# **Annual Progress Report (APR)**



2018 Air Quality Annual Progress Report (APR) for South Lanarkshire Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2018

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### **Executive Summary: Air Quality in Our Area**

#### Air Quality in South Lanarkshire

Air Quality is generally good in most parts South Lanarkshire, there are however some locations where local sources of pollution contribute to poor air quality and action is required. Three Air Quality Management Areas (AQMA) have been declared in South Lanarkshire at Whirlies East Kilbride, Lanark and Rutherglen.

South Lanarkshire Council is committed to working towards achieving compliance with health based air quality objectives. The main sources of air pollutants in South Lanarkshire is road traffic emissions; and to a lesser extent, emissions from industrial processes and commercial/domestic fuel combustion. The main pollutants of concern are nitrogen dioxide (NO<sub>2</sub>) and fine particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).

This Annual Progress Report provides a summary of the 2017 measurements conducted across South Lanarkshire; it also considers any new potential sources of air pollution and if any further action is required to protect or improve air quality within South Lanarkshire.

All annual mean Nitrogen Dioxide (NO<sub>2</sub>) concentrations measured at automatic monitoring sites within South Lanarkshire were below the annual mean objective of 40  $\mu$ g.m<sup>-3</sup> during 2017. The last five years' measurements indicate a downward trend in measured NO<sub>2</sub> concentrations at all of the automatic sites, especially since 2016.

Exceedances of the NO<sub>2</sub> annual mean objective were measured at two diffusion tube sites:

- 24 Low Patrick Street, Hamilton. This was adjusted for distance drop off to the nearest location of relevant exposure but still indicated an exceedance.
- 233 Glasgow Road, Blantyre. A Detailed Assessment of NO<sub>2</sub> and PM<sub>10</sub> at Glasgow Road in Blantyre has recently been completed. The assessment concluded that it is likely that annual mean NO<sub>2</sub> concentrations in excess of the 40 μg.m<sup>-3</sup> objective are occurring at locations where there may be relevant human exposure; South Lanarkshire Council should therefore declare an AQMA for exceedances of the NO2 annual mean at this location.

The 18  $\mu$ g.m<sup>-3</sup> Scottish PM<sub>10</sub> annual mean objective was not exceeded at any of South Lanarkshire Council's seven automatic monitoring sites in 2017. Measured concentrations at PM<sub>10</sub> analyser sites ranged from 10 to 13  $\mu$ g.m<sup>-3</sup>.

Measured PM<sub>10</sub> concentrations were higher in 2017 when compared to 2016 at the Uddingston automatic monitoring site. Measured concentrations were lower at Rutherglen, Whirlies East Kilbride, Lanark, Cambuslang and Raith Interchange 2 automatic sites. Concentrations at Hamilton automatic site were lower in 2017 than 2015 but was not measured in 2016.

Only one hourly mean NO<sub>2</sub> concentration in excess of 200 µg.m<sup>-3</sup> objective was measured at both the Whirlies, East Kilbride and Cambuslang sites during 2017, therefore all measurement sites were compliant with the 1-hour short-term mean objective<sup>1</sup>.

A PM<sub>10</sub> daily mean greater than 50  $\mu$ g.m<sup>-3</sup> was measured at Rutherglen on one occasion during 2017. Therefore all measurement sites were compliant with the 24-hour short-term mean objective<sup>2</sup>

South Lanarkshire Council measured PM<sub>2.5</sub> concentrations at six of their automatic sites. The only site which does not measure PM<sub>2.5</sub> is the Raith Interchange 2. No exceedances of the Scottish PM<sub>2.5</sub> annual mean objective were measured.

The potential air quality impacts of new local developments have been considered including:

- Opening of the Raith Interchange in February 2017
- Erection of a waste processing facility in Hamilton

Based on the available information submitted with the planning applications for these developments; South Lanarkshire Council has not identified any locations where there may be a risk of the air quality objectives being exceeded.

<sup>&</sup>lt;sup>1</sup> 1-hr mean 200 µg.m<sup>-3</sup> standard is not to be exceeded more than 18 times per year

 $<sup>^2</sup>$  24-hr mean 50µg m  $^3$  not to be exceeded more than 7 times a year

#### Actions to Improve Air Quality

South Lanarkshire Council has taken forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality.

South Lanarkshire Council currently has a draft Air Quality Action Plan (AQAP). This plan has not been finalised/published as of yet. Although the draft AQAP has yet to be finalised, progress has been made on the measures in the draft plan. More information is included in Section 2 which provides details of the progress made so far.

# Figure 1: Photograph of students participating in sustainable active travel at high school workshop



#### Local Priorities and Challenges

South Lanarkshire Council will finalise the consolidated AQAP for the Whirlies East Kilbride, Lanark and Rutherglen AQMAs. The council expects to include a full update on progress with the AQAP measures in next year's LAQM annual progress report (APR).

As part of the Action Plan development, dispersion modelling and source apportionment analysis has been conducted; and the results of this used to inform the measures in the AQAP.

Figure 2: Photograph of the planting project in Rutherglen to increase the number of pollution fighting plants in key hot spot locations. The project aims to help with air quality, flooding and biodiversity as well as working with local community group volunteer



Figure 3: "The air that we breathe" - GIS Story Book



#### How to Get Involved

The public can obtain further information relating to air quality in South Lanarkshire on the Council Website.

#### South Lanarkshire Council

More information about air quality in Scotland and actions that members of the public can take to help reduce air pollution is available at <u>http://www.scottishairquality.co.uk</u>.

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### 1. Local Air Quality Management

This report provides an overview of air quality in South Lanarkshire during 2017. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether 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) summarises the work being undertaken by South Lanarkshire Council to improve air quality and any progress that has been made.

Pollutant	Air Quality Object	Date to be	
	Concentration	Measured as	acilieved by
Nitrogen dioxide (NO <sub>2</sub> )	200 µg.m <sup>-3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 μg.m <sup>-3</sup>	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> )	50 µg.m <sup>-3</sup> , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg.m <sup>-3</sup>	Annual mean	31.12.2010
Particulate Matter (PM <sub>2.5</sub> )	10 μg.m <sup>-3</sup>	Annual mean	31.12.2020
Sulphur dioxide (SO <sub>2</sub> )	350 μg.m <sup>-3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg.m <sup>-3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg.m <sup>-3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg.m <sup>-3</sup>	Running annual mean	31.12.2010
1,3 Butadiene	2.25 μg.m <sup>-3</sup>	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m <sup>3</sup>	Running 8-Hour mean	31.12.2003
Lead	0.25 µg.m <sup>-3</sup>	Annual Mean	31.12.2008

Table 1.1 – Summary of Air Quality Objectives in Scotland

### 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 South Lanarkshire can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <u>https://uk-air.defra.gov.uk/aqma/local-authorities?la\_id=386</u>.

AQMA Name	Pollutants and Air Quality Objectives	Description	Action Plan
Whirlies, East Kilbride	PM10 annual mean	An area encompassing the Whirlies Roundabout, East Kilbride between the A725, A749 and B783 and extending along all the roads leading in to the roundabout.	Whirlies AQMA, details available at: <u>http://www.scottishairqual</u> <u>ity.co.uk/laqm/aqma?id=3</u> <u>86</u>
Rutherglen	PM10 annual mean	An area encompassing all areas of Rutherglen is designated.	Rutherglen AQMA, details available at: <u>http://www.scottishairqual</u> <u>ity.co.uk/laqm/aqma?id=3</u> <u>86</u>
Lanark Town Centre	NO2 annual mean	An area encompassing all areas of Lanark is designated.	Lanark AQMA, details available at: <u>http://www.scottishairqual</u> ity.co.uk/laqm/aqma?id=3 <u>86</u>

#### Table 2.1 – Declared Air Quality Management Areas

# 2.2 Progress and Impact of Measures to address Air Quality in South Lanarkshire

South Lanarkshire Council has taken forward a number of measures during the current reporting year of 2017 in pursuit of improving local air quality. Details of all measures in progress are set out below. South Lanarkshire Council have prepared a combined Air Quality Action Plan<sup>3</sup> for the three AQMAs in South Lanarkshire. The Council launched its consultation on the Air Quality Action Plan on Clean Air Day, 21<sup>st</sup> June 2018.

Although the action plan has still to be finalised, significant ongoing progress has been made with some action plan measures as detailed below.

#### Existing Measures Impacting on Air Quality

South Lanarkshire Council have implemented a number of measures that currently impact on air quality. These measures have been considered within the current consultation draft of the AQAP and aim to reduce pollutant concentrations across South Lanarkshire:

- Investigate integrating air quality awareness within education/curriculum for excellence – make use of available air quality packages approved by Scottish Government
- Investigate further behaviour change initiatives communication campaign to promote active sustainable travel
- Continue to expand air quality monitoring identify areas that would benefit from more detailed monitoring
- Expand cycling/pedestrian counters to build an accurate picture of cycling/walking uptake – review information, collect and identify areas where walking/cycling should be targeted
- Improve cycling routes identify routes that require maintenance, updates and/or expansion
- Undertake a cycle hire feasibility study for the Lanark area to be considered alongside the studies undertaken for the Rutherglen and East Kilbride areas.

<sup>&</sup>lt;sup>3</sup> South Lanarkshire Council (2018) Draft Air Quality Action Plan South Lanarkshire Council; For the Whirlies East Kilbride, Lanark and Rutherglen Air Quality Management Areas; 20/06/2018 https://www.southlanarkshire.gov.uk/downloads/download/946/draft\_air\_quality\_action\_plan

Future studies will consider inclusion of electric cycle hire to support cycling for all

- Encouragement of the uptake of low emission vehicles expansion and updating of electric vehicle re-charging infrastructure
- Train station and bus station improvements upgrades including upgraded parking at key train stations
- Real time passenger information support uptake of public transport
- Awareness raising for local authority officers on ongoing air quality issues training sessions on air quality in South Lanarkshire
- SCOOT or other intelligent traffic management system continue expansion of system – identify areas that would benefit
- Section 75 town and Country Planning Act Agreements formally bind developers to provide mitigation in areas of poor air quality
- Source air quality funding to support air quality improvement measures
- Teleconferencing and IT measures reduce the need to travel (e.g. reduce 60% miles travelled)
- Encourage businesses to consider measures they can take to improve air quality
- Shift from private vehicle to pool cars by Council will have an impact on reducing pollution
- Flexi time / working from home to avoid congestion / reduce commute mileage
- Cycle to Work Scheme to encourage uptake of cycling for work commute
- Bike maintenance / Dr Bike sessions to encourage uptake of cycling for work commute
- Energy efficiency of buildings double glazing to reduce energy usage
- Incorporation of green infrastructure integrated into new and existing development
- Encouraging people to walk and cycle for short journeys

- Review traffic signal optimisation at key locations
- Waste make use of software to minimise distance travelled by refuse collection vehicles
- Waste incorporating clean technology in refuse collection vehicles
- Citizen science and educational initiatives promoted within Education
- Report on State of the Environment report includes air quality to raise profile with Council members and partners. The report is also hosted on the intranet platform for education.
- Local Development Plan includes access to active and sustainable transport options
- Continue to work with schools, prioritising those within AQMA's, to look at alternative travel modes through active travel workshops
- Emphasise importance of air quality through the SEA process for all PPPS.
   Includes mitigation and enforcement
- LASS group / Eco schools
- Education walk to school week
- School travel planning walking buses
- Cycle promotion in schools, bikeability

#### 2.2.1 GIS Story Book

"The air that we breathe" – GIS story book<sup>4</sup> – Environmental Services with assistance of colleagues within IT and Public Relations have launched their Air Quality Story Map called "The Air That We Breathe" to coincide with Clean Air Day. This story map is an interactive "one stop shop" for all information relating to Air Quality within South Lanarkshire and will show local pollution information as well as providing information on actions everyone can take to be 'part of the solution, not the problem'.

<sup>&</sup>lt;sup>4</sup> <u>https://www.southlanarkshire.gov.uk/info/200193/pollution/263/air\_quality</u>

#### 2.2.2 Whirlies, East Kilbride Air Quality Management Area

Measures have been identified specifically for the Whirlies, East Kilbride Air Quality Management Area. These include:

- 1. Real time passenger information at a number of bus stops to support uptake of public transport
- 2. Investigate bike hire schemes for key locations increase sustainable travel options

#### 2.2.3 Rutherglen Air Quality Management Area

A number of measures have been identified specifically for the Rutherglen Air Quality Management Area. These include:

- 1. Air quality modelling to assist understanding of air quality measures used to inform local authority of pollutant concentrations
- Investigate bus quality partnerships focus on deploying the cleanest vehicles through the most polluted areas
- Investigate the use of traffic regulation orders improving euro classifications of vehicles improves emissions
- Investigate eco-route signage to encourage alternative routes away from the town centre – increases route options and uptake of less polluted / busy routes may be encouraged
- Investigate the utilisation of green infrastructure to target emission reductions in hot spot locations – increase plant types which have a stronger ability to reduce emissions in hot spot areas where infrastructure allows
- 6. Review pedestrian crossing locations review how they impact the flow of traffic and pedestrians through the area
- Review parking restrictions enforcement and promotion review delivery times within peak times to reduce congestion
- 8. Real time passenger information support uptake of public transport
- 9. Investigate bike hire schemes for key locations increases options for active travel reduces reliance on more polluting forms of transport

#### 2.2.4 Lanark Air Quality Management Area

A number of measures have been identified specifically for the Lanark Air Quality Management Area. These include:

- 1. Investigate cycle hire feasibility increasing opportunities to travel more actively and sustainably should reduce private car journeys
- Investigate bus quality partnerships focus on deploying the cleanest vehicles through the most polluted areas
- Investigate the use of traffic regulation orders improving euro classifications of vehicles improves emissions
- Encourage local businesses in eco fleet initiatives and travel planning engage with local businesses to journey plan and where possible avoid travelling within AQMA
- Investigate eco-route signage to encourage alternative routes away from the town centre – consider route options and uptake of less polluted / busy routes may be encouraged
- Review delivery times review delivery during peak times to reduce congestion and parking issues in town centre
- Review traffic/air quality patterns locally review traffic data and air quality to better understand traffic within area
- 8. Review and promote awareness of parking restrictions community driven campaign to raise awareness of parking issues to improve traffic flow
- Investigate active transport hub for bus and train station improving sustainable options for final stages of journeys has the potential to reduce reliance on private vehicles
- 10. Review pedestrian crossing locations review how they impact the flow of traffic and pedestrians through the area
- 11. Investigate traffic re-routing consider feasibility of an HGV ban in town centre
- 12. Real time passenger information support uptake of public transport

13. Investigate the utilisation of green infrastructure to target emission exposure reduction in hot spot locations – increase plant types which have a stronger ability to reduce emissions in hot spot areas where infrastructure allows

#### 2.3 Cleaner Air for Scotland

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national crossgovernment strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland's legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at http://www.gov.scot/Publications/2015/11/5671/17. Progress by South Lanarkshire 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. South Lanarkshire Council's Employee Travel Plan contains information on reducing the requirement to travel. The Plan provides information on alternative ways of working that can help reduce travel requirements including:

- 1. Utilising an alternative work location closer to home in line with appropriate service delivery requirements. In addition, there is an option to permanently relocate to reduce commuting distance.
- Flexible working arrangements are available to reduce pressures on the commute by enabling travel at less busy times and in particular encouraging less travel if a compressed working pattern is adopted.
- Home working is another option available to employees and is suitable for those able to work from home as well as being dependent on the type of service they deliver.
- 4. For some roles there is an element of travel required and measures to reduce business travel are encouraged including:
  - Consider if meetings are necessary, could business be discussed over the telephone rather than a face to face meeting.
  - Employ technology to accommodate group discussion. Video conferencing, instant messaging or email can be used to facilitate group discussions.
  - Plan meetings at the beginning or end of the day to accommodate commuting commitments.

- Arrange meetings across different locations on the same day taking into account efficient route planning.
- Explore the opportunity to work at alternative locations to avoid additional travel back to core business location.
- Arrange meetings at locations that people travel through on their way to work or home from work or where most people are located.
- Share travelling to meetings with colleagues.
- 5. Digital technologies can impact the need for future travel. South Lanarkshire Council's Local Development Plan, 2015, which is currently being updated, recognises the importance of supporting digital industries through ensuring strategic economic investment locations have been identified for this key growth sector as well as promoting and safeguarding the existing digital sector. The plan also recognises the need to adapt to the changing needs of occupiers of strategic business locations and the advances in technology to ensure that communities are provided for.

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

The 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. There are a number of plans and policies within South Lanarkshire which impact both climate change and air quality. Both subjects are considered regularly by South Lanarkshire Council's Corporate Strategic Environmental Assessment Working Group which reviews any new or revised strategies, plans or policies. This process has facilitated greater synergy between both subjects. Examples which have a positive impact on both climate change and air quality are detailed as follows:

1. The Local Development Plan seeks to ensure that future development takes place in a sustainable way. The overall strategic vision of the plan is to 'promote the continued growth and regeneration of South Lanarkshire by seeking sustainable economic and social development within a low carbon economy whilst protecting and enhancing the environment'. This includes a commitment to ensure development is sustainably located to make best use of public transport and has no significant impacts on the environment. Reducing South Lanarkshire's reliance on fossil fuels whilst supporting the use of renewable, low and zero carbon energy generating technologies are also inbuilt within the Plan. This vision and policies benefit both climate change and air quality.

- 2. South Lanarkshire Council's Local Transport Strategy identifies a number of measures available to the Council and its partners to slow down the rate of traffic growth. The implementation of school travel plans is an example of one such measure. School travel plans aim to increase the number of children walking, cycling and using public transport to travel. In March 2018 68 out of 149 schools had implemented a travel plan with a further 60 plans in development.
- 3. The Local Development Plan's Supplementary Guidance 1: Sustainable Development and Climate Change recognises that planning has a critical role to play in implementing a positive vision for a sustainable future. A key policy is that proposals for new development must, where possible, seek to minimise and mitigate against the effects of climate change by ensuring new development includes opportunities for active travel routes and provisions for public transport which is recognised as having a positive impact on air quality. Development is also required to ensure that there will be no significant impact on air quality. The supplementary guidance also details the provision of electric vehicle recharging infrastructure in new developments to encourage the adoption of low carbon vehicles as another key measure that will have both climate change and air quality benefits.
- 4. Policy 16 of South Lanarkshire's Local Development Plan requires new development proposals to consider, and where appropriate, mitigate the resulting impacts of traffic growth, particularly development related traffic. The development of walking, cycling and public transport networks which provide a viable and attractive alternative to car travel are supported through this policy. Existing and proposed walking and cycling routes will also be safeguarded through this policy.
- 5. South Lanarkshire Council's Sustainable Development and Climate Change Strategy recognises that finding a balance between economic, social and environmental objectives to safeguard the wellbeing of future generations is vital for health and wellbeing. The most recent strategy focuses on the environmental aspects of sustainable development. The policy recognises that a key strategy for a sustainable environment includes the development of South Lanarkshire's Air

Quality Action Plan which is presently undergoing consultation prior to being finalised. The review and assessment of air quality is also recognised as an outcome which contributes to quality of the local environment and wellbeing of local communities.

- 6. Although not a policy as such, a key communication tool with employees is 'The Works' magazine and this includes a regular column called 'carbon corner'. This regularly features articles aimed at reducing travel and encouraging more sustainable, active means of travel which has climate change and air quality cobenefits.
- 7. The most recent Carbon Management Plan produced in 2016 recognises the benefits renewable technology can have on reducing carbon emissions. The Plan also recognises air quality management as a wider Council consideration when considering such technologies. In particular, the plan stipulates that the installation of any biomass can only be progressed if air quality has been considered.
- 8. The Council prepares the 'State of the Environment' report biennially which provides quality data that facilitates evaluation of a range of environmental issues, identifies trends and provides an overall picture of the condition or state of South Lanarkshire's environment. There are chapters which consider climate change and also air quality within the report and it provides information on the current status and direction of trend for indicators such as GHG emissions, energy consumption, transport emissions, renewable capacity and environmental awareness.

#### 2.4 Policies Relevant to Air Quality in South Lanarkshire

South Lanarkshire Council has in place a number of polices which can impact on air quality within the local area. These polices aim to have a positive impact on pollutant concentrations across South Lanarkshire.

#### 2.4.1 Local Development Plan 2015-2020

The Local Development Plan<sup>5</sup> has interactive maps available outlining the land use plans for each of the urban settlements within South Lanarkshire. The development which could impact on the designated AQMAs declared for Whirlies, Rutherglen and Lanark are:

<sup>&</sup>lt;sup>5</sup> <u>http://www.southlanarkshire.gov.uk/info/200172/plans\_and\_policies/39/development\_plans/6</u>

- East Kilbride: Residential development areas are bordering the designated AQMA at Nerston could impact the traffic within the Whirlies AQMA.
- Lanark: Residential development areas to the east and south of the town centre of Lanark, within the AQMA boundary declared by Lanark.
- Rutherglen: Limited development within the immediate area, however large development within Cambuslang to the East of Rutherglen could result in increased traffic within the area. The proposed area of development and growth is outwith the designated AQMA.

The Local Development Plan Policy 4, outlines that development management will ensure that no adverse effects on air quality will occur as a result of proposed developments.

#### 2.4.2 Climate change – annual statement on Climate Change

The Climate Change Annual Statement<sup>6</sup> highlights that sustainable development including climate change compliance is a focus for South Lanarkshire Council. These duties are reflected in the Council Plan and South Lanarkshire's Sustainable Development Strategy (SDS). Climate Change actions are embedded within numerous strategic plans across South Lanarkshire, including:

- Local Development Plan
- Carbon Management Plan
- Employee Travel Plan

South Lanarkshire has key performance targets to reduce energy and fuel consumption in order to further reduce carbon emissions by a further 10% by 2021.

#### 2.4.3 Sustainable Development and Climate Change Strategy 2017 – 2022

South Lanarkshire Council's Sustainable Development and Climate Change Strategy<sup>7</sup> covers the period from 2017 to 2022. The strategy outlines the actions South Lanarkshire will take to reduce their carbon emissions and adapt to climate change.

<sup>&</sup>lt;sup>6</sup> <u>http://www.southlanarkshire.gov.uk/downloads/file/11048/climate\_change\_duties\_summary\_report\_2016</u>

<sup>&</sup>lt;sup>7</sup> https://www.southlanarkshire.gov.uk/downloads/file/12055/sustainable\_development\_and\_climate\_change\_strategy\_2017-2022

#### **Supplementary Planning Guidance** 2.4.4

The Supplementary Planning Guidance for Sustainable Development and Climate Change<sup>8</sup> forms part of the Development Plan for South Lanarkshire. Section 8 outlines key planning issues in relation to air quality that South Lanarkshire require to address, these include:

- Proposed new buildings can impact the local air flow of an area, impacting on air quality
- Proposed road construction, amendments can impact traffic flow and pollutant concentrations as a result of increased congestion.
- Proposed Developments in an area of existing poor air quality can exposure future occupiers and result in increased pressure on the local road networks due to increased traffic.

Overall South Lanarkshire recognises the importance of the planning system to ensure air quality is not hindered through future developments.

#### Local Transport Strategy 2.4.5

The Local Transport Strategy<sup>9</sup> specified that road traffic has been recognised as a significant source of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations across South Lanarkshire. Previous LAQM reports and assessments have identified busy road junctions as areas for potential poor air quality and as a result the monitoring network within South Lanarkshire was expanded. Over the past couple of years PM10 and PM2.5 monitoring has been expanded to Uddingston and Lanark in order to gather further information on pollutant concentrations.

The Local Transport Strategy for South Lanarkshire outlines the aim of working towards economic prosperity and environmental and social sustainability by providing an accessible and integrated transport network. The strategy seeks to link with other council strategies and polices.

The strategy includes numerous objectives which are particularly relevant to reducing pollutant concentrations:

http://www.southlanarkshire.gov.uk/downloads/file/9914/sustainable\_development\_and\_climate\_change
 http://www.southlanarkshire.gov.uk/downloads/file/7420/local\_transport\_strategy\_2013-23

- Ensuring that transport supports and facilitates economic recovery, regeneration and sustainable development.
- Improving health and wellbeing by facilitating and encouraging active travel, through the development of attractive, safe and convenient walking and cycling networks.

Alleviating the impacts of traffic, congestion and traffic growth throughout South Lanarkshire.

# 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.

South Lanarkshire undertook automatic (continuous) monitoring at 7 sites during 2017. Table A.1 in Appendix A shows the details of the sites. A fault was discovered with the automatic analyser at Rutherglen leading to the available measurements being unreliable, therefore results for Rutherglen have not been reported.

National monitoring results are available at <u>http://www.scottishairquality.co.uk/data/</u>. Maps showing the location of the monitoring sites are provided in Appendix D or can be found at <u>http://www.scottishairquality.co.uk/latest/</u>. Further details on QA/QC are included in Appendix C.

#### 3.1.2 Non-Automatic Monitoring Sites

South Lanarkshire Council undertook non-automatic (passive) monitoring of NO<sub>2</sub> at 40 sites during 2017. 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.

Data collection errors were experienced between April and June 2017. Due to lack of confidence in accuracy of results at some locations, the data for this period were not included when calculating measured NO<sub>2</sub> annual mean concentrations.

#### 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 presented in Appendix C.

#### 3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

No annual mean NO<sub>2</sub> concentrations in excess of the 40  $\mu$ g.m<sup>-3</sup> air quality objective were measured at the automatic monitoring sites in South Lanarkshire during 2017.

Table A.3 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40  $\mu$ g.m<sup>-3</sup>. The annual mean concentrations measured at the automatic monitoring sites over the last 5 years are presented in Figure A.1 in Appendix A.

NO<sub>2</sub> annual mean concentrations in excess of the 40 µg.m<sup>-3</sup> objective were measured at 2 diffusion tube sites in South Lanarkshire during 2017. Exceedances of the annual mean objective were measured at:

- Tube 26 24 Low Patrick Street, Hamilton (47 μg.m<sup>-3</sup>)
- Tube 32 233 Glasgow Road, Blantyre (49.6 μg.m<sup>-3</sup>)

These results were adjusted for distance drop off to estimate the annual mean concentrations at the nearest location of relevant exposure. The following NO<sub>2</sub> annual mean concentrations were calculated:

- Tube 26 24 Low Patrick Street, Hamilton (42.3 µg.m<sup>-3</sup>)
- Tube 32 233 Glasgow Road, Blantyre (48.5 μg.m<sup>-3</sup>)

Following distance correction, these 2 diffusion tubes still measured exceedances of the NO<sub>2</sub> annual mean objective.

However, at Low Patrick Street in Hamilton the nearest relevant exposure is at first floor height where NO<sub>2</sub> concentrations are likely to be lower than at ground level. The Detailed Assessment of NO<sub>2</sub> and PM<sub>10</sub> in this area of Hamilton<sup>10</sup>, which was based on the 2013 annual mean NO<sub>2</sub> measurements, concluded that there were no exceedances of the 40  $\mu$ g.m<sup>-3</sup> objective occurring at 1st floor height. The measured NO<sub>2</sub> annual mean concentrations in 2018 at this location is less than that measured in 2013 (51.3  $\mu$ g.m<sup>-3</sup>), it's therefore unlikely that the 40  $\mu$ g.m<sup>-3</sup> objective is being exceeded where relevant exposure is present.

A Detailed Assessment has been conducted at Glasgow Road, Blantyre. Further information regarding this is presented in the conclusions from new monitoring data section of this report (Section 6.1).

<sup>&</sup>lt;sup>10</sup> Ricardo-AEA (2014) Detailed Assessment of Air Quality 2013 Quarry Street/Duke Street junction, Hamilton Town Centre; South Lanarkshire; Report for South Lanarkshire Council Ricardo-AEA/R/ED56927001-HamDA Issue Number 2 Date 09/06/2014

Table A.4 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past 5 years with the short term objective (200  $\mu$ g.m<sup>-3</sup>, not to be exceeded more than 18 times per year).

For diffusion tubes, the full 2017 dataset of monthly mean values is presented in Appendix B.

No annual mean NO<sub>2</sub> concentrations greater than 60 µg.m<sup>-3</sup> were measured at any of the diffusion tube sites; which indicates that there are likely to be no exceedances of the 1-hour objective these locations.

Hourly mean NO<sub>2</sub> concentrations measured at the automatic monitoring locations during 2017 were compliant with the NO<sub>2</sub> 1-hour objective as no sites measured exceedances of the  $200\mu g.m^{-3}$  objective more than 18 times over the year. The Whirlies, East Kilbride and Cambuslang sites both measured hourly concentrations in excess of 200  $\mu g.m^{-3}$  once during the year.

The annual mean concentrations measured at roadside, kerbside and urban background monitoring sites over the last 5 years are presented in Figure A.2, Figure A.3 and Figure A.4 in Appendix A.

#### 3.2.2 Particulate Matter (PM<sub>10</sub>)

Table A.5 in Appendix A compares the ratified and adjusted monitored  $PM_{10}$  annual mean concentrations for the past 5 years with the air quality objective of 18  $\mu$ g.m<sup>-3</sup>.

Table A.6 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past 5 years with the air quality objective of 50  $\mu$ g.m<sup>-3</sup>, not to be exceeded more than 7 times per year. A daily mean greater than 50  $\mu$ g.m<sup>-3</sup> was measured at Rutherglen on 1 occasion, so was compliant with the objective.

There were no exceedances of the 18 µg.m<sup>-3</sup> annual mean objective at any monitoring locations within South Lanarkshire during 2017. A comparison of PM<sub>10</sub> annual mean concentrations measured in South Lanarkshire over the past 5 years are presented in Figure A.5 in Appendix A. In general, measured annual mean PM<sub>10</sub> concentrations have reduced over the last few years.

#### 3.2.3 Particulate Matter (PM<sub>2.5</sub>)

South Lanarkshire Council measured PM<sub>2.5</sub> concentrations at 6 of their automatic monitoring locations during 2017; Rutherglen, East Kilbride Whirlies, Lanark, Hamilton, Uddingston and Cambuslang.

Table A.7 and Figure A.7 in Appendix A compare the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past 5 years with the air quality objective of 10µg.m<sup>-3</sup>. During 2017 PM<sub>2.5</sub> concentrations measured within South Lanarkshire were within the annual mean objective of 10µg.m<sup>-3</sup>.

#### 3.2.4 Sulphur Dioxide (SO<sub>2</sub>)

South Lanarkshire Council do not currently measure SO<sub>2</sub> concentrations.

#### 3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

South Lanarkshire Council do not currently measure any of these pollutants.

#### 4. New Local Developments

#### 4.1 Road Traffic Sources

#### 4.1.1 Opening of Raith Interchange in February 2017

The non-technical summary of the environmental statement<sup>11</sup> for the Raith Interchange upgrade states that the scheme was predicted to improve local air quality in some locations but may also cause air quality to deteriorate in other locations. Since the opening of the Raith Interchange, the following changes to local traffic patterns and congestion have been observed:

- Traffic travelling towards East Kilbride from the north, has been observed to be tailing back further from Whirlies down towards low Blantyre, this may be having a knock-on effect on traffic travelling along Glasgow Road in Blantyre directly towards Cambuslang rather than the original route past Whirlies and on to the East Kilbride/Glasgow Expressway.
- An impact has also been observed on Newhousemill Road, where traffic leaves the expressway and heads past the crematorium and creates a tailback at the narrow bridge.
- The traffic congestion at the Raith Roundabout and its traffic light system created at the start of the expressway has now moved up to the Whirlies and Kingsway junctions. Traffic is flowing freely up the Expressway but gathers quicker at the Whirlies and Kingsway junction.

There are currently no diffusion tubes deployed along these routes. South Lanarkshire Council will consider measuring traffic flows at these locations affected by the changes to the Raith Interchange, to determine if deploying diffusion tubes is required.

#### 4.2 Other Transport Sources

No other transport sources have been identified that require screening or consideration at this time.

#### 4.3 Industrial Sources

No new or significantly changed industrial sources have been identified during 2017.

<sup>&</sup>lt;sup>11</sup> Transport Scotland (2007) M74 Junction5, Raith Environmental Statement Non-Technical Summary 2007

#### 4.4 Commercial and Domestic Sources

No new or significantly changed commercial or domestic sources have been identified during 2017.

#### 4.5 New Developments with Fugitive or Uncontrolled Sources

No new or significantly changed fugitive sources have been identified during 2017.

## 5. Planning Applications

The following applications have been considered during 2017. The table below outlines planning applications where air quality impacts have been assessed. The outcome of the Air Quality Impact Assessment is detailed below.

Application No.	Details	Comments
HW/17/0260	Erection of a waste processing facility including waste recovery plant and thermal treatment facility for energy recovery with associated landscaping, access, parking infrastructure and education and visitor centre. Site at Whistleberry Road, Hamilton, ML3 0EG	Air Quality Impact Assessment from Entran Ltd, Environmental and Transportation Consultancy. Conclusion the increase in traffic associated with the Proposed Development is unlikely to significantly affect local air quality The air quality assessment for the thermal treatment process determined a negligible impact for NO <sub>2</sub> , PM <sub>10</sub> and PM <sub>2.5</sub> . Additional assessment would be undertaken at the PPC permitting stage and will ensure that the Local Air Quality Management Objectives will not be exceeded in any relevant area due to emissions arising from the operation of the development.

 Table 5 – Planning Applications

#### 6. **Conclusions and Proposed Actions**

#### 6.1 **Conclusions from New Monitoring Data**

All Nitrogen Dioxide (NO2) annual mean concentrations measured during 2017 at automatic monitoring sites in South Lanarkshire were less than the 40µg.m<sup>-3</sup> objective.

The last 5 years of measurements indicate a downward trend in measured NO2 concentrations at all automatic sites.

Exceedances of the NO<sub>2</sub> annual mean objective were measured at 2 diffusion tube locations at 24 Low Patrick Street, Hamilton and 233 Glasgow Road, Blantyre.

#### Hamilton

At Low Patrick Street in Hamilton the nearest relevant exposure is at first floor height where NO<sub>2</sub> concentrations are likely to be lower than at ground level. The Detailed Assessment of NO<sub>2</sub> and PM<sub>10</sub> in this area of Hamilton<sup>12</sup>, which was based on the 2013 annual mean NO2 measurements, concluded that there were no exceedances of the 40 µg.m<sup>-3</sup> objective occurring at 1st floor height. The measured NO<sub>2</sub> annual mean concentrations in 2018 at this location is less than that measured in 2013 (51.3 µg.m<sup>-</sup> <sup>3</sup>), it's therefore unlikely that the 40 µg.m<sup>-3</sup> objective is being exceeded where relevant exposure is present. No further action is required at this time based on the 2017 diffusion tube measurements.

#### Blantyre

A Detailed Assessment of NO<sub>2</sub> and PM<sub>10</sub> concentrations at Glasgow Road, Blantyre has recently been completed<sup>13</sup>. The assessment concluded that, based on a dispersion modelling study verified using the 2017 diffusion tube measurements, it is likely that annual mean NO<sub>2</sub> concentrations in excess of the 40 µg.m<sup>-3</sup> objective are occurring at locations where there may be relevant human exposure; South Lanarkshire Council should therefore declare an AQMA for exceedances of the NO2 annual mean at this location.

No exceedances of the PM<sub>10</sub> annual mean objective were measured during 2017. Measured concentrations at the 7 PM<sub>10</sub> measurement sites in South Lanarkshire

<sup>&</sup>lt;sup>12</sup> Ricardo-AEA (2014) Detailed Assessment of Air Quality 2013 Quarry Street/Duke Street junction, Hamilton Town Centre; South Lanarkshire; Report for South Lanarkshire Council Ricardo-AEA/R/EDS6927001-HamDA Issue Number 2 Date 09/06/2014 <sup>13</sup> Ricardo Energy & Environment (2018) Detailed Assessment of air quality at Glasgow Road. Blantyre.

ranged from 10 to 13 μg.m<sup>-3</sup>. Measured PM<sub>10</sub> concentrations were lower in 2017 when compared to 2016 at all analysers except Uddingston which increased by 2 μg.m<sup>-3</sup>.

There were no exceedances of the NO<sub>2</sub> hourly or PM<sub>10</sub> daily short term air quality objectives during 2017.

South Lanarkshire Council measured PM<sub>2.5</sub> concentrations at Rutherglen, East Kilbride Whirlies, Lanark, Hamilton, Uddingston and Cambuslang. No exceedances of the Scottish PM<sub>2.5</sub> annual mean objective were measured in 2017.

#### 6.2 Conclusions relating to New Local Developments

South Lanarkshire Council has not identified any new local developments that required further consideration, or any locations where there may be a risk of the air quality objectives being exceeded. No additional air quality assessment is recommended at this time.

#### 6.3 **Proposed Actions**

Following the public consultation process, South Lanarkshire Council will finalise the consolidated Action Plan for the Whirlies, Rutherglen and Lanark AQMAs. A further full update regarding the action plan will be included in next year's LAQM annual progress report (APR).

Based on the conclusions of the Detailed Assessment at Glasgow Road, Blantyre. South Lanarkshire Council will proceed to declare an AQMA for exceedances of the NO<sub>2</sub> annual mean.

# 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
SL04	Rutherglen	Roadside	261128	661128	NO2; PM10; PM2.5	Yes	Chemiluminescent; FDMS	60	1	2
EK0	East Kilbride Whirlies	Roadside	264370	655670	NO2; PM10; PM2.5	Yes	Chemiluminescent; FDMS	10	0.5	2
SL03	Lanark	Kerbside	288426	643704	NO2; PM10; PM2.5	Yes	Chemiluminescent; FDMS	2	0.5	1
SL05	Hamilton	Roadside	272310	655276	NO2; PM10; PM2.5	Yes	Chemiluminescent; FDMS	2	8	1.8
SL06	Uddingston	Roadside	269663	660304	NO2; PM10; PM2.5	Yes	Chemiluminescent; FDMS	2	2	1.5
SL07	Cambuslang	Kerbside	264321	660516	NO2; PM10; PM2.5	Yes	Chemiluminescent; FDMS	10	0.5	2
SLC08	Raith Interchange 2	Rural	271063	658087	NO2; PM10	Yes	Chemiluminescent; FDMS	25	38	2

(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

.

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?
1	3 London Street, Larkhall	Kerbside	276087	651563	NO <sub>2</sub>	No	2.3	1.0	No
2	6 Machan Road, Larkhall	Roadside	276382	650382	NO <sub>2</sub>	No	3.2	3.8	No
3	4 Kirkton Street, Carluke	Kerbside	284538	650572	NO <sub>2</sub>	No	2.0	0.8	No
4	4 St Leonard Street, Lanark	Kerbside	288438	643694	NO <sub>2</sub>	Yes	0.7	4.4	No
5	32 Friars Lane, Lanark	Urban Background	287860	643685	NO2	Yes	4.8	3.6	No
6	4 Bloomgate, Lanark	Roadside	288122	643685	NO <sub>2</sub>	Yes	2.0	0.2	No
7	14 Scott Hill, East Kilbride	Roadside	264416	655372	NO <sub>2</sub>	No	7.2	3.0	No
8	Whirlies (1), East Kilbride	Kerbside	264374	655673	NO <sub>2</sub>	Yes	6.8	1.9	No
9	Whirlies (2), East Kilbride	Kerbside	364374	655673	NO <sub>2</sub>	Yes	6.8	1.9	No
10	Whirlies (3), East Kilbride	Kerbside	264374	655673	NO <sub>2</sub>	Yes	6.8	1.9	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?
11	West Mains/East Mains, East Kilbride	Kerbside	263170	654849	NO2	No	3.6	2.3	No
12	20 Farmeloan Road, Rutherglen	Kerbside	261662	661789	NO <sub>2</sub>	Yes	0.6	2.1	No
13	252 Main Street, Rutherglen	Kerbside	261662	661663	NO <sub>2</sub>	Yes	3.8	0.1	No
14	12 Mill Street, Rutherglen	Roadside	261302	660734	NO <sub>2</sub>	Yes	5.1	2.6	No
15	25 Burnside Road, Rutherglen	Kerbside	262484	659416	NO <sub>2</sub>	No	9.0	0.3	No
16	1 Rodger Drive (opp), Rutherglen	Kerbside	261789	660949	NO <sub>2</sub>	Yes	18.5	0.7	No
17	262 Cambuslang Road, Cambuslang	Roadside	263086	661296	NO <sub>2</sub>	No	0.3	2.3	No
18	281 Stonelaw Road, Rutherglen	Kerbside	262162	660431	NO <sub>2</sub>	Yes	1.6	1.4	No
19	Blackswell Lane, Hamilton	Roadside	272704	655431	NO <sub>2</sub>	No	6.9	2.7	No
20	4 Annsfield Road, Hamilton	Roadside	271578	653346	NO <sub>2</sub>	No	13.6	3.8	No
21	109 Caird Street, Hamilton	Roadside	271670	656346	NO <sub>2</sub>	No	5.7	3.1	No
22	79 Union Street, Hamilton	Kerbside	271852	655320	NO <sub>2</sub>	No	1.2	3.3	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?
23	134 Almada Street, Hamilton	Roadside	271424	655786	NO <sub>2</sub>	No	3.7	1.4	No
24	Almada Street-Muir Street, Hamilton	Roadside	271861	655952	NO <sub>2</sub>	No	3.6	0.1	No
25	Technology Avenue, Hamilton	Roadside	268444	656101	NO <sub>2</sub>	No	30.0	2.4	No
26	24 Low Patrick Street, Hamilton	Roadside	272608	655213	NO <sub>2</sub>	No	3.3	5.6	No
27	10 Gateside Street, Hamilton	Roadside	272265	655078	NO <sub>2</sub>	No	2.2	0.8	No
28	28 Low Quarry gardens, Hamilton	Urban Background	271949	654957	NO2	No	11.9	0.6	No
29	5 Wordsworth Way, Bothwell	Urban Background	270924	659109	NO2	No	15.9	1.6	No
30	93 Main Street, Bothwell	Kerbside	270526	658722	NO <sub>2</sub>	No	8.9	2.3	No
31	25 Main Street, Bothwell	Roadside	270526	658510	NO <sub>2</sub>	No	3.1	3.3	No
32	233 Glasgow Road, Blantyre	Roadside	268902	657591	NO <sub>2</sub>	No	0.4	3.6	No
33	283 Glasgow Road, Blantyre	Roadside	268754	657689	NO <sub>2</sub>	No	5.2	3.0	No

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?
34	1 Hunthill Road, Blantyre	Roadside	268000	656643	NO <sub>2</sub>	No	4.4	2.3	No
35	65 Old Mill Road, Uddingston	Kerbside	269699	660517	NO <sub>2</sub>	No	3.2	1.1	No
36	Crofthead Road Park, Uddingston	Urban Background	269811	660552	NO2	No	12.9	0.4	No
37	Burnpark Avenue, Uddingston	Roadside	268944	661474	NO <sub>2</sub>	No	22.0	29.2	No
38	81 Main Street, Uddingston	Roadside	269617	660438	NO <sub>2</sub>	No	0.2	2.7	No
39	North British Road, Uddingston	Kerbside	270180	660753	NO <sub>2</sub>	Yes	29.0	1.1	No
40	Bannatyne Street, Lanark	Kerbside	288450	643698	NO <sub>2</sub>	Yes	1.5	0.2	No

(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.

			Valid Data	Valid Data	NO <sub>2</sub>	Annual Mea	n Concent	ration (µg.n	1⁻³) <sup>(3)</sup>
Site ID	Site Type	Monitoring Type	Capture for Monitoring Period (%) <sup>(1)</sup>	Capture 2017 (%) <sup>(2)</sup>	2013	2014	2015	2016	2017
Rutherglen	Roadside	Automatic	0	0	36.0	40.6	37.0	48.0	N/A
East Kilbride Whirlies	Roadside	Automatic	85	85	29.0	35.0	33.0	37.0	29.0
Lanark	Kerbside	Automatic	96	96	25.0	22.0	21.0	24.0	20.0
Hamilton	Roadside	Automatic	99	99	35.0	37.0	35.0	34.0	31.0
Uddingston	Roadside	Automatic	98	98	27.0	29.0	29.0	29.0	27.0
Cambuslang	Kerbside	Automatic	97	97	-	-	33.0	<b>40.0</b> (25.0)	36.0
Raith Interchange 2	Rural	Automatic	72	72	-	-	-	31.0	24.0
1	Kerbside	Diffusion Tube	100	100	29.7	23.7	32.3	36.0	23.9
2	Roadside	Diffusion Tube	100	100	-	-	No result	18.0	16.0
3	Kerbside	Diffusion Tube	50	50	33.2	30.6	36.2	<b>46.0</b> (37.0)	27.3*
4	Kerbside	Diffusion Tube	100	100	-	-	34.0	34.0	29.7
5	Urban Background	Diffusion Tube	100	100	-	-	6.6	12.0	7.2
6	Roadside	Diffusion Tube	75	75	40.3	34.1	38.2	36.0	36.1
7	Roadside	Diffusion Tube	75	75	19.4	14.8	18.5	19.0	20.7
8	Kerbside	Diffusion Tube	75	75	-	-	-	-	36.8
9	Kerbside	Diffusion Tube	75	75	-	-	-	-	34.2
10	Kerbside	Diffusion Tube	75	75	-	-	-	-	31.5
11	Kerbside	Diffusion Tube	67	67	-	-	21.7	25.0	16.2*
12	Kerbside	Diffusion Tube	75	75	39.2	32.6	37.2	<b>41.0</b> (39.0)	39.6
13	Kerbside	Diffusion Tube	75	75	-	-	28.8	31.0	25.2
14	Roadside	Diffusion Tube	67	67	29.2	27.3	27.9	31.0	27.2*
15	Kerbside	Diffusion Tube	75	75	-	-	19.6	18.0	16.3
16	Kerbside	Diffusion Tube	75	75	-	-	No result	32.0	25.8
17	Roadside	Diffusion Tube	75	75	-	-	No result	30.0	27.6
18	Kerbside	Diffusion Tube	58	58	-	-	27.4	33.0	24.7*
19	Roadside	Diffusion Tube	67	67	-	-	32.4	37.0	31.1*

# Table A.3 – Annual Mean NO<sub>2</sub> Monitoring Results

			Valid Data	Valid Data	NO <sub>2</sub> A	Annual Mea	in Concent	ration (µg.r	n <sup>-3</sup> ) <sup>(3)</sup>
Site ID	Site Type	Monitoring Type	Capture for Monitoring Period (%) <sup>(1)</sup>	Capture 2017 (%) <sup>(2)</sup>	2013	2014	2015	2016	2017
20	Roadside	Diffusion Tube	67	67	-	-	19.8	28.0	21.3*
21	Roadside	Diffusion Tube	67	67	-	-	26.2	33.0	27.9*
22	Kerbside	Diffusion Tube	67	67	-	-	14.6	31.0	26.6*
23	Roadside	Diffusion Tube	67	67	-	-	31.6	35.0	29.9*
24	Roadside	Diffusion Tube	67	67	-	-	31.2	30.0	31.4*
25	Roadside	Diffusion Tube	58	58	-	-	14.4	23.0	22.5*
26	Roadside	Diffusion Tube	67	67	-	-	44.6	<b>53.0</b> (47.0)	47.0* (42.3)
27	Roadside	Diffusion Tube	58	58	34.1	39.5	35.3	36.0	30.7*
28	Urban Background	Diffusion Tube	67	67	12.2	12.5	17.8	14.0	17.1*
29	Urban Background	Diffusion Tube	75	75	21.5	19.4	20.0	21.0	20.5
30	Kerbside	Diffusion Tube	75	75	-	-	30.9	<b>40.0</b> (29.2)	32.9
31	Roadside	Diffusion Tube	67	67	-	-	No result	31.0	29.2*
32	Roadside	Diffusion Tube	75	75	-	-	No result	<b>56.0</b> (55.0)	49.6 (48.5)
33	Roadside	Diffusion Tube	75	75	-	-	28.8	33.0	23.5
34	Roadside	Diffusion Tube	75	75	-	-	24.8	27.0	19.8
35	Kerbside	Diffusion Tube	75	75	-	-	18.4	22.0	20.0
36	Urban Background	Diffusion Tube	58	58	-	-	No result	23.0	22.3*
37	Roadside	Diffusion Tube	75	75	29.8	26.5	24.0	28.0	26.3
38	Roadside	Diffusion Tube	75	75	33.3	32.8	31.5	33.0	31.7
39	Kerbside	Diffusion Tube	75	75	27.5	24.6	22.1	27.0	21.1
40	Kerbside	Diffusion Tube	58	58	-	-	-	-	27.7

Notes: Exceedances of the NO<sub>2</sub> annual mean objective of 40µg.m<sup>-3</sup> are shown in **bold**.

NO2 annual means exceeding 60µg.m<sup>-3</sup>, indicating a potential exceedance of the NO2 1-hour mean objective are shown in bold and underlined.

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

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

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

() Distance corrected NO<sub>2</sub> annual mean concentrations are presented in brackets. Where an exceedance is measured at a monitoring site which is not representative of public exposure, the procedure specified in paragraphs 7.77 to 7.79 of LAQM.TG16 has been used to estimate the concentration at the nearest receptor.

\* Annualised

#### Table A.4 – 1-Hour Mean NO<sub>2</sub> Monitoring Results

			Valid Data	Valid Data         NO <sub>2</sub> 1-Hour Means > $200 \mu g.m^{-3}$ (3)           Capture 2017         2013         2014         2015         2016					
Site ID	Site Type	Monitoring Type	Capture for Monitoring Period (%) <sup>(1)</sup>	Capture 2017 (%) <sup>(2)</sup>	2013	2014	2015	2016	2017
Rutherglen	Roadside	Automatic	0	>75	1	0	0	0	-
East Kilbride Whirlies	Roadside	Automatic	85	85	5	7	5	1	1
Lanark	Kerbside	Automatic	96	96	0	0	0	0	0
Hamilton	Roadside	Automatic	99	99	0	0	0	0	0
Uddingston	Roadside	Automatic	98	98	0	0	0	0	0
Cambuslang	Kerbside	Automatic	97	97	-	-	-	12	1
Raith Interchange 2	Rural	Automatic	72	72	-	-	-	0	0

Notes: Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg.m<sup>-3</sup> 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 99.8<sup>th</sup> percentile of 1-hour means is provided in brackets.

		Valid Data Capture	Valid Data	<b>PM</b> 10	o Annual Me	an Concent	tration (µg.m	1 <sup>-3</sup> ) <sup>(3)</sup>
Site ID	Site Type	for Monitoring Period (%) <sup>(1)</sup>	Capture 2017 (%) (2)	2013	2014	2015	2016	2017
Rutherglen	Roadside	96	96	19	20	18	17	12
East Kilbride Whirlies	Roadside	97	97	14	18	16	16	10
Lanark	Kerbside	96	96	-	-	15	11	10
Hamilton	Roadside	93	93	13	16	17	n/a	11
Uddingston	Roadside	98	98	-	-	11	9	11
Cambuslang	Kerbside	97	97	-	-	16	15	12
Raith Interchange 2	Rural	95	95	-	-	-	16	13

#### Table A.5 – Annual Mean PM<sub>10</sub> Monitoring Results

Notes: Exceedances of the PM  $_{10}$  annual mean objective of  $18 \mu g.m^{\text{-}3}$  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.

Site ID Rutherglen		Valid Data Capture for	Valid Data	PM <sub>10</sub> 24-Hour Means > 50µg.m <sup>-3 (3)</sup>							
Site ID	Site Type	Monitoring Period (%) <sup>(1)</sup>	Capture 2017 (%) (2)	2013	2014	2015	2016	2017			
Rutherglen	Roadside	96	96	9	1	5	1	1			
East Kilbride Whirlies	Roadside	97	97	0	2	4	0	0			
Lanark	Kerbside	96	96	-	-	1	0	0			
Hamilton	Roadside	93	93	0	0	3	0	0			
Uddingston	Roadside	98	98	-	-	2	0	0			
Cambuslang	Kerbside	97	66	-	-	5	0	0			
Raith Interchange 2	Rural	95	95	-	-	-	0	0			

Table A.6 – 24-Hour Mean PM<sub>10</sub> Monitoring Results

Notes: Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg.m<sup>-3</sup> 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 – Ann	ual Mean	PM2.5 Moni	toring Results
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		Valid Data Capture	Valid Data	PM <sub>2.5</sub> Annual Mean Concentration (µg.m <sup>-3</sup> ) <sup>(3)</sup>						
Site ID	Site Type	for Monitoring Period (%) <sup>(1)</sup>	Capture 2017 (%) (2)	2013	2014	2015	2016	2017		
Rutherglen	Roadside	91	85	-	-	-	-	6		
East Kilbride Whirlies	Roadside	83	77	-	-	-	-	4		
Lanark	Kerbside	96	96	-	-	5	7	6		
Hamilton	Roadside	83	77	-	-	-	-	5		
Uddingston	Roadside	98	98	-	-	6	5	6		
Cambuslang	Kerbside	66	66	-	-	-	-	0		

Notes: Exceedances of the PM10 annual mean objective of 10µg.m<sup>-3</sup> are shown in **bold**.

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

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

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



Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations at Automatic Sites (2013 to 2017)

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Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations at Roadside Sites (2013 to 2017)

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Figure A.3 – Trends in Annual Mean NO<sub>2</sub> Concentrations at Kerbside Sites (2013 to 2017)

Figure A.4 – Trends in Annual Mean NO<sub>2</sub> Concentrations at Urban Background Sites (2013 to 2017)



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Figure A.5 – Trends in Annual Mean PM<sub>10</sub> Concentrations at Automatic Sites (2013 to 2017)





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# Appendix B: Full Monthly Diffusion Tube Results for 2017

### Table B.1 – NO2 Monthly Diffusion Tube Results for 2017

	NO <sub>2</sub> Mean Concentrations (µg.m <sup>-3</sup> )													
													Annua	I Mean
Site iD	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
1	1.3	41.7	33.9	25.2	22.5	21.4	17.0	19.8	26.5	24.6	54.7	33.7	26.9	23.9
2	11.4	29.5	22.7	15.3	13.6	11.3	9.1	11.4	17.5	23.5	24.3	26.1	18.0	16.0
3	1.7	43.8	50.5	21.5	-	-	-	-	-	-	70.8	49.3	39.6	27.3
4	32.9	48.5	43.9	35.5	30.5	29.2	25.9	28.4	36.0	37.0	9.9	42.3	33.3	29.7
5	6.4	8.4	5.2	3.1	4.4	3.7	3.5	3.7	6.4	6.6	35.9	10.3	8.1	7.2
6	26.1	25.4	52.0	-	-	-	29.4	28.8	44.1	38.9	64.5	53.6	40.5	36.1
7	18.9	50.1	55.0	-	-	-	9.4	11.5	13.8	19.6	32.2	31.2	23.2	20.7
8	32.2	50.0	100.1	-	-	-	24.7	27.6	31.8	37.5	49.6	49.4	41.4	36.8
9	31.3	53.2	90.0	-	-	-	26.4	29.2	32.3	34.3	41.6	44.3	38.4	34.2
10	20.5	16.8	92.0	-	-	-	25.1	27.9	32.9	34.6	41.2	48.1	35.4	31.5
11	21.1	8.3	<1	-	-	-	13.8	14.7	<1	-	29.9	34.8	20.4	16.2
12	40.6	42.4	61.1	-	-	-	31.5	31.3	39.5	43.2	62.0	54.5	44.5	39.6
13	31.1	31.3	33.7	-	-	-	19.1	19.0	26.6	27.9	41.5	39.3	28.3	25.2
14	-	21.6	28.5	-	-	-	24.7	21.8	26.9	29.8	44.1	42.8	30.0	27.2
15	16.6	43.0	25.6	-	-	-	8.8	11.6	13.1	16.3	21.4	27.1	18.3	16.3
16	38.7	45.0	32.2	-	-	-	16.3	19.3	22.0	27.8	42.7	45.3	29.0	25.8

		NO <sub>2</sub> Mean Concentrations (µg.m <sup>-3</sup> )												
													Annua	al Mean
Site ID	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted
17	35.1	43.2	33.2	-	-	-	18.4	22.0	26.7	28.7	47.1	41.8	31.0	27.6
18	26.2	47.0	-	-	-	-	18.6	16.2	25.8	21.1	-	49.2	29.2	24.7
19	45.3	31.8	-	-	-	-	29.8	32.7	36.1	37.6	43.3	46.3	37.9	31.1
20	24.2	37.8	-	-	-	-	16.1	17.9	22.9	27.7	29.4	31.8	26.0	21.3
21	45.7	30.2	-	-	-	-	17.8	19.6	28.3	34.3	47.3	49.1	34.0	27.9
22	38.3	42.1	-	-	-	-	18.9	22.1	28.7	27.3	41.3	41.0	32.5	26.6
23	40.7	33.8	-	-	-	-	20.7	29.9	32.2	40.1	50.7	43.9	36.5	30.0
24	42.6	24.6	-	-	-	-	21.7	23.9	31.4	58.3	60.3	43.1	38.2	31.4
25	-	53.8	-	-	-	-	12.7	12.1	15.1	19.6	24.6	34.7	24.7	22.5
26	69.6	37.9	-	-	-	-	97.9	45.3	55	56.8	17.9	77.4	57.2	47.0
27	57.8	12.4	-	-	-	-	-	32.3	31.8	39.5	56.2	53.0	40.4	30.7
28	17.2	24.2	-	-	-	-	4.9	60.6	9.8	9.9	17.9	22.5	20.9	17.1
29	24.2	56.2	<1	-	-	-	12.8	16.1	17.1	19.0	28.4	35.7	23.0	20.5
30	41.2	37.4	42.7	-	-	-	15.3	32.3	33.6	39.7	47.5	54.7	37.0	32.9
31	-	73.4	34.0	-	-	-	27.5	16.7	19.5	21.8	30.3	34.6	32.2	29.2
32	39.2	38.3	55.5	-	-	-	33.5	63.0	80.3	59.5	109.2	58.0	55.7	49.6
33	32.0	38.3	29.6	-	-	-	16.0	19.7	26.1	27.7	31.6	35.1	26.4	23.5
34	25.4	26.7	13.3	-	-	-	14.3	17.5	21.2	25.5	31.1	31.5	22.2	19.8
35	24.2	33.9	21.2	-	-	-	12.7	16.7	20.9	21.2	29.5	41.7	22.4	20.0

		NO <sub>2</sub> Mean Concentrations (μg.m <sup>-3</sup> )													
Sita ID													Annua	al Mean	
Site ID	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted	
36	23.8	36.8	47.8	-	-	-	13.0	-	16.4	-	33.3	-	28.5	22.3	
37	27.1	43.7	30.9	-	-	-	19.9	18.7	25.8	27.8	47.1	44.1	29.6	26.3	
38	37.9	43.2	42.5	-	-	-	20.7	29.1	32.0	32.6	52.7	48.9	35.6	31.7	
39	19.8	36.0	26.2	-	-	-	16.4	15.8	24.1	24.7	33.0	36.6	23.7	21.1	
40	-	0	35.9	-	-	-	18.6	22.4	24.5	27.8	40.9	33.5	29.1	27.7	

(1) See Appendix C for details on bias adjustment

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

#### QA/QC of Automatic Monitoring

All South Lanarkshire Council's automatic monitoring sites are calibrated and audited by Ricardo Energy & Environment whereby monitoring data are managed to the same procedures and standards as AURN sites.

#### PM Monitoring Adjustment

PM<sub>10</sub> and PM<sub>2.5</sub> measurements were made using either TEOM analysers fitted with FDMS units, or FIDAS analysers. All PM measurement data were fully ratified by Ricardo Energy & Environment to AURN standards.

#### QA/QC of Diffusion Tube Monitoring Data

All passive diffusion tubes (PDT) for NO<sub>2</sub> measurements were prepared and analysed by Edinburgh Scientific Services. The PDTs were prepared using the 50% triethanolamine (TEA) in water method. Edinburgh Scientific Services is a UKAS accredited laboratory with documented Quality Assurance/Quality Control (QA/QC) procedures for diffusion tube analysis.

Edinburgh Scientific Services participates in the HSL AIR PT rounds. The percentage (%) of results submitted which were subsequently determined to be satisfactory during the last five rounds in 2016/2017 based upon a z-score of  $< \pm 2$  were as follows:

- January February 2017 100%
- April May 2017 100%
- July August 100%
- September October 100%
- January February 100%

#### **Diffusion Tube BIAS Adjustment Factors**

The bias adjustment factor of 0.89 from the latest version of the combined national database of adjustment factors was used to adjust the 2017 diffusion tube results. This adjustment factor was considered most appropriate because:

 Overall tube precision at the co-location monitoring site at Whirlies, East Kilbride was good, although automatic monitoring data was poor overall. Therefore, the local BIAS adjustment was not considered reliable to use.  The national database adjustment factor of 0.89 is more consistent with the bias adjustment factors applied to the South Lanarkshire Council diffusion tube results in recent years.

National Diffusion Tube	e Bias Adju	stment	Fac	tor Spreadsheet			Spreadsh	ieet Ver	sion Numb	er: 03/18
Follow the steps below in the correct orde	to show the results	of <u>relevant</u> c	o-locat	ion studies				This	spreadshe	eet will be
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.						updat LAOI	ted at the e 2018 A Helpdesi	nd of June <u>(Website</u>		
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.						al Physic	al Laborato	ry. Original		
Step 1:	Step 2:	Step 3:			S	itep 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 <sup>2</sup> 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.	lf a year is not shown, we have no data <sup>2</sup>	J If you have your own co-location study then see footnote. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953							
Analysed By <sup>1</sup>	Method Tar hda yawrzele ctian, chaare All) fram the paprup lirt	Year <sup>5</sup> To unde your relection, choore (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>s</sup> )	Bias (B)	Tube Precision ®	Bias Adjustment Factor (A) (Cm/Dm)
Edinburgh Scientific Services	50% TEA in acetone	2017	R	Stirling Council	10	25	23	10.0%	G	0.91
Edinburgh Scientific Services	50% TEA in acetone	2017	KS	Marylebone Road Intercomparison	12	91	79	15.4%	G	0.87
Edinburgh Scientific Services	50% TEA in acetone	2017		Overall Factor <sup>3</sup> (2 studies) Use 0.83					0.89	

#### Figure C.1 National BIAS Adjustment

#### **Distance Drop off corrections**

Distance correction was applied to NO<sub>2</sub> monitoring data where an annual mean of 40µg/m<sup>3</sup> or above was measured, and where the monitoring location is not representative of relevant human exposure. Where required, the LAQM NO<sub>2</sub> distance drop off calculator was used. The results are presented below.

Figure (	C.2	Distance	Drop	Off	Calculator

Enter data into the pink cells							
Distance (m)		ice (m)	NO <sub>2</sub> Annual	Mean Concent	ration (µg/m³)		
Site Name/ID	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	Comment	
26.0	5.6	8.9	14.4	47.0	42.3	Predicted concentration at Receptor above AQS objective.	
32.0	3.6	4.0	11.8	49.6	48.5	Predicted concentration at Receptor above AQS objective.	

# Short term to long term adjustment of measurements with annual data capture less than 75%

For measurement sites where the annual data capture was less than 75%, the shortterm period means were adjusted to annual means using the method recommended in TG(16) Box 7.9. Details of the adjustment ratios calculated for various period means relevant to the 2017 South Lanarkshire Council measurements are presented in Table C.1 to Table C.11 below.

#### Table C.1 Annualisation of NO<sub>2</sub> Diffusion Tube 3

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	33	0.76
Eskdalemuir	2	2.5	0.79
St Leonards	20	25.9	0.77
Average Ratio (Ra)		0.77	
Bias adjusted Period Me	35.2		
Annualised Annual Mea		27.3	

#### Table C.2 Annualisation of NO<sub>2</sub> Diffusion Tube 11

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	28.9	0.86
Eskdalemuir	2	2.2	0.91
St Leonards	20	22.2	0.90
Average Ratio (Ra)	0.89		
Bias adjusted Period Me	18.2		
Annualised Annual Mea	16.2		

#### Table C.3 Annualisation of NO<sub>2</sub> Diffusion Tube 14

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	27	0.93
Eskdalemuir	2	1.7	1.14
St Leonards	20	20.4	0.98
Average Ratio (Ra)	1.02		
Bias adjusted Period Me	26.7		
Annualised Annual Mean	27.2		

#### Table C.4 Annualisation of NO<sub>2</sub> Diffusion Tube 18

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	26.6	0.94
Eskdalemuir	2	2.1	0.93
St Leonards	20	20.2	0.99
Average Ratio (Ra)		0.95	
Bias adjusted Period Me	25.9		
Annualised Annual Mea	24.7		

Rackground Sitos	Annual Mean 2017	Period Mean 2017	Ratio (Am/Pm)	
Background Siles	(Am)	(Pm)		
	(/)			
Glasgow Townhead	25	28	0.89	
Eskdalemuir	2	2.2	0.93	
St Leonards	20	21.1	0.95	
Average Ratio (Ra)			0.92	
Bias adjusted Period Me	ean (µg.m <sup>-3</sup> ) – Tube 19		33.7	
Annualised Annual Mean	n (µg.m <sup>-3</sup> ) - Tube 19		31.1	
Bias adjusted Period Me	ean (µg.m <sup>-3</sup> ) – Tube 20		23.1	
Annualised Annual Mean	n (µg.m <sup>-3</sup> ) - Tube 20		21.3	
Bias adjusted Period Me	ean (µg.m <sup>-3</sup> ) – Tube 21		30.3	
Annualised Annual Mean	n (µg.m <sup>-3</sup> ) - Tube 21		27.9	
Bias adjusted Period Me	ean (µg.m <sup>-3</sup> ) – Tube 22		32.5	
Annualised Annual Mean	n (µg.m <sup>-3</sup> ) - Tube 22		28.9	
Bias adjusted Period Me	ean (µg.m <sup>-3</sup> ) – Tube 23		32.5	
Annualised Annual Mea	n (µg.m <sup>-3</sup> ) - Tube 23		30.0	
Bias adjusted Period Me	34.0			
Annualised Annual Mean	31.4			
Bias adjusted Period Mean (µg.m <sup>-3</sup> ) – Tube 26 50.9				
Annualised Annual Mean (µg.m <sup>-3</sup> ) - Tube 26 47.0				
Bias adjusted Period Mean (µg.m <sup>-3</sup> ) – Tube 28 18.6				
Annualised Annual Mean	17.1			

Table C.5 Annualisation of NO<sub>2</sub> Diffusion Tube 19-24, 26, 28

#### Table C.6 Annualisation of NO<sub>2</sub> Diffusion Tube 25

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	26.7	0.94
Eskdalemuir	2	1.8	1.14
St Leonards	20	20	1.00
Average Ratio (Ra)	1.02		
Bias adjusted Period Me	21.9		
Annualised Annual Mean	22.5		

#### Table C.7 Annualisation of NO<sub>2</sub> Diffusion Tube 27

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	30.3	0.83
Eskdalemuir	2	2.3	0.85
St Leonards	20	22.7	0.88
Average Ratio (Ra)	0.85		
Bias adjusted Period Me	36.0		
Annualised Annual Mea	30.7		

### Table C.8 Annualisation of NO<sub>2</sub> Diffusion Tube 31

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	27	0.93
Eskdalemuir	2	1.7	0.14
St Leonards	20	20.4	0.98
Average Ratio (Ra)	1.02		
Bias adjusted Period Me	28.7		
Annualised Annual Mean	29.2		

#### Table C.9 Annualisation of NO<sub>2</sub> Diffusion Tube 36

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	28	0.89
Eskdalemuir	2	2.4	0.83
St Leonards	20	21.9	0.91
Average Ratio (Ra)		0.88	
Bias adjusted Period Me	25.4		
Annualised Annual Mea	22.3		

#### Table C.10 Annualisation of NO<sub>2</sub> Diffusion Tube 40

Background Sites	Annual Mean 2017 (Am)	Period Mean 2017 (Pm)	Ratio (Am/Pm)
Glasgow Townhead	25	27	0.93
Eskdalemuir	2	1.5	1.31
St Leonards	20	20.5	0.98
Average Ratio (Ra)			1.07
Bias adjusted Period Mean (µg.m <sup>-3</sup> )			25.9
Annualised Annual Mean (µg.m <sup>-3</sup> )			27.7

## **Appendix D: Monitoring Site Locations**

Figure D.1: Blantyre and North Hamilton Diffusion tube sites





#### Figure D.2: Bothwell Diffusion tube sites



Figure D.3: Carluke Diffusion tube sites



Figure D.4: East Kilbride monitoring sites









#### Figure D.7: Lanark monitoring sites





#### Figure D.8: Larkhall diffusion tube sites



Figure D.9: Rutherglen and Cambuslang monitoring sites



#### Figure D.10: Uddingston 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 <sub>2</sub>	Nitrogen Dioxide	
NOx	Nitrogen Oxides	
PM10	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less	
PM2.5	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less	
QA/QC	Quality Assurance and Quality Control	
SO <sub>2</sub>	Sulphur Dioxide	

## References

Please provide a list of all documents referred to in the report.

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