Annual Progress Report (APR)

2018 Air Quality Annual Progress Report (APR) for
East Ayrshire Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

August 2018

East Ayrshire Council
Comhairle Siorrachd Àir an Ear

Local Authority Officer	Sandy Loudon
Department	Economy and Skills
Address	Environmental Health and Trading Standards Civic Centre South
Telephone	01563 576834
E-mail	sandy.loudon@east-ayrshire.gov.uk
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Electric vehicle charging point and cycle parking in Foregate North Car Park

Executive Summary: Air Quality in Our Area

Air Quality in East Ayrshire Council

Air quality is important because poor air quality can lead to ill health and reduced life expectancy. The effects of poor air quality on ill health are now well documented and the Committee on the Medical Effects of Air Pollutants (COMEAP) (Reference 25) has reported, "Anthropogenic $PM_{2.5}$ ... is associated with an effect on mortality equivalent to nearly 29,000 deaths in 2008 in the UK and an associated loss of total population survival of 340,000 years". An estimate of local mortality burden in East Ayrshire equates to 45 attributable deaths (age 25+) with associated life years lost at 497 (2010). Recent research has shown that air pollution has been clearly linked to spikes in breathing problem-related admissions to hospitals and visits to GPs in a research project conducted at the University of Dundee (Reference 32). The provision of good air quality is important to East Ayrshire Council (EAC) where it is a material consideration in the planning process and Environmental Health is a consultee where air quality is of concern. Cleaner Air for Scotland Strategy (Reference 30) is at the heart of reducing air pollution in Scotland and is referenced when important planning decisions are made.

A brief summary of Air Quality issues within the East Ayrshire Council area is included in the following section. For further details and the background to LAQM issues reference should be made to previous Air Quality Reports submitted by East Ayrshire Council, in particular the 2010 to 2016 reports and associated Detailed Assessments (Reference 19). The reports give a background to Air Pollution throughout the East Ayrshire Council area and the progress made.

Reasons for non-compliance with air quality objectives throughout Scotland include:

- an increase in the diesel fleet over the last decade although there is now a recent trend back to petrol passenger cars;
- an increase in the total number of vehicles since 2004;
- a disparity between laboratory and real world emissions from vehicle engines;
- topography and spatial planning of urban areas creating street canyons, which can trap air pollution close to ground level;
- limited integration of air quality with other policies related to climate change and planning and;
- transboundary emission sources

The main area of concern for local air quality in the East Ayrshire Council area is the issue associated with vehicular traffic tailpipe emissions (principally from diesel engines), PM (particularly with regard to the fine PM fraction) and NO_x emissions in the following locations:-

1/ Kilmarnock Town Centre due to slow moving traffic in the one way system – PM and NO_x.

2/ Mauchline Cross due to slow moving and queuing traffic where the B743 Ayr to Sorn Road intersects the A76 Kilmarnock Dumfries Trunk Road – NO_x.

3/ A71 Kilmarnock to Edinburgh Road at Loudoun Road, Newmilns where a combination of vehicle numbers and narrowness of the road (canyon effect and interruption to traffic flow due to parked cars on both sides of the road allowing only one large vehicle to pass at a time with the resulting stationary vehicles) – NO_x.

4/ Stewarton Cross where four-way traffic lights results in queuing stationary traffic NO_x.

The other potential area of concern is the possibility that increased biomass combustion may lead to a deterioration in localised air quality. East Ayrshire Council Environmental Health Officers are experiencing increasing numbers of complaints from members of the public with regard to biomass combustion from, principally, log burners and incorrectly operated biomass boilers. To date this is more of a nuisance problem rather than an overall air quality problem but the overall impact may need to be investigated and possibly assessed in the future.

East Ayrshire Council Environmental Health has a close working relationship with the Planning Department and as air quality is a material consideration in the planning process, applicants have to ensure that developments or installations will either improve air quality or have a minimum impact on air quality. Our planning officers would, as a first step, ask any applicant to have pre-planning discussions with the Environmental Health Service. East Ayrshire Council Environmental Health Service's preferred option is that biomass should not be used in urban areas connected to the gas grid. This follows Scottish Government guidance. In certain circumstances, a formal objection may be considered. Furthermore, Environmental Health are minded to object to installations, which in our opinion may lead to nuisance complaints. It is our experience that poorly sited log burners and certain types of biomass boilers will almost certainly lead to justified neighbour complaints. Applications for biomass boilers which replace oil or coal installations, which may lead to an improvement in air quality, will be looked at favourably but will be screened using the biomass screening tool, and if necessary, the applicant will be required to carry out dispersion modelling as part of the application. A similar process would be required for new installations off the gas grid.

Updates of Planning Policy that relate to Air Quality

The local plan currently in force within the East Ayrshire unitary authority is the **East Ayrshire Council Local Development Plan (2017)** (Reference 11). It contains the following policy which is used to assess planning applications:-

Policy ENV12: Water, air, light and noise pollution. The part of the policy, which specifically refers to air quality, is as follows:-

Air

All developers will be required to ensure that their proposals have minimal adverse impact on air quality. Air quality assessments will be required for any proposed development which the Council considers may significantly impact upon air quality, either on its own or cumulatively. Air quality mitigation measures may be required through planning conditions and/or Section 75 Obligations. Development that will have a significant adverse impact on air quality will not be supported. In terms of implementation, this policy will be implemented in an ongoing manner over the next 5 years (from 3rd April 2017).

In conclusion this updated policy will ensure that developers will have to minimise the impact on air quality of any new development and if necessary enter into a legal agreement with East Ayrshire Council to ensure this is the case.

Other actions the local authority take to manage air quality are discussed in Section 2 and listed in Table 2.1a and Table 2.1b

As previously discussed Environmental Health work closely with our Planning Department with regard to air quality as well as a range of other environmental parameters, including noise. We also work with our colleagues in the Traffic section where changes in traffic flow are being considered and new developments are being planned which may have a significant impact on air quality. Often improvements which are introduced by our Traffic Section will also result in improvements in air quality e.g. smart traffic lights. Environmental Health also work with our colleagues in SEPA and Transport Scotland where we are often joint consultees. Where air quality issues arise in the planning process, EAC Environmental Health Service has pre-planning discussions with SEPA and then agree a response to the application. As an example in 2016 we had discussions with SEPA regarding the application at Killoch, Ochiltree for an energy from waste plant regarding background monitoring of PM by the applicant. Environmental Health also participate in joint working on an ad hoc basis.

Conclusion

Air Quality in the East Ayrshire Council area is generally good with low concentrations of PM_{10}, NO_2 and other pollutants that are subject to LAQM. The highest concentrations of PM_{10} and NO_2 arise at heavily trafficked locations in the more urban northern parts of the area, particularly within the congested areas in the centre of Kilmarnock. Road traffic and undefined “rural” sources are important sources of NO_2 in East Ayrshire whereas PM_{10} is predominantly derived from outside the local authority area. It is anticipated that the background concentrations of PM_{10}

and NO_2 will decline slightly over the coming years as a result of reduced transport emissions due to technological improvements and a continued decline in the use of coal for power generation within the UK. Measures implemented by East Ayrshire Council will also improve air quality and these are listed in Section 2. As surface coal mining is in decline within the local area (now down to one operational site) the impact on air quality has lessened substantially from this source.

Actions to Improve Air Quality

As previously mentioned air quality issues for new developments are targeted at the planning stage and ideally at the pre-planning stage. These actions allow applicants to mitigate air quality impacts before any development proceeds preventing problems occurring later. Where developments include biomass, the proposals are screened (as previously mentioned) and if problems are identified the applicant is asked to carry out dispersion modelling to include differing flue heights. This has proved successful in minimising local air quality impacts. Micro location is also discussed, as Environmental Health is finding problems where biomass is situated, for example close to trees and ground hollows, which can lead to localised nuisance issues. Low flue height in urban areas is also leading to problems. We also require the applicant to include a statement of best practice operation as part of the planning process.

Free flowing traffic is essential to minimise pollutant emissions from road transport hence the upgrading of the SCOOT system in Kilmarnock and its proposed introduction in Stewarton and Cumnock. Actions to encourage and promote use of public transport and in particular walking and cycling are also important in reducing private car usage. The council is also in the process of replacing ageing vehicles with less polluting electric vehicles and dual fuel vehicles. Travel Plans are also important and are a requirement of any new sizable development.

Another positive development for air quality is the decision to use geothermal well and ground source heat technology in preference to biomass heating for the proposed mixed-use housing/retail/leisure development on the old Johnnie Walker whisky bottling plant in Kilmarnock. This can only be positive for local air quality (Section 5, Planning Applications).

Actions taken at local and national level are producing a steady improvement in local air quality within East Ayrshire (Figures A.1 - A.7)

Local Priorities and Challenges

As previously mentioned air quality is of high importance within East Ayrshire Council and clean air will continue to be a priority when any new development is taking place. Challenges include squaring improvements in air quality with both climate change and economic development. The drive towards biomass based renewable technology to slow down climate change can lead to deteriorating air quality. UK road taxation policy (biased towards climate change) has, in the recent past, encouraged the

purchase of diesel cars over petrol cars and this has led to higher levels of PM and NO_x emissions. Although this is largely out with the control of local councils, procurement of the council vehicle fleet with the purchase of low emission vehicles can improve air quality and some large urban-based councils have differential parking charges to encourage cleaner fuels.

How to Get Involved

The public can obtain further information on air quality from East Ayrshire Council (EAC) Environmental Health. The website is currently being updated. The website will have links to websites with information on how the public can take steps to lessen their impact on air quality (e.g. Breathe Scotland) plus links to the Scottish Air Quality Database and access to all recent reports. Contact details of the officer responsible for air quality issues is also provided in the air quality report and this has led to direct contact from members of the public.

To summarise, the long term NO_2 levels in East Ayrshire (2007 – 2017) are showing a downward trend (Figures A.1 - A.5) and all monitoring locations were well below 40 µg/m^3 annual mean Air Quality Objective in 2017 (Table A.1 – A.5). Monitored PM_{10} levels in Kilmarnock town centre were substantially below the 18 µg/m^3 annual mean Air Quality Objective during 2017 and have been consistently below the Objective since 2012 using preferred TEOM FDMS or FIDAS technology (Reference 19).

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1. Local Air Quality Management

This report provides an overview of air quality in East Ayrshire Council during 2017. 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 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 East Ayrshire 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)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m^3	Annual mean	31.12.2010
Particulate Matter ($PM_{2.5}$)	10 µg/m^3	Annual mean	31.12.2020
Sulphur dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m^3	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Running 8-Hour mean	31.12.2003
Lead	0.25 µg/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 exceedence or likely exceedence 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.

East Ayrshire Council currently does not have any AQMAs. Due to the improvement in air quality within the East Ayrshire Council area, East Ayrshire Council has no plans at present to declare an AQMA. Measures to improve air quality have been carried out over a number years and many of these measures have been expanded over the years with new measures continually being added. East Ayrshire Council Environmental Health now has increasing involvement in the planning process, which helps ensure air quality is one of the prime considerations when new developments are planned. We are confident this process is working and has led to improvements in air quality.

2.2 Progress and Impact of Measures to address Air Quality in the East Ayrshire Council Area

East Ayrshire Council has taken forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures completed, in progress or planned, are set out in detail in Table 2.1a and 2.1b. More detail on these measures can be found in the East Ayrshire Transport Strategy (Reference 12). The most recent measures in progress are provided in Table 2.1a. with Table 2.b listing previous and ongoing initiatives. The numbering system in Table 2.1a corresponds with Table 2.1b

Table 2.1a – Progress on Measures to Improve Air Quality – Recent Initiatives Update

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3	Pool Bike Hire Scheme	Alternative to Private Vehicle Use/Promoting Travel Alternatives	A pool bike hire scheme is being rolled out for council employees for work related short journeys. Pannier top boxes are available to carry documents. Bikes are fitted with GPS trackers to determine which routes are most frequently used to allow targeting of new cycle lanes and plans are in place to roll out a bike hire scheme for the general public. Discounts are available for council employees to purchase bikes for home to work use. 2018: A business pool bike scheme has been recently introduced in central Kilmarnock via the Council office, and it is hoped this can be rolled out to other towns.	Safer Communities and Partner Businesses.	2015 - 2016	2016 onwards	No AQMA	Employee hire scheme underway in 2016. Four unisex electric assisted bikes and standard bikes available. 2018: Business pool bike scheme introduced in Kilmarnock.	Ongoing	**The Active Travel Hub can help!** EAC are offering free short term bike loans for East Ayrshire Council employees to use on their commute to work and to get between council buildings during the working day. 4 electric bikes are available which can be loaned for up to a maximum of 2 months **FREE OF CHARGE!** Essential cycle skills training, route planning and cycle buddies are also available from The Hub.
4	Active Travel Hub	Alternative to Private Vehicle Use/Promoting Travel Alternatives	The Council has established an Active Travel Hub in Kilmarnock to promote cycling and walking as an alternative to the car. Promote cycling through advertising, leaflets and maps to encourage cycling as an alternative to short car journeys and promote the health benefits of cycling. As part of this initiative the Council is introducing a Pool Bike Scheme to promote business cycle use and complement the Cycle to Work Scheme. Develop and adopt an EAC Travel Plan to encourage staff to use sustainable modes of transport in their work related travel. The Active Travel Officer will work with employers to promote cycling and walking as an alternative to commute by car. Requirement for the adoption of Travel Plans at all significant new retail,	Safer Communities, Economy and Skills	2015 - 2017	2017 onwards	No AQMA	2018: Ayrshire Roads Alliance have completed year 1 of their Active Travel Strategy	Ongoing	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
			commercial and residential developments. In the selection of locations for future development, preference will be given to areas that are, or have the potential to be, well integrated with walking, cycling and public transport networks. 2018: Ayrshire Roads Alliance have completed year 1 of their Active Travel Strategy. The Public Sector Climate Change Duties 2017 Summary Report: East Ayrshire Council Public Sector Climate Change Duties 2017 Summary Report: East Ayrshire Council strategy sets out plans, proposals and targets that aim to encourage and increase active travel. Working in partnership with Sustrans and the Kilmarnock Station Railway Heritage Trust and with funding from Scottish Governments Smarter Choices Smarter Places programme an Active Travel Hub has been be opened at Kilmarnock Railway Station. The Hub promotes and facilitates active travel whether for commuting or leisure purposes.							
17	School Travel Plans and Safer Routes to School Initiatives	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/ Public Information/ Transport	School Travel Plans reduce car use and promote more sustainable transport options for school journeys and identify ways to enable and encourage more walking, cycling, scooting and use of public transport. Schools are encouraged to take part in the Hands Up Scotland Survey(HUSS,) Big Pedal and Walk to school Week ICycle and Balanceability cycle training programmes are delivered in schools along with scooter training	Safer Communities and Economy and Skills			No AQMA	Operational and ongoing.	Ongoing	Operational and ongoing. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
		Planning and Infrastructure/Policy Guidance and Development Control	http://www.sustrans.org.uk/scotland/what-we-do/schools-and-universities/hands-scotland http://www.sustrans.org.uk/our-services/who-we-work/teachers/big-pedal http://www.icycle.org.uk/site/index http://www.balanceability.com/							
19	Fleet Review and Upgrading	Promoting Low Emission Transport/Vehicle Fleet Efficiency	A Fleet Review was carried out by the Energy Savings Trust on behalf of the Council in August 2015, which recommends savings in a number of areas including utilisation of electric vehicles, upgrading to best-in-class models, activating rev limiters and undertaking fuel efficient driver training. All recommendations are currently being implemented. 76 new vans are currently on order (2016), which comply with Euro 6 engine standards on emissions. The Transport Unit is also engaged in a number of other initiatives, including fuel efficiency programmes, green fleet management and driver awareness training. All new vehicles will be limited to a maximum of 60mph but depending on the size of the vehicle this lowers to 50mph and 40 mph.	Safer Communities	2015	2016-2018	No AQMA	2016: 76 Euro 6 vans on order 2017: 96 Euro 6 vans delivered; 100 vehicles in total. 2018: Euro 6 Refuse Vehicles replacing older vehicles.	Ongoing	Operational and ongoing. EAC are in a rolling program of updating the fleet and all new vehicles should adhere to the latest EU requirements for emissions and fuel consumption.
20	Driver Training	Vehicle Fleet Efficiency	200+ feel good driver training places were provided by the energy saving trust and started in August 2016. This will promote fuel efficient driving among council drivers. The Council has installed a new vehicle telematics system which includes feedback on driver behaviour. This should result in a reduction in vehicle emissions as it encourages drivers to drive more fuel efficiently. Other initiatives include green fleet management and driver awareness training.	Safer Communities	2016	2016 - 2017	No AQMA	Initial driver training completed. Fitment of telematics completed. Ongoing initiatives.	Completed	Telematics operational.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
21	Electric Vehicle Infrastructure	Promoting Low Emission Transport/Vehicle Fleet Efficiency	Additional funding has recently been secured from Transport Scotland to develop the infrastructure required to support electric vehicles (including charging points and bike racks) The Ayrshire Roads Alliance is currently investigating options in this area. 2018: The Council were awarded £285k from the Low Carbon Travel & Transportation Challenge Fund, which along with £150k match funding will allow the council to develop East Ayrshire's first EV charging hub at the Ayrshire Athletics Arena. It will include 4-5 rapid charge stations for 8-10 parking bays and have a solar canopy for sustainable charging. East Ayrshire Council will be applying for the recently announced Switched on Towns & Cities grant fund that offers successful bidders between £1.5m - £2.5m for extensive EV charging infrastructure and fleet development.	Safer Communities	2015	2016 onwards	No AQMA	Operational and ongoing. 2018: 14 operational charging points: Public Charging Points 11:- Kilmarnock 6; Stewarton 1; Auchinleck 1; Cumnock 1; New Cumnock 1; Dalmellington 1. Council Charging Points 3:- Kilmarnock 1; Crookedholm 1; Galston 1. 2018: £435k grant awarded.	Ongoing	Operational and ongoing.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
22	Purchase of Electric and diesel electric vans	Promoting Low Emission Transport/Vehicle Fleet Efficiency	Vehicle fleet - the Council has purchased a number of electric vehicles (7 vans (replaced diesel vans), 1 street sweeper, 8 walk-behind sweepers) and 2 hybrid (diesel/electric) 7.5 tonne vans, resulting in a significant fuel saving and lower emissions. Funding has been received for further electric vehicles and EAC Transport section is looking to maximise the amount of new electric vehicles they can procure. Added benefits of increasing numbers of electric vehicles are a reduction in noise levels. In 2017 Transport Scotland funded the purchase of another 3 Nissan ENV200 vehicles. They have an extended range of around 106 miles on a full charge, and can be re-charged in as little as 30 minutes. 2018: East Ayrshire Council has been awarded £38 from the Scottish Government Air Quality grant and has received £139k from Transport Scotland through their Switched on Fleets programme. East Ayrshire Council will be using these budgets jointly to convert a percentage of the fleet (cars and vans) to electric. The precise number will be in the region of 20 additional vehicles.	Safer Communities	2015	2016-2018	No AQMA	Purchased 2016. Ongoing. 3 new electric vans, Nissan ENV200, delivered in June 2017. 2018: 3 additional electric vans replaced 2 petrol cars and 1 diesel van. Awaiting delivery of 2 electric cars. 2018: £177k grant awarded.	Ongoing	Operational and ongoing.
23	Urban Traffic Control	Traffic management /Transport Planning and Infrastructure	The Council has a 'SCOOT' Urban Traffic Control System (UTCS) to manage 35 traffic signals in Kilmarnock town centre. SCOOT can reduce queuing and delays by up to 20% therefore reducing emissions. The system also incorporates priority for buses. The system was due to be upgraded in late 2016 but has been delayed to late	Safer Communities	2015	2017 - 2018	No AQMA	Installation due to start at the end of 2017. 2018: Kilmarnock UTCS now fully operational.	2018	Operational with upgrading of SCOOT system completed in 2018. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
			2017 and will then be further expanded to Cumnock and Stewarton town centres. The Council is also undertaking a programme of introducing 20mph areas. The Council also has decriminalised parking enforcement powers which are used to ensure effective traffic management by reducing indiscriminate and obstructive parking.							
40	Council's Energy Team	Promoting Low Emission Plant/ Promoting Low Emission Transport	Remit to focus on delivery of the energy efficiency savings set out within the Council's Transformation Strategy. Energy Management Strategy and Climate Change. The Head of Facilities and Property Management acts as the Council's "Energy Champion".	Safer Communities	2005 -	Refer to specific initiatives	No AQMA	Figures are produced annually by the Department of Energy and Climate Change (DECC) which seek to compare local authority areas utilising 'Per Capita Emissions' metrics. These show that since 2005 the emissions from the East Ayrshire Authority area have dropped from 6.8t CO2 per person to 4.5t CO2 per person in 2015, a reduction of 34%. Scotland's average emissions per person in 2015 was 6.1t CO2 per person, so in this respect East Ayrshire's emissions are considerably lower than average.	Ongoing	Ongoing. Part of the Energy Strategy and Carbon Management Programme.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
41	Low energy street and building lighting, reducing energy in buildings and housing stock.	Promoting Low Emission Plant	Reducing electricity consumption from the national grid and reducing energy consumption hence reducing emissions from power stations and boilers which reduces background pollutant levels. Reducing water and waste water consumption. Raising energy awareness with Council staff and members of the public. As an example pool covers were installed a cost of £24,000 (10 year lifetime) leading to a saving of approximately £28,000 per year. 2018: Energy Management - A range of actions to maximise the efficiency and benefits of existing Building Energy Management Systems have been undertaken to effect greater control over the heating and hot water systems in our estate. Work continues to upgrade our street lighting estate in addition to modifying our security lighting installations, within properties, taking advantage of LED and CCTV technologies thereby reducing, not only the burning hours of these installations, however, also reducing the electrical load when these systems are operating. A review of legacy winter frost protection protocols has also been undertaken which has resulted in CO2 and financial savings.	Safer Communities	2015 -	2015 -	No AQMA	Figures are produced annually by the Department of Energy and Climate Change (DECC) which seek to compare local authority areas utilising 'Per Capita Emissions' metrics. These show that since 2005 the emissions from the East Ayrshire Authority area have dropped from 6.8t CO2 per person to 4.5t CO2 per person in 2015, a reduction of 34%. Scotland's average emissions per person in 2015 was 6.1t CO2 per person, so in this respect East Ayrshire's emissions are considerably lower than average.		Operational and ongoing. Part of the Energy Strategy and Carbon Management Programme.

Table 2.1b – Progress on Measures to Improve Air Quality – Ongoing Initiatives

Measure No.	Measure	Category	Focus	Lead Authority	Comments
1	Walking and Cycling Networks	Alternative to Private Vehicle Use/Promoting Travel Alternatives	Provision of safe cycle lanes and pedestrian routes (Both dedicated and dual use) including East Ayrshire Strategic Cycle Network linked to National Cycle Network and East Ayrshire Core Paths Plan. EAC now has 40 km of cycle lanes (2014 year). Improved walking facilities between Kilmarnock bus and railway stations. Former railway lines have been converted to footpaths and cycle lanes Bring unadopted footways controlled by EAC up to an adoptable standard. Require developers to provide cycle facilities and links to the public network and/or the EAC Cycle Network as part of their developments (where appropriate).	Safer Communities	Ongoing. 40km of cycle lanes as of 2014. Details in East Ayrshire Local Transport Strategy (LTS).
2	Walking and Cycling Facilities	Alternative to Private Vehicle Use/Promoting Travel Alternatives	Provision of cycle parking in schools and all local authority buildings. Cycle lockers are also available at Kilmarnock and Cumnock bus stations and are also provided at Kilmarnock railway station.	Safer Communities, Economy and Skills, ScotRail, Stagecoach	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
3	Pool bike hire scheme	Alternative to Private Vehicle Use/Promoting Travel Alternatives	A pool bike hire scheme is being rolled out for council employees for work related short journeys. Pannier top boxes are available to carry documents. Bikes are fitted with GPS trackers to determine which routes are most frequently used to allow targeting of new cycle lanes and plans are in place to roll out a bike hire scheme for the general public. Discounts are available for council employees to purchase bikes for home to work use.	Safer Communities and Partner Businesses.	Ongoing. At present one unisex electric assisted bike and four standard bikes are available.
4	Active Travel Hub	Alternative to Private Vehicle Use/Promoting Travel Alternatives	The Council has established an Active Travel Hub in Kilmarnock to promote cycling and walking as an alternative to the car. Promote cycling through advertising, leaflets and maps to encourage cycling as an alternative to short car journeys and promote the health benefits of cycling. As part of this initiative the Council is introducing a Pool Bike Scheme to promote business cycle use and complement the Cycle to Work Scheme. Develop and adopt an EAC Travel Plan to encourage staff to use sustainable modes of transport in their work related travel. The Active Travel Officer will work with employers to promote cycling and walking as an alternative to commute by car. Requirement for the adoption of Travel Plans at all significant new retail, commercial and residential developments. In the selection of locations for future development, preference will be given to areas that are, or have the potential to be, well integrated with walking, cycling and public transport networks.	Safer Communities, Economy and Skills	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
5	Walking	Alternative to Private Vehicle Use/Promoting Travel Alternatives	The Scottish Outdoor Code means everyone has a right to be on most land and inland water for recreation, education and for going from place to place providing they act responsibly. Improve connectivity between houses, schools, shops places of work and public transport interchanges.	Safer Communities, Economy and Skills	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
6	Travel Infrastructure Improvements	Alternative to Private Vehicle Use/Promoting Travel Alternatives/Public Information/Transport Planning and Infrastructure	The Council has implemented a number of infrastructure improvements to promote public transport, walking and cycling. These include: upgraded bus stop facilities including shelters and real-time passenger displays; on and off-road cycle routes; pedestrian improvement schemes. Train and bus usage is promoted over car use.	Safer Communities	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
7	Active Travel Strategy	Alternative to Private Vehicle Use/Promoting Travel Alternatives	An Active Travel Strategy is also under preparation which will set out an action plan to deliver greater levels of active travel.	Safer Communities	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
8	Park and Ride Schemes	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives	Park and Ride facilities are car parks with connections to public transport that allow commuters and others wishing to travel to leave their personal vehicles in a car park and transfer to public transport for the rest of their journey. Park and Ride is currently operated in East Ayrshire by Scot Rail at New Cumnock, Auchinleck, Kilmarnock, Kilmaurs, Stewarton and Dunlop railway stations.	Safer Communities, Railway Station Operators	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
9	Car Sharing	Promoting Travel Alternatives/Public Information	East Ayrshire Council promotes car sharing to minimise emissions of carbon dioxide (climate change) and reduce emissions of pollutants.	Safer Communities	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
10	Bus and rail network service improvements	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Transport Planning and Infrastructure	Improvement to rail stock and bus renewal and upgrade, bus and rail station upgrades including lowered bus floors to ease access. Encourages use of public transport over private car usage.	Safer Communities Train and Bus Operators	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
11	Bus and rail network service improvements	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Transport Planning and Infrastructure	Increasing bus and rail frequency such as the half hourly service between Kilmarnock and Glasgow. Improving railway infrastructure maintenance to reduce delays.	Safer Communities, Train and Bus Operators	Half hour rail service introduced between Kilmarnock and Glasgow. Improvements ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
12	Improved bus services	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Transport Planning and Infrastructure	Bus services provided to supermarkets located out of town centre.	Safer Communities, Bus Operators	Operational. Details in East Ayrshire Local Transport Strategy (LTS).
13	Quality Bus Corridors	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Transport Planning and Infrastructure	Quality bus corridors and bus priority at traffic lights in Kilmarnock speed up public transport. Encourage usage by use of high quality bus shelters, timetable information panels and improved walking links from residential areas to the bus stops. Introduction of bus stop clearways at all marked bus stops to ensure parked vehicles do not obstruct the bus stops.	Safer Communities, Bus Operators	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
14	Use of new technology/ real time passenger information system	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Transport Planning and Infrastructure/Public Information	Electronic bus timetables and easily accessible electronic travel information (e.g. Downloadable timetables to smart phones encourage public transport usage).	Safer Communities, Bus Operators	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
15	Public Transport Ticket purchasing and discounts	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Public Information	Public transport tickets are easily purchased online and discounts are available for advance booking and multi journeys.	Bus and Train Operators	Operational. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
16	Partnership Working	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Public Information/Transport Planning and Infrastructure	Work with Strathclyde Partnership, NHS Ayrshire an Arran, public transport operators and community transport operators to improve and enhance public transport links to hospitals and other healthcare facilities and to improve the physical integration of public transport services.	Safer Communities and Partner Organisations,	Operational and ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
17	School Travel Plans and Safer Routes to School Initiatives	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Public Information/Transport Planning and Infrastructure/Policy Guidance and Development Control	School Travel Plans reduce car use and promote more sustainable transport options for school journeys and identify ways to enable and encourage more walking, cycling and use of public transport.	Safer Communities and Economy and Skills	Operational and ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
18	Travel Plans for new developments	Alternative to Private Vehicle Use/Promoting Low Emission Transport/Promoting Travel Alternatives/Public Information/Transport Planning and Infrastructure/Policy Guidance and Development Control	Travel Plans are specific to each location, taking account of the nature of the business, existing alternatives, and the types of journey that visitors and the workforce make. Travel plans typically include cycle parking; lockers and changing facilities; public transport timetable information on site; offering discounted public transport tickets; car sharing schemes; teleconferencing and working from home. Travel plans are required for all significant new developments, and large, existing employers are encouraged to adopt Travel Plans. The Council has appointed a Travel Co-ordinator to assist in the development of travel plans.	Safer Communities, Economy and Skills and developers.	Operational and ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
19	Fleet Review and Upgrading	Promoting Low Emission Transport/Vehicle Fleet Efficiency	A Fleet Review was carried out by the Energy Savings Trust on behalf of the Council in August 2015, which recommends savings in a number of areas including utilisation of electric vehicles, upgrading to best-in-class models, activating rev limiters and undertaking fuel efficient driver training. All recommendations are currently being implemented. 76 new vans are currently on order, which comply with Euro 6 engine standards on emissions. The Transport Unit is also engaged in a number of other initiatives, including fuel efficiency programmes, green fleet management and driver awareness training. All new vehicles will be limited to a maximum of 60mph but depending on the size of the vehicle this lowers to 50mph and 40 mph.	Safer Communities	Operational and ongoing.

Measure No.	Measure	Category	Focus	Lead Authority	Comments
20	Driver Training	Vehicle Fleet Efficiency	200+ feelgood driver training places have been received by the energy saving trust, due to start in August. This will promote fuel efficient driving among council drivers. The Council is currently installing a new vehicle telematics system which includes feedback on driver behaviour. This should result in a reduction in vehicle emissions as it encourages drivers to drive more fuel efficiently.	Safer Communities	Telematics installation underway and driver training starting in August 2016.
21	Electric Vehicle Infrastructure	Promoting Low Emission Transport/Vehicle Fleet Efficiency	Additional funding has recently been secured from Transport Scotland to develop the infrastructure required to support electric vehicles (including charging points and bike racks) The Ayrshire Roads Alliance is currently investigating options in this area.	Safer Communities	Operational and ongoing.
22	Purchase of Electric and diesel electric vans	Promoting Low Emission Transport/Vehicle Fleet Efficiency	Vehicle fleet - the Council has purchased a number of electric vehicles (7 vans (replaced diesel vans), 1 street sweeper, 8 walk-behind sweepers) and 2 hybrid (diesel/electric) 7.5 tonne vans, resulting in a significant fuel saving and lower emissions. Funding has been received for further electric vehicles and EAC Transport section is looking to maximise the amount of new electric vehicles they can procure. An added benefit of increasing numbers of electric vehicles are a reduction in noise levels.	Safer Communities	Purchased 2016. Ongoing.
23	Urban Traffic Control	Traffic management/Transport Planning and Infrastructure	The Council has a 'SCOOT' Urban Traffic Control system to manage 35 traffic signals in Kilmarnock town centre. SCOOT can reduce queuing and delays by up to 20% therefore reducing emissions. The system also incorporates priority for buses. The system will be upgraded in 2016 and will be further expanded to Cumnock and Stewarton town centres. The Council is also undertaking a programme of introducing 20mph areas. The Council also has decriminalised parking enforcement powers which are used to ensure effective traffic management by reducing indiscriminate and obstructive parking.	Safer Communities	Operational with upgrading of SCOOT system due in 2016. Details in East Ayrshire Local Transport Strategy (LTS).
24	Improvements to interchanges and junctions etc.	Traffic management/Transport Planning and Infrastructure	Improve traffic flow.	Safer Communities	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
25	Provide a high standard of road maintenance and winter gritting	Traffic Management/Transport Planning and Infrastructure	Ensure traffic is free flowing.	Safer Communities	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
26	Electronic car park direction.	Traffic Management/Public Information/Transport Planning and Infrastructure	Electronic car park direction signing scheme incorporates eight Variable Message Signs (VMS) are operational at key locations to reduce congestion.	Safer Communities	Operational. Details in East Ayrshire Local Transport Strategy (LTS).
27	Road closures, traffic delays and rail transport delays information available to public.	Traffic Management/Public Information	Information on transport delays is now easily available online to inform the public to prevent unnecessary journeys.	Safer Communities	Operational and Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
28	Adequate car parking provision	Traffic management/Transport Planning and Infrastructure	Prevent unnecessary vehicle use finding a parking space and prevents inconsiderate on street parking.	Safer Communities	Operational and ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
29	Parking Attendants	Traffic Management	Discourages inconsiderate parking which reduces congestion and hence reduces vehicle emissions and improves air quality.	Safer Communities	Operational and ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
30	Speed reductions on some routes. Enforcement of speed limits with speed cameras, traffic calming measures, speed traps etc.	Traffic management/Transport Planning and Infrastructure	Speed reductions in general lowers vehicle emissions.	Safer Communities Police Scotland	Operational and ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
31	Construction and promotion of road by-passes on strategic routes	Traffic management/Transport Planning and Infrastructure	To improve air quality in congested towns	Safer Communities and Transport Scotland	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
32	Loading Bays	Freight and delivery management	Key locations on busy roads are provided with loading bays to ensure opportunities for effective servicing.	Safer Communities	Operational. Details in East Ayrshire Local Transport Strategy (LTS).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
33	Rail Passenger and Freight Transport	Freight and Delivery Management/Policy Guidance and Development Control/Promoting Low Emission Transport/ Promoting Travel Alternatives/Transport Planning and Infrastructure	Promote re-opening of closed railway stations to encourage public transport use. Sustainable Freight Transport is encouraged by maximising the use of rail transport.	Safer Communities, Economy and Skills and Partner Organisations.	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
34	Local Transport Strategy/Regional Transport Strategy/National Transport Strategy Linkage	Transport Planning and Infrastructure	Ensure LTS is linked to RTS and NTS and national outcomes.	Safer Communities and Economies and Skills	Ongoing. Details in East Ayrshire Local Transport Strategy (LTS).
35	Roads guide and street design	Policy guidance and development control	The Council has formally adopted the National Roads Development Guide and Designing Streets, and planning for sustainable modes is at the forefront of development control and planning for new developments.	Safer Communities and Economy and Skills	Adopted.
36	Minimising adverse impact on air quality	Policy guidance and development control	All developers will be required to ensure that their proposals have minimal adverse impact on air quality. Air quality assessments will be required for any proposed development which the Council considers may significantly impact upon air quality, either on its own or cumulatively. Development that will have a significant adverse impact on air quality will not be supported.	Economy and Skills	Adopted. Policy guidance on air quality due to be updated. State of the Environment Report.
37	Minimising noise nuisance	Policy guidance and development control	All new development must take full account of any Noise Action Plan and Noise Management Areas that are in operation in the area and ensure that significant adverse noise impacts on surrounding properties and uses are avoided. A noise impact assessment may be required in this regard and noise mitigation measures may be required through planning conditions and/or Section 75 Obligations.	Economy and Skills	Adopted Policy on noise due to be updated.
38	Smoke Control Areas	Policy guidance and development control	East Ayrshire has two smoke control areas the Grange Estate, Kilmarnock and the Crossdene Estate, Crosshouse. Reduces smoke emissions in residential areas.	Economy and Skills	Adopted. Only approved solid fuel appliances can be installed.

Measure No.	Measure	Category	Focus	Lead Authority	Comments
39	Minimising dust from coal extraction	Policy guidance and development control	As part of the Environmental Statement an Environmental Impact Assessment is undertaken of all impacts that coal extraction will have on the environment. Part of the Environmental Assessment includes an Air Quality Assessment. They are all similar in nature. The potential rise in PM is assessed from coal extraction, handling and transport. Coal handling processes at the mines are subject to control under Section 3.4 Part B of Schedule 1 of the Pollution Prevention and Control (Scotland) Regulations 2000. Mine support area and coal handling operations are subject to "Part B" regulation by SEPA and authorisation is required to be varied when any of the extensions to currently operating surface mines are approved. All applications have submitted an Environmental Impact Assessment incorporating an Air Quality Assessment as part of the planning application. Proposed dust mitigation measures are also submitted as part of the application. With these mitigation measures in place, the majority of dust will be controlled at source. East Ayrshire Council have a transportation of coal by road protocol which addresses issues such as dust suppression measures in terms of the use of wheel and body washing, sweeping of public roads and the dampening of internal haul roads during dry and windy weather conditions.	Economy and Skills	Adopted. State of the Environment Report. Ayrshire Joint Structure Plan. Approved by Scottish Ministers on 22 November 2007 and forms the Structure Plan for the three Ayrshire Councils. **Visit the Ayrshire Joint Planning Unit website to find out more. East Ayrshire Local Plan. The East Ayrshire Local Plan 2010 was adopted by the Council on October 26, 2010. East Ayrshire Opencast Coal Subject Plan A separate Opencast Coal Subject Plan** dealing exclusively with opencast coal was adopted by the Council in March 2003. Local Development Plans. The Council has started production of a new East Ayrshire Local Development Plan. A separate Minerals Local Development Plan will also be produced. Once these plans are adopted, they will become the new development plan for East Ayrshire. A structure plan is no longer required for Ayrshire with local development plans instead covering strategic issues. Find out more about Local Development Plans. Find out more about supplementary planning guidance for East Ayrshire **Long term planning policies** Find out more about long term planning policies for East Ayrshire

Measure No.	Measure	Category	Focus	Lead Authority	Comments
40	Council's Energy Team	Promoting Low Emission Plant/ Promoting Low Emission Transport	Remit to focus on delivery of the energy efficiency savings set out within the Council's Transformation Strategy. Energy Management Strategy and Climate Change. The Head of Facilities and Property Management acts as the Council's "Energy Champion".	Safer Communities	Operational and ongoing.
41	Low energy street and building lighting, reducing energy in buildings and housing stock.	Promoting Low Emission Plant	Reducing electricity consumption from the national grid and reducing energy consumption hence reducing emissions from power stations and boilers which reduces background pollutant levels. Reducing water and waste water consumption. Raising energy awareness with Council staff and members of the public. As an example pool covers were installed a cost of £24,000 (10 year lifetime) leading to a saving of approximately £28,000 per year.	Safer Communities	Ongoing. Part of the Energy Strategy and Carbon Management Programme.
42	Procurement	Promoting Low Emission Plant	Ensure procurement of goods and services that are energy efficient.	Governance	Ongoing. Part of the Energy Strategy and Carbon Management Programme.
43	Renewable Energy	Promoting Low Emission Plant	Develop the use of renewable energy including solar, biomass, wind and other renewable solutions including district heating systems.	Safer Communities	Operational and ongoing. Biomass use can conflict with air quality if replacing gas. Part of the Energy Strategy and Carbon Management Programme.
44	Update to Local Transport Strategy	Policy guidance and development control	To provide a local transport strategy fit for the forthcoming years and building on the progress achieved to date.	Safer Communities	Due for updating
45	Environmental Permits	Environmental Permits	Environmental Permits are issued by SEPA but in consultation with Environmental Health as joint consultees.	SEPA	Ongoing.

2.3 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 http://www.gov.scot/Publications/2015/11/5671/17. Progress by East Ayrshire Council against relevant actions within this strategy is demonstrated below.

2.3.1 Transport – Avoiding travel – T1

East Ayrshire Council does not have a corporate travel plan. What it does have is a series of travel plans and initiatives which have been implemented over the years. These have helped to decrease the number of car journeys within the East Ayrshire Council area with the benefit of reducing pollutants and improving air quality. These measures are wide and varied and include the establishment of an active travel hub to promote cycling and walking, park and ride facilities, promoting car sharing, quality bus corridors and priority for buses at traffic lights, school travel plans, travel plans for new development, promoting rail for passengers and freight etc. An Active Travel Strategy is also underway. These measures are included in the Table 2.1a. and 2.1b.

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

East Ayrshire Council does not have a Sustainable Energy Action Plan. What it does have is an Energy Strategy and Carbon Management Programme (Reference 13).
EAC complete further sustainability reporting and this can be accessed at the link below:

http://www.keepscotlandbeautiful.org/sustainability-climate-change/sustainable-scotland-network/major-players-and-climate-change-reports/?cid=2

Vision Statement:

*"**East Ayrshire Council***
*is committed to reducing its **Carbon Emissions***
*and will put CO2 emissions reduction at the **core of its business activities**"*

The Council has produced a State of the Environment Report as part of its work for a new Minerals Development Plan. Its 10 detailed chapters considers geology and soils, landscape, ecology, air quality, water environment, climate change, cultural heritage population and human health, noise and material assets. The Minerals Plan includes significant proposals to help tackle the environmental damage caused by the liquidation of two open cast coal operators in 2013/14, link;

https://www.east-ayrshire.gov.uk/Resources/PDF/M/MLDP-Main-Issues-Report.pdf.

Air quality concerns are addressed at the planning stage but sometimes a balance has to be struck between measures that are seen as having a positive effect with regards to climate change but a negative effect with regards to air quality. Biomass combustion is one particularly difficult area and Environmental Health's preference is to follow Scottish Governments advice in that biomass should not be used in urban areas where mains gas is available. Our aim is to achieve a common goal.

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

3.1 Summary of Monitoring Undertaken

Maps showing the location of the monitoring sites are provided in Figures G.4 – G.11. Monitoring data is provided in Appendix A, Tables A.1 – A.8 and Appendix B and any trends in Figures A.1 – A.7. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how local concentrations of the main air pollutants compare with the objectives.
East Ayrshire Council undertook automatic (continuous) monitoring at one site during 2017. Table A.1 in Appendix A shows the details of the site. National monitoring results are available at http://www.scottishairquality.co.uk/. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

East Ayrshire Council undertook non - automatic (passive) monitoring of NO_2 at 34 sites during 2017. Table A.2 in Appendix A shows the details of these sites.
Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C

3.2 Individual pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3. Table A.4 sets out the predicted annual mean NO_2 at actual receptors.
For diffusion tubes, the full 2017 dataset of monthly mean values is provided in Appendix B. Due to concerns with the variability of the December data it was decided to exclude the full month's data from the final data set. Data shaded in blue was excluded Appendix B).

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the Air Quality Objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Please refer to Appendix A.

No exceedences of the annual mean or the hourly mean Air Quality Objectives for NO_2 occurred at any location where monitoring was undertaken within the East Ayrshire Council area during 2017. Indeed no annual mean NO_2 exceedence has occurred since 2010 (Reference 19). Automatic monitoring at St. Marnock Street indicated an annual mean of 29 µg/m^3 and the maximum NO_2 level recorded at any NO_2 diffusion tube site was 33.7 µg/m^3 at West George Street, Kilmarnock, both well within the annual mean Air Quality Objective of 40 µg/m^3 (Table A.3). The maximum NO_2 level predicted at any receptor was 31.4 µg/m^3 at West George St. (which has one domestic property) and 95/97 John Finnie St., Kilmarnock, again well within the annual mean Air Quality Objective of 40 µg/m^3 (Table A4). No exceedences of the NO_2 hourly mean occured at the St. Marnock St. automatic monitoring station during 2017 (Table A.5) and since no roadside located NO_2 tubes exceeded 33.7 µg/m^3 it is highly unlikely that any location within the East Ayrshire Council area would have exceeded the hourly mean since only annual means greater than 60 µg/m^{3}are likely to indicate exceedence of the hourly mean (Reference 6). No hourly mean NO_2 exceedences have occurred since 2014 (Reference 19).

Four NO_2 diffusion tubes have also been located within Kilmarnock bus station as part of a project by a MSc. student in Environmental Health. The results from these additional NO_2 diffusion tubes will be discussed in the 2019 APR once a full year's data is completed. It should be noted that the bus station is not an area where LAQM NO_2 annual mean or hourly mean levels apply, as people only tend to spend a short time within the bus station. Initial results (Table A.3) have indicated that NO_2 levels are between the mid-40's to mid-50's µg/m^3 NO_2. Although LAQM NO_2 objectives are not applicable within the bus station Environmental Health are conscious that passengers and workers should not be subject to excessive levels of pollutants and in this respect Environmental Health have been in contact with the bus operator regarding idling buses and this has led to a reduction in idling along with improvement in levels. This has been assisted by the replacement of 28 older buses on the Ardrossan – Irvine – Kilmarnock run by Euro 6 buses which have considerably lower emissions and also having the benefit that the engines switch off automatically when the buses are stationary in the bus stance. It should also be noted that the bus station is due for a major upgrade.

Relevant Exposure

Diffusion tube monitoring can only give an estimate of the annual mean level of NO_2, therefore objectives should only apply at locations where members of the public

might be regularly exposed such as building facades of residential properties, schools, hospitals, care homes etc. Tube locations are often limited by practical implications such as a suitable mounting point (e.g. lamp post etc.) and often they are nearer the kerb than would be ideal. Table A4 illustrates the extrapolated NO_2 levels from the kerbside and roadside data computed using The NO_2 With Distance From Roads Calculator (Reference 7):-

Cz = ((Cy - Cb) / (-0.5476 x Ln(Dy) + 2.7171)) x (-0.5476*Ln(Dz) + 2.7171) + Cb

Where:

Cz is the total predicted concentration (µg/m^3)at distance Dz;
Cy is the total measured concentration (µg/m^3) at distance Dy;
Cb is the background concentration (µg/m^3);
Dy is the distance from the kerb at which concentrations were measured; and
Dz is the distance from the kerb at which concentrations are to be predicted.
Ln(D) is the natural log of the number D.

1-Hour Mean

Diffusion tubes can only be used to measure the annual mean NO_2 level. Previous research carried out on behalf of DEFRA and the Devolved Administration (Reference 5,Laxen D and Marener B (2003)) identified a relationship between the annual mean and the 1-hour objective, such that exceedences of the latter were considered unlikely where the annual mean was below 60 µg/m^3. An updated analysis (Reference 6, Cook A (2008)) has been carried out taking into account new monitoring data collected over the period 2003-2007. This new analysis has identified a number of exceedences of the 1-hour mean objective where annual mean were below 60 µg/m^3. The majority of these occurrences were recorded at kerbside and roadside sites, and were at sites within South-East England (and in particular within Greater London), but not exclusively so. A large number of these exceedences were associated with a regional pollution event that occurred over several days in December 2007. If these latter exceedences are excluded the number of exceedences of the 1-hour mean where annual mean are below 60 µg/m^3, is extremely limited. On the basis of this evidence, the guidance remains unchanged and authorities may assume that exceedences of the 1-hour mean objective are only likely to occur at locations where annual mean concentrations are 60 µg/m^3 and above. Annual mean levels of NO_2 are well below 60 µg/m^3 throughout all monitoring sites within East Ayrshire (Table A3 and A4) and we can therefore conclude no exceedences of the one hour mean objective are likely at locations of relevant public exposure (any outdoor location where members of the public might reasonably be expected to spend one hour or more e.g. pavements of busy shopping streets etc.)

As previously noted, NO_2 levels at the building facade were at a maximum of 31.4 µg/m^3 at 95/97 John Finnie St., Kilmarnock and 16 West George Street, Kilmarnock.

All other NO_2 levels at building facades were below 30 µg/m^3, significantly below the 40 µg/m^3 annual mean Air Quality Objective. Indeed one of the long term monitoring location in Kilmarnock Town Centre, 96 John Finnie St., has predicted NO_2 levels at the building façade of 20.6 µg/m^3 (26.4 µg/m^3 at the roadside) in 2017 just over half the 40 µg/m^3 annual mean objective. The four long term NO_2 diffusion tube monitoring sites (Figures A.3 – A.4) indicate a significant downward trend from 2007 to 2017. Factors which may be contributing to this trend are:-

1/ Daily vehicle numbers have reduced from 17,000 in 2007 to around 14,000 in 2015 in John Finnie Street due in part to the recession and the closure of the Johnnie Walker Whisky bottling plant.

2/ Measures introduced by East Ayrshire Council to Improve Air Quality - listed in Table 2.1a. and 2.1b, including smart traffic lights (SCOOT) installed in Kilmarnock town centre, active travel strategy etc.

3/ The possibility that stop start vehicle engine technology may be reducing emissions at traffic lights in the town centre where vehicles are stationary and often where diffusion tubes are located.

4/ Possible improvement in vehicle emission technology, although this is patchy (Reference 21) Euro 6 (VI) technology would seem to be providing a significant improvement.

5/ Relatively mild winter weather patterns since the cold winters of 2009/10 and 2010/11 which resulted in raised levels of NO_2 and PM_{10}. It is worth noting that Scotland experienced a relatively prolonged cold spell during the end of 2017 and continued into the spring of 2018. This has led to a short-term rise in NO_2 concentrations. This is similar but less pronounced than the cold winters of 2010/2011 with the proviso that the peaks are considerably lower due to the improving long term trend.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 18µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year.

No exceedences of the annual mean Air Quality Objective occurred at the St. Marnock St. monitoring site during 2017 with annual mean levels of 11 µg/m^3 using FIDAS technology, well below the 18 µg/m^3 Scottish Air Quality Objective. There were no exceedences of the 24-hour mean Air Quality Objective.

Although only five years of PM_{10} data are available for the St. Marnock St. monitoring station it can be clearly established that data obtained using the preferred PM_{10} TEOM FDMS or FIDAS technology indicate that PM_{10} levels from 2014 to 2017 (Reference 19), at between 10 and 14 µg/m^3, are comfortably within the 18 µg/m^3 annual mean Air Quality Objective (Table A.6). Similarly no exceedences of the 24-hour mean have occurred since 2014 (Table A.7). Figures A.6 and A.7 indicates the PM_{10} trend between 2012 and 2017, measured at the Kilmarnock, St. Marnock Street Monitoring Station. Although the trend is noticeably downwards it should be noted that a change of monitor occurred in August 2016 when the BAM 1020 was replaced with a Fidas monitor.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 2 years with the air quality objective of 10µg/m^3.

A $PM_{2.5}$ monitor was installed in St. Marnock St. during August 2016. Using a conservative factor of 0.7 (Reference 27) to estimate the $PM_{2.5}$ within the East Ayrshire Council area, an estimate was made of $PM_{2.5}$ levels within Kilmarnock. During 2015 PM_{10} annual mean readings of 11 µg/m^3 (TEOM FDMS) and 14 µg/m^3 (BAM) were recorded. Using the 0.7 factor results in an estimate of $PM_{2.5}$ between 7.7 µg/m^3 and 9.8 µg/m^3. Historical monitoring of PM_{10} from 2012 to 2015 using TEOM FDMS technology produced annual mean readings of between 10 µg/m^3 and 15 µg/m^3 giving estimated $PM_{2.5}$ levels of 7.0 µg/m^3 to 10.5 µg/m^3. Since the annual mean Air Quality Objective for $PM_{2.5}$ is 10 µg/m^3 potential estimates of $PM_{2.5}$ could lead to exceedence of the 10 µg/m^3 annual mean Air Quality Objective. Monitoring is therefore essential to determine whether this is the case. Monitoring commenced in August 2016. No exceedences of the annual mean $PM_{2.5}$ Air Quality Objective occurred at the St. Marnock St. monitoring site during 2017 with annual mean levels of 6 µg/m^3 using FIDAS technology (Table A8).

3.2.4 Sulphur Dioxide (SO_2)

No Sulphur Dioxide monitoring was carried out in East Ayrshire in 2017. Monitoring was discontinued in 2005 due to the very low levels recorded. Previous monitoring of sulphur dioxide indicated that no exceedences of Air Quality Objectives were found or predicted. Previous assessment of sources of sulphur dioxide concluded that no exceedences of Air Quality Objectives were likely due to the reduction in domestic coal usage and industrial sources.

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3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

No other pollutants, included in the Regulations for the purpose of Local Air Quality Management in Scotland, were monitored by East Ayrshire Council in 2017 as previous monitoring or assessments concluded that no exceedences of Air Quality Objectives were found or predicted.

4. New Local Developments

East Ayrshire Council confirms that there are no new or newly identified **Local Developments**, since the 2016 APR, which may have a significant impact on air quality within the Local Authority area.

East Ayrshire Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources**

5. Planning Applications

Only one large-scale application, which has the potential to affect air quality, is at present being considered in the planning process, namely the Halo Development on land previously used as the Johnnie Walker Whisky Bottling Plant at Balmoral Road/Hill Street/Witch Road, Kilmarnock KA1 3HY.

APPLICATION NO:	**17/0865/PPP**
PROPOSAL:	Mixed-Use Development Comprising Enterprise & Innovation Centre, Live/Work Studio, Urban Wave/Surf Leisure Swimming Pool (including Children's Innovation Hub Nursery)(Class 11), Light Manufacturing (Class 5/6), Office (Class 4), Ancillary Retail (Class 1), Food & Drink (Class 3), Residential Affordable Housing (33.3% quotient), Renewable Energy Centre, Place of Worship (Class 10), Sustainable District Heating Network (Geothermal Deep Well Technology), Urban Park/Landscaping, Road & Infrastructure Improvements.
ADDRESS:	Land at Balmoral Road/Hill Street/Witch Road, Kilmarnock. KA1 3HY

The Masterplan comprises the following development content over 9.87Ha:

- 210 residential Units
- 26 Live / Work Units
- 5,000 Sq metre Innovation Centre
- 3,000 Sq metre Office
- 3,500 Sq metre Leisure Building
- Local Retail
- Energy Centre
- Religious Facility
- Lorry Park

Environmental Impact Assessment

There is no requirement to undertake a formal Environmental Impact Assessment (EIA). Following telephone conversations with East Ayrshire Council Planning staff a formal letter was issued by the council on October 10th 2017 which stated that "the proposed development will not require to be the subject of a formal Environmental Impact Assessment." The letter identified the three key issues to focus on as being:

- Transport impacts on the surrounding roads network
- Surface water management and drainage impacts
- Air Quality Issues

It is recommended that these three issues are covered at the Planning application stage. All three may normally be covered within an EIA but in this instance should be commissioned and presented as standalone reports.

The development has been agreed in principle and the air quality impacts will be assessed once the development progresses to the planning application stage and a formal air quality impact assessment is submitted to the council. It should be emphasised that the heating will be provided by a geothermal well and ground source heat technology rather than biomass combustion, which can only be positive for local air quality.

The geothermal well will be 2 km deep and provide a district heating network alleviating fuel poverty. 40 kw of heat will be generated for each kw of electricity. Peak heat output of 400 – 600 kw/hr at 60 ^{o} C boosted to 80 ^{o} C with ground source heat pump technology. This will be the first in Scotland for 50 years and will save 750,000 kg CO_2 per annum.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

New monitoring has not identified any new exceedences of the objectives for any pollutant.

Both automatic and passive monitoring for NO_2 carried out during 2017 resulted in no exceedences of the annual mean Air Quality Objective at all monitoring locations within East Ayrshire (Tables A.1 – A.8) where LAQM applies. All LAQM monitoring sites were at 33.7 µg/m^3 (maximum 31.4 µg/m^3 at receptor) or below during 2017. All sites were therefore comfortably below the 40 µg/m^3 annual mean Air Quality Objective. The automatic monitor recorded an annual mean NO_2 level of 29 µg/m^3 which is the 5th consecutive year at or below 30 µg/m^3. Similarly, no exceedences of the hourly mean were recorded for the third year in succession. As mentioned previously it is worth noting that Scotland experienced a relatively prolonged cold spell during the end of 2017 which continued into the spring of 2018. This has led to a short term rise in NO_2 concentrations. This is similar but less pronounced than the cold winters of 2009/2010 and 2010/2011 with the proviso that the peaks are considerably lower due to the improving long term trend.

Automatic monitoring of PM_{10} at the St. Marnock Street monitoring site using FIDAS technology (Tables A.6 and A.7) indicated an annual mean level of 11 µg/m^3, significantly below the 18 µg/m^3 annual mean Air Quality Objective. This is now the 3rd year in succession recorded PM_{10} levels have been well below the annual mean Objective. No exceedences of the PM_{10} 24-hour Mean (50 µg/m^3) occurred during 2017, the third year in succession.

$PM_{2.5}$ monitoring commenced at the St. Marnock St., Kilmarnock monitoring site in August 2016 and recorded levels during 2017 indicated an annual mean of 6 µg/m^3, significantly below the 10 µg/m^3 annual mean Air Quality Objective (Table A8).

There has been a significant downward trend in diffusion tube measured NO_2 annual mean (Tables A.3, Figures A.3 and A.4, long term monitoring sites) since 2007 with no exceedences of the annual mean since 2010. The annual mean PM_{10} levels (Table A.7) have been consistently below the annual mean objective since 2012 when measured using TEOM FDMS and FIDAS technology (Reference 19).

Since PM_{10} and NO_2 annual mean levels have exceeded the objective levels in past years, further monitoring is necessary to determine whether the downward trend is consistent and air quality objectives are being met, although this would seem to be the case. As mentioned in Section 3 $PM_{2.5}$ levels will be monitored to ascertain actual levels as predicted levels using the conservative 0.7 factor suggest levels may be close to the annual mean Air Quality Objective, although initial monitoring suggest levels are well within the limits (Table A.8).

6.2 Conclusions relating to New Local Developments

There is only one new local development (since the submission of the 2016 APR) which has the potential to have a significant impact on air quality within the East Ayrshire Council area, namely the Halo Development in Kilmarnock, and is summarised in Section 5 Planning Applications. The air quality impact from the development will be covered at the planning application stage.

All the following have been considered for any proposed development:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

All planning applications with sources which have the potential to impact on air quality will first of all be screened using appropriate guidance including LAQM (TG16), EPUK and the Royal Town Planning Institute Scotland guidance, and if this indicates significant potential air quality issues the applicant will be asked to submit a detailed assessment.

6.3 Proposed Actions

New monitoring has not identified any new exceedences of the objectives for any pollutant.

Further automatic monitoring for NO_2 will continue within Kilmarnock town centre to ascertain whether the downward trend in NO_2 is for the long term and Air Quality Objectives continue to be met. Further automatic monitoring for PM_{10} and $PM_{2.5}$ will be continued within Kilmarnock town centre to ascertain whether the Air Quality Objectives continue to be met and also to determine future trends.

Diffusion tube monitoring for NO_2 will also continue throughout East Ayrshire where it is deemed likely that levels are sufficiently high to warrant this (Table A.3 and A.4). In this respect monitoring is likely to be concentrated within Kilmarnock Town Centre, Loudoun Road, Newmilns, around Mauchline Cross and Stewarton Town Centre. Other sites are likely to be de-commissioned as several years monitoring has indicated levels of NO_2 are well below Air Quality Objectives.

In the future if any location is subject to substantial change, e.g. substantial change in traffic flow, NO_2 diffusion tubes will be used as a screening tool to back up any air quality assessment. With regard to the new learning campus at Knockroon, NO_2 tubes have been located to ascertain pre-development NO_2 levels and will be kept in place to ascertain the actual air quality impact due to the development. Additional NO2 tubes have been located at Polnessan to ascertain whether 40 mph average speed cameras are having an effect on NO_2 levels. NO_2 tubes have also been

located at the recently built Ayrshire College and William McIlvanney School Campus to ascertain levels at these learning campuses. NO_2 Tubes have also been located at houses in close proximity to the bus garage in Kilmarnock as part of a complaint investigation from a nearby resident. Four NO_2 diffusion tubes have also been located within Kilmarnock bus station as part of a project by a MSc. student in Environmental Health. The results from these additional NO_2 diffusion tubes will be discussed in the 2019 APR once a full year's data is completed. As previously discussed, it should be noted that the bus station is not an area where LAQM applies with regard to NO_2 as people only spend a short time within the bus station, Environmental Health have been in contact with the bus operator regarding idling buses and this has led to a reduction in idling along with improvement in levels. This has been assisted by the replacement of 28 older buses on the Ardrossan – Irvine – Kilmarnock run by Euro 6 buses which have considerably lower emissions and also having the benefit that the engines switch off automatically when the buses are stationary in the bus stance.

A funding claim submitted to the Scottish Government has been successful for an AQ mesh pod which will initially be used to monitor real-time PM levels and NO_2 levels at the new Knockroon School Campus.

East Ayrshire Council will continue to monitor PM_{10} and $PM_{2.5}$ to ensure compliance with the Scottish Air Quality Objectives and ascertain whether predicted downward trends will materialise.

The next course of action for East Ayrshire Council will therefore be the submission of the 2018 Annual Progress Report, implementation of measures in progress (Table 2.1a and 2.1b) and the introduction of new measures to reduce pollutant levels will continue.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
A3	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	242742	637705	NO_2	N	Chemiluminescent	0	3.18	2.13
					$PM_{2.5}$, PM_{10}	N	FIDAS	0	3.54	2.30

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?
DT1	Fowlds Street/King Street Junction, Kilmarnock	Kerbside	242805	637620	NO_2	N	2.57	0.43	N
DT2	8 John Finnie Street., Kilmarnock	Roadside	242715	638135	NO_2	N	0.21	3.37	N
DT3	23 Lainshaw Street, Stewarton	Roadside	241901	645818	NO_2	N	2.35	0.70	N
DT4	40 Main Street, Newmilns	Roadside	253601	637310	NO_2	N	0.60	2.50	N
DT6	8A Kilmarnock Road, Mauchline	Roadside	249826	627335	NO_2	N	2.32	0.36	N
DT11	96 John Finnie Street,	Roadside	242656	637874	NO_2	N	3.73	0.47	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?
	Kilmarnock								
DT12	74 John Finnie Street, Kilmarnock	Roadside	242668	637929	NO_2	N	3.03	0.67	N
DT14	95/97 John Finnie Street, Kilmarnock	Roadside	242619	637773	NO_2	N	0.63	2.99	N
DT15	16 West George Street, Kilmarnock	Roadside	242776	638159	NO_2	N	0.87	1.58	N
DT17	23/25 Loudoun Road, Newmilns	Roadside	253204	637237	NO_2	N	0.46	1.48	N
DT24	5/7 Earl Grey Street, Mauchline	Roadside	249894	627233	NO_2	N	0.67	3.60	N
DT27	Junction King Street/St. Marnock Street, Kilmarnock	Kerbside	242771	637714	NO_2	N	2.11	0.45	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?
DT32	Kay Park, Kilmarnock	Urban Background	243302	638259	NO_2	N	N/A	N/A	N
DT33	Howard Park, Kilmarnock	Urban Background	242581	637409	NO_2	N	N/A	N/A	N
DT44A	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	242742	637705	NO_2	N	0	3.18	Y
DT44B	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	242742	637705	NO_2	N	0	3.18	Y
DT44C	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	242742	637705	NO_2	N	0	3.18	Y
DT45	Kilmarnock Bus Station, Stance 2	N/A	242941	638030	NO_2	N	N/A	N/A	N
DT46	Kilmarnock Bus Station,	N/A	242957	638052	NO_2	N	N/A	N/A	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?
	Stance 6								
DT47	Kilmarnock Bus Station, Stance 10	N/A	242972	638072	NO_2	N	N/A	N/A	N
DT48	Kilmarnock Bus Station, Stance 11	N/A	242976	638077	NO_2	N	N/A	N/A	N
DT49	31/32 Polnessan, Patna	Roadside	241862	611929	NO_2	N	7.35	1.38	N
DT50	11/12 Polnessan, Patna	Roadside	241894	611768	NO_2	N	6.89	1.32	N
DT51	1/2 Polnessan, Patna	Roadside	241905	611700	NO_2	N	9.52	0.96	N
DT52	Knockroon Learning Campus, Ayr Road Entrance West	Roadside	256367	619894	NO_2	N	0.24	1.86	N
DT53	Knockroon Learning Campus, Ayr Road Entrance	Roadside	256427	619897	NO_2	N	0.23	1.85	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?
	East								
DT54	Knockroon Learning Campus, Auchinleck Road Entrance North	Roadside	256144	620585	NO_2	N	0.21	1.37	N
DT55	Knockroon Learning Campus, Auchinleck Road Entrance South	Roadside	256197	620525	NO_2	N	0.30	1.70	N
DT56	Ayrshire College, Kilmarnock, Hill Street South Entrance	Roadside	242737	638311	NO_2	N	0.43	1.84	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?
DT57	Ayrshire College, Kilmarnock, Hill Street North Entrance	Roadside	242701	638502	NO_2	N	7.44	1.59	N
DT58	William McIlvanney Campus, Sutherland Drive Entrance North	Roadside	244577	638501	NO_2	N	0.59	1.38	N
DT59	William McIlvanney Campus, Sutherland Drive Entrance South	Roadside	244547	638251	NO_2	N	0.41	1.52	N
DT60	Back Garden, 33	Suburban	243730	637435	NO_2	N	0	N/A	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?
	Sampson Avenue, Kilmarnock								
DT61	Back Lane, 29/33 Sampson Avenue, Kilmarnock	Other	243716	637444	NO_2	N	N/A	N/A	N
DT62	62 MacKinlay Place, Kilmarnock	Roadside	243588	637523	NO_2	N	5.88	2.00	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.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2013	2014	2015	2016	2017
A3	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	Automatic	N/A	99.51	30	30	25	29	29
DT 1	Fowlds Street/King Street Junction, Kilmarnock	Kerbside	Diffusion Tube		91.7	32.4	24.2	23.2	25.2	29.0
DT 2	8 John Finnie Street., Kilmarnock	Roadside	Diffusion Tube		91.7	34.0	26.2	22.3	26.5	29.3
DT 3	23 Lainshaw Street, Stewarton	Roadside	Diffusion Tube		91.7	31.7	23.2	25.1	20.9	25.9
DT 4	40 Main Street, Newmilns	Roadside	Diffusion Tube		91.7	30.8	24.2	25.9	23.2	25.6
DT 6	8A Kilmarnock Road, Mauchline	Roadside	Diffusion Tube		91.7	29.7	23.4	20.7	24.1	22.8
DT 11	96 John Finnie Street, Kilmarnock	Roadside	Diffusion Tube		91.7	32.1	24.9	23.4	28.1	26.4
DT 12	74 John Finnie Street, Kilmarnock	Roadside	Diffusion Tube		83.3	33.1	26.8	25.3	27.0	27.0
DT 14	95/97 John Finnie Street,	Roadside	Diffusion Tube		91.7	35.4	30.0	29.7	29.8	32.4

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2013	2014	2015	2016	2017
	Kilmarnock									
DT 15	16 West George Street, Kilmarnock	Roadside	Diffusion Tube		91.7	36.9	29.1	27.1	29.0	33.7
DT 17	23/25 Loudoun Road, Newmilns	Roadside	Diffusion Tube		66.7	34.7	26.0	26.2	27.2	26.0
DT 24	5/7 Earl Grey Street, Mauchline	Roadside	Diffusion Tube		91.7	39.5	30.5	26.5	29.7	28.5
DT 27	Junction King Street/St. Marnock Street, Kilmarnock	Kerbside	Diffusion Tube		91.7	30.8	28.1	24.9	29.9	29.8
DT 32	Kay Park, Kilmarnock	Urban Background	Diffusion Tube		91.7	12.1	10.2	10.3	10.6	10.9
DT 33	Howard Park, Kilmarnock	Urban Background	Diffusion Tube		91.7	12.6	10.5	9.5	10.6	10.9
DT 44A	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	Diffusion Tube		91.7			22.0	23.3	26.2
DT 44B	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	Diffusion Tube		75			19.9	24.3	24.3
DT 44C	Kilmarnock, St. Marnock Street	Roadside	Diffusion Tube		91.7			21.1	22.8	28.4

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2013	2014	2015	2016	2017
	Monitoring Station									
DT 44A -C	St. Marnock Street Monitoring Station	Roadside	Diffusion Tube	N/A	N/A			22.7	24.2	26.3
DT 45	Kilmarnock Bus Station, Stance 2	N/A	Diffusion Tube	88.9	66.7					53.8
DT 46	Kilmarnock Bus Station, Stance 6	N/A	Diffusion Tube	77.8	58.3					55.8
DT 47	Kilmarnock Bus Station, Stance 10	N/A	Diffusion Tube	88.9	66.7					46.7
DT 48	Kilmarnock Bus Station, Stance 11	N/A	Diffusion Tube	88.9	66.7					46.3
DT 49	31/32 Polnessan, Patna	Roadside	Diffusion Tube	87.5	58.3					11.2
DT 50	11/12 Polnessan, Patna	Roadside	Diffusion Tube	87.5	58.3					8.2
DT 51	1/2 Polnessan, Patna	Roadside	Diffusion Tube	87.5	58.3					4.7
DT 52	Knockroon Learning Campus, Ayr	Roadside	Diffusion Tube	85.7	50					15.2

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
						2013	2014	2015	2016	2017
	Road Entrance West									
DT 53	Knockroon Learning Campus, Ayr Road Entrance East	Roadside	Diffusion Tube	85.7	50					14.0
DT 54	Knockroon Learning Campus, Auchinleck Road Entrance North	Roadside	Diffusion Tube	85.7	50					11.5
DT 55	Knockroon Learning Campus, Auchinleck Road Entrance South	Roadside	Diffusion Tube	71.4	41.7					10.0
DT 56	Ayrshire College, Kilmarnock, Hill Street South Entrance	Roadside	Diffusion Tube	85.7	50					18.4
DT 57	Ayrshire College, Kilmarnock, Hill Street North Entrance	Roadside	Diffusion Tube	85.7	50					14.4

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
						2013	2014	2015	2016	2017
DT 58	William McIlvanney Campus, Sutherland Drive Entrance North	Roadside	Diffusion Tube	85.7	50					22.5
DT 59	William McIlvanney Campus, Sutherland Drive Entrance South	Roadside	Diffusion Tube	71.4	41.7					22.0
DT 60	Back Garden, 33 Sampson Avenue, Kilmarnock	Suburban	Diffusion Tube	66.7	16.7					14.1
DT 61	Back Lane, 29/33 Sampson Avenue, Kilmarnock	Other	Diffusion Tube	66.7	16.7					18.2
DT 62	62 MacKinlay Place, Kilmarnock	Roadside	Diffusion Tube	66.7	16.7					20.3

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

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedence 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.

Table A.4 - Nitrogen Dioxide Diffusion Tube Monitoring Results at Receptors for 2017

		Validated/ Annualised Raw Mean	Corrected Mean (Bias Factor 0.91)	Distance of Diffusion Tube from Kerb (m)	Distance of Building Facade from Kerb (m)	Grid Square Location	Local Annual Mean Background NO2 Concentration (ug/m3)	Predicted Annual Mean NO2 Concentration (ug/m3) at Receptor
DT1	Fowlds Street/King Street Junction, Kilmarnock	31.90	29.0	0.43	3.00	242500; 637500	11.32772	23.1
DT2	8 John Finnie Street, Kilmarnock	32.17	29.3	3.37	3.58	242500; 638500	10.23559	29.0
DT3	23 Lainshaw Street, Stewarton	28.49	25.9	3.05	3.40	241500; 645500	5.914463	25.3
DT4	40 Main Street, Newmilns	28.15	25.6	2.50	3.10	253500; 637500	6.112449	24.6
DT6	8A Kilmarnock Road, Mauchline	25.00	22.8	0.36	2.68	249500; 627500	6.18369	17.2
DT11	96 John Finnie Street, Kilmarnock	29.05	26.4	0.47	4.20	242500; 637500	11.32772	20.6
DT12	74 John Finnie Street Kilmarnock	29.66	27.0	0.67	3.70	242500; 637500	11.32772	22.0
DT14	95/97 John Finnie Street, Kilmarnock	35.62	32.4	2.99	3.62	242500; 637500	11.32772	31.4
DT15	16 West George Street, Kilmarnock	37.03	33.7	1.58	2.45	242500; 638500	10.23559	31.4
DT17	23/25 Loudoun Road, Newmilns	28.56	26.0	1.48	1.94	253500; 637500	6.112449	24.8
DT24	5/7 Earl Grey Street, Mauchline	31.27	28.5	3.60	4.27	249500; 627500	6.18369	27.5
DT27	Junction King St./St. Marnock St., Kilmarnock	32.71	29.8	0.45	2.56	242500; 637500	11.32772	24.2
DT32	Kay Park**,** Kilmarnock	11.99	10.9	N/A	N/A	243500 638500	9.544705	N/A
DT33	Howard Park, Kilmarnock	11.92	10.9	N/A	N/A	242500;	11.32772	N/A

						637500		
DT44	Kilmarnock, St. Marnock St. Monitoring Station	28.91	26.3	3.18	3.18	242500; 637500	11.32772	26.3
DT49	31/32 Polnessan, Patna	12.31	11.2	1.38	8.73	241500; 611500	3.53695	8.2
DT50	11/12 Polnessan, Patna	8.97	8.2	1.32	8.21	241500; 611500	3.53695	6.4
DT51	1/2 Polnessan, Patna	5.17	4.7	0.96	10.48	241500; 611500	3.53695	4.1
DT52	Knockroon Learning Campus, Ayr Road Entrance West	16.71	15.2	1.86	2.10	256500; 619500	5.559571	14.9
DT53	Knockroon Learning Campus, Ayr Road Entrance East	15.41	14.0	1.85	2.08	256500; 619500	5.559571	13.8
DT54	Knockroon Learning Campus, Auchinleck Road Entrance North	12.60	11.5	1.37	1.58	256500; 620500	5.885594	11.3
DT55	Knockroon Learning Campus, Auchinleck Road Entrance South	10.93	10.0	1.70	2.00	256500; 620500	5.885594	9.8
DT56	Ayrshire College, Hill Street South Entrance	20.16	18.4	1.84	2.27	242500; 638500	10.23559	14.2
DT57	Ayrshire College, Hill Street North Entrance	15.77	14.4	1.59	9.03	242500; 638500	10.23559	15.2
DT58	William McIlvanney Campus, Sutherland Drive Entrance North	24.73	22.5	1.38	1.97	244500; 638500	10.29637	21.6
DT59	William McIlvanney Campus, Sutherland Drive Entrance South	24.13	22.0	1.52	1.93	244500; 638500	10.29637	21.4
DT60	Back Garden, 33 Sampson Avenue, Kilmarnock	15.44	14.1	0	N/A	243500; 637500	10.91001	14.1
DT61	Back Lane, 29/33 Sampson Avenue, Kilmarnock	19.94	18.2	N/A	N/A	243500; 637500	10.91001	N/A
DT62	62 MacKinlay Place, Kilmarnock	22.34	20.3	2.00	7.88	243500; 637500	10.91001	17.3

Table A.5 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Name	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
						2013	2014	2015	2016	2017
A3	Kilmarnock, St. Marnock Street Monitoring Station	Roadside	Automatic	N/A	99.51	1(124 µg/m^3)	1(118 µg/m^3)	0	0	0

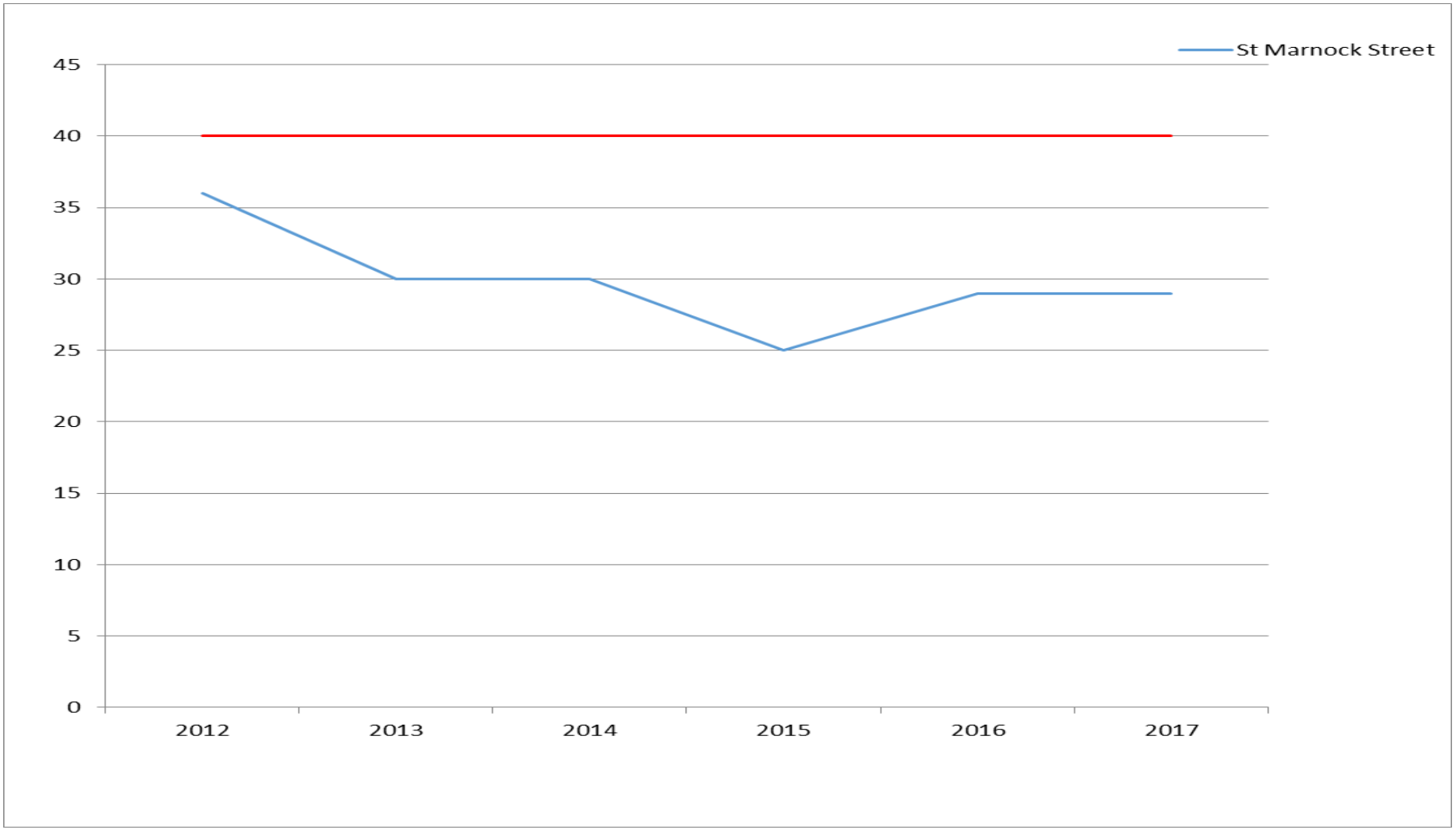
Notes: Exceedences of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold.**

(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%).

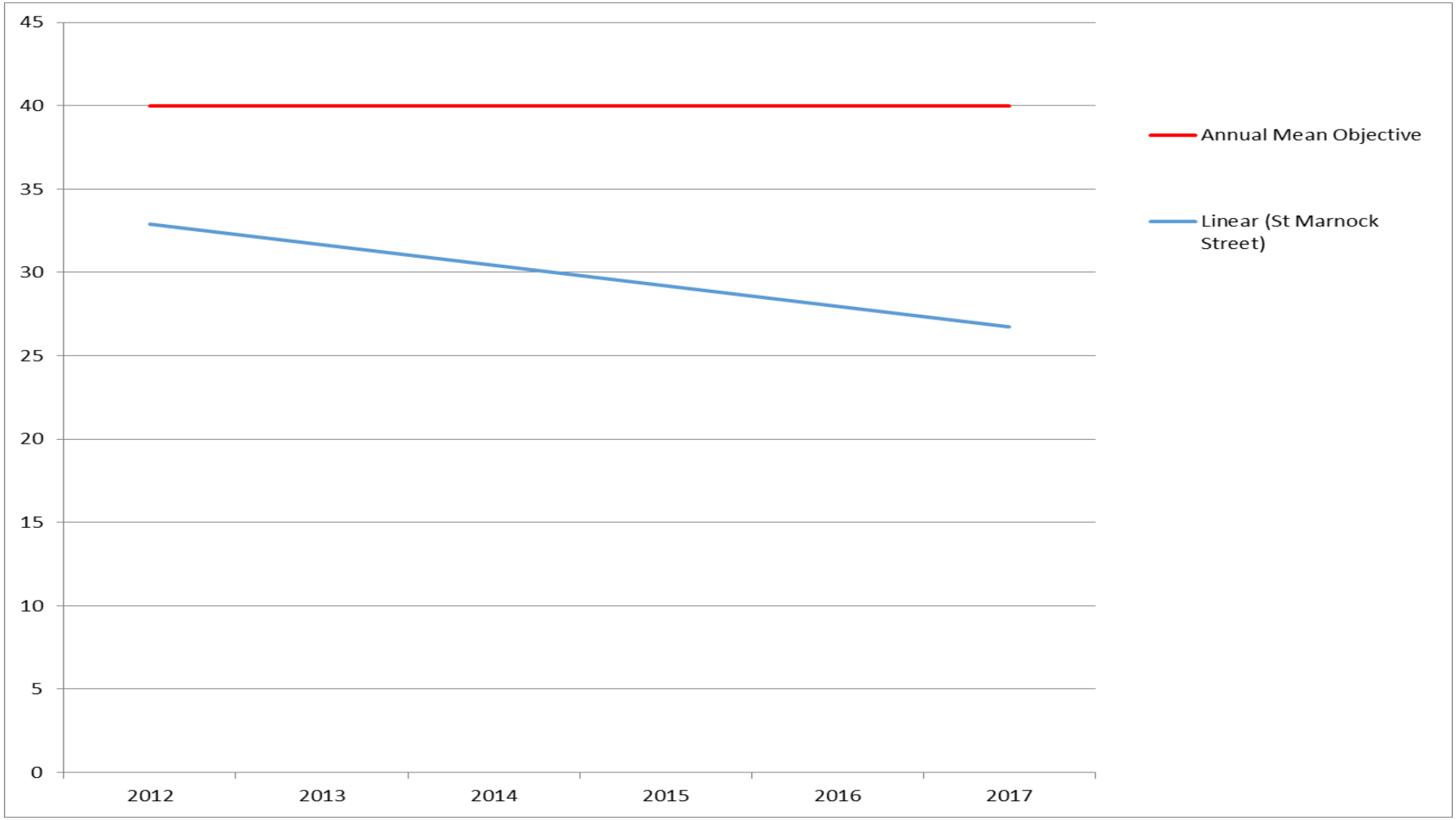
(3) If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

Figure A.1 Trends* in Annual Mean Nitrogen Dioxide Concentrations Measured at St. Marnock Street Automatic Monitor



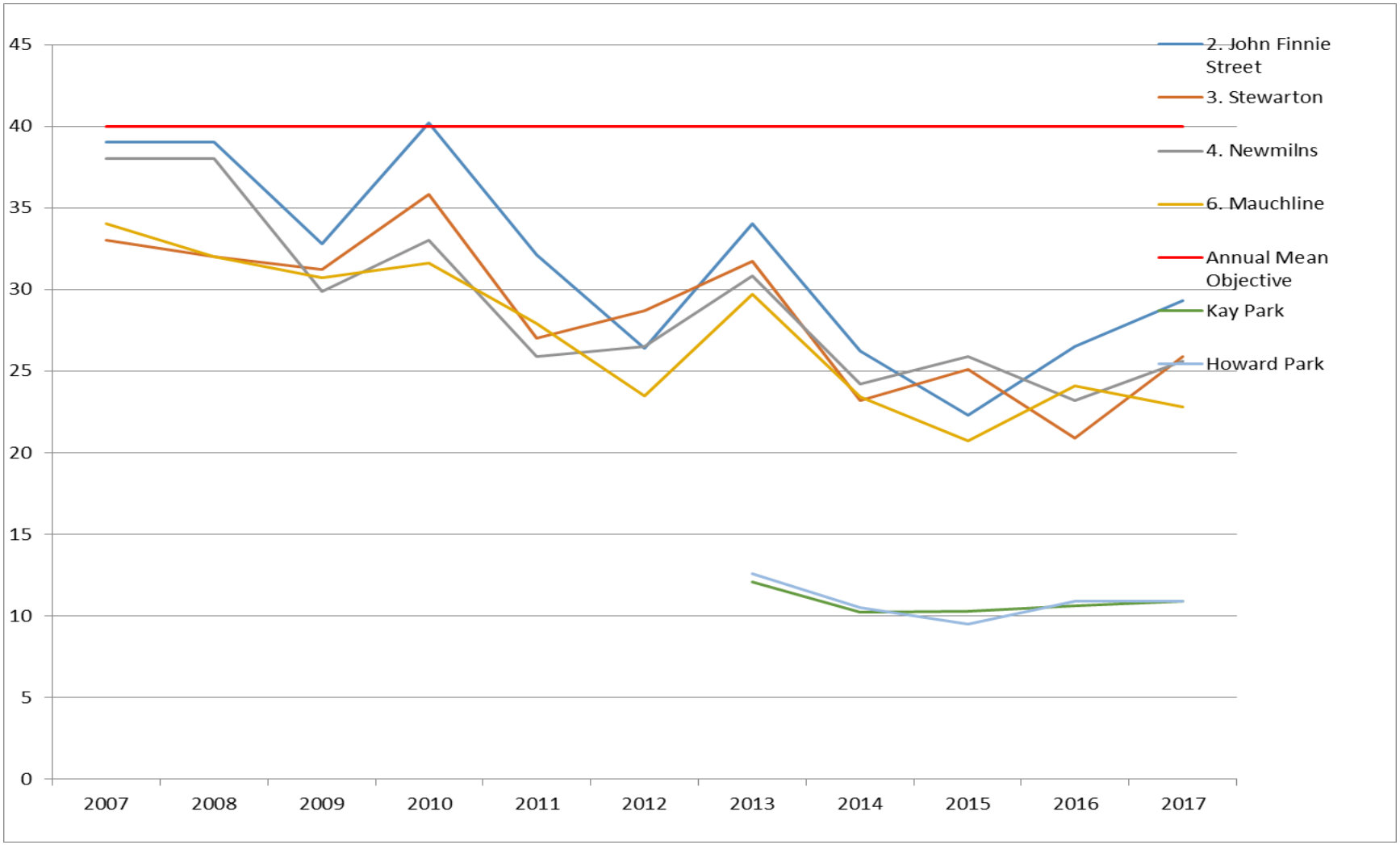
Note: * 5 years data is normally regarded as the minimum required for a significant trend

Figure A.2 Trends* in Annual Mean Nitrogen Dioxide Concentrations Measured at St. Marnock Street Automatic Monitor – Linear



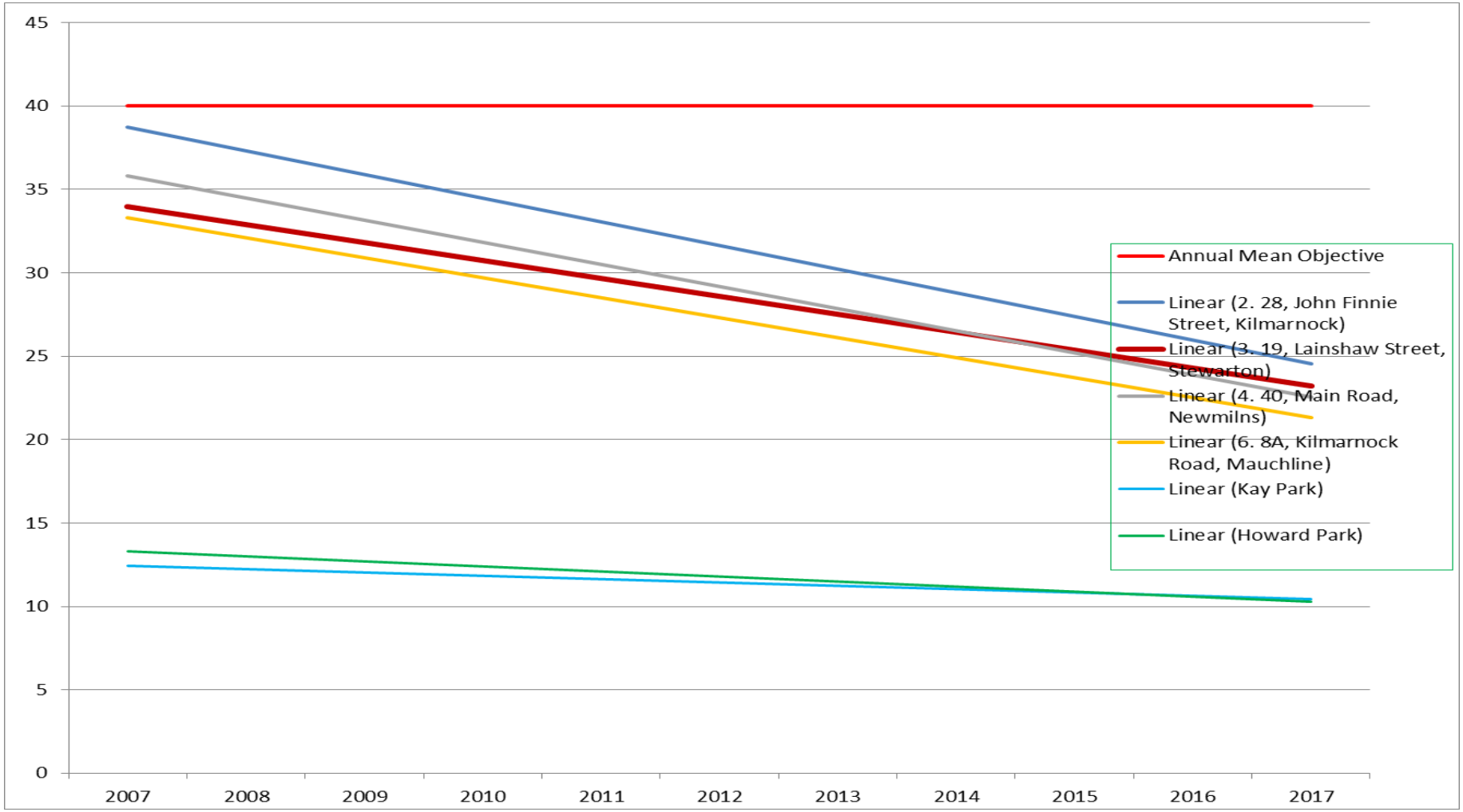
Note: * 5 years data is normally regarded as the minimum required for a significant trend

Figure A.3 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Long Term Diffusion Tube Monitoring Sites 2007-2017



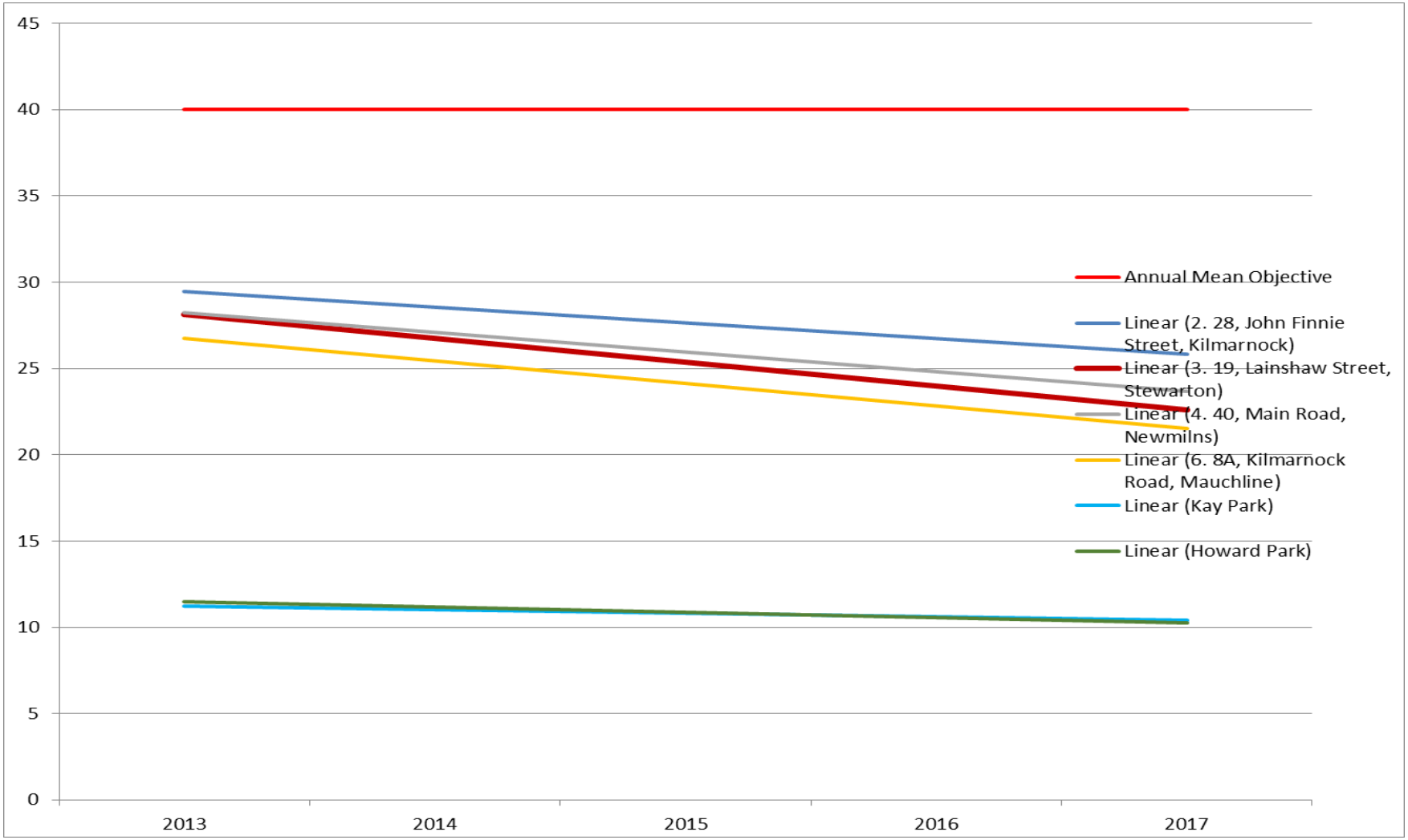
Note: * 5 years data is normally regarded as the minimum required for a significant trend

Figure A.4 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Long Term Diffusion Tube Monitoring Sites – Linear 2007-2017



Note: * 5 years data is normally regarded as the minimum required for a significant trend

Figure A.5 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Long Term Diffusion Tube Monitoring Sites – Linear 2013 – 2017



Data for background sites from 2013 onwards.

Table A.6 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
					2013	2014	2015	2016	2017
A3	Kilmarnock, St. Marnock Street Monitoring Station (BAM1020)	Roadside	N/A	N/A	19	20	14	14	
A3	Kilmarnock, St. Marnock Street Monitoring Station (FIDAS)	Roadside	N/A	99.82					11

Notes: Exceedences of the PM_{10} annual mean objective of 18µg/m^3 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) 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.

Table A.7 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Name	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
					2013	2014	2015	2016	2017
A3	Kilmarnock, St. Marnock Street Monitoring Station (BAM1020)	Roadside	N/A	N/A	2(46 µg/m^3)	2	0	0	
A3	Kilmarnock, St. Marnock Street Monitoring Station (FIDAS)	Roadside	N/A	99.82					0

Notes: Exceedences 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.

Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2017 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2013	2014	2015	2016	2017
A3	Roadside	N/A	99.82				6(7 annualised)	6

Notes: Exceedences of the PM_{10} annual mean objective of 10µg/m^3 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) 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.6 Trends* in Annual Mean PM_{10} Concentrations Measured at St. Marnock Street Automatic Monitor

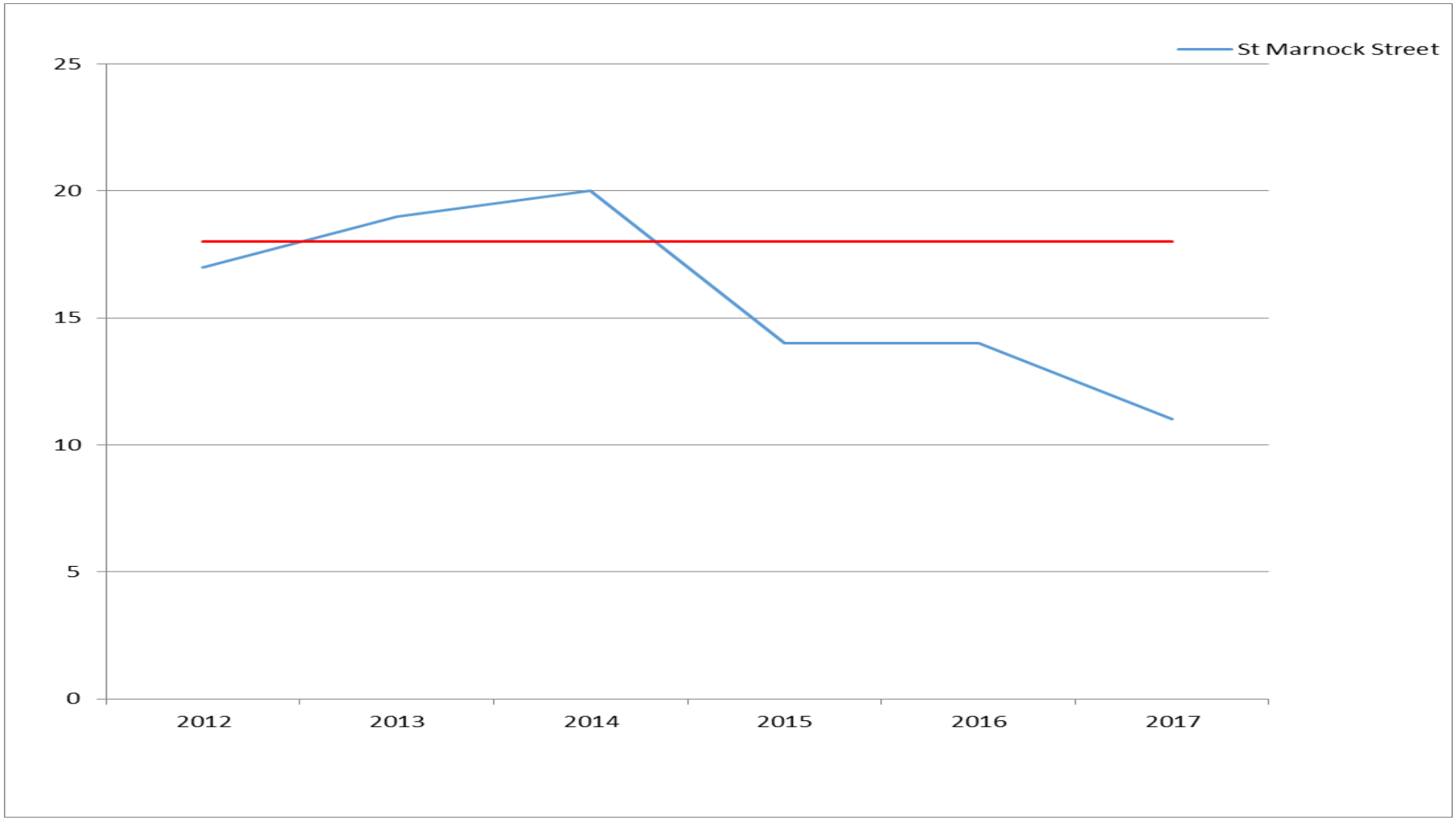
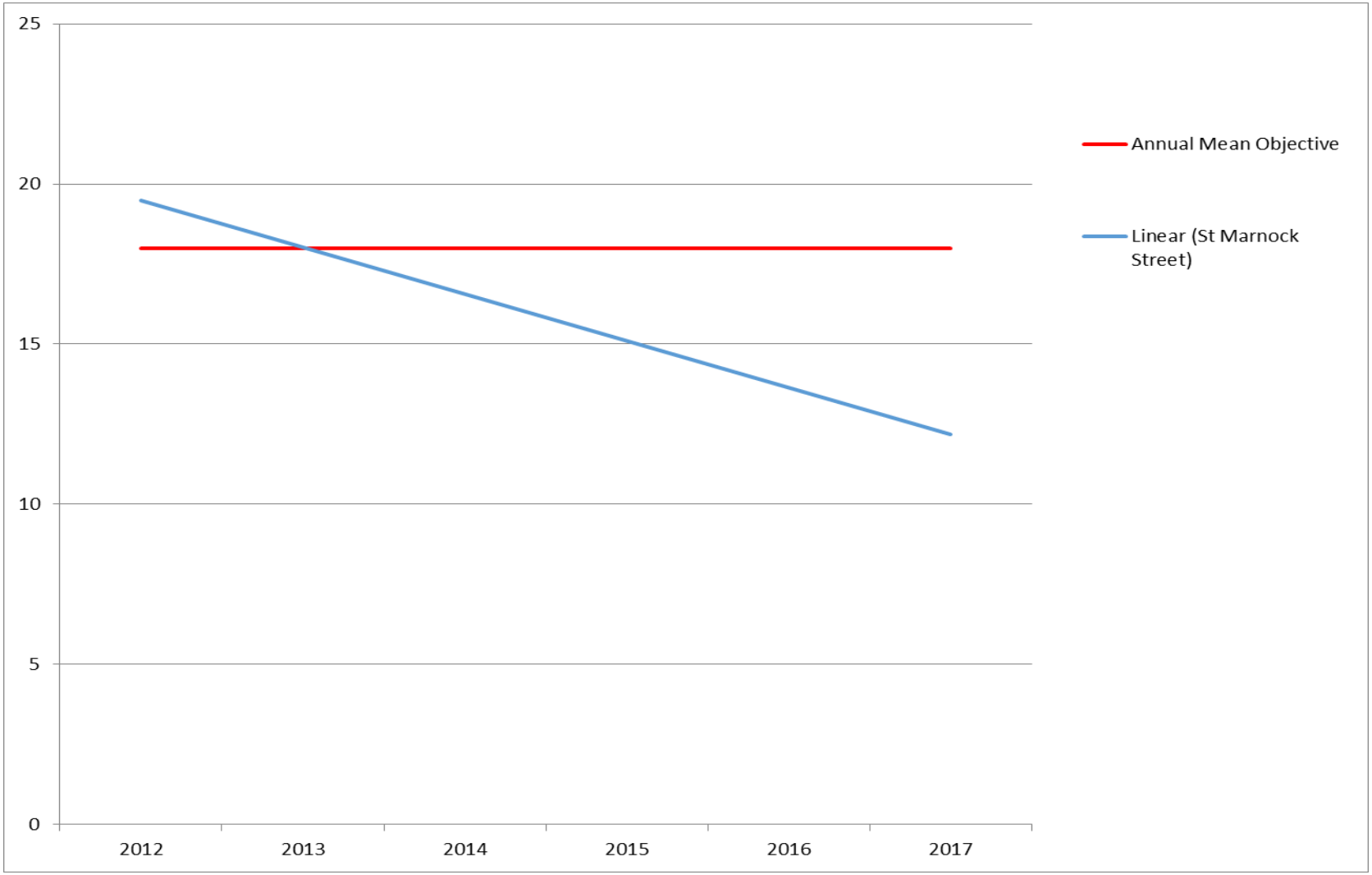


Figure A.7 Trends* in Annual Mean PM_{10} Concentrations Measured at St. Marnock Street Automatic Monitor - Linear



Appendix B: Full Monthly Diffusion Tube Results for 2017

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2017 - Raw Data

Bias Factor	0.91

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec*		Raw Mean
1	Fowlds Street/King Street Junction, Kilmarnock	44.8	41.1	33.7	29.2	27.7	21.6	20.7	20.4	35.6	31.8	44.3	57.3	12	34.02
2	8 John Finnie Street, Kilmarnock	48.4	41.2	28.5	26.9	33.7	21.9	15.5	45	32.3	28.8	31.7	68.7	12	35.22
3	23 Lainshaw Street, Stewarton	37.8	31.2	29	25.6	22.3	23.2	15.1	21.8	31.7	27.2	48.5	1.7	12	26.26
4	40 Main Street, Newmilns	40.1	33.4	29.8	26.8	23.3	20.7	20.2	21.7	27.7	28.2	37.7	33.6	12	28.60
6	8A Kilmarnock Road, Mauchline	34.3	31.7	23.6	21.4	23.1	19.5	18.1	20.1	28.1	26.4	28.7	41.8	12	26.40
11	96 John Finnie Street, Kilmarnock	41.7	39.6	31.6	24.4	26.1	20.9	19.2	22.5	28.9	29	35.6	32.8	12	29.36
12	74 John Finnie Street, Kilmarnock	48.2	39.4	28.7	24.5		19.2	19.2	22.4	28.3	29.8	36.9	3.4	11	27.27
14	95/97 John Finnie Street, Kilmarnock	43.4	43.5	38.1	30.8	22.6	30.6	26.5	26.1	40.9	36.7	52.6	32.7	12	35.38
15	16 West George Street, Kilmarnock	44.6	42	37.8	37.8	26	33.1	23.6	29.6	43.1	40.3	49.4	23.6	12	35.91
17	23/25 Loudoun Road, Newmilns	40.9			28.6	24	21.5	20.7	20.6		29.2	43	33.6	9	29.12
24	5/7 Earl Grey Street, Mauchline	40.7	38.4	34.8	28.2	27.4	25.7	19.6	21.5	38.8	27.3	41.6	49	12	32.75
27	Junction King Street./St. Marnock Street., Kilmarnock	43.6	36.8	34.1	33.3	28.7	24.9	18.2	24.9	35.9	31.1	48.3	49.3	12	34.09
32	Kay Park, Kilmarnock	22.5	16.7	12.6	9.6	7	8.4	6.1	7.4	10.1	11.5	20	41.8	12	14.48
33	Howard Park, Kilmarnock	20.3	18.8	13.4	9.3	7.9	7.8	8.6	9.5	10.5	6.9	18.1	39.6	12	14.23
44A	Kilmarnock, St Marnock Street Monitoring Station	36	32.9	31.8	29.1	28.1	23	17	21.2	29.6	26.5	41	30.8	12	28.92
44B	Kilmarnock, St Marnock Street Monitoring Station	36.1	33.4	2.3*	28.4	17.3	21.8	19.2	23.3	2.5	25.3	35.8	39	12	23.70
44C	Kilmarnock, St Marnock Street Monitoring Station	39.4	33.8	31.6	32.2	26.5	23.5	27.8	37.8	26.8	26	38.3	21.1	12	30.40

45	Kilmarnock Bus Station, Stance 2				55.9	43.4	51.8	37.8	39.3	53.2	47.3	52.7	19.4	9	44.53
46	Kilmarnock Bus Station, Stance 6				63.6	52.9	48.7	1.6*	41	49.6	36.8	53.7	32.6	9	42.28
47	Kilmarnock Bus Station, Stance 10				52.4	40.1	42.5	32.6	32.8	43.5	39.7	50.8	37.3	9	41.30
48	Kilmarnock Bus Station, Stance 11				43.9	42.6	42.3	28.5	37.2	42.9	45.1	46	37.7	9	40.69
49	31/32 Polnessan, Patna					10.6	8.4	6.9	9.3	11.1	11.1	12.7		7	10.01
50	11/12 Polnessan, Patna					7.6	6.2	5.1	4.6	7.9	9.9	9.7	40.6	8	11.45
51	1/2 Polnessan, Patna					5.1	2.7	2.9	3.9	3.6	4.5	6.7	23.3	8	6.59
52	Knockroon Learning Campus, Ayr Road Entrance West						9.9	7.4	8.6	23.6	10.3	22.4	40.6	7	17.54
53	Knockroon Learning Campus, Ayr Road Entrance East						11.8	10.8	12	16.2	11.2	13.8	44.4	7	17.17
54	Knockroon Learning Campus, Auchinleck Road Entrance North						8.6	7.1	9.1	10.8	11	15.4	12.2	7	10.60
55	Knockroon Learning Campus, Auchinleck Road Entance South						6.8	6.3	7.1	9.2		15.4	7.1	6	8.65
56	Ayrshire College, Kilmarnock, Hill Street South Entrance						11	11.1	15.7	17.9	16.9	26.3	17.5	7	16.63
57	Ayrshire College, Kilmarnock, Hill Street North Entrance						9.8	5.8	9.8	12.6	19	20.6	19.5	7	13.87
58	William McKilvanney Campus, Sutherland Drive Entrance North						15.7	15.1	18.5	21.7	19.1	31.5	16.9	7	19.79
59	William McKilvanney Campus, Sutherland Drive Entrance South						14.3		9.9	22.3	21.1	31.3	17.8	6	19.45
60	Back Garden, 33 Sampson Avenue, Kilmarnock										11.7	19.8	25.4	3	18.97
61	Back Lane, 29/33 Sampson Avenue, Kilmarnock										12.6	28.1	27.3	3	22.67
62	62 MacKinlay Place, Kilmarnock										16.2	29.4	25.9	3	23.83

***Data excluded**

Table B.2 – NO_2 Monthly Diffusion Tube Results for 2017 Validated, Annualised and Bias corrected Data

(1)See Appendix C for details on bias adjustment

Bias Factor	0.91

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Validated Raw Mean	Am /Pm	Annualised Mean	Corrected Mean (Bias Factor)
1	Fowlds Street/King Street Junction, Kilmarnock	44.8	41.1	33.7	29.2	27.7	21.6	20.7	20.4	35.6	31.8	44.3		11	31.90	N/A	31.90	29.03
2	8 John Finnie Street, Kilmarnock	48.4	41.2	28.5	26.9	33.7	21.9	15.5	45	32.3	28.8	31.7		11	32.17	N/A	32.17	29.27
3	23 Lainshaw Street, Stewarton	37.8	31.2	29	25.6	22.3	23.2	15.1	21.8	31.7	27.2	48.5		11	28.49	N/A	28.49	25.93
4	40 Main Street, Newmilns	40.1	33.4	29.8	26.8	23.3	20.7	20.2	21.7	27.7	28.2	37.7		11	28.15	N/A	28.15	25.62
6	8A Kilmarnock Road, Mauchline	34.3	31.7	23.6	21.4	23.1	19.5	18.1	20.1	28.1	26.4	28.7		11	25.00	N/A	25.00	22.75
11	96 John Finnie Street, Kilmarnock	41.7	39.6	31.6	24.4	26.1	20.9	19.2	22.5	28.9	29	35.6		11	29.05	N/A	29.05	26.44
12	74 John Finnie Street, Kilmarnock	48.2	39.4	28.7	24.5		19.2	19.2	22.4	28.3	29.8	36.9		10	29.66	N/A	29.66	26.99
14	95/97 John Finnie Street, Kilmarnock	43.4	43.5	38.1	30.8	22.6	30.6	26.5	26.1	40.9	36.7	52.6		11	35.62	N/A	35.62	32.41
15	16 West George Street, Kilmarnock	44.6	42	37.8	37.8	26	33.1	23.6	29.6	43.1	40.3	49.4		11	37.03	N/A	37.03	33.70
17	23/25 Loudoun Road, Newmilns	40.9			28.6	24	21.5	20.7	20.6		29.2	43		8	28.56	N/A	28.56	25.99
24	5/7 Earl Grey Street, Mauchline	40.7	38.4	34.8	28.2	27.4	25.7	19.6	21.5	38.8	27.3	41.6		11	31.27	N/A	31.27	28.46
27	Junction King Street./St. Marnock Street., Kilmarnock	43.6	36.8	34.1	33.3	28.7	24.9	18.2	24.9	35.9	31.1	48.3		11	32.71	N/A	32.71	29.77
32	Kay Park, Kilmarnock	22.5	16.7	12.6	9.6	7	8.4	6.1	7.4	10.1	11.5	20		11	11.99	N/A	11.99	10.91
33	Howard Park, Kilmarnock	20.3	18.8	13.4	9.3	7.9	7.8	8.6	9.5	10.5	6.9	18.1		11	11.92	N/A	11.92	10.85
44A	Kilmarnock, St. Marnock Street Monitoring Station	36	32.9	31.8	29.1	28.1	23	17	21.2	29.6	26.5	41		11	28.75	N/A	28.75	26.16
44B	Kilmarnock, St. Marnock Street Monitoring Station	36.1	33.4		28.4	17.3	21.8	19.2	23.3		25.3	35.8		9	26.73	N/A	26.73	24.32

44C	Kilmarnock, St. Marnock Street Monitoring Station	39.4	33.8	31.6	32.2	26.5	23.5	27.8	37.8	26.8	26	38.3		11	31.25	N/A	31.25	28.44
45	Kilmarnock Bus Station, Stance 2				55.9	43.4	51.8	37.8	39.3	53.2	47.3	52.7		8	47.68	1.24	59.12	53.80
46	Kilmarnock Bus Station, Stance 6				63.6	52.9	48.7		41	49.6	36.8	53.7		7	49.47	1.24	61.34	55.82
47	Kilmarnock Bus Station, Stance 10				52.4	40.1	42.5	32.6	32.8	43.5	39.7	50.8		8	41.80	1.24	51.32	46.70
48	Kilmarnock Bus Station, Stance 11				43.9	42.6	42.3	28.5	37.2	42.9	45.1	46		8	41.06	1.24	50.91	46.33
49	31/32 Polnessan, Patna					10.6	8.4	6.9	9.3	11.1	11.1	12.7		7	10.01	1.23	12.31	11.20
50	11/12 Polnessan, Patna					7.6	6.2	5.1	4.6	7.9	9.9	9.7		7	7.29	1.23	8.97	8.16
51	1/2 Polnessan, Patna					5.1	2.7	2.9	3.9	3.6	4.5	6.7		7	4.20	1.23	5.17	4.70
52	Knockroon Learning Campus, Ayr Road Entrance West						9.9	7.4	8.6	23.6	10.3	22.4		6	13.70	1.22	16.71	15.21
53	Knockroon Learning Campus, Ayr Road Entrance East						11.8	10.8	12	16.2	11.2	13.8		6	12.63	1.22	15.41	14.02
54	Knockroon Learning Campus, Auchinleck Road Entrance North						8.6	7.1	9.1	10.8	11	15.4		6	10.33	1.22	12.60	11.47
55	Knockroon Learning Campus, Auchinleck Road Entrance South						6.8	6.3	7.1	9.2		15.4		5	8.96	1.22	10.93	9.95
56	Ayrshire College, Kilmarnock, Hill Street South Entrance						11	11.1	15.7	17.9	16.9	26.3		6	16.48	1.22	20.16	18.35
57	Ayrshire College, Kilmarnock, Hill Street North Entrance						9.8	5.8	9.8	12.6	19	20.6		6	12.93	1.22	15.77	14.35
58	William McKilvanney Campus, Sutherland Drive Entrance North						15.7	15.1	18.5	21.7	19.1	31.5		6	20.27	1.22	24.73	22.50
59	William McKilvanney Campus, Sutherland Drive Entrance South						14.3		9.9	22.3	21.1	31.3		5	19.78	1.22	24.13	21.96
60	Back Garden, 33 Sampson Avenue, Kilmarnock										11.7	19.8		2	15.75	0.98	15.44	14.05
61	Back Lane, 29/33 Sampson Avenue, Kilmarnock										12.6	28.1		2	20.35	0.98	19.94	18.15
62	62 MacKinlay Place, Kilmarnock										16.2	29.4		2	22.80	0.98	22.34	20.33

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

QA/QC of the Automatic Monitoring

The maintenance of the monitoring site at Kilmarnock is carried out by Air Monitors. This involves routine servicing and provision for emergency callouts as required. Manual calibration, zero and span checks are carried out monthly by Air Monitors. The manual span check consists of a gas of known concentration being passed through the NOx analyser and the measured concentration being recorded for rescaling. The Kilmarnock site is part of the Scottish Air Quality Network and is audited twice yearly by Ricardo on behalf of the Scottish Government. Ricardo also undertake the data management for the site. Since the installation of web loggers, the data is checked daily by East Ayrshire Council Environmental Health staff to ensure there are no faults showing with any of the analysers and the data looks credible. Ricardo and Air Monitors also check the data at regular intervals and e-mail or telephone Environmental Health if any problems occur. An officer from Environmental Health will attend the site to rectify any problems found, often in consultation with an engineer from Air Monitors. If the problem cannot be rectified by Environmental Health staff, Air Monitors attend the site and rectify the faults found. Air Monitors or an officer from Environmental Health carries out any routine filter changes, inlet cleaning etc. as recommended in the equipment instruction manual. At the request of Ricardo manual calibration checks are now carried out in preference to automatic calibrations due to some technical issues with the latter method. Regular visits to the monitoring sites are also good practice as any other faults which may arise from time to time can be picked up and quickly rectified.

Ricardo undertakes quality control of the automatic data for the Kilmarnock site. The QA/QC procedures follow the requirements of the Local Air Quality Management Technical Guidance LAQM.TG(16) (Reference 1) and are equivalent to those used at UK National Network monitoring sites (Automatic Urban and Rural Network (AURN)). This gives a high degree of confidence in the data obtained for reliable concentrations at the automatic sites. Once the calibration factors have been applied Ricardo carry out monthly Data Validation. In essence, the data is screened by visual examination to determine if it contains spurious and/or unusual measurements. Any suspicious data, such as large spikes or high concentrations are “flagged” or marked to be investigated more fully. At three monthly intervals Ricardo carry out Data Ratification. This involves thorough checking of the data to ensure it is reliable and consistent. Essentially the data ratification procedure involves a critical review of all information relating to a particular data set in order to verify, amend or reject the data. When the data has been ratified, Ricardo present the final data set to be used in Review and Assessment Process. BAM PM_{10} data was corrected for slope using a factor of 0.83333 to give an Indicative Gravimetric Equivalent (Reference 9). The Air Pollution Reports produced by Ricardo on behalf of the Scottish Government can be found in Appendix C.

Nitrogen Dioxide Diffusion Tube Monitoring Procedure

The nitrogen dioxide diffusion tubes are placed at each location by East Ayrshire Council to give 12 periods within the calendar year. All diffusion tubes are placed at a height of 2.95m to give a reasonable representation of the air people breathe but be at a height that limits vandalism. After either a four or a five-week period, the exposed tubes are replaced and sent to the laboratory for analysis. All exposure times and dates are recorded and sent to the laboratory with the exposed tubes. East Ayrshire Council also sends one unexposed tube with each batch to check that there has been no contamination while in transit or storage. Selection of diffusion tube sites and instructions for exposing diffusing tubes were carried out using the latest guidance issued by AEA from the work completed by the Working Group on Harmonisation of Diffusion Tubes (Reference 3). The supply of the tubes and analysis is undertaken by Glasgow Scientific Services (GSS) – part of Glasgow City Council. The laboratory is UKAS accredited for the analysis and also participates in two centralised QA/QC schemes; the Workplace Analysis Scheme for Proficiency (now the AIR NO2 Proficiency Testing Scheme)(Reference 4) and a monthly field inter-comparison exercise managed by Bureau Veritas, in which diffusion tubes are co-located with an automatic analyser. The AIR/WASP scheme is an independent analytical proficiency - testing scheme (PT), operated by the Health and Safety laboratory (HSL). For the 5 rounds from January 2017 to February 2018 GSS obtained 3 rounds at 100%, one round at 50% and 1 round at 0%, giving a combined score of 70% which were subsequently determined to be **satisfactory** based on the z-score system (Reference 4). Over a rolling five round AIR/WASP window one would expect that 95% of laboratory results should be within the criteria set within the scheme. If this percentage is substantially lower than 95% for a particular laboratory, within this 5 round window, then one can conclude that the laboratory in question may have significant systemic sources of bias in their assay.

GSS follow the procedures set out in the Harmonisation Practical Guidance and prepares the Palmes-Type diffusion tubes using the 20% Triethanolamine (TEA) in water.

The diffusion tube method is open to a degree of uncertainty inherent in the method. To partially correct for this uncertainty, a bias adjustment factor is applied. To calculate bias adjustment, triplicate tubes from Glasgow Scientific Services are co-located with chemiluminecence automatic analysers at various locations throughout West Central Scotland. The tubes are placed within 1m of the analyser inlet and 10cm apart. The co-located tubes are prepared, handled and analysed in exactly the same way as those from the other (non co-located) monitoring sites in the survey. Co-location data questionnaires are completed and sent to The National Physical Laboratory, Teddington, London. GSS also participate in the Bureau Veritas Marylebone laboratory inter-comparison study (Reference 23). At the time of writing 6 sites, including the Marylebone Road site in London were present on the spreadsheet. A resultant bias adjustment is then computed for each site. A combined

bias adjustment is then calculated from these 6 sites using orthogonal regression to allow for both the uncertainty in both the automatic monitor and the diffusion tubes. The uncertainty of the diffusion tube has been assumed to be double that of the automatic monitor. For 2017 the overall bias adjustment factor was computed at **0.91**. The bias adjustment factor applied to the raw annual means of the diffusion tubes was therefore **0.91** for 2017 data. Precision and Bias Adjustment Data (Reference 20) are shown in Appendix D1.

Appendix D:

D1: QA/QC Data: Defra and The Devolved Administrations, Spreadsheet of Bias Adjustment Factors, Version Number 03/18 V2 Accessed at

http://www.scottishairquality.co.uk/laqm/tools

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/18

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 2018

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:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.								
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data[2]	If you have your own co-location study then see footnote[4]. 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** To undo your selection, choose (All) from the pop-up list	**Year[5]** To undo your selection, choose (All)	**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[6]**	**Bias Adjustment Factor (A) (Cm/Dm)**
Glasgow Scientific Services	20% TEA in water	2017	UB	Glasgow City Council	12	34	25	32.9%	G	**0.75**
Glasgow Scientific Services	20% TEA in water	2017	R	Glasgow City Council	12	38	37	2.9%	G	**0.97**
Glasgow Scientific Services	20% TEA in water	2017	R	Glasgow City Council	10	35	34	3.6%	P	**0.97**
Glasgow Scientific Services	20% TEA in water	2017	KS	Glasgow City Council	12	63	59	6.2%	G	**0.94**
Glasgow Scientific Services	20% TEA in water	2017	R	Glasgow City Council	12	45	36	24.5%	P	**0.80**
Glasgow Scientific Services	20% TEA in water	2017	KS	Marylebone Road Intercomparison	12	77	79	-2.2%	G	**1.02**
Glasgow Scientific Services	20% TEA in water	2017		**Overall Factor[3] (6 studies)**				**Use**		**0.91**

D2 Short-term to Long-term Data adjustment

Short-term to Long-term Data adjustment

Where only short-term periods of monitoring data are available, the results may be adjusted to estimate an annual mean concentration using the approach set out in Technical Guidance LAQM Technical Guidance (TG16) (Reference 1).

Adjustment to estimate annual mean

The adjustment is based on the fact that patterns in pollutant concentrations usually affect a wide region. Thus if a six month average is above average at one place it will almost certainly be above average at other locations in the region. The adjustment procedure is as follows:-

1. Three long term, continuous monitoring sites, from the Scottish Automatic Urban and Rural Network, within 50 miles were identified: Glasgow Anderston, Glasgow Waulkmillglen Reservoir and Glasgow Townhead.
2. The results of the annual mean, **Am,** for these sites in 2017 were obtained.
3. The period means, **Pm,** for 2017 were obtained for the months of the short term monitoring in East Ayrshire.
4. The Ratio, **R,** of the annual mean/period mean (**Am/Pm)** for each of the sites was then calculated.
5. The average of these ratios, $\mathbf{R_a}$**,** was then calculated to give an adjustment factor.
6. The measured period mean **M** was multiplied by the adjustment factor $\mathbf{R_a}$ to give the estimate of the annual mean for 2017 (Table A).

	Annual Mean (Am)	**Period Mean (Pm) 27/03/17 – 05/12/17**	**Ratio (R) = Am/Pm**	**Period Mean (Pm) 28/04/17 – 05/12/17**	**Ratio (R) = Am/Pm**	**Period Mean (Pm) 05/06/17 – 05/12/17**	**Ratio (R) = Am/Pm**	**Period Mean (Pm) 03/10/17 – 05/12/17**	**Ratio (R) = Am/Pm**
Glasgow Anderston	22.5	18.0	1.25	18.3	1.23	18.2	1.24	24.0	0.94
Glasgow Waulkmillglen	9.4	7.4	1.28	7.3	1.29	7.3	1.28	7.8	1.20
Glasgow Townhead	25.1	20.8	1.20	21.0	1.19	22.2	1.13	31.8	0.79
		Average (Ra)	1.24		1.23		1.22		0.98

Appendix E: Results of Automatic Monitoring for NO_2 and PM_{10}

Produced by Ricardo Energy and Environment on behalf of the Scottish Government

EAST AYRSHIRE ST MARNOCK ST FDMS
01 January to 31 December 2017

Pollutant	NO µg/m³	NO_2 µg/m³	NO_x as NO_2 µg/m³	PM_{10} µg/m³	PM_{25} µg/m³
Number Days Low	-	365	-	365	365
Number Days Moderate	-	0	-	0	0
Number Days High	-	0	-	0	0
Number Days Very High	-	0	-	0	0
Max Daily Mean	178	75	348	42	33
Annual Max	358	161	674	151	75
Annual Mean	25	29	67	11	6
98th Percentile of daily mean	-	-	-	28	-
90th Percentile of daily mean	-	-	-	17	-
99.8th Percentile of hourly mean	-	115	-	-	-
98th Percentile of hourly mean	113	82	248	33	25
95th Percentile of hourly mean	72	66	175	25	16
50th Percentile of hourly mean	18	26	54	9	5
% Annual data capture	**99.74%**	**99.51%**	**99.51%**	**99.82%**	**99.82%**

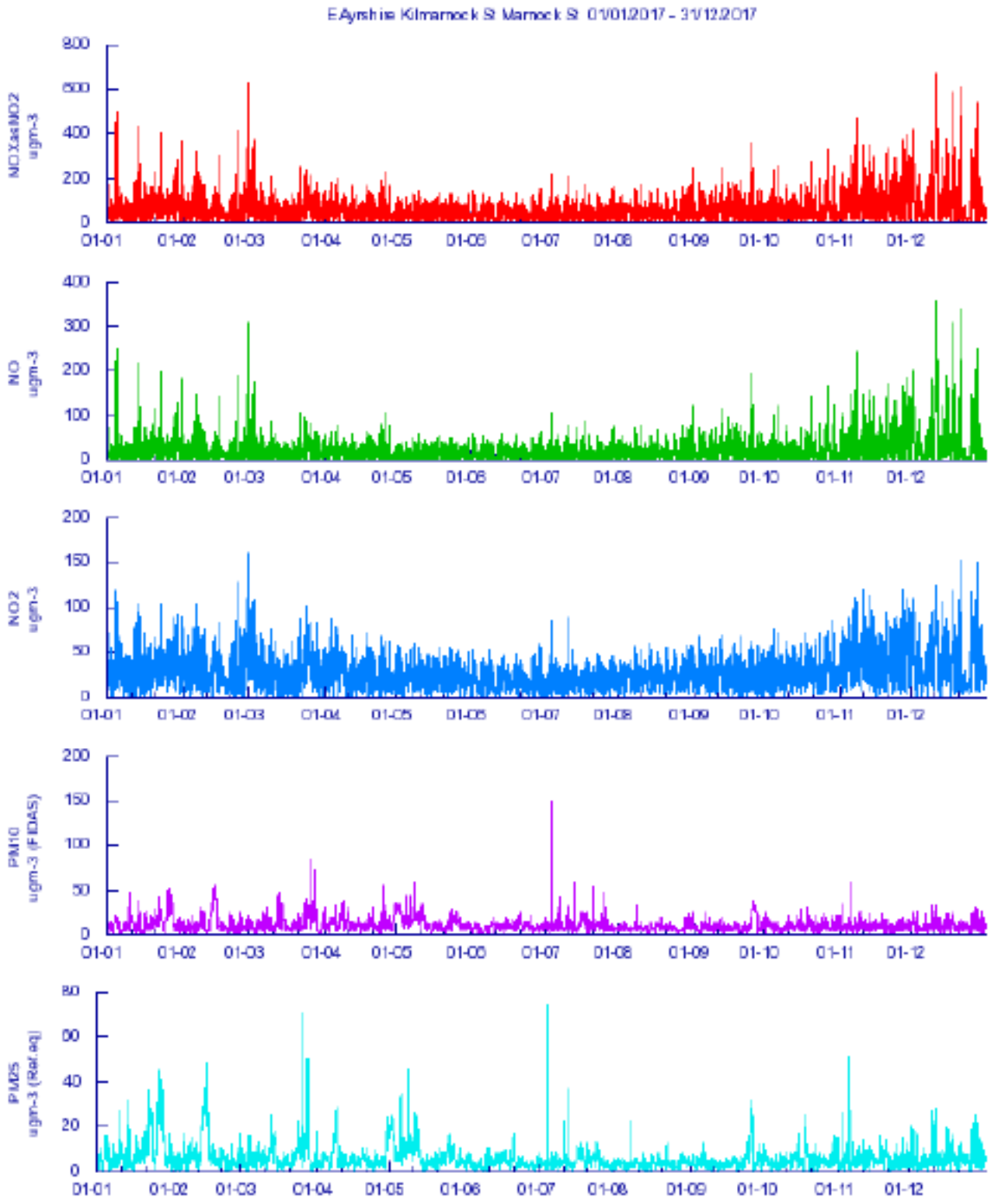
Instruments: PM_{10}: FIDAS

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure. NO_X mass units are NO_X as NO_2 µg m-3

Note: For a strict comparison against the objectives there must be a data capture of 85% or greater throughout the calendar year.

Pollutant	Air Quality Standards (Scotland) Regulations 2010	Exceedances	Days
PM10 particulate matter (Hourly measured)	daily mean > 50 microgrammes per metre cubed	0	0
PM10 particulate matter (Hourly measured)	Annual mean > 18 microgrammes per metre cubed	0	-
PM2.5 particulate matter (Hourly measured)	Annual mean > 12 microgrammes per metre cubed	0	-
Nitrogen dioxide	Hourly Mean > 200 microgrammes per metre cubed	0	0
Nitrogen dioxide	Annual Mean > 40 microgrammes per metre cubed	0	-

Annual Graph



Certificates of Calibration

0401

CERTIFICATE OF CALIBRATION

Ricardo Energy and Environment, Gemini Building, Fermi Avenue Harwell, Didcot, Oxfordshire OX11 0QR. Telephone 01235 753692

Approved Signatories:

- ☐ S. Eaton
- ☐ D Hector
- ☐ N Rand
- ☐ E Marshall-Padkin
- ☐ B Davies
- ☐ B Stacey
- ☐ S Stratton
- ☐ S Telfer
- ☑ S Gray

Signed:

Date of issue: 25 Apr 18

Certificate Number: 3922

Customer Name and Address:

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

Description: Calibration factors for the air monitoring station at East Ayrshire Council

Date of issue: 25 Apr 18

Certificate Number: 3922

Ricardo Energy & Environment ID: ED61598/3922

East Ayrshire Council

NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response[1]	Zero uncertainty ppb	Calibration Factor[2]	Factor uncertainty %	Converter eff. (%)[3]
East Ayrshire Kilmarnock St Marnock St	23-Aug-17	NOx	2361	-3.7	2.5	1.0236	3.50	95.6
		NO		0.0	2.5	1.0308	3.50	

PM10 analysers

Station	Date of audit	Analyser Serial no	Calculated ko	Uncertainty %	Total flow	Uncertainty %	Main flow	Uncertainty %
East Ayrshire Kilmarnock St Marnock St	23-Aug-17	7476			4.59	2.2		2.2

Date of issue:	25 Apr 18
Certificate Number:	3922
Ricardo Energy & Environment ID:	ED61598/3922

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k0(where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in ppb (parts per billion) mole fractions or ppm (parts per million) mole fractions.

[1] The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2] The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (ppb for NO, NOx, SO_2, O_3 and ppm for CO. Where 1ppm = 1000ppb). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)

Where F = Calibration Factor provided on this certificate

Output = Reading on the data logging system of the analyser

Zero Response = Zero Response provided on this certificate

[3] Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

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

[6] The calculated k0 value (specifically for TEOM analysers) is the calculated k0 spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified value of k0.

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

0401

CERTIFICATE OF CALIBRATION

Ricardo Energy and Environment, Gemini Building, Fermi Avenue Harwell, Didcot, Oxfordshire OX11 0QR. Telephone 01235 753692

Approved Signatories:

- ☐ S. Eaton
- ☐ D Hector
- ☐ N Rand
- ☐ E Marshall-Padkin
- ☐ B Davies
- ☐ B Stacey
- ☐ S Stratton
- ☐ S Telfer
- ☑ S Gray

Signed:

Date of issue: 26 Apr 18

Certificate Number: 3946

Customer Name and Address:

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

Description: Calibration factors for the air monitoring station at East Ayrshire Council

Ricardo Energy & Environment ID: ED61598/3946

Date of issue: 26 Apr 18

Certificate Number: 3946

Ricardo Energy & Environment ID: ED61598/3946

East Ayrshire Council

NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response[1]	Zero uncertainty ppb	Calibration Factor[2]	Factor uncertainty %	Converter eff. (%)[3]
East Ayrshire Kilmarnock St Marnock St	07-Dec-17	NOx	2361	-3.1	2.5	1.0684	3.79	101.4
		NO		0.6	2.6	1.0976	4.07	

PM10 analysers

Station	Date of audit	Analyser Serial no	Calculated ko	Uncertainty %	Total flow	Uncertainty %	Main flow	Uncertainty %
East Ayrshire Kilmarnock St Marnock St	07-Dec-17	7476			4.62	2.2		2.2

Date of issue:	26 Apr 18
Certificate Number:	3946
Ricardo Energy & Environment ID:	ED61598/3946

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k0 (where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in ppb (parts per billion) mole fractions or ppm (parts per million) mole fractions.

[1] The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

[2] The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (ppb for NO, NOx, SO_2, O_3 and ppm for CO. Where 1ppm = 1000ppb). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - Zero Response)

Where F = Calibration Factor provided on this certificate

Output = Reading on the data logging system of the analyser

Zero Response = Zero Response provided on this certificate

[3] Converter eff. is the measured efficiency of the NO_2 to NO converter within the oxides of nitrogen analyser under test.

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

[6] The calculated k0 value (specifically for TEOM analysers) is the calculated k0 spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified value of k0.

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

Appendix F: Industrial Premises Regulated by SEPA under the Pollution Prevention and Control (Scotland) Regulations 2000

Part A

PPC/W/20040	Egger	East Ayrshire
PPC/A/1079002	Auldhouseburn Farm	East Ayrshire
PPC/A/1082048	Thomarston Poultry Farm	East Ayrshire
PPC/A/1088432	Hillhead Farm, Kilmaurs,	East Ayrshire
PPC/A/20019	Garlaff Landfill, Skares	East Ayrshire
PPC/A/1017028	Dunniflats Waste Site, Lugton	East Ayrshire
PPC/A/1038885	Billy Bowie Composting, Kilmarnock	East Ayrshire

Part B

PPC/W/30110	Ayr Road Garage, Dalmellington	East Ayrshire
PPC/W/30101	Bridgend Garage, Auchinleck	East Ayrshire
PPC/W/30111	Central Garage, Cumnock	East Ayrshire
PPC/W/30112	JK Thomson, Cumnock	East Ayrshire
PPC/B/1000090	AM Services, Mauchline	East Ayrshire
PPC/B/1004563	Asda Filling Station, Kilmarnock	East Ayrshire
PPC/W/30100	Blair Garage, Stewarton	East Ayrshire
PPC/W/30116	Bobbin Filling Station, Galston	East Ayrshire
PPC/B/1000092	Pace Petroleum, Galston	East Ayrshire
PPC/B/1000088	Pace Petroleum, Kilmarnock	East Ayrshire
PPC/W/30061	Morrisons, Kilmarnock	East Ayrshire
PPC/W/30114	Shell Glencairn, Kilmarnock	East Ayrshire
PPC/B/1033837	Burnpark FS, Kilmarnock	East Ayrshire
PPC/B/1004562	Western Filling Station, Kilmarnock	East Ayrshire
PPC/B/1004561	Malthurst, Kilmarnock	East Ayrshire
PPC/B/1004559	Campbell Fuel Oils, Kilmarnock	East Ayrshire
PPC/B/1000087	Grange Service Station, Kilmarnock	East Ayrshire
PPC/B/1031777	Tesco Petrol Filling Station, Kilmarnock	East Ayrshire
PPC/W/30071	Braehead Metals	East Ayrshire
PPC/W/30125	Barr Ltd (Mobile)	East Ayrshire
PPC/W/30126	BarrLtd (Mobile)	East Ayrshire
PPC/W/30141	BarrLtd (Mobile)	East Ayrshire
PPC/W/30142	Barr Ltd (Mobile) - Roadstone	East Ayrshire
PPC/W/30146	Killoch (SC) DP	East Ayrshire
PPC/W/30154	Skares OCCS	East Ayrshire
PPC/W/30158	Gasswater (SC)	East Ayrshire
PPC/B/1003136	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003137	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003138	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003139	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003189	BarrLtd (Mobile)	East Ayrshire
PPC/B/1004235	Airdsgreen (SC)	East Ayrshire
PPC/B/1004236	Chalmerston (SC)	East Ayrshire
PPC/B/1005102	BarrLtd (Mobile)	East Ayrshire
PPC/B/1009227	Lugton Limeworks, Lugton	East Ayrshire
PPC/B/1015138	Eazyclean Ltd	East Ayrshire
PPC/B/1017559	Crosshouse Launderette	East Ayrshire
PPC/B/1019918	Barr Ltd (Mobile) RMC	East Ayrshire
PPC/B/1024480	Barr Limited, Moorfield Plant	East Ayrshire
PPC/B/1025233	Beez Neez, Stewarton	East Ayrshire
PPC/B/1030092	Barr Ltd (Killoch)	East Ayrshire

PPC/B/1081430	Ve-Tech, Stranhead Cement Batcher	East Ayrshire
PPC/B/1083652	ATH Resources, Netherton	East Ayrshire
PPC/B/1079817	Dunstonhill OCCS, Patna	East Ayrshire

Appendix G:

Figure G.1: Map of Scottish Local Authorities

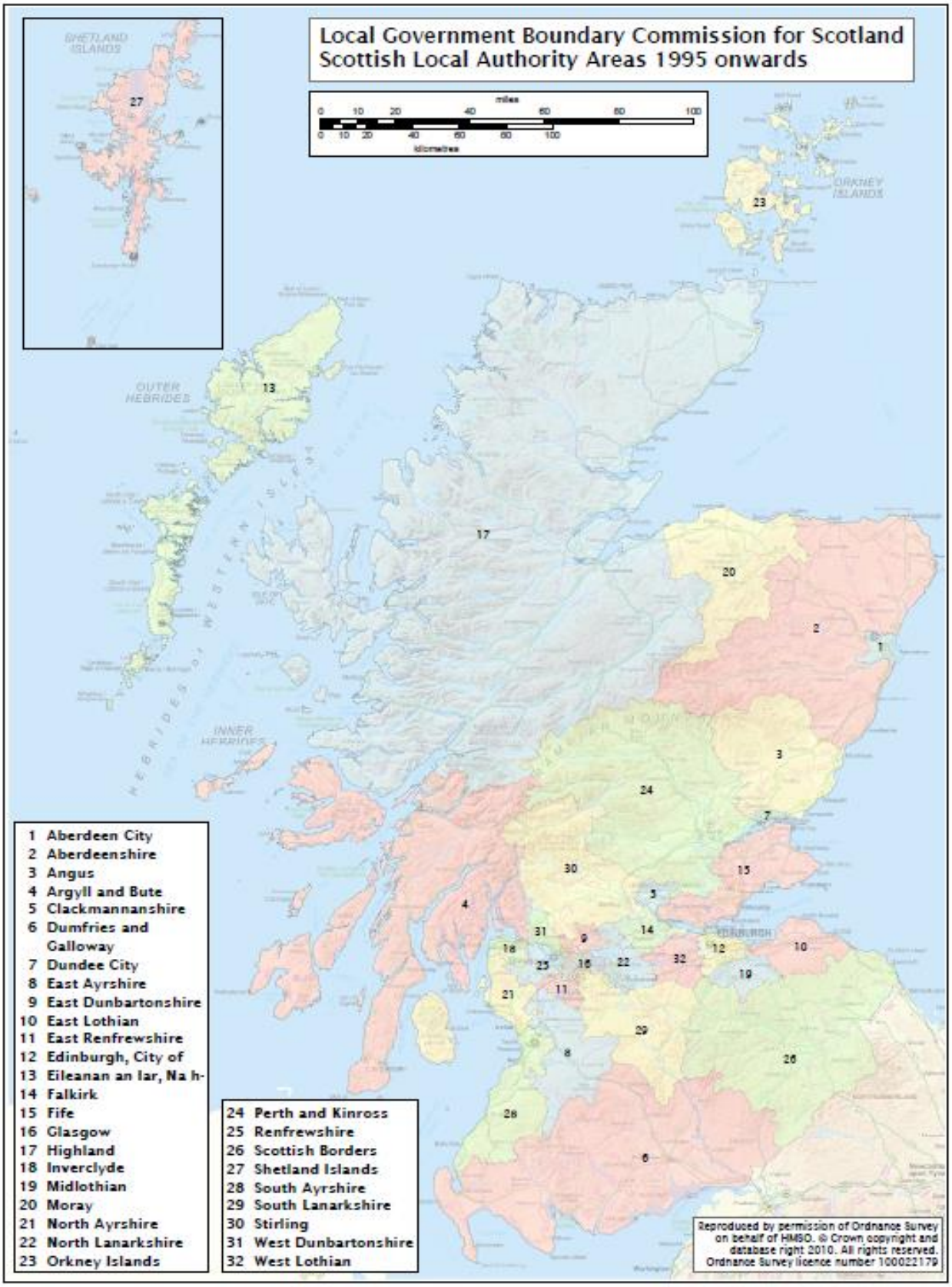


Figure G.2: Map of East Ayrshire

Note: No 1-13 are traffic count location points (Reference12, East Ayrshire Transport Strategy 2009 – 2014)

Figure G.3: Map of Coal Extraction Sites around Cumnock and New Cumnock

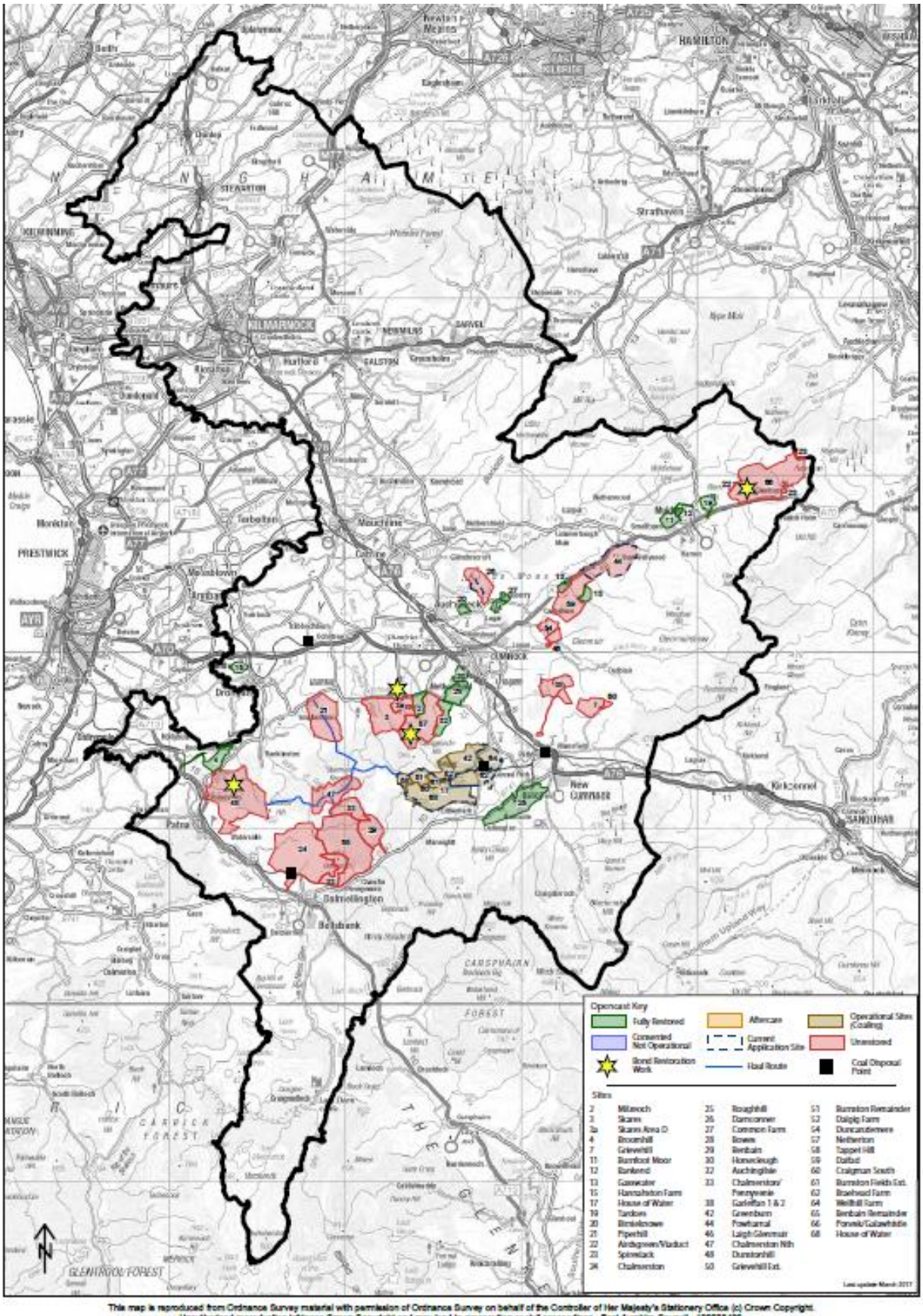


Figure G.4: Kilmarnock Town Centre Automatic Monitoring Station and NO2 Diffusion Tube Locations

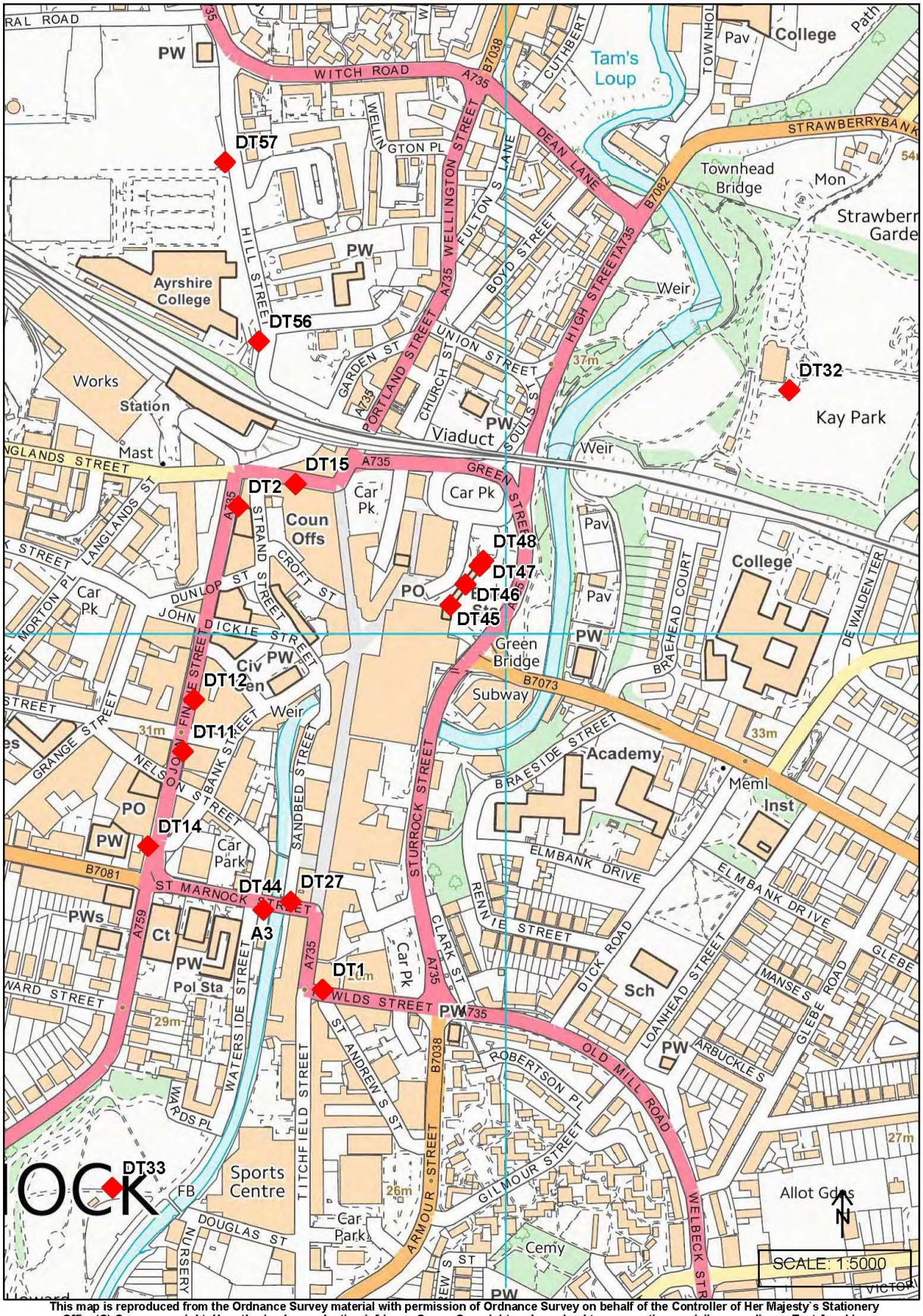


Figure G.5: New Farm Loch, Kilmarnock NO2 Diffusion Tube Locations

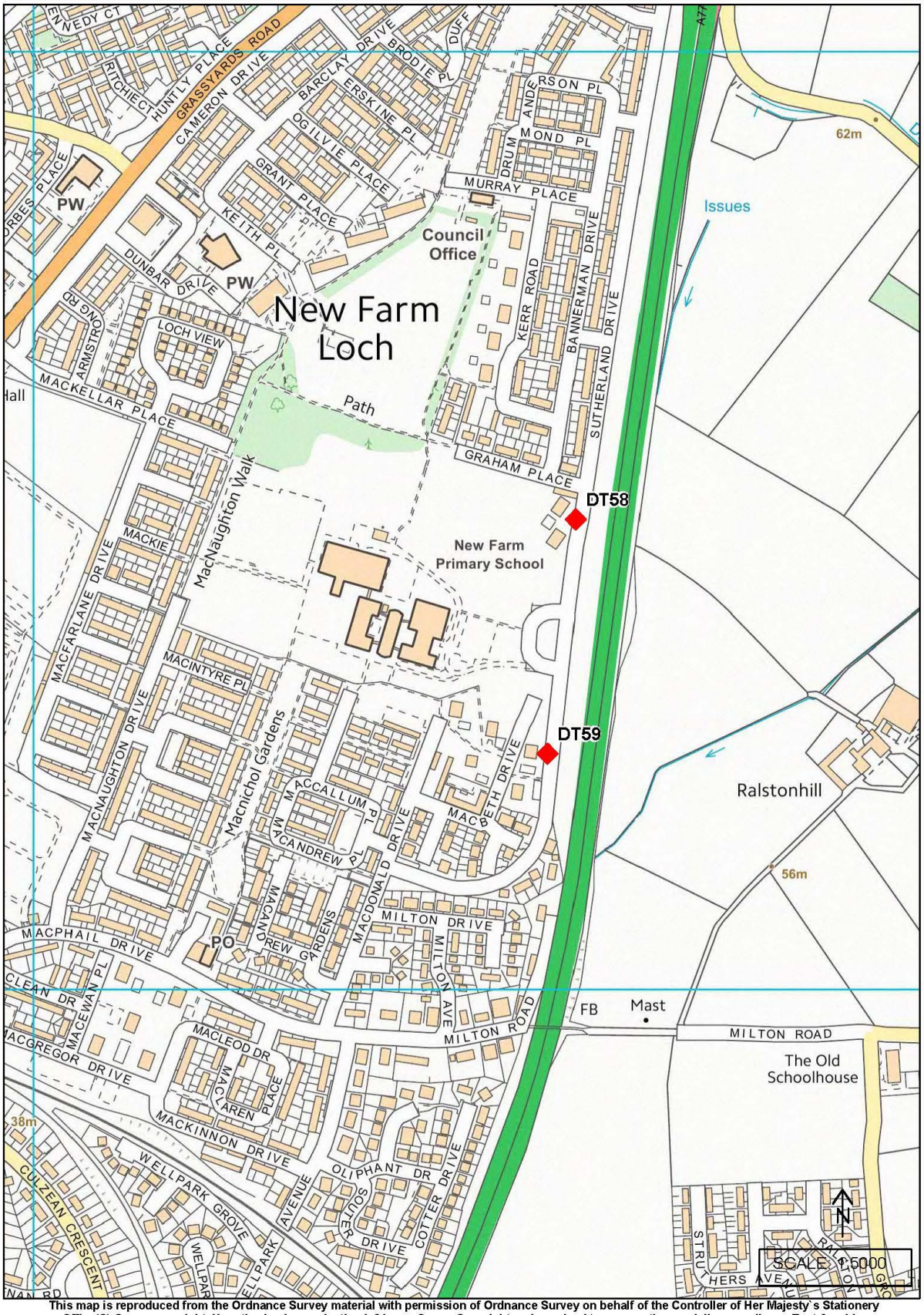


Figure G.6: Kilmarnock Bus Garage NO2 Diffusion Tube Locations

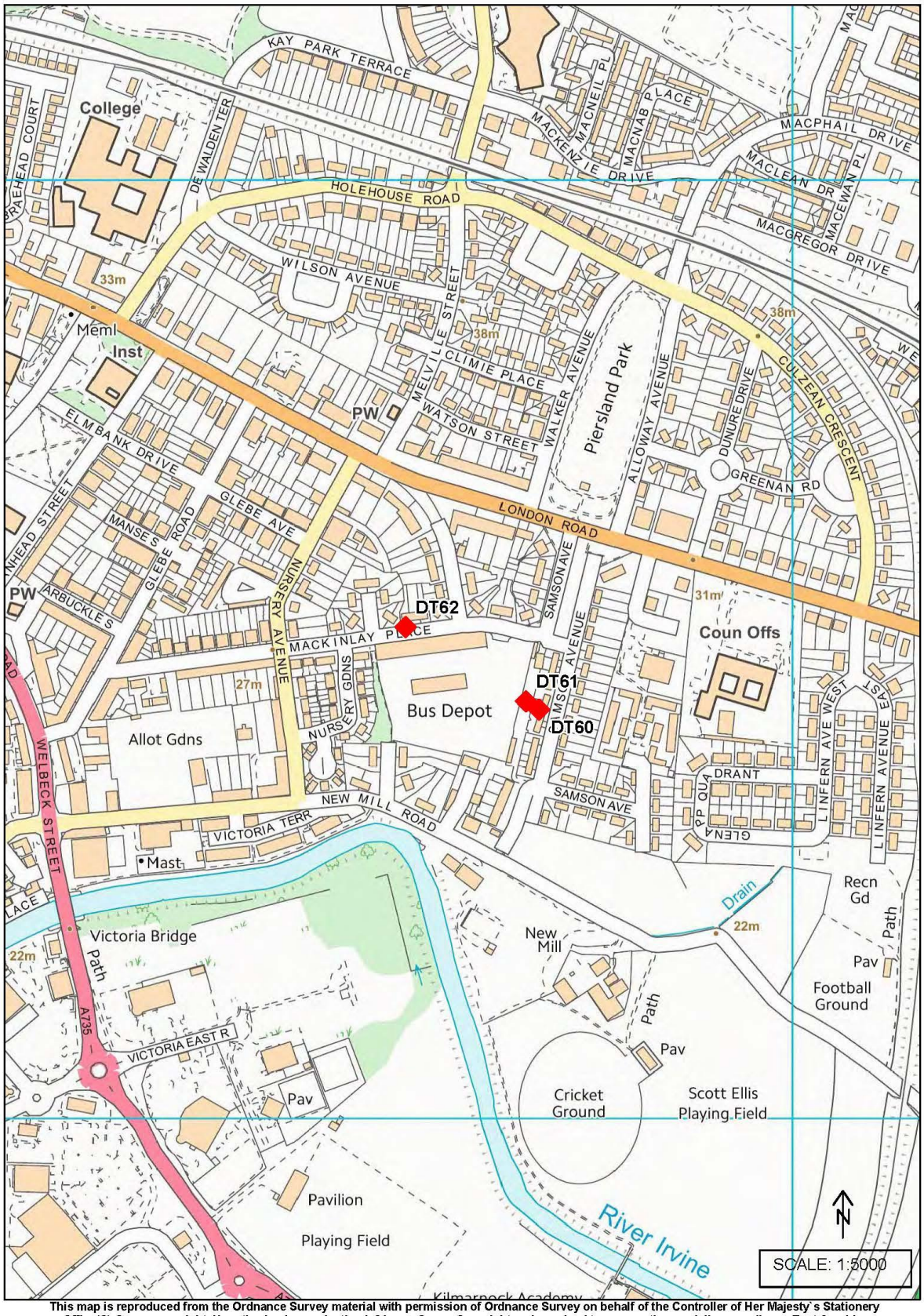


Figure G.7: Stewarton NO2 Diffusion Tube Locations

Figure G.8: Newmilns NO2 Diffusion Tube Locations

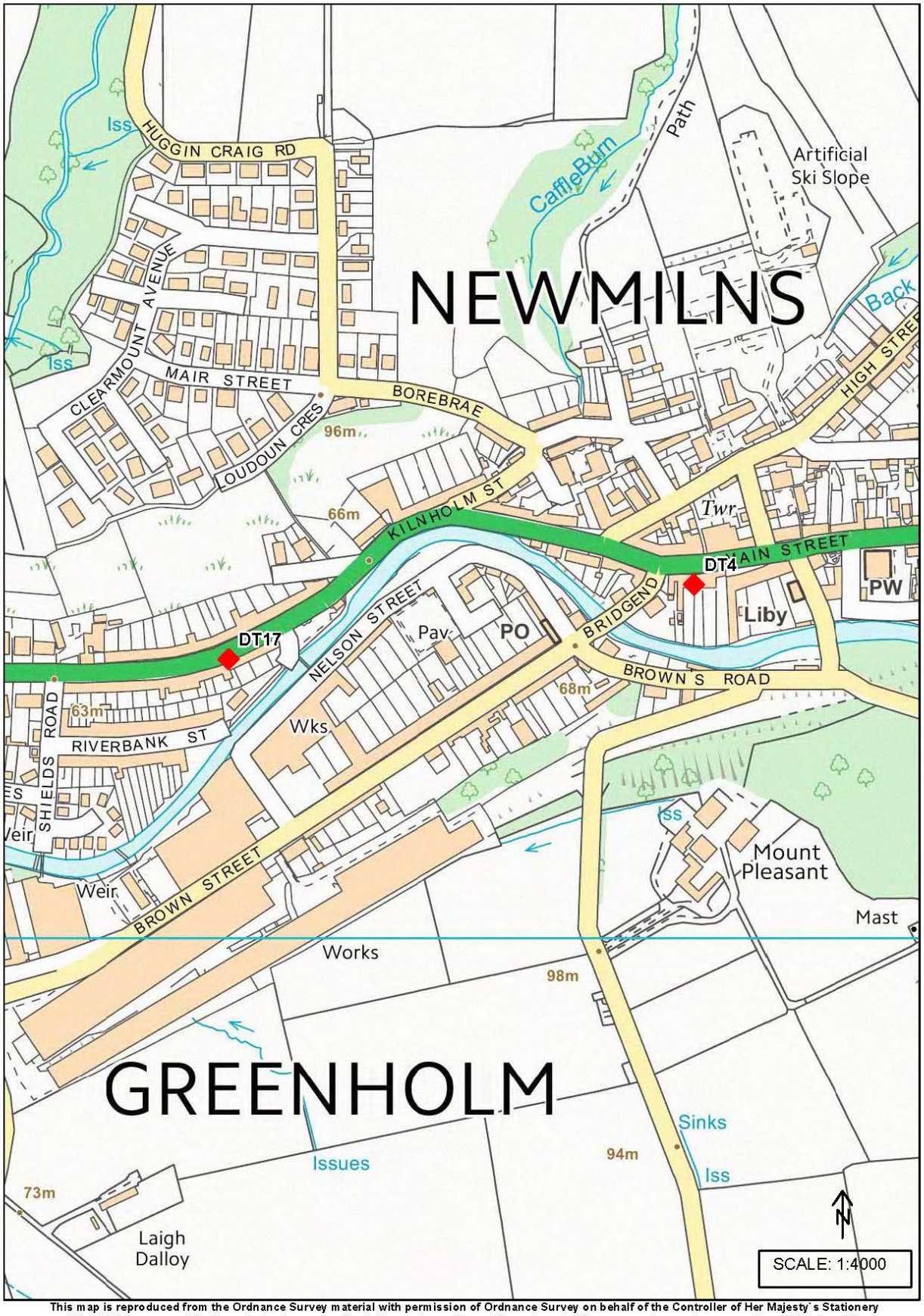


Figure G.9 Mauchline NO2 Diffusion Tube Location

Figure G.10: Cumnock NO2 Diffusion Tube Location

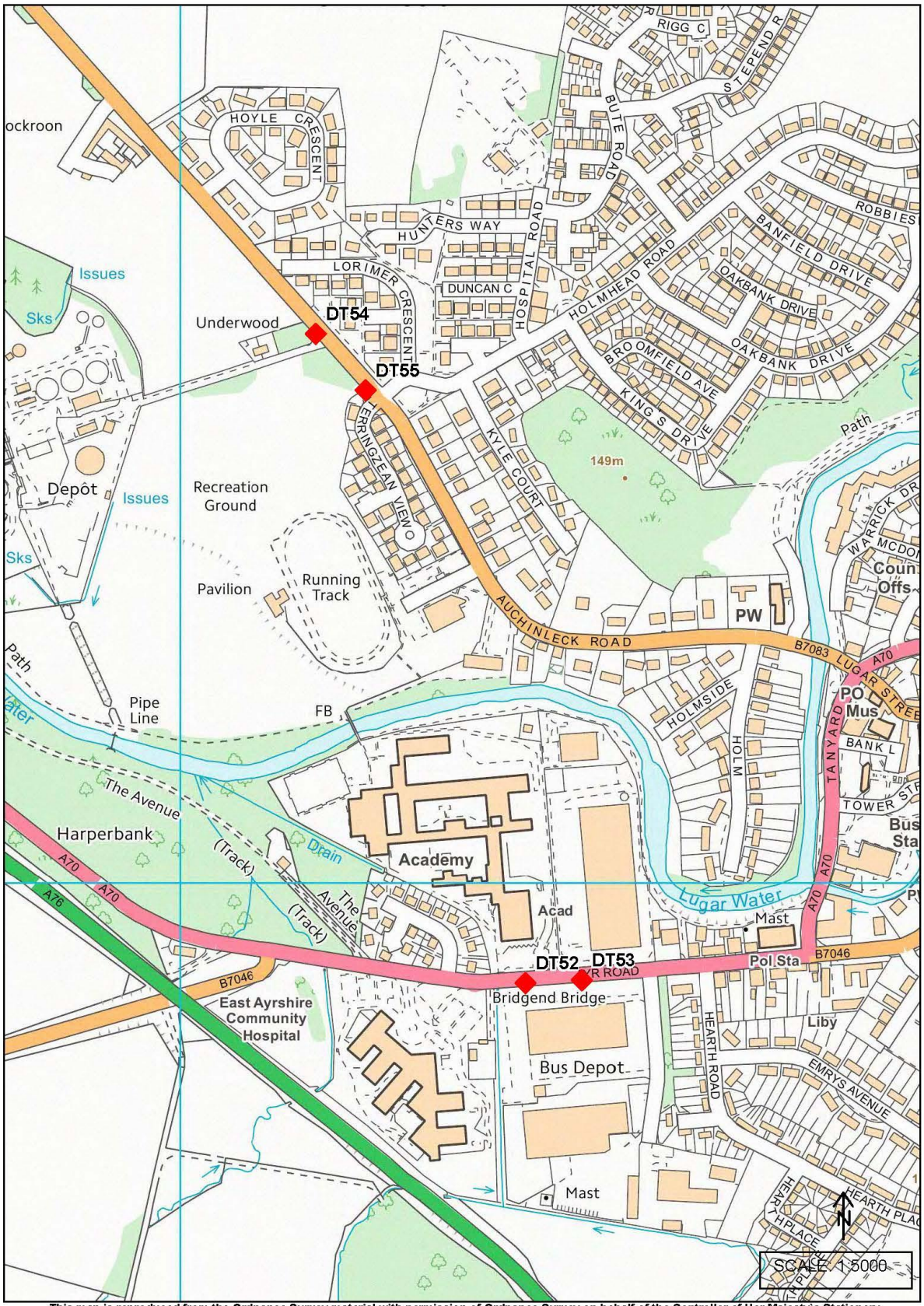
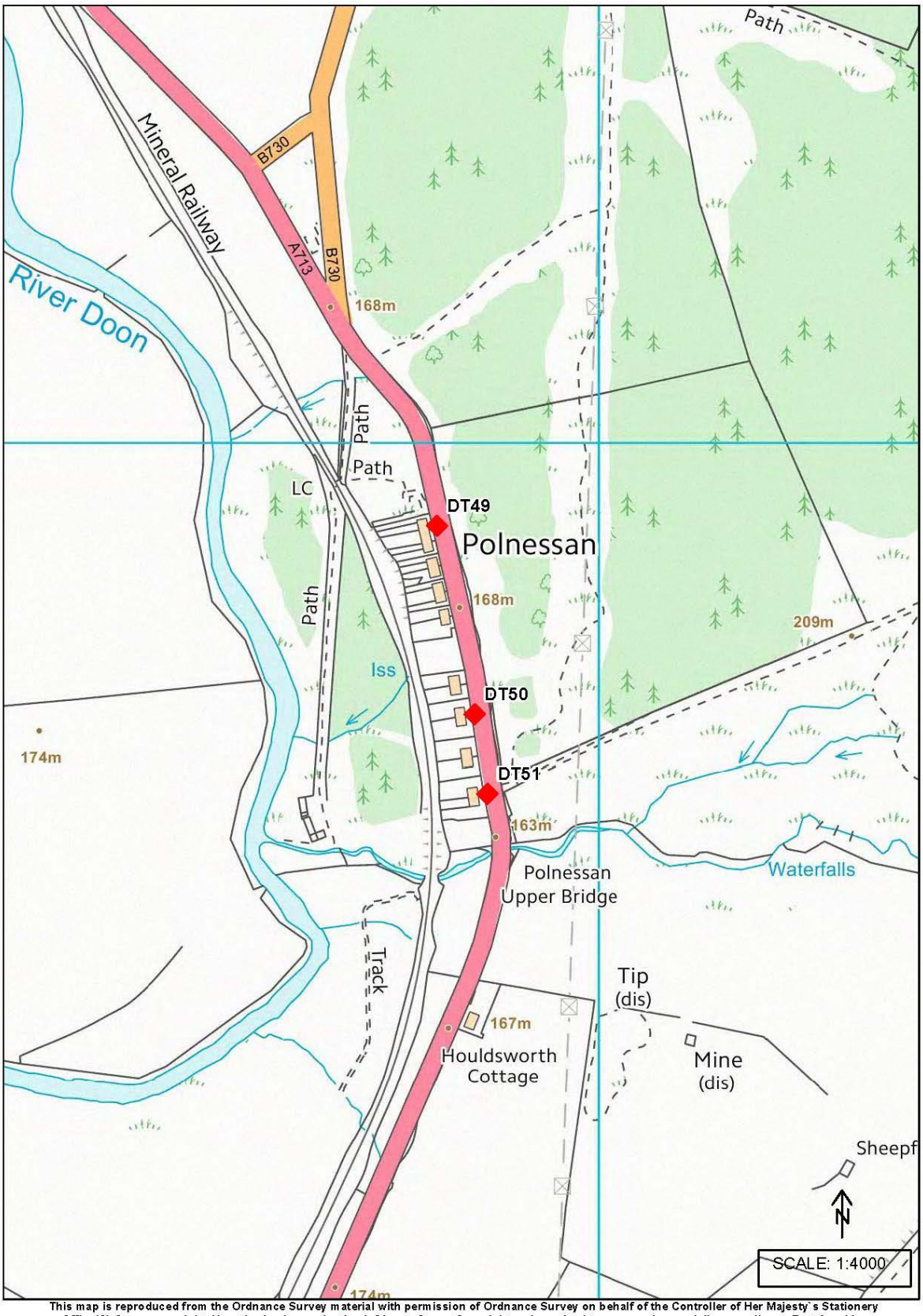


Figure G.11: Polnessan NO2 Diffusion Tube Location



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)
BAM	Beta Attenuation Mass Monitor
COMEAP	Committee on the Medical Effects of Air Pollutants
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
FIDAS	Fine Dust Analysis Systems
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
SCOOT	Split Cycle Offset Optimisation Technique
SO_2	Sulphur Dioxide
TEOM	Tapered Element Oscillating Microbalance

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