

Annual Progress Report (APR)



2023 Air Quality Annual Progress Report (APR) for Inverclyde Council

In fulfilment of Part IV of the Environment Act 1995, as amended by the
Environment Act 2021

Local Air Quality Management

30th June 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Inverclyde Council

Under the requirement of the Environment Act 1995, Inverclyde council regularly monitors the air quality within the local area. There is a diffusion tube network in place which monitors NO₂ within 19 different sites. There is also an Automatic Air Quality Monitoring Station in place to measure the levels of NO₂, PM₁₀, PM_{2.5} and PM₁ at East Hamilton Street, Greenock.

The results have consistently shown NO₂, PM₁₀ and PM_{2.5} levels to be below the National Air Quality Objectives, therefore there has been no requirement to proceed to a Detailed Assessment for any of the pollutants. To date there has been no declaration of an Air Quality Management Area within Inverclyde.

There have been no significant changes which have taken place within the local area that could have a negative impact on air quality or any new domestic or industrial sources since the previous report in 2022.

Actions to Improve Air Quality

Throughout 2022, Inverclyde Council has continued to implement plans, policies and strategies to protect our natural environment and improve the health and well being of people within Inverclyde. Actions have been taking to promote active travel within the community through effective planning and development. The Inverclyde Green Connection Programme aims to construct better network links with a focus on developing areas in Greenock and Port Glasgow. Upgrades were carried out to Greenock's cycle lane and construction went underway on an additional cycle/ footpath along Greenock's waterfront (Image 1). Improvements in infrastructure are hoped to continue to promote active travel within the community.



Image 1: The new coastal route is under construction linking the west and east of Inverclyde and will become part of the National Cycle Network 75 (N75).

For several years, Inverclyde Council has had a NO₂ diffusion tube network comprising of seventeen sites. The annual NO₂ concentrations each year for these sites has been consistently low. Inverclyde Council has altered the NO₂ diffusion tube network in 2022, two additional monitoring locations were installed. The decision was taken to investigate Brisbane Street and Blairmore Road, Greenock. The choice of site was selected based on exposure potential, topography and the likelihood of heightened traffic emissions. NO₂ concentrations for both Blairmore Road and Brisbane Street was far less than the hourly and annual mean objective set out in The Air Quality (Scotland) Regulations 2000.

Inverclyde Council is continuously striving to reduce carbon emissions in order to achieve the national net zero target. Greenhouse gas emissions recorded for the whole of Inverclyde has been steadily declining. Since 2012/13 Inverclyde Council has reduced carbon emissions by over 46%. Overall, Inverclyde Council aims to attain further reductions in air pollutants to improve air quality within the local area.

Local Priorities and Challenges

Inverclyde Council does not have any specific priorities or challenges for the coming year. Statutory monitoring will continue and the next report to be submitted will be the 2024 Air Quality Annual Progress Report.

How to Get Involved

Air Quality information and Inverclyde Council's Air Quality Annual Progress Reports can be found at the following link on the Inverclyde Council website, [Air quality - Inverclyde Council](#) ⁽¹⁾.

Up to date monitoring results from the automatic monitoring station can be found on the Scottish Air Quality website, [Site Data | Scottish Air Quality](#) ⁽²⁾.

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1 Local Air Quality Management

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

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

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO ₂)	40 µg/m ³	Annual mean	31.12.2005
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM ₁₀)	18 µg/m ³	Annual mean	31.12.2010
Particulate Matter (PM _{2.5})	10 µg/m ³	Annual mean	31.12.2021
Sulphur dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m ³	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m ³	Running 8-Hour mean	31.12.2003

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare publish and implement an Air Quality Action Plan (AQAP) within the shortest possible time and no later than 12 months of the date of AQMA Designation Order. The AQAP must set out measures the local authority intends to put in place in pursuit of the objectives within the shortest possible time. Measures should be provided with milestones and a final date for completion. The action plan itself should have a timescale for completion and for revocation of the AQMA. Where measures to reduce air pollution may require a longer timescale an action plan shall be reviewed and republished within five years of initial publication and then five-yearly thereafter.

There has been no exceedance or likely exceedance of an air quality objective in Inverclyde, therefore, no AQMA has been declared.

2.2 Cleaner Air for Scotland 2

[Cleaner Air for Scotland 2 – Towards a Better Place for Everyone \(CAFS2\)](#) ⁽³⁾ is Scotland's second air quality strategy. CAFS2 sets out how the Scottish Government and its partner organisations propose to further reduce air pollution to protect human health and fulfil Scotland's legal responsibilities over the period 2021 – 2026. CAFS2 was published in July 2021 and replaces [Cleaner Air for Scotland – The Road to a Healthier Future \(CAFS\)](#) ⁽⁴⁾, which was published in 2015. CAFS2 aims to achieve the ambitious vision for Scotland "to have the best air quality in Europe". A series of actions across a range of policy areas are outlined, a summary of which is available on the Scottish Government's website.

Progress by Inverclyde Council against relevant actions for which local authorities are the lead delivery bodies within this strategy is demonstrated below.

2.2.1 Placemaking – Plans and Policies

Local authorities with support from the Scottish Government will assess how effectively air quality is embedded in plans, policies, City Deals and other initiatives, and more generally in cross departmental working, identifying and addressing evidence, skills, awareness and operational gaps.

Inverclyde Council has successfully incorporated air quality into a variety of plans, policies, City Deals and other initiatives. Further information to evidence this will be provided in the sections below.

2.2.2 Transport – Low Emission Zones

Local authorities working with Transport Scotland and SEPA will look at opportunities to promote zero-carbon city centres within the existing LEZs structure. To date Inverclyde Council does not possess a LEZ.

2.2.3 Transport– Electric Vehicles/Charging Points

Inverclyde Council has a 12-month procurement programme in place for the purchase of Electric Vehicle (EV) and the development of the EV fleet charging infrastructure. Since 2011, Inverclyde Council has been replacing vehicles within its fleet. By the end of 2022, the Council had a total of 38 EVs within its fleet. In compliance with Scottish Government requirements the target is to have a fully electric car/van fleet by 2025 and have an electric refuse collection fleet in place by 2028.

The Environment and Regeneration Committee Delivery and Improvement Plan 2023/26⁽⁵⁾ aims to protect the natural environment also stipulating the need to replace council vehicles. The plan aims to minimise diesel usage by March 2026 with a reduction target of 1000,000 litres/annum which will in turn allow for a 286,000 kg of CO₂ emissions.

The electric charging infrastructure was upgraded this year with the installation of four dual outlet public chargers. A total of 27 council owned, publicly accessible charging stations have been fitted within the local area. There are also privately owned charging stations that are available for use throughout the local area these can be found using Live Map - Charge Place Scotland⁽⁶⁾. These charging points are usually found in car parks of supermarkets, train stations and business establishments. Inverclyde Council seeks to

further develop the electric charging point infrastructure within the local area to support and encourage the use of electric vehicles.

2.2.4 Transport - Inverclyde's Transport Routes

Inverclyde is well situated and has a great transport network in place to keep people well connected. The A8 and A78 are two trunk roads that run through the area. There are several bus companies that operate. The rail network is comprised of two train lines and fourteen stations. Situated on the coastal route, Inverclyde has ferry services that operate providing travel links to several locations in Argyll and Bute.

Inverclyde is also connected by a comprehensive core path network and National Cycle Network routes, NCN75 and NCN753 provide active travel to Renfrewshire, Glasgow and Ayrshire.

2.2.5 Active Travel in Inverclyde

Encouraging active travel is crucial to improving air quality and public health. To increase active travel within the community, it is important to have routes that are accessible and safe. Inverclyde Council's Local Development plan ⁽⁷⁾ recognises the importance of keeping people connected and the significance of a green infrastructure. Similarly, the Clydeplan⁽⁸⁾ sets out strategies to promote sustainable transport, promote active travel and increase connectivity within the region. Involvement in the Glasgow City –Region City Deal Project provides funding opportunities for major infrastructure projects.

Funding was received by the Spaces for People and the Safer Walking, Safer Roads groups to make improvements to cycling, walking and wheeling infrastructure. These two funding schemes can allow permanent and temporary measures to be installed in the local area to improve active travel routes.

A project to develop a dedicated cycle route from Gourock to Greenock, with an option for a second phase from Greenock to Port Glasgow, was approved by the Council in 2020. The following year a cycle lane and footway from Battery Park to Container Way, Greenock was completed in 2021. Monitoring the usage of the cycle lane went underway revealing an average of 21,992 cyclists a year would use the space. An Environmental Committee report highlighted the creation of the new cycle lane had heightened the number of cyclists that cycle along Eldon, Street Greenock. Based on historical data

obtained in 2014 there is an 131.5% increase in cyclists. This highlights that improving the local landscape with active travel in mind can give people the confidence and encouragement to travel actively.

Further efforts have been made to improve the cycle network, in 2022 work went underway to develop a new cycle/footpath from the Beacons Art Centre, Greenock and Cartsburn, through the East India and Victoria harbours. This additional cycle/footpath connects the west and east of Greenock, reshaping the National Cycle Network Route 75 (NCN75). Future plans are in place for 2023 to improve existing Port Glasgow cycle routes.

Improvements in local infrastructure and marketing of these developments are elements of Inverclyde Council's Active Travel Strategy⁽⁹⁾. Information relating to active travel routes and events can be found on Inverclyde Council website as well as social media outlets⁽¹⁰⁾. Inverclyde Council works in partnership with stakeholders to promote and encourage active travel within the community. Stakeholders include local community groups such as Inverclyde Bothy and Community Tracks.

Inverclyde Bothy⁽¹¹⁾ is a local organisation with an online platform providing similar information and has a walk-in hub situated at Gourock railway station. The hub can help people plan walking and cycling routes, allow people to access history walks, health walks or led bike rides. Community Tracks is an online hub that similarly offers a wide range of advice and support for locals. The hub can provide people with access to cycle maintenance classes, bike fixing workshops, cycling for confidence sessions and led bike rides. In addition, Community Tracks has had a project titled 'flattening hills' which allows people to hire e-bikes. The topography in Inverclyde contains a vast amount of hills and this can often be a barrier to encouraging active travel. The Community tracks 'flattening hills' project was an initiative that would attract more people within the community to uptake cycling.

2.2.6 Developmental Planning in Inverclyde

Encouraging active travel and the use of public transport as opposed to the use of household vehicles requires effective developmental planning. Place making is an important factor that helps to improve air quality by reducing the number of vehicles on the road by land allocation and spatial development strategy. Making urban areas in our jurisdiction well-connected is one of the objectives set out in Inverclyde Council's Local

Development Plan ⁽⁷⁾. The Council strives to ensure new housing, business and industry, retail and other commercial and community developments are easily accessible. This objective coincides with the CAFS2 place making action on the creation of 20 minute neighbourhoods, as well as the proposals set out in the National Planning Framework 4.

2.2.7 Integrated Policy – Climate Change Plan

Inverclyde Council produced the Carbon Management Plan in 2007, with the objective of minimising the generation of carbon emissions from the Councils operation. Since the initial publication the Council has often revised the plan to introduce future targets to achieve further reduction in carbon emissions. The Carbon Management Plan was reinvented and entitled the Climate Change Plan⁽¹²⁾, this plan focused not only on decreasing carbon emissions but on measures that are required to mitigate climate change at present and in the future. Upon implementation of the Carbon Management Plan the carbon emissions omitted from the Councils operations have been reducing each year. Inverclyde Council has introduced various measures which include minimising energy and water use, switching to electrical vehicles, placing LED lamps in street lights, promoting waste reduction, improving the recycling infrastructure and other initiatives has collectively led to a significant reduction in the Councils total carbon emissions.

In the 2022 Air Quality Annual Progress Report it was stated that Inverclyde Council set out to achieve a 16% reduction on carbon emissions based on 2007/08 figures this target was met. The installation of wood pellet heating systems and solar panels in schools along with the various measures that have been previously mentioned has helped to reduce carbon emissions. Since 2012/13 Inverclyde Council has reduced carbon emissions by over 46%.

In compliance with the Climate Change Act 2009, Inverclyde Council has a statutory duty to report the total amount of greenhouse gas emissions, in tonnes, created by the Council operations over the year (April to March) ⁽¹³⁾. Table 2.1 details the amount of greenhouse gas emissions generated by Inverclyde Council over the last five years.

Table 2.1 Inverclyde Council's Greenhouse Gas Emissions

Greenhouse Gas Emissions Generated by Inverclyde Council for the last 5 years					
Year	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022
tCO₂e	12,777	10,928	10,212	10,564	11,705

The Climate Change Plan also documents the total greenhouse gas emissions generated by the whole of Inverclyde. The most current data on greenhouse gas emissions generated by Inverclyde as a whole has been generated by Department for Business, Energy & Industrial Strategy⁽¹⁴⁾. Table 2.2 shows the levels of greenhouse gas emissions recorded for the past for all of Inverclyde over a five year period, this highlights emissions have been declining over the years.

Table 2.2 Inverclyde's Greenhouse Gas Emissions

Greenhouse Gas Emissions Generated by all of Inverclyde in the last 5 years					
Year	2016	2017	2018	2019	2020
ktCO₂e	347.28	337.89	319.73	304.32	295.15

2.2.8 Integrated Policy – Net Zero Strategy 2021-2045

The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, set the target of reducing Scotland's carbon emissions to net zero by 2045. Local Governments have a major role, legally and morally in the reduction of carbon emissions to achieve the net zero target. In 2021, Inverclyde Council published the Net Zero Strategy 2021-2045⁽¹⁵⁾. This strategy aims to implement a series of actions to secure a 73% reduction in carbon emissions by the period 2030/2031 based on the 2012/2012 baseline. From 2030/2031 Inverclyde Council will look to reduce carbon emissions even more by undertaking an improvement process (Plan-Do-Check-Act), working collaboratively with organisations and where needed using certified carbon sinks to offset remainder emissions in order to attain the net zero target.

Inverclyde Council is continuing its work to implement the measures detailed in the Climate Change Plan and introduce additional measures that will become viable to secure further reduction in carbon emissions. Possible solutions are those detailed in the Net Zero Strategy 2021-2045 include switching to hydrogen as a fuel source for vehicles, alternative heating appliances such as water-based heat pumps to decarbonise heating systems or introducing advanced thermal insulation products to buildings increase the retention of heat and making them more energy efficient.

In addition, the Environment and Regeneration Committee Delivery and Improvement Plan 2023/26 has set out to deliver the Net Zero Strategy and Action Plan 2022/27 by carrying out energy efficiency improvements and carbon reduction measures with the goal of protecting our natural environment.

2.2.9 Integrated Policy - Local Heat and Energy Efficiency Strategy

The Scottish Government has proposed a statutory duty upon local authorities to produce Local Heat and Energy Efficiency Strategies. This will require local authorities to create and implement projects to improve the energy efficiency of buildings and decarbonise heating systems in the local area. Actions to reduce reliance on heat and the use of low carbon technology will help tackle climate change and improve air quality. Heating domestic properties within Inverclyde is estimated to generate 41% of Inverclyde's CO₂ emissions.

Although the Local Heat and Energy Efficiency Strategy will not be produced till the near future, financial assistance to improve the energy efficiency of properties within Inverclyde has been underway for the last 10 years through The Scottish Government 'Energy Efficient Scotland Area Based Schemes' (ABS). ABS funding has enabled the local authority to provide funding to private homeowners to carry out energy efficiency measures to their homes. The funding helps households that are in or at risk of fuel poverty to undertake measures to reduce energy usage and costs. The objective of the funding is to support eligible households to have an energy performance certificate rating of C or better by 2030. Whilst the aim of the funding is to improve the energy efficiency of properties within Inverclyde, simultaneously it reduces energy usage and carbon emissions which helps to improve air quality over time.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.

Inverclyde Council undertook automatic (continuous) monitoring at East Hamilton Street, Greenock site during 2022. Table A.1 in Appendix A shows the details of the sites.

National monitoring results are available at [Site Data | Scottish Air Quality](#) ⁽²⁾.

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

Ricardo Energy & Environment have published an air pollution report for Inverclyde which provides an analytical overview of the air quality measured throughout 2022 ⁽¹⁶⁾.

3.1.2 Non-Automatic Monitoring Sites

Inverclyde Council undertook non- automatic (passive) monitoring of NO₂ at 19 sites during 2022.

Maps showing the location of the monitoring sites are provided in Appendix D Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table 3.1 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40 µg/m³.

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

At the start of 2022, the automatic monitoring machine failed to measure NO₂ concentrations for January and February. Unfortunately, there was a leak in the AURN machine which affected the NO analyser. Once the issue was detected an engineer was called out to remediate the matter and monitoring of NO resumed.

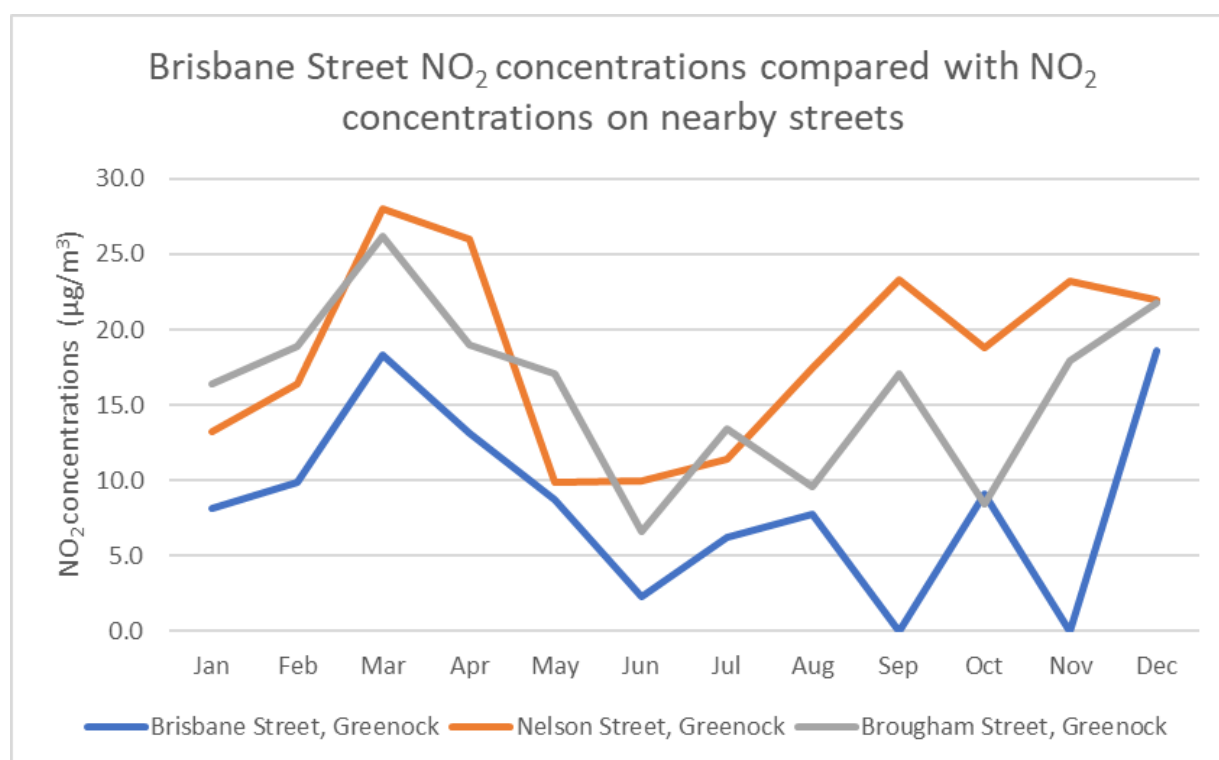
NO₂ concentrations were measured for the remainder of the year. The automatic monitoring machine recorded no exceedences of the hourly mean objective or the annual mean objective. The annual mean NO₂ concentration measured was by the automatic monitor was 21 µg/m³, below the National Air Quality Objective Limit.

Data presented in calendar plots within the annual statistics report produced by Ricardo Energy & Environment allows for effective visualisation of the NO₂ data ⁽¹⁶⁾. The data set reveals there were sporadic periods of heightened NO₂ concentrations specifically in the months of March, November and December. In March, Scotland was experiencing a transboundary pollution episode which resulted in heightened concentrations of particulate matter at the same time concentrations of NO₂ were found to have increased ⁽¹⁷⁾.

To widen our assessment of air quality within Inverclyde, two additional NO₂ diffusion tubes were added to our network. A NO₂ diffusion tube was installed between the tenements 12 and 14 Brisbane Street, Greenock. At the start of the street there is a medium sized bakery establishment which operates daily. The bakery's shop is located close by which is open six days a week. Concerns were raised with the Environmental

Health Department that customers of the bakery shop were leaving car engines idling whilst attending the shop. The street landscape creates a canyon affect which would be problematic if there is a build-up of pollutants within the area. To determine the level of pollution in this area an NO₂ diffusion tube was installed. The average NO₂ concentrations measured at Brisbane Street were found to be low, recording 10.7 µg/m³. Figure 1 shows the monthly NO₂ concentrations recorded for Brisbane Street in comparison to nearby sites.

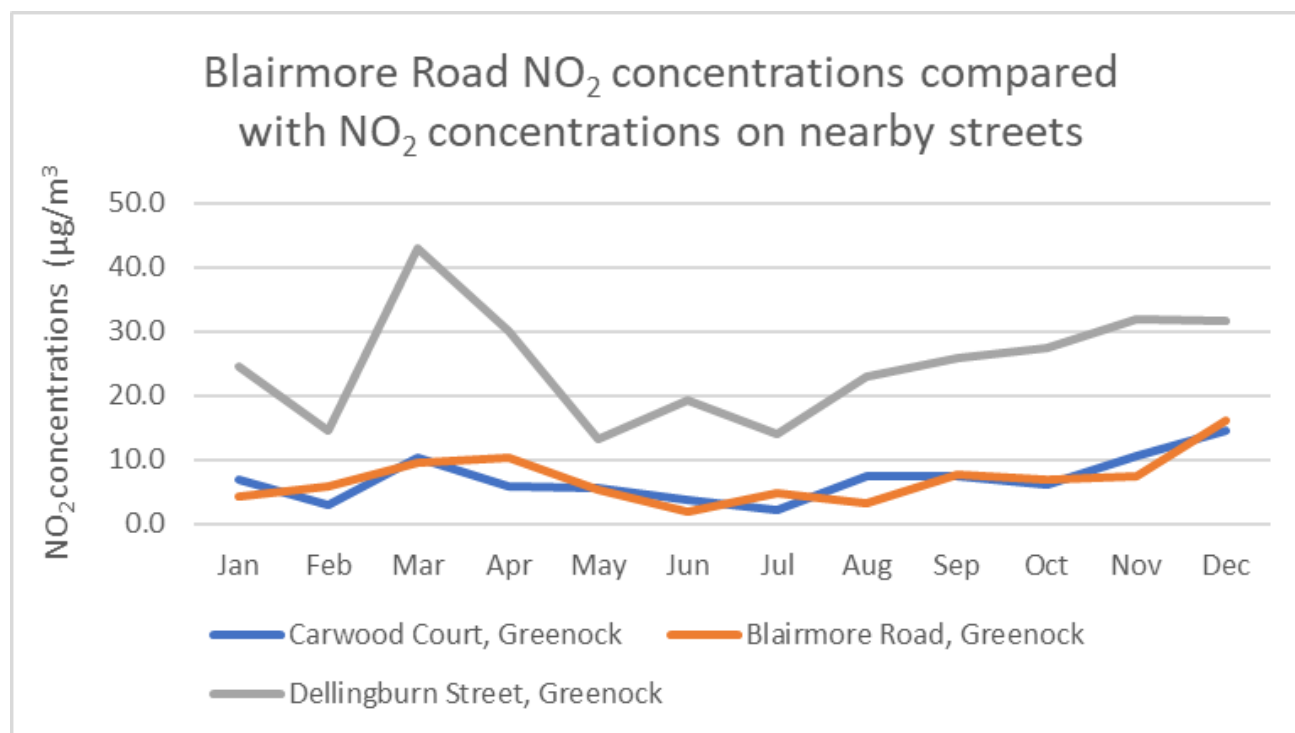
Figure 1 - Brisbane Street NO₂ concentrations compared with NO₂ concentrations on nearby streets



A second NO₂ tube was installed at the front of 3 Blairmore Road, Greenock. This location is directly opposite Blairmore Nursery and All Saints Primary School. To the right of this location is a road junction which adjoins Kilmacolm Road. During drop off and pick up times this road junction can be busy, and the area congested. Therefore, the decision was taken to position an NO₂ diffusion tube at this location to monitor the pollutant levels. The average NO₂ concentrations measured was again far less, recording 7.3 µg/m³. Similarly, the NO₂ concentrations measured at Blairmore Road was compared to concentrations measured at nearby sites. Figure 2 highlights that in comparison to Dellingburn Street the NO₂ concentrations measured at Blairmore Road was considerably lower. There was

minimal variation between the concentrations measured at Carwood Court and Blairmore Road.

Figure 2 - Blairmore Road NO₂ concentrations compared with NO₂ concentrations on nearby street



The annual mean NO₂ concentrations for Brisbane Street and Blairmore Road establish that air pollution in these areas is generally low and no additional monitoring in these areas are required. NO₂ concentrations will continue to be monitored in Brisbane Street and Blairmore Rd for a period of time.

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 18µg/m³.

Table A.6 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than seven times per year.

In respect of Ricardo's equivalence study investigating PM monitoring in the Fidas 200 ⁽¹⁸⁾, the results in Appendix A show the corrected means. Despite corrections to the PM₁₀ data the annual mean objective was 13µg/m³, below the National Air Quality Objective. On four occasions the PM₁₀ 24-hourly mean objective (50µg/m³) was breached, this occurred on

21st March to 24th March 2022. The increase in PM concentrations was not a result of local pollution but was caused by transboundary pollution that affected the whole of Scotland.

3.2.3 Particulate Matter (PM_{2.5})

Table A.7 in Appendix A compares the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years with the air quality objective of 10µg/m³. As mentioned previously Appendix A shows the corrected PM_{2.5} concentrations ⁽¹⁸⁾, even with the correction applied the annual mean remains of 6 µg/m³ remains unchanged and below the National Air Quality Objective. Similar to PM₁₀, heightened levels of PM_{2.5} concentrations were experienced for four days in March 2022 as a result of transboundary air pollution.

3.2.4 Sulphur Dioxide (SO₂)

Inverclyde Council does not monitor for SO₂.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Inverclyde Council does not monitor for Carbon Monoxide, Lead and 1,3-Butadiene.

4 New Local Developments

4.1 Road Traffic Sources

There has been no road traffic sources that have not been considered in previous review and assessment exercises.

4.2 Other Transport Sources

There is no airport situated within Inverclyde Council and no significant changes have occurred in the Shipping Port operations.

4.3 Industrial Sources

There are no new or proposed industrial installations for which an air quality assessment has been carried out in 2022. Inverclyde Council is not aware of any significant changes to existing installations of the introduction of a new receptor that is exposed.

4.4 Commercial and Domestic Sources

There has been no new planning applications approved for the installation of biomass combustion plants.

4.5 New Developments with Fugitive or Uncontrolled Sources

Inverclyde Council has not identified any new potential sources of fugitive or uncontrolled particulate matter.

Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

Measured annual concentrations of NO₂, PM₁₀ and PM_{2.5} in Inverclyde for 2022 remain low, thus no air quality management area needs to be declared. There were 4 occasions where PM₁₀ concentrations exceeded the 24-hourly mean objective, however this was caused by transboundary pollution that affected the whole of Scotland. PM₁₀ and PM_{2.5} concentrations were generally low throughout 2022 with the annual mean objectives being similar to previous years.

Additional sites (Brisbane Street and Blairmore Road, Greenock) were added to the NO₂ diffusion tube network. These sites were chosen to investigate pollution levels based on concerns relating to increase in traffic and engine idling. The NO₂ concentrations measured at these locations were relatively low and were found to be much lower than concentrations measures at surrounding locations. Therefore no additional monitoring of these locations is required.

Analysing the monthly NO₂ concentrations there were sporadic periods in 2022 where the concentrations were heightened. During these periods the NO₂ concentrations remained below the National Air Quality objectives. The data within this report and within Ricardo's Energy and Environment Annual Statistics Report for Inverclyde ⁽¹⁶⁾ have shown that air pollution in Inverclyde continues to be low.

5.2 Proposed Actions

Inverclyde Council will continue to regularly monitor and review air quality within the local area. No changes to the NO₂ diffusion tube network are underway in 2023, if any concerns regarding air quality are to arise then this decision could be reviewed.

The automatic monitoring machine will remain situated at East Hamilton Street. The collocation study will continue at East Hamilton Street, obtaining data from the air monitor and three NO₂ diffusion tubes to develop a local bias adjustment factor.

Results from previous annual progress reports have documented that road traffic is the main source of air pollution within Inverclyde Council. No new sources of air pollution have been identified within Inverclyde and to date road traffic emissions is the predominant cause of air pollution. Thus, Inverclyde Council continues to implement plans and policies which aims to increase active travel within the area which in turn will decrease air pollution and improve the health of people within society. Further actions will be taken by Inverclyde Council to minimise carbon emissions over the course of the year to better local air quality and help Scotland achieve its net zero target.

The next Air Quality Annual Progress Report will be submitted June 2024.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Site

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
MS01	Inverclyde Greenock A8	Roadside	229365	675700	NO ₂ , PM ₁₀ , PM _{2.5} , PM ₁	N	TEOM	12	2.5	1.8

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?
MS02	Carwood Court, Greenock	Roadside	229503	675400	NO2	N	13.5m	5m	N
MS03	Brown Street, Port Glasgow	Roadside	231699	674620	NO2	N	1m	1m	N
MS04	Bridge of Weir Rd, Kilmacolm	Roadside	235824	669909	NO2	N	1m	1m	N
MS05	East Hamilton Street (1), Greenock	Roadside	229365	675700	NO2	N	12m	2.5m	Y
MS06	East Hamilton Street (2), Greenock	Roadside	229365	675700	NO2	N	12m	2.5m	Y
MS07	East Hamilton Street (3), Greenock	Roadside	229365	675700	NO2	N	12m	2.5m	Y
MS08	East Hamilton Street (property), Greenock	Roadside	229301	675712	NO2	N	0m	14.25m	N
MS09	Dellingburn St, Greenock	Roadside	228422	675735	NO2	N	3.5m	5m	N
MS10	Dalrymple St, Greenock	Roadside	228311	675993	NO2	N	15m	3m	N
MS11	Inverkip St, Greenock	Roadside	227563	676246	NO2	N	1m	2.5m	N
MS12	Dunlop St, Greenock	Roadside	226827	675622	NO2	N	4m	2m	N
MS13	Nelson St, Greenock	Roadside	227092	676134	NO2	N	1m	5m	N
MS14	Inverkip Rd, Greenock	Roadside	224441	675224	NO2	N	15m	4m	N
MS15	Larkfield Rd, Greenock	Roadside	224869	675757	NO2	N	3m	2m	N
MS16	Main St, Wemyss Bay	Roadside	219407	668573	NO2	N	1m	2m	N
MS17	Kempock St, Gourock	Roadside	224097	677910	NO2	N	1m	1m	N
MS18	Cardwell Rd, Gourock	Roadside	224664	677168	NO2	N	3m	4m	N
MS19	Newark St, Gourock	Roadside	225460	677501	NO2	N	1m	5m	N

MS20	Brougham St, Greenock	Roadside	227242	677032	NO2	N	7m	5.5m	N
MS21	MacDougall St, Greenock	Roadside	229605	675593	NO2	N	13m	3m	N
MS22	Brisbane St, Greenock	Roadside	227287	676410	NO2	N	0m	2.7m	N
MS23	Blairmore Rd, Greenock	Roadside	228915	674682	NO2	N	4.5m	2.5m	N

Notes:

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

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

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
MS01	Inverclyde Greenock A8	Roadside	Automatic	83.3	32.0	28.0	21	24	21
MS02	Carwood Court, Greenock	Roadside	Diffusion Tube	100	10.5	7.8	8.0	5.5	6.9
MS03	Brown Street, Port Glasgow	Roadside	Diffusion Tube	100	17.7	14.4	13.4	9.3	12.5
MS04	Bridge of Weir Rd, Kilmacolm	Roadside	Diffusion Tube	100	14.0	12.3	9.0	9.6	9.4
MS05	East Hamilton Street (1), Greenock	Roadside	Diffusion Tube	100	31.6	27.6	22.9	18.7	25.0
MS06	East Hamilton St (2), Greenock	Roadside	Diffusion Tube	100	35.1	28.5	24.2	19.8	25.2
MS07	East Hamilton St (3), Greenock	Roadside	Diffusion Tube	100	33.9	27.0	23.4	18.9	24.6
MS08	East Hamilton St (property), Greenock	Roadside	Diffusion Tube	83.3	20.4	17.6	11.9	13.0	16.6
MS09	Dellingburn St, Greenock	Roadside	Diffusion Tube	100	29.3	24.8	20.5	17.2	25.9
MS10	Dalrymple St, Greenock	Roadside	Diffusion Tube	91.6	23.8	18.5	15.3	11.3	16.1
MS11	Inverkip St, Greenock	Roadside	Diffusion Tube	100	27.6	24.1	23.5	15.9	23.2
MS12	Dunlop St, Greenock	Roadside	Diffusion Tube	100	16.1	14.8	13.1	11.0	14.5
MS13	Nelson St, Greenock	Roadside	Diffusion Tube	100	24.9	22.9	18.0	15	19.1
MS14	Inverkip Rd, Greenock	Roadside	Diffusion Tube	100	18.9	16.5	13.0	12.5	15.5
MS15	Larkfield Rd, Greenock	Roadside	Diffusion Tube	100	17.0	15.8	11.8	10.9	13.7
MS16	Main St, Wemyss Bay	Roadside	Diffusion Tube	100	12.7	11.2	8.2	7.4	9.3
MS17	Kempock St, Gourock	Roadside	Diffusion Tube	100	14.6	11.6	9.2	7.6	10.8
MS18	Cardwell Rd, Gourock	Roadside	Diffusion Tube	91.6	25.3	20.1	16.4	14.1	19.4
MS19	Newark St, Greenock	Roadside	Diffusion Tube	100	15.2	11.8	9.7	7.7	9.5
MS20	Brougham St, Greenock	Roadside	Diffusion Tube	100	24.7	20.3	14.8	12.6	16.0
MS21	MacDougall St, Greenock	Roadside	Diffusion Tube	100	21.5	16.7	12.8	13.8	14.7

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
MS22	Brisbane Street, Greenock	Roadside	Diffusion Tube	83.3					10.2
MS23	Blairmore Road, Greenock	Roadside	Diffusion Tube	100					7

Notes:

- Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in bold.
- NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.
- Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(22) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.
- Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture 2022 (%) ⁽²⁾	2018	2019	2020	2021	2022
MS01	Inverclyde Greenock A8	Roadside	Automatic	79	0	0	0	0	0

Notes:

- Exceedances of the NO₂ 1-hour mean objective (200 µg/m³ not to be exceeded more than 18 times/year) are shown in bold.
- If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.
- Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.5 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	Site Name	Site Type	Monitoring Type	Year	Mean	Corrected Mean	Valid Data Capture 2022 (%)
MS01	Inverclyde Greenock A8	Roadside	Automatic	2018	12	13	94
				2019	12	13	
				2020	10	11	
				2021	11	13	
				2022	12	13	

Notes:

- The data presented in the table above highlights the annual mean PM₁₀ concentrations for the last five years. PM₁₀ concentrations have been corrected using the (PM₁₀ divided by 0.909) Scottish Government Equivalence Study To Investigate Particulate Matter Monitoring In Scotland Using The Fidas 200 ⁽¹⁸⁾.
- Exceedances of the PM₁₀ annual mean objective of 18 µg/m³ are shown in bold.
- All means have been “annualised” as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. See Appendix C for details.
- Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture 2022 (%)	2018	2019	2020	2021	2022
MS01	Inverclyde Greenock A8	Roadside	Automatic	94	0	5	0	0	4

Notes:

- Exceedances of the PM₁₀ 24-hour mean objective (50 µg/m³ not to be exceeded more than seven times/year) are shown in bold.
- Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.7 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	Site Name	Site Type	Monitoring Type	Year	Mean	Corrected Mean	Valid Data Capture 2022 (%)
MS01	Inverclyde Greenock A8	Roadside	Automatic	2018	6	7	94
				2019	7	7	
				2020	5	5	
				2021	6	6	
				2022	6	6	

Notes:

- Exceedances of the PM_{2.5} annual mean objective of 10 µg/m³ are shown in bold.
- All means have been “annualised” as per LAQM.TG(22), valid data capture for the full calendar year is less than 75%. See Appendix C for details.
- Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Appendix B: Full Monthly Diffusion Tube Results for 2022

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

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted
MS02	Carwood Court, Greenock	6.9	2.9	10.3	5.9	5.5	3.6	2.1	7.4	7.3	6.0	10.5	14.5	6.9	7.3
MS03	Brown Street, Port Glasgow	9.7	6.1	21.3	14.7	9.5	6.9	6.0	12.8	11.3	12.4	14.7	24.9	12.5	13.2
MS04	Bridge of Weir Road, Kilmacolm	9.5	3.4	23.3	10.6	1.7	5.5	5.5	7.9	9.8	10.2	10.5	14.6	9.4	9.8
MS05	East Hamilton St, Greenock (a)	26.7	10.1	34.1	29.1	26.7	20.4	19.9	26.8	26.2	25.5	18.5	35.9	25.0	26.2
MS06	East Hamilton St, Greenock (b)	18.1	20.9	34.2	29.5	24.7	19.6	12.6	29.9	28.8	25.0	33.2	25.4	25.2	26.4
MS07	East Hamilton St, Greenock (Property)	18.3	15.9	25.8	18.5		12.0	6.3	18.1	15.3	17.0	19.1		16.6	17.5
MS08	Dellingburn Street, Greenock	24.6	14.5	43.0	30.0	13.3	19.2	13.9	22.9	25.9	27.3	32.0	31.7	25.9	27.2
MS09	Dalrymple Street, Greenock	15.7	6.7	27.8	15.7	8.5	9.7	10.0	15.6		17.7	18.2	23.8	16.1	16.9
MS10	Inverkip Street, Greenock	23.9	25.7	33.0	22.0	10.7	17.5	15.9	20.0	17.9	20.2	27.1	34.8	23.2	24.4
MS11	Dunlop Street, Greenock	12.6	15.8	21.2	16.5	4.9	7.2	9.4	13.1	12.4	11.4	16.4	28.9	14.5	15.2
MS12	East Hamilton Street, Greenock	17.4	19.4	33.1	30.7	12.2	18.5	22.0	26.9	26.7	24.8	21.2	31.0	24.6	25.8
MS13	Nelson Street, Greenock	13.2	16.4	28.0	26.0	9.9	10.0	11.4	17.5	23.3	18.8	23.2	22.0	19.1	20.0
MS14	Inverkip Road, Greenock	13.1	15.1	29.0	16.6	6.3	9.2	11.7	13.8	16.1	13.0	14.5	22.1	15.5	16.3
MS15	Larkfield Road, Greenock	12.4	12.0	17.8	12.6	10.9	8.1	8.4	13.3	23.7	12.1	13.2	19.5	13.7	14.4
MS16	Main Street, Wemyss Bay	8.0	9.8	14.2	13.4	6.8	8.2	8.5	9.3	8.5	8.5	5.2	11.2	9.3	9.8
MS17	Kempock Street, Gourrock	7.5	8.3	16.9	12.8	7.0	5.6	9.9	16.1	11.8	7.6	11.6	14.5	10.8	11.3
MS18	Cardwell Road, Gourrock	21.0	20.4	29.4	21.3		9.6	14.5	20.4	19.5	23.4	13.3	20.8	19.4	20.4
MS19	Newark Street, Greenock	8.3	11.4	16.7	10.5	7.5	4.8	5.4	5.8	8.7	10.4	6.5	18.0	9.5	10.0
MS20	Brougham Street, Greenock	16.4	18.9	26.2	19.0	17.1	6.6	13.4	9.6	17.1	8.4	17.9	21.8	16.0	16.8
MS21	MacDougall Street, Greenock	12.5	14.4	21.8	22.1	15.8	5.0	15.4	13.2	12.5	11.9	8.4	23.0	14.7	15.4
MS22	Brisbane Street, Greenock	8.1	9.9	18.3	13.1	8.7	2.3	6.2	7.8		9.1		18.6	10.2	10.7
MS23	Blairmore Road, Greenock	4.3	5.9	9.4	10.4	5.4	2.0	4.7	3.2	7.7	6.9	7.5	16.1	7.0	7.3

Notes: See Appendix C for details on bias adjustment

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

New or Changed Sources Identified Within Inverclyde Council During 2022

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

Additional Air Quality Works Undertaken by Inverclyde Council During 2022

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

QA/QC of Diffusion Tube Monitoring

Glasgow Scientific Services supply and analyse the NO₂ diffusion tubes on a monthly basis. The preparation method used for NO₂ diffusion tubes is 20% TEA in Water. The Laboratory has adopted the procedures for preparation and analysis of the diffusion tubes contained in the document 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance' ⁽¹⁹⁾.

There are 3 diffusion tubes currently located at the automatic monitoring site at East Hamilton Street.

The National Bias adjustment factor of 1.05 for 2022 was retrieved from Glasgow Scientific Services data provided in the DEFRA National Diffusion Tube Bias Adjustment Factor Spreadsheet (03/23) ⁽²⁰⁾.

The Local Bias adjustment factor of 0.9 was obtained using the AEA Energy & Environment Group Spreadsheet. The spreadsheet allowed for the precision and accuracy of our co-location study to be determined. The results revealed the 0.9 Local Bias adjustment factor and the overall quality of the data was found to have poor precision. In accordance with the LAQM TG22⁽²¹⁾, the decision was taken to apply the National Bias adjustment factor, 1.05 to the data obtained.

Glasgow Scientific Services carry out the removal and replacement of Inverclyde Council's diffusion tubes. For the most part this has been completed in adherence with the Diffusion Tube Monitoring Calendar with the only discrepancy being the NO₂ tubes for the month of January were not put in place until the 13th January 2022 which was out with the appropriate timeframe (23rd December 2021 – 11th January 2022). As a result, the monitoring period for the month of January was shorter than the recommended 4 week diffusion tube exposure period.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Inverclyde Council recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

Inverclyde Council have applied a national bias adjustment factor of 1.05 to the 2022 monitoring data. A summary of bias adjustment factors used by Inverclyde Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor A national bias adjustment factor was chosen as the quality of diffusion tube data obtained for 2022 showed poor precision.

Table C.2 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	1.05
2021	National	03/22	1.12
2020	Local	-	0.81
2019	Local	-	0.73
2018	Local	-	0.79

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within Inverclyde Council required distance correction during 2022.

QA/QC of Automatic Monitoring

The automatic monitoring site at East Hamilton Street contains one NO_x/NO₂ analyser and one TEOM Ambient Particulate Monitor. Throughout 2022 site audits and calibrations were undertaken by Ricardo Energy & Environment and services carried out every 6 months by Air Monitors. Fortnightly manual calibrations were carried out by Inverclyde Council. The monitoring data obtained from the Inverclyde Greenock A8 automatic air quality monitor is uploaded onto the Scottish Air Quality website ⁽²⁾. This data provided within the report has undergone ratification by Ricardo Energy & Environment.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The PM₁₀ and PM_{2.5} data contained in this report has been obtained from the Scottish Air Quality website ⁽²⁾. The data provided is the VCM corrected data from the TEOM within at the automatic monitoring site at East Hamilton Street, Greenock.

Automatic Monitoring Annualisation

All automatic monitoring locations within Inverclyde Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

NO₂ Fall-off with Distance from the Road

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

Table C.3 – Local Bias Adjustment Calculation

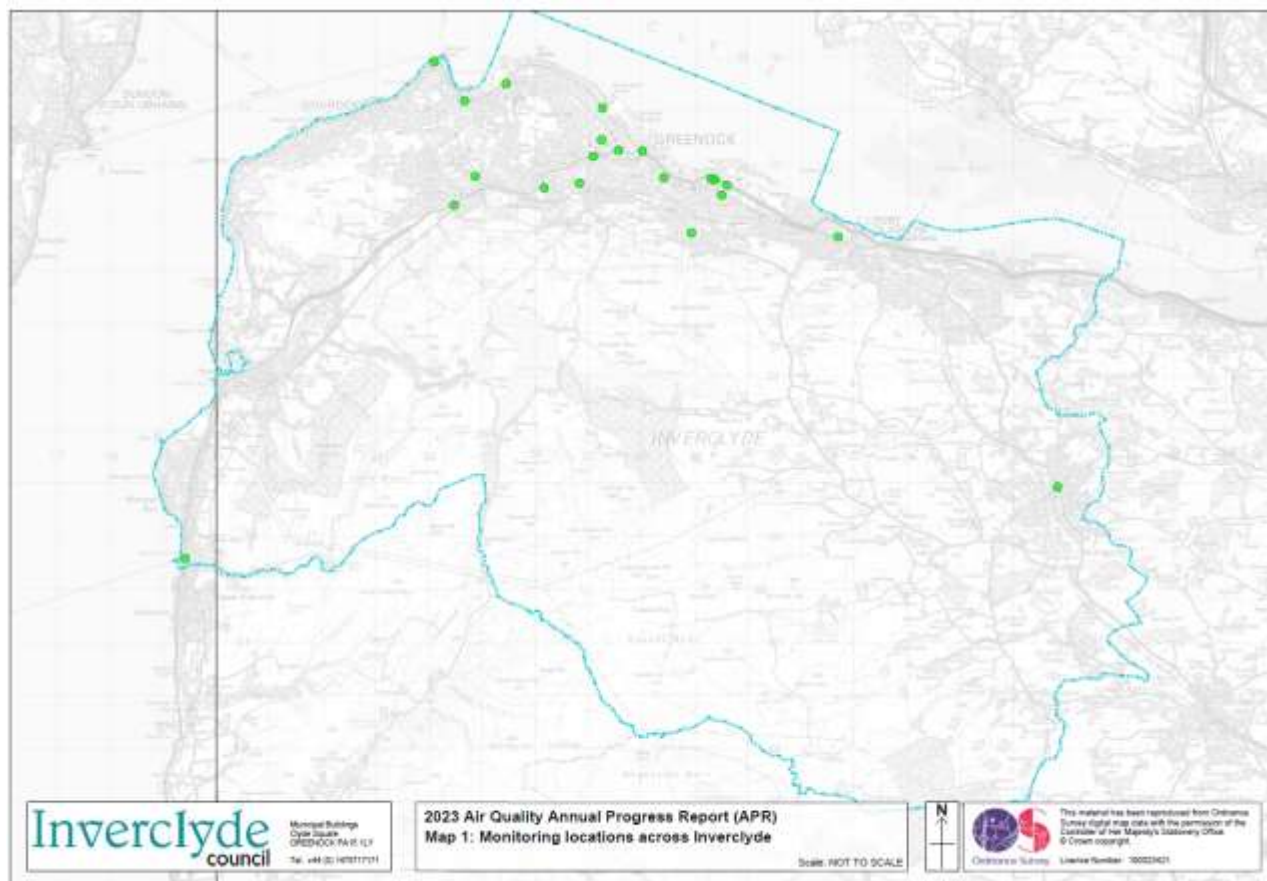
Local Bias Adjustment	
Periods used to calculate bias	10
Bias Factor A	0.9 (0.81-1.01)
Bias Factor B	11% (-1% - 23%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	24
Mean CV (Precision)	26
Automatic Mean ($\mu\text{g}/\text{m}^3$)	21
Data Capture	94%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	21 (19 – 24)

Notes:

A single local bias adjustment factor has been calculated for the 2022 diffusion tube results. The NO₂ diffusion tube results was found to have poor precision, therefore the national bias adjustment factor was used to bias adjust.

Appendix D: Maps of Monitoring Locations in Inverclyde

Map 1: Monitoring locations across Inverclyde



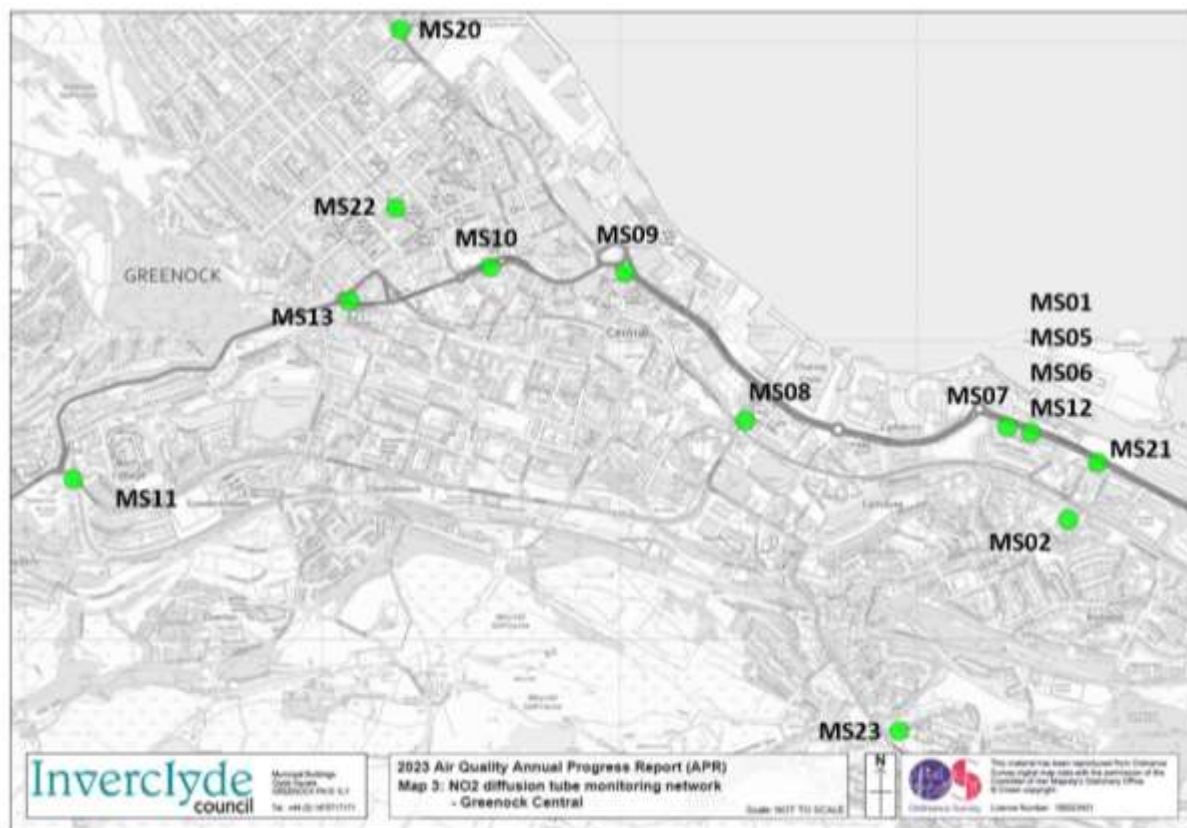
Map 2: Automatic air monitoring site and collocation study at East Hamilton Street



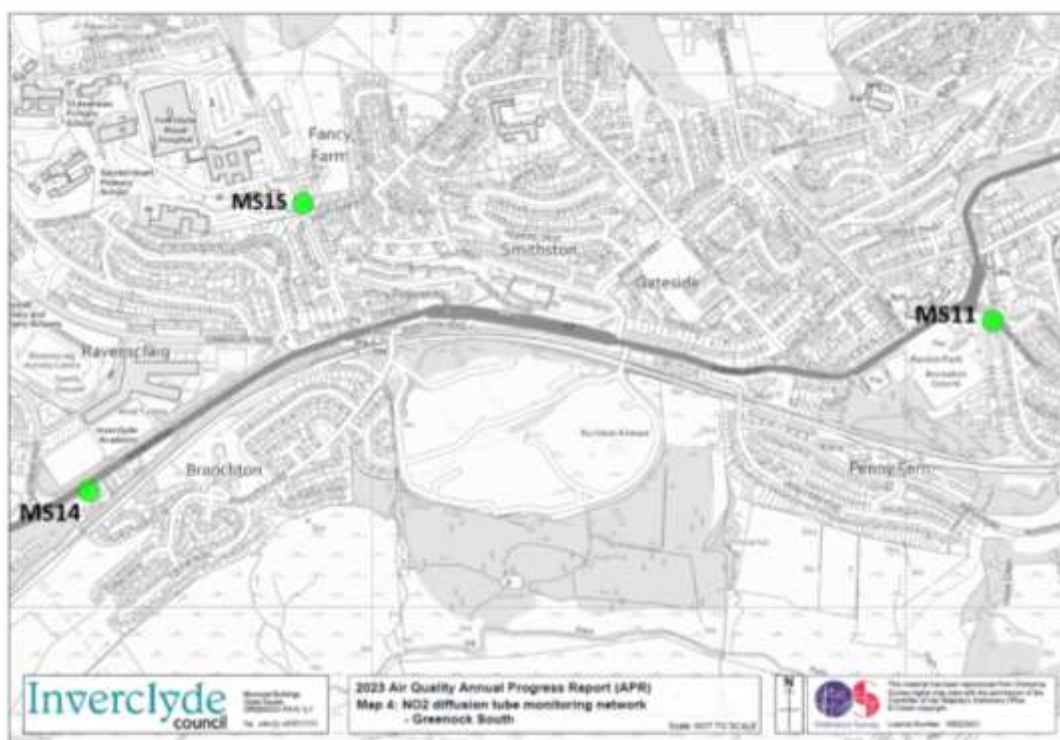
Legend

- **NO₂ diffusion tube at façade of nearest property (East Hamilton Street)**
- **Automatic air quality monitor with 3 x NO₂ diffusion tubes (East Hamilton Street)**
- **1 x NO₂ diffusion tube (MacDougall Street)**

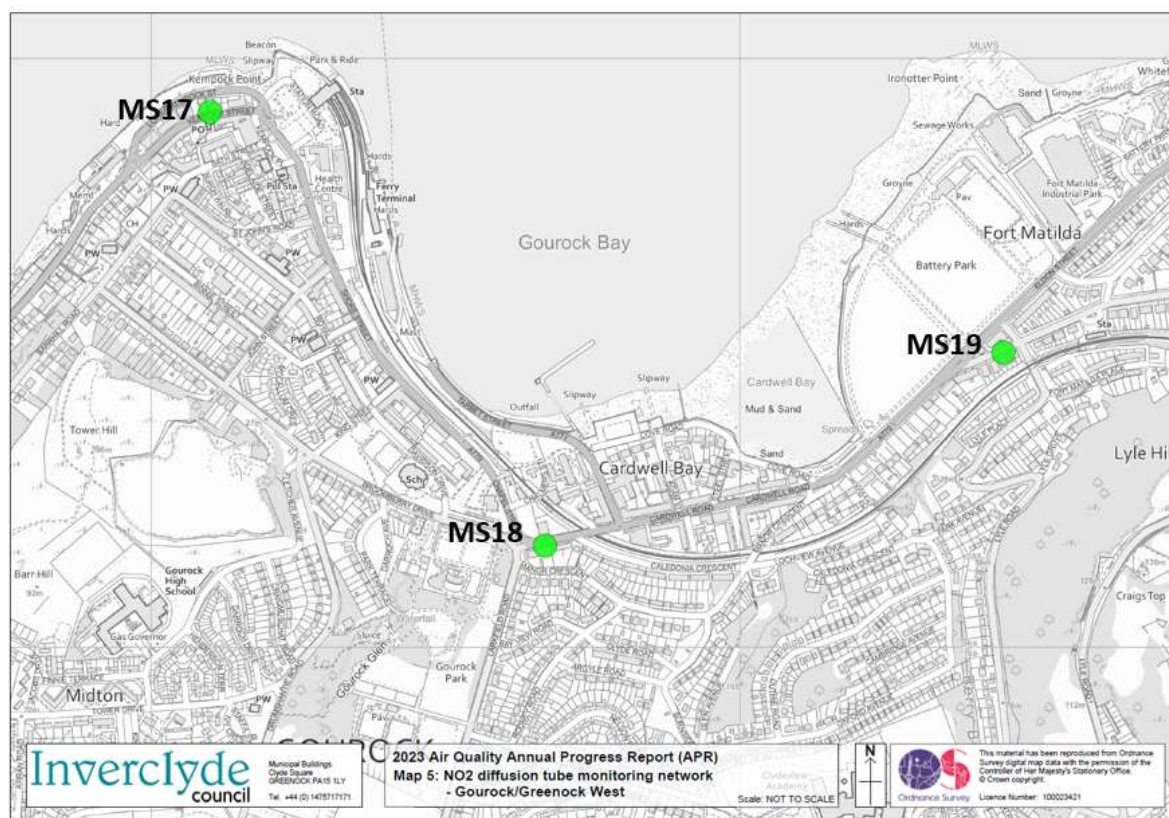
Map 3: NO₂ diffusion tube monitoring network - **Greenock Central**



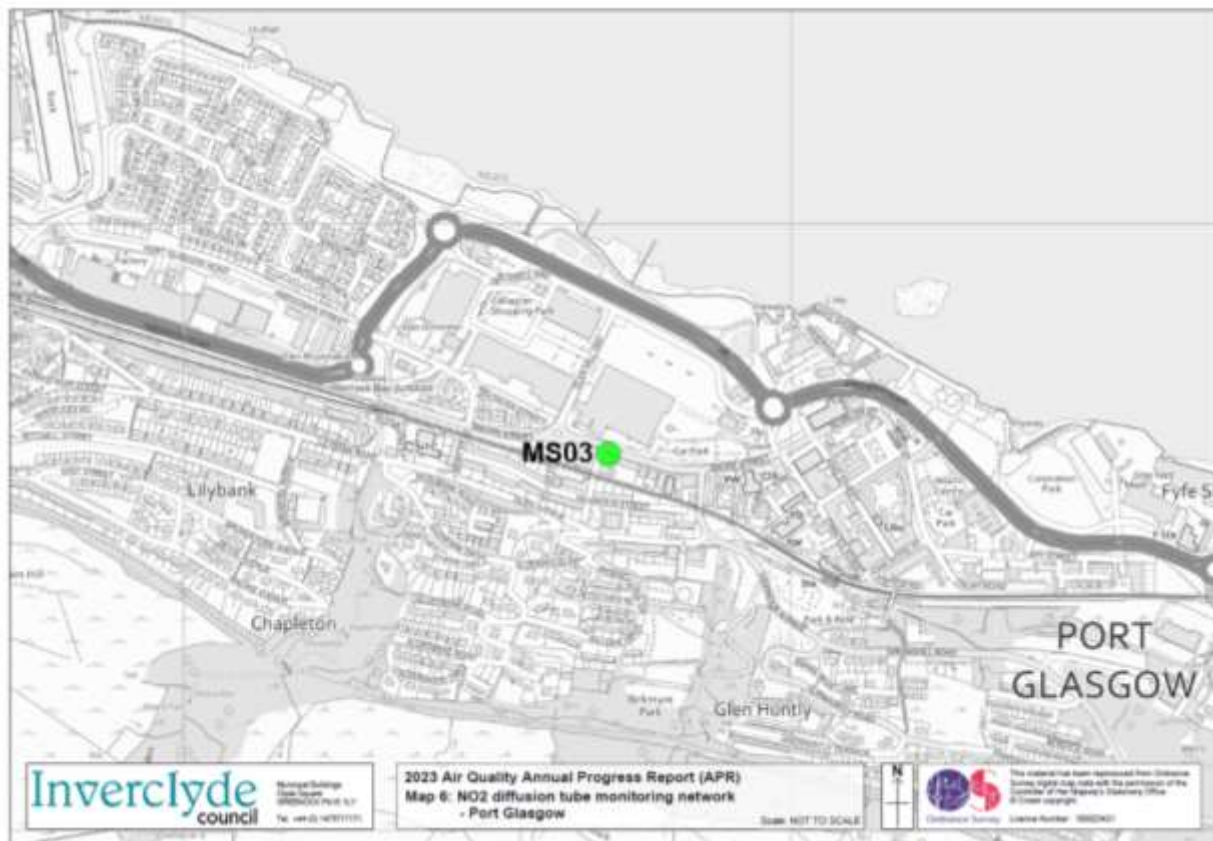
Map 4: NO₂ diffusion tube monitoring network - **Greenock South**



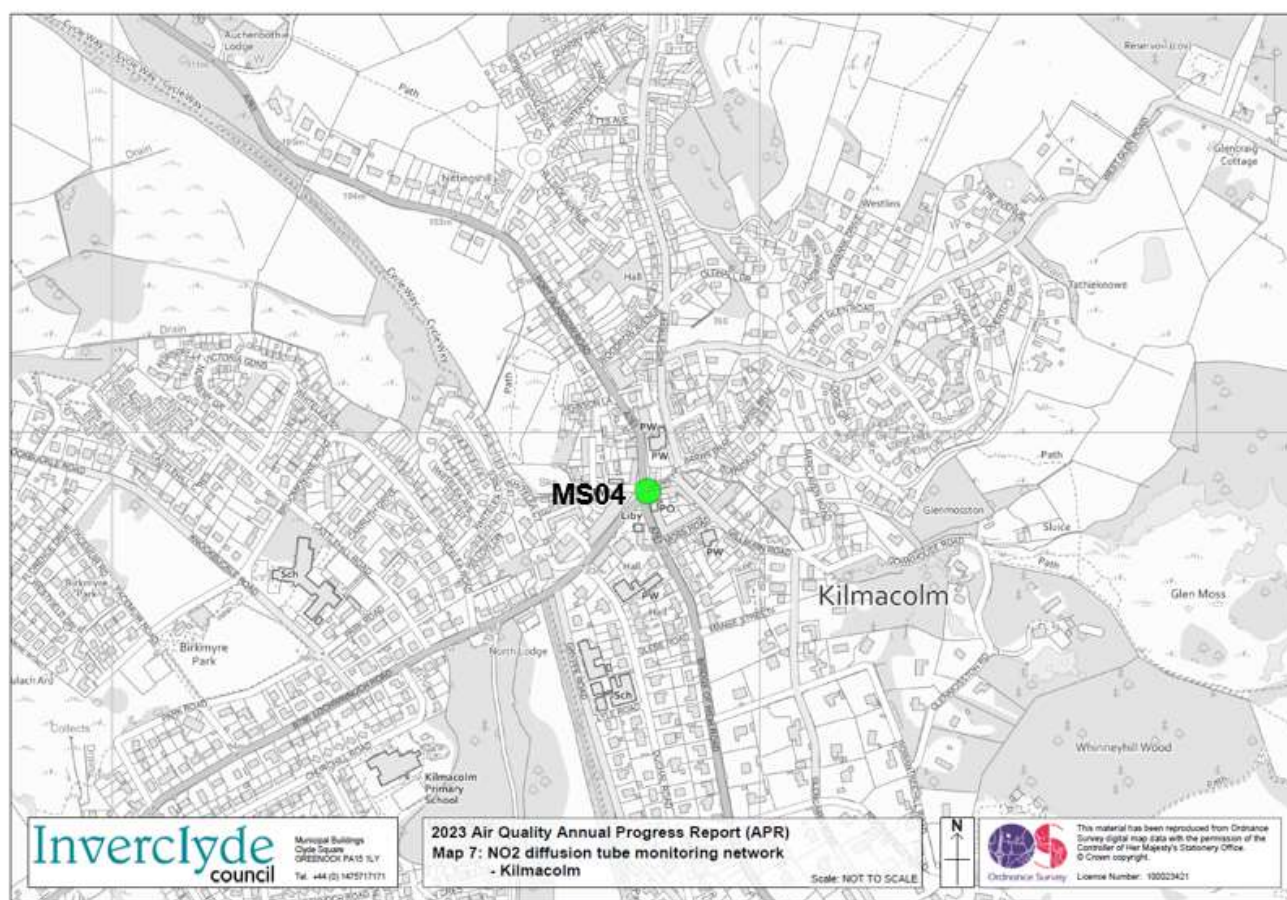
Map 5: NO₂ diffusion tube monitoring network - **Gourock/Greenock West**



Map 6: NO₂ diffusion tube monitoring network - **Port Glasgow**



Map 7: NO₂ diffusion tube monitoring network - **Kilmacolm**



Map 8: NO₂ diffusion tube monitoring network - Wemyss Bay



Glossary of Terms

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

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