Annual Progress Report (APR)

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2019 Air Quality Annual Progress Report (APR) for
East Dunbartonshire Council

In fulfilment of Part IV of the
Environment Act 1995

Local Air Quality Management

30 June 2019

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Executive Summary: Air Quality in Our Area

Air Quality in East Dunbartonshire Council

This report is the 2019 Annual Progress Report undertaken in accordance with East Dunbartonshire Council's statutory obligation under the National Air Quality Strategy.

The report considers measured pollutant concentrations from within East Dunbartonshire for the calendar year of 2018 and considers the potential for exceedences of the air quality objectives.

In East Dunbartonshire, the main pollutants of concern are NO_2, PM_{10} and $PM_{2.5}$ and the source of pollutant is mainly due to the volume of traffic and congestion.

East Dunbartonshire Council has four continuous automatic analysers; one in Bishopbriggs, one in Bearsden, one in Kirkintilloch and one in Milngavie. This equipment downloads automatically and pollutant levels can be viewed via the Council web page or Scottish Air Quality website.

Although monitoring over 2018 indicates a continuing overall downward trend in annual mean NO_2 concentrations, Bearsden and Bishopbriggs remain the same as the previous year, with Kirkintilloch and Milngavie levels reducing further than previously. There were no exceedences of the annual mean objective level and Milngavie recorded an all-time low of 20µg/m^3. All four sites recorded levels well below 10% of the air quality objective for annual mean NO_2.

Annual mean PM_{10} levels increased slightly at Bishopbriggs and Bearsden with no change at Milngavie and a slight decrease at Kirkintilloch however; there were no exceedences of the Scottish objective levels at any of the four continuous monitors. Fidas 200 was installed at the Kirkintilloch site in 2017 giving East Dunbartonshire Council the ability to monitor $PM_{2.5}$ and the annual mean has remained the same as the previous year and is well below the objective level.

There are no new major sources of emissions although there is an on-going increase in the installation of biomass across East Dunbartonshire. The increase in commercial biomass installations appears to have slowed however, the installation of domestic wood burning stoves, and complaints concerning their use, continues to rise.

No new AQMAs were declared during 2018. The additional NO_2 tubes which were added to the network in 2017 to monitor two remaining hotspots in Bishopbriggs are below the objective level and a decision requires to be made as to whether or not the Bishopbriggs AQMA should be revoked. For this reason, the Bishopbriggs Air Quality Action Plan will not be updated.

Air quality is a material consideration in terms of planning which means that all local development is considered in terms of air quality to ensure implications are examined and considered in advance and appropriate consultation takes place with such partners as the Scottish Environment Protection Agency (SEPA), Transport Scotland and Scottish Natural Heritage (SNH).

Actions to Improve Air Quality

During 2018, we added some additional NO_2 tubes to our NO_2 diffusion tube monitoring network to check on possible hot spot areas in Bearsden. One year of results indicates that there is no reason to be concerned.

During 2018, the membership of ECO Stars, a vehicle fleet recognition scheme introduced in 2017, increased to 107 members covering 3987 vehicles and helping to improve air quality through the promotion of both fuel efficient driving and ongoing improvement of the vehicle emissions standards of our freight throughout East Dunbartonshire. Six vehicle emission testing days were undertaken at weekends in order to get the message across to those members of the public not normally around during the working week and over 100 vehicle idling patrols around our primary schools, some in conjunction with North Lanarkshire Council (with whom we are in partnership) took place to encourage the public to switch off vehicle engines and help improve air quality. We additionally responded to individual complaints concerning engine idling.

The Draft Bearsden Air Quality Action Plan was approved by committee in November 2017 and a good response to statutory and public consultation was received. Appraisal of the Draft Plan recommended that further quantification work be undertaken and this was carried out during 2018 with the results being integrated into the Draft Plan. The Draft Plan still awaits adoption.

Air quality is a material consideration in terms of planning which means that all local development is considered in terms of air quality to ensure implications are examined

and considered in advance and appropriate consultation takes place. Air quality planning guidance was developed in house and adopted during 2018 and this will further assist potential developers who will be made aware in advance of any development of our requirements in terms of air quality.

Local Priorities and Challenges

Our priority in the coming year is to ensure the smooth running of our monitoring network to gain as accurate a picture as possible of air quality levels across East Dunbartonshire. This includes the monitoring of $PM_{2.5}$ throughout the East Dunbartonshire area. The challenge presented by the increase in the number of installations of wood burning stoves continues, as does the number of complaints concerning smell, smoke and fumes associated with solid fuel burning.

How to Get Involved

Further information on air quality in East Dunbartonshire can be found on the Council website HERE. You can visit the Scottish Air Quality website and view live air quality data in East Dunbartonshire at http://www.scottishairquality.co.uk. You can register for text and email alerts when air quality is forecast to be poor for the day ahead and can visit the Education pages and involve your children and family – all on the same link.

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1. Local Air Quality Management

This report provides an overview of air quality in East Dunbartonshire during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

A summary of AQMAs declared by East Dunbartonshire Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at this LINK

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
Bishopbriggs AQMA	• NO_2 annual mean • PM_{10} annual mean	East Dunbartonshire	The designated area incorporates a 60-metre-wide corridor along the A803 Kirkintilloch Road, Bishopbriggs, bordered on the South by the Council's boundary with Glasgow City and by a line 30 metres to the North of Cadder Roundabout.	Bishopbriggs Updated Action Plan
Bearsden AQMA	• NO_2 annual mean • PM_{10} annual mean	East Dunbartonshire	The designated area incorporates a 60-metre-wide corridor along the A809 to the junction with Antonine Road and to the south beyond Canniesburn Toll to incorporate several road junctions. The eastern boundary is to the east side of Roman Road Carpark with a small section of Stockiemuir Road also incorporated.	Draft Bearsden AQMA Action Plan

2.2 Progress and Impact of Measures to address Air Quality in East Dunbartonshire

East Dunbartonshire Council has taken forward a number of measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. More detail on these measures can be found in the air quality Action Plan relating to each AQMA.

East Dunbartonshire Council declared an area of Bishopbriggs an AQMA in 2005. An Action Plan was adopted in 2010 and an updated Action Plan was published in 2014. Of the original 41 measures, 8 remain outstanding and mostly out with the control of the local authority. Pollutant levels have fallen sufficiently to consider revoking the AQMA and there were no exceedences during 2018.

The Draft Bearsden Air Quality Action Plan was approved by committee in November 2017 and further quantification work undertaken during 2018 however, the amended Draft Plan has still to be approved.

Key completed measures from the Draft Bearsden Air Quality Action Plan are:

Measure 7 Air quality planning guidance.

Initial guidance was introduced to committee and consulted upon with the guidance being fully adopted in May 2018.

Progress on the following measure has been slower than expected due to the difficulty involved in releasing staff to attend sessions, particularly those who drive fleet vehicles providing Council services.

Measure 19 – Eco Driver Training.

Fuel good training can help individuals become more efficient drivers either at work or during leisure and help save money on fuel costs. Based on 12,000 miles per annum, this equates to typical annual savings of £250 – and to improvements in Air Quality.

Due to the difficulty in releasing drivers who drive EDC Fleet vehicles, East Dunbartonshire Council plan to provide free Fuel Good sessions to employees who drive pool vehicles. This will help to improve air quality, reduce emissions, save money and improve East Dunbartonshire Council’s environmental credentials in

terms of its carbon footprint. The measure will then be evaluated on its success or otherwise and a decision made at that time as to whether to continue with the measure.

Table 2.2 – Progress on Measures to Improve Air Quality – Draft Bearsden Action Plan -Update

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Maintain contact with Scottish Govt re adoption of national air quality measures	Policy Guidance and Development Control	Increase focus on background Concentrations of PM and encourage national action	East Dunbartonshire Council		Ongoing	Compliance across East Dunbartonshire with Scottish Objective levels				Ongoing target of reducing pollutant levels

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
2	Promote air quality with planning and transport strategies and other Council Plans	Policy Guidance and Development Control	East Dunbartonshire Local Development Plan 2 is now underway. The Local Development Plan provides the planning context for the Local Transport Strategy which is also being updated. The Local Development Plan and Local Transport Strategy integrate air quality, planning development and transport planning to mitigate the air pollution effects of traffic. Develop a broad AQMA steering group (for the Bearsden AQAP) and maintain regular and on-going communication between members of the group during the plans implementation. Look for opportunities to enhance joint working between Council Services to encourage potential air quality implications of existing and future Council strategies.	East Dunbartonshire Council		All of these actions are underway and adopted as standard practice		Local planning considerations aim to mitigate the cumulative negative air quality impacts of new development	Local Development Plan 2 is now underway. Update of LTS is underway	Ongoing	Air quality planning guidance has been adopted.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
3	Junction improvements- Feasibility study	Traffic management	Model of junction improvements at Bearsden Cross. Provide Council with evidence to assist in decision whether to make appropriate junction improvements.	East Dunbartonshire Council	This work was undertaken during 2013 and no discernible benefit anticipated.			Low	This measure was again reconsidered in 2016 but dismissed.		This measure was re evaluated as part of the consultation response to the Draft Action Plan however, it is no longer under consideration.
4	Intelligent Traffic Management Systems	Traffic management	Identify appropriate locations and implement intelligent traffic management systems to improve traffic flows Identify improvements at junctions and consider modifying surrounding environment to achieve maximum benefit	East Dunbartonshire Council		Junction upgraded to Mova 8 during 2018.		Medium	Further upgrades are available therefore funding may be sought to improve junction.	Work complete 2018.	Works completed with air quality funding.
5	Parking Controls	Traffic Management	Decriminalise parking Extend the controlled parking zone Additional yellow lines near schools and hotspots	East Dunbartonshire Council		Off street decriminalised parking introduced summer 2016		Small	Charges introduced in Council Car Parks	Ongoing roll out of controlled parking zones	

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
6	Mitigation of emissions from developments within and around the AQMA	Policy guidance and development control	Developments within or impacting on AQMA are reviewed for air quality impacts and where necessary all practical emission mitigation options are considered and implemented. Ensure through planning that all construction / demolition sites have a Dust Management Plan.	East Dunbartonshire Council				Small to medium impact	Regular review and updating of LDP and LTS to take account of all policies consistent with air quality objectives. Mitigation includes active, sustainable travel measures.	Ongoing	All developments requiring a full air quality impact assessment to include a Dust Management Plan as standard
7	Air quality planning guidance	Policy guidance and development control	Improving links with Local Planning and Development Framework consistent approach to air quality impact assessment	East Dunbartonshire Council	2017	2018		Small to medium	Planning guidance adopted 2018.		Developers will know at the start of the planning process what is expected from them.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
8	Fleet waste collection	Traffic Management	Reduce emissions from source by reducing number of vehicles on road at any one time Seven day a week operation has reduced the overall number of vehicles required to operate the service	East Dunbartonshire Council		Implementation complete		Small - medium	Fortnightly fleet waste collection as standard	This measure is now complete with no plans to make any further alteration	Altered shift patterns leads to less heavy vehicles in use across EDC area at any one given time. Early start and weekend working spreads the use of vehicles reducing peak travel time emissions
9	Council fleet replacement programme	Vehicle fleet efficiency	Continue current replacement programme Pool EDC will attempt to increase the availability of electric/hybrid vehicles to appropriate staff Fleet EDC will investigate options available for making use of electric/hybrid vehicles as part of the Council fleet Increase number of charge points across EDC area	East Dunbartonshire Council		Ongoing		High	19 electric pool cars now in use		No current plan to purchase a hybrid fleet vehicle No further charge points added during 2018

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
10	Environmental fleet recognition scheme	Vehicle fleet efficiency	Environmental Fleet Recognition Scheme rates individual vehicles and the overall operation of a vehicle fleet, using a star rating system, to recognise levels of operational and environmental performance. It aims to reduce the energy used by commercial and passenger transport fleets by encouraging increased adoption of fuel efficiency measures. This will bring about benefits for members through more efficient operations, reduced fuel costs and emissions.	EDC, TRL and all members		2017 onwards		Medium	Approx 118 vehicles within EDC Fleet assessed and graded at 4* with 65 vehicles at 5* Approx 85 members	Current contract runs until November 2019	This measure will continue as funding allows

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
11	Vehicle idling enforcement	Vehicle fleet efficiency	The Council has adopted the necessary enforcement powers to allow staff to undertake monitoring of engine idling, including buses, and where appropriate, enforce financial penalties for non-compliance Regular vehicle idling awareness raising campaigns are undertaken with distribution of leaflets and advice	East Dunbartonshire Council – Community Protection		Powers adopted in 2006		Small	Council continues to promote awareness and benefits in regard to reduction of vehicle idling via billboards and advertising campaign on PSV vehicles and bus stops.	Ongoing as resources allow	No fixed penalties issued as policy of education is adhered to. Drivers always asked to switch off.
12	Management of biomass installations	Promoting low emission plant	Suitably manage biomass installations as part of the planning process Suitably manage biomass installations in the domestic sector	East Dunbartonshire Council				Medium	Reactive work undertaken in responding to complaints Ongoing increase in number of complaints received and difficulty in regulating installation as many do not require planning permission		Biomass has a negative impact on air quality unless appropriate abatement is installed. No new large scale applications received since withdrawal of incentives

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
13	Quality bus/bike partnerships	Promoting travel alternatives	Consider extending opportunities to improve infrastructure and create further cycle/bus corridors in other areas of Bearsden Expand the network with new cycle and walking routes both within towns and the countryside dedicated for active travel use to avoid conflict with motor vehicles	East Dunbartonshire Council, SPT and Sustrans					Core paths in Bearsden upgraded 2017/18. New links created to provide traffic free link to bus stop on Drymen Road and Bearsden Academy. 2000 cycle maps printed with more to follow.		In 2016, a decision was made by Council not to proceed with Bears Way Phase 2. There has been no amendment or alteration to this decision.
14	Council smart working	Promoting travel alternatives	Smart working means being more flexible about when and where employees work and how technology is used to find new and more efficient ways to do things.	East Dunbartonshire Council		Already implemented		Medium	Many staff regularly work from home		Less staff travelling to work. Flexible working also changes the peak travel
15	Green travel planning	Promoting travel alternatives	Travel plans aim to address the negative impacts of car travel, notably single occupancy vehicles, by encouraging car sharing, or a shift to more sustainable forms of transport, such as walking, cycling and public transport; or reducing the need for travel.	East Dunbartonshire Council				Small	Cycle parking introduced at Bearsden Community Hub,		

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
16	School travel plans	Promoting travel alternatives	All new build schools within EDC require a school travel plan as part of their planning permission ensuring pupils are catered for and presented with sustainable travel options.	East Dunbartonshire Council		Already implemented		Small	All new build schools within EDC include travel plans as standard		
17	Air quality awareness raising and education	Public information	Raise awareness of air quality issues as part of joint action days with Police Scotland Raise awareness among EDC staff by providing air quality training sessions Raise awareness in schools by involving pupils in science projects, art competitions and planting days	East Dunbartonshire Council		Ongoing		Small		Ongoing	Projects undertaken as funding allows
18	Travel plans for large employers	Promoting travel alternatives	Strategic development and regeneration team to ensure all relevant commercial planning applications have travel plan conditions applied in accordance with current best practice Offer assistance to existing companies to aid the process of creating a travel plan	East Dunbartonshire Council		Ongoing		Small			

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
19	Eco driver training	Vehicle fleet efficiency	Training for Council Staff as well as fleet. Fuel good training can help individuals become more efficient drivers either at work or during leisure and help save money on fuel costs	East Dunbartonshire Council and Energy Savings Trust / Transport Scotland funding available				Small	Contract to procurement however, no further action due to planned withdrawal of subsidy	No completion date planned.	Sessions will be offered to all staff who drive and will count towards CPD
20	Council pool cars – priority spaces and car sharing	Vehicle fleet efficiency	Council pool cars to have prioritised parking spaces Car sharing database to be instigated (introduced in 2016)	East Dunbartonshire Council, SPT and Liftshare				Small	Priority spaces designated for pool cars at all Council buildings 117 employees signed up to SPT Journey share/Liftshare		Relaunch due of car sharing availability website and database
21	Vehicle emission testing	Vehicle fleet efficiency	EDC undertakes vehicle emission testing within AQMAs and other parts of the area. Fixed penalty notices are served for vehicles failing to meet the appropriate emission standards, although there is an option to have a faulty vehicle repaired and re tested.	East Dunbartonshire Council, North Lanarkshire Council, Police Scotland		Powers adopted in 2006	No of fixed penalties served	Low	693 vehicles tested during 2018.	Ongoing as funding allows	Of 693 vehicles tested, no fails were recorded. No fixed penalty notices served.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
22	Vehicle tracking and telematics	Vehicle fleet efficiency	Vehicle tracking systems help monitor and manage fleet operations providing real time information which can help towards the reduction of fuel use and emissions, carbon reduction, encourage better driving techniques and put a stop to any council vehicles engine idling	East Dunbartonshire Council				Small	Master naught vehicle tracking installed in all fleet and pool vehicles	Complete	No plan to upgrade
23	Improvements to SPT prioritised bus stops	Promoting travel alternatives	Upgrading of bus stops to encourage active travel	East Dunbartonshire Council, SPT					Improvements to bus stops on A81 and A809 Drymen Road have been undertaken over last three years.		The Council hope to deliver bus stop and shelter improvements and real time passenger information units along this corridor

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
24	Soft measures – Healthy Habits	Promoting travel alternatives	The Healthy Habits campaign seeks to inspire people to choose active travel such as walking and cycling.	East Dunbartonshire Council					The Healthy Habits project is ongoing with new initiatives continually developed to encourage local people to walk and cycle more often. Healthy Habits maps and signs regularly reviewed, updated and distributed.		
25	Domestic emissions and fuel consumption awareness raising	Public information	Support for awareness raising of energy efficient measures by Scottish and UK government	East Dunbartonshire Council							
26	Tree and wild flowers planting	Public information	Undertake planting schemes within or adjacent to Bearsden AQMA	East Dunbartonshire Council		Undertaken when funding is available		Small	Trees, shrubs and wildflower meadows planted throughout Bearsden AQMA	Ongoing as funding allows	Planting undertaken where funding allows

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
27	Joint health improvement plan	Public Information	The Joint Health Improvement Plan seeks to work with local communities and residents in joint effort to improve health and address health inequalities	East Dunbartonshire Council, NHS Greater Glasgow and Clyde				Small	Ongoing		Environmental measures include promoting good quality air by tackling local air pollution; addressing environmental incivilities such as illicit tipping, graffiti and dog fouling. Other environmental issues such as reducing carbon emissions, promoting green space for active travel, sustainable development and community transport schemes also feature prominently on partnership agendas.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
28	Green Infrastructure	Public Information	Expand the programme of installing sustainable energy measures	East Dunbartonshire Council					LDP Supplementary Guidance on Green Infrastructure and Green Network is now published and available on line	Should be implemented during 2018	Guidance will seek to stimulate installation of green roofs and help extend projects planning solar panels.
29	Taxi Licensing	Promoting low emission transport.	Consider means of reducing emissions from taxis and private hire vehicles in AQMA	East Dunbartonshire Council					No progress to date		Propose to undertake testing in house and increase frequency of testing for older vehicles

BISHOPBRIGGS ACTION PLAN UPDATE – REMAINING OUTSTANDING MEASURES

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
4	Support the construction of phases 3 to 5 of the Bishopbriggs Relief Road (BRR) to the east of Bishopbriggs.	Traffic management		EDC & Transport Scotland		Phase 3 opened 2015.		Medium		Phase 4 opened June 2018	Funding currently being sought to support the construction of phase 5
7	Investigation of options in Bishopbriggs town centre to improve access to Bishopbriggs station and opportunities for active travel.	Promoting travel alternatives		Network Rail & EDC				Small			This measure cannot proceed until the entire BRR is complete
8	Investigate options for a Bishopbriggs East / Westerhill transport hub comprising a bus terminal, rail halt and park and ride facility.	Promoting travel alternatives		EDC, SPT & Transport Scotland							Rail halt and park and ride still aspirational. Both are included in Local Plan but no guarantee of delivery.

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
9	Where possible encourage the establishment of partnerships between public transports to provide more joined up inter-modal transport options.	Promoting travel alternatives		EDC, SPT & local bus operators					No further progress on this measure.		
11	Produce a public transport access map.	Public information		EDC				Small	A public transport map would be best undertaken by SPT given their database of registered bus services etc. SPT currently has no funding available for such an undertaking		

2.3 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at https://www.gov.scot/Publications/2015/11/5671/17. Progress by East Dunbartonshire Council against relevant actions within this strategy is demonstrated below.

2.3.1 Transport – Avoiding travel – T1

All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan. East Dunbartonshire Council continues to progress their Corporate Travel Plan. However, the Plan is not yet complete. The Plan proposes several alternative travel options to encourage a reduction in private car usage. If the Plan proceeds and is adopted, it should result in a reduction of pollutant levels across East Dunbartonshire through the promotion of active travel, increased availability of electric pool cars and associated charging points as well as increased provision of cycle parking and facilities. Communal charging points are also being considered. The guiding principles are incorporated into other initiatives such as our award winning Healthy Habits project. The Healthy Habits project is designed to encourage local people to walk and cycle more as part of their everyday journeys. It is hoped that a formalised corporate travel plan will be implemented but it is a complex task which requires working with colleagues across a variety of services such as transport, sustainability and climate change and environmental health to ensure air quality is given appropriate consideration.

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

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered. East Dunbartonshire Council does not currently plan to produce a Sustainable Energy Action Plan; however, corporate emission reduction is a priority and a variety of projects are being undertaken which will have a bearing on area-

wide emissions. In addition, area-wide benefits will be delivered via agendas including the Local Transport Strategy/Active Travel Strategy.

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

East Dunbartonshire Council undertook automatic (continuous) monitoring at four sites during 2018. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.scottishairquality.scot/latest/summary?view=la

Maps showing the location of the monitoring sites are provided in Appendix D. 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 Dunbartonshire Council undertook non- automatic (passive) monitoring of NO_2 at 46 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

There were no measured exceedences of the NO_2 annual mean air quality objective level at any of the monitoring locations during 2018.

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

Where diffusion tubes did not have a data capture of greater than 75% the data was annualised using the procedure in TG(16).For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

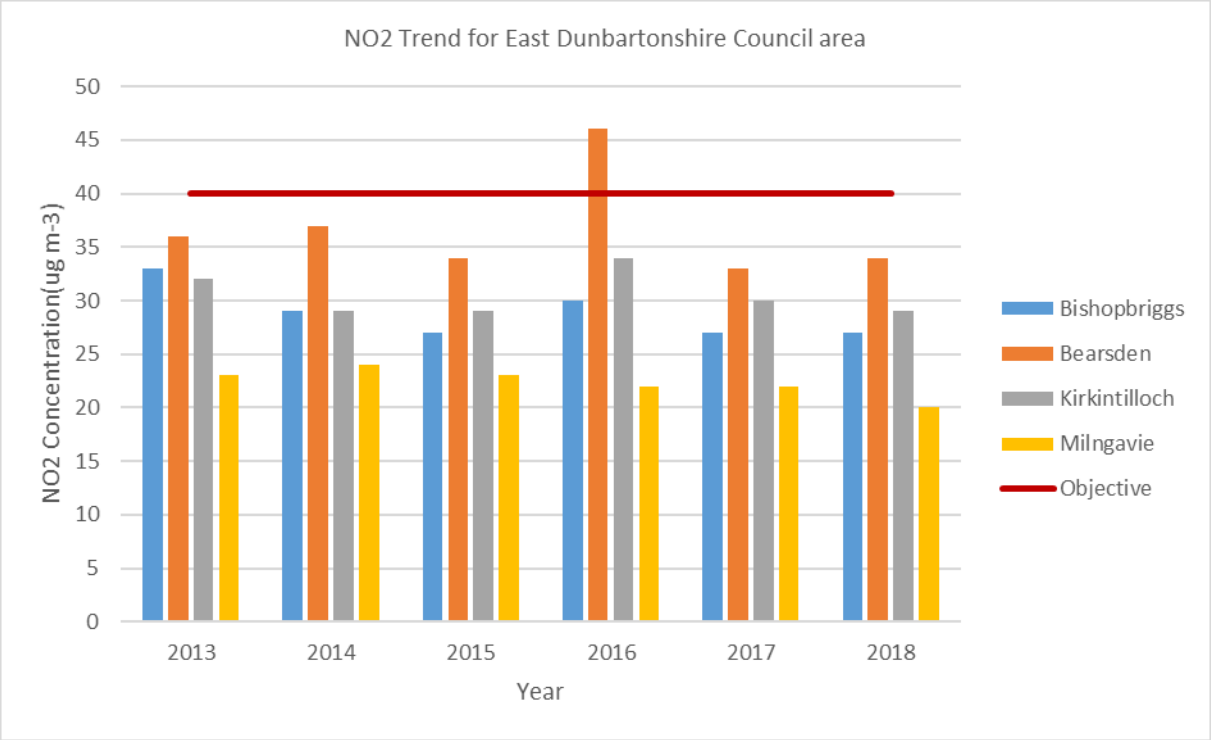


Figure 1 Trend in NO_2 Annual Mean Concentration (µg/m^3) Continuous Monitoring Sites 2013 - 2018

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

All roadside automatic monitoring data in 2018 continued to show an overall downward trend in annual mean NO_2 levels since 2013. The levels are the lowest recorded in the last 5 years. Concentrations at all automatic sites met the annual mean air quality objective of 40 µg/m^3.

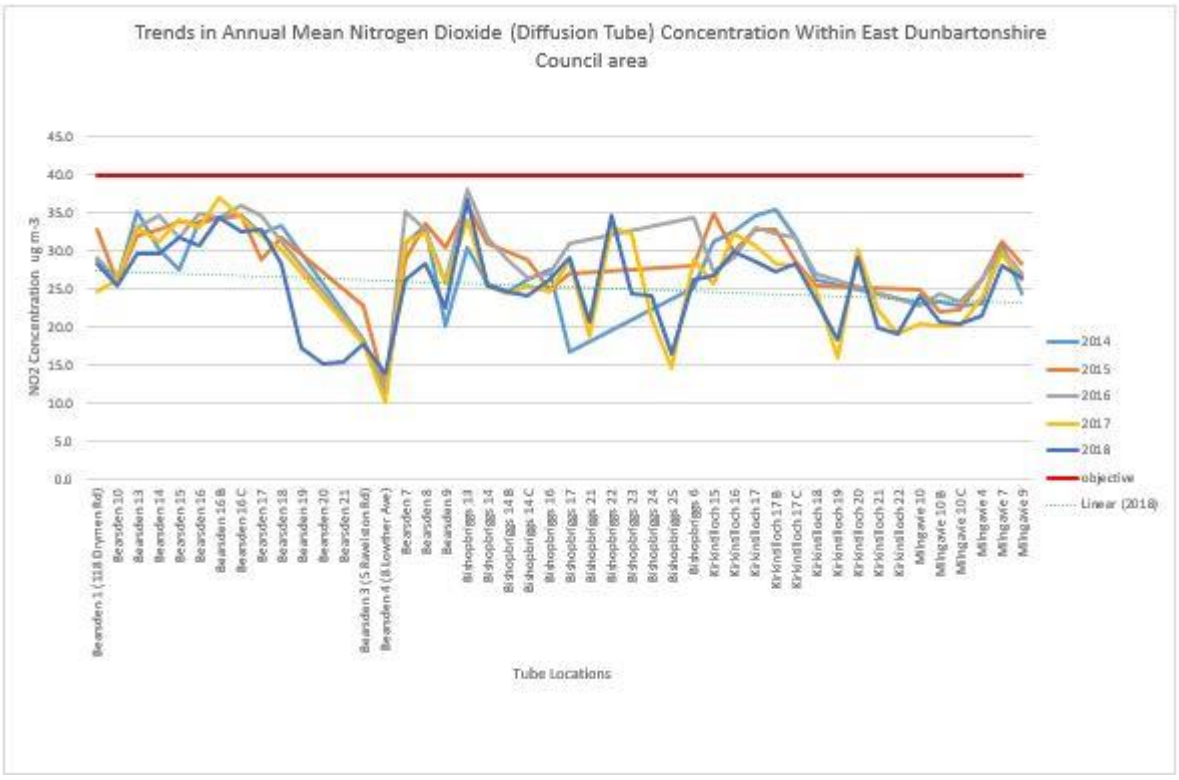


Figure 2 Trends in Annual Mean Nitrogen Dioxide Concentration (Diffusion Tube) Comparison with Annual Mean Objective (40µg/m^3)

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the Scottish air quality objective of 18µg/m^3. The annual mean PM_{10} concentrations recorded at the automatic sites within East Dunbartonshire Council are all below the annual mean objective in 2018 and vary between 11 and 17µg/m^3.The method of monitoring at the Kirkintilloch Townhead Site is a FIDAS analyser which was installed in March 2017. At the other sites, monitoring continued with the Eberlines and a TEOM FDMS instruments.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the Scottish air quality objective of 50µg/m^3, not to be exceeded more than 7 times per year. The annual mean PM_{10} concentration recorded at the automatic sites within East Dunbartonshire Council were below the annual mean objective in 2018. Recording equipment is as detailed above. A trend graph is shown in Figure 3.

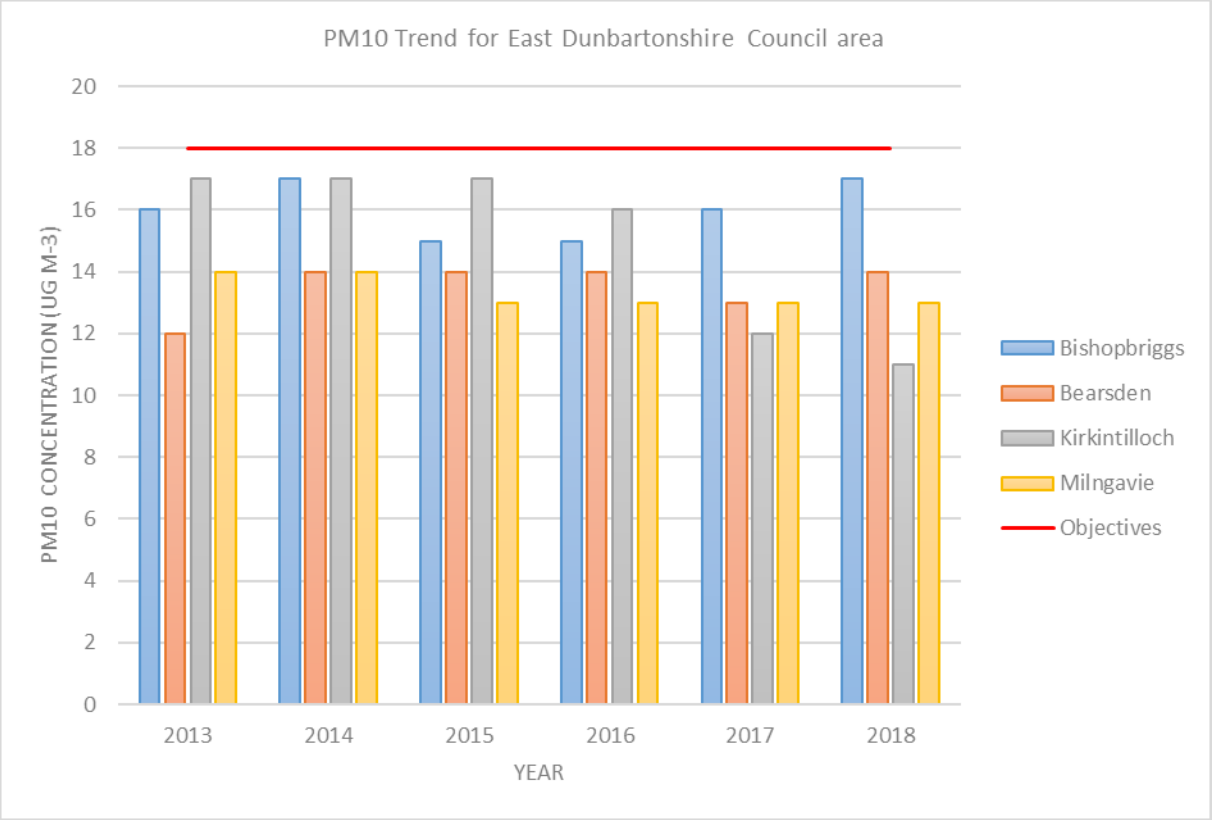


Figure 3 Trend in PM_{10} Annual Mean Concentration (µg/m^3) Continuous Monitoring Sites 2013 - 2018

There were no exceedences of the Annual Mean PM_{10} level or of the daily mean objective level.

3.2.3 Particulate Matter ($PM_{2.5}$)

East Dunbartonshire Council recorded no exceedance of the Scottish Air Quality Objective for $PM_{2.5}$. The annual average for 2018 was 6µg/m^3 which is the same as the 2017 result of 6µg/m^3, however, we have only been monitoring since 2017.

Table A.7 in Appendix A compares the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years with the air quality objective of 10µg/m^3.

3.2.4 Sulphur Dioxide (SO_2)

East Dunbartonshire Council does not monitor sulphur dioxide

Carbon Monoxide, Lead and 1,3-Butadiene

East Dunbartonshire Council does not monitor for carbon monoxide, lead or 1,3-Butadiene

4. New Local Developments

Proposed new local developments in East Dunbartonshire which may affect air quality are still subject to obtaining planning permission therefore have been detailed under Planning Applications. Several applications required air quality assessments and are under consideration and these have also been detailed under Planning Applications.

4.1 Road Traffic Sources

East Dunbartonshire Council Roads were consulted on changes to traffic flows on roads within the area in 2018 and the following information is reported:

- Narrow congested streets with residential properties close to the kerb – no new roads that meet this criteria
- Busy streets where people may spend one hour or closer to traffic – no new roads that meet this criteria
- Roads with a high flow of buses and/or HGVs – no new roads that meet this criteria
- New roads constructed or proposed – no new roads that meet this criteria
- Roads with significantly changed traffic flow – four phases out of five of the Bishopbriggs Relief Road have now been constructed. This is a measure in the Bishopbriggs Air Quality Action Plan and work is underway to secure funding towards the cost of constructing phase five. Development in this part of Bishopbriggs has raised concerns regarding pollutant levels and a detailed assessment is underway. The findings of the detailed assessment will be reported upon separately.
- Bus or coach stations – no new bus or coach stations to report.

4.2 Other Transport Sources

East Dunbartonshire Council confirms that there are no other transport sources as prescribed in the criteria viz: 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 many movements of diesel locomotives, and potential long-term relevant exposure within 30m or ports for shipping.

4.3 Industrial Sources

East Dunbartonshire Council confirms there are no new industrial sources as prescribed in the criteria viz: new or proposed installations for which an air quality assessment has been carried out or existing installations where emissions have increased substantially or new relevant exposure has been introduced or new or significantly changed installations with no previous air quality assessment; major fuel storage depots storing petrol; petrol stations or poultry farms

4.4 Commercial and Domestic Sources

Development of new crematorium, memorial gardens, parking and new access. Land adjacent to Meiklehill Farm, Kirkintilloch Road, Bishopbriggs, East Dunbartonshire. This application was received during 2017 however, the updated Air Quality Impact Assessment was submitted in 2018. Details are contained in Section 5 Planning Applications.

4.5 New Developments with Fugitive or Uncontrolled Sources

An application for restoration of a former quarry was received during 2018. Details are contained in Section 5 Planning Applications.

5. Planning Applications

Environmental Health is consulted on many planning applications and the following included requests for full air quality impact assessments:

TP/ED/18/0223

Restoration of Former Colliery through the extraction of hard rock and inert waste landfill, including inert waste recycling. Former Gartshore Colliery, Waterside Road, Kirkintilloch, East Dunbartonshire.

An air quality assessment has been carried out as part of an Environmental Impact Assessment for the restoration of a former colliery. The assessment concluded the impact of the operations of the quarry on air quality will be insignificant and pollution concentrations will continue to meet national and EU air quality objectives.

This application has not yet been decided upon.

TP/ED/17/0865

Development of new crematorium, memorial gardens, parking and new access. Land adjacent to Meiklehill Farm, Kirkintilloch Road, Bishopbriggs, East Dunbartonshire. This application was received during 2017 however, the updated Air Quality Impact Assessment was submitted in 2018. The air quality impact assessment concluded that the significance of impacts of emissions from operating conditions of the proposed development have been assessed as negligible and any future or likely increase in onsite concentrations would be restricted close to emission points where there is no relevant public exposure. This application has not yet been decided upon.

TP/ED/18/0872

Residential development comprising of 53 dwellings in mixture of house types and 3 storey block of flats with associated car parking, access, landscape and drainage. The site is adjacent to Crofthead Cottage Kirkintilloch Road Bishopbriggs East Dunbartonshire. This site is adjacent to the Bishopbriggs AQMA. The development has the potential to increase congestion and adversely affect air quality both in the vicinity of the proposed residential properties and the wider area, however the air quality assessment carried out did not predict a significant adverse impact or risk of exceedance of the air quality objectives. This application not yet been decided upon.

There were also 30 planning applications concerning domestic property and which included the installation of wood burning stoves.

6. Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Monitoring data for 2018 indicates that an overall downward trend has continued throughout the year.

There was a slight increase in the annual mean PM_{10} level at the Bishopbriggs sites to 17µg/m^3 from 16µg/m^3.

Bishopbriggs remained the same for the annual mean NO_2 level and is well below the objective level at 27µg/m^3.The APNA -360 NOx analyser at Bishopbriggs was replaced in June 2018 with an APNA- 370.

A further year of passive tube monitoring at two additional sites which were added to test hotspots within the AQMA in 2017 are well below the annual mean objective level at 33.9µg/m^3 and 23.8µg/m^3 respectively. There is currently dispersion modelling being undertaken in two areas of Bishopbriggs out with the AQMA and once this information is available, a decision requires to be made concerning the validity of the AQMA designation. Monitoring will continue at this site.

The AQMA in Bearsden was declared in 2011 for exceedences of both the NO_2 and PM_{10} annual mean objective level. The annual mean PM_{10} level for 2018 was slightly higher than last year at 14µg/m^3 but still well below the annual mean objective level. The annual mean NO_2 level remained the same as 2017 but well below the annual mean objective level at 34µg/m^3. The NO_x box was replaced at the Bearsden site in June 2018 and an APNA-370 was installed. During 2018, we added additional passive diffusion tubes to our monitoring network at three sites in Bearsden to check on possible hotspots out with the AQMA. One year of results indicates that there is no need for concern (17, 15.5 and 15µg/m^3 respectively.) Monitoring will continue at this site.

The annual mean NO_2 level reduced further at our Kirkintilloch site to 29µg/m^3. The annual mean PM_{10} level has dropped year on year for the last 5 years and was 11µg/m^3 for 2018. FIDAS 200 was installed in 2017 and a second year of results indicate compliance with the $PM_{2.5}$ annual mean objective. Monitoring will continue at this site.

The continuous monitor in Milngavie has recorded consistently low levels since its installation in 2011. The annual mean NO_2 level dropped further to 20µg/m^3 and the

annual mean PM_{10} remained the same at 13µg/m^3. Permission is required to move this monitor to an alternative site where the data can be better utilised. Monitoring will continue at this site in the meantime.

6.2 Conclusions relating to New Local Developments

New local developments in East Dunbartonshire are unlikely to introduce new exceedences of the relevant objectives. Although a number of applications for development have included air quality impact assessments, there is nothing to indicate that there would be any new exceedences of any of the air quality objectives.

6.3 Proposed Actions

Monitoring throughout 2018 did not reveal any new or unexpected exceedences. Three passive diffusion tubes were added to the NO_2 monitoring network in 2018 to further investigate possible hotspot areas out with the Bearsden AQMA however, the resultant levels have been very low and the tubes will be withdrawn at the end of the current reporting year.

There are no changes required to any existing AQMAs in the form of boundary changes however, serious consideration will be given to revoking the Bishopbriggs AQMA once current dispersion modelling is complete. Advice will be sought where necessary from appropriate stakeholders to ensure the process is undertaken in compliance with all the appropriate guidance.

New particulate monitoring equipment in the form of FIDAS was installed at our Bishopbriggs and Bearsden sites at the beginning of 2019 and allows for the monitoring of $PM_{2.5}$ in addition to PM_{10}. This will be reported on further in the next Annual Progress Report.

It is anticipated that the Draft Bearsden Air Quality Action Plan will have been fully adopted by the Council before the next Annual Progress Report is due for submission. The measures contained within the Draft Action Plan will continue to be implemented.

The next Annual Progress Report will be submitted in 2020.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA ?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
EDB1	Bishopbriggs	Roadside	260995	670130	NO_2; PM_{10}	Y	Chemiluminescent; BAM (heated inlet)	5m	2m	2
EDB2	Bearsden	Kerbside	254269	672067	NO_2; PM_{10}	Y	Chemiluminescent; BAM (heated inlet)	<2m	1m	2
EDB3	Kirkintilloch	Kerbside	265675	673516	NO_2; PM_{10} $PM_{2.5}$	N	Chemiluminescent; FIDAS	<2m	1m	3
EDB4	Milngavie	Roadside	255328	674115	NO_2; PM_{10}	N	Chemiluminescent; TEOM FDMS	<40m	1m	3

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
EDB5	Bearsden 1 (118 Drymen Rd)	Roadside	254218	672193	NO2	Y	3m	2m	N
EDB11	Bearsden 10	Roadside	255394	670683	NO2	N	24m	2m	N
EDB12	Bearsden 13	Roadside	254809	671057	NO2	Y	26m	2m	N
EDB13	Bearsden 14	Roadside	254877	671000	NO2	Y	8m	2m	N
EDB14	Bearsden 15	Roadside	254898	671023	NO2	Y	2m	2m	N
EDB15	Bearsden 16	Roadside	254269	672067	NO2	Y	2m	1m	Y
EDB16	Bearsden 16B	Roadside	254269	672067	NO2	Y	2m	1m	Y
EDB17	Bearsden 16C	Roadside	254269	672067	NO2	Y	2m	1m	Y
EDB18	Bearsden 17	Roadside	254258	672077	NO2	Y	<2m	2m	N
EDB19	Bearsden 18	Roadside	254275	672069	NO2	Y	<2m	2m	N
EDB58	Bearsden 19	Roadside	255403	673236	NO2	Y	5m	<2m	N
EDB59	Bearsden 20	Roadside	255400	673134	NO2	Y	28m	<2m	N
EDB60	Bearsden 21	Roadside	254984	671910	NO2	Y	32m	<2m	N
EDB6	Bearsden 3 (5 Ravelston Rd)	Roadside	254655	670158	NO2	N	8m	5m	N
EDB7	Bearsden 4 (8 Lowther Ave)	Roadside	253075	673382	NO2	N	6m	5m	N
EDB8	Bearsden 7	Roadside	254269	672069	NO2	Y	<2m	2m	N
EDB9	Bearsden 8	Roadside	254275	672047	NO2	Y	18m	2m	N
EDB10	Bearsden 9	Roadside	254751	670621	NO2	N	30m	2m	N
EDB21	Bishopbriggs 13	Roadside	260549	669312	NO2	Y	5m	2m	N
EDB22	Bishopbriggs 14	Roadside	260995	670130	NO2	Y	42m	2m	Y
EDB23	Bishopbriggs 14B	Roadside	260995	670130	NO2	Y	42m	2m	Y

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?
EDB24	Bishopbriggs 14C	Roadside	260995	670130	NO2	Y	42m	2m	Y
EDB25	Bishopbriggs 16	Roadside	260580	669533	NO2	Y	<2m	2m	N
EDB26	Bishopbriggs 17	Roadside	260552	669320	NO2	Y	<2m	2m	N
EDB53	Bishopbriggs 21	Roadside	261033	669650	NO2	Y	6m	2m	N
EDB54	Bishopbriggs 22	Roadside	260571	669339	NO2	Y	5m	2m	N
EDB55	Bishopbriggs 23	Roadside	260759	669999	NO2	Y	5m	2m	N
EDB56	Bishopbriggs 24	Roadside	261903	671955	NO2	Y	10m	2m	N
EDB57	Bishopbriggs 25	Roadside	260617	670338	NO2	Y	6m	2m	N
EDB31	Bishopbriggs 6	Roadside	261016	670198	NO2	Y	<2m	2m	N
EDB32	Kirkintilloch 15	Roadside	265641	673497	NO2	N	2m	2m	N
EDB33	Kirkintilloch 16	Roadside	265697	673524	NO2	N	3m	2m	N
EDB34	Kirkintilloch 17	Roadside	265675	673516	NO2	N	3m	1m	Y
EDB35	Kirkintilloch 17B	Roadside	265675	673516	NO2	N	3m	1m	Y
EDB36	Kirkintilloch 17C	Roadside	265675	673516	NO2	N	3m	1m	Y
EDB37	Kirkintilloch 18	Roadside	265674	673521	NO2	N	<2m	2m	N
EDB47	Kirkintilloch 19	Roadside	265602	673583	NO2	N	<2m	<2m	N
EDB48	Kirkintilloch 20	Roadside	265849	673424	NO2	N	6m	<2m	N
EDB49	Kirkintilloch 21	Roadside	265506	671961	NO2	N	5m	<2m	N
EDB50	Kirkintilloch 22	Roadside	265657	671678	NO2	N	5m	<2m	N
EDB44	Milngavie 10	Roadside	255329	674114	NO2	N	40m	1m	Y
EDB45	Milngavie 10B	Roadside	255329	674114	NO2	N	40m	1m	Y
EDB46	Milngavie 10C	Roadside	255329	674114	NO2	N	40m	1m	Y
EDB38	Milngavie 4	Roadside	255728	674486	NO2	N	5m	2m	N
EDB41	Milngavie 7	Roadside	255279	674124	NO2	N	<2m	9m	N
EDB43	Milngavie 9	Roadside	255331	674214	NO2	N	7m	2m	N

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3)				
					2014	2015	2016	2017	2018
Bearsden	Kerbside	Automatic	60	60	37	34	46	33	34
Bishopbriggs	Roadside	Automatic	84	84	29	27	30	27	27
Kirkintilloch	Kerbside	Automatic	99	99	29	29	34	30	29
Milngavie	Roadside	Automatic	84	84	24	23	22	22	20
Bearsden 1 (118 Drymen Rd)	Roadside	Diffusion Tubes	100%	100%	28.8	32.87	29.1	24.72	28.3
Bearsden 10	Roadside	Diffusion Tubes	100%	100%	26.1	26.07	26.2	26.34	25.6
Bearsden 13	Roadside	Diffusion Tubes	100%	100%	35.2	31.97	33.2	33.16	29.6
Bearsden 14	Roadside	Diffusion Tubes	100%	100%	30.2	32.91	34.8	31.36	29.8
Bearsden 15	Roadside	Diffusion Tubes	100%	100%	27.6	33.9	31.9	34.27	31.9
Bearsden 16	Roadside	Diffusion Tubes	100%	100%	33.9	33.58	35.03	33.2	30.6
Bearsden 16B	Roadside	Diffusion Tubes	100%	100%	34.5	34.43	34.53	37.12	34.4
Bearsden 16C	Roadside	Diffusion Tubes	100%	100%	34.6	34.77	35.92	34.43	32.6
Bearsden 17	Roadside	Diffusion Tubes	100%	100%	32.3	28.79	34.76	32.13	32.9
Bearsden 18	Roadside	Diffusion Tubes	100%	100%	33.3	31.69	31.27	30.2	28.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3)				
					2014	2015	2016	2017	2018
Bearsden 19	Roadside	Diffusion Tubes	75%	75%	#N/A	#N/A	#N/A	#N/A	17.4
Bearsden 20	Roadside	Diffusion Tubes	75%	75%	#N/A	#N/A	#N/A	#N/A	15.4
Bearsden 21	Roadside	Diffusion Tubes	67%	67%	#N/A	#N/A	#N/A	#N/A	15.5
Bearsden 3 (5 Ravelston Rd)	Roadside	Diffusion Tubes	100%	100%	18.5	22.8	18.41	17.88	17.9
Bearsden 4 (8 Lowther Ave)	Urban Background	Diffusion Tubes	92%	92%	11.4	11.95	11.76	10.13	14.0
Bearsden 7	Roadside	Diffusion Tubes	100%	100%	31	28.84	35.33	31.3	26.4
Bearsden 8	Roadside	Diffusion Tubes	100%	100%	33.4	33.54	32.8	32.34	28.5
Bearsden 9	Roadside	Diffusion Tubes	100%	100%	20.1	30.57	26.07	25.85	22.6
Bishopbriggs 13	Roadside	Diffusion Tubes	100%	100%	30.5	35.99	38.13	34.07	36.7
Bishopbriggs 14	Roadside	Diffusion Tubes	100%	100%	25.8	30.92	31.78	25.47	25.5
Bishopbriggs 14B	Roadside	Diffusion Tubes	100%	100%	24.7	30.04	29	24.56	24.6
Bishopbriggs 14C	Roadside	Diffusion Tubes	100%	100%	26.3	28.88	26.66	25.59	24.1
Bishopbriggs 16	Roadside	Diffusion Tubes	100%	100%	27.7	24.96	26.98	24.72	26.2

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3)				
					2014	2015	2016	2017	2018
Bishopbriggs 17	Roadside	Diffusion Tubes	100%	100%	16.9	27.08	31.02	29.01	29.2
Bishopbriggs 21	Roadside	Diffusion Tubes	100%	100%	#N/A	#N/A	#N/A	18.91	20.8
Bishopbriggs 22	Roadside	Diffusion Tubes	92%	92%	#N/A	#N/A	#N/A	33.16	34.6
Bishopbriggs 23	Roadside	Diffusion Tubes	100%	100%	#N/A	#N/A	#N/A	32.29	24.4
Bishopbriggs 24	Roadside	Diffusion Tubes	100%	100%	#N/A	#N/A	#N/A	21.21	24.2
Bishopbriggs 25	Roadside	Diffusion Tubes	100%	100%	#N/A	#N/A	#N/A	14.78	16.5
Bishopbriggs 6	Roadside	Diffusion Tubes	100%	100%	25.1	28.11	34.35	28.77	26.4
Kirkintilloch 15	Roadside	Diffusion Tubes	100%	100%	31.3	34.96	27.36	25.73	26.7
Kirkintilloch 16	Roadside	Diffusion Tubes	100%	100%	32.6	29.93	29.15	32.41	30.1
Kirkintilloch 17	Roadside	Diffusion Tubes	100%	100%	34.7	32.8	33.16	30.86	28.8
Kirkintilloch 17B	Roadside	Diffusion Tubes	92%	92%	35.6	32.85	32.23	28.44	27.4
Kirkintilloch 17C	Roadside	Diffusion Tubes	100%	100%	31.7	28.53	31.91	28.09	28.4
Kirkintilloch 18	Roadside	Diffusion Tubes	83%	83%	26.4	25.45	27.15	25.07	23.8

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO2 Annual Mean Concentration (µg/m3) (3)				
					2014	2015	2016	2017	2018
Kirkintilloch 19	Roadside	Diffusion Tubes	100%	100%	#N/A	#N/A	#N/A	15.96	18.4
Kirkintilloch 20	Roadside	Diffusion Tubes	100%	100%	#N/A	#N/A	#N/A	30.09	29.1
Kirkintilloch 21	Roadside	Diffusion Tubes	100%	100%	#N/A	#N/A	#N/A	22.44	19.9
Kirkintilloch 22	Roadside	Diffusion Tubes	92%	92%	#N/A	#N/A	#N/A	19.09	19.2
Milngavie 10	Roadside	Diffusion Tubes	92%	92%	23.1	24.89	22.98	20.52	24.2
Milngavie 10B	Roadside	Diffusion Tubes	92%	92%	23.3	21.94	24.44	20.1	20.7
Milngavie 10C	Roadside	Diffusion Tubes	92%	92%	22.8	22.42	23.33	20.28	20.6
Milngavie 4	Roadside	Diffusion Tubes	100%	100%	23	26.4	26.26	23.95	21.4
Milngavie 7	Roadside	Diffusion Tubes	100%	100%	30.9	31.21	30.32	29.61	28.0
Milngavie 9	Urban Background	Diffusion Tubes	100%	100%	24.4	28.4	27.0	26.2	26.6

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

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

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

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. (Annualised sites highlighted in grey) See Appendix C for details.

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

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2014	2015	2016	2017	2018
Bearsden	Kerbside	Automatic	60	60	0	5	19	0	0
Bishopbriggs	Roadside	Automatic	84	84	0	0	0	0	0 (99)
Kirkintilloch	Kerbside	Automatic	99	99	0	0	0	0	0
Milngavie	Roadside	Automatic	84	84	0	1	0	0	0 (105)

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
Bearsden	Kerbside	93	93	14	14	14	13	14
Bishopbriggs	Roadside	96	96	17	15	15	16	17
Kirkintilloch	Kerbside	89	89	17	17	16	12	11
Milngavie	Roadside	87	87	14	13	13	13	13

Notes: Exceedances of the PM_{10} annual mean objective of 18$\mu g/m^3$ are shown in **bold.**

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2014	2015	2016	2017	2018
Bearsden	Kerbside	93	93	1	0	0	0	0
Bishopbriggs	Roadside	96	96	0	1(23)	0	2	7
Kirkintilloch	Kerbside	89	89	2	4	0	0	0
Milngavie	Roadside	87	87	0	0	0	1	0

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

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

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

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

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

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2018 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2014	2015	2016	2017	2018
Kirkintilloch	Kerbside	89	89	N/A	N/A	N/A	6	6

Notes: Exceedances of the PM_{10} annual mean objective of $10\mu g/m^3$ are shown in **bold.**

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

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

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

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results for 2018

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Bearsden 1 (118 Drymen Rd)	**44.7**	**40.1**	32.5	30.6	28.1	17.2	23.1	25.3	21.1	28.5	39.0	38.9	30.8	28.3
Bearsden 10	**44.1**	**45.9**	32.4	28.0	25.3	9.2	18.5	13.6	17.8	34.7	29.2	35.3	27.8	25.6
Bearsden 13	**48.4**	**40.2**	**42.9**	33.6	33.5	15.6	24.0	16.1	24.4	36.4	30.1	**40.7**	32.2	29.6
Bearsden 14	**49.3**	19.1	37.7	34.7	33.6	15.4	25.6	30.2	26.8	36.0	34.8	**45.0**	32.4	29.8
Bearsden 15	39.0	**47.3**	39.0	34.7	32.2	14.3	23.0	25.2	**44.8**	32.1	**40.7**	**43.4**	34.6	31.9
Bearsden 16	**48.0**	**45.3**	**40.0**	29.8	27.7	30.0	34.3	9.4	32.1	22.2	**48.4**	32.3	33.3	30.6
Bearsden 16 B	**48.0**	**46.7**	**42.4**	34.4	39.4	25.8	25.3	31.6	34.5	34.8	38.2	**47.0**	37.3	34.4
Bearsden 16 C	**49.9**	**45.3**	**45.7**	35.5	32.2	21.2	29.1	17.5	31.7	**41.6**	33.8	**41.4**	35.4	32.6
Bearsden 17	**50.1**	**41.3**	**46.8**	**42.3**	**47.9**	31.2	23.1	24.5	25.9	26.6	29.7	39.3	35.7	32.9
Bearsden 18	**47.9**	36.3	23.2	30.6	29.0	15.5	26.8	25.5	32.6	26.0	34.0	**42.4**	30.8	28.4
Bearsden 19				24.4	21.4	6.9	12.9	14.5	17.9	24.0	13.9	34.2	18.9	17.4
Bearsden 20				18.7	20.3	8.9	12.5	13.5	14.6	16.0	13.1	32.6	16.7	15.4
Bearsden 21				19.4	19.9	12.7		12.4	7.8	22.4	20.3	35.8	16.8	15.5
Bearsden 3 (5 Ravelston Rd)	35.5	24.9	23.1	15.9	13.6	5.9	10.1	8.0	13.4	14.8	39.9	28.8	19.5	17.9
Bearsden 4 (8 Lowther Ave)	22.5	38.4	14.6	10.2	8.7		6.0	5.3	6.5	10.7	25.9	19.1	15.3	14.0
Bearsden 7	3.8	39.2	37.2	26.0	32.1	23.5	26.8	26.4	22.7	37.6	31.8	36.9	28.7	26.4
Bearsden 8	**43.5**	34.3	36.9	31.1	29.9	19.9	24.2	24.7	26.5	26.8	32.2	**41.8**	31.0	28.5

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Bearsden 9	39.0	36.8	28.6	22.9	22.9	7.6	17.2	14.2	19.2	20.6	31.2	34.1	24.5	22.6
Bishopbriggs 13	55.1	79.9	44.0	46.1	42.1	26.1	27.7	25.7	28.5	38.6	18.1	47.3	39.9	36.7
Bishopbriggs 14	40.5	35.8	30.7	29.3	26.5	14.3	20.4	16.3	22.6	22.8	36.8	36.7	27.7	25.5
Bishopbriggs 14B	38.5	36.5	33.0	27.9	22.8	15.7	16.1	25.2	17.9	16.7	35.2	35.6	26.8	24.6
Bishopbriggs 14C	34.5	27.4	34.3	29.2	26.5	9.5	20.4	21.0	18.2	20.6	35.3	38.0	26.2	24.1
Bishopbriggs 16	39.1	34.6	35.9	27.5	29.1	11.7	19.7	17.7	18.0	24.5	49.4	34.8	28.5	26.2
Bishopbriggs 17	41.2	39.5	38.2	38.5	32.4	15.5	21.7	18.2	NR	34.1	30.4	39.2	31.7	29.2
Bishopbriggs 21	33.8	26.2	65.1	17.2	10.7	4.3	11.3	11.0	12.5	17.7	33.4	28.2	22.6	20.8
Bishopbriggs 22	53.4	43.1	45.5	39.3	41.0	25.6	27.4	28.8	30.4	35.6	NR	43.7	37.6	34.6
Bishopbriggs 23	46.1	NR	37.8	30.4	26.6	10.9	18.8	19.7	21.0	24.4	16.2	39.4	26.5	24.4
Bishopbriggs 24	40.6	38.0	29.6	36.4	30.6	12.1	18.3	14.6	10.5	29.5	20.6	34.2	26.3	24.2
Bishopbriggs 25	31.3	25.2	18.6	16.3	15.6	NR	9.8	9.8	9.9	16.2	17.9	27.2	18.0	16.5
Bishopbriggs 6	46.6	40.2	28.3	27.6	31.3	20.4	24.6	21.4	21.0	25.7	27.1	29.9	28.7	26.4
Kirkintilloch 15	44.7	40.9	32.2	29.4	23.1	18.5	23.5	19.0	17.8	25.5	33.1	41.1	29.1	26.7
Kirkintilloch 16	44.6	43.6	37.0	31.5	30.2	17.3	26.9	24.1	20.5	31.0	43.0	42.5	32.7	30.1
Kirkintilloch 17	47.3	43.6	33.9	29.9	29.6	18.2	23.0	25.8	22.6	29.0	35.0	37.3	31.3	28.8
Kirkintilloch 17B	NR	43.7	36.1	32.3	30.9	14.0	21.6	15.6	20.2	22.7	40.2	50.7	29.8	27.4
Kirkintilloch 17C	47.7	47.6	35.4	30.7	29.5	10.4	20.0	14.3	23.6	32.2	41.2	37.5	30.8	28.4
Kirkintilloch 18	37.7	NR	33.7	22.0	19.6	9.8	19.2	NR	22.1	28.0	28.8	37.4	25.8	23.8
Kirkintilloch 19	31.3	31.3	21.5	18.2	19.1	4.3	15.5	18.3	11.2	20.8	17.3	30.8	20.0	18.4
Kirkintilloch 20	41.8	46.5	31.2	27.6	32.2	13.4	29.6	34.6	27.2	36.0	16.0	43.1	31.6	29.1
Kirkintilloch 21	27.7	34.6	27.9	22.9	20.2	8.7	12.5	17.7	18.5	22.2	16.4	29.9	21.6	19.9
Kirkintilloch 22	36.0	31.9	24.9	20.7	16.9	8.1	16.8	5.5	15.7	21.2	NR	31.4	20.8	19.2
Milngavie 10	34.0	30.3	26.0	NR	22.3	8.3	16.9	17.0	23.8	22.7	54.4	34.2	26.4	24.2

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
Milngavie 10B	35.3	31.1	27.7	NR	17.8	10.8	15.4	16.7	16.3	21.7	26.3	27.9	22.5	20.7
Milngavie 10C	34.4	26.9	28.5	NR	20.2	10.9	16.5	13.9	17.3	22.9	23.8	31.0	22.4	20.6
Milngavie 4	32.9	28.8	28.4	23.5	22.4	8.3	18.6	19.3	20.7	24.3	23.1	29.3	23.3	21.4
Milngavie 7	38.9	30.4	36.7	13.9	27.2	NR	NR	19.6	27.3	25.8	45.3	39.7	30.5	28.0
Milngavie 9	34.9	35.7	32.6	27.8	24.6	NR	21.4	23.3	16.0	28.2	39.2	34.8	29.0	26.6

(1) See Appendix C for details on bias adjustment

As described in the Technical Guidance LAQM-TG-16 if there is more than one collocation study then the A factors should not be averaged but an approximation should be derived by averaging the B values. For example if there are two studies of 22% and 28% the average would be 25%. This is expressed as a factor, eg 0.25, then 1 is added to this, 0.25+1.00 = 1.25. Finally take the inverse to give the bias adjustment factor 1/1.25=0.80.

We had 2 B values of 11% and 6%. Average = 8.5% = 0.085+1=1.085. Inverse of this is 1/1.085 = 0.92.
Therefore we have a Bias adjustment factor of 0.92.

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

QA/QC of diffusion tube monitoring

Diffusion tube monitoring is carried out in accordance with the procedures contained in the guidance 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users' and LAQM.TG 16. All tubes, other than those co-located at the continuous analysers are attached to lampposts/downpipes at a height of approximately 2 metres above ground level and exposed for 4 to 5 weeks in line with the Defra calendar of exposure periods. Co-located tubes are located in triplicate close to the analyser air intake. All exposure times are recorded. Unexposed travel blanks are submitted to the laboratory with each batch of exposed tubes. Glasgow Scientific Services Laboratory is UKAS accredited for the analysis of Diffusion tubes.

The laboratory also participates monthly in the nitrogen dioxide "inter comparison" exercise, managed by the National Physical Laboratory. GSS satisfactorily passed all WASP (Workplace Analysis Scheme for Proficiency) tests since 2009. GSS recorded "good" precision throughout the first half of 2018 but "poor" in the second half.

Factor from Local Co-location Studies

East Dunbartonshire Council undertakes its own triplicate co-location study to obtain a Local Bias Adjustment Factor. The triplicate co-location study is undertaken with the Kirkintilloch, Milngavie, Bishopbriggs and Bearsden Air Quality Monitoring Stations however, only the Kirkintilloch study showed good precision and data capture in each of the twelve months.

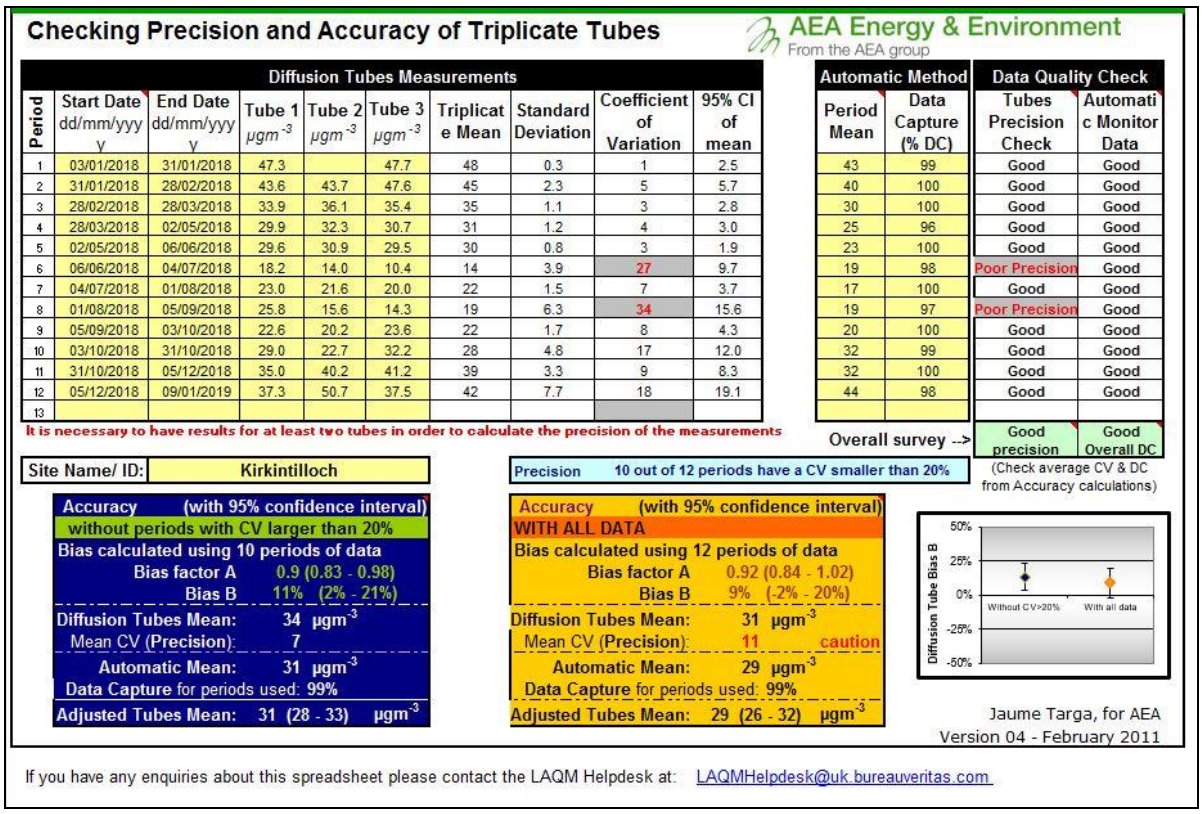
Diffusion Tube Bias Adjustment Factors

In accordance with LAQM TG16, a locally derived Bias Adjustment Factor has been calculated for the 2018 NO_2 diffusion tube results based on one co-location site study, the Kirkintilloch Air Quality Monitoring Station which showed good precision and good data capture. The local results for Bishopbriggs, Milngavie and Kirkintilloch Air Quality Monitoring Stations were submitted to the LAQM Helpdesk to contribute to

the national bias factor, however, studies from Bearsden Cross could not be included due to less than 9 months valid data period and poor data quality.

The nitrogen dioxide diffusion tubes used were supplied to East Dunbartonshire Council by Glasgow Scientific Services laboratory (GSS) and were prepared using the 20% triethanolamine (TEA) in water method. In accordance with LAQM TG 16 Bias B values of road side continuous monitoring locations were averaged for the road side locations and the inverse derived to obtain a bias adjustment factor of **0.92** as opposed to **0.86** from Glasgow Scientific Services (GSS). We however, utilised our locally derived bias adjustment factor for the sake of consistency and only data with good precision has been used (coefficient of variation smaller than 20%). We did however, compare all our NO_2 tube results against both the national and the GSS bias adjustment figure and no exceedences were obtained with either figure.

A spreadsheet compiled by the National Physical Laboratory reports bias corrections reflecting the difference between results obtained from automatic analysers compared with those obtained from co-located diffusion tubes analysed by individual laboratories. Four co-location studies were undertaken within the East Dunbartonshire Council area, and the result of this study is higher than that for 2017, when that of GSS was 0.91. There was no need for distance correction to be applied to diffusion tube results using the fall off with distance calculator this year. Accordingly, the locally derived bias factor based on the co-located tubes at the Kirkintilloch Townhead continuous monitoring station was used to adjust diffusion tube measurements at the other locations across the council area.



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation	95% CI of mean
1	03/01/2018	31/01/2018	47.3		47.7	48	0.3	1	2.5
2	31/01/2018	28/02/2018	43.6	43.7	47.6	45	2.3	5	5.7
3	28/02/2018	28/03/2018	33.9	36.1	35.4	35	1.1	3	2.8
4	28/03/2018	02/05/2018	29.9	32.3	30.7	31	1.2	4	3.0
5	02/05/2018	06/06/2018	29.6	30.9	29.5	30	0.8	3	1.9
6	06/06/2018	04/07/2018	18.2	14.0	10.4	14	3.9	27	9.7
7	04/07/2018	01/08/2018	23.0	21.6	20.0	22	1.5	7	3.7
8	01/08/2018	05/09/2018	25.8	15.6	14.3	19	6.3	34	15.6
9	05/09/2018	03/10/2018	22.6	20.2	23.6	22	1.7	8	4.3
10	03/10/2018	31/10/2018	29.0	22.7	32.2	28	4.8	17	12.0
11	31/10/2018	05/12/2018	35.0	40.2	41.2	39	3.3	9	8.3
12	05/12/2018	09/01/2019	37.3	50.7	37.5	42	7.7	18	19.1
13									

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
43	99	Good	Good
40	100	Good	Good
30	100	Good	Good
25	96	Good	Good
23	100	Good	Good
19	98	Poor Precision	Good
17	100	Good	Good
19	97	Poor Precision	Good
20	100	Good	Good
32	99	Good	Good
32	100	Good	Good
44	98	Good	Good
Overall survey -->		Good precision	Good Overall DC

Site Name/ ID: Kirkintilloch

Precision: 10 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 10 periods of data
Bias factor A 0.9 (0.83 - 0.98)
Bias B 11% (2% - 21%)
Diffusion Tubes Mean: 34 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 31 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 31 (28 - 33) µgm^{-3}

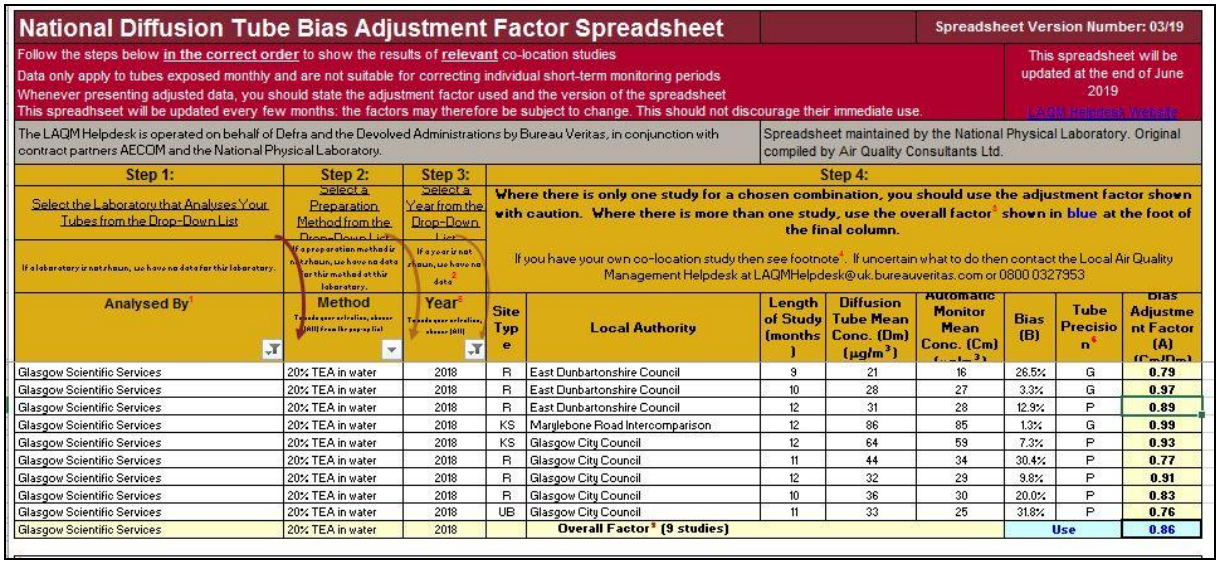
Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 12 periods of data
Bias factor A 0.92 (0.84 - 1.02)
Bias B 9% (-2% - 20%)
Diffusion Tubes Mean: 31 µgm^{-3}
Mean CV (Precision): 11 caution
Automatic Mean: 29 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 29 (26 - 32) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at: LAQMHelpdesk@uk.bureauveritas.com

Figure 4 NO_2 Locally Derived Bias Adjustment Factor Spreadsheets

The national diffusion tube bias adjustment factor spreadsheet can be seen below for comparison purposes. The overall National bias factor in 2018 was **0.86** for East Dunbartonshire Council.



National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/19

Follow the steps below in the correct order to show the results of relevant co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.
This spreadsheet will be updated at the end of June 2019
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.
Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List
If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List
If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List
If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.
If you have your own co-location study then see footnote[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	Year[2]	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m^3)	Automatic Monitor Mean Conc. (Cm)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Glasgow Scientific Services	20% TEA in water	2018	R	East Dunbartonshire Council	9	21	16	26.5%	G	0.79
Glasgow Scientific Services	20% TEA in water	2018	R	East Dunbartonshire Council	10	28	27	3.3%	G	0.97
Glasgow Scientific Services	20% TEA in water	2018	R	East Dunbartonshire Council	12	31	28	12.9%	P	0.89
Glasgow Scientific Services	20% TEA in water	2018	KS	Marylebone Road Intercomparison	12	86	85	1.3%	G	0.99
Glasgow Scientific Services	20% TEA in water	2018	KS	Glasgow City Council	12	64	59	7.3%	P	0.93
Glasgow Scientific Services	20% TEA in water	2018	R	Glasgow City Council	11	44	34	30.4%	P	0.77
Glasgow Scientific Services	20% TEA in water	2018	R	Glasgow City Council	12	32	29	9.8%	P	0.91
Glasgow Scientific Services	20% TEA in water	2018	R	Glasgow City Council	10	36	30	20.0%	P	0.83
Glasgow Scientific Services	20% TEA in water	2018	UB	Glasgow City Council	11	33	25	31.8%	P	0.76
Glasgow Scientific Services	20% TEA in water	2018		Overall Factor[3] (9 studies)				Use		0.86

Figure 5 – National Bias Adjustment Factor Spreadsheet

QA/QC of Automatic Monitoring

All air quality monitoring equipment is subject to the QA/QC procedure recommended in LAQM.TG 16. East Dunbartonshire Council has service contracts in place so that all analysers are serviced every 6 months. The service contracts include call outs to site for repairs and the routine replacement of consumables.
A combination of Horiba APNA 370 and Model 42i Thermo instruments are used to monitor oxides of nitrogen (NO_x) to establish NO_2 concentrations in the network together with Eberline Beta-attenuation monitor (BAM) and TEOM FDMS to monitor PM_{10} particles and a FIDAS to measure PM_{10} and $PM_{2.5}$. All stations are air conditioned.

All sites are part of the Scottish Government data reporting process and subject to independent audit by Ricardo-AEA at 6 monthly intervals. Data validation and ratification is also performed by Ricardo-AEA, who also carry out the QA/QC for the automatic monitors and the equipment is calibrated annually to meet the criteria for the national network.

Data Annualisation

Annualisation of data was carried out where there was insufficient data capture. At Bishopbriggs one diffusion tube had insufficient data capture (67%) and the NO_2 data from the automatic monitoring station at Bearsden Cross was less than 75% hence annualisation was carried out in accordance with LAQM TG (16). Table C.1 details annualisation of diffusion tube data and C.2 for the NO_2 data at Bearsden Cross.

Table C.1

Site ID	Type Data	Data	Data Capture 2018 (%)	Annual Mean Raw data (M)	Period of data	Period Mean (Pm)	Ratio Am/Pm (Ra)
Glasgow Townhead	Urban Background	NO2 Annual Mean	99	23.95	28/03/18 to 04/07/18; 01/08/19 to 09/01/19	26.85	0.892
Average (Ra)							**0.892**

Table C.2

Site ID	Background Site	Data Capture 2018 (%)	Annual Mean Raw data (Am)	Period Mean (Pm)	Ratio Am/Pm (Ra)
A	Townhead Glasgow	99	23.6	23.9	0.987
B	Edinburgh St Leonards	97	17.8	17.8	1.000
C	Dundee Mains Loan	91	12.37	12.1	1.022
D	Aberdeen Errol Place	99	20.39	18.5	1.102
Average (Ra)					**1.028**

Appendix D:

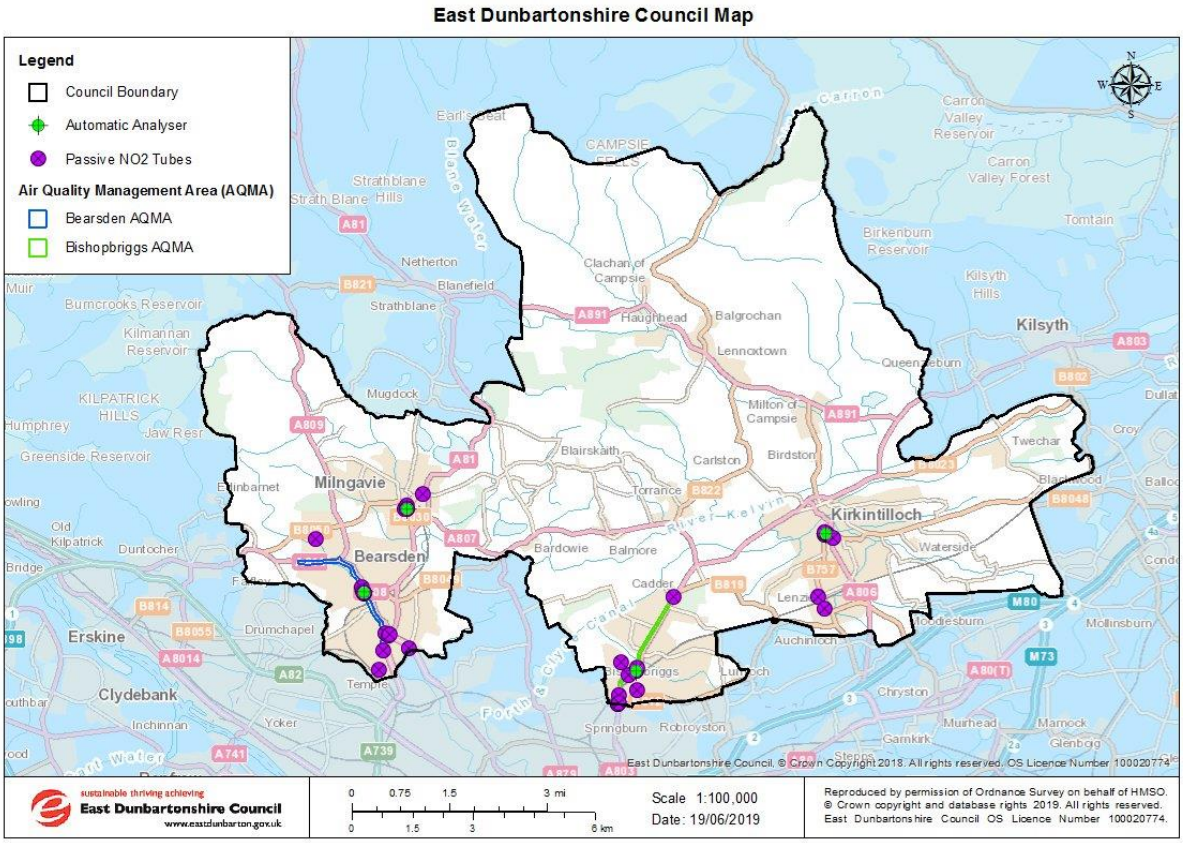


Figure 6 Map showing the location of the monitoring sites

Glossary of Terms

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

References

Department for Environment, Food and Rural Affairs (Defra). 2016. *Technical Guidance LAQM.TG (16),* Defra publications. http://laqm.defra.gov.uk/technical-guidance/

Palas GmbH (2016) Fidas ® 200 - Product Lines - Palas. Available at: http://www.palas.de/en/product/fidas200 (Accessed: 18/6/18).

Draft Bearsden Air Quality Action Plan

Bishopbriggs Air Quality Management Area Action Plan

Bishopbriggs Air Quality Management Area Update