Renfrewshire Council

Annual Progress Report 2020

Bureau Veritas

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Annual Progress Report (APR)

2020 Air Quality Annual Progress Report (APR) for
Renfrewshire Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

June 2020

Bureau Veritas
AIR7726900

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Executive Summary: Air Quality in Our Area

Air Quality in Renfrewshire Council

There are currently three Air Quality Management Areas (AQMAs) within Renfrewshire; 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}, Paisley only). The monitored concentrations of both NO_2 and PM_{10} have shown a continual downward trend across Renfrewshire for over five years, and following the distance correction of annual mean NO_2 results, there were no exceedances of the relevant AQOs for 2019 within the PTC and JHS AQMAs, with one NO_2 diffusion tube exceedance present within RTC AQMA (41.1µg/m^3, DT8).

Concentrations of the annual mean and short term objectives for NO_2, PM_{10} and $PM_{2.5}$ recorded at all automatic monitoring sites during 2019 were below AQO levels, with the exception of the Johnstone High Street monitor, where 14 exceedances of the PM_{10} 50µg/m^3 24-hour mean were recorded due to some isolated renovation works carried out next to the monitoring site during June and July 2019. In May 2018 the PM_{10} monitor on St. James Street was reconfigured to solely monitor $PM_{2.5}$, and subsequently all monitoring all ceased at the site in July 2019. The St. James Street automatic monitoring location is therefore no longer part of Renfrewshire's LAQM monitoring regime, with Renfrew Inchinnan Road automatic monitoring station introduced in January 2019 to monitor NO_2.

Of the sixty-four diffusion tube monitoring sites across Renfrewshire, prior to the application of distance correction, there was one exceedance of the NO_2 annual mean AQO recorded in 2019. Diffusion tube DT8, located within the RTC AQMA, reported a bias adjusted concentration of 41.4µg/m^3 and, following distance correction in line with LAQM guidance, reported 41.1µg/m^3.

Within the PTC AQMA there were no exceedances of either the NO_2 or PM_{10} AQOs at any monitoring location. The PTC AQMA has been declared for both annual mean and short term NO_2 exceedances, and for annual mean PM_{10} exceedances. There have now been five consecutive years where compliance of the relevant AQOs has been achieved. In line with the Council's 2019 Air Quality Action Plan (AQAP), transport improvement projects in 2020 and the continued downward trends reported in 2019, consideration may be given either this year or early 2021 to the possible amendment or revocation of the PTC AQMA.

1.1 Actions to Improve Air Quality

The updated Renfrewshire Air Quality Action Plan (AQAP) incorporates all three existing AQMAs and with approval from the Council Board and statutory consultees including the Scottish Government and Scottish Environment Protection Agency (SEPA), was published in March 2019. Throughout 2019, a number of measures detailed within the AQAP have been progressed in order to improve air quality throughout Renfrewshire. All measures and their progression in 2019 are further discussed in Section 2.4.

During 2019, following the Council's successful grant applications in relation to sustainable travel improvement based measures; a new cycle route and associated infrastructure were proposed, with Electric Vehicle (EV) Hubs and additional projects in relation to the Council's Sustainable Travel Planning Scheme were progressed. Sixteen measures are presently published within the 2019 AQAP within 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.

In addition the Council have undertaken a number of initiatives during 2019 in order to raise awareness and further improve on Renfrewshire's air quality:

Sustainable Travel Roadshow

The roadshow was held at Renfrewshire House, the Council's main headquarters, on the 20th of June 2019 to coincide with National Clean Air Day 2019. The Roadshow,

aimed mainly towards Council staff, was used to promote various air quality and sustainable travel planning themes with a stand set up in the main staff reception area. Clean Air Day itself was promoted with the use of banners and merchandise provided by Environmental Protection Scotland (EPS). At that time the Council were also in the process of preparing a draft Corporate Travel Plan, one of the measures detailed within the 2019 AQAP. To aid the preparation of the plan, a Staff Travel Survey and a Staff Commuter Challenge were completed.

The Roadshow was therefore used to promote both these events with the Staff Travel Survey going live earlier that same week. Staff from Renfrewshire Council and an external consultancy were in attendance to provide advice in relation to air quality and travel related queries. Local walking maps, cycling maps and information on bus routes and timetables were available. The roadshow was used to promote the ongoing roll out of pool cars within the Council, and to provide information on the Council's pool bikes scheme with one of these bikes on display at the stand. There was also the opportunity for staff to test drive an electric pool car. In addition, Scotrail attended to provide information on their Smartcard system and a bike mechanic stall was set up outside Renfrewshire House to perform free MOT checks on staff bikes.

Corporate Travel Plan – Staff Travel Survey & Commuter Challenge

One of the ongoing action plan measures in the Council's 2019 Air Quality Action Plan is the production of a Renfrewshire Council Corporate Travel Plan. The plan will detail a range of measures aimed at promoting and facilitating sustainable transport modes by council staff both in their means of travel to and from work and business travel during work. Understanding the baseline travel conditions, such as existing travel characteristics and travel trends, is an integral part of developing a successful travel plan and crucial to identifying aims, objectives and targets.

A Staff Travel Survey was therefore undertaken during June and July in 2019 to obtain general baseline travel figures on elements such as travel mode share and business travel. The survey was distributed to council staff via email, internal intranet, weekly news bulletins and management team talks. It was made up of an informal set of questions focusing on how staff travel to and from work and reasons for choosing that mode of transport. It also provided an opportunity for Council staff to think about alternative travel options and the improvements that could be made by the Council to help staff consider these. Approximately 1100 staff responded to the survey and responses and comments will be used to inform the travel plan which is currently in draft form.

Commuter Challenge

Associated with raising awareness of the Corporate Travel Plan, and tied in with the Sustainable Travel/Clean Air Day Roadshow event, the Council launched a four week staff Commuter Challenge in August 2019 to encourage staff to think about more sustainable modes of transport for their commute. There were a total of 341 respondents to the Commuter Challenge.

Safer Schools Pilot

An action measure within the Council's 2019 AQAP is to raise awareness of unnecessary vehicle idling, and its impact on air pollution. Regular targeted campaigns to raise awareness of this issue have been ongoing since 2011.

A new School Parking Campaign was introduced in April 2018 aimed at road safety around schools including safe parking and an anti-idling message. All Primary schools in Renfrewshire were engaged in the school parking campaign in August 2019. Banners were erected at the entrances to all schools to raise awareness of the dangers of idling as well as parents being encouraged to sign up to pledges agreeing to adhere to guidance on safe parking around schools.

The Council are now planning to introduce an exclusion zone in the streets around the entrances to four local primary schools as Renfrewshire Council aim to create a safer, healthier school environment for pupils. In 2019, this was scheduled to commence in April 2020, however will now be put on hold in light of current events within 2020. The six month pilot scheme will introduce a part-time vehicle exclusion zone at the start and end of the school day in some of the surrounding streets of four schools within Renfrewshire with the aim of easing congestion issues, reducing harmful emissions, and ensuring the safety of children. The new scheme will help promote active travel by encouraging pupils to walk or cycle to school and will create a safer space for pupils on their daily commute. Further details on the scheme can be found at the following webpage:http://renfrewshire.gov.uk/saferschoolspilot

1.2 Local Priorities and Challenges

Due to the Covid-19 outbreak in 2020, a number of measure updates were not available at time of publication of the 2020 APR, a further update of all measures taken forward in 2019 will be provided in the 2021 APR. Additionally any new measures will be discussed including a full update to the Council's Urban Traffic Control (UTC) system following the 2019 completion of Measure 2 detailed in the Council's 2019 AQAP, and the initiation of a tender exercise for an overarching Transport Network Action Plan. Additional proposed actions and LAQM requirements for Renfrewshire Council are as follows:

- Progression of the two City Deals projects (Clyde Waterfront & Renfrew Riverside Project and the Glasgow Airport Investment Area Project), which will bring significant new road infrastructure including the Renfrew North Development Road (RNDR). Works for the Glasgow Airport Investment Area (GAIA) project commenced in summer 2019, however this was suspended in 2020 in light of the Covid-19 pandemic. Priorities to recommence suspended developments are to be sought in line with government guidelines when possible. The RNDR road will reduce traffic volume through Renfrew Town Centre resulting in improved air quality levels, in particular within the RTC AQMA;
- Continue to upgrade the Councils fleet of vehicles and complete the implementation of phase 3 of the Pool Car Scheme;
- Publish a Corporate Travel Plan and development of the Transport Network Action Plan for use with Renfrewshire Council's local planning guidance;
- Progression with the Council's Sustainable Travel Planning Scheme, including the use of electric bikes, development of Robertson Park cycling infrastructure and restoration of a bicycle playground following award of the Scottish Government's AQAP grant;
- Progression of UTC system upgrades to all of the current 175 traffic signal installations across Renfrewshire;
- Following the vehicle anti-idling campaigns throughout 2019, 49 schools were engaged by August 2019. The second phase of the scheme will be progressed concerning the introduction of exclusion zones in streets close to selected schools at the start and the end of the school day;
- Development of a new cycle route connecting Canal Street and High Paisley Street following funding awarded from the Scottish Government's Low Carbon Travel and Transport Challenge Fund, together with an EV Charging Hub to be

installed in Paisley;

- Assess the 2020 monitoring data within the PTC AQMA when available, to note if the downward trends observed in the 2019 data continues, with consideration to revoking/amending the AQMA based upon the results whilst remaining mindful of possible reduced vehicle trends during the 2020 pandemic;
- Continue to review all air quality assessments that are submitted as part of planning applications in relation to possible impacts upon local air quality;
- Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ at all relevant locations throughout Renfrewshire; and
- Submit the 2021 Annual Progress Report.

1.3 How to Get Involved

The general public can find out more about air quality and how to get involved on the Renfrewshire Council web site at http://www.renfrewshire.gov.uk/airquality, current and historic pollution levels and up to date forecasts are available at http://www.scottishairquality.co.uk/, and further details on the 2019 Clean Air Day are available at https://www.cleanairday.org.uk/clean-air-scotland. In addition, details on the Safer Schools Pilot, which is to be implemented as a result of the August 2019 School Parking Campaign that engaged all 49 Renfrewshire Primary Schools to raise awareness on reducing emissions and improving safety, can be found here http://renfrewshire.gov.uk/saferschoolspilot.

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1. Local Air Quality Management

This report provides an overview of air quality in the Renfrewshire Council administrative area during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) is summarises the work being undertaken by 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		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0mg/m^3	Running 8-Hour mean	31.12.2003
Lead	0.25µg/m^3	Annual Mean	31.12.2008

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

There have been no reported exceedances of the NO_2 and PM_{10} AQOs within the PTC AQMA for example, for five years (2015-2019), however the Council will continue to maintain its current monitoring strategy across all AQMAs, and continued progression of the 2019 AQAP. The Council wish to consider the possible revocation of the PTC AQMA following publication of the 2020 APR or within early 2021.

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} annual 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	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	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 junction of	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
			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

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at https://www.gov.scot/Publications/2015/11/5671/17. Progress by Renfrewshire Council against specific relevant actions within this strategy is demonstrated below, with details on all measures taken forward during the current reporting year of 2019 as part of the 2019 Renfrewshire AQAP, discussed in Section 2.4.

2.2.1 Transport – Avoiding travel – T1

All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan. Renfrewshire Council has included a measure within their 2019 AQAP to develop a Corporate Travel Plan (*measure 14*, Table 2.4), together with ongoing detailed reviews of transport plans within Paisley and Johnstone. The £1.13bn Glasgow City Region City Deal infrastructure fund[1] will enable investment in the transport network and improve public transport in Renfrewshire. The City Deal projects within Renfrewshire include the Glasgow Airport Investment Area Project (GAIA) and the Clyde Waterfront & Renfrew Riverside (CWRR) projects. The projects aim to improve the region's transport links, most significantly within Renfrew Town Centre. The air quality assessments submitted, as part of the projects' Environmental Impact Assessments (EIA), predict a reduction in NO_2 annual mean concentration of

[1] http://renfrewshire.gov.uk/citydeal

3µg/m^3 at the historically exceeding monitoring location (DT8), and reductions of up to 3.9µg/m^3 along Inchinnan Road within the Renfrew Town Centre AQMA. This reduction is reported based on implementation of the CWRR development in 2020, in comparison to 2020 baseline levels.

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

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[2], and as discussed in the Council's AQAP, Renfrewshire Council commissioned a study during 2019 to review the AQAP measures in line with the 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.

2.3 National Low Emission Framework (NLEF) Stage 1 Screening Appraisal for Renfrewshire Council

The NLEF[3], which is now part of the review and assessment process for LAQM reporting in Scotland, contributes to the Cleaner Air for Scotland strategy by aiming to improve local air quality in areas where air quality objectives are exceeded, or likely to be exceeded, primarily due to emissions from transport.

The NLEF is directly linked to Action Planning for local authorities with AQMAs, and will help to identify actions to improve local air quality within these areas. The NLEF appraisal takes the form of a two-stage process, as summarised in Table 2.2:

Table 2.2 – NLEF Appraisal Process

Stage		Outcome	Actions Required
1	Screening	• Decision on whether to proceed to stage two assessment	• Screening process to identify actions that will benefit air quality within the AQMA • Screening evidence should form part of the Annual Progress Report, with the decision agreed by Scottish Government and

[2] http://www.renfrewshire.gov.uk/article/3246/Carbon-Management-Plan-2014-2020
[3] https://www.gov.scot/publications/national-low-emission-framework/pages/2/

Stage		Outcome	Actions Required
			SEPA
2	Assessment	• Decision to proceed with introduction of a Low Emission Zone (LEZ) or identification of alternative transport-related measures required to improve air quality • Stage two assessment report agreed by Scottish Government and SEPA	• NMF approach to support assessment of sources of pollution and options • Quantitative impact assessment (based on predicted change in pollutant concentrations) • Consideration of consequential impacts (e.g. congestion, export of pollution)

The NLEF Stage 1 Screening Appraisal for Renfrewshire Council is detailed in Table 2.3. It is the opinion of Renfrewshire Council that the proposed measures are sufficient and there is therefore no need to proceed to a Stage 2 Assessment at this time.

This conclusion is supported by the downward trends that are continued to be observed across all pollutants within the AQMAs for the majority of the monitoring sites, in comparison to 2018, with 79% of NO_2 monitored concentrations reducing in 2019 from concentrations reported in 2018 (see Appendix A: Monitoring Results). Furthermore, in accordance with the NLEF Screening Assessment guidance, geographically restricted areas would not be appropriate for Low Emission Zone declaration (JHS and RTC AQMAs, specifically) and there are a number of transport measures in the Council's 2019 AQAP that aim to further improve air quality across Renfrewshire.

Table 2.3 describes the expected improvements following implementation of the approved City Deals Projects (Measure 1 of the 2019 AQAP), alongside the 2019 AQAP measures taken forward as discussed in Table 2.4 that include a number of travel improvement schemes including the continued investment in the Council's Sustainable Travel Planning Scheme and development progress in the cycle network and electric vehicle network within Renfrewshire.

Table 2.3 – NLEF Stage 1 Screening Appraisal

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
1	What is the name of the declared AQMA(s)?	Paisley Town Centre (PTC), Johnstone High Street (JHS), Renfrew Town Centre (RTC)
2	What pollutants are the AQMA(s) declared for?	PTC; NO_2 annual mean, NO_2 1-hour mean & PM_{10} annual mean JHS; NO_2 annual mean RTC: NO_2 annual mean, NO_2 1-hour mean
3	What are the main sources of air pollution, or other factors, contributing to the declaration of the AQMA? *(If the main source is not transport–related no further screening is required).*	Local road traffic sources, notably cars and buses. NO_x road traffic contributions as reported in the 2015 Source Apportionment study: PTC – 61–80% NO_x, JHS – 89-91% NO_x, RTC – 72-87% All PM_{10} source apportionment was found to mostly comprise of background concentrations across all AQMAs.

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
4	Are the declared AQMA(s) (and therefore area(s) of exceedance) restricted in nature geographically to a small area for which a Low Emission Zone (LEZ) would not be appropriate or proportionate (e.g. single streets, road junctions, small town centre)?	PTC AQMA reported no exceedances by passive monitoring locations in 2019. The last close to exceedance concentration within PTC was in 2013 at Paisley 82 & 83 (within 10% of AQS). LEZ not considered appropriate at JHS and RTC as the AQMAs are restricted along a stretch of road. Additionally, one exceedance alone has been reported at passive monitoring sites following distance correction in 2019. Location Renfrew8 (DT8), within RTC AQMA, reported 41.4µg/m^3 in 2019 and 41.1µg/m^3 following distance correction.

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
5	Do the monitored concentrations within the AQMA(s) meet the air quality objective(s)? If yes, for how long has compliance been achieved? If not, what are the extent of the exceedances?	Yes, annual mean PM_{10} and $PM_{2.5}$ objectives were not exceeded in 2019, with no annual mean exceedances recorded to date at all existing particulate monitoring sites. All automatic monitoring sites achieved compliance for NO_2 AQOs in 2019 and have not exceeded within the past 10 years. Cockles Loan automatic monitoring site, which is not located within an AQMA, recorded a 2011 NO_2 annual mean of 43µg/m^3 and has since continued to achieve compliance for NO_2 annual mean concentrations. Before distance correction, there were no exceedances of the NO_2 annual mean AQO in 2019 within JHS and PTC, with one location (DT8) in the RTC AQMA recording 41.4µg/m^3. Following distance correction, DT8 reported a 2019 concentration of 41.1µg/m^3. Previous exceedances reported at passive monitoring sites, following distance correction, were recorded in 2017 at DT 59 (JHS AQMA) and 2018 at DT8 (RTC AQMA); 40.6µg/m^3 and 40.8µg/m^3, respectively. PTC last recorded a NO_2 exceedance in 2014 at DT43 (41.9µg/m^3).

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
6	What is the current trend for pollutant concentrations within the AQMA(s) (state the trend for each pollutant declared)?	Based on the previous 5 years, in line with the 2019 APR's reporting data; PTC; NO_2 annual mean, NO_2 1-hour mean & PM_{10} annual mean – No exceedances with a largely downward trend. JHS; NO_2 annual mean; no exceedances since 2017 with a downward trend observed. RTC: NO_2 annual mean, NO_2 1-hour mean; One exceedance (DT8), with a largely downward trend.

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
7	Are there any major planned developments which could impact air quality within or surrounding the AQMA(s)?	PTC; Developments granted in 2019, including a residential development and Biomass application, were concluded to not have a significant impact according to the required air quality assessments (AQA) submitted, with mitigation measures provided. A 2020 application for 605 residential dwellings in Paisley has been submitted, pending approval, however the AQA concludes its impacts are not significant with no exceedances of the AQOs at sensitive receptors predicted. JHS; No developments currently planned. RTC; Approved City Deal Projects, such as the Glasgow Airport Investment Area and the Clyde Waterfront and Renfrew Riverside Investment Project, intend to benefit air quality particularly in relation to the RTC AQMA. CHP plant development in industrial area of Renfrew was approved in 2019 with AQA concluding a slight impact on air quality. Change of use application was granted in 2019, however no AQA was submitted. Applicant was advised on stack height to ensure emissions did not impact on surrounding area; it was concluded that the biomass boiler was unlikely to impact on LAQM. A refurbishment and development project not yet approved, which is accumulative of the City Deal Projects already approved, concludes that the air quality impacts are negligible at relevant receptors.

No.	NLEF Stage 1 Screening Appraisal Question	Appraisal Response
8	What are the current trends for vehicle movements within the AQMA and surrounding areas?	The 2015 Source Apportionment study indicates that traffic emissions are the main contributor to all of the Renfrewshire AQMAs' pollutant concentrations. The AQMAs observe downward trends of NO_2 and particulates over the last five years (see Appendix A: Monitoring Results), together with a number of AQAs approved in 2019 that indicate traffic flows introduced as part of a development are unlikely to have a significant impact on the existing air quality within or near to an AQMA. The City Deal project aims to reduce traffic movements across Renfrewshire, specifically in relation to RTC AQMA, where the Council's highest NO_2 concentrations have historically been reported.
9	Provide evidence showing how the AQAP (and associated plans, programmes and strategies) will deliver significant improvements towards achieving the air quality objective(s) in as short a timescale as possible?	The air quality assessments submitted, as part of the City Deal projects' Environmental Impact Assessments (EIA), predict a reduction of 3µg/m^3 at the historically exceeding monitoring location, DT8 in the RTC AQMA, and reductions of up to 3.9µg/m^3 along Inchinnan Road within the RTC AQMA. This reduction is reported based on implementation of the Clyde Waterfront and Renfrew Riverside Investment Project development in 2020, in comparison to 2020 baseline levels, further supporting that vehicle movement trends as a result of the scheme, are set to improve further following 2020.

2.4 Progress and Impact of Measures to address Air Quality in Renfrewshire Council

Renfrewshire Council has taken forward a number of measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.4. More detail on these measures can be found in the AQAP relating to each AQMA.

Key completed measures are listed as follows:

- Measure 2 – 2019 UTC SCOOT system upgrades to reduce congestion have been completed in response to repairs and upgrades of identified junctions, however this measure has since progressed into a complete upgrade of Renfrewshire's UTC system which has been initiated for tender in 2020;
- Measure 6 – Phase 2 of the Council's Sustainable Travel planning scheme reached completion in 2019, Phase 3 is currently ongoing; and
- Measure 13 – Emission testing of vehicles continues to be no longer an ongoing measure, with focus directed towards vehicle idling reduction and awareness.

Due to the Covid-19 outbreak, a number of measure updates were not available at time of publication of the 2020 APR. A further update of all measures taken forward in 2019 will be provided in the 2021 APR, together with new measures to be discussed including the full update to the Council's Urban Traffic Control (UTC) system following completion of AQAP Measure 2 and a further measure to be developed for an overarching Transport Network Action Plan. This will be used to shape future development as part of the Council's local planning guidance. Renfrewshire Council expects the following measures to be completed over the course of the next reporting year, subject to any delays in relation to the Covid-19 pandemic:

- Continue to upgrade the Councils fleet of vehicles and complete the implementation of phase 2 of the Pool Car Scheme;
- Publish a Corporate Travel Plan and development of the Transport Network Action Plan for use with Renfrewshire Council's local planning guidance;
- Progression with the Council's Sustainable Travel Planning Scheme, including the use of electric bikes, develop the Robertson Park cycling

infrastructure and restoration of a bicycle playground following award of the Scottish Government's AQAP grant;

- Progression of UTC system upgrades to the current 175 traffic signal installations across Renfrewshire;
- The second phase of the anti-idling scheme will be progressed concerning the introduction of exclusion zones in streets close to selected schools at the start and the end of the school day;
- Development of a new cycle route connecting Canal Street and High Paisley Street following funding awarded from the Scottish Government's Low Carbon Travel and Transport Challenge Fund, together with an EV Charging Hub to be installed in Paisley.

Table 2.4 – 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)	Transport Planning and Infrastructure Traffic Management Promoting Travel Alternatives	Road Infrastructure	Scottish Government & Local Authorities (LAs) across the region. The decision-making body is the Glasgow City Region Cabinet. The Renfrewshire projects are led within the Council by Communities, Housing and Planning Services City Deals Section.	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).	**GAIA** Nov 2017 – planning consent granted Spring 2019 – tender contracts awarded June 2019 – start of construction. **CWRR** Nov 2018 – planning consent granted (by Scottish Ministers) Autumn 2019 – tenders published Jan 2021 – proposed start of construction	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. 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 3.9ugm^3) measured at the 3 DTs on Inchinnan Road. A reduction of 3 ugm^3 is expected at DT No.8 where there is a current exceedance (41.1ugm^3 in 2019, before distance correction). Reference should be made	For the GAIA, construction works did commence summer 2019, however these have temporarily stopped due to the Covid-19 pandemic and it is unclear when works will recommence. For the CWRR, the tender was published in Autumn 2019 and initial tenders returned in January 2020. A negotiation process is now underway with tenderers with award anticipated in December 2020 with works to commence in January 2021.	GAIA – completion delayed until Spring 2021 at the earliest. CWRR – completion anticipated Summer 2023. City Deal funding from the UK and Scottish Governments will be unlocked in 5-year funding blocks. The formal process for agreeing the release of funding will be a series of 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	Refer to section 3.1.7 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.

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								to the AQAs for full details.		unlocked.	
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.	**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.	Defective loops repaired/replaced in June 2017. Validation of traffic signals & PROM updates completed in November 2017.	Physical works completed November 2017. Evaluation post works to be undertaken following a full year of operation for comparison against annual air quality levels. A comparison of 2017 air pollutant data with 2018 pollutant data in the locality of the traffic signal sites will be undertaken in 2019 once 2018 data is available. Cost - £31,500 provided through Scottish Government AQAP grant funding process.	Additional information on this measure is provided in the 2019 Renfrewshire Council Air Quality Action Plan.

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							- % improvement in journey times -improved traffic flow.				
3	**Council Fleet Improvements** - Continue to improve the standard of fleet	Promoting Low Emission Transport	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. 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.	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 CO_2 emissions across entire Council area. Existing Council KPIs: - 2017/18 twelve EURO V HGVs will be replaced with EURO VI standard vehicles - amount of CO_2 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.	**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 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.	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 vehicles by 2022 at latest. Funded via the Council's Vehicle Replacement Capital Programme.	See measure no.4 which deals specifically with electric vehicle numbers within the fleet.

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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 41 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.	Ongoing The Council have worked in partnership with Transport Scotland to purchase an additional 48 EVs (30 cars & 18 vans) with delivery between June and Nov 2019 which will take the EV fleet total to 89. The cars will support the Sustainable Travel Project (see measure No.6). The 18 vans will arrive end of 2019 and will replace fossil-fuelled vans. 19 EV Charing Units (38 Charging Bays) will be installed during 2019 in publicly accessible council car parks in Paisley, Johnstone, Renfrew, Bridge of Weir and Houston. In addition, there have been 23 charging bays	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 CO_2 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.	Electric fleet planned to increase from 41 EVs to 89 in 2019. There are currently 25 council operated charging points. This will increase to 63 in 2019. 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.	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. 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.	

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						recently installed in Renfrewshire House to support the new EV pool cars.					
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	Route management plans/ Strategic routing strategy for HGVs	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	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.	**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.	

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					approval by Council Board.		KPIs may be measured via: - reduction in vehicle fleet numbers due to identification of underutilisation of vehicles. - reduction of idling times - 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	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	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	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	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	Phase 3 is ongoing. 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 Improvement

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	transport where appropriate to carry out Council business.				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.	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).		all pool cars to be EVs, thereby reducing emissions by replacing trips that would otherwise have been undertaken by non EV vehicles.	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.		s 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**	Vehicle Fleet Efficiency	Fleet efficiency and recognitio n 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.

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
	on hold as of summer 2019.										
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	**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.	To be determined	Refer to section 3.1.2 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.

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							times - % reduction in queue lengths.				
9	**Paisley Town Centre Transportation Improvements** - 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.	Policy Guidance and Development Control Traffic Management	Other policy & Congestion management	Environment & Infrastructure - Roads and Infrastructure	Procurement process for consultant to 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	Ongoing. The proposed options are intentionally high level, providing ideas of key potential transport interventions for Paisley. Some of these measures will now be developed from the current concept phase taking into account traffic modelling and allowing for appropriate 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	The following KPIs may be relevant: - % 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.	**Paisley AQMA** In terms of target pollution reduction, it is recognised 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.	The draft feasibility study details a programme of phased interventions covering the short, medium and long term. An update has been provided after this table with regards to a short to medium term programme of works that has been identified and will be prioritised and taken forward within 2019/20 & 2020/21.	Whilst a prioritised programme of works has been identified for the short to medium term, further modelling has yet to be undertaken and a timeline for implementation of the measures yet to be decided. Some long-term improvements are also identified in line with the PTC 10yr Action Plan, but these require further investigation. The 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.	Refer to section 3.1.5 of the 2019 Renfrewshire Council Air Quality Action Plan for further details on this measure.

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					conclusions of this feasibility study may feed into any PTC Transport Strategy.	of final proposals will thereafter be subject to identification of funding streams.					
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.	Ongoing. As per information within the Planning Phase.	Implementation of measures will be subject to approval and capital funding but expected to be complete by 2019/20.	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	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	An initial meeting was held in April 2019 with the management of the largest bus operator in Renfrewshire	To be determined	Once consultation on this measure has taken place, the Council will require

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				Planning Services in consultation with local bus operators and SPT				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/m^3 at the diffusion tube location (DT No. 59) where the 2019 bias adjusted and distance corrected concentration was 37.5µg/m^3.	and staff from Renfrewshire Council to discuss the AQAP and potential improvements in bus operations. Further engagement is required. Given the current Covid-19 pandemic, further engagement with bus operators has been put on hold and it is unclear when this will recommence.		considering how this is implemented and taken forward. It is anticipated this will be 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.
12	**Vehicle Idling Awareness Raising** - Regular targeted campaigns to raise awareness regarding	Traffic Management Public Information	Anti-idling enforcement & information via other mechanisms	Renfrewshire Community Safety Partnership; Communities, Housing and Planning Services Safety Wardens and	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	Improves overall awareness of fuel efficiency & environmental impacts of vehicles particularly at areas of sensitive receptors e.g.	All AQMAs Measure is more an awareness raising tool however it is also a useful measure to prevent vehicles idling and stopping in inappropriate	By August 2019, all 49 Primary schools in Renfrewshire were engaged in the campaign. Regarding the second phase of the scheme, four primary schools	Ongoing measure. The School Parking Campaign has been funded internally by Communities, Housing and	The use of Fixed Penalty Notices has historically not been adopted by the Council. Instead drivers have been requested to turn their

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	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			Environment & Infrastructure Service		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.	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.	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.	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 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.	Planning Services and Environment & Infrastructure Services.	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.

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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.	

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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 development of this measure.	Jan 2019 - Consultant undertook site visits to relevant council offices to determine existing facilities. June 2019 - staff travel survey issued to determine current transport modes etc. A Roadshow event was also held on Clean Air Day in June 2019 at Renfrewshire House. Council staff and the consultants were in attendance to provide travel planning advice, info on pool cars, promotion of the travel survey etc. Dr Bikes and Scotrail were also in attendance. A staff commuter challenge was undertaken in August 2019. Nov 2019 – draft plan provided by consultant	KPIs will be an integral part of the Travel Plan and will be determined during developme nt 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. Once the plan is published and measures implemented a second staff survey is planned to determine any change in travel behaviour.	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.	

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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.	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.

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
16	**Renfrewshire Council Staff Cycling Incentives** **- Staff Cycle to Work Scheme** Council employees can participate in this Government approved salary sacrifice scheme which allows them to purchase a bike with tax free benefits. **This measure is currently on hold pending a review by the Council's HR to determine feasibility of offering this to staff. The review will be complete by end of 2019.**	**Promoting Travel Alternatives**	Promotion of cycling	Environment & Infrastructure		Ongoing	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.**	Cycle to work scheme last open to employees Oct 2016.	Ongoing	Update not provided at time of 2020 APR publication. To provide update in 2021 APR report.

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

This section sets out what monitoring has taken place across Renfrewshire, and how monitored concentrations of NO_2, PM_{10} and $PM_{2.5}$ compare with the objectives.

3.1 Summary of Monitoring Undertaken

The Council carried out NO_2 diffusion tube monitoring at 64 locations in 2019, with two new locations established (DT91 & triplicate site DT90). No diffusion tube sites were removed from the 2018 monitoring strategy. 50 out of the 62 sites that were in place in 2018 reported a reduction in NO_2 concentrations in 2019, with the highest increase of 8µg/m^3 at a NO_2 diffusion tube in comparison to the 2018 established DT89 in Paisley; 30.4µg/m^3 recorded in 2019, which remains significantly below the AQO.

Five continuous sites operated across the Council area in 2019, monitoring a range of pollutants; three sites monitored NO_2 (Gordon Street, Inchinnan Road, Cockels Loan), three monitored PM_{10} (Gordon Street, Cockels Loan, High Street, Johnstone) and two sites monitored $PM_{2.5}$ (St James Street, High Street, Johnstone). St. James Street, Paisley, measured $PM_{2.5}$ only in 2019 and was discontinued from the Council's monitoring regime in July 2019. The Inchinnan Road NO_2 automatic monitoring site was introduced into to the RTC AQMA in January 2019, with the co-located DT90 diffusion tubes established from March 2019.

3.1.1 Automatic Monitoring Sites

Renfrewshire Council undertook automatic (continuous) monitoring at five sites during 2019. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.scottishairquality.co.uk/.

All of the automatic monitors are part of the Scottish Air Quality Database network, whereby monitoring data is managed by Ricardo Energy and Environment in line with the same procedures and standards as the Automatic Urban and Rural Network (AURN) monitoring sites.

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

St. James Street, Paisley, was discontinued from the Council's monitoring regime in July 2019, therefore the data has been annualised for 2019 as per LAQM Technical Guidance, TG(16)[4]. The Cockels Loan automatic monitoring site ceased monitoring between 25th May and 20th June 2019 due to an instrument fault, and again throughout September and November 2019 due to water ingress following a damaged station roof. Both the PM_{10} and NO_2 data has therefore been annualised for 2019. The Inchinnan Road automatic monitoring site was introduced in January 2019 to monitor both NO_2 annual and short term means. The Inchinnan Road monitoring site reported significantly below the annual mean AQO for NO_2 in 2019 (24.2µg/m^3) with 86.6% annual data capture.

3.1.2 Non-Automatic Monitoring Sites

Renfrewshire Council undertook non- automatic (passive) monitoring of NO_2 at 64 sites during 2019.

Table A.2 in Appendix A shows the details of the sites. Four monitoring locations consisted of triplicate sites; DT21, DT31, DT62 and DT90. Diffusion tube locations DT90 and DT91 were introduced by the Council in 2019 and are located within the RTC AQMA and along Kilbarchan Road, respectively. The DT90 monitoring site is co-located at the Inchinnan Road automatic monitoring station. DT21 and DT62 monitoring sites are co-located at the Gordon Street and Cockels Loan monitoring stations, respectively.

Maps showing the location of the monitoring sites are provided in Appendix A: Monitoring Results Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

3.2 Individual pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation, bias and distance corrected. Further details on adjustments are provided in Appendix C. Graphs presented within Appendix A: Monitoring Results show that all sites in 2019 do not exceed the relevant AQOs, with Figure A.17 illustrating the historically exceeding site DT8, which is the only site reporting an AQO exceedance (41.1µg/m^3) in 2019.

[4] http://www.scottishairquality.scot/laqm/technical-guidance

3.2.1 Nitrogen Dioxide (NO_2)

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

All automatic monitoring sites achieved compliance for NO_2 AQOs in 2019 and have not reported an exceedance within the past 10 years inside an AQMA. Cockles Loan automatic monitoring site, which is not located within an AQMA, recorded an NO_2 annual mean concentration of 43µg/m^3 in 2011, and has since achieved compliance for the NO_2 annual mean AQO.

A number of diffusion tubes reported erroneous data in 2019 and, as recommended in paragraphs 7.137 and 7.161 of TG(16)4, the data was removed prior to data adjustment. Table B.1 highlights where erroneous data was captured at each diffusion tube location in 2019. Diffusion tube site DT91, located within the JHS AQMA, was introduced into the Council's monitoring regime in August 2019. As such, DT91 reported an annual data capture of 33.3% and therefore annualisation was carried out as per TG(16)4. Distance correction was undertaken for three monitoring sites, all of which were located within each of the existing AQMAs; DT8, DT59 and DT34, as they were not located at locations of relevant exposure and reported concentrations in exceedance, or within 10% of the AQO. During 2019, prior to distance correction, DT8 in the RTC AQMA reported 41.4µg/m^3. Following distance correction, all monitoring locations apart from DT8 (41.1µg/m^3 following distance correction) achieved NO2 AQO compliance in 2019. Previous exceedances were last reported at passive monitoring sites, following distance correction; in 2017 at DT59 (JHS AQMA) and 2018 at DT8 (RTC AQMA); 40.6µg/m^3 and 40.8µg/m^3, respectively.

The two diffusion tube locations which recorded within 10% of the AQO in 2019 before distance correction; DT59 (37.9µg/m^3) and DT34 (37.3µg/m^3), are located in the JHS and PTC AQMAS. DT34 reported significantly below 10% of the AQO following distance correction (29.0µg/m^3) with DT59 remaining within 10% of the AQO following distance correction (37.5µg/m^3). For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Table B.1.

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 200µg/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.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 18µg/m^3. The PM_{10} automatic monitoring sites have not recorded an exceedance of the annual mean AQO since their installation.

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. The 24-hour AQO was exceeded in 2019 for PM_{10} at the Johnstone automatic monitor (14 instances in comparison to the 24-hour PM_{10} AQO's 50µg/m^3 seven exceedances), however this has not previously been observed since monitoring commenced. It was confirmed, following a visit to the site by the Council, that between June and July 2019 major renovation works were ongoing at a restaurant where the monitor is located outside of. The works created dust plumes that directly impacted the data at the monitor, with the data presenting isolated peaks during the works (see Figure C.3). This will be discussed in next year's APR where it will become evident from the 2020 monitoring data that this was an isolated event.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years with the air quality objective of 10µg/m^3. From the monitoring results obtained, there were no exceedances of the annual AQO for $PM_{2.5}$ at any of the monitoring sites. St. James Street, Paisley, was discontinued from the Council's monitoring regime in July 2019, therefore the data has been annualised for 2019 as per LAQM Technical Guidance, TG(16)[5].

3.2.4 Sulphur Dioxide (SO_2)

Renfrewshire Council does not currently monitor SO_2 within the Council area. Historically SO_2 was measured at the Glasgow Airport monitoring station however, due to the concentrations recorded being substantially below the AQO, monitoring of SO_2 was discontinued at the monitoring site at the end of 2007.

[5] http://www.scottishairquality.scot/laqm/technical-guidance

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Renfrewshire Council does not currently monitor carbon monoxide, lead or 1,3-Butadiene concentrations within the Council area. No significant sources of these pollutants have been identified in previous rounds of Review and Assessment.

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. Planning permission has now been granted for both applications and works for the GAIA and CWRR projects commenced in summer 2019 and January 2020, respectively. Both projects are currently on hold due to the 2020 Covid-19 outbreak and subsequent government restrictions implemented from March 2020. The projects aim to provide significant new roads infrastructure within Renfrewshire 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. Progress to date on the projects are discussed within Table 2.4.

The air quality assessments submitted, as part of the City Deal projects' Environmental Impact Assessments (EIA), predict a reduction of 3µg/m^3 at the historically exceeding monitoring location, DT8 in the RTC AQMA, and reductions of up to 3.9µg/m^3 along Inchinnan Road within the RTC AQMA. This reduction is reported based on implementation of the Clyde Waterfront and Renfrew Riverside Investment Project development in 2020, in comparison to 2020 baseline levels, further supporting that vehicle movement trends as a result of the scheme, are set to improve further following 2020.

4.1 Road Traffic Sources

- 19/0044/PP Demolition of nightclub and erection of 36 flats and Class 3 (restaurant) commercial unit. 22 Bridge Street, Paisley, PA1 1XN. Granted December 2019.

One planning application was received by Renfrewshire Council during 2019 that was identified as introducing new sensitive receptors within the Paisley Town Centre AQMA. An air quality assessment was completed for the application and reviewed by Renfrewshire Council. Details on the application is presented in Table 5.1.

4.2 Other Transport Sources

No planning applications were received by Renfrewshire Council during 2019 that identified any new or significantly changed other transport sources.

4.3 Industrial Sources

- 19/0070/PP Installation of containerised natural gas fuelled combined heat and power (CHP) plant, containerised steam waste heat boiler (WHB) including 10m chimney, transformer, two oil tanks and ring main unit. 3 Fountain Drive, Inchinnan, Renfrew, PA4 9RF. Granted August 2019.

One industrial planning application was received by Renfrewshire Council during 2019, relating to electricity generation facilities. An air quality assessment has been completed for the application and has been reviewed by Renfrewshire Council. Details on the industrial application are presented in Table 5.1.

4.4 Commercial and Domestic Sources

- 19/0841/PP Installation of a 600kW biomass boilers with associated housing, fuel stores and flues. Main Depot and Recycling Centre, Renfrewshire Council Depot, Underwood Road, Paisley, PA3 1TL. Granted February 2020.
- 19/0410/PP Change of use of agricultural barn to farm shop and café. Unit A, Barnhill Farm, Houston Road, Inchinnan, Renfrew, PA4 9LU.

One boiler plant planning application was received by Renfrewshire Council during 2019, relating to heating and hot water facilities for a number of offices and workshops in Paisley. An air quality assessment has been completed for the application and has been reviewed by Renfrewshire Council. The second application, relating to biomass boiler installation, did not impose any LAQM issues and therefore an air quality assessment was not required. Details on the applications are presented in Table 5.1.

4.5 New Developments with Fugitive or Uncontrolled Sources

No planning applications were received by Renfrewshire Council during 2019 that identified any new developments with fugitive or uncontrolled sources.

5. Planning Applications

In relation to the highlighted approved applications as contained in Section 4 and applications not yet approved, Table 5.1 provides a summary of the planning application outcomes as received by Renfrewshire Council in 2019;

Table 5.1 – Planning Application Summary 2019

Application Reference	Assessment Received	Application Outcome
19/0810/PP | Erection of 605 dwelling houses with associated access, parking and landscaping. Grounds of Dykebar Hospital, Grahamston Road, Paisley, PA2 7DE.	Air Quality Assessment	Not yet Approved
19/0219/PP Approval of matters specified in Planning Permission in Principle 15/0688/PP for the development of a masterplan to include refurbishment of industrial/warehouse units; erection of industrial/business units; erection of bridge, erection of hotel; erection of multi-storey car park; erection of residential development; erection of restaurant; alterations to road layout and formation of parking. Land at Westway Distribution Park, Porterfield Road, Renfrew.	Air Quality Assessment	Not yet Approved
19/0410/PP Change of use of agricultural barn to farm shop and café. Unit A, Barnhill Farm, Houston Road, Inchinnan, Renfrew, PA4 9LU.	Biomass Boiler Information Form – AQA not required	Approved
19/0841/PP Installation of a 600kW biomass boilers with associated housing, fuel stores and flues. Main Depot and Recycling Centre, Renfrewshire Council Depot, Underwood Road, Paisley, PA3 1TL.	Air Quality Assessment	Approved

Application Reference	Assessment Received	Application Outcome
19/0070/PP Installation of containerised natural gas fuelled combined heat and power (CHP) plant, containerised steam waste heat boiler (WHB) including 10m chimney, transformer, two oil tanks and ring main unit. 3 Fountain Drive, Inchinnan, Renfrew, PA4 9RF.	Air Quality Assessment	Approved
19/0044/PP Demolition of nightclub and erection of 36 flats and Class 3 (restaurant) commercial unit. 22 Bridge Street, Paisley, PA1 1XN.	Air Quality Assessment	Approved

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Before distance correction was applied, there was one reported exceedance in relation to the 40µg/m^3 NO_2 annual mean AQO in 2019 at monitoring location DT8, within the RTC AQMA. This monitoring site has historically exceeded however has indicated concentration improvements over the past five years and, following distance correction, Renfrewshire reports one exceedance only of 1.1µg/m^3 above the NO_2 annual mean AQO during 2019.

In addition to the DT8 monitoring site, two diffusion tube locations recorded within 10% of the AQO in 2019 before distance correction; DT59 (37.9µg/m^3) and DT34 (37.3µg/m^3). Both sites are located in the JHS and PTC AQMAs, respectively. DT34 reported significantly below 10% of the AQO following distance correction (29.0µg/m^3) with DT59 remaining within 10% of the AQO following distance correction (37.5µg/m^3).

The PM_{10} automatic monitoring sites have never recorded an exceedance of the annual mean AQO since their installation, however the 24-hour PM_{10} AQO's 50µg/m^3 seven annual permissible exceedances was surpassed in 2019 for PM_{10} at the JHS automatic monitor (14 instances recorded in 2019). This was however due to some isolated renovation works carried out next to the monitoring site during June and July 2019. There were no exceedances of the annual AQO for $PM_{2.5}$ at any of the monitoring sites.

It was proposed in the previous year's APR that consideration may be given to revocation or amendment of the PTC AQMA, following review of the 2019 monitoring data. In light of the 2020 pandemic and ongoing measure progression, although the downward concentration trends largely continue across all pollutants with one small exceedance of the annual mean AQOs reported during 2019, it was decided to maintain the current Council monitoring regime and continue to progress and develop the 2019 AQAP measures, with a further review of the PTC AQMA's revocation to be carried out following publication of this year's APR.

6.2 Conclusions relating to New Local Developments

Renfrewshire Council is satisfied that any new developments likely to have an impact upon local air quality, or potentially introduce new receptors into areas of poor air

quality have been adequately assessed during the planning process. Processes and guidance notes are in place to ensure that prospective developers and Renfrewshire Council Planning Officers have clear instructions on what information is required in relation to certain types of development, especially biomass, and when to request more detailed information on the potential impacts of the proposals.

6.3 Proposed Actions

Renfrew Council's proposed actions following the publication of the 2020 APR are as follows:

- Progression of the two City Deals projects (Clyde Waterfront & Renfrew Riverside Project and the Glasgow Airport Investment Area Project), which will bring significant new road infrastructure including the Renfrew North Development Road (RNDR). Works for the Glasgow Airport Investment Area (GAIA) project commenced in summer 2019, however were suspended in light of the Covid-19 pandemic. Priorities to recommence suspended developments ware to be sought in line with government guidelines when possible. The RNDR road will reduce traffic volume through Renfrew Town Centre resulting in improved air quality levels, in particular at the area of current exceedance of the NO_2 annual mean AQO on Inchinnan Road (DT8);
- Continue to upgrade the Councils fleet of vehicles and complete the implementation of phase 3 of the Pool Car Scheme;
- Publish a Corporate Travel Plan and development of the Transport Network Action Plan for use with Renfrewshire Council's local planning guidance;
- Progression with the Council's Sustainable Travel Planning Scheme, including the use of electric bikes, Robertson Park cycling infrastructure and restoration of a bicycle playground following award of the Scottish Government's AQAP grant;
- Progression of UTC system upgrades to the current 175 traffic signal installations across Renfrewshire;
- Following the vehicle anti-idling campaigns throughout 2019, 49 schools were engaged by August 2019. The second phase of the scheme will be progressed concerning the introduction of exclusion zones in streets close to selected schools at the start and the end of the school day;

- Development of a new cycle route connecting Canal Street and High Paisley Street following funding awarded from the Scottish Government's Low Carbon Travel and Transport Challenge Fund, together with an EV Hub to be installed in Paisley;
- Consider revocation of the PTC AQMA in 2020/21;
- Continue to review all air quality assessments that are submitted as part of planning applications in relation to possible impacts upon local air quality;
- Continue to monitor NO_2, PM_{10} and $PM_{2.5}$ at all relevant locations throughout Renfrewshire;
- Assess the 2020 monitoring data when available, to note if the downward trends observed in the 2019 data continues, whilst remaining mindful of reduced vehicle use during the 2020 pandemic, and;
- Submit the 2021 Annual Progress Report.

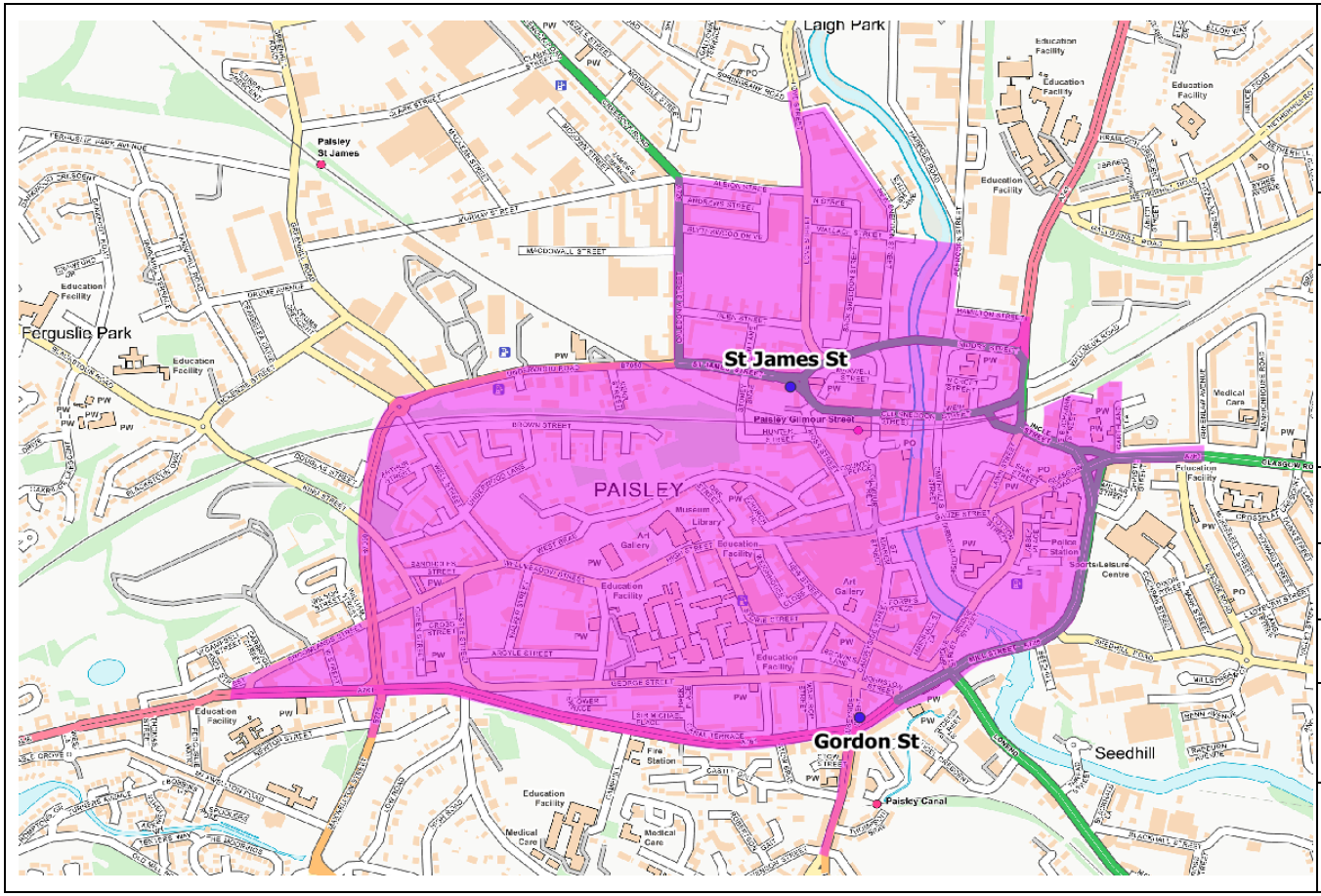
Appendix A: Monitoring Results

Table A.1– Details of Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Gordon Street, Paisley	Roadside	248316	663612	NO_2; PM_{10}	Y	Chemiluminescent; FDMS	6.5	10	NO_x – 2.2 PM_{10} – 2.4
St James Street, Paisley (4)	Roadside	248173	664320	$PM_{2.5}$	Y	FDMS	0	4	2.35
Inchinnan Road, Renfrew(5)	Roadside	250567	667558	NO_2	Y	Chemiluminescent	7.1	3.9	1.6
Cockels Loan	Roadside	250463	665934	NO_2; PM_{10}	N	Chemiluminescent; FDMS	5	18	NO_x – 2.2m PM_{10} – 2.8
High Street, Johnstone	Roadside	242984	663178	PM_{10}; $PM_{2.5}$	Y	FIDAS 200	0.5 (3)	2.9	1.9

(1) 0 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 0.5m is to the façade of the closest building, there are commercial units at ground level and residential on the firstfloor.
(4) St James Street - monitoring equipment at this site was changed from monitoring PM_{10} to monitoring $PM_{2.5}$ on 04/05/18, then removed from the Council's monitoring regime permanently on 02/07/2019
(5) Incinnnan Road began data capture from 11/01/2019.

Figure A.1 - Automatic Monitoring Sites: Paisley



Legend

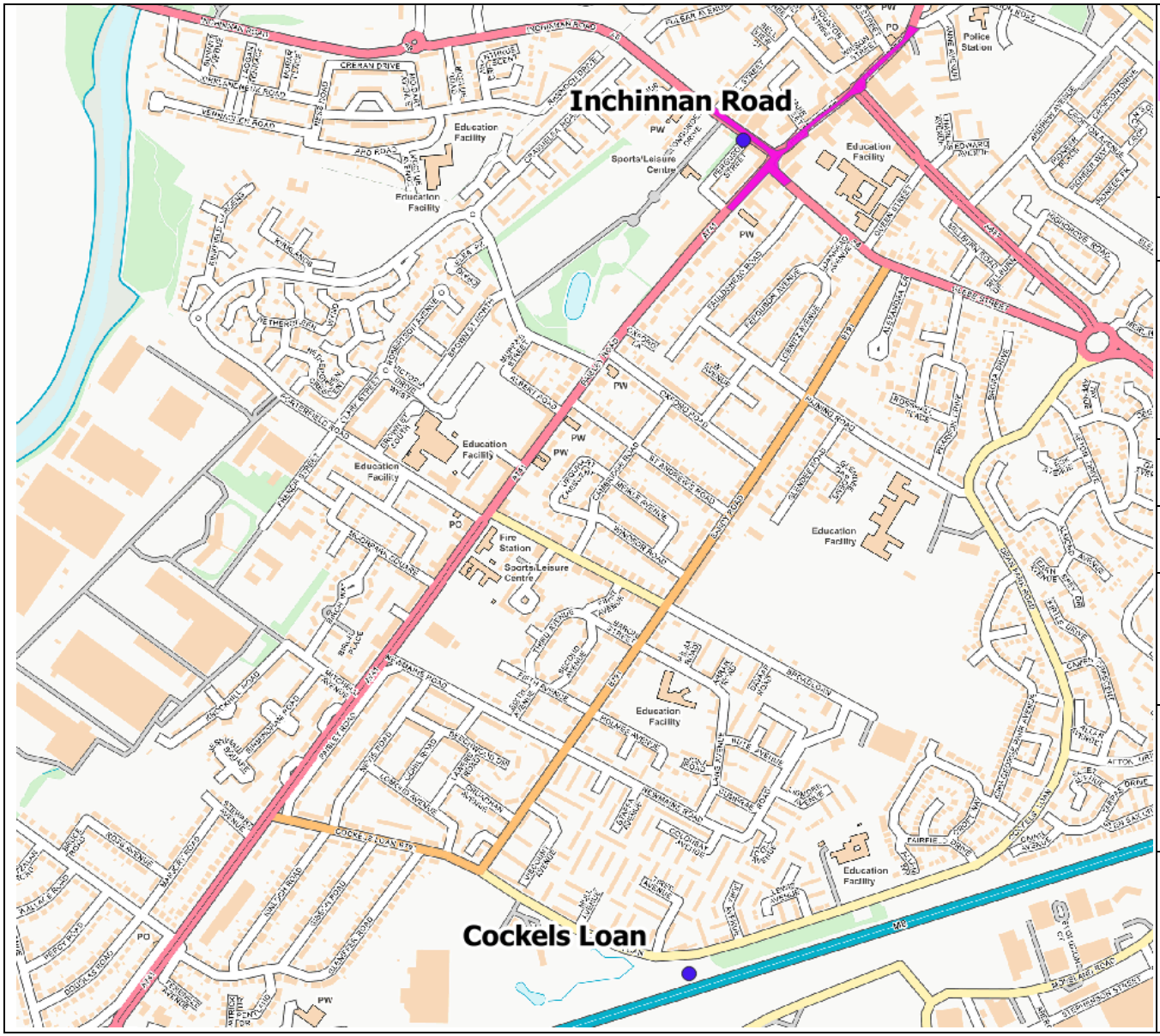
AQMA Boundary

Automatic Monitor

Air Quality
Bureau Veritas
5th Floor
66 Prescot Street
London, E1 8HG

Location Renfrewshire Council	
Title Automatic Monitoring Sites: Paisley	
By JD	**Approved** PB
Scale Not to Scale	**Job Ref** 7726900
Date June 2020	**Figure No.** **A.1**

Figure A.2 - Automatic Monitoring Sites: Renfrew



Legend

AQMA Boundary

Automatic Monitor

Air Quality
Bureau Veritas
5th Floor
66 Prescot Street
London, E1 8HG

Location	
Renfrewshire Council	
Title	
Automatic Monitoring Sites: Renfrew	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.2**

Figure A.3 - Automatic Monitoring Sites: High Street, Johnstone

Legend

AQMA Boundary

Automatic Monitor

Air Quality
Bureau Veritas
5th Floor
66 Prescot Street
London, E1 8HG

Location Renfrewshire Council	
Title Automatic Monitoring Sites: High Street, Johnstone	
By JD	**Approved** PB
Scale Not to Scale	**Job Ref** 7726900
Date June 2020	**Figure No.** A.3

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 collocated with a Continuous Analyser?
Paisley1	Gilmour St, Paisley	Urban Centre	248350	664082	NO_2	Y	N/A	68	N
Paisley2	Oakshaw St, Paisley	Urban Background	247925	664052	NO_2	Y	11	35	N
Paisley3	Lochfield Dr, Paisely	Urban Background	249004	662142	NO_2	N	8	1.5	N
Renfrew8	15 Inchinnan Rd, Renfrew	Kerbside	250589	667547	NO_2	Y	0.1	2.6	N
Bishopton9	Station Rd, Bishopton	Roadside	243975	670545	NO_2	N	13	3	N
Paisley13	Greenock Rd, Paisley	Urban Background	247371	665674	NO_2	N	8.3 (-12)	23 (M8)	N
Paisley15	Montgomery Dr, Paisley	Urban Background	249185	665713	NO_2	N	4.3	1.6 (11.5 to M8 slip-road)	N
Renfrew17	Tanar Way, Renfrew	Roadside	251524	666287	NO_2	N	0	29 (M8)	N
Paisley19	Linwood Rd, Johnstone	Roadside	245701	663604	NO_2	N	5	2.5	N
Johnstone20	High St, Johnstone	Kerbside	242675	663286	NO_2	Y	0.45	1.4	N

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 collocated with a Continuous Analyser?
Paisley21	Causeyside St, Paisley (Triplicate)	Roadside	248316	663612	NO_2	Y	6.3 (-6.3)	9.9	Y
Bishopton27	Rossland Gardens, Bishopton	Suburban	243183	671188	NO_2	N	6	2	N
West Walkingshaw31	West Walkinshaw (Triplicate)	Roadside	246189	666141	NO_2	N	30 (-14)	17 (M8)	N
Paisley33	76 Causeyside St, Paisley	Roadside	248277	663524	NO_2	Y	1.1	2.9	N
Paisley34	63 Causeyside St, Paisley	Roadside	248303	663566	NO_2	Y	3	0.7	N
Paisley35	Old Sneddon St, Paisley	Roadside	248360	664272	NO_2	Y	0.4	3.4	N
Paisley36	Caledonia St, Paisley	Roadside	247948	664774	NO_2	Y	4.5	3.3	N
Renfrew40	Hairst St, Renfrew	Roadside	250763	667631	NO_2	Y	0.25	6.2	N
Paisley41	Smithhills St (West), Paisley	Roadside	248463	66417	NO_2	Y	16	5	N
Paisley43	Smithhills St (East), Paisley	Roadside	248481	664153	NO_2	Y	0	2.5	N

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 collocated with a Continuous Analyser?
Paisley44	Love St, Paisley	Roadside	248209	664474	NO_2	Y	0.2	2.2	N
Renfrew45	Xscape. Renfrew	Kerbside	251803	667365	NO_2	N	18	2	N
Renfrew48	Glen Sax Dr, Renfrew	Roadside	251264	666217	NO_2	N	8 (-22)	45 (M8)	N
Renfrew49	Tanar Way 2, Renfrew	Roadside	251462	666326	NO_2	N	9	85 (M8)	N
Paisley50	Renfrew Rd, Paisley	Roadside	248985	665494	NO_2	N	7	12	N
Renfrew52	Glasgow Rd 2, Renfrew	Roadside	251515	666955	NO_2	N	4	3	N
Inchinnan53	Old Greenock Rd, Inchinnan	Roadside	248154	668832	NO_2	N	9	1.5	N
Kilbarchan54	Easwald Bank, Kilbarchan	Roadside	241059	662743	NO_2	N	4.5	1.2	N
Renfrew56	Paisley Rd, Renfrew	Roadside	250579	667488	NO_2	Y	3.5	4.5	N
Renfrew57	Paisley Rd, Renfrew	Roadside	250597	667473	NO_2	Y	1.2	6	N
Renfrew58	Glebe St, Renfrew	Roadside	250667	667448	NO_2	N	4.5	2.8	N
Johnstone59	High St, Johnstone	Roadside	242656	663281	NO_2	Y	0.1	1.7	N

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 collocated with a Continuous Analyser?
Paisley60	Underwood Rd, Paisley	Roadside	247525	664326	NO_2	Y	7.8	0.5	N
Kilbarchan61	High Barholm, Kilbarchan	Roadside	240584	663007	NO_2	N	0.1	1	N
Cockels Loan 62	Cockels Loan, Renfrew	Roadside	250463	665934	NO_2	N	5	18	Y
Paisley63	Renfrew Rd, Paisley	Roadside	249159	665710	NO_2	N	6.8	3.7	N
Paisley64	Montgomery Rd, Paisley	Roadside	249202	665708	NO_2	N	8.8	0.15	N
Kilbarchan65	High Barholm, Kilbarchan	Roadside	240599	663000	NO_2	N	0.4	2	N
Kilbarchan66	High Barholm, Kilbarchan	Roadside	240573	663021	NO_2	N	0.4	1.6	N
Kilbarchan67	High Barholm, Kilbarchan	Roadside	240512	663027	NO_2	N	1.8	3	N
Renfrew68	Paisley Rd, Renfrew	Roadside	250522	667419	NO_2	N	0.2	3	N
Renfrew69	Inchinnan, Renfrew	Roadside	250537	667602	NO_2	Y	0.1	2.9	N
Renfrew70	Inchinnan, Renfrew	Roadside	250599	667561	NO_2	Y	4.5	3.7	N
Renfrew71	Braille Drive, Renfrew	Roadside	251729	666360	NO_2	N	0	25 (M8)	N

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 collocated with a Continuous Analyser?
Johnstone72	High St, Johnstone	Roadside	243080	663140	NO_2	Y	0.45	3	N
Paisley73	Lawn St, Paisley	Roadside	248566	664072	NO_2	Y	0.45	3	N
Paisley74	Causeyside St, Paisley	Roadside	248313	663621	NO_2	Y	0.19	1.95	N
Renfrew75	Canal St, Renfrew	Roadside	250853	667747	NO_2	Y	0.19	3.3	N
Bridge of Weir76	Main Rd, Bridge of Weir	Roadside	238899	665488	NO_2	N	0.17	5	N
Bridge of Weir77	Main Rd / Houston Rd,	Roadside	238570	665892	NO_2	N	0.15	4.73	N
Paisley78	Neilston Rd, Paisley	Roadside	248339	662575	NO_2	N	0.15	2.26	N
Paisley79	Incle St, Paisley	Roadside	248632	664212	NO_2	Y	0.18	2.8	N
Paisley80	Glasgow Rd, Paisley	Roadside	249653	664123	NO_2	N	1.9	2.1	N
Airport81	Glasgow Airport	Roadside	247346	665805	NO_2	N	32	33 (M8)	N
Paisley82	Well Street, Paisley	Roadside	247513	664024	NO_2	Y	0.2	2.27	N
Paisley83	Wellmeadow St, Paisley	Roadside	247671	663913	NO_2	Y	0.4	3.32	N

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 collocated with a Continuous Analyser?
Paisley84	Ferry Village, Renfrew	Kerbside	251254	667876	NO_2	N	18	0.5	N
Johnstone85	High St, Johnstone	Roadside	242622	663306	NO_2	Y	0.62	1.1	N
Johnstone86	High St, Johnstone	Roadside	242495	663358	NO_2	Y	0.14	2.7	N
Johnstone87	High St, Johnstone	Roadside	243117	663127	NO_2	Y	0.35	3	N
Paisley88	Hawkhead Road, Paisley	Roadside	249850	663991	NO_2	N	7	2.05	N
Paisley89	Abercorn St Paisley	Roadside	248467	664303	NO_2	Y	0.14	3.5	N
Renfrew90	Inchinnan Monitor	Roadside	250567	667558	NO_2	Y	8	5	Y
Johnstone91	Kilbarchan Road	Roadside	241742	662526	NO_2	N	9.7	1.5	N

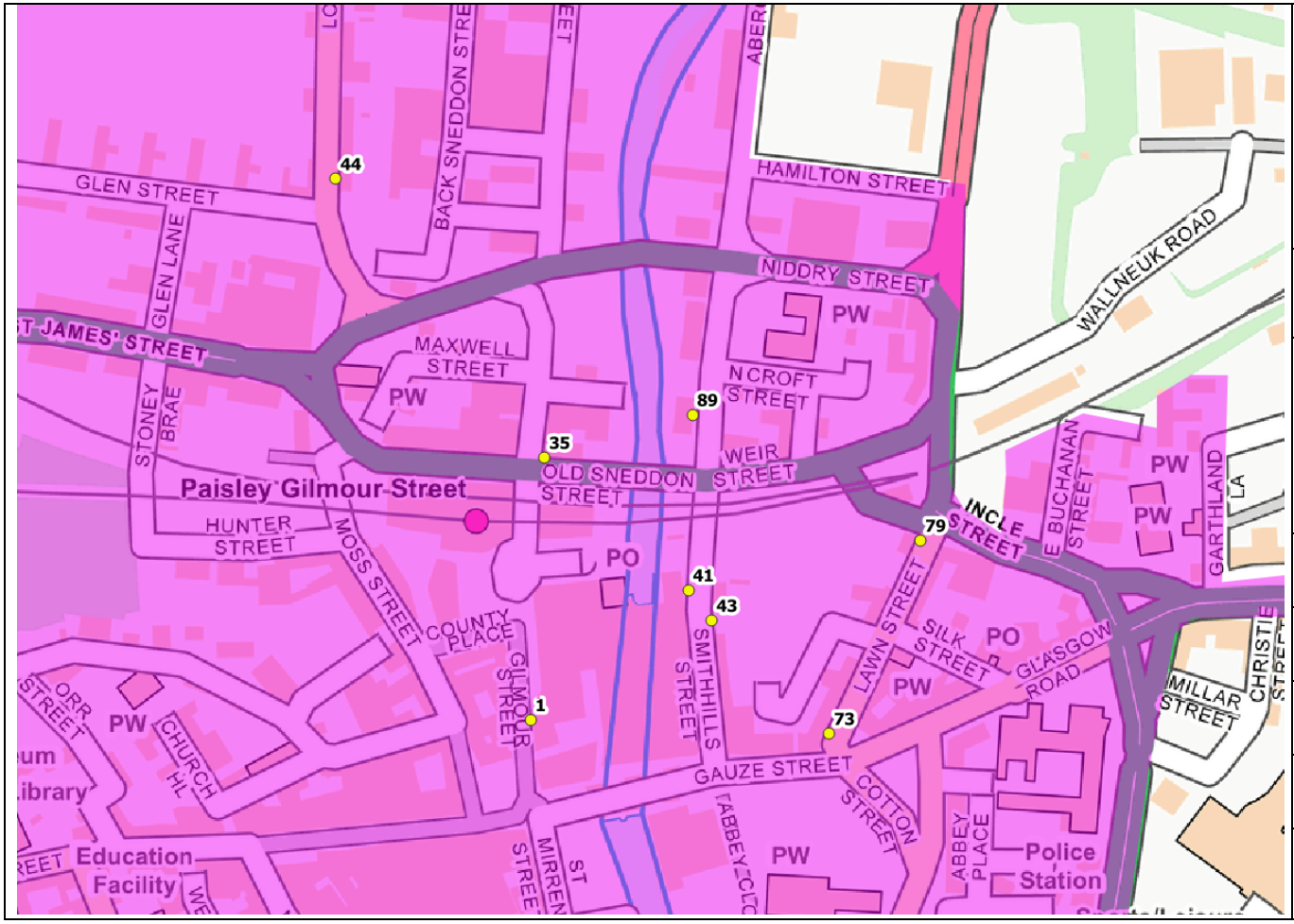
(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).
(2) N/A if not applicable.

Notes:

Monitoring location distance to relevant exposure is reported as the distance from tube to nearest sensitive receptor. Value (in brackets), for distance of the tube to relevant exposure, are reflective of the 2019 APR representation of the nearest road source proximity to the relevant exposure. As is recommended in TG(16), sites are not eligible for distance correction where additional road sources impact the receptor, where the annual mean NO_2 concentration falls below 36µg/m^3, or where the receptor is >20m from the monitoring location

Sites that are highlighted in green are new sites that have commenced monitoring in 2019

Figure A.4 - Diffusion Tube Monitoring Locations: Paisley Central



Legend

AQMA Boundary

Diffusion Tube

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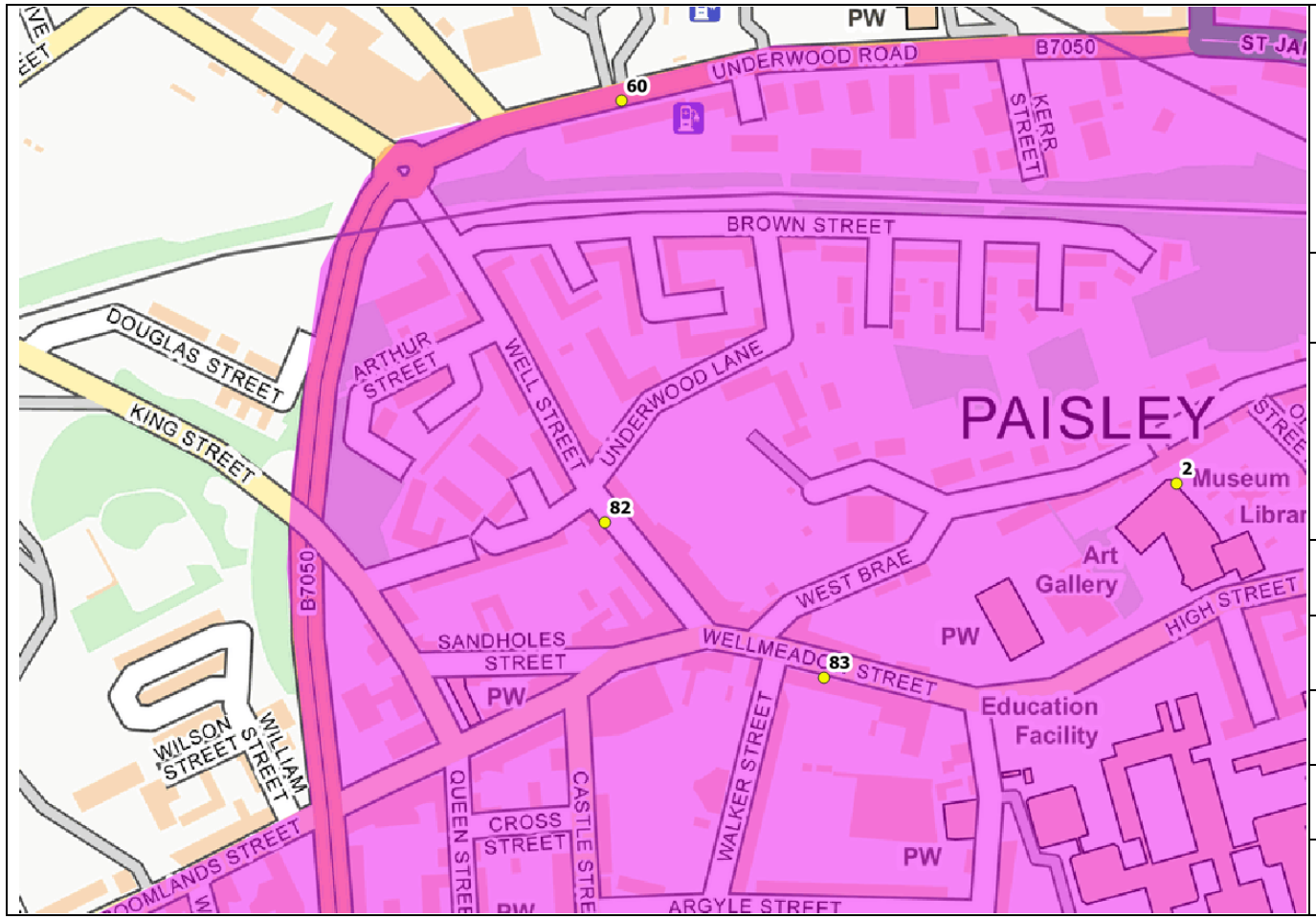
Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Paisley Central	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.4**

Figure A.5 - Diffusion Tube Monitoring Locations: Paisley West



Legend

AQMA Boundary

Diffusion Tube

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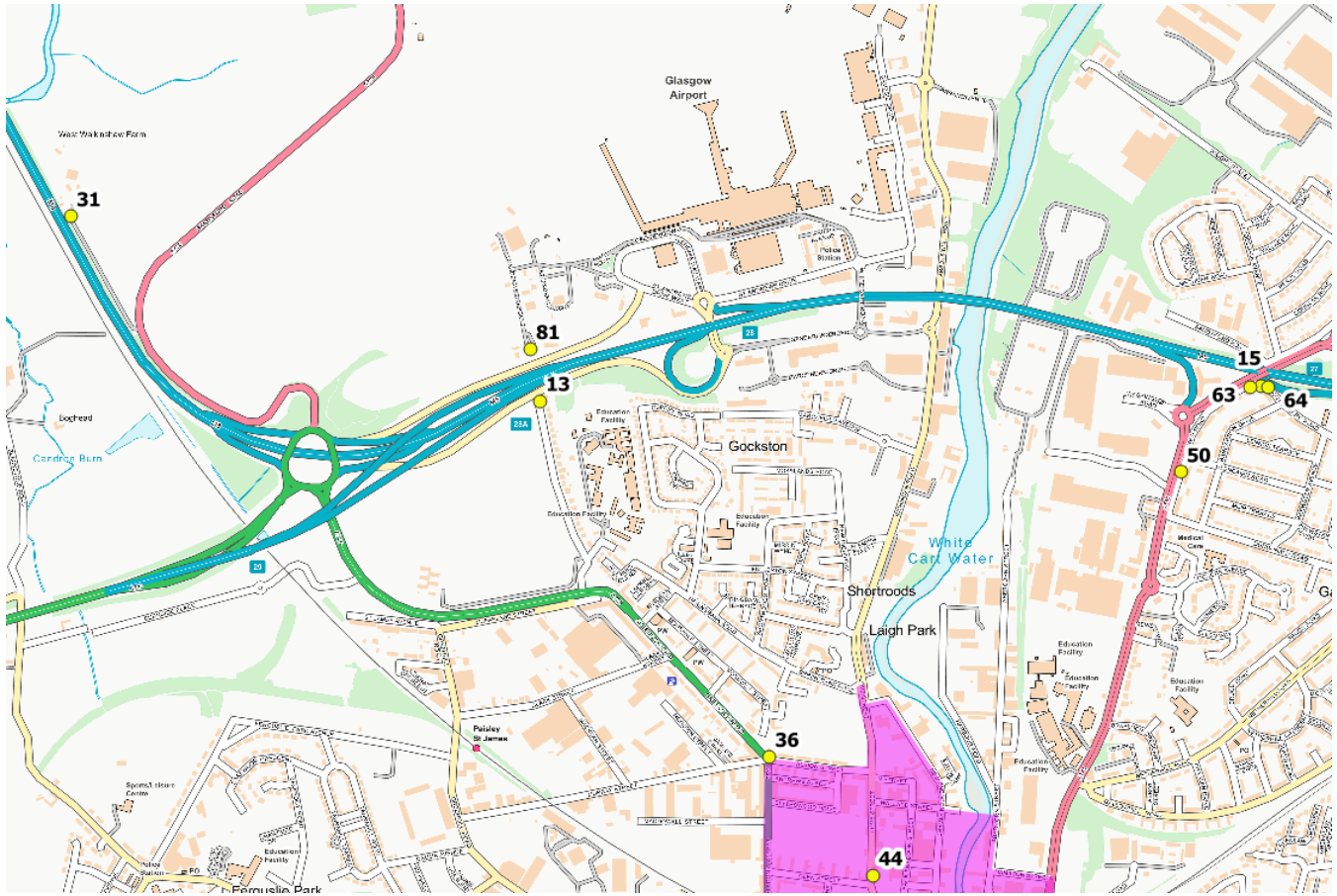
London, E1 8HG

Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Paisley West	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.5**

Figure A.6 - Diffusion Tube Monitoring Locations: Paisley North



Legend

AQMA Boundary

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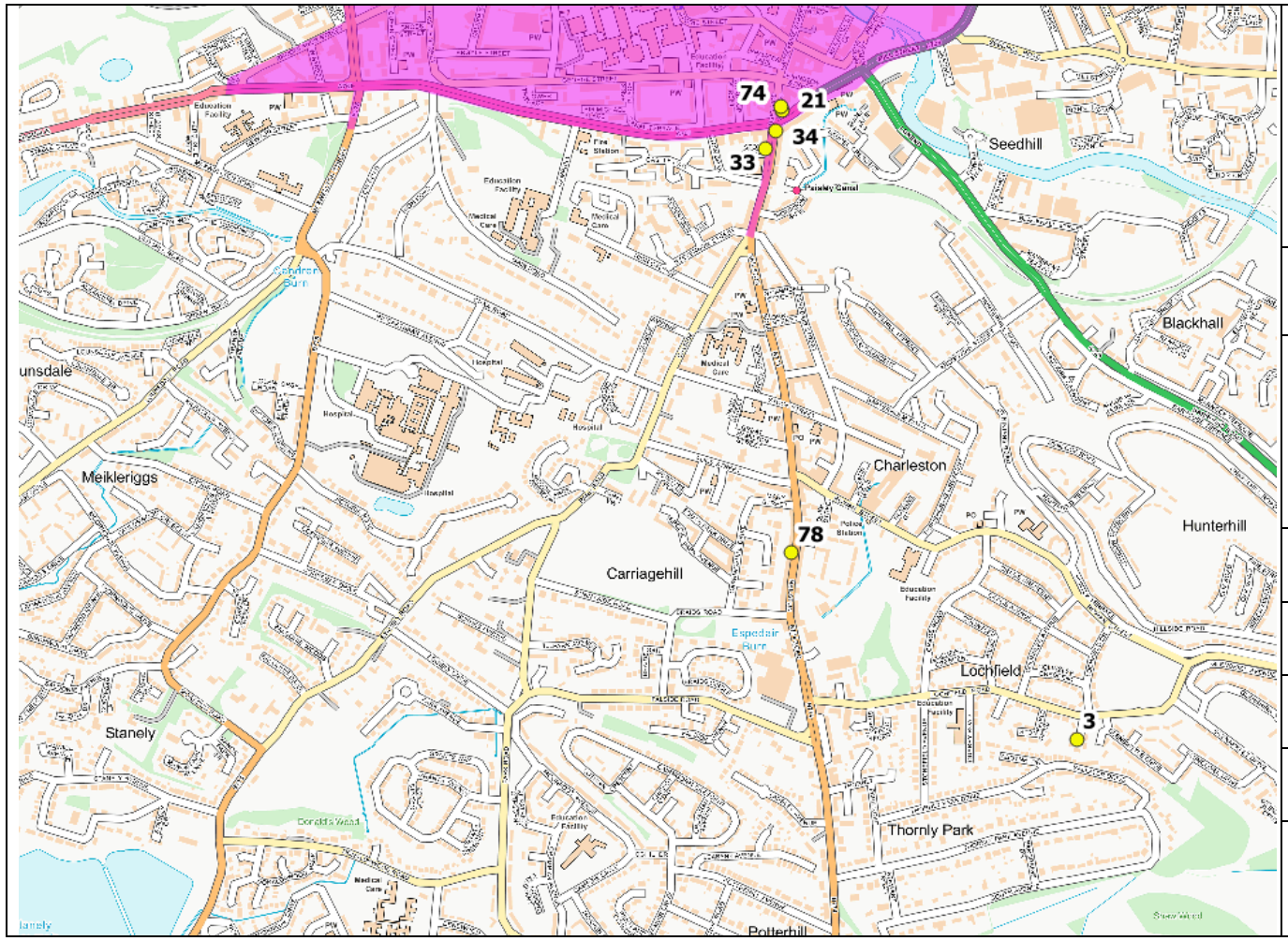
Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Paisley North	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.6**

Figure A.7- Diffusion Tube Monitoring Locations: Paisley South



Legend

AQMA Boundary

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Location	
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Title	
Diffusion Tube Sites: Paisley South	
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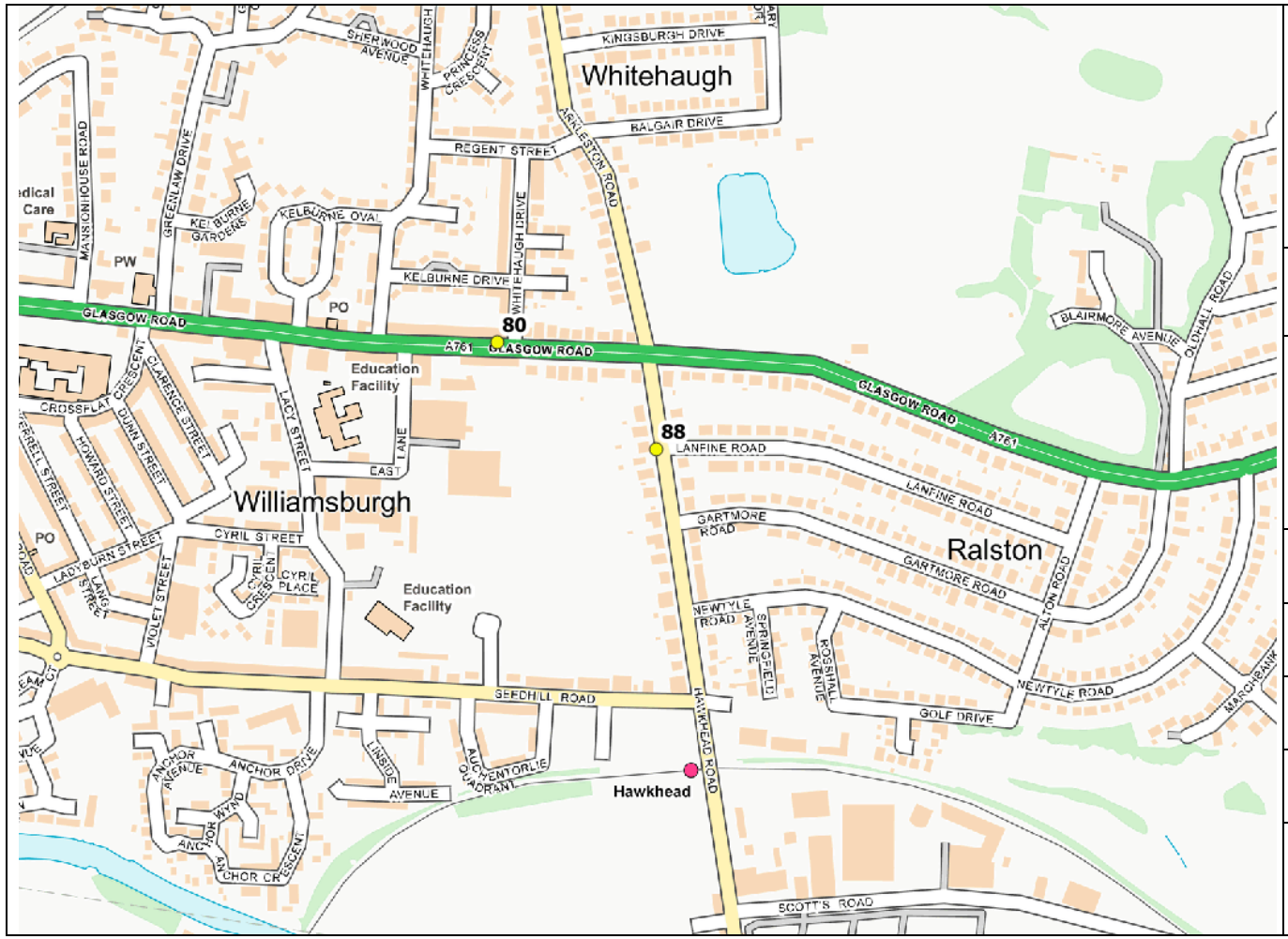
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.7**

Figure A.8 - Diffusion Tube Monitoring Locations: Paisley East



Legend

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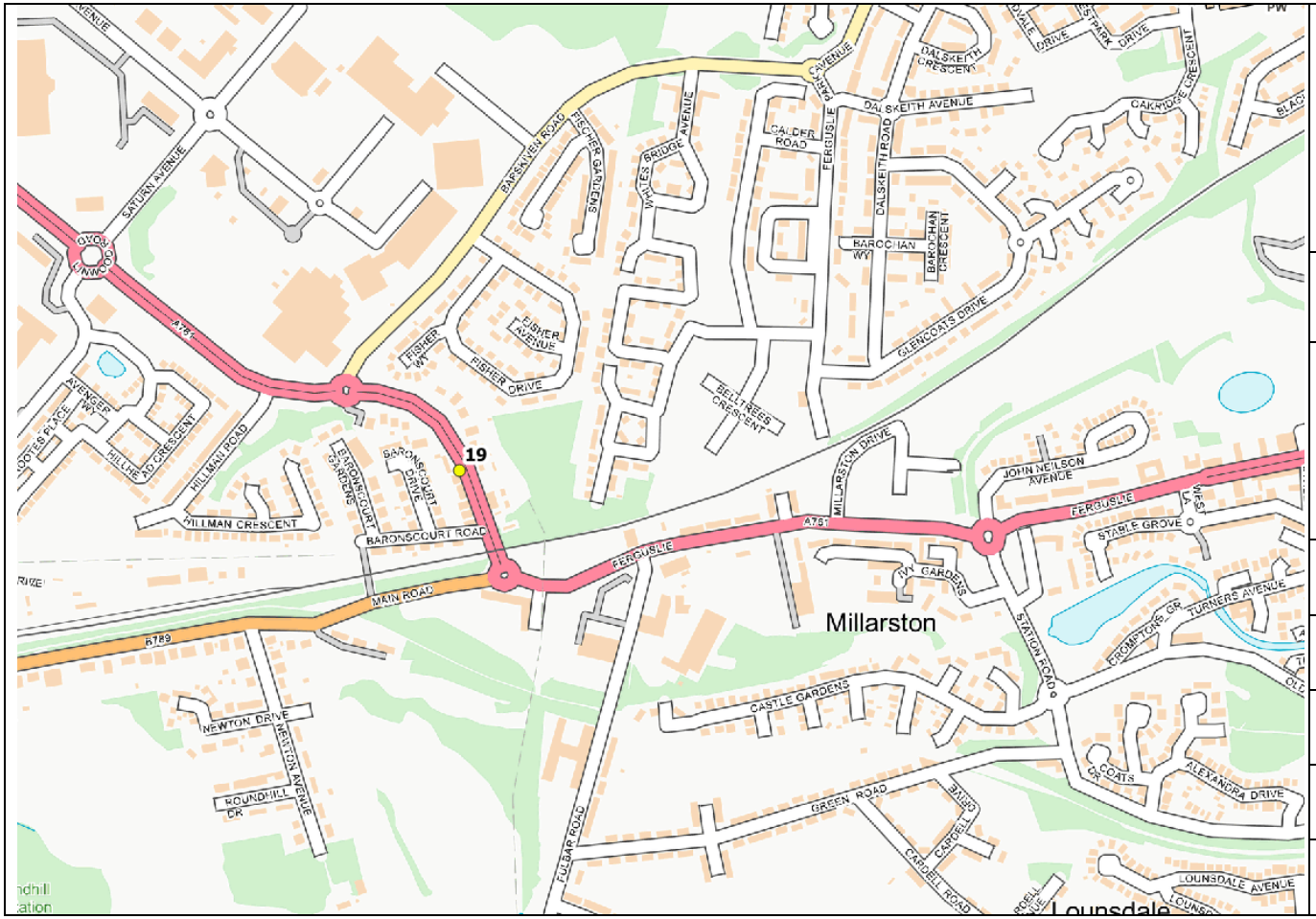
Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Paisley East	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.8**

Figure A.9- Diffusion Tube Monitoring Locations: Paisley South West



Legend

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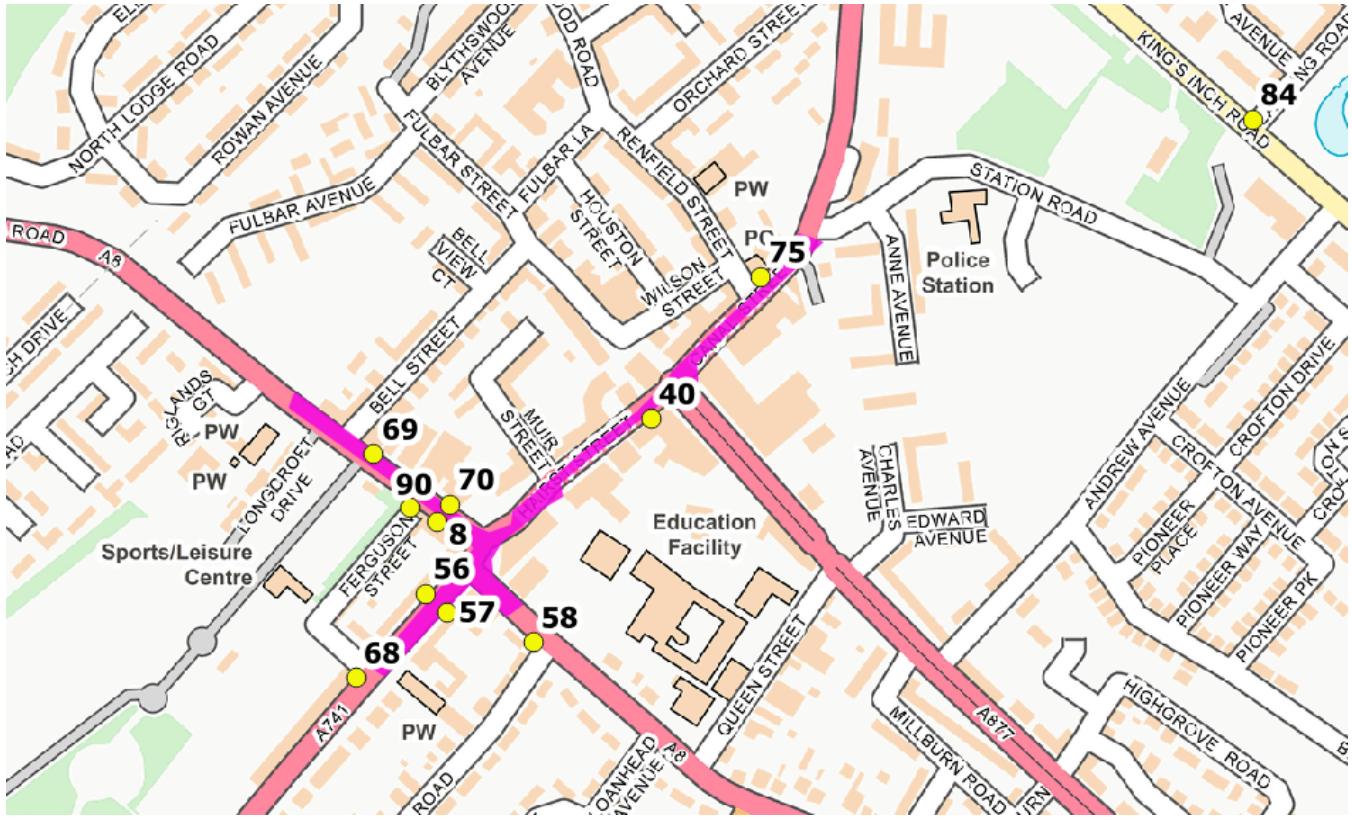
Location	Renfrewshire Council
Title	Diffusion Tube Sites: Paisley South West
By JD	**Approved** PB
Scale Not to Scale	**Job Ref** 7726900
Date June 2020	**Figure No.** **A.9**

Figure A.10 - Diffusion Tube Monitoring Locations: Renfrew Central



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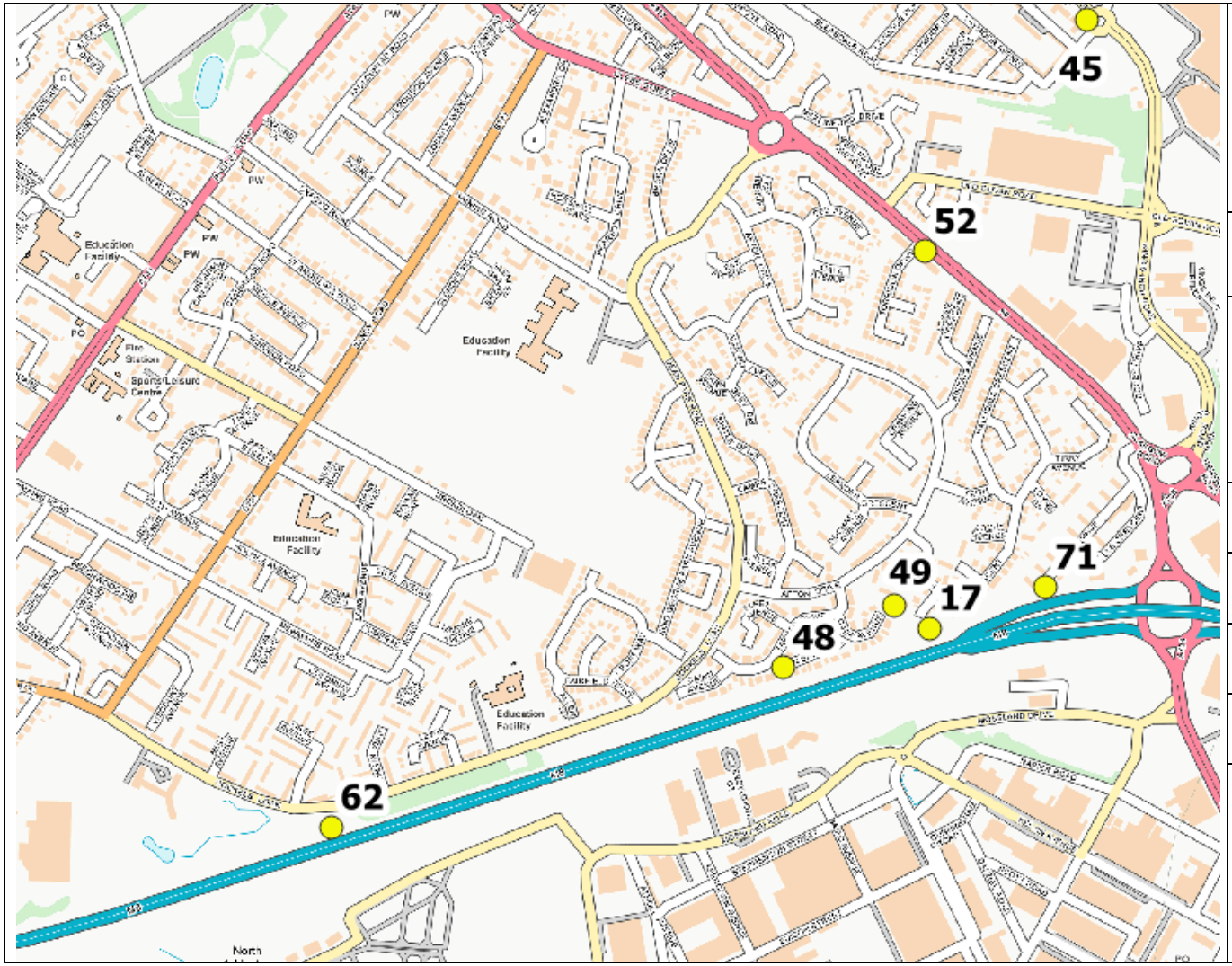
Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Renfrew Central	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.10**

Figure A.11 - Diffusion Tube Monitoring Locations: Renfrew East



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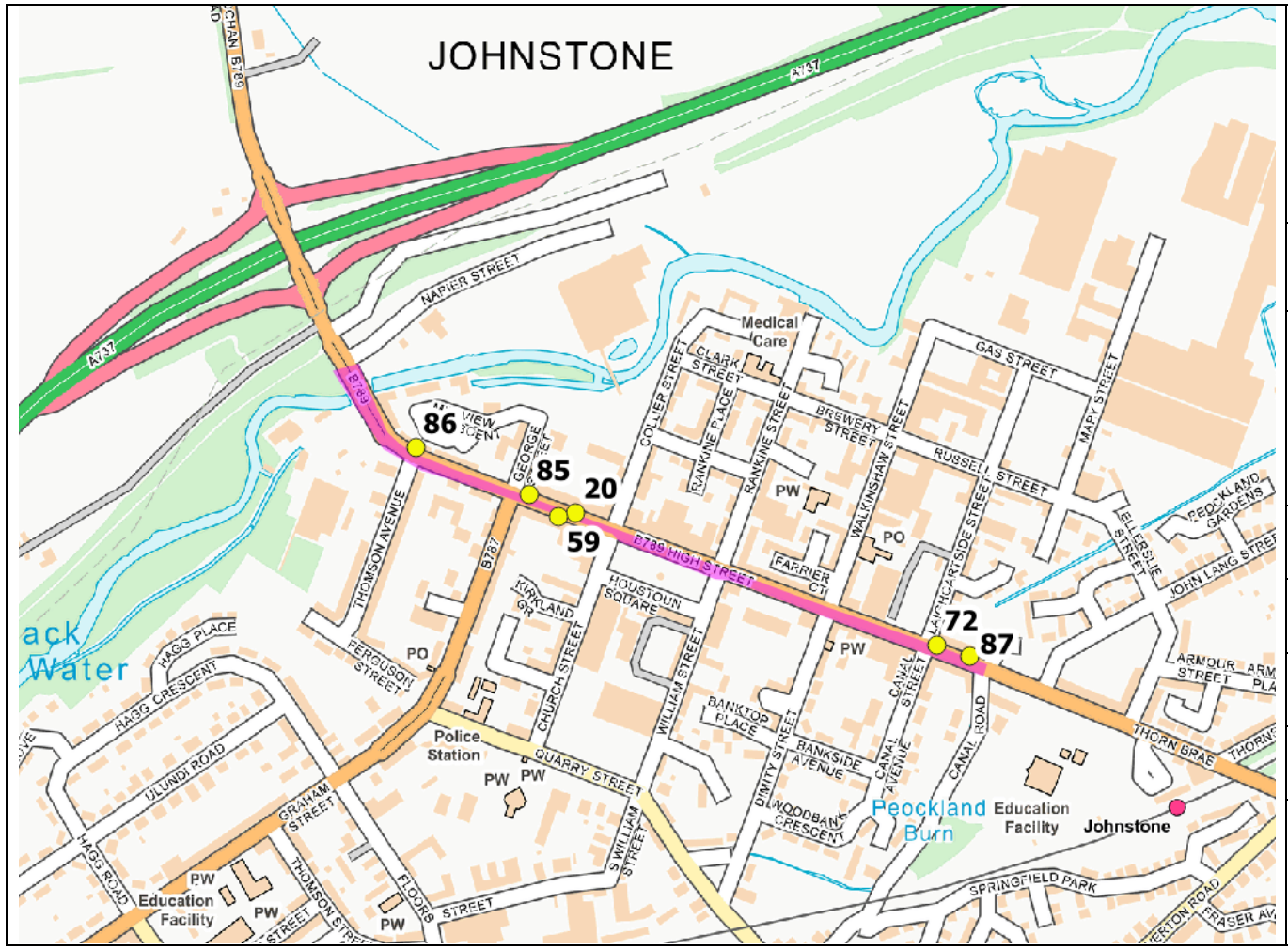
Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Renfrew East	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.11**

Figure A.12 - Diffusion Tube Monitoring Locations: Johnstone



Legend

AQMA Boundary

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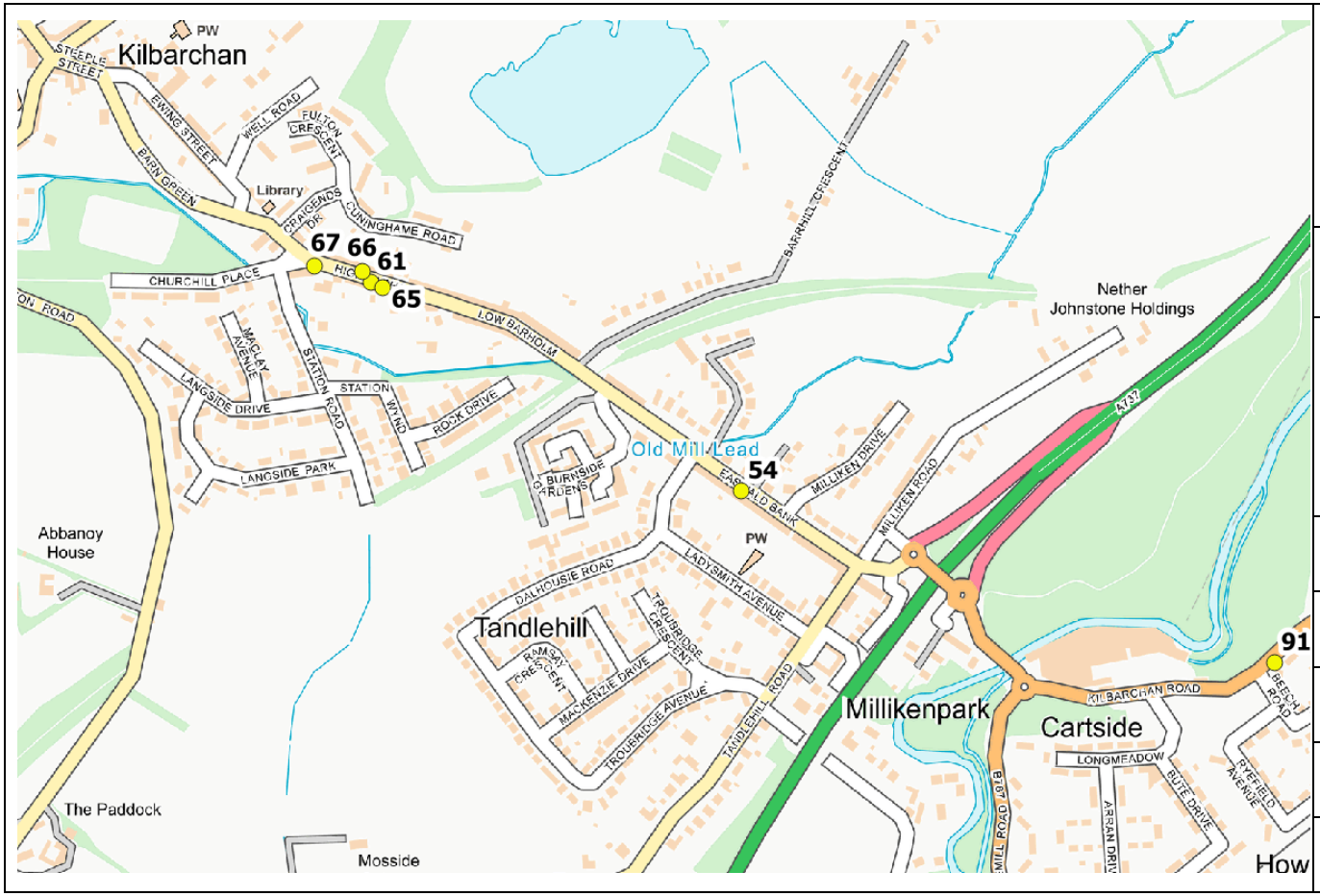
Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Johnstone	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.12**

Figure A.13 - Diffusion Tube Monitoring Locations: Kilbarchan



Legend

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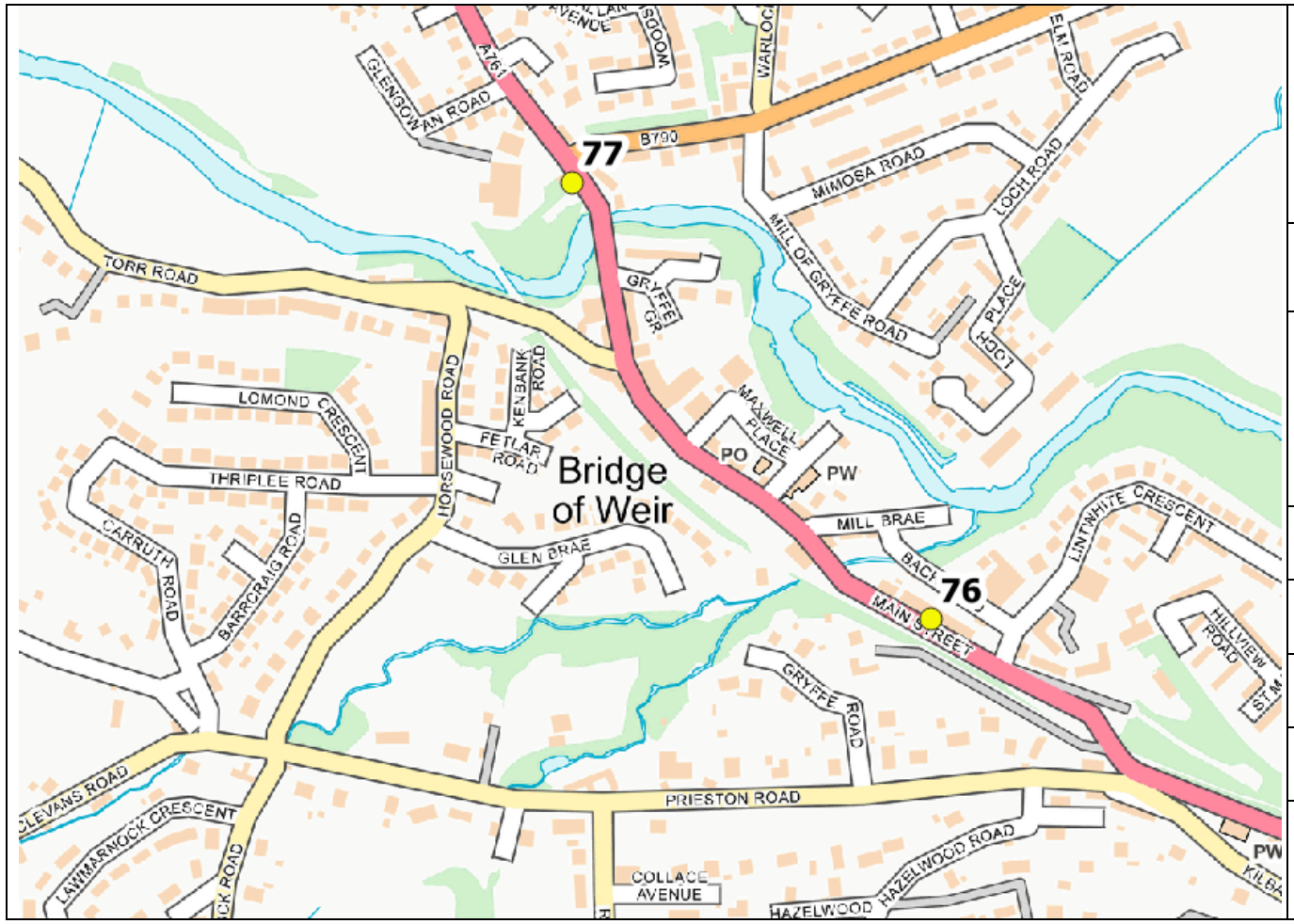
Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Kilbarchan	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.13**

Figure A.14 - Diffusion Tube Monitoring Locations: Bridge of Weir



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Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Bridge of Weir	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.14**

Figure A.15 - Diffusion Tube Monitoring Locations: Bishopton

Legend

Diffusion Tube

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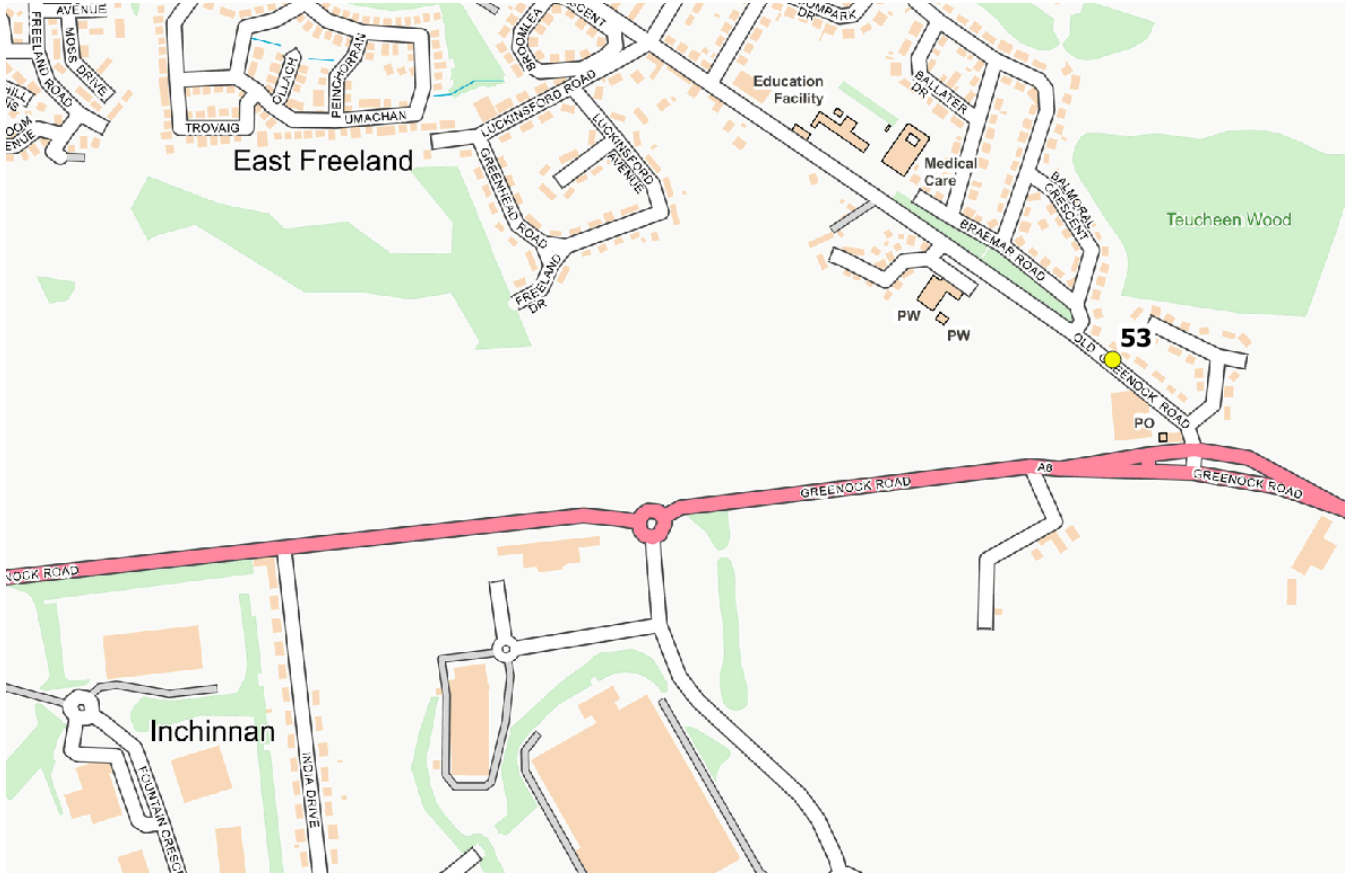
Location Renfrewshire Council	
Title Diffusion Tube Sites: Bishopton	
By JD	**Approved** PB
Scale Not to Scale	**Job Ref** 7726900
Date June 2020	**Figure No.** **A.15**

Figure A.16 - Diffusion Tube Monitoring Locations: Inchinnan



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Location	
Renfrewshire Council	
Title	
Diffusion Tube Sites: Inchinnan	
By	**Approved**
JD	PB
Scale	**Job Ref**
Not to Scale	7726900
Date	**Figure No.**
June 2020	**A.16**

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period(%)[1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3][4]				
					2015	2016	2017	2018	2019
Gordon Street, Paisley	Roadside	Automatic	99.8	99.8	27	30	27.4*	31.5	28.7
Cockels Loan	Roadside	Automatic	66.8	66.8	36	34	32.1	31.6	32.1*
Inchinnan Road	Roadside	Automatic	86.6	86.6	-	-	-	-	24.2
Paisley1	Urban Centre	Passive	83.3	83.3	18.8	18	21.1	20.3	21.3
Paisley2	Urban Background	Passive	91.7	91.7	12.7	14.8	12.5	14.4	14.6
Paisley3	Urban Background	Passive	100	100	9.3	9.8	9.5	12.0	11.6
Renfrew8	Roadside	Passive	100	100	**43.4 (43.2)**	37.8	**42.8* (42.5)**	**41.1 (40.8)**	**41.4 (41.1)**
Bishopton9	Roadside	Passive	100	100	13.1	13.2	14.5	18.1	15.2
Paisley13	Roadside	Passive	100	100	20.5 (21.3)	23.2 (26.7)	24.0 (26.8)	20.5 (22.1)	21.7
Paisley15	Roadside	Passive	100	100	26.2	31.1	28.9	24.9	28.7
Renfrew17	Roadside	Passive	75	75	32.5 (34.1)	32.5	31.5	33.7	32.0
Paisley19	Roadside	Passive	100	100	24.5	25.5	25.6	28.3	24.9
Johnstone20	Roadside	Passive	100	100	33.2	27.8	28.5	29.7	28.7
Paisley21†	Roadside	Passive	100	100	28 (31.6)	28.8 (35.0)	28.6	28.9 (34.5)	27.6
Bishopton27	Suburban	Passive	100	100	8.1	9.1	12.4	12.0	9.7
West Walkingshaw31†	Roadside	Passive	91.7	91.7	26.4 (32.8)	26.6 (39.2)	25.8 (35.9)	25.1 (35.0)	23.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period(%)[1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3][4]				
					2015	2016	2017	2018	2019
Paisley33	Roadside	Passive	100.0	100.0	33.2	30.1	32.8	31.7	28.8
Paisley34	Roadside	Passive	100.0	100.0	35.4	36.9	37.1 (29.8)	37.89 (30.4)	37.3 (29.0)
Paisley35	Roadside	Passive	91.7	91.7	30.5	34.4	32.6	34.7	31.1
Paisley36	Roadside	Passive	83.3	83.3	29.8	27.4	28.7	30.4	28.2
Renfrewshire40	Roadside	Passive	91.7	91.7	27.6	28.1	28.7	27.4	25.8
Paisley41	Roadside	Passive	91.7	91.7	37.9	33.8	32.1	30.6	26.4
Paisley43	Roadside	Passive	100.0	100.0	32.1	30	28.5	28.9	26.7
Paisley44	Roadside	Passive	100.0	100.0	21.8	21.5	22.5	23.6	21.9
Renfrew45	Roadside	Passive	100.0	100.0	23.6	23.2	24.5	25.8	21.5
Renfrew48	Roadside	Passive	83.3	83.3	28.7 (30.7)	29.0 (31.3)	28.7 (33.6)	30.9 (37.5)	29.1
Renfrew49	Roadside	Passive	100.0	100.0	22.4	24.3	28.2	26.8	26.4
Paisley50	Roadside	Passive	100.0	100.0	25.6	23.5	32.3	29.4	24.3
Renfrew52	Roadside	Passive	91.7	91.7	27.2	26.8	29.1	31.8	25.3
Inchinnan53	Roadside	Passive	91.7	91.7	22.9	23.6	23	23.6	24.6
Kilbarchan54	Roadside	Passive	100.0	100.0	20.7	22.4	22.6	21.6	19.8
Renfrew56	Roadside	Passive	91.7	91.7	30.2	30.6	30.6	30.3	26.3
Renfrew57	Roadside	Passive	91.7	91.7	24	22.3	26	24.1	24.4
Renfrew58	Roadside	Passive	83.3	83.3	18.5	20.7	20.8	21.7	23.9
Johnstone59 [5]	Roadside	Passive	100.0	100.0	**45.3 (45.0)**	39.1	**41.0 (40.6)**	**40.0** (39.6)	37.9 (37.5)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period(%)[1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3][4]				
					2015	2016	2017	2018	2019
Paisley60	Roadside	Passive	100.0	100.0	28.9	31.6	30.3	34.4	33.6
Kilbarchan61	Roadside	Passive	100.0	100.0	31.2	30.4	36.7 (36.1)	32.4	30.2
Cockels Loan 62†	Roadside	Passive	88.9	88.9	35.3	32.3	34.6	36.8 (35.3)	34.3
Paisley63	Roadside	Passive	91.7	91.7	29.7	31.2	32.5	33.2	29.4
Paisley64	Roadside	Passive	100.0	100.0	27.8	26	29.2	29.0	28.7
Kilbarchan65	Roadside	Passive	100.0	100.0	28.2	26.6	33.2	28.2	30.3
Kilbarchan66	Roadside	Passive	100.0	100.0	18.7	18.1	23	19.3	22.3
Kilbarchan67	Roadside	Passive	100.0	100.0	14.7	14.3	17.3	18.6	17.5
Renfrew68	Roadside	Passive	100.0	100.0	27.3	25.9	27.3	27.4	23.8
Renfrew69	Roadside	Passive	100.0	100.0	31.8	39.7	31.2	30.7	29.9
Renfrew70	Roadside	Passive	91.7	91.7	29.2	26	26.8	31.7	25.4
Renfrew71	Roadside	Passive	75.0	75.0	28.9	28.1	29.7	28.5	29.2
Johnstone72	Roadside	Passive	100.0	100.0	-	22.3	20.9	22.9	23.4
Paisley73	Roadside	Passive	91.7	91.7	-	35.8	35.1	32.0	26.1
Paisley74	Roadside	Passive	91.7	91.7	-	30.8	28	30.9	27.8
Renfrew75	Roadside	Passive	100.0	100.0	-	23.7	25.3	22.6	22.1
Bridge of Weir76	Roadside	Passive	100.0	100.0	-	22.9	21.3	19.1	21.6
Bridge of Weir77	Roadside	Passive	100.0	100.0	-	24.1	24.3	22.7	22.5
Paisley78	Roadside	Passive	100.0	100.0	-	28.8	27.8	28.9	26.6
Paisley79	Roadside	Passive	100.0	100.0	-	34.4	39.6 (39.2)	32.5	27.8

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period(%)[1]	Valid Data Capture 2019 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3][4]				
					2015	2016	2017	2018	2019
Paisley80	Roadside	Passive	100.0	100.0	-	23.1	25.8	24.9	23.9
Airport81	Roadside	Passive	100.0	100.0	-	25.3	22.5	23.3	23.9
Paisley82	Roadside	Passive	100.0	100.0	-	39.5	37.7 (37.2)	33.2	28.9
Paisley83	Roadside	Passive	83.3	83.3	-	38.1	30.5	31.1	33.2
Paisley84	Roadside	Passive	100.0	100.0	-	32.9	20.2	24.3	23.1
Johnstone85	Roadside	Passive	91.7	91.7	-	-	28.5	26.1	25.0
Johnstone86	Roadside	Passive	91.7	91.7	-	-	19.5	28.1	27.0
Johnstone87	Roadside	Passive	91.7	91.7	-	-	22.5	22.8	26.0
Paisley88	Roadside	Passive	91.7	91.7	-	-	18.5	21.9	23.4
Paisley89	Roadside	Passive	100.0	100.0	-	-	-	22.4*	30.4
Renfrew90†	Roadside	Passive	96.7	80.6	-	-	-	-	24.4
Johnstone91	Roadside	Passive	33.3	100	-	-	-	-	16.3*

Notes: Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**. * - Annualised as per LAQM.TG(16) guidance. † – Triplicate Site

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.**

(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%).
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.
(4) As per LAQM.TG(16) guidance distance correction has been applied to all concentrations above the NO_2 annual mean objective, and also those within 10% of the objective. Distance corrected NO_2 annual means are shown in brackets. Where a concentration has increased, the receptor is closer to the kerbside than the monitor.
(5) Site Johnstone 59 – although site reading within 10% of the annual mean objective of 40µg/m^3, exposure is at street level whereas there is no exposure to public until first floor level in this section of the High Street.

Figure A.17 – Renfrew Town Centre AQMA NO_2 Annual Mean Concentrations 2015 – 2019

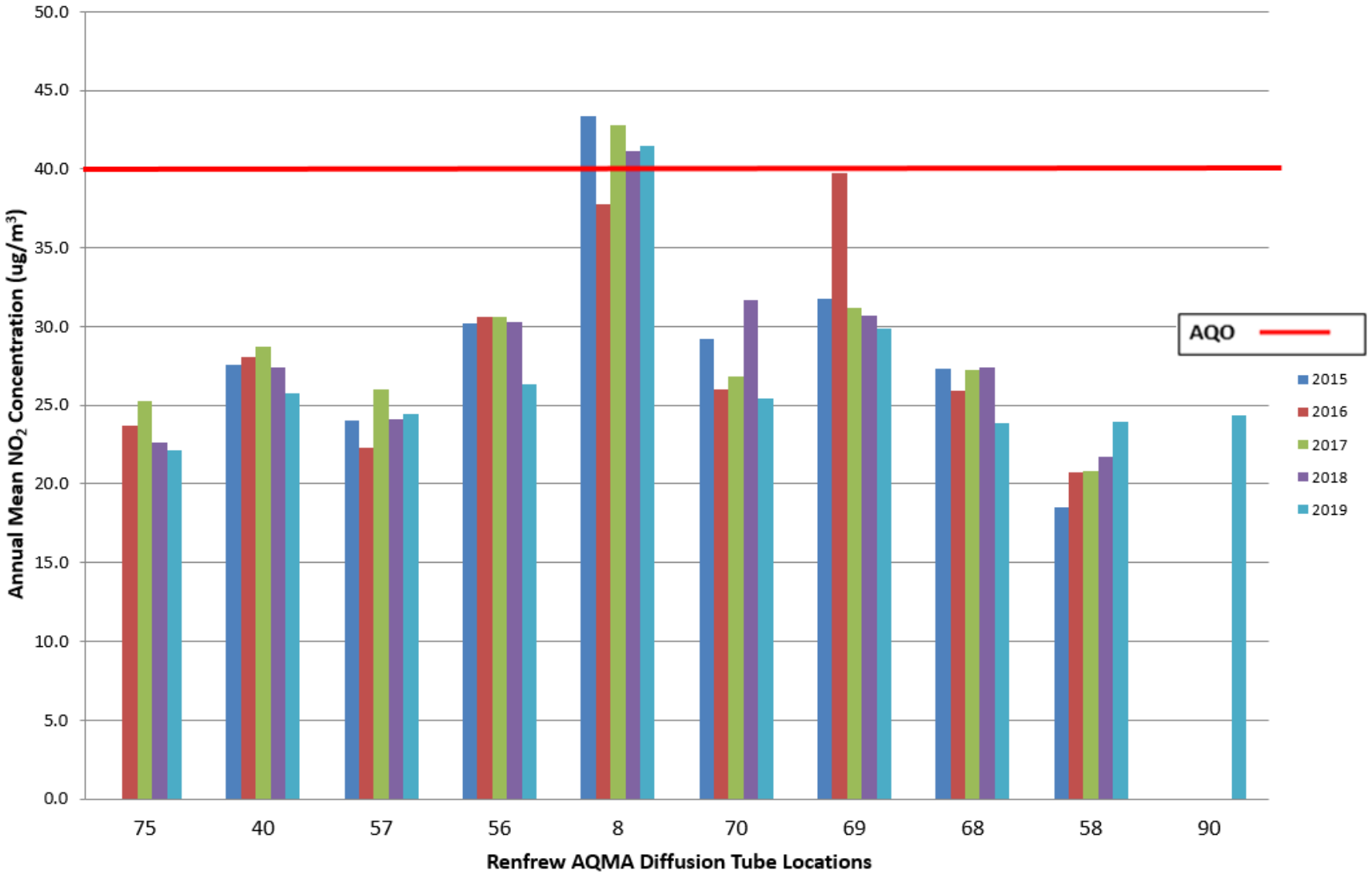


Figure A.18 – Johnstone High Street AQMA NO_2 Annual Mean Concentrations 2015 – 2019

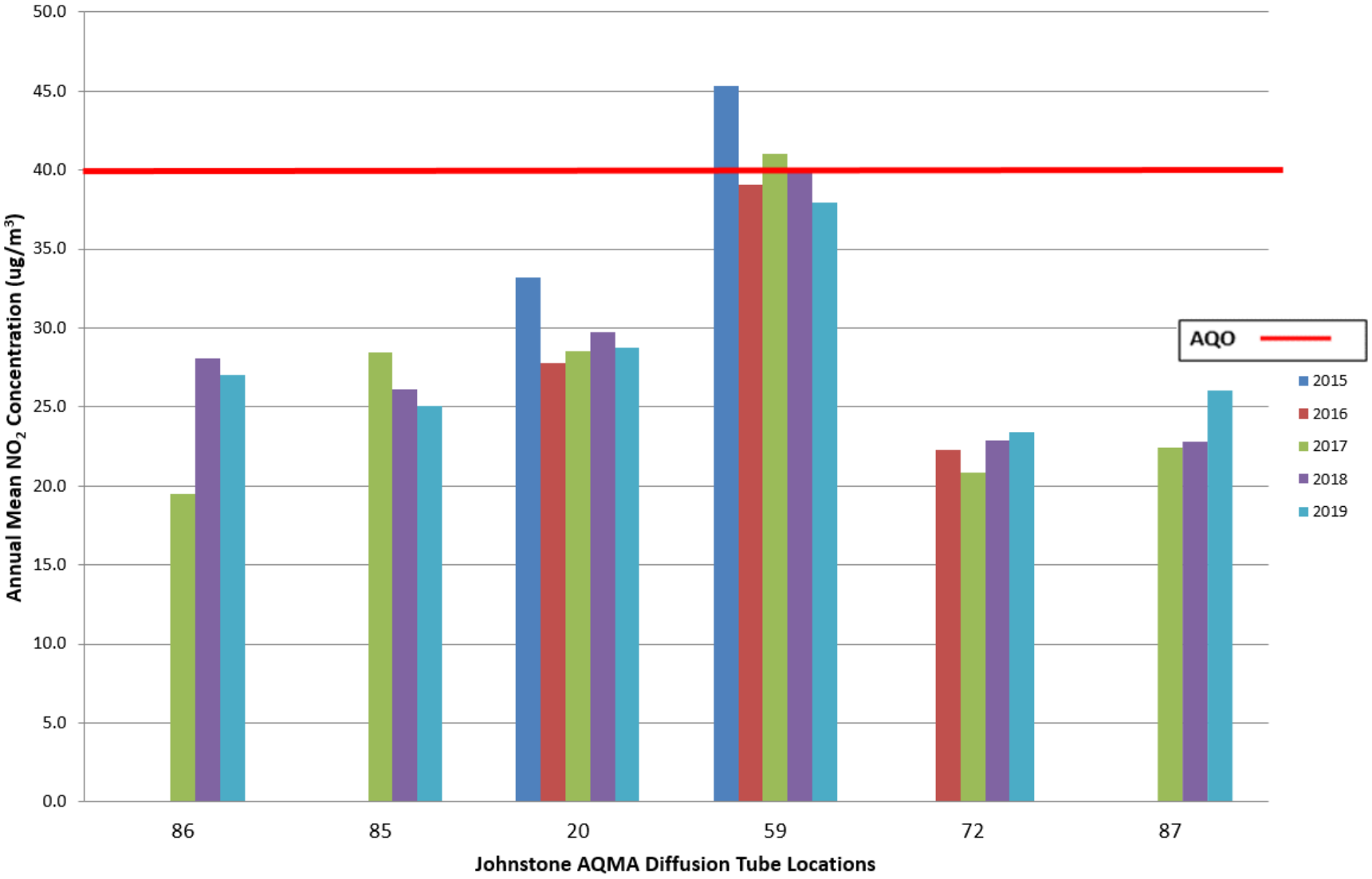


Figure A.19 – Paisley Town Centre AQMA NO_2 Annual Mean Concentrations 2015 – 2019

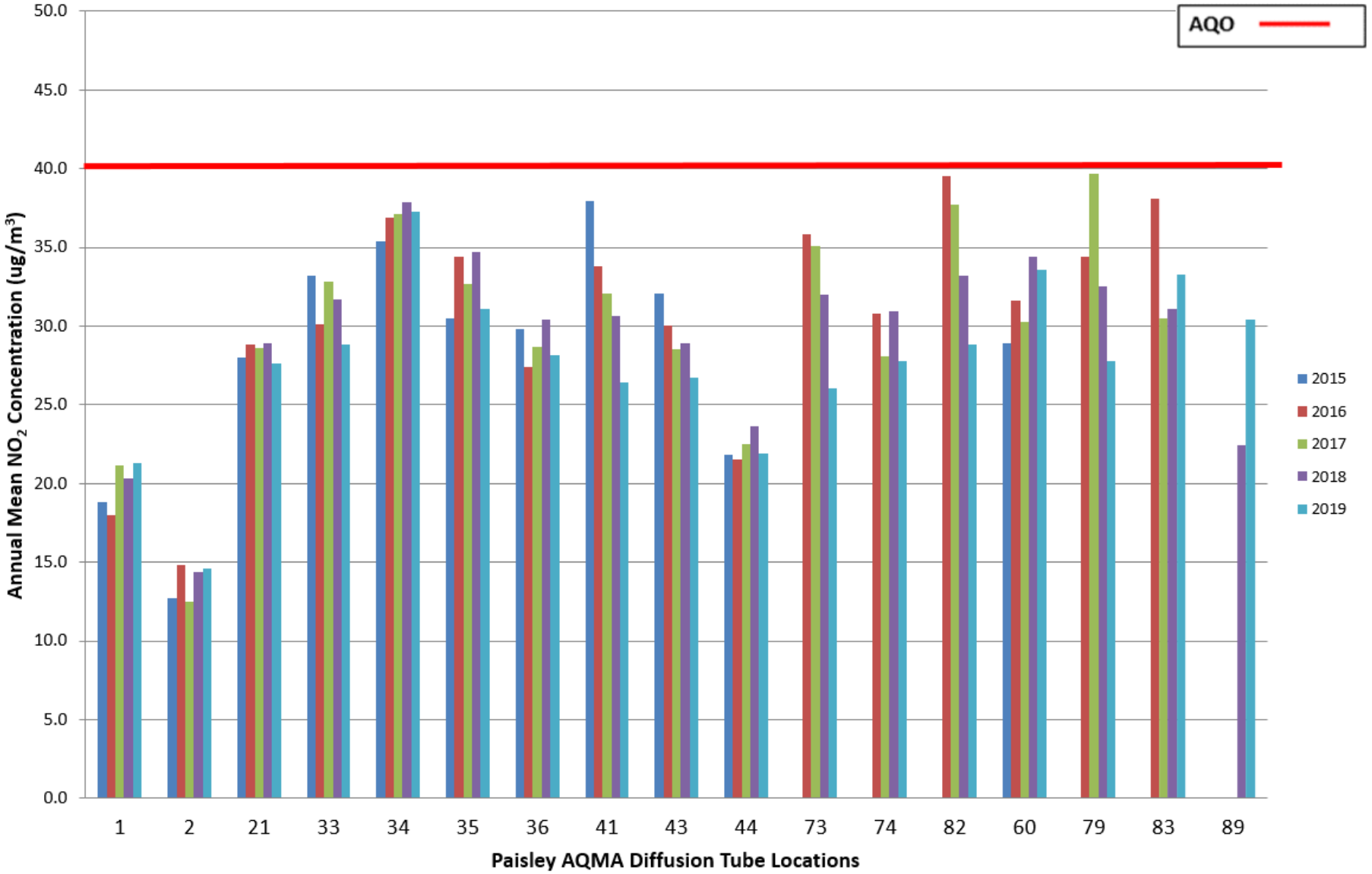


Figure A.20 – Renfrew NO_2 Annual Mean Concentrations 2015 – 2019

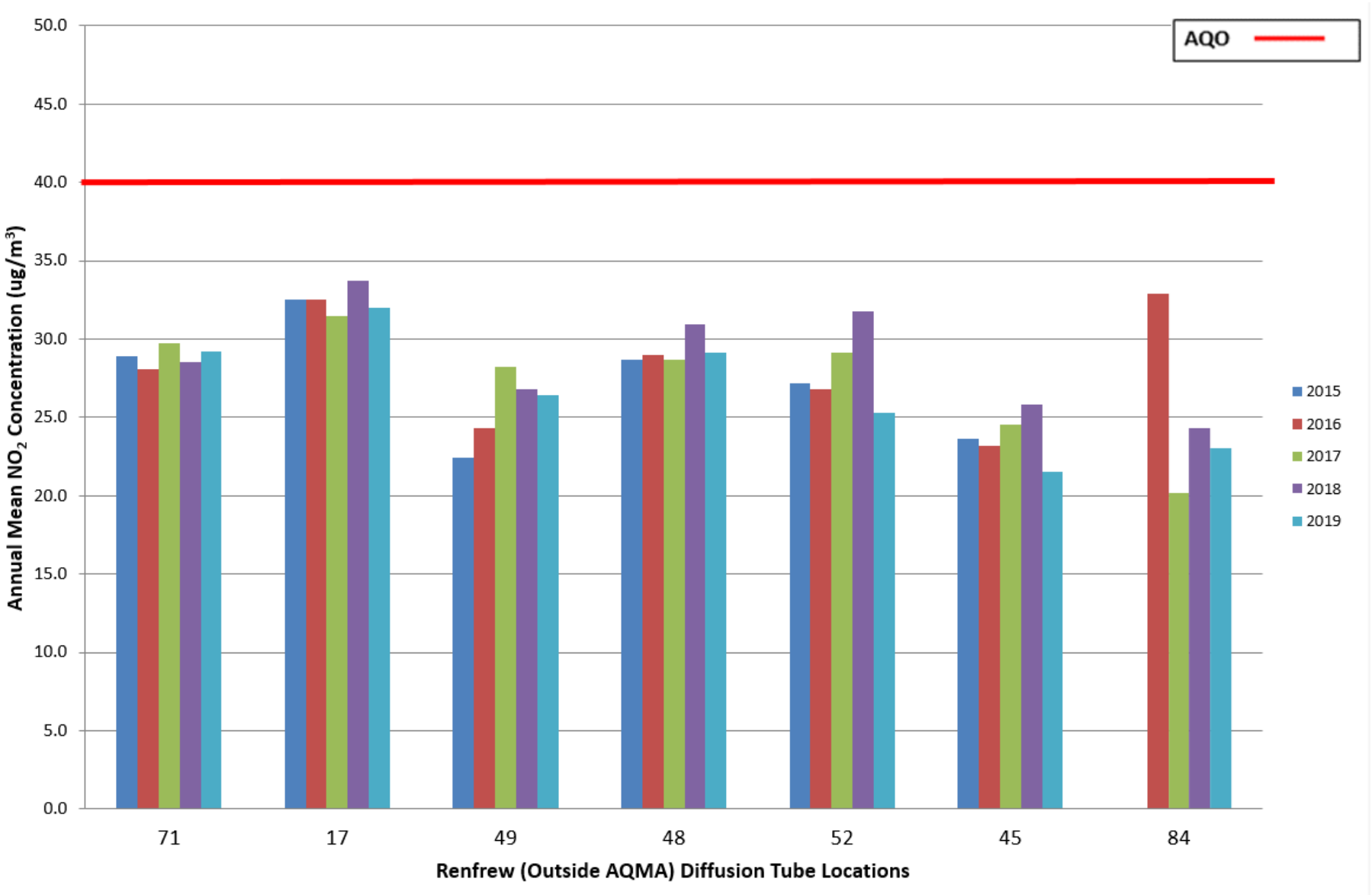


Figure A.21 – Paisley NO_2 Annual Mean Concentrations 2015 – 2019

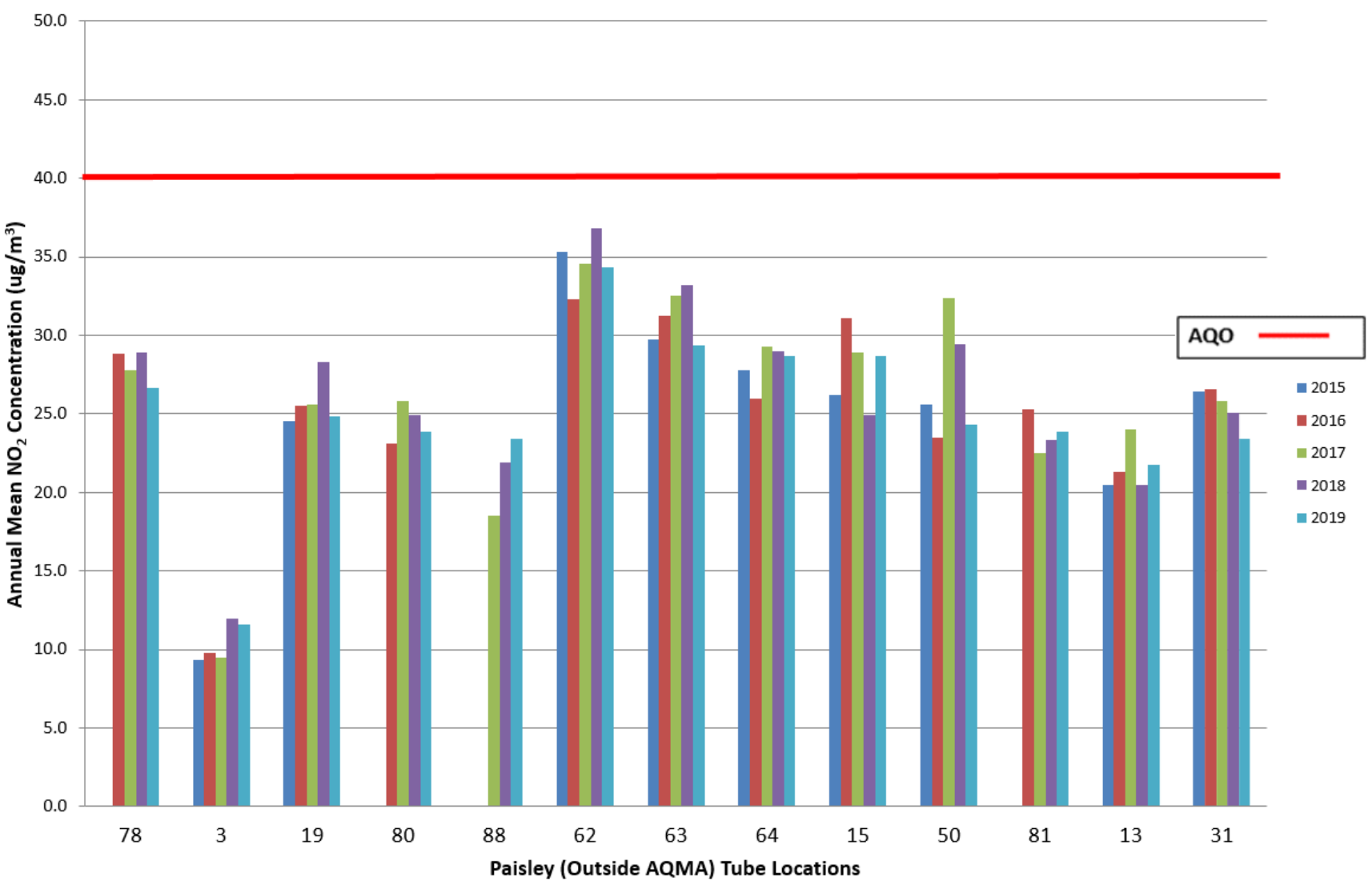


Figure A.22 – Kilbarchan/Bridge of Weir NO_2 Annual Mean Concentrations 2015 – 2019

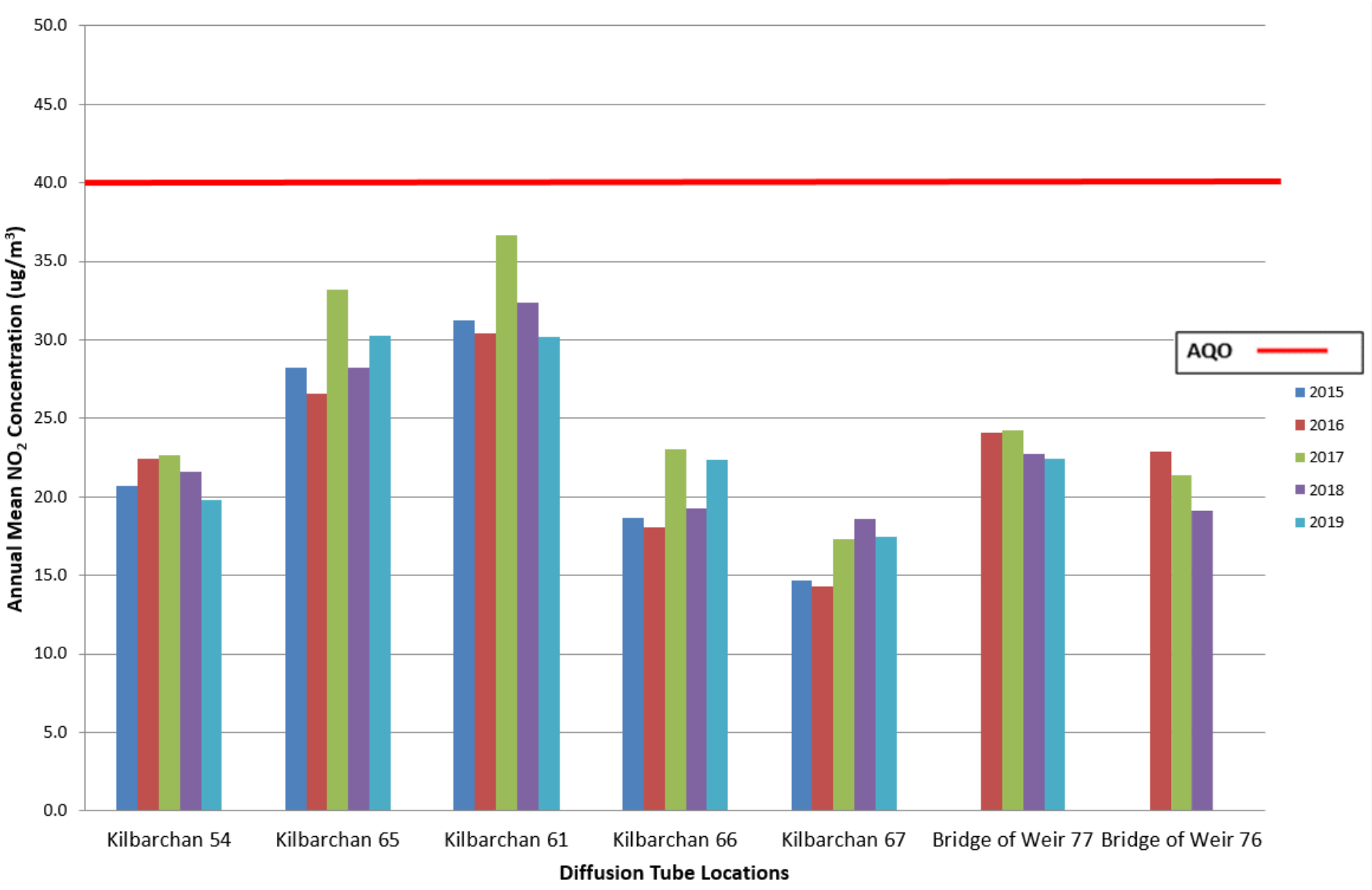


Figure A.23 – Bishopton/Inchinnan AQMA NO_2 Annual Mean Concentrations 2015 – 2019

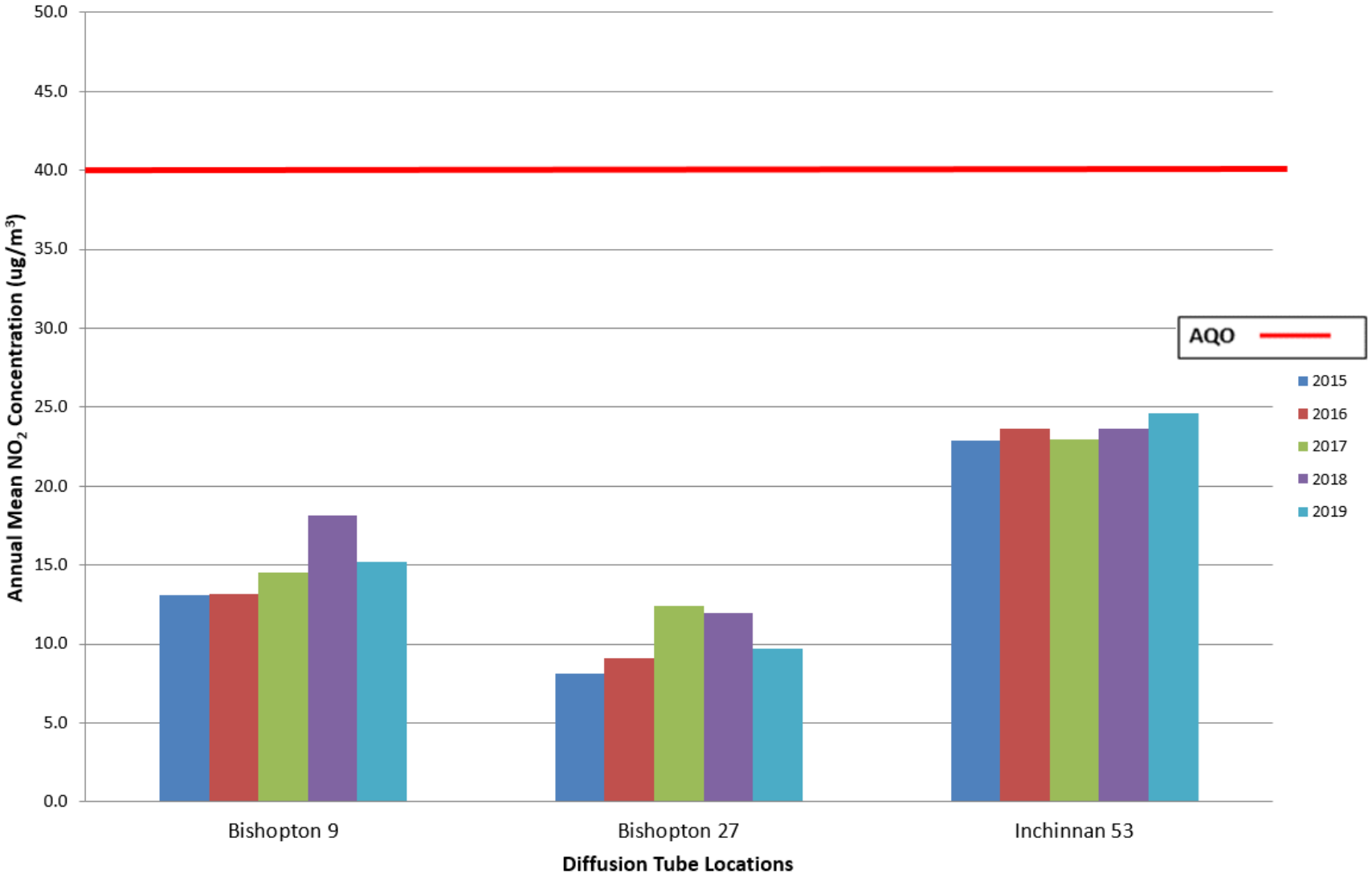


Figure A.24 – Automatic Monitoring NO_2 Annual Mean Concentrations 2015 – 2019

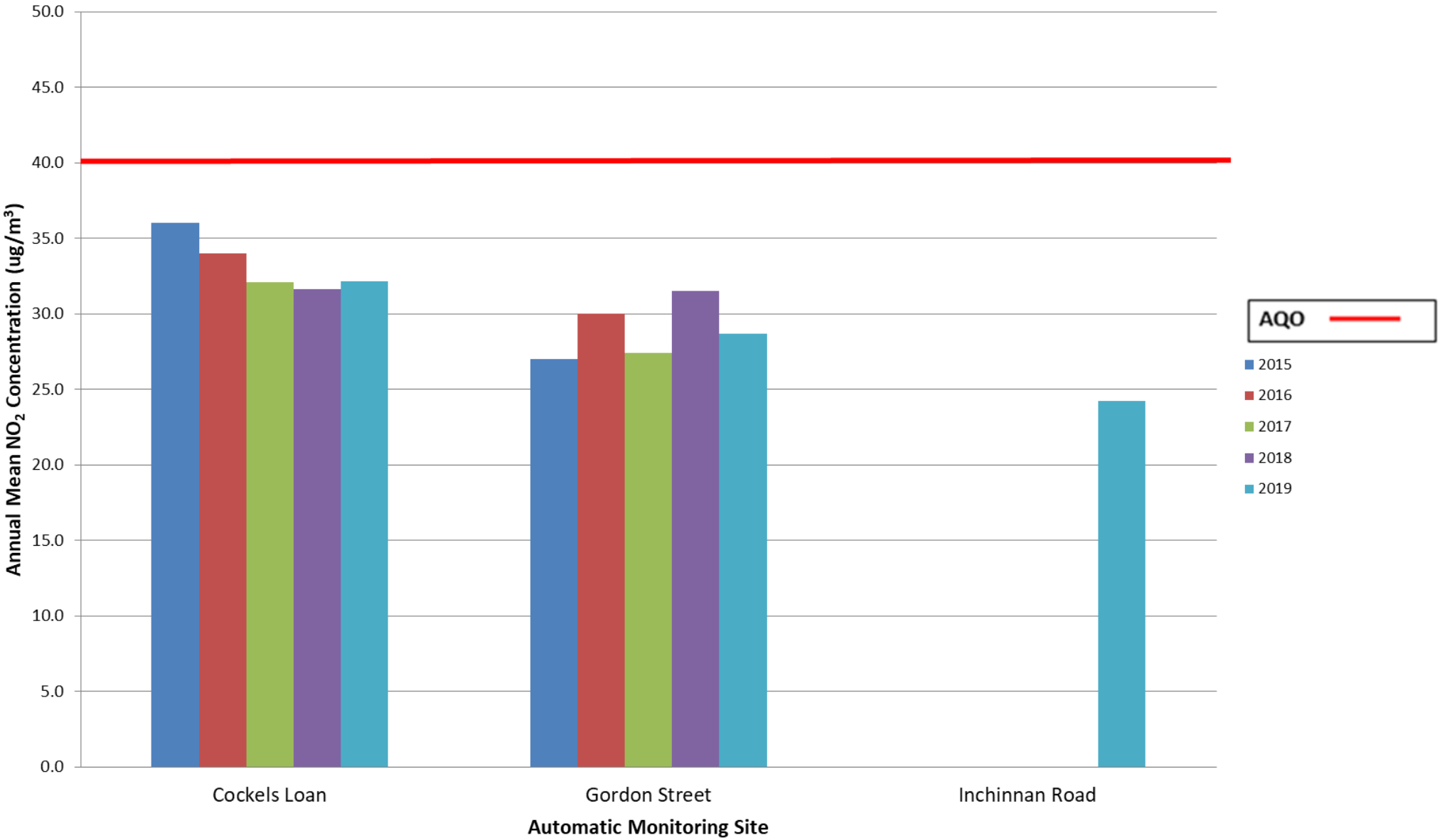


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period(%)(1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2015	2016	2017	2018	2019
Gordon Street	Roadside	Automatic	99.8	99.8	0	0	3 (149)	0	0
Cockels Loan	Roadside	Automatic	66.8	66.8	0	0	0	0	0 (122)
Inchinnan Road	Roadside	Automatic	88.8	86.6	-	-	-	-	0

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

(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%).

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

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period(%)(1)	Valid Data Capture 2019 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2015	2016	2017	2018	2019
Gordon Street	Roadside	94.7	94.7	15.2*	14	14.7*	12	12.1
Cockels Loan	Roadside	62.6	62.6	13.1*	14	13.6	16	14.5*
High St Johnstone	Roadside	93.7	93.7	-	-	11.7*	13	16.4

Notes: Exceedances of the PM_{10} annual mean objective of 18µg/m^3 are shown in **bold.** *- Annualised as per LAQM.TG(16) guidance.

(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%).

(3) All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure A.25 – Automatic Monitoring PM_{10} Annual Mean Concentrations 2015 – 2019

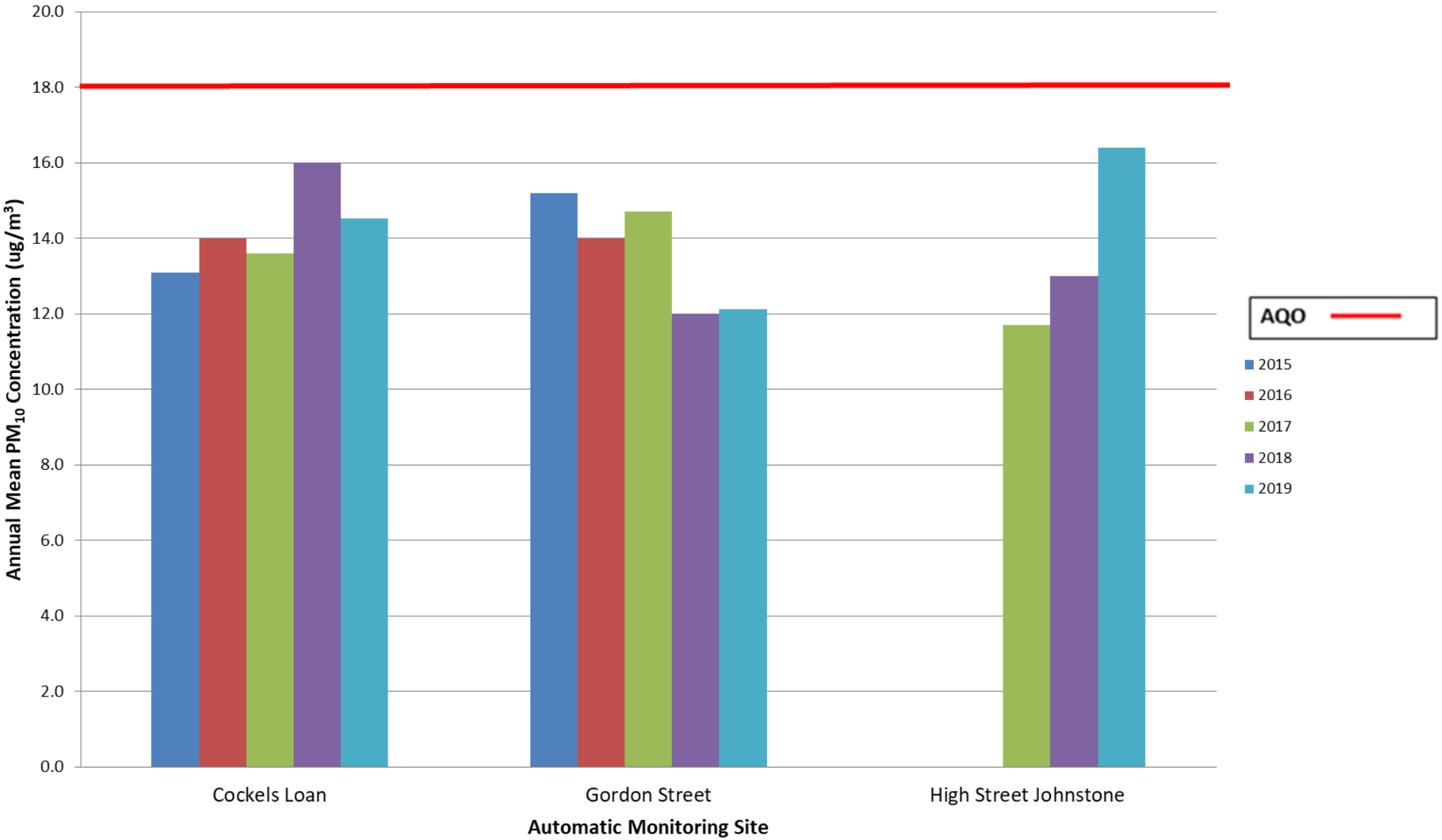


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period(%)(1)	Valid Data Capture 2019 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2015	2016	2017	2018	2019
Gordon Street	Roadside	94.7	94.7	0 (33)	0	0 (36)	0	4
Cockels Loan	Roadside	62.6	62.6	3	1 (37)	3	1 (73)	4 (47)
High St	Roadside	93.7	93.7	-	-	0 (25)	1 (51)	**14***

Notes: Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 7 times/year) are shown in **bold.**

(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%).

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

**JHS exceedance of the 24-hour mean objective was due to some isolated renovation works carried out next to the monitoring site during June and July 2019*

Table A.7 – Annual Mean $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period(%)(1)	Valid Data Capture 2019 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2015	2016	2017	2018	2019
High St Johnstone	Roadside	93.7	93.7	-	-	7.1*	7.0*	7.9
St James Street (4)	Roadside	84.3	41.8	-	-	-	7.0*	7.5*

Notes: Exceedances of the PM_{10} annual mean objective of 10µg/m^3 are shown in **bold.** *- Annualised as per LAQM.TG(16) guidance.

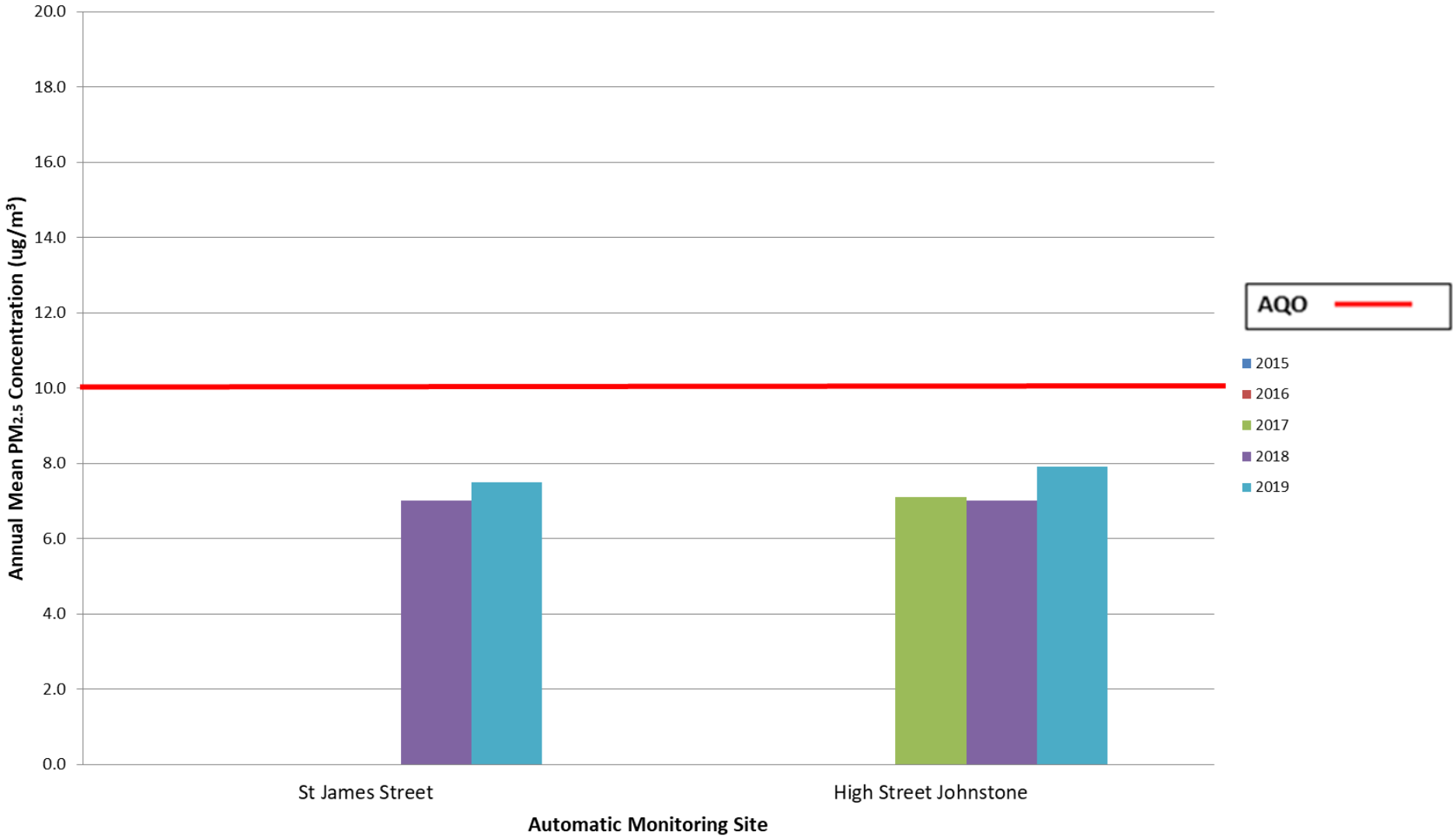
(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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%).

(3) All means have been "annualised" as per LAQM.TG(16), valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) St James Street - monitoring equipment at this site was changed from monitoring PM_{10} to monitoring $PM_{2.5}$ on 04/05/18, then removed from the Council's monitoring regime permanently on 02/07/2019

Figure A.26 – Automatic Monitoring $PM_{2.5}$ Annual Mean Concentrations 2015 – 2019



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2019

Site ID	2019 NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (0.89)(1) (2)
Paisley1		36.3	17.3	26.8		17.2	13.4	14.6	18.6	28.7	41.5	25.2	24.0	21.3
Paisley2	27.8	22.9	17.5	19.5	8.9	9.4	7.8	6.2	10.4	17.8	32		16.4	14.6
Paisley3	22.9	14.6	20.3	14.3	6.3	6.5	5.2	4.6	7.2	10.3	28.4	15.6	13.0	11.6
Renfrew8	**74.3**	**66.7**	18.4	30.6	38.9	29.5	39.2	**44.6**	38.9	**60.9**	**69.2**	**47.6**	**46.6**	**41.4**
Bishopton9	32	24.3	14.9	18.2	8.5	10.4	10.4	8.7	12.4	17	27.6	20.5	17.1	15.2
Paisley13	38.8	24.9	19.9	25.6	26.8	20.6	15.1	17.4	23	23.9	34.7	22.1	24.4	21.7
Paisley15	50	34.1	19.2	43.4	27.6	25	20.3	21.6	23.2	30.6	60.2	31.5	32.2	28.7
Renfrew17	43.2	53.3	25.6	39.8	21.5		25.9			32.8	47.5	43.8	36.0	32.0
Paisley19	46.1	39.2	26.6	29.3	24.2	19.6	14.4	14.5	16.4	29.7	47.1	28.1	27.9	24.9
Johnstone20	46.5	38.2	21.4	43.7	26.3	25.2	23	19.8	27	30	53.8	32.3	32.3	28.7
Paisley21 (1)	39.8	43.6	17.6	38.5	26	24.1	23.1	23.9	26	31.9	53.1	32.6	31.1	27.6
Paisley21(2)	43.4	45.1	26.3	34.7	24.7	25.2	19.3	20.8	27.1	35	51	31.5		
Paisley21(3)	32.1	43.1		37.7	25.8	24.7	20.9	21.3	27.8	33.7	50.2	27.8		
Bishopton27	19.9	17.2	5.9	13.3	5.3	5.9	3.4	4.8	9.4	11.8	20.3	14	10.9	9.7
West Walkingshaw31 (1)	41.3	35.6	19.7	26.2	20.2	15.7	20.5	22.2	21.9	23.9	36	29.9	26.3	23.4
West Walkingshaw31 (2)	41.5	35.6	19.7	27.6	21.1	17.9	22.6	22.3	21.7	23.3	31.5	28.9		
West Walkingshaw31 (3)	39.2	38	21.5	25.9	23.3	19.8				23.8	38.8	27.8		
Paisley33	38	43.5	24.4	37.8	22.6	30.6	20.9	24.5	26	34.8	49.6	35.8	32.4	28.8
Paisley34	47.7	58.7	34.2	52.1	29.8	37.6	27.6	29.8	38.5	37.9	66.5	41.9	41.9	37.3
Paisley35	42.4	52.6		45.8	39.5	33.2	19.9	24.6	32.4	34.6	53	35.5	34.9	31.1
Paisley36	50.1	44.8		39.3	32.9		20.6	25.7	25.6	27.6	45.7	32.6	31.7	28.2

Site ID	2019 NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (0.89)[1] [2]
Renfrew40	30	43.5		27.9	29.3	17.4	15.6	26.6	27.1	21.9	50.1	29.2	29.0	25.8
Paisley41	42.8	46.8	7.5		15.9	27.5	20.2	28.3	30.5	32.4	37.9	36.7	29.7	26.4
Paisley43	41.2	38.3	9.7	31.7	46.2	22.4	10.3	21.6	26.3	28.5	49.2	34.9	30.0	26.7
Paisley44	33	36.4	10.6	31.6	21.9	19.9	16.8	15.2	21.2	21	43.4	24.8	24.7	21.9
Renfrew45	31.5	28.9	7	25.6	24.2	15.5	16	15.7	20.6	24	51.6	29.9	24.2	21.5
Renfrew48	41.8	43.9		34.9	16.6	16.4	24.5	25.2	29.9		50.9	37.7	32.7	29.1
Renfrew49	40.5	36.3	17.2	29.1	21.1	17.4	19.5	18.9	20.9	31.7	59.9	43.6	29.7	26.4
Paisley50	44.1	39.7	9.5	31.1	19.7	19.3	18.3	20.7	20.3	24.1	46.4	34.6	27.3	24.3
Renfrew52	42.7	45.6	8.2	29.3	19.7	18.3	19.3	21	24.1		46.5	38.1	28.4	25.3
Inchinnan53	34.7	36.6	59.8	20.7	17.5	11.5	13.7	19		20.1	45.2	25.3	27.6	24.6
Kilbarchan54	33.7	32	13.4	26	18.2	13.3	15.2	16	17.6	20.3	33.2	27.5	22.2	19.8
Renfrew56	43.9	40.9	24.2	30.3		20.4	19.9	22.2	23.8	26.9	41.8	31.3	29.6	26.3
Renfrew57	36.5	37.1	27.8	30.9	27	15.6	13.6	16.3	20.9	25.7	50.4		27.4	24.4
Renfrew58	33.2	29.6	36.9	27.1		14.3		12.6	19.2	26	45.1	25.1	26.9	23.9
Johnstone59	51.2	59.6	24.7	48.2	15.3	36.5	32	45.2	39.1	63	38.1	58.3	**42.6**	37.9
Paisley60	42.4	49.1	33.4	39.9	40.9	25.5	24.5	29.7	25.3	38.6	61.9	41.4	37.7	33.6
Kilbarchan61	43	47.4	27.3	37.4	28.5	24.2	20.1	28.8	23.5	37.1	57.8	31.7	33.9	30.2
Cockels Loan62(1)		59.1	24.5	49.1	26.4	32.4	30.8	38.5	29.9	47.1	51.7		38.5	34.3
Cockels Loan62(2)	52.3	55.3	25.3	53.3	27.4	28.6	28.8		25.9	39.8	57.6	48.9		
Cockels Loan62(3)	39.1	59.9		48.2	33.8	25	33.4	36.8	28.4	38.4	59.7	51.2		
Paisley63	25.2	38.9	28.4	44		20.3	14.1	47.7	30.4	29.5	53.6	31.1	33.0	29.4
Paisley64	49.8	34.4	24.8	41.3	28.6	19.3	19.4	22.1	25.3	29.3	59	33.2	32.2	28.7
Kilbarchan65	64.4	44.1	24.9	31.2	25.4	32.1	23.3	25.2	27.6	31.2	48.3	30.6	34.0	30.3
Kilbarchan66	50.8	25.9	31	27.6	23.7	15.7	10.3	12	15	26.9	42.3	20.1	25.1	22.3
Kilbarchan67	25.7	21.2	30.7	19.4	15.4	10.8	8.5	9.7	13	20	40.5	20.4	19.6	17.5
Renfrew68	38	38.3	34.6	26	12.2	16.3	14.8	20.4	20.6	35.2	31.6	33.4	26.8	23.8
Renfrew69	51.2	41.6	28.2	35.4	18.7	17.2	11.6	27.5	28	63.1	37.6	42.4	33.5	29.9
Renfrew70	45	38.5	25.8	31.9	25.2	18.7	16.8	19.3	24.5	35.4		33.2	28.6	25.4

Site ID	2019 NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (0.89)(1) (2)
Renfrew71	19	51.2	32.4		21.5	19.9			22.8	33.7	56	38.5	32.8	29.2
Johnstone72	48.4	29.1	28.3	32.6	20.9	20.7	14.9	13.9	18.5	26.6	42.4	19.5	26.3	23.4
Paisley73	31.3	44.2	16.7	30.1		21.2	26.6	24.5	27.4	31	37.5	31.7	29.3	26.1
Paisley74	41.2	44.3	22.7	38.6		19.6	17.1	18.7	21.7	29.4	51	39.4	31.2	27.8
Renfrew75	23.3	36.4	25.8	21.6	22	15.4	14.3	16.4	20.2	24.2	47.5	31.2	24.9	22.1
Bridge of Weir76	28.6	28.8	26.1	27.3	18.6	14	10	34.9	18.2	26.1	37.6	21.1	24.3	21.6
Bridge of Weir77	51	36.6	28.9	20	18.3	14.1	11.1	19.6	23.1	25.7	30	24.4	25.2	22.5
Paisley78	44.2	43.9	32	33.7	21.7	19.7	24.2	22.6	22.5	29.5	28.1	36.9	29.9	26.6
Paisley79	46.5	43.2	20.7	35.9	22.3	19.4	24.3	18.6	30.1	31.1	41.7	40.5	31.2	27.8
Paisley80	31.3	30.8	18.9	30.1	23.9	16.1	17.1	16.4	23.3	31	50.6	32.2	26.8	23.9
Airport81	38.6	36.1	38.3	31.1	16.8	15.3	16.9	17.1	18.9	26.1	43.1	23.9	26.9	23.9
Paisley82	44.5	48.4	22.6	21.4	18.4	19.6	30.5	22.1	23.7	40.6	40.8	56.6	32.4	28.9
Paisley83	25.6	43.6	22.1	33.2		51		25	29	33.9	76.6	33.4	37.3	33.2
Paisley84	23.4	31	46.4	21.6	21.4	14.3	13.6	27.3	16.1	20.9	50	24.8	25.9	23.1
Johnstone85	23.3	37.8	30.9	43.9		26.6	25	18	25.4	34.9	35.5	28.3	28.1	25.0
Johnstone86	22.1	32.8	34.2	42.6		23.3	21.7	13.5	25.2	33.4	57.1	28.4	30.4	27.0
Johnstone87	41.6	29.7	46.8	32.2	20.3	19.5	17.2	13.9	19.4		56	25	29.2	26.0
Paisley88	28.9	27.4	46	25.5		15.5	7	11.4	15.9	17.5	72.8	21.8	26.3	23.4
Paisley89	41.3	44	46.5	29.4	27.9	24.4	26.9	24.8	32	29.2	47.4	36.5	34.2	30.4
Renfrew90 (1)			23.2	36.8	18.4	19.1	18.7	16.9	22.9	27.8	53.3	25.7	27.4	24.4
Renfrew90 (2)			24.6	41.4	19.1	18.4	19.9		19.1	30.4	47.5	26		
Renfrew90 (3)			29.6	37.7	19.9	17.5	18.4	18.8	25.2	23	47.8	26.3		
Johnstone91								11.8	19.2	17.9	33.4		20.6	16.8*

Notes: Exceedances of the NO_2 annual mean objective of $40\mu g/m^3$ are shown in **bold**. *- Annualised as per LAQM.TG(16) guidance.
MISSING TUBE **INSECT CONTAMINATION** **ERRONEOUS DATA REMOVED** **ISOLATED SITE WORKS**

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

(1) See Appendix C for details on bias adjustment (2) Results have not been distance corrected

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

Diffusion Tube Local Bias Adjustment Factors

During 2019 there were three co-location studies where triplicate NO_2 diffusion tubes were located with NO_x automatic analysers; Gordon Street, Inchinnan Road and Cockels Loan. Local bias adjustment factors have been calculated for all three locations using the Precision and Bias adjustment spreadsheet (v04), the outputs are presented below in Table C.1, Table C.2 and Table C.3.

Table C.1 - Local Bias Correction Output: Gordon Street

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	09/01/2019	06/02/2019	39.8	43.4	32.1	38	5.8	15	14.3	43.63	100.00	Good	Good
2	06/02/2019	06/03/2019	43.6	45.1	43.1	44	1.0	2	2.6	37.16	100.00	Good	Good
3	06/03/2019	03/04/2019	17.6	26.3		22	6.2	28	55.3	23.52	99.41	Poor Precision	Good
4	03/04/2019	01/05/2019	38.5	34.7	37.7	37	2.0	5	5.0	30.71	99.70	Good	Good
5	01/05/2019	05/06/2019	26.0	24.7	25.8	26	0.7	3	1.7	22.70	100.00	Good	Good
6	05/06/2019	03/07/2019	24.1	25.2	24.7	25	0.6	2	1.4	19.86	99.26	Good	Good
7	03/07/2019	07/08/2019	23.1	19.3	20.9	21	1.9	9	4.7	16.73	100.00	Good	Good
8	07/08/2019	04/09/2019	23.9	20.8	21.3	22	1.7	8	4.1	16.04	100.00	Good	Good
9	04/09/2019	02/10/2019	26.0	27.1	27.8	27	0.9	3	2.3	20.54	100.00	Good	Good
10	02/10/2019	06/11/2019	31.9	35.0	33.7	34	1.6	5	3.9	31.83	99.52	Good	Good
11	06/11/2019	04/12/2019	53.1	51.0	50.2	51	1.5	3	3.7	50.42	100.00	Good	Good
12	04/12/2019	08/01/2020	32.6	31.5	27.8	31	2.5	8	6.2	24.71	99.42	Good	Good
13													
												Good precision	Good Overall

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey -->

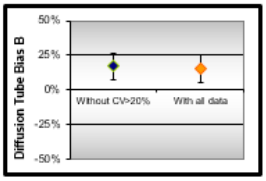
Site Name/ ID:

Precision 11 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.89 (0.82 - 0.97)
Bias B	13% (3% - 23%)
Diffusion Tubes Mean:	32 μgm^{-3}
Mean CV (Precision):	6
Automatic Mean:	29 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	29 (26 - 31) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.9 (0.82 - 0.98)
Bias B	12% (2% - 21%)
Diffusion Tubes Mean:	31 μgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	28 μgm^{-3}
Data Capture for periods used:	100%
Adjusted Tubes Mean:	28 (26 - 31) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Table C.2 - Local Bias Correction Output: Cockels Loan

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	09/01/2019	06/02/2019		52.3	39.1	46	9.3	20	83.9	40.81	82.53	Poor Precision	Good
2	06/02/2019	06/03/2019	59.1	55.3	59.9	58	2.5	4	6.1	35.26	99.39	Good	Good
3	06/03/2019	03/04/2019	24.5	25.3	7.1	19	10.3	54	25.5	27.65	98.51	Poor Precision	Good
4	03/04/2019	01/05/2019	49.1	53.3	48.2	50	2.7	5	6.8	33.07	99.70	Good	Good
5	01/05/2019	05/06/2019	26.4	27.4	33.8	29	4.0	14	10.0	25.72	70.83	Good	Poor Data Capture
6	05/06/2019	03/07/2019	32.4	28.6	25.0	29	3.7	13	9.2	20.00	44.20	Good	Poor Data Capture
7	03/07/2019	07/08/2019	30.8	28.8	33.4	31	2.3	7	5.7	21.55	100.00	Good	Good
8	07/08/2019	04/09/2019	38.5		36.8	38	1.2	3	10.8	27.28	86.61	Good	Good
9	04/09/2019	02/10/2019	29.9	25.9	28.4	28	2.0	7	5.0	30.75	21.60	Good	Poor Data Capture
10	02/10/2019	06/11/2019	47.1	39.8	38.4	42	4.7	11	11.6		0.00	Good	Poor Data Capture
11	06/11/2019	04/12/2019	51.7	57.6	59.7	56	4.1	7	10.3	66.94	19.94	Good	Poor Data Capture
12	04/12/2019	08/01/2020	16.3	48.9	51.2	39	19.5	50	48.5	33.37	99.19	Poor Precision	Good
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Poor precision | Poor Overall

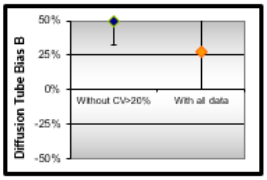
Site Name/ ID:

Precision 9 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 4 periods of data	
Bias factor A	0.66 (0.6 - 0.75)
Bias B	51% (34% - 68%)
Diffusion Tubes Mean:	44 µgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	29 µgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	29 (27 - 33) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 7 periods of data	
Bias factor A	0.78 (0.64 - 0.99)
Bias B	28% (1% - 56%)
Diffusion Tubes Mean:	40 µgm^{-3}
Mean CV (Precision):	21 caution
Automatic Mean:	31 µgm^{-3}
Data Capture for periods used:	95%
Adjusted Tubes Mean:	31 (26 - 40) µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Table C.3 - Local Bias Correction Output: Inchinnan Road

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	09/01/2019	06/02/2019								38.26	41.92		Poor Data Capture
2	06/02/2019	06/03/2019								33.05	100.00		Good
3	06/03/2019	03/04/2019	23.2	24.6	29.6	26	3.4	13	8.4	18.09	89.15	Good	Good
4	03/04/2019	01/05/2019	36.8	41.4	37.7	39	2.4	6	6.1	29.18	99.85	Good	Good
5	01/05/2019	05/06/2019	18.4	19.1	19.9	19	0.8	4	1.9	17.84	100.00	Good	Good
6	05/06/2019	03/07/2019	19.1	18.4	17.5	18	0.8	4	2.0	16.14	99.70	Good	Good
7	03/07/2019	07/08/2019	18.7	19.9	18.4	19	0.8	4	2.0	12.18	70.95	Good	Poor Data Capture
8	07/08/2019	04/09/2019	16.9		18.8	18	1.3	8	12.1	15.83	91.96	Good	Good
9	04/09/2019	02/10/2019	22.9	19.1	25.2	22	3.1	14	7.7	22.32	94.24	Good	Good
10	02/10/2019	06/11/2019	27.8	30.4	23.0	27	3.8	14	9.3	27.05	96.19	Good	Good
11	06/11/2019	04/12/2019	53.3	47.5	47.8	50	3.3	7	8.1	37.41	94.05	Good	Good
12	04/12/2019	08/01/2020	25.7	26.0	26.3	26	0.3	1	0.7	24.43	84.84	Good	Good
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Good precision | Poor Overall

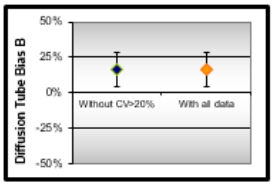
Site Name/ ID:

Precision 10 out of 10 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 9 periods of data	
Bias factor A	0.85 (0.77 - 0.95)
Bias B	18% (6% - 29%)
Diffusion Tubes Mean:	27 µgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	23 µgm^{-3}
Data Capture for periods used:	94%
Adjusted Tubes Mean:	23 (21 - 26) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 9 periods of data	
Bias factor A	0.85 (0.77 - 0.95)
Bias B	18% (6% - 29%)
Diffusion Tubes Mean:	27 µgm^{-3}
Mean CV (Precision):	8
Automatic Mean:	23 µgm^{-3}
Data Capture for periods used:	94%
Adjusted Tubes Mean:	23 (21 - 26) µgm^{-3}



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Version 04 - February 2011

Diffusion Tube National Bias Adjustment Factors

The diffusion tubes used by Renfrewshire Council are supplied and analysed by Glasgow Scientific Services (GSS), the tubes were prepared using the 20% TEA in water preparation method. The national bias adjustment factor for GSS 20% TEA in water is 0.86, based on six studies for the year 2019, as derived from the national bias adjustment factor spreadsheet as presented in Table C.4.

Table C.4 – GSS 2019 National Bias Adjustment Factor

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/20

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2020
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[2]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (Tube preparation, please select from the drop-down list)	Year[2] (Year of exposure, please select)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Glasgow Scientific Services	20% TEA in water	2019	R	East Dunbartonshire Council	12	36	32	12.7%	P	**0.89**
Glasgow Scientific Services	20% TEA in water	2019	R	East Dunbartonshire Council	12	23	21	10.6%	P	**0.90**
Glasgow Scientific Services	20% TEA in water	2019	R	East Dunbartonshire Council	12	33	26	23.7%	G	**0.81**
Glasgow Scientific Services	20% TEA in water	2019	KS	Marylebone Road Intercomparison	12	79	65	21.0%	G	**0.83**
Glasgow Scientific Services	20% TEA in water	2019		**Overall Factor[3] (4 studies)**				**Use**		**0.86**

Discussion of Choice of Factor to Use

The diffusion tube data has been corrected using a bias adjustment factor, this is an estimate of the difference between diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. Defra LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring.

Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_X/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, Defra LAQM.TG(16) and the LAQM Helpdesk recommend the use of a local bias adjustment factor where available and relevant to the diffusion tube sites. A summary of the local bias adjustment factors is presented in Table C.5, with the Council's relevant national factor illustrated in Table C.4.

Table C.5 – Local Bias Adjustment Summary

Co-location site	Tube Precision	Automatic Data Quality	Bias Factor A (excluding periods with CV >25%)	Bias Factor B (excluding periods with CV >25%)
Gordon Street, Paisley	Good Precision	Good Overall	0.89	13%
Inchinnan Road, Renfrew	Good Precision	Poor Overall	0.85	18%
Cockels Loan, Renfrew	Poor Precision	Poor Overall	0.66	51%

Diffusion tube bias adjustment factors for 2019 are available from three co-location studies and the national database of co-location studies. Historically Renfrewshire Council have used an average of the local adjustment factors to adjust their diffusion tube results, however for the previous two years, the national factor has been used.

The 2019 national adjustment factor is based on four studies of which two are of poor precision, and two are of good precision. Taking the average of all relevant national studies, a factor of 0.86 is given. When taking an average of only the studies with good precision gives a factor of 0.83.

A summary of the local bias factors, both excluding periods with a CV > 25% and using all twelve periods are presented in Table C.5. When adjusting single tube measurements the factor calculated using all twelve periods should be used. It is therefore important that this is representative of the bias calculated using triplicate tube surveys with 'good' precision.

At the Cockels Loan co-location, five out of the twelve periods had a poor data capture, and three periods had poor precision. Due to this the factor derived from the Cockels Loan co-location has not been used. At the Inchinnan Road co-location, two out of the twelve periods had a poor data capture, and two periods did not have diffusion tubes in place. The Inchinnan Road co-location has therefore also not been used. The Gordon Street co-location reports both good precision and data capture and the bias adjustment factor of 0.89 has therefore been applied to this year's diffusion tube results.

In previous years an average of two local factors has been used for the bias adjustment factor. For 2019 the local adjustment factor of 0.89 from the Gordon Street local study has been used only. This is due to the Cockels Loan and Inchinnan co-locations having a poor data capture for 2019 and the national factor for all four studies is of a lower value than the Gordon Street local factor; the local adjustment will therefore offer a more conservative approach in line with previous years to the bias adjustment.

Short-term to Long-term Data Adjustment - Annualisation

Data capture at all sites which recorded less than 75% data capture during 2019 has been annualised according to the method set out in LAQM.TG(16) Box 7.9. The details of the annualisation have been provided in Table C.6.

Table C.6 – Annualised Sites 2019

Site	Unadjusted Mean (µg/m^3)	Annualisation Factor Glasgow Townhead	Annualisation Factor Peebles	Annualisation Factor Edinburgh St Leonards	Average Annualisation Factor	Annualised Bias Adjusted Concentration (µg/m^3)
Diffusion Tube						
DT91	20.58	0.94	0.86	0.96	0.92	16.8
Site	**Unadjusted Mean (µg/m^3)**	**Annualisation Factor Glasgow Townhead**	**Annualisation Factor - Waulkmillglen-reservoir**	**Annualisation Factor Edinburgh St Leonards**	**Average Annualisation Factor**	**Annualised Concentration (µg/m^3)**
Continuous Monitor (NO_2)						
Cockels Loan	31.18	1.03	1.09	0.98	1.03	32.2
Site	**Unadjusted Mean (µg/m^3)**	**Annualisation Factor Glasgow Townhead**	**Annualisation Factor – Auchencorth Moss**	**Annualisation Factor Edinburgh St Leonards**	**Average Annualisation Factor**	**Annualised Bias Adjusted Concentration (µg/m^3)**
Continuous Monitor (PM_{10} & $PM_{2.5}$)						
St James Street ($PM_{2.5}$)	8.86	0.86	0.84	0.83	0.85	7.5
Cockels Loan (PM_{10})	16.09	0.95	0.89	0.86	0.90	14.51

Fall off with Distance Correction of Monitoring Sites within 10% or in Exceedance of the NO_2 Annual Mean Objective

The three monitoring sites (DT8, DT34 and DT59) which reported within 10% or exceeded the NO_2 AQS objective were each located within each of the AQMAs. Each diffusion tube site was not representative of exposure, therefore, 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.7.

Table C.7 – Fall off with Distance Calculations

Site Name/ID	Distance (m)		NO_2 Annual Mean Concentration ($\mu g/m^3$)			Comment
	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	
Johnstone59	1.7	1.8	8.5	37.9	37.5	Predicted concentration at Receptor within 10% the AQS objective.
Renfrew8	2.6	2.7	12.1	41.4	**41.1**	Predicted concentration at Receptor above AQS objective.
Paisley34	0.7	3.7	11.3	37.3	29.0	

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2019 were supplied and analysed by 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 AR028 (September to October 2018) – 100%
- AIR-PT AR030 (January to February 2019) – 100%
- AIR-PT AR031 (April to May 2019) – 100%
- AIR-PT AR033 (July to August 2019) – 100%
- AIR-PT AR034 (September to November 2019) – 50%

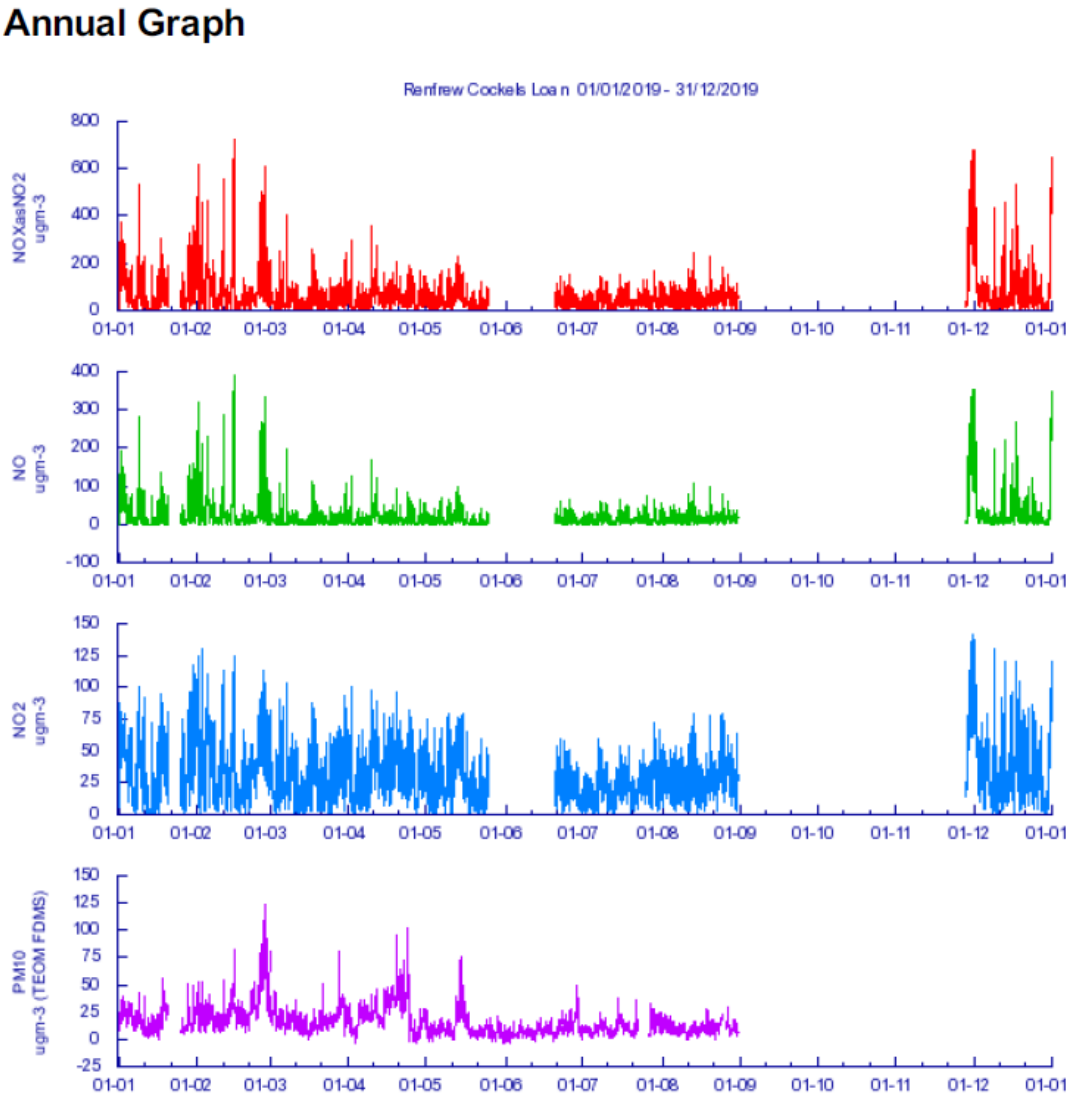
Over a rolling five round AIR-PT window, it is expected that 95% of laboratory results should be ≤+2. If this percentage is substantially lower than 95% for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have sources of error within their analytical procedure.

For the latest five round window 90% of GSS results were ≤+2 therefore the diffusion tube performance over this period has been assessed as satisfactory.

QA/QC of Automatic Monitoring

Automatic monitoring of NO_x, PM_{10} and $PM_{2.5}$ is completed within Renfrewshire Council using Chemiluminescence (NO_x), FDMS (PM_{10}) and Fidas (PM_{10} and $PM_{2.5}$) analysers. All data is available in real-time, and following data dissemination is ratified by Ricardo Energy and Environment to AURN standards. The following extracts from the Scottish Air Quality website[6] present the 2019 data graphs for each automatic site in Renfrewshire.

Figure C.1 - Cockels Loan Data 2019



[6] http://www.scottishairquality.scot/data/

Figure C.2 - Gordon Street Data 2019

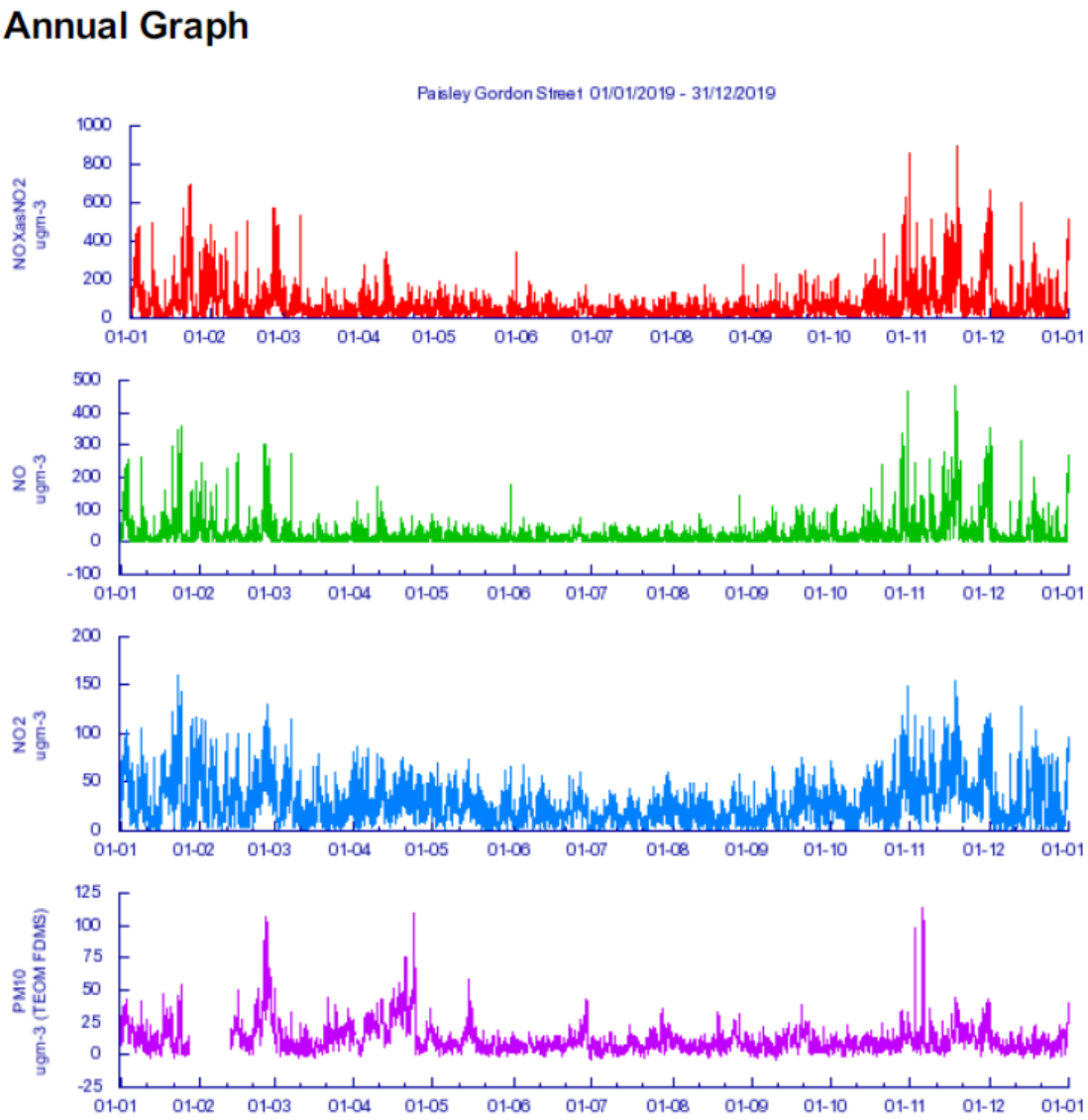


Figure C.3 - Johnstone 2019 Data

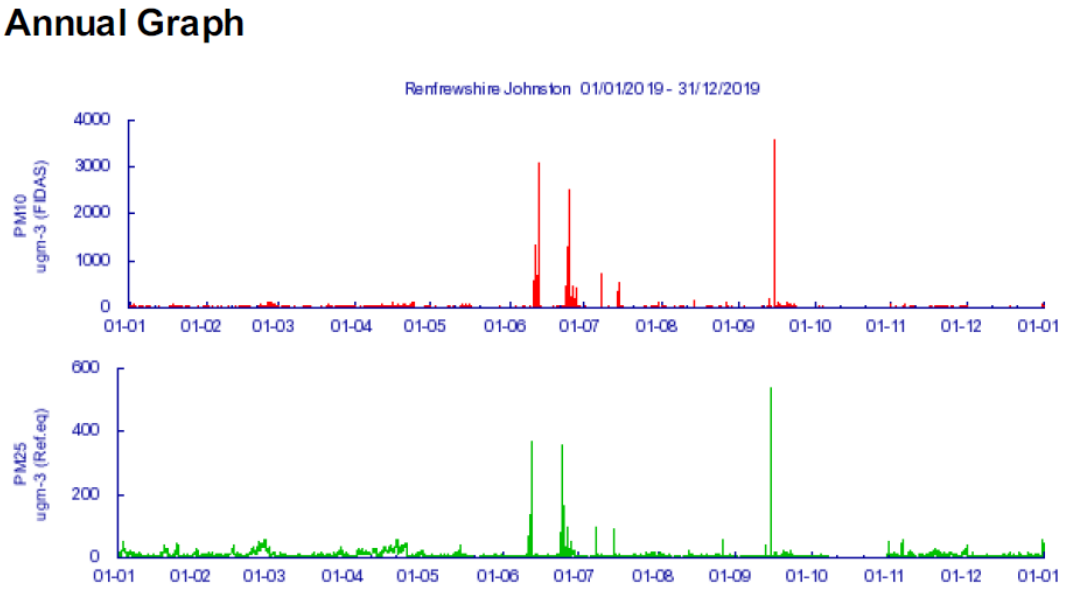


Figure C.4 - Inchinnan Road 2019 Data

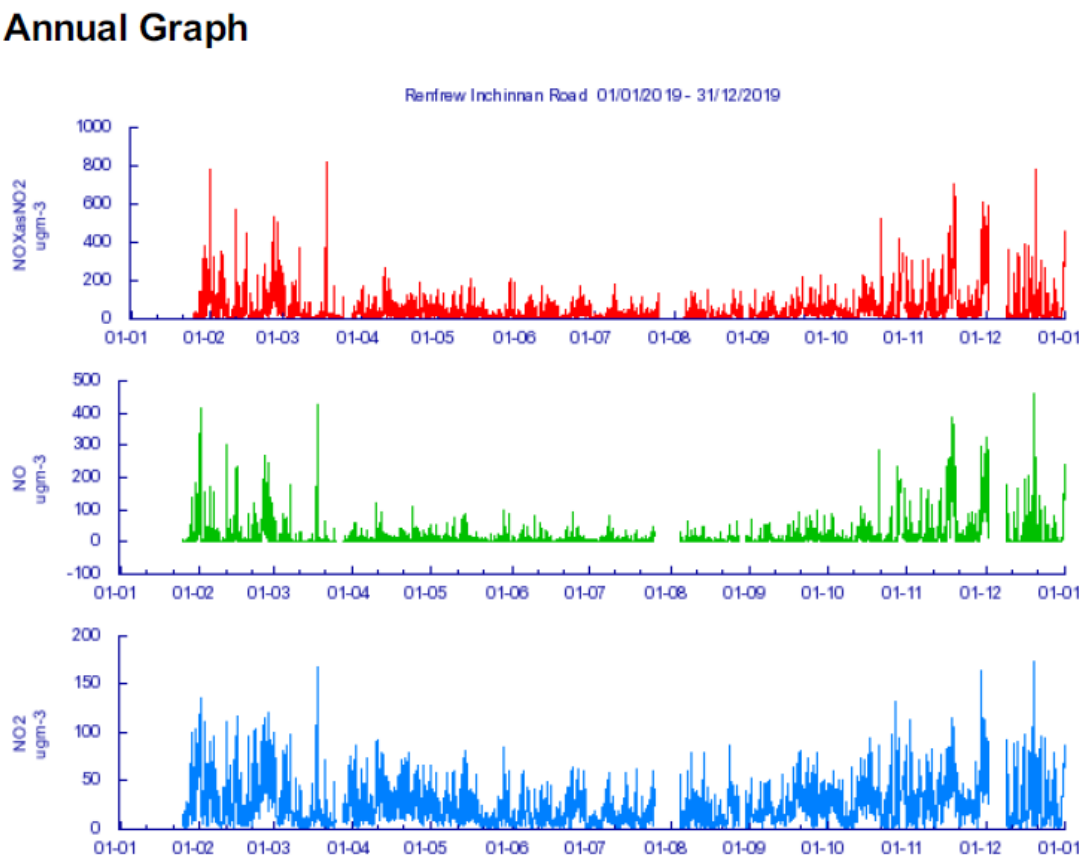
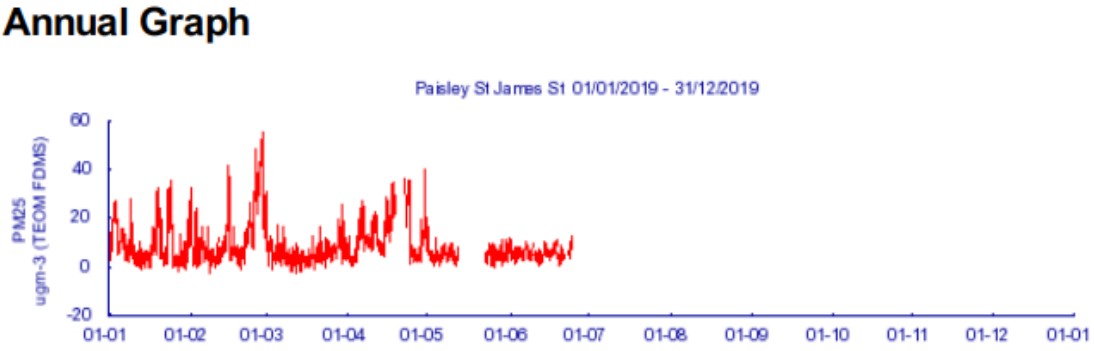


Figure C.5 – Paisley St James 2019 Data



Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG(16). May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland
- Local Air Quality Management Policy Guidance LAQM.PG(16). May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland
- Renfrewshire Council (2018) Annual Progress Report
- Renfrewshire Council (2019) Annual Progress Report
- Air Quality in Scotland website (2019 data), available at http://www.scottishairquality.co.uk/
- AEA_DifTPAB_v04.xls, available at http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html
- National Diffusion Tube Bias Adjustment Factor Spreadsheet version 03/20 available at https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html
- Renfrewshire Council Carbon Management Plan 2014/15 – 2019/20

  Renfrewshire Cycling Strategy 2016 – 2025
- Defra LAQM helpdesk – https://laqm.defra.gov.uk/
- Renfrewshire Air Quality Action Plan 2019