Argyll and Bute Council

Comhairle Earra-Ghàidheal agus Bhòid

2022 Air Quality Annual Progress Report (APR) for **Argyll and Bute Council**

In fulfilment of Part IV of the

Environment Act 1995

Local Air Quality Management

Argyll and Bute Council

Comhairle Earra-Ghàidheal agus Bhòid

Information	**Argyll and Bute Council**
Local Authority Officer	Anthony Carson
Department	Development and Economic Growth
Address	Kilmory, Lochgilphead PA31 8RT
Telephone	01546 604421
E-mail	envhealth@argyll-bute.gov.uk
Report Reference Number	LAQM/APR/2022
Approved by Alan Morrison, Regulatory Services Manager	
Signature	
Date	14/09/2022

Executive Summary: Air Quality in Our Area

Air Quality in Argyll and Bute

Air quality in Argyll and Bute is considered to be generally very good and complies with all the air quality objectives listed in Table 1.1. The Council has not identified any areas where air quality objectives may be under threat and where specific action is required to improve air quality. The COVID-19 pandemic is considered to have had a continuing impact on local air quality and the medium term impacts will be considered in future progress reports. However, in the short-term, this report has identified that annual average nitrogen dioxide (NO_2) concentration levels in 2021 generally showed a slight increase with regard to those of 2020 at most monitoring locations, although well below the statutory action limit. This is likely to be related to greater outdoor mobility during the second year of the Covid-19 response.

There is therefore no requirement to undertake a Detailed Assessment for any pollutant.

Argyll and Bute is an authority with over 73% of its area classified as remote[1] and a widely distributed population. Helensburgh is the only town with a population greater than 10,000 and industries tend to be geographically diverse and related to the natural assets of the area. Forestry and agriculture are prevalent inland, whilst in coastal areas there are a number of distilleries, aquaculture and fishing businesses. Large scale industry is absent and this is reflected by the low number and nature of industries regulated by SEPA under the Pollution Prevention and Control regime. Tourism makes a significant and important contribution to the Argyll and Bute economy and is responsible for higher summer-time traffic flows in some areas.

The shift to install small to medium-sized biomass boilers at commercial premises has continued. Technical details supporting planning applications are subject to scrutiny and evaluation in accordance with guidance to ensure that air quality objectives should not be compromised.

National modelling of sources of nitrogen dioxide (NO_2) and fine particulates[7] show that background concentrations are very low. In the absence of industry hotspots, the major

potential source of pollution that may impact on resident's health is transportation. However, traffic flows tend to reflect the low density dispersed population. Nitrogen dioxide levels have been monitored at locations in a network of town centres for more than 10 years. This monitoring has shown a trend of low and decreasing NO_2.

Challenges, highlighted through the COVID-19 response and preparation of the 2021 APR prompted a review of the Council's NO_2 monitoring program. This was completed in December 2021 and reviewed the monitoring locations and arrangements for undertaking the monthly changeover. As a result the number of monitoring locations were reduced, retaining only those in the busiest town centres with relevant exposure. Procedures were also improved and arrangements for tube changeover were enhanced.

Monitoring showed slight increases at most locations on the 2020 levels reported in 2021. The measured annual trends in Figures 1 to 10 shows that nitrogen dioxide levels are well below the annual objective, and that trends in the data over the last eleven years are falling.

Actions to Improve Air Quality

Where opportunities exist the Council supports initiatives such as the multi-agency Argyll Timber Transport Forum which aims to minimise the environmental impact of timber transport between forest and mill. This is achieved through the use of dedicated off-highway transport routes and sea transport via the TimberLINK network. The TimberLINK service ships up to 100,000 tonnes of timber a year from the Argyll ports of Ardrishaig, Campbeltown, Sandbank and temporary facilities to wood processing plants in Ayrshire. This removes around 8,000 lorry journeys (or nearly one million lorry miles) a year from roads between Argyll and Ayrshire, including tourist routes in Argyll and roads within the Greater Glasgow conurbation.

The Council works in Partnership with Transport Scotland, Highlands and Islands Transport Partnership (HITRANS) and Strathclyde Partnership for Transport (SPT) to secure funding to install electric vehicle charging infrastructure across the region and to improve accessibility to public transport services with the aim of reducing the dependence on vehicles powered by fossil fuels.

Local Priorities and Challenges

Although the Council does not face any specific challenges in relation to air quality the current regulatory system does not fully control the potential emissions from smaller biomass boilers and stoves which often fall out with the development planning system. In the Cleaner Air for Scotland 2 (CAFS2) deliver plan, published in July 2021, the Scottish Government's objectives for domestic (household) burning are to encourage cleaner fuels and stove efficiency, introduce controls on the most polluting fuels, and update existing controls on domestic burning. Their key medium term actions (to 2024) in this respect are to work with SEPA and local government on what changes are needed to the current permitted development rights for flues for woodburning stoves and biomass boilers. The Council looks forward to the outcomes of this work, leading to better regulation of these combustion sources, and associated benefits for public health through improved local air quality.

How to Get Involved

The Council publishes a report summarising the results of its air quality monitoring Copies can be downloaded at https://www.argyll-bute.gov.uk/planning-and-environment/air-pollution-and-local-air-quality.

Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) is summarises the work being undertaken by Argyll and Bute 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 an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

Argyll and Bute Council currently does not have any AQMAs and this current and past annual assessments suggest that it will be very unlikely to be necessary to declare any AQMAs in the future based on current air quality objectives.

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 Argyll and Bute 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.

Argyll and Bute Council has policies on Placemaking in the Proposed Argyll and Bute Local Development Plan 2[(11)]. The Plan doesn't have specific policies on Air Quality or

detail specific air quality initiatives within Placemaking policies. However Placemaking policies in areas such as building design, active travel and transport relate directly to sustainability and climate change mitigation within which improving air quality is implicit.

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.

Argyll and Bute Council as a predominantly rural local authority doesn't have the association of high traffic density within urban conurbations which characterise poor air quality in many of our cities. Argyll and Bute Council will continue to work towards short and medium term outcomes for transport within the CAFS2 led by Regional and National strategies, including outcomes relating to avoiding unnecessary travel, promoting active travel and reducing transport emissions.

2.2.3 National Park

Argyll and Bute Council area includes a proportion of Loch Lomond and the Trossachs National Park. The National Park Authority undertakes some typical local authority functions within its boundaries such as being the Planning Authority, and have responded positively to previous consultations on Local Air Quality Management. The Park Authority has cited relevant initiatives within its Local Development Plan to understand current emissions, and reduce the need to travel to and within the National Park by car. They have recently developed planning guidance on Sustainable and Active Travel and are working with communities in developing their Rural 20 minute neighbourhood model. A pilot study to create a relevant approach and resource available for Argyll and Bute communities has been undertaken and research recently commissioned to assess and appraise Sustainable Travel and Modal Shift.

2.3 Progress and Impacts of Measures to address Air Quality in Argyll and Bute Council

Argyll and Bute Council currently does not have any AQMAs, and therefore does require an Air Quality action plan.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Argyll and Bute Council did not undertake any automatic (continuous) monitoring during 2021 as previous reports identified that this was unnecessary

3.1.2 Non-Automatic Monitoring Sites

Argyll and Bute Council undertook non- automatic (passive) monitoring of NO_2 at 10 sites during 2021. Table A.1 in Appendix A shows the details of the sites.

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

Argyll and Bute Council's monitoring programme reflects the previous outcomes of assessment reports which identified nitrogen dioxide as a pollutant to monitor. 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.

A review of the Council's air quality monitoring programme was carried out at the end of 2021. This review resulted in a rationalisation of the programme and a reduction of monitoring locations. The review did not have any implications for monitoring during 2021 or its reporting in this APR.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3.

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B.

The results show that for all sites the bias adjusted annual mean concentrations of NO_2 continue to be well below the annual objective. The majority of sites have been monitored continuously for between 10 and 15 years allowing trends to be shown. Figures 1 to 10 (Appendix A) show continuing downward trend in annual average NO_2 concentrations at all urban sites. In many cases the 2021 annual mean NO_2 concentrations are slightly increased on 2020 data, although consistent with or lower than pre-pandemic levels and within the overall downward trend since 2010. This is likely due to continuing COVID-19 response measures during the 2021 allowing greater personal travel and transportation.

3.2.2 Particulate Matter (PM_{10})

Argyll and Bute Council does not monitor Particulate Matter.

3.2.3 Particulate Matter ($PM_{2.5}$)

Argyll and Bute Council does not monitor Particulate Matter.

3.2.4 Sulphur Dioxide (SO_2)

Argyll and Bute Council does not monitor for SO_2.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Argyll and Bute Council does not monitor carbon monoxide, lead or 1,3 butadiene.

4 New Local Developments

Since the publication of the 2021 Annual Progress Report[4] there have been a small number of new developments which, if approved, may affect air quality as characterised by guidance LAQM TG16[5]. They are listed in the sections below:

4.1 Road Traffic Sources

Argyll and Bute Council confirms that there are no roads or features in the following list that are new or newly identified that would require further assessment:

- Narrow congested streets with residential properties close to the kerb.
- Busy streets where people may spend one hour or more close to traffic.
- Roads with a high flow of buses and/or HGVs.
- Junctions.
- New roads constructed or proposed
- Roads with significantly changed traffic flows.
- Bus or coach stations.

4.2 Other Transport Sources

Argyll and Bute Council confirms that there none of the following that are new or newly identified that would warrant further assessment:

- Airports.
- 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 large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.
- Ports for shipping.

4.3 Industrial Sources

Argyll and Bute Council confirms that there none of the following that are new or newly identified that would warrant further assessment:

- Industrial installations: new or proposed installations for which an air quality assessment has been carried out.
- Industrial installations: existing installations where emissions have increased substantially or new relevant exposure has been introduced.
- Industrial installations: new or significantly changed installations with no previous air quality assessment.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms.

4.4 Commercial and Domestic Sources

No new assessments of biomass boilers (>50kW) were received for developments during 2021.

Argyll and Bute Council confirms that there are no new risks of objectives being exceeded due to individual installations or the combined impacts of multiple biomass/domestic combustion installations.

4.5 New Developments with Fugitive or Uncontrolled Sources

There are a number of new un-metalled access roads associated with forestry extraction or windfarm construction that are of a temporary nature and are hard surfaced with graded and rolled aggregate. These roads are of a standard suitable for road-going vehicles and are invariably remote, inherently damp and do not threaten to cause breaches of PM_{10} or $PM_{2.5}$ objectives.

The Council does not propose to carry out individual assessments of these sources unless particular circumstances indicate that it would be appropriate.

5 Planning Applications

The only significant planning application with a potential air quality impact and subject to an air quality assessment submitted in 2021 was:

21/02138/PP Campbeltown Hospital. Extension to the existing boiler house building and relocation of existing oil tanks

This application was approved with a suspensive condition requiring submission of an air quality impact assessment.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

The graphs in Figures 1 to 10 (Appendix A) continue to show a long-term steady or falling trend in those areas monitored by nitrogen dioxide diffusion tubes and all sites are well below the annual mean objective. There is therefore no requirement to undertake a Detailed Assessment.

6.2 Conclusions relating to New Local Developments

Only one development application during 2021 was considered to contain proposals with potential adverse air quality impact. A recommended suspensive condition in this respect was adopted in its determination, and air quality impact will be considered when supporting assessment documents are submitted.

6.3 Proposed Actions

Monitoring during 2021 confirmed levels of atmospheric NO_2 continue to be well below the air quality objective. Therefore no actions, to reduce NO_2 concentrations, are required to meet this objective.

Argyll and Bute Council undertook a detailed review of its NO_2 monitoring program in 2021. It found that the risks of exceedance of annual mean objectives for NO_2 were low at all locations. It concluded that the value in monitoring public exposure at a number of the existing locations was limited: principally in their siting on roadsides with relatively low traffic flow, and in open settings where topography necessary to concentrate ambient pollution levels were absent. It was decided to remove these locations from the programme.

Monitoring ceased at Campbeltown and Dunoon due to the relatively low traffic flow.

Monitoring ceased at Cardross due to limited public exposure and its open topography.

Monitoring at Lochgilphead ceased due to both relatively low traffic flow and open topography

Monitoring will continue in 2022 for locations in Oban and Helensburgh as there is relatively high local traffic flow through these towns and the building heights and layout provide a topography which could concentrate ambient pollution levels.

A copy of the 2021 review document can be provided on request.

Results of monitoring and other air quality assessment work will be presented in the next Annual Progress Report due in June 2023.

Appendix A: Monitoring Results

Table A.1 – 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?	Tube Height (m)
N1	George Street 1, Oban	Roadside	185921	729942	NO_2	N	5	2	No	2.5
N2	George Street 2, Oban	Roadside	185880	730253	NO_2	N	0	5	No	2
N3	George Street 3, Oban	Roadside	185870	730317	NO_2	N	0	5	No	2
N4	Argyll Street, Dunoon	Roadside	217324	676894	NO_2	N	6	3	No	2.5
N5	Main St, Campbeltown	Roadside	171970	620380	NO_2	N	0	3	No	2.5
N6	Colchester Sq, Lochgilphead	Roadside	186280	687920	NO_2	N	0	2	No	2.5
N7	Inverneil	Rural Background	184019	681303	NO_2	N	3	N/A	No	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) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
N8	East Princes St, Helensburgh	Roadside	229919	682287	NO_2	N	4	2	No	2.5
N9	Main Road, Cardross	Roadside	234338	677717	NO_2	N	6	2	No	2.5
N10	Sinclair Street Helensburgh	Roadside	229675	682442	NO_2	N	0	3	No	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.2 – Annual Mean NO_2 Monitoring Results ($\mu g/m^3$)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
N1	Roadside	Diffusion Tube	100	100	21.1	20.1	21.4	14.0	19
N2	Roadside	Diffusion Tube	84	84	22.5	22.2	20.1	15.2	20.5
N3	Roadside	Diffusion Tube	100	100	22.5	20.8	21.9	16.1	18.3
N4	Roadside	Diffusion Tube	100	100	12.1	12.1	13.5	8.2	9.6
N5	Roadside	Diffusion Tube	100	100	15.4	15.8	15.6	9.6	12.8
N6	Roadside	Diffusion Tube	92	92	17.8	13.5	14.8	10.3	10.8
N7	Rural B'ground	Diffusion Tube	75	75	2.1	2.1	2.2	2.7	2.2
N8	Roadside	Diffusion Tube	100	100	10.8	9.9	11.8	10.3	10
N9	Roadside	Diffusion Tube	100	100	10.7	11.2	13.0	9.3	11.7
N10	Roadside	Diffusion Tube	100	100	17.1	15.0	15.5	10.9	14.1

Notes:

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

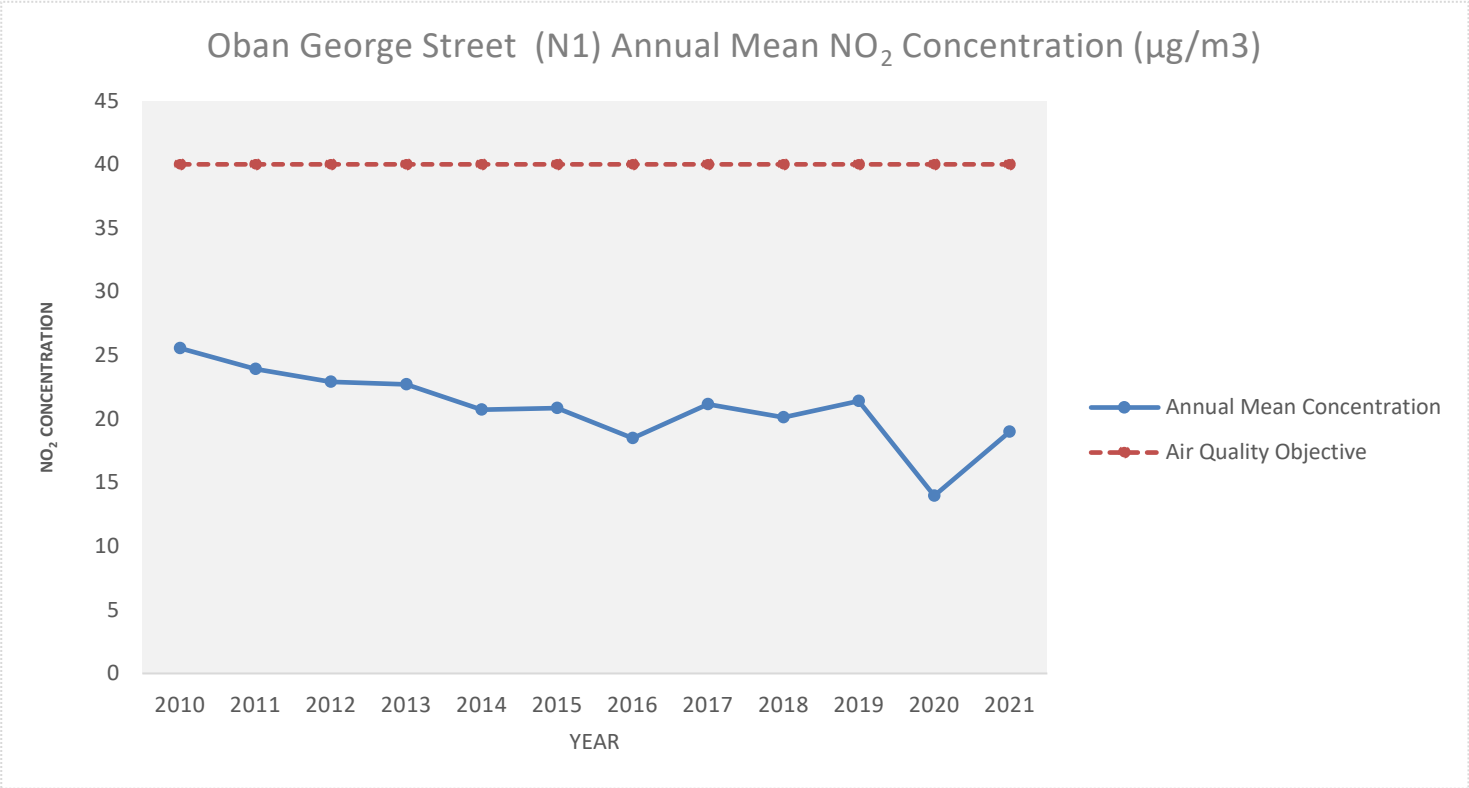

Figure 1 Annual mean NO_2 concentrations for site N1 Oban 2010 to 2021.

This chart shows a drop in annual mean concentrations of 25.6µg/m^3 in 2010 to between 18.5 and 21.4µg/m^3 for the period 2014 to 2019. In 2020 there is a drop to 14µg/m^3 and then a rise to 19µg/m^3 in 2021, related to Covid-19 response. It shows a long-term falling, then generally steady pre-Covid trend in annual mean concentrations at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

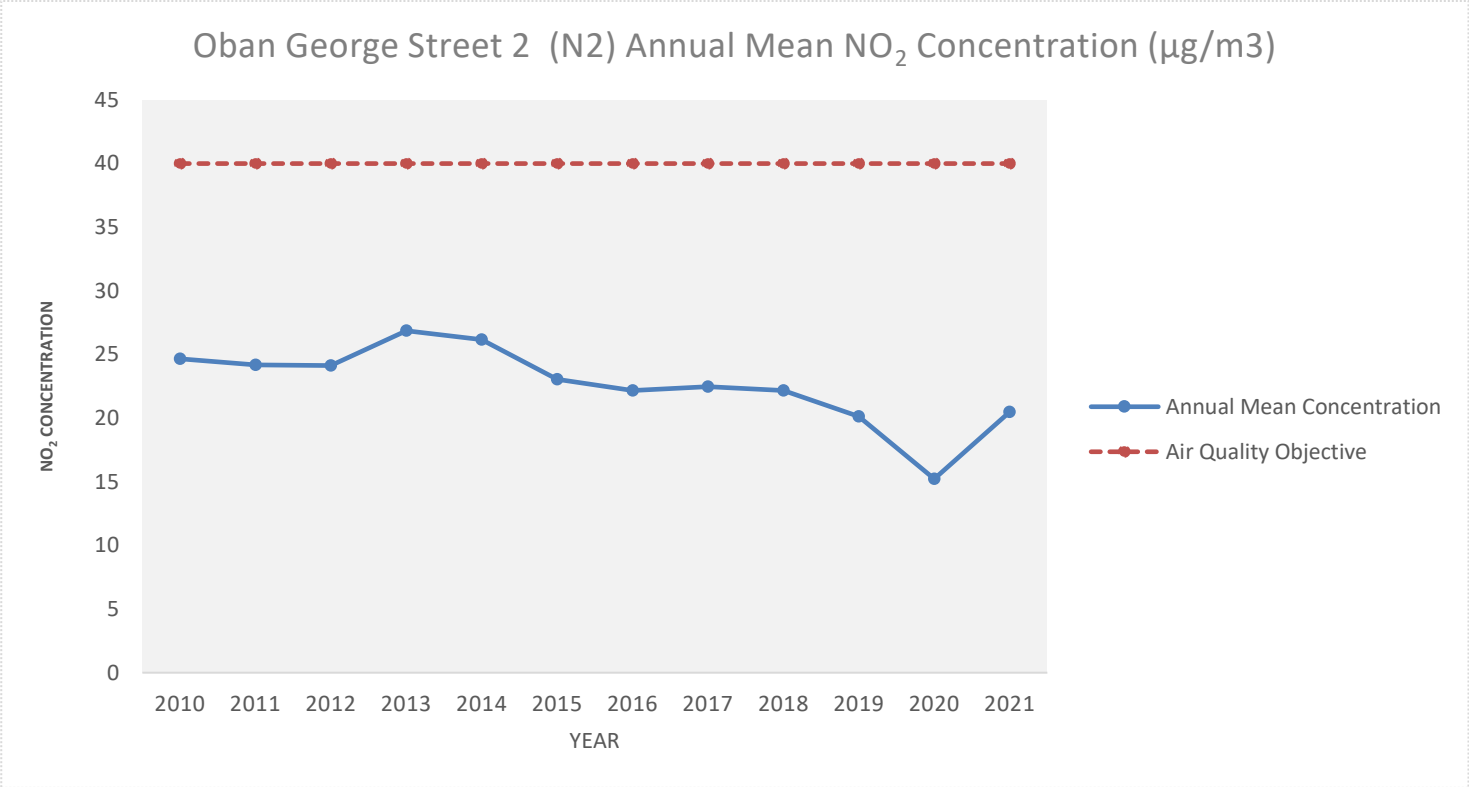

Figure 2 Annual mean NO_2 concentrations for site N2 Oban 2010 to 2021.

This chart shows a drop in annual mean concentrations from 26.9µg/m^3 in 2013 to 20.1µg/m^3 in 2019. In 2020 there is a drop to 15.2µg/m^3 and then a rise to 20.5µg/m^3 in 2021, related to Covid-19 response. It shows a 6 year falling trend in pre-Covid annual mean concentrations at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

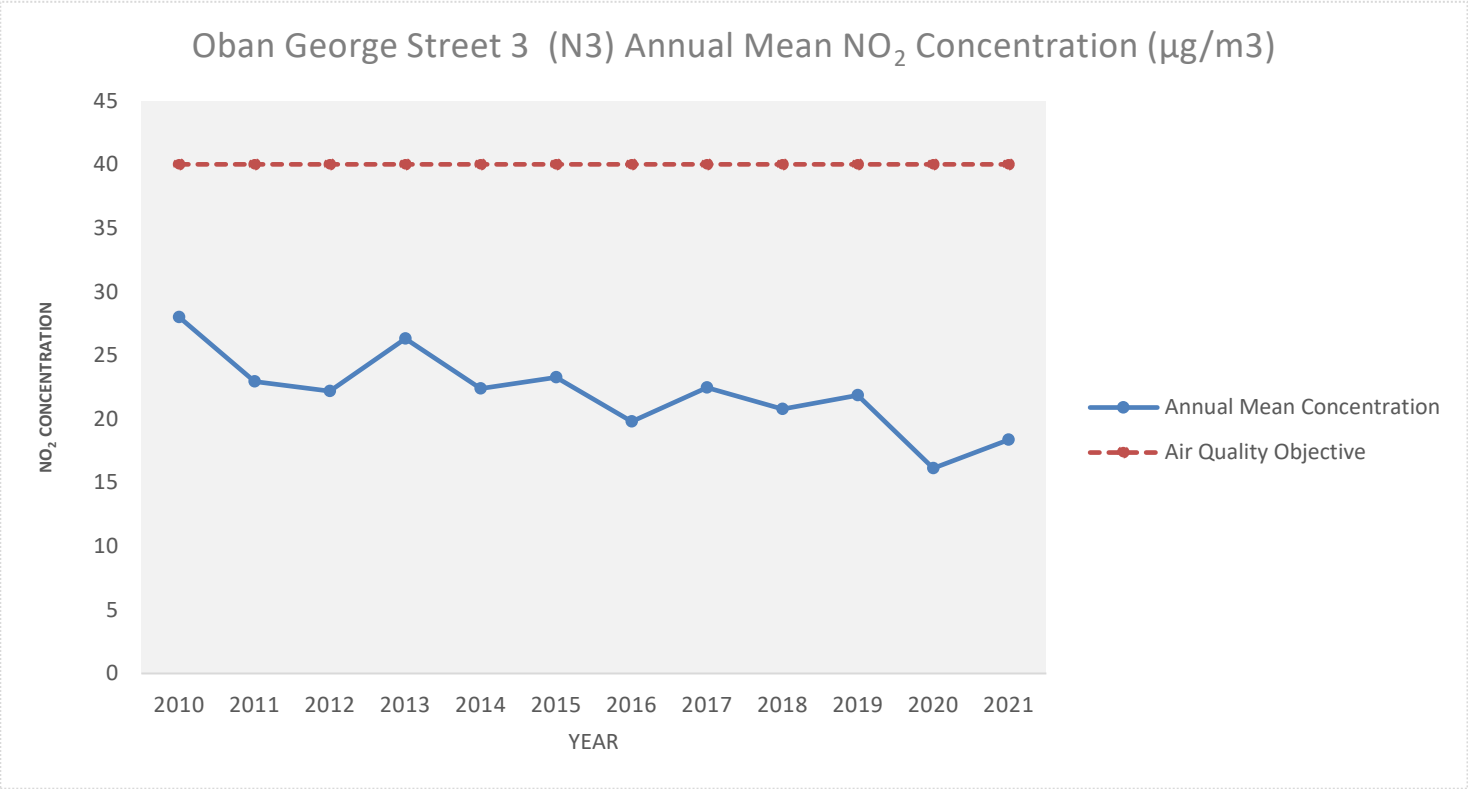

Figure 3 Annual mean NO_2 concentrations for site N3 Oban 2010 to 2021.

This chart shows a drop in annual mean concentrations from 28µg/m^3 in 2010 to 15.5µg/m^3 to 2019. In 2020 there is a drop to 10.9µg/m^3 and then a rise to 14.1µg/m^3 in 2021, related to Covid-19 response. It shows a long-term pre-Covid fluctuating, generally falling trend in annual mean concentrations at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

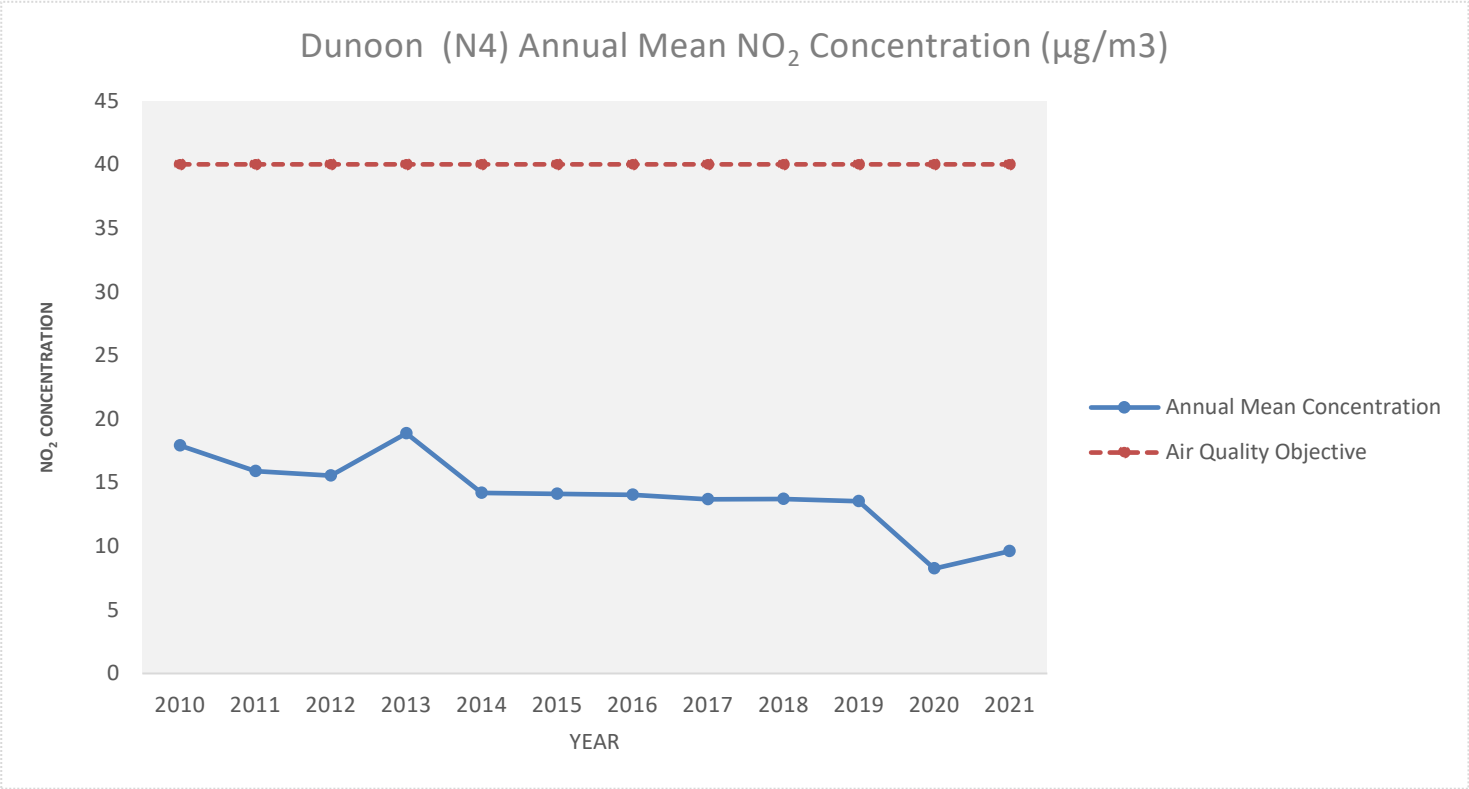

Figure 4 Annual mean NO_2 concentrations for site N4 Dunoon 2010 to 2021.

This chart shows a drop in annual mean concentrations from 17.9µg/m^3 in 2010 to 13.7µg/m^3 in 2019 (with a blip in 2013 to 18.9µg/m^3). In 2020 there is a drop to 8.2µg/m^3 and then a rise to 9.6µg/m^3 in 2021, related to Covid-19 response. It shows a long-term pre-Covid falling trend in annual mean concentrations at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

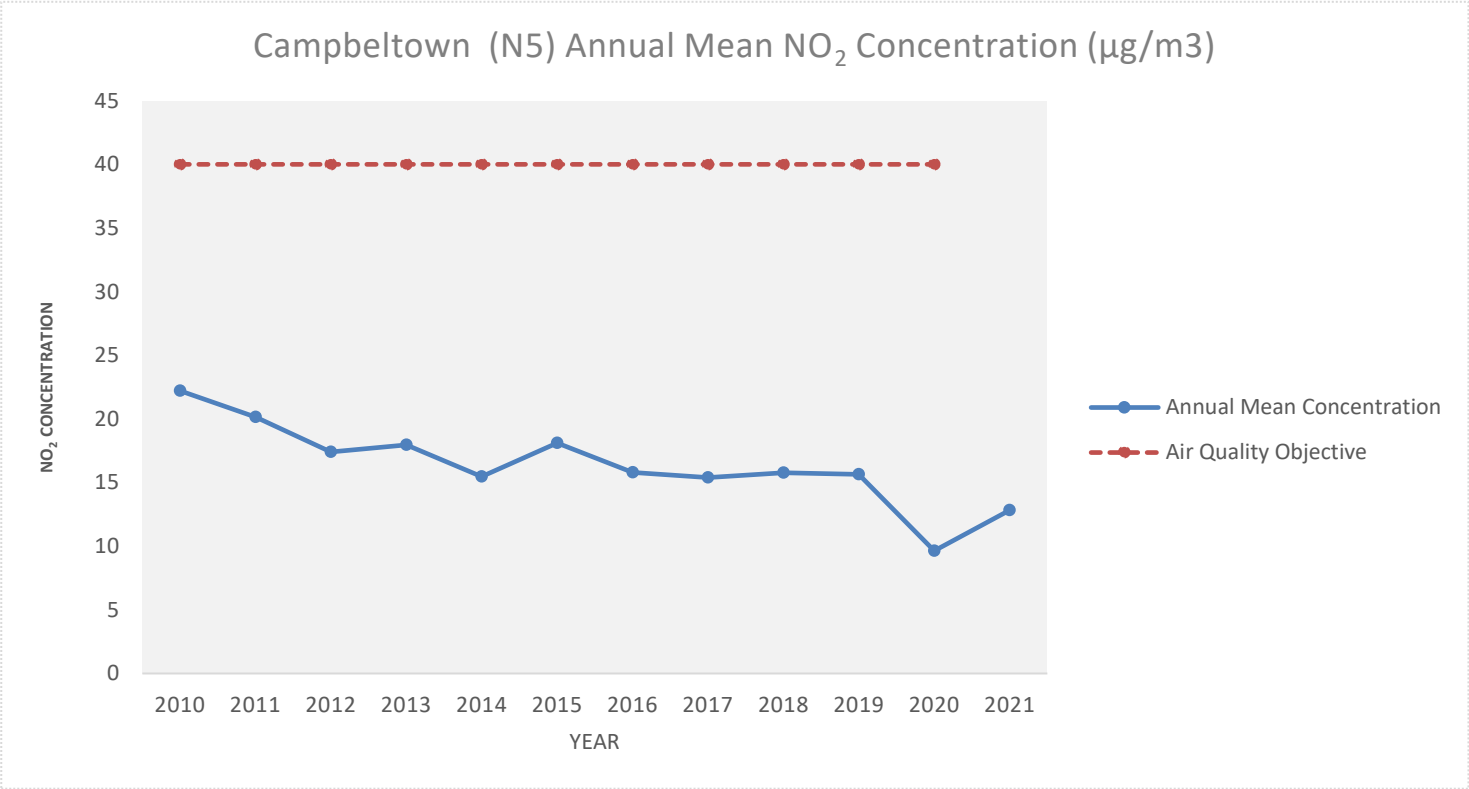

Figure 5 Annual mean NO_2 concentrations for site N5 Campbeltown 2010 to 2021.

This chart shows a drop in annual mean concentrations from 22.2µg/m^3 in 2010 to 15.6µg/m^3 in 2019. In 2020 there is a drop to 9.6µg/m^3 and then a rise to 12.8µg/m^3 in 2021, related to Covid-19 response. It shows a long-term falling trend in annual mean concentrations at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

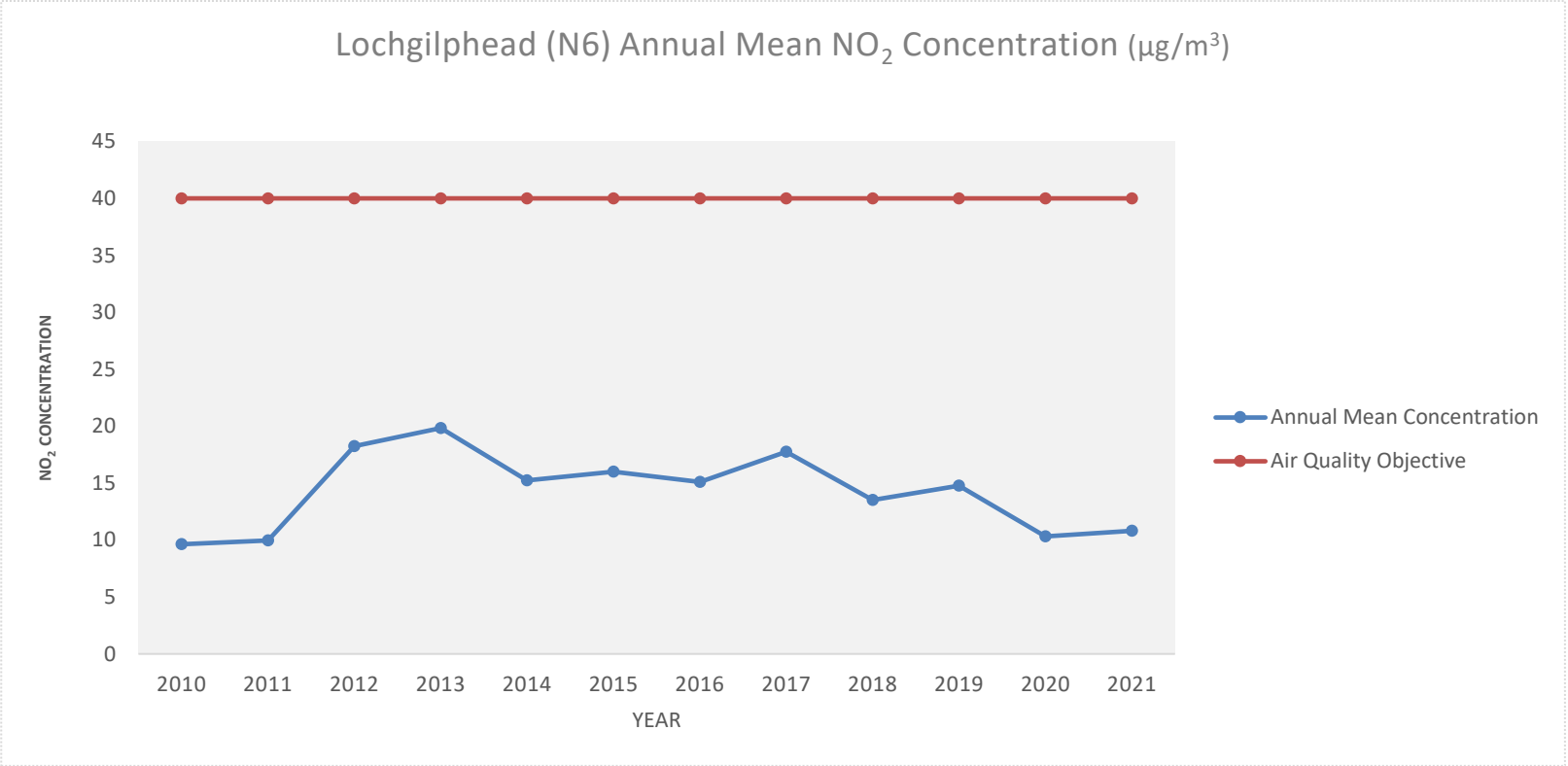

Figure 6 Annual mean NO_2 concentrations for site N6 Lochgilphead 2010 to 2021.

This chart shows a rise in annual mean concentrations from 2011 to 2012 due to a change in monitoring location. From 19.8µg/m^3 in 2013 annual mean concentrations fluctuate between 19.5 and 15.7µg/m^3 in the period to 2019. In 2020 there is a drop to 10.3µg/m^3 and then a rise to 10.8µg/m^3 in 2021, related to Covid-19 response. It shows a relatively steady pre-Covid trend in annual mean concentrations from 2014 at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

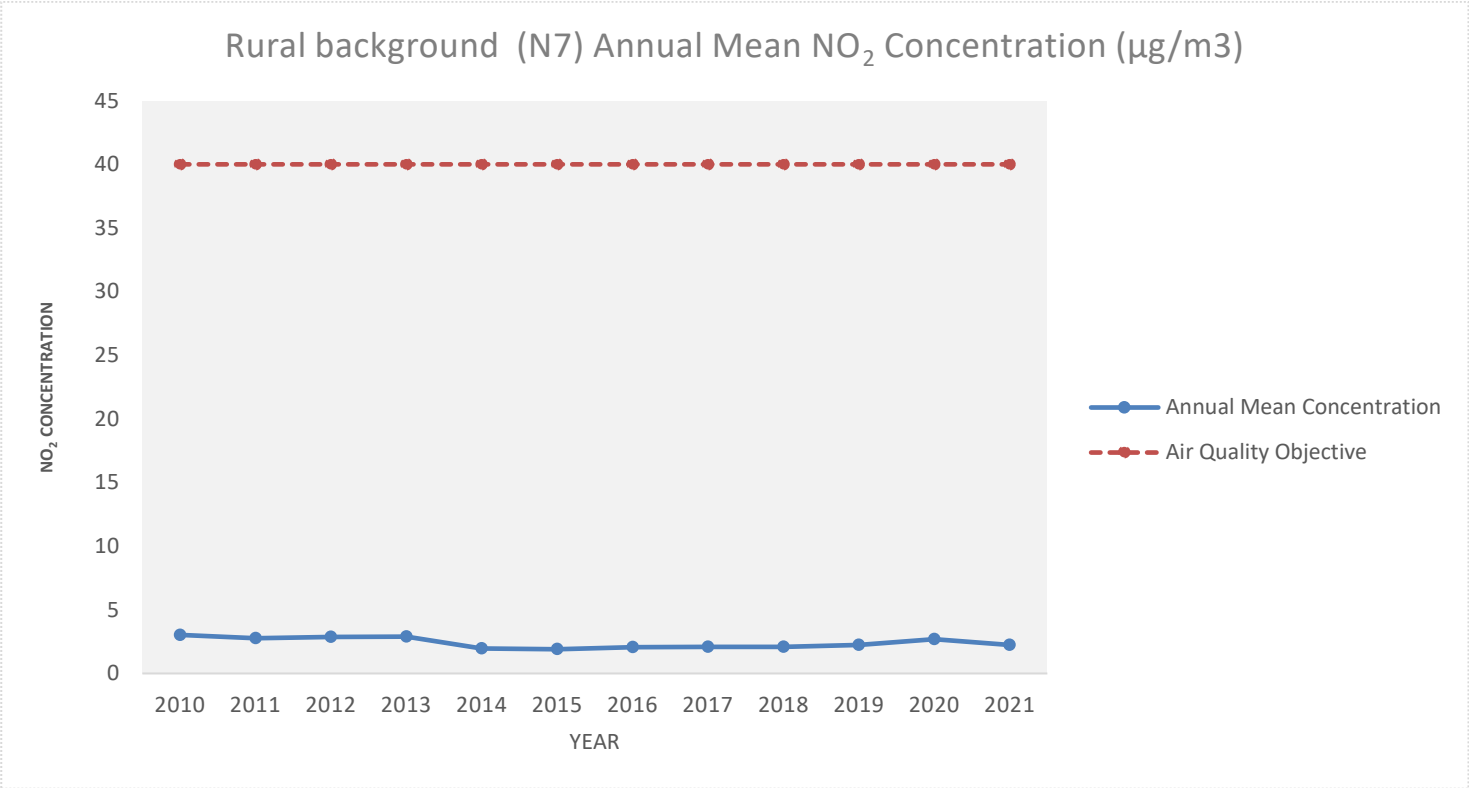

Figure 7 Annual mean NO_2 concentrations for site N7 Rural background 2010 to 2021.

This chart shows a steady trend in annual mean concentrations below 3µg/m^3 from 2010 at this location, well below the annual mean objective.

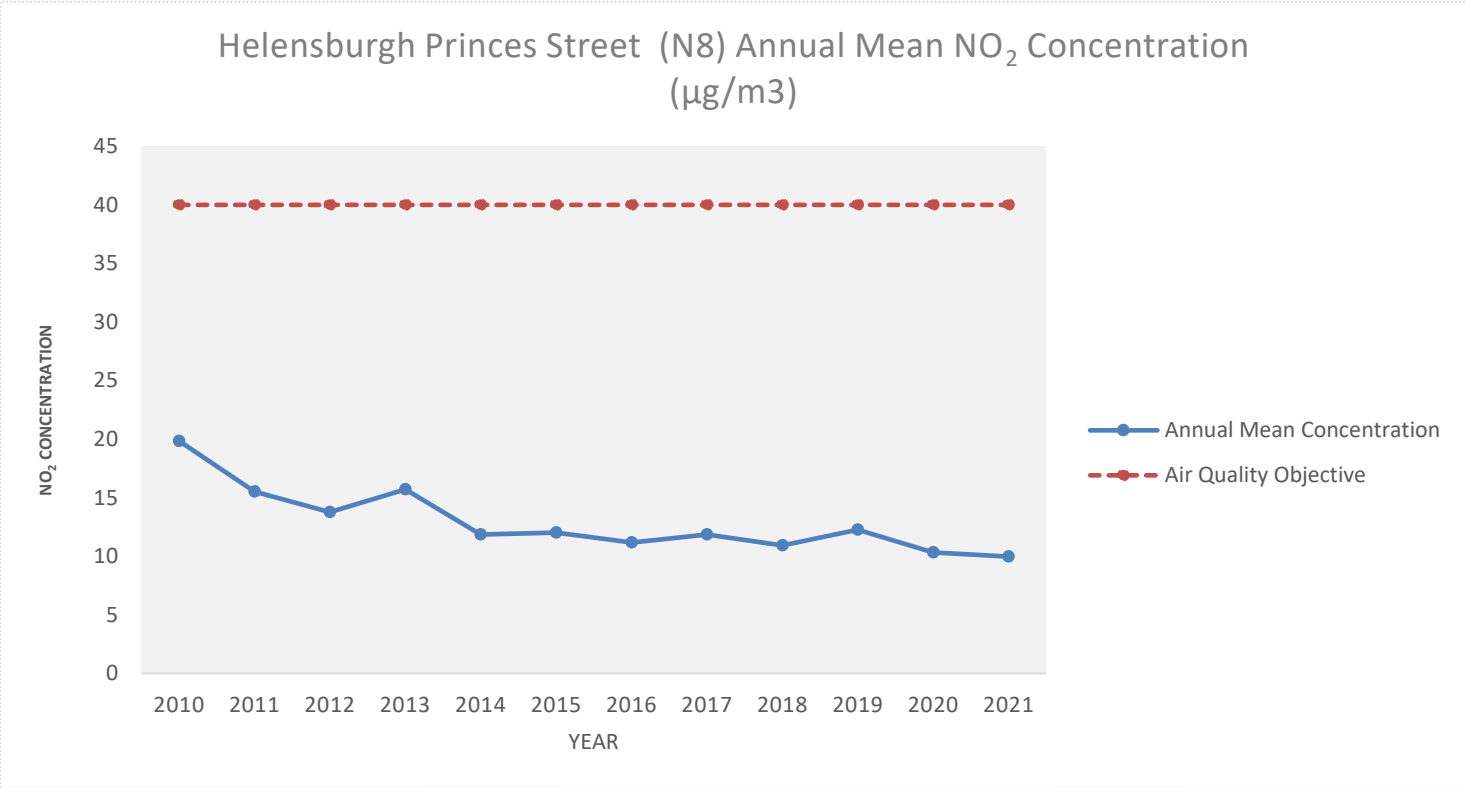

Figure 8 Annual mean NO_2 concentrations for site N8 Helensburgh 2010 to 2021.

This chart shows a drop in annual mean concentrations from 19.8µg/m^3 in 2010 to 12.3µg/m^3 in 2019. In 2020 there is a drop to 10.3µg/m^3 and then to 9.97µg/m^3 in 2021. It shows a long-term falling trend in annual mean concentrations at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

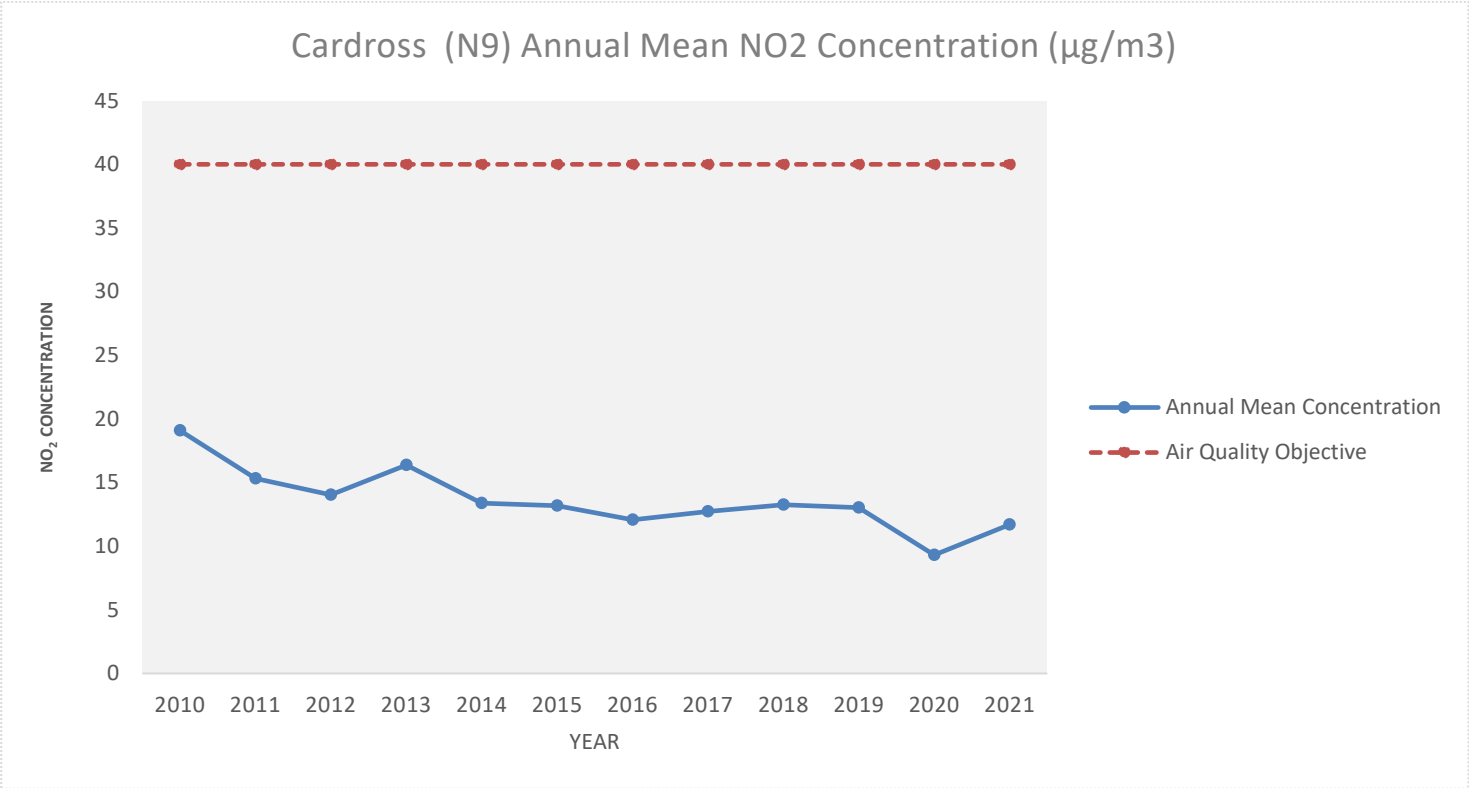

Figure 9 Annual mean NO_2 concentrations for site N9 Cardross 2010 to 2021.

This chart shows a drop in annual mean concentrations from 19.1µg/m^3 in 2010 to between 13µg/m^3 in 2019. In 2020 there is a drop to 9.3µg/m^3 and then a rise to 11.7µg/m^3 in 2021, related to Covid-19 response. It shows a relatively steady pre-Covid trend in annual mean concentrations at this location from 2014. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

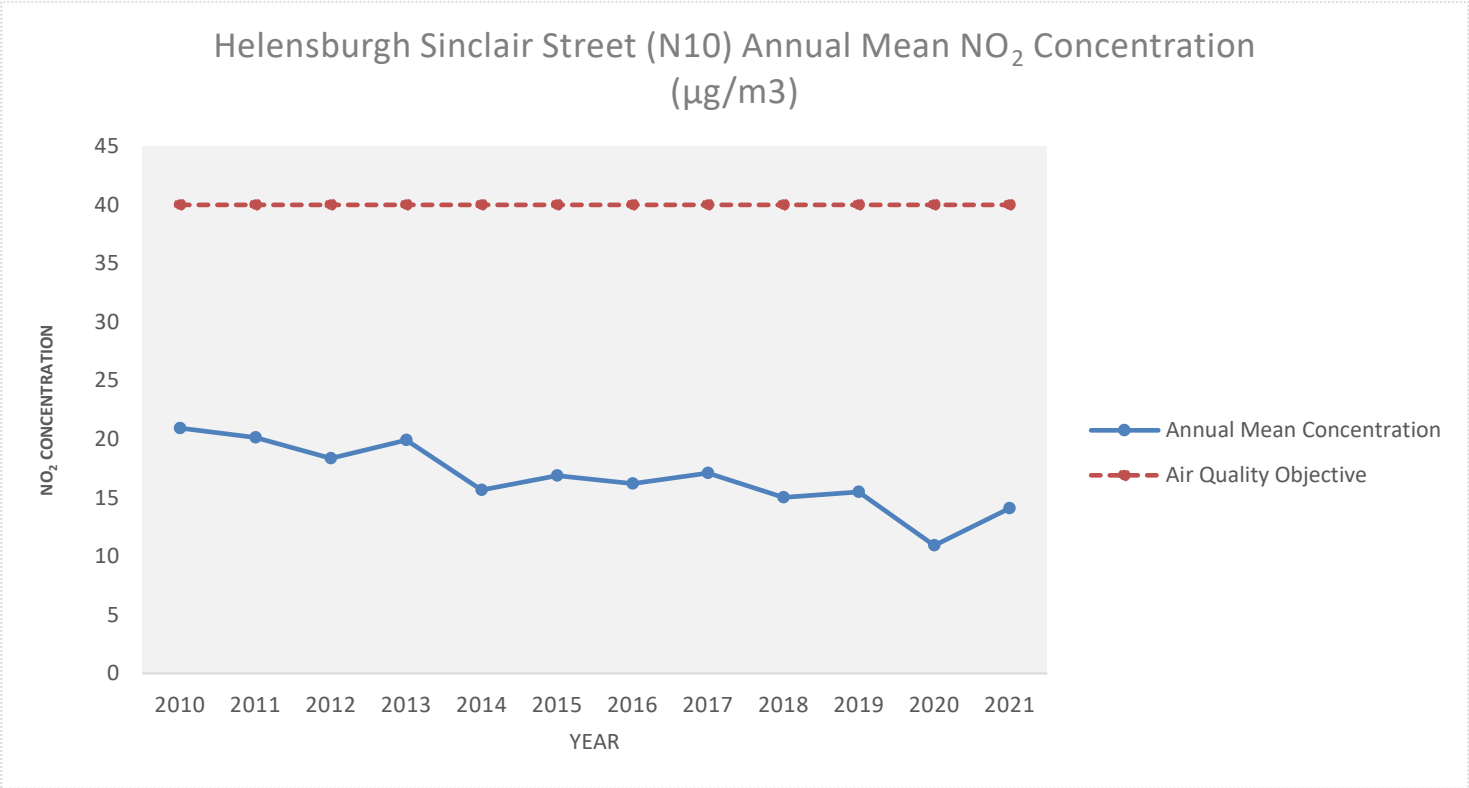

Figure 10 Annual mean NO_2 concentrations for site N10 Helensburgh 2010 to 2021.

This chart shows a drop in annual mean concentrations from 20.9µg/m^3 in 2010 to 15.5µg/m^3 in 2019. In 2020 there is a drop to 10.9µg/m^3 and then a rise to 14.1µg/m^3 in 2021, related to Covid-19 response. It shows a long-term falling trend in pre-Covid annual mean concentrations at this location. All annual mean NO_2 concentrations in this period are well below the annual mean objective.

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Monthly Diffusion Tube Results ($\mu g/m^3$)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
N1	10.9	13.6	10.6	21.8	20.9	16.4	18.5	17.7	18.4	17.7	19.6	17.3	17	19
N2	10.7	23.8	4.3	2.1	34.9	18.0	19.4	18.0	18.4	NR	NR	23	18.3	20.5
N3	13.2	9.9	7.7	18.9	19.8	16.1	15.1	21.4	22.3	21.7	13.5	17.0	16.4	18.3
N4	12.4	4.7	4.0	12.2	13.8	3.9	7.3	4.7	8.7	9.3	9.8	12.1	8.6	9.6
N5	10.9	11.7	6.2	14.6	15.0	5.7	9.1	17.3	10.8	12.5	3.6	20	11.5	12.8
N6	2.2	8,7	2.0	12.3	13.5	11.8	10.4	12.6	12.5	NR	1.8	18.3	9.6	10.8
N7	2.2	1.5	2.8	15.1	2.0	2.2	1.6	1.8	2.3	NR	18.0	1.6	2.0	2.2
N8	14.3	5.7	3.1	2.7	10.1	5.8	6.7	10.8	8.0	10.6	14.4	14.7	8.9	10
N9	14.2	6.4	3.3	12.6	11.3	7.3	7.8	12.3	10.1	14.8	14.0	11.3	10.5	11.7
N10	18.1	11.5	3.4	16.1	11.7	9.4	5.2	12.6	14.1	16.5	18.6	13.9	12.6	14.1

Notes:

(1) See Appendix C for details on bias adjustment

(2) Figures in red discounted as spurious

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

New or Changed Sources Identified Within Argyll and Bute Council During 2021

Argyll and Bute Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Argyll and Bute Council During 2021

Argyll and Bute Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

The NO_2 diffusion tubes are supplied and analysed by Glasgow Scientific Services (GSS) and prepared by using 20% TEA in water. The duration of exposure is normally the 4/5 week period suggested by the calendar provided by Defra. GSS have adopted the procedures for preparation and analysis contained in the document "Diffusion Tubes for Ambient NO_2 Monitoring:- Practical Guidance." Section 3 of this document also provides the basis for the operation of the Council's diffusion tube network

GSS have advised they have accreditation for the analysis of exposed tubes and the cleaning and re-use of the tubes. Before deploying any re-used tubes they carry out quality control assessments to ensure they have been properly cleaned.

GSS participate in the NPL intercomparison exercise, and also the LGC proficiency testing (AIR NO_2 PT).

A national bias adjustment factor of 1.12[10] (for GSS laboratory) was applied to the annual mean NO_2 concentrations for 2021.

No local co-location studies in Argyll and Bute were available to produce local bias adjustment factors.

There were unavoidable deviations from the from the 2020 Diffusion Tube Monitoring Calendar due to COVID-19 response. Given the low levels modelled and previously monitored across Argyll and Bute this is not considered to have had a significant effect on the calculated annual mean concentrations.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Argyll and Bute 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

Argyll and Bute Council have applied a national bias adjustment factor of 1.12 to the 2021 monitoring data. A summary of bias adjustment factors used by Argyll and Bute 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
2021	National	v06_22	1.12
2020	National	v06_21	0.95
2019	National	v03_20	0.86

2018	National	v0319	0.86
2017	National	v03_18	0.91

NO_2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within Argyll and Bute Council required distance correction during 2021.

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)
CAFS2	Cleaner Air for Scotland 2 – Towards a Better Place for Everyone
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

References

(1) http://www.scotland.gov.uk/Topics/Statistics/About/Methodology/UrbanRuralClassification

(2) Argyll and Bute Council. Local development Plan.

(3) Argyll and Bute Council. Economic Strategy.

(4) 2021 Air Quality Annual Progress Report for Argyll and Bute Council

(5) Defra in partnership with the devolved administrations, Technical Guidance LAQM.TG(16), February 2018

(6) Defra in partnership with the devolved administrations, Technical Guidance LAQM.TG(09), February 2009

(7) http://www.scottishairquality.co.uk/data/mapping?view=data

(8) Argyll and Bute Council. Online access to planning applications is available at http://publicaccess.argyll-bute.gov.uk/online-applications/

(9) Loch Lomond and Trossachs National Park Authority. Online access to planning applications is available at https://eplanning.lochlomond-trossachs.org/OnlinePlanning/?agree=0

(10) http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

(11) Proposed Argyll and Bute Local Development Plan 2 written Statement (argyll-bute.gov.uk)