by poor air quality.
3. The data contained within the 2020 ASR is not considered to represent a deterioration in LAQ.
4. In 2020 and beyond PCC will continue to increase its knowledge of NO_2 levels by expanding and maintaining our capabilities to further explore the geographical extent of possible hotspot areas to evidence longer term trends.
5. Delivering compliance with statutory obligations and further reducing harmful levels of pollution remains the key priority of PCC.
6. PCC commits to working together with DEFRA and other interested parties to assess the complex needs of the city, whilst undertaking this necessary and important work.

2 Summary of nitrogen dioxide monitoring results

NDDTS = Nitrogen Dioxide Tube Survey
CAQMS = Continuous Air Quality Monitoring Station
*All results are annual averages
N/A = Not applicable

NDDTS year	NO_2 DOWNWARD trend* recorded at long term monitored locations	Improvement?
2015 - 2019	92.59%	Yes
2014 - 2018	60.71%	
NDDTS year	NO_2 annual mean levels decreased at long term monitored locations	Improvement?
2019	100%	Yes
2018	53.57%	
NDDTS year	Locations in excess of NO_2 NAQO* (long term sites)	Improvement?
2019	3.70%	Yes
2018	7.14%	
NDDTS year	No. of sites exceeding NAQO* (long term sites) located outside an AQMA	Improvement?
2019	0	Yes
2018	0	
CAQMS Station	5 year NO_2 trend*	Improvement?
London Road	Upward	No
Gatcombe Park	Downward	Yes
Burrfields Road	Downward	Yes
Mile End Road	Upward	No
CAQMS Station	NO_2 2018 compared with 2019	Improvement?
London Road	0.27% decrease	Yes
Gatcombe Park	6.48% decrease	Yes
Burrfields Road	8.47% decrease	Yes
Mile End Road	4.45% decrease	Yes
CAQMS Station	Exceeding NO_2 NAQO*	
London Road	Yes	
Gatcombe Park	No	
Burrfields Road	No	
Mile End Road	No	
Anglesea Road	No	

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3 Local air quality management

This report provides an overview of air pollution in Portsmouth during 2019. It fulfils the requirements of 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 R&A AQ in their areas, and to determine whether or not the NAQOs are likely to be achieved.

Where an exceedance at sensitive locations where relevant exposure is considered likely, we must declare an AQMA and prepare an AQAP setting out the measures we intend to put in place in pursuit of the NAQOs.

This ASR, which follows the prescriptive template requirements provided by DEFRA, is an annual requirement outlining the strategies employed by PCC to improve LAQ and any progress or otherwise that has been made in reducing air pollution.

The statutory NAQO applicable to LAQM in England can be found in Table E.1 in Appendix E.

4 Actions to improve air quality

4.1 Bus retrofit- targeting A3 Mile End Road and A3 Alfred Road

A DEFRA funded project enabled 105 buses that regularly travel through the two exceedance links to be retrofitted with Selective Catalytic Reduction Technology (SCRT), to reduce harmful emissions such as Oxides of Nitrogen (NOx), Diesel Particulates (PM), Carbon Monoxides (CO) and Hydrocarbons (HC).

It was anticipated that the project would reduce annual NO_2 concentrations on Alfred Road and Mile End Road to within legal limits in 2019 and 2022 respectively.

The project commenced in October 2019 with over 90% of buses retrofitted by spring 2020. However, the coronavirus pandemic slowed progress, with the final bus being retrofitted in October 2020.

As part of the Clean Air Fund bid that was submitted along with the LAQP OBC funding has been secured for a second round of the bus retrofit project, with the scope widened to coaches as well as buses.

4.2 Park & Ride expansion - M275, A3 Commercial Road and A3 Alfred Road

The Portsmouth Park & Ride (P&R) is located off junction 1 of the M275 and currently provides 665 car parking spaces, which are often filled to capacity at weekends and during major events. The P&R offers reliable journey time between the city centre and the Hard interchange and also helps to reduce congestion by facilitating modal shift.

PCC would like to expand the number of car parking spaces available at the P&R in order to address peak capacity issues and to encourage further modal shift away from private car use. In particular this is likely to have a positive impact on the two areas of exceedance being targeted through the LAQP (Alfred Road and Commercial

Road) as there is potential to reduce the number of private cars travelling along these roads if they can be encouraged to use the P&R.

4.3 Workplace Sustainable Travel Fund- citywide

PCC have offered organisations across the city the opportunity to apply for funding from their Workplace Sustainable Travel Fund (WSTF) to deliver sustainable travel initiatives which support cleaner air across the city. Organisations were invited to bid for up to £5,000 for measures, such as bicycle parking, which encourage cycling and walking, or otherwise accommodate sustainable travel.

4.4 On-street electric vehicle charging points- citywide

Funding was secured from the Office for Low Emission Vehicles (OLEV) on-street Residential Chargepoint Scheme (ORCS) which saw the installation of 36 charge points in residential areas in March 2019, enabling residents without off-street parking the ability to charge their vehicles at home.

Following the success of this award winning project, PCC secured additional funding to install around 80 additional charge points due to demand from residents, which are planned to be installed by the end of 2020. PCC have also installed EV charging points in three public pay and display car parks as part of a small trial, before considering providing EV charging in more council owned car parks.

4.5 Sustainable school travel - citywide

Children across the city continue to be engaged in road safety and sustainable travel activity. In 2019 around 1,200 school children took part in the 'Pompey Monster' challenge which rewarded them with collectable prizes if they walked, scooted or cycled to school.

4.6 Future transport - citywide

Solent Transport, in partnership with Hampshire County Council, Isle of Wight Council, Portsmouth City Council and Southampton City Council have been successful in secure funding from the Department for Transport's Future Mobility Zone Fund.

The funding will be used to support a number of projects over the coming years, including:

- Personal Mobility: providing new modes of travel, and developing new, complementary means of planning and paying for journeys e.g. e-scooter trials and mobility as a service platform.
- Sustainable Urban Logistics: developing innovative approaches to address impacts of freight & logistics in urban environments e.g. micro and macro consolidation and drone logistics trials.

It is anticipated the projects will help to address issues of traffic congestion, high car dependency and poor air quality, in Portsmouth and the wider sub-region by trialling innovative approaches to personal mobility and logistics.

4.7 Transforming Cities Fund - citywide

The Portsmouth City Region has been awarded £56 million from the Department of Transport (DfT) Transforming Cities Fund (TCF) to deliver Tranche 2 of the South East Hampshire Rapid Transit scheme. In addition, a further £46 million public and private sector contributions have been secured.

The funding will deliver 23 infrastructure improvements across Portsmouth (9 schemes, £26.7m), Hampshire (10 schemes, £19.6 m), and the Isle of Wight (4 schemes, £10m) to improve connectivity within the city region by active travel and public transport. The improvements will enable productivity growth, reduce congestion, improve local air quality across the city region, and reduce greenhouse gas emissions.

Patronage growth will be encouraged by the journey-time savings and enhancements to service reliability delivered by the TCF schemes, as well as new service offerings and new high-specification double decker vehicles from First and Stagecoach.

The package of measures is forecast to deliver significant modal shift away from private car, to public transport and active modes, of approximately 3,100 person trips

per day, resulting in reduced carbon emissions and citywide improvements to air quality.

4.8 Progress on DEFRA grant funded projects

Measure	Update on progress
Bus retrofit	• Completed - 105 First and Stagecoach buses completed. • Further buses and coaches to be retrofitted using Clean Air Fund financial support for buses and coaches (see below).
Class B CAZ	• Siemens has been appointed as the contractor to design the CAZ. • Site surveys have been undertaken to consider whether the automatic number plate recognition cameras (ANPR) should be located. • CAZ to 'go live' in November 2021.
Alfred Road signal changes	• Modelling has been undertaken to consider the best ways to optimise flow at this junction. • Final design yet to be confirmed. • The changes likely to 'go live' in spring 2021.
Targeted communication and marketing	• A communication plan is in development. • Marketing and communication activity to launch in January 2021.
Financial support to upgrade non-compliant taxis/ PHVs, buses and coaches and HGVs (Clean Air Fund)	• Online application form in development. • Engagement ongoing with various trade groups to consider best approaches to eligibility for the fund. • Funding applications to open in spring 2021.

4.9 Priorities in addressing air pollution

Portsmouth is a bustling south coast city with unique geography, being surrounded by 49km of coastline on three sides. Its historic, diverse and vibrant waterfront contains the HM Naval Base, Portsmouth International Port, and major tourist attractions (such as Southsea seafront, Gunwharf Quays retail outlet, and the world-renowned Portsmouth Historic Dockyard / Mary Rose Museum). In addition, the University of Portsmouth in the city centre has a population of c. 20,000 students and has ambitious plans for growth.

Portsmouth is one of the most densely populated cities in Europe (with a population density higher than some parts of London), and its population of around 217,000 is expected to grow to 236,000 by 2040.

These factors create unique challenges for Portsmouth in terms of improving its air quality. It is well documented that road traffic is a significant contributor to air pollution and in July 2017 the UK government (DEFRA and DfT) published the UK plan for tackling roadside NO_2 concentrations[16], setting out its commitment to achieving a cleaner and healthier environment, with the aim of benefitting both people and the economy.

Air pollution is the largest environmental risk to public health in the UK and it is known to have disproportionate effects on vulnerable groups. Air quality disproportionately affects the very old, the very young, and those with chronic conditions. It also has greater impact on those who live, work, or go to school in more deprived areas.

With such clear evidence about the impact of air pollution on people's health, PCC has been clear about its plans to improve air quality in the city, as set out in the Air Quality Strategy 2017-2027[17]. The strategy sets out a commitment to “work collaboratively to improve and maintain a healthy local air quality in the city in order

[16] Air quality plan for nitrogen dioxide (NO2) in UK (2017)

[17] PCC Air Quality Strategy PDF

to protect health and the environment, enhancing our status as a great waterfront city".

It sets out the following strategic aims to:

- foster closer working relationships between council directorates and external partners;
- create a focus on sustainable travel, including the promotion of a modal shift in transport from the car to active travel;
- provide high quality information and guidance on local air quality to members of the public;
- develop and implement measures to reduce traffic and congestion-related emissions, addressing road network flow and functionality;
- support and stimulate sustainable citywide economic growth, including a focus on reducing carbon emissions; and
- ensure that as a council we lead by example in supporting sustainable working practices, minimising our own emissions and carbon footprint.

The strategic objectives are underpinned by the following core principles: evidenced-based practice, innovation, collaborative working, monitoring and evaluation, ambition, seeking funding, and analysis.

The strategic aims of the strategy and core principles have been applied in the development of Portsmouth's LAQP, produced in response to ministerial directions requiring the council to make improvements to concentrations of NO_2 in the city in the 'shortest possible time'.

On 26 July 2017, the government published the UK plan for tackling roadside nitrogen dioxide (NO_2) concentrations ('the UK Plan'). This set out how the government would bring the UK NO_2 concentrations within the statutory annual limit of 40 micrograms per cubic metre (µg/m3) in the shortest possible time. As part of the UK Plan, the government set out how 28 local authorities (first and second wave local authorities) with the most severe NO_2 exceedances should develop local plans

to implement measures to achieve compliance with statutory NO_2 limits (set out in the Ambient Air Quality Directive) within the shortest possible time.

On 5 October 2018, the government published a supplement to the UK Plan, setting out conclusions for each of the 33 ‘third wave’ local authorities, based on Targeted Feasibility Studies undertaken for each of these authorities. The supplement identified eight local authorities with more persistent long-term exceedances. Portsmouth is one of the eight authorities falling into this category.

Under the terms of the Environment Act 1995, the government issued a Ministerial Direction, requiring these local authorities to develop a local plan to identify the option which will deliver compliance with legal limits for nitrogen dioxide in the shortest possible time.

Portsmouth's plan concludes that in order to deliver the levels of reduction in air pollution required, non-charging measures alone would not be sufficient and Class B charging CAZ (with supporting non-charging measures) would need to be introduced in the city.

The proposed package (intended to bring forward compliance to 2022) comprises of:

- a concentrated area charging Class B CAZ designed to include key destinations for targeted traffic on the two links (Commercial Road and Alfred Road) where intervention is required to reduce NO_2 concentration to less than the 40 µg/m3, and intended to minimise re-routing;
- signal changes at the Alfred Road / Queen Street junction to reduce emissions from queuing traffic;
- progressive tightening of taxi licensing rules to ensure use of lower emission vehicles;
- rapid charging points at taxi ranks to enable taxi drivers to upgrade to electric vehicles;
- targeted communications and marketing campaigns.

Therefore, the priorities for addressing air pollution in the city are to:

- reduce concentrations of nitrogen dioxide to within legal limits before the end of 2022;
- deliver the measures outlined in the LAQP;
- continue to increase our knowledge of NO_2 levels in the city and success of measures to improve air pollution;
- continue to work with government's Joint Air Quality Unit (JAQU) to deliver improvements to air quality in the shortest possible time;
- continue to work with individuals, businesses and organisations in the city to help them take action to reduce their emissions.

5 Air quality management areas

AQMAs are declared when there is an exceedance or likely exceedance of the NAQO. After declaration, authorities must prepare an AQAP within 12 to 18 months, setting out measures intended to be put in place in pursuit of the NAQOs.

A summary of AQMAs declared by PCC can be found in Table 2.1.

Alternatively, see Appendix D: Map(s) of CAQMSs and AQMAs, which provides a map of AQ monitoring locations in relation to the AQMAs.

Further information relating to declared or revoked AQMAs, including maps of AQMAs boundaries are available online at UK Air Local Authority Details.

There are five AQMAs currently in place within Portsmouth statutory boundary which were declared due to exceedances in the annual NO_2 NAQO:

- AQMA6 - which extends north along Fratton Road from Fratton Bridge to Kingston Road, continuing into London Road until the roundabout junction with Stubbington Avenue and Gladys Avenue;
- AQMA7 - covering Hampshire Terrace and the St Michael's Road gyratory;
- AQMA9 - covering the southernmost section of Eastern Road from Sword Sands Road south into Velder Avenue and its junction with Milton Road;
- AQMA11 - which extends from Rudmore Roundabout south to Church Street roundabout; and
- AQMA12 - encompassing the greater part of Queen Street from The Hard to St James's Street.

Additionally because of DEFRA's focus on additional areas of the city through the Pollution Control Model (PCM)[18] model, the following two road links in Portsmouth have subsequently been modelled and are predicted to exceed the annual mean NO_2 limit value (PCC, 2018a)[19]: The short term monitoring data acquired during 2018 and 2019 also confirms that this is likely to be the case. These two road links are:

[18] Air modelling for Defra

[19] Portsmouth City Council (2018a). Targeted Feasibility Study to delivery nitrogen dioxide concentration compliance in the shortest possible time. Submitted to Defra, September 2018.

- A3, Alfred Road between Hope Street roundabout and the Queen Street / Anglesea Road / Alfred Road intersection. The PCM predicts that this road link will achieve compliance in 2020 (due to the natural upgrade of the national vehicle fleet to cleaner models), but data from a recent local modelling study suggests that this may not be achieved until 2023.
- A3, Mile End Road between the southern end of the M275 and Church Street roundabout (located within AQMA 11). The PCM model predicts that this link will achieve compliance in 2021, although results from recent local modelling suggest compliance may be achieved one year earlier in 2020.

6 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)		Local Air Quality Plan	
						At Declaration	Now (From 2018 to 2019)	Name	Date of Publication
AQMA 6	2005	NO_2 Annual Mean	PCC	An area encompassing a large number of residential properties extending north along Fratton Road; from Fratton Bridge into Kingston Road, continuing into London Road until the roundabout junction with Stubbington Road and Gladys Avenue	NO	59.9 µg/m^3	From 46.02 µg/m^3 to 40.42 µg/m^3	PCC	2019
AQMA 7	2005	NO_2 Annual Mean	PCC	An area encompassing a number of residential properties along Hampshire Terrace and St Michaels Road gyratory	NO	43.36 µg/m^3	From 42.92 µg/m^3 to 36.92µg/m^3	PCC	2019
AQMA 9	2005	NO_2 Annual Mean	PCC	An area encompassing a number of residential properties near to the southernmost section of Eastern Road from Sword Sands Road south into Velder Avenue and its junction with Milton Road	NO	43.1 µg/m^3	From 37.68µg/m^3 to 33.38µg/m^3	PCC	2019

AQMA 11	2010	NO_2 Annual Mean	PCC	This area encompasses a large number of residential properties east of the west transport corridor extending along part of the M275 and Mile End Road stretching from Rudmore roundabout south to Church Street roundabout	NO	46.25 µg/m^3	From 39.17 µg/m^3 to 34.29 µg/m^3	PCC	2019
AQMA 12	2005	NO_2 Annual Mean	PCC	An area encompassing a number of residential properties along Queen Street mainly an area stretching from The Hard to St James's Road	NO	33.11 µg/m^3	From 34.04µg/m^3 to 31.2µg/m^3	PCC	2019

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

7 Table 2.1 – Progress on measures to improve air quality

Measure 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
APV1	Car Clubs	Alternatives to Private Vehicle Use	Car Clubs	PCC	2020	2020	Use of Car Club	<0.1µgm3 Car Club sharing has the potential to reduce the cars per person on the road and therefore reduce emissions.	A report detailing the rationale for Car Clubs is expected to be raised at cabinet in July 2020.	2021	Currently no funding is available, this will be key to delivering the scheme.
APV2	Promoting bus use	Alternatives to private vehicle use	Bus based Park & Ride	Bus Operators	2009	Ongoing	Increase in bus patronage	N/A	Increasing bus vehicle miles and bus patronage is the responsibility of the bus operators. Portsmouth City Council work closely with the operators to encourage usage and increased punctuality and so making public transport more attractive	Ongoing	
APV3	Working with South Western Railway to implement investments through the new Rail Franchise	Alternatives to private vehicle use	Other	PCC/SWR	2019	Ongoing	N/A	N/A	PCC are working with South Western Railway to see improvements to rail stations in Portsmouth. This includes improved and additional electronic signage at stations and improved information on onward connections, by bus and ferry, to be completed 2019/20. Meetings continue to be held with rail operator to work through proposals to improve stations and services	Ongoing	
APV4	Park and Ride decking	Alternatives to private vehicle use	Bus based Park & Ride	PCC funding feasibility study	2017	Ongoing	Initial completion of additional scoping work. Long term - introduction of Park and Ride decking	<0.1µgm3 If this development is successful it would potentially double the parking spaces available at the park and ride, assisting in reducing traffic flow	The feasibility study has been completed for this scheme, and if developed will provide increased parking space availability at the Park and Ride site, allowing for increased usage of the service. At present, the Park and Ride provides 665 parking spaces. If the new decking is	Ongoing	Currently no funding to take this scheme forward to the next stage

								through into the city through AQMA 11	developed to make the car park a multi-storey, it is proposed that an additional 1000 spaces will be provided, taking the total car parking spaces up to 1650.		
C1	The provision of appropriate cycle parking at key destinations across the city	Promoting Travel Alternatives	Promotion of cycling	PCC	Ongoing	Ongoing	N/A	N/A	Cycle parking is continually introduced and improved as required and as funding is available. Further cycle parking will be provided at various locations through ongoing schemes. Throughout 2020/21 PCC will oversee the provision of new bike 'hangars' which will facilitate the storage of multiple bikes.	Ongoing	The ongoing continuation of this will be dependent upon funding resources. A small amount of funding is available for 2019/20, which will be prioritised according to need
C10	Local Cycling and Walking Infrastructure Plan (LCWIP)	Promoting Travel Alternatives	Promotion of cycling	Feasibility funded by PCC, technical support provided by DfT	2017	Ongoing	Completion of LCWIP	<0.1µgm3 This measure will support cycling in the city	The production of a Local Cycling and Walking Infrastructure Plan (LCWIP) for Portsmouth is underway, following the production of Government's Local Cycling and Walking Investment Strategy. PCC were successful in securing technical support for the development of the LCWIP, which is now with the Secretary of State for review.	Pending approval from Secretary of State and consultation - ongoing.	
C2	Bike Hire Scheme	Promoting Travel Alternatives	Promotion of cycling	No funding currently available	2017	Ongoing	Delivery and uptake of Bike Hire scheme	<0.1µgm3 This scheme is likely to provide only a very small reduction in air pollution initially, however, there is the possibility that greater overall reductions could be achieved over time, as uptake of the scheme increases.	Implementation of a city wide bike hire scheme. This scheme will require development and funding to be progressed	Currently unknown	Promotion and marketing of this scheme will be required to support its launch and delivery
C3	Family Cycle Grants and Family Cycle Training	Promoting Travel Alternatives	Promotion of cycling	PCC, funded through Defra Air Quality Grant	2017	2018/19	Uptake of Family Bike Grant scheme and cycle training	N/A	Successfully delivered in 2016/17, enabling lower income families to access safe cycling and move away from the private car. Also successfully delivered in 2018/19 through the Air Quality Grant. For the family cycle training scheme, 36 families received cycle training, to increase skills and confidence, learn to effectively shepherd children and to journey plan. A further 22 sessions have run cycle maintaining training. Evaluation suggests that both training sessions have been very well received and have been effective in increasing confidence and	Completed in March 2019	Further roll out of this scheme will be dependent upon further funding becoming available

									rates of cycling, and reducing the barriers to cycling. For the family cycle grants, 24 families received a grant towards new bikes and associated safety equipment (helmets, lights, locks and high vis). 36 adult bikes were funded and 33 children's bikes. Feedback suggests that the families in receipt of the bikes and safety equipment are cycling more, using the bikes for leisure, school and work and are cycling more as families.		
C4	Community Cycle Hub Continued partnership working to support and generate income through community events and initiatives using Bike Doctor	Promoting Travel Alternatives	Promotion of cycling	PCC	2014	2019	Level of uptake of Cycle Hub services	N/A	Ongoing - support of a cycle hub providing maintenance, training and retail of cycle goods. Cycle hire provision also available. Continuation of the Bike Dr maintenance sessions across the city.	Ongoing	Community Cycle Hub initiatives were funded up to 2019 through the LSTP. Now intended to be self-sufficient PCC are looking to secure another supplier to continue the activity of the Cycle Hub.
C5	Supply of sustainable travel options for staff business travel	Promoting Travel Alternatives.	Promotion of cycling.	PCC	Ongoing	Ongoing	Uptake of pool bikes, electric vehicles for business staff travel	<0.1µgm3	Pool bikes are available for staff business use. This initiative is currently being relaunched with the booking system being updated to enable online bookings, a cycle maintenance stand to be provided at the PCC Civic Offices	Ongoing	The cycle maintenance stand will be available for use by staff using the pool bikes, but also by staff travelling to work by bike, adding a further incentive to staff to consider sustainable travel to work
C6	City-wide Early Release Low Level Cycle Signals	Promoting Travel Alternatives	Promotion of cycling	PCC	2018/19	2019	Installation of early release signals	<0.1µgm3 This measure will support cycling in the city	The installation of low level signals and early release at existing signalised junctions, improving cycle safety. Installation at sites has begun.	2019/20	
C7	Quieter Routes	Promoting Travel Alternatives.	Promotion of cycling.	PCC	2016	2019/20	Upgrading of signage	<0.1µgm3 Supports travel behaviour change, strengthening the cycle routes in the city, particularly for short local journeys	A number of 'Quieter Routes' have been marked out in the city, with the use of coloured stickers on lampposts. There are currently five routes between the north and south of the city, and five between the east and west. Signage was upgraded on these routes during 2019/20 with continued	19/20	The existing network of 20mph roads support the formation of the 'Quiet Routes' network

									investigation of new signage to further improve the routes.		
C8	Road Safety and Active Travel Events Programme	Promoting Travel Alternatives.	Promotion of cycling.	PCC	2017	Ongoing	Delivery of cycling events and attendance levels.	N/A Whilst the events themselves won't deliver a significant reduction in pollution levels, the awareness raising achieved will have longer term benefits	Successfully delivered Pedal Portsmouth events, Glow Ride, Changing Places and Be bright be Seen in 2017 and 2018. Pedal Portsmouth Events, Glow Ride, Changing Places and Be Bright Be Seen events were all due to run in 2019.	Ongoing	
C9	Promoting Road Safety & Active Travel initiatives. For example; - educational programmes in schools - Road safety behaviour change with students and commuters -Cycle promotion through community based cycle events to promote quieter routes. - Cycle Hub to support events with the provision of Bike Dr. Stakeholder engagement to support CyclingUK set up Community cycle groups	Promoting Travel Alternatives	Promotion of cycling	PCC,	2010	Ongoing	Delivery of cycling, road safety and active travel initiatives	N/A Promotion of active travel initiatives will support the uptake of sustainable travel modes and contribute to positive travel behaviour change	Walking and cycling map is a popular resource. Planning is underway for an interactive map on the council website. Works in conjunction with stakeholders such as Portsmouth Cycle Forum continue. Educational programmes in schools continue to be delivered, such as the Pompey Monsters Challenge.	Ongoing	A small amount of funding was available for 2019, but further funding will be required to take forward into the future

O1	Domestic heating emissions	Other	Other	PCC	2014	2021	Uptake of scheme	Unknown	PCC have received funding for a boiler replacement scheme and to date have installed 40 new boilers. Fuel Cell Micro-CHP Installations were also carried out in 2018/19, with monitoring of the performance of the systems being conducted by remotely accessing generation data. 8 Completed installs were being carried out in 2018/19, with new installs being carried out in 2019/20.	Ongoing	
O2	Bidding for Funding	Other	Other	N/A	Ongoing	Ongoing	Successful applications for additional funding towards Air Quality improvements and initiatives	N/A	We will seek funding opportunities to assist with air quality initiatives wherever possible	Ongoing	
O3	Explore new technology	Other	Other	PCC	2017	Ongoing	Implementation of research into new technology, as opportunities arise	There is the potential for significant reductions in NOX to be achieved through the introduction of new technologies	Undertake research and test new transport technologies to reduce levels of NOx and consider their potential use within future strategies. Research into other technologies beyond transport based solutions, for example green infrastructure.	Ongoing	
PGDC 1	AQ improvement through the planning process	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	PCC	Ongoing	Ongoing	N/A	<0.1µgm3	There is an ongoing involvement with Planning Policy on the air quality effects of developments through the Planning Process. Consideration is given to limiting air pollution issues which may arise from new developments both during and after construction	Ongoing	The Planning Department are represented on the Air Quality Board
PGDC 2	Air Quality Board	Policy Guidance and Development Control	Other	PCC	2018	2018 and ongoing	Regular meetings/updates to Air Quality Board	N/A	An Air Quality Board was formed in 2018 and includes wide departmental involvement from Transport Planning, Regulatory Services, Planning, Public Health, Housing and the Port Authority	Ongoing	In 2020 the AQ board will undergo a restructuring to better accommodate wider Air Quality scope, and to ensure the successful delivery of the AQ Local Plan
PGDC 3	Portsmouth International Port Air Quality Action Plan	Policy Guidance and Development Control	Low Emissions Strategy	PCC, PIP, DfT	2019	Ongoing	Delivery of plan to reduce emissions	There is the potential for significant reductions in emissions around the Port.	Outline Action Plan to be submitted to DfT summer 2020.	Ongoing	

PGDC 4	Air Quality Local Plan	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	DEFRA	2019	2020/21	Reduction in NOx to within legal limits	The plan aims to achieve a significant reduction in NO_2 emissions, particularly in areas which current exceed legal limits.	OBC approved March 2020, development of the FBC and procurement of CAZ supplier ongoing and expected to be approved end of 2020 / early 2021. CAZ installation to take place in 2021 ready for go-live by the end of the same year.	Ongoing	
PI 1	Provision of information regarding air quality, including real time monitoring data and information regarding assessments of air quality to enable public awareness of issues and success of actions implemented	Public Information	Other	PCC	Ongoing	Ongoing	Collection of monthly air quality readings Production of Annual Status Report to inform public of monitored data	N/A	Widespread monitoring of NO_2 is undertaken across the city using diffusion tubes. There are also five continuous monitoring stations, with a sixth to be installed during 2020/21. Data on levels of particulate matter is collected at 3 locations. This data is available through the Annual Status Report	Ongoing	
PI 10	Air Quality Communications and Marketing - Clean Air Day 2018	Public Information	Via the internet Via leaflets Via other mechanisms	Funded through DEFRA Air Quality Grant	2018	21st June 2018	Involvement and participation in Clean Air Day events	Whilst there were not significant reductions in air pollution during this day, it assisted in raising awareness of air pollution, its effects on health, and ways in which people could consider travelling more sustainably	Completed	Completed on 21/06/18	Various activities were held across the city to coincide with Clean Air Day. Activities included: Roadshow type event at various locations, free park and ride access on Clean Air Day to people previously signed up, electric bike demonstration, Bike Doctor, resources including air quality facts/myths and sustainable travel information
PI 2	Air Quality Communications and Marketing - Clean Air Day 2019	Public Information	Via the internet Via leaflets Via other mechanisms	PCC	2019	20th June 2019	Involvement and participation in Clean Air Day events	Whilst there were not significant reductions in air pollution during this day, it assisted in raising awareness of air pollution, its effects on health,	Completed	Completed on 20/06/2019	Various activities were held across the city to coincide with Clean Air Day. Activities included:

								and ways in which people could consider travelling more sustainably			
PI 3	Air Quality Communications and Marketing - Clean Air Day 2020	Public Information	Via the internet Via leaflets Via radio Via other mechanisms	PCC	2020	Delayed due to COVID-19	Involvement and participation in Clean Air Day events Uptake of public transport	Whilst there are not likely to be significant reductions in air pollution during this day, it will assist in raising awareness of air pollution, its effects on health, and ways in which people could consider travelling more sustainably	Various events to be held raising awareness of air quality and its effects on health, and promoting sustainable travel, focussing on PCC staff, residents, local businesses, and schools. Initial preparation for events underway	To be held at the end of 2020	Ongoing engagement with Clean Air Day is dependent upon future funding. It is hoped that engagement in forthcoming years will be possible
PI 4	Air Quality Steering Group	Public Information	Other	PCC	2018	2018 and ongoing	Attendance at Air Quality Steering Group	N/A	An Air Quality Steering Group was formed in 2018, with several meetings having been held in 2019/2020. This group includes representation from local residents groups, businesses and organisations, active travel groups, and relevant officers from PCC. The format of the steering group is being reconsidered so that it is more productive.	Ongoing	
PI 5	Sustainable Travel Behaviour Change	Public Information	Other	Some historical schemes funded through DEFRA PCC	2012	Ongoing	Increase in change in travel behaviour away from the private car to more sustainable modes of travel, particularly for short local journeys around the city	<0.1µgm3 Raising awareness of sustainable travel options through various schemes and initiatives, and encourage consideration of uptake	Much good work has been carried out through Local Sustainable Transport Fund, Sustainable Travel Transition Year Grant and Clean Air Grant 2018/19 Further sustainable travel behaviour work will come as part of the Air Quality Local Plan in 2020/2021.	2019/20 and ongoing	The promotion of sustainable travel is an ongoing element of many schemes, and the My Journey programme. Future running of specific behaviour change programmes will be dependent upon securing future funding
PI 6	Clean Air Network	Public Information	Other	PCC (funding yet to be identified)	2019	2020 and ongoing	Sign up rate for the Clean Air Network	N/A	A Clean Air Network (CAN) is to be set up, to engage with local businesses, interest groups, residents and educational institutions, to encourage reduced levels of air pollution in the city through changes in personal and organisational actions	Ongoing	Initial research into the setting up of a CAN in Portsmouth has been undertaken, with a view to initiating this network in 2020
PI 7	Personal Journey Planning	Public Information	Via leaflets Via other mechanisms	Funded through Defra Air Quality Grant in 2018/19	2018	2018	No. of people engaged within residential and events based activities	<0.1µgm3 Awareness raising with local residents and visitors	Personal Journey Planning (PJP) work was undertaken during 2018 as part of the Air Quality Grant work. An element of this programme focussed on PJP in AQMA 6, involving both residential and event based activities.	2018	Future Personal Journey Planning dependent upon further funding

									Previous PJP work has also been carried out with the use of Travel Advisors, through the LSTF and Sustainable Travel Transition Year programmes. Where funding has been available on street travel advisors has been used at various events held across the city		
PI 8	Air Quality Communications and Marketing - Market Research	Public Information	Via the internet Via leaflets Via other mechanisms	Funded through DEFRA Air Quality Grant	2018	2018	Number of responses received to the market research exercise	N/A	Completed	Completed	This consultation, which was open for five weeks, gave residents and employees of businesses in Portsmouth the opportunity to provide insight into views of current air quality in the city, and gave opportunity to explore where people think are the most impacted areas with regards to air pollution. It was promoted through various channels, and attracted 628 responses.
PI 9	Air Quality Communications and Marketing - Anti Idling Campaign	Public Information	Other	Funded through DEFRA Air Quality Grant	2018	Ongoing	Reduction of idling vehicles in the city Raising awareness and educating drivers about the impact of engine idling.	<0.1µgm3 Whilst not delivering a significant reduction in air pollution, this campaign has raised significant awareness of the need to switch off vehicle engines when stationary for more than a couple of minutes.	Anti-idling campaign complete but lamppost banners still in place, to remain for foreseeable future The second phase of the campaign is due to launch early 2020, with activities for the public to get involved with.	Ongoing	
PI11	Traveline	Public Information	Other	PCC	2016	Ongoing	Continued up to date travel and public transport information on Traveline	N/A Although not delivering measurable air pollution reduction targets, public transport information supports uptake of active travel	Traveline consists of a national database for all bus stops and timetables which is updated daily, providing comprehensive information and is used to populate all journey planning engines	Ongoing	

PI12	Public Transport Network Maps	Public Information	Other	PCC	2017	Ongoing	Completion of online mapping system	N/A Supporting public transport use	New Public Transport Network Hub map produced in 2017 An online mapping system using network maps was developed and completed June 2018. Work is ongoing to explore the development of online active travel maps.	Ongoing	Bus route maps are updated on a regular basis
PI13	Public transport information	Public Information	Other	PCC, with TCF element funded by DfT	2012	Ongoing	Provision of public transport information	N/A Although not delivering measurable air pollution reduction targets, public transport information supports uptake of active travel	SMS/ texting / bus timetable downloads; Improved Shelters with 90 real-time passenger information units have been installed in 2017/18. The TCF Tranche 1 has delivered 120 RTI units which have been installed at bus stops across the city, with a further 20 RTI pole only locations and 12 interchange screens with bus destinations. Further planning is being made to include journey planning features.	Ongoing	
PI14	Public Transport Hub Maps	Public Information	Other	PCC	2018	2018	Feedback from forthcoming 2019 National Highways and Transport (NHT)survey will give some indication of public satisfaction of public transport information provision	N/A Supporting public transport use	Bespoke Hub Map created for all Portsmouth Stations excluding Hilsea, International Port and Q.A. Hospital and these maps were created in 2018.	Completed	A specific question on public transport information in included in NHT surveys, which provides some indication of levels of satisfaction for this
PLE T1	Electric Vehicle Charge Point scheme - off street	Promoting Low Emission Transport	Other	Charge points funded by City EV Bay marking and electricity funded by PCC	2018	2020	Installation of charge points and level of usage	<0.1µgm3 This measure will initially only achieve a very low level of NO_2 reduction. There is potential for greater reductions to be achieved over time as EV usage increases across the city	Off street charge points have been installed at 3 car parks in the city: Isambard Brunel Multi storey, Esplanade car park and Clarence Pier car park	2020	The trial will be completed in 2020. An off- street charging policy is currently being produced.

PLE T2	Electric Vehicle Residential Charge point schemes - phase 1	Promoting Low Emission Transport	Other	Office for Low Emission Vehicles (ORCS) Grant	2018	2019	Installation of charge points and level of usage	<0.1µgm3 This measure will initially only achieve a very low level of NO_2 reduction. There is potential for greater reductions to be achieved over time as EV usage increases across the city	36 on-street charge points have been installed through the ORCS scheme, at various locations in the city, where requested by residents. All charge points have been installed at locations where the resident does not have off street parking.	May 2019	Information is being gathered on further residents interested in a residential on-street charge point, to further develop the network when funding becomes available
PLE T3	Electric Vehicle Residential Charge Point scheme - phase 2	Promoting Low Emission Transport	Other	Office for Low Emission Vehicles (ORCS) Grant	2019	2020	Installation of further charge points and level of usage	<0.1µgm3	Funding for the second phase has been secured, where 79 on-street charging points will be delivered.	2020	
PLE T4	Review of PCC fleet and moving away from diesel vehicles	Promoting Low Emission Transport	Company vehicle procurement	PCC	Ongoing	Ongoing	Reduced emissions from Council vehicles	N/A	Future consideration to be given to PCC fleet procurement, with a view to moving away from Diesel vehicles	Ongoing	Further work is necessary to progress this further, however it is a clear aspiration of PCC.
PLE T5	Electric Vehicle Promotion	Promoting Low Emission Transport	Other	Funded through Defra Clean Air Grant	2018	2019 and ongoing	Uptake of electric vehicles/ULEV	N/A	Promotion of electric vehicle charge points available through OLEV's ORCS scheme, encouraging further uptake of electric and hybrid vehicles in the city. An off street EV charge point trial also taking place at three city car parks	Completed	35 charge points have been installed through the ORCS scheme, and all three off street EV charge points are now fully operational which have had good usage. Funding for 79 more chargers has been secured for the second phase of the project.
PTA1	'Play Streets' Development	Promoting Travel Alternatives	Other	No funding currently available	2019	2020	Delivery of Play Streets	<0.1µgm3 There is the potential for reductions in NO_2 to be achieved in the play street locations	The first Play Street Pilot was successfully delivered along Francis Avenue	Ongoing	Work is ongoing so that neighbourhoods can arrange their own committees so they are able to organise play street events themselves.
PTA2	Safer Routes to School Minor Remedial Works	Promoting Travel Alternatives	School Travel Plans	PCC	2014	2030	Completion of schemes, and uptake by parents/pupils	<0.1µgm3 Safer routes to school schemes tend to be small scale, supporting sustainable travel to	This work is on-going and will be completed year on year.	Ongoing	

								school through increasing safety and supporting walking to school			
PTA3	Pompey Monster Walk to School Challenge - school behaviour change	Promoting Travel Alternatives	Promotion of walking	PCC, further work funded through Defra Clean Air Grant	2016	Ongoing	Uptake of scheme by schools	<0.1µgm3 Supporting sustainable travel to school	The Pompey Monsters Scheme was introduced in 2016/17, and a trial of the scheme was carried out at three schools in the city, as part of the STTY scheme. This successful initiative is popular with the children and encouraged an increase in walking to school. This scheme was delivered to 4 further schools within or close to AQMA's in 2018/19, through the DEFRA Air Quality Grant. The scheme now supports 6 schools to encourage travel behaviour change.	Ongoing	6 schools have benefitted from the Pompey Monster Walk to School Challenge through the Clean Air Grant. Half term events in libraries encouraged children to walk with their families. Evaluation is underway to assess modal shift. A new air quality Pompey Monster was developed, Breezy, and air quality messages promoted in the school via assemblies, and also the Pompey Monster packs.
PTA4	School travel plans	Promoting Travel Alternatives	School Travel Plans	PCC, with funding from Air Quality Grant to deliver further schemes in 2018/19	2014	Ongoing	Delivery of school travel plan schemes, and effect on school travel modes	<0.1µgm3 Supporting sustainable travel to school	In 2018/19, 14 schools in AQMA areas took part in gathering parent pledges to travel to school sustainably to improve air quality. Park and Stride maps were created and distributed to 2 schools and 15 schools have received Scootability training. Evaluation suggests that the training was well received and has increased following the training.	Ongoing	Further development of school travel plan schemes dependant on funding and resource
PTA5	Workplace travel plans (WPTP)	Promoting Travel Alternatives	Workplace Travel Planning	PCC, and DEFRA Air Quality Grant	2014	Ongoing	Number of travel plans implemented, or engagement with WPTP activities	<0.1µgm3 Workplace travel plans can support increases in sustainable travel	There are over 40 active WTP in total. More WTPs expected. Easit offers a range of benefits including discounts on peak train travel, cycling, & electric vehicle for employees of member organisation. Many large employers provide discounted bus travel for staff. PCC works with these employers to promote sustainable travel Through the Clean Air Grant fund, workplace travel planning activities were carried out with 4 large businesses located within or close to an AQMA	Ongoing	The work delivered through the Clean Air Grant 2018/19 provided various engagement materials to the 4 businesses involved, including, Clean Air Initiative flyers, travel information flyers, printed and online pledge cards. Clean Air Initiative flyers were also distributed to SME's along the AQMA 6 corridor. Through "lunch and Learn" sessions, eco driving, bike doctor

											and engagement, 94 people have pledged to travel to work more sustainably. Follow up emails will be sent to all those that have pledged to see if there has been any modal shift. Further Workplace Travel Planning activities are dependent upon further funding becoming available
PTA6	Workplace Sustainable Travel Fund (WSTF)	Promoting Travel Alternatives	Workplace Travel Planning	PCC, further work funded through Defra Air Quality Grant	2016/2017	Ongoing	Delivery of WSTF to businesses located close to or within an AQMA	<0.1µgm3 Whilst this fund would only make a very small impact on local air pollution levels, it is a useful measure in raising awareness of and supporting sustainable travel for local work related journeys	The WSTF was carried out in 2016/17 through STTY, with 8 organisations successfully receiving funding for sustainable travel and a total of 11 organisations receiving a package of supporting measures. Through the Clean Air Grant 2018/19, 9 small businesses received grants of up to £2000 to implement changes to allow employees to travel to work more sustainably. Evaluation suggests that employees are making use of the new facilities and walking/cycling has increased.	Completed	Further provision of this scheme will be dependent upon further funding becoming available
PTA7	Emergency Active Travel Fund	Promoting Travel Alternatives	Other	DfT	2020	2020	Shift to active travel modes	There is potential for NOx emissions to be improved on some links in the city where active travel measures are introduced, if modal shift is achieved.	PCC were successful in securing funding from the first round of the DfT Emergency Travel Fund. This funding will be used to deliver a range of active travel schemes in the city. PCC will also be making a bid to the second round of this funding and are in the process of prioritising which measures should be included.	Ongoing	
TM1	LTP Programme	Traffic Management	Strategic highway improvement, re-prioritising road space away from cars, including	PCC	Ongoing	Ongoing	Implementation of LTP schemes	<0.1µgm3 Pollution reductions achieved by individual LTP schemes will be low, however the combination of these measures would likely have an overall positive	On-going schemes being developed through the LTP will provide improvements to local air quality	Ongoing	

			Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane.					impact on assisting with reducing levels of NO_2			
TM10	Speed Reduction Schemes	Traffic Management	Other	PCC	2018	2020	Implementation of schemes	<0.1µgm3 Speed reduction measures can help in increasing uptake of walking and cycling through improved safety	Various speed reduction schemes have recently been completed to improve safety and encourage uptake of walking and cycling. Measures included additional speed cushions and coloured surfacing. Further speed reduction schemes have been implemented throughout 2019/20 across the city to improve road safety.	2019/2020 Ongoing	
TM2	Signs and Lines	Traffic Management	Other	PCC	2018	2020	Implementation of schemes	N/A Whilst these measures will not deliver measurable air pollution targets, they will assist in improving traffic flow	Various small city wide improvements to existing road signage and markings were carried out in 2019/20.	2019/2020 and ongoing	
TM3	Variable message signs	Traffic Management	Other	PCC	2009	Ongoing	Installation of VMS	<0.1µgm^3	Several VMS signs are already in place in the city. In late 2017 five new signs displaying live car park occupancy information were installed. These signs incorporated the 'Cough Cough Engine Off' anti-idling campaign messages between January and April 2019. One main sign is still displaying this message, and will continue to do so for the foreseeable future. Potentially a further 3 or 4 signs will be installed during 2019/20	2018 and ongoing	Ongoing as need and funding arises
TM4	Traffic Signal Reconfiguration	Traffic Management	Other	PCC	2014	Ongoing	Completion of signalised junction and crossing review	<0.1µgm3 Will provide improved journey times and less congestion in specific areas	TSOP was delivered at eleven junctions in the city in 2017, with MOVA technology being introduced. These schemes delivered more efficient traffic flow Some minor junction improvements, such as timing improvements, were carried out in 2018/19, which will incorporate improvements to cycle safety.	Ongoing	Further improvements are dependent on funding

									A number of signalised junctions and crossings will be reviewed to ensure correct and efficient operation.		
TM5	Junction improvements	Traffic Management	Strategic highway improvements	PCC	2013	Ongoing	Completion of city wide junction review	<0.1µgm3 Will provide improved journey times and less congestion in specific areas	On-going improvements to junctions. Recently completed 3 junction upgrades as part of an award from Tranche 1 of the Transforming Cities Fund. These included more efficient vehicle detection and low-level cycle signals. 2 junction upgrades on two of the city's busiest junctions to improve pedestrian facilities including the first example of an "X" crossing in Portsmouth were also completed during 2019/20.	Ongoing	
TM6	Smart Motorways M27 Jct. 11	Traffic Management	Strategic highway Improvements Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Other	2017	2019	Completion of works	Unknown	Upgrade and improvements from M27 Junction 4 - junction 11 to the A27/A3 (M) junction to include: Smart Motorways, ALR, and off-HE network investment in connecting junctions including Farlington and Portsbridge roundabouts.	2020	Programme to junction 11 is underway
TM7	Wightlink increased vehicle stacking capacity and reduced queuing	Traffic Management	Other	Wightlink	2017	2018	Reduced queuing of vehicles entering the ferry port following completion of planned works	<0.1µgm3 Significant congestion can occur at this location. The introduction of ANPR will go some way in addressing this issue and reducing local NO_2 levels	Wightlink undertook work to facilitate increased capacity, improved loading and vehicle waiting facilities in 2017. Further work was completed in 2018 to implement Automatic Number Plate Recognition (ANPR), which allows for faster check in times and reduce ferry related congestion. Electric vehicle charge points were installed at the Wightlink terminal in 2018.	ANPR - Completed Vehicle Stacking - ongoing	Wightlink have reported reduced queuing times since the scheme was completed. Development of vehicle stacking infrastructure is ongoing.
TM8	Eastern Corridor Phase 2 Works	Traffic Management	Other	PCC	2017	Ongoing	Completion of all schemes of works	Milton Common cycle path design/planning permission/ Milton Common Restoration and Management Framework possible update to allow the	A comprehensive study of the Eastern Road corridor was conducted, which will deliver identifiable solutions for this key corridor into the city. The study identified problems of current uses and identified future uses and solutions.	Ongoing	Milton Common Cycle Path falls within a site of importance for Nature Conservation (SINC) and is close to sites that are important for

								cycle path is underway. Phase 2 feasibility study regarding carriageway widening and one left slip lane onto A27 is underway.	Further development of the plan is on hold to ensure shared interests with the Coastal Defence strategy are met.		Brent Goose feeding. Planning permission or permitted development is required. Development alongside Coastal Defence works.
TM9	A27 Safer Roads Funds	Traffic Management	Strategic highway improvement, re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	DfT, PCC	2017	2020	Delivery of traffic safety measures	<0.1µgm3	Traffic safety measures including improved facilities for active travel modes, high friction surfacing, signage, and modifications to the shared footway.	2020	
TPI1	Access for people with disabilities	Transport Planning and Infrastructure	Other	PCC	2016	Ongoing	Delivery of measures to support access for people with disabilities	N/A Whilst not delivering high levels of direct pollution reduction, these measures will support mobility	To provide low cost measures citywide in Portsmouth where improvements to the kerb lines, signing and street furniture will aid mobility for the disabled and parents with young children in prams and pushchairs. Encouraging active travel modes. Further small scale schemes will be delivered in 2020/21	Ongoing	
TPI2	South East Hampshire Rapid Transit (SEHRT)	Transport Planning and Infrastructure	Bus Route Improvements	DfT, with PCC/ Hampshire and IOW funding development bid	Ongoing	Ongoing	Submission of re-bid	<0.1µgm3 This scheme would deliver significant benefits to the city in terms of public transport provision	Re-bid submitted July 2020 awaiting approval.	Ongoing	The Portsmouth & South East Hampshire City Region Transforming Cities Bid was 1 of 12 cities shortlisted into the co-design phase with the DfT. SEHRT remains a key aim for PCC despite an initial bid

											for funding from the Transforming Cities Fund (TCF) proving unsuccessful. A revised bid for a scaled back series of bus priority and walking/cycling interventions across the Portsmouth and South-East Hants region was submitted on July 3rd 2020.
TPI3	Transforming Cities Fund	Transport Planning and Infrastructure	Other	DfT	Ongoing	Ongoing		This scheme would deliver significant benefits to the city in terms of public transport provision and promoting active travel alternatives.	For £56m, the revised package will deliver 23 schemes agreed across the partnership of Hampshire County Council (10, £19.6m), Portsmouth City Council (9, £26.7m) and the Isle of Wight Council (4, £10m).	2023	
TPI4	Central Corridor Scheme	Transport Planning and Infrastructure	Cycle Network	Funded through DEFRA Air Quality Grant	2018	2019	Completion of scheme and improvements to cycle safety along route	<0.1µgm3 This measure will support cycling in the city	Construction of raised tables at various sites along the A2047 and improvements to the cycle lane have now been completed.	2019	
TPI5	Holbrook Road/ Arundel Street Roundabout	Transport Planning and Infrastructure	Other	PCC	2019	2019/20	Completion of works	<0.1µgm3 Will increase safety for cyclists and encourage cycling	Improve signage and lane discipline which will reduce the risks to cyclists at this roundabout, cycling on this route will be more attractive and therefore may increase the number of people choosing to cycle.	2020/21	
TPI6	Northern Parade-Gladys Avenue junction improvement.	Transport Planning and Infrastructure	Other	PCC	2019	2019/20	Completion of works	<0.1µgm3 Will increase safety for cyclists and pedestrians to encourage active travel	A junction improvement that will make safety improvements for both pedestrians and cyclists, through larger pedestrian islands and a surface treatment to increase driver awareness of cyclists.	2019	
TPI7	Zebrite	Transport Planning and Infrastructure	Other	PCC	2018/19	Ongoing	Successful implementation of beacons.	N/A	Roll out of enhanced LED belisha beacons which provide greater increased visibility of zebra crossings and are especially effective at crossings that experience vehicles not stopping for pedestrians. The Zebrite beacons draw attention to the crossing thus making it more likely that a pedestrian waiting to cross will be seen and therefore road safety is improved.	2019	Completion of the project was delayed.

TPI8	Fratton to the Hard Interchange Active Travel Corridor	Transport Planning and Infrastructure	Cycle Network	PCC	2019	2019/20	Implementation of cycle route and usage of route by cyclists	<0.1µgm3 Will increase safety for cyclists and encourage cycling	As part of the Fratton to The Hard Interchange Active Travel Corridor to provide a segregated cycle lane, where feasible between the junction with Haslemere Road/ Goldsmith Avenue and the eastern approach to the Fratton Roundabout. Significant infrastructure. This scheme is currently waiting to be consulted on before any further progress can be made.	2020/21	
TPI9	Re-development of Hard Interchange	Transport Planning and Infrastructure	Public transport Improvements interchanges stations and services	PCC	2014	New Interchange opened in 2017, but benefits to supporting sustainable travel are ongoing	Increase in bus patronage at The Hard Interchange	<0.1µgm3	The new Interchange opened in May 2017, and provides improved links to rail and ferry services and improved pedestrian and cycle links to Gunwharf Quays and tourist attractions, helping to make public transport easier and more attractive to use. The interchange provides a modern, state of the art gateway to the city, with a secure environment for customers	Completed	Bus and coach operators have reported an increase in bus patronage boarding at The Hard, and increased passenger satisfaction.
TPI10	Milton Road/ Priory Crescent Junction/crossing improvement	Transport Planning and Infrastructure	Other	PCC	2019	2019/20	Completion of works	<0.1µgm3 Will increase safety for cyclists and pedestrians to encourage active travel	To improve an existing junction to increase visibility and build cycle lanes to improve safety. This will provide improved cycle safety and improved pedestrian facilities.	2020/21	
TPI11	New Road Copnor-Junction Treatment	Transport Planning and Infrastructure	Other	PCC	2019	2019/20	Completion of Scheme	<0.1µgm3 Will provide improved journey times and less congestion in specific areas	To improve an existing junction, to make safety improvements at the junction and its approaches. This will provide improved pedestrian facilities as well as increased cycle safety.	2020	
VFE1	Bus Retrofit Programme	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	DEFRA	2018	2019/20	Upgrading buses travelling along specific route to Euro 6 standard	Buses upgraded to Euro 6 standard can result in significant reductions in levels of local air pollution. Compliance with legal NO_2 limits along Mile End Road.	The bus retrofit programme is for Stagecoach and First buses running along routes 48196 and 18114, it will enable pre-Euro VI buses running along these routes to be upgraded to the higher emission standard of Euro VI. 105 buses will be retrofitted by the end of the programme, now due for completion summer 2020.	2020	Further bus retrofitting to be carried out if further funding becomes available. Supplier / COVID delays slightly impacted the estimated completion date.

VFE3	Eco Driver Training	Vehicle Fleet Efficiency	Driver training and ECO driving aids	PCC, further work funded through Defra Air Quality Grant	2013	2018/19	Delivery of Eco Driver training to businesses located within or close to AQMA	<0.1µgm3 Whilst this training would only make a very small impact on local air pollution levels, it is a useful measure in raising awareness of and promoting eco driving techniques	Eco Driver Training was delivered as part of the STTY project, with the training being offered to local businesses. Through funding received from Defra's Clean Air Fund, 104 drivers from 6 companies received eco driving training from the Blue Lamp Trust. Businesses within or close to an AQMA area were selected Evaluation from these sessions showed an average fuel consumption decrease of 15%.	Completed	Further provision of this scheme will be dependent upon further funding becoming available
W1	Rights of Way / Way finding and signage rationalisation Routes4U Piloted programme (City-centre) to detail accessible routes for the elderly, visually and physically impaired. Reactive response to rights of way requests. Sustainable way finding signage and repair of damage	Promoting Travel Alternatives.	Promotion of walking.	PCC	2012	Ongoing	Delivery of access improvements for pedestrians	N/A	Rights of Way Improvement Plan review completed by 2019. PCC currently working on a contract for Routes4U, to bring about access improvements for pedestrians. This contract has been signed until the end of 2022	Ongoing	

W2	Promote walking Road Safety & Active Travel initiatives set and prioritised around improving road safety for pedestrians and behaviour change. Educational programmes in schools such as, pedestrian training, Junior Road Safety Officers and Pompey Monster Walk to School Challenge, along with supporting measures such as Park and Stride. Partnership work with Routes4U and local action groups to support local walking initiatives	Promoting Travel Alternatives.	Promotion of walking.	PCC	2010	2030	Development of new walking and cycling strategy, uptake of initiatives such as Pompey Monsters Walk to School Challenge	N/A Whilst not providing a direct pollution reduction target, promoting active travel initiatives will support the uptake of sustainable travel modes and contribute to positive travel behaviour change	Walking and cycling map is a popular resource. Planning is underway for an interactive map on the council website. Works in conjunction with stakeholders such as Portsmouth Cycle Forum continues. Education programmes in schools such as Bikeability and Pompey Monsters continue to be delivered. Junior Road Safety Officers are recruited annually and Portsmouth Smart Steps awards scheme has been developed in line with this.	Ongoing	A small amount of funding is available for 2020, but further funding will be required to take forward into the future
W3	Local Cycling and Walking Infrastructure Plan (LCWIP)	Promoting Travel Alternatives	Promotion of walking	Feasibility funded by PCC, technical support provided by DfT	2017	Ongoing	Completion of LCWIP	<0.1µgm3 This measure will support walking in the city	The production of a Local Cycling and Walking Infrastructure Plan (LCWIP) for Portsmouth is underway, following the production of Government's Local Cycling and Walking Investment Strategy. PCC were successful in securing technical support for the development of the LCWIP, which is now with the Secretary of State for review.	Pending approval from Secretary of State and consultation - ongoing.	
W4	Active Travel Improvements	Promoting Travel Alternatives	Promotion of walking	No funding currently available	Ongoing	Ongoing	Increased modal shift indicated by increased levels	<0.1µgm3	Various small-scale infrastructure improvements across the city to assist modal shift away from the car toward	Ongoing	No current funding

							of walking and cycling		more active travel modes such as walking and cycling		

Key

	Funding available / in an Air Quality Management Area
	No funding currently available but likely
	No funding currently available
	Completed

8 $PM_{2.5}$ – 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. Inhalation of particulate pollution can have adverse health impacts, and there is understood to be no safe threshold below which no adverse effects would be anticipated[20]. Long-term exposure to $PM_{2.5}$, increases the age-specific mortality risk, particularly from cardiovascular causes. Exposure to high concentrations of PM, for example, during short-term pollution episodes, can also exacerbate lung and heart conditions, significantly affecting quality of life, and increase deaths and hospital admissions[21]. Whilst the tiny airborne particles are not defined by composition or toxicology, when inhaled they can be drawn deep into the respiratory tract, crossing over into the blood stream.

Particulate matter is everything in the air that is not a gas, a suspension of particles which are solid, liquid or somewhere in between. It can come from natural sources such as pollen, sea spray and desert dust, and human made sources such as smoke from fires, soot from vehicle exhausts, dust from tyres and brakes, as well as emissions from industry.

Particles emitted directly from these sources are called primary PM. Secondary PM is formed in the atmosphere through chemical reactions between other air pollutant gases such as nitrogen oxides (NOX), ammonia (NH3) and sulphur dioxide (SO2). Particulates are classified according to size, either as PM_{10} (particles of ≤10µm (micrometres) diameter) or $PM_{2.5}$ (particles of ≤2.5µm diameter particles which are 200 times smaller than a grain of sand).

The Government's 2019 Air Quality Strategy states that 38% of UK primary PM emissions come from burning wood and coal in domestic open fires and solid fuel stoves, 12% comes from road transport (e.g. fuel related emissions and tyre and brake wear) and a further 13% comes from solvent use and industrial processes (e.g. steel making, brick making, quarries, construction).

[20] Air Quality Guidelines, Global Update 2005, World Health Organization (2006) (PDF, 3.8MB, 496 pages)
[21] Air Quality and Health Question and Answer, World Health Organisation (PDF, 49.5KB, 3 pages)

Here are some examples of PCC measures to address microscopic particulates measured as $PM_{2.5}$:

- The phasing out of pre euro-V emission buses substantially reduces particulate emissions from the local bus fleet.
- Continuing to monitor and control the Smoke Control Areas (SCA) in place within the south west region of Southsea[22].
- Continuing to investigate complaints in respect to the burning of garden, household and commercial waste.

[22] Portsmouth City Council Smoke Map PDF

9 Air quality monitoring data and comparison with air quality objectives and national compliance

9.1 Summary of monitoring undertaken

This section sets out what monitoring has taken place by PCC.

PCC's NO_2, $PM_{2.5}$ and PM_{10} monitoring programmes are annually assessed to ensure that the LAQ monitoring requirements of the R&A process are met. This includes the additional Ambient Air Quality Directive[23] (AAQD) measurement requirements.

According to AAQD measurements must meet certain siting requirements. These requirements must be met for measurements collected by either method (automatic chemiluminescence analysers or NDDT). A summary of the AAQD siting requirements as provided in Annex A outlines that siting requirements for NO_2 measurements at roadside / urban traffic sites must be carried out at locations which meet the siting requirements set out in Annex III of the AAQD. For example:

- Measurements should not be sited within 25m of a major junction
- Measurements should be made within 10m from the kerbside (NB. given the uncertainties in assessing access using aerial photography, roads with no clear access within 15m may be excluded from the PCM modelling).
- The inlet sampling point should be within 1.5 - 4m above the ground
- Measurements should be representative of air quality for a street segment no less than 100m in length.

LAQ monitoring program was therefore subject to the following changes since the publication of the 2017 ASR:

- In accordance with AAQD monitoring requirement, there has been significant change to PCC's AQ monitoring program within the period 2018 - 2019 as the number of the newly added NDDT sites increased by 39.09% (an addition of 43 sites) to reach 153 sites. This substantial increase in NO_2

[23] European Commission Air Quality - Existing Legislation

monitoring using NDDT is to meet both PCC requirement under LAQM regime and the AAQD monitoring requirements. Some of the added monitoring locations are within the two exceedance road links as identified by PCM model for Portsmouth. This LAQ monitoring is to be used instead of the corresponding PCM modelled concentrations for the purposes of determining compliance or non-compliance with the 40 µg/m^3 limit value. Other added monitoring locations across Portsmouth were identified as having similar criteria to those identified in the two road links by the PCM model.

- In addition to the above, PCC is intending to add a new continuous monitoring station at Alfred Road. Whilst the site is significantly constrained, all possible efforts will be made to ensure that this will be sited according to the AAQD monitoring requirements.

- The characteristics and the locations of each of the CAQMS sites are summarised and shown respectively in Table A.1, Appendix A and Map1.

PCC currently monitor LAQ and in doing so meet the following two requirements:

- In respect to the annual mean NAQO, in accordance with LAQM.TG(16) in Section 1.37 and 1.39 (including Box 1.1) emphasis has been placed on monitoring and assessing outdoor locations where members the public might be regularly exposed. These include:

    - Building facades of residential properties

    - Schools, hospitals, care homes, library facades etc.

- According to AAQD measurements must meet certain siting requirements as outlined at the beginning of this section.

9.2 Automatic monitoring sites

PCC continued undertaking automatic (continuous) monitoring at the four PCC owned CAQMSs during 2019. In addition, LAQ monitoring data, from the newly

installed DEFRA CAQMS in Anglesea Road, is included in this report in the second year in a row.

Details of all CAQMS sites are shown in Table A.1 in Appendix A.

Maps showing the location of individual CAQMSs and their proximity to AQMAs are also provided in Map1 to Map6 in Appendix D as follows:

- Map1 shows the CAQMS locations across the city.
- Map2, Map3, Map4, Map5 and Map6 show individual locations of PCC's and DEFRA's owned CAQMSs: London Road, Gatcombe Park, Burrfields Road, Mile End Road and Anglesea Road CAQMSs.

NO_2, $PM_{2.5}$ and PM_{10} continue to be continuously monitored as outlined below in accordance with the QA / QC protocols documented in Appendix C:

- CAQMS C2 (Map3, Appendix D): This station is located in a relatively narrow busy roadside shopping area where large numbers of pedestrians are present (with pavements in places approximately only 2 metres). This station is located within AQMA6. It is originally a fixed kerbside station set up to monitor NO_2, PM_{10} and $PM_{2.5}$ generated by the road traffic along London Road before the pavement was enlarged. Buildings in the immediate vicinity are predominantly commercial. However, residential units are located further north and south of the site typically at first floor level above retail outlet units. This shopping location has some of the characteristics of a street canyon-like sitting with slow moving road traffic often causing congestion. It was refurbished in January 2017 with a new HORIBA's APDA-372 $PM_{2.5}$ and PM_{10} analyser; that replaced the aged Eberline to meet DEFRA's AQ monitoring requirements.

- CAQMS C4 (Map2, Appendix D): An Automatic Urban and Rural Network (AURN) station located in an urban background location at Gatcombe Park Primary School, Curtis Mead. The pollutants monitored at are NO_2, PM_{10} and $PM_{2.5}$. This monitoring station is currently being replaced in its entirety. This significant upgrade will mean that the results from this station will be dramatically reduced in 2020.

- CAQMS C6 (Map 4, Appendix D): This is a fixed roadside station established since 2007 to monitor NO_2 and PM_{10} generated by the road traffic along Burrfields Road. This station is located at a junction with large numbers of pedestrians and residential properties. Buildings in the immediate vicinity are a mixture of both commercial and residential. This station was mainly set up to monitor road traffic related pollution generated from the adjacent Burrfields Road / Copnor Road junction within the revoked AQMA3. The aging PM_{10} analyser in this station was removed in mid of 2018 and has not been replaced since. However, an order has been place for a replacement analyser (Horiba APDA-372) that is due for delivery and fitting in the near future.

- CAQMS C7 (Map5, Appendix D): This station is located within AQMA11 approximately 6.5 metres from Mile End Road kerbside in a residential area. Buildings in the immediate vicinity are all residential. It is a fixed Roadside station established since 2007 to monitor road related NO_2 PM_{10} and $PM_{2.5}$ along Mile End Road and the southern end of the M275 into the City. This CAQMS was refurbished in January 2017 with a new HORIBA APDA-372 $PM_{2.5}$ and PM_{10} analyser; that replaced the aged Eberline to meet DEFRA's AQ monitoring requirements.

- CAQMS C8 (Map6, Appendix D): In accordance with Ambient Air Quality Directive 2008/50/EC, Bureau Veritas identified Anglesea Road (A3) as a road link of main interest in respect of compliance on May the 5th 2016, to enhance the UK coverage of sites in order to better understand the nature of the compliance challenges. As a result, the required site type in the Portsmouth Urban Area was identified as an urban traffic site, which namely requires the site to be located close to a main road. Specifically, the site is required to be within 10m of a road where high level of traffic pollution (NO_2 and PM_{10}) are either modelled, or are already measured. The requirements of the AAQD stated that this site must not be located within 25m of a junction and the location must be representative of 100m of road length. Bureau Veritas installed a fixed roadside CAQMS (C8) as outlined above approximately 2.5 metres from Anglesea Road kerbside in a non-residential urban area. The nearest buildings are some distance and are either

Portsmouth University buildings or HM Naval administrative buildings. This station was established since the beginning of 2018 to monitor road related NO_2 and PM_{10}.

9.3 Non-automatic monitoring sites

PCC revised its non-automatic (passive) monitoring of NO_2 network, NDDT network, to expand it to reach 154 sites up to 2019 including co-locations sites.

This monitoring network expansion was initiated as result of DEFRA's commentary on PCC's 2017 ASR.

Table A.2 in Appendix A shows the details of the sites:

- **Yellow highlighted sites**: Ongoing monitoring sites for many years (**27 sites excluding co-locations**).
- **Blue highlighted sites**: The additional monitoring sites in the period 2017-2018 (**78 sites**).
- **Green highlighted sites**: The additional monitoring sites since the beginning of year 2019 as a result of DEFRA's previous commentary on PCC's ASR reports (**43 sites**).

Maps showing the NDDT locations of the monitoring sites and their proximity to AQMAs are provided in Appendix D.

Due to the large number of monitoring locations and their respective spread across the city maps showing PCC's NDDT monitoring network has been subdivided into 10 maps covering various zones in the city. These are numbered from one to ten to allow clear identification of the site locations:

- Map7: Portsmouth map showing the 11 Zones for NDDT monitoring site locations.
- Map8 to Map18: individual "zoomed in" area maps.

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.

9.4 Individual pollutants

The LAQ monitoring results presented in these sections were subjected to various corrections depending on the monitored pollutant, monitoring methodology, and monitored duration. Hence, LAQ monitoring results presented in this section were, where relevant, adjusted for bias (only NDDT), annualised and distance correction. Further details on adjustments are provided in Appendix C.

The CAQMS's NO_2 data for 2015 / 2019 period is presented on last 5 rows of Table A.3, Appendix A.

9.5 Nitrogen dioxide (NO_2)

The NO_2 continuous monitoring program is supplemented by a non-automatic passive monitoring survey using an extensive NDDT network. These sites are located mainly near busy junctions at kerbside and roadside locations at relevant exposure locations as defined in Box 1.1 of the LAQM.TG(16) guidance. Additional monitoring locations were needed to cover the ministerial directions for the road links to validate compliance in respect of the AAQD.

This monitoring program is no longer focusing on declared / revoked AQMAs but was expanded as outlined above to include locations within the two exceedance road links as identified by PCM model for Portsmouth and monitoring sites in road links of similar criteria across Portsmouth.

The NDDT survey locations and monitoring site characteristics are summarised in Table A2, Appendix A and illustrated in Maps 7-17, Appendix D.

NDDT survey has been conducted in accordance with the QA / QC outlined in Appendix C.

The NDDT network covered 153 locations in 2019. Five of these locations are dedicated to co-location studies.

The 2015, 2016, 2017, 2018 and 2019 NDDT survey data was subjected up to 3 stage adjustments to be directly compared to the NO_2 annual mean NAQO:

9.5.1 Data annualisation:

According to Box 7.10 of LAQM.TG (16), data generated from NDDT survey was firstly annualised where monitoring had been carried out for a period greater or

equal to 3 months and fewer than 9 months. As a result, this assessment covers 43 out of 148 NDDT monitoring locations (29.05% of total NDDT monitoring locations, excluding co-locations).

9.5.2 Bias correction:

Secondly, all NDDT data was subjected to bias correction using locally generated bias correction factor from local co-location study involving the exposure of a triplicate NDDTs at each of the 5 CAQMSs.

The bias correction factor was generated following the approach prescribed on Section 7.190 to 7.198 of LAQM.TG (16) using the calculating precision and accuracy spreadsheet using DEFRAs spreadsheet based Local Bias Adjustment Factor tool.

For 2019 as the reporting year the NDDT co-location study generated the following bias correction factors:

- Tubes exposed at the London Road station (kerbside station) generated 0.92 as the bias correction factor.
- Tubes exposed at both Burrfields Road and Mile End Road stations (both roadside stations) generated 0.91 and 0.75 respectively as the bias correction factors.
- Tubes exposed at the Gatcombe Park station (Urban Background station) generated 0.85 as the bias correction factor.
- Tubes exposed at DEFRA's station (Roadside station) generated 0.8 as the bias correction factor.

The above bias correction factors were averaged using the methodology prescribed in Section 7.192 of the LAQM.TG (16).

The 2019 NDDT survey results were bias adjusted using 0.84 as the average of all the above mentioned bias correction factors.

9.5.3 Distance correction to the nearest relevant exposure:

To predict the level of the pollutant at the façade of the receptors property should the monitoring location be at some distance from the receptor. This was carried out using the calculator that was made available by 'Air Quality Consultants'. This tool is provided to local authorities to predict the annual mean NO_2 concentration for a receptor location that is close to a monitoring site, but nearer or further to the kerb than the monitor.

Two NDDT locations were however subjected to a further adjustment as the monitoring points at these locations are distant from the façade of the nearest relevant exposure.

The two locations are:

- 106 Victoria Road North
- Anchorage Road.

9.6 NO_2 data sets (2015-2019)

9.6.1 Nitrogen Dioxide Diffusion Tube monitoring

2015 NDDT:

The 2015 NDDT survey data concluded that:

- 2015 NO_2 annual mean levels decreased compared with those of 2014 at 72.41% of the monitored locations across the City resulting in an improvement of LAQ
- Most significant improvement was registered at Addison Madden (Hampshire Terrace), 117 Kingston Road, Market Tavern (Mile End Road), 103 Elm Grove, Anchorage Road (Column 6), 221 Fratton Road, Larch Court Church Road (Corner), 2 Victoria Road North, 7 Velder Avenue, 4 Milton Road with a decrease of 12.95, 10.39, 9.81, 5.81, 4.40, 4.18, 3.25, 2.74, 2.16 and 1.99µg/m^3 respectively

- The highest increase was recorded at 88 Stanley Road, in Queen Street, the Tap Public House in London Road, 106 Victoria Road North and Lord Montgomery Way with an increase of 11.21, 2.57, 2.32, 2.20, and 1.76µg/m^3 respectively. However, Data capture at 88 Stanley Road was very poor (two month of readings only) and therefore the increase at this location by 11.21µg/m^3 can be considered as incorrect and not recorded as an exceedance of the NO_2 annual mean NAQO in 2015 at this location

- NO_2 annual mean levels were in excess of the NO_2 annual mean NAQO at:

    - 117 Kingston Road, AQMA6
    - The Tap Public House London Road, AQMA6
    - Lord Montgomery Way, AQMA7
    - 88 Stanley Road (It is important to note that this location is represented by NDDT survey data for only two months which was subjected to all necessary corrections).

2016 NDDT:

The 2016 NDDT survey data concluded that NO_2 annual mean levels were in excess of the annual mean NAQO at the following monitored locations:

- Lord Montgomery Way, AQMA7
- Northern Road
- Albert Road
- London Road CAQMS (C2), AQMA6
- 117 Kingston Road, AQMA6
- The Tap Public House London Road, AQMA6

2017 NDDT:

The 2017 NDDT survey data concluded that NO_2 annual mean levels were in excess of the annual mean NAQO at the following monitored locations:

- "The Tap" public house on London Road, AQMA6
- London Road CAQMS (C2), AQMA6
- 117 Kingston Road, AQMA6

A closer examination at the NDDT survey data for the period 2013 to 2017 revealed that:

- a downward trend emerged at 34.37% monitored locations in the last 5 years since 2013 compared to 40.6% monitored locations for the 5 year commencing year 2012 (From Figure F1 to Figure F28, Appendix F)
- The 2017 NDDT annual mean levels decreased at 64.28% of the monitored locations compared to 2016. However, the 2016 NO_2 annual mean levels decreased at only 10.71% of the monitored locations compared to 2015
- Only 7.14% of the monitored locations were in excess of the NAQO in 2017 compared to 17.86% in 2016.

Despite the seemingly contradicting statements above PCC concludes that we are moving towards compliance with the NAQO.

It is not possible to categorically state why the NO_2 levels increased across the city in 2014, decreased in 2015, and to increase again in 2016 just to drop again in 2017 as a multitude of factors influence pollutant generation and their subsequent dispersion. Such influences are wide ranging and complex.

2018 NDDT:

The 2019 ASR Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the NAQO of 40µg/m^3.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Table B1, Appendix B.

The 2018 NDDT survey data concluded that NO_2 annual mean levels were in excess of the annual mean NAQO at 13 monitoring locations mostly in/very close to declared/revoked AQMAs while others were located within the two exceedance road links as identified by PCM model for Portsmouth, and were as follows:

- The long-term monitoring locations registered 2 exceedances:
    - Lord Montgomery Way (SL: 1, DC: 100%, AM: 42.92µg/m^3, AQMA7):
        - The NO_2 annual average has remained above the NAQO in the last 5 years with the exception of 2017.
        - The NO_2 annual average exhibits a downward trend in the last 5 years demonstrating an AQ improvement in the long-term similar to the previously reported 5 year trend.
    - The TAP (PH) London Road (SL: 26, DC: 100%, AM:46.02µg/m^3, AQMA6):
        - The NO_2 annual average remained above the NAQO for the last 5 years.
        - The NO_2 annual average exhibits an upward trend in the last 5 years demonstrating a continued AQ deterioration in the long-term, similar to the previously reported 5 year trend.
- The newly established monitoring locations since the beginning of 2018 registered 11 exceedances:
    - 2-3 Selbourne Terrace (SL: 94, DC: 41.67%, AM:40.33µg/m^3, AQMA6)

- 47 Queen Street (SL: 50, DC: 66.67%, AM:40.37µg/m^3, AQMA12)
- 98/100 Albert Road (SL:85, DC: 66.67%, AM: 40.41µg/m^3, just outside of west Revoked AQMA2)
- 4 Market Way (SL: 44, DC: 58.33%, AM: 40.41µg/m^3, just outside, west of AQMA11).
- Opposite 6 Market Way (SL: 45, DC: 41, 67%, AM: 41.97µg/m^3, just outside west of AQMA11).
- 145 Albert Road (SL: 84, DC: 41.67%, AM:42.82µg/m3, just outside, north Revoked AQMA2).
- 137 London Road (SL: 108, DC: 50%, AM:44.18µg/m^3, north AQMA6).
- Mile End Road, Column 5 (SL: 46, DC: 50%, AM:44.51µg/m^3, AQMA11).
- Alfred Road, Opposite MW-StABS (SL: 120, DC: 25%, AM: 47.51µg/m^3, southwest of AQMA11).
- Alfred Road, Column 12 (SL: 118, DC: 25%, AM: 50.38µg/m^3, Southwest of AQMA11).
- Alfred Road, Column 9 (SL: 117, DC: 25%, AM:50.42µg/m^3, southwest of AQMA11).

A closer examination at the NDDT survey data for the period 2014 to 2018 at the 28 long-term monitoring locations as presented on Table A.3 (Appendix A) revealed that:

- In the long-term a downward trend emerged at 60.716% (17 locations) monitored locations in the last 5 years since 2014 compared to 34.37% monitored locations for the 5 year commencing year 2013 (From Figure F1

to Figure F28, Appendix F). Therefore, AQ could be considered to be improving.

- In the short term NDDT monitoring revealed that:
    - The 2018 NDDT annual mean levels decreased at 53.57% of the monitored locations compared to 2017. This level of AQ improvement was lower than that registered in 2017 where the NDDT annual mean levels decreased at 64.28% of the monitored locations compared to 2016. Hence, LAQ improved in 2018 in a number of monitored locations that is less to that of 2017 amounting to AQ deterioration.
    - The 2018 NDDT annual mean levels exceeded the NO_2 NAQO at 7.14% of the monitored locations (2 locations). This percentage of difference was similar to the one registered in 2017 but with the following differences:

        1. Lord Montgomery Way (AQMA7, Figures F1, Appendix F):

        a. The NO_2 annual average has remained above the NAQO in the last 5 years with the exception of 2017.

        b. The NO_2 annual average at this roadside monitoring location increased by 4.12µg/m^3 (an increase of 10.29%) between 2017 and 2018 to exceed the NAQO in 2018 (42.9µg/m^3) exhibiting an AQ deterioration in the short-term.

        c. The 2017-2018 NO_2 annual average change is described as being substantially adverse.

        d. The NO_2 annual average exhibits a **downward** trend in the last 5 years demonstrating an AQ improvement in the long-term similar to the previously reported 5 year trend.

2. The Tap (PH) London Road (AQMA6 Figures F15, Appendix F):

    a. The NO_2 annual average remained above the NAQO for the last 5 years.

    b. The NO_2 annual average at this kerbside monitoring location increased by 2.93µg/m^3 (an increase of 7.33%) between 2017 and 2018, and remains above the NAQO in 2018 (46µg/m^3) exhibiting an AQ deterioration in the short-term.

    c. The 2017-2018 NO_2 annual average change is described as being substantially adverse.

    d. The NO_2 annual average exhibits an upward trend in the last 5 years demonstrating a continued AQ deterioration in the long-term, similar to the previously reported 5 year trend.

3. 117 Kingston Road (AQMA6, Figures F17, Appendix F):

    a. The NO_2 annual average has fallen below the NAQO for the first time in the last 5 years.

    b. The NO_2 annual average at this roadside monitoring location decreased by 6.07µg/m^3 (a decrease of 15.17%) between 2017 and 2018 and remains below the NAQO in 2018 (38.2µg/m^3) exhibiting an AQ improvement in the short-term.

    c. The 2017-2018 NO_2 annual average change is described as being substantially beneficial.

    d. The NO_2 annual average exhibits a downward trend in the last 5 years demonstrating AQ improvement

in the long-term contrary to the previously reported five year trend.

Monitoring at all added locations since the beginning of 2018 continued.

2019 NDDT

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

For diffusion tubes, the full 2019 NO_2 dataset of monthly mean values is provided in Table B1, Appendix B.

According to 2019 NDDT survey dataset, for the same monitored locations to those of 2018, the 2019 NO_2 annual mean levels were in excess of the annual mean NAQO only at four locations compared to thirteen monitoring locations in 2018 (one exceedance at AQMA6 ("The Tap PH") and three locations along the road links as identified by PCM model for Portsmouth), and were as follows:

1. A closer examination of the NDDT survey data for the period 2015 to 2019 at the 27 long-term monitoring locations as presented on Table A.3 (Appendix A) and illustrated I from Figure F1 to F27 (Figure A.1. Appendix A), revealed that:

    - In the short term NDDT monitoring revealed that:

        - The 2019 NDDT annual mean levels decreased at all the 27 long-term monitored locations (100%). This level of AQ improvement is higher than that registered in 2018 where the NDDT annual mean levels decreased at 53.57% of the monitored locations compared to 2017. Hence, LAQ improved in 2019 in a number of monitored locations that is higher to that of 2018 amounting to an AQ improvement.

        - The beneficial change in LAQ can be apportioned as follows:

            - Negligibly beneficial at 5 out of 27 locations (18.52%)

- Slightly beneficial at 8 out of 27 locations (29.63%)
- Moderately beneficial at 11 out of 27 locations (40.74%)
- Substantially beneficial at 3 out of 27 locations (11.11%)

- The 2019 NDDT annual mean levels exceeded the NO_2 annual mean NAQO at 3.70% of the monitored locations (1 out of 27 locations). This percentage of difference is lower to the one registered in 2018 but with the following differences:
  - The Tap (PH) London Road (AQMA6 Figures F15, Figures A.1, Appendix A):
    - The NO_2 annual average remained above the NAQO for the last 5 years.
    - The NO_2 annual average at this kerbside monitoring location decreased by 5.6µg/m^3 (a decrease of 12.17%) between 2018 and 2019, but remained above the NAQO in 2019 (40.42µg/m^3), but still exhibiting an AQ improvement in the short-term.
    - The 2018-2019 NO_2 annual average decrease is described as "substantially beneficial".
    - The NO_2 annual average "downward" trend in the last 5 years exhibited a continued AQ improvement in the long-term, contrary to the previously reported 5-year trend.

- In the Long-term a downward trend emerged at 92.59% (25 out of 27 monitored locations) in the last 5 years since 2015 compared to 60.72% of the monitored locations for the 5 year period commencing on year 2014 (From Figure F1 to Figure F27, Figure A.1, Appendix A). Therefore, AQ is considered to be improving.

2. A closer examination of the added 78 NDDT location dataset for the period 2018 to 2019 as presented on Table A.3 (Appendix A) revealed that:

    - Exceedance of the annual mean levels NO_2 NAQO at three locations, outside of AQMA11, along the road links as identified by PCM model for the second year in a row:

        - Alfred Road, Column 9 (AR-Col9, DC: 91.67%, South/West of AQMA11):

            1. The NO_2 annual average at this roadside monitoring location decreased by 2.42µg/m^3 (a decrease of 4.8%) between 2018 and 2019, but remained above the NAQO in 2019 (48µg/m^3) for the second consecutive year, and still exhibiting an AQ improvement in the short-term.

            2. The 2018-2019 NO_2 annual average decrease is described as "substantially beneficial".

        - Alfred Road, Column 12 (AR-Col12, DC: 58.33%, South/West of AQMA11)

            1. The NO_2 annual average at this roadside monitoring location increased by 2.15µg/m^3 (an increase of 4.26%) between 2018 and 2019, but remained above the NAQO in 2019 (52.52µg/m^3) for the second consecutive year, exhibiting an AQ deterioration in the short-term.

            2. The 2018-2019 NO_2 annual average increase is described as "substantially adverse".

        - Alfred Road, opposite Saint Agatha's Bus Stop (OSABS, DC: 83.33%, South/West of AQMA11).

1. The NO_2 annual average at this roadside monitoring location decreased by 0.61µg/m^3 (a decrease of 1.29%) between 2018 and 2019, but remained above the NAQO in 2019 (46.90 µg/m^3) for the second consecutive year, and still exhibiting an AQ improvement in the short-term.

2. The 2018-2019 NO_2 annual average decrease is described as "substantially beneficial".

- The change in LAQ was beneficial at 72 out of 77 locations (93.51%). The beneficial change in LAQ was apportioned as follows:
    - Negligibly beneficial at 8 out of 72 locations (11.11%) and of the total 77 locations (10.39%)
    - Slightly beneficial at 18 out of 72 locations (25.00%) and of the total 77 locations (23.38%)
    - Moderately beneficial at 30 out of 72 locations (41.67%) and of the total 77 locations (38.96%)
    - Substantially beneficial at 16 out of 72 locations (22.22%) and of the total 77 locations (20.78%)
- The remaining five monitored locations (6.49%) exhibited an adverse change in LAQ. This change in LAQ was apportioned as follows:
    - Negligibly adverse at one out of the five locations (20.00%) and of the total 77 locations (1.30%)
    - Slightly adverse at two out of the five locations (40.00%) and of the total 77 locations (2.60%)
    - Moderately adverse at one out of the five locations (20.00%) and of the total 77 locations (1.30%)

- Substantially adverse at one out of the five locations (20.00%) and of the total 77 locations (1.30%)

3. To sum up, for the same 104 monitored locations to those of 2018, the 2019 change in NO_2 annual mean levels exhibited the following characteristics:

    - 99 locations exhibited beneficial change in LAQ (95.19%):

        - Negligibly beneficial at 13 out of 99 locations (13.13%) and of the total 104 locations (12.50%)

        - Slightly beneficial at 26 out of 99 locations (26.26%) and of the total 104 locations (25.00%)

        - Moderately beneficial at 41 out of 99 locations (41.41%) and of the total 104 locations (39.42%)

        - Substantially beneficial at 19 out of 99 locations (19.19%) and of the total 104 locations (18.27%)

    - Five locations only exhibited adverse change in LAQ (4.81%)

        - Negligibly adverse at one out of 99 locations (1.01%) and of the total 104 locations (0.96%)

        - Slightly adverse at two out of 99 locations (2.02%) and of the total 104 locations (1.92%)

        - Moderately adverse at one out of 99 locations (1.01%) and of the total 104 locations (0.96%)

        - Substantially adverse at one out of 99 locations (1.01%) and of the total 104 locations (0.96%)

As for the newly established 42 monitoring locations in year 2019, eight monitored locations exhibited levels in excess of 40.5 µg/m^3. These constitute exceedances of the NO_2 annual mean NAQO in the course of 2019 and were as follows:

- 8 Old London Road (OLR-8), 40.81 µg/m^3.
- Hope Street by Sainsbury, Unmarked Lamp Post Column (OSHS-Col4), 43.91 µg/m^3.
- Southampton Road, Column 171 (SR-Col171), 41.97 µg/m^3.
- Southampton Road, Column 177 (SR-Col177), 43.04 µg/m^3.
- Eastern Road, Column 116 (ER-Col116), 40.92 µg/m^3.
- Eastern Road, Column 51, (ER-Col51), 45.25 µg/m^3.
- Commercial Road, Column 3 (CR-Col3), 41.50 µg/m^3.
- Fratton Road, Column 5 (FR-Col5), 41.88 µg/m^3.

Monitoring at all added locations since the beginning of 2019 will continue.

9.6.2 Continuous air quality monitoring 2015 - 2019

The NO_2 continuous monitoring program for the period stretching between 2015 and 2019 concluded that:

- The 2015 NO_2 annual mean levels fell compared to that of 2014 to a level below the NO_2 annual mean NAQO at all 4 CAQMSs. This demonstrates an improvement in LAQ. The maximum recorded concentration was at London Road kerbside CAQMS (38.4µg/m^3). This level was close to breaching the NO_2 annual mean NAQOs.
- The 2016 NO_2 annual mean level increased across the four CAQMS compared to that of 2015 to a level below the NO_2 annual mean NAQO at all but London Road CAQMSs to result in a worsening in LAQ. The

maximum recorded concentration was at London Road kerbside CAQMS (41.21µg/m^3). This level breaches the NO_2 annual mean NAQO.

- The 2017 NO_2 annual mean level increased cross 50% of CAQMSs compared to that of 2016, meeting the NO_2 annual mean NAQO at all but London Road CAQMSs to result in a worsening in LAQ. The maximum-recorded concentration was at London Road kerbside CAQMS (44.6µg/m^3). This level breaches the NO_2 annual mean NAQO. The largest increase in 2017 NO_2 annual mean was registered at C2 London Road CAQMS as it increased by 3.39µg/m^3 compared to the level recorded in 2016.

- The 2018 NO_2 annual mean level increased slightly (From 33.54 µg/m^3 to 33.95µg/m^3) only at one of CAQMSs (Mile End Road, C7, AQMA11) compared to that of 2017 (London Road and Burrfields Road), but met the NO_2 annual mean NAQO at all but London Road CAQMSs. This could be considered as an overall improvement in LAQ. The maximum recorded concentration was at London Road kerbside CAQMS (40.57µg/m^3). This level constitutes a breach of the NO_2 annual mean NAQO. This exceedance is located in AQMA6.

- The 2019 NO_2 annual mean level decreased cross the five CAQMSs compared to that of 2018, but met the NO_2 annual mean NAQO at all but London Road CAQMSs. These changes are considered as beneficial across the five stations with variable degrees (Moderately Beneficial 40%, Slightly Beneficial 20%, Negligibly Beneficial 40%). Hence, an overall improvement in LAQ. The maximum-recorded concentration was at London Road kerbside CAQMS (40.46µg/m^3), which still constitutes a continued breach of the NO_2 annual mean NAQO, just as was the case in year 2018. This exceedance is located in AQMA6. In the meantime, the 5-year trend was downward at two PCC's owned CAQMS:

    - London Road CAQMS (LR-C2, AQMA6, as per Figure F28, Figure A.1, Appendix A):

        - The NO_2 annual average remained above the NAQO in the last four years.

- The NO_2 annual average at this kerbside monitoring location decreased by 0.11µg/m^3 (a decrease of 0.27%) between 2018 and 2019, but remained above the NAQO in 2019 (40.46µg/m^3) exhibiting a negligible AQ improvement in the short-term.

- The 2018-2019 NO_2 annual average decrease is described as "negligibly beneficial".

- The NO_2 annual average "upward" trend in the last 5 years exhibited however an AQ deterioration contrary to the previously reported 5-year trend.

▪ Gatcombe Park CAQMS (AURN-C4, as per Figure F29, Figure A.1, Appendix A):

- The NO_2 annual average remained considerably below the NAQO in the last 5 years.

- The NO_2 annual average at this urban background monitoring location decreased by 1.21µg/m^3 (a decrease of 6.48%) between 2018 and 2019, and remained below the NAQO in 2019 (17.47µg/m^3) exhibiting an AQ improvement in the short-term.

- The 2018-2019 NO_2 annual average decrease is described as "negligibly beneficial".

- The NO_2 annual average "downward" trend in the last 5 years, exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

▪ Burrfields Road CAQMS (BR-C6, Revoked AQMA3, as per Figure F30, Figure A.1, Appendix A):

- The NO_2 annual average has remained below the NAQO in the last 5 years.

- The NO_2 annual average at this roadside monitoring location decreased by 2.88µg/m^3 (a decrease of 8.47%) between 2018 and 2019, and remains below the NAQO in 2019 (31.12µg/m^3) exhibiting an AQ improvement in the short-term.

- The 2017-2018 NO_2 annual average change is described as being "moderately beneficial".

- The NO_2 annual average exhibits a "downward" trend in the last 5 years demonstrating an AQ improvement in the long-term contrary to the previously reported 5-year trend.

- Mile End Road CAQMS (MER-C7, AQMA11, as per Figures F31, Figures A.1, Appendix A):

  - The NO_2 annual average remained below the NAQO in the last 5 years.

  - The NO_2 annual average at this roadside monitoring location decreased by 1.51µg/m^3 (a decrease of 4.45%) between 2018 and 2019, and remained below the NAQO in 2019 (32.44µg/m^3) exhibiting an AQ improvement in the short-term.

  - The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".

  - The NO_2 annual average "upward" trend in the last 5 years exhibited an AQ deterioration in the long-term.

- DEFRA's Anglesea Road CAQMS (DEFRA-C8):

  - The NO_2 annual average remained below the NAQO for the second monitored consecutive year.

- The NO_2 annual average at this roadside monitoring location decreased by 2.72µg/m^3 (a decrease of 8.91%) between 2018 and 2019, and remained below the NAQO in 2019 (27.80µg/m^3) exhibiting an AQ improvement in the short-term.

- The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

Table A4 in Appendix A compares the ratified continuous monitoring NO_2 hourly mean concentrations for the past 5 years with the NAQO of 200µg/m^3 (not to be exceeded more than 18 times per year).

The NO_2 hourly mean did not exced 200µg/m^3 in 2019 at any of the CAQMS operating in Portsmouth statutory boundary. Therefore, the NO_2 hourly mean NAQO was not breached in the course of 2019.

Data collected at PCC CAQMSs did not register any exceedance of the NO_2 hourly mean NAQO up-to-date since the highest registred NO_2 annual mean was 40.46µg/m^3 in 2019 at London Road (C2) kerbside CAQMS.

In addition, none of CAQMS NO_2 annual mean exceeded 60µg/m^3 which indicates that an exceedance of the 1-hour mean NAQO is unlikely.

9.6.3 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 NAQO (40µg/m^3).

There has been no exceedance of the PM_{10} annual mean NAQO since 2015 at any of Portsmouth based CAQMSs. The highest registered annual mean since then was recorded in 2015 at London Road kerbside CAQMS (34.36µg/m^3).

The highest PM_{10} annual mean recorded in 2019 was 17.79µg/m^3 at London Road CAQMSs.

The 2019 PM_{10} monitoring at each of the CAQMSs concluded:

- London Road CAQMS (LR-C2, as per Figure F32, Figure A.3 Appendix A):
    - The PM_{10} annual average has remained considerably below the NAQO in the last 5 years.
    - The PM_{10} annual average at this kerbside monitoring location increased by 0.07µg/m^3 (a decrease of 0.40%) between 2018 and 2019, but remains below the NAQO in 2019 (17.79µg/m^3) exhibiting an AQ deterioration in the short-term.
    - The 2018-2019 PM_{10} annual average change is described as being "negligibly adverse".
    - However, the PM_{10} annual average exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term contrary to the previously reported 5-year trend.
- Gatcombe Park CAQMS (AURN-C, as per Figure F33, Figure A.3 Appendix A):
    - The PM_{10} annual average has remained considerably below the NAQO in the last 5 years.
    - The PM_{10} annual average at this urban-background monitoring location increased by 0.41µg/m^3 (an increase of 2.79%) between 2018 and 2019, and remains below the NAQO in 2019 (15.08µg/m^3) exhibiting an AQ deterioration in the short-term for the second consecutive year.

- The 2018-2019 PM_{10} annual average change is described as being "negligibly adverse".

- However, the PM_{10} annual average exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term contrary to the previously reported 5-year trend.

- Mile End Road CAQMS (MER-C7, a per Figure F34, Figure A.3 Appendix A):

  - The PM_{10} annual average has remained considerably below the NAQO in the last 5 years.

  - The PM_{10} annual average at this roadside monitoring location decreased by 2.04µg/m^3 (a decrease of 12.16%) between 2018 and 2019, and remains below the NAQO in 2019 (14.74µg/m^3) exhibiting an AQ improvement in the short-term.

  - The 2018-2019 PM_{10} annual average change is described as being negligibly beneficial.

  - The PM_{10} annual average exhibits a downward trend in the last 5 years, demonstrating an AQ improvement in the long-term contrary to the previously reported 5-year trend.

- DEFRA's Anglesea Road CAQMS (DEFRA/AR-C8):

  - The PM_{10} annual average has remained considerably below the NAQO in the last 5 years.

  - The PM_{10} annual average at this roadside monitoring location increased by 0.19µg/m^3 (a decrease of 0.98%) between 2018 and 2019, and remains below the NAQO in 2019 (19.48µg/m^3) exhibiting an AQ deterioration in the short-term.

  - The 2018-2019 PM_{10} annual average change is described as being negligibly adverse.

The 2019 PM_{10} annual mean remains below the NAQO at all CAQMSs, with the highest annual mean level (19.49 µg/m^3) being recorded at DEFRA's Anglesea Road CAQMS (C8).

PM_{10} levels are in decline across all PCC owned CAQMSs in the long-term. However, PM_{10} levels increased in the short term at two CAQMSs.

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

- London Road 24-hour PM_{10} CAQMS (LR-C2). Figure F.36, Figure A.4, Appendix A.
  - The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remain well below 35 occurrence per annum. Hence, no exceedance of the 24-hour Mean NAQO in 2019.
  - The number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remains considerably below the NAQO in the last 5 years.
  - The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 decreased by 5 occurrences between 2018 and 2019 exhibiting an AQ improvement in the short term.
  - However, the number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 exhibits an "upward" trend in the last 5 years, demonstrating an AQ deterioration in the long-term.
- Gatcombe Park PM_{10} CAQMS (AURN-C4). Figure F.37, Figure A.4, Appendix A:
  - The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remain well below 35 occurrence per annum. Hence, no exceedance of the 24-hour Mean NAQO in 2019.
  - The number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remains considerably below the NAQO in the last 5 years.
  - The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 increased by one occurrences between 2018 and 2019 exhibiting an AQ deterioration in the short term.
  - However, the number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term.

- Mile End Road PM_{10} CAQMS (MER-C7). Figure F.38, Figure A.4, Appendix A:
    - The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remain well below 35 occurrence per annum. Hence, no exceedance of the 24-hour Mean NAQO in 2019.
    - The number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remains considerably below the NAQO in the last 5 years.
    - The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 decreased by 5 occurrences between 2018 and 2019 exhibiting an AQ improvement in the short term.
    - However, the number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 exhibits an "upward" trend in the last 5 years, demonstrating an AQ deterioration in the long-term.

In 2019 the highest number of daily means in excess of 50 µg/m^3 was recorded twice at DEFRA's CAQMSs. However this does not amount to an exceedance of the daily NAQO (Figure F.35, Figure A.4, Appendix A:).

9.6.4 Particulate matter ($PM_{2.5}$)

PCC monitors $PM_{2.5}$ at the AURN CAQMS of Gatcombe Park (C4), and commenced monitoring $PM_{2.5}$ from January 2017 at London Road (C2) and Mile End Road (C7) CAQMSs.

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

The 2019 $PM_{2.5}$ annual mean remains below the NAQO at all three CAQMSs, with the highest annual mean level (11.19 µg/m^3) being recorded at London Road CAQMS (C2).

The 2019 $PM_{2.5}$ annual mean decreased at all CAQMSs resulting to AQ improvement.

Historically, the highest $PM_{2.5}$ annual mean recorded in Portsmouth was 14.26µg/m^3 back in 2014 at the AURN CAQMS. This level dropped in 2018 to reach 12.32µg/m^3. This level dropped again in 2019 to reach 8.9µg/m^3.

- Gatcombe Park $PM_{2.5}$ CAQSM (AURN-C4) exhibits as per Figure F.39, Figure A.5, Appendix F the followings:
    - The $PM_{2.5}$ annual average has remained considerably below the NAQO in the last 5 years.
    - The $PM_{2.5}$ annual average at this urban-background monitoring location decreased by 3.4µg/m^3 (a decrease of 27.6%) between 2018 and 2019, and remains below the NAQO in 2019 (8.92µg/m^3) exhibiting an AQ improvement in the short-term.
    - The 2018-2019 $PM_{2.5}$ annual average change is described as being "moderately beneficial".
    - The $PM_{2.5}$ annual average exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term for the second consecutive year 5-year trend.
- London Road $PM_{2.5}$ CAQSM (R1-C2):
    - The $PM_{2.5}$ annual average has remained considerably below the NAQO for the third consecutive year.
    - The $PM_{2.5}$ annual average at this kerbside monitoring location decreased this year again by 0.09µg/m^3 (a decrease of 0.8%) between 2018 and

2019, and remained below the NAQO in 2019 (11.19µg/m^3) exhibiting an AQ improvement in the short-term.

- The 2018-2019 $PM_{2.5}$ annual average change is described as being "negligibly beneficial".
- The $PM_{2.5}$ annual average exhibits a "downward" trend in the last 3 years, demonstrating an AQ improvement in the long-term.

- Mile End Road $PM_{2.5}$ CAQSM (R5-C7):
  - The $PM_{2.5}$ annual average has remained considerably below the NAQO for the third consecutive year.
  - The $PM_{2.5}$ annual average at this roadside monitoring location decreased this year by 1.02µg/m^3 (a decrease of 9.44%) between 2018 and 2019, and remains below the NAQO in 2019 (9.79µg/m^3) exhibiting an AQ improvement in the short-term.
  - The 2018-2019 $PM_{2.5}$ annual average change is described as being "negligibly beneficial".
  - The $PM_{2.5}$ annual average exhibits a "downward" trend in the last 3 years, demonstrating an AQ improvement in the long-term.

9.6.5 Sulphur dioxide (SO_2)

PCC do not monitor for SO_2 as it is not a pollutant of concern in Portsmouth.

9.7 Conclusion

Nitrogen dioxide (NO_2)

Nitrogen dioxide diffusion tube monitoring

For the same monitored locations to those of 2018, the 2019 NO_2 annual mean levels were in excess of the annual mean NAQO only at four locations compared to thirteen monitoring locations in 2018 (one exceedance at AQMA6 ("The Tap PH") and three locations along the road links as identified by PCM model for Portsmouth), and were as follows:

a. A closer examination of the NDDT survey data for the period 2015 to 2019 at the 27 long-term monitoring locations as presented on Table A.3 (Appendix A) revealed that:

- In the short term NDDT monitoring revealed that:
    - The 2019 NDDT annual mean levels decreased resulting in a beneficial change at all the 27 long-term monitored locations (100%). This level of AQ improvement is higher than that registered in 2018 where the NDDT annual mean levels decreased at 53.57% of the monitored locations compared to 2017. Hence, LAQ improved in 2019 in a number of monitored locations that is higher to that of 2018 amounting to an AQ improvement.
    - The above beneficial change in LAQ can be apportioned as follows:
        - Negligibly beneficial at 5 out of 27 locations (18.52%)
        - Slightly beneficial at 8 out of 27 locations (29.63%)
        - Moderately beneficial at 11 out of 27 locations (40.74%)
        - Substantially beneficial at 3 out of 27 locations (11.11%)
    - The 2019 NDDT annual mean levels exceeded the NO_2 NAQO at only 1 out of 27 locations
- In the long-term a downward trend emerged at 92.59% (25 out of 27 monitored locations) in the last 5 years since 2015 compared to 60.72% of the monitored locations for the 5 year period commencing on year 2014. Therefore, AQ is considered to be improving.

b. A closer examination of the dataset of the added 77 NDDT location for the period 2018 to 2019 as presented on Table A.3 (Appendix A) revealed that:

- Exceedance of the annual mean levels NO_2 NAQO at three locations along the road links as identified by PCM model for the second consecutive year:
    - Alfred Road, Column 9 (AR-Col9, DC: 91.67%, South/West of AQMA11): (48µg/m^3)
    - Alfred Road, Column 12 (AR-Col12, DC: 58.33%, South/West of AQMA11) (52.52µg/m^3)
    - Alfred Road, opposite St Agatha's Bus Stop, (MW.OSABS, DC: 83.33%, South/West of AQMA11). (46.90 µg/m^3)
- The change in LAQ was beneficial at 72 out of 77 locations (93.51%).

c. To sum up, for the same 104 monitored locations to those of 2018, the 2019 change in NO_2 annual mean levels exhibited a beneficial change at 99 locations (95.19%):

- Negligibly beneficial at 13 out of 104 locations (12.50%)
- Slightly beneficial at 26 out of 104 locations (25.00%)
- Moderately beneficial at 41 out of 104 locations (39.42%)
- Substantially beneficial at 19 out of 104 locations (18.27%)

As for the newly established 42 monitoring locations in year 2019, eight monitored locations exhibited exceedances of the NO_2 annual mean NAQO in the course of 2019 and were as follows:

- 8 Old London Road (OLR-8), 40.81 µg/m^3.
- Hope Street by Sainsbury, Unmarked Lamp Post Column (OSHS-Col4), 43.91 µg/m^3.
- Southampton Road, Column 171 (SR-Col171), 41.97 µg/m^3.

- Southampton Road, Column 177 (SR-Col177), 43.04 µg/m^3.
- Eastern Road, Column 116 (ER-Col116), 40.92 µg/m^3.
- Eastern Road, Column 51, (ER-Col51), 45.25 µg/m^3.
- Commercial Road, Column 3 (CR-Col3), 41.50 µg/m^3.
- Fratton Road, Column 5 (FR-Col5), 41.88 µg/m^3.

Monitoring at all added locations since the beginning of 2019 will continue.

9.7.1 Nitrogen Dioxide Continuous Monitoring

The 2019 NO_2 annual mean level decreased cross the five CAQMSs compared to that of 2018, but met the NO_2 annual mean NAQO at all but London Road CAQMSs. However, this can still be considered as an overall improvement in LAQ. The maximum-recorded concentration was at London Road kerbside CAQMS (40.46µg/m^3), which constitutes a continued breach of the NO_2 annual mean NAQO. This exceedance is located in AQMA6. In the meantime, the 5-year trend was downward at two of the four PCC owned CAQMS.

In addition, since none of CAQMS NO_2 annual mean exceeded 60µg/m^3, the 1-hourly mean NAQO is unlikely to be breached.

9.7.2 Particulate matter (PM_{10})

There has been no exceedance of the PM_{10} annual mean NAQO since 2015 at any of Portsmouth based CAQMSs. The highest registered annual mean since then was recorded in 2015 at London Road kerbside CAQMS (34.36µg/m^3).

The 2019 PM_{10} annual mean remains below the NAQO at all CAQMSs, with the highest annual mean level (19.49 µg/m^3) being recorded at DEFRA's Anglesea Road CAQMS (C8).

The 2019 PM_{10} monitoring concluded that PM_{10} annual average increased at all CAQMSs but Mile End Road CAQMS where the beneficial change was negligible. However, the PM_{10} annual average exhibits a "downward" trend in the last 5 years across all PCC's CAQMS, demonstrating an AQ improvement in the long-term.

PM_{10} levels are in decline across the all PCC owned CAQMSs in the long-term. However, PM_{10} levels increased in the short term at three CAQMSs including DEFRA's.

In 2019 the highest number of daily means in excess of 50 µg/m^3 was recorded at DEFRA's CAQMSs was twice. This does not amount to an exceedance of the daily NAQO.

9.7.3 Particulate matter ($PM_{2.5}$)

The 2019 $PM_{2.5}$ annual mean remains below the NAQO at all 3 CAQMSs, with the highest annual mean level (11.19 µg/m^3) being recorded at London Road CAQMS (C2).

The 2019 $PM_{2.5}$ annual mean decreased at all CAQMSs resulting to AQ improvement.

It is not possible to categorically state why the NO_2 and $PM_{2.5}$ levels decreased in several areas across the city in 2019 given that a multitude of factors influence pollutant generation and their subsequent dispersion. Such influences are wide ranging and complex.

Localised influences such as route popularity or road changes / roadworks may be part of the cause. Others may be of a regional nature perhaps dictated by the meteorological conditions. National or international stimuli such as requirement for improved vehicle emissions technologies are also likely to play a part.

10 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 major road (m) (2)	Inlet Height (m)
C2	London Road	Kerbside	464925	102129	NO_2 $PM_{2.5}$ PM_{10}	Y	Chemiluminescent, HORIBA's APDA- 372	1.8m of the kerbside further to the south of the station	1m	1.8m
C4	Gatcombe Park Primary School (AURN)	Urban Background	465403	103952	NO_2 PM_{10} $PM_{2.5}$ O_3	N	Chemiluminescent, FDMS	0m Within the school perimeter	119 m	2.5m
C6	Burrfields Road	Roadside	466004	102348	NO_2	N	Chemiluminescent	0.5m	4.5m of Burrfields Road & 5.5m of Copnor Road	1.8m
C7	Mile End Road	Roadside	464397	101270	NO_2 $PM_{2.5}$ PM_{10}	Y	Chemiluminescent, HORIBA's APDA- 372	2m	6.5m	1.8m
C8	Anglesea Road (DEFRA)	Roadside	463835	100259	NO_2 PM_{10}	Y	Chemiluminescent, FDMS	5m	2.5m	1.8m

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.

11 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 CAQMS	Minimum height (m) (3)
1	Lord Montgomery Way (LMW-FST)	Roadside	463872	99874	NO2	Close		3.7m	No	2m
2	12 Chadderton Gardens (CG-12)	Urban background	463705	99371	NO2	N		N/A	No	2m
3	High Street (HS-121A)	Roadside	463408	99460	NO2	N		3.1m	No	2m
4	Queen Street (QS-Col 30)	Roadside	463190	100390	NO2	Y	N/A	3m	No	2m
5	119 Whale Island Way (WIW-119)	Roadside	464230	102194	NO2	Close		16.23m	No	2m
6	88 Stanley Road (SR-88)	Roadside	464331	102197	NO2	Close		9.88m	No	2m
7	138 Lower Derby Road (LDR-138)	Urban background	464291	102279	NO2	N		37.57m	No	2m
8	492 Hawthorn Crescent (HC-492)	Urban background	466690	104355	NO2	N		34m	No	2m
9	6 Northern Road (NR-6)	Roadside	465621	105528	NO2	N		5.43m	No	2m
10	20 Stroudley Avenue (SA-20)	Urban background	467107	104850	NO2	N		N/A	No	2m
11	Anchorage Road (AR-Col6)	Roadside	466869	103457	NO2	N	11.76M	6.56m	No	2m
14	4 Merlyn Drive (MD-4)	Roadside	466109	103736	NO2	N		11.26m	No	2m
15	29 Milton Road (MR-29)	Roadside	466120	101324	NO2	N		7.04m	No	2m
16	Parade Court, London Road (LR-PC)	Roadside	465474	104205	NO2	N	5.32m	5.15m	No	2m
18	4 Milton Road (MR-4)	Roadside	466097	101332	NO2	N		6.13m	No	2m
19	7 Velder Avenue (VA-7)	Roadside	466392	100226	NO2	Y		4.44m	No	2m
20	136 Eastney Rd (ER-136)	Roadside	466712	99415	NO2	N		6.23m	No	2m
21	118 Albert Road (AR-116)	Roadside	465209	98964	NO2	N		2.36m	No	2m
22	2 Victoria Road North (VRN-2)	Roadside	464778	99306	NO2	N		5.53m	No	2m

23	106 Victoria Road North (VRN-106)	Roadside	464974	99766	NO2	N	2.37m	2.42m	No	2m
24	221 Fratton Road (FR-221)	Roadside	465111	100737	NO2	Y		4.21m	No	2m
25	117 Kingston Rd (KR-117)	Roadside	465036	101547	NO2	Y		2.46m	No	2m
26	The Tap London Road (LR-Tap)	Kerbside	464900	101976	NO2	Y		1.91m	No	2m
30	Market Tavern (Mile End Rd) (MER-MT)	Roadside	464478	101457	NO2	Y		12.73m	No	2.12m
34	Sovereign Gate, Commercial Rd (CR-UF)	Roadside	464425	100893	NO2	Y		4.40m	No	2m
35	Hampshire Terrace (HT-AM)	Roadside	463837	99759	NO2	Close		4.9m to 10.74m	No	2m
36	Elm Grove (EG-103)	Roadside	464501	99329	NO2	N		2.26m	No	2m
42	Kingston Crescent-Admiral Drake PH- (KC-ADPH)	Roadside	464552	101940	NO2	N			No	2m
43	Kingston Crescent-Vanguard House (KC-VH)	Urban background	464774	101922	NO2	N			No	2m
44	Opp. 4 Market Way (OppMW-4)	Roadside	464336	100833	NO2	Close			No	2m
45	5 Market Way (MW-4)	Roadside	464344	100808	NO2	Close	N/A		No	2m
46	Mile End Road-Col5(MW-Col5)	Roadside	464339	101273	NO2	Y		3.35m	No	2.3m
47	1 Stamshaw Road West (SR-W1)	Roadside	464586	102125	NO2	N			No	2m
48	28 Stamshaw Road East (SR-E28)	Urban background	464597	102119	NO2	N			No	2m
49	Half Moon Street-The Ship and Castle(PH) (HMS-S&CPH)	Urban background	463042	100315	NO2	Y			No	2m
50	47 Queen Street (QS-47)	Roadside	463388	100398	NO2	Y			No	2m
51	57 Queen Street (QS-57)	Urban background	463333	100395	NO2	Y			No	2m
52	Column 29 Queen Street (QS-Col29)	Roadside	463235	100412	NO2	Y	11.76M		No	2m
55	Gunwharf Road, Column 12 (GWR-Col12)	Roadside	463224	99590	NO2	N		1.5 m	No	2m
56	Gunwharf Road, Column 4 (GWR-Col4)	Roadside	463261	99782	NO2	N		1.5 m	No	2m
58	St Georges Street-9 (St GS-9)	Roadside	463487	99659	NO2	N	N/A	6.00	No	2m
59	Milton Road, Column 41 (MR-Col41)	Roadside	466263	100334	NO2	N		1.5 m	No	2m
60	Column 42 Milton Road (MR-Col42)	Roadside	466201	100478	NO2	N	5.32m		No	2m

61	1/10 Southwick House Milton Road on the fence (MR- SH)	Roadside	466136	100610	NO2	N			No	2m
62	12 Hambrook House Milton Road (MR-HH)	Roadside	466165	100573	NO2	N			No	2m
63	209 Milton Road (SR-209)	Roadside	466354	100172	NO2	Y			No	2m
64	Summerson Lodge Milton Road (MR-SL)	Roadside	466326	100165	NO2	Y			No	2m
65	Moorings Way-12 (MW-12)	Roadside	466681	100373	NO2	Close	11.76M	1.5 m	No	2m
66	1 Velder Avenue (VA-1)	Roadside	466267	100216	NO2	Y			No	2m
67	23 Velder Avenue (VA-23)	Roadside	466457	100253	NO2	Y	2.37m		No	2m
68	36 Velder Avenue (VA-36)	Roadside	466501	100277	NO2	Y			No	2m
69	Column 4 Velder Avenue (VA-Col4)	Roadside	466396	100248	NO2	Y			No	2m
70	Milton Primary School (ER-DS)	Roadside	466667	99546	NO2	N			No	2m
71	19 Havant Road (HR-19)	Kerbside	465711	105624	NO2	N			No	2m
72	60 Northern Road (NR-60)	Roadside	465657	105577	NO2	N			No	2m
73	52 Northern Road (NR-52)	Roadside	465653	105544	NO2	N			No	2m
74	Column 38 Northern Road (NR-Col38)	Roadside	465610	105383	NO2	N			No	2m
75	1-6 Chipstead House Southampton Road (SR-CH)	Roadside	465618	105619	NO2	N			No	2m
76	142 Copnor Road (CR-142)	Roadside	466002	102053	NO2	N			No	2m
77	Copnor School Playground Copnor Road (CR-School)	Roadside	466008	102097	NO2	N			No	2m
78	3 Goldsmith Avenue (GA-3)	Roadside	466523	99599	NO2	N			No	2m
79	Column 1 Goldsmith Avenue (GA-Col1)	Kerbside	466555	99598	NO2	N	1.8 m		No	2m
80	147 Albert Road (AR-147)	Urban background	465204	98978	NO2	N			No	2m
81	Column 22 Albert Road (AR-Col22)	Roadside	465278	98968	NO2	N	0.5 M		No	2m
82	106-108 Albert Road (On Waverley Road) (AR-WR)	Roadside	465178	98945	NO2	N	2m		No	2m
83	141 Albert Road (AR-141)	Roadside	465166	98982	NO2	N			No	2m
84	145 Albert Road (On Lawrence Road) (AR-145)	Roadside	465198	98996	NO2	N			No	2m

85	98-100 Albert Road (AR-98/100)	Urban background	465150	98968	NO2	N	5.00		No	2m
86	91 Fawcett Road (FR-91)	Roadside	465201	99734	NO2	N	N/A		No	2m
87	Priory School Fawcett Road (FR-PSc)	Roadside	465183	99904	NO2	N			No	2m
88	1-8 Brandon House Lawrence Road (LR-BH)	Urban background	465186	98996	NO2	N			No	2m
89	114 Waverley Road (WR-114)	Urban background	465190	98946	NO2	N			No	2m
90	18 Baffins Road (BR-18)	Urban background	466095	100813	NO2	N			No	2m
91	3 Baffins Road (BR-3)	Urban background	466070	100819	NO2	N			No	2m
92	Locksway Road-13 (LR-13)	Roadside	466525	99736	NO2	N		2.5 m,	No	2m
93	40 Victoria Road North (Back of nursery) (VRN-40)	Roadside	464826	99500	NO2	N			No	2m
95	189 Collins Place Fratton (CP-189)	Roadside	465109	100005	NO2	Close			No	2m
96	Mary Rose Centre Albert Road (AR-MR)	Urban background	465465	98937	NO2	N			No	2m
97	29 Rowan Court, Goldsmith Avenue (GA-29)	Roadside	465896	99852	NO2	N	5.32m		No	2m
98	13-29 Eastern Road (ER-13/29)	Roadside	466700	100591	NO2	Close			No	2m
99	64-80 Eastern Road (ER-64/80)	Roadside	466727	100572	NO2	Close			No	2m
100	340 Havant Road (HR-340)	Roadside	467783	105677	NO2	N			No	2m
101	Column 52 Havant Road (HR-Col52)	Roadside	467693	105687	NO2	N			No	2m
102	Hillside & Wymering Centre Service Road (SR-HWC)	Roadside	464585	105714	NO2	N			No	2m
103	UTC Portsmouth	Roadside	465556	103968	NO2	N	2.37m		No	2m
108	137 London Road (LR-137)	Roadside	464951	102418	NO2	Close			No	2m
109	122/124 London Road (LR-122/124)	Roadside	464961	102383	NO2	Close			No	2m
110	2a/2b Gladys Avenue (GA-2a/2b)	Roadside	464913	102419	NO2	Close			No	2m
111	Column 3 Gladys Avenue (GA-Col3)	Roadside	464898	102414	NO2	Close			No	2m
117	Alfred Road Column 9 (AR-Col 9)	Roadside	463901	100508	NO2	Close			No	
118	Alfred Road Column 12 (AR-Col 12)	Roadside	463951	100531	NO2	Close			No	

119	Market Way-left of St Agatha's bus shelter (MW-StABS)	Kerbside	464098	100748	NO2	Close			No	
120	Market Way Opposite MW-StABS (MW-OppStABS)	Roadside	464086	100765	NO2	Close			No	
121	46 London Road (LR-46)	Roadside	464930	102071	NO2	Y			No	
122	47 London Road (LR-47)	Roadside	464918	102090	NO2	Y			No	
124	Hillsley Road Column 23 (HR-Col23)	Roadside	462491	106553	NO2	N			No	
125	7 Tudor Crescent (TC-7)	Roadside	465624	104626	NO2	N			No	
126	Column 32 Port Way (PW-Col32)	Roadside	463756	105253	NO2	N			No	
127	133 Southampton Road (SR-133)	Roadside	463536	105652	NO2	N			No	
128	47 Derby Road (DR-47)	Roadside	464710	102222	NO2	Close			No	
129	50 Derby Road (DR-50)	Roadside	464711	102239	NO2	Close			No	
130	120 London Road (On Stubbington Avenue Bus Stop) (SA-BS)	Kerbside	464986	102344	NO2	Close			No	
131	16 London Road on Chichester Road (CR-PP0	Roadside	464925	101969	NO2	Close			No	
132	Column 50 Milton Road (MR-Col50)	Roadside	466344	100139	NO2	Close			No	
141	Column 7 St Jude School (StJS-Col7)	Roadside	463504	99362	NO2	N			No	
133	Labour Party Club Holbrook Road (HR-LPC)	Roadside	464882	100475	NO2	N			No	
134	Labour Party Club Coburg Street (CS-LPC)	Roadside	464919	100464	NO2	N			No	
135	Southampton Road - North (SR-N)	Kerbside	464526	105665	NO2	N			No	
136	Southampton Road - South (SR-S)	Roadside	464512	105641	NO2	N			No	
137	Column 96 Southampton Road (SR-Col96)	Roadside	464082	105658	NO2	N			No	
138	Column 97 Southampton Road (SR-Col97)	Kerbside	464067	105633	NO2	N			No	
139	Column79 Southampton Road (SR-Col79)	Roadside	463938	105638	NO2	N			No	
140	69 Hillsley Road (HR-69)	Urban background	462813	106442	NO2	N			No	
142	23 St Nicholas Street (StNS-23)	Roadside	463476	99345	NO2	N			No	
143	8 Old London Road (OLR-8)	Roadside	465686	103868	NO2	N			No	
144	Column 3 Old London Road (OLR-Col3)	Kerbside	465668	103832	NO2	N			No	
145	Opposite Sainsbury Hope Street- Col4)	Kerbside	464259	100965	NO2	Close			No	

146	Column 1 Sevenoaks Road (SOR-Col1)	Roadside	465265	105807	NO2	N			No	
147	Column 4 Sevenoaks Road (SOR-Col4)	Roadside	465303	105817	NO2	N			No	
148	Column 146 Southampton Road (SR-Col146)	Roadside	464670	105713	NO2	N			No	
149	Column 147 Southampton Road (SR-Col147)	Roadside	464665	105737	NO2	N			No	
150	Column 154 Southampton Road (SR-Col154)	Roadside	464791	105775	NO2	N			No	
151	Column 155 Southampton Road (SR-Col155)	Roadside	464806	105751	NO2	N			No	
152	Column 171 Southampton Road (SR-Col171)	Roadside	465169	105763	NO2	N			No	
153	Column 172 Southampton Road (SR-Col172)	Kerbside	465173	105784	NO2	N			No	
154	Column 177 Southampton Road (SR-Col177)	Roadside	465337	105726	NO2	N			No	
155	Column 178 Southampton Road (SR-Col178)	Roadside	465350	105748	NO2	N			No	
156	Column 78 Southampton Road (SR-Col78)	Roadside	463936	105617	NO2	N			No	
157	Opposite Column2 Church Street (Cs-OCol2)	Kerbside	464471	101099	NO2	Close			No	
158	106 Eastern Road (ER-106)	Roadside	467322	103333	NO2	N			No	
159	107 Eastern Road (ER-107)	Roadside	467357	103337	NO2	N			No	
160	116 Eastern Road (ER-116)	Roadside	467378	103247	NO2	N			No	
161	117 Eastern Road (ER-117)	Roadside	467343	103240	NO2	N			No	
162	51 Eastern Road (ER-51)	Roadside	467441	104208	NO2	N			No	
163	52 Eastern Road (ER-52)	Roadside	467423	104211	NO2	N			No	
164	Column 2 Allaway Avenue (AA-Col2)	Kerbside	464707	105787	NO2	N			No	
165	Column 3 Allaway Avenue (AA-Col3)	Roadside	464716	105817	NO2	N			No	
166	Column 2 Anchorage Road (AR-Col2)	Roadside	467269	103292	NO2	N			No	
167	Column 11 Church Street (CS-Col11)	Roadside	464589	100962	NO2	N			No	
168	Column 15 Copnor Road (CR-Col15)	Kerbside	465798	103856	NO2	N			No	
169	Column 16 Copnor Road (CR-Col16)	Kerbside	465809	103870	NO2	N			No	
170	Column 3 Commercial Road (ComR-Col3)	Roadside	464454	101044	NO2	Y			No	
171	Column 4 Commercial Road (ComR-Col4)	Roadside	464423	101047	NO2	Y			No	
172	Column 11 Hope Street (HS-Col11)	Roadside	464365	101038	NO2	N			No	
173	Column 5 Fratton Road (FR-Col5)	Roadside	465161	100081	NO2	Y			No	
174	Column 12 Church Street (CS-Col12)	Roadside	464606	100961	NO2	N			No	
175	Column 2 Church Street (CS-Col2)	Roadside	464478	101110	NO2	Close			No	

176	Column 3 Anchorage Road (AR-Col3)	Roadside	467269	103275	NO2	N			No	

Yellow highlighted sites: Ongoing monitoring sites for many years (**27 sites including co-locations**).

Blue highlighted sites: The additional monitoring sites in year 2018 (**78 sites**).

Green highlighted sites: The additional monitoring sites in year 2019 (**43 sites**).

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.

(3) 2m is the **minimum** height above ground level.

12 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]				
					2015	2016	2017	2018	2019
1	Roadside	Diffusion Tube		83.33	**44.33**	**43.52**	38.80	**42.92**	36.92
2	Urban background	Diffusion Tube		83.33	15.74	17.40	16.38	17.09	14.96
3	Roadside	Diffusion Tube		91.67	24.07	25.75	23.70	24.13	21.02
4	Roadside	Diffusion Tube		91.67	30.54	34.70	34.20	34.04	31.20
5	Roadside	Diffusion Tube		83.33	27.53	29.52	24.38	28.08	24.86
6	Roadside	Diffusion Tube		33.33	**46.06**	36.08	32.08	30.86	30.18
7	Urban background	Diffusion Tube		91.67	26.05	28.09	27.32	27.74	23.29
8	Urban background	Diffusion Tube		91.67	28.43	29.94	26.75	25.97	23.18
9	Roadside	Diffusion Tube		83.33	34.98	**40.86**	37.06	36.70	33.60
10	Urban background	Diffusion Tube		83.33	16.48	19.54	17.58	17.17	15.08
11	Roadside	Diffusion Tube		83.33	28.27	28.10	23.50	22.90	20.70
14	Roadside	Diffusion Tube		91.67	26.87	22.20	21.28	21.66	19.54
15	Roadside	Diffusion Tube		91.67	26.21	28.97	28.95	27.64	24.91
16	Roadside	Diffusion Tube		83.33	32.01	36.45	35.44	29.59	25.44
18	Roadside	Diffusion Tube		91.67	26.91	29.30	29.62	26.01	24.32
19	Roadside	Diffusion Tube		83.33	35.08	39.61	34.72	37.68	33.38
20	Roadside	Diffusion Tube		91.67	27.58	29.12	29.73	28.42	24.01
21	Roadside	Diffusion Tube		91.67	35.28	**40.05**	38.37	36.50	33.41

22	Roadside	Diffusion Tube		75.00	28.06	31.23	26.48	29.28	24.49
23	Roadside	Diffusion Tube		91.67	31.00	37.00	34.00	34.60	32.20
24	Roadside	Diffusion Tube		91.67	36.32	37.74	38.30	36.76	31.30
25	Roadside	Diffusion Tube		83.33	**41.79**	**43.65**	**44.28**	38.21	37.63
26	Kerbside	Diffusion Tube		91.67	**43.12**	**49.16**	**43.09**	**46.02**	**40.42**
30	Roadside	Diffusion Tube		83.33	34.31	39.34	38.48	39.17	34.29
34	Roadside	Diffusion Tube		83.33	34.65	36.06	36.17	33.34	31.01
35	Roadside	Diffusion Tube		91.67	28.48	30.68	30.13	30.08	26.92
36	Roadside	Diffusion Tube		91.67	29.00	33.32	29.74	31.47	27.01
42	Roadside	Diffusion Tube		91.67				38.05	32.46
43	Urban background	Diffusion Tube		91.67				32.50	30.30
44	Roadside	Diffusion Tube		83.33				**40.41**	32.35
45	Roadside	Diffusion Tube		83.33				**41.97**	31.84
46	Roadside	Diffusion Tube		91.67				**44.51**	33.87
47	Roadside	Diffusion Tube		91.67				36.77	31.07
48	Urban background	Diffusion Tube		91.67				30.54	25.32
49	Urban background	Diffusion Tube		91.67				34.64	29.05
50	Roadside	Diffusion Tube		91.67				**40.37**	34.07
51	Urban background	Diffusion Tube		91.67				33.18	28.92
52	Roadside	Diffusion Tube		75.00				32.29	27.77
55	Roadside	Diffusion Tube		75.00			30.40	25.38	26.17
56	Roadside	Diffusion Tube		91.67			36.17	35.09	30.44
58	Roadside	Diffusion Tube		91.67			33.80	29.32	26.93
59	Roadside	Diffusion Tube		91.67				38.23	37.11
60	Roadside	Diffusion Tube		91.67				29.77	25.16
61	Roadside	Diffusion Tube		83.33				33.67	30.28

62	Roadside	Diffusion Tube		91.67				22.04	17.56
63	Roadside	Diffusion Tube		91.67				34.17	29.43
64	Roadside	Diffusion Tube		83.33				37.88	30.33
65	Roadside	Diffusion Tube		91.67			27.62	28.24	24.35
66	Roadside	Diffusion Tube		91.67				31.90	27.60
67	Roadside	Diffusion Tube		91.67				36.73	31.44
68	Roadside	Diffusion Tube		91.67				36.86	29.25
69	Roadside	Diffusion Tube		91.67				31.14	24.95
70	Roadside	Diffusion Tube		83.33			23.69	25.14	21.58
71	Kerbside	Diffusion Tube		91.67				27.78	25.19
72	Roadside	Diffusion Tube		83.33				26.49	23.33
73	Roadside	Diffusion Tube		91.67				27.40	23.78
74	Roadside	Diffusion Tube		75.00				37.27	30.25
75	Roadside	Diffusion Tube		91.67				25.71	21.25
76	Roadside	Diffusion Tube		91.67				31.25	28.87
77	Roadside	Diffusion Tube		83.33				21.23	18.51
78	Roadside	Diffusion Tube		83.33				25.04	19.91
79	Kerbside	Diffusion Tube		33.33				39.32	26.26
80	Urban background	Diffusion Tube		91.67				38.35	32.36
81	Roadside	Diffusion Tube		91.67				35.22	30.66
82	Roadside	Diffusion Tube		91.67				30.79	26.61
83	Roadside	Diffusion Tube		83.33				32.43	28.50
84	Roadside	Diffusion Tube		83.33				**42.82**	30.40
85	Urban background	Diffusion Tube		83.33				**40.41**	31.52
86	Roadside	Diffusion Tube		83.33				28.89	24.00
87	Roadside	Diffusion Tube		91.67				27.30	24.80

88	Urban background	Diffusion Tube		91.67				35.35	28.43
89	Urban background	Diffusion Tube		83.33				30.85	25.97
90	Urban background	Diffusion Tube		83.33				23.98	22.13
91	Urban background	Diffusion Tube		91.67				26.69	23.84
92	Roadside	Diffusion Tube		91.67			28.69	27.27	25.70
93	Roadside	Diffusion Tube		83.33				35.04	34.81
95	Roadside	Diffusion Tube		75.00				29.31	26.06
96	Urban background	Diffusion Tube		75.00				23.47	21.48
97	Roadside	Diffusion Tube		83.33				25.84	22.64
98	Roadside	Diffusion Tube		83.33				22.51	18.19
99	Roadside	Diffusion Tube		91.67				23.57	20.29
100	Roadside	Diffusion Tube		83.33				22.14	19.94
101	Roadside	Diffusion Tube		58.33				28.17	25.00
102	Roadside	Diffusion Tube		91.67				28.72	23.71
103	Roadside	Diffusion Tube		75.00				24.73	23.04
108	Roadside	Diffusion Tube		75.00				**44.18**	32.46
109	Roadside	Diffusion Tube		91.67				35.76	30.11
110	Roadside	Diffusion Tube		83.33				27.72	22.15
111	Roadside	Diffusion Tube		91.67				28.73	24.60
117	Roadside	Diffusion Tube		91.67				**50.42**	**48.00**
118	Roadside	Diffusion Tube		58.33				**50.38**	**52.52**
119	Kerbside	Diffusion Tube		91.67				31.97	30.67
120	Roadside	Diffusion Tube		83.33				**47.51**	**46.90**
121	Roadside	Diffusion Tube		83.33				37.32	38.55
122	Roadside	Diffusion Tube		91.67				37.68	36.76
124	Roadside	Diffusion Tube		83.33				28.56	26.07

125	Roadside	Diffusion Tube		91.67				39.58	27.88
126	Roadside	Diffusion Tube		33.33				37.53	38.66
127	Roadside	Diffusion Tube		91.67				36.10	28.44
128	Roadside	Diffusion Tube		75.00					23.39
129	Roadside	Diffusion Tube		83.33					23.18
130	Kerbside	Diffusion Tube		75.00					35.80
131	*Roadside*	*Diffusion Tube*		*83.33*				39.61	33.16
132	*Roadside*	*Diffusion Tube*		*91.67*				36.85	39.36
141	Roadside	Diffusion Tube		41.67					16.92
133	*Roadside*	*Diffusion Tube*		*58.33*				**43.07**	35.73
134	*Roadside*	*Diffusion Tube*		*83.33*				25.41	24.96
135	*Kerbside*	*Diffusion Tube*		*75.00*					25.73
136	Roadside	Diffusion Tube		83.33				**42.00**	26.67
137	Roadside	Diffusion Tube		66.67					35.42
138	Kerbside	Diffusion Tube		41.67					38.31
139	Roadside	Diffusion Tube		75.00					33.74
140	Urban background	Diffusion Tube		66.67					24.64
141	Roadside	Diffusion Tube		41.67					16.92
142	Roadside	Diffusion Tube		41.67					17.67
143	Roadside	Diffusion Tube		66.67					33.35
144	Kerbside	Diffusion Tube		41.67					**40.81**
145	Kerbside	Diffusion Tube		25.00					**53.91**
146	Roadside	Diffusion Tube		41.67					26.69
147	Roadside	Diffusion Tube		41.67					26.17
148	Roadside	Diffusion Tube		33.33					24.19
149	Roadside	Diffusion Tube		41.67					33.93

150	Roadside	Diffusion Tube		33.33					37.46
151	Roadside	Diffusion Tube		41.67					31.83
152	Roadside	Diffusion Tube		33.33					**41.97**
153	Kerbside	Diffusion Tube		33.33					36.31
154	Roadside	Diffusion Tube		41.67					**43.04**
155	Roadside	Diffusion Tube		33.33					35.76
156	Roadside	Diffusion Tube		58.33					35.80
157	Kerbside	Diffusion Tube		41.67					37.33
158	Roadside	Diffusion Tube		41.67					33.96
159	Roadside	Diffusion Tube		41.67					39.16
160	Roadside	Diffusion Tube		41.67					**40.92**
161	Roadside	Diffusion Tube		41.67					28.49
162	Roadside	Diffusion Tube		41.67					**45.25**
163	Roadside	Diffusion Tube		41.67					38.56
164	Kerbside	Diffusion Tube		25.00					34.57
165	Roadside	Diffusion Tube		25.00					30.25
166	Roadside	Diffusion Tube		41.67					34.71
167	Roadside	Diffusion Tube		91.67					29.01
168	Kerbside	Diffusion Tube		41.67					27.62
169	Kerbside	Diffusion Tube		41.67					32.66
170	Roadside	Diffusion Tube		41.67					**41.50**
171	Roadside	Diffusion Tube		33.33					31.33
172	Roadside	Diffusion Tube		41.67					38.77
173	Roadside	Diffusion Tube		41.67					**41.88**
174	Roadside	Diffusion Tube		33.33					31.30
175	Roadside	Diffusion Tube		41.67					37.55

176	Roadside	Diffusion Tube		33.33					29.41
37	Kerbside	Automatic		99.92	38.40	**41.21**	**44.60**	**40.57**	**40.46**
38	Urban background	Automatic		93.76	18.78	20.05	19.41	18.68	17.47
39	Roadside	Automatic		99.42	32.81	34.34	35.22	34.00	31.12
40	Roadside	Automatic		83.05	30.25	35.48	33.54	33.95	32.44
53	Roadside	Automatic		100.00				30.52	27.80

☒ **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.

13 Significance of local air quality change

The assessment and description of change in nitrogen dioxide annual average has been carried out according to guidance on land use planning and development control AQ impact descriptors for annual mean pollutant concentrations.

The air quality change from year on year can be considered to be significant if it leads to significant impacts at existing sensitive receptors. In this assessment similar approaches have been adopted as presented in guidance on land-use planning and development control. This guidance suggests that a two-stage approach should be adopted to determine whether or not a change in air quality is considered as a significant.

The methodology followed is:

- Firstly, qualitative descriptions are applied to the latest air quality monitoring data at individual receptors.

- Secondly, professional judgement is applied to judge whether the accumulation of the identified impacts constitute a significant impact overall.

In order to assess the potential change in local air quality, a description of the change is given based on the magnitude of change as a percentage of a relevant Air Quality Assessment Level. Account must also be taken of latest monitoring pollutant concentrations and their relationship to the NAQO for the pollutants of concern.

A summary of the impact descriptors for annual mean pollutant concentrations is tabulated in Section 13.1. The impact descriptors may be adverse or beneficial depending upon whether monitored concentrations increase or decrease.

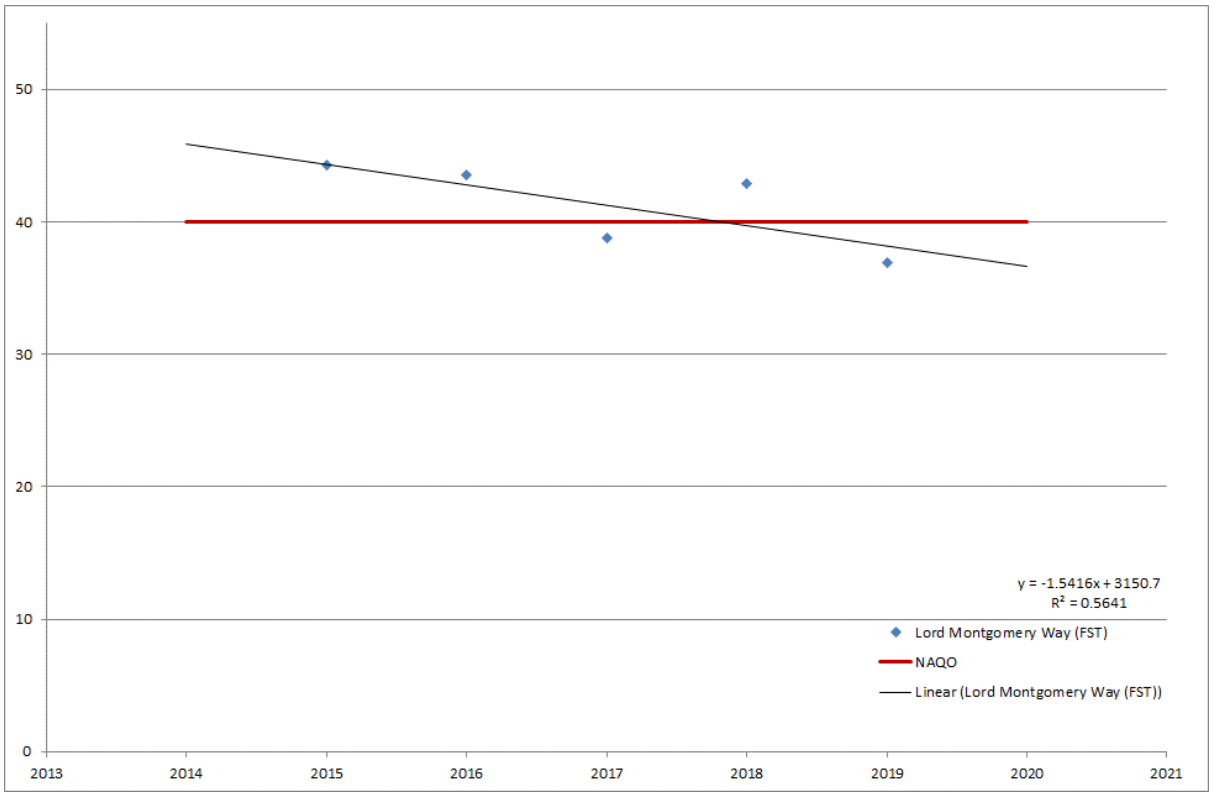
13.1 Air quality Impact descriptors for annual mean pollutant concentrations:

Annual mean concentration at receptor in assessment year (as % of AQAL)	PM_{10} Annual mean concentration ($\mu g/m^3$) [3]				
	0	1	2 – 5	6 – 10	>10
≤75%	Negligible	Negligible	Negligible	Slight	Moderate
76% - 94%	Negligible	Negligible	Slight	Moderate	Moderate
95% - 102%	Negligible	Slight	Moderate	Moderate	Substantial
103% - 109%	Negligible	Moderate	Moderate	Substantial	Substantial
≥110%	Negligible	Moderate	Substantial	Substantial	Substantial

14 Figure A.1 – Trends in annual mean NO_2 concentrations

In this section, the trends in Annual Mean NO_2 concentrations are illustrated for both NDDT monitoring (27 locations from Figure F1 to F27) and CAQMS's data (4 locations from Figure 28 to Figure 31).

14.1 Figure 1: Lord Montgomery Way (LMW-FST).



Summary: *No Exceedance, short-term (Substantially Beneficial), long-term (Downward).*

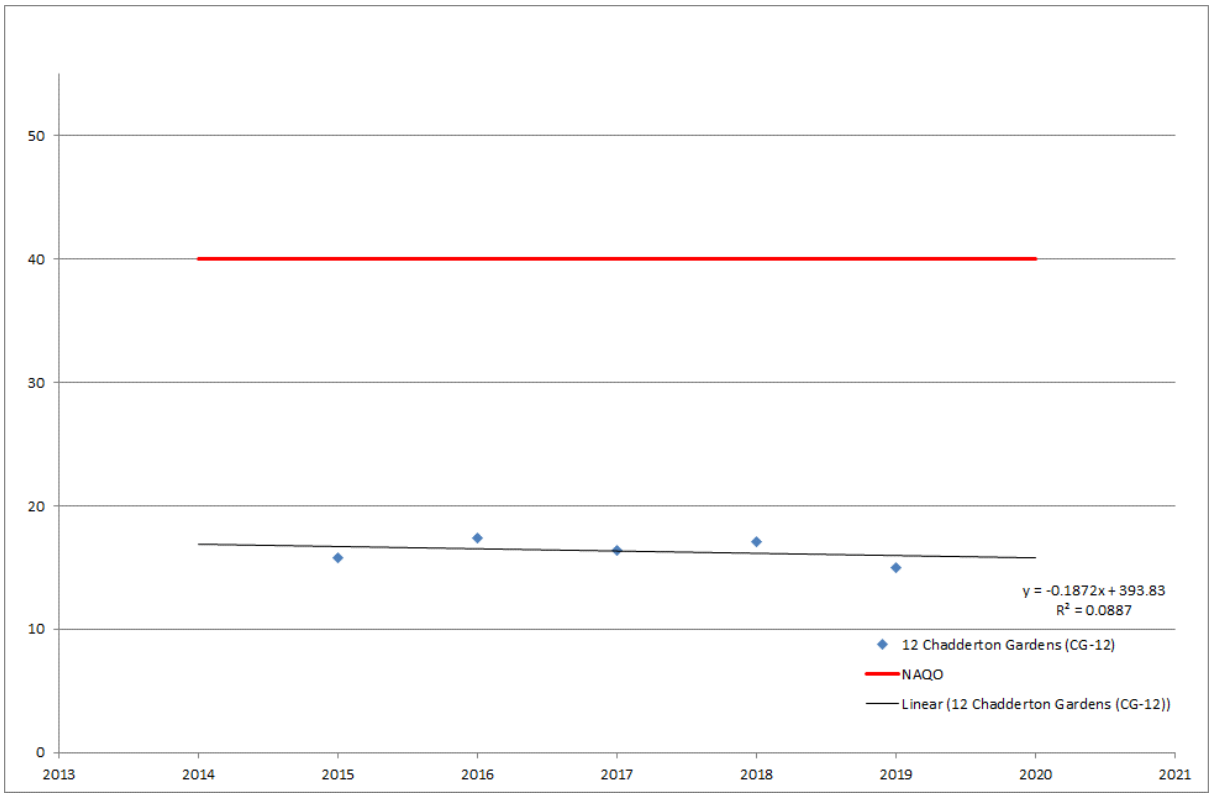
1. The NO_2 annual average decreased below the NAQO for the second time in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 5.99µg/m^3 (a decrease of 13.98%) between 2018 and 2019 to meet the NAQO in 2019 (36.92µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "substantially beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term exhibiting a consistency with to the previously reported 5-year trend.

14.2 Figure 2: 12 Chadderton Gardens (CG-12).



Summary: *No Exceedance, short-term (Negligibly beneficial), long-term (Downward).*

1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **urban background** monitoring location decreased by 2.13µg/m^3 (a decrease of 12.44%) between 2018 and 2019, and remained under the NAQO in 2019 (14.96µg/m^3), exhibiting a slight AQ improvement in the short-term.

3. This 2018-2019 NO_2 annual average decrease is described as "negligibly beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term.

14.3 Figure 3: 121A High Street (HS-121A).

Summary: *No Exceedance, short-term (Slightly Beneficial), long-term (Downward).*

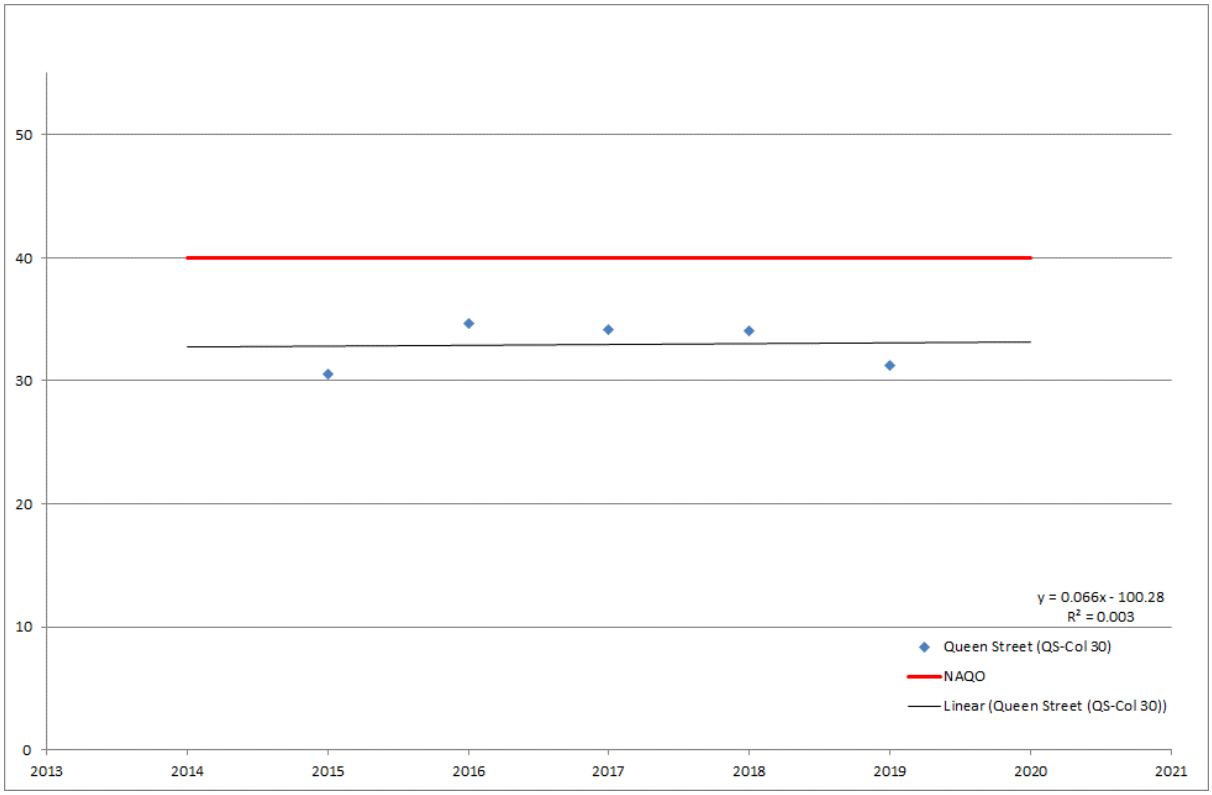
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 3.11µg/m^3 (a decrease of 12.89%) between 2018 and 2019, and remained below the NAQO in 2019 (21.02µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.4 Figure 4: Queen Street, Column 30 (QS-Col30).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Upward).*

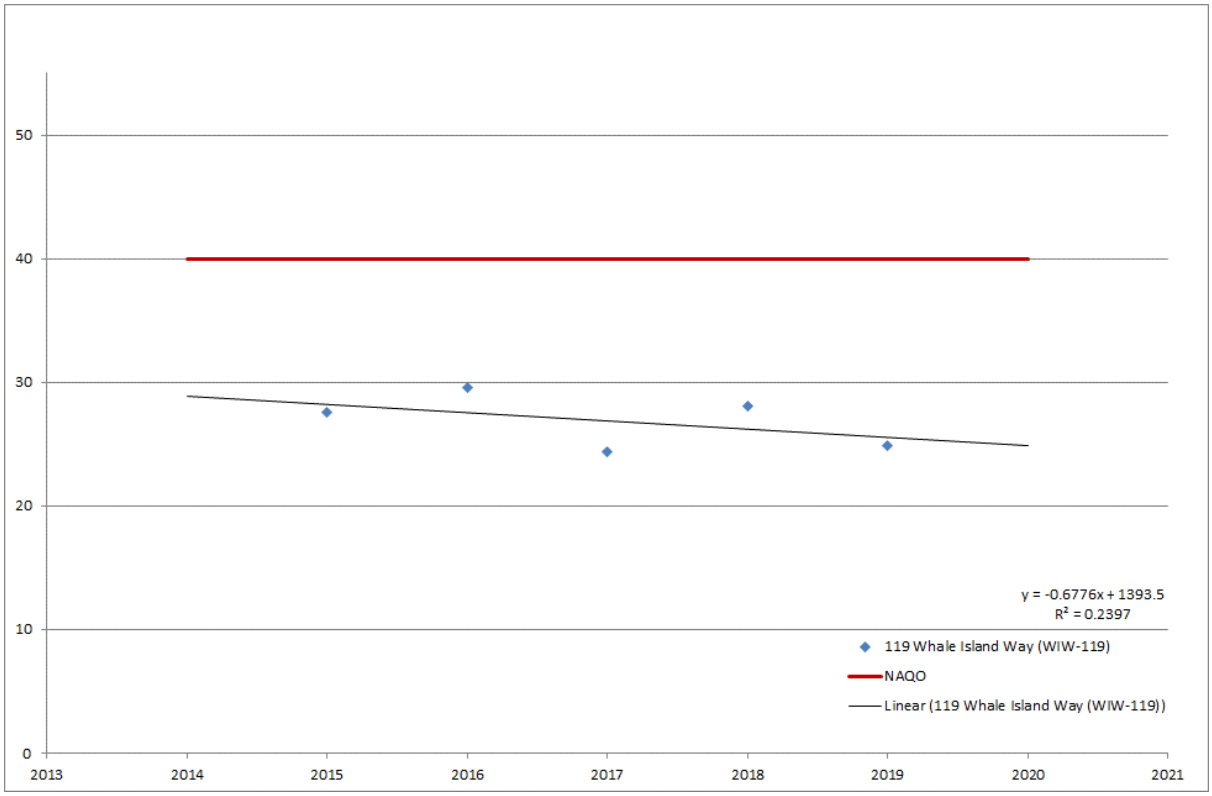
1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The NO_2 annual average decreased at this **roadside** monitoring location by 2.83µg/m^3 (a decrease of 8.34%) between 2018 and 2019, and remained below the NAQO in 2019 (31.20µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. However the NO_2 annual average "upward" trend in the last 5 years exhibited an AQ deterioration in the long-term similar to the previously reported 5 year trend.

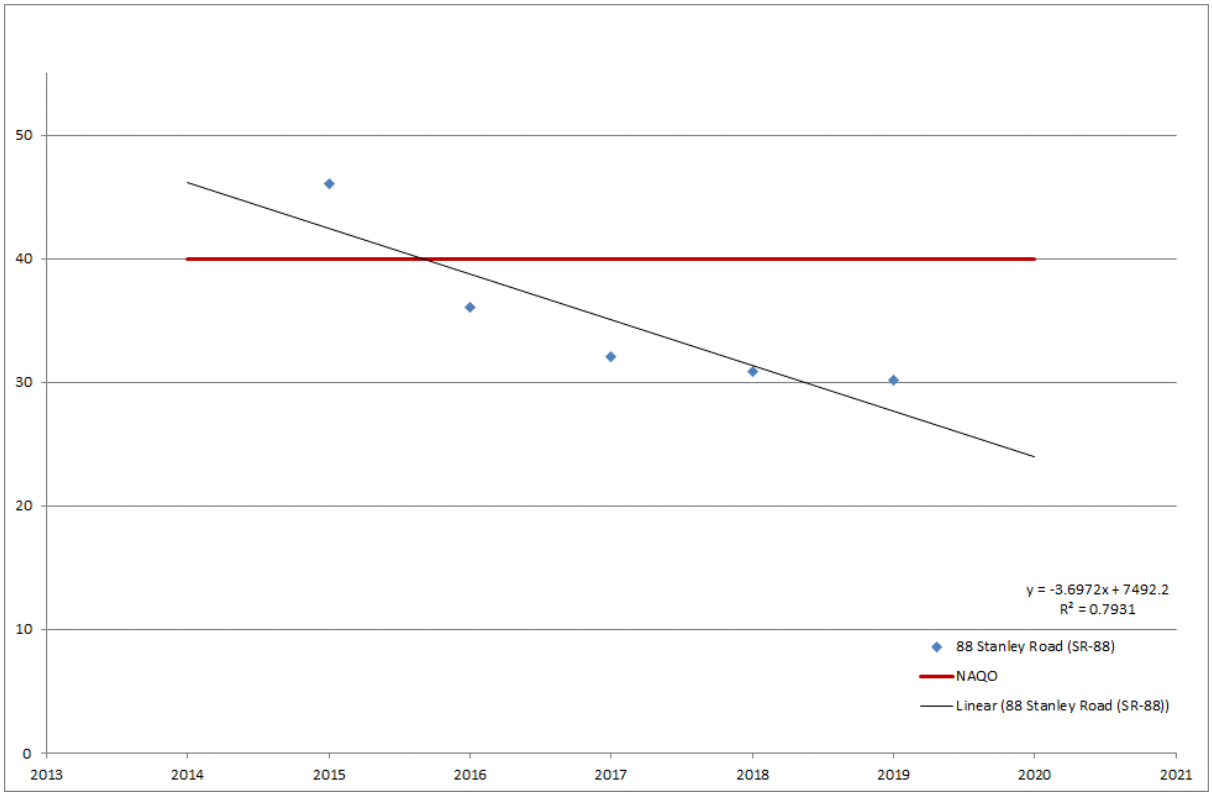
14.5 Figure 5: 119 Whale Island Way (WIW-119).



Summary: *No Exceedance, short-term (Slightly Beneficial), Long-term (Downward).*

1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.
2. The NO_2 annual average at this **roadside** monitoring location decreased by 3.22µg/m^3 (an increase of 11.45%) between 2018 and 2019, and remained below the NAQO in 2019 (24.86µg/m^3) exhibiting an AQ improvement in the short-term.
3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".
4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

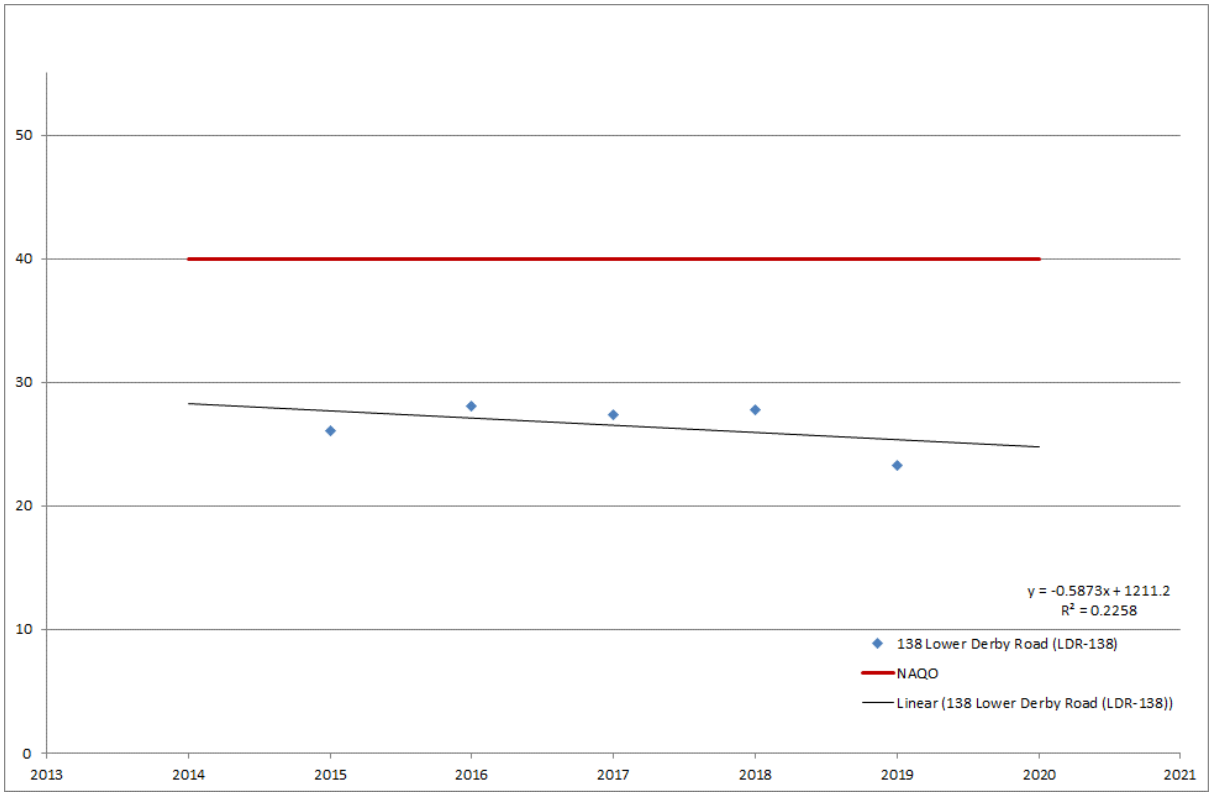
14.6 Figure 6: 88 Stanley Road (SR-88).



Summary: *No Exceedance, short-term (Slightly Beneficial), long-term (Downward).*

1. The NO_2 annual average remained considerably below the NAQO in the last five years with the exception of 2015.
2. The NO_2 annual average at this **roadside** monitoring location decreased by 0.67µg/m^3 (a decrease of 2.19%) between 2018 and 2019, and remained below the NAQO in 2019 (30.18µg/m^3) exhibiting an AQ improvement at this location in the short-term.
3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".
4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

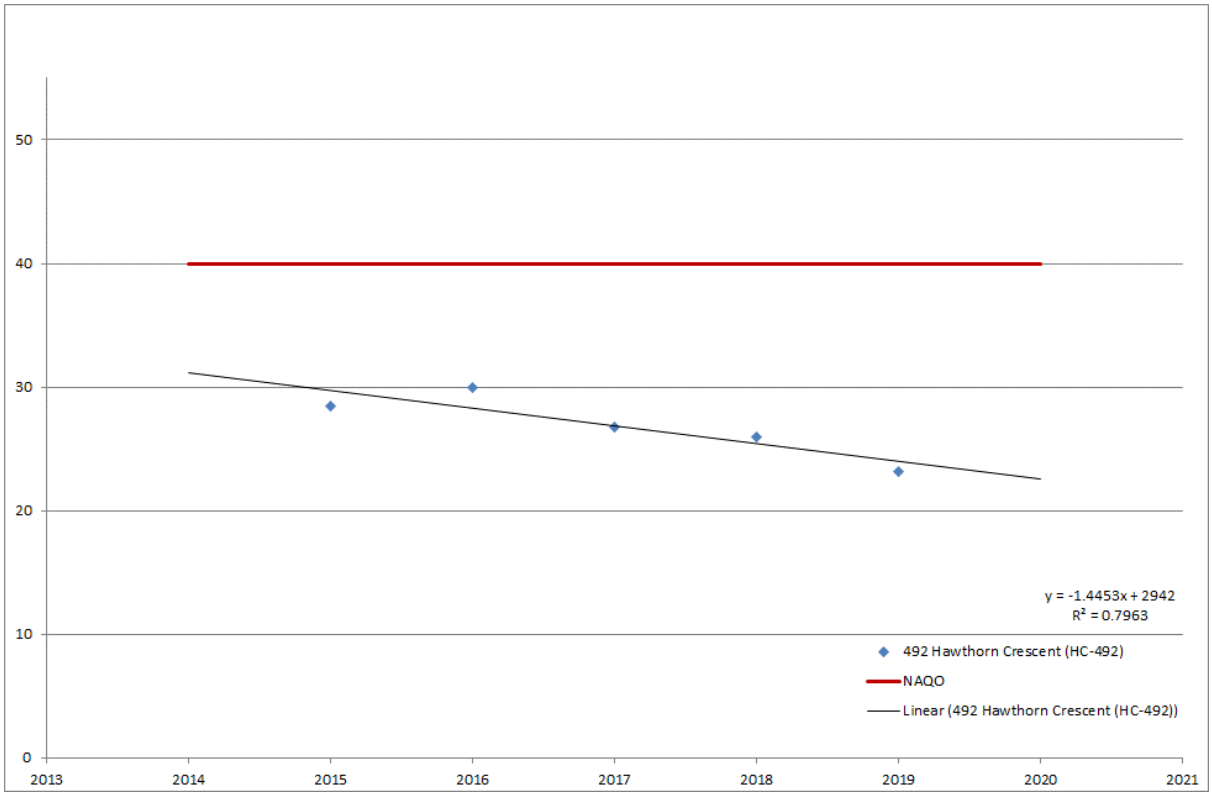
14.7 Figure 7: 138 Lower Derby Road (LDR-138).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

1. The NO_2 annual average remained considerably below the NAQO in the last five years.
2. The NO_2 annual average at this **roadside** monitoring location decreased by 4.46µg/m^3 (an decrease of 16.06%) between 2018 and 2019, and remained below the NAQO in 2019 (23.29µg/m^3) exhibiting an AQ improvement in the short-term.
3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".
4. The NO_2 annual average "downward" trend in the last five years exhibited an AQ improvement in the long-term contrary to the previously reported 5-year trend.

14.8 Figure 8: 492 Hawthorn Crescent (HC-492).



Summary: *No Exceedance, short-term (slightly Beneficial), long-term (Downward).*

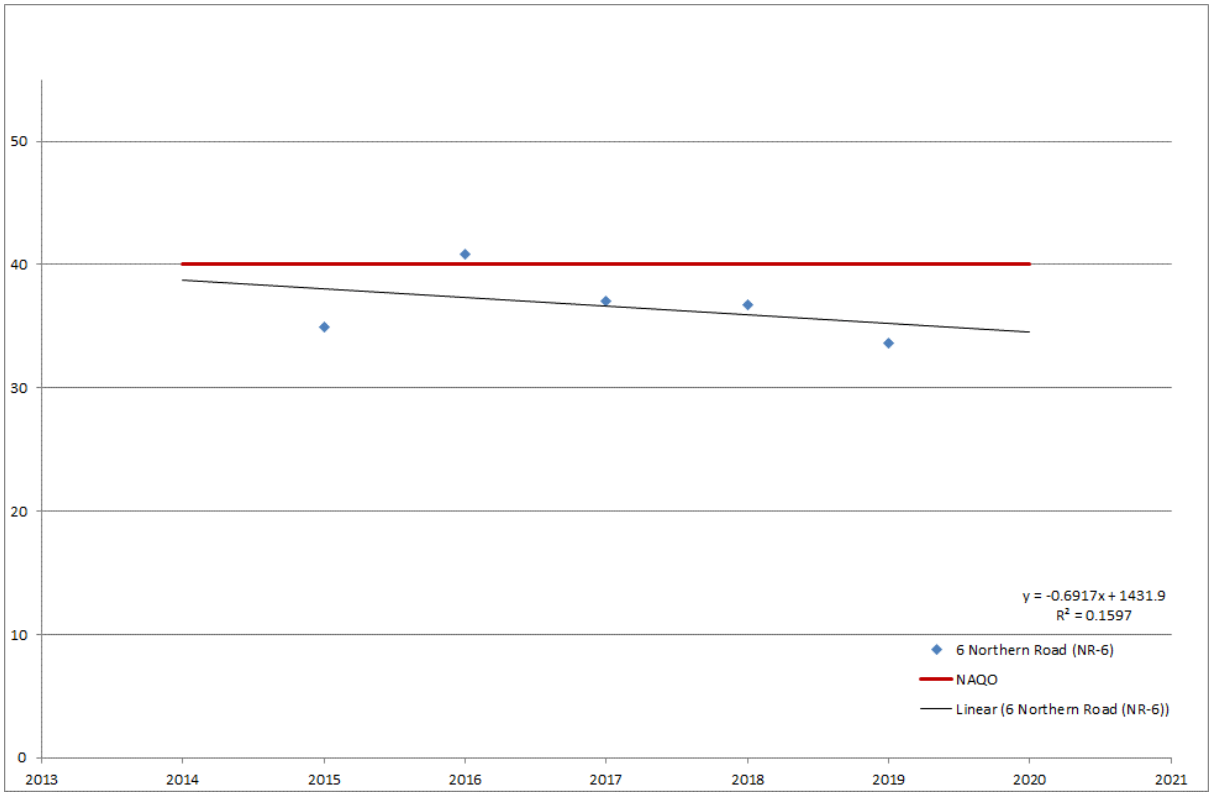
1. The NO_2 annual average has remained considerably below the NAQO in the last five years.

2. The NO_2 annual average at this **urban background** monitoring location decreased by 2.79µg/m^3 (a decrease of 10.74%) between 2018 and 2019, and remained below the NAQO in 2019 (23.18µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".

4. The NO_2 annual average "downward" trend in the last five years exhibited an AQ improvement in the long-term similarly to the previously reported 5-year trend.

14.9 Figure 9: 6 Northern Road (NR-6).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

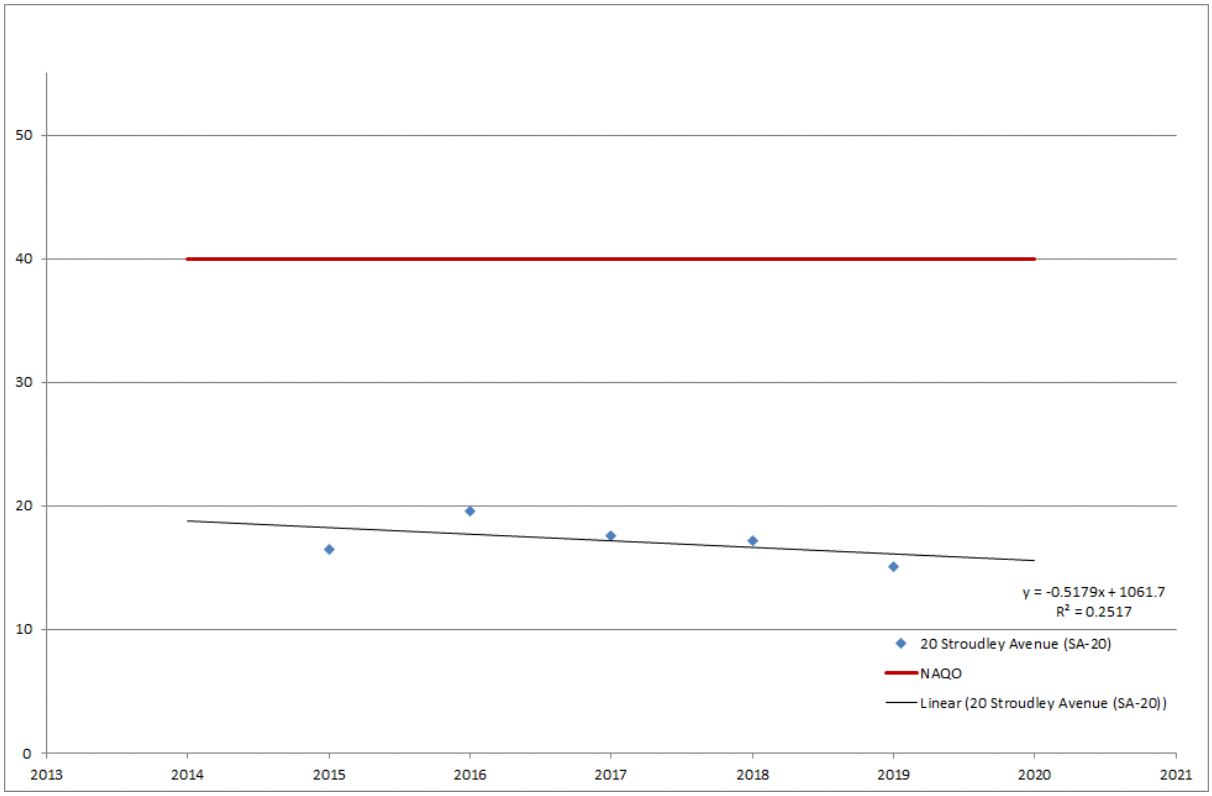
1. NO_2 annual average remained below the NAQO in the last 5 years with the exception of 2016.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 3.09µg/m^3 (a reduction of 8.43%) between 2018 and 2019, and remained below the NAQO in year 2019 (33.6µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-years trend.

14.10 Figure 10: 20 Stroudley Avenue (SA-20).



Summary: *No Exceedance, short-term (Negligibly Beneficial), long-term (Downward).*

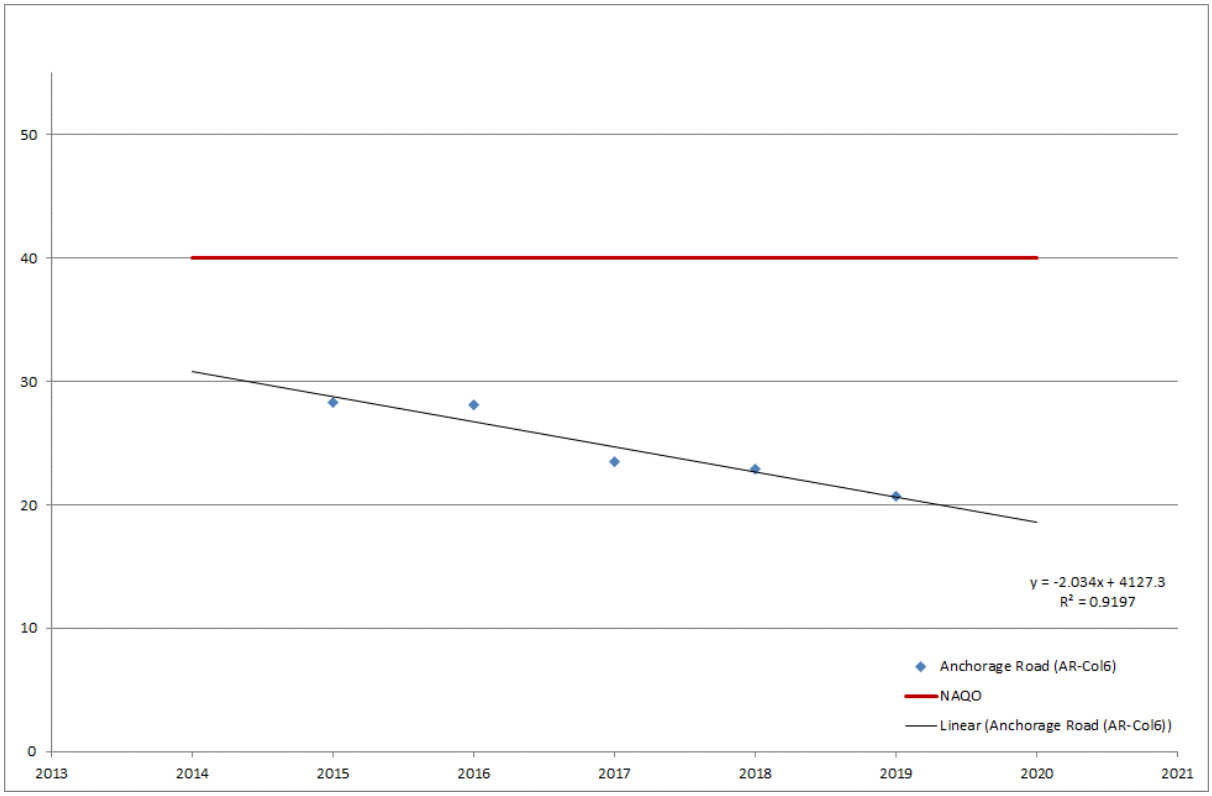
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **urban background** monitoring location decreased by 2.09µg/m^3 (a reduction of 12.17%) between 2018 and 2019, and remained well below the NAQO in 2019 (15.08µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "negligibly beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.11 Figure 11: Anchorage Road, Column 6 (AR-Col6).



Summary: *No Exceedance, short-term (Negligibly Beneficial), long-term (Downward).*

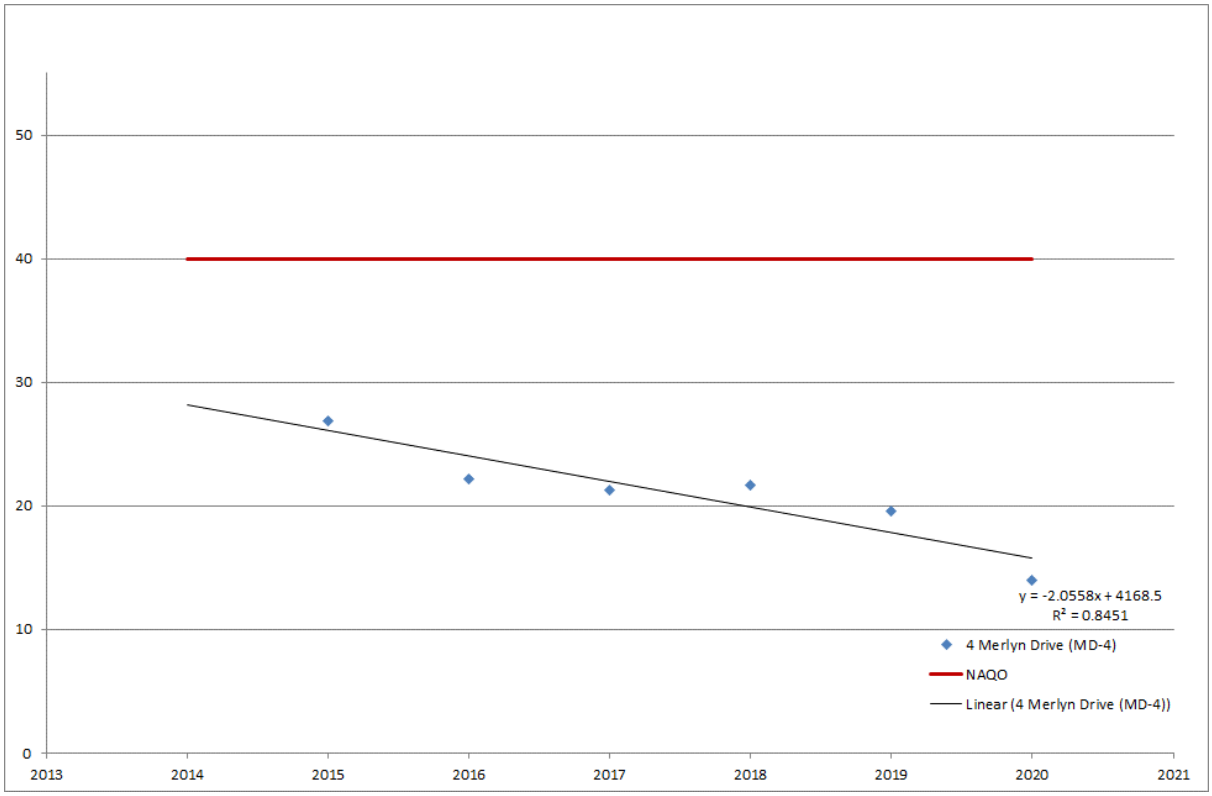
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this roadside monitoring location decreased by 2.2µg/m^3 (a decrease of 9.61%) between 2018 and 2019, but remained well below the NAQO in 2019 (20.7µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "negligibly beneficial".

4. NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.12 Figure 12: 4 Merlyn Drive (MD-4).



Summary: *No Exceedance, short-term (Negligibly Beneficial), long-term (Downward).*

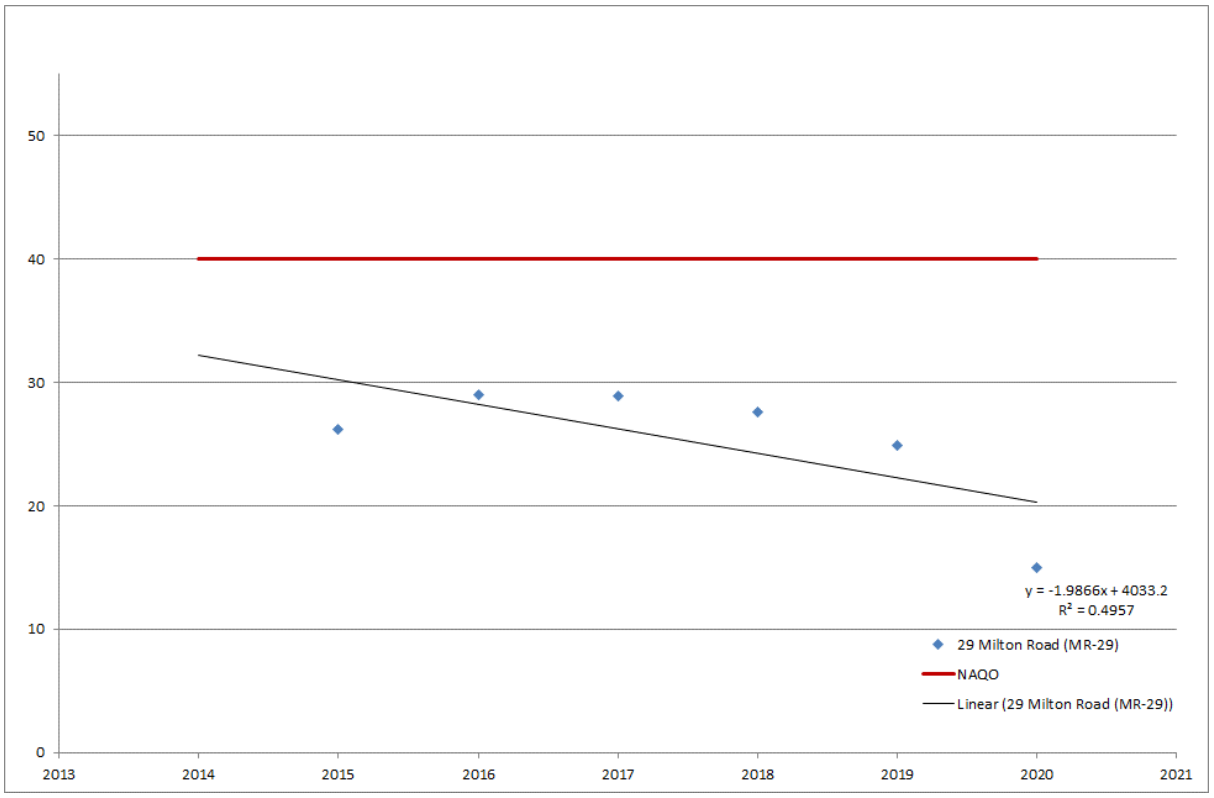
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 2.12µg/m^3 (a decrease of 9.79%) between 2018 and 2019, and remained well below the NAQO in 2019 (19.54µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "negligibly beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

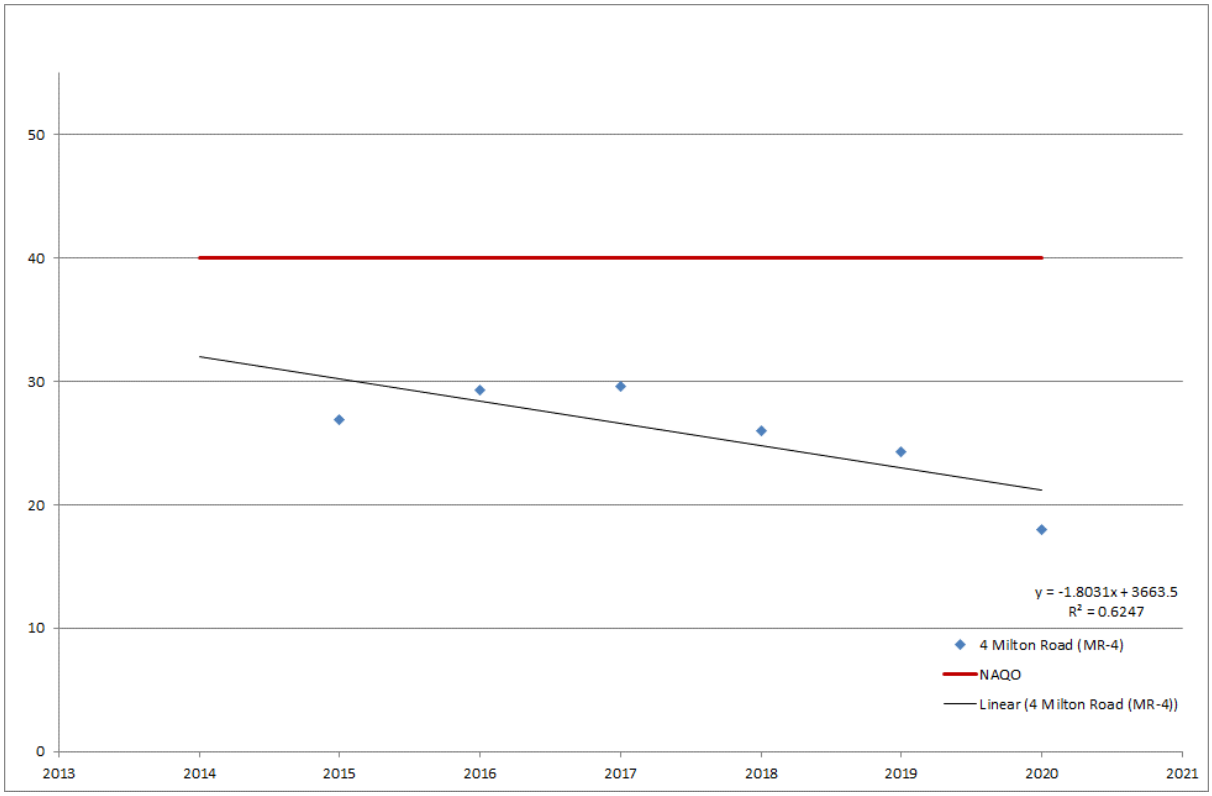
14.13 Figure 13: 29 Milton Road (MR-29).



Summary: *No Exceedance, short-term (Slightly Beneficial), long-term (Downward).*

1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.
2. NO_2 annual average at this **roadside** monitoring location decreased by 2.73µg/m^3 (a decrease of 9.86%) between 2018 and 2019, and remained well below the NAQO in 2019 (24.91µg/m^3) exhibiting an AQ improvement in the short-term.
3. The 2018-2019 NO_2 annual average decrease is being described "slightly beneficial".
4. The NO_2 annual average "downward" trend in the last 5 years exhibited AQ improvement in the long-term similar to the previously reported 5-year trend.

14.14 Figure 14: 4 Milton Road (MR-4).



Summary: *No Exceedance, short-term (Negligibly Beneficial), long-term (Downward).*

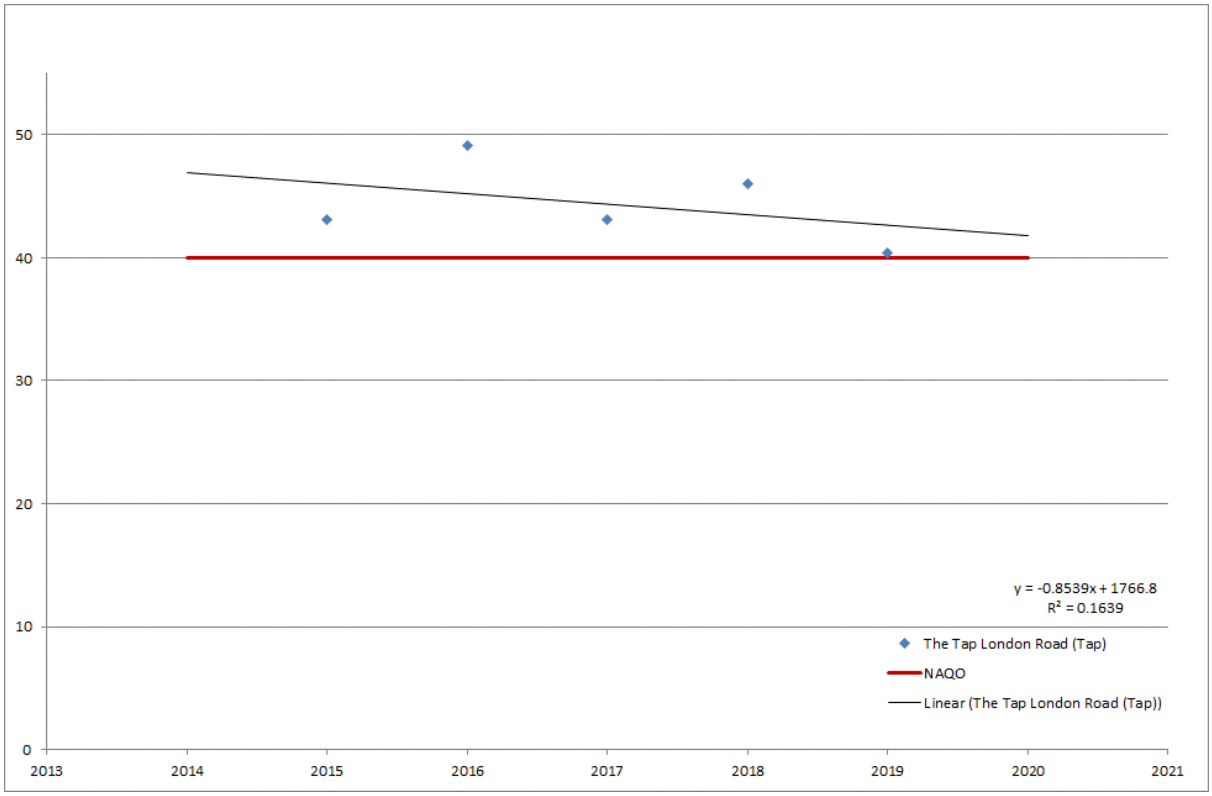
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 1.69µg/m^3 (a decrease of 6.51%) between 2018 and 2019, and remained well below the NAQO in 2019 (24.32g/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease change is described as "negligibly beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term contrary to the previously reported 5-year trend.

14.15 Figure 15: The Tap Public House London Road (LR-TAP(PH)).



Summary: *Yes Exceedance, short-term (Substantially Beneficial), long-term (Downward).*

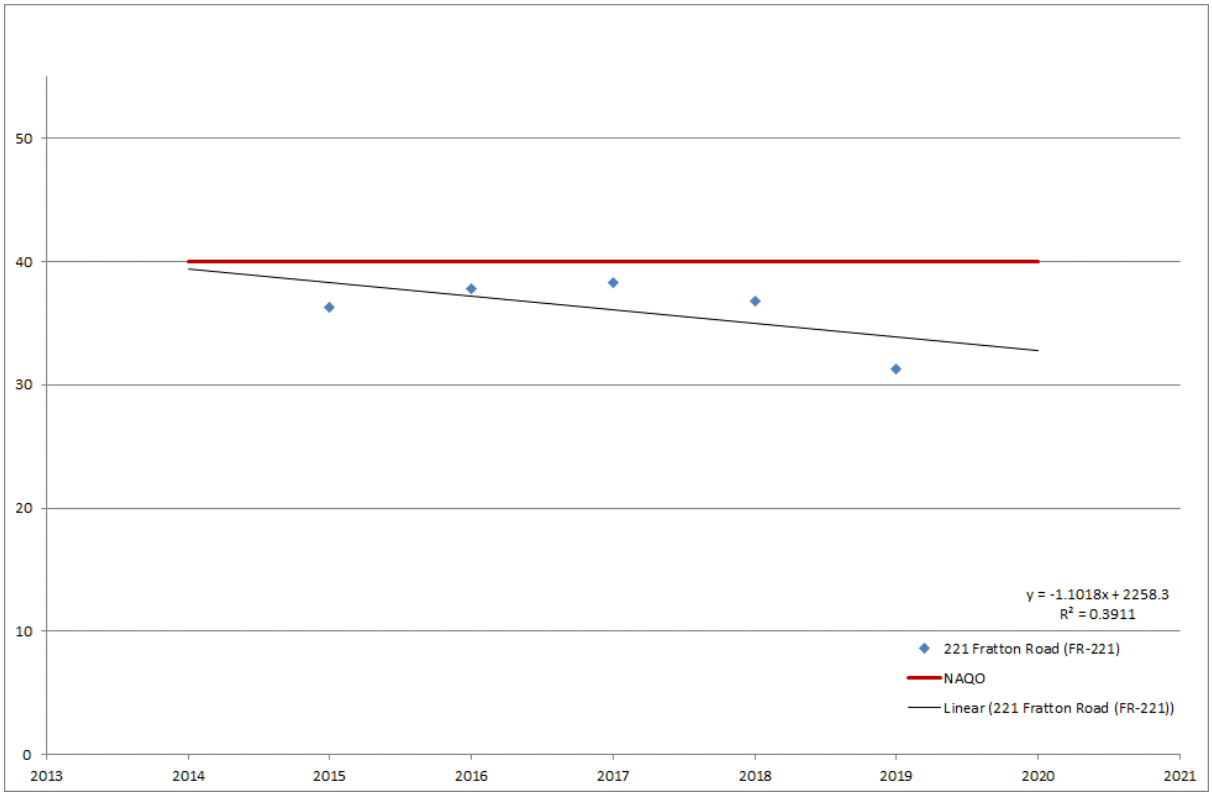
4. The NO_2 annual average remained above the NAQO for the last 5 years.

5. The NO_2 annual average at this **kerbside** monitoring location decreased by 5.60µg/m^3 (a decrease of 12.17%) between 2018 and 2019, but remained above the NAQO in 2019 (40.42µg/m^3) and still exhibiting an AQ improvement in the short-term.

6. The 2018-2019 NO_2 annual average decrease is described as "substantially beneficial".

7. The NO_2 annual average "downward" trend in the last 5 years exhibited a continued AQ improvement in the long-term, contrary to the previously reported 5-year trend.

14.16 Figure 16: 221 Fratton Road (FR-221).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

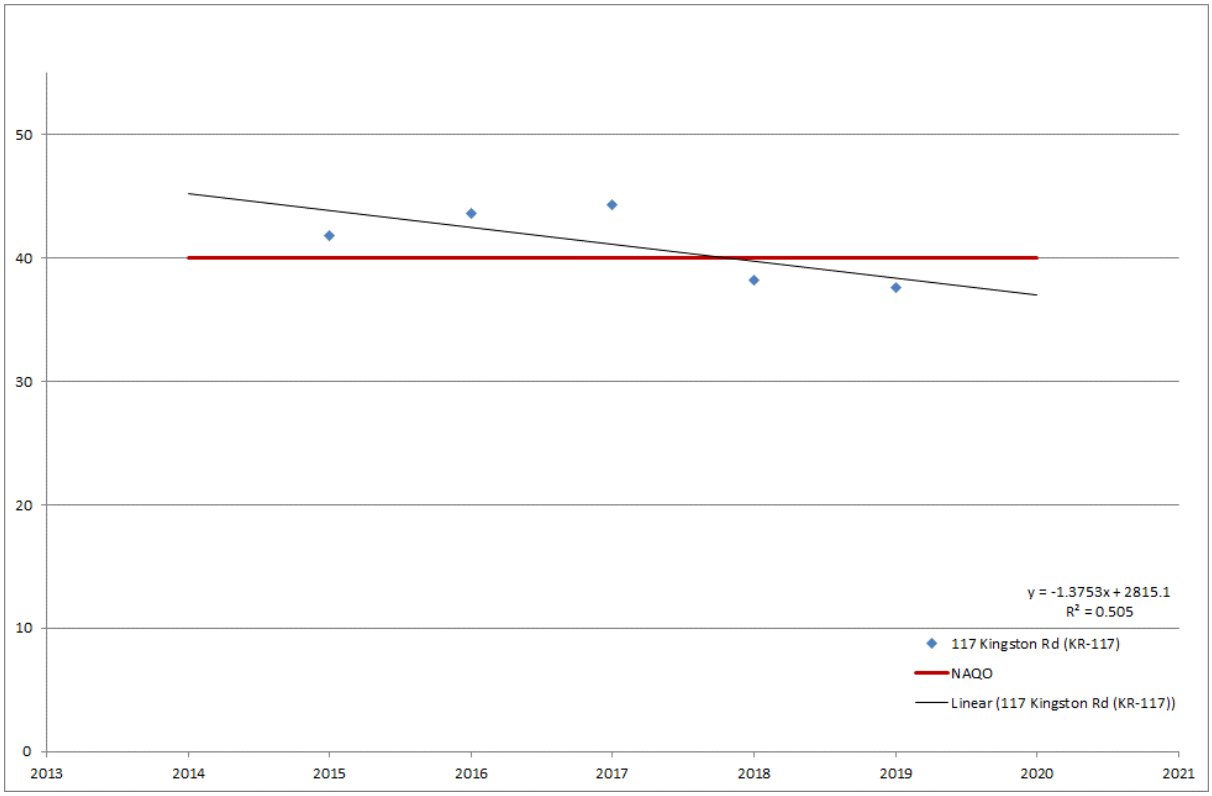
1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 5.46µg/m^3 (a decrease of 14.85%) between 2018 and 2019, and remained below the NAQO in 2019 (31.30µg/m^3) for the fifth consecutive year, exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average change is described as "moderately beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.17 Figure 17: 117 Kingston Road (KR-117).



Summary: *No Exceedance, short-term (Slightly Beneficial), long-term (Downward).*

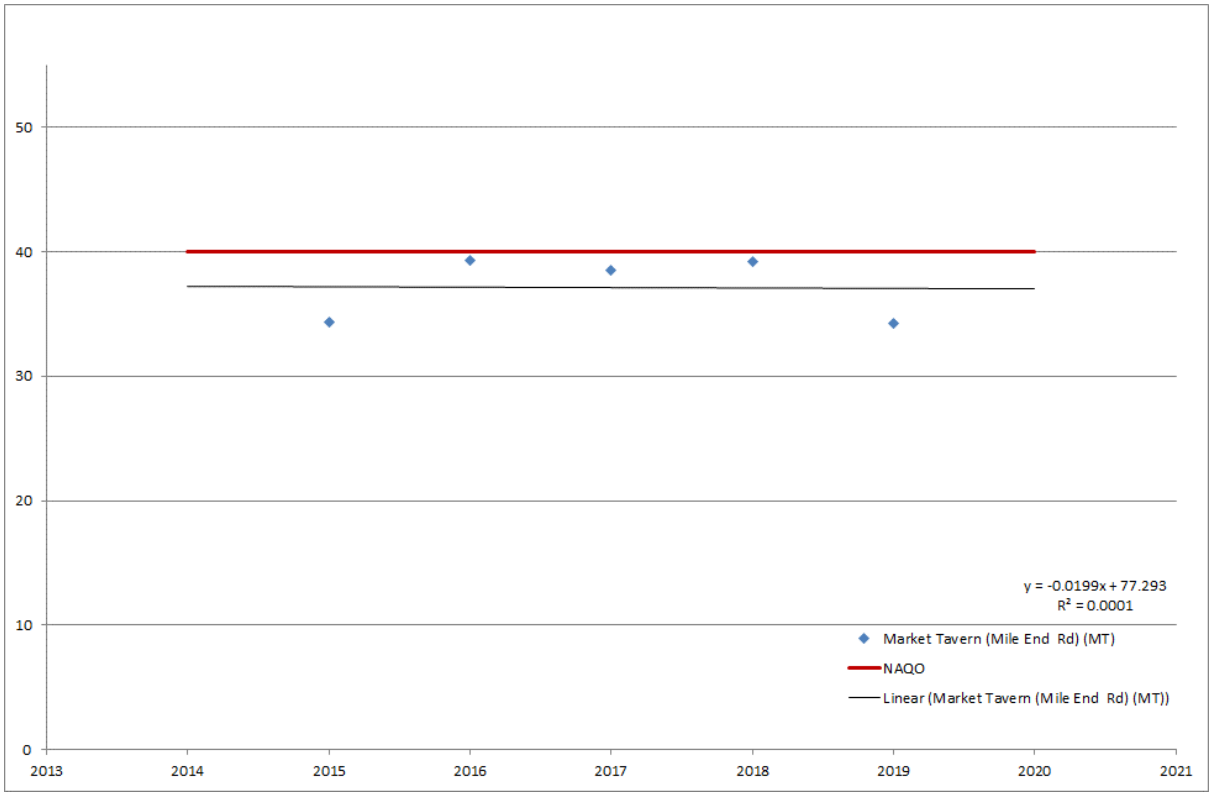
1. The NO_2 annual average remained below the NAQO for the second time in the last six years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 0.58µg/m^3 (a decrease of 1.51%) between 2018 and 2019 and remained below the NAQO in 2019 (37.63µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited AQ improvement in the long-term similarly to the previously reported 5-year trend.

14.18 Figure 18: "Market Tavern PH", Mile End Road (MER-MT).



Summary: *No Exceedance, short-term (Substantially Beneficial), long-term (Downward).*

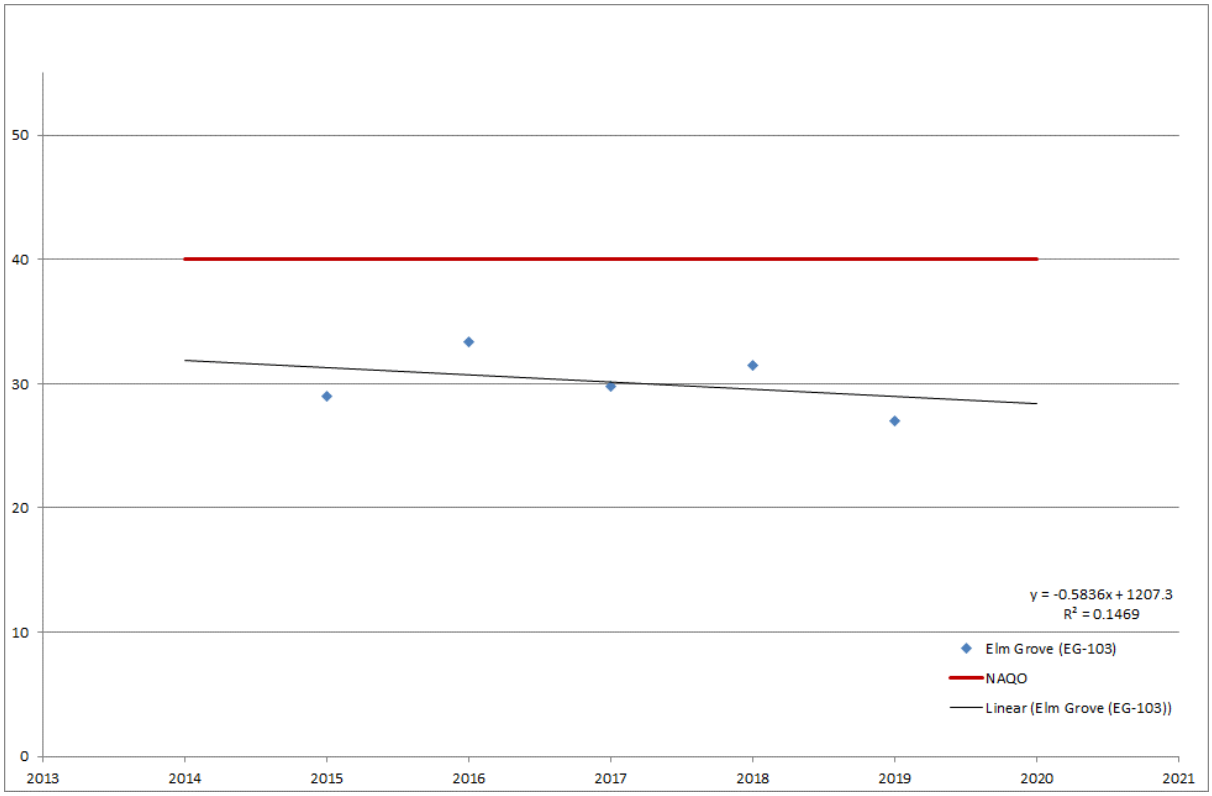
1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 4.88µg/m^3 (a decrease of 12.46%) between 2018 and 2019, and remained below the NAQO in 2019 (34.29µg/m^3) for the fifth consecutive year, exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "substantially beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.19 Figure 19: 103 Elm Grove (EG-103).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

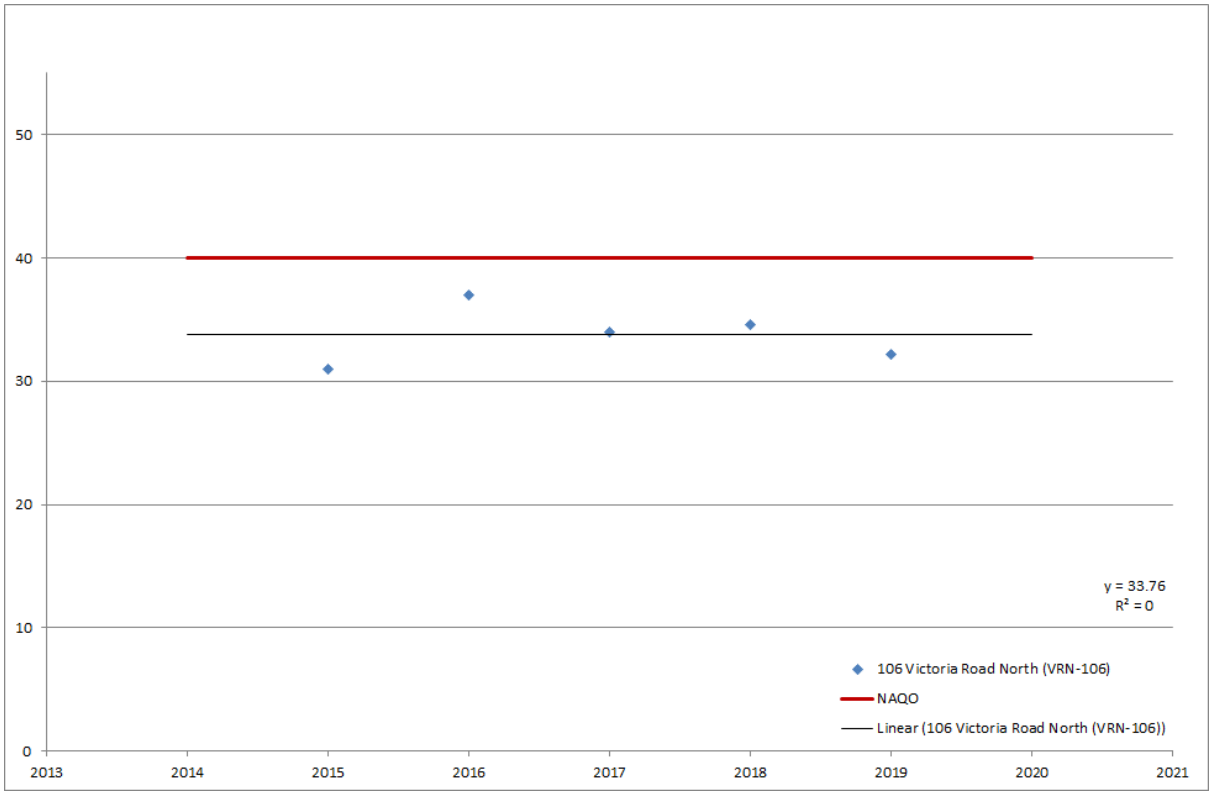
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 4.47µg/m^3 (a decrease of 14.20%) between 2018 and 2019, but remained below the NAQO in 2019 (27.01µg/m^3) for the sixth consecutive year, exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average "downward" trend for the last 5 years exhibited however an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.20 Figure 20: 106 Victoria Road North (VRN-106).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (**Constant**).*

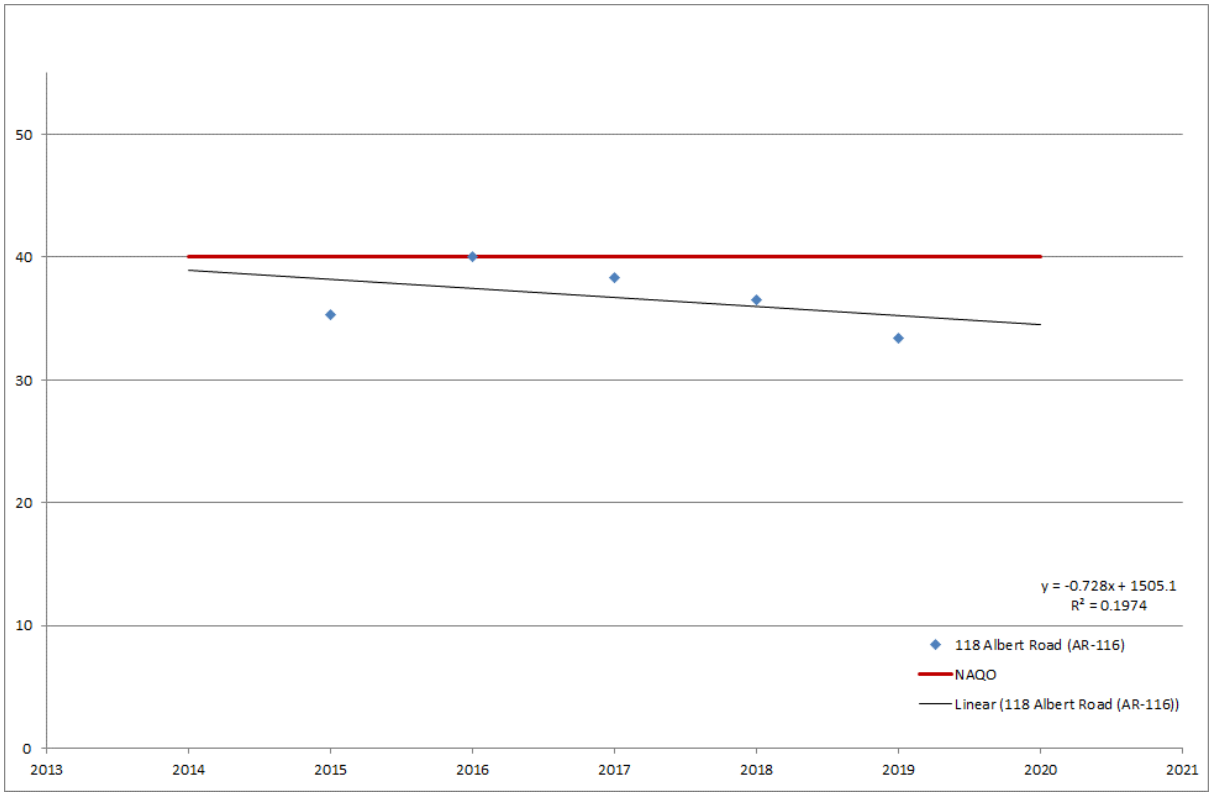
1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 2.4µg/m^3 (a decrease of 6.94%) between 2018 and 2019, and remained below the NAQO in 2019 (32.2µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average **"constant"** trend in the last 5 years exhibited however **NO AQ change** in the long-term.

14.21 Figure 21: 116 Albert Road (AR-116).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

1. The NO_2 annual average remained below the NAQO in the last 5 years with an exception for year 2016.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 3.09µg/m^3 (a decrease of 8.46%) between 2018 and 2019, and remained below the NAQO in 2019 (33.41µg/m^3) for the third consecutive year, exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average downward trend in the last 5 years exhibited an AQ improvement in the long-term contrary to the previously reported 5-year trend.

14.22 Figure 22: 2 Victoria Road North (VRN-2).

Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

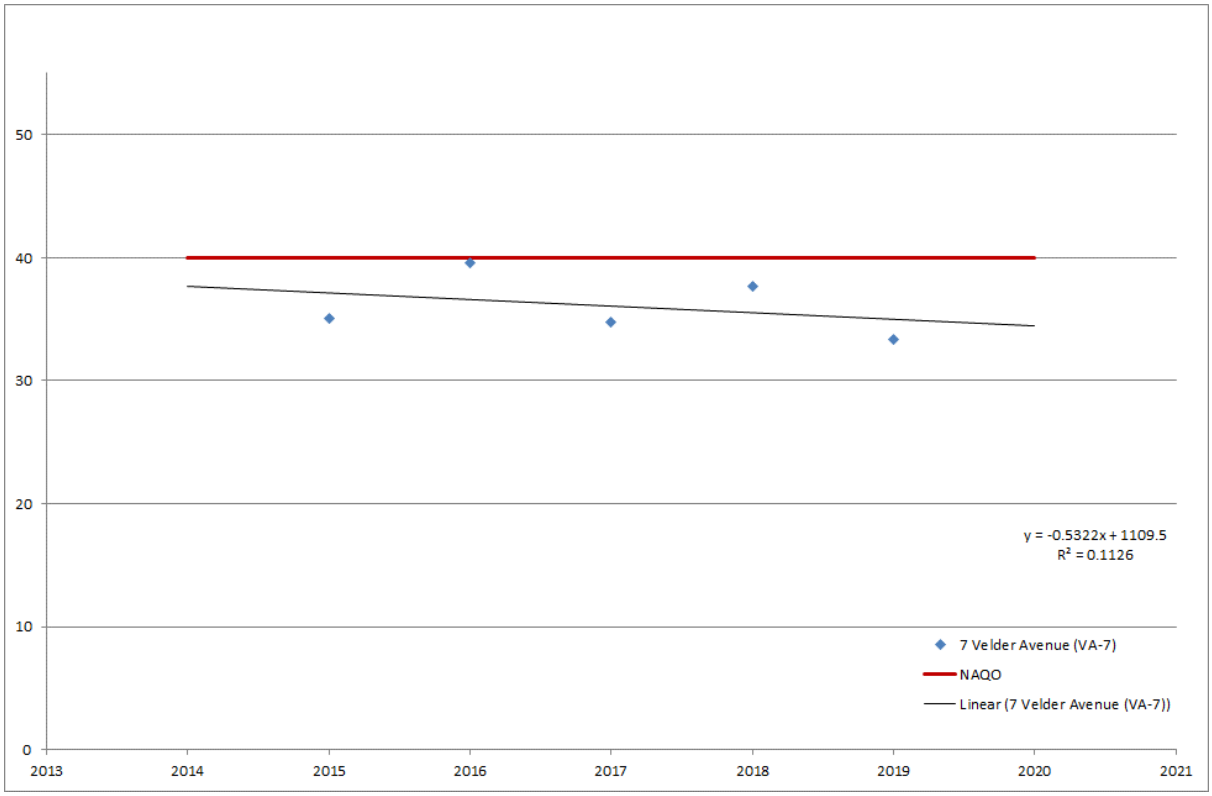
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 4.79µg/m^3 (a decrease of 16.35%) between 2018 and 2019, and remained below the NAQO in 2019 (24.94µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.23 Figure 23: 7 Velder Avenue (VA-7).



Summary: *No Exceedance, short-term (Moderately beneficial), long-term (Downward).*

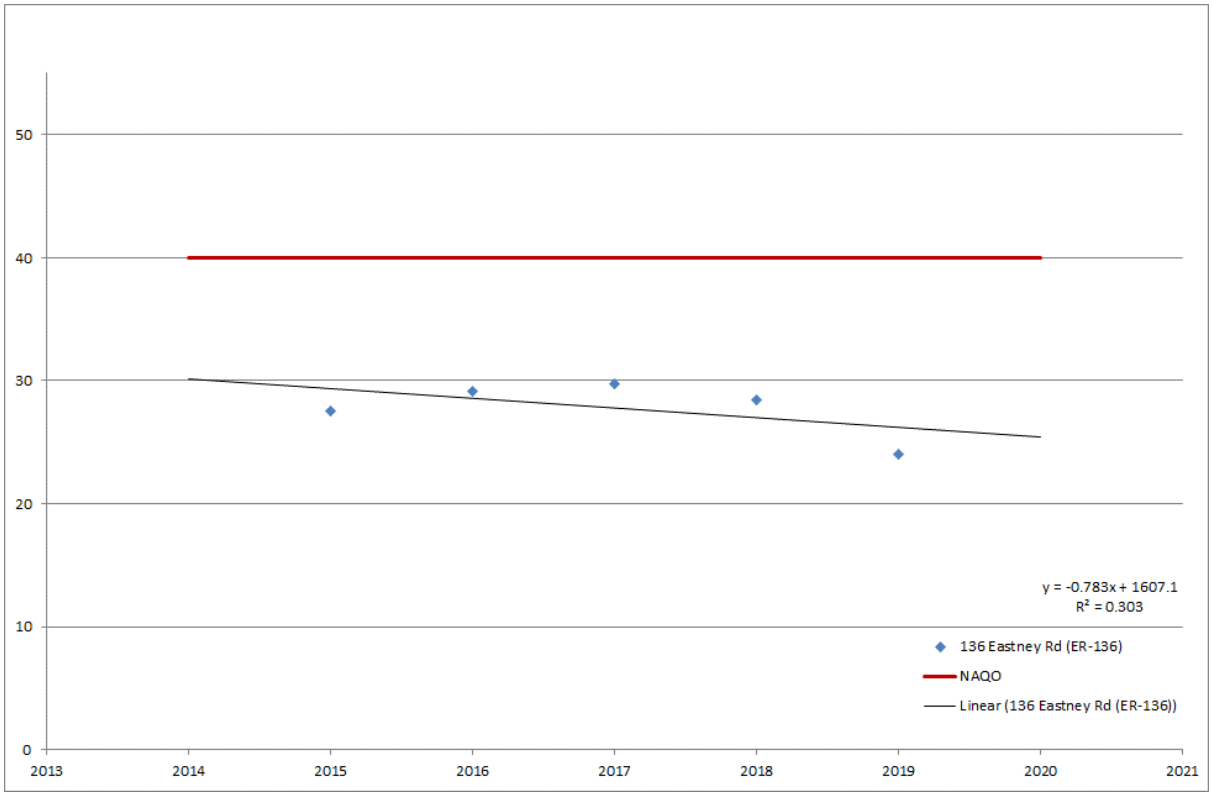
1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased significantly by 4.3µg/m^3 (a decrease of 11.41%) between 2018 and 2019, and remained below the NAQO in 2019 (33.38µg/m^3) exhibiting AQ improvement in the short-term.

3. This 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term contrary to the previously reported 5-year trend.

14.24 Figure 24: 136 Eastney Road (ER-136).



Summary: *No Exceedance, short-term (Moderately beneficial), long-term (Downward).*

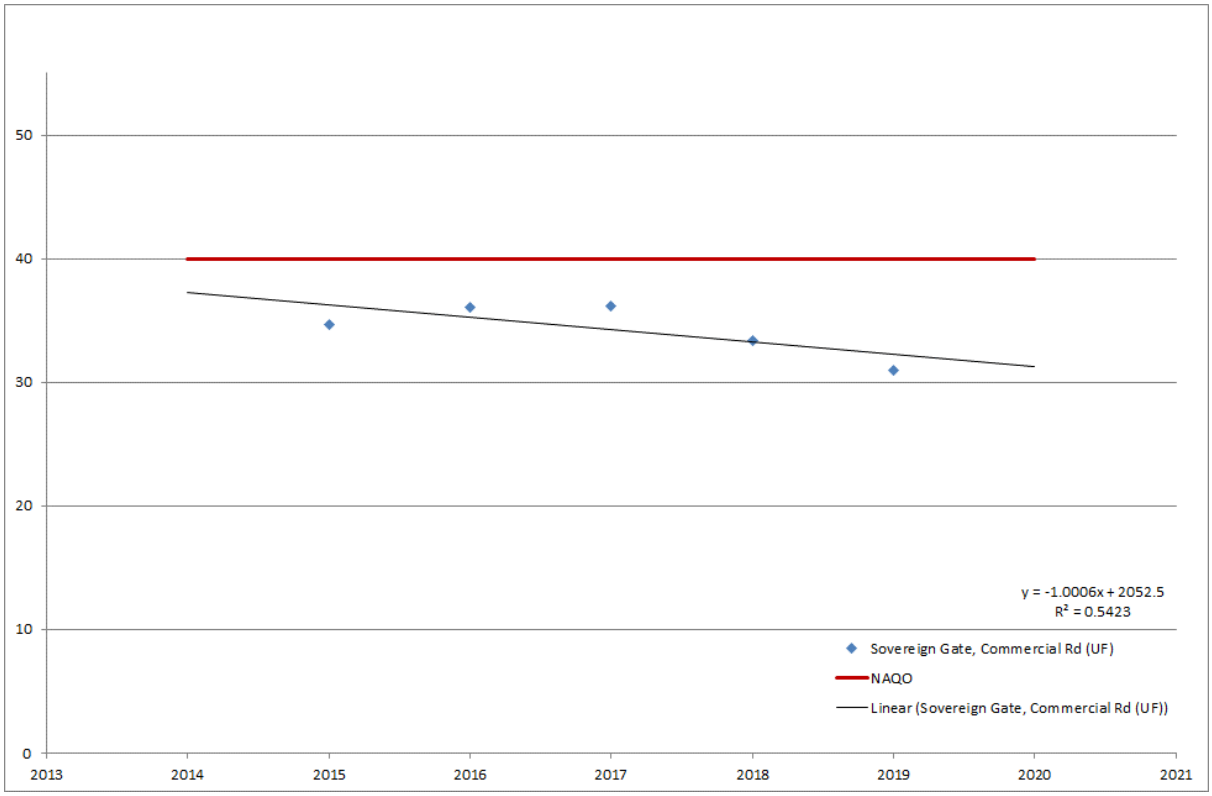
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 4.41µg/m^3 (a decrease of 15.51%) between 2018 and 2019, and remained below the NAQO in 2018 (24.01µg/m^3) exhibiting an AQ improvement in the short-term.

3. This NO_2 annual average decrease is described as "moderately beneficial".

4. The 2018-2019 NO_2 annual average "downward" trend exhibited an AQ improvement in the long-term contrary to the previously reported 5-year trend.

14.25 Figure 25: Sovereign Gate, Commercial Road (CR- UF).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

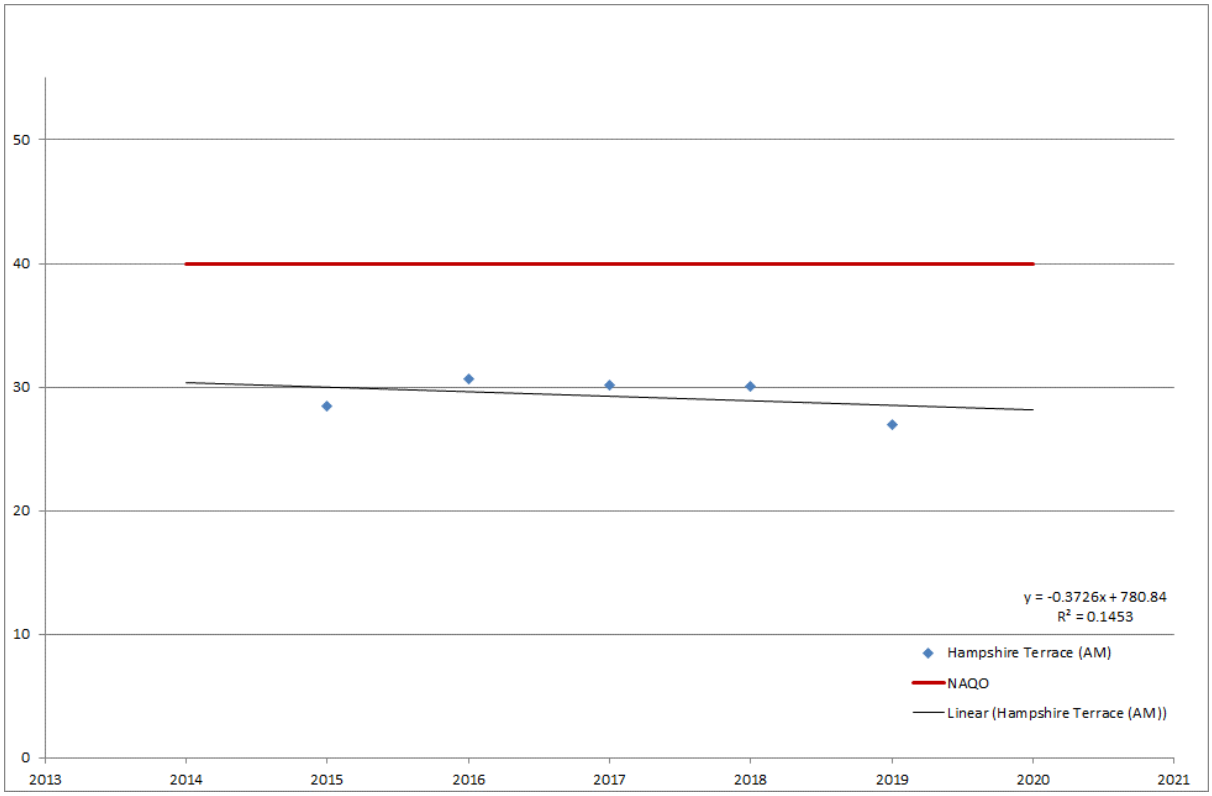
1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The annual average at this **roadside** monitoring location decreased by 2.33µg/m^3 (a decrease of 6.97%) between 2018 and 2019, and remained below the NAQO in 2019 (31.01µg/m^3) exhibiting an AQ improvement in the short-term.

3. This 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average "downward" trend in the last reported 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.26 Figure 26: 11/12 Hampshire Terrace (HT-AM).



Summary: *No Exceedance, short-term (Slightly Beneficial), long-term (Downward).*

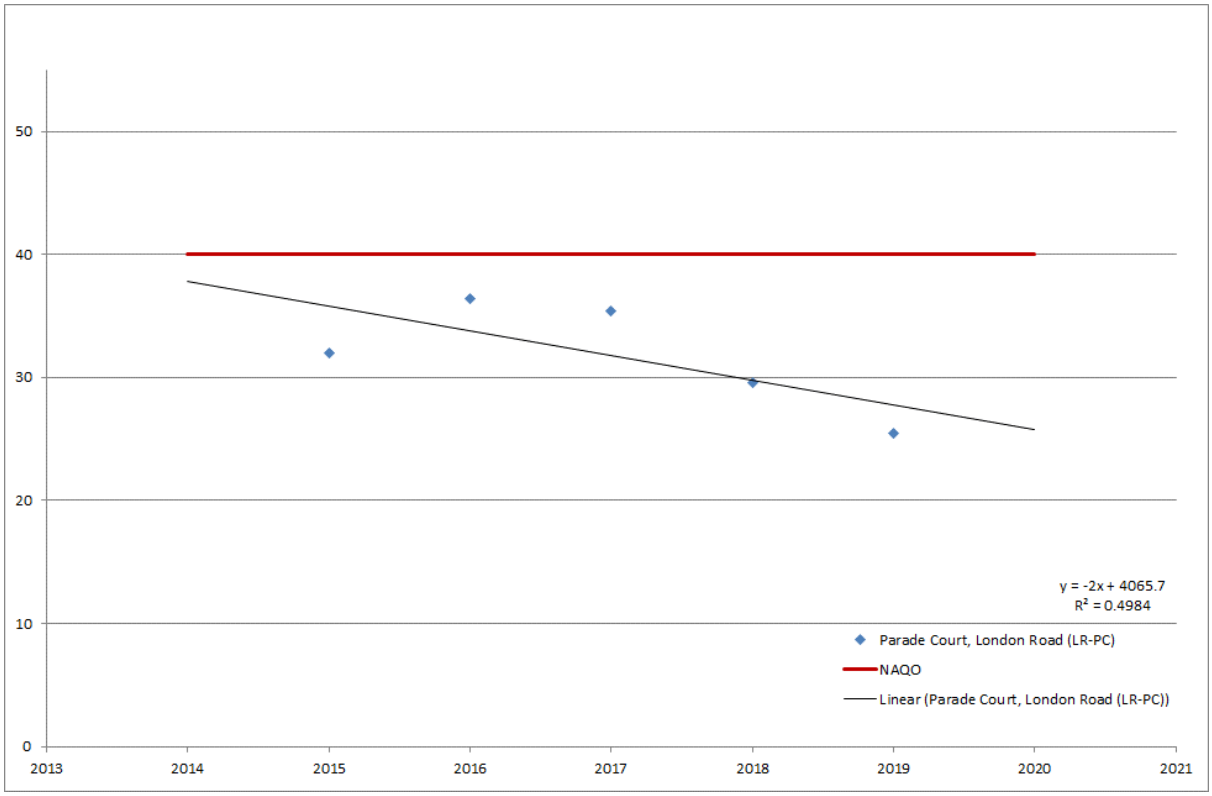
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 3.17µg/m^3 (a decrease of 10.53%) between 2018 and 2019, and remained below the NAQO in 2019 (26.92µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".

4. The NO_2 annual average "downward" trend in the last reported 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.27 Figure 27: Parade Court, London Road (LR-PC).



Summary: *No Exceedance, short-term (Slightly Beneficial), long-term (Downward).*

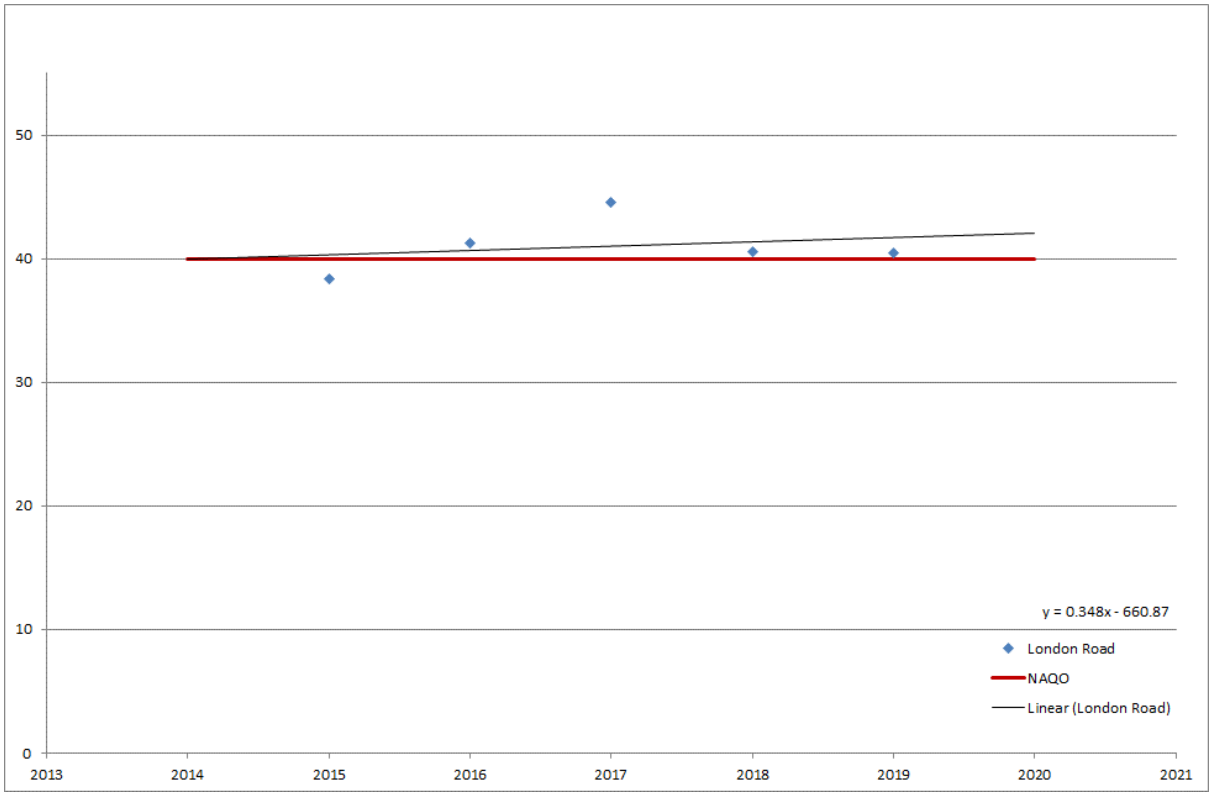
1. The NO_2 annual average remained considerably below the NAQO in the last six years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 4.16µg/m^3 (a decrease of 14.04%) between 2018 and 2019, and remained below the NAQO in 2019 (25.44µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".

4. The 2018-2019 NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.28 Figure 28: London Road CAQMS (LR-C2).



Summary: *Yes Exceedance, short-term (Moderately Beneficial), long-term (Upward).*

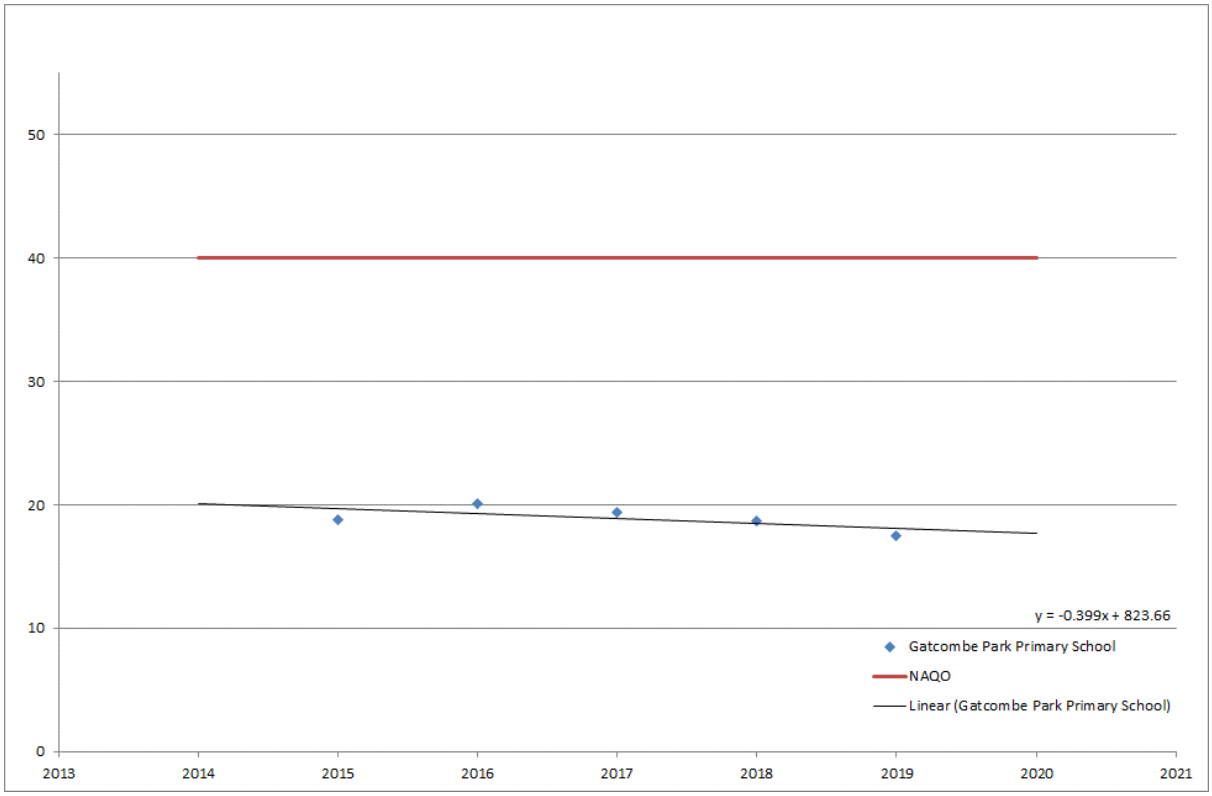
1. The NO_2 annual average remained above the NAQO in the last four years.

2. The NO_2 annual average at this **kerbside** monitoring location decreased by 0.11µg/m^3 (a decrease of 0.27%) between 2018 and 2019, but remained above the NAQO in 2019 (40.46µg/m^3) exhibiting a negligible AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "negligibly beneficial".

4. The NO_2 annual average "upward" trend in the last 5 years exhibited however an AQ deterioration contrary to the previously reported 5-year trend.

14.29 Figure 29: Gatcombe Park, CAQMS (AURN-C4).



Summary: *No Exceedance, short-term (Negligibly Beneficial), long-term (Downward).*

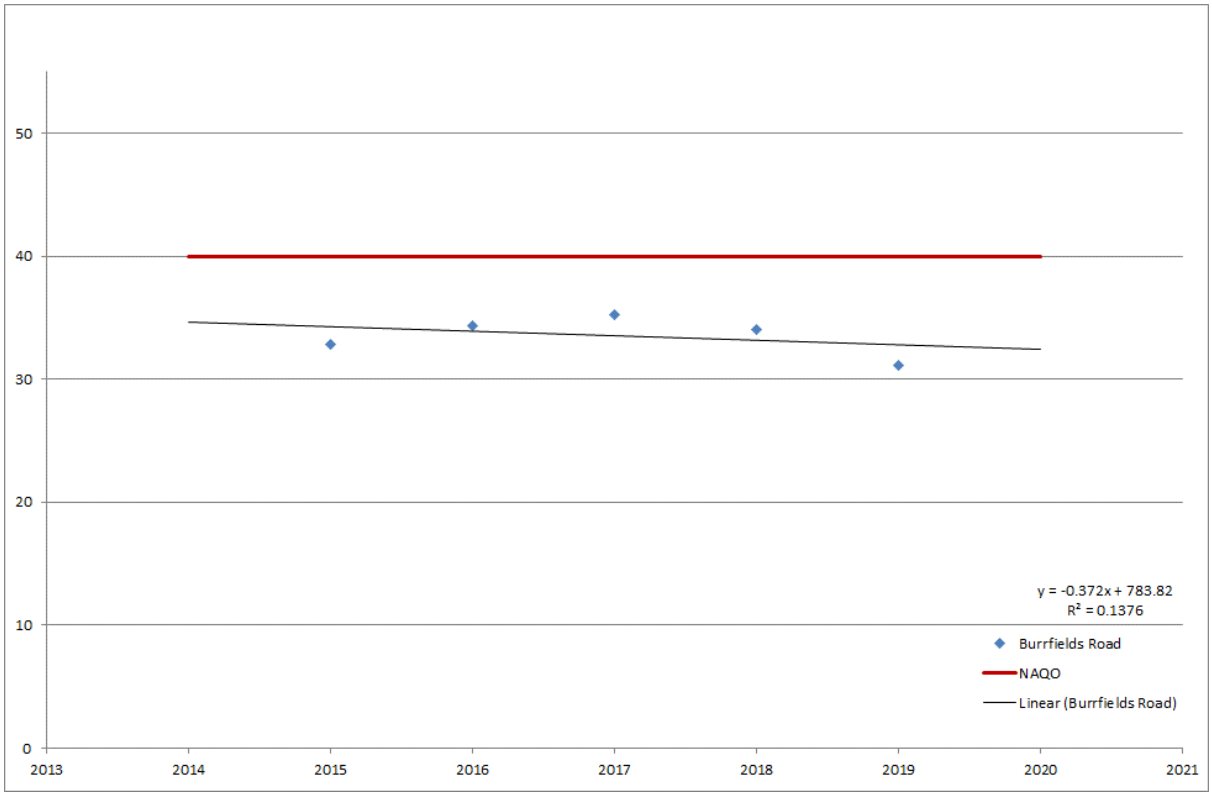
1. The NO_2 annual average remained considerably below the NAQO in the last 5 years.

2. The NO_2 annual average at this **urban background** monitoring location decreased by 1.21µg/m^3 (a decrease of 6.48%) between 2018 and 2019, and remained below the NAQO in 2019 (17.47µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is be described as "negligibly beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years, exhibited an AQ improvement in the long-term similar to the previously reported 5-year trend.

14.30 Figure 30: Burrfields Road, CAQMS (BR-C6).



Summary: *No Exceedance, short-term (Moderately Beneficial), long-term (Downward).*

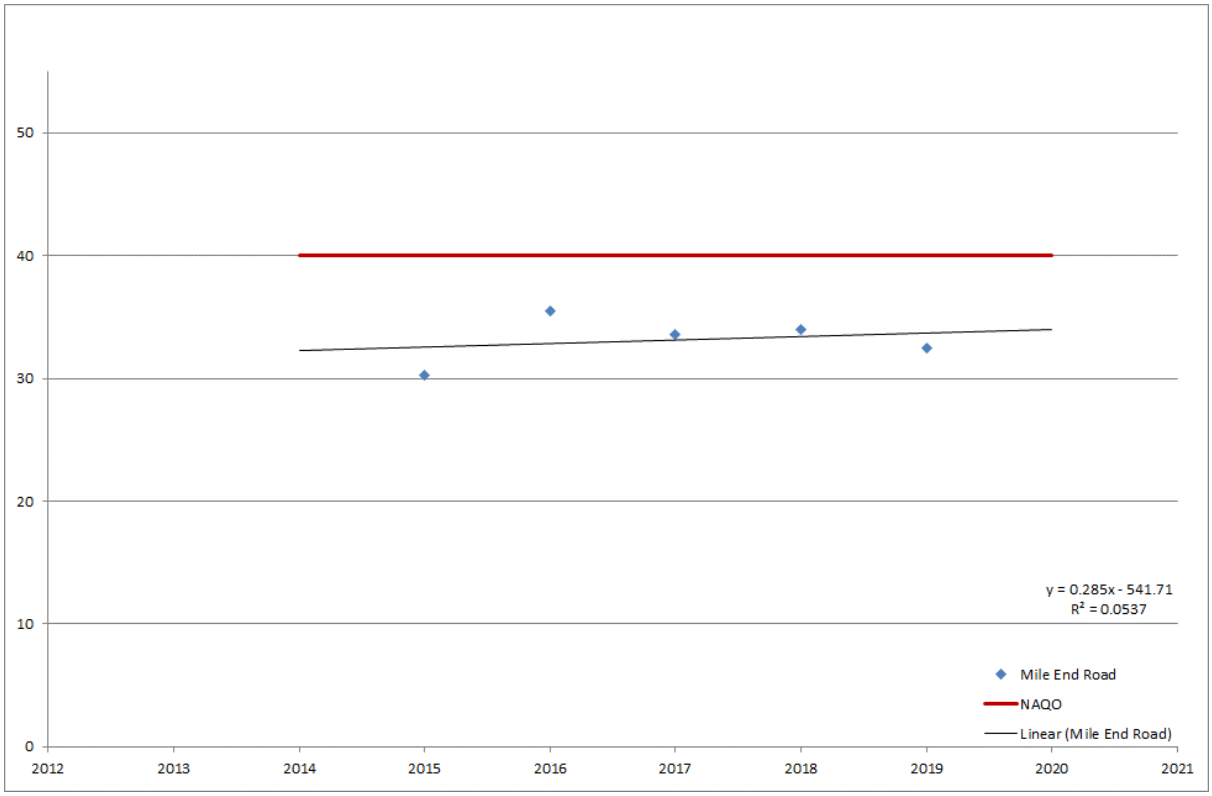
1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 2.88µg/m^3 (a decrease of 8.47%) between 2018 and 2019, and remained below the NAQO in 2019 (31.12µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "moderately beneficial".

4. The NO_2 annual average "downward" trend in the last 5 years exhibited an AQ improvement in the long-term similarly to the previously reported 5-year trend.

14.31 Figure 31: Mile End Road, CAQMS (MER-C7).



Summary: *No Exceedance, short-term (Slightly Beneficial), long-term (Upward).*

1. The NO_2 annual average remained below the NAQO in the last 5 years.

2. The NO_2 annual average at this **roadside** monitoring location decreased by 1.51µg/m^3 (a decrease of 4.45%) between 2018 and 2019, but remained below the NAQO in 2019 (32.44µg/m^3) exhibiting a slight AQ improvement in the short-term.

3. The 2018-2019 NO_2 annual average decrease is described as "slightly beneficial".

4. The NO_2 annual average "upward" trend in the last 5 years, exhibited a slight AQ deterioration in the long-term contrary to the previously reported 5 year trend.

15 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 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2015	2016	2017	2018	2019
C2	Kerbside	Automatic		95.86	0	0	0	0	0
C4	Urban background	Automatic		99.44	0	0	0	0	0
C6	Roadside	Automatic		99.73	0	0	0	0	0
C7	Roadside	Automatic		98.13	0	0	0	0	0
C8	Roadside	Automatic		96.6				1	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.

16 Figure A.2 – Trends in number of NO_2 1-hour means > 200µg/m^3

There has been no nitrogen dioxide hourly mean level in excess of 200µg/m^3 at any of PCC owned CAQMSs since 2015 through to 2019 with the exception of DEFRA's CAQMS that registered one incident as illustrated above.

17 Table A.5 – Annual Mean PM_{10} monitoring results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2018 (%) [2]	PM_{10} Annual Mean Concentration (µg/m^3) [3]				
				2015	2016	2017	2018	2019
C2	Kerbside		64.35	34.36	20.04	19.71	17.72	17.79
C4	Urban background		88.65	16.16	18.15	14.65	14.67	15.08
C6	Roadside			26.45	19.75	19.96	21.69	
C7	Roadside		95.04	23.45	11.88	16.11	16.78	14.74
C8	Roadside		85.43				19.3	19.49

☒ **Annualisation has been conducted where data capture is <75%:** Data highlighted in red was annualised. Given that all background AURN network station within 50 miles did not meet the criteria of data capture, PCC used local monitoring location for the purpose of annualisation of data with less than 75% data capture as they meet the data capture criteria: C2(Kerbside), C7(Roadside), and C8 (Roadside).

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.

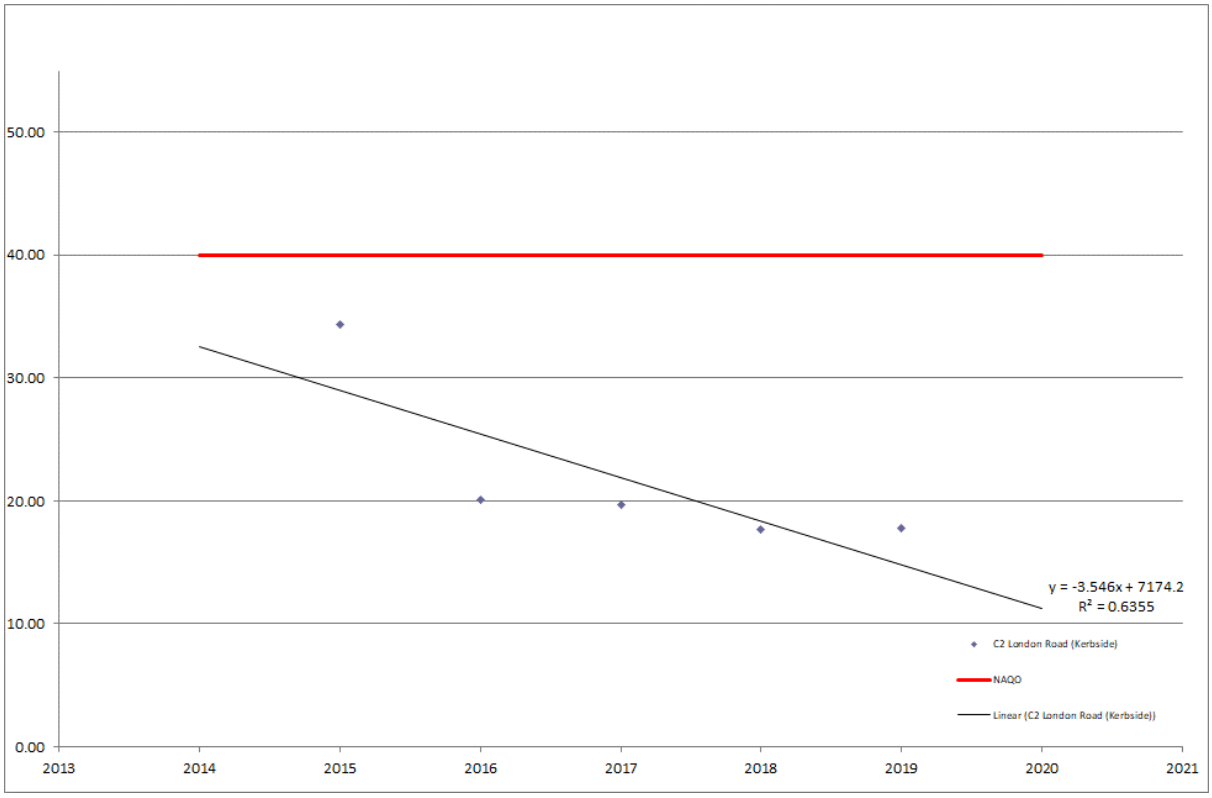
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(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.

18 Figure A.3 – Trends in annual mean PM_{10} concentrations

In this section, the trends in Annual Mean PM_{10} concentrations from the three long term CAQMS are illustrated Figure F32 to F34.

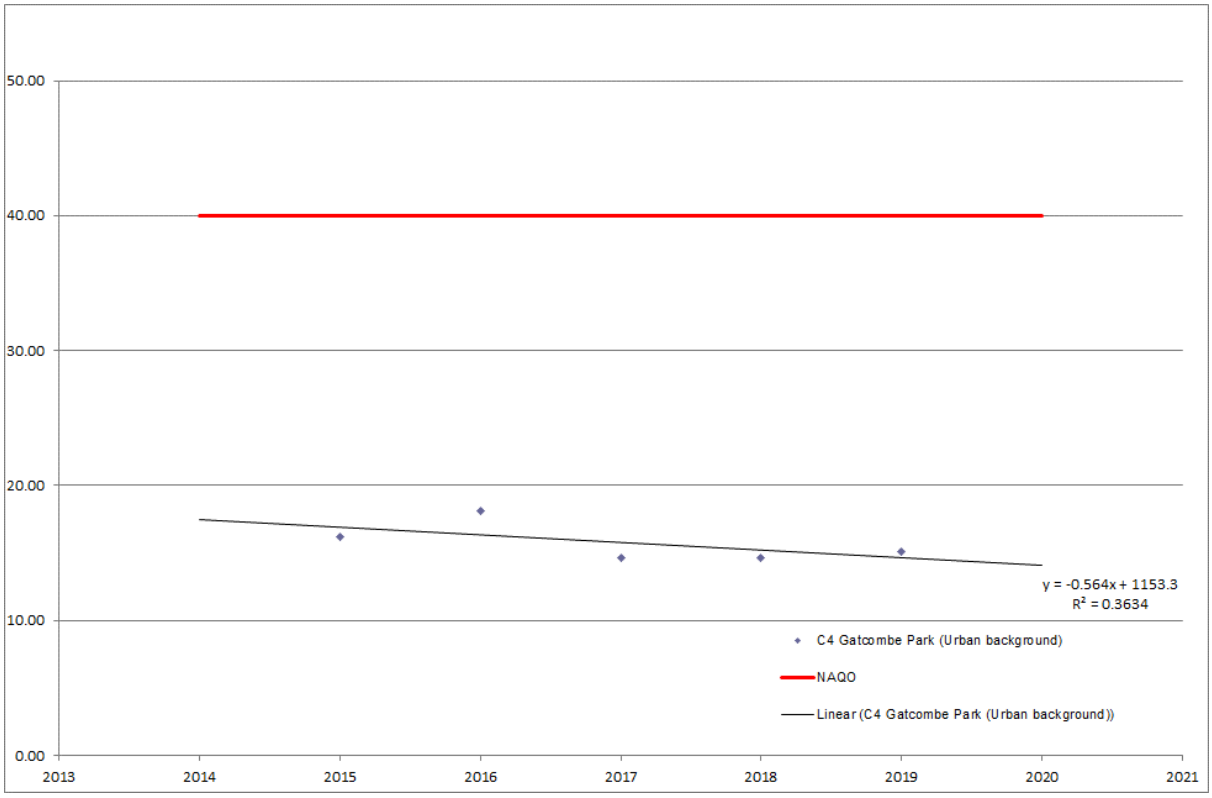
18.1 Figure 32: London Road PM_{10} CAQMS (LR-C2).



Summary: *Exceedance (No), short-term (negligibly adverse), long-term (Downward).*

- The PM_{10} annual average has remained considerably below the NAQO in the last 5 years.
- The PM_{10} annual average at this **kerbside** monitoring location increased by 0.07µg/m^3 (a decrease of 0.40%) between 2018 and 2019, but remains below the NAQO in 2019 (17.79µg/m^3) exhibiting an AQ deterioration in the short-term.
- The 2018-2019 PM_{10} annual average change is described as being "negligibly adverse".
- However, the PM_{10} annual average exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term contrary to the previously reported 5-year trend.

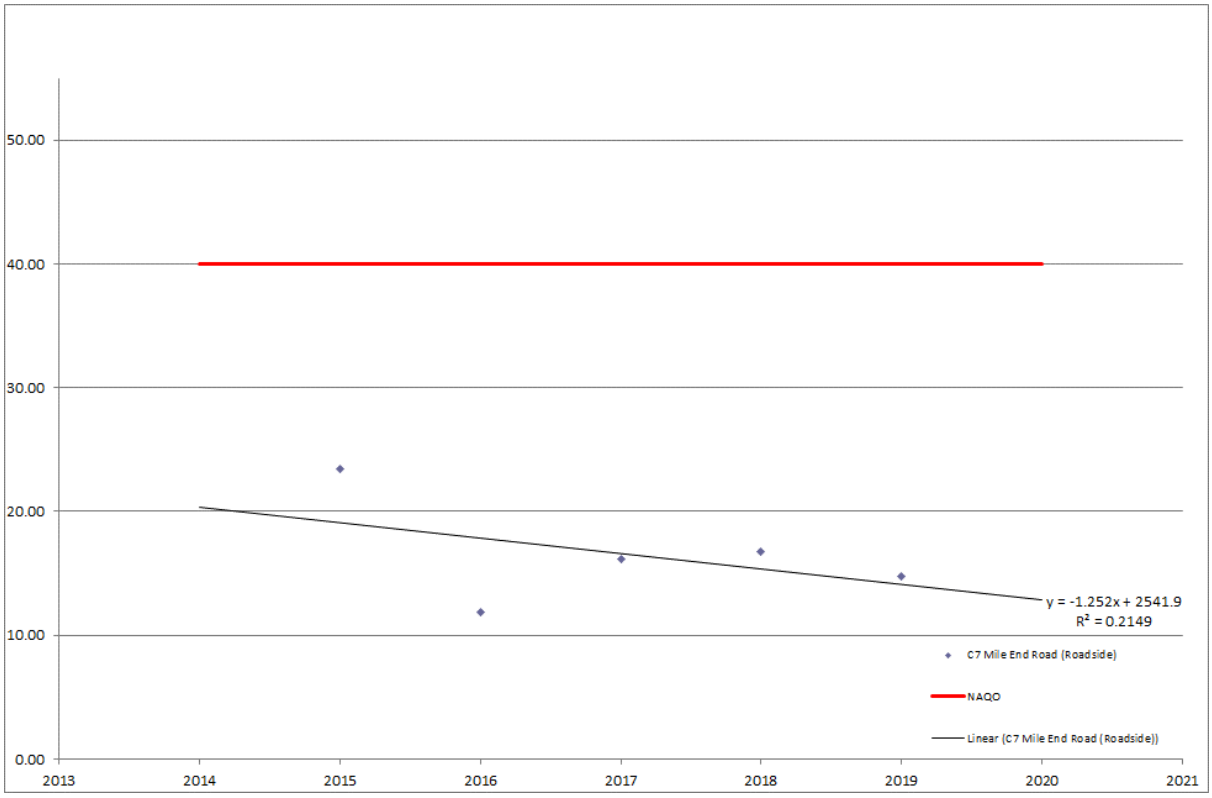
18.2 Figure 33: Gatcombe Park PM_{10} CAQMS (AURN-C4).



Summary: *Exceedance (No), short-term (Negligibly Adverse), long-term (Downward).*

- The PM_{10} annual average has remained considerably below the NAQO in the last 5 years.
- The PM_{10} annual average at this **urban-background** monitoring location increased by 0.41µg/m^3 (an increase of 2.79%) between 2018 and 2019, and remains below the NAQO in 2019 (15.08µg/m^3) exhibiting an AQ deterioration in the short-term for the second consecutive year.
- The 2018-2019 PM_{10} annual average change is described as being "negligibly adverse".
- However, the PM_{10} annual average exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term contrary to the previously reported 5-year trend.

18.3 Figure 34: Mile End Road PM_{10} CAQMS (MER-C7).



Summary: *Exceedance (No), short-term (negligibly beneficial), long-term (Downward).*

- The PM_{10} annual average has remained considerably below the NAQO in the last 5 years.
- The PM_{10} annual average at this **roadside** monitoring location decreased by 2.04µg/m^3 (a decrease of 12.16%) between 2018 and 2019, and remains below the NAQO in 2019 (14.74µg/m^3) exhibiting an AQ improvement in the short-term.
- The 2018-2019 PM_{10} annual average change is described as being "negligibly beneficial".
- The PM_{10} annual average exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term contrary to the previously reported 5-year trend.

19 Table A.6 – 24-Hour Mean PM_{10} monitoring results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m³ (3)				
				2015	2016	2017	2018	2019
C2	Kerbside		64.35	1	1	4	5	0
C4	Urban background		88.65	2	2	0	0	1
C6	Roadside			4	1	1	3	
C7	Roadside		95.04	1	0	1	5	0
C8	Roadside		95.22				1	2

Data highlighted in red was annualised. Given that all background AURN network station within 50 miles did not meet the criteria of data capture, PCC used local CAQMSs for the purpose of annualisation of data with less than 75% data capture as they meet the data capture criteria: C2(Kerbside), C7(Roadside), and C8 (Roadside).

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m³ 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.

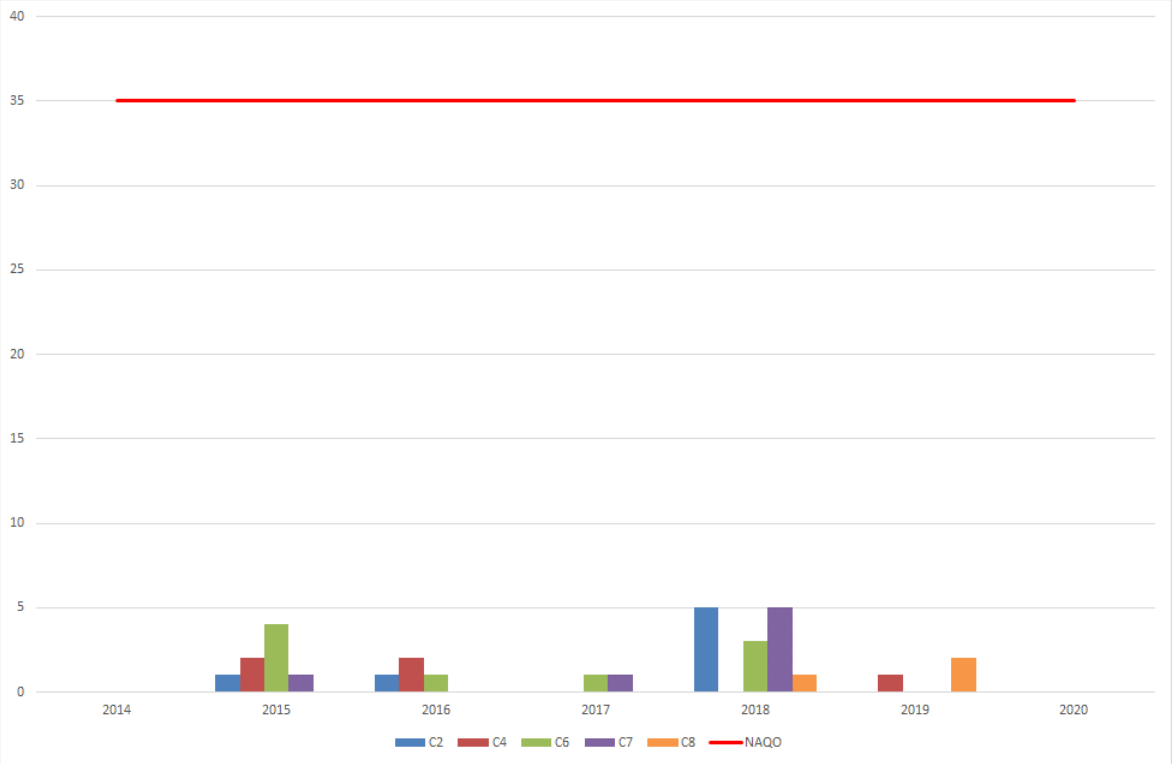
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

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

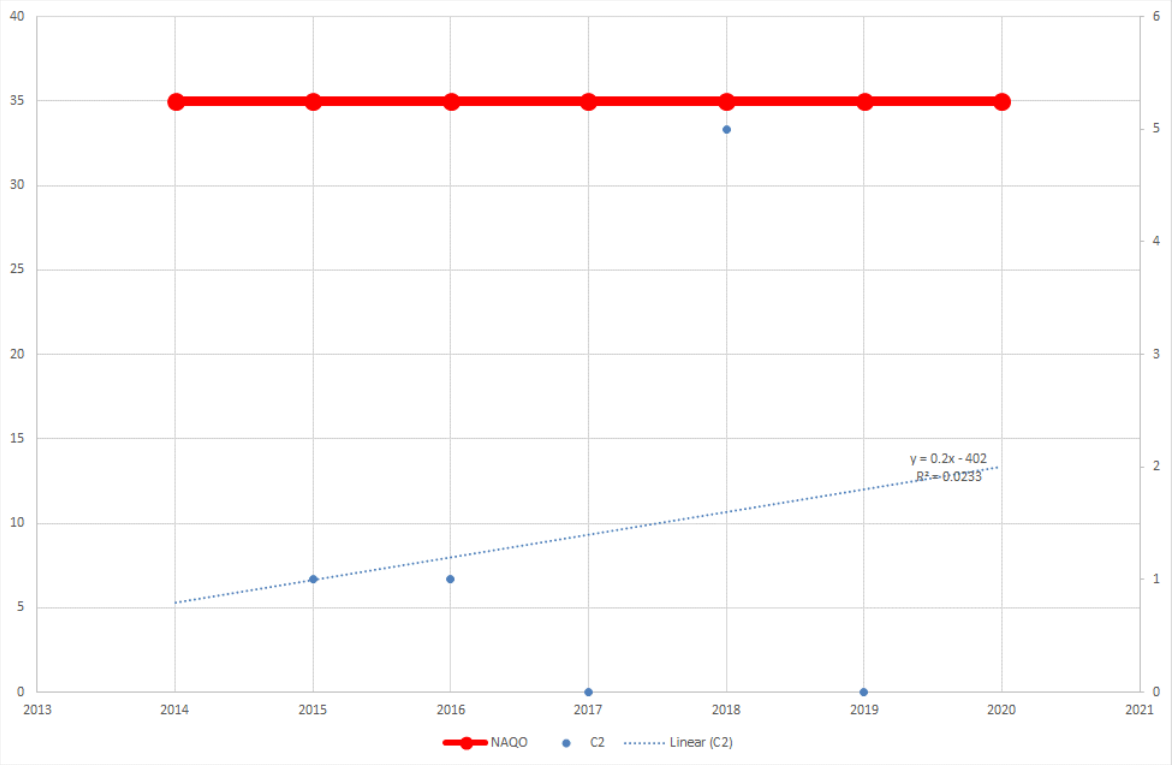
20 Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results >50µg/m^3

In this section the trends in the number of the 24-Hour (Daily) Mean PM_{10} concentrations in excess of 50µg/m^3 across all four long term CAQMS are illustrated in Figure 35 through to Figure 38.

20.1 Figure 35: Trends in the number of the 24-Hour (Daily) Mean PM_{10} concentrations in excess of 50µg/m^3 across all four long term CAQMS:



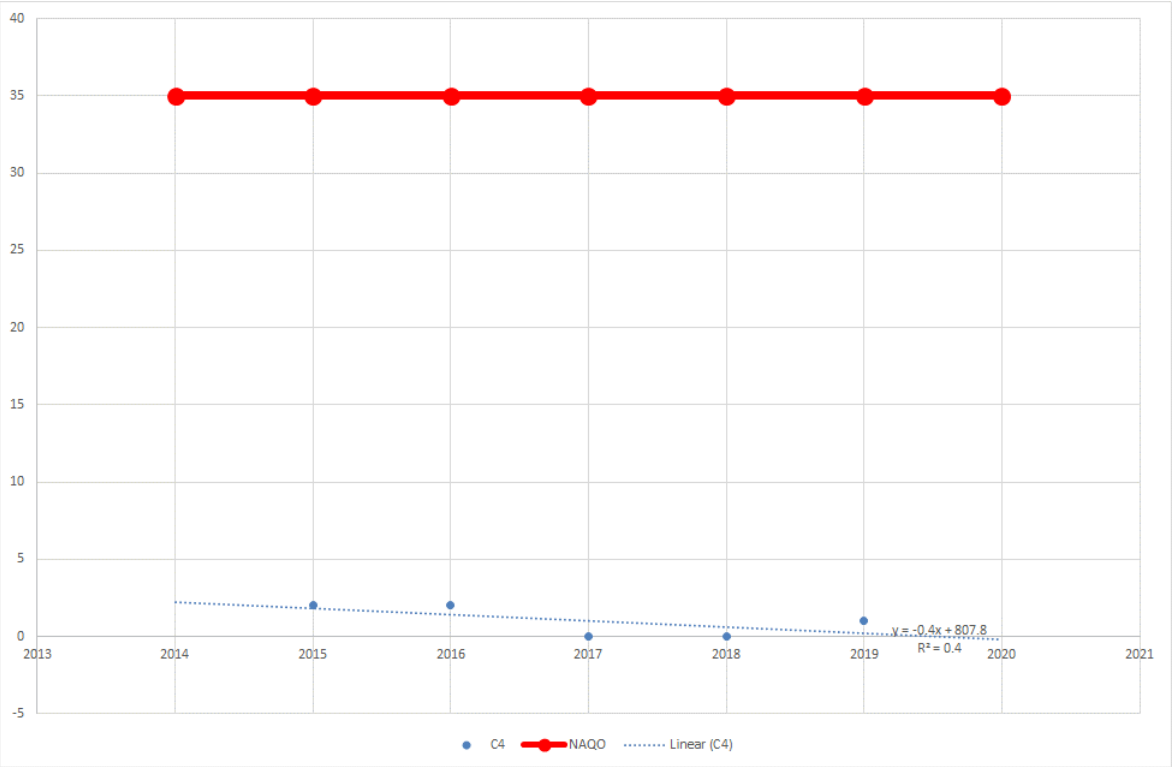
20.2 Figure 36: The number of 24-Hour Mean PM_{10} levels in excess of 50µg/m^3 per annum at London Road CAQMS (LR-C2).



Summary: *Exceedance (No), short-term (Beneficial), long-term (Upward).*

- The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remain well below 35 occurrence per annum. Hence, no exceedance of the 24-hour Mean NAQO in 2019.
- The number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remains considerably below the NAQO in the last 5 years.
- The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 decreased by 5 occurrences between 2018 and 2019 exhibiting an AQ improvement in the short term.
- However, the number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 exhibits an "upward" trend in the last 5 years, demonstrating an AQ deterioration in the long-term.

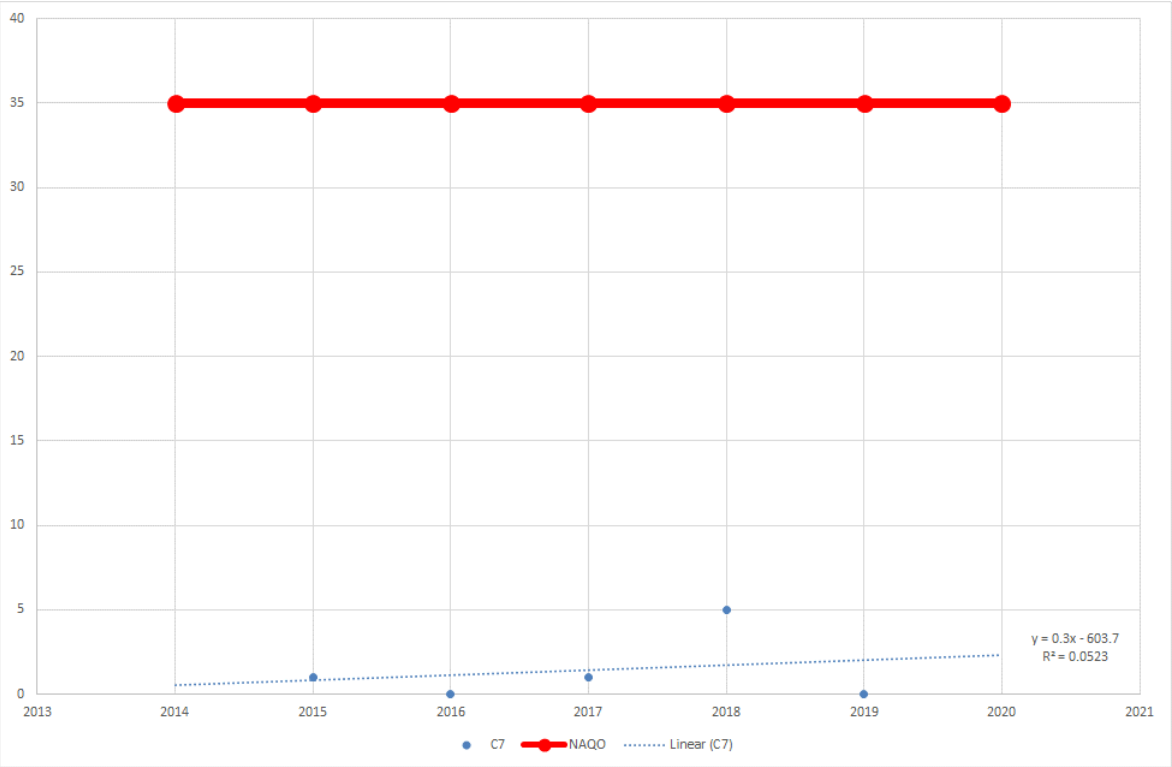
20.3 Figure 37: The number of 24-Hour Mean PM_{10} levels in excess of 50µg/m^3 per annum at Gatcombe Park CAQMS (AURN-C4).



Summary: *Exceedance (No), short-term (Adverse), long-term (Downward).*

- The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remain well below 35 occurrence per annum. Hence, no exceedance of the 24-hour Mean NAQO in 2019.
- The number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remains considerably below the NAQO in the last 5 years.
- The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 increased by one occurrences between 2018 and 2019 exhibiting an AQ deterioration in the short term.
- However, the number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term.

20.4 Figure 38: The number of 24-Hour Mean PM_{10} levels in excess of 50µg/m^3 per annum at Mile End Road CAQMS (MER-C7).



Summary: *Exceedance (No), short-term (Beneficial), long-term (Upward).*

- The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remain well below 35 occurrence per annum. Hence, no exceedance of the 24-hour Mean NAQO in 2019.
- The number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 remains considerably below the NAQO in the last 5 years.
- The number of 24-Hour Mean of PM_{10} level in excess 50µg/m^3 decreased by 5 occurrences between 2018 and 2019 exhibiting an AQ improvement in the short term.
- However, the number of the 24-Hour Mean of PM_{10} level in excess 50µg/m^3 exhibits an "upward" trend in the last 5 years, demonstrating an AQ deterioration in the long-term.

21 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)				
				2015	2016	2017	2018	2019
C2	Kerbside		64.35			12.28	11.28	11.19
C4	Urban background		83.03	10.5	11.63	11.17	12.32	8.9
C7	Roadside		95.04			10.54	10.81	9.79

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

Data highlighted in red was annualised using data from Southampton Centre and Bournemouth CAQMSs.

Notes:

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

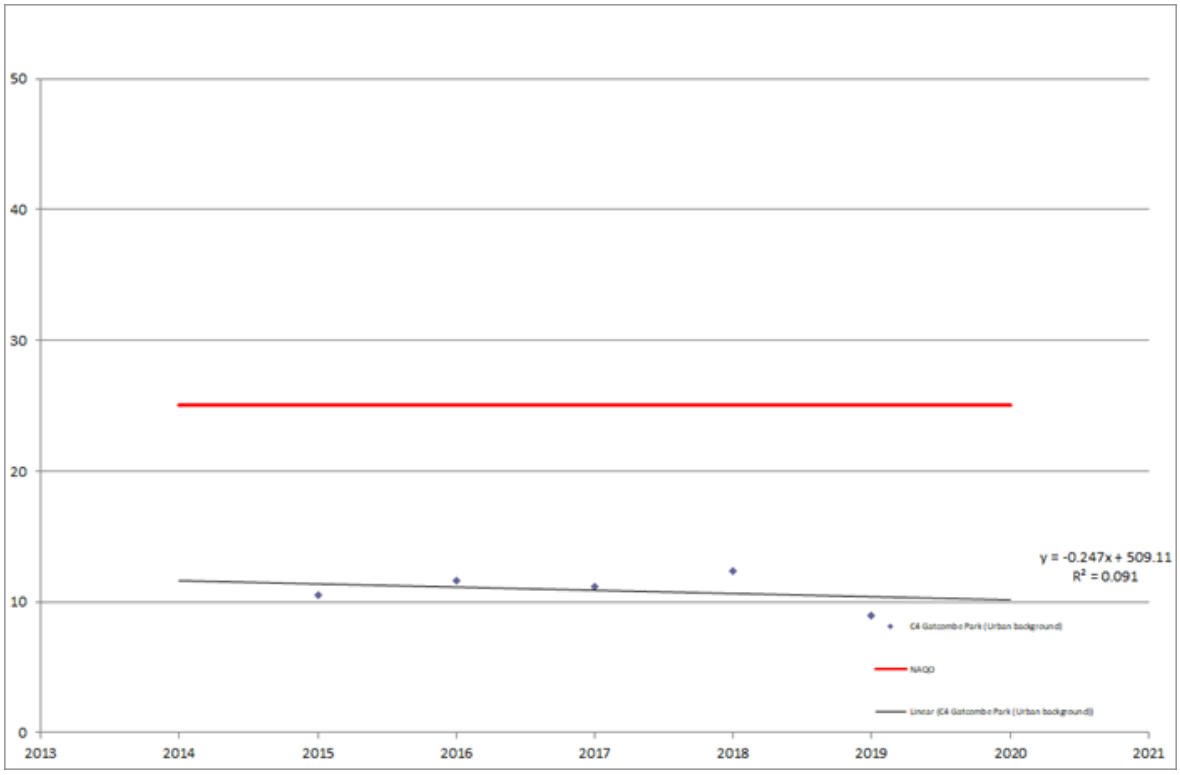
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(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.

21.1 Figure A.5 – Trends in annual mean $PM_{2.5}$ concentrations

In this section the trend in Annual Mean $PM_{2.5}$ concentrations for the only long term CAQMS is illustrated Figure 39.

21.2 Figure 39: Gatcombe Park $PM_{2.5}$ CAQSM (AURN-C4).



Summary: *Exceedance (No), short-term (moderately beneficial), long-term (Downward).*

1. The $PM_{2.5}$ annual average has remained considerably below the NAQO in the last 5 years.

2. The $PM_{2.5}$ annual average at this **urban-background** monitoring location decreased by 3.4µg/m^3 (a decrease of 27.6%) between 2018 and 2019, and remains below the NAQO in 2019 (8.92µg/m^3) exhibiting an AQ improvement in the short-term.

3. The 2018-2019 $PM_{2.5}$ annual average change is described as being "moderately beneficial".

4. The $PM_{2.5}$ annual average exhibits a "downward" trend in the last 5 years, demonstrating an AQ improvement in the long-term for the second consecutive year 5-year trend.

22 Appendix B: Full monthly diffusion tube results

Table B.1 – 2019 NO_2 monthly diffusion tube results

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.84) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
1	45.60		42.57	50.23	40.95	42.51		44.37	42.77	42.20	46.35	42.02	43.96	36.92	
2	26.98		17.16	20.05	15.09		15.10	13.87	12.56	18.23	25.51	13.58	17.81	14.96	
3	30.85		26.39	29.79	23.33	21.74	20.71	21.09	22.71	25.14	31.35	22.20	25.03	21.02	
4	46.66		35.52	39.08	32.14	32.12	35.16	37.00	32.44	38.47	41.50	38.47	37.14	31.20	
5	30.07			38.22	24.20	28.50	27.07	23.64	26.07	35.76	31.56	30.90	29.60	24.86	
6	37.94					28.81	31.75		29.35				31.96	30.18	
7	34.95		29.14	29.25	22.39	27.98	24.06	26.80	26.26	33.20	34.70	16.22	27.72	23.29	
8	30.57		26.50	29.75	21.27	22.81	25.88	27.59	28.03	25.20	31.54	34.46	27.60	23.18	
9	47.41		42.37	38.43	35.68	32.58	36.89		38.46	41.50	41.90	44.82	40.00	33.60	
10	24.40		16.14	19.74	12.69	13.29	13.02		14.41	20.07	23.49	22.26	17.95	15.08	
11	37.81		26.06	28.39	21.19	21.95		24.84	11.16	29.46	34.15	35.45	27.04	22.72	20.7
14	32.99		19.73	24.58	19.13	18.38	18.50	15.11	20.00	35.41	30.73	21.33	23.26	19.54	
15	39.01		26.52	36.27	22.80	24.55	26.20	23.97	27.18	29.67	35.63	34.44	29.66	24.91	
16	38.17		30.23	31.88	24.89	26.89		23.41	26.64	30.71	41.02	28.99	30.28	25.44	
18	39.26		31.07	28.67	21.69	22.51	26.38	24.09	26.33	28.93	35.21	34.29	28.95	24.32	

19	47.04		35.72	53.83	37.41	34.64	39.61	38.75	34.92	35.26		40.22	39.74	33.38	
20	37.25		28.88	26.77	26.25	28.51	30.31	25.46	24.82	28.81	33.29	24.10	28.59	24.01	
21	45.73		37.61	46.09	36.45	36.16	40.02	38.62	34.86	40.05	43.28	38.66	39.78	33.41	
22	33.59		27.73		23.87	29.03	30.94	27.50	26.33		32.92	30.49	29.15	24.49	
23	52.27		35.01	54.88	37.42	35.46	36.35	30.66	39.67	44.06	48.78	42.98	41.59	34.94	32.2
24	43.81		39.00	40.66	37.04	32.85	30.61	34.34	30.71	37.90	43.68	39.30	37.26	31.30	
25	57.97		44.59	41.79	35.85	35.77	43.79		37.00	51.18	43.26	56.80	44.80	37.63	
26	56.57		47.27	52.00	38.72	45.04	46.48	43.06	43.17	47.84	53.16	56.04	48.12	40.42	
30	50.60		41.05		36.75	34.14	37.37	37.45	34.20	40.64	45.09	50.95	40.82	34.29	
34			28.82	54.34	35.54	32.72	33.64	31.06	31.77	36.14	43.08	42.07	36.92	31.01	
35	36.85		29.15	43.17	29.95	28.45	29.12	27.71	26.77	30.53	40.87	29.92	32.04	26.92	
36	41.41		33.35	40.98	26.15	23.05	28.36	25.56	29.74	39.03	38.84	27.17	32.15	27.01	
42	45.90		43.32	37.47	33.17	34.92	33.62	32.33	37.14	39.34	41.94	45.90	38.64	32.46	
43	37.62		37.44	31.81	30.08	33.78	33.42	27.27	33.54	44.11	41.49	46.28	36.08	30.30	
44	42.43			37.88	38.84	34.37	34.45	32.78	34.67	44.70	43.06	42.00	38.52	32.35	
45			35.20	41.73	32.37	36.58	35.32	33.44	33.13	47.05	42.69	41.52	37.90	31.84	
46	46.00		38.68	52.75	34.50	33.19	36.48	26.90	31.21	42.24	51.86	49.70	40.32	33.87	
47	41.07		39.70	34.05	30.04	30.55	31.27	31.15	35.70	42.37	44.69	46.36	36.99	31.07	
48	35.13		28.73	29.43	25.88	27.17	27.89	23.49	25.35	35.92	32.68	39.95	30.15	25.32	
49	35.26		32.61	44.55	30.51	35.27	32.26	27.67	30.71	38.59	39.91	33.01	34.58	29.05	
50	42.01		41.94	44.37	34.99	38.44	40.04	32.99	39.21	42.93	46.24	42.97	40.56	34.07	
51	36.63		34.94	37.62	29.79	33.97	32.08	30.48	32.63	37.49	36.47	36.57	34.43	28.92	
52	33.98		35.76	34.10		29.65	28.33		28.93	34.73	41.19	30.88	33.06	27.77	
55			50.94	33.57		24.91	25.21	24.65	29.64	28.46	32.29	30.77	31.16	26.17	
56	44.28		32.79	26.59	35.44	38.37	35.19	34.21	35.51	36.02	41.69	38.56	36.24	30.44	
58	37.86		29.43	38.00	29.07	30.17	29.52	29.55	28.21	32.11	35.00	33.76	32.06	26.93	
59	53.42		38.93	49.21	39.77	36.79	45.32	39.99	38.84	44.71	53.22	45.79	44.18	37.11	

60	38.72		29.89	30.16	27.57	26.05	29.78	26.74	28.43	29.82	33.82	28.54	29.96	25.16	
61	48.54			49.45	29.26	33.47	34.92	27.64	31.82	36.04	39.04	30.25	36.04	30.28	
62	30.54		19.17	24.33	16.80	17.07	19.79	16.44	17.47	21.22	27.14	20.00	20.91	17.56	
63	39.69		33.41	49.96	34.43	31.85	31.24	26.22	28.85	34.53	41.95	33.21	35.03	29.43	
64	41.85		38.66	31.30	31.45	31.70		35.36	30.50	44.84	38.30	37.09	36.11	30.33	
65	38.86		33.16	25.44	26.20	24.29	27.58	26.93	26.44	29.30	30.39	30.32	28.99	24.35	
66	40.87		34.42	36.51	31.33	27.41	32.94	24.39	28.87	33.00	40.18	31.54	32.86	27.60	
67	40.92		35.31	45.71	32.83	31.49	36.07	34.69	32.13	37.60	45.33	39.63	37.43	31.44	
68	35.74		36.74	39.71	29.08	33.72	36.62	28.06	26.50	36.88	41.66	38.31	34.82	29.25	
69	37.86		32.63	30.75	27.96	12.42	29.05	21.54	26.79	33.64	35.13	38.93	29.70	24.95	
70	27.72		24.99	32.95	26.79	22.06	21.47	18.78	23.15	24.44	34.51		25.69	21.58	
71	37.01		33.17	33.51	26.21	22.22	25.51	24.24	21.87	31.72	37.29	37.11	29.99	25.19	
72	36.30		28.12	28.72	23.27	21.97	24.64	22.09		27.66	34.28	30.64	27.77	23.33	
73	34.59		28.20	27.77	22.57	23.65	23.29	23.77	22.07	40.24	35.00	30.27	28.31	23.78	
74	45.15			40.91		30.34	35.17	21.48	24.57	43.03	42.69	40.79	36.01	30.25	
75	32.98		24.06	27.24	19.84	18.46	22.08	20.55	23.17	29.66	31.87	28.36	25.30	21.25	
76	43.71		29.72	48.00	31.09	31.33	32.49	22.19	27.81	33.04	39.35	39.31	34.37	28.87	
77	33.48		22.26	24.49	18.45	13.87	19.67	17.70	18.43	22.64	29.40		22.04	18.51	
78	34.37		22.25	30.81	23.85	19.89	24.43	21.56		24.46	29.24	6.20	23.71	19.91	
79	46.31		31.63	41.08					20.67				34.92	26.26	
80	50.85		38.71	47.99	38.21	32.04	34.70	32.25	33.75	35.51	46.49	33.32	38.53	32.36	
81	48.31		36.65	47.81	32.91	28.72	35.41	31.41	28.83	35.01	39.60	36.90	36.50	30.66	
82	46.10		28.55	37.37	32.75	27.54	27.64	24.28	29.18	32.69	40.95	21.39	31.68	26.61	
83	46.72		27.86	44.54	31.57		28.09	30.33	28.86	39.34	36.65	25.31	33.93	28.50	
84	43.78		36.53	49.69	31.64	35.62	38.10	25.50	31.32	35.03		34.69	36.19	30.40	
85	43.27		34.48		38.32	33.76	41.26	29.98	33.10	38.75	44.49	37.84	37.52	31.52	
86			26.75	43.39	26.79	26.78	25.16	20.50	25.77	23.14	41.12	26.31	28.57	24.00	

87	41.86		27.57	29.60	26.49	24.21	28.34	23.51	26.12	28.82	39.29	28.96	29.52	24.80	
88	46.72		42.82	29.54	31.95	29.94	32.80	30.11	28.43	29.23	33.36	37.34	33.84	28.43	
89	38.15		28.21	40.49	28.50	31.22		18.19	26.54	31.51	40.23	26.11	30.92	25.97	
90	31.56		25.90	29.56		19.61	22.86	19.73	21.48	23.74	40.36	28.62	26.34	22.13	
91	37.91		26.51	27.04	23.64	21.95	28.49	23.06	26.68	29.12	33.23	34.50	28.38	23.84	
92	37.55		29.05	26.88	24.95	21.84	24.90	44.11	25.07	30.72	46.51	24.97	30.59	25.70	
93	44.88		30.96	50.47	35.78	39.37	38.73	33.26		66.95	31.13	42.90	41.44	34.81	
95	42.09		29.89		26.61	26.98	24.91	19.02		27.86	52.72	29.14	31.02	26.06	
96	30.90		26.13	26.69	21.64		20.60	16.82	21.07	25.65	40.69		25.58	21.48	
97	34.25			26.92	22.87	19.74	21.11	18.53	22.83	47.14	31.73	24.42	26.95	22.64	
98	31.97		19.72		19.60	18.45	19.54	16.34	17.14	21.62	30.73	21.50	21.66	18.19	
99	36.70		22.90	24.97	21.09	19.12	20.96	19.42	19.83	24.56	29.68	26.52	24.16	20.29	
100	24.33		17.19	25.59	18.91	21.05		16.35	16.22	43.62	30.28	23.86	23.74	19.94	
101			28.68	33.74	23.15	26.14		23.10			28.23	35.87	28.42	25.00	
102	32.63		26.04	32.24	20.62	24.83	27.57	21.03	23.66	29.83	36.94	35.14	28.23	23.71	
103	35.28		24.74		37.61	20.34	20.14		21.02	26.73	34.69	26.29	27.43	23.04	
108			41.39	39.54	38.71		42.58	31.90	36.55	47.95	27.21	41.99	38.65	32.46	
109	38.32		32.56	42.44	31.90	31.14	31.12	30.91	29.05	39.61	43.18	44.09	35.85	30.11	
110	35.23		23.71	23.18	20.78	23.99	22.39	23.85	26.12	30.57		33.88	26.37	22.15	
111	33.20		25.21	28.42	23.61	24.80	28.86	23.48	26.27	31.70	41.21	35.33	29.28	24.60	
117	75.70		55.13	58.10	55.61	52.16	61.29	46.30	51.39	57.06	59.32	56.48	57.14	48.00	
118	71.30		54.29				61.07	45.59	53.60	67.45	71.62		60.70	52.52	
119	46.77		33.85	35.52	35.57	34.11	35.44	28.44	35.05	40.65	40.52	35.77	36.52	30.67	
120	61.78		51.22	72.77	54.82	55.49	59.61	42.16		48.76	54.13	57.53	55.83	46.90	
121	50.64		40.40	59.89	42.78	40.97		29.64	38.04	46.88	52.42	57.32	45.90	38.55	
122	53.63		39.97	40.85	40.61	38.07	41.66	34.19	39.57	47.32	49.05	56.51	43.77	36.76	
124	37.92		32.85		20.06	27.57	33.13	25.52	26.31	36.85	33.90	36.24	31.03	26.07	

125	35.89		33.23	37.10	33.39	29.75	34.83	26.24	24.67	35.04	35.51	39.45	33.19	27.88	
126	47.64		28.71	53.60								88.23	54.55	38.66	
127	41.93		32.89	34.19	30.70	29.91	33.90	29.69	29.24	34.64	38.82	36.57	33.86	28.44	
128	35.04		27.20		24.11	24.58	25.64	26.23	25.84	30.36	31.62		27.85	23.39	
129	34.49		23.27	27.61	23.65	25.11		24.35	26.77	26.52	31.15	33.08	27.60	23.18	
130	48.53		35.12		63.43	37.06	40.55	28.25		41.89	39.02	49.77	42.62	35.80	
131	51.80		37.77	41.00	40.48	41.51	43.53	31.64	36.11	38.51		32.41	39.48	33.16	
132	53.03		96.39	53.18	41.30	39.03	42.78	33.17	36.91	34.07	46.33	39.24	46.86	39.36	
141	28.68		16.88	24.91	19.10	16.23							21.16	16.92	
133	54.51		33.65		42.80	36.91			32.62	44.39		37.06	40.28	35.73	
134	39.28		31.50	25.18	25.67	22.10	27.10		25.72	32.52	35.38	32.68	29.71	24.96	
135			30.87	33.71	17.23	28.76	29.87	27.24	28.58		39.59	39.83	30.63	25.73	
136			31.73	35.40	29.17	25.40	29.79	18.06	28.62	32.59	46.06	40.73	31.75	26.67	
137				52.45	35.11	41.86	43.61	36.36	29.35		47.55	51.00	42.16	35.42	
138					41.72		38.87		29.18		49.79	47.73	41.46	38.31	
139			63.33	36.17	36.12	36.52	36.12	30.16	33.17		44.76	45.10	40.16	33.74	
140					22.41	21.66	21.90	22.83	21.99	28.56	28.53	29.31	24.65	24.64	
142							18.97	16.03		19.83	24.18	16.12	19.03	17.67	
143					28.32	30.45	38.32	31.44	31.06	36.82	37.66	32.99	33.38	33.35	
144								36.38	40.49	57.46	48.89	37.23	44.09	40.81	
145								56.61		64.89	62.67		61.39	53.91	
146								22.19	20.70	35.92	36.33	29.17	28.86	26.69	
147								24.49	26.79	30.86	27.56	31.85	28.31	26.17	
148								23.76	11.30		39.32	30.07	26.11	24.19	
149								31.82	29.57	41.52	39.60	41.02	36.70	33.93	
150								29.86	38.93		47.41	45.56	40.44	37.46	
151								21.00	29.54	38.04	45.08	38.51	34.43	31.83	

152									40.29	47.37	52.37	54.90	48.73	41.97	
153									36.72	41.10	43.58	47.24	42.16	36.31	
154								40.10	42.82	46.55	51.24	52.04	46.55	43.04	
155								33.61	34.83		44.43	41.56	38.61	35.76	
156				51.21	37.10	28.64	37.23		28.80		49.53	41.96	39.21	35.80	
157								37.29	38.15	40.60	41.55	44.01	40.32	37.33	
158								27.74	20.83	39.76	55.08	40.24	36.73	33.96	
159								39.80	40.64	47.93	30.39	53.04	42.36	39.16	
160								25.89	47.90	35.83	55.83	55.87	44.26	40.92	
161								25.35	9.86	34.84	49.65	34.40	30.82	28.49	
162								51.54	53.53	30.97	53.10	55.58	48.94	45.25	
163								40.51	43.17	24.27	54.31	46.30	41.71	38.56	
164									28.76	34.28		43.89	35.64	34.57	
165									26.89	20.92		45.75	31.19	30.25	
166								36.92	35.30	36.40	46.44	32.61	37.54	34.71	
167	41.31		39.16	38.76	27.08	27.22	26.14	30.33	29.84	36.39	34.61	49.10	34.54	29.01	
168								29.19	23.90	24.37	45.18	34.84	31.50	27.62	
169								34.87	37.31	23.42	48.40	42.21	37.24	32.66	
170								40.19	33.79	44.19	55.39	50.40	44.79	41.50	
171								26.83		32.38	44.18	39.34	35.68	31.33	
172								33.24	37.76	46.29	45.00	46.93	41.85	38.77	
173								46.03	38.34	43.54	41.25	43.92	42.62	41.88	
174								26.12		30.32	41.30	44.82	35.64	31.30	
175								33.00	28.58	41.05	44.27	55.68	40.52	37.55	
176								23.32		40.68	41.34	31.96	34.32	29.41	

☒ **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**

Data with data capture less than 25% was highlighted in Green and was not annualised.

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.

23 Appendix C: Supporting technical information / air quality monitoring data QA / QC

23.1 QA / QC of automatic monitoring

23.1.1 Continuous air quality monitoring, quality assurance and quality control

PCC manages four air quality-monitoring stations. These are all fully equipped with PCC DEFRA / NETCEN approved real-time automatic continuous monitoring analysers. These are sophisticated automatic monitoring systems housed in purpose built air-conditioned enclosures. These analysers measure and record in real-time a combination of NO_2, PM_{10} and $PM_{2.5}$.

PCC compiled continuous air quality monitoring data for the Further Assessment using Horiba's APNA-370, NO_2 based on the chemiluminescent analysis method.

23.1.2 Routine site operations

PCC employs a dedicated staff member to operate the network of continuous air quality monitoring stations. This officer is trained in all aspects of the monitoring processes including routine site operations, field calibrations and data ratification. The officer is also the trained Local Site Operator (LSO) for the local affiliated Automatic Urban and Rural Network (AURN)[24] station. This is to ensure that both a high-level of accurate data and an acceptable percentage of data capture are obtained.

All automatic monitoring equipment has both routine remote calibration check and routine (fortnightly) on-site checks. They also have maintenance visits, which follow documented procedures that stem from equipment manuals, manufacturer instructions and the UK Automatic Network Site Operators Manual[25].

Routine visits include:

- visual inspection of the station

[24] Automatic Urban and Rural Network (AURN)

[25] Report: UK Automatic Network Site Operator's Manual

- regular inlet-filter changes
- regular sampling head-cleaning and airflow
- a two-point calibration of the NO_2 analyser using a zero-air scrubber and a Nitric Oxide (NO) gas on-site
- AIR LIQUIDE supplies the NO_x span gas with the concentration certificate. This gas is traceable to national standards

All equipment fitted within each station's enclosure (e.g. sample meteorological sensors, pumps, air conditioning units, modem etc.) is subject to independent routine maintenance and support via a service contract with Horiba. This includes:

- six-monthly minor service and equipment check visits by the manufacturer for Horiba's analysers and approved engineers covering all non-Horiba equipment following national protocols and traceable QA/QC procedures. Horiba is ISO 9001 accredited and carries out similar or identical support work for a number of AURN network stations across the UK
- six-monthly major service where a full multi-point calibration is carried out on the NO_2 analyser, using zero-air, NO and NO_2 span gas (again traceable to national standards) meaning the analyser data slope and offset factors are reset. In addition to multi-point calibration the following checks are carried out:
    - linearity
    - noise
    - response time, leaks and flow
    - converter efficiency
    - stability of the on-site gas calibration cylinder

The local AURN station is also subject to external audit. Site Inter-calibration checks carried out by National Environmental Technology Centre Network engineers prior to each Horiba's major service.

Horiba also carries out non-routine site visits in response to equipment failure to the same standards. Contract arrangements ensure that visits are carried out within two to three days of the notification of call-out in order to minimise data loss.

All routine and non-routine site visits are fully documented and detail all works carried out, including any adjustments, modifications and repairs completed.

23.1.3 Calibration check methods

The calibration procedure for NO_x for sites C2, C4, C6 and C7 is based on a two point zero / span calibration check being performed at intervals of two weeks. The calibration procedure for the NO_x analyser of the C4 AURN network was based on three points, the third being span NO_2 to check the NO_2 Converter. However this was changed to two point calibration check. The methodology for the calibration procedure is followed according to the manufacturers' instruction handbooks:

- pre-calibration check - the site condition and status of the analyser is recorded prior to the zero / span check being conducted

- zero check – the response of the analyser to the absence of the gas being monitored. The stations were fitted with an integrated scrubber system incorporating a set of scrubbers, Hopcalite, activated charcoal, Purafil and Drierite, to generate a dried gas with none of the monitored pollutants. All were changed at least every six months but Hopcalite is changed more frequently due to the high levels of humidity in Portsmouth. These were changed to be fitted with synthetic air cylinders supplied by Air Liquide UK Ltd

- span check – the response of the analyser to the presence of the gas of a known concentration. Traceable gases are used for calibration checks supplied as part of the maintenance contract

- post calibration check - the site condition and status of the analyser upon completion of all checks

- all Horiba's APNA-370 analysers have their own built in data storage facility. They are built in a multi-drop set up. The calibration checks are

done directly through the front panel. Each analyser zero / span check is fully documented with records being kept centrally

23.1.4 Automatic data handling

All the stations are remotely accessible from a desktop computer at the civic offices via a telemetry linkage by either landline or GSM system. The telemetry linkage software used is ‘Data Communication Server’. It is set on a daily auto-dial collection mode for data retrieval. It is also set to run calibration checks every three days.

Once the connection is established, the ‘Data Communication Server’ software retrieves the overnight auto-calibration first and stores it in a temporary database and a calibration factor is generated according to the following steps:

- instrument span, F = C/(Vs-Vz) and
- pollutant concentration (ppb) = Fx(Va-Vz) where:
    - C is the set gas value on the gas certificate
    - Vs span value
    - Vz zero span value
    - Va is the sample value as recorded by the analyser.

Raw measured data retrieved from the station data logger(s) is then subject to the calculated correction factors and stored in the final database as corrected. The latter is then made readily available to be queried via the ‘IDAZRW Central Station’, database access software.

Instrument status and internal auto-calibration data can be viewed in addition to the corrected collected measured monitoring data.

The air quality data ratification is carried out manually from this station.

23.1.5 Manual data handling

All collected data is screened or validated by visual examination to see if there are any unusual measurements. The affected data is then flagged in the database. Any further remaining suspicious data, such as large spikes, 'flat-lines' and excessive negative data is flagged for more detailed investigation. 'IDAZRW Central Station' is capable to trace back any change made at all times with the administrator's name. An original raw dataset is always kept in the data processing software.

When data ratification has been completed the data is then made available for further statistical and critical examination for reporting purposes.

Air quality monitoring data can be imported manually into a Microsoft Excel spreadsheet. This scaled data (where values are above the lower detectable limit is considered to be valuable data) is then further converted to generate data in the National Air Quality Objective format to enable direct comparison to the standards. A file of raw data is always kept for reference in the database.

23.2 QA / QC of diffusion tube monitoring

23.2.1 Monitoring technique

The continuous NO_2 monitoring network is complemented by a secondary network of passive NO_2 tubes that are located in suspected air quality hot spots. In addition, tubes are located at the relevant continuous monitoring sites to enable data adjustment. At a selection of sites three tubes are exposed simultaneously and the data compared. Where the data is consistent, the results are averaged. Where the tubes results show significant differences the data is discounted.

This method provides a cost-effective means of monitoring a wide range of monitoring locations. The accuracy of tubes however is variable depending on the tube handling procedures, the specific tube preparation, adsorbent mixture and the analysing laboratory. These tubes are supplied and analysed by Gradko International Ltd.

PCC's NO_2 diffusion tubes are prepared by the supplier using 50% Triethanolamine (TEA) in acetone. These tubes were exposed for one-month periods in accordance with LAQM.TG (16) guidance [5].

23.2.2 Tube handling procedures

Once received by post, NO_2 tubes are stored in cool location within the supplied packaging until use. The tube end caps are not removed until the tube has been placed at the monitoring location at the start of the monitoring period. The exposed tubes are recapped at the end of the monitoring period and returned as quickly as possible to a clean cool storage environment then sent to GIL for analysis.

23.2.3 Laboratory QA / QC

GIL is a UKAS accredited company for the analysis of NO_2. GIL take part in the WASP scheme on a quarterly basis. An inter-comparison of results from other laboratories demonstrates that GIL's performance is good in terms of accuracy and precision.

23.2.4 Data ratification

Once analysed, the NO_2 diffusion tubes results which, were significantly within the documented limit of detection, were laboratory blank corrected.

The returned results are closely examined on a monthly basis to identify any spurious data (e.g. very high or very low data).

The data is subjected to a further series of corrections for the monitored period under consideration:

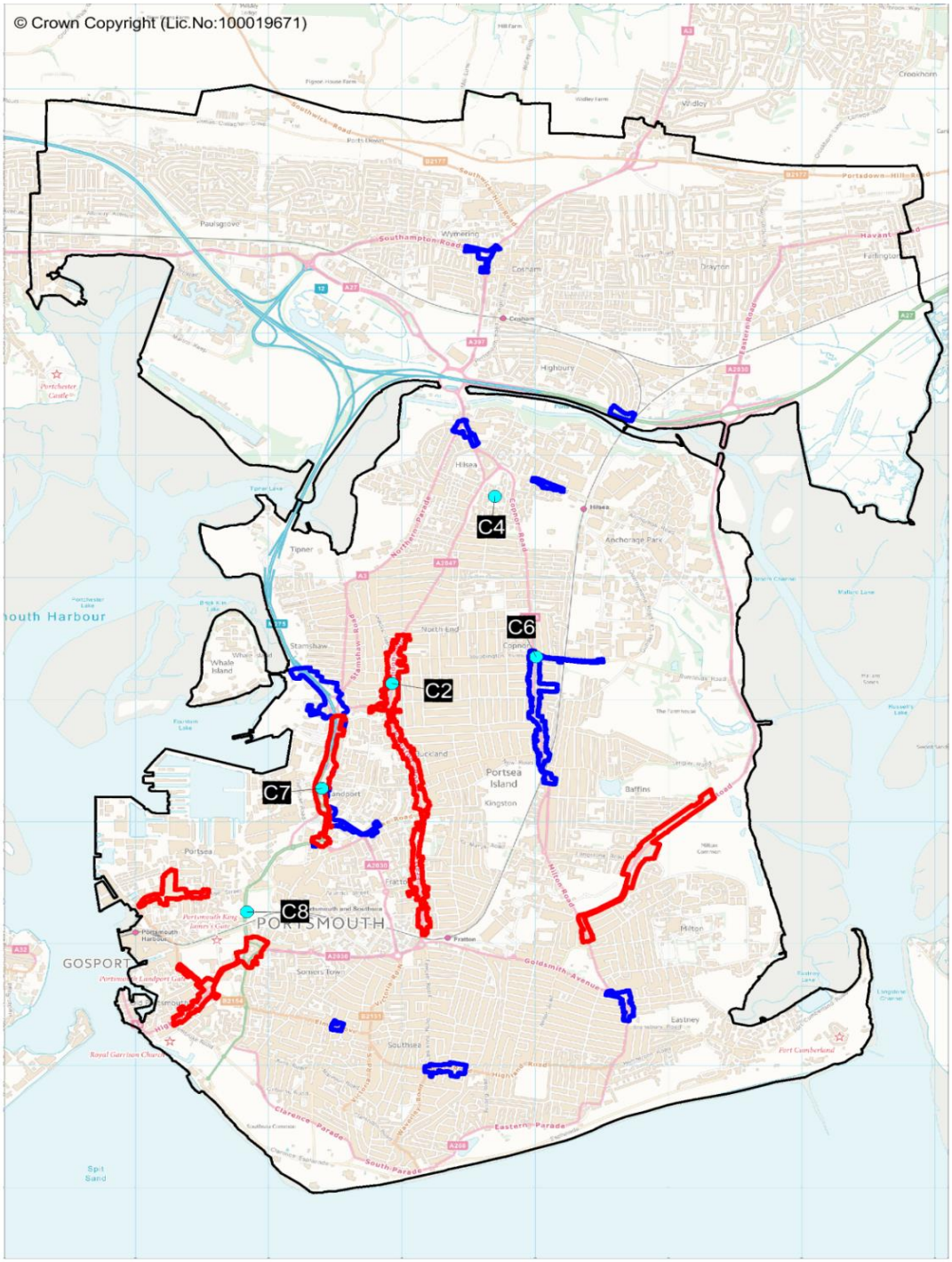
- Firstly, PCC use the data from the local collocation study of NO_2 diffusion tubes to calculate the bias following the approach prescribed in Box 6.4 of LAQM TG (16), using the appropriate continuous monitoring data from the local air quality monitoring network for individual NO_2 monitored site, according to the site criteria

- Secondly, the estimation of the NO_2 annual mean is deduced for individual NO_2 diffusion tube monitored locations, following the approach prescribed in Box 6.5 of LAQM TG (16), using data from both Portsmouth and Southampton AURN stations

- The corrected results are then reported and used for comparison only, i.e. not for verification processes in any Further Assessment (Review and Assessment process).

24 Appendix D: Map(s) of CAQMSs and AQMAs Locations

24.1 Map1 – Locations of PCC's (C2, C4, C6, and C7) and DEFRA's (C8) CAQMSs.

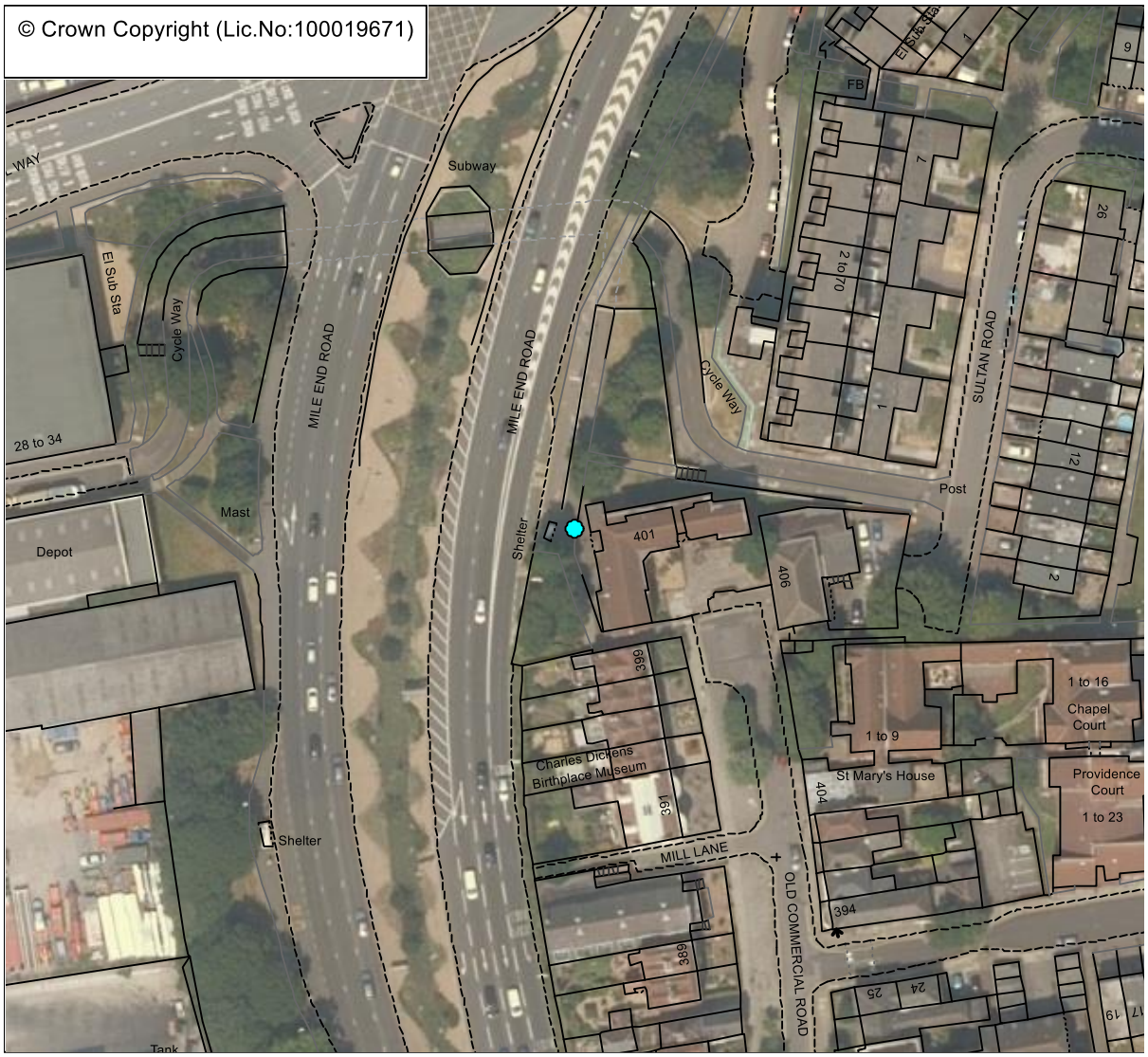


24.2 Map2 – PCC's Kerbside CAQMS: Location (C2) London Road.

24.3 Map3 – PCC's AURN CAQMS: Location (C4) at Gatcombe Park Primary School.

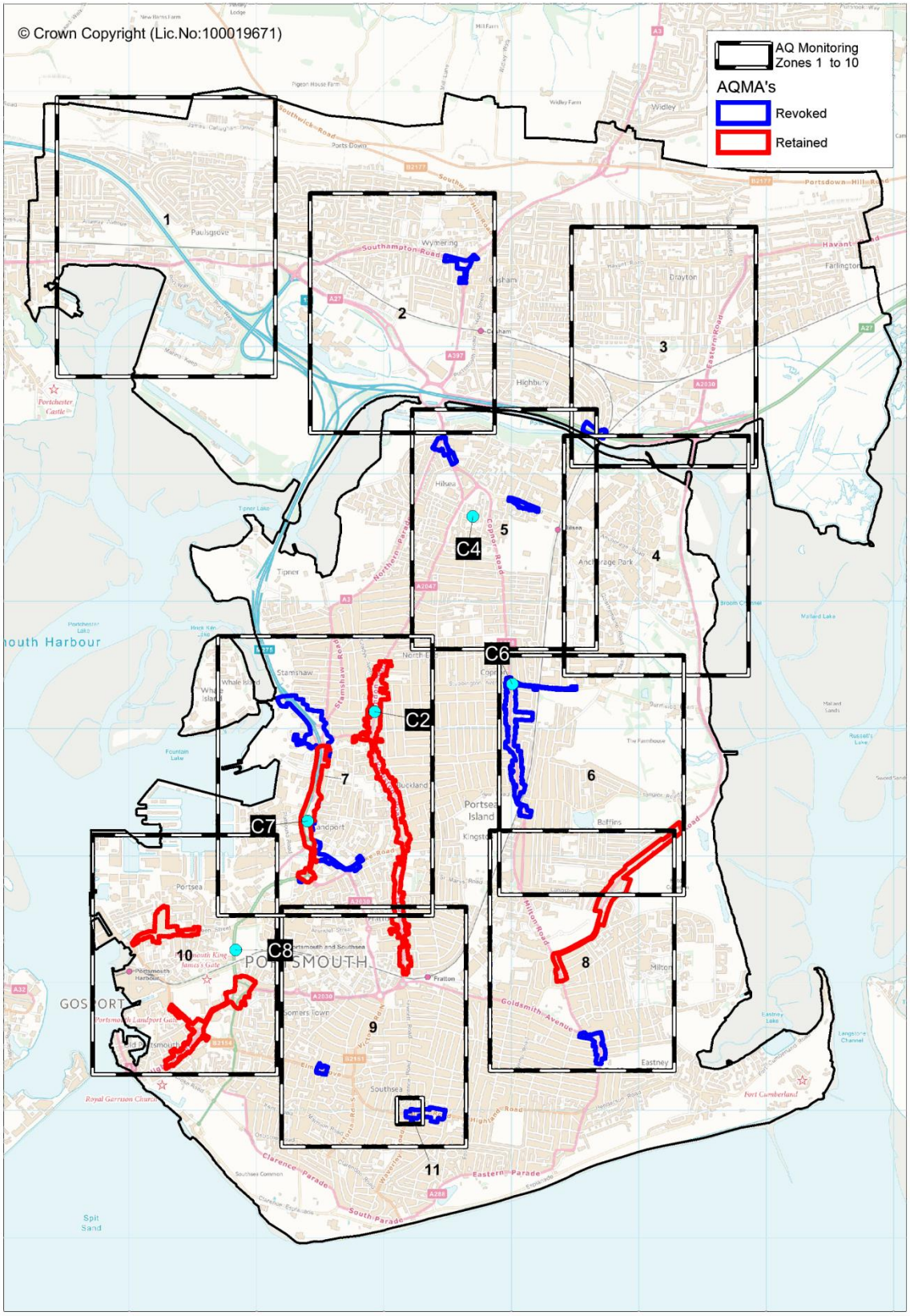
24.4 Map4 – PCC's Roadside CAQMS: Location (C6) along Burrfields Road.

24.5 Map5 – PCC's Roadside CAQMS: Location (C7) along Mile End Road.

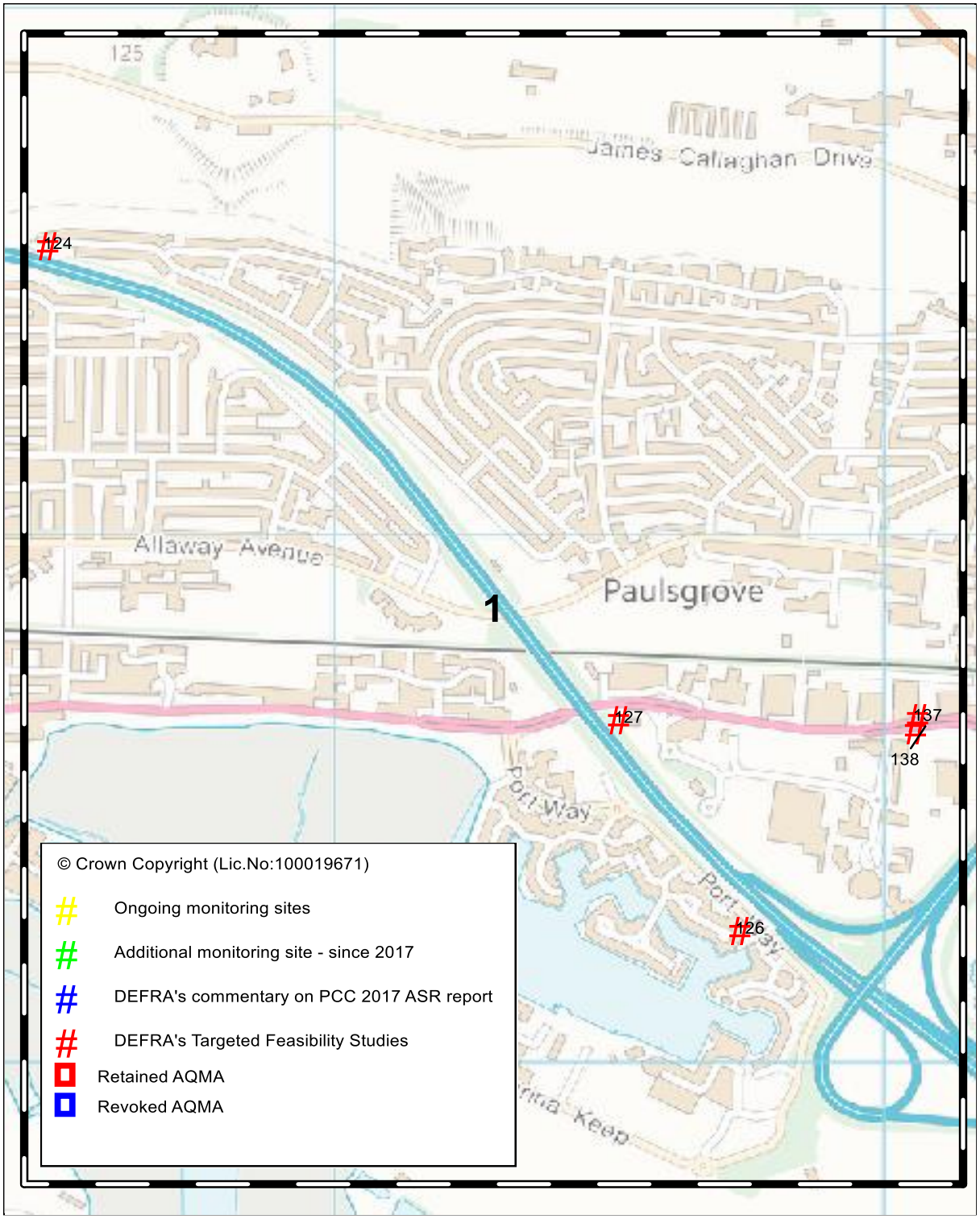


24.6 Map6 – DEFRA's Roadside CAQMS: Location (C8) along Anglesea Road.

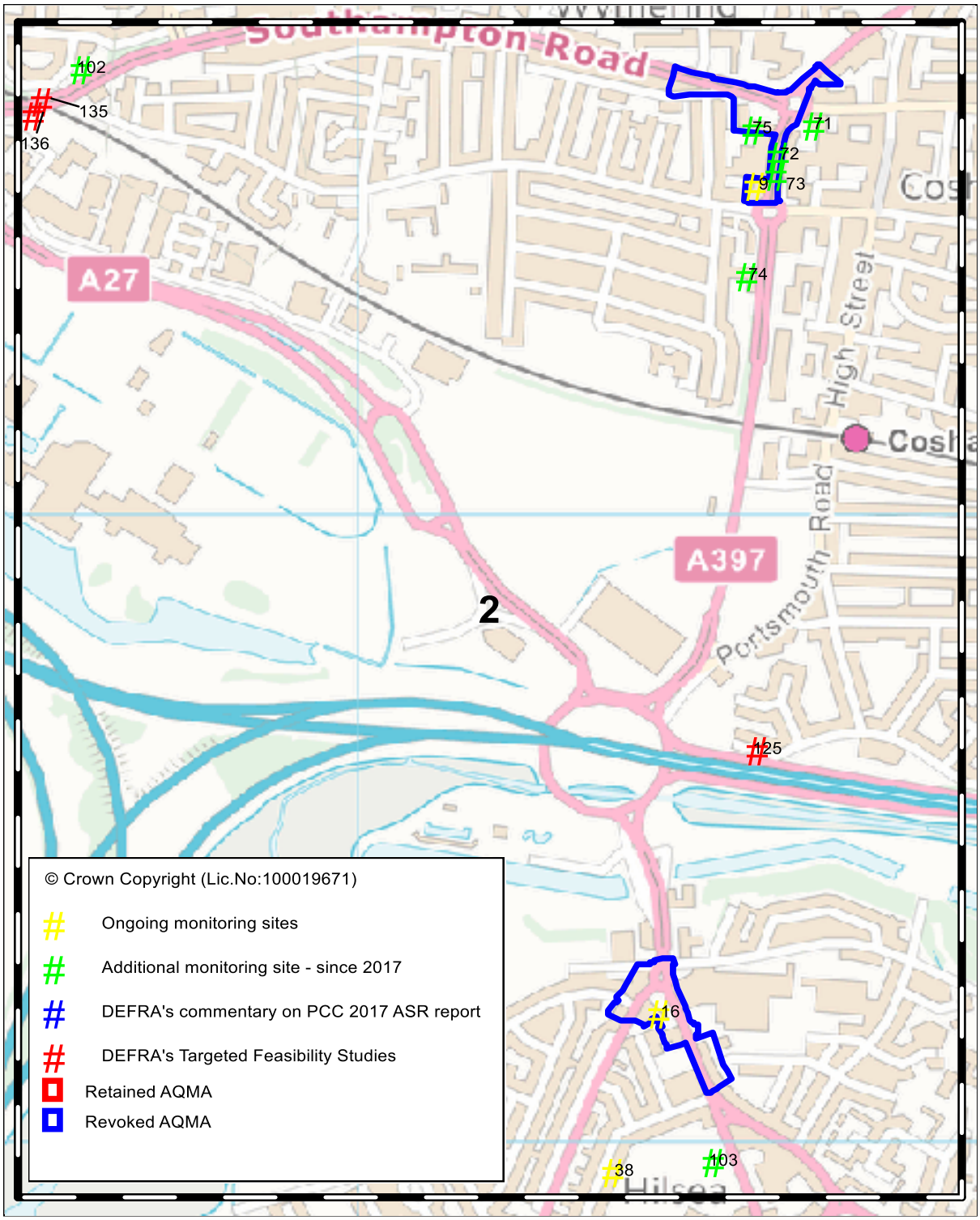
24.7 Map7 – PCC's AQMAs and the 11 NDDT monitoring locations zones.



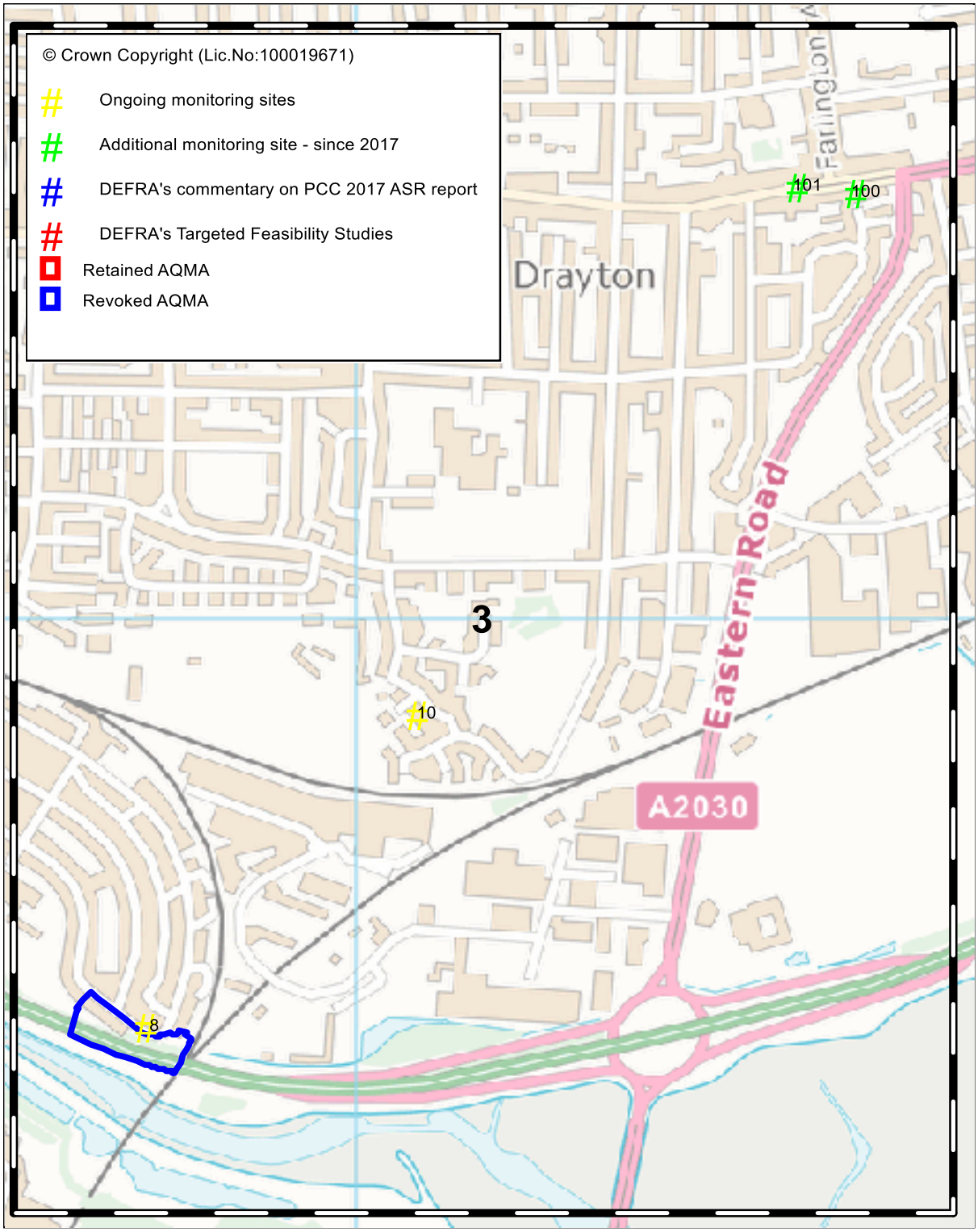
24.8 Map8 – PCC's NDDT monitoring locations (Zone 1).



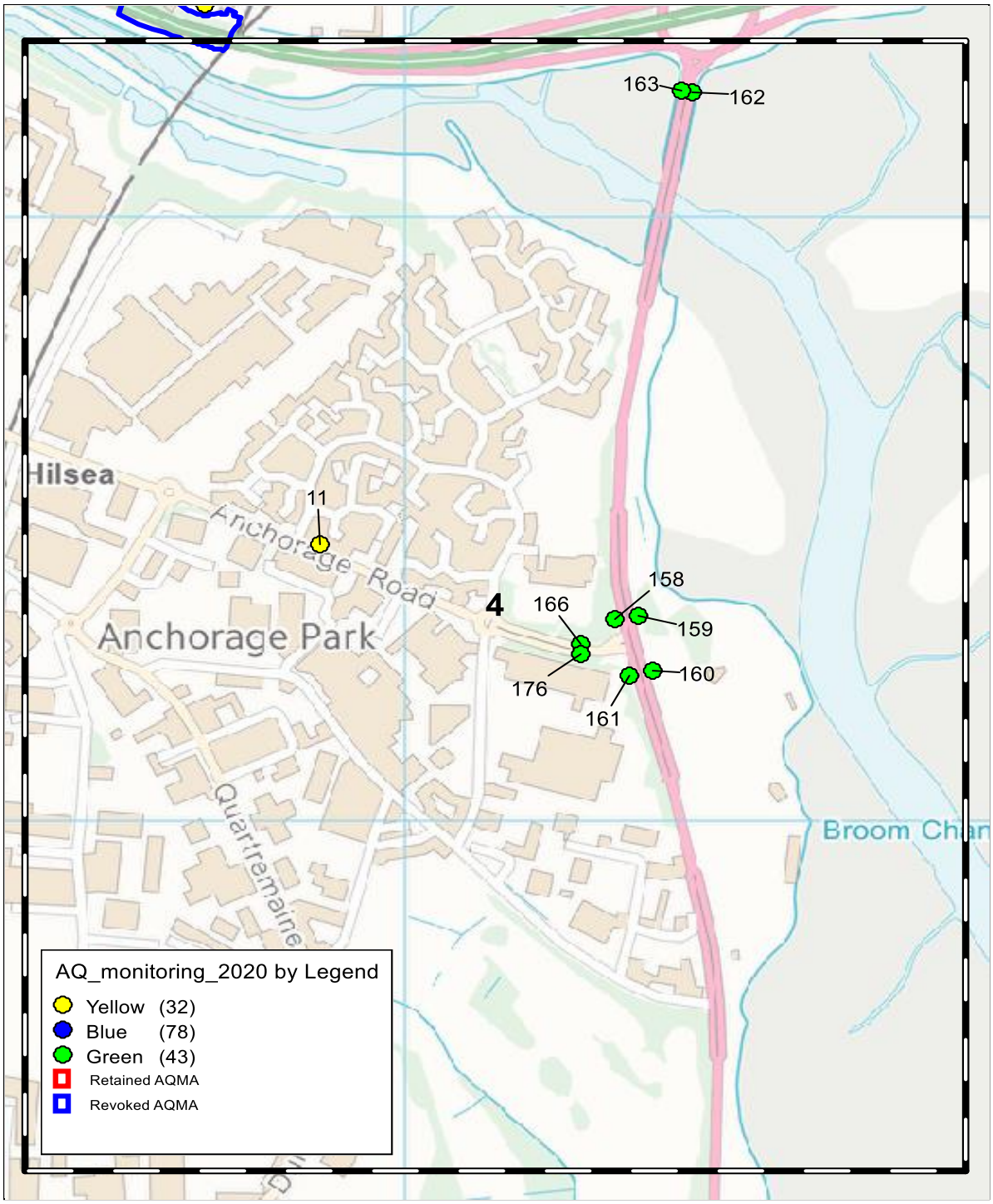
24.9 Map9 – PCC's NDDT monitoring locations (Zone 2).



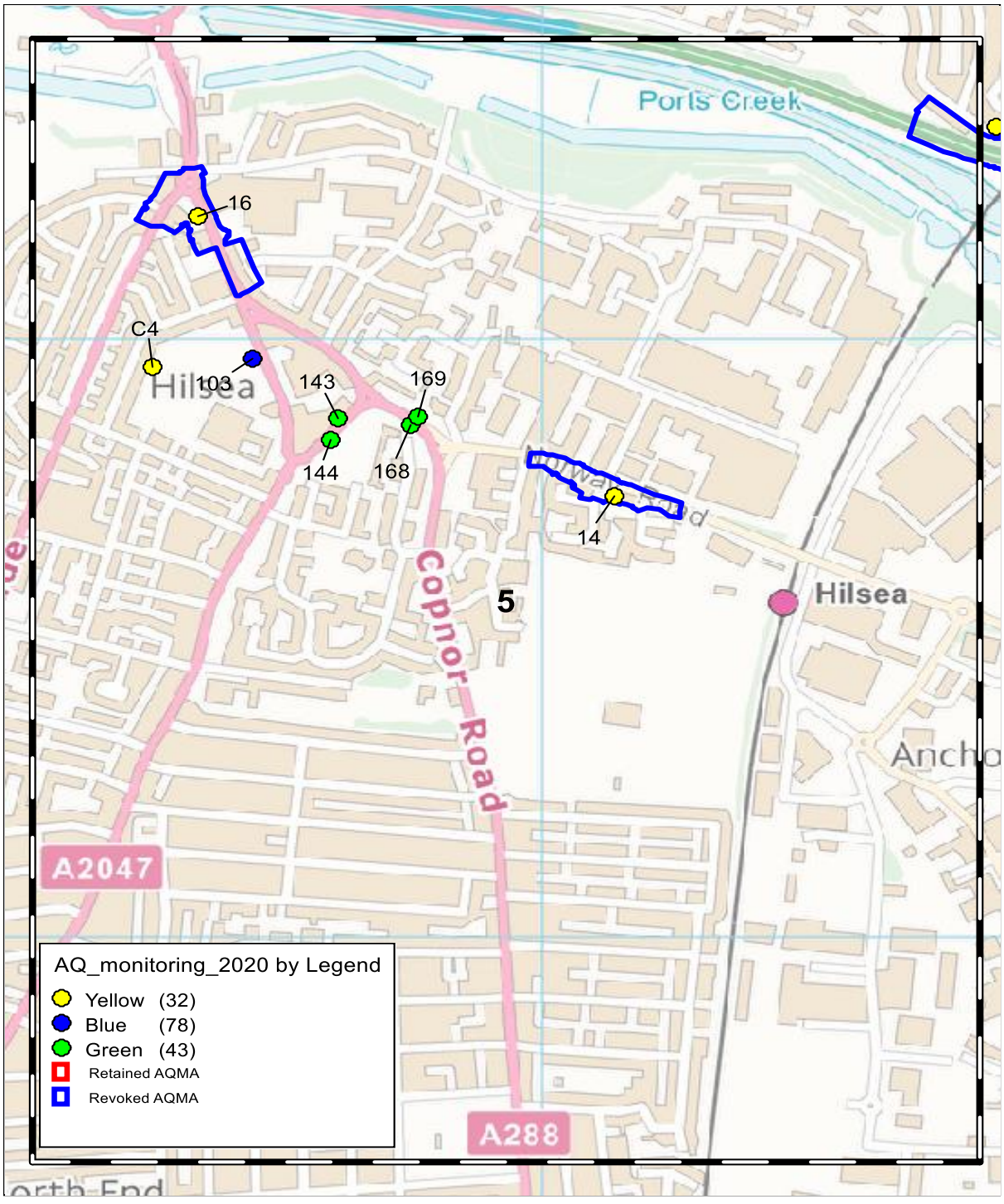
24.10 Map10 – PCC's NDDT monitoring locations (Zone 3).



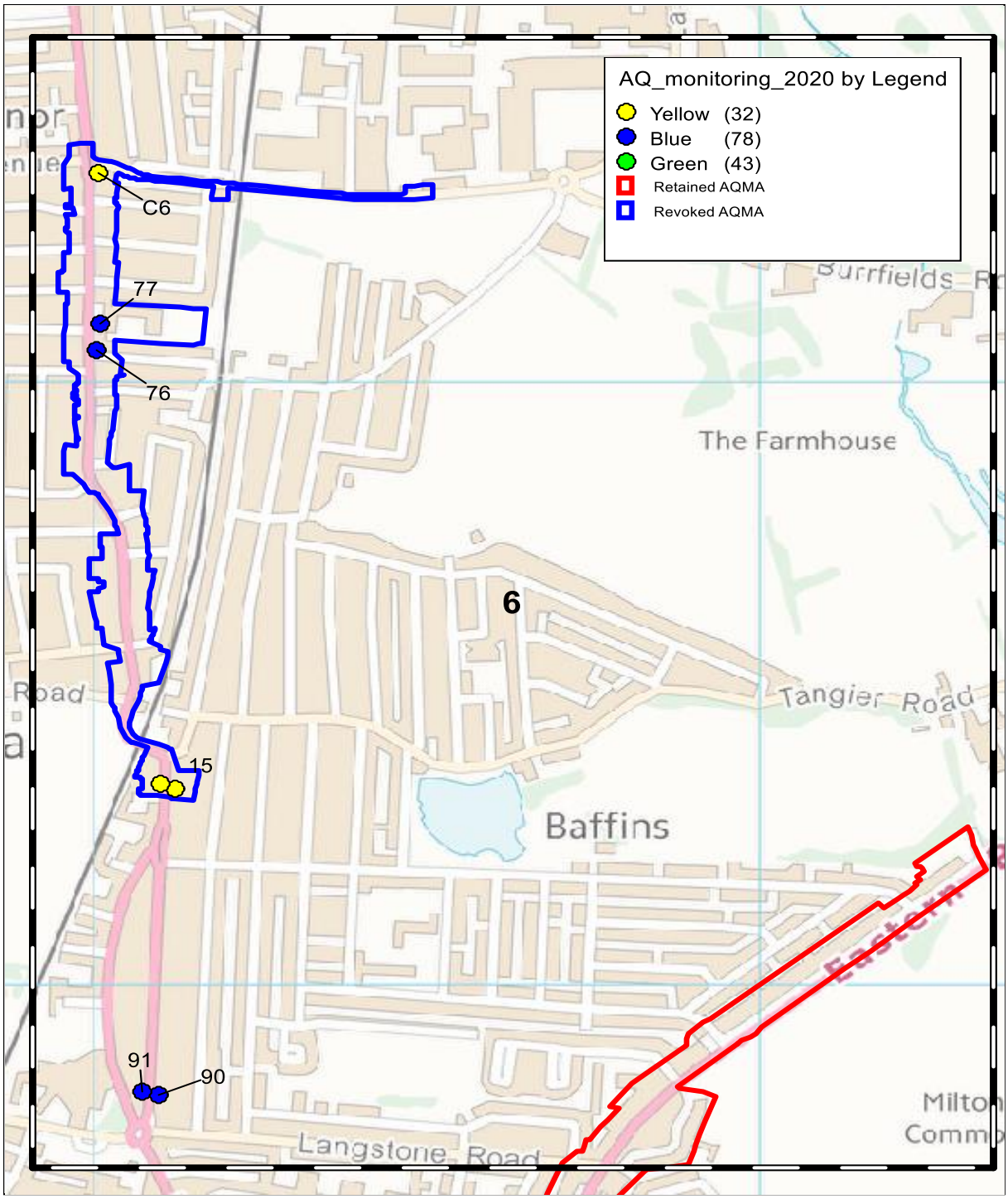
24.11 Map11 – PCC's NDDT monitoring locations (Zone 4).



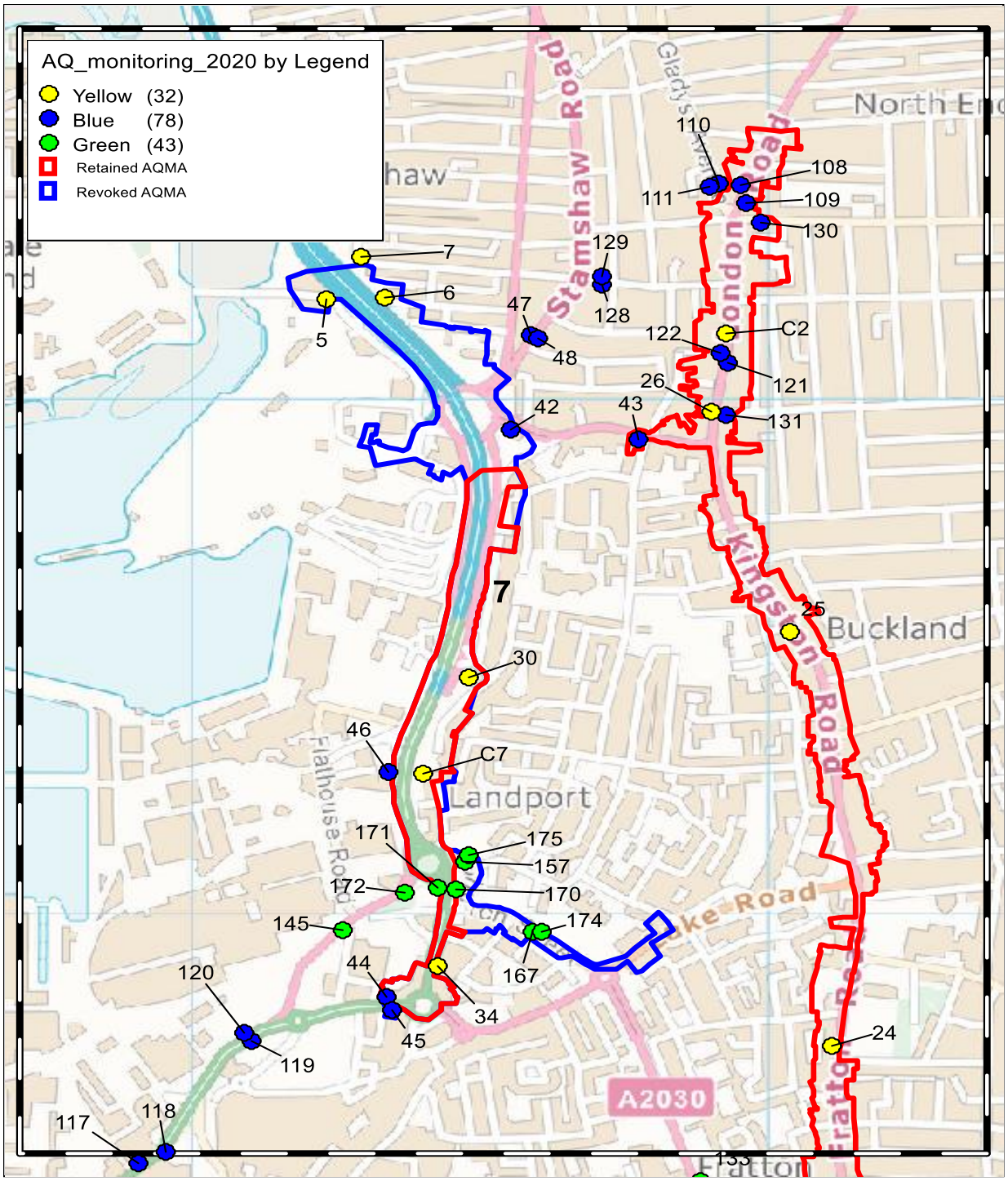
24.12 Map12 – PCC's NDDT monitoring locations (Zone 5).



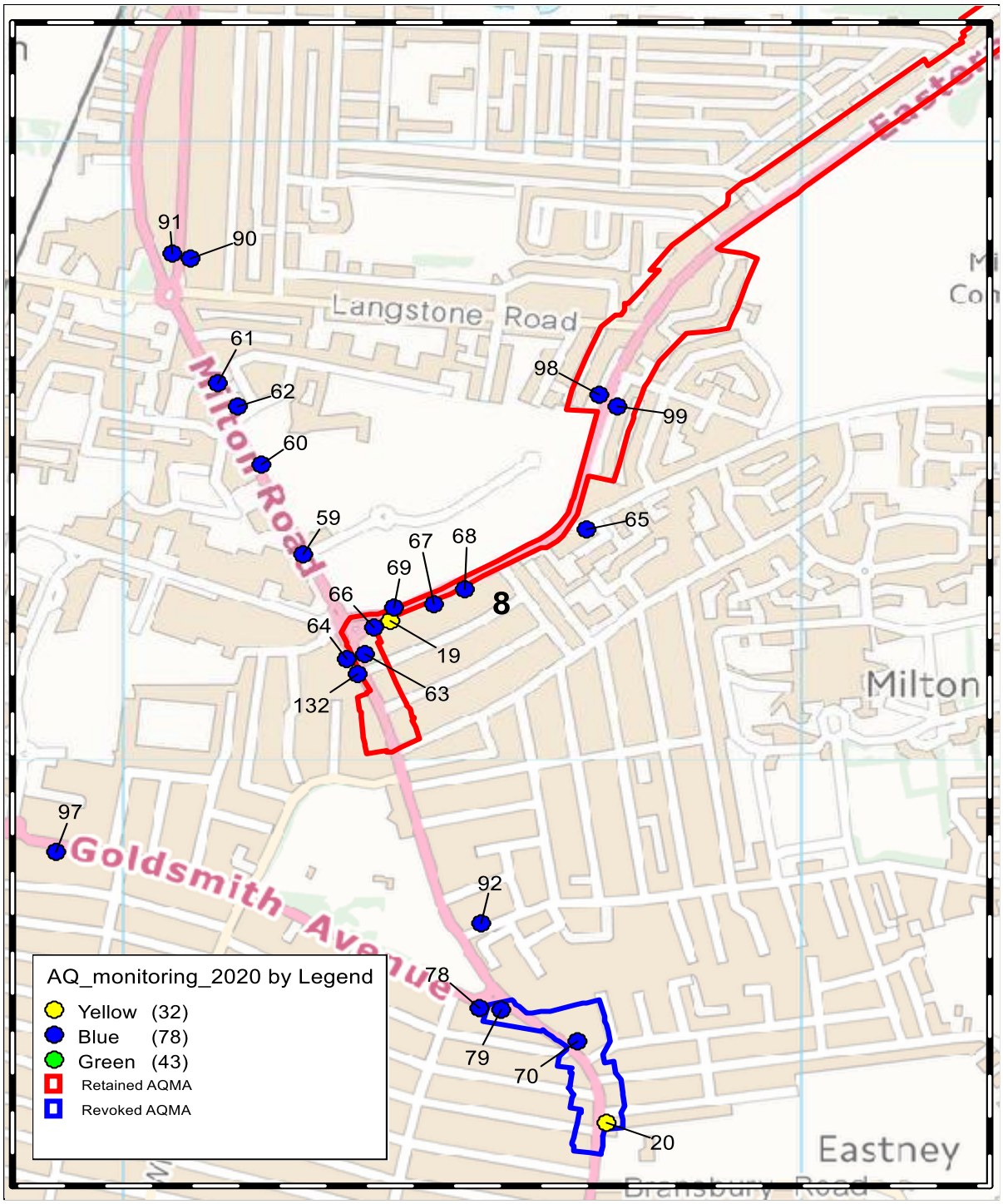
24.13 Map13 – PCC's NDDT monitoring locations (Zone 6).



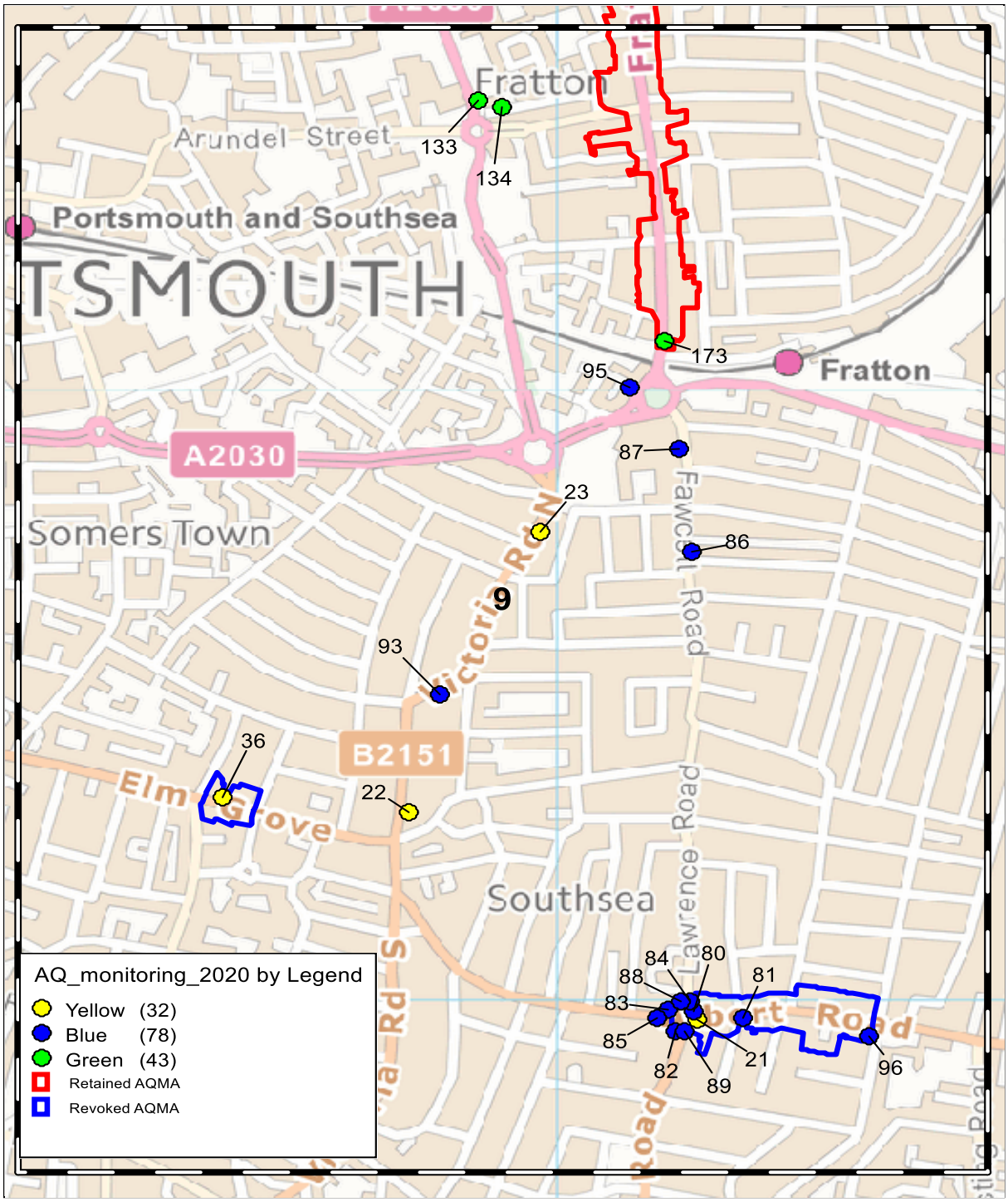
24.14 Map14 – PCC's NDDT monitoring locations (Zone 7).



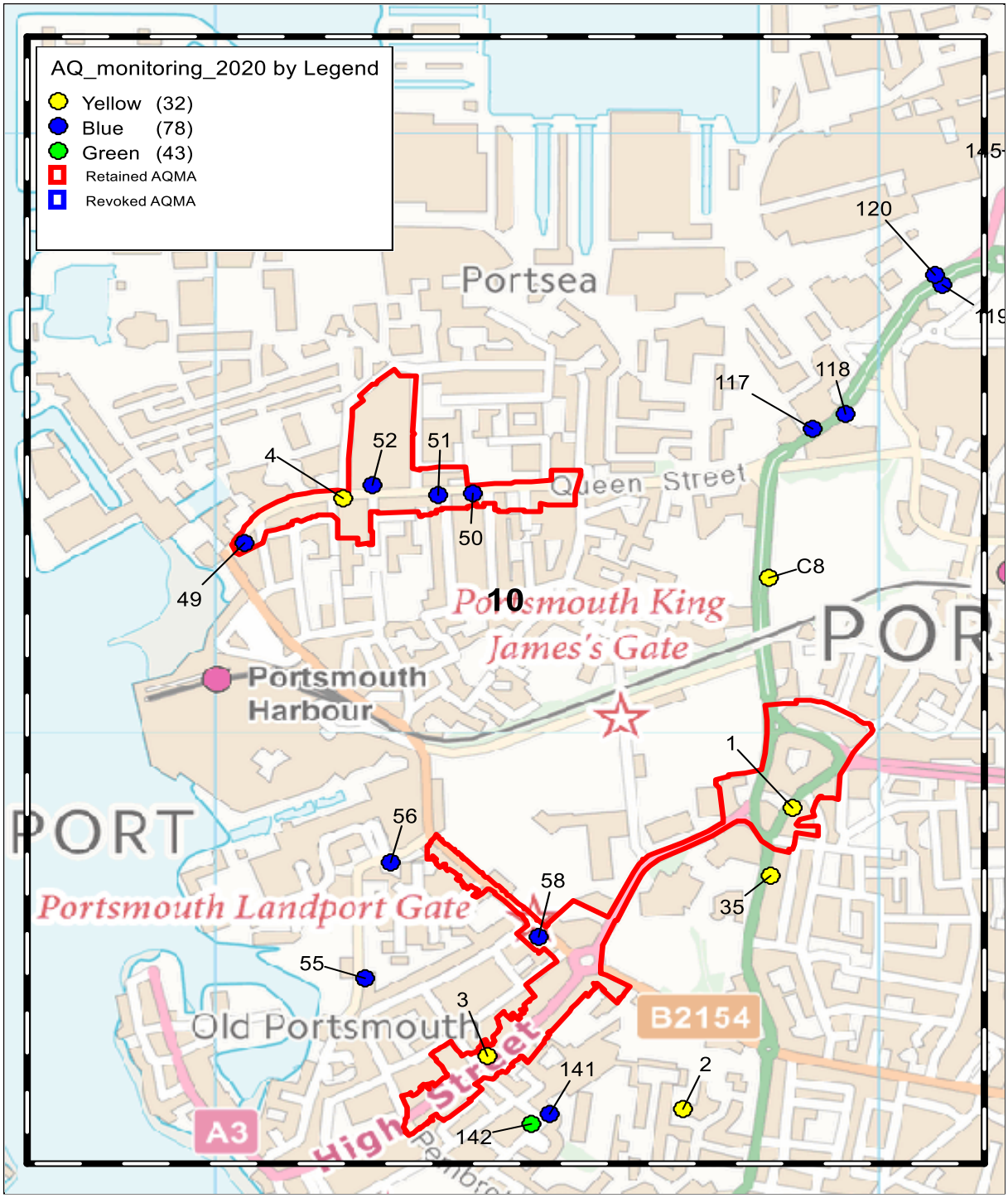
24.15 Map15 – PCC's NDDT monitoring locations (Zone 8).



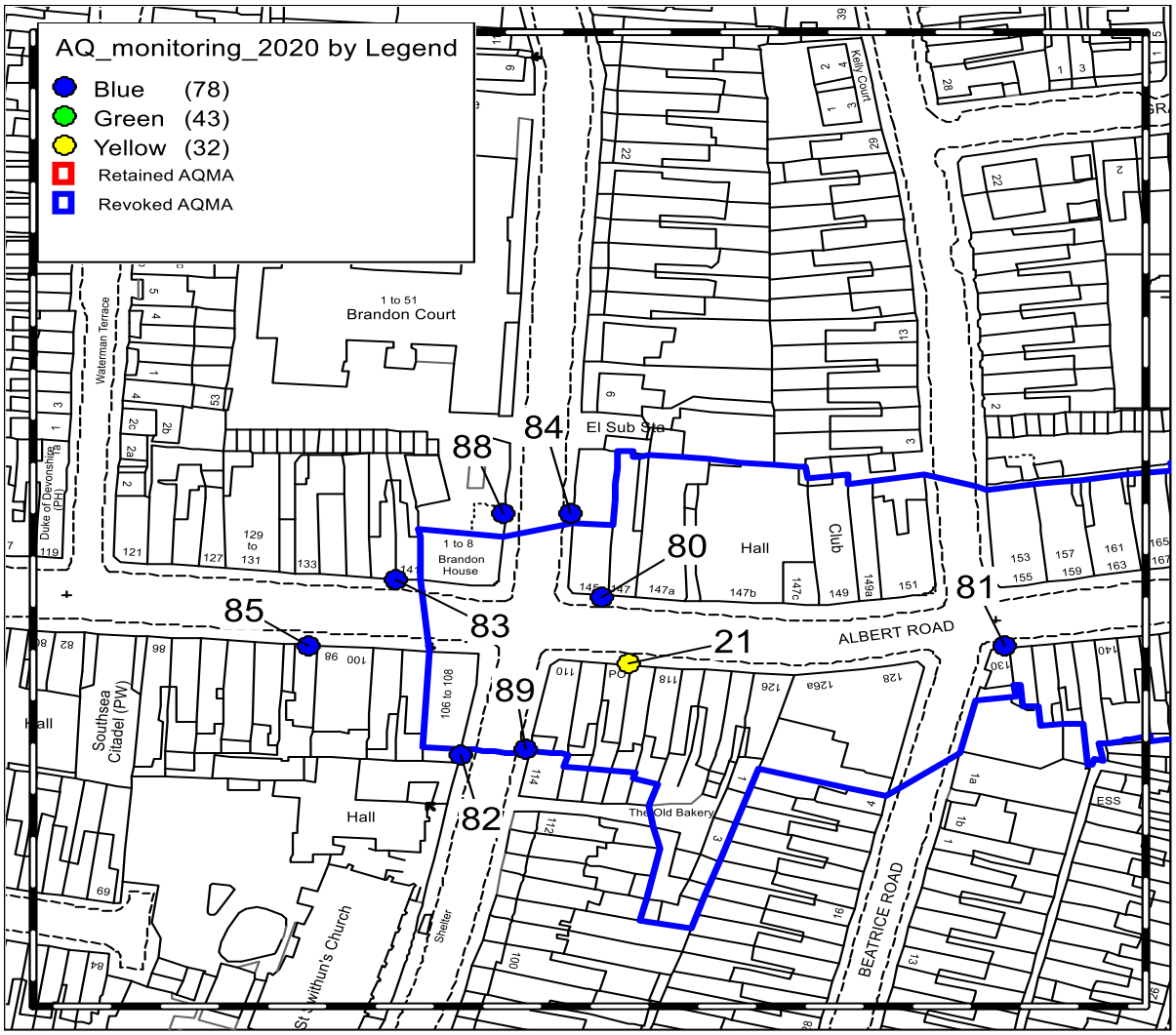
24.16 Map16 – PCC's NDDT monitoring locations (Zone 9).



24.17 Map17 – PCC's NDDT monitoring locations (Zone 10).



24.18 Map18 – PCC's NDDT monitoring locations (Zone 11).



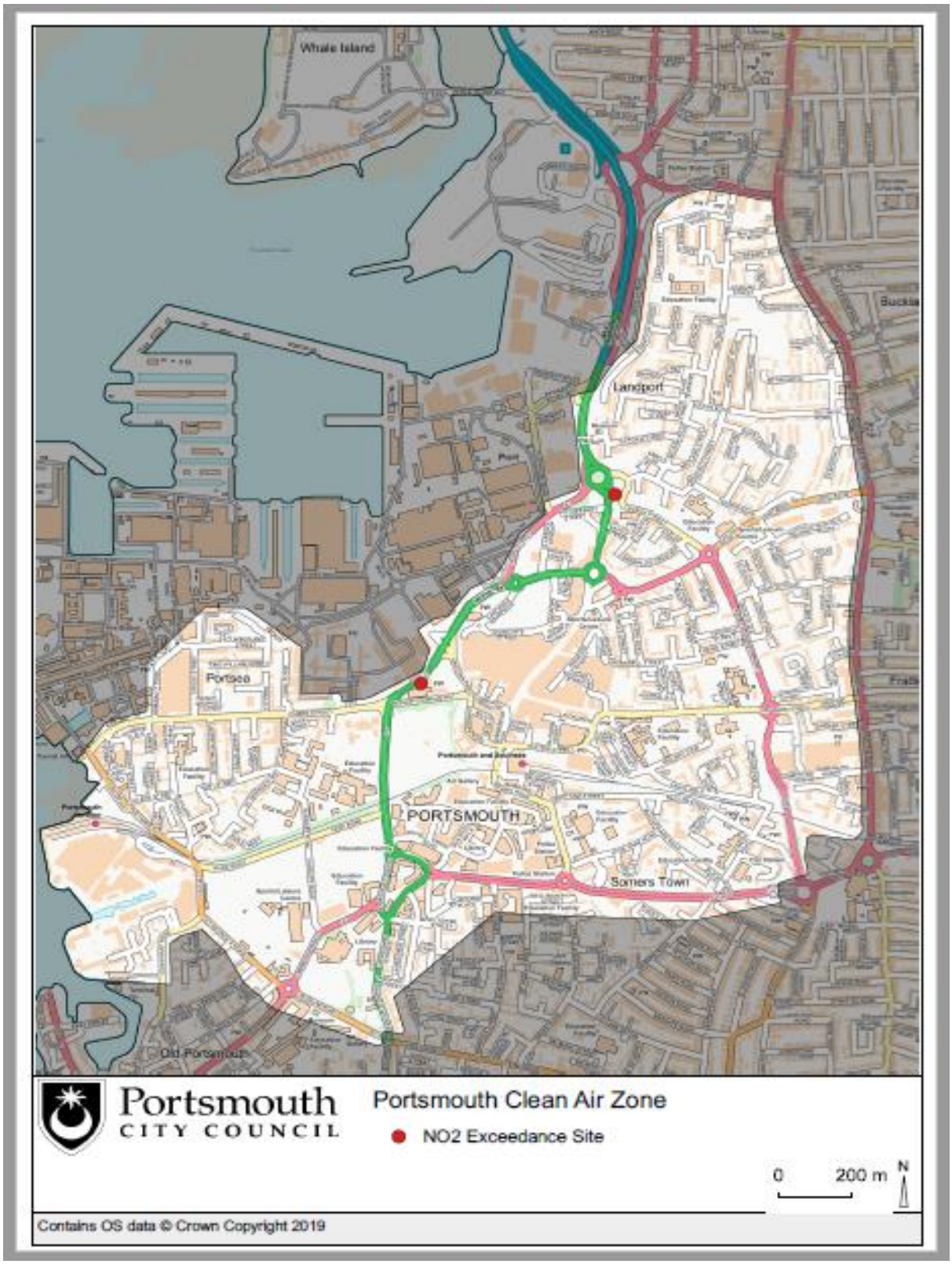
25 Appendix E: Summary of air quality objectives in England

Table E.1 – Air quality objectives in England

Pollutant	Air Quality Objective[26]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200µg/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})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40µg/m^3	Annual mean
Particulate Matter ($PM_{2.5}$)	25µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

26 Appendix F: Concentrated CAZ



27 Glossary of terms

Frequently use abbreviations	Description
AAQD	Ambient Air Quality Directive
AP	Air Pollution
AQ	Air Quality
AQAP	Air Quality Action Plan
AQB	Air Quality Board
AQG	Air Quality Grant
AQMA (s)	Air Quality Management Area (a) – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQS	Air Quality Strategy
AQSG	Air quality Steering Group
ASR	Annual Status Report
AURN	Automatic Urban and Rural Network
CAQMS	Continuous Air Quality Monitoring Station
CAZ	Clean Air Zone
DEFRA	Department for Environment, Food and Rural Affairs
EU	European Union
EV	Electric Vehicle
FA	Further Assessment
FBS	Full Business Case
FDMS	Filter Dynamics Measurement System
JAQU	Joint Air Quality Unit
LA(s)	Local Authority(s)
LAQ	Local Air Quality
LAQP	Local Air Quality Plan
LAQM	Local Air Quality Management
LAQM.TG(16)	Local Air Quality Management. Technical Guidance (16)
LAQRA	Local Air Quality Review and Assessment
LAQS	Local Air Quality Strategy
NAQO	National Air Quality Objective
NDDT	Nitrogen Dioxide Diffusion Tubes
NDDTS	Nitrogen Dioxide Diffusion Tubes Survey
NO_2	Nitrogen Dioxides
NO_x	Nitrogen Oxides
OBC	Outline Business Case
PAQS	Portsmouth Air Quality Strategy
PCAN	Portsmouth Clean Air Network
PCC	Portsmouth City Council
PCM	Pollution Climate Model
PHE	Public Health England
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
OBC	Outline Business Case
SO_2	Sulphur Dioxide
TFS	Targeted Feasibility Study