

# Annual Progress Report (APR)



**North Ayrshire Council**  
Comhairle Siorrachd Àir a Tuath

2024 Air Quality Annual Progress Report (APR) for  
North Ayrshire Council

In fulfilment of Part IV of the Environment Act 1995, as amended by the  
Environment Act 2022

Local Air Quality Management  
June 2024

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# Executive Summary: Air Quality in Our Area

## Air Quality in North Ayrshire Council

This report was prepared in accordance with the Local Air Quality Management (LAQM) Technical Guidance 2022 (TG22) and sets out the air quality monitoring carried out in North Ayrshire, with results and conclusions of data collected for 2023. Monitoring is carried out in North Ayrshire for Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM), particles of soot (carbon), metals or inorganic salts of sizes less than or equal to 10micrometers, PM<sub>10</sub>; and less than or equal to 2.5micrometers, PM<sub>2.5</sub>.

Monitoring in previous years identified that the main air quality issue in North Ayrshire was associated with NO<sub>2</sub> and related to a) traffic congestion in High Street, Irvine and b) queuing traffic in New Street, Dalry. Mitigation projects were completed successfully in 2019 for the two areas and monitoring results reflect the changes in ambient air quality, showing a downward trend accordingly. Monitoring continues to ensure that these mitigation measures have been successful.

NO<sub>2</sub> for the three diffusion tube monitors of previous years' concern in High Street, Irvine, seen a slight decrease for two tubes and slight increase for one from **11.5, 11.2, 11.3**µg/m<sup>3</sup> in 2022 to **10.7, 11.4, 11.1**µg/m<sup>3</sup> in 2023 respectively. A slight decrease was also observed at the nearby automatic monitor station where NO<sub>2</sub> decreased from **11**µg/m<sup>3</sup> in 2022 to **10**µg/m<sup>3</sup> for 2023.

In New Street, Dalry, NO<sub>2</sub> also decreased or marginal increased at **10.7, 13.8**µg/m<sup>3</sup> in 2022 and **9, 14**µg/m<sup>3</sup> for 2023 respectively for the same corresponding diffusion tubes of concern.

Whilst relatively new PM monitoring instruments have generally brought improvements in measurement capability, achieving accurate and reproducible measurements of low concentrations remains a significant challenge and it is recognised that ambient concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> reported by different instruments in the same environments can vary by several micrograms (as an annual mean). Investigation into the relevant instruments and the completed report can be found here:

[Equivalence Study to Investigate Particulate Matter Monitoring in Scotland Using the Fidas 200 | Scottish Air Quality](#) with the corresponding guidance here [Local Authority Guidance Note for LAQM Reporting of Scottish PM Data | Scottish Air Quality](#).

PM statistics are now displayed as corrected and uncorrected values. PM<sub>10</sub> decreased from an annual mean of 12.5µg/m<sup>3</sup> (13.8µg/m<sup>3</sup> corrected) in 2022 to 11.6µg/m<sup>3</sup> (12.8µg/m<sup>3</sup> corrected) in 2023 in High Street, Irvine. The Scottish annual mean air quality objective for PM<sub>10</sub> is 18µg/m<sup>3</sup>. PM<sub>2.5</sub> also decreased from 6.7µg/m<sup>3</sup> (7.1µg/m<sup>3</sup> corrected) in 2022 to 6.0µg/m<sup>3</sup> (6.4µg/m<sup>3</sup> corrected) in 2023 for the same location. The Scottish annual mean air quality objective for PM<sub>2.5</sub> is 10µg/m<sup>3</sup>.

Overall, monitoring results for 2023 have shown that both NO<sub>2</sub> and PM levels slightly decreased in High Street, Irvine. NO<sub>2</sub> levels in New Street, Dalry have also shown a decrease at one tube and a marginal increase at another. NO<sub>2</sub> levels have shown a downward trend across the whole of North Ayrshire since 2019. A slight increase was noted in 2021 following the easing of COVID-19 restrictions but this has not continued in 2022 or 2023. PMs have shown a decrease from 2022 to 2023 closely returning to COVID-19 travel restrictions values of 2020. Results show that all parameters remain well below the respective Air Quality Objectives.

North Ayrshire Council has one officer located within Environmental Health who implements the LAQM requirements: ensuring monitoring equipment is maintained correctly; dealing with enquiries, planning permissions and complaints; report writing, liaising with relevant colleagues in other departments and partners as required e.g. SEPA and Transport Scotland.

2023 data shows that there are no ambient air quality issues within North Ayrshire Council.

## **Actions to Improve Air Quality**

North Ayrshire Council has Energy and Sustainability Officers, an Access Officer, a School Travel Plan Co-ordinator, Traffic and Transportation Managers, a Business Change Project Manager, Workplace Engagement Officers and supporting teams who collectively promote modal shift and actions to improve air quality and wellbeing.

A No Engine Idling campaign was promoted via social media and a slogan created was highlighted on the side of refuse vehicles. This project was undertaken during the winter

months of 2023/24 as it was considered that this would be the most appropriate time to target this behaviour. Refuse vehicles are generally slow moving/stationary, visit many streets and therefore reach a large public audience. Photos of the refuse vehicle promotion are shown below.



Refuse vehicle promotion side 1



Refuse vehicle promotion side 2

North Ayrshire Council operates a Sustainable Business Travel Plan Carpool Scheme alongside Enterprise Car Club. The Council is committed to promoting the uptake of electric vehicles and the aim of our [Electric Vehicle Strategy \(north-ayrshire.gov.uk\)](http://north-ayrshire.gov.uk) is to increase the number of electric vehicles (EVs) being used throughout North Ayrshire by creating a robust network of EV charge points.

A £695k programme of additional energy efficient lighting improvements to introduce LED white lighting for around 5,000 other existing white light sources with higher energy consumption was completed successfully in 2023. This change has significantly reduced our energy use and carbon emissions from lighting. There are no new projects on the horizon at this time and it will be business as usual and maintenance of LEDs.

During 2023 the Council's Travel Smart behaviour change project continued to promote modal shift to active and sustainable travel, but also focused on Mental and Physical Wellbeing whilst employees were working at home. One Workplace Engagement Officer is appointed within North Ayrshire Council to promote active and sustainable travel to/from work, and a Schools and Workplaces Active Travel Programme.

Throughout the reporting period the number of engagements with workplaces increased, and the following new workplaces expressed an interest to engage with the Travel Smart Project:

- Abacus Valves
- Canmore Childrens Home (NAC Site)
- CCL North
- Gales Hotel
- Highland Meats
- Hyster Yale
- Nuclear Restoration Services Hunterston A
- Police Scotland
- Restructa

Working with these employers during 2023, the project has organised:

Workplace Step Count Challenge: One workplace took part in a Step Count Challenge throughout the year achieving 11.6 million steps, covering approximately 5200 miles.

National Bike Week: In June employees within workplaces achieved as many points as possible based on a point scoring challenge. Achieving points by using multi modes of active travel to places of work secured small incentive rewards.

E-Bike Taster Sessions: 5 e-Bike taster sessions took place where 16 employees attended. This event allowed for employees to trial an e-bike for 1 hour at our Closed Loop Cycle Track in Quarry Road, Irvine giving employees the opportunity to experience an e-bike before making any expensive purchases in the future.

Cycle to works/anywhere days: Organised during August and September seen 31 members of staff from 3 workplaces cycled over 1500 miles, this was made up of 820 miles for commuting, and 657 miles of leisure cycling.

E-Bike Loans: 42 were loaned to employees across various workplaces for a two-week period allowing employees to experience an e-bike for the first time, but also allowed them to trial one prior to purchasing their own through the Cycle To Work Scheme and;

Weekly Wednesday Walk: Organised for 4 weeks, the walk took participating employees to various locations within proximity to their place of work, this also provided the opportunity to meet other colleagues and to encourage a more active lifestyle during lunch breaks. In total 41 employees attended these events over the 4 weeks.

## Local Priorities and Challenges

The priorities for North Ayrshire Council in addressing air quality for the coming year are a) to continue with monitoring air quality within its area, particularly in High Street, Irvine and New Street, Dalry, to ensure concentrations remain below the relevant objective levels following the improvement works and to observe if post COVID-19 pandemic pollutant concentrations return to business as usual levels, b) respond timeously and investigate any complaints received regarding air quality, c) to continue improving on charging infrastructure so that we may further increase our use of EVs across NAC, d) continue to promote, support and help facilitate Active Travel and e) to implement the [Actions in the Council's Environmental Sustainability & Climate Change Strategy 2022-23](#) (Sustainable North Ayrshire Strategy 2024-2027 is due to be published July 2024).



The challenges will be to ensure that a) any monitoring equipment malfunction is rectified timeously and the data capture rate is maintained at a high level and b) any targets with regard to improving air quality, directly or indirectly within North Ayrshire are achieved.

## How to Get Involved

If you would like to become involved and participate in helping improving air quality in the area, details of alternative modes of travel, route options and projects can be found at [Leisure, parks and events \(north-ayrshire.gov.uk\)](https://www.north-ayrshire.gov.uk/leisure-parks-and-events).

North Ayrshire Council incorporated Clean Air Day (CAD) actions into Bike Week for June 2023 and encouraged staff to actively travel to work or for leisure. The event was promoted to staff and schools via internal Newsletters, Facebook and Twitter. North Ayrshire Council will continue to support and promote this event. For information on how to become involved in air quality events around the UK and free promotional material please visit [Clean Air Day - the UK's largest clean air campaign](https://www.cleanairday.co.uk/).

Further information on our local air quality can also be found here [Home page | Scottish Air Quality](https://www.scottishairquality.scot/) on the Air Quality in Scotland website where information is updated every hour. A free service to subscribers in Scotland (that may be of benefit to people whose breathing gets worse when air pollution increases) is Know & Respond – Scotland. The service sends an alert message to registered members if air pollution in their area is forecast to be moderate, high or very high and this may be of benefit to pollution sensitive individuals who want to take steps to minimise the effects of any pollution incidents. To register for Know & Respond – Scotland please visit: [Know & Respond - Scotland, the free air pollution alert messaging system - Air Quality in Scotland \(scottishairquality.scot\)](https://www.scottishairquality.scot/know-respond).

Know and Respond can also be accessed via an iPhone and Android app which is free to download at: [Apps for iPhone and Android - Air Quality in Scotland \(scottishairquality.scot\)](https://www.scottishairquality.scot/apps).



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# 1. Local Air Quality Management

This report provides an overview of air quality in North Ayrshire Council during 2023. 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 North Ayrshire Council to improve air quality and any progress that has been made.

**Table 1.1 – Summary of Air Quality Objectives in Scotland**

<b>Pollutant</b>	<b>Air Quality Objective Concentration</b>	<b>Air Quality Objective Measured as</b>	<b>Date to be Achieved by</b>
Nitrogen dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO <sub>2</sub> )	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM <sub>10</sub> )	18 µg/m <sup>3</sup>	Annual mean	31.12.2010
Particulate Matter (PM <sub>2.5</sub> )	10 µg/m <sup>3</sup>	Annual mean	31.12.2021
Sulphur dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO <sub>2</sub> )	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO <sub>2</sub> )	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m <sup>3</sup>	Running annual mean	31.12.2010

<b>Pollutant</b>	<b>Air Quality Objective Concentration</b>	<b>Air Quality Objective Measured as</b>	<b>Date to be Achieved by</b>
1,3 Butadiene	2.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m <sup>3</sup>	Running 8-Hour mean	31.12.2003

## 2. Actions to Improve Air Quality

### 2.1 Air Quality Management Areas

Air Quality Management Areas (AQMA) 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.

Monitoring in previous years identified that the main air quality issue in North Ayrshire was associated with NO<sub>2</sub> and related to a) traffic congestion caused by a small section of High Street, Irvine being used as a bus terminus and b) queuing traffic in New Street, Dalry because of traffic lights on the main A737 passing through the town. The history of these two areas and mitigation measures have been discussed in previous reports which can be found here [LAQM Reports | Scottish Air Quality](#). Mitigation projects have now been completed successfully for both areas and monitoring results reflect the changes in ambient air quality, showing a downward trend accordingly.

North Ayrshire Council's current Environmental Sustainability & Climate Change Strategy 2021 – 2023 can be found here [Environmental Sustainability & Climate Change Strategy \(north-ayrshire.gov.uk\)](#). The Sustainable North Ayrshire Strategy for 2024-2027 is a set of actions that explain how the Council will focus on fulfilling its commitment to achieve net zero carbon emissions by 2030 has been approved by the Cabinet and will be published in July 2024. Reference to it and link to the online document will be included in future APRs.

Some recent progress highlights on the net-zero journey include: The council further reducing its carbon emissions across the estate by an estimated 14,600 tonnes and plans



being drawn up to design and build two council owned solar farms, to provide vital renewable energy, with construction due to start in early 2024.

North Ayrshire Council currently does not have any AQMAs.

**Table 2.1 – Declared Air Quality Management Areas**

<b>AQMA Name</b>	<b>Pollutants and Air Quality Objectives</b>	<b>City / Town</b>	<b>Description</b>	<b>Action Plan</b>
N/A	N/A	N/A	N/A	N/A

## 2.2 Cleaner Air for Scotland 2

[Cleaner Air for Scotland 2 – Towards a Better Place for Everyone \(CAFS2\)](#) 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 \(CAFS\)](#), 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 North Ayrshire 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.

North Ayrshire Council has a [Adopted Local Development Plan \(north-ayrshire.gov.uk\)](http://north-ayrshire.gov.uk) (LDP) that was published in November 2019.

The LDP sets out how we aim to guide development and investment in our area over the next 20 years and includes:

- Our **spatial development strategy**: the principles we will use to direct the right development to the right place.
- Our **placemaking policy**: the key criteria that will allow us to deliver the six qualities of successful places.
- Our **strategic development areas** and the key factors we will consider in developing these major areas of change.

To support this our [Development Plan Scheme \(north-ayrshire.gov.uk\)](https://north-ayrshire.gov.uk) (DPS) was published in November 2023 and sets out a planning authority's programme for preparing and reviewing their development plan. As the local planning authority, we are required to prepare a DPS every year. The DPS must also include a Participation Statement stating when, how and with whom consultation on the plan will take place.

In [Our Council Plan \(north-ayrshire.gov.uk\)](https://north-ayrshire.gov.uk) 2023 – 2028 our residents are at the heart of our plan, our mission is working together to improve the lives of our people in North Ayrshire.

### 2.2.2 Transport – Low Emission Zones

Local authorities working with Transport Scotland and Scottish Environment Agency will look at opportunities to promote zero-carbon city centres within the existing LEZs structure.

North Ayrshire Council does not meet the criterion to have a LEZ but has a 2023 – 2028 Local Transport and Active Travel Strategy which can be accessed here:

[Transport strategy \(north-ayrshire.gov.uk\)](https://north-ayrshire.gov.uk)

North Ayrshire Council also has an Electric Vehicle (EV) Strategy (2021-2025) [Electric Vehicle Strategy \(north-ayrshire.gov.uk\)](https://north-ayrshire.gov.uk). It includes an action to work in partnership with government agencies to explore potential for further EV charging infrastructure.

Encouraging the uptake of EVs will help reduce greenhouse gas emissions and help improve local air quality.

### **2.2.3 Further Actions**

As noted above, the Sustainable North Ayrshire Strategy for 2024-2027 is a set of actions that explain how the Council will focus on fulfilling its commitment to achieve net zero carbon emissions by 2030 has been approved by the Cabinet and will be published in July 2024. Reference to it and link to the online document will be included in future APRs.

Some recent progress highlights on the net-zero journey include: The council further reducing its carbon emissions across the estate by an estimated 14,600 tonnes and plans being drawn up to design and build two council owned solar farms, to provide vital renewable energy, with construction due to start in early 2024.

The key actions completed, in progress or planned and outcomes in terms of benefits for air quality can be found in Appendix 1 of the current Strategy's Action Plan here:

[Environmental Sustainability & Climate Change Strategy \(north-ayrshire.gov.uk\)](https://www.north-ayrshire.gov.uk/environmental-sustainability-and-climate-change-strategy)

The Council's Travel Smart behaviour change project will also continue to promote modal shift to active and sustainable travel.

## **2.3 Implementation of Air Quality Action Plan(s) and/or measures to address air quality.**

As intimated in Section 2.1 above, North Ayrshire Council does not have any AQMAs therefore does not meet the criterion to develop an Air Quality Action Plan. Other measures that North Ayrshire Council are taking to address air quality are provided in Section 2.2.3 above.

**Table 2.1 – Progress on Measures to Improve Air Quality**

<b>Measure No.</b>	<b>Measure</b>	<b>Category</b>	<b>Expected/Actual Completion year</b>	<b>Measure Status</b>	<b>Funding Status</b>	<b>Key Milestones</b>	<b>Progress</b>	<b>Barriers to implementation</b>
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

## 3. Air Quality Monitoring Data and Comparison with Air Quality Objectives

### 3.1 Summary of Monitoring Undertaken

A fixed automatic monitoring station is located on High Street, Irvine. It has contained a chemiluminescent NO<sub>x</sub> analyser monitor since its installation in 2009 and a Fidas 200 fine dust and monitoring emission measurement system for the continuous and simultaneous measurement of PM<sub>1</sub>, PM<sub>2.5</sub> as per EN 14907 and PM<sub>10</sub> as per EN12341 since 14th April 2015. This monitoring station is also the site being used for the triplicate co-location of NO<sub>2</sub> diffusion tubes.

Calibration checks are conducted every two weeks on site by Local Authority Officers and collected data is forwarded to Ricardo - AEA who validate and ratify the data. The unit is calibrated by Ricardo - AEA every six months. Ricardo - AEA reports are included in [Appendix C: QA/QC of Automatic Monitoring](#). Twenty-two diffusion tubes also monitor NO<sub>2</sub> at various locations in towns throughout North Ayrshire and the data capture rate was 99%.

2023 results show that all pollutants have either remained the same or decreased throughout North Ayrshire and have not returned their pre COVID-19 business-as-usual levels as expected. This may have been due to weather conditions and more monitoring will be required to establish any long-term trend.

No monitoring results for 2023 within North Ayrshire has exceeded any relevant UK or EU Limit Value. None of these changes have led to the declaration of an AQMA, decision to amend or revoke an AQMA, or appropriate local strategy.

#### 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.

North Ayrshire Council undertook automatic (continuous) monitoring at one site during 2023. [Table A.1](#) in Appendix A shows the details of the sites. National monitoring results are available at [Home page | Scottish Air Quality](#).

Maps showing the location of the monitoring sites are provided in Appendix C: [Error! Reference source not found.](#) Further details on how the monitors are calibrated and how the data has been adjusted are also included in [Appendix C: QA/QC of Automatic Monitoring.](#)

### 3.1.2 Non-Automatic Monitoring Sites

North Ayrshire Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 22 sites during 2023. [Table A.2](#) in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix C: [Error! Reference source not found.](#) and further details on the data and bias adjustment for the diffusion tubes are included in [Appendix C: QA/QC of Diffusion Tube Monitoring.](#)

### 3.1.3 Other Monitoring Activities

North Ayrshire Council has two Zephyr low-cost air monitors produced by Earth Sense [Zephyr Air Quality Monitor | EarthSense](#). These monitors are solar-powered and measure NO, NO<sub>2</sub>, O<sub>3</sub>, PM<sub>1</sub>, PM<sub>2.5</sub>, PM<sub>10</sub>, temperature, humidity, and pressure continuously. The monitors are not certified to Equivalence standards but are co-located with such instruments and their differences certificated. Low-cost sensors are only indicative of the ambient air quality but nonetheless useful tools to install in areas where there are no previous recordings. The monitors are currently located near the former bitumen terminal to the west of Montgomerie Street, Ardrossan and were deployed here to record the relevant background measurements prior to a major redevelopment of the site by North Ayrshire Council. Details of which can be found here:

[23/00319/PPM | Erection of community campus comprising early years, primary & secondary school with additional support needs, shared community facilities including; library, learning hub and integrated services, indoor sports facilities including swimming pool, sports hall, gymnasium, dance studio & fitness studio, outdoor sports facilities including 2 sports pitches and Multi-Use Games Area \(MUGA\); Outdoor learning landscape, recreational spaces and growing spaces, associated parking and infrastructure | Site At North Shore Adjacent To North Crescent Road Ardrossan Ayrshire \(north-ayrshire.gov.uk\)](#). Their purpose now is to record ongoing ambient air quality.

## 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: Supporting Technical Information / Air Quality Monitoring Data QA/QC](#)

### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

[Table A.3](#) in Appendix A compares the ratified monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40 µg/m<sup>3</sup> at automatic monitoring sites.

[Error! Reference source not found.](#) in Appendix A compares the adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40 µg/m<sup>3</sup> at non automatic monitoring sites.

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in [Appendix B.](#)

[Table A.5](#) in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year. There have been no exceedances recorded for the 2019 to 2023 reporting period.

None of these results have led to the declaration of an AQMA.

Annual Mean NO<sub>2</sub> concentrations measured at the automatic monitoring site in High Street, Irvine and diffusion tube monitoring sites located throughout North Ayrshire have shown a downward trend since 2019. There has been a particularly noticeable decline in the NO<sub>2</sub> concentrations since 2019 in and around Irvine and Dalry following mitigation measures to ease traffic congestion. There was a slight increase during 2021 due the easing of COVID-19 pandemic restrictions and return to normality but this has not been maintained and there has been a decrease during 2022 and 2023. A graph of these trends is included in Appendix C: [Error! Reference source not found.](#) & [Error! Reference source not found.](#)



### 3.2.2 Particulate Matter (PM<sub>10</sub>)

[Table A.6](#) in Appendix A compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 18µg/m<sup>3</sup>.

[Table A.7](#) in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than seven times per year. There have been no exceedances recorded for the 2019 to 2023 reporting period.

None of these results have led to the declaration of an AQMA.

At High Street, Irvine, PM<sub>10</sub> levels decreased significantly from 2019 – 2021 but showed an increase during 2022. PM<sub>10</sub> levels have have decreased again during 2023. A graph showing this trend is included in Appendix C: [Error! Reference source not found.](#)

### 3.2.3 Particulate Matter (PM<sub>2.5</sub>)

[Table A.8 in Appendix A](#) compares the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past five years with the air quality objective of 10µg/m<sup>3</sup>.

None of these results have led to the declaration of an AQMA.

PM<sub>2.5</sub> levels reflected those trends of PM<sub>10</sub> during 20198 – 2023 at High Street, Irvine. A graph showing this trend is included in Appendix C: [Error! Reference source not found.](#)

### 3.2.4 Sulphur Dioxide (SO<sub>2</sub>)

Monitoring for sulphur dioxide (SO<sub>2</sub>) and smoke has been discontinued in North Ayrshire since 2004. Historical monitoring data is available for nearly every town in the area and there is no indication from these results that the air quality standard is likely to be breached even around local industrial sources.

Further details of historic SO<sub>2</sub> monitoring can be found in North Ayrshire Council's previous Air Quality Reports which are available online at:

[LAQM Reports | Scottish Air Quality](#)

There has been no evidence of any change to SO<sub>2</sub> production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in SO<sub>2</sub> levels at locations where there could be relevant public exposure.

[Table A.9](#) in Appendix A compares the ratified continuous monitored SO<sub>2</sub> concentrations for year 2023 with the air quality objectives for SO<sub>2</sub>.

However the Sílingarfell volcano in southwest Iceland began erupting in December 2023 but the most recent eruption, on May 29<sup>th</sup> 2024, pushed SO<sub>2</sub> in Scotland to levels not seen since the 1970s.

SEPA's [national volcanic emissions network](#) first detected an increase in SO<sub>2</sub> on the Isle of Lewis on the evening of 30 May 2024. During the early hours, the plume moved southward, peaking in Scotland's Central Belt by 6 am on 31 May. St Leonard's in Edinburgh reported a maximum concentration of 1,161 µg m<sup>3</sup>. More details can be found here: [Atmospheric sulphur dioxide levels reach historic high in Scotland following Icelandic volcano eruption - REHIS](#).

### **3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene**

No monitoring of Carbon monoxide, Lead and 1,3-Butadiene has been undertaken.

Further details of historic Carbon Monoxide, Lead and 1,3-Butadiene monitoring can be found in North Ayrshire Council's previous Air Quality Reports which are available online at: [LAQM Reports | Scottish Air Quality](#)

There has been no evidence of any change to Carbon Monoxide, Lead and 1,3- Butadiene production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in Carbon Monoxide, Lead and 1,3- Butadiene levels at locations where there could be relevant public exposure.

## 4. New Local Developments

There were two significant housing developments proposed in 2023 that was considered to have the potential to increase traffic numbers and flows in and around the relevant area. These are listed below together with their reporting status:

23/00212/LUP [23/00212/LUP | Erection of 50 dwellinghouses with associated roads, footpaths, parking, open space, landscaping and SuDS infrastructure | Former Garnock Academy School Road Kilbirnie North Ayrshire \(north-ayrshire.gov.uk\)](#) AQ Assessment approved.

23/00420/PPM [23/00420/PPM | Erection of 85 residential dwellings with associated works including access, parking, landscaping, open-space and SuDS | Site To South West Of Mosscolloch Farm Kilwinning Ayrshire \(north-ayrshire.gov.uk\)](#) AQ Assessment approved.

### 4.1 Road Traffic Sources

North Ayrshire Council confirms that there are no new/newly: narrow congested streets with a flow above 5,000 vehicles per day and residential properties close to the pavement; busy streets where people may spend 1 hour or more close to traffic; roads with high flows of buses/heavy delivery vehicles; busy junctions/roads; roads with significantly changed traffic flows and no relevant bus stations in the Local Authority area identified during 2023.

### 4.2 Other Transport Sources

North Ayrshire Council confirms that there are no: airports in the Local Authority area; locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m; locations with a significant number of movements of diesel locomotives, and potential long-term relevant exposure within 30m; or ports or shipping that meet the specified criteria within the Local Authority area identified during 2023.

### 4.3 Industrial Sources

North Ayrshire Council confirms that there are no new or proposed industrial installations: for which an air quality assessment has been carried out; existing installations where emissions have increased substantially, or new relevant exposure has been introduced; significantly changed installations with no previous air quality assessment; major fuel storage depots storing petrol; petrol stations or poultry farms that we are aware of during 2023.

### 4.4 Commercial and Domestic Sources

There were two developments proposed in 2023 that was considered to have the potential to impact air quality. These are listed below together with their reporting status:

23/00663/PP [23/00663/PP | Erection of outbuilding for the installation of biomass boiler room and associated flue \(retrospective\) | 36A Templand Road Dalry Ayrshire KA24 5EU \(north-ayrshire.gov.uk\)](#) Exempt Appliance.

23/00662/PP [23/00662/PP | Erection of extension to garage for the installation of a biomass boiler to include the associated flue | Easter Highfield Dalry North Ayrshire KA24 4HT](#) Exempt Appliance.

### 4.5 New Developments with Fugitive or Uncontrolled Sources

There were two developments proposed in 2023 that was considered to have the potential to impact air quality. These are listed below together with their reporting status:

23/00634/PP [23/00634/PP | Infilling of former railway trackbed with inert material for land improvement purposes | Lands To North Of B706 Beith Road Barrmill Beith North Ayrshire \(north-ayrshire.gov.uk\)](#) Dust Management Plan Approved.

23/00851/PP [23/00851/PP | Infilling of former quarry with inert materials to facilitate land restoration for nature conservation purposes, including the formation of a temporary vehicular access track | Dockra Quarry Gateside Beith North Ayrshire \(north-ayrshire.gov.uk\)](#) Dust Management Plan Approved.

## 5. Planning Applications

There were two significant developments proposed in 2023 that was considered to have the potential to increase traffic numbers and flows in and around the relevant area. These are listed below together with their reporting status:

23/00219/PPM [23/00219/PPM | Erection of 228 holiday homes with village hub including access, landscaping, open space and associated works | Land At Former Montfode Oil Storage Depot Ardrossan Ayrshire \(north-ayrshire.gov.uk\)](#) AQ Assessment approved.

23/00319/PPM [23/00319/PPM | Erection of community campus comprising early years, primary & secondary school with additional support needs, shared community facilities including; library, learning hub and integrated services, indoor sports facilities including swimming pool, sports hall, gymnasium, dance studio & fitness studio, outdoor sports facilities including 2 sports pitches and Multi-Use Games Area \(MUGA\); Outdoor learning landscape, recreational spaces and growing spaces, associated parking and infrastructure | Site At North Shore Adjacent To North Crescent Road Ardrossan Ayrshire \(north-ayrshire.gov.uk\)](#) AQ Assessment approved.

## **6. Conclusions and Proposed Actions**

### **6.1 Conclusions from New Monitoring Data**

All NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> monitoring data within North Ayrshire Council for 2023 complied with the 40µg/m<sup>3</sup>, 18µg/m<sup>3</sup> and 10µg/m<sup>3</sup> respective Air Quality Objectives as set out in the Directive. Monitoring will continue at all the existing sites for 2024.

### **6.2 Conclusions relating to New Local Developments**

Planning applications for two significant housing developments were received in 2023. Consideration was given to the applications as they met the criterion of the relevant guidance for local air quality to be assessed. The applicants were requested, via Planning Conditions, to undertake Air Quality Screening Assessments and submit a report to demonstrate whether their proposed development would have any detrimental effect on local air quality. Two screening reports were submitted which was satisfactory and detailed modelling was not required.

### **6.3 Proposed Actions**

2023 monitoring data has not identified any new exceedances of the objectives for any pollutant or any need for additional monitoring. It is anticipated that a review of the existing monitoring programme within North Ayrshire will be undertaken to ensure all monitoring points are relevant.

#### **Irvine**

Following the introduction of mitigation measures to reduce congestion in 2019 and COVID-19 restrictions, a significant reduction in NO<sub>2</sub> has been recorded in High Street. A slight increase was noted in 2021 following the easing of restrictions, however levels fell again in 2022 and monitoring has shown that this trend continued, and levels remained low during 2023. This may have been a result of prevailing weather conditions or a change in business-as-usual working patterns. It is proposed that NO<sub>2</sub> sampling continues in this area to observe this trend. Close supervision of any future developments in the area shall also be observed if required.

**Dalry**

Monitoring has shown that the opening of the Dalry Bypass in May 2019, together with COVID-19 restrictions, eased traffic congestion significantly through the town and NO<sub>2</sub> concentrations were seen to reduce accordingly. The same trend was noted here as in Irvine, NO<sub>2</sub> increased slightly during 2021 but decreased during 2022 and stable in 2023. It is proposed that monitoring is continued in this area to establish normal levels.



## 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? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
ROM	ROMON	Roadside	232189	638857	NO <sub>2</sub> ; PM <sub>10</sub> ; PM <sub>2.5</sub>	No N/A	Chemiluminescent; Optical Light Scatter	20	4.88	2.15

**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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
DT1	35 East Road, Irvine	Roadside	232323	638892	NO2	N	1	2.5	N	2.5
DT2	22 Bank Street, Irvine	Roadside	232216	638961	NO2	N	2.5	1.6	N	2.5
DT3	147 High Street, Irvine	Roadside	232077	638990	NO2	N	0	4	N	2.5
DT4	85 High Street, Irvine	Roadside	232158	638882	NO2	N	0	3.7	N	3
DT5	79 High St, Irvine	Roadside	232169	638878	NO2	N	3.5	1.5	N	2.5
DT6	75 High St, Irvine HIGH	Roadside	232170	638871	NO2	N	0	5	N	3
DT7	65a High Street, Irvine, (ROMON)	Roadside	232194	638859	NO2	N	4.7	1.7	Y	2.15
DT8	65 High Street, Irvine, (ROMON)	Roadside	232194	638859	NO2	N	4.7	1.7	Y	2.15

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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
DT9	63 High Street, Irvine, (ROMON)	Roadside	232194	638859	NO2	N	4.7	1.7	Y	2.15
DT10	34 Kirkgate Irvine	Urban Background	232085	638774	NO2	N	10	0.5	N	2.5
DT11	25 Main Rd, Springside	Kerbside	236824	638654	NO2	N	5	1	N	2.5
DT12	Auchengate (Bridge)	Urban Background	233337	635565	NO2	N	N/A	32	N	2.5
DT13	Dalry Rd, Kilwinning	Kerbside	229936	643390	NO2	N	2	1	N	2.5
DT14	12 Garnock St, Dalry	Urban Background	229318	649253	NO2	N	10	0.5	N	2.5
DT15	67 New St, Dalry	Kerbside	229338	649337	NO2	N	0	0.5	N	2.5
DT16	45 New St, Dalry	Kerbside	229286	649365	NO2	N	0	0.5	N	2.5

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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube co-located with a Continuous Analyser?	Tube Height (m)
DT17	2 Townhead St, Dalry	Roadside	229150	649292	NO2	N	0	3	N	2
DT18	Highfield Hamlet, Dalry	Urban Background	230911	650259	NO2	N	10	1	N	2
DT19	85 Main Street, Largs	Kerbside	220336	659313	NO2	N	1.5	0	N	2
DT20	Hunterston Road	Rural	219588	652044	NO2	N	N/A	N/A	N	2
DT21	Princess St/Glasgow St, Ardrossan	Kerbside	222942	642101	NO2	N	0	0.5	N	2.5
DT22	Vernon St, Saltcoats	Kerbside	224708	641339	NO2	N	0	1	N	2.5

**Notes:**

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

(2) N/A if not applicable.

**Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m<sup>3</sup>)**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
ROMON	Roadside	Automatic	-	99	16	10	13	11	10

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in bold.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

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

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

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

**Table A.4 – Annual Mean NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)**

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
DT1	232323	638892	Roadside	-	100.0	20.0	13.0	15.0	13.0	12.1
DT2	232216	638961	Roadside	-	100.0	19.0	11.0	11.0	9.0	9.1
DT3	232077	638990	Roadside	-	100.0	16.0	11.0	16.0	11.0	12.0
DT4	232158	638882	Roadside	-	100.0	17.0	10.0	11.0	12.0	10.7
DT5	232169	638878	Roadside	-	100.0	20.0	12.0	13.0	11.0	11.4
DT6	232170	638871	Roadside	-	82.7	20.0	12.0	14.0	11.0	11.1
DT7, DT8, DT9	232194	638859	Roadside	-	100.0	19.0	11.0	12.0	11.0	10.0
DT10	232085	638774	Urban Background	-	100.0	9.0	7.0	8.0	6.0	6.2
DT11	236824	638654	Kerbside	-	100.0	13.0	10.0	8.0	8.0	7.2
DT12	233337	635565	Urban Background	-	100.0	11.0	10.0	8.0	7.0	6.3
DT13	229936	643390	Kerbside	-	92.3	17.0	13.0	15.0	12.0	11.4

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
DT14	229318	649253	Urban Background	-	100.0	9.0	6.0	6.0	5.0	5.5
DT15	229338	649337	Kerbside	-	100.0	21.0	12.0	14.0	11.0	9.0
DT16	229286	649365	Kerbside	-	100.0	26.0	16.0	14.0	14.0	14.0
DT17	229150	649292	Roadside	-	100.0	21.0	11.0	11.0	9.0	8.9
DT18	230911	650259	Urban Background	-	100.0	14.0	8.0	6.0	6.0	6.0
DT19	220336	659313	Kerbside	-	100.0	16.0	12.0	13.0	11.0	11.3
DT20	219588	652044	Rural	-	100.0	5.0	3.0	3.0	3.0	2.7
DT21	222942	642101	Kerbside	-	100.0	15.0	12.0	11.0	11.0	10.5
DT22	224708	641339	Kerbside	-	92.3	14.0	11.0	13.0	12.0	10.5

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

☒ Diffusion tube data has been bias adjusted.

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

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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.

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

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



**Table A.5 – 1-Hour Mean NO<sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m<sup>3</sup>**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
ROMON	Roadside	Automatic	-	99	0	0	0	0	0

**Notes:**

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200 µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

**Table A.6 – Annual Mean PM<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site	Year	Mean	Mean_Corrected	Hourly max	Hourly max Corrected	Max 24-hour	Max 24-hour Corrected
North Ayrshire Irvine High St	<b>2019</b>	14.5	16	918.3	1,010.2	69.7	76.7
North Ayrshire Irvine High St	<b>2020</b>	11.3	12.5	238.3	262.2	35.8	39.4
North Ayrshire Irvine High St	<b>2021</b>	10.8	11.9	135.4	148.9	28.9	31.8
North Ayrshire Irvine High St	<b>2022</b>	12.5	13.8	85.4	93.9	55.7	61.3
North Ayrshire Irvine High St	<b>2023</b>	11.6	12.8	140.3	154.4	34.0	37.4

**Notes:**

Exceedances of the PM<sub>10</sub> annual mean objective of 18 µg/m<sup>3</sup> 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.

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Table A.7 – 24-Hour Mean PM<sub>10</sub> Monitoring Results, Number of PM<sub>10</sub> 24-Hour Means > 50µg/m<sup>3</sup>**

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
ROMON	Roadside	-	100	0	0	0	0	0

**Notes:**

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50 µg/m<sup>3</sup> not to be exceeded more than seven times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 98.1st percentile of 24-hour means is provided in brackets.

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

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

**Table A.8 – Annual Mean PM<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site	Year	Mean	Mean Corrected	Max 24-hour mean	Max 24-hour Corrected
North Ayrshire Irvine High St	<b>2019</b>	8	8.5	40	42.4
North Ayrshire Irvine High St	<b>2020</b>	6.1	6.5	19.9	21.1
North Ayrshire Irvine High St	<b>2021</b>	6	6.3	22.7	24
North Ayrshire Irvine High St	<b>2022</b>	6.7	7.1	40.3	42.7
North Ayrshire Irvine High St	<b>2023</b>	6.0	6.4	24.5	25.9

**Notes:**

Exceedances of the PM<sub>2.5</sub> annual mean objective of 10 µg/m<sup>3</sup> 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.

- (1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
- (2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Table A.9 – SO<sub>2</sub> 2023 Monitoring Results, Number of Relevant Instances**

Site ID	Site Type	Valid Data Capture for monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	Number of 15-minute Means > 266 µg/m	Number of 1-hour Means > 350 µg/m	Number of 24-hour Means > 125 µg/m
N/A*	N/A	N/A	N/A	N/A	N/A	N/A

**Notes:**

Exceedances of the SO<sub>2</sub> objectives are shown in bold (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets (15-Minute means: 99.9<sup>th</sup> percentile, 1-hour means: 99.7<sup>th</sup> percentile, 24-hour means: 99.2<sup>nd</sup> percentile).

(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%).

\* No SO<sub>2</sub> monitoring has been undertaken within North Ayrshire Council since 2004.

## Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO<sub>2</sub> 2023 Monthly Diffusion Tube Results (µg/m<sup>3</sup>)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(0.89)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT1	232323	638892	23.2	18.1	17.2	14.4	7.2	14.8	5.5	12.9	7.8	15.8	20.3	6.2	13.6	12.1	-	-
DT2	232216	638961	15.5	11.0	12.6	12.3	4.4	11.3	7.4	3.4	9.7	12.0	17.7	5.4	10.2	9.1	-	-
DT3	232077	638990	20.2	10.9	10.4	10.9	5.4	12.1	6.7	7.3	10.4	15.6	23.9	27.8	13.5	12.0	-	-
DT4	232158	638882	18.7	13.5	14.3	14.3	8.2	13.6	8.8	5.3	10.6	7.6	15.5	13.9	12.0	10.7	-	-
DT5	232169	638878	20.3	13.3	17.2	14.8	6.0	12.7	10.5	6.8	12.0	10.1	19.8	10.5	12.8	11.4	-	-
DT6	232170	638871	19.5	14.5		12.0	5.9	10.5	8.4	5.1	14.6	13.7	20.8		12.5	11.1	-	-
DT7	232194	638859	13.8	11.7	15.7	13.3	4.9	13.0	7.3	4.8	11.1	9.5	18.7	8.7	-	-	-	Triplicate Site with DT7, DT8 and DT9 - Annual data provided for DT9 only
DT8	232194	638859	19.6	13.2	12.6	12.3	6.0	12.2	8.4	5.1	10.7	11.4	17.3	9.7	-	-	-	Triplicate Site with DT7, DT8 and DT9 - Annual data provided for DT9 only
DT9	232194	638859	16.7	13.3	15.0	13.2	4.4	12.0	7.8	6.6	10.0	8.5	20.8	7.1	11.3	10.0	-	Triplicate Site with DT7, DT8 and DT9 - Annual data provided for DT9 only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(0.89)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT10	232085	638774	11.2	7.6	8.4	7.1	2.0	6.3	1.9	5.5	6.0	5.9	17.2	4.2	6.9	6.2	-	-
DT11	236824	638654	13.8	7.7	12.1	8.7	2.0	8.6	4.5	3.2	13.2	6.1	12.3	4.4	8.1	7.2	-	-
DT12	233337	635565	10.1	9.7	10.1	9.7	2.2	7.0	2.3	3.9	7.7	4.2	11.4	6.8	7.1	6.3	-	-
DT13	229936	643390	17.3	14.6	18.4	13.8	6.7	12.9	10.6	4.8		19.9	15.9	5.7	12.8	11.4	-	-
DT14	229318	649253	9.5	5.8	9.7	7.4	2.0	7.0	2.1	1.8	4.7	6.7	12.8	4.1	6.1	5.5	-	-
DT15	229338	649337	16.9	12.7	11.7	13.1	4.2	12.1	6.2	5.4	7.9	11.3	13.4	6.6	10.1	9.0	-	-
DT16	229286	649365	26.2	19.6	19.5	15.6	14.4	14.4	12.4	9.9	13.4	13.2	20.1	9.8	15.7	14.0	-	-
DT17	229150	649292	8.3	8.3	15.6	11.8	6.5	13.0	3.9	3.2	9.9	12.6	20.2	6.5	10.0	8.9	-	-
DT18	230911	650259	11.1	5.9	9.1	7.4	3.9	6.1	2.5	2.0	5.2	10.1	15.1	2.6	6.8	6.0	-	-
DT19	220336	659313	8.0	12.1	16.9	14.9	15.8	19.8	8.0	8.4	13.8	10.5	16.8	7.2	12.7	11.3	-	-
DT20	219588	652044	2.3	2.2	4.1	4.0	3.1	4.8	1.9	2.8	2.5	2.7	4.2	1.8	3.0	2.7	-	-
DT21	222942	642101	7.3	10.3	17.6	14.9	10.1	15.4	8.2	7.3	11.2	13.2	18.1	8.1	11.8	10.5	-	-

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(0.89)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
DT22	224708	641339	10.1	10.1	17.4	10.4	13.5	13.9	11.1	9.8	10..4	10.6	14.1	8.6	11.8	10.5	-	-

- ☒ All erroneous data has been removed from the NO<sub>2</sub> diffusion tube dataset presented in Table B.1.
- ☐ Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.
- ☒ Local bias adjustment factor used.
- ☐ National bias adjustment factor used.
- ☐ Where applicable, data has been distance corrected for relevant exposure in the final column.
- ☒ North Ayrshire Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.



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

### **New or Changed Sources Identified Within North Ayrshire Council During 2023**

North Ayrshire Council has not identified any new sources relating to air quality within the reporting year of 2023.

### **Additional Air Quality Works Undertaken by North Ayrshire Council During 2023**

North Ayrshire Council has not completed any additional works within the reporting year of 2023.

### **QA/QC of Diffusion Tube Monitoring**

Glasgow Scientific Services (GSS) was the supplier used for diffusion tubes within 2022 and the method of preparation was 20% TEA in water. GSS has been supplying North Ayrshire Council's diffusion tubes since December 2013.

GSS are UKAS accredited, and their process is based on the AEA and DEFRA procedure. They participate in the AIR-PT analysis scheme and in the annual field inter-comparison exercise. The results of which are presented below in [Error! Reference source not found.](#) below.

Monitoring was completed in adherence with the 2022 Diffusion Tube Monitoring Calendar.

#### **Diffusion Tube Annualisation**

All diffusion tube monitoring locations within North Ayrshire Council recorded data capture of 75% or greater 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

North Ayrshire Council have applied a local bias adjustment factor of 0.89 to the 2023 monitoring data. A summary of bias adjustment factors used by North Ayrshire Council over the past five years is presented in [Table C.1](#).

**Table C.1 – Bias Adjustment Factor**

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	Local	-	0.89
2022	Local	-	0.82
2021	Local	-	1.03
2020	National	03/20	0.92
2019	National	03/18	0.86

## National Adjustment Factors

Diffusion tubes (20% TEA/Water) used in the sampling period for 2023 were supplied and analysed by Glasgow Scientific Services (GSS). Diffusion Tube Bias Adjustment Factors for tubes provided by GSS are listed in the National Diffusion Tube Bias Adjustment Factor Spreadsheet Version 03/24 in [Error! Reference source not found.](#) below. The resultant bias for GSS is **0.74** based on one study with “Good” precision.

## Factor from Local Co-location Studies.

The automatic monitoring station (ROMON) on High Street, Irvine has been operational since early 2009 and is the site being used for three co-location diffusion tubes. The unit is permanently located here and allows for full “calendar year” data to be collected.

The ROMON has fortnightly checks carried out in accordance with the prescribed methodology as issued by Ricardo - AEA. The unit is audited every 6 months by Ricardo -

AEA and is serviced every 6 months under contract to a specialist company.

Corresponding data was entered into the Diffusion Tube Data Processing Tool v4.0. The resulting Bias Factor for 2023 data is 0.89 using 12 periods ([Table C.3 – Local Bias Adjustment Calculations](#)

below).

### **Discussion of Choice of Factor to Use**

The diffusion tube co-location study for North Ayrshire Council shows this has “Good” precision and corresponding “Good” overall Data Capture from the ROMON for all twelve periods. Records show from [Table C.1](#) that previous derived bias factors over the last four years ranged from 0.82 – 1.03 between 2019 and 2022 whilst the National Bias Adjustment Factor from GSS of **0.74** is only based on one study with “Good” precision. Therefore, it is considered that the Local Bias Adjustment Factor of **0.89** is based on more reliable data and when applied reflects a more realistic trend for NO<sub>2</sub> pollution levels within North Ayrshire Council.

### **NO<sub>2</sub> Fall-off with Distance from the Road**

No diffusion tube NO<sub>2</sub> monitoring locations within North Ayrshire Council required distance correction during 2023.

## **QA/QC of Automatic Monitoring**

The automatic monitoring instruments housed within the roadside cabinet has Local Site Operator (LSO) onsite calibration and data management checks conducted every two weeks by a Local Authority Officer. All checks are carried out in accordance with procedures laid out by Ricardo - AEA and calibration check sheets are forwarded to them after each visit. The site is visited by Ricardo - AEA engineers every six months to carry out calibration audit tests and the Annual Report and Certificates from these visits are included in [Error! Reference source not found.](#) & [Error! Reference source not found.](#) below. The instrument units are also serviced twice yearly by a specialist company and reports from these visits are included in [Error! Reference source not found.](#) below. Data derived from the automatic monitors and presented within this report has all been ratified by Ricardo AEA. All live and historic data pertaining to North Ayrshire Council is available through the Air Quality in Scotland website [Home page | Scottish Air Quality.](#)

### **PM<sub>10</sub> and PM<sub>2.5</sub> Monitoring Adjustment**

North Ayrshire Council operate a Fidas 200 type of PM<sub>10</sub>/PM<sub>2.5</sub> monitor(s) and following research [Equivalence Study to Investigate Particulate Matter Monitoring in Scotland Using the Fidas 200 | Scottish Air Quality](#) the application of a correction factor is required. In accordance with Scottish Government guidance [Local Authority Guidance Note for LAQM Reporting of Scottish PM Data | Scottish Air Quality](#).

Collected PM<sub>10</sub> data has been corrected by **dividing the** ratified data by **0.909**.

Collected PM<sub>2.5</sub> data has been corrected by **multiplying** ratified data **by 1.06**.

Both the corrected and uncorrected ratified data statistics has been presented as recommended.

### **Automatic Monitoring Annualisation**

All automatic monitoring locations within North Ayrshire 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 during 2023.

### **NO<sub>2</sub> Fall-off with Distance from the Road**

No automatic NO<sub>2</sub> monitoring locations within North Ayrshire Council required distance correction during 2023.

**Table C.2 – Annualisation Summary (concentrations presented in  $\mu\text{g}/\text{m}^3$ )**

Site ID	Annualisation Factor Site 1 Name	Annualisation Factor Site 2 Name	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
N/A*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

\* No automatic or non-automatic Annualisation calculations were required to be undertaken within North Ayrshire Council during 2023.

**Table C.3 – Local Bias Adjustment Calculations**

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12	-	-	-	-
Bias Factor A	0.89 (0.77 – 1.04)	-	-	-	-
Bias Factor B	13% (-4% - 29%)	-	-	-	-
Diffusion Tube Mean ( $\mu\text{g}/\text{m}^3$ )	11.3	-	-	-	-
Mean CV (Precision)	10.8%	-	-	-	-
Automatic Mean ( $\mu\text{g}/\text{m}^3$ )	10.0	-	-	-	-
Data Capture	98%	-	-	-	-
Adjusted Tube Mean ( $\mu\text{g}/\text{m}^3$ )	10 (9 - 12)	-	-	-	-

Notes:

A single local bias adjustment factor has been used to bias adjust the 2023 diffusion tube results.

**Table C.4 – NO<sub>2</sub> Fall off With Distance Calculations (concentrations presented in µg/m<sup>3</sup>)**

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
DT1*	N/A	N/A	N/A	N/A	N/A	N/A

\* No NO<sub>2</sub> Fall off With Distance Calculations were required to be undertaken within North Ayrshire Council during 2023.



Figure 1: Automatic Monitoring Site Location, High Street, Irvine 2023

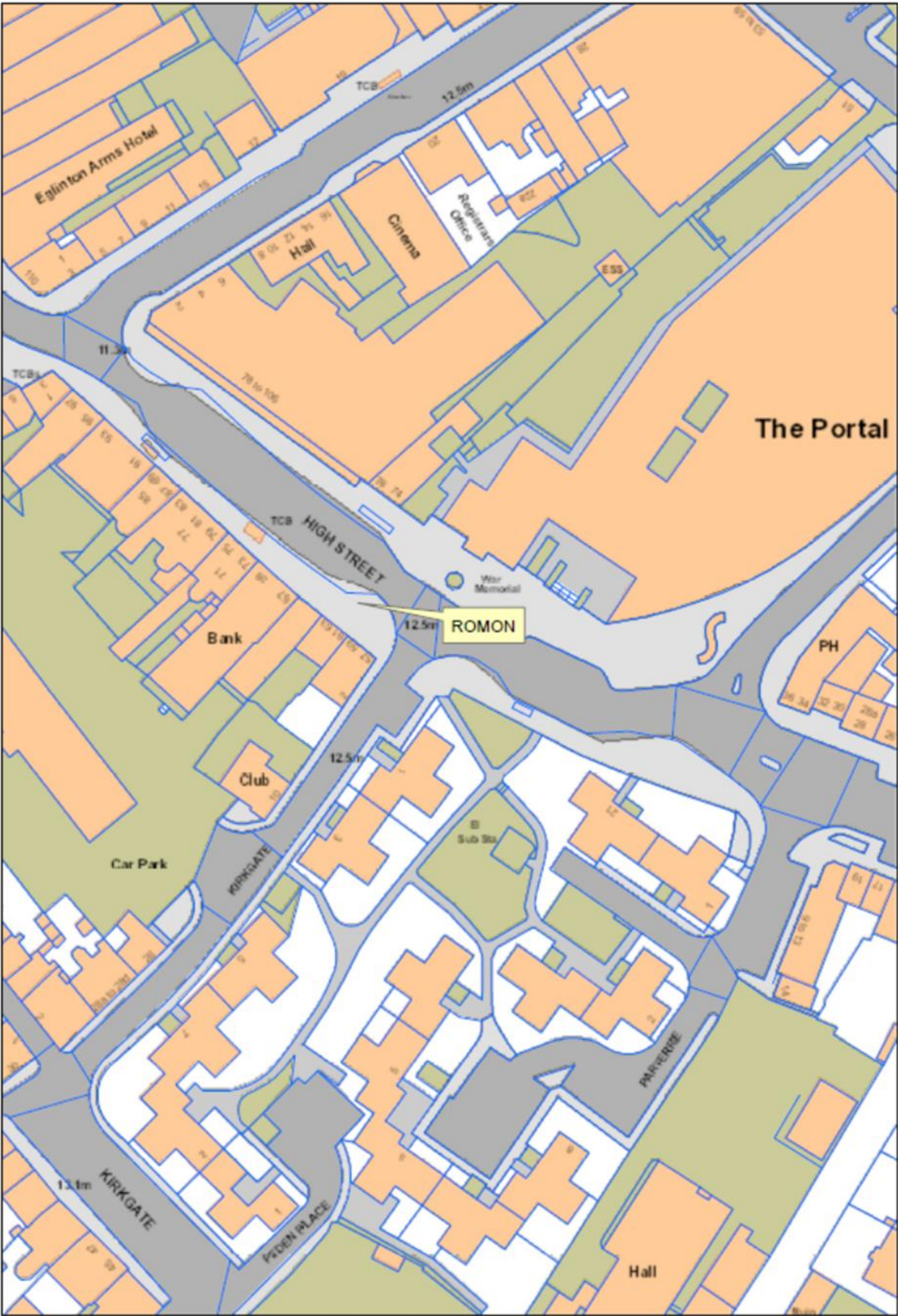




Figure 2: Non-Automatic Monitoring Site Locations 2023

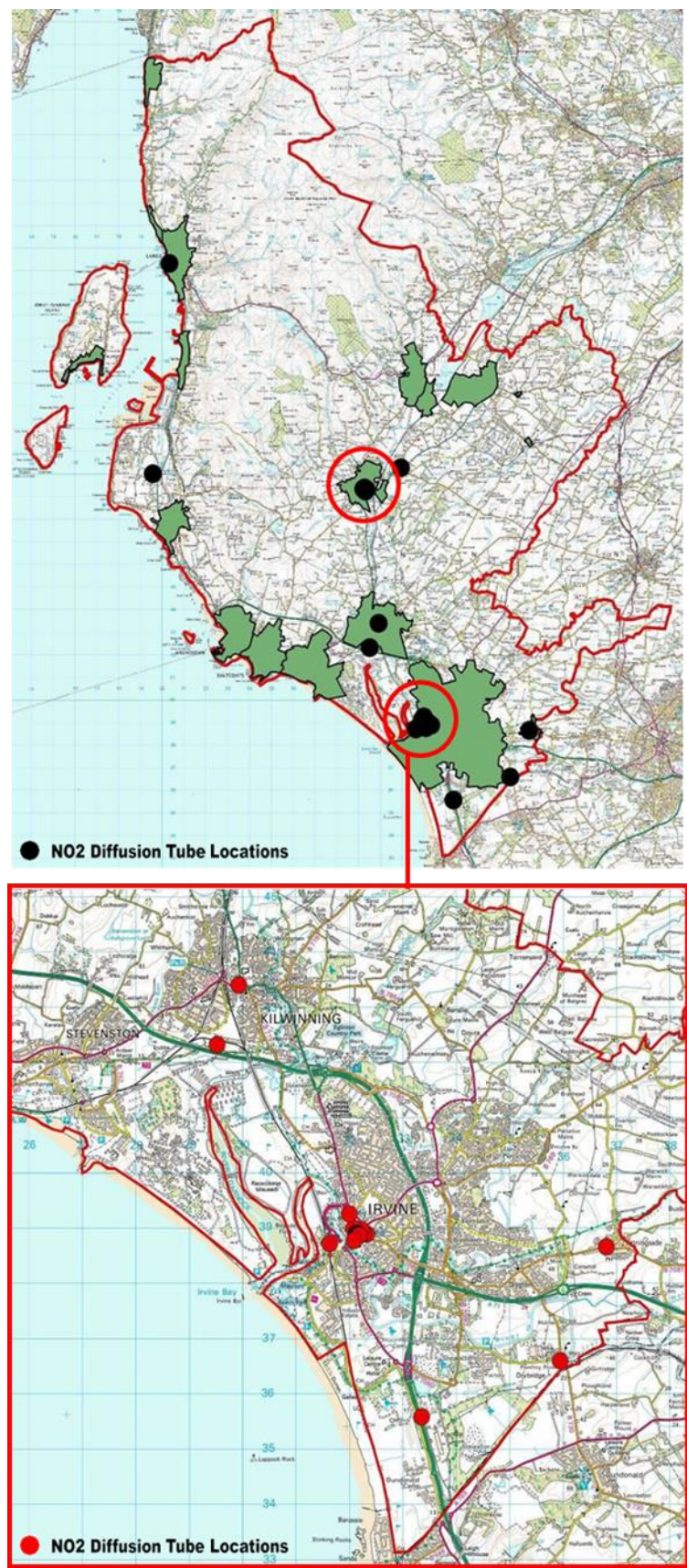
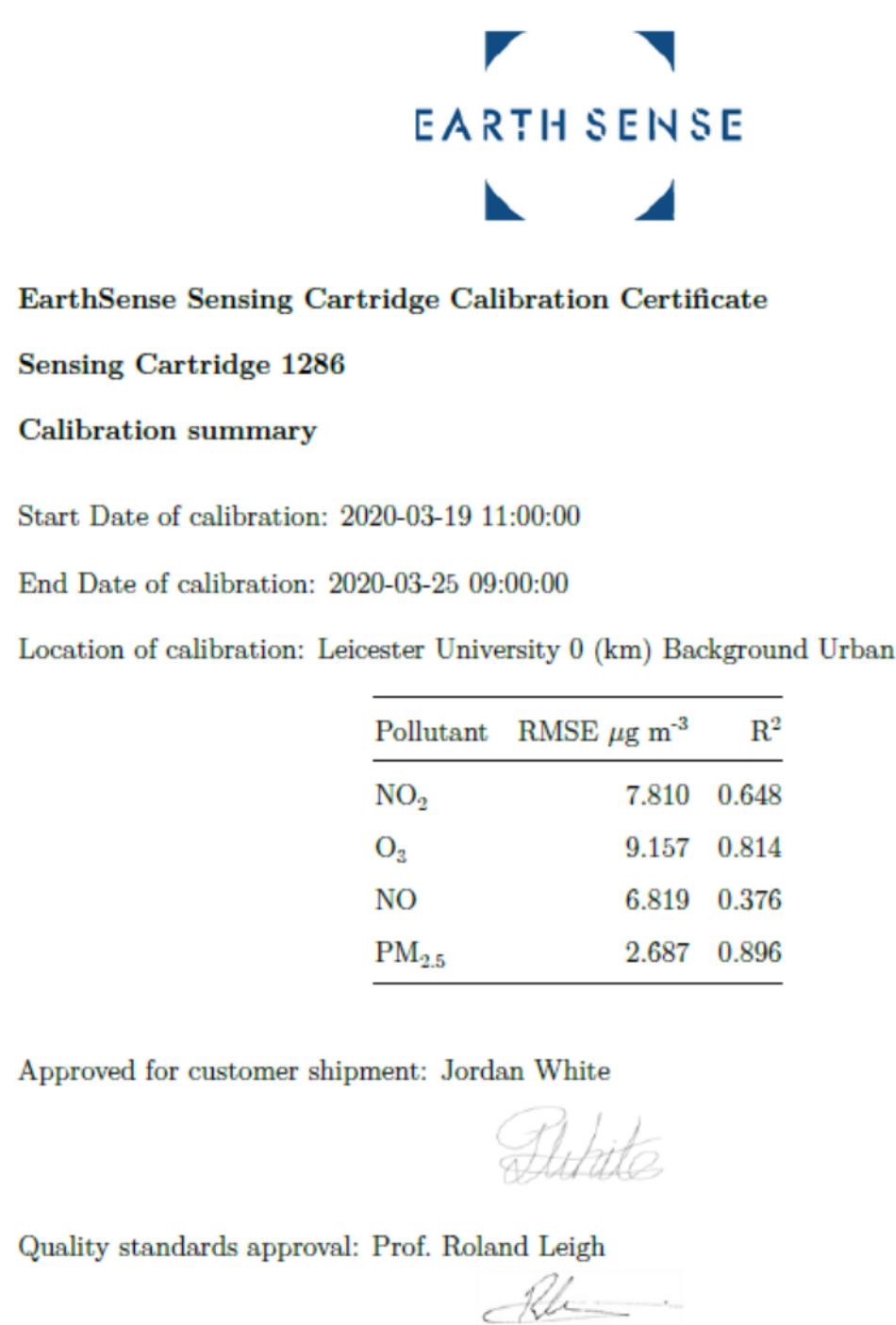




Figure 3: Earth Sense/Zephyr Certificates of Calibration 2023





EarthSense Systems Ltd.

## Zephyr Sensor Cartridge Calibration Certificate

Sensor Cartridge BIC2083

### Calibration Summary

Location: *EarthSense manufacturing facility*

Start Date: *2022-02-21 00:00:01*

End Date: *2022-02-28 00:00:01*

Pollutant	RMSE	RMSE Pass Criteria	R <sup>2</sup>	R <sup>2</sup> Pass Criteria	Status
NO <sub>2</sub>	3.17 ug/m <sup>3</sup>	7 ug/m <sup>3</sup>	0.944	0.75	Pass
NO	3.6 ug/m <sup>3</sup>	8 ug/m <sup>3</sup>	0.967	0.75	Pass
O <sub>3</sub>	3.89 ug/m <sup>3</sup>	12 ug/m <sup>3</sup>	0.874	0.75	Pass
PM <sub>2.5</sub>	2.84 ug/m <sup>3</sup>	7 ug/m <sup>3</sup>	0.931	0.75	Pass

Approved for customer shipment: *Isaac Mitchell*



Quality standards approval:

*Dr. Roland Leigh*



Figure 4: Zephyr Monitoring Locations, Ardrossan 2023

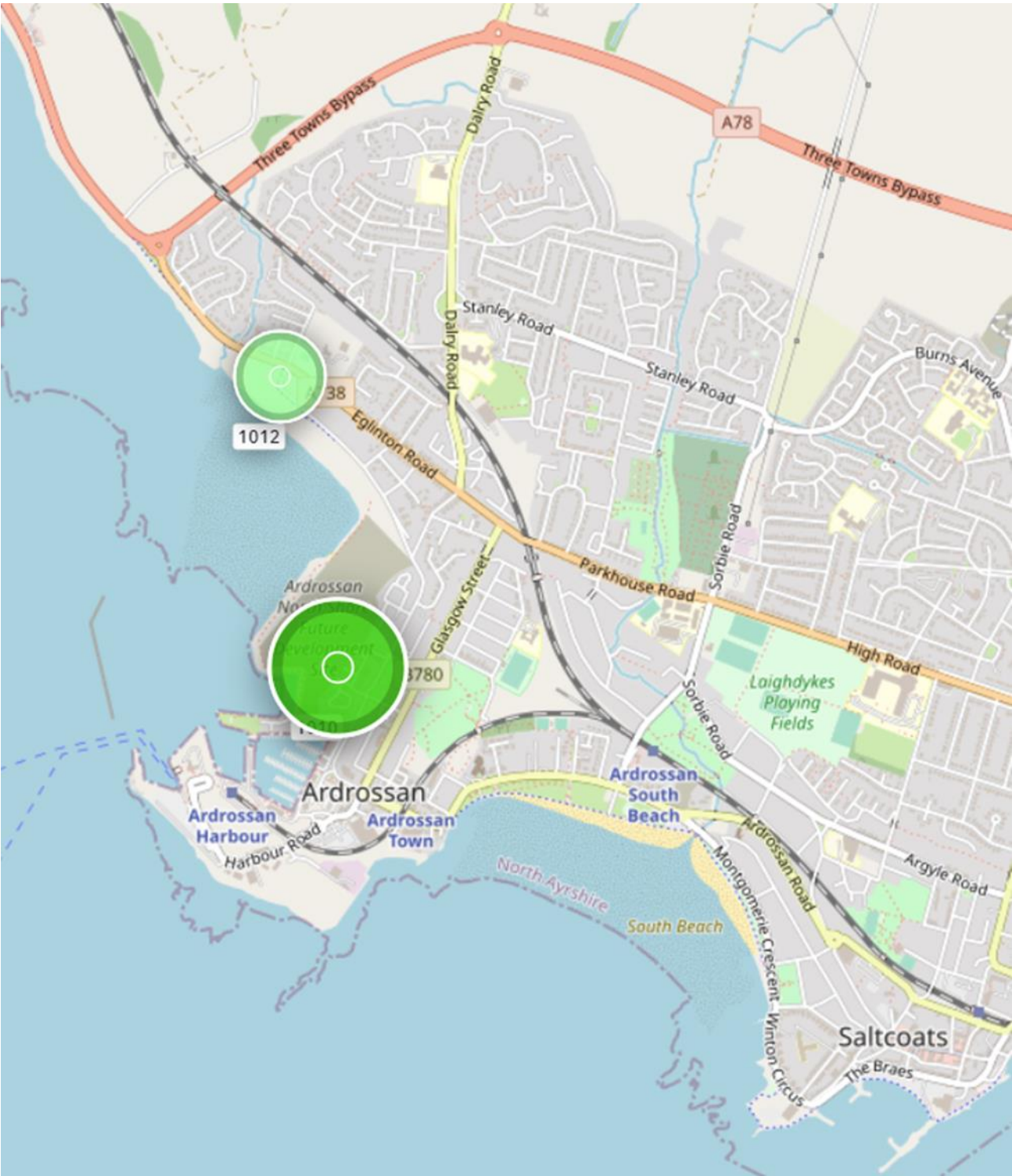


Figure 5: Trends in Annual Mean NO<sub>2</sub> Concentrations measured at Diffusion Tube Monitoring Sites in Irvine 2019 - 2023

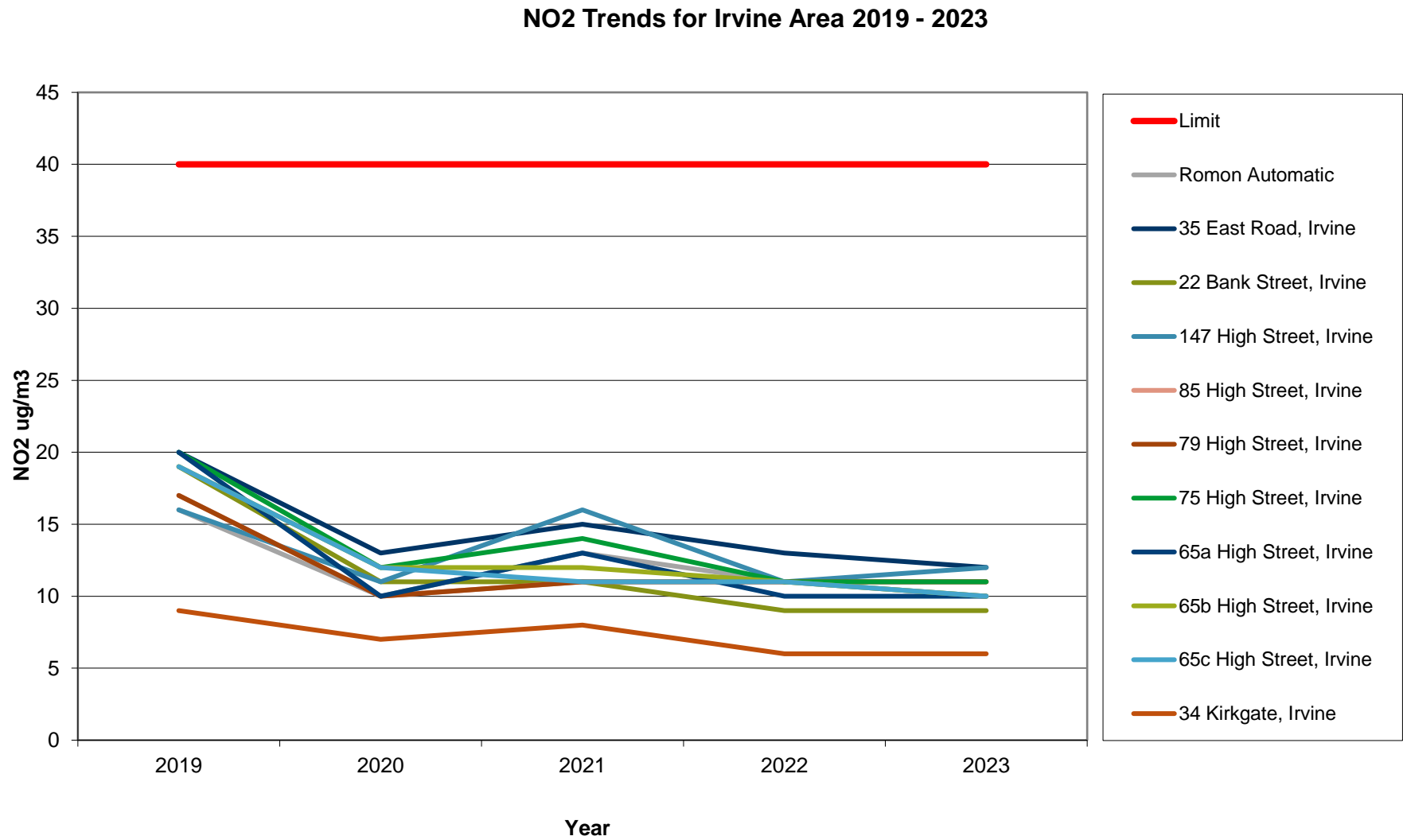
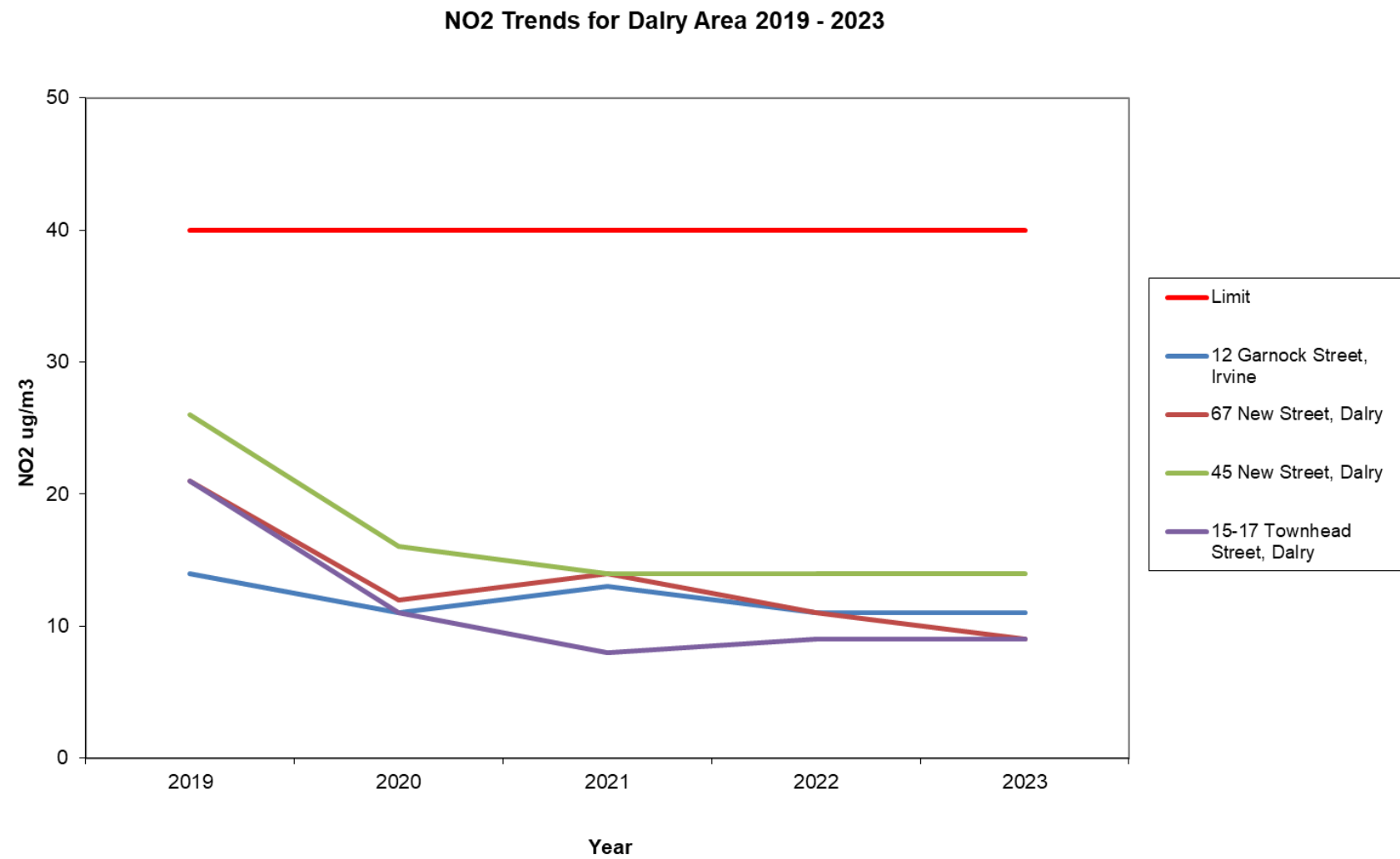
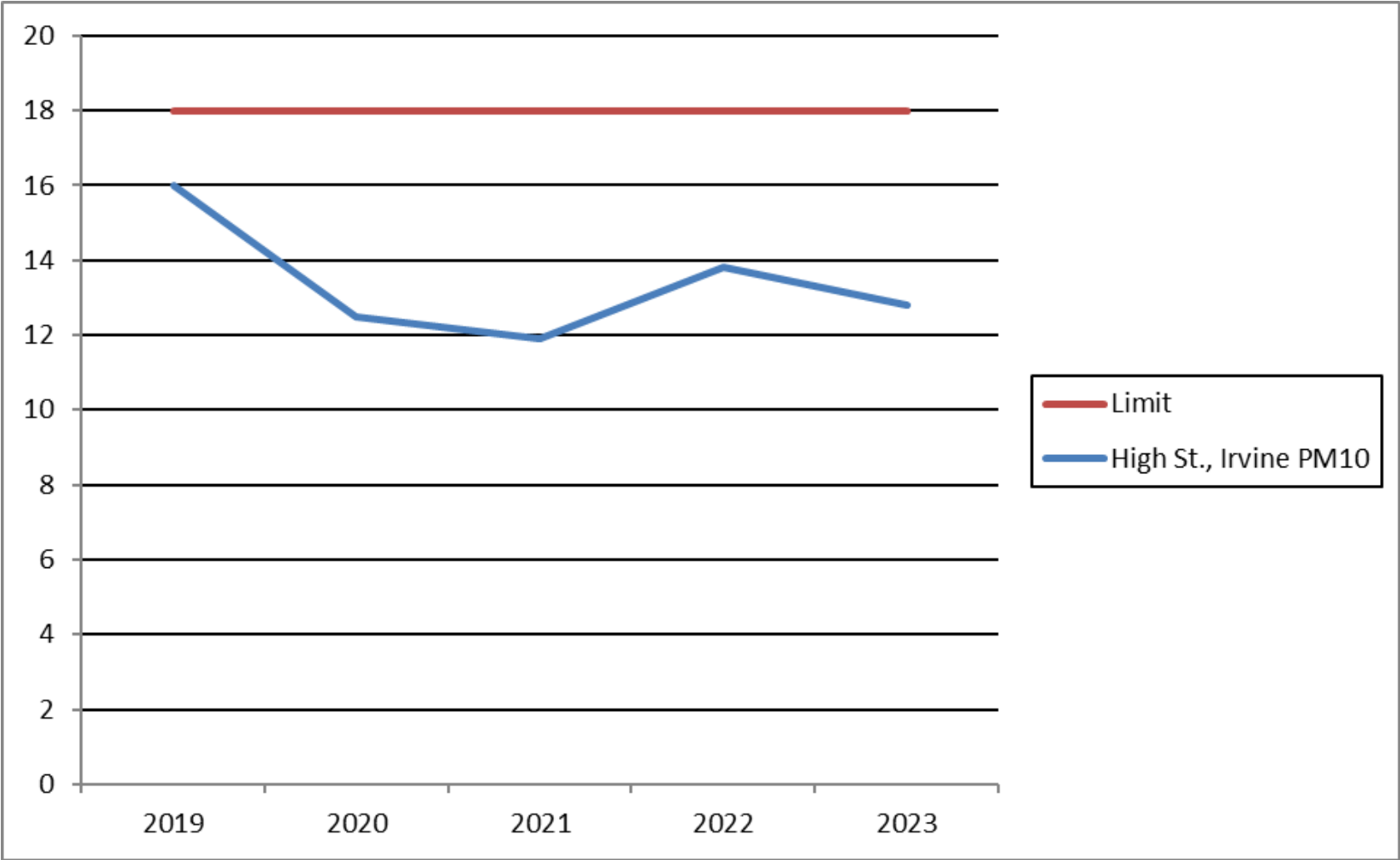


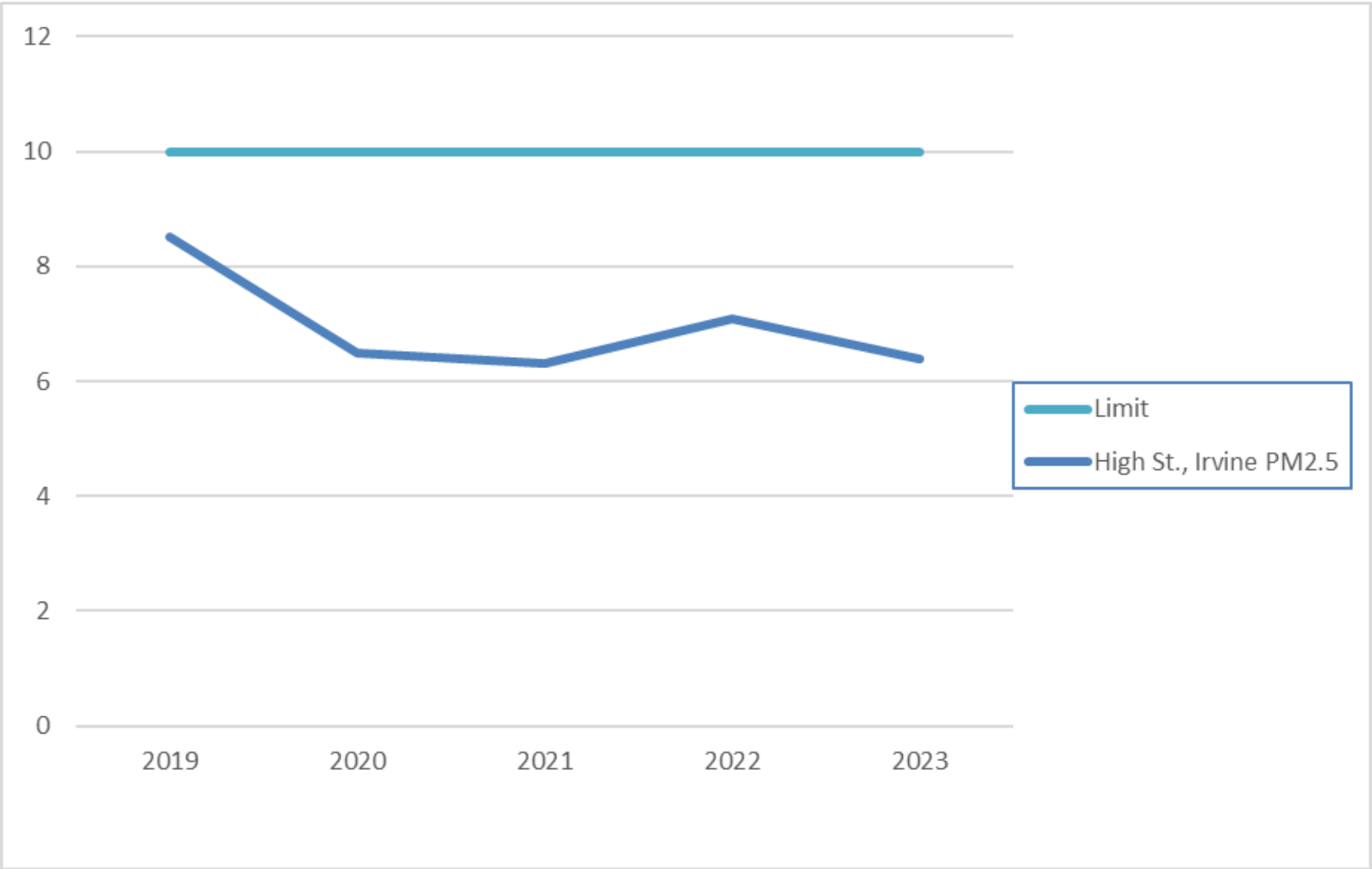
Figure 6: Trends in Annual Mean NO<sub>2</sub> Concentrations measured at Diffusion Tube Monitoring Sites in Dalry 2019-2023



**Figure 7: Trends in Annual Mean PM10 Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2019–2023**



**Figure 8: Trends in Annual Mean PM2.5 Concentrations measured at Automatic Station (ROMON) in High Street, Irvine 2019 - 2023**



## Figure 9: Tube Precision & AIR-PT Results

**Table 1: Laboratory summary performance for AIR NO<sub>2</sub> PT rounds AR046, 49, 50, 52, 53, 55, 56, 58 and 59**

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO<sub>2</sub> PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of  $\leq \pm 2$  as defined above.

AIR PT Round	AIR PT AR046	AIR PT AR049	AIR PT AR050	AIR PT AR052	AIR PT AR053	AIR PT AR055	AIR PT AR056	AIR PT AR058	AIR PT AR059
Round conducted in the period	September – October 2021	January – February 2022	May – June 2022	July – August 2022	September – October 2022	January – February 2023	May – June 2023	July – August 2023	September – October 2023
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	100 %	0 %	100 %	100 %	75 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	75 %	NR [2]	50 %	100 %	100 %	100 %	75 %	100 %	50 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	NR [2]	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Gradko International	100 %	100 %	100 % [1]	100 %	100 %	100 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	75 %	50 %	75 %	100 %	50 %	0 %	75 %	50 %	0 %
Milton Keynes Council	100 %	75 %	100 %	100 %	100 %	50 %	75 %	100 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	75 %	100 %	75 %	100 %	100 %	75 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]	NR [2]
Staffordshire County Council, Scientific Services	100 %	100 %	100 %	0 %	100 %	100 %	100 %	100 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	NR [2]	100 %	100 %	NR [2]	100 %	NR [2]	NR [2]
West Yorkshire Analytical Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR, No results reported.

[3] Cardiff Scientific Services, Exova (formerly Clyde Analytical), Kent Scientific Services, Kirklees MBC, Northampton Borough Council and West Yorkshire Analytical Services; no longer carry out NO<sub>2</sub> diffusion tube monitoring and therefore did not submit results.



Figure 10: Bias Factor Spreadsheet (Glasgow Scientific)

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/24			
<p>Follow the steps below <b>in the correct order</b> to show the results of <b>relevant</b> co-location studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet</p> <p>This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.</p>							<p>This spreadsheet will be updated at the end of June 2024</p> <p><a href="#">LAQM Helpdesk Website</a></p>			
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.			
<b>Step 1:</b>	<b>Step 2:</b>	<b>Step 3:</b>	<b>Step 4:</b>							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor <sup>3</sup> shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data <sup>2</sup>	If you have your own co-location study then see footnote <sup>4</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
<b>Analysed By<sup>1</sup></b>	<b>Method</b> To undo your selection, choose (All) from the pop-up list	<b>Year<sup>5</sup></b> To undo your selection, choose (All)	<b>Site Type</b>	<b>Local Authority</b>	<b>Length of Study (months)</b>	<b>Diffusion Tube Mean Conc. (Dm) (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Automatic Monitor Mean Conc. (Cm) (<math>\mu\text{g}/\text{m}^3</math>)</b>	<b>Bias (B)</b>	<b>Tube Precision<sup>6</sup></b>	<b>Bias Adjustment Factor (A) (Cm/Dm)</b>
Glasgow Scientific Services	20% TEA in water	2023	KS	Marylebone Road intercomparison	10	50	37	34.8%	G	0.74
Glasgow Scientific Services	20% TEA in water	2023		<b>Overall Factor<sup>3</sup> (1 study)</b>				<b>Use</b>		<b>0.74</b>

**Figure 11: RICARDO - AEA Air Pollution Report****North Ayrshire Irvine High St****01/01/2023 to 31/12/2023****These data have been fully ratified****Correction Factor for Gravimetric Equivalence applied**

	V High (No. of Days)	High (No. of Days)	Mod (No. of Days)	Low (No. of Days)	Max. Hourly Conc.	Max. Daily Conc.	Max. Running 8 Hour Mean	Max. Running 24 Hour Mean	Period Mean Conc.	Period Data Capture (%)
<b>NO (<math>\mu\text{g}/\text{m}^3</math>)</b>	0	0	0	0	182.3	47.4	-	-	5.1	99.2
<b>NO2 (<math>\mu\text{g}/\text{m}^3</math>)</b>	0	0	0	365	86.2	38.4	-	-	10.2	99.2
<b>NOX (<math>\mu\text{g}/\text{m}^3</math>)</b>	0	0	0	0	361.9	111.1	-	-	18.1	99.2
<b>PM10 (<math>\mu\text{g}/\text{m}^3</math>)</b>	0	0	0	365	140.3	-	-	34	11.6	100
<b>PM2.5 (<math>\mu\text{g}/\text{m}^3</math>)</b>	0	0	0	365	44	-	27	24.5	6	100

Particulate matter concentrations are reported at ambient temperature and pressure.  
All mass units are at 20°C and 1013mb.

	<b>Air Quality Objective</b>	<b>Exceedances</b>	<b>Days</b>
<b>NO2</b>	Hourly mean > 200 $\mu\text{g}/\text{m}^3$	None	0
<b>NO2</b>	Period mean > annual mean obj 40 $\mu\text{g}/\text{m}^3$	No	
<b>PM10</b>	Daily mean > 50 $\mu\text{g}/\text{m}^3$	None	0
<b>PM10</b>	Period mean > annual mean obj 18 $\mu\text{g}/\text{m}^3$ (Scotland)	No	
<b>PM2.5</b>	Period mean > annual mean obj 10 $\mu\text{g}/\text{m}^3$ (Scotland)	No	
<b>PM2.5</b>	Period mean > annual mean obj 20 $\mu\text{g}/\text{m}^3$ (EU)	No	
Note: When comparing site measurements against the air quality objectives data capture should meet or exceed 90% across a calendar year.			

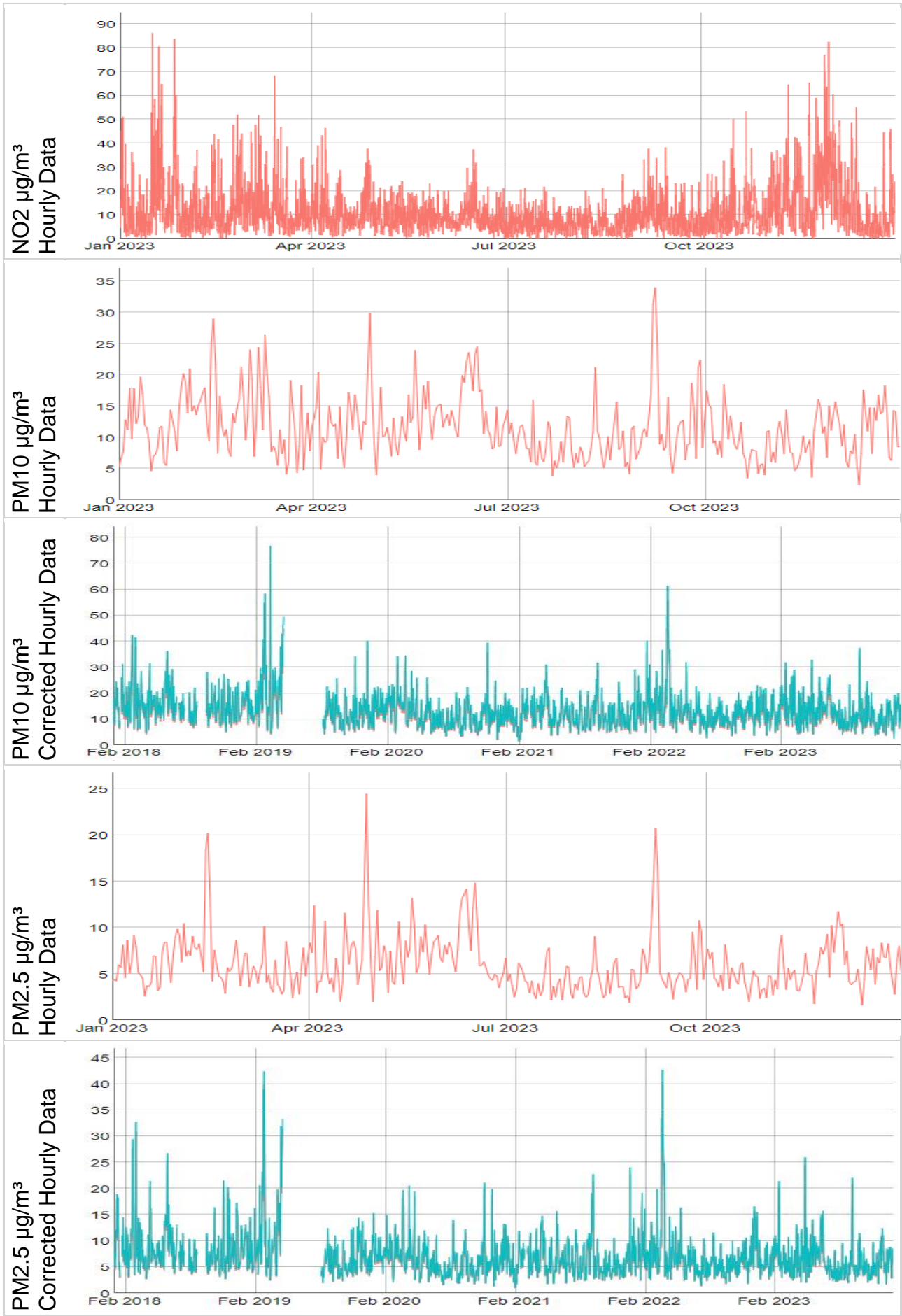


Figure 12: Ricardo - AEA Certificates of Calibration



**CERTIFICATE OF CALIBRATION**

Ricardo Energy & Environment 18 Blythwood Square, Glasgow, G2 4BG

Telephone 01235 753434



Page 1 of 3

Approved Signatories:

☐ S. Eaton

☐ D Hector

☐ N Rand

☐ B Davies

☐ B Stacey

☐ S Stratton

☒ S Telfer

☐ S Gray

Signed:



Date of issue:

23 March 2023

Certificate Number:

6204

Customer Name and Address:

Scottish Government  
Water, Air, Soils and Flooding Division  
Environmental Quality Directorate  
Scottish Government  
Victoria Quay  
Edinburgh  
EH6 6QQ

Description:

Calibration factors for the air monitoring station(s) at  
North Ayrshire Council

Ricardo Energy & Environment ID:

ED11194/6204

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor  $k=2$  providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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CERTIFICATE OF CALIBRATION



Page 2 of 3

Date of issue: 23 March 2023  
Certificate Number: 6204  
Ricardo Energy & Environment ID: ED11194/6204

North Ayrshire Council  
NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response <sup>1</sup>	Zero uncertainty nmol/mol	Calibration Factor <sup>2</sup>	Factor uncertainty %	Converter eff. (%) <sup>3</sup>
North Ayrshire Irvine High Street	15 December 2022	NOx	19-2513	1.0	2.6	1.0878	3.50	100 (263nmol/mol)
		NO		1.0	2.5	1.0778	3.50	100 (116nmol/mol)

Fidas analysers

Station	Date of audit	Analyser Serial no	Calculated k <sub>p</sub> <sup>3</sup>	Uncertainty %	Total flow <sup>4</sup>	Uncertainty %	Main flow	Uncertainty %
North Ayrshire Irvine High Street	15 December 2022	6251			4.88	2.2		2.2



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# CERTIFICATE OF CALIBRATION



Page 3 of 3

Date of issue: 23 March 2023

Certificate Number: 6204

Ricardo Energy & Environment ID: ED11194/6204

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and  $k_0$  (where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are reported in concentration units of nmol/mol or  $\mu\text{mol/mol}$ .

<sup>1</sup> The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

<sup>2</sup> The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (nmol/mol for NO, NOx, SO<sub>2</sub>, O<sub>3</sub> and  $\mu\text{mol/mol}$  for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration =  $F(\text{Output} - \text{Zero Response})$

Where  $F$  = Calibration Factor provided on this certificate

Output = Reading on the data logging system of the analyser

Zero Response = Zero Response provided on this certificate

<sup>3</sup> Converter eff. is the measured efficiency of the NO<sub>2</sub> to NO converter within the oxides of nitrogen analyser under test.

<sup>4</sup> The measured main flow rate (where this is applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where this is applicable) is the flow rate through the bypass tubing of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are L.min<sup>-1</sup>, reported at prevailing ambient conditions unless otherwise specified. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

<sup>5</sup> The calculated  $k_0$  value (specifically for TEOM analysers) is the calculated  $k_0$  spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified value of  $k_0$ .

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.


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**CERTIFICATE OF CALIBRATION**  
Ricardo Energy & Environment, 18 Blythwood Square, Glasgow, G2 4BG  
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Page 1 of 3

Approved Signatories:

☐ S. Eaton  
☐ N Rand  
☐ B Davies

☐ B Stacey  
☐ S Stratton  
☒ S Telfer  
☐ S Gray

Signed:

Date of issue:

17 August 2023

Certificate Number:

6414

Customer Name and Address:

Scottish Government  
Water, Air, Soils and Flooding Division  
Environmental Quality Directorate  
Scottish Government  
Victoria Quay  
Edinburgh  
EH6 6QQ

Description:

Calibration factors for the air monitoring station(s) at  
North Ayrshire Council

Ricardo Energy &amp; Environment ID:

ED11194/6414

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor  $k=2$  providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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CERTIFICATE OF CALIBRATION



Date of issue: 17 August 2023  
Certificate Number: 6414  
Ricardo Energy & Environment ID: ED11194/6414

North Ayrshire Council  
NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response <sup>1</sup>	Zero uncertainty nmol/mol	Calibration Factor <sup>2</sup>	Factor uncertainty %	Converter eff. (%) <sup>3</sup>
North Ayrshire Irvine High Street	13 June 2023	NOx	19-2513	0.0	2.6	1.0820	3.50	99.2 (267nmol/mol)
		NO		0.0	2.5	1.0747	3.50	98.8 (186nmol/mol)

FIDAS analysers

Station	Date of audit	Analyser Serial no	Calculated ko <sup>2</sup>	Uncertainty %	Total flow <sup>4</sup>	Uncertainty %	Main flow	Uncertainty %
North Ayrshire Irvine High Street	13 June 2023	6251			4.54	2.2		2.2



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# CERTIFICATE OF CALIBRATION



Page 3 of 3

Date of issue: 17 August 2023

Certificate Number: 6414

Ricardo Energy & Environment ID: ED11194/6414

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO<sub>x</sub> analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and  $k_0$  (where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are reported in concentration units of nmol/mol or  $\mu$ mol/mol.

<sup>1</sup> The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

<sup>2</sup> The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (nmol/mol for NO, NO<sub>x</sub>, SO<sub>2</sub>, O<sub>3</sub> and  $\mu$ mol/mol for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)

Where F = Calibration Factor provided on this certificate

Output = Reading on the data logging system of the analyser

Zero Response = Zero Response provided on this certificate

<sup>3</sup> Converter eff. is the measured efficiency of the NO<sub>2</sub> to NO converter within the oxides of nitrogen analyser under test.

<sup>4</sup> The measured main flow rate (where this is applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where this is applicable) is the flow rate through the bypass tubing of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are l.min<sup>-1</sup>, reported at prevailing ambient conditions unless otherwise specified. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

<sup>5</sup> The calculated  $k_0$  value (specifically for TEOM analysers) is the calculated  $k_0$  spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified value of  $k_0$ .


The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

End of certificate

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Figure 13: NOx & PM Service Reports



Enviro Technology Services


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www.et.co.uk

### ENGINEER'S REPORT

 Please consider the environment before printing this report

ET Ref No:

CS 26202

Customer Order No:

Engineer Name:

Colin Rennie

Visit Type:

Routine Service

Enviro Client / Database Name:

North Ayrshire

Official AURN Site Name (if applicable):

Irvine

Site Visit Start Date:

15/02/2023

Time:

10:40

GMT

(Data Elimination)

Site Visit End Date:

15/02/2023

Time:

14:10

GMT

Reported Fault / Task:

Issues Found at Audit:

Yes ☒ OptNo ☐ OptNA ☐ Opti

Carry out routine service of Fidas & nox analysers. 6 monthly service of AC unit.

Engineer's Comments:

Audit Issues Resolved:

Yes ☒ OptNo ☐ OptNA ☐ Opti

Service carried out as above. I didn't find any of the audit issues, how ever leak check failed badly at first. O rings replaced. Everything is servicable now. Nox stabilises in 4 minutes at 0.5Bar so didn't see any great gas loss during calibration. No leaks in the cal system. AC all OK.

Communications Tested:


Yes ☒ OptNo ☐ OptNA ☐ Opti

Parts Used:

Part Number	Description	Quantity
162677	Fidas filter	1
#N/A	O ring 4x42	1
#N/A	O riing 2x20	1
FILT-004	Filter, 47mm 5um P.T.F.E., 25pk (unlaminated)	2


Total Time:

3.5

**Enviro Technology Services***Air Pollution Solutions*

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### ENGINEER'S REPORT

 Please consider the environment before printing this report

ET Ref No: CS 27972

Customer Order No:

Engineer Name: Colin Rennie

Visit Type: Routine Service

Enviro Client / Database Name: North Ayrshire

Official AURN Site Name (if applicable): Irvine

Site Visit Start Date: 15/08/2023

Time: 10:15

GMT (Data Elimination)

Site Visit End Date: 15/08/2023

Time: 13:15

GMT

Reported Fault / Task:

Issues Found at Audit: Yes ☐ Opt ☒ No ☐ Opt ☐ NA ☐ Opt ☒

Carry out routine service of Fidas & nox analysers. 6 monthly service of AC unit. Annual PAT test of equipment.

Engineer's Comments:

Audit Issues Resolved: Yes ☐ Opt ☒ No ☐ Opt ☐ NA ☐ Opt ☒

Service carried out as above, all OK. AC filters cleaned, functions / temps checked, all OK. Calibrated with on site cylinder & dust. Repaired slightly damaged tubing at cylinder.

Communications Tested: Yes ☒ Opt ☐ No ☐ Opt ☐ NA ☐ Opt ☐

Parts Used:

Part Number	Description	Quantity
FILT-004	Filter, 47mm 5um P.T.F.E., 25pk (unlaminated)	2

Total Time: 3hrs

## 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	Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
CAD	Clean Air Day
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
DT	Diffusion Tube
EVs	Electric Vehicles
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
LTS	Local Transport Strategy
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

## References

1. Cleaner Air for Scotland Strategy – The Road to a Healthier Future (CAFS), November 2015.
2. Cleaner Air for Scotland 2 – Towards a Better Place for Everyone (CAFS2) July 2022.
3. Environment Act 1995 Part IV.
4. Local Air Quality Management, Technical Guidance LAQM.TG (22), August 2022.
5. North Ayrshire Council Adopted Local Development Plan, November 2019.
6. North Ayrshire Council Development Plan Scheme, November 2023.
7. North Ayrshire Council Electric Vehicle (EV) Strategy 2023-28.
8. North Ayrshire Council Environmental Sustainability & Climate Change Strategy 2022-2023.
9. North Ayrshire Council Local Transport and Active Travel Strategy 2023-2028.