Annual Progress Report (APR)

2022 Air Quality Annual Progress Report (APR) for Renfrewshire Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2022

Information	**Renfrewshire Council**
Local Authority Officer	Karen McIndoe
Department	Communities and Housing Services
Address	Renfrewshire Council Renfrewshire House Cotton Street Paisley PA1 1BR
Telephone	07768 988028
E-mail	karen.mcindoe@renfrewshire.gov.uk
Report Reference Number	APR2022
Date	June 2022

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). Renfrewshire Council monitor NO_2, PM_{10} and $PM_{2.5}$ at a number of locations.

Renfrewshire Council undertook automatic (continuous) monitoring at four sites during 2021 – REN1 (Renfrew Cockels Loan), REN02 (Renfrewshire Johnstone), REN03 (Renfrew Inchinnan Road) and PAI3 (Paisley Gordon Street).

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 2021. 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 2021 were below AQO levels. It should be noted that concentrations recorded at both diffusion tube and automatic monitoring locations in 2021 will have been impacted to a certain extent by COVID-19 related lockdowns or COVID-19 restrictions.

There were a total of 65 diffusion tube monitoring sites across Renfrewshire in 2021, 10 sites were either added to the diffusion tube monitoring network or changed in the network from 2020. The details of this are as follows. Johnstone 87 was removed in May 2021 due to constant removal by vandals and was not replaced as Johnstone 72 is close by, Renfrew 97 was added close to Renfrew 8 as this site was exceeding the AQO historically. Seven other new sites were introduced in 2021 (Johnstone 98 – 100, Paisley 102 – 105), Johnstone 98 – 100 sites were recommended within the previous APR appraisal, Paisley 102, 104 and 105 were added due to increases in buses and planned changes in taxi rank areas and Paisley 103 was added close to Glasgow airport following a complaint about aircraft fumes.

Within the PTC AQMA, there continued to be no exceedances of either the NO_2 or PM_{10} AQOs at the automatic and passive monitoring locations as reported in the 2021 Annual Status Report. The PTC AQMA has been declared for both annual mean and short term NO_2 exceedances, and for annual mean PM_{10} exceedances. Within previous APR appraisals, the revocation or amendment of both PTC and JHS AQMAs was supported and recommended the decisions be accompanied by a detailed assessment. Although continued downward trends are reported within the AQMAs, the Council have advised that the City Deals transport infrastructure improvement projects, delayed due to COVID-19, could still potentially influence some traffic volumes throughout the PTC AQMA, in particular. The Glasgow Airport Investment Area (GAIA) project opened to traffic in March 2022 and the Clyde Waterfront and Renfrew Riverside (CWRR) project has a completion delay of up to Q4 2023. The Council therefore propose to await operational traffic volumes following the works before a consideration may be given to the revocation or amendment of the PTC and JHS AQMAs.

Actions to Improve Air Quality

Throughout 2021, 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 further discussed in Section 1.3.

Renfrewshire Council created and filled a permanent Active Travel Officer post to assist delivery on a wide range of priority active travel and public transport infrastructure related projects. The promotion of active travel will also tie in with projects being delivered as part of the Glasgow Region City Deal that will significantly improve the transport and cycling connections in Renfrewshire. These include:

- Clyde Waterfront and Renfrew Riverside (CWRR) project;
- Glasgow Airport Investment Area (GAIA); and
- Advanced Manufacturing Innovation District Scotland (AMIDS) South project.

Sixteen measures are within the existing AQAP, covering the following topic areas:

- Freight and delivery management;
- Policy guidance and development control;
- Promoting low emission transport;
- Promoting travel alternatives;

- Public information;
- Transport planning and infrastructure;
- Traffic management;
- Alternatives to private vehicle use; and
- Vehicle fleet efficiency.

Local Priorities and Challenges

Renfrewshire Council's proposed priorities following the publication of the 2022 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;
- Continuation with the upgrade and development of the cycling network as per the Renfrewshire Council Cycle Strategy priorities;
- Consider recommencing the Corporate Travel Plan which has been on hold since the pandemic due to the significant changes in staff home working;
- Following the creation of an Active Travel Officer post within the council, progress with development of a Renfrewshire Active Travel Strategy aimed at Renfrewshire residents, business, visitors etc;
- Continuation with the implementation of improvements to bus services at key junctions within Paisley Town Centre over the next 18 months as part of the Glasgow City Region Bus Partnership where Renfrewshire was successful in securing £2million funding to deliver this project;
- Continuation with the expansion of the council's electric vehicle (EV) charging network and the improvements and linking up of existing and planned active travel routes in Renfrewshire as part of the Transport Scotland's Low Carbon Travel and Transport Challenge Funding project;
- Provide an update on the Air Quality Action Plan (AQAP) during 2022/2023;
- Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ at all relevant locations throughout Renfrewshire;
- Submit the 2023 Annual Progress Report.

Despite various challenges, the 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 Renfewshire on the Renfrewshire Council website https://www.renfrewshire.gov.uk/airquality.

Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

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

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

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 http://www.scottishairquality.scot/laqm/aqma?id=382

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 along Glebe Street to property number 4 Glebe St; thence along Paisley Road to the	Renfrewshire Council Air Quality Action Plan 2019: http://www.renfrewshire.gov.uk/airquality

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
			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	

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 the towns of 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-front line 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

Local authorities working with Transport Scotland and the Scottish Environmental Protection Agency (SEPA) are looking at opportunities to promote zero-carbon city centres within the existing Low Emission Zones (LEZ) structure.

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.

2.2.3 Further actions

The Advanced Manufacturing Innovation District Scotland (AMIDS) South project which is discussed more in Section 6 New Local Developments, will provide new infrastructure between Paisley town centre, AMIDS and Glasgow Airport. The project will improve transport links, connect communities and bolster business growth in addition to removing traffic from routes where there is a density of residential properties.

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

Renfrewshire Council has taken forward a number of measures during the current reporting year of 2021 in pursuit of improving local air quality. 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 2019 Air Quality Action. Key completed measures are:

- Measure 15 – Progression of the development of the Council's cycle network with the completion of a segregated cycle way path from Bishopton to Glasgow Airport and refurbishment and reopening of the White Cart footbridge, Paisley.

Progress on the following measures has been slower than expected:

- Measure 6 – Phase 3 has been delayed due to the impact the pandemic has had on the number of staff working from home;
- Measure 7 – The ECO Stars scheme is currently on hold as funding is being prioritised to take forward other measures within the AQAP;
- Measure 8 – The Council await publication of a revised National and Regional Transport Strategy before preparation of Renfrewshire's Local Strategy may be undertaken;
- Measure 9 – Funding has been secured for PTC transportation improvements but modelling has not yet been undertaken and a timeline for implementation has not yet been decided.

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

- Measure 16 – Renfrewshire Council Staff Cycle2Work scheme open from 24 March to 17 June 2022;
- Better Points active travel incentive scheme implementation. Renfrewshire Council received funding from the Scottish Government to implement this scheme for a 12-month period which commenced in Spring 2022. Better Points offers a mobile app and management system, incentivising its users to make positive active travel behaviour changes as well as offering baseline surveying to build a picture of people's current behaviour, attitudes and capacity for change. The mobile app delivers incentives and rewards tailored to reach as many of the target audience as possible.

Table 2-2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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	Road infrastructure	Scottish Government, UK Government & Local Authorities (LAs) across the region. For the City Deal funded projects the decision-making body is the Glasgow City Region Cabinet. For the UK Government Levelling Up Fund project, the decision-making bodies is the UK Gov Department for Transport. Within Renfrewshire Council the projects are led by Chief Executive Services, City Deal & Infrastructure.	GAIA & CWRR March 2017 – proposal of Application Notices submitted. April to May 2017 – consultation with Elected Members/ Community Councils/ public. June 2017 - submission of planning applications (GAIA 'Core' 17/0485/PP, GAIA 'Cycleway' 17/0487/PP & CWRR 17/0486/PP). AMIDS South May 2022 – proposed planning application	GAIA Nov 2017 – planning consent granted Spring 2019 – tender contracts awarded June 2019 – start of construction. March 2022 – Works opened to the public. CWRR Nov 2018 – planning consent granted Autumn 2019 – tenders published Nov 2021 – Contract Start Date. Early 2025 – Anticipated construction completion. AMIDS South Oct 2022 – Programmed planning consent Nov 2022 to Oct 2023 – Contractor procurement and land acquisition. Nov 2023 to March 2025 – Construction period.	Various –reduced traffic volume through Renfrew Town Centre following construction of Renfrew North Development Road (as part of the CWRR project) and reduced congestion and journey times. -Reduced traffic on Love Street, Old Sneddon Street, west side of Niddry Street. Increase in active travel choice. KPIs may be measured via: - % change in traffic flow: annual traffic counts on key commuter routes - % improvement in journey times - % reduction in queue lengths	Renfrew AQMA The AQAs conclude that pollutant concentrations at receptors due to traffic flow changes from the developments will be below AQO levels. The 2020 baseline concentrations vs 2020 with CWRR development will result in a minor to moderate beneficial impact on air quality levels (reduction of up to 3.9ugm3) measured at the 3 DTs on Inchinnan Road. A reduction of 3 ugm3 is expected at DT No.8 where there is a current exceedance (40.2 ugm3 in 2020). Reference should be made to the AQAs for full details.	Works for GAIA commenced in summer 2019, however delays including those associated with the COVID-19 pandemic, resulted in the road opening to traffic in March 2022. For CWRR, a contract start date was achieved in November 2021. Preparatory site works have commenced in parallel with detailed design and off-site fabrication processes. It is anticipated that the project will open to the public in early 2025.	GAIA – completion early 2022. CWRR – completion early 2025. Scottish Gov 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. AMIDS South – anticipated March 2025. UK Government funding 90% of the capital costs of the project. Renfrewshire council contribution is 10% of costs.	Refer to section 3.1.7 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.
2	Upgrades & Improvements to the Council's Urban Traffic Control (UTC) system - Identification of faults within the Council's UTC SCOOT system, repair/ replacement of defective loops, validation of traffic signals & PROM updates to traffic controllers to ensure full optimisation of traffic signals in order to reduce congestion.	Traffic Management	UTC, congestion management	Environment & Infrastructure - Roads and Infrastructure	Jan/Feb 2017 preparation and advertising of tender. March 2017 award of tender.	May 2017 to Nov 2017	An effective SCOOT system may reduce traffic delay by an average of 20%. Peak time congestion is an issue within the AQMAs. If this can be reduced, then traffic would flow more freely resulting in a reduction in emissions. Data in relation to traffic congestion pre and post SCOOT updates will be compared to identify the level of improvement achieved. KPIs may be measured via: - reduction in congestion monitored by an increase in overall speed through the junctions. - % improvement in journey times -improved traffic flow.	Paisley & Johnstone AQMA Paisley – 9 traffic signal sites repaired and validated on the Paisley Town Centre (PTC) ring road. The PTC source apportionment analysis confirmed that congestion contributes to pollutant levels to varying degrees dependant on location within the AQMA. Johnstone – 2 sites on High St repaired and validated.	Original defective loops repaired/ replaced in June 2017. Validation of traffic signals & PROM updates completed in November 2017. Further plans to upgrade 66 sites to a cloud-based SCOOT system from 2020. This work to modernise the Council's urban traffic control system and to replace its life-expired traffic signals continues. Communications issues between the signals and the system are being rectified by the installation of new technology and priority junctions are having their equipment replaced. These junctions include High Street and MacDowall Street Johnstone, A726 Barrhead Road and Saucel Crescent Paisley, Mill Street and Seedhill Road, A726 Barrhead Road and Thread Street, Maxwellton Street and Corsebar Road, Lawn Street and Gauze Street and Barrhead Road and Lochfield Road.	Initial council upgrade is to be expanded upon as of 2020, following instruction of a 10-year contract with Siemens at 66 sites across 30 junctions across the Council.	Additional information on this measure is provided in the 2019 Renfrewshire Council Air Quality Action Plan.
3	Council Fleet Improvements - Continue to improve the standard of fleet	Promoting Low Emission Transport (Company vehicle procurement - Prioritising uptake of low emission vehicles)	Company vehicle procurement – Prioritising uptake of low emission vehicles	Environment & Infrastructure – Fleet Solutions and Social Transport	Ongoing. There is an annual vehicle replacement programme whereby vehicles at the end of their service life are replaced with an improved EURO standard or an electric alternative.	Ongoing In 2016/17 12 HGVs were replaced with EURO VI standard. Further 12 EURO V HGVs replaced with EURO VI HGVs during 2017/18 (10 HGV lorries and 2 buses).	Reduces number of polluting vehicles, operational running costs of vehicles and CO2 emissions across entire Council area. Existing Council KPIs: - 2017/18 twelve EURO V HGVs will be replaced with EURO VI standard vehicles	All AQMAs, council wide air quality improvements. Reduces overall environmental impact of vehicles. Paisley – the Council's transport depot is located within the Paisley AQMA therefore all vehicles travelling to and from the depot will go through the	Approximately 32 HGVs are currently EURO VI standard.	Ongoing. The Council will continue to improve the standard of fleet and introduce greener vehicles where opportunities and funding permits. Full replacement of HGV fleet with minimum EURO VI	See measure no.4 which deals specifically with electric vehicle numbers within the fleet.

					The Council fleet consists of approx 500 vehicles of which >70% are of EURO V or VI standard. 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.		- amount of CO2 emitted by vehicle fleet. KPIs may also be measured via: -an annual review of Council vehicle fleet inventory in order to track year on year improvements which can then be reported in AQAP updates.	AQMA in addition to operating within it. The Council's HQ is also located within the Paisley AQMA. Several thousand employees work from this location.		vehicles by end of 2022. Funded via the Council's Vehicle Replacement Capital Programme.	
4	Council Fleet Improvements - Increase numbers of electric vehicles (EVs) & associated charging infrastructure - EV Fleet Strategy Feasibility Study	Promoting Low Emission Transport	Company vehicle procurement prioritising uptake of low emission vehicles & Procuring alternative refuelling infrastructure to promote low emission vehicles, EV recharging	Environment & Infrastructure – Fleet Solutions and Social Transport	Ongoing. First Council EVs and charging points purchased and installed in 2012. The Council currently have 90 EVs (cars/vans) in the fleet. An EV Fleet Strategy feasibility study has been completed to determine the maximum no. of EVs that could replace current diesel fleet vehicles. There is the potential for up to 200 EV vehicles to be purchased over the following 3/4 years subject to funding. EV Charging Hub at Stow Street Car Park will provide 12 charging sockets and works due to start in June 2022. Design concept completed and next stage is engagement with key stakeholders over summer 2022.	Ongoing. The Council will continue to introduce EVs & charging points where opportunities and funding permits. As technology evolves the Council will extend the EV Fleet Strategy to include all vehicles including HGVs and buses. There is also a planned £250,000 investment in Underwood Road Waste Depot during 2022/23 with a new 2.3MVA power supply and transformer to support the further expansion of EV charging infrastructure for light vans, HGVs and refuse collection vehicles. Council awarded £920,000 of funding in 2020 which will provide an EV Charging Hub near Canal Street Station and NCR7.	Existing Council KPIs: -% of the vehicle fleet which uses alternative fuels i.e. electricity (2018/19 target was 9% and we achieved 10%). Target for 2019/20 is 21% - amount of CO2 emitted by vehicle fleet.	All AQMAs, council wide air quality improvements. By acting to reduce its own emissions through the uptake of low emissions technology and vehicles, the Council will hopefully encourage other vehicle users to consider greener fuel options.	There are now 92 council operated publicly available charging points in Renfrewshire and 85 charging bays for council vehicles across 10 council depots /buildings. The EV Fleet Strategy has been completed and the conclusions presented to the Council Board meeting in March 2019 with implementation of aspects of this expected 2019. In 2020, 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. The addition of electric pool bikes is seen as an attractive incentive for increased use of this form of transport for business use.	Ongoing. Costs – EV car costs variable. Funded via the Council's Replacement Vehicle Programme, Transport Scotland Switched on Fleets funding and the Scottish Govn AQAP grant. Chargers cost from £5k to £40k to install. Funding mainly from Transport Scotland & Scottish Govn AQAP Grant.	
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 Vehicle Fleet Efficiency (other)	Route management plans/ Strategic routing strategy for HGV's	Environment & Infrastructure – Fleet Solutions and Social Transport	Masternaut was originally installed in all council vehicles in 2009-10. This was upgraded to a newer Masternaut Connect version early 2017 which provides an easier reporting system and focuses in more detail on driver behaviour, vehicle utilisation etc. Procurement process undertaken during 2016 and awarded at the end of 2016 following approval by Council Board.	System effective from 1st April 2017. Dedicated member of staff employed from Autumn 2018 to work solely with the Masternaut system to provide regular reports and identify problem areas e.g. low mileage users, excessive idling. Mileage of EV vehicles will also be monitored to ensure EV vehicles are being used to their optimum.	Improved scheduling and routing of journeys via optimising vehicle movements and increased utilisation of fleet thus reducing the no. of vehicles in operation. Reduction of idling is also a key area to reduce fuel and maintenance costs & to lower emissions. Masternaut is able to monitor vehicle idling times and this is a specific area that will be monitored and addressed. KPIs may be measured via: -reduction in vehicle fleet numbers due to identification of underutilisation of vehicles. -reduction of idling times	All AQMAs, council wide air quality improvements. The new Masternaut provides an easier reporting system which may allow calculations to be undertaken on emissions reductions. This will be reviewed once the system has been fully operational for a period of time.	System operational from April 2017. Dedicated member of staff employed from Autumn 2018.	Operational and ongoing.	

							- improvements in driver behaviour e.g. harsh braking/ acceleration.				
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. -Encouraging staff to walk or use public transport where appropriate to carry out Council business.	Alternatives to Private Vehicle Use Promoting Low Emission Transport	Car clubs/ sharing schemes	Environment & Infrastructure – Roads and Infrastructure	Phase 1 of the Sustainable Travel Planning Scheme was introduced across several teams within Environment & Infrastructure during 2017/18. This involved 35 vehicles being available for use to staff within this Service. Staff required to use the fleet cars in replacement of their own cars. Phase 2 involved pool cars being available for all other relevant staff members across Services in Renfrewshire House. Phase 3 involves locating pool vehicles at other Council buildings. A feasibility study for this was completed summer 2019.	Phase 1 – introduced Oct 2018. Phase 2 –introduced Jan 2019 and ongoing. Prior to the formal introduction of pool cars, a trial pool car scheme was undertaken in 2016/17 with one EV pool car being available for use by the Environmental Improvements Section within Communities, Housing and Planning Services. The purchase of this vehicle was funded via the Scottish Govn AQAP grant fund. With regard to the pool bikes, the aim is to increase awareness of these to staff through further advertising. The Corporate Travel Plan & Roadshow event was used to assist with this (see measure No.14).	Encourage more efficient and cost-effective methods of business travel. Reduce the impact on the environment. Increase the use of electric vehicles and charging infrastructure.	All AQMAs, council wide air quality improvements. Renfrewshire House, the Council's HQ is situated within the Paisley AQMA therefore business trips undertaken by staff based here will start and end within the Paisley AQMA. Target pollution reduction may potentially be measured via: -An annual review of the reduction in mileage and the equivalent 'savings' in emissions. Also, the aim is for all pool cars to be EVs, thereby reducing emissions by replacing trips that would otherwise have been undertaken by non EV vehicles.	Phase 1 of the Scheme was introduced Oct 2018 and is now complete. Phase 2 of the scheme was introduced Jan 2019. 300 HQ staff are now using pool vehicles. 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. EVs are on order and are scheduled for delivery March 2021.	Phase 3 has been delayed 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. The majority of funding for the EVs has come from Transport Scotland Switched On Fleet funding.	The introduction of the scheme means that officers no longer require to use their own car for work purposes. From experience this leads to officers travelling into work by alternative means e.g. train or cycling as observed from the trial of the EV pool car by the Environmental Improvements team. By end of 2019 all pool cars based at Renfrewshire House were EVs as discussed in measure No.4.
7	ECO Stars (Efficient and Cleaner Operations) Fleet Recognition Scheme - A fuel management and operational efficiency support programme aimed at operators of goods vehicles, vans, buses, taxis and coaches. This measure is currently on hold as of summer 2019.	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Communities, Housing and Planning Services - Environmental Improvements Section	Scheme was initiated on a small scale during 2016/17. Scottish Govn funding received to fully implement during 2017/18 & 2018/19. Procurement process undertaken Winter 2017.	Full scheme implemented April 2018.	KPIs may be measured via: -membership numbers & numbers of vehicles within scheme. Total no. of members as of 2019 – 92 Total no. of vehicles operated by those members - 4564	All AQMAs, council wide air quality improvements.	Scheme first initiated at the end of 2016 on a small-scale trial period. 10 members established during this time. Continuation of scheme during 2017/18 and into 2019.	Current scheme funded until June 2019. Fully funded via the Scottish Government AQAP fund, no cost to council. 2016/17 £9,000 2018/19 £22,500 The scheme is currently on hold as funding is being requested and used to take forward other measures within the AQAP.	Additional information on this measure is provided in the 2019 Renfrewshire Council Air Quality Action Plan.
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	Communities, Housing and Planning Services - Policy & Regeneration Environment & Infrastructure - Roads and Infrastructure	The Council's 2007 LTS sets out key objectives and vision for transport over 10-20 yrs. A refresh was undertaken in Feb 2017 providing an update on the Council's achievements to date. A new Renfrewshire LTS will be prepared following publication of the new National and Regional Transport Strategies which are currently under review.	New Renfrewshire LTS will be produced following publication of the new National and Regional Transport Strategies. The new LTS will identify short, medium and long term priorities that contribute towards relevant local, regional and national transport targets and goals. Renfrewshire Council are a stakeholder as part of the Regional Transport Strategy review and we are currently in communication with SPT in this regard.	The 2007 LTS contains measures relevant to AQ e.g. development of a transport strategy for Paisley town centre (measure no.9 of this AQAP). Progress against these is detailed within the Feb 2017 refreshed LTS. The new LTS will provide detailed aims and actions with specific KPIs associated with these. In addition the following KPIs may be relevant: - % change in traffic flow: annual traffic counts on key commuter routes - % improvement in journey times - % reduction in queue lengths.	All AQMAs, council wide air quality improvements. Any potential target pollution reduction will be dependent on the proposed new/updated action measures within the Renfrewshire Local Transport Strategy.	A refresh of the Renfrewshire LTS was undertaken Feb 2017 but awaiting publication of the new National and Regional Transport Strategies before a new Renfrewshire LTS will be prepared. We believe the Regional LTS is nearing conclusion which will then allow us to commence preparation of our LTS.	To be determined	Refer to section 3.1.2 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.
9	Paisley Town Centre Transportation Improvements	Policy Guidance and Development Control	Other policy & Congestion management	Environment & Infrastructure - Roads and Infrastructure	Procurement process for consultant to	Ongoing. The proposed options are intentionally high level, providing ideas	The following KPIs may be relevant:	Paisley AQMA In terms of target pollution reduction, it is recognised	£2 million funding successfully secured as part of the Glasgow City Region	Whilst a prioritised programme of works has been identified	Refer to the additional updated text following this

	- aim is to allow Paisley to reach a vision for a more connected and accessible place with significant environmental and AQ benefits. - Undertake a feasibility study of potential transport interventions for Paisley town centre e.g. reinstating two-way traffic flows, amending key junctions, review of lining & signage and trial removal of certain traffic lights on ring road.	Traffic Management			undertake feasibility study awarded the beginning of 2017. First draft of the feasibility study produced which establishes initial proposals and reports on potential areas of improvement, their 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.	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 assessment, design and eventual delivery. 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.	- % change in traffic flow: annual traffic counts on key commuter routes -improved flow in traffic - % reduction in queue lengths -overall reduction in congestion -% improvement in journey times -% improvement in bus journey times -improved connectivity and accessibility within the town centre.	that the future implementation of recommended interventions may have a significant impact on traffic movement throughout Paisley town centre and therefore air quality. A requirement of the next phase of this study will be modelling the effect on air quality from proposed interventions.	Bus Partnership to do deliver improvements to bus services at key junctions within Paisley Town Centre over the next 18 months. The project will aim to deliver improvements to bus journey times through the implementation of bus priority infrastructure at the junctions below: - Lonend/ Gordon Street, - Mill Street/ Glasgow Road, - Causeyside Street/Gordon Street and, - Wallneuk Other elements included in the funding bid included: - upgrading traffic signal installations to increase bus priority at key junctions across Renfrewshire - A range of bus priority measures across key locations to improve journey times and increase reliability - Introducing enforcement cameras to address inconsiderate parking behaviour - develop a feasibility study for introduction of a transport hub at the AMIDS site - improving key junctions within town centre locations	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 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.	table and section 3.1.5 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.
10	Johnstone Town Centre Transportation Improvements	Policy Guidance and Development Control Traffic Management	Other policy & Parking enforcement on Highway	Environment & Infrastructure - Roads and Infrastructure Communities, Housing and Planning Services - Development Management, Policy & Regeneration and Community Safety Wardens	Ongoing. An initial survey of Johnstone Town Centre has been undertaken with traffic management issues/problem areas identified. Initial infrastructure improvements proposed e.g. review of TRO yellow line restrictions and effective enforcement of these, new parking signage and relocation of bus stops.	A final implementation plan requires to be developed and implemented in a phased basis following approval.	The following KPIs may be relevant: - % change in traffic flow: annual traffic counts on key commuter routes - % improvement in journey times - % reduction in queue lengths	Johnstone AQMA Any potential target pollution reduction will be dependent on the proposed action measures within the final implementation plan.	Bus routes are now terminating from Glasgow at Houston Square, Johnstone and then using the bus stops at the square as an Interchange with local services, then taking the bus user onto their final destination. New local services are advertised as operating at the same frequency as current service provision therefore the changes present no reduction in service provision. Environment & Infrastructure Services have commissioned STANTEC to provide a report on further transportation improvements.	Implementation of measures will be subject to approval and capital funding.	Refer to section 3.1.6 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.
11	Improvements in the Bus Fleet Standard	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	Renfrewshire Council Environment & Infrastructure and Communities, Housing and Planning Services in consultation with local bus operators and SPT	Consultation with local bus operators and SPT still to be undertaken	Subject to consultation outcomes	KPIs may be measured via: -% of buses meeting set EURO standard	Johnstone AQMA primarily but possibly Council wide benefits. The Air Quality Action Plan Support 2017 Study by AECOM identified interventions around bus operations as the most effective way of reducing emissions in the short term within the Johnstone AQMA to levels below air quality objectives. From the scenarios considered, the greatest reduction was from upgrading all buses to Euro VI emission standard. Implementing this measure would result in a reduction of 1.6ug/m3 at the diffusion tube location (DT No. 59) where the 2020 bias	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.	Ongoing. The purchase of these buses by the operator has been aided by the Scottish Ultra Low Emission Bus Scheme.	This is a voluntary measure with the cooperation of local bus operators. Refer to section 3.3 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.

								adjusted and distance corrected concentration was 39.5 µg/m3.			
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 Public Information	Anti-idling enforcement & information via other mechanisms	Renfrewshire Community Safety Partnership; Communities, Housing and Planning Services Safety Wardens and Environment & Infrastructure Service	General idling awareness campaigns have been ongoing since 2011.	A School Parking Campaign was introduced in April 2018 aimed at road safety around schools including safe parking and an anti-idling message. By Aug 2019, all 49 primary schools in Renfrewshire were engaged in the campaign. 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. 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.	Improves overall awareness of fuel efficiency & environmental impacts of vehicles particularly at areas of sensitive receptors e.g. primary schools. However, an effective awareness raising campaign may actually increase the number of complaints received. Also need to be aware that cold weather can affect personal preferences to idle engines. The second phase of the scheme aims to address congestion issues, reduce emissions, and ensure the safety of children around our schools. The new scheme will help promote active travel by encouraging pupils to walk or cycle to school.	All AQMAs Measure is more an awareness raising tool however it is also a useful measure to prevent vehicles idling and stopping in inappropriate places that may cause congestion, which is a significant cause of emissions generated in the AQMAs. The measure can be used where necessary to reduce congestion and keep traffic flowing.	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 will now be put on hold until April 2021 given the current pandemic situation. When it is next able to commence, it will consist of a six-month pilot scheme and will introduce a part-time vehicle exclusion zone at the start and end of the school day in some of the surrounding streets of the four schools.	Ongoing measure. The School Parking Campaign has been funded internally by Communities, Housing and Planning Services and Environment & Infrastructure Services.	The use of Fixed Penalty Notices has historically not been adopted by the Council. Instead drivers have been requested to turn their engines off voluntarily. However the use of FPNs for this purpose was approved at board in November 2019. Training will be delivered to frontline staff on the back of the pandemic with implementation thereafter. Current hotspot areas will be targeted once implemented.
13	Vehicle Emissions Testing - programme of roadside vehicle emissions testing of private vehicles in accordance with the Road Traffic (Vehicle Emissions) (Fixed Penalty) (Scotland) Regulations 2003. This measure ceased in March 2018 in accordance with the Scottish Government's preference for air quality funding to be focused on vehicle idling reduction and educational awareness.	Vehicle Fleet Efficiency	Testing vehicle emissions	Renfrewshire's Community Safety Partnership; Community Safety Wardens & Police Scotland with assistance from Glasgow City Council, East Renfrewshire Council & North Lanarkshire Council's taxi enforcement and emissions testing officers.	An awareness raising and communication strategy would be undertaken prior to testing. This included: -publication of a public notice and press release in local and national press -information letters and idling leaflets sent to bus, taxi and large transport businesses operating within Renfrewshire -information being made available on the Council's website. All drivers stopped & tested were given a Renfrewshire Council "Don`t Be An Idler" information leaflet and explanatory letter.	From 2011 to March 2018.	Improves overall awareness of fuel efficiency & environmental impacts of vehicles. Reduces numbers of polluting vehicles.	All AQMAs The testing location was chosen to be within or as close to the AQMAs as possible. Target pollution reduction would be minimal, but the measure was an effective awareness raising tool.	Testing would be undertaken over two days twice a year from 2011 to March 2018. Where vehicles failed relevant emissions standards, drivers were issued with a fixed penalty notice. However, where the driver presented a MOT test certificate within 14 days indicating that the fault had been repaired and vehicle exhaust emissions complied with current legislation then the notice was deemed to be complied with. A test undertaken in October 2017 resulted in 432 vehicles being tested with 3 FPNs served for failing the emissions test.	Measure has now ceased. Funding was previously via the Scottish Government Air Quality grant funding.	
14	Renfrewshire Council Corporate Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	Communities, Housing and Planning Services – Environmental Improvements Section	The Scottish Government's Cleaner Air for Scotland Strategy requires LAs with AQMAs to prepare a corporate travel plan that is consistent with its AQAP. A procurement process was undertaken at the end of 2018 and a consultant instructed to commence the	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,	KPIs will be an integral part of the Travel Plan and will be determined during development of the plan. KPIs may be measured via: -the overall distance travelled by Council staff per year on company business. -the percentage of travel by staff using public transport per year.	All AQMAs, council wide air quality improvements.	Ongoing. 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.	Funding was granted from the Scottish Government's 2018/19 AQAP grant to cover the cost of this measure. Costs associated with implementation of proposed measures will require funding to be sourced.	

					development of this measure.	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			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 - 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	Environment & Infrastructure - Roads and Infrastructure	2014-2016	The Cycle Strategy was approved by Board in Dec 2016. Measures contained within the action plan will be implemented dependant on funding. There are five cycling infrastructure projects which are currently at concept design /public consultation design stage. The routes for these are – 1.Paisley to Renfrew 2.Renfrew to GCC Boundary 3.Hawkhead Rd/ Glasgow Rd junction 4.Southbar Rd/ Parkway roundabout 5.Elderslie Gap.	KPIs are detailed within the Cycle Strategy and Action Plan. Currently there is a low level of everyday cycle use within Renfrewshire and so the KPI focus is on a small number of key targets to be achieved by 2025. For example -3% of all journeys to work being made by bicycle -% of children travelling to school by bicycle -% of primary schools offered Bikeability Level 2 training.	All AQMAs, council wide air quality improvements. The strategy identifies areas of improvement required on existing cycle routes, areas of potential expansion of the cycle network and methods to encourage increased cycle usage. Action measures associated with these have been identified, prioritised and timelines provided. The target pollution reduction will be non-measurable.	Upgrade and development of the cycling network is ongoing as per the strategy priorities. The five stated projects are currently at concept design/ public consultation design stage. Segregated shared cycle way path from Bishopton to Glasgow Airport with the section from M8 Junction 29A to Red Smiddy Roundabout completed March 2021. Refurbishment of White Cart footbridge at Abercorn Street, Paisley, commenced in January 2021 and the bridge reopened in May 2021.	Ongoing Funding is applied for each financial year from the Scottish Government under the Cycling, Walking and Safer Streets fund. At least 36% of this fund has to be allocated to cycling including for example infrastructure or design works. All concept designs are due for completion in 2021 and are being funding 100% by Sustrans. The total cost for projects 1-4 is £100,000. Project 5, Elderslie Gap, is awaiting Sustrans funding approval. Thereafter we will apply to Sustans for 50% match funding for construction of these projects in forthcoming years.	Refer to section 3.1.8 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.
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	Environment & Infrastructure in partnership with Halfords	2021/22	The scheme is currently open from 24 March to 17 June 2022.	KPIs may be measured via: -% of employees participating in scheme and who regularly travel to work by cycle -usage of the hire bikes	All AQMAs, council wide air quality improvements.	Scheme currently open.	Due to close 17 June 2022. Staff can apply for anything between £100 and £2000 towards cost of bike or cycle accessories which could potentially save up to £960 per person.	Update on uptake of scheme will be provided in 2023 APR report.

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 four sites during 2021. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://www.scottishairquality.scot/latest, however the results have not been annualised. The results require annualisation if the data capture is between 25% and 75%. The Gordon Street automatic monitoring site currently monitors both PM_{10} and NO_2 and, during 2021, the NO_2 data reported below the minimum data capture required for annualisation to be applied (15.9% data capture achieved due to instrument faults). The mean NO_2 concentrations for Gordon Street are therefore not reported within this year's Annual Progress Report (APR). The Gordon Street PM_{10} monitor was converted from monitoring PM_{10} to monitoring $PM_{2.5}$ in February 2021, following advice from the Scottish Government, considering the low PM_{10} concentration trends at the site and Scotland's statutory focus on $PM_{2.5}$. Therefore, the PM_{10} monitor reported below the minimum data capture required for annualisation to be applied (3% data capture achieved). The $PM_{2.5}$ monitoring began in February 2021 however only achieved a data capture of 29% and therefore required annualisation. Renfrew Inchinnan Road automatic monitoring station was introduced in January 2019 to monitor NO_2 and reported a 2021 annual mean concentration reduction of 0.9 µg/m^3 in comparison to 2020. The Cockels Loan monitoring station, located close to the M8 motorway, reported an increase in NO_2 annual mean concentrations in 2021, of 3.6 µg/m^3.

Maps 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 65 sites during 2021. Table A.2 in Appendix A shows the details of the sites.

10 sites were changed or added from 2020:

- Paisley 84 had a broken strap and was replaced at 2.36 m in March 2021;
- Johnstone 87 was removed in May 2021 due to constant removal by vandals, it was not replaced as it is close to Johnstone 72;
- Renfrew 97 was added close to Renfrew 8 which was exceeding the objectives;
- Johnstone 98 – 100 were added in March 2021 as recommended in the 2020 APR;
- Paisley 102 was added due to a complaint about an increase in buses using Orchard Street;
- Paisley 103 was added in December 2021 due to a complaint about aircraft fumes from Glasgow Airport; and
- Paisley 104 – 105 were added in November 2021 as part of Central Road is to become an overflow taxi rank area.

Of the 65 diffusion tube monitoring sites across Renfrewshire in 2021, following bias adjustment and prior to the application of distance correction, there were no exceedances of the NO_2 annual mean AQO recorded in 2021. Following distance correction in line with LAQM guidance, Paisley 21 (1), (2) and (3) reported bias adjusted annual mean NO_2 concentrations of 26.3 µg/m^3, 23.8 µg/m^3 and 27.2 µg/m^3 respectively, and Renfrew 48 reported a bias adjusted concentration of 23 µg/m^3. DT8 has historically reported exceedances of the annual mean NO_2 AQO in previous years however, DT8 indicated a significant reduction in 2021 levels in comparison to 2020 (-10.4µg/m^3).

Maps showing the location of the monitoring sites are provided in Figure 2. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment 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

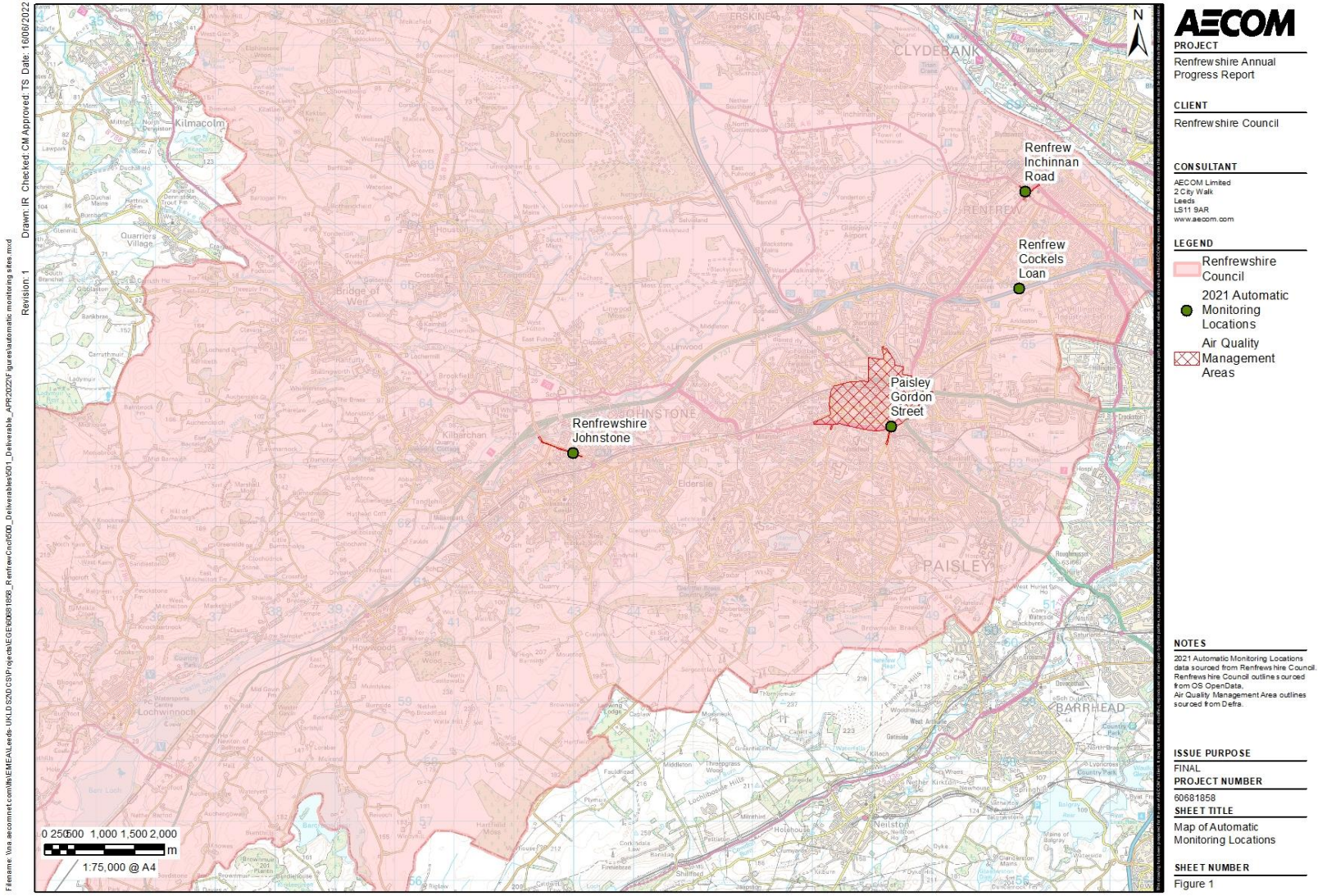
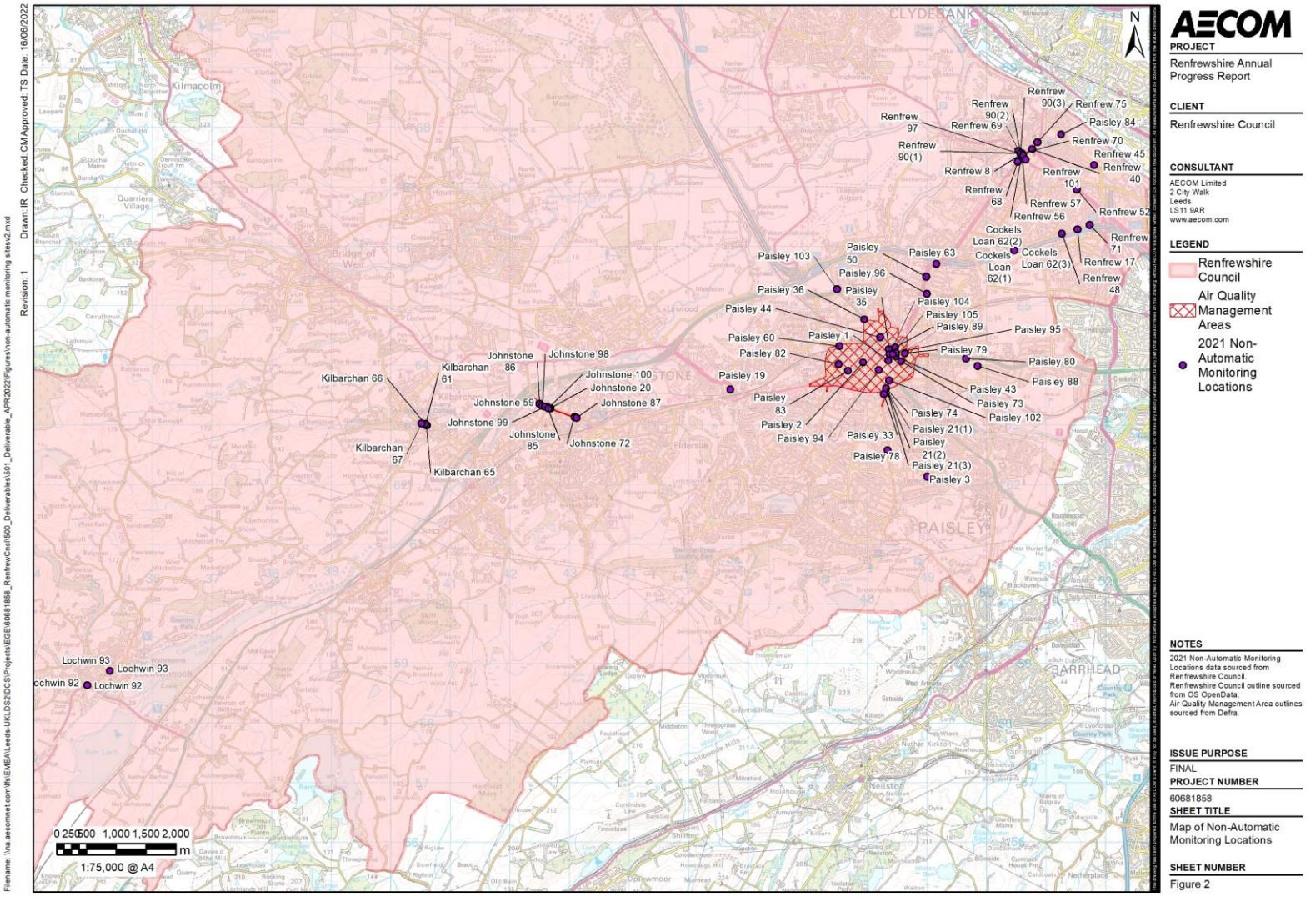


Figure 2. Map of non-Automatic Monitoring Sites



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 and Figure A-1 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. In 2021, the Gordon Street automatic monitoring site failed to achieve 25% data capture, the minimum annual data capture required to allow for annualisation of NO_2 data to take place, therefore this monitoring site did not provide any NO_2 data for inclusion within this year's APR. The remaining two automatic monitoring sites measuring NO_2 achieved compliance of AQOs in 2021.

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B and Figures A-2 to A-6. There were eight new sites established in 2021. Five diffusion tube monitoring sites had only one or two months of data and therefore could not be annualised, this data is still shown in Table B.1. Distance correction was undertaken for four monitoring sites to estimate the concentration at the nearest receptor, with calculations provided in Table C.4. All diffusion tube monitoring locations in Renfrewshire Council achieved NO_2 AQO compliance in 2021 with Johnstone 99 reporting the highest concentration of 35.4 µg/m^3.

The downward trend in concentrations observed in 2020 continues for the majority of sites in 2021, this may still be partially attributed to the atypical traffic conditions observed across the UK during the pandemic lockdowns. Six sites experienced an increase in annual mean NO_2 concentration from 2020 to 2021, these include REN1 – Renfrew Cockels Loan automatic site and five diffusion tube sites (Paisley 43, Renfrew 57, Kilbarchan 61, Renfrew 69 and Lochwinnoch 93). The increases range from +0.1 µg/m^3 (at Paisley 43 and Kilbarchan 61) to +7.4 µg/m^3 (at Renfrew 69). 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 diffuson 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 and Figure A-7 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 18µg/m^3, showing that REN02 – Renfrewshire Johnstone shows an increase from 2017 to 2019 followed by a decline in 2020 and an increase again in 2021. It should be noted that the PM_{10} annual mean in 2020 and 2021 may have been impacted by COVID-19 related lockdowns. PAI3 – Paisley Gordon Street failed to achieve the minimum data capture required for annualisation to take place, therefore this monitoring site did not provide any PM_{10} data for inclusion within this year's APR. REN02 – Renfrewshire Johnstone required annualisation as the data capture was between the limits of 25% and 75%. The PM_{10} automatic monitoring sites have not recorded an exceedance of the annual mean AQO since 2017.

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 50µg/m^3, not to be exceeded more than seven times per year. In 2021, REN02 – Renfrewshire Johnstone monitor reported no instances of 24-hour mean AQO exceedances. The 24-hour PM_{10} 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 and Figure A-8 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years with the air quality objective of 10µg/m^3. In 2021, PAI3 – Paisley Gordon Street monitored $PM_{2.5}$ for the first time. From the monitoring results obtained from the PAI3 – Paisley Gordon Street and REN02 – Renfrewshire Johnstone monitors, there was no exceedance of the annual AQO for $PM_{2.5}$. Both PAI3 and REN02 monitoring sites required annualisation for $PM_{2.5}$ as they reported data capture between the threshold of 25% and 75%.

4 New Local Developments

The Clyde Waterfront and Renfrew Riverside (CWRR) and Glasgow Airport Investment Area Projects (GAIA) are part of a wider City Deal generation project that consists of 20 infrastructure projects across the Glasgow City Region. The £1.13bn City Deal has been designed to create thousands of new jobs, improve public transport and connectivity; and deliver significant economic growth through investment within Renfrewshire. Both projects will bring significant new road infrastructure including the Renfrew North Development Road (RNDR) that will provide a positive impact on air quality in certain areas. They are therefore prioritised as action measure No.1 within the 2019 Renfrewshire Air Quality Action Plan.

Works for the GAIA and CWRR projects commenced in summer 2019 and January 2020, respectively however both projects were placed on hold in March 2020 due to the ongoing pandemic. Works have since recommenced and the new road network associated with the Glasgow Airport Investment Area (GAIA) project opened to traffic in March 2022. The Clyde Waterfront & Renfrew Riverside Project (CWRR) is now expected to be completed by 2025. The RNDR road will reduce traffic volume through Renfrew Town Centre resulting in improved air quality, in particular within the RTC AQMA.

In addition to the GAIA and CWRR projects, the UK Government Levelling Up fund has enabled an additional transport link project to progress, the Advanced Manufacturing Innovation District Scotland (AMIDS) South project. This will provide new infrastructure between Paisley town centre, AMIDS and Glasgow Airport including a new road bridge over the White Cart Water in Paisley. Traffic will be taken off routes where there is a density of residential properties (Love Street, south end of Inchinnan Road), reduced on the western end of Old Sneddon Street / Niddry Street and introduce new active travel links across the White Cart. Design work is on-going with a planning application programme for May 2022. Construction completion is anticipated by March 2025.

A summary of the AMIDS South project is detailed below:

- The Paisley to AMIDS transport links project will improve transport links, connect communities and bolster business growth between Paisley town centre and the Advanced Manufacturing Innovation District Scotland (AMIDS).

- The project includes a road bridge crossing over the White Cart river, an east-west link road from Renfrew Rd to the bridge crossing, dedicated cycling and walking provision along the full route and extended into Gallowhill, street design improvements and traffic management measures to reduce and slow traffic on Love Street.
- In addition, there will be environmental improvements along the White Cart river clearing debris and enhancing riverside biodiversity.
- Economic projections found the project could bolster the local economy by an additional £136 million and cut carbon emissions by 21,700 tonnes while helping existing and new companies to grow, creating new job opportunities for years to come.
- Cut congestion and implement traffic calming measures in residential areas in Paisley town centre such as on Love Street.

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

4.1 Road Traffic Sources

- Application reference 20/0171/PP. Formation of vehicle delivery and storage compound with associated works, including boundary fencing.

A simple desk top air quality assessment was undertaken for this application and concluded that air quality would not be significantly affected and that a further quantitative assessment of local air quality is not required. The assessment was found to be satisfactory, and the application approved August 2020

- Application reference 19/0877/PP. Residential Development of 35 flatted dwellings along with associated infrastructure. Land to Southwest of Junction with High Street, Macdowall Street, Johnstone.

A detailed air quality assessment was undertaken which concluded air quality was not considered a constraint to planning consent for the proposed development. The report was considered satisfactory, and the application approved July 2020.

- Application reference 20/0308/PP. Residential development comprising the erection of seventy-three flats, the formation of new roads, parking and landscaping. Site bounded by Smithhills St, Lawn St, Abbey View and Weir St, Paisley.

A detailed air quality assessment was undertaken which concluded air quality was not considered a constraint to planning consent for the proposed development. The report was considered satisfactory, and the application approved October 2020.

4.2 Other Transport Sources

No planning applications were received by Renfrewshire Council during 2021 that identified any new or significantly changed other transport sources.

4.3 Industrial Sources

- Application reference 17/0663/PP. Installation of gas-powered electricity generation plant with associated access, fence and security columns. Site 300 Metres Southwest of Shilton Cottage, Old Greenock Road, Bishopton.

This application was initially refused by the Council's planning services but subsequently granted on appeal by a planning board in 2018 by which point it was classed as a Medium Combustion Plant and therefore falling within the remit of SEPA's licencing and permitting regulations. Renfrewshire Council understand that SEPA will have required an air quality assessment as part of the permitting requirements but this has not been seen by Renfrewshire Council.

4.4 Commercial and Domestic Sources

- Application reference 19/0841/PP. Installation of two 250 kW biomass boilers with associated housing, fuel stores and flues. Main Depot and Recycling Centre, Renfrewshire Council Depot, Underwood Road, Paisley.

A detailed air quality assessment was undertaken which determined that the air quality impact of the development at relevant receptors was not considered to be significant. There will also be no exceedances of relevant statutory air quality Limit Values and Objectives at any receptors at or within the vicinity of the development. It was therefore concluded that air quality was not considered a constraint to planning consent for the proposed development and the application was approved in February 2020.

4.5 New Developments with Fugitive or Uncontrolled Sources

No planning applications were received by Renfrewshire Council during 2021 that identified any new developments with fugitive or uncontrolled sources.

5 Planning Applications

Table 5.1 provides a summary of the planning applications either progressed or received by Renfrewshire Council, in 2021.

Table 5-1 - Planning Application Summary 2021

Application Reference	Assessment Received	Application Outcome
20/0171/PP. Formation of vehicle delivery and storage compound with associated works, including boundary fencing.	Simple desk top Air Quality Assessment	Approved August 2020.
19/0877/PP. Residential Development of 35 flatted dwellings along with associated infrastructure. Land to Southwest of Junction with High Street, Macdowall Street, Johnstone.	Detailed Air Quality Assessment	Approved July 2020
20/0308/PP. Residential development comprising the erection of seventy-three flats, the formation of new roads, parking and landscaping. Site bounded by Smithhills St, Lawn St, Abbey View and Weir St, Paisley.	Detailed Air Quality Assessment	Approved October 2020
17/0663/PP. Installation of gas-powered electricity generation plant with associated access, fence and security columns. Site 300 Metres	Air Quality Assessment	Granted on appeal in 2018

Southwest of Shilton Cottage, Old Greenock Road, Bishopton.		
19/0841/PP. Installation of two 250 kW biomass boilers with associated housing, fuel stores and flues. Main Depot and Recycling Centre, Renfrewshire Council Depot, Underwood Road, Paisley.	Detailed Air Quality Assessment	Approved February 2020.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

There were no AQO exceedances identified in Renfrewshire Council during 2021. Historically, the Renfrew 8 diffusion tube monitoring site has exceeded the annual mean NO_2 AQO however this year it reported a concentration of 29.8 µg/m^3 and so fell below the annual mean AQO of 40 µg/m^3 for the first time in at least five years after recording 40.2 µg/m^3 in 2020. This may be attributable to COVID-19 related lockdowns or COVID-19 restrictions, however may also be due to road closures around the junction of Inchinnan Road with Greenock Road and Abbotsinch Road, to the east of Glasgow Airport; this area is part of the GAIA City Deals project and so there were road closures throughout 2021 and consequent diversion of east-west travellers due to significant infrastructure works (including placement of a new footway/cycle bridge over the Black Cart Water).

87% of existing diffusion tube monitoring sites recorded a decrease in annual mean NO_2 concentrations from 2020 to 2021. This may be caused by the atypical traffic patterns observed across the UK due to the pandemic. The remaining sites experienced an increase in NO_2 concentrations, including the REN1 – Renfrew Cockels Loan automatic monitoring site and five diffusion tube monitoring sites.

PM_{10} annual mean concentrations at REN02 – Renfrewshire Johnstone increased from 2020 to 2021 but still remained below the annual mean AQO. $PM_{2.5}$ was measured at PAI3 – Paisley Gordon Street for the first time in 2021, REN02 – Renfrewshire Johnstone also records $PM_{2.5}$ and experienced a small decrease (-0.1 µg/m^3) from 2020 to 2021, both monitoring stations recorded concentrations below the annual mean AQO.

A downward trend in annual mean NO_2 concentrations across the majority of monitoring sites may ordinarily lead to the Council considering either revoking or amending the JHS AQMA however in light of the COVID-19 related lockdowns or COVID-19 restrictions, this is not currently proposed.

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.

The Council is awaiting the finalisation of City Deals Projects to the north of Paisley AQMA in order to assess the impact on road traffic and AQMA before considering any changes to the Paisley AQMA.

6.3 Proposed Actions

Renfrewshire Council's proposed actions following the publication of the 2022 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;
- Continuation with the upgrade and development of the cycling network as per the Renfrewshire Council Cycle Strategy priorities;
- Consider recommencing the Corporate Travel Plan which has been on hold since the pandemic due to the significant changes in staff home working;
- Following the creation of an Active Travel Officer post within the council, progress with development of a Renfrewshire Active Travel Strategy aimed at Renfrewshire residents, business, visitors etc;
- Continuation with the implementation of improvements to bus services at key junctions within Paisley Town Centre over the next 18 months as part of the Glasgow City Region Bus Partnership where Renfrewshire was successful in securing £2million funding to deliver this project;
- Continuation with the expansion of the council's EV charging network and the improvements and linking up of existing and planned active travel routes in Renfrewshire as part of the Transport Scotland's Low Carbon Travel and Transport Challenge Funding project;
- Provide an update on the AQAP during 2022/2023;
- Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ at all relevant locations throughout Renfrewshire; and
- Submit the 2023 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)
REN03	Renfrew Inchinnan Road	Roadside	250567	667558	NO, NO_2	Y – RTC	Chemiluminescent	7.1	3.9	1.6
REN1	Renfrew Cockels Loan	Roadside	250464	665933	NO, NO_2	N	Chemiluminescent	5.0	18.0	2.2
PAI3	Paisley Gordon Street	Roadside	248317	663616	$PM_{2.5}$, NO_2, NO	Y – PTC	Chemiluminescent, FDMS	6.5	10.0	NO_X 2.2, $PM_{2.5}$ 2.4
REN02	Renfrewshire Johnstone	Roadside	242984	663178	$PM_{2.5}$, PM_{10}	Y - JHS	FIDAS 200	0.5(3)	2.9	1.9

Notes:

(1) 0 m 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?	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, Paisley	Urban Centre	248350	664082	NO_2	Y – PTC	70	68.0	N	2.7
Paisley 2	Oakshaw Street, Paisley	Urban Background	247925	664052	NO_2	Y – PTC	11	35.0	N	2.4
Paisley 3	Lochfield Drive, Paisley	Urban Background	249002	662138	NO_2	N	8	1.5	N	2.4
Renfrew 8	Inchinnan Road, Renfrew	Kerbside	250589	667547	NO_2	Y – RTC	0.1	2.6	N	2.4
Renfrew 17	Tanar Way, Renfrew	Roadside	251524	666287	NO_2	N	0	28.0 (to M8)	N	2.3
Paisley 19	Linwood Road, Paisley	Roadside	245701	663603	NO_2	N	5	2.5	N	2.5
Johnstone 20	High Street, Johnstone	Kerbside	242675	663286	NO_2	Y – JHS	0.45	1.4	N	2.3
Paisley 21(1)	Causeyside Street, Paisley (Triplicate)	Roadside	248316	663612	NO_2	Y – PTC	-6.3	9.9 (Causeyside street)	N	2.3
Paisley 21(2)	Causeyside Street, Paisley (Triplicate)	Roadside	248316	663612	NO_2	Y – PTC	-6.3	9.9 (Causeyside street)	N	2.3
Paisley 21(3)	Causeyside Street, Paisley (Triplicate)	Roadside	248316	663612	NO_2	Y – PTC	-6.3	9.9 (Causeyside street)	N	2.3
Paisley 33	76 Causeyside Street, Paisley	Roadside	248277	663524	NO_2	Y – PTC	1.1	2.8	N	2.8
Paisley 35	Old Sneddon Street, Paisley	Roadside	248360	664272	NO_2	Y – PTC	0.4	3.4	N	2.7
Paisley 36	Caledonia Street, Paisley	Roadside	247948	664774	NO_2	Y – PTC	4.5	3.3	N	2.5
Renfrew 40	Hairst Street, Renfrew	Roadside	250763	667631	NO_2	Y – RTC	0.25	6.2	N	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
Paisley 43	Smithhills Street (East), Paisley	Roadside	248481	664154	NO_2	Y – PTC	0	2.5	N	2.5
Paisley 44	Love Street, Paisley	Roadside	248209	664474	NO_2	Y – PTC	0.17	2.2	N	2.5
Renfrew 45	Xscape, Renfrew	Kerbside	251803	667365	NO_2	N	18	2.0	N	2.5
Renfrew 48	Glen Sax Drive, Renfrew	Roadside	251264	666217	NO_2	N	-22	45.0 (to M8)(3)	N	2.6
Paisley 50	Renfrew Road, Paisley	Roadside	248985	665494	NO_2	N	7	12.0	N	2.5
Renfrew 52	Glasgow Road 2, Renfrew	Roadside	251515	666955	NO_2	N	4	3.0	N	2.3
Renfrew 56	Paisley Road, Renfrew	Roadside	250579	667488	NO_2	Y – RTC	3.45	4.5	N	2.4
Renfrew 57	Paisley Road, Renfrew	Roadside	250597	667473	NO_2	N	1.2	6.0	N	2.4
Johnstone 59	High Street, Johnstone	Kerbside	242656	663281	NO_2	Y – JHS	0.1	1.7	N	2.5
Paisley 60	Underwood Rd, Paisley	Roadside	247525	664326	NO_2	N	7.8	0.5	N	2.4
Kilbarchan 61	High Barholm, Kilbarchan	Roadside	240584	663007	NO_2	N	0.1	1.1	N	2.4
Cockels Loan 62(1)	Cockels Loan, Renfrew	Roadside	250463	665934	NO_2	N	5	18.0 (to M8)	Y	3
Cockels Loan 62(2)	Cockels Loan, Renfrew	Roadside	250463	665934	NO_2	N	5	18.0 (to M8)	Y	3
Cockels Loan 62(3)	Cockels Loan, Renfrew	Roadside	250463	665934	NO_2	N	5	18.0 (to M8)	Y	3
Paisley 63	Renfrew Road, Paisley	Roadside	249159	665710	NO_2	N	6.8	3.7 (12 to Renfrew Road)	N	2.4
Kilbarchan 65	High Barholm, Kilbarchan	Roadside	240599	663000	NO_2	N	0.42	2.0	N	2.2

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
Kilbarchan 66	High Barholm, Kilbarchan	Roadside	240573	663021	NO_2	N	0.43	1.6	N	2.2
Kilbarchan 67	High Barholm, Kilbarchan	Roadside	240512	663027	NO_2	Y -	1.75	3.0	N	2.3
Renfrew 68	Paisley Road, Renfrew	Roadside	250522	667419	NO_2	Y -	0.2	3.0	N	2.3
Renfrew 69	Inchinnan Road, Renfrew	Roadside	250537	667602	NO_2	Y – RTC	0.12	2.9	N	2
Renfrew 70	Inchinnan Road, Renfrew	Roadside	250599	667561	NO_2	N	4.5	3.7	N	2
Renfrew 71	Braille Drive, Renfrew	Roadside	251729	666360	NO_2	Y -	0 (equivalent distance to nearby housing)	26.5 (to M8 slip road)(3)	N	2
Johnstone 72	High St, Johnstone	Roadside	243080	663140	NO_2	Y – JHS	0.45	3.0	N	2.3
Paisley 73	Lawn Street, Paisley	Roadside	248566	664072	NO_2	Y – PTC	0.19	2.0	N	2.45
Paisley 74	Causeyside Street, Paisley	Roadside	248313	663621	NO_2	Y – PTC	0.19	3.3	N	2.2
Renfrew 75	Canal Street, Renfrew	Roadside	250853	667747	NO_2	N	0.17	5.0	N	2.45
Paisley 78	Neilston Road, Paisley	Roadside	248339	662576	NO_2	Y -	0.15	2.6	N	2.5
Paisley 79	Incle Street, Paisley	Roadside	248632	664212	NO_2	N	0.18	2.8	N	2.16
Paisley 80	Glasgow Road, Paisley	Roadside	249653	664123	NO_2	N	1.9	2.1	N	2.35
Paisley 82	Well Street	Roadside	247513	664024	NO_2	Y – PTC	0.2	2.3	N	2.36
Paisley 83	Wellmeadow Street	Kerbside	247671	663913	NO_2	N	0.4	3.3	N	2.46
Paisley 84	Ferry Village, Renfrew	Roadside	251254	667876	NO_2	Y -	18	0.5	N	2.4
Johnstone 85	High Street, Johnstone	Roadside	242622	663306	NO_2	Y – JHS	0.62	1.1	N	2.4

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
Johnstone 86	High Street, Johnstone	Roadside	242495	663358	NO_2	Y – JHS	0.14	2.7	N	2.41
Johnstone 87	High Street, Johnstone	Roadside	243117	663127	NO_2	N	0.35	3.0	N	2.45
Paisley 88	Hawkhead Road, Paisley	Roadside	249850	663991	NO_2	Y -	7	2.1	N	2.39
Paisley 89	Abercorn Street, Paisley	Roadside	248467	664303	NO_2	Y – PTC	0.14	3.5	N	2.3
Renfrew 90(1)	Renfrew monitor (triplicate)	Roadside	250567	667558	NO_2	Y – RTC	7	3.9	Y	1.63
Renfrew 90(2)	Renfrew monitor (triplicate)	Roadside	250567	667558	NO_2	Y – RTC	7	3.9	Y	1.63
Renfrew 90(3)	Renfrew monitor (triplicate)	Roadside	250567	667558	NO_2	Y – RTC	7	3.9	Y	1.63
Lochwin 92	Newton of Barr, Lochwinnoch	Roadside	234904	658634	NO_2	N	0.45	2.0	N	2.35
Lochwin 93	Main St, Lochwinnoch	Roadside	235280	658877	NO_2	N	0.43	1.2	N	2.55
Paisley 94	New St, Paisley	Roadside	248186	663925	NO_2	Y – PTC	2.1	0.5	N	2.37
Paisley 95	Smithhills Street (West), Paisley	Roadside	248479	664216	NO_2	Y – PTC	0.45 (to wall)	1.7	N	2.45
Paisley 96	McDonalds Renfew Rd, Paisley	Roadside	248998	665204	NO_2	N	19	2.2	N	2.23
Renfrew 97	Inchinnan Road, Renfrew	Kerbside	250610	667534	NO_2	Y -RTC	2.1	0.6	N	2.42
Johnstone 98	High Street, Johnstone	Roadside	242540	663323	NO_2	Y – JHS	0.5	1.4	N	2.3
Johnstone 99	High Street, Johnstone	Roadside	242584	663307	NO_2	Y – JHS	0.45	1.3	N	2.36
Johnstone 100	High Street, Johnstone	Roadside	242643	663285	NO_2	Y – JHS	0.1	1.9	N	2.24

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
Renfrew 101	Glebe Street, Renfrew	Roadside	250656	667457	NO_2	N	4.5	2.5	N	2.3
Paisley 102	Orchard Street, Paisley	Roadside	248363	663752	NO_2	Y – PTC	0.6	2.3	N	2.1
Paisley 103	Greenock Road, Paisley	Roadside	247486	665285	NO_2	N	18	0.8	N	2.24
Paisley 104	Central Road 1, Paisley	Roadside	248371	664190	NO_2	Y – PTC	10	1.3	N	2.3
Paisley 105	Central Road 2, Paisley	Roadside	248425	664192	NO_2	Y - PTC	55	4.0	N	2.25

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results ($\mu g/m^3$)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
REN03	Roadside	Automatic	99.5	99.5	-	-	24.1	19.9	19
REN1	Roadside	Automatic	97.8	97.8	32.1	31.2	31.1	20.9	24.5
Paisley1	Urban Centre	Diffusion Tube	92.3	92.3	21.1	20.3	21.3	16.1	14.9
Paisley 2	Urban Background	Diffusion Tube	100.0	100.0	12.5	14.4	14.6	10.9	9.6
Paisley 3	Urban Background	Diffusion Tube	100.0	100.0	9.5	12.0	11.6	8.9	7.4
Renfrew 8	Kerbside	Diffusion Tube	92.3	92.3	**42.8**	**41.1**	**41.4**	**40.2**	29.8
Renfrew 17	Roadside	Diffusion Tube	100.0	100.0	31.5	33.7	32.0	26.3	22.9
Paisley 19	Roadside	Diffusion Tube	100.0	100.0	25.6	28.3	24.9	24.1	22.5
Johnstone 20	Kerbside	Diffusion Tube	90.4	90.4	28.5	29.7	28.7	25.5	20.2
Paisley 21 (1)(2)(3)	Roadside	Diffusion Tube	97.4	97.4	28.6	28.9	27.6	25.7	21.9
Paisley 33	Roadside	Diffusion Tube	100.0	100.0	32.8	31.7	28.8	27.7	24.1
Paisley 35	Roadside	Diffusion Tube	100.0	100.0	32.6	34.7	31.1	31.5	25.7
Paisley 36	Roadside	Diffusion Tube	100.0	100.0	28.7	30.4	28.2	27.7	26.5
Renfrew 40	Roadside	Diffusion Tube	92.3	92.3	28.7	27.4	25.8	21.6	18.7
Paisley 43	Roadside	Diffusion Tube	100.0	100.0	28.5	28.9	26.7	20.4	20.5
Paisley 44	Roadside	Diffusion Tube	100.0	100.0	22.5	23.6	21.9	16.3	16.1
Renfrew 45	Kerbside	Diffusion Tube	100.0	100.0	24.5	25.8	21.5	20.3	18.4
Renfrew 48	Roadside	Diffusion Tube	92.3	92.3	28.7	30.9	29.1	24.8	20.9
Paisley 50	Roadside	Diffusion Tube	100.0	100.0	32.3	29.4	24.3	21.8	17.9
Renfrew 52	Roadside	Diffusion Tube	75.0	75.0	29.1	31.8	25.3	24.9	21.2
Renfrew 56	Roadside	Diffusion Tube	100.0	100.0	30.6	30.3	26.3	24.4	20.9
Renfrew 57	Roadside	Diffusion Tube	100.0	100.0	26.0	24.1	24.4	18.1	19.0
Johnstone 59	Kerbside	Diffusion Tube	100.0	100.0	**41.0**	**40.0**	37.9	39.5	34.4
Paisley 60	Roadside	Diffusion Tube	100.0	100.0	30.3	34.4	33.6	30.1	24.5
Kilbarchan 61	Roadside	Diffusion Tube	100.0	100.0	36.7	32.4	30.2	26.0	26.1
Cockels Loan 62 (1)(2)(3)	Roadside	Diffusion Tube	96.8	96.8	34.6	36.8	34.3	30.5	25.3
Paisley 63	Roadside	Diffusion Tube	92.3	92.3	32.5	33.2	29.4	25.2	25.2
Kilbarchan 65	Roadside	Diffusion Tube	80.8	80.8	33.2	28.2	30.3	25.8	20.9
Kilbarchan 66	Roadside	Diffusion Tube	90.4	90.4	23.0	19.3	22.3	18.1	15.9
Kilbarchan 67	Roadside	Diffusion Tube	100.0	100.0	17.3	18.6	17.5	18.6	13.2
Renfrew 68	Roadside	Diffusion Tube	100.0	100.0	27.3	27.4	23.8	21.0	16.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
Renfrew 69	Roadside	Diffusion Tube	100.0	100.0	31.2	30.7	29.9	25.0	32.4
Renfrew 70	Roadside	Diffusion Tube	82.7	82.7	26.8	31.7	25.4	26.9	17.4
Renfrew 71	Roadside	Diffusion Tube	84.6	84.6	29.7	28.5	29.2	26.2	24.4
Johnstone 72	Roadside	Diffusion Tube	84.6	84.6	20.9	22.9	23.4	20.2	19.9
Paisley 73	Roadside	Diffusion Tube	100.0	100.0	35.1	32.0	26.1	27.0	22.5
Paisley 74	Roadside	Diffusion Tube	100.0	100.0	28.0	30.9	27.8	28.6	23.0
Renfrew 75	Roadside	Diffusion Tube	100.0	100.0	25.3	22.6	22.1	21.1	20.2
Paisley 78	Roadside	Diffusion Tube	100.0	100.0	27.8	28.9	26.6	24.4	24.0
Paisley 79	Roadside	Diffusion Tube	100.0	100.0	39.6	32.5	27.8	32.0	24.6
Paisley 80	Roadside	Diffusion Tube	84.6	84.6	25.8	24.9	23.9	23.7	18.4
Paisley 82	Roadside	Diffusion Tube	92.3	92.3	37.7	33.2	28.9	36.1	28.1
Paisley 83	Kerbside	Diffusion Tube	100.0	100.0	30.5	31.1	33.2	25.1	22.7
Paisley 84	Roadside	Diffusion Tube	84.6	84.6	20.2	24.3	23.1	16.8	14.9
Johnstone 85	Roadside	Diffusion Tube	100.0	100.0	28.5	26.1	25.0	30.2	24.5
Johnstone 86	Roadside	Diffusion Tube	100.0	100.0	19.5	28.1	27.0	29.9	19.0
Paisley 88	Roadside	Diffusion Tube	82.7	82.7	18.5	21.9	23.4	22.5	17.7
Paisley 89	Roadside	Diffusion Tube	100.0	100.0	-	22.4	30.4	24.9	23.2
Renfrew 90 (1)(2)(3)	Roadside	Diffusion Tube	92.3	92.3	-	-	24.4	21.4	20.1
Lochwin 92	Roadside	Diffusion Tube	100.0	100.0	-	-	-	14.8	14.3
Lochwin 93	Roadside	Diffusion Tube	100.0	100.0	-	-	-	14.1	16.7
Paisley 94	Roadside	Diffusion Tube	100.0	100.0	-	-	-	21.0	19.0
Paisley 95	Roadside	Diffusion Tube	90.4	90.4	-	-	-	33.5	24.9
Paisley 96	Roadside	Diffusion Tube	84.6	84.6	-	-	-	24.2	21.2
Renfrew 97	Kerbside	Diffusion Tube	84.6	84.6	-	-	-	-	30.5
Johnstone 98	Roadside	Diffusion Tube	84.6	84.6	-	-	-	-	33.8
Johnstone 99	Roadside	Diffusion Tube	84.6	84.6	-	-	-	-	35.4
Johnstone 100	Roadside	Diffusion Tube	84.6	84.6	-	-	-	-	31.8
Renfrew 101	Roadside	Diffusion Tube	92.3	92.3	-	-	-	-	19.5

Notes:

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

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

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75% and more than 25%. 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 A- 1. Annual Mean NO_2 Concentrations at Automatic Monitoring Sites.

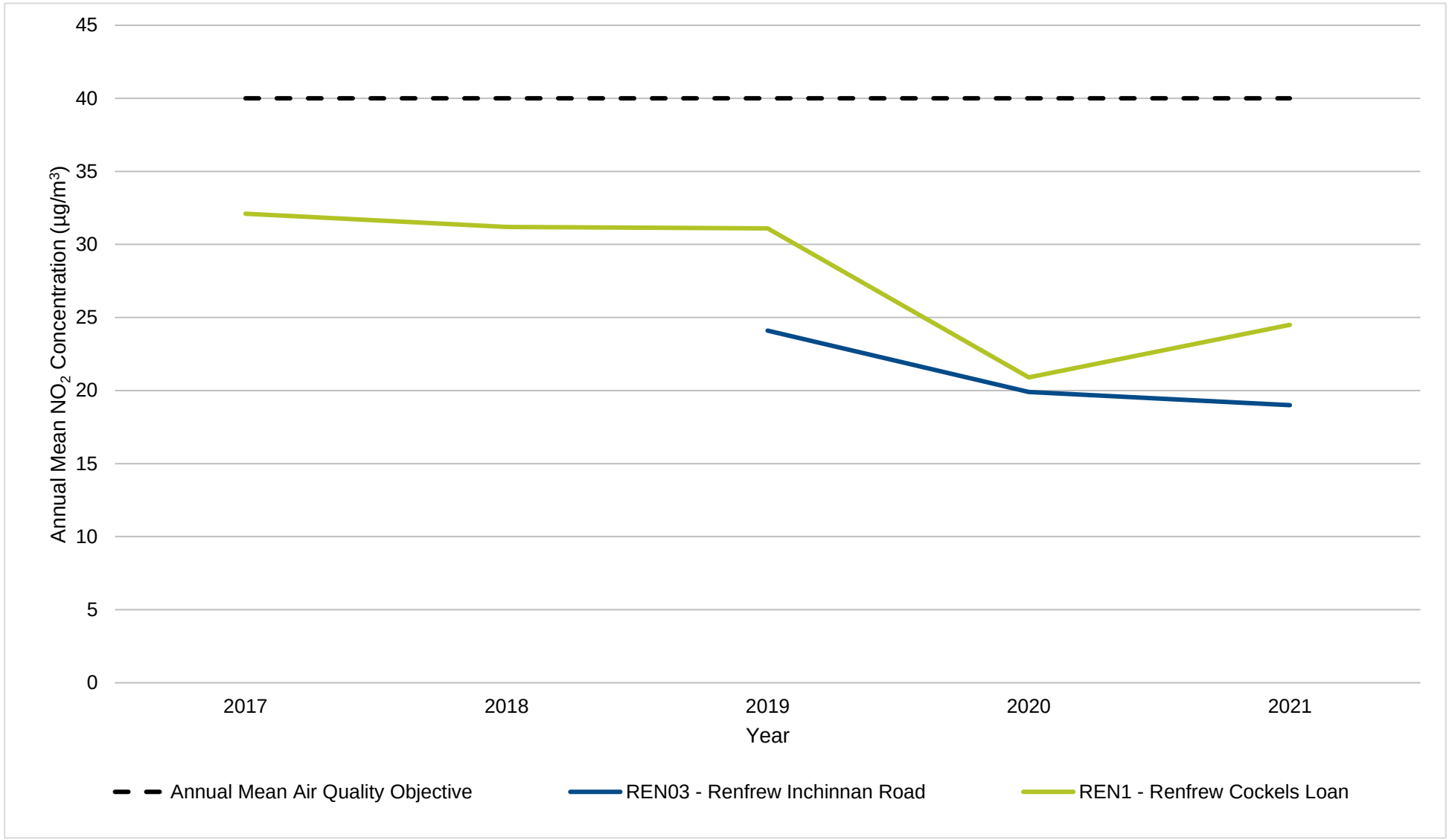


Figure A- 2. Annual Mean NO_2 Concentrations at Non-Automatic Monitoring Sites (Urban Centre, Urban Background, Kerbside).

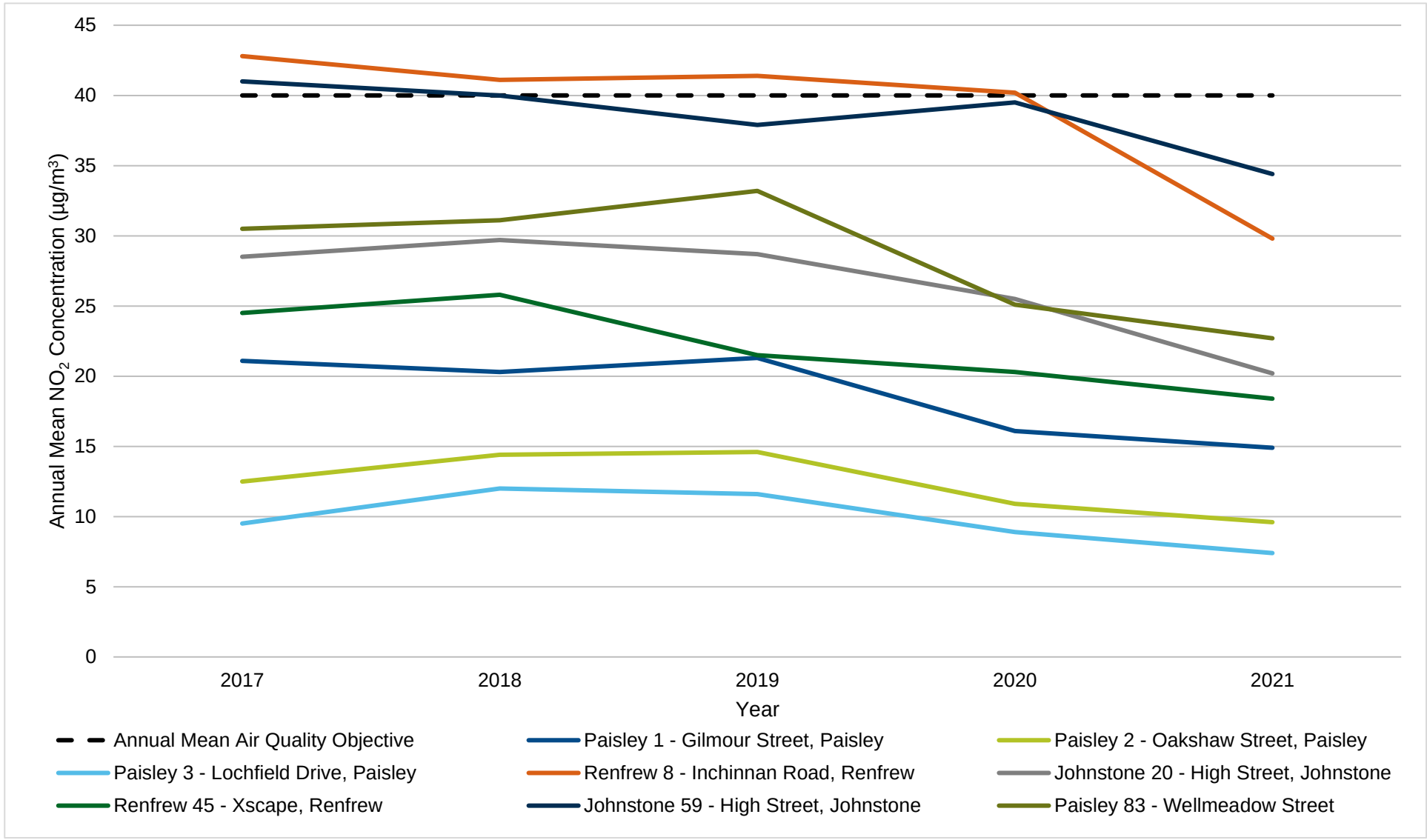


Figure A- 3. Annual Mean NO_2 Concentrations at Non-Automatic Roadside Monitoring Sites (1).

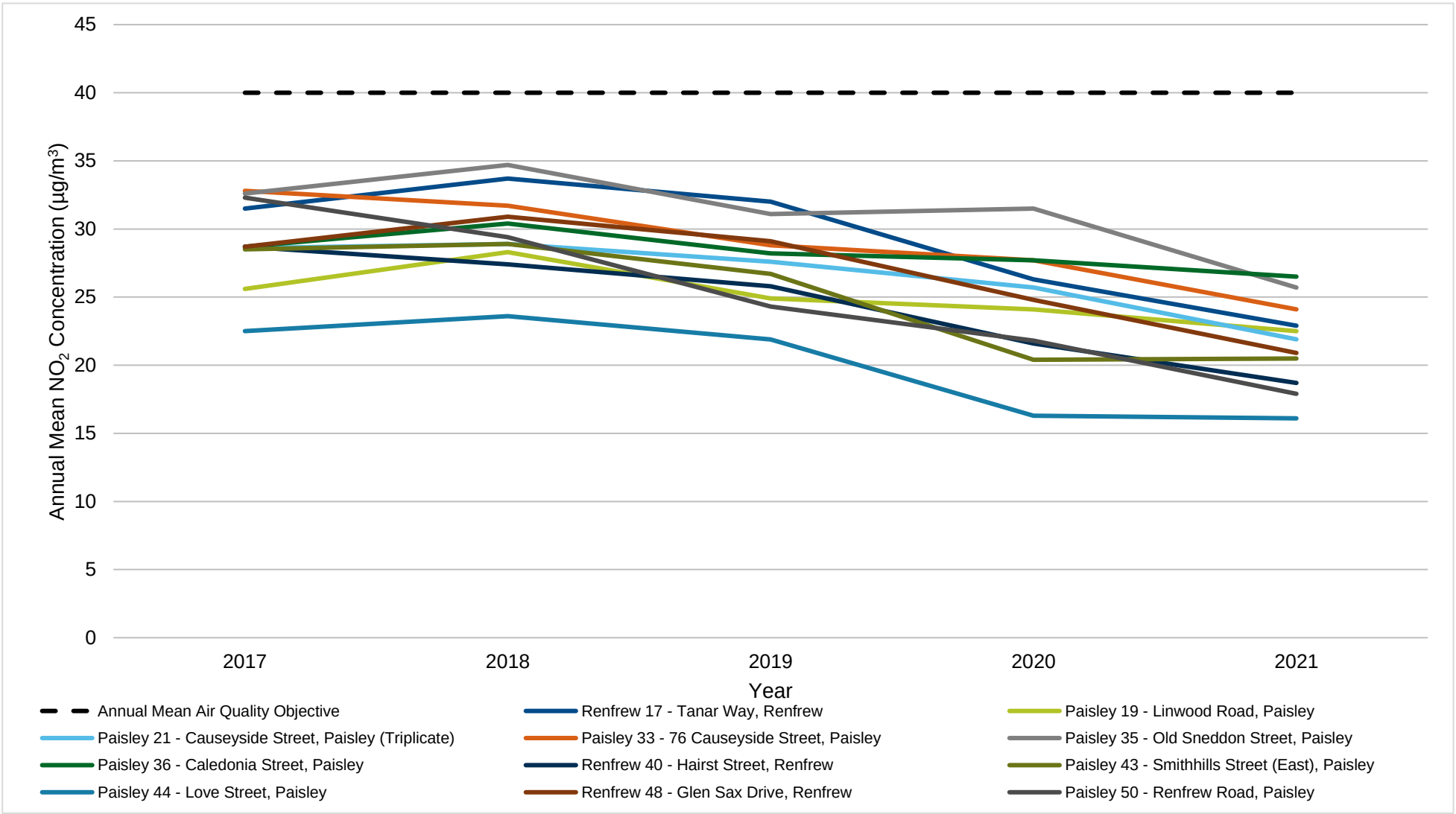


Figure A- 4. Annual Mean NO_2 Concentrations at Non-Automatic Roadside Monitoring Sites (2).

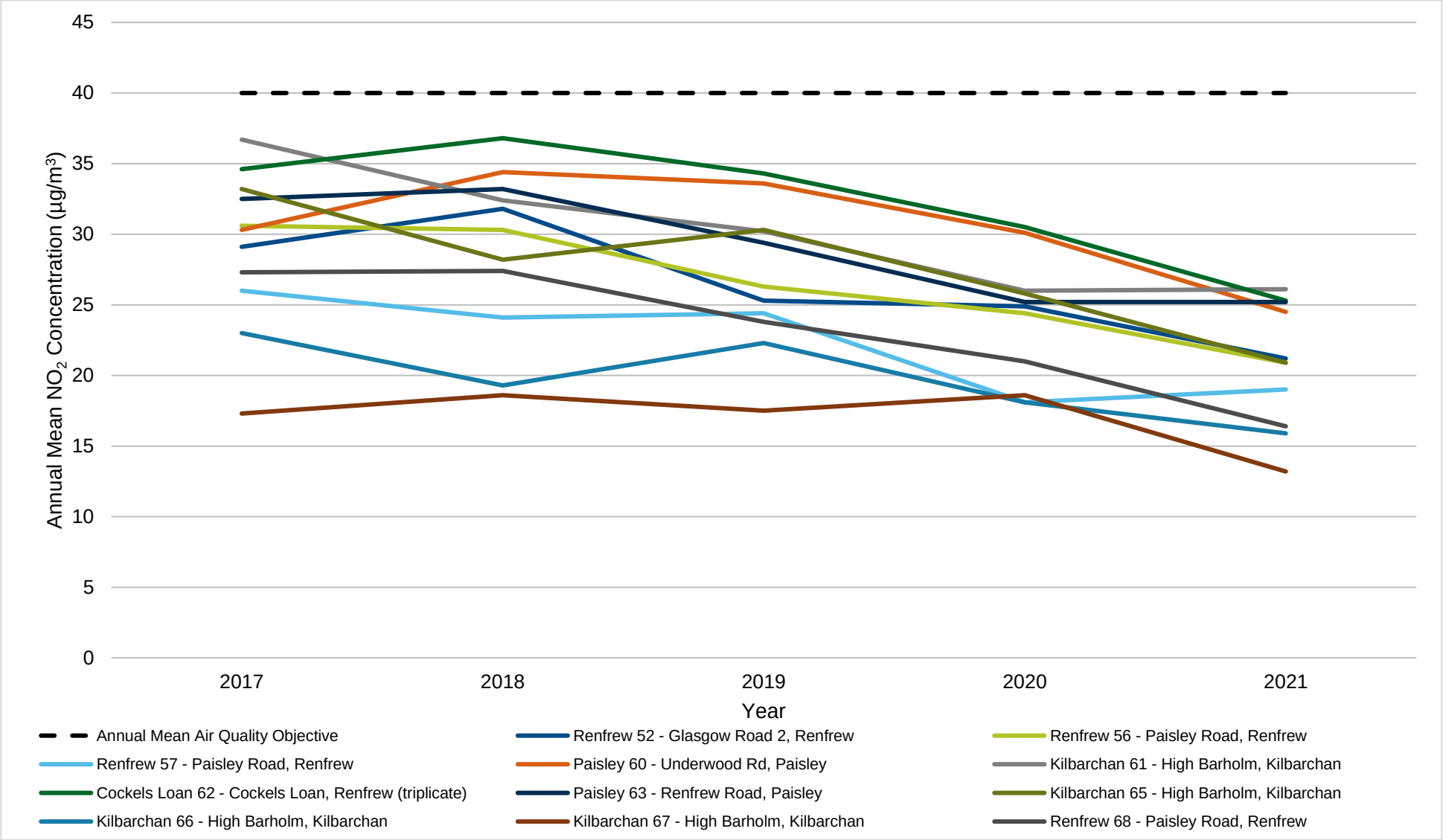


Figure A- 5. Annual Mean NO_2 Concentrations at Non-Automatic Roadside Monitoring Sites (3).

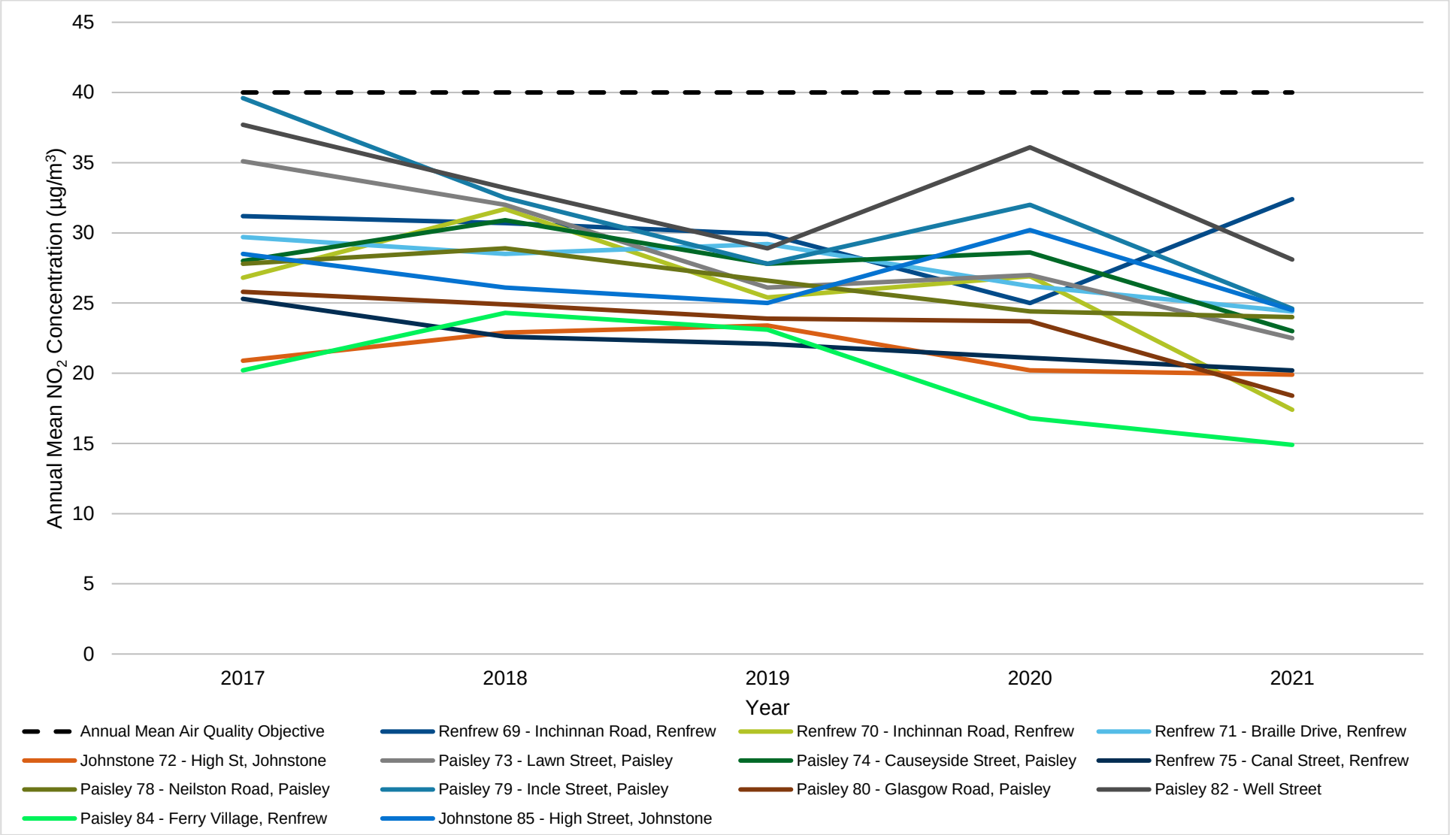


Figure A- 6. Annual Mean NO_2 Concentrations at Non-Automatic Roadside Monitoring Sites (4).

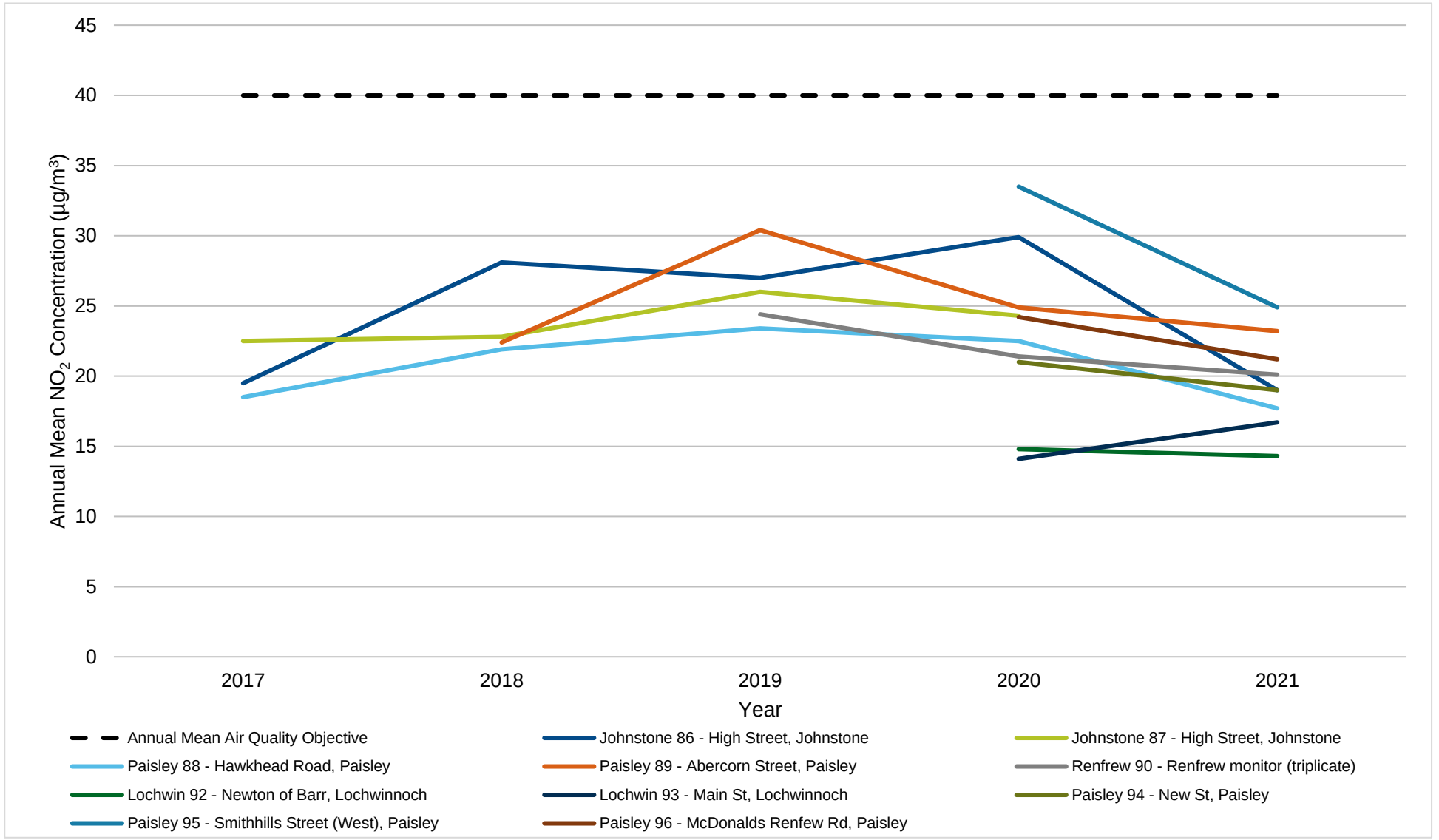


Table A.4 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
REN03	Roadside	Automatic	99.5	99.5	-	-	0	0	0
REN1	Roadside	Automatic	97.8	97.8	0	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 2021 (%) (2)	2017	2018	2019	2020	2021
REN02	Roadside	36	36	9.3	13.4	16.3	10.2	13.6

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(16), valid data capture for the full calendar year is less than 75% and more than 25%. 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 A- 7. Annual Mean PM_{10} Concentrations at Automatic Monitoring Sites.

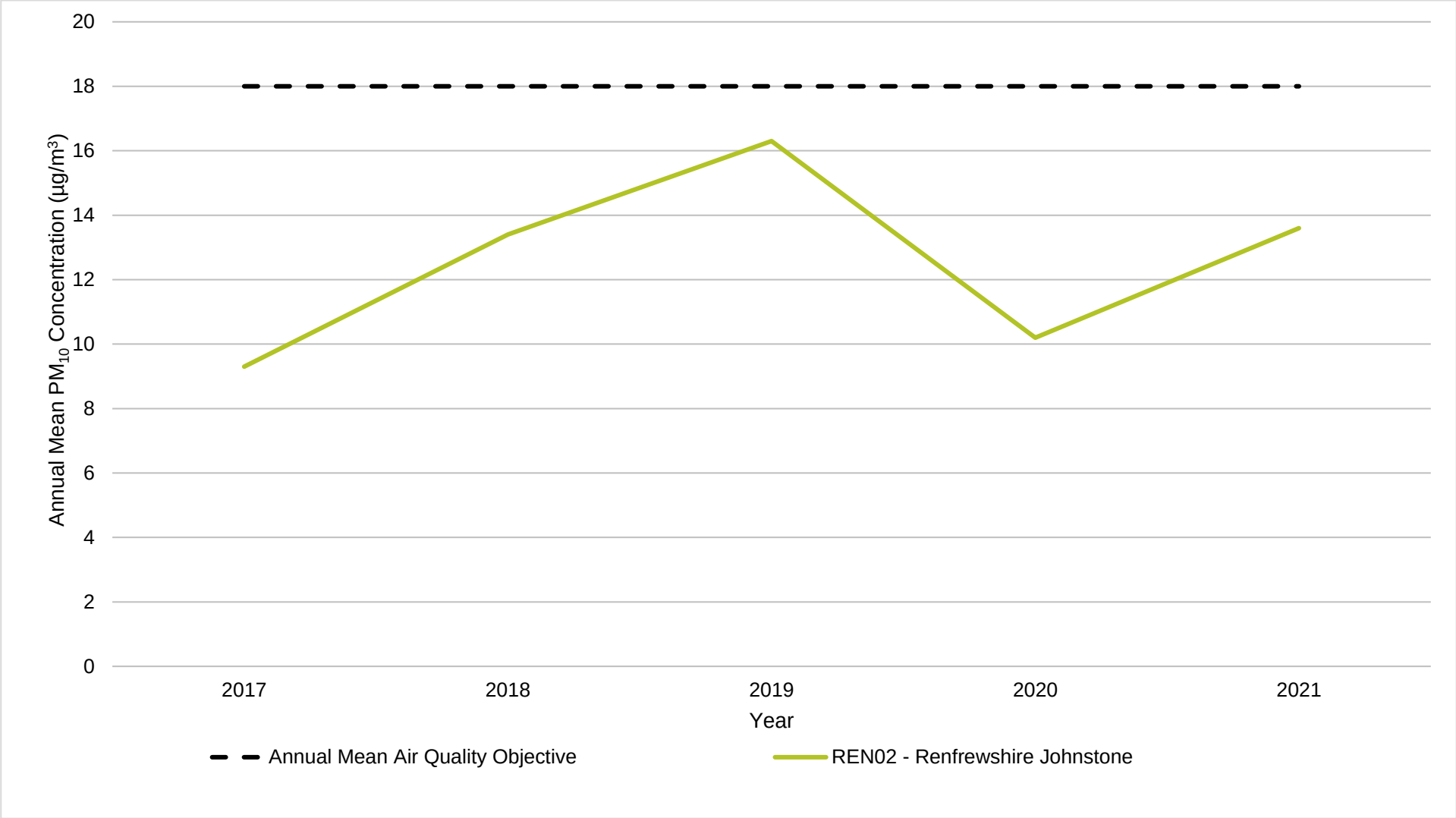


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
REN02	Roadside	36	36	0	1	**14**	0	1

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 2021 (%) (2)	2017	2018	2019	2020	2021
PAI3	Roadside	29	29	-	-	-	-	4.8
REN02	Roadside	36	36	5.4	7.3	7.9	5.5	5.8

Notes:

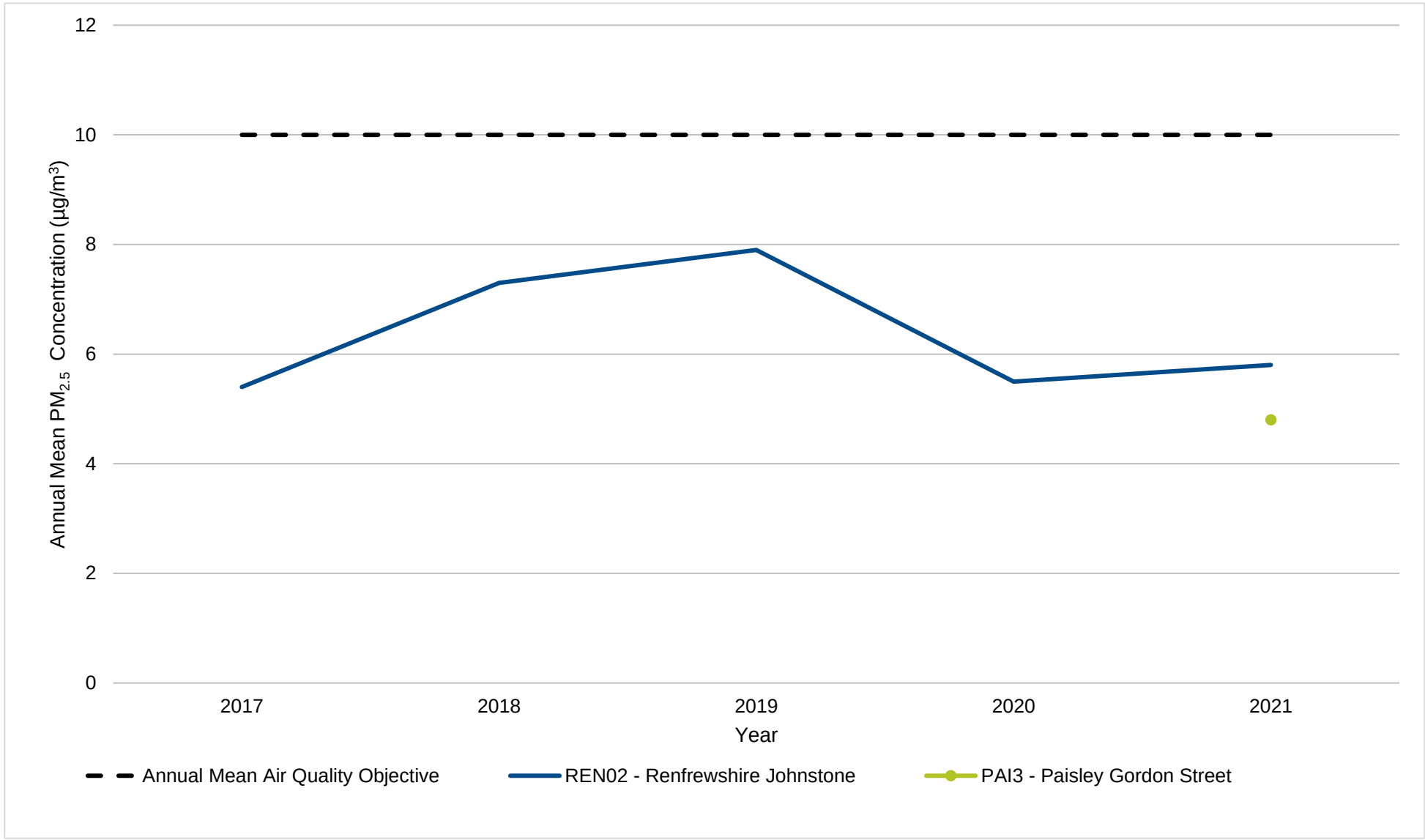
Exceedances of the $PM_{2.5}$ annual mean objective of 10 µg/m^3 are shown in bold.

All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75% and more than 25%. 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 A- 8. Annual Mean $PM_{2.5}$ Concentrations at Automatic Monitoring Sites.



Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 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)
Paisley 1	17.1	10	6.4	14.5	15.9	5.8	7.7	-	13.7	18.8	15.2	21.2	13.3	14.9
Paisley 2	25.9	5.5	3.1	6.9	2.1	2.1	4.7	8.8	5.7	11	11.4	16.1	8.6	9.6
Paisley 3	19.4	4.1	2.1	4.7	13.5	2.1	5.5	6.0	3.5	8.6	8.1	1.3	6.6	7.4
Renfrew 8	37.3	28.1	18.2	16.1	9.3	11.3	20.5	-	19	**45.7**	**43.6**	**43.9**	26.6	29.8
Renfrew 17	24.4	21.2	24.0	24.3	6.4	6.7	11.9	19.2	18.4	30.3	28.1	30.3	20.4	22.9
Paisley 19	27.5	14.3	15.8	13.4	31.8	10.9	17.2	19.4	14.5	24.1	25.9	26.0	20.1	22.5
Johnstone 20	27.0	12.1	17.5	13.4	24.6	10.2	18.3	10.4	11.4	-	25	28.6	18.0	20.2
Paisley 21(1)	32.0	13.9	12.1	12.4	20.4	10.5	14.7	20.0	21.5	25.9	28.1	27.0	19.9	22.3
Paisley 21(2)	27.7	10.9	13.5	11.5	12.1	11.3	13.6	18.4	18.3	27.2	26.2	28.7	18.3	20.5
Paisley 21(3)	34.7	-	13.1	11.8	25.3	10.9	11.0	15.4	20.8	24.6	27.3	29.9	20.4	22.9
Paisley 33	32.2	16.9	14.3	26.3	22.4	14.5	14.4	14.6	20.3	24.6	28.8	28.6	21.5	24.1
Paisley 35	26.4	21.8	14.7	31.0	19.4	10.4	12.8	24.0	18.2	33.7	30.7	32.1	22.9	25.7
Paisley 36	38.0	11.5	14.9	24.2	28.9	10.9	20.1	18.8	21.5	30.6	32.8	31.7	23.7	26.5
Renfrew 40	25.8	12.0	8.4	12.0	-	5.9	8.6	20.5	16.5	23.9	23.9	26.3	16.7	18.7
Paisley 43	18.0	10.6	12.2	14.8	**40.0**	6.2	13.8	15.5	17.7	21.4	22.1	27.0	18.3	20.5
Paisley 44	21.7	10.2	6.5	11.1	16.0	5.3	11.2	14.8	13.7	19.1	20.1	23.1	14.4	16.1
Renfrew 45	32.2	11.2	6.6	11.3	19.9	6.0	10.5	12.5	21.3	20.4	19.5	26.2	16.5	18.4
Renfrew 48	27.5	17.0	12.2	13.5	16.8	-	5.9	10.2	21.0	23.4	25.4	32.5	18.7	20.9
Paisley 50	24.5	9.2	10.1	19.9	17.8	6.9	10.6	11.3	11.2	14.2	26.5	29.6	16.0	17.9
Renfrew 52	**43.0**	11.8	-	14.3	19.3	-	11.8	9.8	11.9	20.8	27.3	-	18.9	21.2
Renfrew 56	21.5	9.7	9.0	17.5	22.0	11.5	18.3	9.2	15.3	28.5	30.1	31.8	18.7	20.9
Renfrew 57	29.8	10.0	13.0	15.6	19.4	5.0	11.1	12.5	20.9	22.9	18.7	25.0	17.0	19.0
Johnstone 59	**50.6**	13.5	27.4	31.2	17.0	13.0	35.6	13.4	34.8	**41.7**	**45.4**	**45.1**	30.7	34.4
Paisley 60	34.6	12.5	19.4	18.9	18.2	10.5	18.1	17.8	23.1	26.5	30.7	32	21.9	24.5
Kilbarchan 61	36.7	13.6	21.4	22.0	32.8	9.9	18.0	10.6	24.1	25.3	33.5	31.3	23.3	26.1

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
Cockels Loan 62(1)	28.2	26.2	22.2	24.3	22.3	11.6	15.5	14.6	23.1	22.4	33.8	37.2	23.5	26.3
Cockels Loan 62(2)	**40.7**	24.6	20.1	23.9	22.3	11.7	15.1	14.0	21.6	23.9	29.5	**53.6**	25.1	28.1
Cockels Loan 62(3)	23.2	19.8	13.6	17.0	22.3	10.3	13.0	13.2	22.4	24.3	32.6	-	19.2	21.6
Paisley 63	39.0	15.8	12.4	18.2	20.8	12.6	22.7	-	23.5	20.2	29.8	32.4	22.5	25.2
Kilbarchan 65	33.4	11.4	15.4	-	24.4	11.5	15.0	13.2	22.1	14.9	25.0	-	18.6	20.9
Kilbarchan 66	23.7	9.3	7.4	-	27.2	5.9	7.4	13.8	11.7	12.4	17.9	19.3	14.2	15.9
Kilbarchan 67	21.9	10.1	7.9	7.8	23.6	6.0	4.9	9.1	11.8	11.4	14.4	12.6	11.8	13.2
Renfrew 68	21.2	9.4	10.6	16.5	2.1	6.0	12.7	7.9	17.2	16.0	24.8	31.8	14.7	16.4
Renfrew 69	**52.5**	**41.4**	12.6	20.4	**46.2**	9.1	17.3	16.4	19.1	**40.9**	32.9	38.4	28.9	32.4
Renfrew 70	-	12.1	17.8	25.6	16.5	2.0	9.6	11.9	12.6	20.5	26.6	-	15.5	17.4
Renfrew 71	23.0	14.7	20.0	22.3	-	-	8.1	22.1	18.2	25.7	28.5	35.2	21.8	24.4
Johnstone 72	27.8	-	-	20.9	25.2	3.9	6.9	19.4	13.7	16.7	18.6	24.8	17.8	19.9
Paisley 73	28.7	12.3	17.6	20.8	23.0	13.9	13.0	12.6	18.6	23.9	24.9	31.7	20.1	22.5
Paisley 74	39.3	15.0	12.9	26.4	18.4	12.9	15.5	11.4	20.6	22.6	20.9	30.5	20.5	23.0
Renfrew 75	31.4	11.2	13.6	13.1	28.1	6.4	6.3	17.4	18.2	20.0	22.6	28.0	18.0	20.2
Paisley 78	31.6	16.0	21.7	23.2	28.8	9.6	13.0	18.4	13.7	20.2	30.6	30.7	21.5	24.0
Paisley 79	**55.0**	16.9	11.9	21.9	12.5	5.7	10.4	14.6	16.7	35.5	27.1	35.0	21.9	24.6
Paisley 80	-	12.7	13.0	22.5	22.4	5.3	15.1	19.0	13.2	17.7	-	23.7	16.5	18.4
Paisley 82	**78.4**	-	18.0	19.5	22.6	15.7	11.3	13.2	2.0	35.1	22.2	38.2	25.1	28.1
Paisley 83	25.4	13.0	22.0	22.5	20.2	11.6	12.1	10.9	19.9	24.8	30.5	30.6	20.3	22.7
Paisley 84	-	-	7.0	14.9	20.3	8.7	3.4	10.5	9.9	15.0	19.6	23.9	13.3	14.9
Johnstone 85	**44.8**	12.7	19.1	30.1	25.5	10.2	14.2	20.5	15.8	17.1	22.8	29.5	21.9	24.5
Johnstone 86	26.9	11.5	17.9	19.8	11.6	10.4	9.8	10.5	20.9	14.3	22.3	27.4	16.9	19.0
Johnstone 87	**53.3**	-	-	-	-	-	-	-	-	-	-	-	53.3	-
Paisley 88	32.7	9.3	7.1	20.3	25.0	10.8	6.6	14.5	14.7	17.4	-	-	15.8	17.7
Paisley 89	21.5	14.3	15.6	25.4	26.9	11.0	10.6	15.6	23.5	21.7	33.9	28.8	20.7	23.2
Renfrew 90(1)	20.9	11.9	-	21.2	19.6	11.2	8.9	14.6	13.2	17.6	21	29.7	17.3	19.3
Renfrew 90(2)	26.4	11.6	-	19.1	26.9	7.4	9.1	15.9	19.4	21.8	19.8	26.3	18.5	20.7
Renfrew 90(3)	32.9	13.3	-	18.5	19.0	13.8	7.6	8.3	13.2	20.6	20.5	30.3	18.0	20.2
Lochwin 92	17.7	10.9	11.0	15.9	2.1	13.1	9.7	11.7	16.2	14.3	14.4	16.0	12.8	14.3

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
Lochwin 93	23.2	10.4	12.2	10.2	**46.1**	8.9	3.8	12.7	12.0	10.2	13.2	15.6	14.9	16.7
Paisley 94	28.6	8.7	9.3	30.5	12.3	15.3	9.4	6.3	21.5	19.7	18.3	23.2	16.9	19.0
Paisley 95	31.2	22.3	24.0	25.9	9.7	25.6	10.4	14.0	30.0	24.4	27.0	-	22.2	24.9
Paisley 96	36.2	14.2	12.4	15.1	-	12.7	10.4	-	16.5	18.6	24.9	28.4	18.9	21.2
Renfrew 97	-	-	23.5	30.5	30.5	26.2	11.5	18.7	26.3	32.6	**41.2**	31.0	27.2	30.5
Johnstone 98	-	-	31.5	34.7	34.2	26.8	15.3	20.8	31.1	30.0	35.7	**41.8**	30.2	33.8
Johnstone 99	-	-	36.7	35.1	28.8	28.7	20.9	21.3	32.6	35.9	36.5	39.8	31.6	35.4
Johnstone 100	-	-	27.1	28.0	33.6	25.6	20.1	25.7	28.3	31.6	31.2	33.0	28.4	31.8
Renfrew 101	29.4	7.3	9.3	15.5	19.5	-	5.1	20.5	16.3	23.4	20.6	24.7	17.4	19.5
Paisley 102	-	-	-	-	-	-	-	-	-	32.1	24.5	-	28.3	-
Paisley 103	-	-	-	-	-	-	-	-	-	-	-	17.7	17.7	-
Paisley 104	-	-	-	-	-	-	-	-	-	-	-	25.9	25.9	-
Paisley 105	-	-	-	-	-	-	-	-	-	-	-	15.3	15.3	-

Notes:

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

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

Means for all diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG (16) if valid data capture for the full calendar year is less than 75% and more than 25%. See Appendix C for details. Distance corrected values are provided in Table C.4.

(1) See Appendix C for details on bias adjustment

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

New or Changed Sources Identified Within Renfrewshire Council During 2021

Renfrewshire has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Renfrewshire Council During 2021

Renfrewshire Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2021 were supplied and analysed by Glasgow Scientific Services (GSS), the tubes were prepared 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 AR030 (January – February 2019) – 100%
- AIR-PT AR031 (April – May 2019) – 100%
- AIR-PT AR033 (July – August 2019) – 100%
- AIR-PT AR034 (September – November 2019) – 50%
- AIR-PT AR036 (January – February 2020) – 100%
- AIR-PT AR037 (May – June 2020) – No Results (NR)

- AIR-PT AR039 (July – August 2020) – NR
- AIR-PT AR040 (September – October 2020) – 100%
- AIR-PT AR042 (January – March 2021) – 50%

Diffusion Tube Annualisation

Five diffusion tube monitoring locations within Renfrewshire recorded less than 25% data capture and therefore cannot be used or the data annualised. No annualisation of diffusion tube data was undertaken for 2021.

Diffusion Tube Bias Adjustment Factors

The 2021 national bias adjustment factor was taken from the National Diffusion Tube Bias Adjustment Factor Spreadsheet (version 03/22) of which reports six studies analysed by Glasgow Scientific Services in 2021 to give a national bias adjustment factor of 1.12. There were two locations which provided opportunity for input to local bias adjustment calculation. The local bias adjustment factor for 2021 was 1.08 from the Cockels Loan co-location site, which reported a good overall precision. 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.16 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"*. Renfrewshire Council have applied the national bias adjustment factor of 1.12 to the 2021 monitoring data. The national bias adjustment factor was used as it was larger than the local 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.

A summary of bias adjustment factors used by Renfrewshire Council over the past five years is presented in Table C.1. Bias adjustment 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/).

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	1.12
2020	Local	-	1.20
2019	Local	-	0.89
2018	Local	-	0.91
2017	National	03/18	0.91

NO_2 Fall-off with Distance from the Road

Four monitoring sites (Paisley 21 (1), Paisley 22 (1), Paisley 23 (1) and Renfrew 48) 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 location 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), FDMS (PM_{10}) and Fidas (PM_{10} and $PM_{2.5}$) analysers. Local Site Operator (LSO) duties are carried out by a senior Technical Officer from Renfrewshire Council on a monthly basis. Acoem undertakes routine service visits twice a year and Ricardo carries out an audit twice a year. 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.

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

The type of PM_{10} and $PM_{2.5}$ monitor(s) utilised within Renfrewshire Council do not require the application of a correction factor.

Automatic Monitoring Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Annualisation was required for PM_{10} at Renfrewshire Johnstone (REN02) (36% data capture) and for $PM_{2.5}$ at Renfrewshire Johnstone (REN02) (36% data capture) and Paisley Gordon Street (PAI3) (29% data capture). The annualisation data is presented in Table C.2. It is noted that the data presented in this report is different to that available at https://www.scottishairquality.scot/latest, however the results there have not been annualised.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Renfrewshire Council required distance correction during 2021.

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

Site ID	Annualisation Factor Glasgow Waulkmillglen Reservoir	Annualisation Factor Glasgow Townhead	Annualisation Factor Site 3	Annualisation Factor Site 4	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
REN02 PM10	0.9899	09941			0.9920	13.7	13.6	
REN02 PM2.5	0.9146	0.9399			0.9273	6.3	5.8	
PAI3 PM2.5	0.8676	0.9019			0.8848	5.5	4.8	

Table C.3 – Local Bias Adjustment Calculations

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	9				
Bias Factor A	1.08 (0.97 – 1.22)				
Bias Factor B	-8% (-18% – 3%)				
Diffusion Tube Mean (µg/m^3)	20.6				
Mean CV (Precision)	7.6%				
Automatic Mean (µg/m^3)	22.3				
Data Capture	100%				
Adjusted Tube Mean (µg/m^3)	22 (20 – 25)				

Notes:

The national adjustment factor has been used to bias adjust the 2021 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
Paisley 21 (1)	9.9	3.6	22.3	11.6	26.3	
Paisley 21 (2)	9.9	3.6	20.5	11.6	23.8	
Paisley 21 (3)	9.9	3.6	22.9	11.6	27.2	
Renfrew 48	45.0	23.0	20.9	17.3	23.0	*Receptor is more than 20m further from the kerb than monitor - treat result with caution.*

Glossary of Terms

Abbreviation	Description
AMIDS	Advanced Manufacturing Innovation District Scotland
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
CO_2	Carbon Dioxide
CWRR	Clyde Waterfront and Renfrew Riverside Project
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
DT	Diffusion Tube
ECO	Efficient and Clean Operations
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
FPN	Fixed Penalty Notice
GAIA	Glasgow Airport Investment Area Project

GCC	Glasgow City Council
GSS	Glasgow Scientific Services
HGV	Heavy Goods Vehicle
JHS	Johnstone high street
KPI	Key Performance Indicator
LA	Local Authority
LAQM	Local Air Quality Management
LEZ	Low Emission Zone
LSO	Local Site Operator
LTS	Local Transport Strategy
NCR7	National Cycle Route 7
NO	Nitrogen Monoxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PAI3	Paisley Gordon Street
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
PROM	Programmable Read Only Memory
PTC	Paisley Town Centre
QA/QC	Quality Assurance and Quality Control
REN1	Renfrew Cockels Loan
REN02	Renfrewshire Johnstone automatic monitor

REN03	Renfrew Inchinnan Road
RNDR	Renfrew North Development Road
RTC	Renfrew Town Centre
SCOOT	Split Cycle Offset Optimisation Technique
SEPA	Scottish Environment Protection Agency
SO_2	Sulphur Dioxide
SPT	Strathclyde Partnership for Transport
TEA	Triethanolamine
TRO	Traffic Regulation Orders
UTC	Urban Traffic Control

References

Air Quality in Scotland website (2021 Monitoring data), available at http://www.scottishairquality.co.uk/

AIR-PT-Rounds 30 to 42 (Jan 2019 to March 2021) available at https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework/

AMIDS South - https://www.renfrewshire.gov.uk/transport-links-amids-south-paisley.

Cleaner Air for Scotland 2. July 2021. Published by the Scottish Govermnent.

Defra LAQM helpdesk – https://laqm.defra.gov.uk/

Diffusion Tube Data Processing Tool v2.0 available at https://laqm.defra.gov.uk/air-quality/air-quality-assessment/diffusion-tube-data-processing-tool/

http://renfrewshire.gov.uk/citydeal

Local Air Quality Management Policy Guidance LAQM.PG(S)16. April 2018. Published by the Scottish Government.

Local Air Quality Management Technical Guidance LAQM.TG(16). April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.

National Diffusion Tube Bias Adjustment Factor Spreadsheet version 03/22 available at https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias/

Renfrewshire Air Quality Action Plan 2019.

Renfrewshire Council (2016-2021) Annual Progress Reports.

Renfrewshire Council Carbon Management Plan 2014/15 – 2019/20

Renfrewshire Cycling Strategy 2016 – 2025.