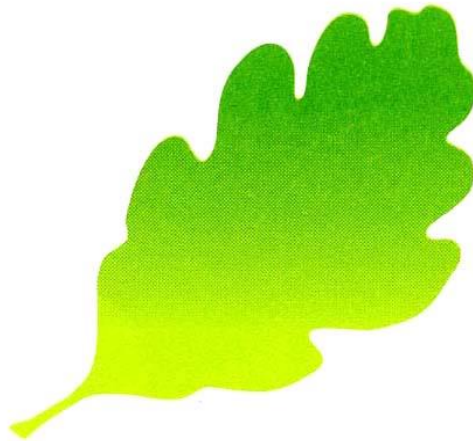


Annual Progress Report (APR)

Midlothian



2023 Air Quality Annual Progress Report (APR) for Midlothian Council

In fulfilment of Part IV of the Environment Act 1995, as amended by the
Environment Act 2021

Local Air Quality Management

26 July, 2023

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Executive Summary: Air Quality in Our Area

Air Quality in Midlothian Council

At the latest updated figures in June 2021, Midlothian's population was shown to be just over 94,500. It is predicted that this will rise to over 100,000 by 2028. The area comprises a number of small and medium sized towns, together with many small villages and hamlets. Penicuik, Bonnyrigg and Dalkeith are the largest towns; Loanhead, Gorebridge, Mayfield, Newtongrange and Pathhead are smaller settlements. A schematic map of Midlothian showing villages, towns and roads within the district is shown in Appendix D, Figure 1. The new town of Shawfair at the south eastern "wedge" between Danderhall and the City Bypass is currently under development and will include approximately 4,000 new homes, schools, commercial and retail use.

Midlothian is largely a countryside setting. The area stretches from the Pentland Hills to the Moorfoots and Lammermuirs, and comprises a gently sloping plain, much of it intensively farmed, rising to moorland with upland country beyond. Much of this landscape is protected by policy designations such as the Green Belt.

There are currently no large industrial processes in very close proximity to housing in Midlothian and the main issues with regards to air quality are due to road traffic emissions, particularly in the town and village centres. Another issue is domestic solid fuel combustion due to the rural setting of Midlothian and limited mains gas supply to some villages. This issue was addressed in the village of Pathhead with the installation of a new gas main.

The report sets out the results of air quality monitoring carried out by Midlothian Council since the Annual Progress Report in 2022 and considers the potential impacts from a range of sources such as road traffic and other transport emissions, industrial processes, commercial and domestic fuel use and fugitive emission sources.

A network of nitrogen dioxide diffusion tubes is maintained throughout the district. The monitoring results indicate that concentrations measured at all locations are well within the annual mean air quality objective.

No new issues were identified in 2022 as requiring further assessment and there are currently no air quality issues in Midlothian. Appraisal of Midlothian's 2022 APR recommended review of our Nitrogen Dioxide tube sites and this will be carried out in time for the next APR in 2024.

Actions to Improve Air Quality

Some years ago Midlothian Council achieved significant improvements in air quality in Dalkeith and in the village of Pathhead, two areas of previous concern.

The improvement in Pathhead in terms of PM₁₀, allowed Midlothian Council to revoke the Pathhead AQMA which was declared in 2008. There are no outstanding Air Quality Managements Areas in Midlothian.

Midlothian Council forms part of East Central Scotland Vehicle Emissions Partnership, together with West Lothian Council, East Lothian Council, Falkirk Council, Stirling Council and Scottish Government. The remit of the Vehicle Emissions Partnership is to help reduce vehicle emissions by encouraging drivers to switch off their engine whenever possible, educating the general public and by handling idling complaints. Further information is available on the partnership website at <http://switchoffandbreathe.org>

Midlothian Council supports and encourages the development of a 'green network' to promote active travel by walking and cycling and which will form part of the Central Scotland Green Network. Further information is available in the Midlothian Council Travel Plan, which is available on Midlothian Council website: www.midlothian.gov.uk. Midlothian Council is currently updating their travel plan. The current plan was due to be updated in 2021/22 but was delayed.

Initiatives to move towards a cleaner Council fleet have been in place for several years. Council staff have access to electric cars to use on local business trips, providing an eco-friendly way of travelling. This fleet has recently been increased.

Midlothian Council encourages staff to actively travel to work, promoting a pool bike scheme to staff and promoting interest free loans to purchase a bicycle through the tax free Government 'Bike Purchase Scheme'.

Local Priorities and Challenges

In terms of local priorities, Midlothian Council is committed to reviewing the diffusion tube locations and implement changes prior to submission of the APR 2024. The last revision was carried out in 2019 and implemented in early 2020. This introduced new NO₂ monitoring locations close to schools and close to new and proposed housing developments. The results from these locations and the existing NO₂ site are discussed in this Air Quality Report.

Staff shortages, the continued effects of the Covid -19 pandemic and the need for social distancing resulted in NO₂ tubes not being changed in the first half of 2022 in Midlothian. A solution, in terms of resource to undertake this work, was found in term of Edinburgh Scientific Services taking over the monthly tube changes and full data is available from July 2022 onwards. This has resulted in the need for annualisation of the data for 2022.

Other than this, Midlothian Council had no specific challenges for the following year beyond the statutory monitoring and reporting requirements.

How to Get Involved

Information on Local Air Quality Management in Midlothian is available on the Council website at [Air quality | Midlothian Council](#). This information includes copies of the Council's air quality reports and a link to the Pathhead AQMA Revocation Order.

Further information can be obtained by contacting Environmental Health at:
environmentalhealth@midlothian.gov.uk

The website also contains a link to the national Air Quality in Scotland webpage, where members of the public can access historical monitoring data for Midlothian and sign up to receiving text / email alerts where poor air quality is forecast.

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1 Local Air Quality Management

This report provides an overview of air quality in Midlothian Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 Midlothian 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 Concentration	Air Quality Objective Measured as	Date to be Achieved by
Nitrogen dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
Nitrogen dioxide (NO ₂)	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
Particulate Matter (PM ₁₀)	18 µg/m ³	Annual mean	31.12.2010
Particulate Matter (PM _{2.5})	10 µg/m ³	Annual mean	31.12.2021
Sulphur dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
Sulphur dioxide (SO ₂)	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

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 publish and implement an Air Quality Action Plan (AQAP) within the shortest possible time and no later than 12 months of the date of AQMA Designation Order. The AQAP must set out measures the local authority intends to put in place in pursuit of the objectives within the shortest possible time. Measures should be provided with milestones and a final date for completion. The action plan itself should have a timescale for completion and for revocation of the AQMA. Where measures to reduce air pollution may require a longer timescale an action plan shall be reviewed and republished within five years of initial publication and then five-yearly thereafter.

A summary of AQMAs declared by Midlothian 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 [Air quality | Midlothian Council](#).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants & Air Quality Objectives	City /Town	Description	Date Declared	Date Revoked
Pathhead AQMA	PM ₁₀ annual mean	Pathhead, Midlothian	An area encompassing 2 square kilometres surrounding the village of Pathhead, Figure 2	30 April 2008	7 April 2014

2.2 Cleaner Air for Scotland 2

[Cleaner Air for Scotland 2 – Towards a Better Place for Everyone \(CAFS2\)](#) is Scotland's second air quality strategy. CAFS2 sets out how the Scottish Government and its partner organisations propose to further reduce air pollution to protect human health and fulfil Scotland's legal responsibilities over the period 2021 – 2026. CAFS2 was published in

July 2021 and replaces [Cleaner Air for Scotland – The Road to a Healthier Future \(CAFS\)](#), which was published in 2015. CAFS2 aims to achieve the ambitious vision for Scotland "to have the best air quality in Europe". A series of actions across a range of policy areas are outlined, a summary of which is available on the Scottish Government's website.

Progress by Midlothian Council against relevant actions for which local authorities are the lead delivery bodies within this strategy is demonstrated below.

2.2.1 Placemaking – Plans and Policies

Local authorities with support from the Scottish Government will assess how effectively air quality is embedded in plans, policies, City Deals and other initiatives, and more generally in cross departmental working, identifying and addressing evidence, skills, awareness and operational gaps.

Midlothian Council is currently updating their Travel Plan. The update will ensure that air quality is embedded within its objectives.

The current plan, which was originally programmed, to cover the period 2017-2021, is available on the website at [Midlothian Council Travel Plan](#). This plan promotes a reduction in single occupancy car trips (principally those that are part of the daily commute) as well as addressing car parking and car use in general. It also aims to make necessary car travel more sustainable. Travel planning, in line with the ongoing process of organisational change has been influenced by the change in work practices since the Covid-19 pandemic. Midlothian Council, the largest employer in Midlothian, now operates a hybrid working model where staff may work both from home and from offices. This has greatly reduced journey's by staff, linked to commuting. It has also reduced the pressure on car parking around Midlothian's main hubs of Midlothian and Fairfield Houses in the centre of Dalkeith.

At a regional level Midlothian Council is a member of SEStran, one of 7 regional transport partnerships. The regional transport strategy for South East Scotland sets out core work for the period 2008-2023. One of its main aims is to promote sustainable transport.

The Single Midlothian Plan 2023-27 details Midlothian's plans to be details will be healthier, safer, greener, have a wellbeing economy and be better connected. The plan gives the two biggest sources of carbon emissions in Midlothian as domestic uses (30.5%) and transport (27.5%) and aims to concentrate of reducing carbon emissions from these

two sources. It is planned to be achieved this by, among other actions, more active travel, support for electric vehicles and protection of green spaces.

The current Midlothian Council Local Development plan was produced in 2017. The Council are at the very start of a process which will deliver Local Development Plan 2. Engagement with local communities and other stakeholders has been completed and will inform the production of the MLDP2 Evidence Report. LDP2 will be based on the principals of National Planning Framework 4 (NPF4), which was published on 13th February 2023. NPF4 has a real focus on climate crisis, sustainability and biodiversity including renewable energy, living locally and the 20-minute neighbourhood, location and quality of different types of development.

2.2.2 Transport – Low Emission Zones

Midlothian Council has no Low Emission Zones established within the Local Authority area.

2.3 Implementation of Air Quality Action Plan(s) and/or measures to address air quality

Midlothian does not have an Air Quality Management Area and as such it does not have an Air Quality Action Plan.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date	Comments
1	Locating development where it can easily access the borders rail and other public transport	Transport Planning and Infrastructure + policy guidance and development control	Taken into account when allocating new sites in Midlothian	Midlothian Council	2017 onwards	Ongoing	
2	Vehicle idling	Vehicle idling	Publicity campaigns to discourage vehicle idling, targeting schools and other sensitive locations.	Joint East Central Vehicle Emissions Partnership	2017 - current	Ongoing	Continuing details can be found at http://switchoffandbreath.org

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date	Comments
3	Midlothian Council Travel plan	Promoting travel alternatives, , Vehicle Fleet Efficiency, Promoting Low Emission Transport	<p>Current Travel plan originally covered the period 2017 to 2021. Currently being updated.</p> <p>Electric fleet vehicles available for staff to use on local business trips.</p> <p>A tax free bike purchase scheme is available + entitlement to a class bike mileage for business trips made by bike</p>	Midlothian Council	2017 - 2021	ongoing	<p>25 public access EV charging points in MC area.</p> <p>4 new EV charging points to be installed in 2023.</p> <p>Funding claimed between 2020 to 2022 from Switched on Fleets fund over (SoF), managed by Energy Saving Trust. Helped fund installation of 14 EV charging points at MC buildings.</p> <p>The action plan will include a prioritised list of infrastructure projects to support walking, wheeling, cycling and multi-modal journeys.</p>

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date	Comments
4	Midlothian Hybrid working Policy	Promoting a reduction work related travel, travel out with peak times.	Hybrid working allows staff to spend much of their working time at home. This greatly reduces the number of commuting journeys for staff and reduces the pressure on car parking and congestion around the main Council Building Hubs of Midlothian and Fairfield Houses in the centre of Dalkeith.	Midlothian Council	2022- present	On going	

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date	Comments
5	Midlothian Local Development Plan 2017	Alternatives to private vehicle use	Incorporating high speed broadband connections and other digital technologies in new housing developments to facilitate home working and reduction in travel.	Midlothian Council	2017 onwards	Ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date	Comments
6	Midlothian Local Development Plan 2017	Transport Planning and Infrastructure	A requirement for cycle parking to be incorporated into the layout of new housing development.	Midlothian Council	2017 onwards	ongoing	

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date	Comments
7	Midlothian Local Development Plan 2017	Transport Planning and Infrastructure	The development and extension of the National Cycle Route Network	Midlothian Council	2017 onwards	Ongoing	New Local Plan development has begun.

Measure No.	Measure	Category	Focus	Lead Authority	Implementation Phase	Estimated Completion Date	Comments
8	Midlothian Local Development Plan 2017	Transport Planning and Infrastructure	Dedicated routes to encourage walking and cycling to work and for recreation and leisure.	Midlothian Council	2017 onwards	Ongoing	

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Midlothian Council does not undertake any automatic (continuous) monitoring within the authority's area.

3.1.2 Non-Automatic Monitoring Sites

Midlothian Council undertook non- automatic (passive) monitoring of NO₂ at 18 sites during 2022. **Error! Reference source not found.** 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.

3.1.3 Other Monitoring Activities

No other monitoring activities have been undertaken in 2022.

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Table A. in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40 µg/m³.

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B.

There are no exceedance of the air quality objective for NO₂ in 2022 or in any year proceeding this.

3.2.2 Particulate Matter (PM₁₀)

Midlothian Council does not monitor for PM₁₀.

3.2.3 Particulate Matter (PM_{2.5})

Midlothian Council does not monitor for PM_{2.5}.

3.2.4 Sulphur Dioxide (SO₂)

Midlothian Council does not monitor for SO₂.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Midlothian Council does not monitor for Carbon Monoxide, Lead and 1,3-Butadiene.

4 New Local Developments

There have been no major developments in Midlothian in 2022 which may adversely affect air quality.

4.1 Road Traffic Sources

In Midlothian in 2022 there have been no new changes to road traffic sources which may impact on air quality such as:

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

4.2 Other Transport Sources

In Midlothian, in 2022, there have been no other changes to major transport source such as:

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

4.3 Industrial Sources

There have been no major developments in Midlothian in 2022 which required AQIA or met the criteria of:

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

4.4 Commercial and Domestic Sources

In 2023 within Midlothian work will start on the Destination Hillend development. This development required an Environmental Impact Assessment of which an Air Quality Impact assessment (AQIA) formed part. This AQIA concluded that the development of Destination Hillend will have negligible impact on air quality in the surrounding area. There have been no other developments in 2022 within Midlothian which met the criteria of:

- Biomass combustion plant – individual installations.

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

4.5 New Developments with Fugitive or Uncontrolled Sources

There have been no development of new:

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

within Midlothian Council area within the calendar year 2022.

5 Planning Applications

In 2022 several planning applications were approved which may have an impact on local air quality.

22/00027/PPP is an application for a residential development with associated neighbourhood retail, commercial and/or community facilities at land in Mayfield, Dalkeith. An Environmental Impact Assessment (EIA) was required for this application. The Air Quality Impact Assessment provided as part of the EIA concluded that, in relation to pollutants from road traffic, no exceedances were predicted for any of the pollutants at future human receptors. The impact on existing receptors was concluded to be negligible at all but three receptors where there is a slight impact from NO₂ concentrations. Where this is the case, no exceedances were predicted. When assessed in terms of the EPUK and IAQM guidance, the impacts on local air quality conditions arising from increased traffic flows, as a result of the development, were described as not significant.

The site is adjacent to a waste recycling site licensed by SEPA under the Waste Management Licensing (Scotland) Regulation 2011. As part of this submission a detailed air quality impact assessment (AQIA), of the impacts of this facility, on future residents of the proposed development was carried out. This predicted that for the majority of the

proposed development there would be negligible impact. However, for receptors closest to the activities on the waste-recycling site there is slight potential for adverse effects because of dust emissions. The detailed assessment found this was not significant.

21/00252/PPP relates to an application for planning permission in principle for a residential development and associated works at Stobs Farm, Lady Brae, Gorebridge. An AQIA was submitted with the application in relation to the effects of road traffic on the proposed development. This found that the adverse air quality impacts would be negligible.

22/00856/PAC and 22/00853/SCR relate to a proposal of application notice for recycling facility and landfill operations at Middleton Lower Quarry Gorebridge. 22/00856/PAC related to the level of consultation required for the application and 22/00853/SCR to the need for an EIA for this application. The level of consultation was agreed and a decision was made that an EIA was not required for this application. However, an AQIA may be requested on full application.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Nitrogen dioxide levels were monitored at several locations across Midlothian using diffusion tubes. The results indicated that concentrations measured at all locations are well within the annual mean air quality objective.

Measured NO₂ concentrations at all non-automatic sites in 2022 were well below the statutory air quality objectives for both annual mean and short-term statutory objectives. Data capture at all sites was below 75% for the year. As laid out in section 7 of the LAQM Technical Guidance (TG22), it was therefore necessary to annualise the monitoring data.

Measured levels of NO₂ at all non-automatic sites show a decrease from 2021 levels. In 2022 all passive Diffusion Tubes measured NO₂ below the statutory annual mean objective. The highest reading Diffusion Tube (SN2) recorded an annual mean of 19.6 µg/m³ of NO₂ which is well below the statutory objective of 40 µg/m³. Similar to 2020 and 2021, Diffusion Tube sites in 2022 were still showing lower levels than were experienced pre COVID-19, in 2019. No NO₂ monitoring sites breached the short-term statutory objective in 2022.

6.2 Conclusions relating to New Local Developments

As in the last few years, a large number of sites in Midlothian are currently under development for housing, following allocation in the Midlothian Local Development plan. Sites within the wider Shawfair area, which contains the villages of Millerhill, Danderhall and Newton and extending to Cauldcoats Farm, close to the boundary with the City of Edinburgh Council continue to be developed.

As previously reported, the air quality report for the Cauldcoats development, (application for planning permission in principal, ref 14/00910/PPP) concluded that for all modelled scenarios, the predicted concentrations of NO₂ receptors and PM₁₀ following completion of the development are within the annual mean objectives at all modelled. The predicted impact at most modelled receptors is reported as being negligible however, at one receptor location, taking into account all proposed and committed development, a slight adverse impact is predicted. The report noted this can be mitigated through policies including TRANS5 of the Midlothian Local Development Plan, requiring electric vehicle charging stations and through planning conditions, requiring suitable walking and cycle routes linking the new housing with the proposed new primary school and the rest of Shawfair. The outcome will be reported in future LAQM reports.

As stated above, the development of residential properties adjacent to a waste recycling facility in Mayfield, Dalkeith has the potential to introduce receptors close to a facility, which is likely to produce dust, and there is predicted to be a slight potential for adverse effects at the closest receptors. Changes to this waste recycling facility have recently been undertaken without permission from either SEPA, as their regulator, or the Planning Authority. This may result in the impact on the future residents being more significant than has been predicted. Any development with this site will be reported in future annual progress reports.

6.3 Proposed Actions

The last detailed review of diffusion tube locations took place at the end of 2019. Advice from the appraisal of Midlothian's 2022 Annual Progress Report was to review monitoring locations again. It is planned that this review, in consultation with SEPA, will take place and any changes in monitoring locations made, prior to submission of the Annual Progress report in 2024. In the meantime, Midlothian Council will continue to monitor the concentration of NO₂ at the current locations spread throughout the district.

Appendix A: Monitoring Results

Table A.1 – 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)	Tube co-located with a Continuous Analyser?
BR1	Bonnyrigg	Roadside	330895	665229	NO ₂	N	0 m	1.5	N
BCR	Bonnyrigg	Roadside	331424	664808	NO ₂	N	0 m	1.5	N
BER	Bonnyrigg	Roadside	331798	665894	NO ₂	N	0 m	1.5	N
BD1	Dalkeith	Roadside	333055	667183	NO ₂	N	0.1 m	1.5	N
ED1	Dalkeith	Roadside	333206	667372	NO ₂	N	0.1 m	1.5	N
ND1	Dalkeith	Roadside	333410	667059	NO ₂	N	2 m	1.5	N
DL1	Dalkeith	Roadside	333247	667073	NO ₂	N	0 m	1.5	N
DDC	Dalkeith	Roadside	334887	667957	NO ₂	N	0 m	1.5	N
LH1	Loanhead	Roadside	328242	665585	NO ₂	N	2.3 m	0.9	N
SN2	Loanhead	Roadside	327262	666588	NO ₂	N	0 m	3.6	N
P2	Penicuik	Roadside	323677	661000	NO ₂	N	2.5 m	2.5	N
PBH	Penicuik	Roadside	324168	661503	NO ₂	N	0 m	1.5	N
PGP	Penicuik	Roadside	324824	662115	NO ₂	N	0 m	1.5	N
PD1	Pathhead	Roadside	339601	664172	NO ₂	N	3 m	1.5	N
LW1	Lasswade	Roadside	330343	666138	NO ₂	N	0m	1.5	N
LW2	Lasswade	Roadside	330470	666125	NO ₂	N	0m	0.5	N
SWS	Shawfair	Roadside	330309	669685	NO ₂	N	0m	1.5	N
SWN	Shawfair	Roadside	330662	670904	NO ₂	N	0m	1.5	N

Notes:

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

Table A.2 – Annual Mean NO₂ Monitoring Results (µg/m³)

Site ID	Site Type	Monitoring Type	Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%)	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2018	2019	2020	2021	2022*
DDC	Roadside	Diffusion Tube	42%	50%	N/C	N/C	7.1	6.1	4.5
BD1	Roadside	Diffusion Tube	50%	58%	26.6	20.7	19.0	19.5	15.3
ED1	Roadside	Diffusion Tube	50%	58%	32.4	28.4	21.3	23.1	18.5
ND1	Roadside	Diffusion Tube	50%	58%	26.2	21.7	22.3	21.6	19.5
DL1	Roadside	Diffusion Tube	50%	58%	27.4	17.9	21.5	20.8	16.8
SWS	Roadside	Diffusion Tube	42%	50%	22.1	17.6	14.3	15.8	7.7
SWN	Roadside	Diffusion Tube	50%	50%	N/C	N/C	21.4	18.0	16.6
P2	Roadside	Diffusion Tube	50%	58%	22.1	17.6	19.2	14.4	13.2
PBH	Roadside	Diffusion Tube	50%	50%	N/C	N/C	11.6	8.2	7.6
PGP	Roadside	Diffusion Tube	50%	50%	N/C	N/C	7.1	6.7	5.3
PD1	Roadside	Diffusion Tube	50%	42%	17.6	15.5	9.2	10.4	7.4
BR1	Roadside	Diffusion Tube	50%	58%	16.5	17.3	17.6	17.4	14.0
BCR	Roadside	Diffusion Tube	50%	50%	N/C	N/C	8.1	7.5	6.1
BER	Roadside	Diffusion Tube	50%	50%	N/C	N/C	13.8	8.8	7.7
LH1	Roadside	Diffusion Tube	50%	58%	23.8	18.1	17.0	12.6	11.7
SN2	Roadside	Diffusion Tube	50%	58%	28.6	22.4	26.5	21.7	19.6
LW1	Roadside	Diffusion Tube	50%	58%	23.6	17.9	20.9	16.5	13.6
LW2	Roadside	Diffusion Tube	50%	58%	30.6	31.6	28.0	23.2	19.5

Notes:

- (1) All means have been “annualised” as per LAQM.TG(22) as valid data capture for the full calendar year is less than 75%. See Appendix C for detail .
Annualised Annual Means for diffusion tubes have been corrected for bias.

Chart A.1 – Dalkeith Annual Mean NO₂ Monitoring Results

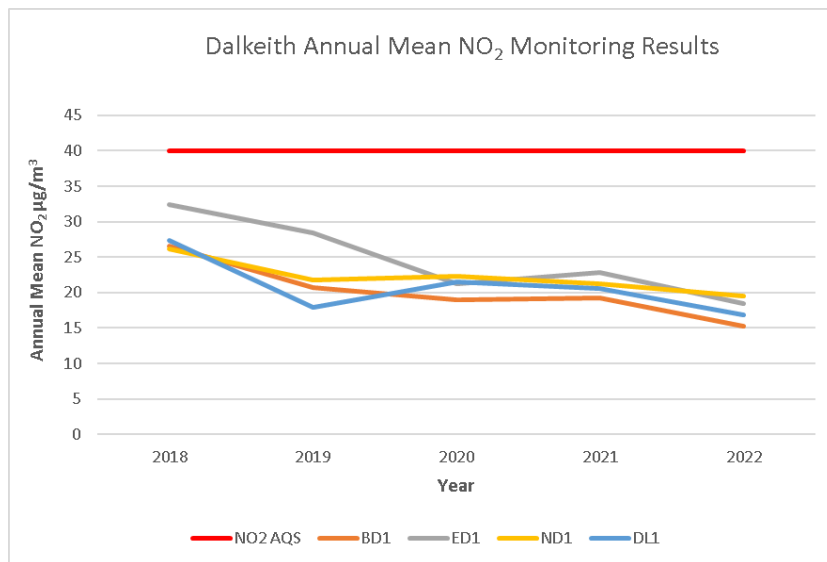


Chart A.2 – Lasswade Annual Mean NO₂ Monitoring Results

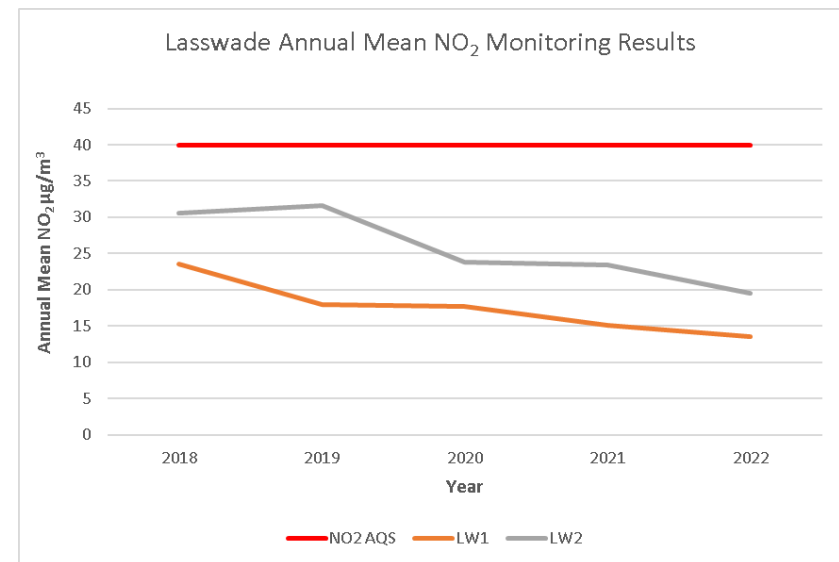


Chart A.3 – Loanhead Annual Mean NO₂ Monitoring Results

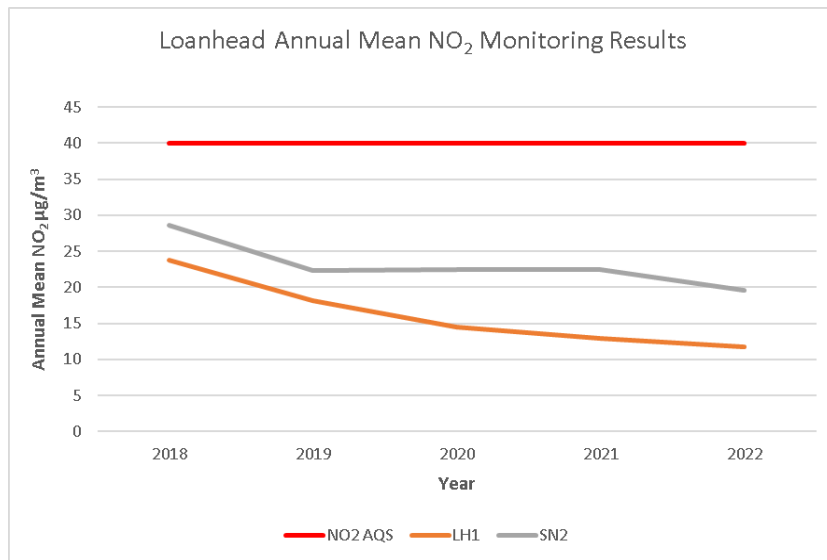


Chart A.4 – Penicuik, Pathhead and Bonnyrigg Annual Mean NO₂ Monitoring Results

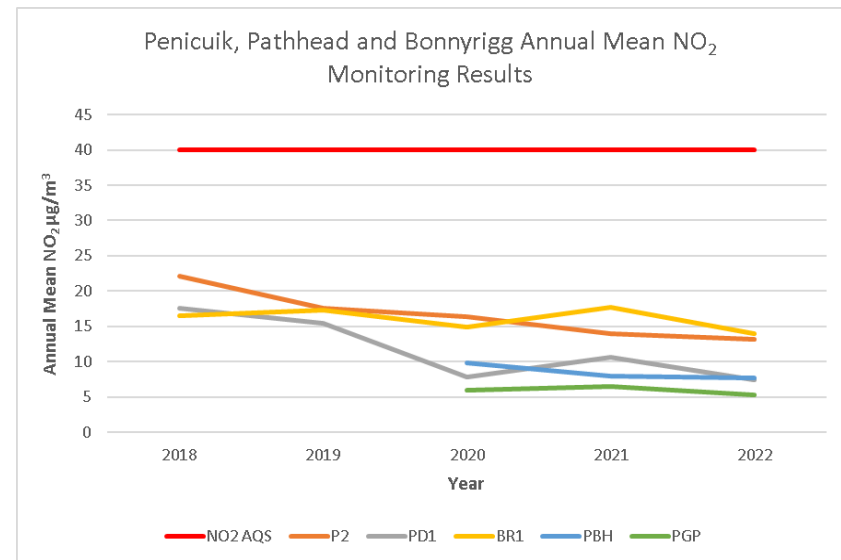
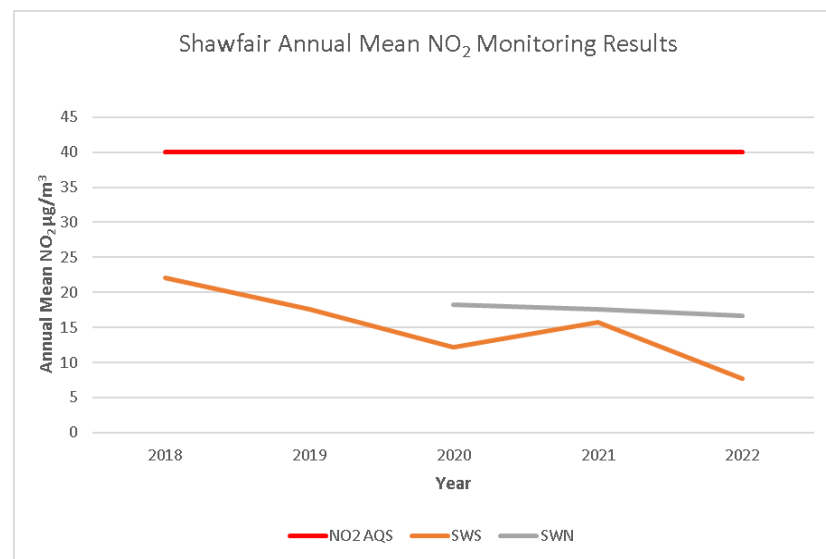


Chart A.5 – Shawfair Annual Mean NO₂ Monitoring Results



Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 –Raw NO₂ 2022 Monthly Diffusion Tube Results (µg/m³) – Non-Annualised

Site ID	NO ₂ Mean Concentrations (µg/m ³)														
	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Ave	Annual Mean	
														Bias	Bias Adjusted
DDC	-	-	-	-	-	-	6.3	5.7	6.8	5.9	10.7	-	7.1	0.81	5.7
BD1	-	-	-	-	-	-	16	18.4	23.8	19.7	22.9	21	20.3	0.81	16.4
ED1	-	-	-	-	-	-	18.2	22	29.3	22.4	27.6	27.6	24.5	0.81	19.9
ND1	-	-	-	-	-	-	19.6	22.4	25.5	27	31.4	29	25.8	0.81	20.9
DL1	-	-	-	-	-	-	17.5	20.7	23.5	23.7	25	23.5	22.3	0.81	18.1
SWS	-	-	-	-	-	-	9.8	-	11.9	4.3	20.1	15	12.2	0.81	9.9
SWN	-	-	-	-	-	-	19.2	22.6	18.1	19.4	28	24.8	22.0	0.81	17.8
P2	-	-	-	-	-	-	12.2	17	17	16.9	22.5	19.3	17.5	0.81	14.2
PBH	-	-	-	-	-	-	6.8	9.3	9.9	8.1	14.5	12	10.1	0.81	8.2
PGP	-	-	-	-	-	-	5.6	6.6	5.4	6.7	8.5	9.6	7.1	0.81	5.7
PD1	-	-	-	-	-	-	9.8	11.3	12.4	10	3.8	11.5	9.8	0.81	7.9
BR1	-	-	-	-	-	-	13.4	15.6	22.9	16.3	22.2	21	18.6	0.81	15.0
BCR	-	-	-	-	-	-	5	7.6	7	7.1	9.3	12.8	8.1	0.81	6.6
BER	-	-	-	-	-	-	2.6	9.2	9.2	10.1	14.7	15.1	10.2	0.81	8.2
LH1	-	-	-	-	-	-	11.6	15.6	16.5	13.7	18.6	17.2	15.5	0.81	12.6
SN2	-	-	-	-	-	-	18.5	21.1	23.4	24.5	35.1	33.1	25.95	0.81	21.0
LW1	-	-	-	-	-	-	14.6	16.7	17.7	16.8	19.2	23	18.0	0.81	14.6
LW2	-	-	-	-	-	-	19.6	25.1	29.7	22.9	30.2	27.3	25.8	0.81	20.9

Notes:

- (1) See Appendix C for details on bias adjustment.
- (1) Dash represents no data due to missing tube.

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

New or Changed Sources Identified Within Midlothian Council During 2022

Midlothian Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by Midlothian Council During 2022

Midlothian Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes are analysed by Edinburgh Scientific Services using the 50% triethanolamine (TEA) in acetone method.

ESS has confirmed that the procedures set out in the Harmonisation Practical Guidance are followed during the analysis. The laboratory is UKAS accredited for the analysis and also participates in the Workplace Analysis Scheme for Proficiency (WASP) scheme. ESS has reported that the results from the WASP scheme confirm that the laboratory is performing satisfactorily. The laboratory uses the 50% v/v triethanolamine (TEA) in acetone method where the adsorbent pads are dipped into this solution, dried and then inserted into the acrylic diffusion tubes. All exposure times and dates are recorded by Midlothian Council and sent to the laboratory with the exposed tubes. Midlothian Council also sends one unexposed tube with each batch to check that there has been no contamination during handling or analysis.

Diffusion Tube Annualisation

As laid out in section 7 of the LAQM Technical Guidance (TG22), where monitoring data capture is below 75% for the year, it is necessary to annualise the data. As shown below

in Table C.1, continuous monitoring sites within a radius of 50 miles from the MC monitoring area, with at least 85% data capture, have been selected for the annualisation process.

The annualisation ratio shown in Table C.2 was calculated by first taking the annual mean (Am) of each of the selected sites dividing that by the raw data period mean (Pm) for the relevant months of data to obtain a ratio between the Am and Pm for each site. The average of these ratios is the annualisation ratio. An example of this calculation is shown in box 7-8 of the TG22 guidance.

Diffusion Tube Bias Adjustment Factors

Midlothian Council have applied a local bias adjustment factor of 0.81 to the 2022 monitoring data. A summary of bias adjustment factors used by Midlothian Council over the past five years is presented in Table C.1.

The bias adjustment factor for this laboratory and method are listed in the Spreadsheet of Bias Adjustment Factors v.03/23 (Ref. 2) is 0.81. This is based on a co-location study at a kerbside site carried out by Marylebone Road. This factor has been chosen as it is based on tubes analysed by the laboratory at Edinburgh Scientific Services analyses where Midlothian’s Council’s NO₂ tubes are also analysed. Midlothian Council can no longer calculate its own bias adjustment factor following the decommissioning of the Dalkeith Monitoring Station.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	Local	03/23	0.81
2021	National	09/22	0.85
2020	National	09/22	0.85
2019	National	06/19	0.96
2018	National	06/18	0.81

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within Midlothian Council required distance correction during 2022.

Table C.2 – Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$)

Site ID	Annualisation Factor Peebles	Annualisation Factor Bush Estate	Annualisation Factor Currie	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
DDC	0.75	0.80	0.78	0.78	7.1	5.5	
BD1	0.91	0.96	0.93	0.93	20.3	18.9	
ED1	0.91	0.96	0.93	0.93	24.5	22.8	
ND1	0.91	0.96	0.93	0.93	25.8	24.0	
DL1	0.91	0.96	0.93	0.93	22.3	20.8	
SWS	0.75	0.80	0.78	0.78	12.2	9.5	
SWN	0.91	0.96	0.93	0.93	22.0	20.5	
P2*	0.91	0.96	0.93	0.93	17.5	16.3	
PBH	0.91	0.96	0.93	0.93	10.1	9.4	
PGP	0.91	0.96	0.93	0.93	7.1	6.6	
PD1	0.91	0.96	0.93	0.93	9.8	9.1	
BR1	0.91	0.96	0.93	0.93	18.6	17.3	
BCR	0.91	0.96	0.93	0.93	8.1	7.6	
BER	0.91	0.96	0.93	0.93	10.2	9.5	
LH1	0.91	0.96	0.93	0.93	15.5	14.5	
SN2	0.91	0.96	0.93	0.93	25.95	24.2	
LW1	0.91	0.96	0.93	0.93	18.0	16.8	
LW2	0.91	0.96	0.93	0.93	25.8	24.0	

Table C.3 – Local Bias Adjustment Calculations

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/23			
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 spreadsheet 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 2023 LAQM Helpdesk Website		
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ³ shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ²	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
Analysed By ¹	Method	Year ⁵	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision	Bias Adjustment Factor (A) (Cm/Dm)
Edinburgh Scientific Services	50% TEA in acetone	2022	KS	Marylebone Road Intercomparison	12	52	42	22.9%	G	0.81
Edinburgh Scientific Services	50% TEA in acetone	2022		Overall Factor³ (1 study)				Use		0.81

Notes: A single local bias adjustment factor has been used to bias adjust the 2022 diffusion tube results.

Figure 2 Extent of Revoked Air Quality Management Area, Pathhead

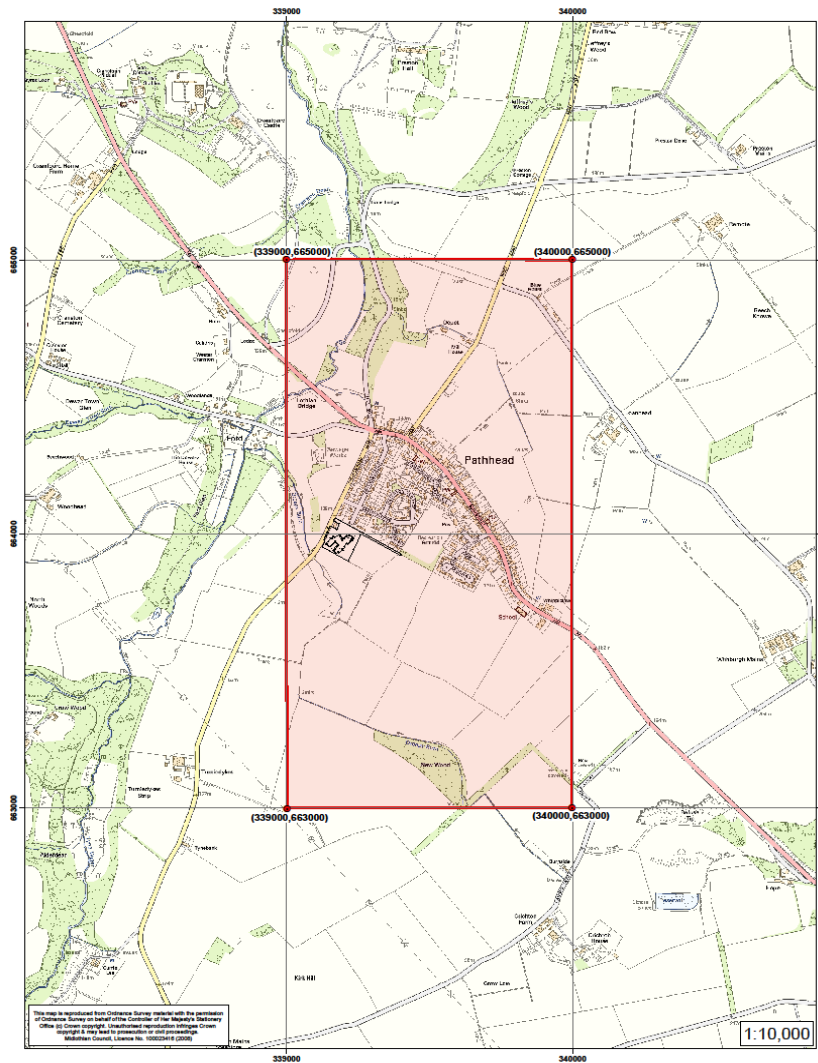


Figure 3 Location of passive diffusion tubes and (decommissioned) automatic monitoring station, Dalkeith

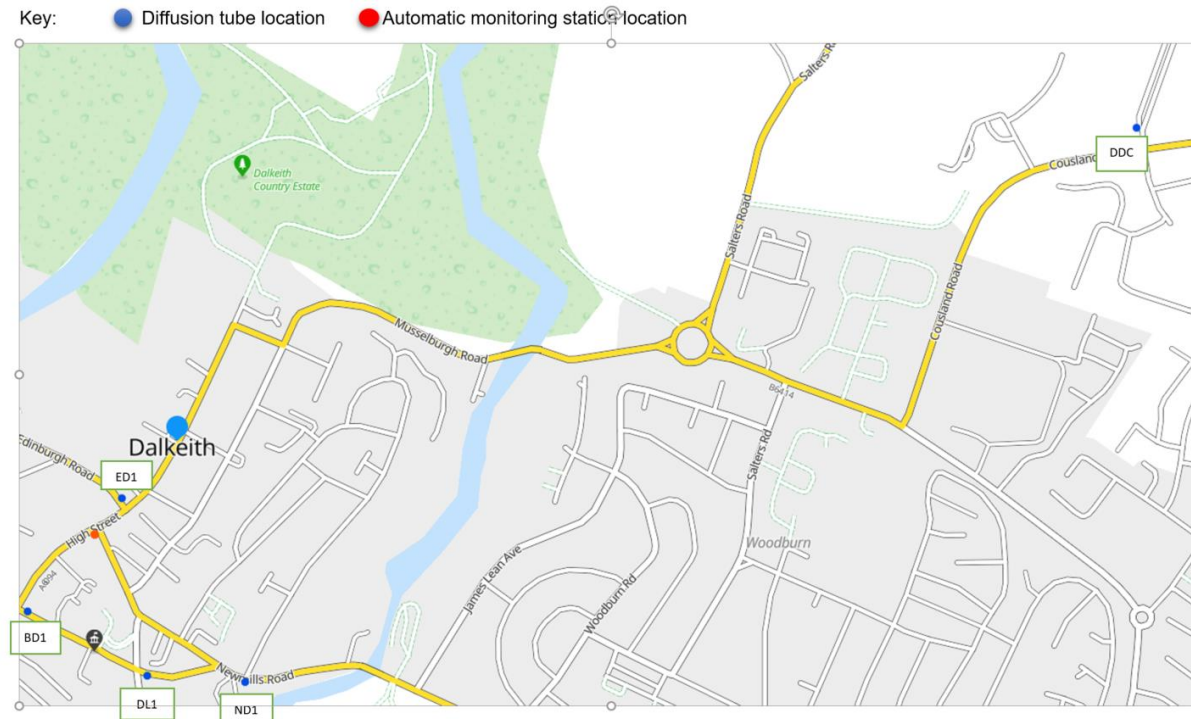


Figure 4 Location of passive diffusion tubes and previous location of now removed automatic monitoring station in Pathhead

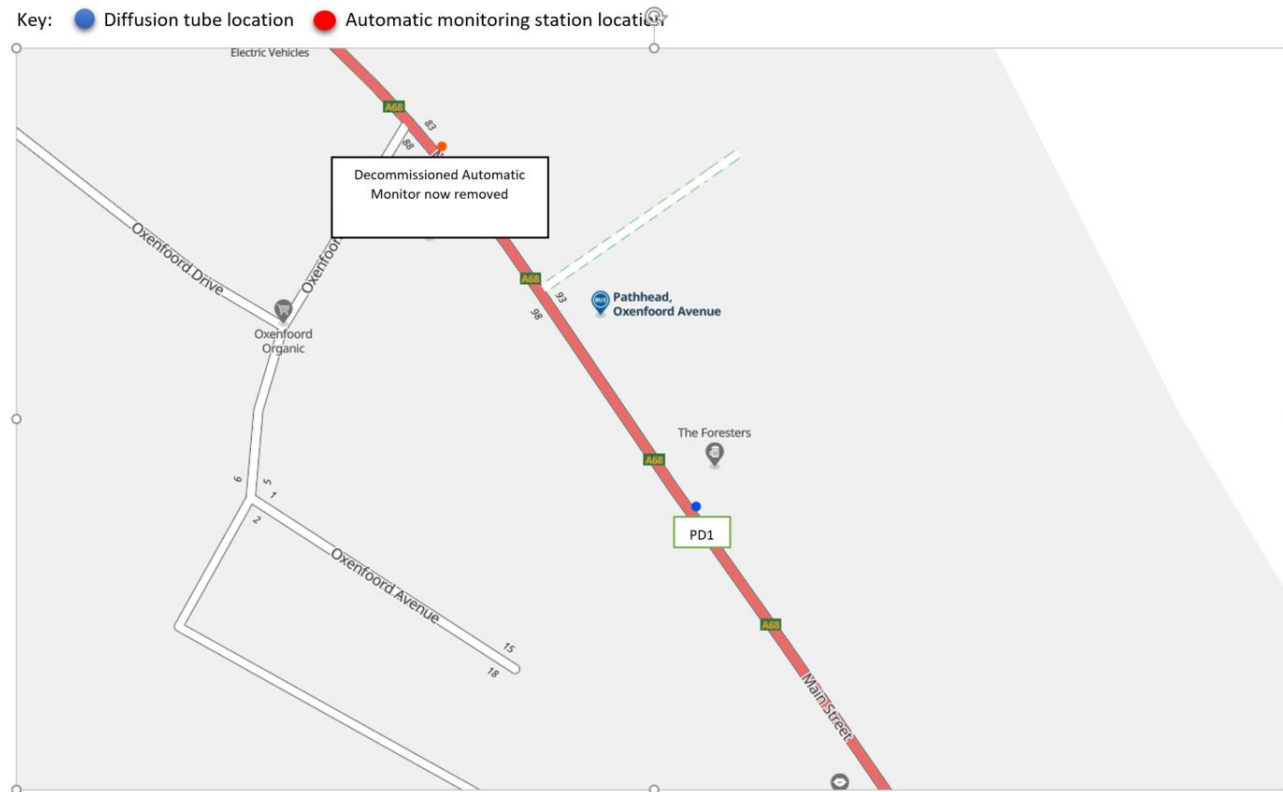


Figure 5 Location of passive diffusion tubes in Penicuik

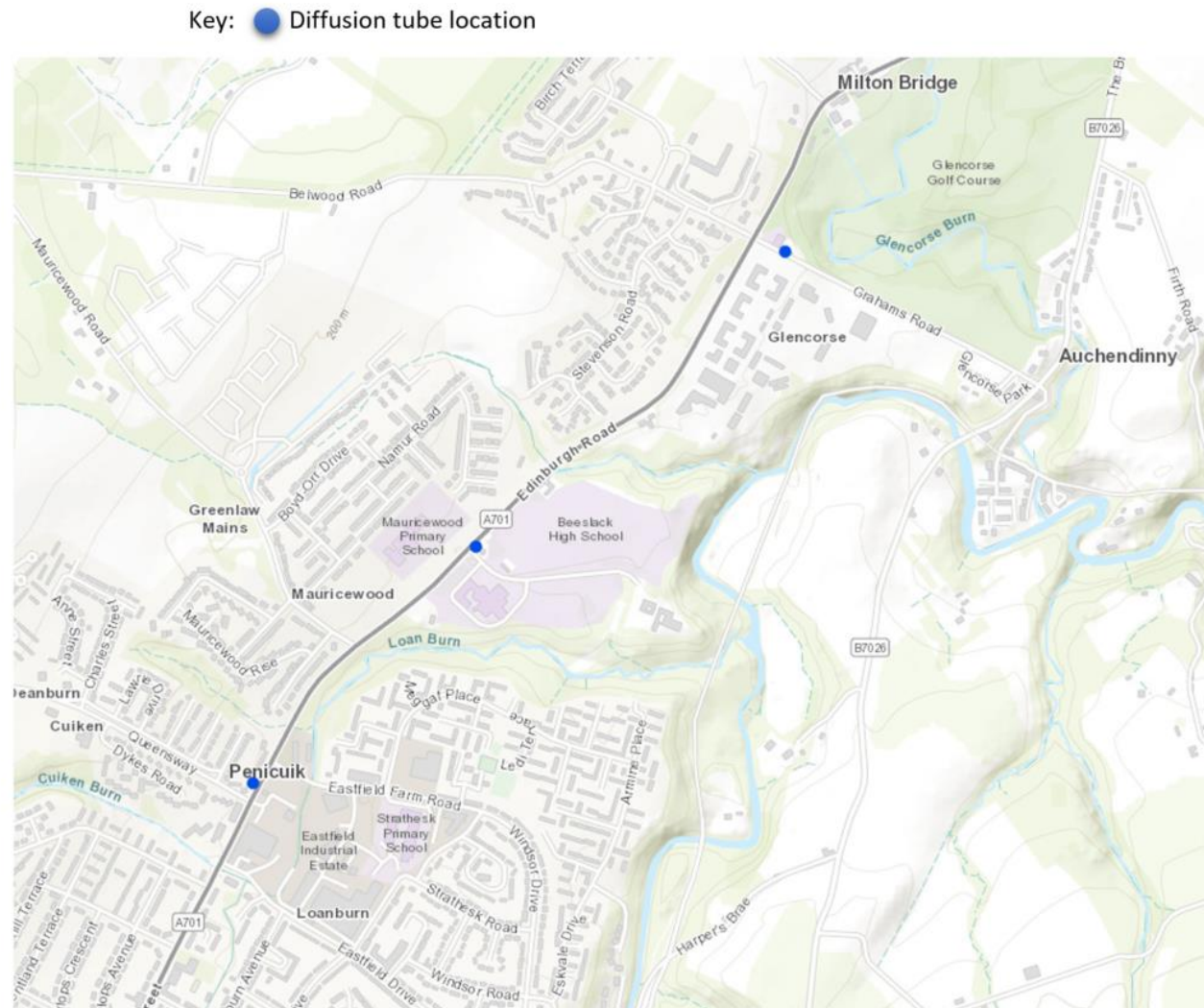


Figure 6 Location of passive diffusion tubes in Bonnyrigg

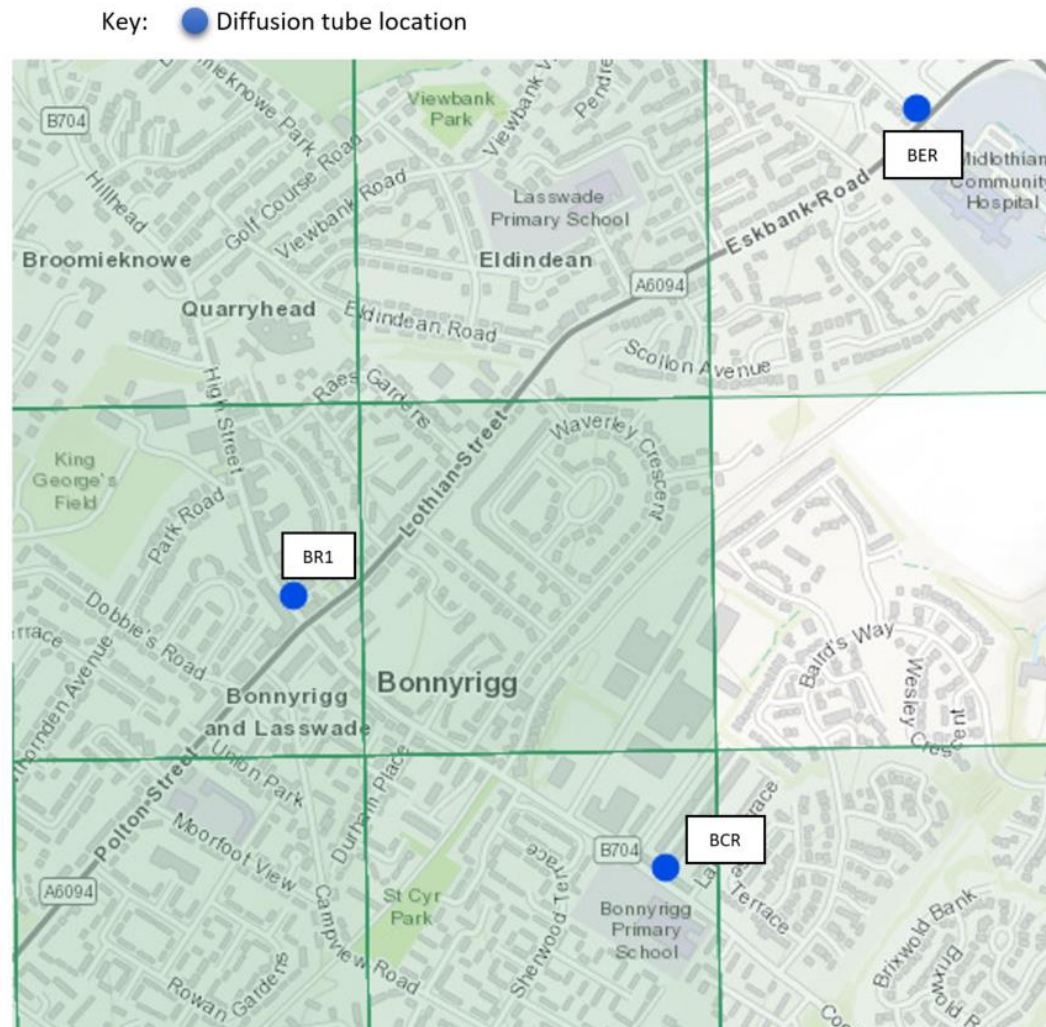


Figure 7 Location of passive diffusion tubes in Loanhead



Figure 8 Location of Passive Diffusion Tubes in Lasswade



Figure 9 Location of passive diffusion tubes in Danderhall

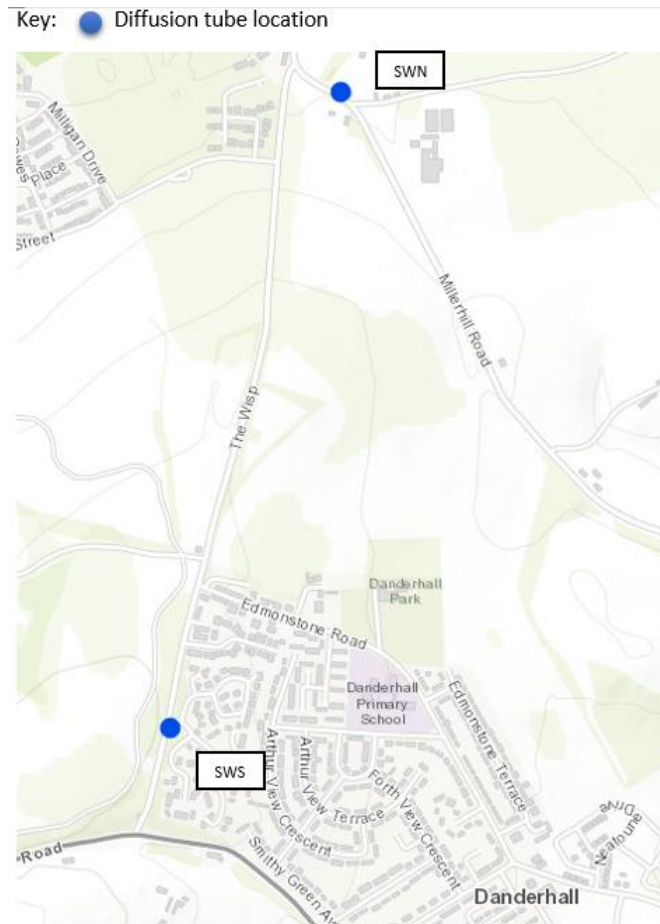
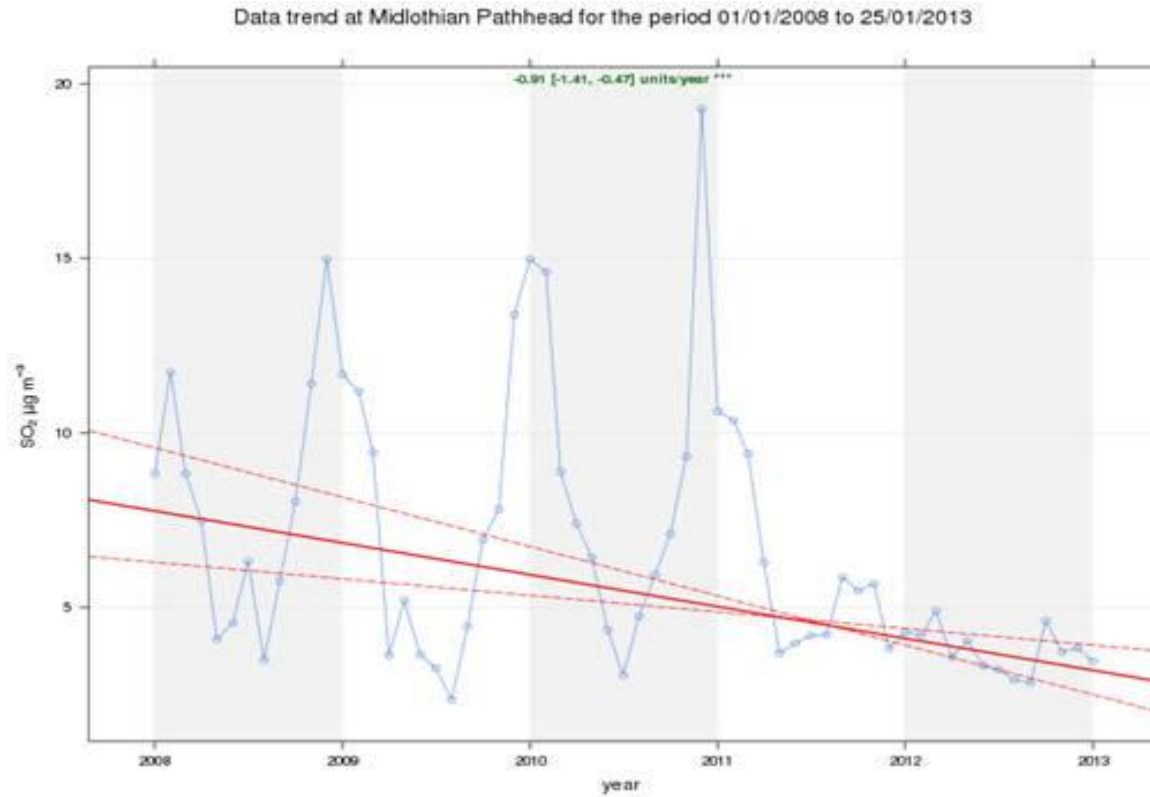


Figure 10 SO₂ Concentration at Pathhead, Midlothian (Jan 2008 – Jan 2013)



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

References

1. Defra and the Devolved Administrations, Local Air Quality Management, Technical Guidance (TG22), August, 2022.
2. Defra and the Devolved Administrations, National Diffusion Tube Spreadsheet of Bias Adjustment Factors v.03/23, accessed at <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html>.
3. Cleaner Air for Scotland: The Road to a Healthier Future, Scottish Government
4. Midlothian Council Travel Plan 2017 to 2021
5. Midlothian Local Development Plan 2017