



Annual Progress Report (APR)

2016 Air Quality Annual Progress Report (APR) for
East Ayrshire Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

June 2016

| | |
|--------------------------------|---|
| Local Authority Officer | Sandy Loudon |
| Department | Economy and Skills |
| Address | Environmental Health and Trading Standards Civic Centre South John Dickie Street Kilmarnock KA1 1HW |
| Telephone | 01563 576834 |
| E-mail | sandy.loudon@east-ayrshire.gov.uk |
| Report Reference number | EAC/AQ01/APR2016 |
| Date | June 2016 |



Electric vehicle charging point and cycle parking in Foregate North Car Park



Employee Pool Bike Hire Scheme - Electric assisted bike, standard bikes, lockers and safety equipment

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 2010 to 2015 reports and associated Detailed Assessments (Reference 19). The reports give a background to Air Pollution throughout East Ayrshire 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;
- 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 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 would object as a matter of course to any biomass installations which replace gas boilers (or new installations which are in areas served by mains gas), following Scottish Government guidance, and are minded to object to installations which in our opinion may lead to nuisance complaints. It is our experience that poorly sited log burners 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 Plan (2010)** (Reference 14). It contains the following policy which is used to assess planning applications:-

Policy ENV25

The Council will require all developers to ensure that their proposals have minimal adverse impact on air quality and will require air quality assessments to be undertaken in respect of any proposed developments which it considers

may significantly impact on air quality. The Council will also ensure that any new development will have minimum adverse effects on the physical environment and the amenity of an area as a result of light and noise pollution. Appropriate conditions and Section 75 Agreements will be attached to individual planning consents to ensure that environmental impacts caused by air, light and noise pollution are minimised wherever possible.

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 2.1.

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 effect 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 we are in 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 PM₁₀, NO₂ and other pollutants that are subject to LAQM. The highest concentrations of PM₁₀ and NO₂ arise at heavily trafficked locations in the more urban northern parts of the area, particularly within the congested areas within Kilmarnock. Road traffic and undefined “rural” sources are important sources of NO₂ in East Ayrshire whereas PM₁₀ is predominantly derived from outside the local authority area. It is anticipated that the background concentrations of PM₁₀ and NO₂ 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 these 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 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 are 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.7)

Local Priorities and Challenges

As previously mentioned air quality is of high importance within East Ayrshire Council and clean air will continue to be a priority when any new development is taking place.

Challenges include squaring improvements in air quality with both climate change and economic development. The drive towards biomass based renewable technology to slow down climate change can lead to deteriorating air quality. UK road taxation policy (biased towards climate change) has 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 outwith 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 has 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. EAC Environmental Health is also in the process of formulating a press release statement to be sent to local papers to inform the public of measures which individuals can take to lessen their impact on air quality. Contact details of the officer responsible for air quality issues are also provided in the air quality report and this has led to direct contact from members of the public.

To summarise, the long term NO₂ levels in East Ayrshire (2007 – 2015) are showing a downward trend (Figures A.1 - A.7) and all monitoring locations were below 30 µg/m³ in 2015, substantially below the 40 µg/m³ annual mean Air Quality Objective (Table A.1 – A.6). Monitored PM₁₀ levels in Kilmarnock town centre were substantially below the 18 µg/m³ annual mean Air Quality Objective in 2014 and have been consistently below the Objective since 2012 using preferred TEOM FDMS technology.

Table of Contents

| | |
|--|-----------|
| Executive Summary: Air Quality in Our Area | i |
| Air Quality in East Ayrshire Council | i |
| Actions to Improve Air Quality | iv |
| Local Priorities and Challenges | iv |
| How to Get Involved | iv |
| 1. Local Air Quality Management | 1 |
| 2. Actions to Improve Air Quality | 2 |
| 2.1 Air Quality Management Areas | 2 |
| 2.2 Progress and Impact of Measures to address Air Quality in the East Ayrshire Council area | 2 |
| 3. Air Quality Monitoring Data and Comparison with Air Quality Objectives | 13 |
| 3.1 Summary of Monitoring Undertaken | 13 |
| 3.1.1 Automatic Monitoring Sites | 13 |
| 3.1.2 Non-Automatic Monitoring Sites | 13 |
| 3.2 Individual pollutants | 13 |
| 3.2.1 Nitrogen Dioxide (NO ₂) | 13 |
| 3.2.2 Particulate Matter (PM ₁₀) | 15 |
| 3.2.3 Particulate Matter (PM _{2.5}) | 15 |
| 3.2.4 Sulphur Dioxide (SO ₂) | 15 |
| 3.2.5 Carbon Monoxide, Lead, 1,3-Butadiene and other Pollutants | 16 |
| 4. New Local Developments | 17 |
| 4.1 Road Traffic Sources | 17 |
| 4.2 Other Transport Sources | 17 |
| 4.3 Industrial Sources | 18 |
| 4.4 Commercial and Domestic Sources | 18 |
| 4.5 New Developments with Fugitive or Uncontrolled Sources | 19 |
| 5. Planning Applications | 20 |
| 6. Conclusions and Proposed Actions | 24 |
| 6.1 Conclusions from New Monitoring Data | 24 |
| 6.2 Conclusions relating to New Local Developments | 25 |
| 6.3 Proposed Actions | 25 |
| Appendix A: Monitoring Results and Trends | 27 |
| Appendix B: Full Monthly Diffusion Tube Results for 2015 | 51 |

Appendix C: Supporting Technical Information / Air Quality Monitoring

| | |
|--|----|
| Data QA/QC | 53 |
| Appendix D: QA/QC Data | 55 |
| Appendix E: Results of Automatic Monitoring NO ₂ and PM ₁₀ | 56 |
| Appendix F: Industrial Premises Regulated by SEPA under the Pollution Prevention and Control (Scotland) Regulations 2000 | 60 |
| Appendix G: Maps | 62 |
| Glossary of Terms | 75 |
| References | 76 |

List of Tables

| | |
|---|---|
| Table 1.1 – Summary of Air Quality Objectives in Scotland | 1 |
| Table 2.1 – Progress on Measures to Improve Air Quality | 3 |

List of Figures

Figures

| | |
|---|----|
| Figure G1: Map of Scottish Local Authorities | 62 |
| Figure G2: Map of East Ayrshire | 63 |
| Figure G3: Map of Coal Extraction Sites around Cumnock and New Cumnock | 64 |
| Figure G4: Kilmarnock – Automatic Monitoring Station | 65 |
| Figure G5: Stewarton NO ₂ Diffusion Tube Location | 66 |
| Figure G6: Kilmarnock Town Centre Air Monitoring Locations | 67 |
| Figure G7: Newmilns NO ₂ Diffusion Tube Location | 68 |
| Figure G8: Mauchline NO ₂ Diffusion Tube Location | 69 |
| Figure G9: Kilmarnock NO ₂ Diffusion Tube Location | 70 |
| Figure G10 Kay Park Kilmarnock | 71 |
| Figure G11: Howard Park Kilmarnock | 72 |
| Figure G12: Kirkstyle Primary School Kilmarnock No ₂ Diffusion Tube Location | 73 |
| Figure G13: Hurlford Road Kilmarnock No ₂ Diffusion Tube Location | 74 |

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 exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

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 2015 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. More detail on these measures can be found in the East Ayrshire Transport Strategy 2009 – 2014 (Reference 12).

Table 2.1– Progress on Measures to Improve Air Quality

| 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. |

East Ayrshire Council

| 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 Kilmaronock 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, Kilmaronock, 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). |

East Ayrshire Council

| 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). |

East Ayrshire Council

| 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 and 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). |

East Ayrshire Council

| 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. |

East Ayrshire Council

| 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). |

East Ayrshire Council

| 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). |

East Ayrshire Council

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

East Ayrshire Council

| 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 | <p>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.</p> <p>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</p> <p>Long term planning policies</p> <p>Find out more about long term planning policies for East Ayrshire</p> |
| 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. |

East Ayrshire Council

| 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 NEW | Public information on EAC EH Website | Public Information | Information provided for businesses and the general public on measures which they can take to help improve air quality including links to CAFS, Breathe Scotland web site, Scottish AQ website and AQ reports. Environmental Health produced EAC wide e-mail promoting above and local press release. | Economy and Skills (Environmental Health) | Environmental Health website is in the process of being updated. |
| 45 | 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 |
| 46 | Environmental Permits | Environmental Permits | Environmental Permits are issued by SEPA but in consultation with Environmental Health as joint consultees. | SEPA | Ongoing. |

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.13. Monitoring data is provided in Appendix A, Tables A.1 – A.8 and Appendix B and any trends in Figures A.1 – A.7. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.1 Automatic Monitoring Sites

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

East Ayrshire Council undertook automatic (continuous) monitoring at one site during 2015. 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 NO₂ at 22 sites during 2015. 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 (NO₂)

Please refer to Appendix A.

No exceedences of the annual mean or the hourly mean Air Quality Objectives for NO₂ occurred at any location where monitoring was undertaken within the East Ayrshire Council area during 2015. Automatic monitoring at St Marnock St. indicated a four year low of 25 µg/m³ and the maximum NO₂ level recorded at any NO₂ diffusion tube site was 29.7 at 95/97 John Finnie St., Kilmarnock, both well below the annual mean Air Quality Objective of 40 µg/m³. The four long term monitoring NO₂ sites (Figures A.3 – A.4) indicate a significant downward trend from 2007 to 2015. 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 2.1, 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).

4/ Relatively mild winter weather patterns since the cold winters of 2010/11 and 2011/12 which resulted in raised levels of NO₂ and PM₁₀.

NO₂ Survey

An NO₂ survey was undertaken in 2015 due to concerns regarding emissions from the Hurlford Rd., Kilmarnock Industrial Park. 5 diffusion tubes (Figures G12 and G13) were placed around the industrial park with two tubes placed within Kirkstyle Primary School boundary, two tubes placed adjacent to residential areas and one tube to the west of the park next to the main Hurlford Road which runs through Bellfield. The results (Tables A.4 and A.5) indicate the NO₂ levels within the school boundary to the southeast of the park (prevailing wind from the southwest) are low at 9 - 11 µg/m³, with the surrounding residential area to the east of the park between 11 and 12 µg/m³. The control location to the west at 72/74 Hurlford Road, adjacent to the main road resulted in the highest recorded reading at 16 µg/m³. It can therefore be concluded that the proximity to the main road has the largest influence on NO₂ levels and that the NO₂ levels within the school and within the nearby residential areas are low and well below the 40 µg/m³ annual mean AQ Objective.

Table A.3 and A.5 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the Air Quality Objective of 40µg/m³.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.6 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

No exceedences of the NO₂ hourly mean occurred at the St. Marnock St. automatic monitoring station during 2015 and since no NO₂ tubes exceeded 29.7 µg/m³ 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/m³ are likely to indicate exceedence of the hourly mean.

3.2.2 Particulate Matter (PM₁₀)

No exceedences of the annual mean Air Quality Objective occurred at the St. Marnock St. monitoring site during 2015 with annual mean levels of 14 µg/m³ using BAM 1020 technology and 11 µg/m³ using TEOM FDMS technology, well below the 18 µg/m³ objective. There was one exceedence of the 24-hour mean Air Quality Objective recorded using TEOM FDMS technology, well within the Air Quality Objective of 50 µg/m³ not to be exceeded 7 times a year.

Table A.7 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past 5 years with the Air Quality Objective of 18µg/m³. Table A.8 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past 5 years with the Air Quality Objective of 50µg/m³, not to be exceeded more than 7 times per year.

Although only four years of PM₁₀ data are available for the St. Marnock St. monitoring station it can be clearly established that data obtained using the preferred PM₁₀ TEOM FDMS monitor from both St. Marnock St. and John Finnie St. monitoring sites indicate that PM₁₀ levels from 2012 to 2015, at between 10 and 15 µg/m³, are comfortably within the 18 µg/m³ Air Quality Objective (Table A.7).

3.2.3 Particulate Matter (PM_{2.5})

East Ayrshire Council does not presently monitor PM_{2.5}. Using a conservative factor of 0.7 (Reference27) to estimate the PM_{2.5} within East Ayrshire an estimate can be made of PM_{2.5} levels within Kilmarnock. During 2015 PM₁₀ annual mean readings of 11 µg/m³ (TEOM FDMS) and 14 µg/m³ (BAM) were recorded. Using the 0.7 factor results in an estimate of PM_{2.5} between 7.7 µg/m³ and 9.8 µg/m³. Historical monitoring of PM₁₀ from 2012 to 2015 using TEOM FDMS technology produced annual mean readings of between 10 µg/m³ and 15 µg/m³ giving estimated PM_{2.5} levels of 7.0 µg/m³ to 10.5 µg/m³. Since the annual mean objective for PM_{2.5} is 10 µg/m³ potential estimates of PM_{2.5} could lead to exceedence of the 10 µg/m³ annual mean objective and hence monitoring is essential to determine whether this is the case. To this end East Ayrshire Council has gained part funding from the Scottish Government for the installation of a FIDAS particulate monitor and will start monitoring PM_{2.5} later on this year to determine actual levels and if exceedence is likely what actions will be required.

3.2.4 Sulphur Dioxide (SO₂)

No Sulphur Dioxide monitoring was carried out in East Ayrshire in 2014. 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, 1,3-Butadiene and other Pollutants

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 no new developments in the last year within the East Ayrshire Council area of a scale which required a detailed air quality assessment.

East Ayrshire Council confirms that there are no new developments identified which require an air quality assessment within the Local Authority area.

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 **Other Transport 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.

East Ayrshire Council confirms that there are no new or newly identified biomass combustion plants or areas where domestic solid fuel burning which may have a significant impact on air quality within the Local Authority area.

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.

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

In summary, East Ayrshire Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

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

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

5. Planning Applications

Planning applications for new developments which have not yet been approved but which could impact upon air quality.

(a) Killoch, Ochiltree (Reference 28)

A major development which has the potential to impact on air quality is the proposed 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 will incorporate 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 27) 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 will take 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.

Method of Assessment

The assessment will include discussion of the key health issues relating to the processes involved with construction and operation of the site.

Proposed control systems will be described and dispersion modelling will be carried out to confirm the acceptability of the proposed technology. A DMRB (Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1: Air Quality – May 2007) assessment will also be carried out to examine road traffic emissions.

Consultation with SEPA will take place and assessment of air quality impacts upon ecological sites within 15km of the site will be undertaken.

Preliminary proposed mitigation measures include:

- 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 has agreed to carry out one year's PM₁₀ 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 underway and the final air quality assessment will be included, when completed, in the appropriate Annual Progress Report.

(b) Loudoun Castle, Galston (Reference 28)

Another major development which could impact on air quality is the proposed leisure development with associated housing at Loudoun Castle, Galston. The proposed development includes 450 holiday lodges, indoor water park and sports facilities, restaurants, erection of a distillery, initial phase of 300 houses, with further phases attached to re-instatement of Loudoun Castle, and an associated heat plant.

The development has been called in by the Scottish Government for determination, although with the information so far provided by the applicant East Ayrshire Council planning service recommended refusal.

The applicant corresponded with East Ayrshire Council Environmental Health Service regarding the potential impact on air quality and was asked specifically to consider the effect from road traffic from the development and the effect of the heat plant on local air quality. Due to the potential inclusion of biomass in the heat plant the applicant was asked by Environmental Health to move the heat plant to the east of the development and the nearby school Loudoun Academy (south westerly prevailing wind) to lessen the impact of emissions on residents and visitors. The developer agreed to re-locate the heat plant. An initial air quality assessment was provided by the applicant and the conclusions are set out below:-

Conclusions

The project is located within the administrative area of East Ayrshire Council. East Ayrshire Council has not designated any Air Quality Management Areas (AQMA's) and air quality in the general area is very good. The assessment has considered dust effects during the construction phase and the air quality impacts due to the operation of the project. In addition, the suitability of the project site for its intended use in the context of air quality has been considered. The results of the risk assessment of construction dust impacts undertaken using the Institute of Air Quality Management guidance, indicate that before the implementation of mitigation and controls, the risk of dust impacts would be medium. Implementation of the highly-recommended mitigation measures described in the Institute of Air Quality Management construction dust guidance should reduce the residual dust effects to a level categorised as 'not significant'. Detailed atmospheric dispersion modelling of development traffic emissions and energy centre stack emissions has been undertaken for the first year in which the development is expected to be fully operational, 2024. Pollutant concentrations are predicted to be well within the relevant health-based objectives at the facades of both existing and proposed receptors. Therefore, air quality is acceptable at the project site making it suitable for its proposed uses. The operational impact of the project on existing receptors is predicted to be 'negligible' taking into account the changes in pollution levels and

absolute levels. Overall, the resulting air quality effect of the development is considered to be 'not significant'.

To summarise, the new development is located in an essentially rural location and the largest town in the locality (Galston) has approximately 5000 inhabitants, air quality is generally good with air quality targets being easily met, the impact on air quality is predicted to be negligible as the air quality assessment predicted a maximum change to annual mean NO₂ of 1.3 µg/m³ (max 3% of AQS Objective), 0.3 µg/m³ PM₁₀ (max 2% of AQS Objective) and 0.1 µg/m³ PM_{2.5} (max 1% of AQS Objective). Since the maximum NO₂ annual mean is predicted at 24.8 µg/m³ (well below 60 µg/m³) hourly means are highly unlikely to be exceeded. Similarly with a maximum predicted annual mean PM₁₀ of 14.4 µg/m³ daily mean PM₁₀ levels are unlikely to be exceeded.

Defra Mapped Annual-Mean Background NO₂ Concentrations (µg.m-3) Loudoun Castle

NO₂ 4.8 µg/m³

PM₁₀ 11.1 µg/m³

PM_{2.5} 6.9 µg/m³

The air quality assessment was completed without specific details of the makeup of the heat plant being finalised and Environmental Health have requested the applicant to consult this service before installation with a final pollutant dispersion model being submitted before determination.

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 NO₂ carried out during 2015 resulted in no exceedences of the annual mean Air Quality Objective at all monitoring locations within East Ayrshire (Tables A.1 – A.6). All monitoring sites were below 30 µg/m³ during 2015, comfortably below the 40 µg/m³ annual mean Air Quality Objective. Similarly no exceedences of the hourly mean were recorded.

Automatic monitoring of PM₁₀ at the St. Marnock Street monitoring site using BAM technology indicated an annual mean level of 14 µg/m³ with the TEOM FDMS technology indicating 11 µg/m³ with both results comfortably below the 18 µg/m³ annual mean Air Quality Objective (Tables A.7 and A.8). Both results confirm previous TEOM FDMS annual mean results below the objective since monitoring started using this preferred technology in 2012 within Kilmarnock town centre. One exceedence of the PM₁₀ 24-hour mean was recorded using TEOM FDMS technology, well below the 7 times a year 24-hour mean Air Quality Objective. East Ayrshire Council will submit an update to the 2013 Kilmarnock Town Centre Detailed Assessment bringing together recent monitoring data from both monitoring technologies. This should be completed by September 2016.

The comparative trial with the differing PM monitoring technology is complete and an initial comparison (Table A.7 and A.8) indicates large differences in results between the BAM technology and the TEOM FDMS technology with the BAM readings consistently higher. As referred to in previous reports (Reference 19) TEOM FDMS is regarded as being more likely to record the actual PM₁₀ due to the BAM technology propensity to read moisture as particulate matter and therefore requiring a correction factor. The TEOM FDMS technology also tends to correlate better with the modelling which has been carried out in the 2013 and 2016 detailed assessments.

There has been a significant downward trend in diffusion tube measured NO₂ annual mean (Tables A.3 – A.6, Figures A.3 and A.4, long term monitoring sites) since 2006 with no exceedences of the annual mean since 2010. The annual mean PM₁₀ levels (Table A.7) have been consistently below the annual mean objective since 2012 when measured using TEOM FDMS technology.

Since PM₁₀ and NO₂ 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.

6.2 Conclusions relating to New Local Developments

There are no new or newly identified local developments (since the submission of the 2015 US&A and 2014 PR) which may have a significant impact on air quality within the Local Authority area.

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.

Possible future developments which may have a significant impact on local air quality have been listed in **Section 4 Planning Applications**. All planning applications with sources which have the potential to impact on air quality will first of all be screened using appropriate guidance including TG (016) and EPUK 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 NO₂ will be continued within Kilmarnock town centre to ascertain whether the downward trend in NO₂ is for the long term and Air Quality Objectives continue to be met. Further automatic monitoring for PM₁₀ 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 NO₂ 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 NO₂ are well below Air Quality Objectives.

In the future if any location is subject to substantial change, e.g. substantial change in traffic flow, NO₂ diffusion tubes will be used as a screening tool to back up any air quality assessment. As previously discussed a comparative trial was carried out for 2 years with the co-location of a BAM1020 and a TEOM FDMS PM₁₀ monitor with part funding from the Scottish Government. Conclusions from this trial will be included in the 2017 Annual Progress Report.

As PM₁₀ levels exceeded the annual mean Air Quality Objective in recent years, using the BAM 1020 monitoring technology, East Ayrshire Council is proceeding with an update of the 2013 Kilmarnock Town Centre Detailed Assessment and this will be submitted in September 2016.

East Ayrshire Council will start monitoring PM_{2.5} later this year to measure actual levels of fine particulate to determine what actions may be required.

The next course of action for East Ayrshire Council will therefore be the submission of an updated Detailed Assessment for PM₁₀ and NO₂ within Kilmarnock town centre and submission of the 2017 Annual Progress Report. Implementation of measures in progress (Table 2.1) and introduction of new measures to reduce pollutant levels will continue. PM_{2.5} monitoring is due to commence in August 2016.

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? |
|---------|--------------------------------|-----------|---------------------|---------------------|------------------|----------------------|-----------|----------------------|--|--|---|
| A2 | Kilmarnock, John Finnie Street | Roadside | 242691 | 638095 | 1.77 | NO ₂ | N | Chemiluminescent | Y (<1m) | 2.79 | Y |
| | | | | | 2.11 | PM ₁₀ | N | TEOM-FDMS | Y (<1m) | 2.73 | Y |
| A3 | Kilmarnock, St. Marnock Street | Roadside | 242742 | 637705 | 2.13 | NO ₂ | N | Chemiluminescent | Y (<1m) | 3.18 | Y |
| | | | | | 1.95 | PM ₁₀ | N | BAM 1020 | Y (<1m) | 3.54 | Y |
| | | | | | 2.35 | PM ₁₀ | N | TEOM-FDMS | Y (<1m) | 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, Kilmarlock | Kerbside | 242805 | 637620 | 2.95 | NO ₂ | N | N | Y(35m)* | < 1m | Y |
| 2. 28 John Finnie Street, Kilmarlock | Roadside | 242701 | 638083 | 2.95 | NO ₂ | N | N | Y(3 – 4m) | 2-3m | Y |
| 3. 19 Lainshaw Street, Stewarton | Kerbside | 241907 | 645820 | 2.95 | NO ₂ | N | N | Y(2 – 3m) | < 1m | Y |
| 4. 40 Main Street, Newmilns | Roadside | 253601 | 637310 | 2.95 | NO ₂ | N | N | Y(< 1m) | 2-3m | Y |
| 6. 8A Kilmarlock Road, Mauchline | Roadside | 249826 | 627335 | 2.95 | NO ₂ | N | N | Y(2 – 3m) | 2-3m | Y |
| 11. 96 John Finnie Street, Kilmarlock | Roadside | 242657 | 637883 | 2.95 | NO ₂ | N | N | Y(3-4m) | 2-3m | Y |
| 12. 62 John Finnie Street, Kilmarlock | Roadside | 242673 | 637955 | 2.95 | NO ₂ | N | N | Y(3 – 4m) | 2-3m | Y |

East Ayrshire Council

| 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? |
|---|------------------|----------------------------|----------------------------|------------------------|-----------------------------|-----------------|--|---|---|--|
| 14. 95/97 John Finnie Street, Kilmarnock | Roadside | 242619 | 637773 | 2.95 | NO ₂ | N | N | Y(100m)* | 3m | Y |
| 15. 16 West George Street, Kilmarnock | Roadside | 242766 | 638160 | 2.95 | NO ₂ | N | N | Y(35m)* | 1-2m | Y |
| 17. 23/25 Loudoun Road, Newmilns | Roadside | 253204 | 637237 | 2.95 | NO ₂ | N | N | Y(<1m) | 2-3m | Y |
| 23. 3/5 Loudoun Street, Mauchline | Roadside | 249867 | 627232 | 2.95 | NO ₂ | N | N | Y(<1m) | 3-4m | Y |
| 24. 5/7 Earl Grey Street, Mauchline | Roadside | 249894 | 627233 | 2.95 | NO ₂ | N | N | Y(<1m) | 2m | Y |
| 25. John Finnie Street Monitor, Kilmarnock | Roadside | 242691 | 638095 | 2.95 | NO ₂ | N | N | Y(17m)* | 2-3m | Y |
| 27. Junction King Street/St. Marnock Street, Kilmarnock | Kerbside | 242771 | 637714 | 2.95 | NO ₂ | N | N | Y(44m)* | <1m | Y |

East Ayrshire Council

| 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? |
|---|------------------|----------------------------|----------------------------|------------------------|-----------------------------|-----------------|--|---|---|--|
| 32. Kay Park, Kilmarnock | Urban Background | 243302 | 638259 | 2.95 | NO ₂ | N | N | Y(>50m) | N/A | N |
| 33. Howard Park, Kilmarnock | Urban Background | 242581 | 637409 | 2.95 | NO ₂ | N | N | Y(>50m) | N/A | N |
| 39. West Gable, Kirkstyle Primary School, Kilmarnock | Urban Background | 243367 | 636566 | 2.95 | NO ₂ | N | N | Y | N/A | N |
| 40. South West Gate, Kirkstyle Primary School, Kilmarnock | Urban Background | 243301 | 636456 | 2.95 | NO ₂ | N | N | Y | N/A | N |
| 41. 2/4 Annan Road, Kilmarnock | Urban Background | 243313 | 636414 | 2.95 | NO ₂ | N | N | Y | 1.6m | N |
| 42. 120/122 Hurlford Road, Kilmarnock | Urban Background | 243320 | 636343 | 2.95 | NO ₂ | N | N | Y | 1.4m (12.5m from main rd) | N |

East Ayrshire Council

| 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? |
|--|------------------|----------------------------|----------------------------|------------------------|-----------------------------|-----------------|--|---|---|--|
| 43. 72/74 Hurlford Road, Kilmarnock | Roadside | 243020 | 636257 | 2.95 | NO ₂ | N | N | Y | 2.9m | Y |
| 44A. St. Marnock Street Monitoring Station | Roadside | 242742 | 637705 | 2.13 | NO ₂ | N | Y | Y | 3.2m | Y |
| 44B. St. Marnock Street Monitoring Station | Roadside | 242742 | 637705 | 2.13 | NO ₂ | N | Y | Y | 3.2m | Y |
| 44C. St. Marnock Street Monitoring Station | Roadside | 242742 | 637705 | 2.13 | NO ₂ | N | Y | Y | 3.2m | Y |

*Although these sites are greater than 5m from relevant exposure (annual mean), they are representative of such exposure. These locations were chosen because of the suitability of mounting the NO₂ diffusion tubes at equivalent representative points to annual mean relevant exposure. Although diffusion tubes can only be used to measure annual mean levels of NO₂ 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 2015 % ⁽²⁾ | Annual Mean Concentration ($\mu\text{g}/\text{m}^3$) ⁽³⁾ | | | | |
|-----------------------------------|-----------|--------------|---|--|---|--------------------|--------------------|------|------|
| | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| A2/John Finnie Street, Kilmarnock | Roadside | N | N/A | N/A | 35 | 30 | 39 | 32 | N/A |
| A3/St. Marnock Street, Kilmarnock | Roadside | N | N/A | 90 | | 29 (36 annualised) | 32 (30 annualised) | 30 | 25 |

Annual Mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for Nitrogen Dioxide - $40 \mu\text{g}/\text{m}^3$.

Notes: Exceedences of the NO_2 annual mean objective of $40 \mu\text{g}/\text{m}^3$ are shown in **bold**.

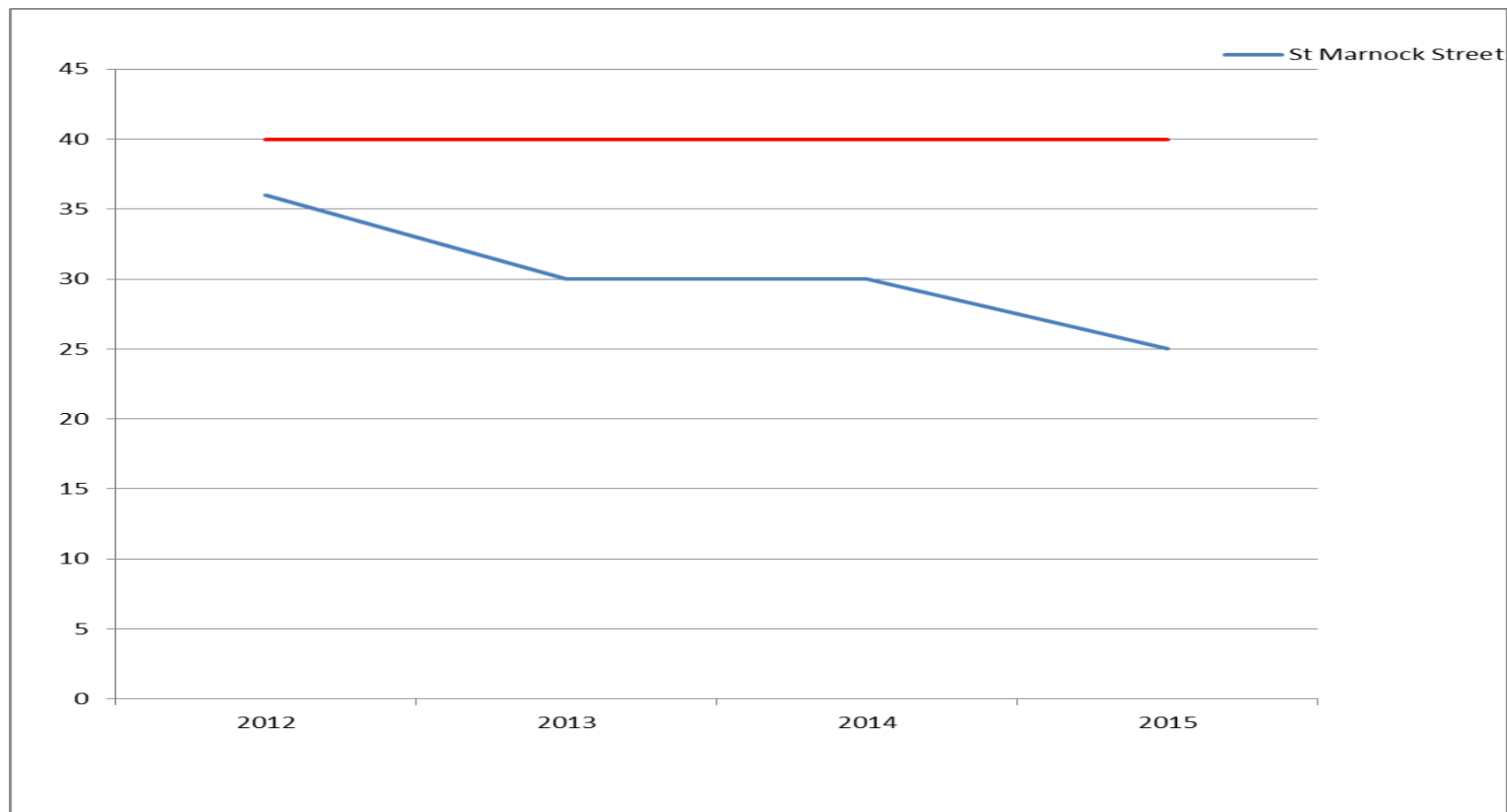
NO_2 annual means exceeding $60 \mu\text{g}/\text{m}^3$, indicating a potential exceedence of the NO_2 1-hour mean objective are shown in **bold and underlined**.

(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%).

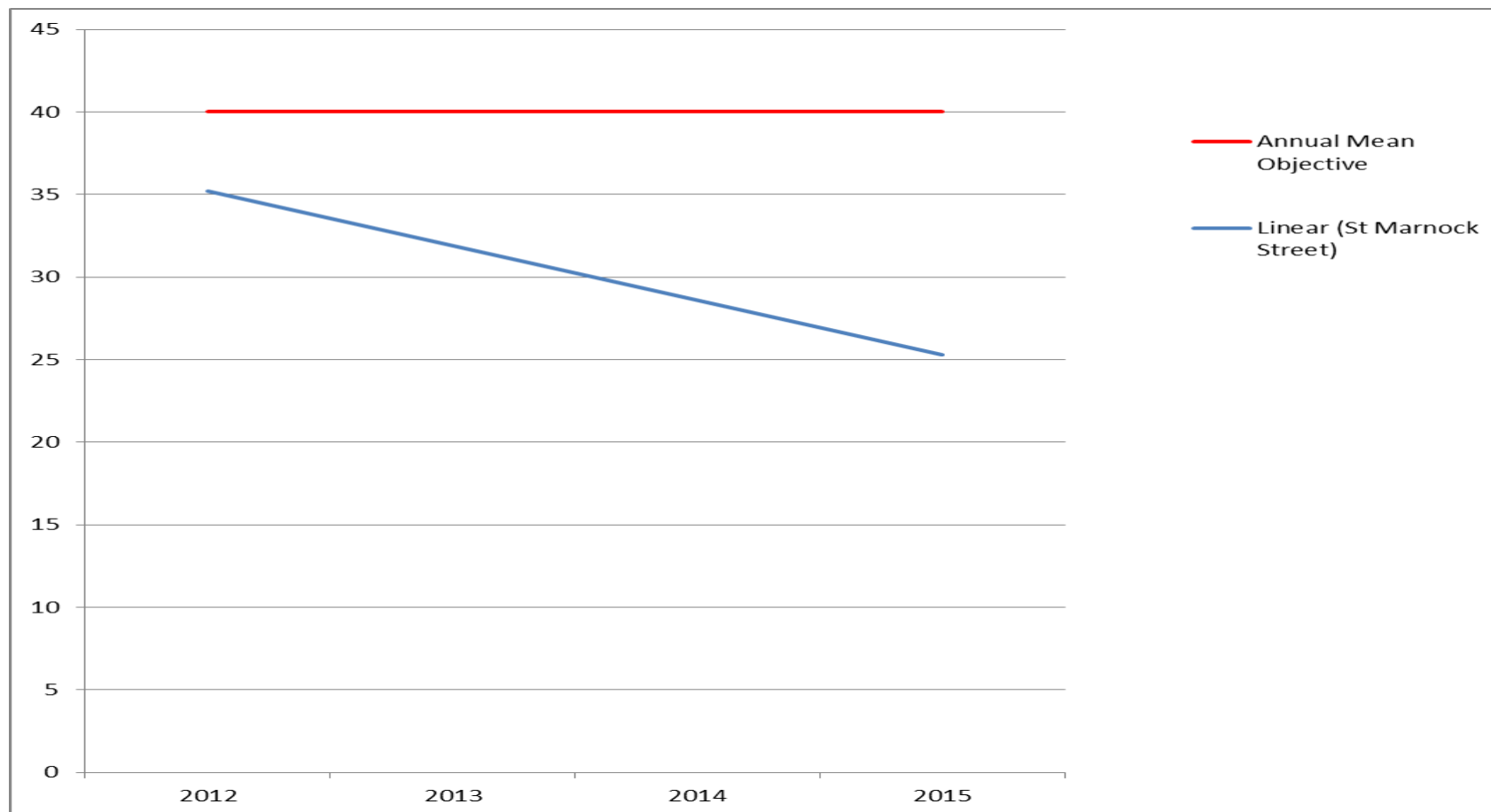
(3) All means have been “annualised” as per LAQM.TG(16) (Reference1) if valid data capture for the full calendar year is less than 75%. See Reference 19 for details.

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.4 Results of Nitrogen Dioxide Diffusion Tubes in 2015

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2015 (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 = 0.98) ⁽²⁾ |
|---------|--|-----------|--------------|-------------------------------|---|---|---|--|
| | | | | | | | | 2015 (µg/m ³) |
| 1 | Fowlds Street/King Street Junction, Kilmarnock | Kerbside | N | N | 12 | N/A | N | 23.2 |
| 2 | 28 John Finnie Street, Kilmarnock | Roadside | N | N | 12 | N/A | N | 22.3 |
| 3 | 19 Lainshaw Street, Stewarton | Kerbside | N | N | 11 | N/A | N | 25.1 |
| 4 | 40 Main Street, Newmilns | Roadside | N | N | 12 | N/A | N | 25.9 |
| 6 | 8A Kilmarnock Road, Mauchline | Roadside | N | N | 12 | N/A | N | 20.7 |
| 11 | 96 John Finnie Street, Kilmarnock | Roadside | N | N | 12 | N/A | N | 23.4 |
| 12 | 62 John Finnie Street, Kilmarnock | Roadside | N | N | 12 | N/A | N | 25.3 |
| 14 | 95/97 John Finnie Street, Kilmarnock | Roadside | N | N | 12 | N/A | N | 29.7 |

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2015 (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 = 0.98) ⁽²⁾ |
|---------|---|------------------|--------------|-------------------------------|---|---|---|--|
| | | | | | | | | 2015 (µg/m ³) |
| 15 | 16 West George Street, Kilmarnock | Roadside | N | N | 10 | N/A | N | 27.1 |
| 17 | 23/25 Loudoun Road, Newmilns | Roadside | N | N | 12 | N/A | N | 26.2 |
| 23 | 3/5 Loudoun Street, Mauchline | Roadside | N | N | 12 | N/A | N | 20.7 |
| 24 | 5/7 Earl Grey Street, Mauchline | Roadside | N | N | 12 | N/A | N | 26.5 |
| 25 | John Finnie Street, Kilmarnock | Roadside | N | N | 9 | N/A | N | 28.1 |
| 27 | Junction King Street/St. Marnock Street, Kilmarnock | Kerbside | N | N | 11 | N/A | N | 24.9 |
| 32 | Kay Park, Kilmarnock | Urban Background | N | N | 12 | N/A | N | 10.3 |
| 33 | Howard Park, Kilmarnock | Urban Background | N | N | 12 | N/A | N | 9.5 |

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2015 (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 = 0.98) ⁽²⁾ |
|---------|---|------------------|--------------|-------------------------------|---|---|---|--|
| | | | | | | | | 2015 ($\mu\text{g}/\text{m}^3$) |
| 39 | West Gable, Kirkstyle Primary School, Kilmarnock | Urban Background | N | N | 12 | N/A | N | 9.8 |
| 40 | South West Gate, Kirkstyle Primary School, Kilmarnock | Urban Background | N | N | 11 | N/A | N | 11.0 |
| 41 | 2/4 Annan Road, Kilmarnock | Urban Background | N | N | 12 | N/A | N | 11.0 |
| 42 | 120/122 Hurlford Road, Kilmarnock | Roadside | N | N | 12 | N/A | N | 12.5 |
| 43 | 72/74 Hurlford Road, Kilmarnock | Urban Background | N | N | 12 | N/A | N | 16.2 |
| 44A | St. Marnock Street Monitoring Station | Roadside | N | Y | 11 | N/A | N | 22.0 |
| 44B | St. Marnock Street Monitoring Station | Roadside | N | Y | 11 | N/A | N | 19.9 |

| Site ID | Location | Site Type | Within AQMA? | Triplicate or Collocated Tube | Data Capture 2015 (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 = 0.98) ⁽²⁾ |
|---------------|---------------------------------------|-----------|--------------|-------------------------------|---|---|---|--|
| | | | | | | | | 2015 ($\mu\text{g}/\text{m}^3$) |
| 44C | St. Marnock Street Monitoring Station | Roadside | N | Y | 11 | N/A | N | 21.1 |
| 44A-C Average | St. Marnock Street Monitoring Station | Roadside | N | Y | 11 | N/A | N | 22.7 |

Annual Mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for Nitrogen Dioxide - $40 \mu\text{g}/\text{m}^3$.

Notes: Exceedences of the NO_2 annual mean objective of $40 \mu\text{g}/\text{m}^3$ are shown in **bold**.

NO_2 annual means exceeding $60 \mu\text{g}/\text{m}^3$, 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.5 Results of Nitrogen Dioxide Diffusion Tubes in 2010-2015

| Site ID | Location | Site Type | Within AQMA? | Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$ ⁽¹⁾⁽²⁾ | | | | | |
|---------|--|-----------|--------------|--|---|---|---|---|---|
| | | | | 2010 (Bias Adjustment Factor = 1.12) | 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) ⁽¹⁾⁽²⁾ |
| 1. | Fowlds Street/King Street Junction, Kilmarnock | Kerbside | N | 39.1 | 25.0 | 27.4 | 32.4 | 24.2 | 23.2 |
| 2. | 28 John Finnie Street, Kilmarnock | Roadside | N | 40.2 | 32.1 | 26.4 | 34.0 | 26.2 | 22.3 |
| 3. | 19 Lainshaw Street, Stewarton | Kerbside | N | 35.8 | 27.0 | 28.7 | 31.7 | 23.2 | 25.1 |
| 4. | 40 Main Street, Newmilns | Roadside | N | 33.0 | 25.9 | 26.5 | 30.8 | 24.2 | 25.9 |
| 6. | 8A Kilmarnock Road, Mauchline | Roadside | N | 31.6 | 27.9 | 23.5 | 29.7 | 23.4 | 20.7 |
| 7. | Junction at Main Street & A70 Ochiltree | Roadside | N | 26.2 | 19.9 | 20.3 | 20.9 | | |
| 9. | Townhead/Glaisnock Street Junction, Cumnock | Roadside | N | 17.4 | 15.6 | 13.8 | 15.4 | | |
| 11. | 96 John Finnie Street, Kilmarnock | Roadside | N | 34.8 | 27.9 | 28.4 | 32.1 | 24.9 | 23.4 |
| 12. | 62 John Finnie Street, Kilmarnock | Roadside | N | 40.0 | 33.3 | 31.1 | 33.1 | 26.8 | 25.3 |
| 14. | 95/97 John Finnie Street, Kilmarnock | Roadside | N | 43.8 | 34.2 | 33.7 | 35.4 | 30.0 | 29.7 |
| 15. | 16 West George Street, Kilmarnock | Roadside | N | 43.2 | 35.8 | 34.8 | 36.9 | 29.1 | 27.1 |
| 17. | 23/25 Loudoun Road, Newmilns | Roadside | N | 40.6 | 30.4 | 31.8 | 34.7 | 26.0 | 26.2 |

East Ayrshire Council

| | | | | | | | | | |
|--------------|---|-------------|---|------|------|------|------|------|------|
| 18. | 100 Main Street, Newmilns | Roadside | N | 26.4 | 22.1 | 19.9 | | | |
| 19. | 57/59 Townhead Street, Cumnock | Roadside | N | 22.6 | 19.0 | 17.5 | | | |
| 20. | 66 Main Street, Muirkirk | Roadside | N | 17.8 | 14.2 | 12.9 | | | |
| 22. | The Cross, Mauchline | Roadside | N | 29.5 | 29.6 | 24.7 | 29.6 | | |
| 23. | 3/5 Loudoun Street, Mauchline | Roadside | N | 31.4 | 28.4 | 26.0 | 27.3 | 21.5 | 20.7 |
| 24. | 5/7 Earl Grey Street, Mauchline | Roadside | N | 39.5 | 34.2 | 33.5 | 39.5 | 30.5 | 26.5 |
| 25A. | John Finnie Street, Kilmarnock | Roadside*** | N | 35.2 | 28.2 | 28.9 | | | |
| 25B. | John Finnie Street, Kilmarnock | Roadside*** | N | 39.8 | 28.0 | 29.5 | | | |
| 25C | John Finnie Street, Kilmarnock | Roadside*** | N | 37.8 | 30.6 | 28.9 | | | |
| Mean 25A-25C | John Finnie Street, Kilmarnock | Roadside*** | N | 37.7 | 29.0 | 29.1 | | | |
| 25 | John Finnie Street Monitor, Kilmarnock | Roadside | N | | | | 32.5 | 24.4 | 28.1 |
| 26 | 76 Loudoun Road, Newmilns | Roadside | N | | 21.4 | 18.8 | | | |
| 27 | Junction King Street/St. Marnock Street, Kilmarnock | Kerbside | N | | 30.8 | 29.9 | 30.8 | 28.1 | 24.9 |
| 28 | 2A Welbeck Street, Kilmarnock | Roadside | N | | 25.6 | 24.9 | 25.0 | | |
| 29 | Junction McLelland Drive/Dundonald Road, Kilmarnock | Roadside | N | | 25.2 | 25.2 | 26.4 | | |

East Ayrshire Council

| | | | | | | | | | |
|-----|---|------------------|---|--|------|------|------|------|------|
| 30 | 16 Cumnock Road, Mauchline. | Roadside | N | | 19.1 | 20.0 | | | |
| 31 | Wellington Street, Kilmarnock | Kerbside | N | | 21.8 | 26.2 | 26.7 | | |
| 32 | Kay Park, Kilmarnock | Urban Background | N | | | | 12.1 | 10.2 | 10.3 |
| 33 | Howard Park, Kilmarnock | Urban Background | N | | | | 12.6 | 10.5 | 9.5 |
| 34 | 39 Loudoun Road, Newmilns | Roadside | N | | | | 28.9 | | |
| 35 | Nelson Street, Kilmarnock | Roadside | N | | | | 19.6 | | |
| 36 | 17 Portland Road, Kilmarnock | Roadside | N | | | | 19.6 | | |
| 37 | Sturrock Street, Kilmarnock | Roadside | N | | | | 21.9 | | |
| 38 | 16/18 Earl Grey Street, Mauchline | Roadside | N | | | | | 29.8 | |
| 39 | West Gable, Kirkstyle Primary School, Kilmarnock | Urban Background | N | | | | | | 9.8 |
| 40 | South West Gate, Kirkstyle Primary School, Kilmarnock | Urban Background | N | | | | | | 11.0 |
| 41 | 2/4 Annan Road, Kilmarnock | Urban Background | N | | | | | | 11.0 |
| 42 | 120/122 Hurlford Road, Kilmarnock | Roadside | N | | | | | | 12.5 |
| 43 | 72/74 Hurlford Road, Kilmarnock | Urban Background | N | | | | | | 16.2 |
| 44A | St. Marnock Street Monitoring Station | Roadside | N | | | | | | 22.0 |
| 44B | St. Marnock Street Monitoring Station | Roadside | N | | | | | | 19.9 |

| | | | | | | | | | |
|-------|---------------------------------------|----------|---|--|--|--|--|--|------|
| 44C | St. Marnock Street Monitoring Station | Roadside | N | | | | | | 21.1 |
| 44A-C | St. Marnock Street Monitoring Station | Roadside | N | | | | | | 22.7 |

Annual Mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for Nitrogen Dioxide - 40 $\mu\text{g}/\text{m}^3$.

Notes: Exceedences of the NO_2 annual mean objective of 40 $\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO_2 annual means exceeding 60 $\mu\text{g}/\text{m}^3$, 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 2015.

(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

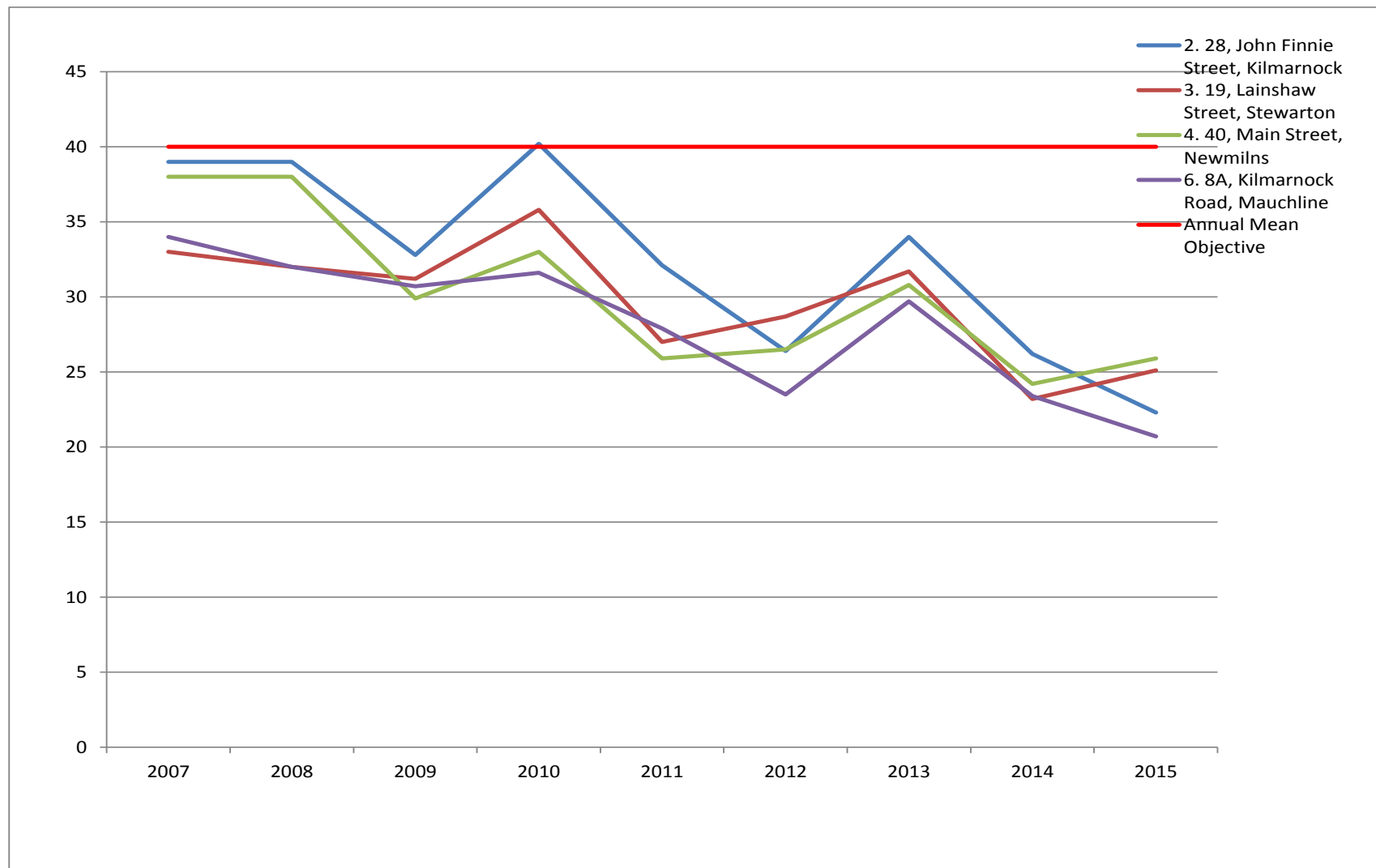


Figure A.4 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Long Term Diffusion Tube Monitoring Sites - Linear

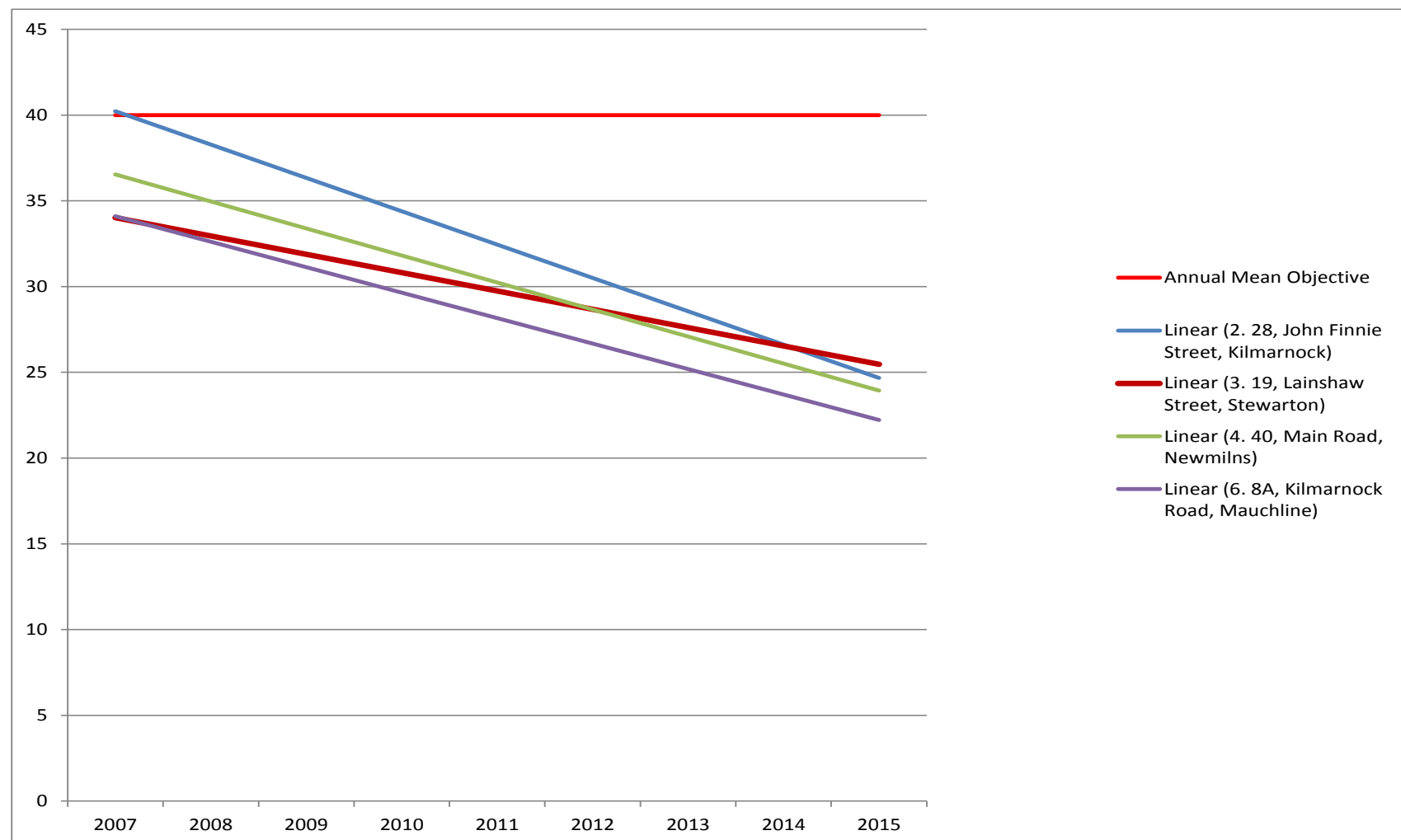


Figure A.5 - Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites (where measured levels have been highest over the past 7 years)

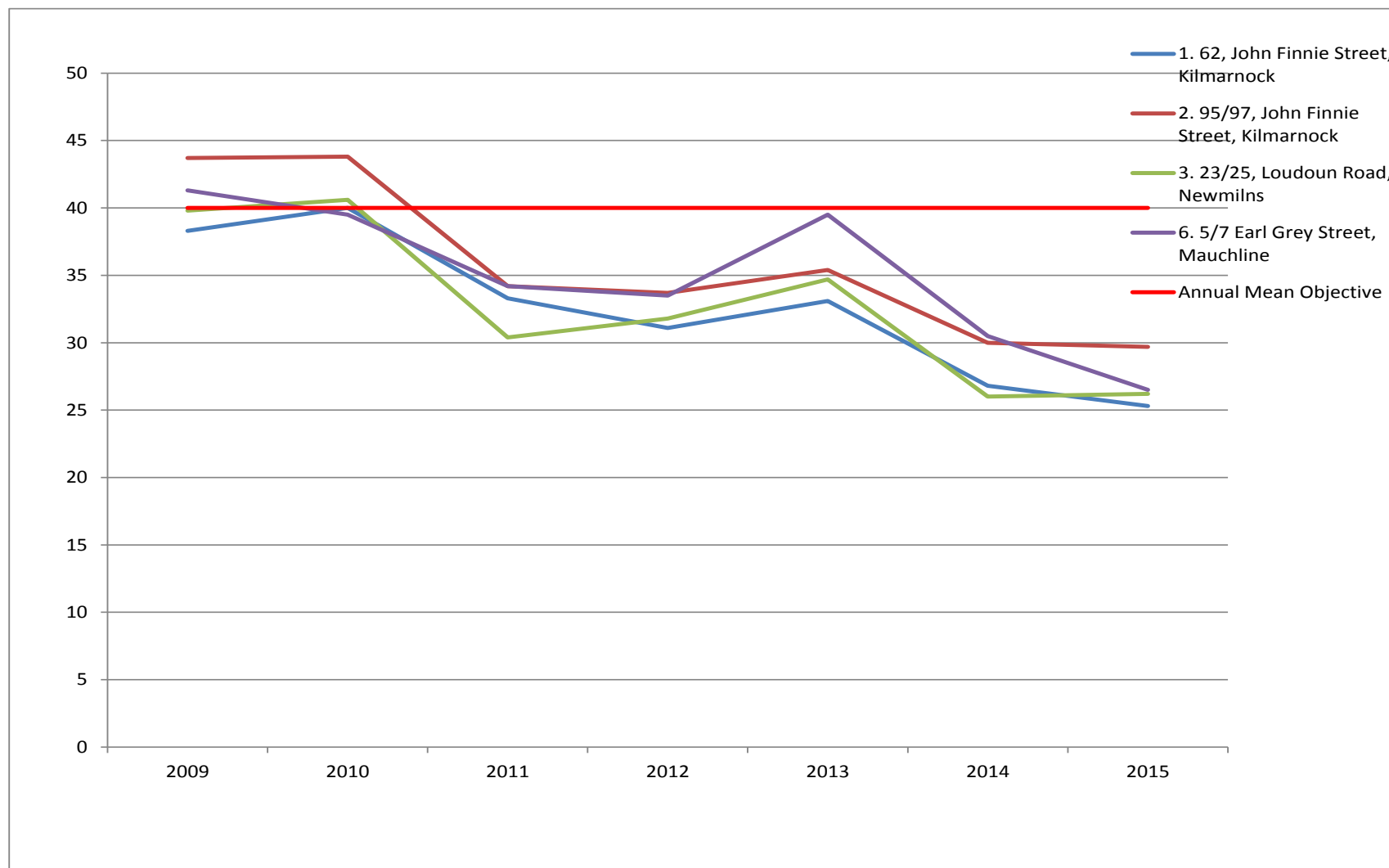


Figure A.6 - Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites (where measured levels have been highest over the past 7 years) - Linear

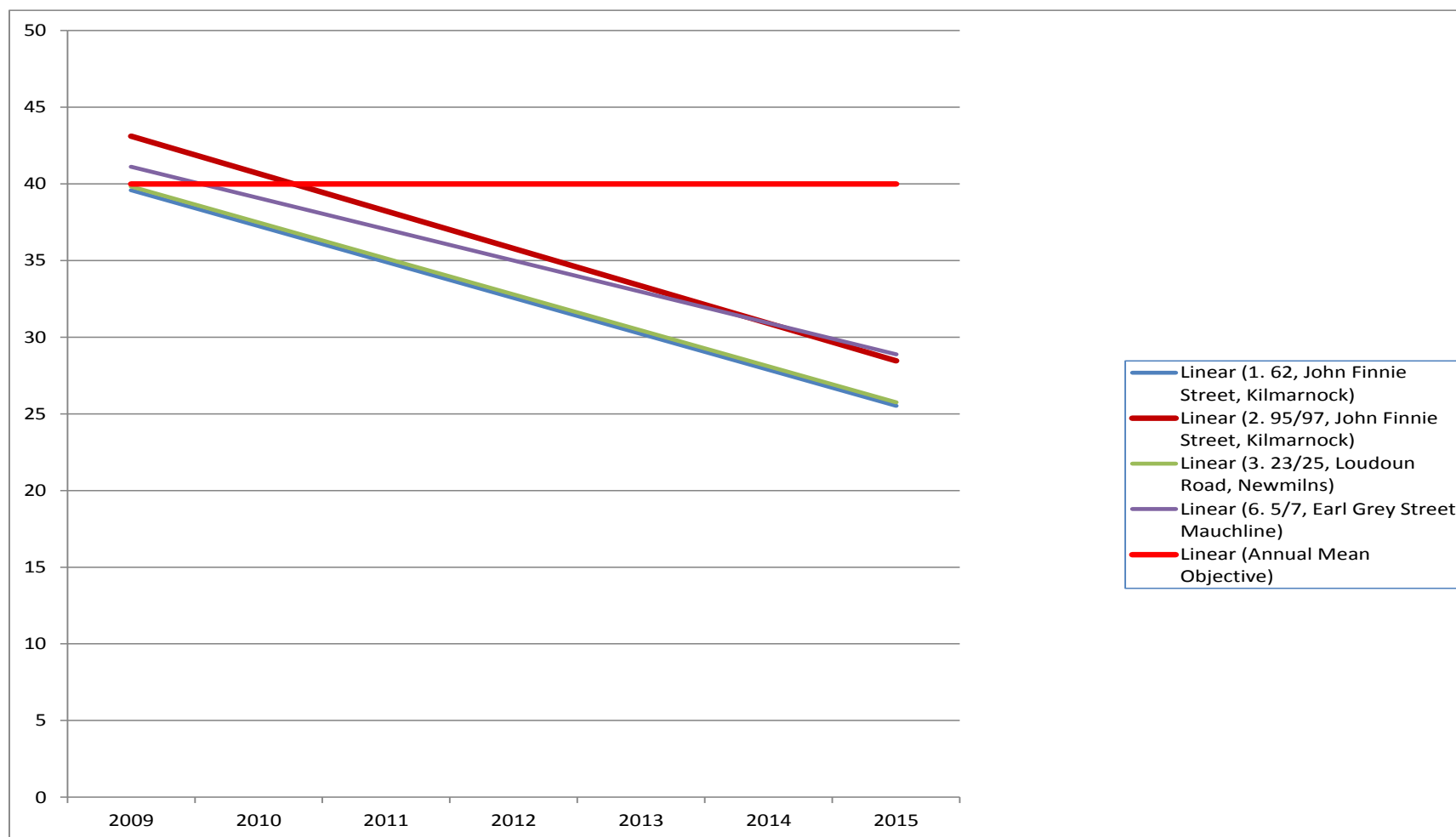
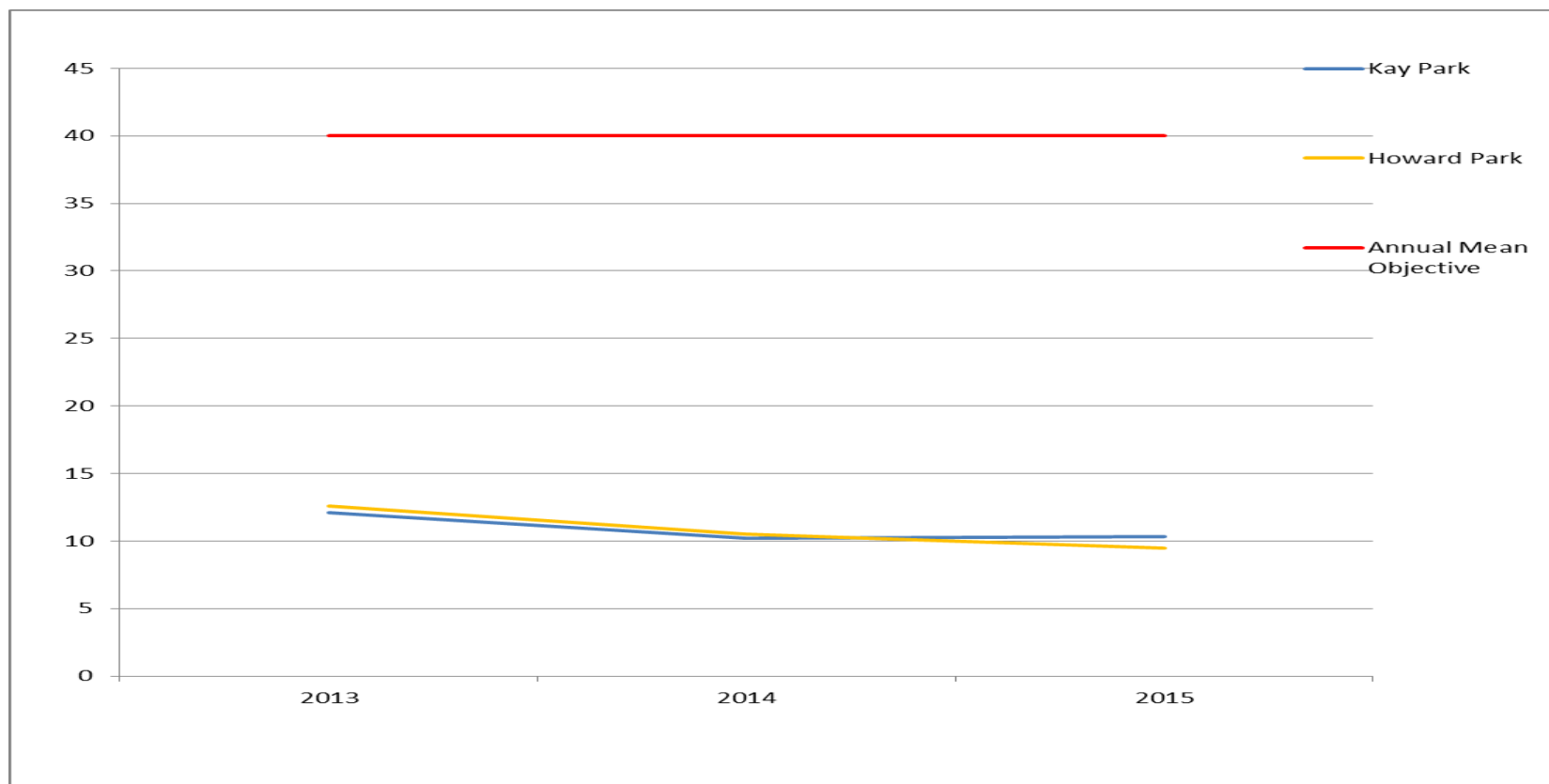


Figure A.7 - Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Background Monitoring Sites



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

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 | | | | |
|-----------------------------------|-----------|--------------|---|--|---|---------------------------|---------------------------|---------------------------|------|
| | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| A2/John Finnie Street, Kilmarnock | Roadside | N | N/A | N/A | 1(159 µg/m ³) | 0(109µg/m ³) | 0 | 0(134 µg/m ³) | N/A |
| A3/St. Marnock Street, Kilmarnock | Roadside | N | N/A | 90 | | 0(122 µg/m ³) | 1(124 µg/m ³) | 1(118 µg/m ³) | 0 |

Exceedences of the NO₂ 1-hour mean objective (200µg/m³ 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 PM₁₀: Comparison with Annual Mean Objective

| Site ID | Site Type | Within AQMA? | Valid Data Capture for monitoring Period % ⁽¹⁾ | Valid Data Capture 2014 % ⁽²⁾ | Confirm Gravimetric Equivalent (Y or NA) | Annual Mean Concentration µg/m ³ ⁽³⁾ | | | | |
|--|-----------|--------------|---|--|--|--|---------------------------|-------------------|-------------------|------|
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| A2 (FDMS 1405) Kilmarnock, John Finnie Street | Roadside | N | N/A | N/A | Y | 20 | 13(12 annualised) | 16(15 annualised) | 15(15 annualised) | N/A |
| A3 (BAM) Kilmarnock, Saint Marnock Street | Roadside | N | N/A | 93 | Y | | 19 (17 annualised) | 19 | 20 | 14 |
| A3 (FDMS) Kilmarnock, Saint Marnock Street | Roadside | N | N/A | 85.9 | Y | | | | 11(10 annualised) | 11 |

Annual mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for PM₁₀ - 18 µg/m³.

Notes: Exceedences of the PM₁₀ annual mean objective of 18µg/m³ 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 details

Table A.8 Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour mean Objective

| Site ID | Site Type | Within AQMA ? | Valid Data Capture for monitoring Period % ⁽¹⁾ | Valid Data Capture 2014 % ⁽²⁾ | Confirm Gravimetric Equivalent | Number of Exceedences of 24-Hour Mean (50 µg/m ³) ⁽³⁾⁽⁴⁾ | | | | |
|--|-----------|---------------|---|--|--------------------------------|---|-------------------------|-------------------------|-------------------------|------|
| | | | | | | 2011 | 2012 | 2013 | 2014 | 2015 |
| A2 (FDMS 1405) Kilmarnock, John Finnie Street | Roadside | N | | N/A | Y | 1(38µg/m ³) | 0(21µg/m ³) | 0(35µg/m ³) | 0(27µg/m ³) | N/A |
| A3 (BAM) Kilmarnock, Saint Marnock Street | Roadside | N | | 93 | Y | | 3(44µg/m ³) | 2(46µg/m ³) | 2 | 0 |
| A3 (FDMS) Kilmarnock, Saint Marnock Street | Roadside | N | | 85.8 | Y | | | | 0(32µg/m ³) | 1 |

24- hour mean Air Quality Objective (included in Regulations for the purpose of LAQM in Scotland) for PM₁₀ - 50 µg/m³, not to be exceeded more than 7 times a year.

Notes: Exceedences of the PM₁₀ 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).

Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1– NO₂ Monthly Diffusion Tube Results for 2015

| | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | | Raw Mean | Corrected Mean (Bias Factor 0.98) |
|----|--|------|------|------|------|------|------|------|------|------|------|------|------|----|----------|-----------------------------------|
| 1 | Fowlds Street/King Street Junction, Kilmarnock | 27.6 | 34.6 | 20.9 | 13.3 | 11.8 | 13.9 | 22.7 | 23 | 29.6 | 28.7 | 32.6 | 25.1 | 12 | 23.65 | 23.18 |
| 2 | 28 John Finnie Street, Kilmarnock | 35.1 | 39.7 | 17.6 | 10.7 | 12.8 | 14.5 | 23.6 | 25.4 | 24.8 | 21.2 | 24.9 | 22.2 | 12 | 22.71 | 22.25 |
| 3 | 19 Lainshaw Street, Stewarton | 34.4 | 35.5 | 29.5 | 16.8 | 13.9 | 21.9 | 20.4 | 18.9 | 23.7 | 36.5 | 30.1 | | 11 | 25.60 | 25.09 |
| 4 | 40 Main Street, Newmilns | 38.8 | 44 | 34.5 | 15.1 | 11.7 | 21.8 | 21.4 | 23.7 | 24.1 | 33.1 | 23.8 | 25.3 | 12 | 26.44 | 25.91 |
| 6 | 8A Kilmarnock Road, Mauchline | 26.1 | 22.7 | 22.2 | 14.3 | 11.4 | 18.3 | 21.2 | 21 | 26.5 | 28.2 | 20.2 | 20.8 | 12 | 21.08 | 20.65 |
| 11 | 96 John Finnie Street, Kilmarnock | 32.1 | 39.4 | 18.3 | 16.2 | 13.5 | 20.2 | 24.8 | 22.5 | 27.1 | 32.1 | 20.3 | 19.6 | 12 | 23.84 | 23.36 |
| 12 | 62 John Finnie Street Kilmarnock | 35 | 32.3 | 25.8 | 16.5 | 16.7 | 21.8 | 26 | 21.8 | 25.7 | 33.7 | 24.3 | 30 | 12 | 25.80 | 25.28 |
| 14 | 95/97 John Finnie Street, Kilmarnock | 46.6 | 43.6 | 21.6 | 22.6 | 19.4 | 29.3 | 31.3 | 24.6 | 34.8 | 37.4 | 26 | 26.5 | 12 | 30.31 | 29.70 |
| 15 | 16 West George Street, Kilmarnock | 39.3 | | 22.4 | 22.4 | 15.4 | | 26.4 | 27.1 | 30.3 | 39.8 | 26.4 | 27.1 | 10 | 27.66 | 27.11 |
| 17 | 22/25 Loudoun Road, Newmilns | 38.7 | 43.5 | 16.9 | 20 | 13.9 | 24.4 | 21.5 | 24 | 22.6 | 31.1 | 31.8 | 32.4 | 12 | 26.73 | 26.20 |
| 23 | 3/5 Loudoun Street, Mauchline | 24.2 | 35.1 | 12.9 | 12.6 | 13.4 | 17.8 | 13.5 | 20.5 | 23 | 34 | 21.3 | 25.1 | 12 | 21.12 | 20.69 |
| 24 | 5/7 Earl Grey Street, Mauchline | 36.3 | 42.2 | 25 | 17.8 | 13.6 | 20.8 | 14.6 | 25.6 | 33.5 | 38.5 | 29.5 | 26.7 | 12 | 27.01 | 26.47 |
| 25 | John Finnie Street Monitor | 34.3 | 36.5 | 20.1 | 16.6 | 16.3 | | | | 45.2 | 39.7 | 24.1 | 25.2 | 9 | 28.67 | 28.09 |

East Ayrshire Council

| | | | | | | | | | | | | | | | | |
|-----|---|------|------|------|------|------|------|------|------|------|------|------|------|----|-------|-------|
| 27 | Junction King St./St. Marnock St., Kilmarnock | 37.1 | 42.2 | 16.3 | 17.4 | 16.6 | 23.6 | 23.9 | | 30.3 | 32.5 | 18.3 | 20.7 | 11 | 25.35 | 24.85 |
| 32 | Kay Park, Kilmarnock | 17.7 | 19.3 | 8.6 | 8.3 | 3.8 | 6.7 | 4.8 | 7.4 | 10.1 | 16.5 | 11.5 | 11.7 | 12 | 10.53 | 10.32 |
| 33 | Howard Park, Kilmarnock | 13.6 | 16.3 | 7.1 | 7.2 | 4.1 | 5.9 | 5.1 | 10 | 10.4 | 11.7 | 11.4 | 13.8 | 12 | 9.72 | 9.52 |
| 39 | West Gable, Kirkstyle PS, Kilmarnock | 14.9 | 19 | 5.7 | 10 | 4.6 | 7.3 | 8.5 | 10 | 13.2 | 7.6 | 8.2 | 10.6 | 12 | 9.97 | 9.77 |
| 40 | South West Gate, Kirkstyle PS, Kilmarnock | 11.6 | 19.7 | | 6.8 | 7.2 | 13.5 | 7.4 | 5.8 | 13.9 | 9.1 | 14.5 | 14.3 | 11 | 11.25 | 11.03 |
| 41 | 2/4 Annan Road, Kilmarnock | 18.5 | 19.8 | 8.2 | 5.7 | 4.9 | 9.7 | 6.7 | 10.7 | 14.2 | 13.8 | 13 | 9.4 | 12 | 11.22 | 10.99 |
| 42 | 120/122 Hurlford Road, Kilmarnock | 25 | 21.5 | 8 | 8 | 4.3 | 10.1 | 8.6 | 10.6 | 14.5 | 12.5 | 19 | 11.5 | 12 | 12.80 | 12.54 |
| 43 | 72/74 Hurlford Road, Kilmarnock | 20.1 | 28.4 | 10.9 | 9.1 | 7.1 | 15.3 | 17 | 16.6 | 20.5 | 14.7 | 21.5 | 16.8 | 12 | 16.50 | 16.17 |
| 44A | St Marnock St Monitoring Site, Kilmarnock | | 31.7 | 18.8 | 12.6 | 14.2 | 23.2 | 20.8 | 19.9 | 24.9 | 28.8 | 30.8 | 21 | 11 | 22.43 | 21.98 |
| 44B | St Marnock St Monitoring Site, Kilmarnock | | 32.1 | 16 | 12.7 | 15.5 | 21.4 | 12.3 | 21.2 | 24.5 | 18.6 | 28.9 | 20.4 | 11 | 20.33 | 19.92 |
| 44C | St Marnock St Monitoring Site, Kilmarnock | | 37.6 | 14.8 | 9 | 13.2 | 20.3 | 24.2 | 19.6 | 27 | 24.2 | 25.8 | 20.8 | 11 | 21.50 | 21.07 |

Note: Refer to Appendix C 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 NO_x 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 AEA Technology (now 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 undertake 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 PM₁₀ 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 AEA 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 2014 to February 2015 GSS obtained 4 rounds at 100% and one round at 75%, giving a combined score of 95% 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 chemiluminescence automatic analysers at various locations throughout West Central Scotland. The tubes are placed within 1m of the analyser inlet and 10cm apart. The co-located tubes are prepared, handled and analysed in exactly the same way as those from the other (non co-located) monitoring sites in the survey. Co-location data questionnaires are completed and sent to The National Physical Laboratory, Teddington, London. GSS also participate in the Bureau Veritas Marylebone laboratory inter-comparison study (Reference 23). At the time of writing 6 sites, including the Marylebone Road site in London were present on the spreadsheet. A resultant bias adjustment is then computed for each site. A combined bias adjustment is then calculated from these 6 sites using orthogonal regression to allow for both the uncertainty in both the automatic monitor and the diffusion tubes. The uncertainty of the diffusion tube has been assumed to be double that of the automatic monitor. For 2015 the overall bias adjustment factor was computed at **0.98**. The bias adjustment factor applied to the raw annual means of the diffusion tubes was therefore **0.98** for 2015 data. Precision and Bias Adjustment Data (Reference 20) are shown in Appendix D.

Appendix D:

QA/QC Data: Defra and The Devolved Administrations, Spreadsheet of Bias Adjustment Factors, Version Number 09/13. Accessed at

www.uwe.ac.uk/agm/review/index.html

| National Diffusion Tube Bias Adjustment Factor Spreadsheet | | | | | | Spreadsheet Version Number: 03/16 | | | | |
|--|---|--|--|---|--------------------------|---|--|----------|---|------------------------------------|
| Follow the steps below <u>in the correct order</u> to show the results of <u>relevant</u> co-location studies | | | | | | | | | This spreadsheet will be updated at the end of June 2016 LAQM Helpdesk Website | |
| 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 spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use. | | | | | | | | | | |
| 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 ² | Year ⁵ | Site Type | Local Authority | Length of Study (months) | Diffusion Tube Mean Conc. (Dm) (µg/m ³) | Automatic Monitor Mean Conc. (Cm) (µg/m ³) | Bias (B) | Tube Precision ⁶ | Bias Adjustment Factor (A) (Cm/Dm) |
| Glasgow Scientific Services | 20% TEA in water | 2015 | R | East Dunbartonshire Council | 12 | 34 | 34 | -2.1% | G | 1.02 |
| Glasgow Scientific Services | 20% TEA in water | 2015 | R | East Dunbartonshire Council | 12 | 28 | 28 | -1.7% | P | 1.02 |
| Glasgow Scientific Services | 20% TEA in water | 2015 | R | East Dunbartonshire Council | 11 | 29 | 33 | -12.5% | P | 1.14 |
| Glasgow Scientific Services | 20% TEA in water | 2015 | R | East Dunbartonshire Council | 11 | 23 | 22 | 4.0% | P | 0.96 |
| Glasgow Scientific Services | 20% TEA in water | 2015 | KS | Marylebone Road Intercomparison | 12 | 98 | 81 | 21.1% | G | 0.83 |
| Glasgow Scientific Services | 20% TEA in water | 2015 | R | North Ayrshire Council | 12 | 29 | 29 | 0.9% | P | 0.99 |
| Glasgow Scientific Services | 20% TEA in water | 2015 | | Overall Factor ³ (6 studies) | | | | | Use | 0.98 |

Appendix E: Results of Automatic Monitoring for NO₂ and PM₁₀

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

EAST AYRSHIRE ST MARNOCK ST FDMS 01 January to 31 December 2015

These data have been fully ratified by Ricardo Energy & Environment

| POLLUTANT | PM ₁₀ *+ |
|-----------------------------------|-----------------------|
| Maximum daily mean | 54 µg m ⁻³ |
| 98.08th percentile of daily means | 30 µg m ⁻³ |
| Average | 11 µg m ⁻³ |
| Data capture | 85.8 % |

+ PM₁₀ instruments:

FDMS using a gravimetric factor of 1 from 1 January 2015

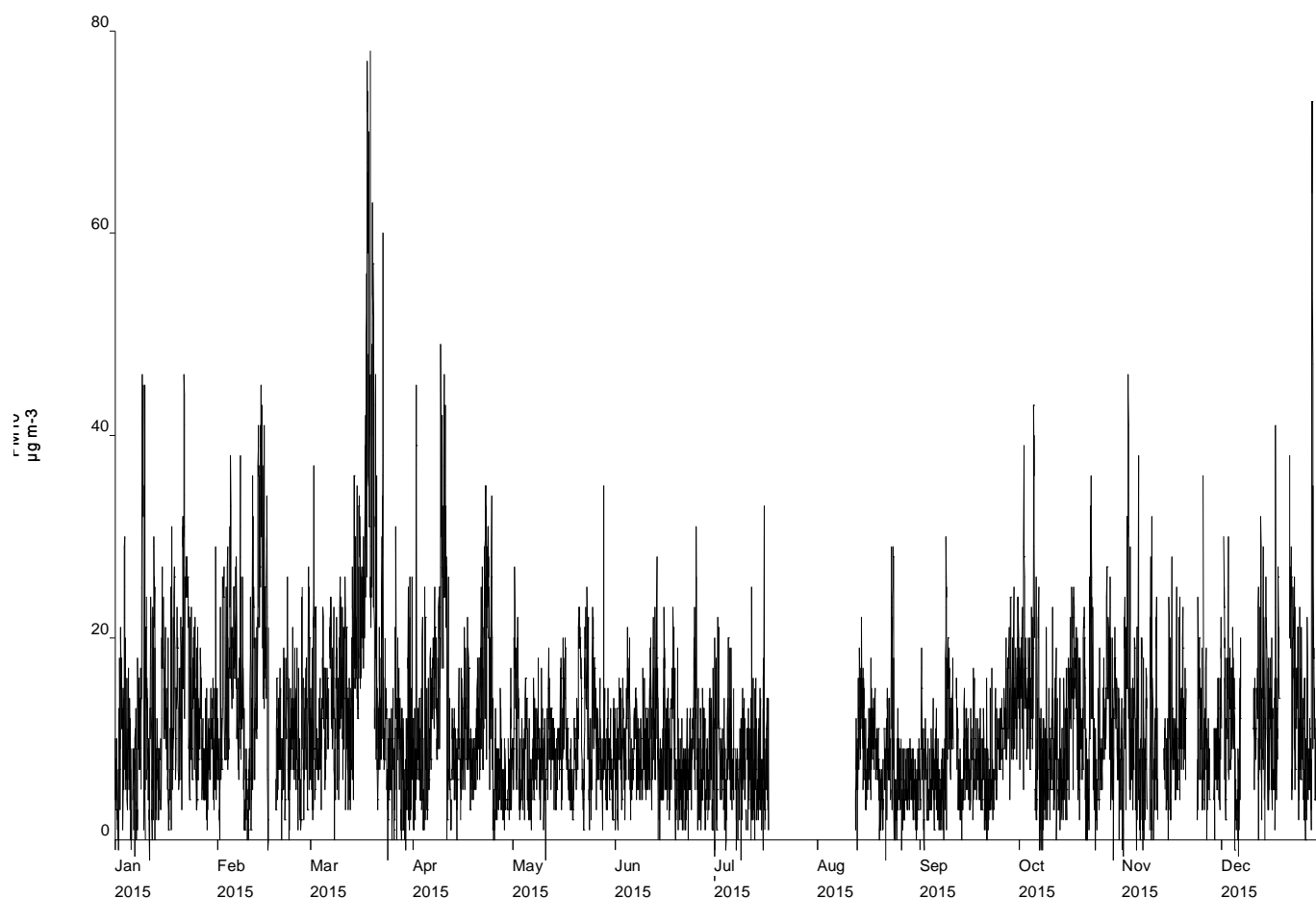
Particulate matter concentrations are reported at ambient temperature and pressure.

| Pollutant | Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002 | Exceedences | Days |
|--|---|-------------|------|
| PM ₁₀ Particulate Matter (Gravimetric) | Daily mean > 50 µg m ⁻³ | 1 | 1 |
| PM ₁₀ Particulate Matter (Gravimetric) | Annual mean > 18 µg m ⁻³ | 0 | - |

Note: For a strict comparison against the objectives there must be a data capture of >90% throughout the calendar year

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

East Ayrshire St Marnock St FDMS
Hourly Mean Data for 01 January to 31 December 2015



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

EAST AYRSHIRE KILMARNOCK ST MARNOCK ST 01 January to 31 December 2015

The data has been fully ratified by Ricardo Energy and Environment

| POLLUTANT | PM ₁₀ *+ | NO ₂ | NO _x |
|---------------------|-----------------------|------------------------|------------------------|
| Maximum hourly mean | 92 µg m ⁻³ | 164 µg m ⁻³ | 502 µg m ⁻³ |
| Maximum daily mean | 46 µg m ⁻³ | 66 µg m ⁻³ | 195 µg m ⁻³ |
| Average | 14 µg m ⁻³ | 25 µg m ⁻³ | 58 µg m ⁻³ |
| Data capture | 93 % | 90.0 % | 90.0 % |

+ PM₁₀ instruments:

BAM using a gravimetric factor of 0.83333 for Indicative Gravimetric Equivalent from 1 January 2015

All gaseous pollutant mass units are at 20°C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.

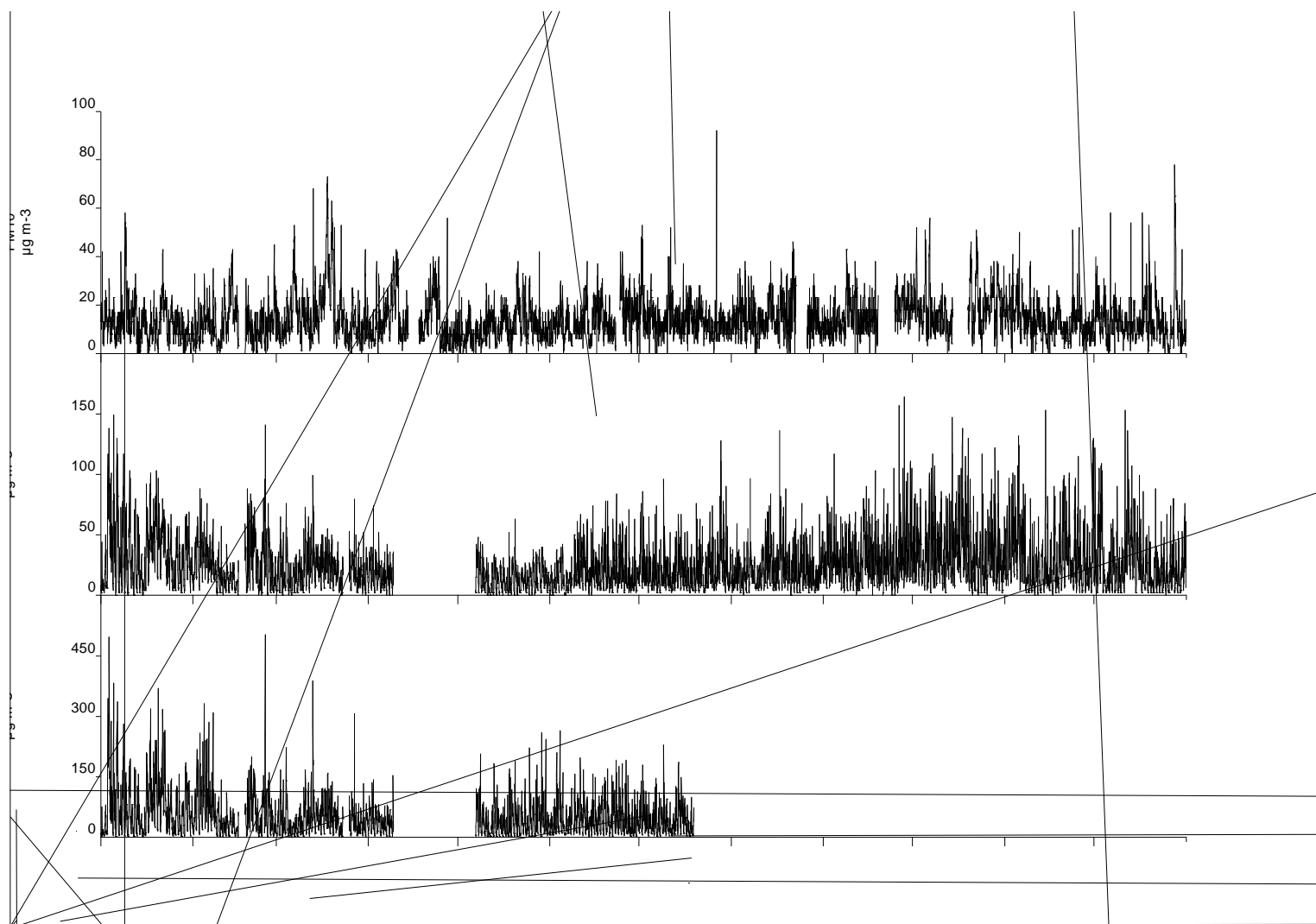
NO_x mass units are NO_x as NO₂ µg m⁻³

| Pollutant | Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002 | Exceedences | Days |
|--|---|-------------|------|
| PM ₁₀ Particulate Matter (Gravimetric) | Daily mean > 50 µg m ⁻³ | 0 | 0 |
| PM ₁₀ Particulate Matter (Gravimetric) | Annual mean > 18 µg m ⁻³ | 0 | - |
| Nitrogen Dioxide | Annual mean > 40 µg m ⁻³ | 0 | - |
| Nitrogen Dioxide | Hourly mean > 200 µg m ⁻³ | 0 | 0 |

Note: For a strict comparison against the objectives there must be a data capture of >90% throughout the calendar year

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

**East Ayrshire Kilmarnock St Marnock St
Hourly Mean Data for 01 January to 31 December 2015**



Date Created: 22/04/2016

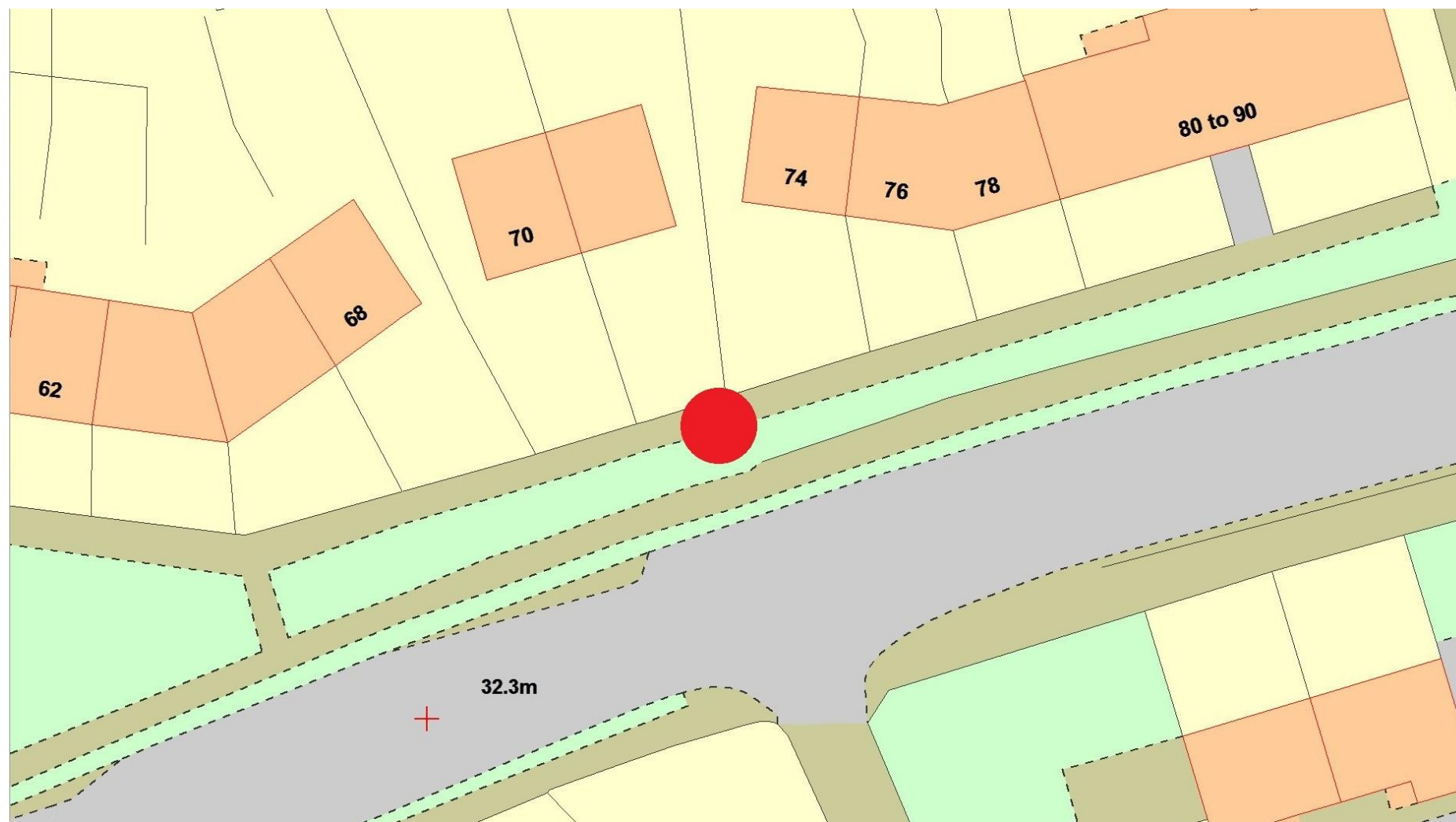
Figure G.11: Howard Park, Kilmarnock NO₂ Diffusion Tube Location



Figure G.12: Kirkstyle Primary School, Kilmarnock NO₂ Diffusion Tube Location



Figure G.13: Hurlford Road, Kilmarnock NO₂ Diffusion Tube Location



Glossary of Terms

| Abbreviation | Description |
|---------------------|---|
| AQAP | Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values' |
| AQMA | Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives |
| APR | Air quality Annual Progress Report |
| AURN | Automatic Urban and Rural Network (UK air quality monitoring network) |
| BAM | Beta Attenuation Mass Monitor |
| COMEAP | Committee on the Medical Effects of Air Pollutants |
| Defra | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England |
| FDMS | Filter Dynamics Measurement System |
| FIDAS | Fine Dust Analysis Systems |
| LAQM | Local Air Quality Management |
| NO ₂ | Nitrogen Dioxide |
| NO _x | Nitrogen Oxides |
| PM ₁₀ | Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less |
| PM _{2.5} | Airborne particulate matter with an aerodynamic diameter of 2.5µm or less |
| QA/QC | Quality Assurance and Quality Control |
| SCOOT | Split Cycle Offset Optimisation Technique |
| SO ₂ | Sulphur Dioxide |
| TEOM | Tapered Element Oscillating Microbalance |

References

1. Defra and The Devolved Administrations, Local Air Quality Management, Technical Guidance LAQM.TG(16), 2016. Accessed at <http://www.scottishairquality.co.uk/laqm/tools>
2. Part IV of the Environment Act 1995 Local Air Quality Management Policy Guidance PG(S)(16) March 2016. Accessed at <http://www.scottishairquality.co.uk/laqm/tools>
3. Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users. Report to Defra and the Devolved Administrations. ED48673043 Issue 1a Feb2008. Authors Jaume Targa, Alison Lauder and The Defra Working Group on Harmonisation of Diffusion Tubes. Accessed at <http://www.laqm.defra.gov.uk/>
4. The Workplace Analysis Scheme for Proficiency (WASP) – summary of laboratory performance in rounds 103-107. Accessed at <http://www.scottishairquality.co.uk/laqm/tools>
5. Laxen D and Marner B (2003). Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites. Available at www.airquality.co.uk/archive/reports/list.php
6. Cook A (2008). Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedences of the 1-hour mean AQS Objective. Available at www.airquality.co.uk/archive/reports/list.php
7. Fall-off in nitrogen dioxide concentrations at different distances from roads. The calculator can be accessed at www.airquality.co.uk/archive/laqm/tools.php
8. Harrison D (2006) UK Equivalence Programme for Monitoring of Particulate Matter. Available at www.airquality.co.uk/archive/reports/list.php
9. Background Pollutant Concentration Maps. Accessed at <http://www.scottishairquality.co.uk/>
10. Air Pollution in Scotland 2010 and 2011. Produced by AEA on behalf of the Scottish Government. Available at www.scottishairquality.co.uk
11. East Ayrshire Local Plan 2010. Accessed at <http://www.east-ayrshire.gov.uk/>
12. The East Ayrshire local Transport Strategy 2009 – 2014. Accessed at <http://www.east-ayrshire.gov.uk/>

13. East Ayrshire Council Carbon Management Programme Strategy and implementation Plan (SIP) October 2007. Accessed at <http://www.east-ayrshire.gov.uk/>
14. East Ayrshire Community Plan. Accessed at <http://www.east-ayrshire.gov.uk/>
15. East Ayrshire Council Sustainability Strategy. Accessed at <http://www.east-ayrshire.gov.uk/>
16. Carbon Trust Local Authority Carbon Management Programme. Accessed at <http://www.east-ayrshire.gov.uk/>
17. Defra and The Devolved Administrations, Spreadsheet of Bias Adjustment factors. Accessed at www.scottishairquality.co.uk
18. Trends in Primary NO₂ in The UK www.defra.gov.uk/environment/quality/air/airquality/publications/primaryno2-trends/index.htm (Accessed 25th February 2011).
19. East Ayrshire Council Air Quality Reports. Accessed at <http://www.eastayrshire.gov.uk/PlanningAndTheEnvironment/Pollution/AirPollution/AirPollution.aspx>
20. Bureau Veritas Marylebone laboratory inter-comparison study. Accessed at <http://uk-air.defra.gov.uk/>
21. ICCT – Real World Emissions Study – Diesel Cars. http://www.theicct.org/sites/default/files/publications/ICCT_PEMS-study_diesel-cars_20141010.pdf
22. Scottish Farmer Biomass Article Smiths Gore December 2014. <http://www.thescottishfarmer.co.uk/>
23. Detailed Assessment of John Finnie Street, Kilmarnock, Ayrshire. Compiled by Golder Associates on behalf of East Ayrshire Council; Report NO.: 12514820689.500/.0 dated November 2013. Accessed at <http://www.eastayrshire.gov.uk>
24. Environmental Protection UK – Biomass and Air Quality Guidance for Scottish Local Authorities. Accessed at http://www.iaqm.co.uk/text/guidance/epuk/biomass_guidance_scotland.pdf
25. The Committee on the Medical Effects of Air Pollutants (COMEAP) <https://www.gov.uk/government/collections/comeap-reports>
26. Smoke Control Area Maps <https://smokecontrol.defra.gov.uk/index.php>

27. Scottish Air Quality Website
<http://www.scottishairquality.co.uk/>
28. East Ayrshire Council Planning Website
<https://www.eastayrshire.gov.uk/PlanningAndTheEnvironment/PlanningAndTheEnvironment.aspx>
29. East Ayrshire Council State of the Environment Report
<https://www.east-ayrshire.gov.uk/PlanningAndTheEnvironment/Development-plans/State-of-the-Environment-Report.aspx>
30. Cleaner Air for Scotland – Road to a healthier Future
<http://www.scottishairquality.co.uk/news/index?id=513>
31. Breathe Scotland – the cleaner air initiative
<http://www.breathescotland.org.uk/>