Annual Progress Report (APR)

2017 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 2017

East Ayrshire Council
Comhairle Siorrachd Àir an Ear

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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 that "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). 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 regards to biomass combustion from, principally, log burners, and also 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 looked at 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 and 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 East Ayrshire 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. 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. 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.

Actions taken at local and national level are producing a steady improvement in local air quality within East Ayrshire (Figures A.1 - A.5)

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 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 – 2016) are showing a downward trend (Figures A.1 - A.5) and all monitoring locations were below 30 µg/m^3 in 2016, substantially below the 40 µg/m^3 annual mean Air Quality Objective (Table A.1 – A.6). Monitored PM_{10} levels in Kilmarnock town centre were substantially below the 18 µg/m^3 annual mean Air Quality Objective in 2016 and have been consistently below the Objective since 2012 using preferred TEOM FDMS technology.

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1. Local Air Quality Management

This report provides an overview of air quality in the East Ayrshire Council area during 2016. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedence is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Progress Report (APR) summarises the work being undertaken by 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 2016 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 2009 – 2014 (Reference 12). The most recent measures in progress are provided in Table 2.1a. 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.	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	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.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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, 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 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/	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
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	2016-2017	No AQMA	96 new vans delivered during 2016.	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.	Safer Communities	2016	2016 - 2017	No AQMA	Driver training completed. Fitment of telematics completed.	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.	Safer Communities	2015	2016 onwards	No AQMA	Operational and ongoing.	Ongoing	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	2015	2016-2017	No AQMA	Purchased 2016. Ongoing. 3 new electric vans, Nissan ENV200, delivered in June 2017	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
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 was due to be upgraded in late 2016 but has been delayed to late 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.	Safer Communities	2015	2017 - 2018	No AQMA	Installation due to start at the end of 2017	2018	Operational with upgrading of SCOOT system due in 2017. Details in East Ayrshire Local Transport Strategy (LTS).

Table 2.2b – 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 NEW	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.

Measure No.	Measure	Category	Focus	Lead Authority	Comments
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).
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).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
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).
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).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
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).
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).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
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 NEW	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.
20 NEW	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 NEW	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 NEW	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.

Measure No.	Measure	Category	Focus	Lead Authority	Comments
23 NEW	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).
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).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
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).
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).

Measure No.	Measure	Category	Focus	Lead Authority	Comments
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
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.

Measure No.	Measure	Category	Focus	Lead Authority	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.	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 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 under preparation. 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, see 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.1 – G.10. Monitoring data is provided in Appendix A, Tables A.1 – A.9 and Appendix B and any trends in Figures A.1 – A.5. 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 2016. 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 15 sites during 2016. Table A.2 in Appendix A shows the details of the sites.
Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

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 2016. Automatic monitoring at St Marnock St. indicated an annual mean of 29 µg/m^3 and the maximum NO_2 level recorded at any NO_2 diffusion tube site was 29.9 µg/m^3 at the junction of King St. and St. Marnock St., Kilmarnock, both well below the annual mean Air Quality Objective of 40 µg/m^3. The maximum NO_2 level predicted at any receptor was 28.8 µg/m^3 at 95/97 John Finnie St., Kilmarnock. Again well within the annual mean Air Quality Objective of 40 µg/m^3 (Table A4b).

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 A4b 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.)

NO_2 levels at the building facade were at a maximum of 28.8 µg/m^3 at 95/97 John Finnie St., Kilmarnock. All 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 locations in Kilmarnock Town Centre, Fowlds St., has predicted NO_2 levels at the building façade of 20 µg/m^3 (25 µg/m^3 at the roadside) in 2016 and 19 µg/m^3 in 2015 (Table 4a and 4b), half the 40 µg/m^3 and a fall of 13/14 µg/m^3 since the peak roadside levels of 38 µg/m^3 in 2011 and 39 µg/m^3 in 2010 (EAC 2012 Progress Report, Reference 19). The four long term monitoring NO_2 sites (Figures A.3 – A.4) indicate a significant downward trend from 2007 to 2016. 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.

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

5/ Relatively mild winter weather patterns since the cold winters of 2010/11 and 2011/12 which resulted in raised levels of NO_2 and PM_{10}.

Table A.3 and A.5 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the Air Quality Qbjective of 40µg/m^3. For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B. Table A.6 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.

No exceedences of the NO_2 hourly mean occured at the St. Marnock St. automatic monitoring station during 2016 and since no NO_2 tubes exceeded 29.9 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).

3.2.2 Particulate Matter (PM_{10})

No exceedences of the annual mean Air Quality Objective occurred at the St. Marnock St. monitoring site during 2016 with annual mean levels of 14 µg/m^3 using BAM 1020 and FIDAS technology, well below the 18 µg/m^3 objective. There were no exceedences of the 24-hour mean Air Quality Objective.

Table A.7 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.8 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.

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 2016, at between 10 and 14 µg/m^3, are comfortably within the 18 µg/m^3 annual mean Air Quality Objective (Table A.7).

3.2.3 Particulate Matter ($PM_{2.5}$)

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 can be 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 therefore 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 August to December 2016 with annual mean levels of 6 µg/m^3 using FIDAS technology. The annual mean level was annualised using three background sites (Appendix D2) and was computed at 7 µg/m^3 well below the 10 µg/m^3 objective (Table A9).

3.2.4 Sulphur Dioxide (SO_2)

No Sulphur Dioxide monitoring was carried out in East Ayrshire in 2016. Monitoring was discontinued in 2005 due to the very low levels recorded. Previous monitoring of sulphur dioxide showed 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.

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 2016 as previous monitoring or assessments concluded that no exceedences of Air Quality Objectives were found or predicted.

4. New Local Developments

LAQM.TG16, paragraphs 3.25 – 3.28 (Reference 1) were used to assess new developments. There have been 2 new developments in the last year within the East Ayrshire Council area of a scale which required a detailed air quality assessment, namely Knockroon Learning & Enterprise Campus, Cumnock and the Energy Recovery Park, Killoch, Ochiltree. These are discussed in Section 5. Planning Applications.

4.1 Road Traffic Sources

In order to provide an assessment of road traffic sources for this report, the most up to date information on traffic flows on several roads within East Ayrshire was obtained from the Traffic Section, East Ayrshire Council and Transport Scotland.

The following sources were considered:-

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

East Ayrshire Council confirms that there are no new or newly identified **Road Traffic Sources** which may have an impact on air quality within the Local Authority area.

4.2 Other Transport Sources

The following transport sources were considered:-

- Airports.
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.
- Ports for shipping.

East Ayrshire Council area has no airports or ports.

East Ayrshire Council confirms that there are no new or newly identified **Other Transport Sources** which may have an impact on air quality within the Local Authority area.

4.3 Industrial Sources

East Ayrshire Council considered the following industrial sources which are new since the last Updating and Screening Assessment.

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

East Ayrshire Council confirms that there are no new or newly identified **Industrial Sources** which may have an impact on air quality within the Local Authority area.

4.4 Commercial and Domestic Sources

East Ayrshire Council considered the following commercial and industrial sources which are new since the last Updating and Screening Assessment.

- Biomass combustion plant – individual installations.
- Areas where the combined impact of several biomass combustion sources may be relevant.
- Areas where domestic solid fuel burning may be relevant.
- Combined Heat and Power (CHP) plant.

A biomass plant will be installed as part on the new Knockroon Enterprise & Learning Campus and is covered in Section 5 Planning Applications.

4.5 New Developments with Fugitive or Uncontrolled Sources

East Ayrshire Council considered the following new developments with fugitive or uncontrolled sources which are new since the last Updating and Screening Assessment.

- Landfill sites.
- Quarries.
- Unmade haulage roads on industrial sites.
- Waste transfer stations, etc.
- Other potential sources of fugitive particulate matter emissions.

Opencast Coal Extraction

Open cast coal has reduced considerably due to the collapse in 2013 of two large operators, Scottish Coal and ATH Resources, cutting operational mines by over fifty percent to four operational mines in 2013. At the time of writing the report, only one mine is presently operational namely Greenburn, New Cumnock and therefore the air quality impact from open cast coal sites is now greatly reduced. It is unlikely this will change unless coal prices rise substantially.

Energy from Waste Plant

An energy from waste plant will be installed as part on the new Killoch Energy

Recovery plant and is covered in Section 5. Planning Applications.

An energy recovery park is due to be installed at Killoch, Ochiltree and is covered in Section 5 Planning Applications.

In summary, East Ayrshire Council confirms that there are 2 new or newly identified local developments which may have an impact on air quality within the Local Authority area. These are discussed in Section 5 Planning Applications.

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

Two planning applications for new developments have been approved since the last reporting year which could impact upon air quality are as follows:-

(a) Energy Recovery Park, Killoch, Ochiltree Planning Reference No 15/0413/PP Approved 22nd June 2017 (Reference 28)

A major development which has the potential to impact on air quality is the Energy Recovery Park (ERP) located at Barr's present site at Killoch, Ochiltree. The facility will provide treatment and recovery services for residual municipal waste. Mechanical treatment and gasification technologies will be utilised to recover recyclable materials, where practicable, and generate heat and power from the remaining residual wastes.

The Energy Recovery Park incorporates a Waste Reception Hall, Material Recovery Facility (MRF), and an Energy Recovery Gasification Facility, which will extract heat and energy from the refuse derived fuel (RDF). The ERP will have the capacity to treat up to 120,000 tonnes of residual waste per year in the MRF. This will generate 85,000 tonnes per year of RDF which will be utilised within the energy recovery gasification facility. In turn, this will produce approximately 12MW of electricity to the National Grid (which could power an equivalent of 12,000 households) and 25MW of heat which will be used on-site.

The proposed layout of the development incorporates a new main building, which will contain all of the following; the waste reception hall, MRF and energy recovery gasification facility. This enables the process of receiving the residual waste, its mechanical treatment and recovery of recyclables and the gasification of the remaining waste to occur within one building. The stack associated with the facility will be located in the west corner of the energy recovery gasification facility. The height of the proposed stack has been determined through emission modelling (detailed in Appendix 10.1 of the Environmental Statement, Reference 28) and will be 55m high. This equates to the same height as the winding towers that existed on site when the Killoch site was operated as a coal mining and processing facility from the 1950s to the late 1980s. The present site entrance from the A70 will be retained.
The proposed development will source waste available from the following Barr facilities. These include:-

- Garlaff (East Ayrshire) – Recycling and Resource Management Facility
- Southhook (East Ayrshire) – Waste Transfer and Recycling Facility
- Heathfield (South Ayrshire) – Recycling Centre
- Auchencarroch (West Dunbartonshire) - Recycling and Resource Management Facility

Residential Receptors

There are a number of scattered private dwellings, farms and smaller clusters of dwellings within the area. The closest are: Killoch Farm on the immediate opposite (southern) side of the A70 road, 30-35m to the south; Killochside, approximately 300m to the west; Provost Mount, approximately 360m to the south; Creoch House, approximately 650m to the north west; Lessnessock Bungalows, approximately 700m to the south east; Ardmhor, and Lessnessock, approximately 745m to the north west and south east, respectively; and High Tarbeg, approximately 400m to the north east.

Air Quality and Odour

The assessment took into account the air quality impacts associated with the proposed development. Existing air quality will be evaluated and potential impacts predicted by reference to current guidelines.

Current operations at the site include the asphalt plant and equipment storage. The impact on air quality associated with current site operation is from vehicles using the site as well as the operation of the asphalt plant equipment. The cumulative impacts were included in the modelling study.

Method of Assessment

The assessment included a discussion of the key health issues relating to the processes involved with construction and operation of the site. Proposed control systems were described and dispersion modelling was carried out to confirm the acceptability of the proposed technology. The air quality study was carried out in accordance with SEPA and Environment Agency guidance on air quality modelling studies, and established good practice for air quality modelling and assessment. ADMS 5 and AEROMOD version 14134 dispersion models were used in the assessment. A DMRB (Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1: Air Quality – May 2007) assessment was also carried out to examine road traffic emissions.

Consultation with SEPA took place and assessment of air quality impacts upon ecological sites within 15km of the site was also undertaken.

Mitigation measures included:

- Rapidly opening and closing doors to the tipping hall entrance to ensure odour does not escape;
- An odour control unit as a part of the building;
- Areas where waste is delivered, stored, dispatched or bulked-up operating under negative air pressure with air filtered before being discharged via a stack
- Regular maintenance of fleet vehicles and replacement where necessary, with use of low emission vehicles where possible; and
- Minimising of dust generating activities.

The applicant carried out one year's PM_{10} and $PM_{2.5}$ monitoring to ascertain the background PM levels in the immediate locality of the site to give robust data to input

into the dispersion model to provide more accurate air quality data. This is completed and included in the final air quality assessment.

An air quality, dust, odour and human health impact assessment was completed by Ricardo-AEA on behalf of the main consultants Wardell Armstrong. The report number is ED 60039_Issue Number 2 and can be accessed on the East Ayrshire Council website Reference 28. **On the basis of this assessment, it was concluded that the proposed facility will have no significant adverse effects on air quality.** The following extracts from the report summarise the findings:-

Executive summary

The proposed Barr Killoch Energy Recovery Park will process up to 120,000 tonnes per annum (tpa) of residual waste through a materials recovery facility (MRF) of which 85,000 tpa will be treated by gasification, generating both heat and electricity. The air quality impact assessment for the proposed facility was carried out as follows:

(a) Outline review of the policy context for air quality.

(b) Assessment of baseline air quality.

(c) Identification of potentially sensitive locations.

(d) Dispersion modelling study of emissions to forecast air concentrations and deposition rates at potentially sensitive locations.

(e) Evaluation of forecast levels of released substances against relevant standards, guidelines, critical levels and critical loads.

(f) Assessment of plume visibility.

(g) Assessment of road traffic emissions on air quality.

(h) Assessment of abnormal operating conditions/accidental releases.

(i) Mitigation measures.

(j) Conclusions.

The main focus of the air quality assessment was the evaluation of modelled levels against relevant standards and guidelines. Levels of relevant substances were forecast at sensitive receptors to enable an assessment of the effects on air quality with regard to human health risks to be evaluated. Levels of relevant released substances were also forecast at designated habitat sites in the local area to enable an assessment of the potential effects on habitat sites due to emissions to air from the proposed facility to be carried out.

The study used a wide range of information on baseline air quality to characterise baseline conditions in the vicinity of the proposed facility. A state-of-the-art computer model was used to forecast the levels of substances emitted from the proposed facility that would result in the local area. The forecast levels of released substances combined with baseline levels were assessed against relevant air quality standards and guidelines.

In all cases, modelled levels of released substances when combined with background levels were forecast to comply with standards and guidelines for air quality at all locations in the vicinity of the proposed facility.

The proposed development is forecast to have no significant effects on air quality due to road traffic emissions, and no significant cumulative effects are forecast to occur. No amenity issues such as odours or dusts would be expected to arise outside the site boundary, and emissions to air from the proposed facility are forecast to have no significant effects at designated habitat sites.

The study was carried out using a highly conservative approach to ensure that any air quality effects are more likely to be over-estimated than under-estimated. For example, emissions from a comparable facility in Norway are at much lower levels than the limits which were assumed for the purposes of this study.

Using a set of independent criteria, the impact of the proposed facility can be described as "negligible".

On the basis of this assessment, it was concluded that the proposed facility will have no significant adverse effects on air quality. Consequently, it was concluded that no further mitigation is necessary, other than the extensive mitigation and control measures already built into the proposed facility. Emissions monitoring will be specified under the terms of the Pollution Prevention and Control permit for the proposed facility. If considered useful, an ambient air quality monitoring programme could also be specified under the remit of the PPC Permit.

Table 3: Baseline air quality in the study area

Substance	Long-term baseline level (µg/m³)	Basis
Particulate matter (PM_{10})	16 µg/m³	Highest level measured at any automatic monitoring station in South and East Ayrshire in 2010, 2011 and 2012. This level is higher than the interpolated map values within the vicinity of the site.
Particulate matter (PM_{10}) (90.4th percentile of 24 hour mean concentrations)	32 µg/m³	Calculated as 2x the annual mean (Ref. 10 page 26)
Particulate matter (PM_{10}) (98.08th percentile of 24 hour mean concentrations)	32 µg/m³	Calculated as 2x the annual mean (Ref. 10 page 26)
Particulate matter ($PM_{2.5}$)	7 µg/m³	Highest interpolated map value in the vicinity of the site (x. 245500 - 251500, y. 617500 - 623500).
Benzene	0.8 µg/m³	Highest level measured at Auchencorth Moss monitoring station between 2012 and 2014.
Hydrogen chloride	0.41 µg/m³	Highest level measured at the four nearest rural sites (Eskdalemuir, Carradale, Auchencorth Moss and Bush Estate) during 2011, 2012 and 2013.
Hydrogen fluoride	2.46 µg/m³	Short-term peak level suggested by EPAQS[8]
Carbon monoxide	1400 µg/m³	There are no automatic monitoring stations for CO in East or South Ayrshire. This value is the highest level measured at either of the two automatic monitoring stations in Glasgow during 2013 (Glasgow Byres Road). The use of data from Glasgow is likely to be highly conservative for the vicinity of the proposed facility.

Substance	Long-term baseline level ($\mu g/m^3$)	Basis
Sulphur dioxide	3 $\mu g/m^3$	There are no automatic monitoring stations for SO_2 in East or South Ayrshire. Recorded at the Glasgow Anderston monitoring station in 2013. The use of data from Glasgow Centre is likely to be conservative for the vicinity of the proposed facility.
Nitrogen dioxide	26 $\mu g/m^3$	Highest concentration recorded by diffusion tube at the Junction at Main Street & A70 Ochiltree between 2007 and 2009. This level is higher than the interpolated map values within the vicinity of the site and higher than the values recorded by automatic monitoring stations in East and South Ayrshire between 2009 and 2012.
Oxides of nitrogen	Various	Interpolated map data was used to evaluate baseline levels of oxides of nitrogen at designated habitat sites.
Ammonia	0.93 $\mu g/m^3$	Highest annual mean recorded at the Auchencorth Moss monitoring station between 2011 and 2013. National Ammonia Monitoring Network (NAMN).
Dioxins and furans ITEQ	49 $fgTEQ/m^3$	Highest level measured at urban and rural locations in the UK in 2010 (level recorded at Manchester). This is likely to be highly conservative for the area of the proposed facility.
PAHs (benzo(a)pyrene)	0.000055	Highest annual mean level recorded at Auchencorth Moss monitoring station between 2011 and 2013 (PAH Digitel (solid phase).
Metals		
Cadmium	0.032 ng/m^3	Rural Heavy Metals Network: Highest value recorded at the Auchencorth Moss automatic monitoring site between 2011 and 2013.
Mercury	1.97 ng/m^3	
Arsenic	0.2 ng/m^3	
Lead	1.6 ng/m^3	
Chromium	0.79 ng/m^3	
Copper	0.99 ng/m^3	
Manganese	1.05 ng/m^3	
Nickel	0.38 ng/m^3	
Vanadium	0.42 ng/m^3	
Chromium VI	0.16 ng/m^3	
Cobalt	0.04 ng/m^3	
Antimony	No national measurement. Baseline measurements used in relation to other developments confirms that baseline levels are not significant in relation to the air quality standards and guidelines.	
Thallium		

Table 17: Maximum modelled air concentrations of released substances

Substance	Averaging time	AQ Standard / Guideline (µg/m³)	Baseline (µg/m³)	Process contribution (µg/m³)	PC/ AQSG	Combined process + baseline (µg/m³)	Combined/ AQSG
Particulate matter (PM_{10})	Annual mean	18	16	0.14	0.76%	16	90%
Particulate matter (PM_{10})	90.4th percentile of 24 hour means (UK)	50	32	0.41	0.83%	32	65%
Particulate matter (PM_{10})	98.08th percentile of 24 hour means (Scotland)	50	32	0.76	1.51%	33	66%
Particulate matter ($PM_{2.5}$)	Annual mean (Scotland)	12	7	0.14	1.14%	7.33	61%
Particulate matter ($PM_{2.5}$)	Annual mean (UK)	25	7	0.14	0.55%	7.33	29%
VOCs (assessed as benzene)	Annual mean	3.25	0.27	0.14	4.20%	0.40	12%
VOCs (assessed as 1,3-butadiene)	Annual mean	2.25	0.27	0.14	6.06%	0.40	18%
Hydrogen chloride	Maximum hourly mean	750	0.4	19	2.60%	20	2.65%
Hydrogen fluoride	Annual mean	16	2.5	0.014	0.085%	2.51	16%
Hydrogen fluoride	Maximum hourly mean	160	2.5	1.30	0.81%	3.80	2.37%
Carbon monoxide	Maximum 8 hour mean	10000	1400	2.26	0.023%	1402	14%
Sulphur dioxide	99.9th percentile of 15 minute means	266	6	49	18%	55	21%
Sulphur dioxide	99.7th percentile of hourly means	350	6	31	8.77%	37	10%
Sulphur dioxide	99.2nd percentile of 24 hour means	125	3	4.58	3.66%	8	6%
Nitrogen dioxide	Annual mean	40	26	1.91	4.78%	28	70%
Nitrogen dioxide	99.79th percentile of hourly means	200	88	22	11%	110	55%
Ammonia	Annual mean	180	0.932	0.14	0.076%	1.07	0.59%
Ammonia	Maximum hourly mean	2500	1.865	6.49	0.26%	8.35	0.33%
Cadmium	Annual mean	0.005	0.00003	0.00068	14%	0.00071	14%
Thallium	Annual mean	No AQSG	No data	0.00068	No AQSG	No data	No AQSG

Substance	Averaging time	AQ Standard / Guideline (µg/m³)	Baseline (µg/m³)	Process contribution (µg/m³)	PC/ AQSG	Combined process + baseline (µg/m³)	Combined/ AQSG
Thallium	Maximum hourly mean	No AQSG	No data	0.018	No AQSG	No data	No AQSG
Mercury	Annual mean	0.25	0.002	0.00068	0.27%	0.0027	1.06%
Mercury	Maximum hourly mean	7.5	0.004	0.016	0.22%	0.020	0.27%
Antimony	Annual mean	5	No data	0.00076	0.015%	0.0011	0.022%
Antimony	Maximum hourly mean	150	No data	0.018	0.012%	0.019	0.012%
Arsenic	Annual mean	0.003	0.0002	0.00076	25%	0.0010	33%
Lead	Annual mean	0.25	0.002	0.00076	0.30%	0.0024	0.96%
Chromium	Annual mean	5	0.0008	0.00076	0.015%	0.0015	0.031%
Chromium	Maximum hourly mean	150	0.0016	0.018	0.012%	0.020	0.013%
Chromium VI	Annual mean	0.0002	0.000158	0.00000061	0.30%	0.000159	79%
Cobalt	Annual mean	No AQSG	0.00004	0.00076	No AQSG	0.00080	No AQSG
Cobalt	Maximum hourly mean	No AQSG	0.00008	0.018	No AQSG	0.018	No AQSG
Copper	Annual mean	10	0.001	0.00076	0.0076%	0.0017	0.017%
Copper	Maximum hourly mean	200	0.002	0.018	0.0090%	0.020	0.010%
Manganese	Annual mean	150	0.001	0.00076	0.00051%	0.0018	0.0012%
Manganese	Maximum hourly mean	1500	0.002	0.018	0.0012%	0.020	0.0013%
Nickel	Annual mean	0.02	0.0004	0.00076	3.79%	0.0011	5.70%
Vanadium	Annual mean	5	0.0004	0.00076	0.015%	0.0012	0.023%
Vanadium	Maximum 24 hour mean	1	0.0008	0.0064	0.64%	0.0073	0.73%
Dioxins and furans ITEQ	Annual mean	No AQSG	4.90×10^{-08}	1.36E-09	No AQSG	5.04E-08	No AQSG
PAHs (benzo(a)pyrene)	Annual mean	0.00025	0.000055	0.000014	5.46%	0.00069	28%

Note PC: Process Contribution AQSG: Air quality standard or guideline

Table 23: Summary of cumulative impact assessment

Substance	AQSG (µg/m³)	Baseline (µg/m³)	Max PC ERP* (µg/m³)	Max PC RCP** (µg/m³)	Max Combined PC (µg/m³)	Combined PC / AQSG (%)	Combined PEC (µg/m³)	Combined PEC / AQSG (%)
PM_{10} annual mean	18	16	0.14	0.73	0.83	4.58 %	17	93 %
PM_{10} 90.4th%ile of 24hr means	50	32	0.41	2.54	2.83	5.65 %	35	70 %
PM_{10} 98.08th%ile of 24hr means	50	32	0.76	5.23	5.71	11.41 %	38	75 %
$PM_{2.5}$ annual mean (Scotland)	12	7	0.14	0.73	0.83	6.88 %	8.01	67 %
$PM_{2.5}$ annual mean (UK)	25	7	0.14	0.73	0.83	3.30 %	8.01	32 %

*Barr Killoch Energy Recovery Park
**Killoch roadstone coating plant
Note: the location of maximum PC values due to the ERP and RCP are different. Consequently, the maximum combined PC is less than the sum of the individual maximum PC values.

6 Conclusions

6.1 Summary

This study describes an assessment of potential effects on air quality of substances emitted from the proposed Barr Killoch Energy Recovery Park.

Modelled levels of all released substances when combined with background levels are forecast to comply with standards and guidelines for air quality.

The proposed development is forecast to have no significant effects on air quality due to road traffic emissions, and no significant cumulative effects are forecast to occur. No odour, bioaerosols or dust issues would be expected to arise outside the site boundary, and emissions to air from the proposed facility are forecast to have no significant effects at designated habitat sites.

The study was carried out using a highly conservative approach to ensure that any air quality effects are more likely to be over-estimated than under-estimated. For example, the data set out in Figure 4 demonstrates that emissions from a comparable facility are at much lower levels than the Industrial Emissions Directive limits which were assumed for the purposes of this study.

On the basis of this assessment, it is concluded that the proposed facility will have no significant adverse effects on air quality.

6.2 EPUK Criteria

The EPUK criteria set out in Section 4.16 provide standard descriptors to be used in describing the forecast air quality effects of the proposed development. While these are designed primarily for use in relation to traffic emissions, they can also be applied to describing the impact of emissions to air from the proposed facility. The assessment for annual mean nitrogen dioxide and PM_{10} levels is as follows:

- Nitrogen dioxide:
    - Maximum forecast change: 1.91 µg/m^3 – Small
    - Absolute concentration outside of the AQMA: 27.91 µg/m^3 (below objective/limit value)

  Impact descriptor: **Negligible**

- PM_{10}:
    - Maximum forecast change: 0.14 µg/m^3 – Imperceptible
    - Absolute concentration: 16.14 µg/m^3 (above objective/limit value)

  Impact descriptor: **Negligible**

On this basis, the impact in relation to annual mean nitrogen dioxide and PM_{10} levels can be described as "negligible".

6.3 Mitigation and monitoring

In view of the finding that the proposed Energy Recovery Park will have no significant adverse effects on air quality, it is concluded that no further mitigation is necessary, other than the extensive mitigation and control measures already built into the proposed facility.

Emissions from the proposed facility will be measured continuously, and as part of a programme of period extractive monitoring. This work programme is managed under the terms of the PPC Permit for the proposed facility. Continuous emissions monitoring data will be made available for inspection by the regulatory authorities and members of the public via a dedicated website.

In view of the low forecast levels of released substances, and conservative assumptions built in to the modelling study, it is most unlikely that an environmental monitoring programme would be effective in identifying a detectable change in air quality which could be linked to emissions from the proposed facility. However, an ambient air quality monitoring programme could be designed as a cross-check on the conclusions of the study. Again, this would more readily fall under the remit of the PPC Permit.

(b) Knockroon Learning & Enterprise Campus Planning Reference No 17/0019/PP Approved 23rd June 2017 (Reference 28)

The campus will replace 2 secondary schools, 3 primary schools and 2 nursery schools. The campus situated on the North West periphery of Cumnock is approximately 23,000 sq. metres gross internal floor area, incorporating nursery, additional special needs, primary and secondary school buildings for around 2500 pupils; community facilities, indoor and outdoor sports pitches and facilities, plant and renewable energy (incorporating biomass boilers).

The main area of concern with regard to air quality issues is the incorporation of a biomass boiler in the development and traffic related emissions. At the time of the EIA screening response the increase in traffic was below the guidance threshold for carrying out traffic related emissions air quality air quality assessments. The transport assessment was published in May 2016 and can be accessed on the East Ayrshire planning website.

Emissions from the biomass plant was subject to an Air Quality Assessment, Report No 70016684 published December 2016 and can be accessed on the East Ayrshire Council Planning website. The energy plant consisted of two 400 kW biomass boilers and two 1MW gas boilers. The atmospheric dispersion model ADMS 5.1 (version 5.1.2.0) was used for quantifying the impacts of emissions from the plant on air quality in the surrounding area. It was assumed that the plant would be operating 24-hours per day, 365 days per year. For $PM_{2.5}$ as there were no emissions data available, it was it is assumed that all the particles emitted were as $PM_{2.5.}$ Therefore the actual concentrations are expected to be lower.

Predicted Impacts (Refer to Table 5 and 6 reproduced from the report)
The maximum change in annual mean nitrogen dioxide concentrations at a 20 m stack height is imperceptible in magnitude (1% of the relevant objective). Due to the relatively low background levels of the pollutants, which are well below the annual mean objectives, the impact of the plant emissions on annual mean NO_2 concentrations at ground level is negligible. The maximum process contribution to hourly mean NO_2 on concentrations is small (<5% of the relevant objective). In this case, the impact is also negligible due to the low background concentrations of $NO_{2.}$

Table 5: Background Pollutant Concentrations

Location	Nitrogen Dioxide (µg/m^3)		Particulate Matter (µg/m^3)	
	Annual Mean	Hourly Mean	Annual Mean	Daily Mean
255500,620500	4.7	9.4	9.5	19.0

Table 7: Maximum Ground Level and Façade Process Contribution

Objective	Nitrogen Dioxide				Particulate Matter			
	Annual Mean PC		Hourly Mean PC (99.79th)		Annual Mean PC		Daily Mean PC (98.1th)	
	40µg/m^3		200 µg/m^3		18 µg/m^3		50 µg/m^3	
Receptors	µg/m^3	% of obj.	µg/m^3	% of obj.	µg/m^3	% of obj.	µg/m^3	% of obj.
Ground Level (Entire Study Area)	0.41	1.0	5.78	2.9	-	-	-	-
School Façade (North)	0.42	1.1	5.08	2.5	0.17	0.9	3.84	7.7
School Façade (East)	0.05	0.1	1.13	0.6	0.02	0.1	0.88	1.8
School Façade (South)	0.12	0.3	4.94	2.5	0.05	0.3	3.88	7.8
School Façade (West)	0.69	1.7	7.37	3.7	0.27	1.5	5.66	11.3

The maximum magnitude of change due to the biomass plant on annual mean PM_{10} is imperceptible (<2% of the relevant objective). Due to the relatively low background levels of the pollutants, which are well below the annual mean objectives, the impact of the plant emissions on annual mean PM_{10} is negligible. The maximum process contribution to daily PM_{10} concentrations is large (>10% of the relevant objective). In this case, the impact is considered to be moderate, however due to the low background concentrations of PM_{10} no significant effects are anticipated. In the absence of emissions data for $PM_{2.5}$, it was assumed 100% of all particulate emissions are $PM_{2.5.}$ Therefore, the maximum magnitude of change due to the biomass plant on annual mean $PM_{2.5}$ is small (<5% of the relevant objective). Due to the relatively low background levels of the pollutants, which are well below the annual mean objectives, the impact of the plant emissions on annual mean $PM_{2.5}$ concentrations is negligible; therefore no significant effects are anticipated.

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 2016 resulted in no exceedences of the annual mean Air Quality Objective at all monitoring locations within East Ayrshire (Tables A.1 – A.9). All monitoring sites were below 30 µg/m^3 during 2016. All sites were therefore comfortably below the 40 µg/m^3 annual mean Air Quality Objective. Similarly no exceedences of the hourly mean were recorded.

Automatic monitoring of PM_{10} at the St. Marnock Street monitoring site using BAM 1020 and FIDAS technology indicated an annual mean level of 14 µg/m^3, comfortably below the 18 µg/m^3 annual mean Air Quality Objective (Tables A.7 and A.8). No exceedences of the PM_{10} 24-hour Mean (50 µg/m^3) occurred during 2016.

$PM_{2.5}$ monitoring commenced at the St. Marnock St., Kilmarnock monitoring site in August 2016. Actual levels recorded for the period were 6 µg/m^3 with an annualised annual mean of 7 µg/m^3, well below the 10 µg/m^3 annual mean Air Quality Objective (Table A9).

There has been a significant downward trend in diffusion tube measured NO_2 annual mean (Tables A.5, 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.

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. As mentioned in Section 2 $PM_{2.5}$ 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 9).

6.2 Conclusions relating to New Local Developments

There are two new local developments (since the submission of the 2016 APR) which have the potential to have a significant impact on air quality within the East Ayrshire Council area. The air quality impacts were summarised in Section 5 Planning Applications and concluded that the air quality impacts from both developments were at a level that did not raise significant concerns.

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.**

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 be continued 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 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.4 and A.5). 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 installed to ascertain pre-development NO_2 levels and will be kept in place to ascertain the actual air quality impact due to the development. A funding claim has also been submitted for two AQ mesh pods to also monitor PM levels.

East Ayrshire Council will continue to monitor PM_{10} and $PM_{2.5}$ to ensure compliance and ascertain whether predicted downward trends will materialise.

The next course of action for East Ayrshire Council will therefore be the submission of the 2017 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 Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA ?	Monitoring Technique	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
A3	Kilmarnock, St. Marnock Street	Roadside	242742	637705	2.13	NO_2	N	Chemiluminescent	Y (0m)	3.18	Y
					1.95/2.3	PM_{10}	N	BAM 1020/FIDAS	Y (0m)	3.54	Y
					2.35	PM_{10}	N	TEOM-FDMS	Y (0m)	3.50	Y

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

Site ID / Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to annual mean relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
1. Fowlds Street/King Street Junction, Kilmarnock	Kerbside	242805	637620	2.95	NO_2	N	N	Y(2.57m)	0.43m	Y
2. 28 John Finnie Street, Kilmarnock	Roadside	242701	638083	2.95	NO_2	N	N	Y(0.21m)	3.37m	Y
3. 19 Lainshaw Street, Stewarton	Kerbside	241907	645820	2.95	NO_2	N	N	Y(2.35m)	0.70m	Y
4. 40 Main Street, Newmilns	Roadside	253601	637310	2.95	NO_2	N	N	Y(0.60m)	2.50m	Y
6. 8A Kilmarnock Road, Mauchline	Roadside	249826	627335	2.95	NO_2	N	N	Y(2.32m)	0.36m	Y
11. 96 John Finnie Street, Kilmarnock	Roadside	242657	637883	2.95	NO_2	N	N	Y(3.73m)	0.47m	Y

Site ID / Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to annual mean relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
12. 62 John Finnie Street, Kilmarnock	Roadside	242673	637955	2.95	NO_2	N	N	Y(3.03m)	0.67m	Y
14. 95/97 John Finnie Street, Kilmarnock	Roadside	242619	637773	2.95	NO_2	N	N	Y(0.63m)	2.99m	Y
15. 16 West George Street, Kilmarnock	Roadside	242766	638160	2.95	NO_2	N	N	Y(0.87m)	1.58m	Y
17. 23/25 Loudoun Road, Newmilns	Roadside	253204	637237	2.95	NO_2	N	N	Y(0.46m)	1.48m	Y
24. 5/7 Earl Grey Street, Mauchline	Roadside	249894	627233	2.95	NO_2	N	N	Y(0.67m)	3.60m	Y
27. Junction King Street/St. Marnock Street, Kilmarnock	Kerbside	242771	637714	2.95	NO_2	N	N	Y(2.11m)	0.45m	Y
32. Kay Park, Kilmarnock	Urban Background	243302	638259	2.95	NO_2	N	N	N	N/A	N

Site ID / Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to annual mean relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
33. Howard Park, Kilmarnock	Urban Background	242581	637409	2.95	NO_2	N	N	N	N/A	N
44A. St. Marnock Street Monitoring Station	Roadside	242742	637705	2.13	NO_2	N	Y	Y(0m)	3.18m	Y
44B. St. Marnock Street Monitoring Station	Roadside	242742	637705	2.13	NO_2	N	Y	Y(0m)	3.18m	Y
44C. St. Marnock Street Monitoring Station	Roadside	242742	637705	2.13	NO_2	N	Y	Y(0m)	3.18m	Y

Although diffusion tubes can only be used to measure annual mean levels of NO_2, they do give an indication of whether the hourly mean objective is likely to be breached (References 5 and 6). It is therefore reasonable to conclude that all of the above sites have relevant exposure as members of the public might reasonably be expected to spend one hour or longer at these locations. Details of previous sites can be obtained from previous East Ayrshire Council Air Quality Reports (Reference 19).

Table A.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID/Location	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %(1)	Valid Data Capture 2016 % (2)	Annual Mean Concentration (µg/m^3)(3)				
					2012	2013	2014	2015	2016
A3/St. Marnock Street, Kilmarnock	Roadside	N	N/A	93.81	36 (annualised)	30 (annualised)	30	25	29

Annual Mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for Nitrogen Dioxide - 40 µg/m^3.

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 are shown in **bold**.

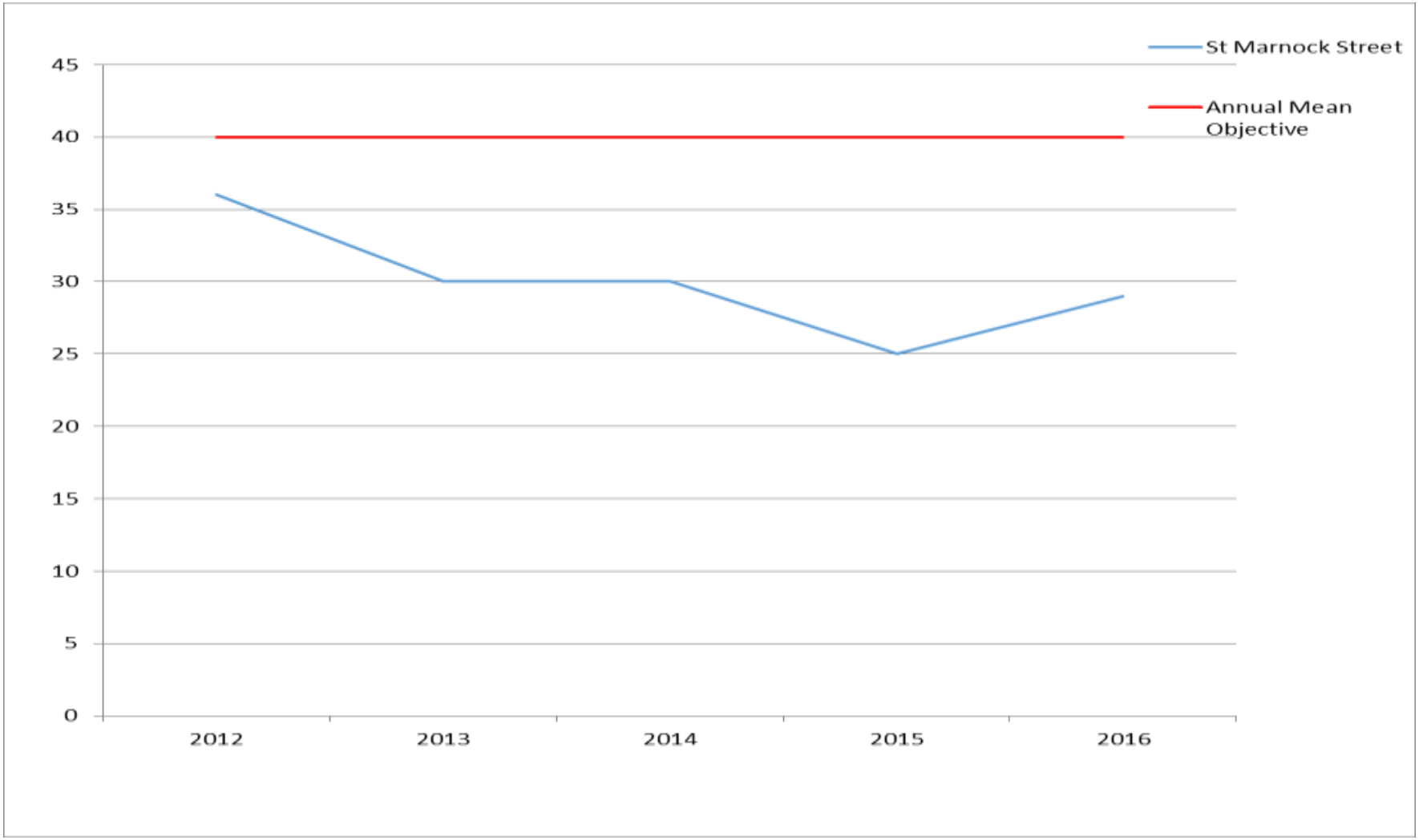
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedence of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(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%).

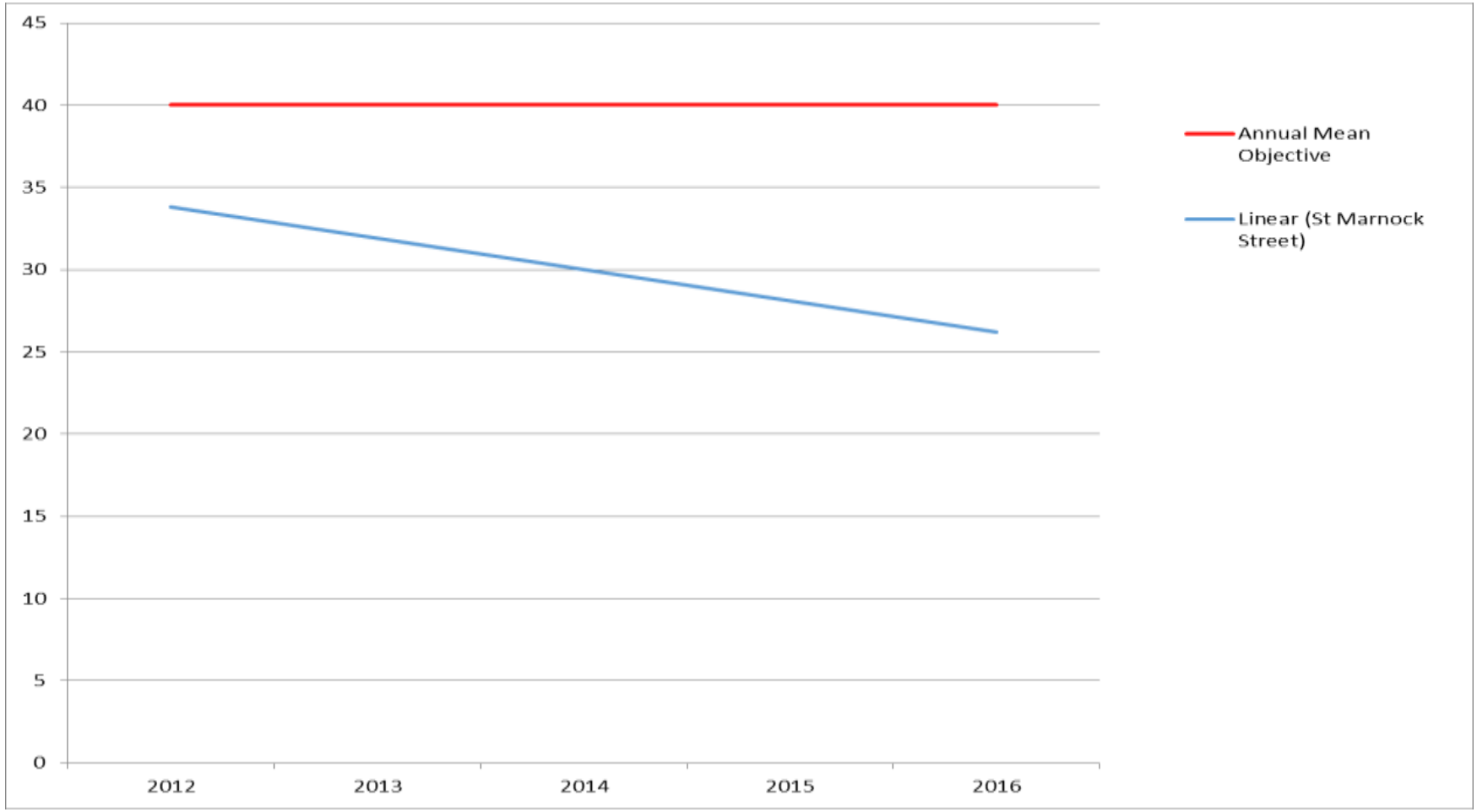
(3) All means have been "annualised" as per LAQM.TG(16) (Reference1) if valid data capture for the full calendar year is less than 75%. See Reference 19 for details.

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

Table A.4a Results of Nitrogen Dioxide Diffusion Tubes in 2016

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2016 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)[1]	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.97)[2] 2016 (μg/m^3)
1	Fowlds Street/King Street Junction, Kilmarnock	Kerbside	N	N	12	N/A	N	25.2
2	28 John Finnie Street, Kilmarnock	Roadside	N	N	10	N/A	N	26.5
3	19 Lainshaw Street, Stewarton	Kerbside	N	N	9	N/A	N	20.9
4	40 Main Street, Newmilns	Roadside	N	N	12	N/A	N	23.2
6	8A Kilmarnock Road, Mauchline	Roadside	N	N	12	N/A	N	24.1
11	96 John Finnie Street, Kilmarnock	Roadside	N	N	11	N/A	N	28.1
12	62 John Finnie Street, Kilmarnock	Roadside	N	N	12	N/A	N	27.0
14	95/97 John Finnie Street, Kilmarnock	Roadside	N	N	12	N/A	N	29.8

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2016 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)[1]	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.97)[2] 2016 (μg/m^3)
15	16 West George Street, Kilmarnock	Roadside	N	N	11	N/A	N	29.0
17	23/25 Loudoun Road, Newmilns	Roadside	N	N	12	N/A	N	27.2
24	5/7 Earl Grey Street, Mauchline	Roadside	N	N	10	N/A	N	29.7
27	Junction King Street/St. Marnock Street, Kilmarnock	Kerbside	N	N	10	N/A	N	29.9
32	Kay Park, Kilmarnock	Urban Background	N	N	11	N/A	N	10.6
33	Howard Park, Kilmarnock	Urban Background	N	N	10	N/A	N	10.9
44A	St. Marnock Street Monitoring Station	Roadside	N	Y	10	N/A	N	25.5
44B	St. Marnock Street Monitoring Station	Roadside	N	Y	12	N/A	N	24.3

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2016 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)(1)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.97)(2) 2016 (µg/m^3)
44C	St. Marnock Street Monitoring Station	Roadside	N	Y	12	N/A	N	22.8
44A-C Average	St. Marnock Street Monitoring Station	Roadside	N	Y		N/A	N	24.21

Annual Mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for Nitrogen Dioxide - 40 µg/m^3.

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 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) Monitoring was carried out for a full 12 months at all locations during 2016.

(2) Means for diffusion tubes have been corrected for bias.

Table A.4b Results of Nitrogen Dioxide Diffusion Tubes at receptors in 2016

Bias Factor 0.97								
		Raw Mean	Corrected Mean (Bias Factor 0.97)(1)	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
Fowlds Street/King Street Junction, Kilmarnock	12	26.00	25.22	0.43	3.00	242500; 637500	9.713772	20.0
28 John Finnie Street, Kilmarnock	12	27.31	26.49	3.37	3.58	242500; 638500	8.443345	26.2
19 Lainshaw Street, Stewarton	9	21.54	20.90	0.70	3.05	241500; 645500	4.564661	16.4
40 Main Street, Newmilns	12	23.90	23.18	2.50	3.10	253500; 637500	5.288909	22.2
8A Kilmarnock Road, Mauchline	12	24.82	24.07	0.36	2.68	249500; 627500	4.595427	17.5
96 John Finnie Street, Kilmarnock	12	28.95	28.09	0.47	4.20	242500; 637500	9.713772	21.10
62 John Finnie Street Kilmarnock	12	27.87	27.03	0.67	3.70	242500; 637500	9.713772	21.5
95/97 John Finnie Street, Kilmarnock	12	30.73	29.81	2.99	3.62	242500; 637500	9.713772	28.8
16 West George Street, Kilmarnock	12	29.85	28.96	1.58	2.45	242500; 638500	8.443345	27.0
23/25 Loudoun Road, Newmilns	12	28.03	27.18	1.48	1.94	253500; 637500	5.288909	25.9
5/7 Earl Grey Street, Mauchline	11	30.61	29.69	3.60	4.27	249500; 627500	4.595427	28.5
Junction King St./St. Marnock St., Kilmarnock	12	30.82	29.90	0.45	2.56	242500; 637500	9.713772	23.8
Kay Park, Kilmarnock	12	10.89	10.56	N/A	N/A		N/A	N/A
Howard Park, Kilmarnock	11	11.24	10.90	N/A	N/A		N/A	N/A
St Marnock St Monitoring Site, Kilmarnock	11	26.26	25.47	N/A	N/A		N/A	N/A
St Marnock St Monitoring Site, Kilmarnock	12	25.08	24.33	N/A	N/A		N/A	N/A
St Marnock St Monitoring Site, Kilmarnock	12	23.55	22.84	N/A	N/A		N/A	N/A

(1) See Appendix C for details on bias adjustment

Table A.5 Results of Nitrogen Dioxide Diffusion Tubes in 2010-2016

Site ID	Location	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) μg/m^3[1][2]					
				2011 (Bias Adjustment Factor = 0.94)	2012 (Bias Adjustment Factor = 0.96)	2013 (Bias Adjustment Factor = 0.99)	2014 (Bias Adjustment Factor = 0.83)	2015 (Bias Adjustment Factor = 0.98)	2016 (Bias Adjustment Factor = 0.97)[1][2]
1.	Fowlds Street/King Street Junction, Kilmarnock	Kerbside	N	25.0	27.4	32.4	24.2	23.2	25.2
2.	28 John Finnie Street, Kilmarnock	Roadside	N	32.1	26.4	34.0	26.2	22.3	26.5
3.	19 Lainshaw Street, Stewarton	Kerbside	N	27.0	28.7	31.7	23.2	25.1	20.9
4.	40 Main Street, Newmilns	Roadside	N	25.9	26.5	30.8	24.2	25.9	23.2
6.	8A Kilmarnock Road, Mauchline	Roadside	N	27.9	23.5	29.7	23.4	20.7	24.1
11.	96 John Finnie Street, Kilmarnock	Roadside	N	27.9	28.4	32.1	24.9	23.4	28.1
12.	62 John Finnie Street, Kilmarnock	Roadside	N	33.3	31.1	33.1	26.8	25.3	27.0
14.	95/97 John Finnie Street, Kilmarnock	Roadside	N	34.2	33.7	35.4	30.0	29.7	29.8
15.	16 West George Street, Kilmarnock	Roadside	N	35.8	34.8	36.9	29.1	27.1	29.0
17.	23/25 Loudoun Road, Newmilns	Roadside	N	30.4	31.8	34.7	26.0	26.2	27.2
24.	5/7 Earl Grey Street, Mauchline	Roadside	N	34.2	33.5	39.5	30.5	26.5	29.7
27	Junction King Street/St. Marnock Street, Kilmarnock	Kerbside	N	30.8	29.9	30.8	28.1	24.9	29.9

32	Kay Park, Kilmarnock	Urban Background	N			12.1	10.2	10.3	10.6
33	Howard Park, Kilmarnock	Urban Background	N			12.6	10.5	9.5	10.9
44A	St. Marnock Street Monitoring Station	Roadside	N					22.0	23.3
44B	St. Marnock Street Monitoring Station	Roadside	N					19.9	24.3
44C	St. Marnock Street Monitoring Station	Roadside	N					21.1	22.8
44A-C	St. Marnock StreetMonitoring Station	Roadside	N					22.7	24.21

Annual Mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for Nitrogen Dioxide - 40 µg/m^3.

Notes: Exceedences of the NO_2 annual mean objective of 40µg/m3 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) Monitoring was carried out for a full 12 months at all locations during 2016.

(2) Means for diffusion tubes have been corrected for bias.

(3) All means have been "annualised" as per LAQM.TG(16) (Reference 1) if valid data capture for the full calendar year is less than 75%. See Reference 19 for details.

Figure A.3 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Long Term Diffusion Tube Monitoring Sites 2007-2016

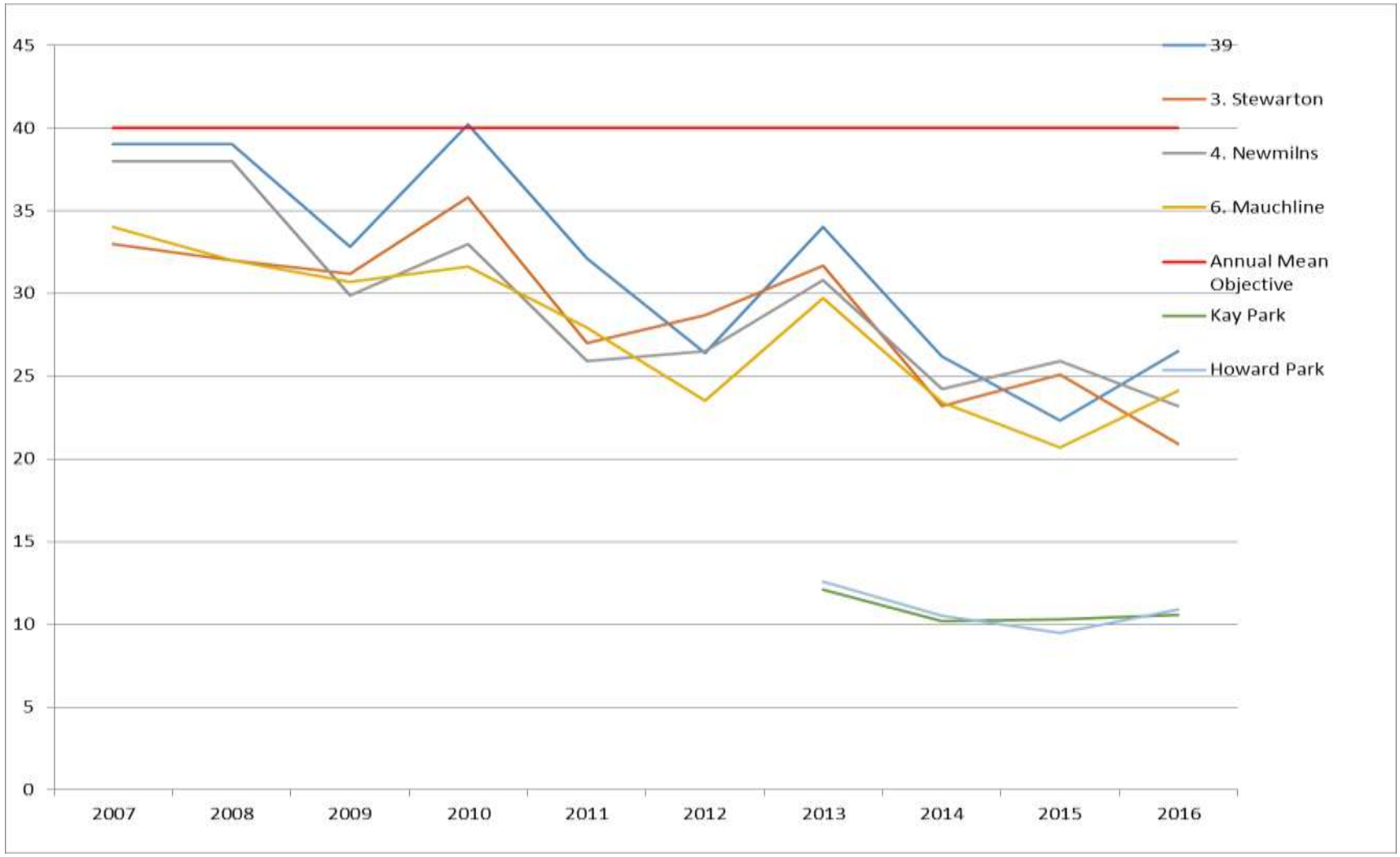
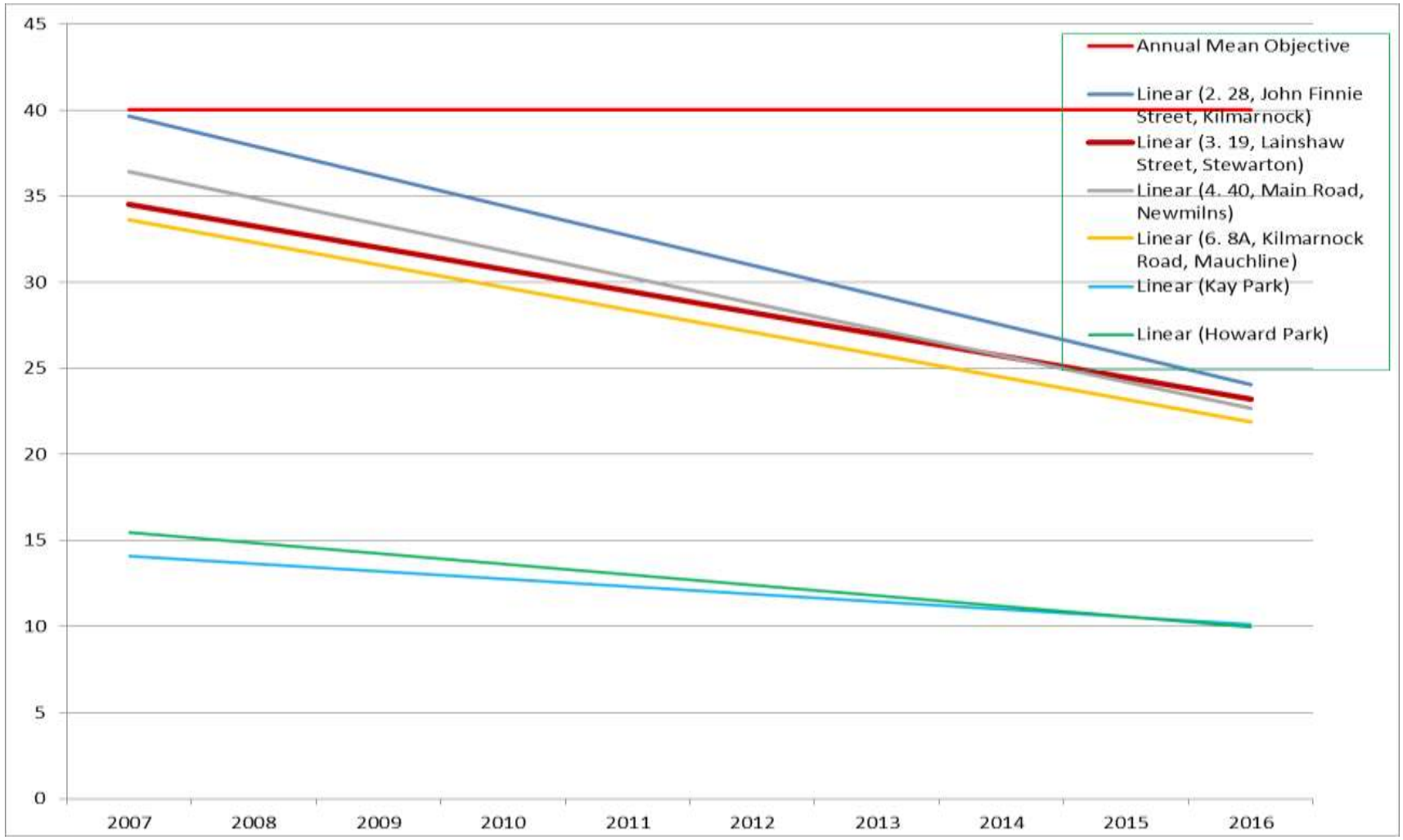
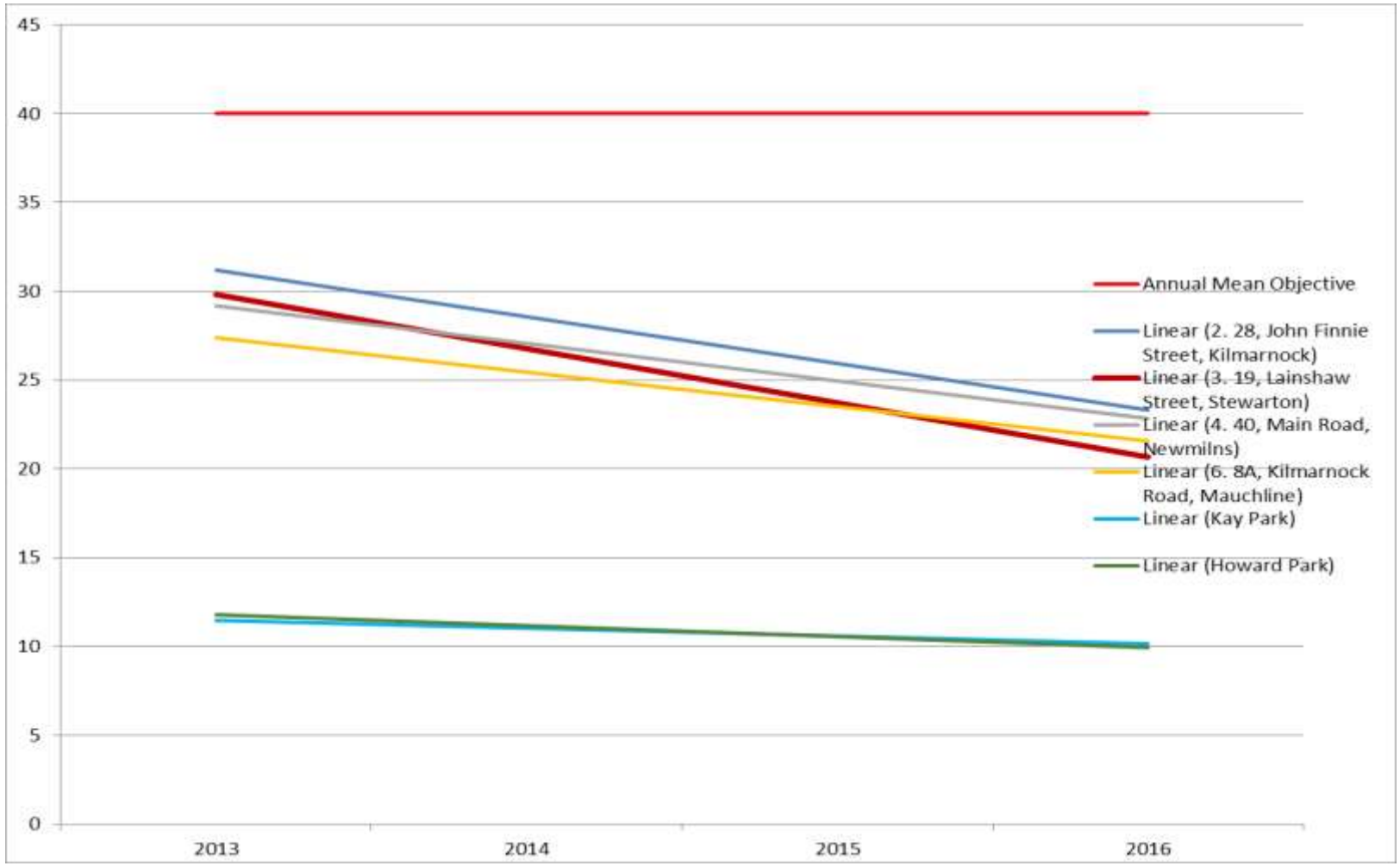


Figure A.4 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Long Term Diffusion Tube Monitoring Sites – Linear 2007-2016



Data for background sites from 2013 onwards.

Figure A.5 - Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Long Term Diffusion Tube Monitoring Sites – Linear 2013 - 2016



Data for background sites from 2013 onwards.

Table A.6 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %(1)	Valid Data Capture 2015 %(2)	Number of Hourly Means > 200µg/m^3				
					2012	2013	2014	2015	2016
A3/St. Marnock Street, Kilmarnock	Roadside	N	N/A	93.81	0(122 µg/m^3)	1(124 µg/m^3)	1(118 µg/m^3)	0	0

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.**

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

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

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

Table A.7 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %(1)	Valid Data Capture 2015 %(2)	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m3(3)				
						2012	2013	2014	2015	2016
A3 (BAM) Kilmarnock, Saint Marnock Street	Roadside	N	N/A		Y	**19**(17 annualised)	**19**	**20**	14	14
A3 (FDMS) Kilmarnock, Saint Marnock Street	Roadside	N	N/A	86.08	Y			11(10 annualised)	11	N/A
A2 (FDMS 1405) Kilmarnock, John Finnie Street(4)	Roadside	N	N/A	N/A	Y	**20**	13(12 annualised)	16(15 annualised)	15(15 annualised)	N/A

Annual mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for PM_{10} - 18 μg/m^3.

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) (Reference 1), valid data capture for the full calendar year is less than 75%. See Reference 19 for detail

(4) A2 John Finnie St. site decommissioned.

Table A.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA ?	Valid Data Capture for monitoring Period %(1)	Valid Data Capture 2016 %(2)	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 μg/m³)(3)(4)				
						2012	2013	2014	2015	2016
A3 (BAM) Kilmarnock, Saint Marnock Street	Roadside	N		93	Y	3(44μg/m³)	2(46μg/m³)	2	0	0
A3 (FDMS) Kilmarnock, Saint Marnock Street	Roadside	N		86.08	Y			0(32μg/m³)	1	N/A
A2 (FDMS 1405) Kilmarnock, John Finnie Street(5)	Roadside	N		N/A	Y	1(38μg/m³	0(21μg/m³)	0(35μg/m³)	0(27μg/m³)	N/A

24- hour mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for PM_{10} - 50 μg/m³, not to be exceeded more than 7 times a year.

Notes: Exceedences of the PM_{10} 24-hour mean objective (50μg/m³ 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 90.4th percentile of 24-hour means is provided in brackets (2015 year)

(4) where the period of valid data was less than 90% of the full year, the 98.08th percentile of hourly means are included in brackets (2011-2014 year).

(5) A2 John Finnie St. site decommissioned.

Table A.9 – Annual Mean $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	$PM_{2.5}$ Annual Mean Concentration (µg/m^3) (3)				
				2012	2013	2014	2015	2016
A3 (FIDAS) Kilmarnock, Saint Marnock Street	Roadside	99.2	35.50					6(7 annualised)

Notes: Exceedences of the $PM_{2.5}$ 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.

Appendix B:

Table B.1 – NO_2 Full Monthly NO_2 Diffusion Tube Results for 2016 ($\mu g/m^3$)

Bias Factor	0.97														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		Raw Mean	Corrected Mean (Bias Factor 0.97)(1)
Fowlds Street/King Street Junction, Kilmarnock	20.7	22.5	23.7	15.3	29.3	17.6	20.4	17	28.9	36.6	43.8	36.2	12	26.00	25.22
28 John Finnie Street, Kilmarnock	30.6	21.5	26.6	14.2	28.4	18.8		29.6	33.2	34.1	36.1		10	23.03	26.49
19 Lainshaw Street, Stewarton		23.7	29	15.4	30	14.6	16.4	20.8	19.4	24.6			9	21.54	20.90
40 Main Street, Newmilns	31.6	18.8	26.6	18.7	24.7	9.8	19.4	25.8	27.3	20.3	34.6	29.2	12	23.90	23.18
8A Kilmarnock Road, Mauchline	24.7	19.8	25.7	14.3	21.8	27.8	18.9	24.7	25.4	32.5	36.2	26	12	24.82	24.07
96 John Finnie Street, Kilmarnock	17.2	21.8	29	12.1		25.2	27.5	26.1	26.7	32	65.4	35.5	11	27.09	28.09
62 John Finnie Street Kilmarnock	15.5	22.1	27.3	14.5	29.6	27.1	20.4	29	34	32.3	47.4	35.2	12	27.87	27.03
95/97 John Finnie Street, Kilmarnock	34.2	23.8	29.6	15	30.6	29.6	20.2	33.9	31.9	30.4	54.7	34.9	12	30.73	29.81
16 West George Street, Kilmarnock	37.1	22.1	27	16.7	27.3	13.4		32.8	32.1	32	49.8	38.1	11	27.52	28.96
23/25 Loudoun Road, Newmilns	32.3	23.4	26.2	10	26.4	21.6	22.9	24.6	27.5	36.7	51.1	33.6	12	28.03	27.18
5/7 Earl Grey Street, Mauchline	26.4			14.1	32.6	30.6	22.1	29	28.8	45.7	45.3	31.5	10	32.75	29.69
Junction King St./St. Marnock St., Kilmarnock	9	43.1	32.1	16.9	34.1	21.2	25.4	24	30.4	35.1	55.6	33.4	12	30.03	29.90
Kay Park, Kilmarnock	16.5	11.6	14.7	4.9	8.1	5.2	5.1	9.1	10.6	11.1	22.9		11	10.11	10.56
Howard Park, Kilmarnock		11.2	10.9	6.9	6.2	7.3	4.4		9.5	19.1	21.2	15.7	10	12.97	10.90
St Marnock St Monitoring Site, Kilmarnock	30.4			12.7	26.4	20.8	24.5	24.4	23.8	26.5	42.3	30.8	10	24.06	25.47
St Marnock St Monitoring Site, Kilmarnock	30.6	17.4	21.2	16.8	23.5	23	23.2	27.7	28.2	27.1	39.4	22.9	12	25.08	24.33
St Marnock St Monitoring Site, Kilmarnock	22.5	16.1	23.2	11.5	22.6	19.4	24	24.9	27.6	29	42.3	19.5	12	23.55	22.84

(2) See Appendix C and D1 for details on bias adjustment

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. After either a four or 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 2016 to February 2017 GSS obtained 3 rounds at 100%, one round at 75% and 1 round at 0%, giving a combined score of 75% 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 9 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 9 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 2016 the overall bias adjustment factor was computed at **0.97**. The bias adjustment factor applied to the raw annual means of the diffusion tubes was therefore **0.97** for 2016 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 03/17 V2

Accessed at

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

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 06/17

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 September 2017
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 see your selection, choose (All) from the pop-up list	**Year[5]** To see 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	2016	KS	Glasgow City Council	12	60	65	-7.5%	P	**1.08**	
Glasgow Scientific Services	20% TEA in water	2016	R	Glasgow City Council	11	36	33	8.8%	P	**0.92**	
Glasgow Scientific Services	20% TEA in water	2016	R	Glasgow City Council	12	40	36	10.7%	P	**0.90**	
Glasgow Scientific Services	20% TEA in water	2016	UB	Glasgow City Council	12	29	26	9.8%	P	**0.91**	
Glasgow Scientific Services	20% TEA in water	2016	R	East Dunbartonshire Council	11	34	37	-8.8%	P	**1.10**	
Glasgow Scientific Services	20% TEA in water	2016	R	East Dunbartonshire Council	12	35	36	-2.6%	G	**1.03**	
Glasgow Scientific Services	20% TEA in water	2016	R	East Dunbartonshire Council	12	28	27	6.0%	P	**0.94**	
Glasgow Scientific Services	20% TEA in water	2016	R	East Dunbartonshire Council	12	24	24	-2.7%	P	**1.03**	
Glasgow Scientific Services	20% TEA in water	2016	KS	Marylebone Road Intercomparison	12	93	79	17.4%	G	**0.85**	
Glasgow Scientific Services	20% TEA in water	2016		**Overall Factor[3] (9 studies)**				**Use**		**0.97**	

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: South Lanarkshire Lanark, Auchencorth Moss and Glasgow Townhead
2. The results of the annual mean, **Am,** for these sites in 2016 were obtained.
3. The period means, **Pm,** for 2016 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 2016 (Table A.9).

		Period Mean (Pm)	Annual Mean (Am)	Factor (R = Am/Pm
	South Lanarkshire Lanark	6.986871598	6.735825332	0.964069
	Auchencorth Moss	2.657161586	2.601387616	0.97901
	Glasgow Townhead	4.99498463	6.888115189	1.379006
			Average Ra	**1.11**
		Periods	Pm	Adj Mean
St Marnock	PM2.5	23/08/2016 - 31/12/2016	6.273252085	**6.9**

Appendix E1: 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 2016

E Ayrshire Kilmarnock St Marnock St (Site ID: MARN)

These data have been fully ratified

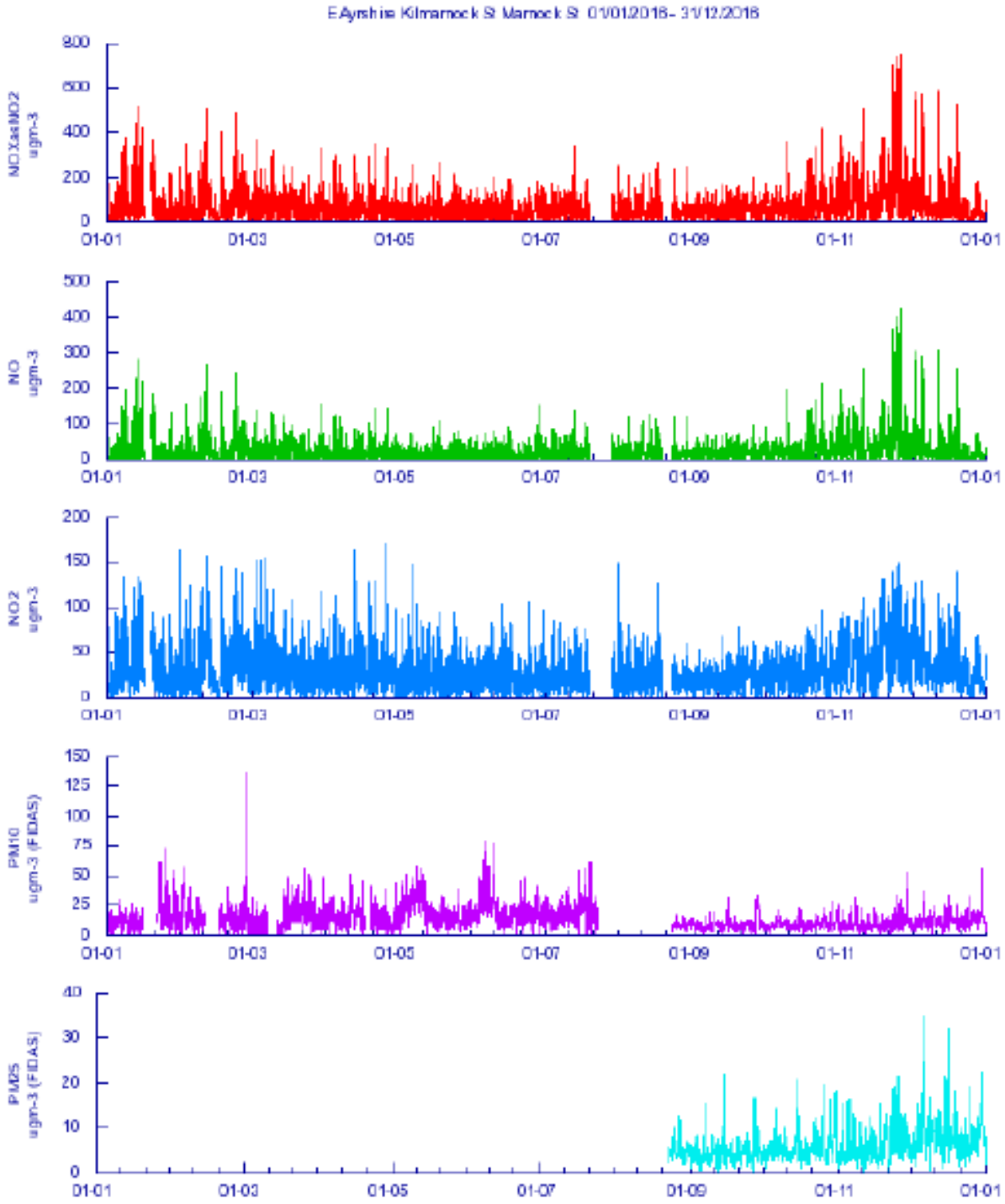
Only relevant statistics for LAQM are presented in the table. Cells with - indicate no data available or calculated.

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	-	352	-	312	129
Number Days Moderate	-	0	-	0	0
Number Days High	-	0	-	0	0
Number Days Very High	-	0	-	0	0
Max Daily Mean	174	81	346	41	19
Annual Max	422	172	751	137	No data
Annual Mean	27	29	71	14	No data
98th Percentile of daily mean	-	-	-	36	-
90th Percentile of daily mean	-	-	-	24	-
99.8th Percentile of hourly mean	-	138	-	-	-
98th Percentile of hourly mean	126	94	280	42	No data
95th Percentile of hourly mean	81	74	195	33	No data
50th Percentile of hourly mean	18	25	54	12	No data
% Annual data capture	**94.23%**	**93.81%**	**93.81%**	**86.08%**	**35.50%**

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

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



Appendix E2: Certificates of Calibration

0401

CERTIFICATE OF CALIBRATION

Ricardo Energy & Environment, 18 Blythswood Square, Glasgow, G2 4BG

Telephone 01235 753642

Authorised Signatories: D Hector ✓
S Stratton

Signed:

Date of Issue: 18th July 2017

Certificate Number: 3747

Page 1 of 2

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 East Ayrshire Kilmarnock St Marnock Street air monitoring station.

Site / Date Test Carried Out	Species	Analyser Serial No.	Zero Response[1]	Uncertainties ppb	Calibration Factor[2]	Uncertainties %	Converter eff. (%)[3]
Kilmarnock St Marnock St 8th July 2016	NO_x	2361	8.1	2.63	1.2533	3.5	99.5
	NO		6.7	2.6	1.2344	3.5	

Site / Date Test Carried Out	Species	Analyser Serial No.	Parameter	Specified Value	Measured Value	Deviation %	Uncertainty %
Kilmarnock St Marnock St 8th July 2016	BAM	H4188	Total Flow[4]	16.67	17.75	6.5	2.25

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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Registered in England No.
08229264

VAT Registration No.
GB 212 8365 24

Certificate Number: 3747

Site / Date Test Carried Out	Species	Analyser Serial No.	Parameter	Specified Value	Measured Value	Deviation %	Uncertainty %
Kilmarnock St Marnock St 8th July 2016	BAM	H4168	Total Flow[4]	16.67	17.75	6.5	2.25

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO_x analysers only) 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 k_0 (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, NO_2, SO_2, O_3 and ppm for CO. Where 1 ppm = 1000 ppb). 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 applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where applicable) is the flow rate through the bypass tubing 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. 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.

The calibration results shaded are those that fall out with 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 & Environment, 18 Blythswood Square, Glasgow, G2 4BG

Telephone 01235 753642

Authorised Signatories: D Hector✓
S Stratton

Signed:

Date of Issue: 18th July 2017

Certificate Number: 3755

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 East Ayrshire Kilmarnock St Marnock Street air monitoring station.

Site / Date Test Carried Out	Species	Analyser Serial No.	Zero Response [1]	Uncertainties ppb	Calibration Factor[2]	Uncertainties %	Converter eff. (%)[3]
Kilmarnock St Marnock St 3rd March 2017	NO_x	2361	-3.6	2.6	1.1512	3.5	99.1
	NO		3.1	2.6	1.2114	3.5	

Site / Date Test Carried Out	Species	Analyser Serial No.	Parameter	Specified Value	Measured Value	Deviation %	Uncertainty %
Kilmarnock St Marnock St 3rd March 2017	FIDAS	7476	Total Flow[4]	4.7	4.59	-3.59	2.25

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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Certificate Number: 3755 Page 2 of 2

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO_x analysers only) 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 k_0 (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, NO_x, SO_2, O_3 and ppm for CO. Where 1 ppm = 1000 ppb). 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 applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where applicable) is the flow rate through the bypass tubing 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. 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.

The calibration results shaded are those that fall out with 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

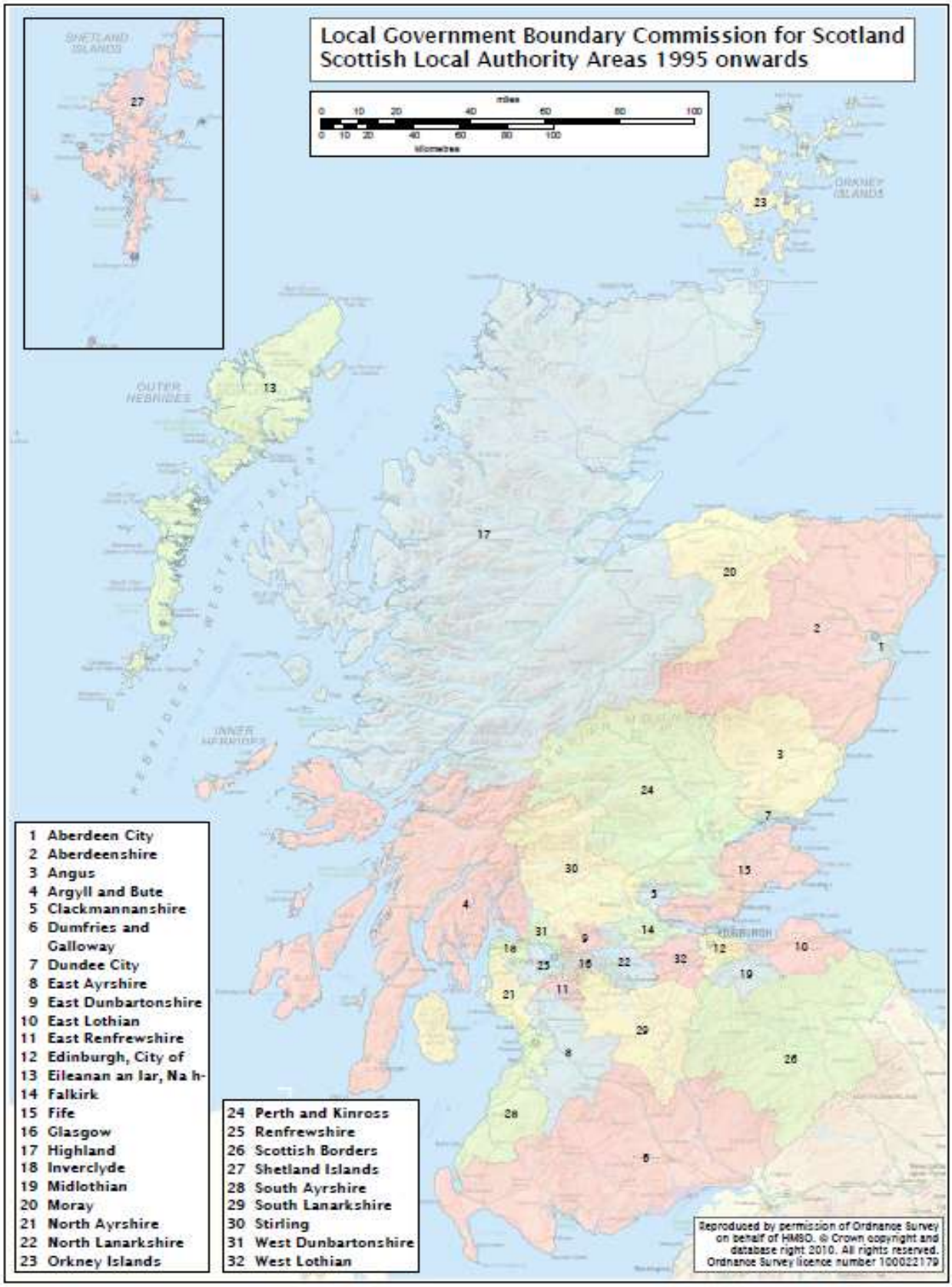


Figure G.2: Map of East Ayrshire

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

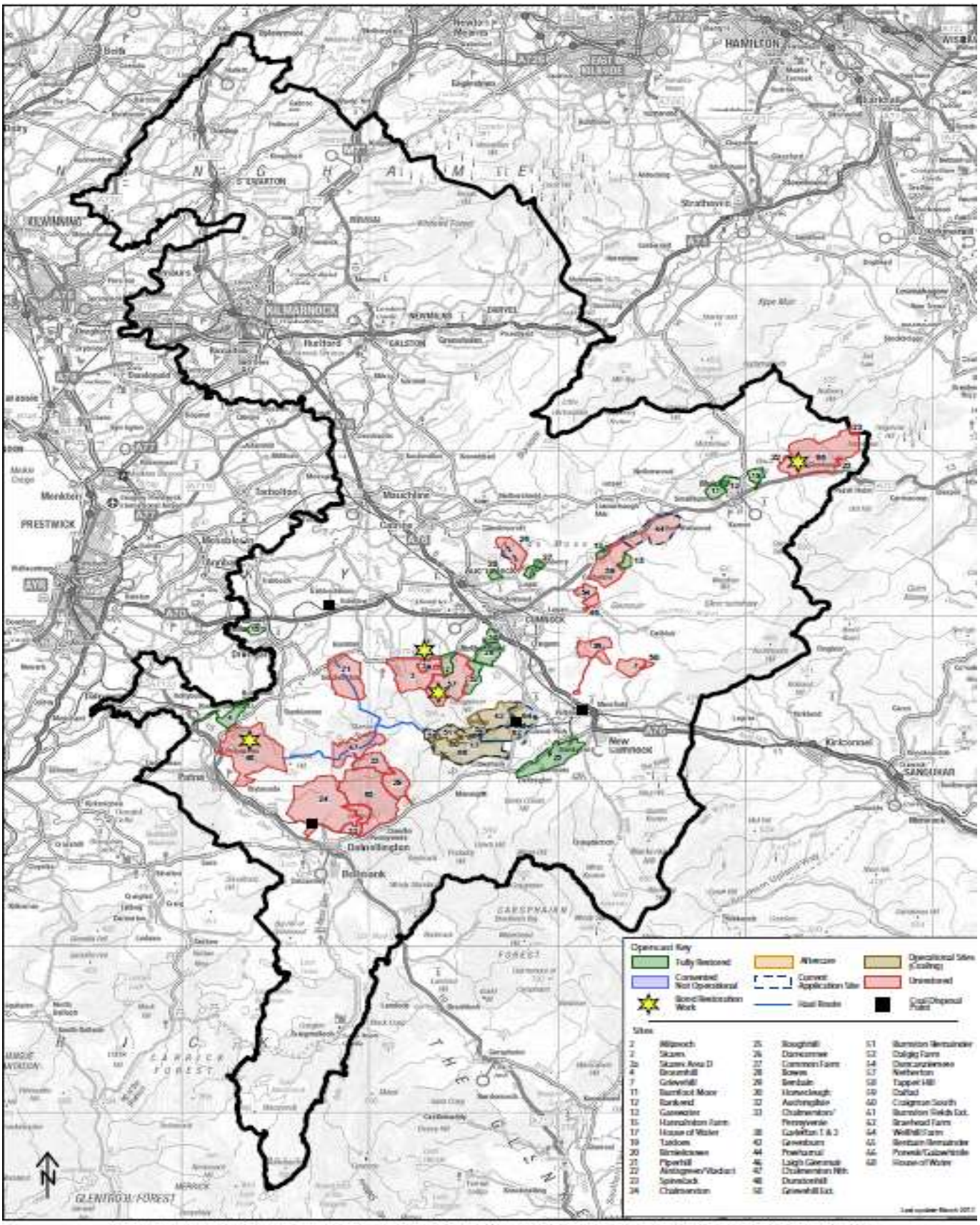


Figure G.4: Kilmarnock Automatic Monitoring Stations (Present and Historic)

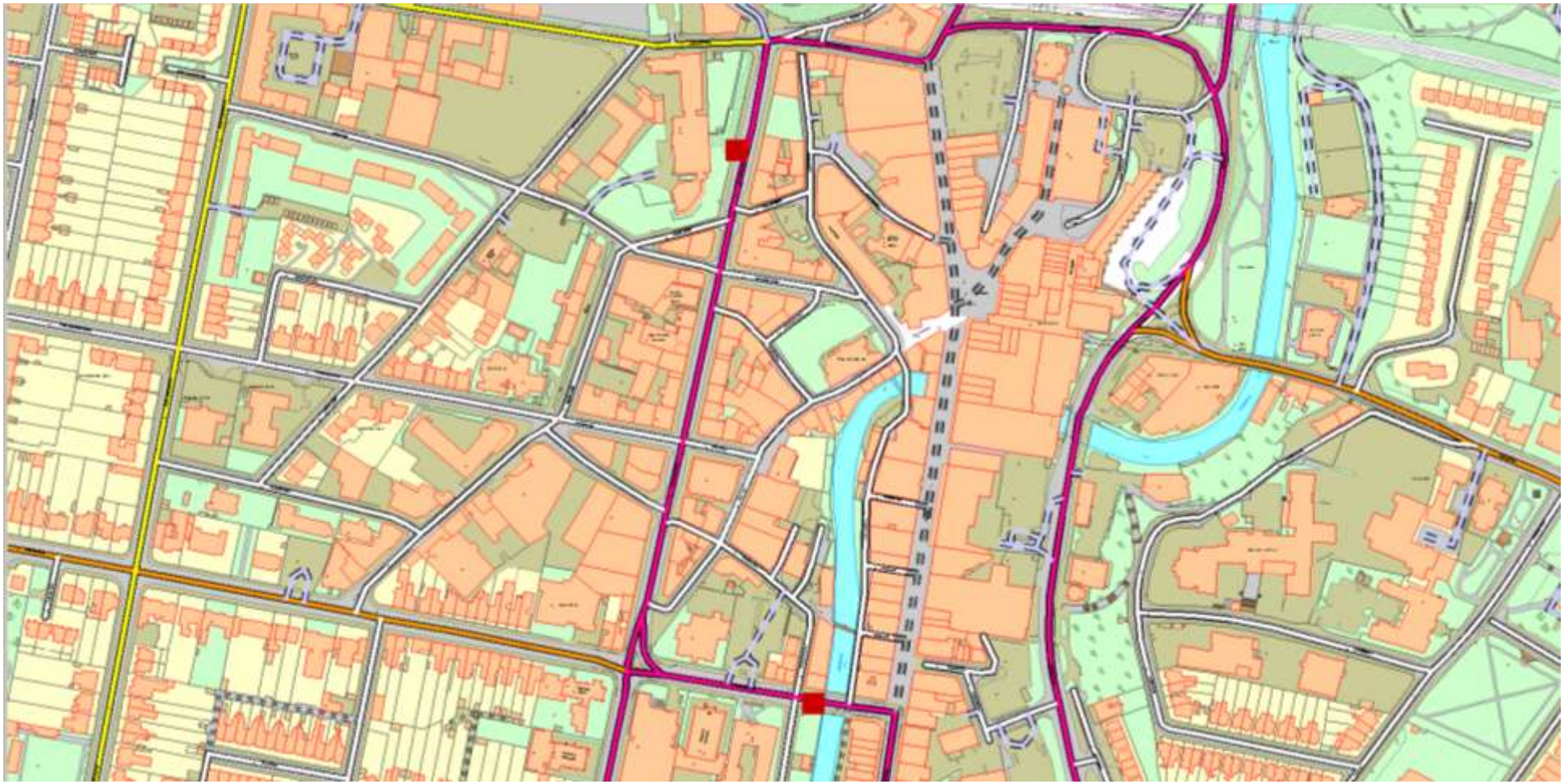


Figure G.5: Stewarton NO2 Diffusion Tube Location

Figure G.6: Kilmarnock Town Centre Air Monitoring Locations (Present and Historic)

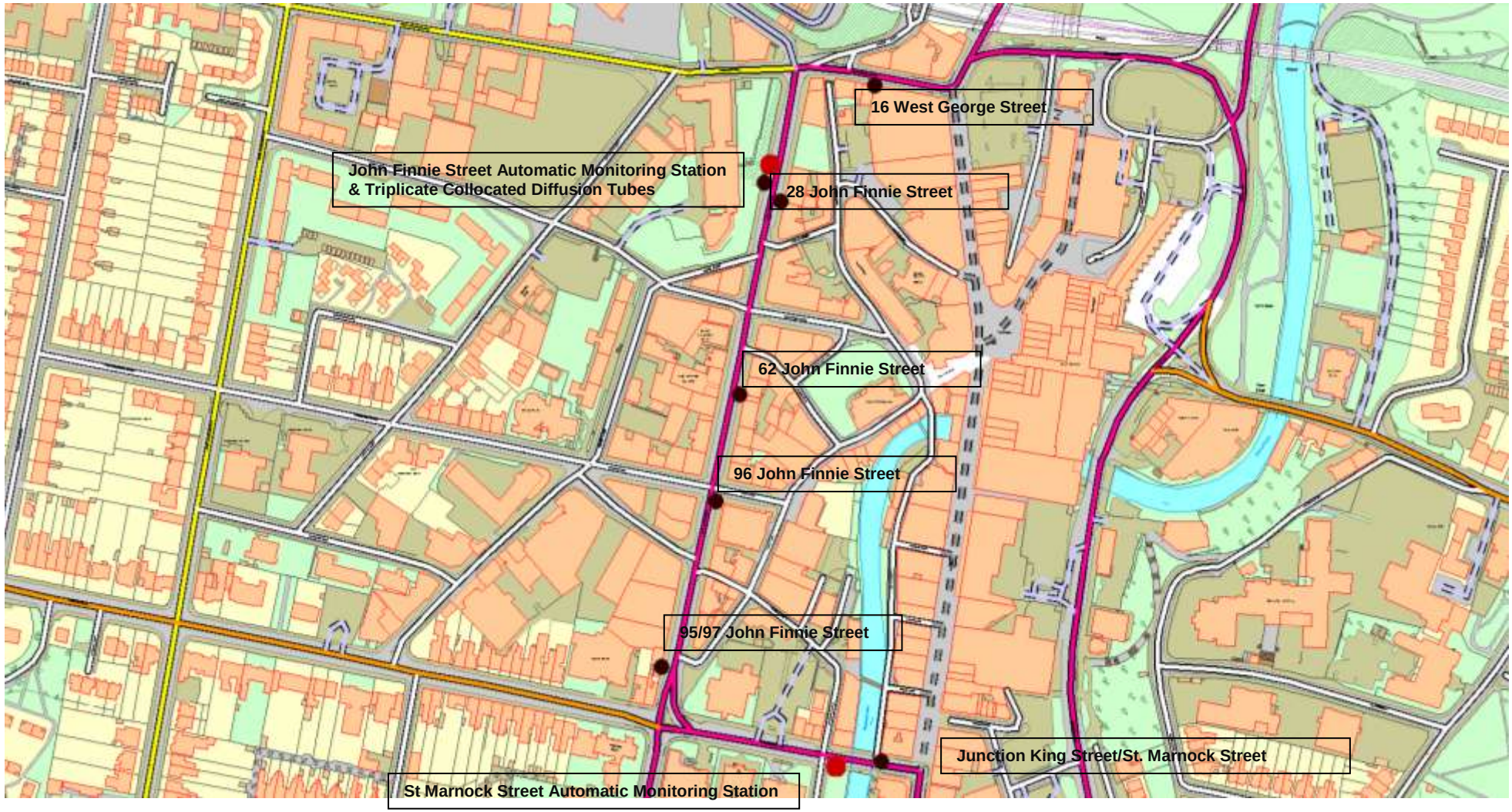


Figure G.7: Newmilns NO_2 Diffusion Tube Locations (Present and Historic)

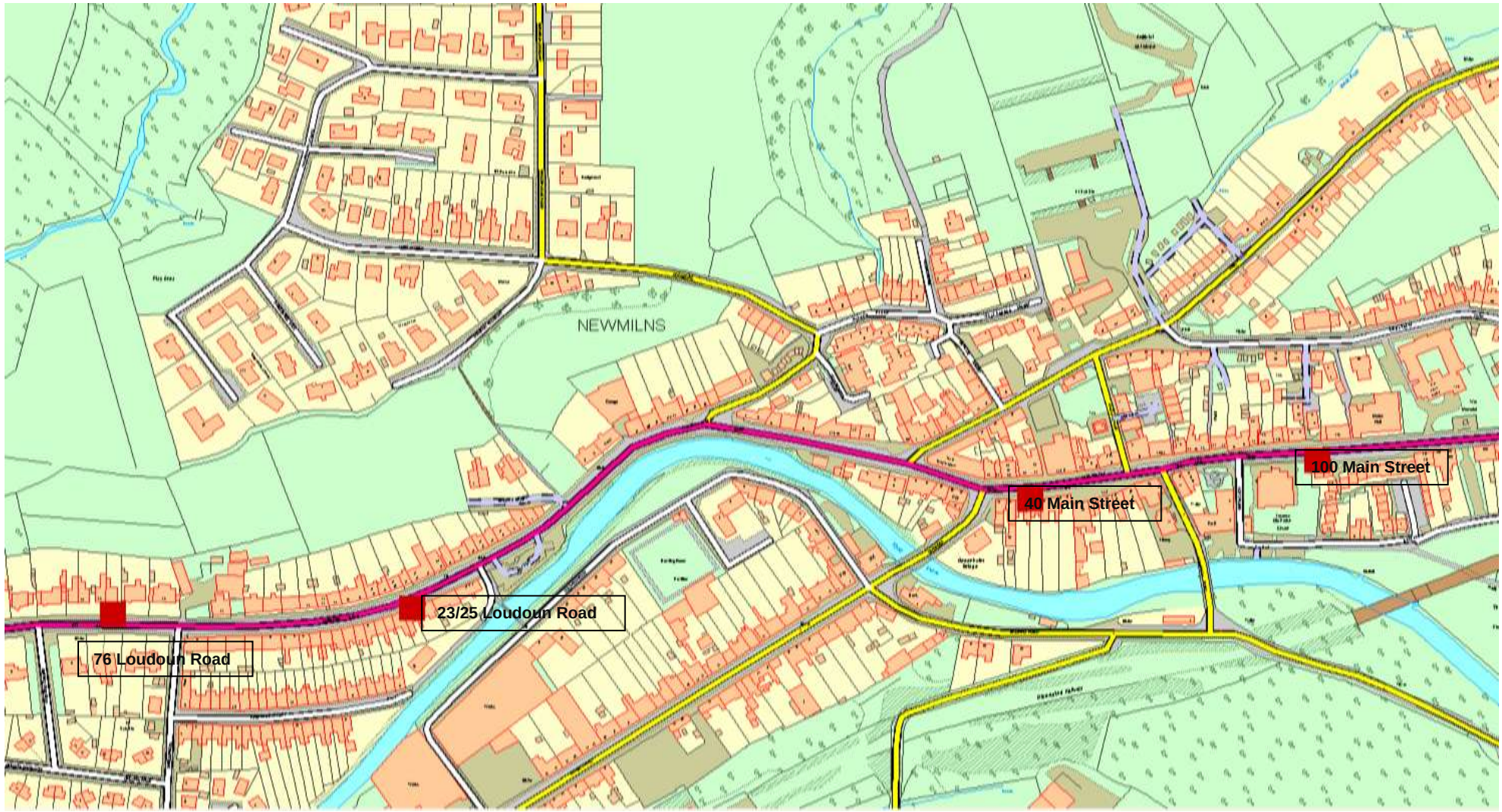


Figure G.8: Mauchline NO_2 Diffusion Tube Locations (Present and Historic)

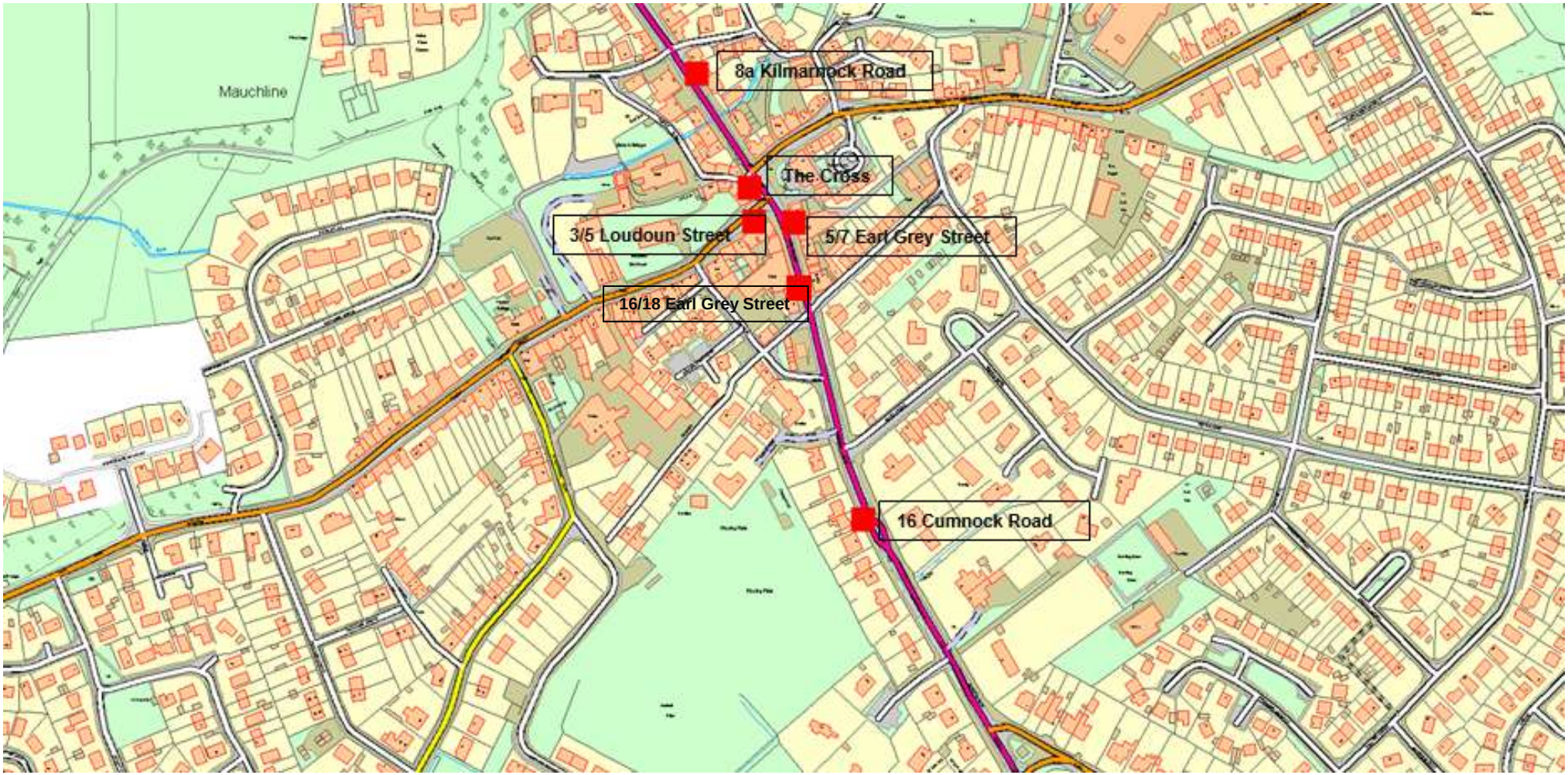


Figure G.9 Kay Park, Kilmarnock NO_2 Diffusion Tube Location

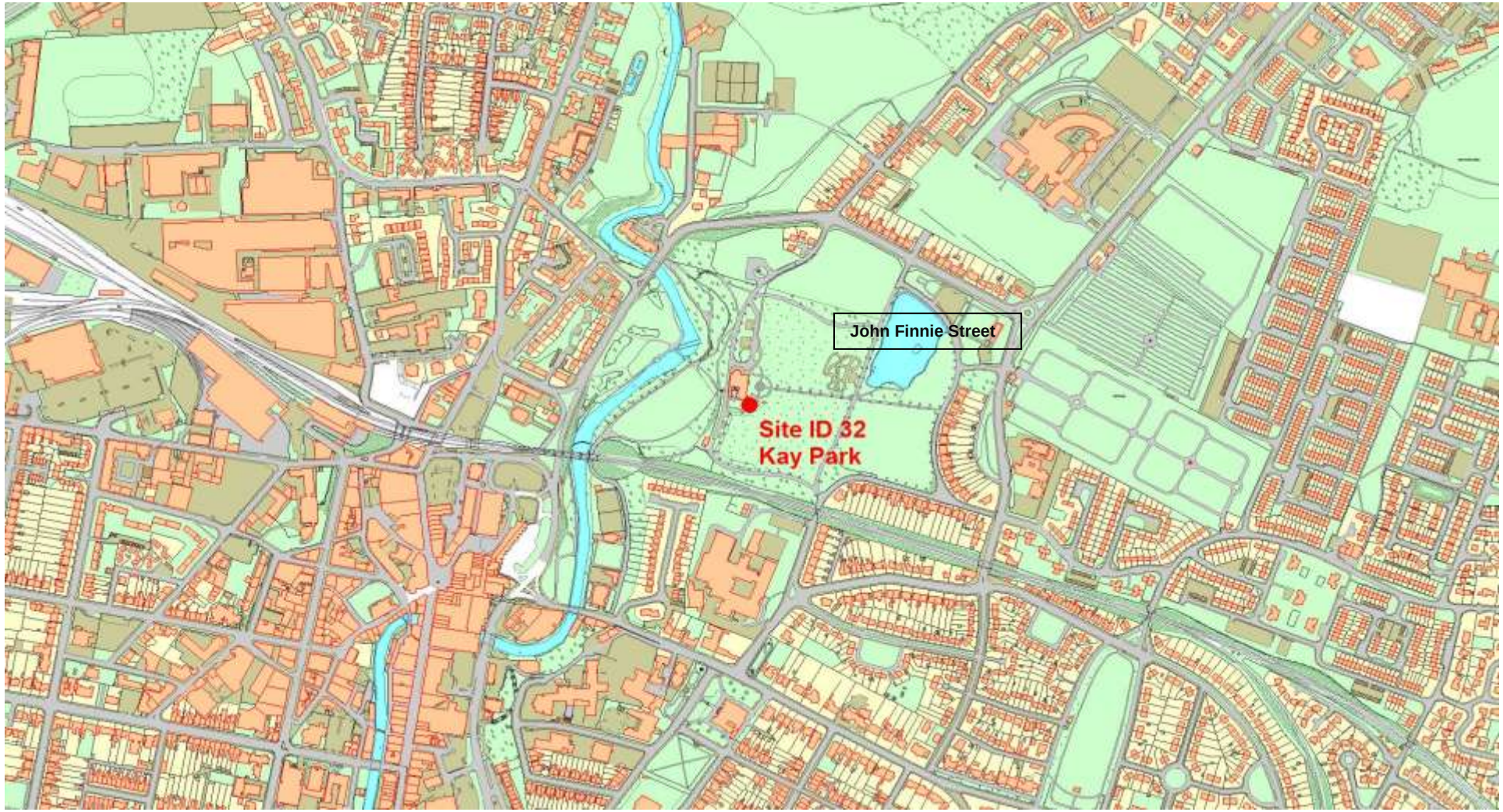
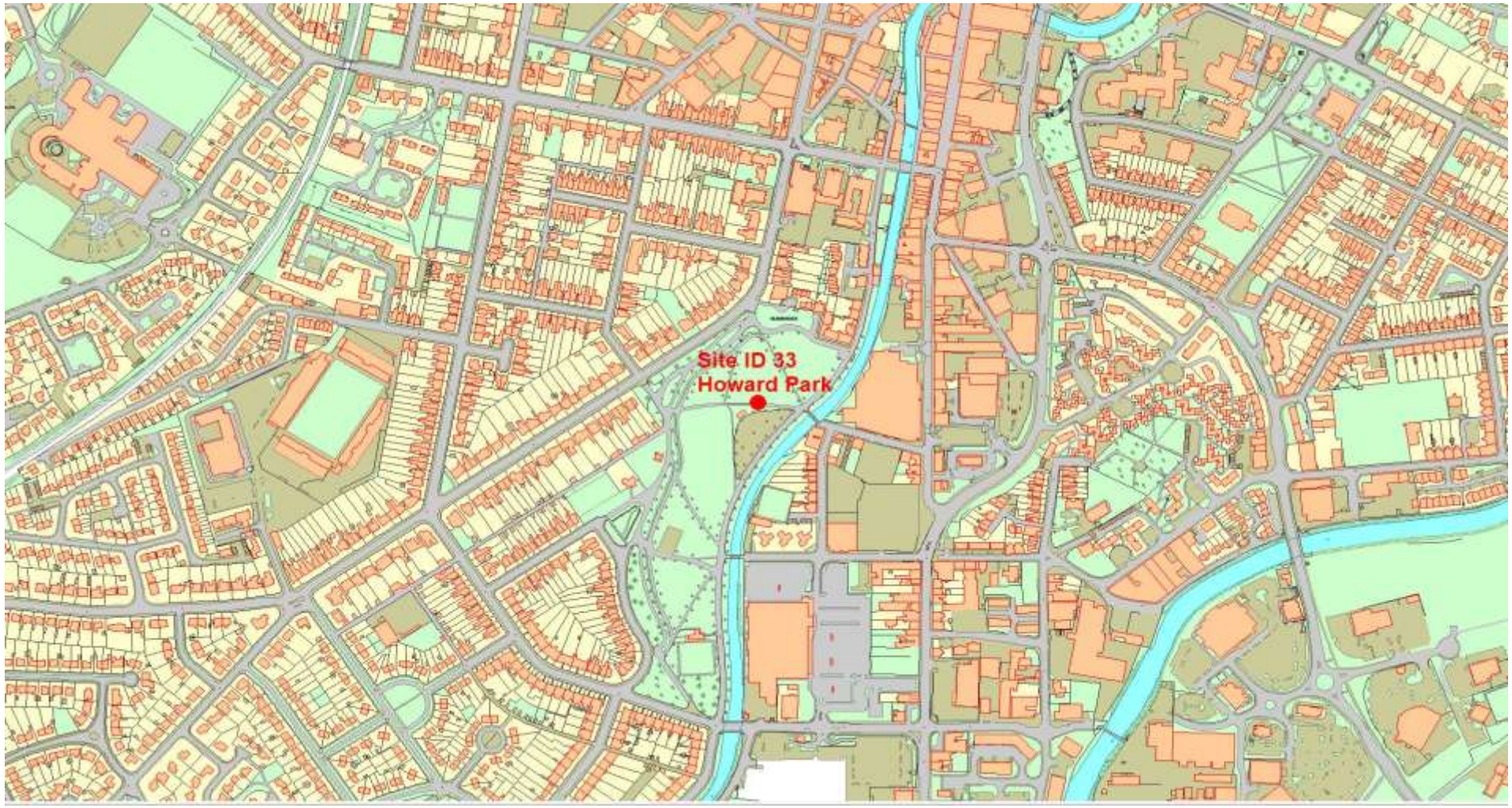


Figure G.10: Howard Park, Kilmarnock NO_2 Diffusion Tube Location



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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