Annual Progress Report (APR)

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

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

Local Air Quality Management

June, 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Renfrewshire Council

There are currently three Air Quality Management Areas (AQMAs) within Renfrewshire Council. The AQMAs are located within Paisley Town Centre (PTC), Johnstone High Street (JHS) and Renfrew Town Centre (RTC). The AQMAs have been declared due to exceedances of the air quality objective (AQO) levels for nitrogen dioxide (NO_2) and particulate matter (PM_{10}, PTC only). There continue to be no exceedances of either the NO_2 or PM_{10} AQOs at the automatic and passive monitoring locations within any of the AQMAs as reported in this APR. Renfrewshire Council monitor NO_2, PM_{10} and $PM_{2.5}$ at a number of locations.

Renfrewshire Council undertook automatic (continuous) monitoring at three sites during 2022 – REN1 (Renfrew Cockels Loan), REN02 (Renfrewshire Johnstone), REN03 (Renfrew Inchinnan Road). REN1 and REN03 monitor NO_2 while REN02 monitors PM_{10} and $PM_{2.5}$.

The monitored concentrations of NO_2 continue to show the downward trend observed across Renfrewshire for the majority of the past decade, and there were no exceedances of the relevant AQOs reported during 2022. Concentrations of the annual mean and relevant short-term objectives for NO_2, PM_{10} and $PM_{2.5}$ recorded at all automatic monitoring sites during 2022 were below AQO levels.

There were a total of 62 diffusion tube monitoring sites across Renfrewshire in 2022, six sites were either added to the diffusion tube monitoring network or changed in the network from 2021. The details of these are as follows: Paisley88 was removed in August due to low return rates and was not replaced; Paisley95 was removed in February due to building works and was replaced by Paisley106; Johnstone106 was removed in March due to building works and was replaced by Johnstone107; Paisley104 was removed in June due to low return rates and was replaced by Paisley108. Three additional new sites were introduced in 2022 – Paisley102, Paisley103 and Paisley105.

Actions to Improve Air Quality

Throughout 2022, several sustainable travel-based measures detailed within the 2019 Air Quality Action Plan (AQAP) have been progressed to improve air quality throughout Renfrewshire, all measures and their progress are discussed in Section 2.3 Implementation of Air Quality Action Plan(s) and/or measures to address air quality.

Renfrewshire Council ran three schemes in 2022 to encourage active travel – Better Points active travel incentive scheme, Living Streets WOW project walk to school challenge, and Beat the Street competition where competitors tap Beat the Streets cards on Beat Boxes to record distances walked or cycled. Additionally, the Paisley to Renfrew and Inchinnan Active Travel Routes were constructed and the Cycle2Work Scheme was open from March – June 2022.

Fourteen measures are within the existing AQAP, they cover the following topic categories:

- Transport Planning and Infrastructure;
- Traffic Management;
- Promoting Travel Alternatives;
- Promoting Low Emission Transport;
- Freight and Delivery Management;
- Vehicle Fleet Efficiency;
- Alternatives to Private Vehicle Use;
- Policy Guidance and Development Control; and
- Public Information.

Local Priorities and Challenges

Renfrewshire Council's priorities following the publication of the 2023 APR are as follows:

- Progress with the significant new road and cycle infrastructure projects which are part of the City Deals and AMIDS South projects;
- Publication of a new Renfrewshire Local Transport Strategy and development of a Paisley Town Centre Transport Strategy;
- Continuation with the upgrade and development of the cycling network as per the Renfrewshire Council Cycle Strategy priorities;
- Improvement of the council's fleet, funded via the Council's Vehicle Replacement Capital Programme. £2.2 million has been set aside for the VRC Programme in 2023-24 for the purchase of new fleet vehicles. This includes the replacement of older fossil vehicles with newer fleet vehicles with better emission standards and the introduction of HVO as an alternative fuel for some of the fleet;

- Reopening the Cycle2Work scheme in April 2023 and keeping it available for the full financial year;
- Upgrading fleet tracking telemetric system fitted to all Council vehicles to optimise utilisation of fleet. This will be completed by end of May 2023;
- Refresh the local transport strategy and active travel strategy/action plan;
- Full review of the 2019 Renfrewshire Council AQAP in summer 2023 in order to have the review completed by next Spring which is in accordance with the new requirements of the Scottish Government's Policy Guidance 2023 whereby the Scottish Government now requires all action plans are reviewed and republished on a five-yearly cycle from date of initial publication, which will be March 2024. This process will involve consultation with steering group members and a full update of the action plan measures. The updated AQAP will include new measures that are not listed within the 2019 AQAP such as Beat the Streets, Better Points Ltd.;
- Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ at all relevant locations throughout Renfrewshire; and
- Submit the 2024 Annual Progress Report.

Renfrewshire Council has no comment on challenges faced as air quality in the area has been steadily improving over the years.

How to Get Involved

The general public can find further information about air quality within Renfrewshire on the Renfrewshire Council website https://www.renfrewshire.gov.uk/airquality.

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1 Local Air Quality Management

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

Table 1.1 – Summary of Air Quality Objectives in Scotland

Pollutant	Air Quality Objective Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO_2)	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
Particulate Matter (PM_{10})	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2021
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO_2)	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO_2)	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Running 8-Hour mean	31.12.2003

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by Renfrewshire Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://www.scottishairquality.scot/laqm/aqma?id=382#!/la/462.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
Paisley Town Centre (PTC)	NO_2 annual mean NO_2 1-hour mean PM_{10} 24-hour mean	Paisley	An area encompassing a large part of central Paisley and extending a short distance along some radial roads	Renfrewshire Council Air Quality Action Plan 2019: http://www.renfrewshire.gov.uk/airquality
Johnstone High Street (JHS)	NO_2 annual mean	Johnstone	From the junction of High Street and Peockland Place; thence along High Street to the junction of Barrochan Road and Napier Street	Renfrewshire Council Air Quality Action Plan 2019: http://www.renfrewshire.gov.uk/airquality
Renfrew Town Centre (RTC)	NO_2 annual mean NO_2 1-hour mean	Renfrew	From the junction of Paisley Road, Inchinnan Road, Hairst Street and Glebe Street; thence	Renfrewshire Council Air Quality Action Plan 2019:

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
			along Glebe Street to property number 4 Glebe St; thence along Paisley Road to the junction of Donaldson Drive; thence along Inchinnan Road to the junction of Longcroft Drive; thence along Hairst Street to the junction with Canal Street and High Street; thence along Canal St to the junction with Ferry Road	http://www.renfrewshire.gov.uk/airquality

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 Renfrewshire 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.

Renfrewshire Council has relevant initiatives in Transport and Climate Change, as detailed below:

Transport – Avoiding Travel – T1

Renfrewshire Council has included a measure within their 2019 AQAP to develop a Corporate Travel Plan (Measure 14, Table 1.3) together with ongoing detailed reviews of transport plans within Paisley and Johnstone. A draft travel plan and travel directories were prepared and provided by a consultant at the end of 2019. The steering group had been planned for spring 2020 to finalise the travel plan, however due to the pandemic, this has now been put on hold. It is not yet known when the steering group may be established, as the pandemic has had a significant effect on staff work habits with the majority of non-frontline workers still working from home.

The council has recently created and filled a permanent Active Travel Officer post within the councils Transportation and Development team. The post was created to assist delivery on a wide range of priority active travel and public transport infrastructure related projects within Renfrewshire as well as develop and deliver a Renfrewshire Active Travel Strategy. This will be aimed at all residents, business etc. across Renfrewshire and not solely for staff as per the Corporate Travel Plan.

Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2

The Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered. In addition to the Council's 2014 Carbon Management Plan, and as discussed in the Council's AQAP, Renfrewshire Council commissioned a study during 2019 to review the AQAP measures in line with CAFS objectives. As such, it was found that within the 16 AQAP measures listed, the decarbonising transport and low emission vehicle use aspects were strongly aligned with the CAFS strategy.

2.2.2 Transport – Low Emission Zones (LEZs)

Local authorities working with Transport Scotland and SEPA will look at opportunities to promote zero-carbon city centres within the existing Low Emission Zones (LEZs) structure.

Renfrewshire Council has no LEZs established within the Local Authority area. Renfrewshire Council undertook a National Low Emission Framework Stage 1 Screening Appraisal as part of the 2020 APR and determined that the proposed air quality measures were sufficient as declared AQMAs either reported no exceedances in 2019, or LEZs were not considered appropriate due to AQMAs being restricted along a stretch of road. This position is not considered to have changed since the appraisal and LEZs remain to not be considered appropriate in Renfrewshire.

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

In order to ensure that local authorities implement the measures within an action plan by the timescales stated within that plan, the Scottish Government expects authorities to submit updates on progress through the APR process. Renfrewshire Council has taken forward a number of measures within the action plan during the current reporting year of 2022 in pursuit of improving local air quality and meeting the air quality objectives within the shortest possible time. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in the Air Quality Action Plan relating to each AQMA.

Key completed measures for this reporting year are:

- Measure 1 – Gaia Works are now substantially complete and the completed infrastructure is in use;
- Measure 1 – Two AMIDS (Advanced Manufacturing Innovation District Scotland) buildings are now complete and occupied;
- Measure 15 – Construction of Paisley to Renfrew and Inchinnan Active Travel Routes; and
- Measure 16 – Cycle2Work Scheme open from 24 March 2022 to 17 June 2022.

New measures for this reporting year that were not included within the 2019 AQAP but will be detailed in the 2024 AQAP update include the following:

- Better Points active travel incentive scheme ran for 12 months from Spring 2022. Headline results include:
  - 654 users out of 917 replaced their last car journey with an active travel option;

  - 75.9% of respondents agreed they used the car less than usual to get from place to place;
  - 73% of respondents agreed they would likely use the car less to get from place to place in the future;
  - 75.2% of respondents said they are more likely to walk or cycle to get from place to place in the future;
  - 66.4% of respondents said they are likely to use public transport to get from place to place in future; and
  - 76.7% of respondents said that the scheme has made them leave the car at home.
- Living Streets WOW project is a year-round walk to school challenge undertaken within Renfrewshire in 2022/23 which rewards children and young people with badges for choosing an active travel method in going to school. Headline results include:
  - 6455 children engaged with the project; and
  - 259,208 sustainable and active travel journeys undertaken.
- Beat the Street empowers communities to increase activity levels and improve health with a walking and cycling competition where participants tap their Beat the Street cards on Beat Boxes on lampposts to record distances walked or cycled. Headline results for 2021/22:
  - 6313 players;
  - 37% activity undertaken during typical commute travel periods thus the game encouraged people to use active modes of travel to get to school and work;
  - 2% decrease in car proportion travelling to school by car each day following the scheme;
  - 68% players reported walking more and 11% reported cycling or wheeling more; and
  - 79% players said they were likely or very likely to continue walking, cycling or wheeling for travel in future.
- Scootability is a training programme aimed at P3/4 allowing children to learn the skills and knowledge to ride safely. 5 primary schools took part in 2022/23 and 292 pupils completed training.

Progress on the following measures has been slower than expected due to:

- Measure 1 – Effective acquisition of land required to implement the AMIDS South project is considered a potential barrier to implementation.
- Measure 6 – Phase 3 is ongoing but delayed due to the impact the pandemic has had on the number of staff working from home.
- Measure 9 – Funding has been secured for PTC transportation improvements and a prioritised programme of works has been identified but modelling has not yet been undertaken and a timeline for implementation has not yet been decided.
- Measure 14 – Council steering group established to finalise the travel plan has been put on hold since Spring 2020 due to the pandemic.

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

- Measure 3 - £2.2 million set aside for purchase of new fleet vehicles in 2023/24.
- Measure 5 – new fleet tracking telematic system installed from 31st May 2023.
- Measure 11 – Further meeting will be undertaken with local bus operators as part of the 2024 update to the AQAP.
- Measure 15 – Refresh of local transport strategy and active travel strategy/action plan.
- Renfrewshire Council will be commencing a full review of the 2019 Renfrewshire Council AQAP this summer in order to have the review completed by next Spring which is in accordance with the new requirements of the Scottish Government's Policy Guidance 2023 whereby the Scottish Government now requires all action plans are reviewed and republished on a five-yearly cycle from date of initial publication, which will be March 2024. This process will involve consultation with steering group members and a full update of the action plan measures.

Table 2.2 – Progress on Measures to Improve Air Quality

No.	Measure	Category	Expected / Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to Implementation
1	**Glasgow City Region City Deal Projects** - Clyde Waterfront & Renfrew Riverside Project (CWRR) - Glasgow Airport Investment Area Project (GAIA) **UK Government Levelling Up Fund Project** - Advanced Manufacturing Innovation District Scotland (AMIDS) South	Transport Planning and Infrastructure Traffic Management Promoting Travel Alternatives	CWRR – expected completion early 2025 GAIA – completed 2022 AMIDS South – expected completion March 2025	CWRR – in progress GAIA – completed AMIDS South – in progress	Partially funded. UK Government funding 90% of the capital costs of the project. Renfrewshire council contribution is 10% of costs. Government funding will be unlocked in 5 yearly Gateway Reviews. If the City Deal meets agreed outputs and outcomes at each review, the full £1 billion of funding from the UK and Scottish Governments will be unlocked.	**CWRR** Nov 2018 – planning consent granted Autumn 2019 – tenders published Nov 2021 – Contract Start Date Early 2025 – Anticipated construction completion. **GAIA** Nov 2017 – planning consent granted Spring 2019 – tender contracts awarded June 2019 – start of construction March 2022 – Works opened to the public. **AMIDS South** March 2023 – planning consented Nov 2022 to Oct 2023 – Contractor procurement and land acquisition Nov 2023 to March 2025 – Construction period.	CWRR site works are progressing, and off-site manufacture of the bridge structure underway. It is anticipated that the project will open to the public in early 2025. GAIA Works are now substantially complete with rectification of defects on-going. The completed infrastructure is in use. The GAIA project has been the catalyst for AMIDS which is now progressing well, with the first two buildings complete and occupied. Detailed design for AMIDS South is progressing in parallel with landowners and stakeholder liaison.	**AMIDS South** – Effective acquisition of the land required to implement the project is considered a potential barrier to implementation

2	**Upgrades & Improvements to the Council's Urban Traffic Control (UTC) system** Replacement of UTC system with externally hosted UTC-X system from Yunex with guaranteed updates for the next 10 years.	**Traffic Management** (UTC, congestion management)	Expected completion year - 2023	In progress	Not funded (from external sources).	Original defective loops repaired/ replaced in June 2017. Validation of traffic signals & PROM updates completed in November 2017. Spring 2023 - 66 sites' communications improved to prevent dropouts and minimise frequency of traffic delay. Feasibility of extending UTC control to Johnstone being pursued but will be dependent on funding.	66 sites across 30 junctions throughout the council area have been upgraded to an externally hosted UTC system between 2020 and 2023. This is then followed with a 10-year maintenance contract at these sites to ensure signals remain as efficient as possible. The work to replace life-expired traffic signals continues. 4G communications between the signals and the system are being superseded by connections to the council's fibre network and priority junctions continue to have their equipment replaced as needs and funding arise	
3	**Council Fleet Improvements** **- Continue to improve the standard of fleet**	**Promoting Low Emission Transport** (Company vehicle procurement - Prioritising uptake of low emission vehicles)	Ongoing. There is an annual vehicle replacement programme (VRP) whereby vehicles at the end of their service life are replaced with an improved EURO standard or an electric alternative.	In progress	Not funded (from external sources). Funded via the Council's Vehicle Replacement Capital Programme. Through the VRP programme we are always looking to invest in our fleet – 2.2m has been set aside for 2023-24 for purchase of new fleet vehicles, this will incorporate replacing older fossil vehicles with newer fleet vehicles with better emission standards	The Council fleet consists of approx 500 vehicles of which >70% are of EURO V or VI standard. We have recently introduced HVO as an alternative fuel for some of our fleet – and are looking to expand the project to come in line with more vehicles on the fleet.	Ongoing. The Council will continue to improve the standard of fleet and introduce greener vehicles where opportunities and funding permits. There are approx 80 HGV vehicles, 32 of which are EURO VI standard with the remaining 48 being of EURO V standard. The EURO V HGVs are prioritised for replacement with EURO VI vehicles.	
4	**Council Fleet Improvements** - Increase numbers of electric vehicles (EVs) & associated charging infrastructure	**Promoting Low Emission Transport** (Company vehicle procurement	Ongoing. The Council will continue to introduce EVs & charging points where	In progress	Funded mainly via the Council's Replacement Vehicle Programme and Transport Scotland's Switched On Fleets funding.	First Council EVs and charging points purchased and installed in 2012. The Council now have 115 EVs (cars/vans) in the	Contract awarded for £250,000 investment in Underwood Road Waste Depot during 2023 with a new 2.3MVA power supply and transformer to support the further expansion of EV	

	- EV Fleet Strategy Feasibility Study	prioritising uptake of low emission vehicles & Procuring alternative refuelling infrastructure to promote low emission vehicles, EV recharging)	opportunities and funding permits. As technology evolves the Council will extend the EV Fleet Strategy to include all vehicles including HGVs and buses.			fleet or 27% of overall fleet. There are now 124 council operated publicly available charging points in Renfrewshire and 89 charging bays for council vehicles across 14 council depots /buildings.	charging infrastructure for light vans, HGVs and refuse collection vehicles In addition to pool cars, the council have 10 pool bikes for staff to use for business travel as part of the Business Travel Hierarchy.	
5	**Masternaut Connect Fleet Telemetric System** - Upgrade of fleet tracking telemetric system fitted to all Council vehicles to optimise utilisation of fleet. The tracking system allows close monitoring of movement and operating status of all fleet vehicles.	**Freight and Delivery Management** (Route management plans/ Strategic routing strategy for HGV's) **Vehicle Fleet Efficiency** (other)	Masternaut Connect installed/ completed 2017. However new fleet tracking system being installed 31st May 2023	In progress	Not funded (from external sources).	Masternaut was originally installed in all council vehicles in 2009-10. This was upgraded to a newer Masternaut Connect version early 2017 which provided an easier reporting system and focused in more detail on driver behaviour, vehicle utilisation etc. A new fleet tracking system is being installed from 31st May 2023	System operational from April 2017. Dedicated member of staff employed from Autumn 2018. Masternaut is getting replaced on the 31st of May and a new supplier - UK Telematics - will be the fleet tracker system for the council. This will provide real time, web-based asset tracking system using GPS. This should improve fuel economy and provide departments with more in-depth reports about driver behaviour when in a fleet vehicle.	
6	**Renfrewshire Council Sustainable Travel Planning Scheme** - Supply high mileage users with council cars and introduce a fleet of pool vehicles to replace business mileage for employees. - Pool bikes are available for staff to use to carry out Council business.	**Alternatives to Private Vehicle Use** (Car clubs/ sharing schemes) **Promoting Low Emission Transport**	Ongoing	Phase 1 of scheme - introduced Oct 2018 and now complete. Phase 2 - introduced Jan 2019 and complete. Phase 3 – ongoing but delayed,	Funded. The majority of funding for the EVs has come from Transport Scotland Switched On Fleet funding.	Phase 1 of the scheme was introduced in 2018. This involved 35 vehicles being available for staff use within Environmental Services. Staff required to use the fleet cars in replacement of their own cars. Phase 2 was introduced Jan 2019 and involved pool cars being available for all other relevant staff	Currently, there are 47 electric pool vehicles with 23 charger units located in Renfrewshire HQ. 300,000 miles have been travelled by pool vehicles since October 2018. Phase 3 – locating pool vehicles at other council buildings has started with EV charging units now installed at HCSP office in Paisley for Care at Home teams. Further	

	-Encouraging staff to walk or use public transport where appropriate to carry out Council business.			mainly due to the impact that the pandemic has had on increased numbers of staff working from home. There is currently not the need for significant numbers of pool cars to be stationed at other council buildings.		members across Renfrewshire House HQ. By the end of 2019 all pool cars based at Renfrewshire House were EVs and over 300 HQ staff are now using pool vehicles. Phase 3 involves locating pool vehicles at other Council buildings.	EVs were delivered March 2021.	
8	**Renfrewshire's Local Transport Strategy** **- Publication of a new Local Transport Strategy (LTS) to replace the Council's 2007 LTS will be undertaken.**	**Policy Guidance and Development Control** (Other policy)	New Renfrewshire LTS – expected completion 2024/25	In progress	Not funded (from external sources).	The Council's 2007 LTS set out key objectives and vision for transport over 10-20 yrs. A refresh of this 2007 LTS was undertaken in Feb 2017. A new Renfrewshire LTS will be prepared following the policy guidelines in the National Transport Strategy 2020 and the Regional Transport Strategy 2023, which is currently awaiting Scottish Ministers approval.	New Renfrewshire LTS is currently out to tender for consultancy support. A detailed scope of the council's requirements includes consideration of its plan for net zero emissions by 2030.	
9	**Paisley Town Centre Transportation Improvements** - Undertake a feasibility study of potential transport interventions for Paisley town centre e.g. reinstating two-way traffic flows, amending key junctions,	**Policy Guidance and Development Control** (Other policy) **Traffic Management** (Congestion management)	To be confirmed following further modelling	In progress	The feasibility study has been funded via SPT. Funding of any future proposed measures will be subject to availability of capital funding with the potential of funding from external partners also e.g. SPT.	Procurement process for feasibility study awarded 2017. 2019 - first draft of the feasibility study produced which establishes initial proposals and reports on potential areas of improvement, their	Ongoing. The proposed options are intentionally high level, providing ideas of key potential transport interventions for Paisley. Some of these measures will now be developed from the current concept phase taking into account traffic modelling and allowing for appropriate	Funding of measures.

	review of lining & signage and trial removal of certain traffic lights on ring road.					technical feasibility, benefits and deliverability. The development of a Transport Strategy for Paisley Town Centre (PTC) was identified as a key action within the Renfrewshire LTS and PTC 2016-2026 Action Plan. The conclusions of this feasibility study may feed into any PTC Transport Strategy. The conclusions will then be subject to senior management review, Board approval and consultation with stakeholders before any decisions are made on potential action measures. Implementation of final proposals will thereafter be subject to identification of funding streams.	assessment, design and eventual delivery. Whilst a prioritised programme of works has been identified for the short to medium term, further modelling has yet to be undertaken and a timeline for implementation of the measures yet to be decided. Some long-term improvements are also identified in line with the PTC 10yr Action Plan, but these require further investigation. The draft feasibility study details a programme of phased interventions covering the short, medium and long term.	
10	**Johnstone Town Centre Transportation Improvements**	**Policy Guidance and Development Control** (Other policy) **Traffic Management** (Parking enforcement on Highway)	Temporary measures have been completed. Permanent TRO changes to be pursued after the Renfrewshire consolidated digital TRO is made in 2023.	In progress	Not funded (from external sources).	Yellow line restrictions and bus stop closures/relocations have been carried out under TTRO to enable a turning facility for buses around Houston Square.	Permanent TRO changes to be pursued after the Renfrewshire consolidated digital TRO is made in 2023. Consideration is being given to Johnstone as an extension to the UTC system to better link and control signal junctions on High Street.	.

11	**Improvements in the Bus Fleet Standard**	**Vehicle Fleet Efficiency (Promoting Low Emission Public Transport)**	Ongoing	In progress	The purchase of these by the operator has been aided by the Scottish Ultra Low Emission Bus Scheme.	An initial meeting was held in April 2019 with the management of the largest bus operator in Renfrewshire and staff from Renfrewshire Council to discuss the potential improvements in bus operations. The operator has since invested significantly in their EV fleet brining in 23 EV buses at the end of 2021 and used for local residential routes, therefore improving emissions locally. In addition, EV charging infrastructure has been installed in Johnstone and Inchinnan Depots. Further engagement required with other operators.	Further meeting will be undertaken with local bus operators as part of the 2024 update to the Air Quality Action Plan	
12	**Vehicle Idling Awareness Raising** - Regular targeted campaigns to raise awareness regarding idling vehicles & air pollution. Campaigns aimed at specific categories of drivers or in areas where vehicles idle unnecessarily e.g. schools, bus terminals, taxi ranks or in response to complaints.	**Traffic Management** (Anti-idling enforcement) **Public Information** (via other mechanisms	Ongoing. General idling awareness campaigns have been ongoing since 2011.	On hold	Not funded (from external sources).	A School Parking Campaign was introduced in April 2018 aimed at road safety around schools including safe parking and an anti-idling message. Banners were erected at school entrances and every pupil received a school parking pledge leaflet which contained a message regarding no idling and encouraging parents to sign up to safe parking pledges around schools.	By August 2019, all 49 Primary schools in Renfrewshire were engaged in the campaign. Regarding the second phase of the scheme, four primary schools have been identified to introduce an exclusion zone in the streets around their entrances as we aim to create a safer, healthier school environment for pupils. This was due to commence in April 2020 but has been put on hold. When it is next able to commence, it will consist of a six-month pilot scheme and will introduce a part-time	

						A second phase of the campaign will consider the closure of surrounding roads around selected primary schools. A feasibility study for this was undertaken in 2019.	vehicle exclusion zone at the start and end of the school day in some of the surrounding streets of the four schools.	
14	**Renfrewshire Council Corporate Travel Plan**	**Promoting Travel Alternatives** (Workplace Travel Planning)	Uncertain	On hold	Not funded (from external sources).	Jan 2019 - Consultant undertook site visits to relevant council offices to determine existing facilities. June 2019 - staff travel survey issued to determine current transport modes etc. A Roadshow event was also held on Clean Air Day in June 2019 at Renfrewshire House. Council staff and the consultants were in attendance to provide travel planning advice, info on pool cars, promotion of the travel survey etc. Dr Bikes and Scotrail were also in attendance. A staff commuter challenge was undertaken in August 2019. Nov 2019 – draft plan provided by consultant	A draft travel plan and travel directories were prepared and provided by the consultant during Nov 2019. A council steering group requires to be established to finalise the plan and then consultation of this with other relevant services/ organisations. This had been planned for spring 2020 but has now been put on hold due to the current pandemic. It is unclear when this stage will recommence. Once the plan is published and measures implemented a second staff survey is planned to determine any change in travel behaviour.	

15	**Renfrewshire Council Cycle Strategy & Action Plan 2016-2025** - The strategy contains a Cycling Action Plan which sets out a programme of activities and network interventions for the coming ten years including upgrades and expansion of cycle networks, upgrading the Council's facilities for cyclists and updating the Council's Travel Plan.	**Promoting Travel Alternatives** (Promotion of cycling)	The Cycle Strategy and Action Plan runs from 2016-2025. Upgrades and development of the cycling network is ongoing as per the strategy priorities. Council will refresh Local Transport Strategy and Active Travel Strategy / Action Plan during 2023/24.	In progress	Funding is applied for each financial year from the Scottish Government under the Cycling, Walking and Safer Routes fund. At least 36% of this fund must be allocated to cycling including for example infrastructure or design works. Renfrewshire used 49.4% of CWSR budget in 2022/23 on new infrastructure to encourage cycling. Projects included construction of Paisley to Renfrew and Inchinnan Active Travel Routes. Designs for Erskine and Inchinnan Business Park. Sustrans funded projects completed in 22/23 include NCN improvements at Jennyswell, Miller Street Johnstone.	The Cycle Strategy was approved by Board in Dec 2016. Measures contained within the action plan will be implemented dependant on funding.	There are several cycling infrastructure projects which are currently at concept design /public consultation design stage. The routes for these are – 1.Southolm Roundabout Erskine 2.Linside Avenue 3.Hawkhead Rd/ Glasgow Rd junction 4.Linclive Roundabout 5. Inchinnan Business Park 6. Barnsford Road, Glasgow Airport	
16	**Renfrewshire Council Staff Cycling Incentives** - Staff Cycle to Work Scheme. Cycle2Work Council employees can participate in this Government approved salary sacrifice scheme which allows them to purchase a bike and cycle accessories with tax free benefits.	**Promoting Travel Alternatives (Promotion of cycling)**	Ongoing	In progress	Not funded (from external sources). Staff can apply for anything between £100 and £2000 towards the cost of bike or cycle accessories which could potentially save up to £960 per person.	The scheme was previously open from 24 March 2022 to 17 June 2022. Given its previous popularity, the Cycle2Work scheme was reopened in April 2023 and is now available all year round.	Scheme currently open for uptake	

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Renfrewshire Council undertook automatic (continuous) monitoring at three sites during 2022. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://www.scottishairquality.scot/data. Two sites monitor NO_2 – REN1 Renfrew Cockels Loan and REN03 Renfrew Inchinnan Road, with the final site REN02 Renfrewshire Johnstone monitoring $PM_{2.5}$ and PM_{10}. No exceedances of the relevant air quality objectives were recorded for any pollutant at any automatic monitoring station in 2022. No changes occurred to Renfrewshire Council's automatic monitoring network in 2022.

Gordon Street automatic continuous monitor was decommissioned in November 2021. The continuous monitor was old and required continual repairs and experienced issues with its main electrical feed prior to closure. No exceedances had been recorded in Paisley Town Centre for over five years, from either this continuous monitoring site or diffusion tube monitoring sites. Therefore, it was decided that this site was to be decommissioned rather than paying for continual repairs.

A map showing the location of the monitoring sites are provided in Figure 1. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Renfrewshire Council undertook non- automatic (passive) monitoring of NO_2 at 60 sites during 2022, including three triplicate sites. Table A.2 in Appendix A shows the details of the sites.

The following changes to Renfrewshire Council's diffusion tube network occurred during 2022:

- Paisley88 was removed in August due to low return rates.
- Paisley95 was removed in February due to building works and was replaced by Paisley106
- Johnstone106 was removed in March due to building works and was replaced by Johnstone107
- Paisley104 was removed in June due to low return rates and was replaced by Paisley108.

Of the 60 diffusion tube monitoring sites across Renfrewshire in 2022, following bias adjustment and prior to the application of distance correction, there were no exceedances of the NO_2 annual mean air quality objective recorded in 2022.

Maps showing the location of the monitoring sites are provided in Figure 2 to Figure 5. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

3.1.3 Other Monitoring Activities

No other monitoring activities have been undertaken.

Figure 1. Map of Automatic Monitoring Sites

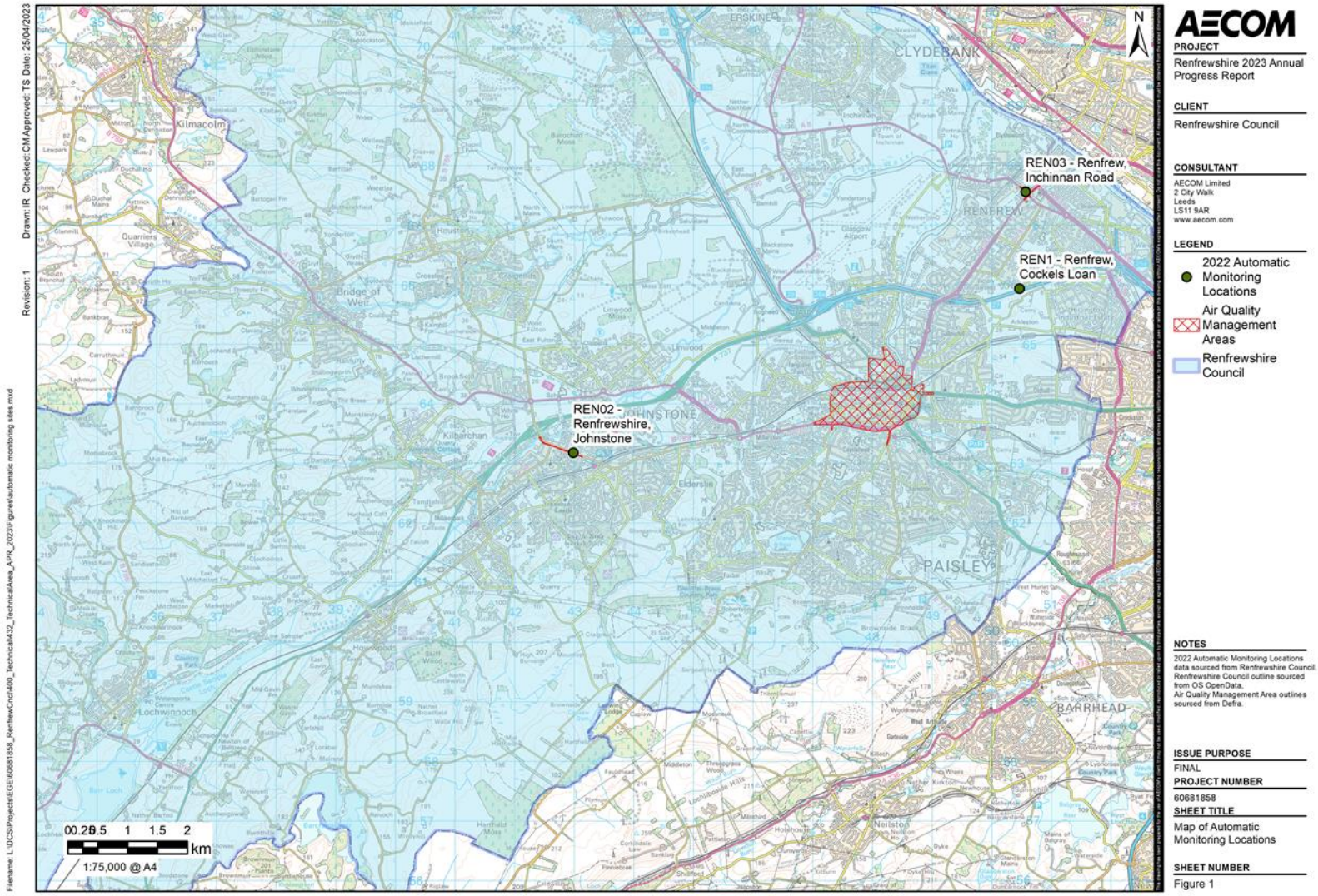


Figure 2. Map of Non-Automatic Monitoring Sites in Renfrew

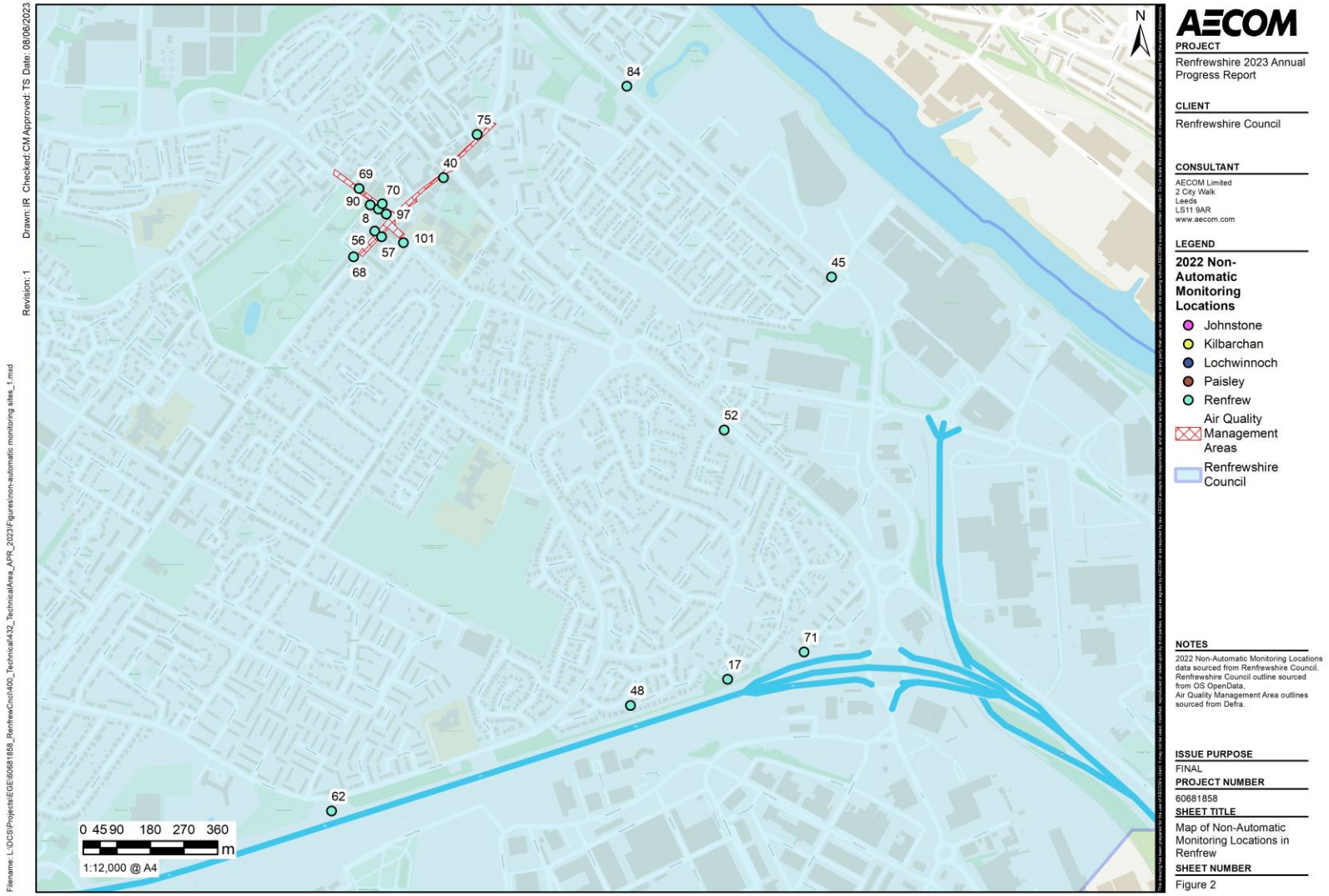


Figure 3. Map of Non-Automatic Monitoring Sites in Paisley

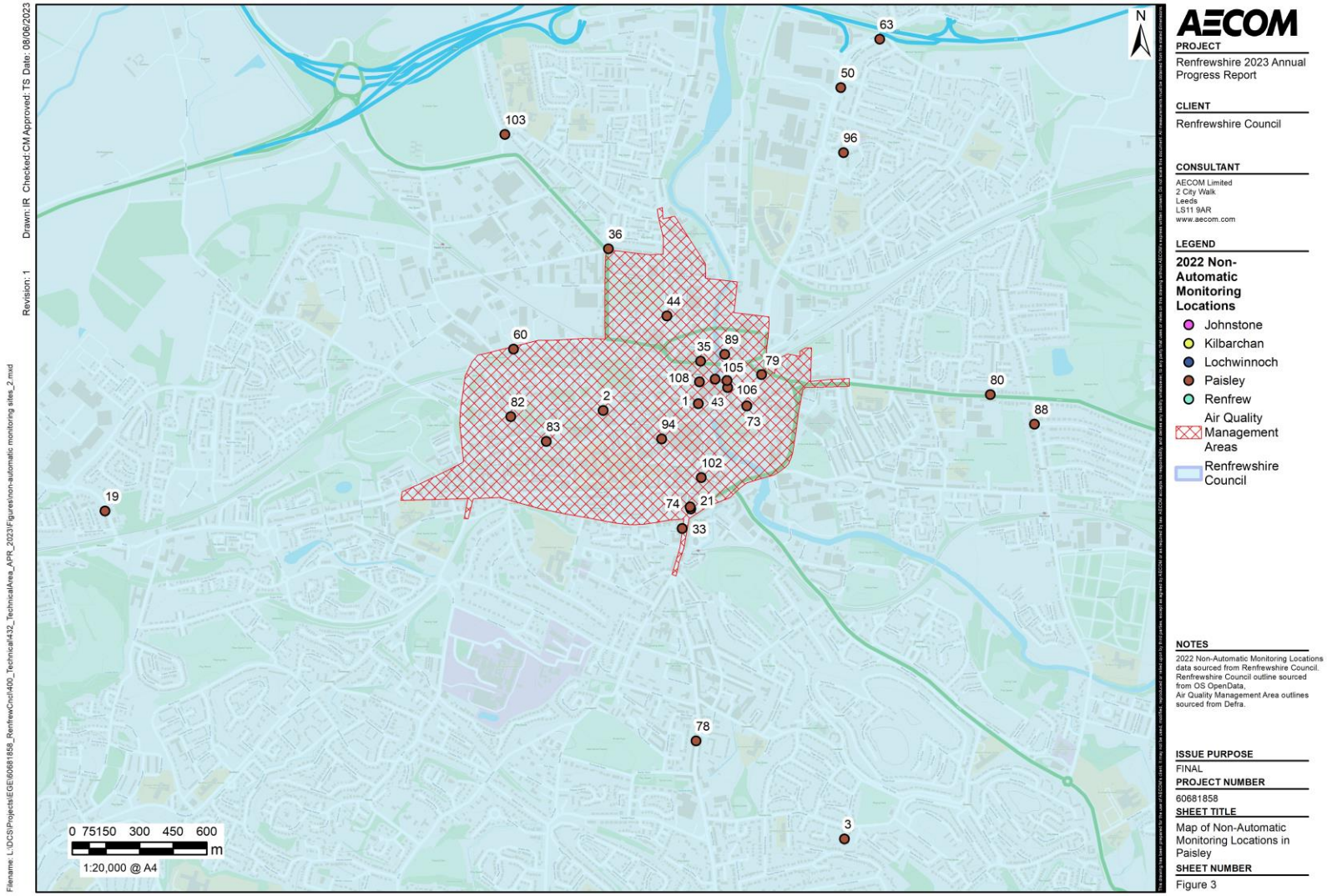


Figure 4. Map of Non-Automatic Monitoring Sites in Kilbarchan and Johnstone

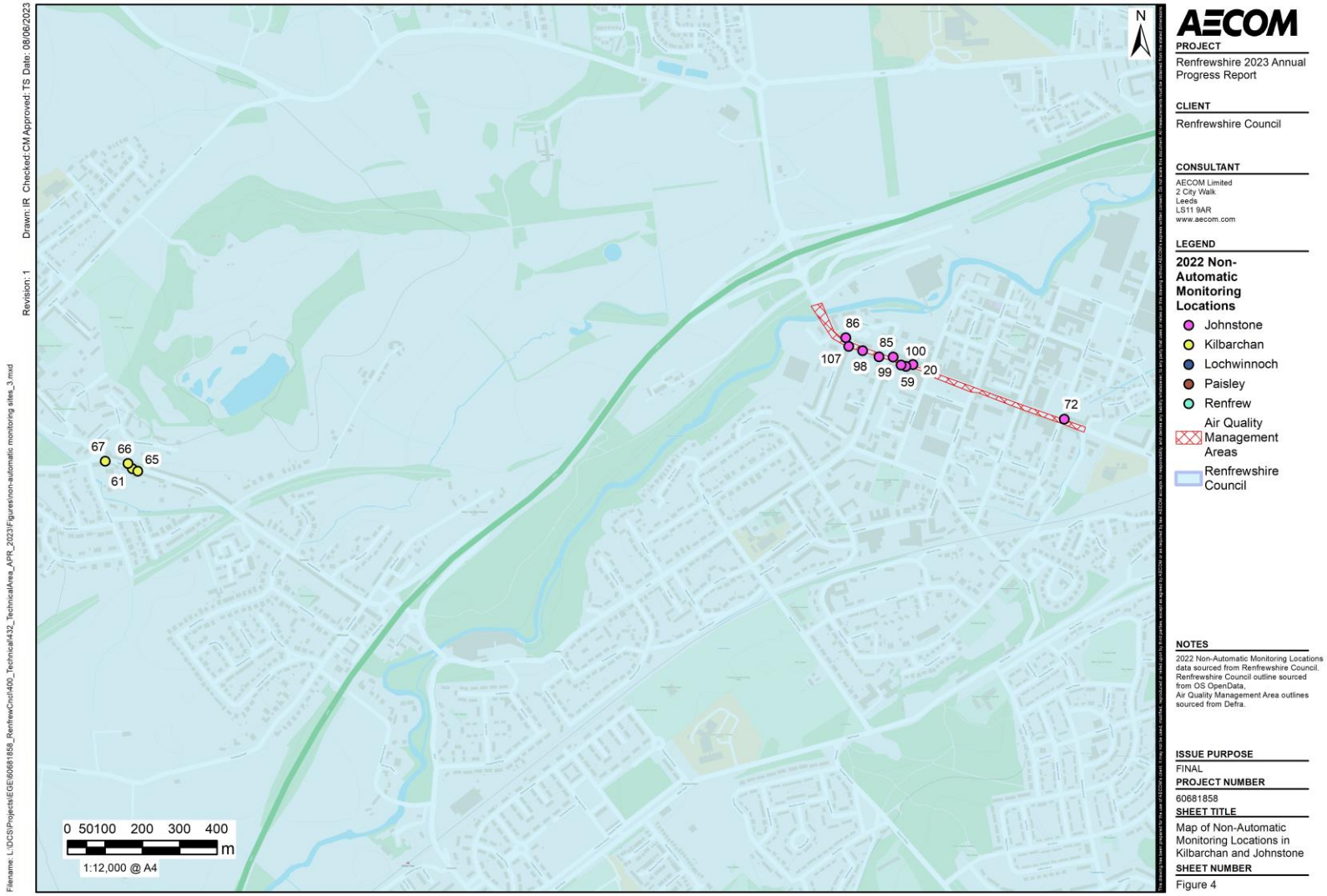
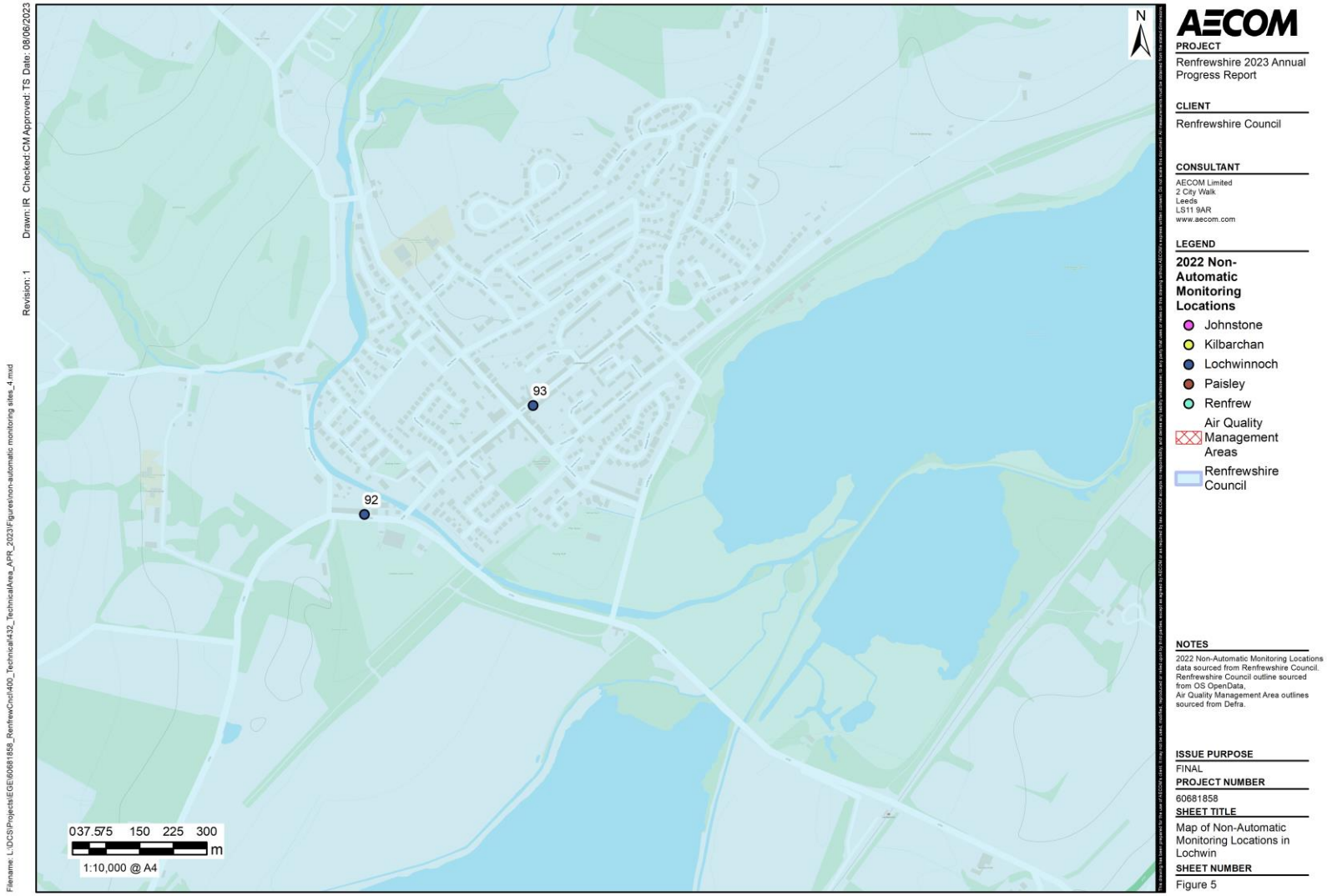


Figure 5. Map of Non-Automatic Monitoring Sites in Lochwinnoch



3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 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 2022 dataset of monthly mean values is provided in Appendix B. There were six new sites established in 2022. Two diffusion tubes recorded a data capture below 25% and therefore could not be annualised, this data is still shown in (monthly table). Two diffusion tubes required annualisation as their data capture was between 25% and 75% - Renfrew70 and Paisley108. Distance correction was undertaken for two monitoring sites to estimate the concentration at the nearest receptor, with calculations provided in Table C.4 – Paisley21 (triplicate site) and Renfrew48. All diffusion tube monitoring locations in Renfrewshire Council achieved NO_2 AQO compliance in 2022. The highest concentration was 30.9 µg/m^3 reported at Johnstone59 (High Street).

The observed downward trend in concentrations continues for the majority of monitoring sites in 2022. Only seven sites experienced an increase in annual mean NO_2 concentration from 2021 to 2022, compared to 49 sites experiencing a decrease, these include REN03 – Renfrew Inchinnan Road automatic monitoring site and five diffusion tube locations (Paisley2, Renfrew8, Renfrew17, Renfrew68, Renfrew70 and Johnstone86). These increases range from +0.2 µg/m^3 (at Johnstone86) to +2.3 µg/m^3 (at Paisley2). The decreases observed range from -0.6 µg/m^3 (Paisley3, Paisley44 and Paisley50) to -9.7 µg/m^3 (Johnstone99). The remaining six sites were commissioned in 2023. Broadly, over the past five years, the majority of the diffusion tube monitoring sites have shown a decrease in NO_2 concentrations.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200 µg/m^3, not to be exceeded more than 18 times per year. No exceedances of the hourly mean air quality objective for NO_2 were recorded at any of the automatic monitoring sites. None of the diffusion tube monitoring sites reported concentrations exceeding 60 µg/m^3 which indicates that there are no exceedances of the short-term air quality objective.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 18 µg/m^3 showing the ratified data and the ratified corrected data for REN02 (Renfrewshire, Johnstone). following the Scottish Government Guidance Note in relation to the measurement of ambient Particulate Matter (PM) and the LAQM reporting of measured concentrations issued in May 2023. REN02 (Renfrewshire, Johnstone) has shown variations in concentrations ranging from 10.2 µg/m^3 to 16.3 µg/m^3 for the ratified data and 11.3 µg/m^3 to 17.9 µg/m^3 in the ratified corrected data in the past five years. It should be noted that the PM_{10} annual mean in 2020 and 2021 may have been impacted by COVID-19 related lockdowns. The concentration in 2022 is a reduction of 0.8 – 0.9 µg/m^3 compared to the concentration recorded in 2021. This site has not recorded an exceedance of the annual mean AQO since at least 2018.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50 µg/m^3, not to be exceeded more than seven times per year. In 2022, REN02 (Renfrewshire Johnstone) monitor reported no instances of 24-hour mean AQO exceedances. The 24-hour PM10 AQO was last exceeded in 2019 at REN02 – Renfrewshire Johnstone, this exceedance has been attributed to localised buildings works undertaken in summer 2019.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A compares the ratified and ratified corrected monitored $PM_{2.5}$ annual mean concentrations for the past five years with the air quality objective of 10 µg/m^3. In 2022, REN02 (Renfrewshire Johnstone) recorded a concentration of 6.1 µg/m^3 or a corrected value of 6.5 µg/m^3, these both show a slight increase (+0.1 µg/m^3 and +0.2 µg/m^3 respectively) compared to the concentration reported in 2021 (6.0 µg/m^3 and 6.3 µg/m^3 respectivey) but a reduction compared to the concentrations in 2018 and 2019 (7.3 µg/m^3 and 7.9 µg/m^3 for the ratified annual mean and 7.7 µg/m^3 and 8.4 µg/m^3 for the corrected annual mean). However, it should be noted that the $PM_{2.5}$ annual mean in 2020 and 2021 may have been impacted by COVID-19 related lockdowns. The site has not recorded an exceedance of the annual mean AQO since at least 2018.

3.2.4 Sulphur Dioxide (SO_2)

No monitoring of SO_2 was undertaken in 2022.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

No monitoring of Carbon Monoxide, Lead or 1,3-Butadiene was undertaken in 2022.

4 New Local Developments

4.1 Road Traffic Sources

There are a number of developments within the local authority that may affect air quality, The following developments that will affect road traffic sources are outlined below:

- 22/0363/PP - Advanced Manufacturing Innovation District Scotland (AMIDS) South project. Formation of 2 lane road, including a bridge crossing over the White Cart Water, road and footpath upgrades and other associated works. Site Linking Inchinnan Road and Harbour Road with Abercorn Street, Paisley.

Two detailed air quality assessments were submitted for the application – the first being a Preliminary Air Quality Assessment relating to the construction phase of the development and then an Air Quality Addendum report for the operational phase road traffic impacts of the scheme. Both reports were found to be satisfactory with mitigation measures recommended in order to address potential dust issues from the construction phase. Development approved January 2023.

- 22/0345/PP - Erection of residential development comprising eighty flats and thirty-nine dwellinghouses and formation of roads, infrastructure, and open space amenity. Site On Southern Edge of Roundabout Junction with Laymoor Avenue, King's Inch Road, Renfrew.

A detailed air quality assessment was submitted with the application and found to be satisfactory. The assessment concluded there were no significant effects on air quality as a result of the development and therefore no requirement for mitigation measures. Development approved April 2023.

- 22/0142/PP - Demolition of existing office building and erection of sixty-seven flats with associated access, landscaping, open space and parking. 2 Lonend Paisley PA1 1SS.

A simple air quality assessment was submitted with this application (in accordance with relevant air quality and planning guidance based on the proposed number of traffic vehicle movements). The assessment determines that further quantitative assessment of local air quality is not required for the proposed future use of the scheme and that the air quality impact of the development was not considered to be significant. Development approved August 2022.

- 21/1668/PP - Mixed Use Redevelopment of The Paisley Centre to include Class 1 (Shops), Class 2 (Financial, Professional & Other Services), Class 3 (Food & Drink), Class 4 (Business), Class 7 (Hotel), Class 10 (Non-residential Institutions), Class 11 (Assembly & Leisure), Residential, Healthcare, Sui Generis (Hot Food Takeaway), Demolition and Other Ancillary Uses (Planning Permission in Principle). Paisley Centre 23 High Street Paisley PA1 2AF. This is a large-scale redevelopment of Paisley Town Centre proposal which was approved March 2022.

An air quality assessment has still to be received for this as the main application is a masterplan with further supporting documents, such as air quality assessments, to be submitted at the detailed planning application stage.

4.2 Other Transport Sources

No planning applications were received by Renfrewshire Council during 2022 that identified any new or significantly changed other transport sources.

4.3 Industrial Sources

A statutory consultation notification was received from SEPA in March 2022 of the following:

- Pollution Prevention and Control (Scotland) Regulations 2012 Application for a New Pollution Prevention and Control, Part B Permit Application by: Scottish Leather Group Operations Ltd, Bridge of Weir

An air quality and odour dispersion modelling assessment was submitted with the application. The air quality aspect of the assessment screened out any human health concerns or impacts on vegetation and ecosystems as a result of the proposals.

4.4 Commercial and Domestic Sources

No planning applications were received by Renfrewshire Council during 2022 that identified any new or significantly changed commercial and domestic sources.

4.5 New Developments with Fugitive or Uncontrolled Sources

No planning applications were received by Renfrewshire Council during 2022 that identified any new developments with fugitive or uncontrolled sources.

5 Planning Applications

The transport project within Paisley town centre known as AMIDS South was granted planning approval in January 2023. The project will create new routes between Paisley town centre and the Advanced Manufacturing Innovation District Scotland (AMIDS) and Glasgow Airport. The project involves a road bridge crossing the White Cart and an east-west link road, all with accompanying walking and cycling options. This is 90% funded by the UK Government Levelling Up Fund, with the rest paid by Renfrewshire Council.

Two detailed air quality assessments were submitted with the application, a Preliminary Air Quality Assessment relating to the construction phase of the development and an Air Quality Addendum report for the operational phase road traffic impacts of the scheme. Both reports were found to be satisfactory. With regards to the operational phase, the assessment determines that there will be no exceedances of air quality objectives as a result of the development. There will also be a beneficial effect on annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at the majority of locations assessed.

In terms of public support for the development, more than 260 people completed a public survey with their thoughts on the project proposals. The survey found:

- 90% would use the riverside route
- 86% confirmed that they would be more likely to walk or cycle here following the infrastructure improvements
- More than two-thirds of people would use the walking and cycling route between Gallowhill Road and Inchinnan Road
- 70% indicated that they would consider leaving the car at home and walk or cycle instead

A contractor for the development should be appointed by the end of 2023 with completion expected in 2025.

Further information on AMIDS South can be found at https://www.renfrewshire.gov.uk/transport-links-amids-south-paisley

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

There were no AQO exceedances identified in Renfrewshire Council during 2022. Historically, the Renfrew 8 diffusion tube monitoring site has exceeded the annual mean NO_2 AQO however in 2021 the reported concentration was 29.8 µg/m^3 and so this monitoring site fell below the AQO for the first time in at least five years. In 2022, the reported concentration was 30.2 µg/m^3 and so still fell significantly below the AQO.

89% of existing monitoring sites recorded a decrease in annual mean NO_2 concentrations from 2021 to 2022. The remaining sites experienced an increase in NO_2 concentrations, including the REN03 Renfrew Inchinnan Road automatic monitoring site and five diffusion tube monitoring sites.

PM_{10} annual mean concentrations at REN02 – Renfrewshire Johnstone decreased from 2021 to 2022 by 0.8 µg/m^3 or by 0.9 µg/m^3 for the corrected annual mean concentrations. REN02 – Renfrewshire Johnstone also records $PM_{2.5}$ and experienced a small increase (+0.1 µg/m^3 for the ratified annual mean concentrations or +0.3 µg/m^3 for the corrected annual mean concentrations) from 2021 to 2022, both pollutants monitored at REN02 recorded concentrations below their respective annual mean AQOs.

6.2 Conclusions relating to New Local Developments

Any new developments that are likely to impact local air quality, or potentially introduce new receptors into areas of poor air quality, have been adequately assessed during the planning process.

No planning applications were received by Renfrewshire Council in 2022 that identified any new or significantly changed Non-Road, Industrial, Commercial or Domestic Sources or developments with fugitive or uncontrolled sources that had any human health concerns or impacts on vegetation or ecosystems.

The air quality impacts were assessed to be not significant for two Road Traffic source planning applications submitted to Renfrewshire Council. The planning application reports relating to AMIDS South project were found to be satisfactory with construction phase dust

mitigation measures. Renfrewshire Council are still awaiting an air quality assessment for the Mixed Use Redevelopment of Paisley Centre to be submitted.

6.3 Proposed Actions

Renfrewshire Council's proposed actions following the publication of the 2023 APR are as follows:

- Progress with the significant new road and cycle infrastructure projects which are part of the City Deals and AMIDS South projects;
- Publication of a new Renfrewshire Local Transport Strategy and development of a Paisley Town Centre Transport Strategy;
- Continuation with the upgrade and development of the cycling network as per the Renfrewshire Council Cycle Strategy priorities;
- Improvement of the council's fleet, funded via the Council's Vehicle Replacement Capital Programme. £2.2 million has been set aside for the VRC Programme in 2023-24 for the purchase of new fleet vehicles. This includes the replacement of older fossil vehicles with newer fleet vehicles with better emission standards and the introduction of HVO as an alternative fuel for some of the fleet;
- Reopening the Cycle2Work scheme in April 2023 and keeping it available for the full financial year;
- Upgrading fleet tracking telemetric system fitted to all Council vehicles to optimise utilisation of fleet. This will be completed by end of May 2023;
- Refresh the local transport strategy and active travel strategy/action plan;
- Full review of the 2019 Renfrewshire Council AQAP commencing summer 2023 in order to have the review completed by next Spring which is in accordance with the new requirements of the Scottish Government's Policy Guidance 2023 whereby the Scottish Government now requires all action plans are reviewed and republished on a five-yearly cycle from date of initial publication, which will be March 2024. This process will involve consultation with steering group members and a full update of the action plan measures;
- Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ at all relevant locations throughout Renfrewshire; and
- Submit the 2024 Annual Progress Report.

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) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
REN1	Renfrew, Cockels Loan	Roadside	250464	665933	NO, NO_2	N	Chemiluminescent	5	18	2.2
REN02	Renfrewshire, Johnstone	Roadside	242984	663178	$PM_{2.5}$, PM_{10}	Y – JHS	FIDAS 200	0.5(3)	2.9	1.9
REN03	Renfrew, Inchinnan Road	Roadside	250567	667558	NO, NO_2	Y – RTC	Chemiluminescent	7.1	3.9	1.6

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.

(3) The distance of 0.5 m is to the façade of the closest building, these are commercial units at ground level and residential units on the first floor

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
Paisley1	Gilmour Street	Urban Centre	248350	664082	NO_2	Y – PTC	70	68	N	2.7
Paisley2	Oakshaw Street	Urban Background	247925	664052	NO_2	Y – PTC	11	35	N	2.4
Paisley3	Lochfield Drive	Urban Background	249002	662138	NO_2	N	8	1.5	N	2.4
Renfrew8	Inchinnan Road	Kerbside	250589	667547	NO_2	Y – RTC	0.1	2.64	N	2.4
Renfrew17	Tanar Way	Roadside	251524	666287	NO_2	N	0	28 to M8	N	2.3
Paisley19	Linwood Road	Roadside	245701	663603	NO_2	N	5	2.5	N	2.5
Johnstone20	High Street	Kerbside	242675	663286	NO_2	Y – JHS	0.45	1.4	N	2.3
Paisley21	Causeyside Street (triplicate)	Roadside	248316	663612	NO_2	Y – PTC	-6.3	9.9 (Causeyside St)	N	2.3
Paisley33	76 Causeyside Street	Roadside	248277	663524	NO_2	Y – PTC	1.1	2.76	N	2.8
Paisley35	Old Sneedon Street	Roadside	248360	664272	NO_2	Y – PTC	0.4	3.4	N	2.7
Paisley36	Caledonia Street	Roadside	247948	664774	NO_2	Y – PTC	4.5	3.3	N	2.5
Renfrew40	Hairst Street	Roadside	250763	667631	NO_2	Y – RTC	0.25	6.18	N	2.5
Paisley43	Smithhills Street (East)	Roadside	248481	664154	NO_2	Y – PTC	0	2.45	N	2.5
Paisley44	Love Street	Roadside	248209	664474	NO_2	Y – PTC	0.17	2.17	N	2.5
Renfrew45	Xscape	Kerbside	251803	667365	NO_2	N	18	2	N	2.5
Renfrew48	Glen Sax Drive	Roadside	251264	666217	NO_2	N	-22	45 to M8	N	2.6
Paisley50	Renfrew Road	Roadside	248985	665494	NO_2	N	7	12	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) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
Renfrew52	Glasgow Road	Roadside	251515	666955	NO_2	N	4	3	N	2.3
Renfrew56	Paisley Road	Roadside	250579	667488	NO_2	Y – RTC	3.45	4.5	N	2.4
Renfrew57	Paisley Road	Roadside	250597	667473	NO_2	N	1.2	6	N	2.4
Johnstone59	High Street	Kerbside	242656	663281	NO_2	Y – JHS	0.1	1.7	N	2.5
Paisley60	Underwood Road	Roadside	247525	664326	NO_2	N	7.8	0.5	N	2.4
Kilbarchan61	High Barholm	Roadside	240584	663007	NO_2	N	0.1	1.1	N	2.4
Renfrew62	Cockels Loan (triplicate)	Roadside	250463	665934	NO_2	N	5	18 to M8	Y	3
Paisley63	Renfrew Road	Roadside	249159	665710	NO_2	N	6.8	3.7 (12 to Renfrew Rd)	N	2.4
Kilbarchan65	High Barholm	Roadside	240599	663000	NO_2	N	0.42	2	N	2.2
Kilbarchan66	High Barholm	Roadside	240573	663021	NO_2	N	0.43	1.64	N	2.2
Kilbarchan67	High Barholm	Roadside	240512	663027	NO_2	N	1.75	2.95	N	2.3
Renfrew68	Paisley Road	Roadside	250522	667419	NO_2	Y – RTC	0.2	3	N	2.3
Renfrew69	Inchinnan Road	Roadside	250537	667602	NO_2	Y – RTC	0.12	2.87	N	2
Renfrew70	Inchinnan Road	Roadside	250599	667561	NO_2	Y – RTC	4.5	3.71	N	2
Renfrew71	Braille Drive	Roadside	251729	666360	NO_2	Y – RTC	0 (equivalent distance to nearby housing)	26.5 to M8 slip road	N	2
Johnstone72	High Street	Roadside	243080	663140	NO_2	Y – JHS	0.45	3	N	2.3
Paisley73	Lawn Street	Roadside	248566	664072	NO_2	Y – PTC	0.19	1.95	N	2.45
Paisley74	Causeyside Street	Roadside	248313	663621	NO_2	Y – PTC	0.19	3.3	N	2.2

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)
Renfrew75	Canal Street	Roadside	250853	667747	NO_2	N	0.17	5	N	2.45
Paisley78	Neilston Road	Roadside	248339	662576	NO_2	**Y**	0.15	2.63	N	2.5
Paisley79	Incle Street	Roadside	248632	664212	NO_2	N	0.18	2.8	N	2.16
Paisley80	Glasgow Road	Roadside	249653	664123	NO_2	N	1.9	2.1	N	2.35
Paisley82	Well Street	Roadside	247513	664024	NO_2	Y – PTC	0.2	2.27	N	2.36
Paisley83	Wellmeadow Street	Kerbside	247671	663913	NO_2	N	0.4	3.32	N	2.46
Renfrew84	Ferry Village	Roadside	251254	667876	NO_2	Y – PTC	18	0.5	N	2.4
Johnstone85	High Street	Roadside	242622	663306	NO_2	Y – JHS	0.62	1.1	N	2.4
Johnstone86	High Street	Roadside	242495	663358	NO_2	Y – JHS	0.14	2.7	N	2.41
Paisley88	Hawkhead Road	Roadside	249850	663991	NO2	Y - PTC	7	2.05	N	2.39
Paisley89	Abercorn Street	Roadside	248467	664303	NO2	Y– PTC	0.14	3.5	N	2.3
Renfrew90	Renfrew Monitor (triplicate)	Roadside	250567	667558	NO_2	Y – RTC	7	3.9	Y	1.63
Lochwin92	Newton of Barr	Roadside	234904	658634	NO_2	N	0.45	2	N	2.35
Lochwin93	Main Street	Roadside	235280	658877	NO_2	N	0.43	1.15	N	2.55
Paisley94	New Street	Roadside	248186	663925	NO_2	Y – PTC	2.1	0.47	N	2.37
Paisley96	McDonalds Renfrew Road	Roadside	248998	665204	NO_2	N	19	2.23	N	2.23
Renfrew97	Inchinnan Road	Kerbside	250610	667534	NO_2	Y – RTC	2.1	0.57	N	2.42
Johnstone98	High Street	Roadside	242540	663323	NO_2	Y – JHS	0.5	1.37	N	2.3
Johnstone99	High Street	Roadside	242584	663307	NO_2	Y – JHS	0.45	1.3	N	2.36
Johnstone100	High Street	Roadside	242643	663285	NO_2	Y – JHS	0.1	1.85	N	2.24
Renfrew101	Glebe Street	Roadside	250656	667457	NO_2	N	4.5	2.5	N	2.3
Paisley102	Orchard Street	Roadside	248363	663752	NO_2	Y – PTC	0.58	2.32	N	2.1

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)
Paisley103	Greenock Road	Roadside	247486	665285	NO_2	N	18	0.8	N	2.24
Paisley105	Central Road 2	Roadside	248425	664192	NO_2	Y – PTC	55	4	N	2.25
Paisley106	Smithhills Street	Roadside	248477	664186	NO_2	Y – PTC	5.59	0.59	N	2.17
Johnstone107	High Street	Roadside	242503	663335	NO_2	Y – JHS	6	2.8	N	2.24
Paisley108	Central Road	Roadside	248355	664180	NO_2	Y – PTC	0.51	6.84	N	2.41

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.

PTC – Paisley Town Centre, RTC – Renfrew Town Centre, JHS – Johnstone High Street

Table A.3 – Annual Mean NO_2 Monitoring Results (µg/m^3)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%)(1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
REN1	Roadside	Automatic	99.7	99.7	31.2	31.1	20.9	24.5	22.4
REN03	Roadside	Automatic	98.2	98.2	-	24.1	19.9	19.0	19.7
Paisley1	Urban Centre	Diffusion Tube	100.0	100.0	20.3	21.3	16.1	14.9	13.5
Paisley2	Urban Background	Diffusion Tube	84.6	84.6	14.4	14.6	10.9	9.6	11.9
Paisley3	Urban Background	Diffusion Tube	92.3	92.3	12.0	11.6	8.9	7.4	6.8
Renfrew8	Kerbside	Diffusion Tube	92.3	92.3	**41.1**	**41.4**	**40.2**	29.8	30.2
Renfrew17	Roadside	Diffusion Tube	92.3	92.3	33.7	32.0	26.3	22.9	23.5
Paisley19	Roadside	Diffusion Tube	100.0	100.0	28.3	24.9	24.1	22.5	17.9
Johnstone20	Kerbside	Diffusion Tube	92.3	92.3	29.7	28.7	25.5	20.2	19.3
Paisley21 (1), Paisley21 (2), Paisley21 (3)	Roadside	Diffusion Tube	100.0	100.0	28.9	27.6	25.7	21.9	18.6
Paisley33	Roadside	Diffusion Tube	92.3	92.3	31.7	28.8	27.7	24.1	19.4
Paisley35	Roadside	Diffusion Tube	92.3	92.3	34.7	31.1	31.5	25.7	21.9
Paisley36	Roadside	Diffusion Tube	100.0	100.0	30.4	28.2	27.7	26.5	20.5
Renfrew40	Roadside	Diffusion Tube	100.0	100.0	27.4	25.8	21.6	18.7	16.4
Paisley43	Roadside	Diffusion Tube	100.0	100.0	28.9	26.7	20.4	20.5	15.0
Paisley44	Roadside	Diffusion Tube	100.0	100.0	23.6	21.9	16.3	16.1	15.5
Renfrew45	Kerbside	Diffusion Tube	90.4	90.4	25.8	21.5	20.3	18.4	14.9
Renfrew48	Roadside	Diffusion Tube	100.0	100.0	30.9	29.1	24.8	20.9	17.7
Paisley50	Roadside	Diffusion Tube	90.4	90.4	29.4	24.3	21.8	17.9	17.3
Renfrew52	Roadside	Diffusion Tube	100.0	100.0	31.8	25.3	24.9	21.2	17.3
Renfrew56	Roadside	Diffusion Tube	92.3	92.3	30.3	26.3	24.4	20.9	19.5
Renfrew57	Roadside	Diffusion Tube	100.0	100.0	24.1	24.4	18.1	19.0	12.9
Johnstone59	Kerbside	Diffusion Tube	100.0	100.0	**40.0**	37.9	39.5	34.4	30.9
Paisley60	Roadside	Diffusion Tube	100.0	100.0	34.4	33.6	30.1	24.5	22.3
Kilbarchan61	Roadside	Diffusion Tube	100.0	100.0	32.4	30.2	26.0	26.1	18.7
Renfrew62 (1), Renfrew62 (2), Renfrew62 (3)	Roadside	Diffusion Tube	100.0	100.0	36.8	34.3	30.5	25.3	21.9
Paisley63	Roadside	Diffusion Tube	92.3	92.3	33.2	29.4	25.2	25.2	20.9
Kilbarchan65	Roadside	Diffusion Tube	100.0	100.0	28.2	30.3	25.8	20.9	16.9

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%)[1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
Kilbarchan66	Roadside	Diffusion Tube	75.0	75.0	19.3	22.3	18.1	15.9	14.1
Kilbarchan67	Roadside	Diffusion Tube	92.3	92.3	18.6	17.5	18.6	13.2	10.3
Renfrew68	Roadside	Diffusion Tube	100.0	100.0	27.4	23.8	21.0	16.4	17.4
Renfrew69	Roadside	Diffusion Tube	82.7	82.7	30.7	29.9	25.0	32.4	25.3
Renfrew70	Roadside	Diffusion Tube	57.7	57.7	31.7	25.4	26.9	17.4	18.1
Renfrew71	Roadside	Diffusion Tube	92.3	92.3	28.5	29.2	26.2	24.4	19.1
Johnstone72	Roadside	Diffusion Tube	100.0	100.0	22.9	23.4	20.2	19.9	13.6
Paisley73	Roadside	Diffusion Tube	100.0	100.0	32.0	26.1	27.0	22.5	17.7
Paisley74	Roadside	Diffusion Tube	100.0	100.0	30.9	27.8	28.6	23.0	18.7
Renfrew75	Roadside	Diffusion Tube	100.0	100.0	22.6	22.1	21.1	20.2	13.9
Paisley78	Roadside	Diffusion Tube	100.0	100.0	28.9	26.6	24.4	24.0	16.8
Paisley79	Roadside	Diffusion Tube	100.0	100.0	32.5	27.8	32.0	24.6	20.0
Paisley80	Roadside	Diffusion Tube	92.3	92.3	24.9	23.9	23.7	18.4	14.9
Paisley82	Roadside	Diffusion Tube	100.0	100.0	33.2	28.9	36.1	28.1	24.3
Paisley83	Kerbside	Diffusion Tube	100.0	100.0	31.1	33.2	25.1	22.7	21.8
Renfrew84	Roadside	Diffusion Tube	100.0	100.0	24.3	23.1	16.8	14.9	13.1
Johnstone85	Roadside	Diffusion Tube	92.3	92.3	26.1	25.0	30.2	24.5	19.9
Johnstone86	Roadside	Diffusion Tube	92.3	92.3	28.1	27.0	29.9	19.0	19.2
Paisley89	Roadside	Diffusion Tube	100.0	100.0	22.4	30.4	24.9	23.2	20.0
Renfrew90 (1), Renfrew90 (2), Renfrew90 (3)	Roadside	Diffusion Tube	100.0	100.0	-	24.4	21.4	20.1	17.2
Lochwin92	Roadside	Diffusion Tube	100.0	100.0	-	-	14.8	14.3	13.5
Lochwin93	Roadside	Diffusion Tube	100.0	100.0	-	-	14.1	16.7	11.1
Paisley94	Roadside	Diffusion Tube	84.6	84.6	-	-	21.0	19.0	17.9
Paisley96	Roadside	Diffusion Tube	100.0	100.0	-	-	24.2	21.2	16.9
Renfrew97	Kerbside	Diffusion Tube	100.0	100.0	-	-	-	30.5	28.5
Johnstone99	Roadside	Diffusion Tube	82.7	82.7	-	-	-	35.4	25.7
Johnstone100	Roadside	Diffusion Tube	100.0	100.0	-	-	-	31.8	24.3
Renfrew101	Roadside	Diffusion Tube	90.4	90.4	-	-	-	19.5	17.8
Paisley102	Roadside	Diffusion Tube	92.3	92.3	-	-	-	-	19.1
Paisley103	Roadside	Diffusion Tube	100.0	100.0	-	-	-	-	13.1
Paisley105	Roadside	Diffusion Tube	100.0	100.0	-	-	-	-	16.6
Paisley106	Roadside	Diffusion Tube	81.0	75.0	-	-	-	-	17.7
Johnstone107	Roadside	Diffusion Tube	100.0	84.6	-	-	-	-	20.6
Paisley108	Roadside	Diffusion Tube	86.7	50.0	-	-	-	-	14.7

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(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%).

Figure 6. Annual Mean NO_2 Concentrations at Automatic Monitoring Sites

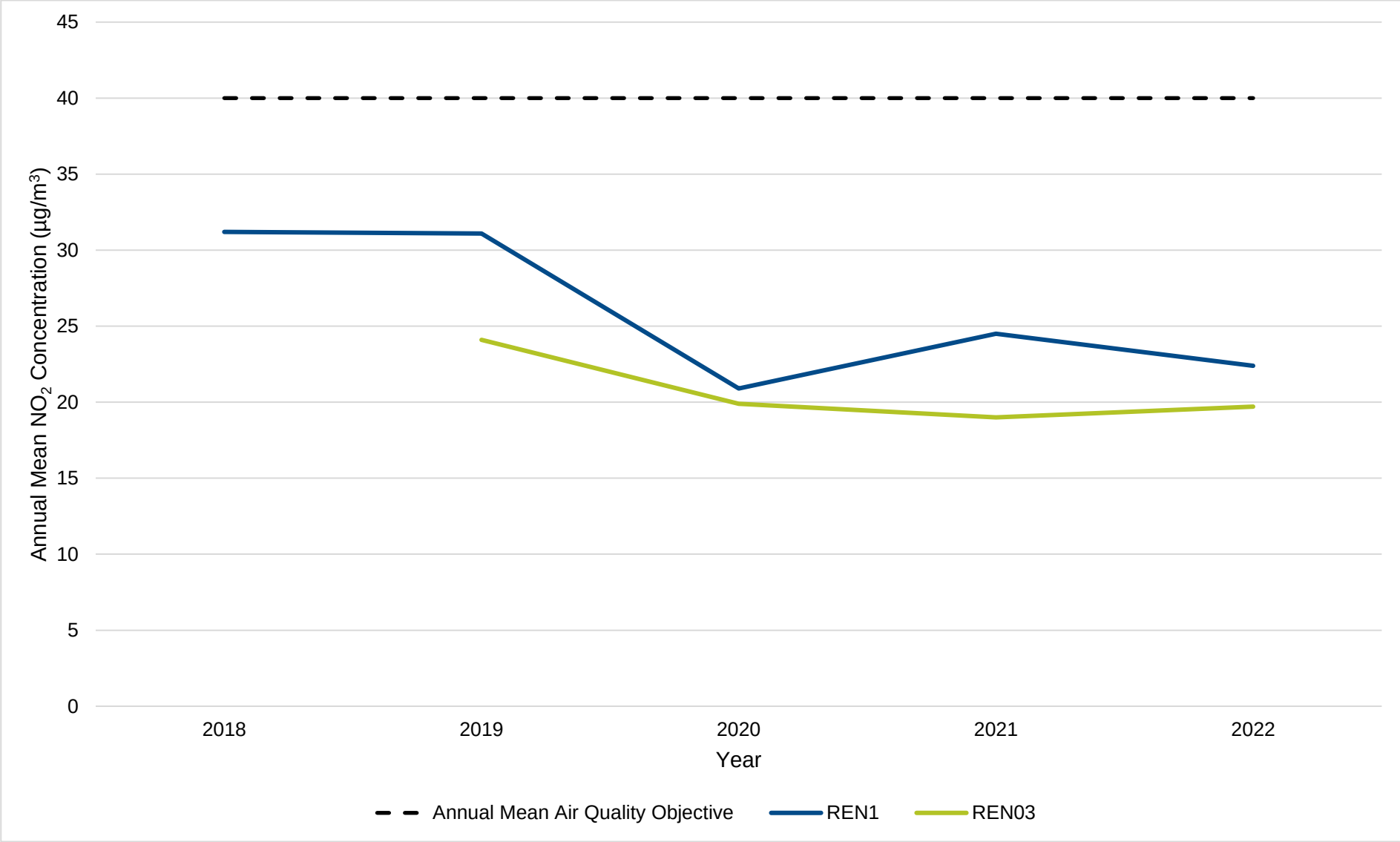


Figure 7. Annual Mean NO_2 Concentrations at Non-Automatic Monitoring Sites (Urban Centre, Urban Background, Kerbside)

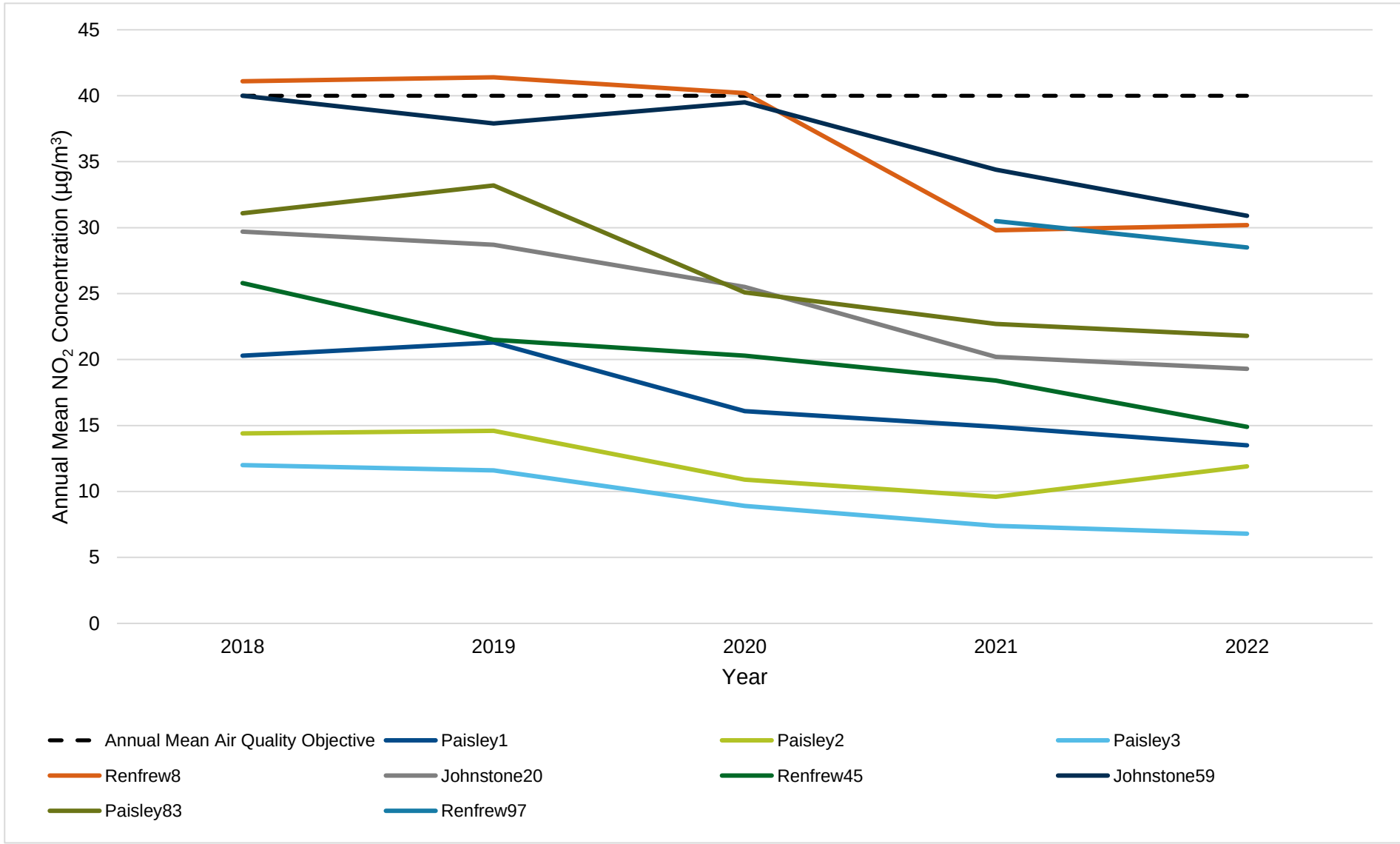


Figure 8. Annual mean NO_2 Concentrations at Non-Automatic Monitoring Sites (Roadside 1)

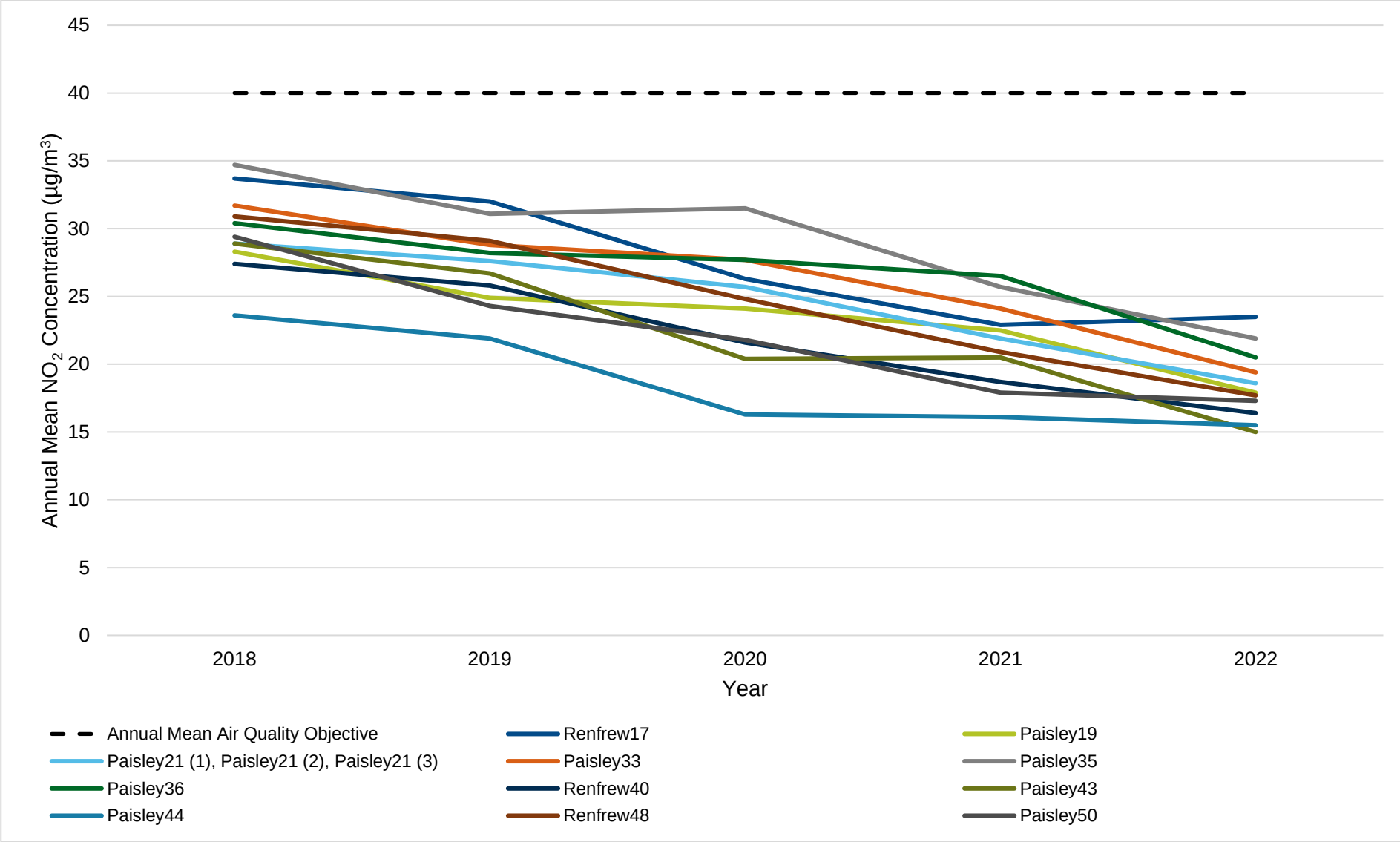


Figure 9. Annual Mean NO_2 Concentrations at Non-Automatic Monitoring Sites (Roadside 2)

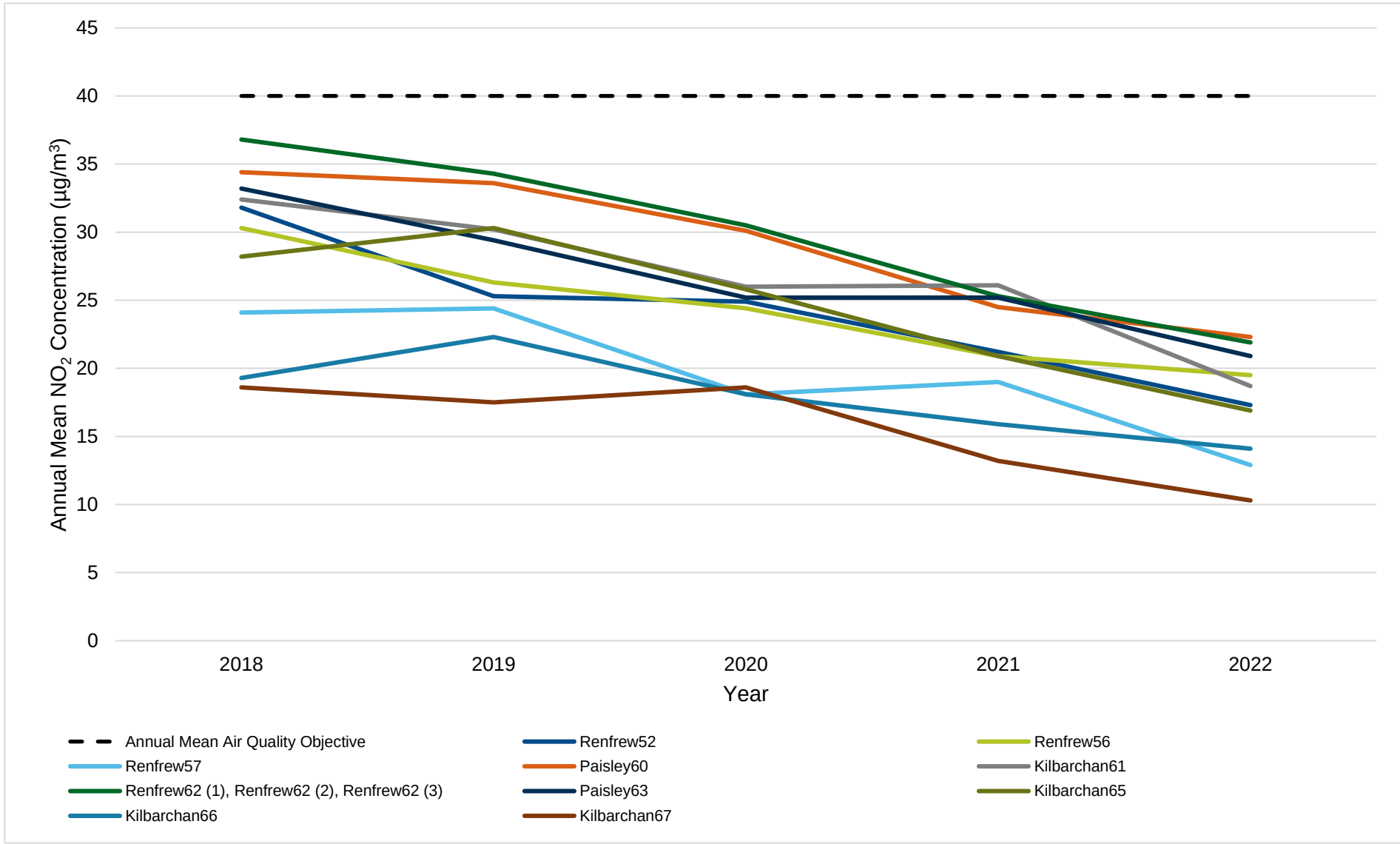


Figure 10. Annual Mean NO_2 Concentrations at Non-Automatic Monitoring Sites (Roadside 3)

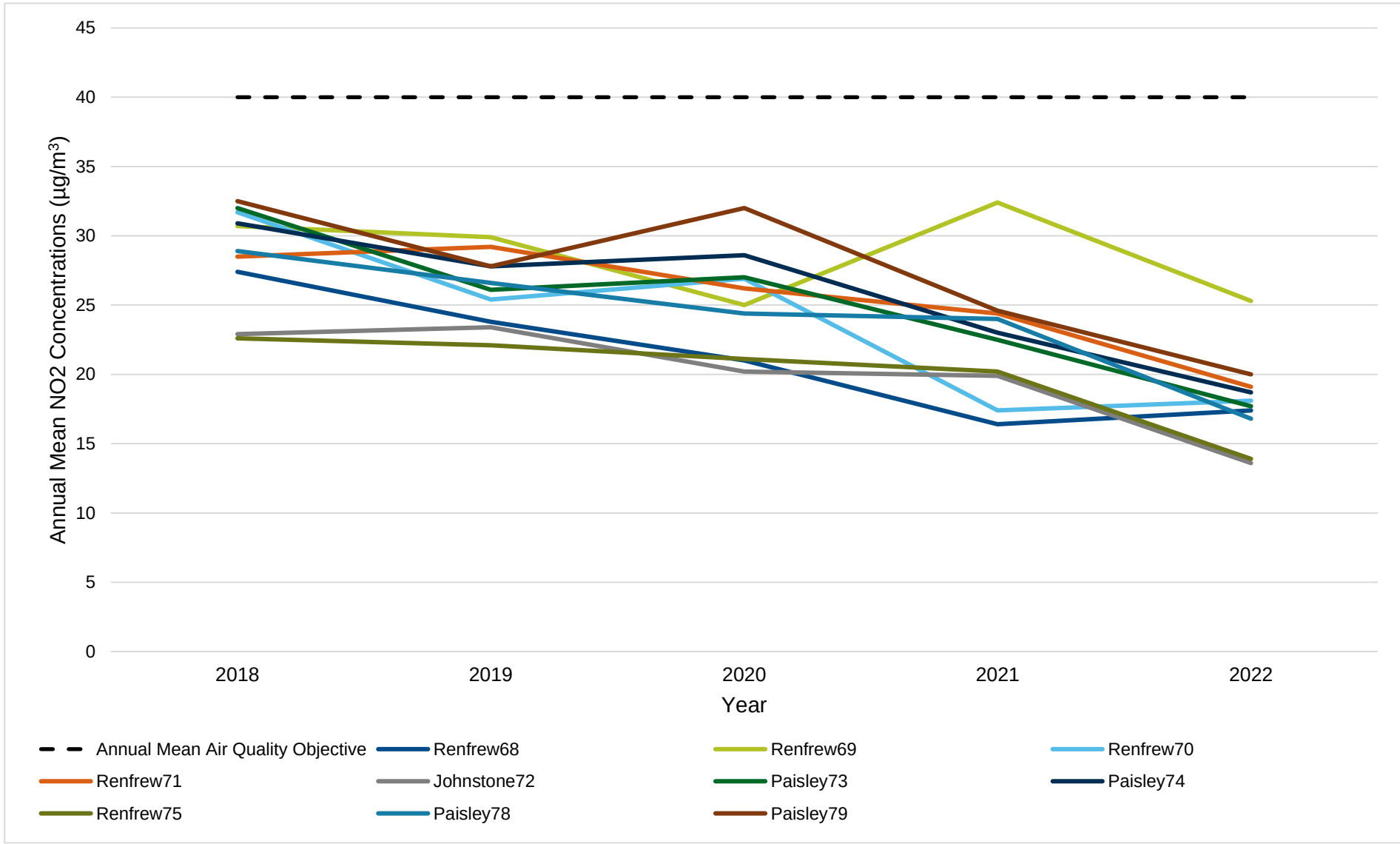


Figure 11. Annual Mean NO_2 Concentrations at Non-Automatic Monitoring Sites (Roadside 4)

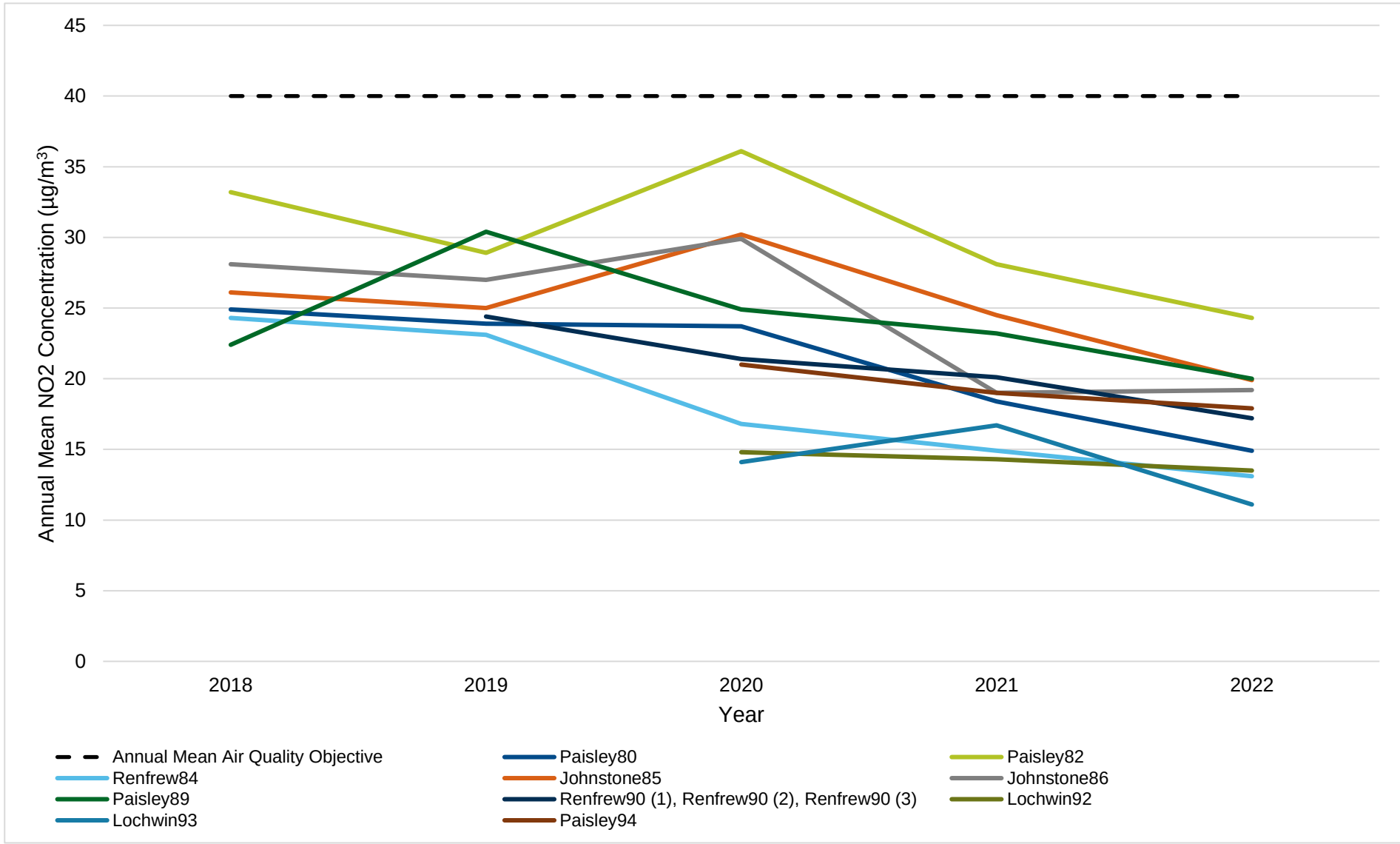


Figure 12. Annual Mean NO_2 Concentrations at Non-Automatic Monitoring Sites (Roadside 5)

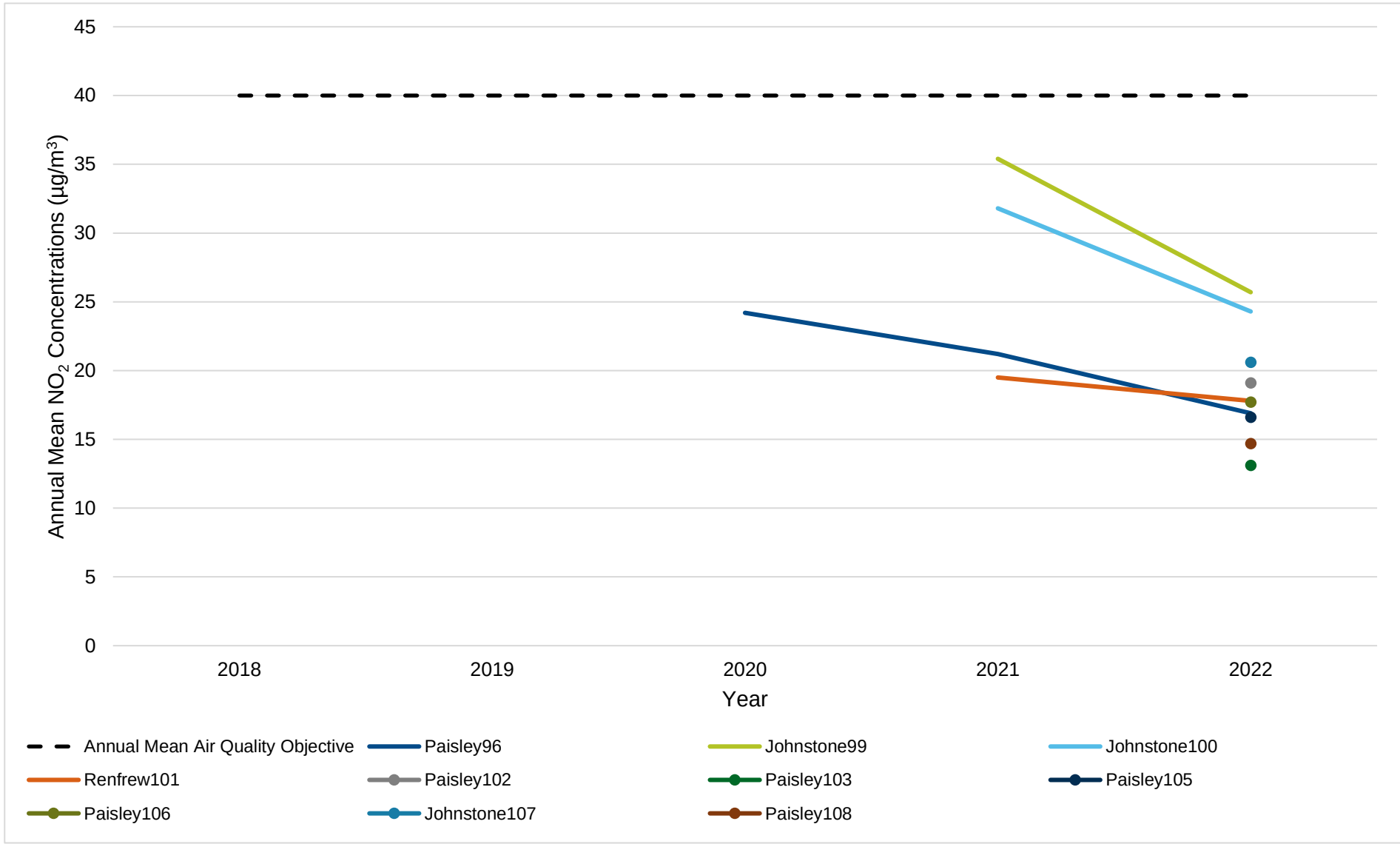


Table A.4 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
REN1	Roadside	Automatic	99.7	99.7	0	0	0	0	0
REN03	Roadside	Automatic	98.2	98.2	-	0	0	0	0

Notes:

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

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

(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 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
REN02	Roadside	82.3	82.3	13.4	16.3	10.2	13.7	12.9
REN02 Corrected	Roadside	82.3	82.3	14.8	17.9	11.3	15.1	14.2

Notes:

Exceedances of the PM_{10} annual mean objective of 18 µg/m^3 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.

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 13. Annual Mean PM_{10} Concentrations at Automatic Monitoring Sites

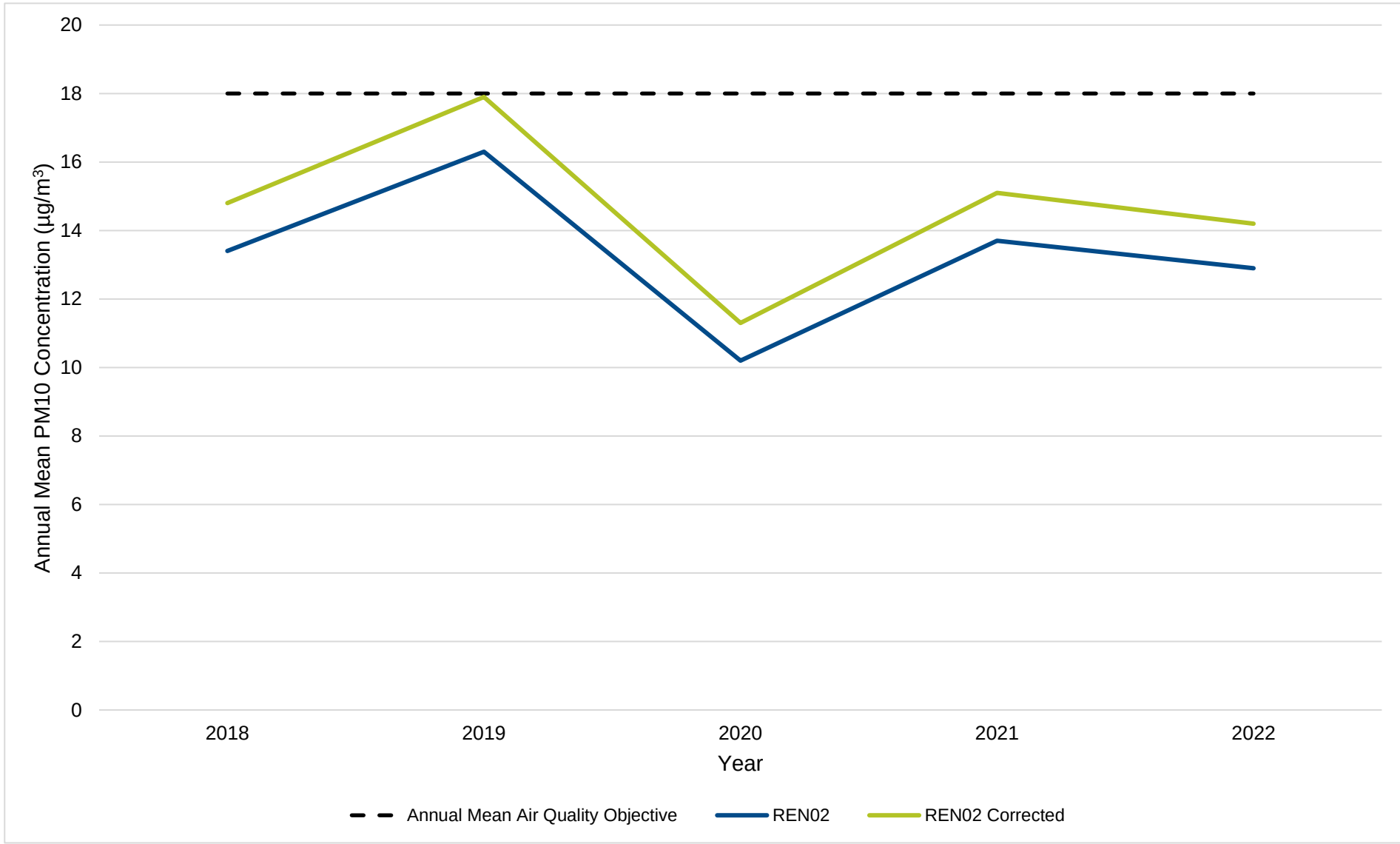


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
REN02	Roadside	82.3	82.3	1	**14**	0	1	0

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50 µg/m^3 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.7 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
REN02	Roadside	82.3	82.3	7.3	7.9	5.5	6.0	6.1
REN02 Corrected	Roadside	82.3	82.3	7.7	8.4	5.9	6.3	6.5

Notes:

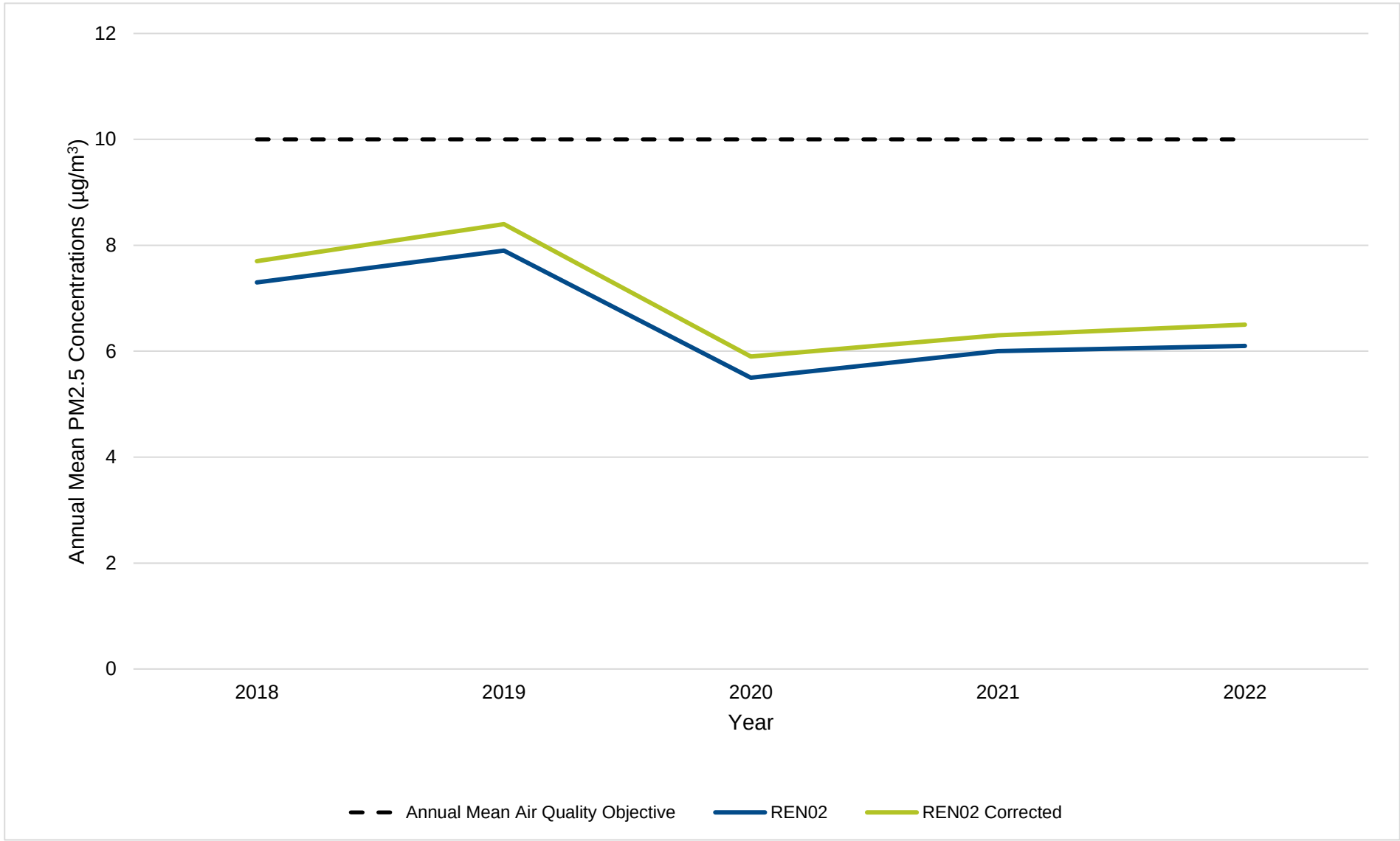
Exceedances of the $PM_{2.5}$ annual mean objective of 10 µg/m^3 are shown in bold.

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.

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 14. Annual Mean PM2.5 Concentrations at Automatic Monitoring Sites



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Monthly Diffusion Tube Results (µg/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)
Paisley1	8.2	11.4	17.8	13.2	4.5	8.3	5.8	11.9	11.0	14.5	12.5	34.2	12.8	13.5
Paisley2	-	23.6	6.9	10.1	5.4	-	4.9	8.3	8.1	8.5	16.2	20.7	11.3	11.9
Paisley3	-	6.7	4.5	8.6	2.1	2.3	3.4	5.5	5.8	6.5	6.4	18.8	6.4	6.8
Renfrew8	31.7	39.2	14.9	23.6	15.3	31.8	29.9	23.5	22.1	34.4	-	47.0	28.5	30.2
Renfrew17	20.7	24.2	13.3	27.0	12.1	16.0	14.6	16.3	-	27.4	34.6	37.7	22.2	23.5
Paisley19	9.3	14.6	13.2	19.8	11.3	12.8	12.0	10.2	19.8	20.8	27.5	31.9	16.9	17.9
Johnstone20	14.0	15.9	15.9	24.7	18.8	10.3	14.2	12.3		13.0	25.7	36.0	18.3	19.3
Paisley21 (1)	16.9	17.5	15.6	24.1	11.8	11.8	13.3	-	15.6	14.1	26.6	37.3	-(2)	-(2)
Paisley21 (2)	15.6	18.0	12.1	23.6	10.7	14.2	8.5	16.0	12.1	20.7	22.2	32.8	-(2)	-(2)
Paisley21 (3)	11.4	18.8	11.8	25.1	9.8	13.3	12.2	8.7	-	18.2	28.2	36.0	17.5(2)	18.6(2)
Paisley33	10.5	13.3	15.8	26.6	20.1	11.9	18.2	11.6	22.9	13.7	-	36.8	18.3	19.4
Paisley35	15.4	12.3	15.9	29.0	21.5	16.0	18.6	14.0	26.4	16.3	-	41.9	20.7	21.9
Paisley36	19.7	18.0	7.1	21.6	12.1	11.7	15.5	13.6	22.1	23.5	33.2	34.5	19.4	20.5
Renfrew40	12.0	7.2	12.1	16.4	13.9	12.7	9.5	11.6	12.1	17.7	23.7	36.2	15.4	16.4
Paisley43	12.3	8.0	10.7	18.1	10.2	9.2	8.9	11.7	10.4	14.8	20.3	35.3	14.2	15.0
Paisley44	9.6	7.5	12.9	17.7	10.7	8.8	8.5	15.6	17.3	15.1	23.8	28.0	14.6	15.5
Renfrew45	11.6	8.4	19.8	17.4	7.4	10.2	13.1	7.1	17.3	16.9	25.7	-	14.1	14.9
Renfrew48	13.6	10.2	14.9	10.4	7.7	13.6	11.5	7.5	20.0	23.7	29.0	38.1	16.7	17.7
Paisley50	14.2	11.1	10.7	-	15.3	11.9	12.2	7.5	21.0	18.5	21.5	35.9	16.3	17.3
Renfrew52	15.8	9.9	15.0	9.1	13.6	14.3	10.7	10.7	15.7	18.0	28.5	35.1	16.4	17.3
Renfrew56	18.0	9.5	14.0	23.1	10.4	15.9	10.7	17.3	-	21.9	28.1	33.8	18.4	19.5
Renfrew57	11.7	6.9	12.8	16.2	10.6	6.6	9.1	7.6	18.1	18.5	25.4	2.9	12.2	12.9
Johnstone59	34.1	16.5	21.4	31.9	29.2	20.4	10.6	29.7	29.2	42.0	41.0	44.3	29.2	30.9
Paisley60	21.6	8.8	17.3	15.6	15.3	12.0	16.9	20.9	25.6	21.1	34.1	42.9	21.0	22.3
Kilbarchan61	19.5	12.0	16.4	12.8	16.5	6.8	13.1	14.8	23.7	15.0	27.9	33.4	17.7	18.7
Renfrew62 (1)	28.8	16.0	14.5	18.1	15.3	11.8	16.8	14.8	24.2	26.5	31.8	40.1	-(3)	-(3)
Renfrew62 (2)	25.2	11.4	14.1	15.9	19.9	9.5	-	19.3	22.6	30.0	32.6	38.1	-(3)	-(3)
Renfrew62 (3)	24.3	17.2	12.8	18.5	8.6	11.1	2.0	-	28.0	28.8	27.6	39.8	20.6(3)	21.9(3)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
Paisley63	19.8	18.7	15.5	17.2	17.6	6.2	16.3	17.9	-	24.4	25.9	37.3	19.7	20.9
Kilbarchan65	20.6	9.0	15.6	12.1	15.1	7.3	12.1	14.8	19.3	16.8	17.1	31.3	15.9	16.9
Kilbarchan66	10.2	-	10.5	-	9.4	-	6.4	11.5	15.4	11.5	17.8	26.9	13.3	14.1
Kilbarchan67	7.3	-	9.0	6.4	7.5	3.7	5.7	8.5	10.3	11.2	14.2	23.6	9.8	10.3
Renfrew68	12.7	10.4	13.7	10.6	7.3	7.1	10.9	14.1	17.8	18.7	32.6	40.8	16.4	17.4
Renfrew69	15.1	22.2	18.3	17.1	-	-	14.3	18.6	26.8	28.0	51.4	26.9	23.9	25.3
Renfrew70	-	-	14.9	9.0	15.2	7.9	13.0	-	20.5	-	28.1	-	15.5	18.1
Renfrew71	10.4	-	16.4	9.9	10.0	7.7	11.9	12.0	21.3	25.5	35.7	37.3	18.0	19.1
Johnstone72	10.0	5.3	12.6	8.6	12.0	5.2	10.0	13.4	23.3	11.6	19.6	22.6	12.9	13.6
Paisley73	11.7	7.9	13.4	14.7	16.3	7.5	16.9	15.8	18.1	16.7	20.5	41.2	16.7	17.7
Paisley74	8.9	6.3	14.1	27.1	17.8	8.1	11.4	19.2	15.7	21.0	26.2	35.6	17.6	18.7
Renfrew75	12.6	9.0	11.4	8.2	5.9	6.8	10.1	12.0	5.3	18.7	23.0	34.3	13.1	13.9
Paisley78	13.3	12.3	17.3	15.6	8.4	10.8	15.7	14.2	9.3	13.6	23.9	35.4	15.8	16.8
Paisley79	17.5	10.9	16.5	19.0	9.5	9.9	12.8	17.1	16.4	20.7	30.9	45.4	18.9	20.0
Paisley80	9.3	8.7	13.3	21.5	11.5	4.3	10.6	12.3	-	12.8	17.8	32.4	14.0	14.9
Paisley82	16.3	36.0	20.0	22.1	11.6	5.5	11.3	27.4	23.1	31.4	28.8	41.8	22.9	24.3
Paisley83	20.2	9.3	29.3	21.7	18.8	12.6	16.6	17.4	12.5	20.8	29.9	38.0	20.6	21.8
Renfrew84	6.5	5.7	10.3	11.4	9.4	7.5	10.9	11.8	11.9	14.7	22.4	26.1	12.4	13.1
Johnstone85	12.5	6.7	-	25.3	17.8	9.4	14.7	20.4	16.1	20.0	27.2	36.6	18.8	19.9
Johnstone86	16.0	10.6	13.2	22.1	19.6	6.7	12.1	19.4	-	20.6	24.8	34.4	18.1	19.2
Paisley88	-	-	-	11.8	-	-	10.2	-	-	-	-	-	-	-
Paisley89	18.2	19.3	12.5	24.8	15.4	9.7	16.7	18.3	14.7	14.3	23.5	38.7	18.8	20.0
Renfrew90 (1)	7.4	8.0	18.8	14.4	13.3	10.4	10.9	15.6	9.6	15.2	28.6	38.3	-(4)	-(4)
Renfrew90 (2)	6.2	5.1	12.7	20.6	8.6	7.5	11.0	12.8	11.1	17.8	31.5	35.2	-(4)	-(4)
Renfrew90 (3)	12.6	8.0	27.9	18.7	14.6	6.5	10.9	15.1	10.6	19.9	30.3	37.6	16.2(4)	17.2(4)
Lochwin92	11.2	4.6	16.1	11.3	12.9	7.8	12.1	16.2	13.2	10.7	15.7	20.7	12.7	13.5
Lochwin93	8.4	6.0	17.2	10.8	10.7	4.5	7.6	7.8	6.0	10.4	16.6	19.8	10.5	11.1
Paisley94	12.1	4.2	24.7	22.3	15.1	-	-	13.9	8.5	11.6	21.5	34.6	16.9	17.9
Paisley96	20.9	11.2	25.3	12.1	11.3	9.5	10.3	10.3	7.1	19.3	20.6	33.7	16.0	16.9
Renfrew97	37.8	24.7	38.2	27.0	23.9	12.8	16.9	20.9	11.0	31.5	34.6	43.1	26.9	28.5
Johnstone98	36.0	-	-	-	-		-	-	-	-	-	-	-	-
Johnstone99	-	12.3	26.8	-	27.6	18.4	16.4	29.0	17.0	18.6	31.5	44.6	24.2	25.7
Johnstone100	26.8	16.2	30.6	18.8	18.9	22.1	14.6	16.8	15.9	23.8	31.8	38.8	22.9	24.3
Renfrew101	18.1	9.3	25.8	-	13.8	9.8	5.9	9.7	15.1	18.7	23.5	35.5	16.8	17.8
Paisley102	13.6	8.2	28.2	13.6	16.3	7.8	-	27.7	10.2	14.7	22.4	35.3	18.0	19.1

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
Paisley103	11.8	5.3	21.8	9.6	9.5	6.1	8.3	11.6	10.8	12.4	14.6	26.3	12.3	13.1
Paisley105	10.5	9.7	28.0	12.5	8.7	6.9	10.1	17.9	11.4	17.3	20.7	34.6	15.7	16.6
Paisley106	-	12.5	27.5	17.7	-	9.1	-	8.5	9.3	15.1	22.3	28.0	16.7	17.7
Johnstone107	-	-	31.5	23.4	10.3	15.9	9.4	10.7	13.4	19.3	28.6	31.6	19.4	20.6
Paisley108	-	-	-	-	-	5.2	3.6	10.1	15.5	13.3	-	29.6	12.9	14.7

Notes:

(1) See Appendix C for details on bias adjustment

(2) Triplicate Site with Paisley21 (1), Paisley21 (2) and Paisley21 (3) - Annual data provided for Paisley21 (3) only

(3) Triplicate Site with Renfrew62 (1), Renfrew62 (2) and Renfrew62 (3) - Annual data provided for Renfrew62 (3) only

(4) Triplicate Site with Renfrew90 (1), Renfrew90 (2) and Renfrew90 (3) - Annual data provided for Renfrew90 (3) only

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

New or Changed Sources Identified Within Renfrewshire Council During 2023

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

Additional Air Quality Works Undertaken by Renfrewshire Council During 2023

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

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the reporting year of 2022 were supplied and analysed by Glasgow Scientific Services (GSS) using the 20% TEA in water preparation method. All results have been bias adjusted and annualised (where required) before being presented in Appendix A: Monitoring Results.

GSS is a UKAS accredited laboratory and participates in the AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre.

The latest AIR-PT results were as follows:

- AIR-PT AR037 (May – June 2020) – No Results (NR)
- AIR-PT AR039 (July – August 2020) – No Results (NR)
- AIR-PT AR040 (September – October 2020) – 100%
- AIR-PT AR042 (January – February 2021) – 50%
- AIR-PT AR043 (May – June 2021) – 100%

- AIR-PT AR045 (July – August 2021) – 100%
- AIR-PT AR046 (September – October 2021) – No Results (NR)
- AIR-PT AR049 (January – February 2022) – 100%
- AIR-PT AR050 (May – June 2022) – 100%

Diffusion Tube Annualisation

Two diffusion tube monitoring locations within Renfrewshire Council required annualisation as their data capture was less than 75% but greater than 25%: Renfrew70 and Paisley108, details are provided in Table C.2. Two diffusion tube monitoring locations recorded a data capture below 25% and therefore could not be annualised: Paisley88 and Johnstone98. The remainder of the sites recorded a data capture greater than 75% and therefore did not require annualisation.

Diffusion Tube Bias Adjustment Factors

Renfrewshire Council have applied a local bias adjustment factor of 1.06 to the 2022 monitoring data. A summary of bias adjustment factors used by Renfrewshire Council over the past five years is presented in Table C.1.

The 2022 national bias adjustment factor was taken from the National Diffusion Tube Bias Adjustment Factor Spreadsheet (version 03/23) of which reports six studies analysed by Glasgow Scientific Services in 2022 to give a national bias adjustment factor of 1.05. There were two locations which provided opportunity for input to local bias adjustment calculation. The local bias adjustment factor for 2022 was 1.06 from Cockels Loan co-location site, which reported good overall precision and overall data capture. Renfrew Inchinnan Road co-location site reported a poor overall precision for the diffusion tubes and therefore was not used to calculate the local bias adjustment factor as per LAQM.TG(22) which states *"Where results show poor precision, then they should be treated with caution, and they may not be suitable for their intended purpose… The aim should be to use results from tubes that are giving good precision, as this will improve the overall reliability of the annual mean concentrations derived from the diffusion tubes to which the locally derived bias adjustment factors have been applied."*

The local adjustment factor was used as it was larger than the national adjustment factor and was considered to provide a more conservative, worst case approach; this is consistent with the Council's previous years' choice of bias adjustment factors. Bias

adjustment was carried out using the Defra Diffusion Tube Data Processing Tool v3.0 (https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-data-processing-tool/).

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	-	1.06
2021	National	03/22	1.12
2020	Local	-	1.20
2019	Local	-	0.89
2018	Local	-	0.91

NO_2 Fall-off with Distance from the Road

Two monitoring sites (Paisley21 and Renfrew48) were not representative of exposure and so the NO_2 fall-off with distance calculator was used to estimate the NO_2 concentration at the nearest receptor with relevant exposure for each site. The calculations are shown in Table C.4. NO_2 Fall-off with Distance from the Road was carried out using the Defra Diffusion Tube Data Processing Tool (https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-data-processing-tool/).

QA/QC of Automatic Monitoring

Automatic monitoring of NO_X, PM_{10} and $PM_{2.5}$ is completed within Renfrewshire using Chemiluminescence (NO_X) and FIDAS 2000 ($PM_{2.5}$ and PM_{10}) analysers. Local Site Operator (LSO) duties are carried out by an Officer from Renfrewshire Council on a monthly basis. Automatic monitoring data is available on the Scottish Air Quality website (https://www.scottishairquality.scot/) both in real-time and following ratification by Ricardo Energy and Environment to AURN standards. The continuous monitoring sites are audited every six monthly by Ricardo and are serviced every six months by ACOEM who maintain the Service and Maintenance Contract. REN1 and REN03 NO_2/NOx monitors are visited and calibrated once a month by an LSO from Renfrewshire Council and reports from these calibrations are sent to Ricardo to use in the QA/QC process.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

PM_{10} and $PM_{2.5}$ data have been corrected in line with the Scottish Government Guidance Note in relation to the measurement of ambient Particulate Matter (PM) and the LAQM reporting of measured concentrations, issued in May 2023. PM_{10} data have been corrected by dividing the ratified data by 0.909. $PM_{2.5}$ data have been corrected by multiplying the ratified data by 1.06. Both the corrected and uncorrected values have been reported for completeness, as per the Scottish Government Guidance Note.

Automatic Monitoring Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. All automatic monitoring locations within Renfrewshire Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Renfrewshire Council required distance correction during 2022.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Glasgow Anderston	Annualisation Factor Glasgow Townhead	Annualisation Factor Site 3 Name	Annualisation Factor Site 4 Name	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
Renfrew70	1.0604	1.1452	-	-	1.1028	15.5	17.1	
Paisley108	1.0911	1.0564	-	-	1.0737	12.9	13.8	

Table C.3 – Local Bias Adjustment Calculations

	Local Bias Adjustment Input 1 (Renfrew Cockels Loan)	Local Bias Adjustment Input 2 (Inchinnan Road)	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	9	7			
Bias Factor A	1.06 (0.86 – 1.37)	1.12 (0.95 – 1.36)			
Bias Factor B	-6% (-27% - 16%)	-10% (-26% - 5%)			
Diffusion Tube Mean (µg/m^3)	23.1	19.8			
Mean CV (Precision)	9.3%	8.4%			
Automatic Mean (µg/m^3)	24.5	22.1			
Data Capture	100%	100%			
Adjusted Tube Mean (µg/m^3)	25 (20 – 32)	22 (19 – 27)			

Notes:

Local bias adjustment input 2 (Inchinnan Road) has been disregarded due to poor diffusion tube precision so a single local bias adjustment factor (Renfrew Cockels Loan) has been used to bias adjust the 2022 diffusion tube results.

Table C.4 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

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
Paisley21 (1), Paisley21 (2), Paisley21 (3)	9.9	3.6	18.6	11.1	21.4	
Renfrew48	45.0	23.0	17.7	16.4	18.4	*Receptor is more than 20m further from the kerb than the monitor - treat result with caution.*

Glossary of Terms

Abbreviation	Description
AMIDS	Advanced Manufacturing Innovation District Scotland South
APR	Air Quality Annual Progress Report
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
AQO	Air Quality Objective
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
CAFS2	Cleaner Air for Scotland 2
CWRR	Clyde Waterfront & Renfrew Riverside
DEFRA	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
GAIA	Glasgow Airport Investment Area
GSS	Glasgow Scientific Services
HGV	Heavy Goods Vehicle
HVO	Hydrotreated Vegetable Oil
JHS	Johnstone High Street
LA	Local Authority
LAQM	Local Air Quality Management
LEZ	Low Emission Zone

LSO	Local Site Operator
LTS	Local Transport Strategy
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
PTC	Paisley Town Centre
REN1	Renfrew Cockels Loan
REN02	Renfrewshire Johnstone
REN03	Renfrew Inchinnan Road
RTC	Renfrew Town Centre
QA/QC	Quality Assurance and Quality Control
SEPA	Scottish Environment Protection Agency
SO_2	Sulphur Dioxide
SPT	Strathclyde Partnership for Transport
TEA	Triethanolamine
TRO	Traffic Regulation Order
TTRO	Temporary Traffic Regulation Order
UTC	Urban Traffic Control
VPR	Vehicle Replacement Programme
VRC	Vehicle Replacement Capital

References

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Renfrewshire Council (2016-2021) Annual Progress Reports.