Clackmannanshire Council

Annual Progress Report 2022

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Annual Progress Report (APR)

Clackmannanshire Council

2022 Air Quality Annual Progress Report (APR) for Clackmannanshire Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

June 2022

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Executive Summary: Air Quality in Our Area

This report provides an overview of air quality within Clackmannanshire during 2021. It provides a review of pollutant monitoring data and atmospheric emission sources within Clackmannanshire and compares the available monitoring data to the national air quality standards in accordance with the guidance in LAQM TG(16) Technical Guidance.

Air Quality in Clackmannanshire

In Clackmannanshire the air quality is generally good, owing to the large amount of rural land. As a result, there are no Air Quality Management Areas declared in Clackmannanshire. Automatic and passive monitoring during 2021 demonstrates the continuing trend of pollutant concentrations below the air quality objectives. Therefore, there is no intention to declare an Air Quality Management Area within Clackmannanshire during the current year.

Clackmannanshire Council continued to monitor concentrations of NO_2, PM_{10} and $PM_{2.5}$ to determine if any air quality objectives were exceeded during 2021. During 2021, there were two automatic monitoring sites operated by Clackmannanshire Council – one located at King Street (Site ID: CM1) and one located at Hallpark Road in Alloa (Site ID: AQ Mesh).

The chemiluminescent monitor at the automatic monitoring station at King Street (CM1) recorded an annual mean NO_2 concentration of 17.7 µg/m^3, a slight decrease from the concentration recorded in 2020 (19.0 µg/m^3). Over the last five years, the annual mean NO_2 concentration recorded at this site has been in the range of 17.7 – 23.0 µg/m^3.

The 'low-cost sensor' (AQ Mesh pod) installed at Hallpark Road in Alloa recorded an annual mean NO_2 concentration of 17.9 µg/m^3, an increase from that recorded in 2020 (14.6 µg/m^3), though this is likely due to the effect of reduced traffic during the Covid-19 pandemic. Over the last five years, the annual mean NO_2 concentration recorded at this site has been in the range of 14.6 – 43.0 µg/m^3.

Both automatic monitoring stations recorded annual mean NO_2 concentrations below the air quality objectives for 2021.

Clackmannanshire Council also operated a network of six non-automatic passive diffusion tubes to monitor ambient concentrations of NO_2 throughout 2021. At all sites, the monitored concentration was below the annual mean air quality objective of 40 µg/m^3.

Across the entire diffusion tube network, the maximum annual mean NO_2 concentration at a single site was 18.6 µg/m^3, which is a slight increase from the 16.1 µg/m^3 recorded in the previous year. This increase is likely reflective of the greater level of travel activity in 2021 than in 2020 when there were more restrictions in place to control the spread of COVID-19.

The FIDAS monitor located at the CM1 automatic monitoring station recorded an annual mean concentration of 10.7 µg/m^3 and 5.6 µg/m^3 for PM_{10} and $PM_{2.5}$, respectively. Over the last five years, the annual mean concentration at this automatic monitoring site has been in the range of 9.0 – 12.0 µg/m^3 for PM_{10} and 5.0 – 6.0 µg/m^3 for $PM_{2.5}$.

The AQ Mesh pod installed at Hallpark Road in Alloa recorded an annual mean concentration of 3.7 µg/m^3 and 2.1 µg/m^3 for PM_{10} and $PM_{2.5}$, respectively. Over the last five years, the annual mean concentration at this automatic monitoring site has been in the range of 3.7 – 9.2 µg/m^3 for PM_{10} and 2.0 – 3.9 µg/m^3 for $PM_{2.5}$.

Both automatic monitoring stations recorded PM_{10} and $PM_{2.5}$ concentrations below the air quality objectives for 2021.

A review of planning applications submitted in 2021 showed that there are several proposed developments within Clackmannanshire which could potentially impact local air quality.

One of these developments is the mixed use development (residential, educational) on the former distillery and warehouse site in Carsebridge, Alloa. An air quality assessment was required for the 390 – 650 houses and 1,000 m^2 of business use.

Another significant planning application is the phase 1 (27 houses, 16 flats) and phase 2 (47 houses) residential development of Schawpark Golf Course. An air quality assessment was required and the outcome of the planning application is still awaiting a decision.

Clackmannanshire Council Roads and Transportation confirmed there were no new roads constructed during the current reporting year with the potential to result in an exceedance of the air quality objectives. There are numerous electrical vehicle charging points installed within Clackmannanshire, promoting the uptake and use of a less polluting mode of travel.

Actions to Improve Air Quality

There are currently no Air Quality Management Areas or specific action plans in the Clackmannanshire area, however the APR summarises potential increases in emissions

which may adversely affect air quality (i.e. new roads or developments). Where potential air pollution 'hotspots' are considered likely, monitoring will be considered for those areas.

Clackmannanshire Council continues to:

- Monitor the ambient concentration of NO_2, PM_{10} and $PM_{2.5}$ in the Alloa area, including additional monitoring at Hallpark Road.
- Promote sustainable travel alternatives (walking, cycling and car sharing) through the Local Active Travel Strategy, the promotion of cycle routes, and the introduction of travel plans and cycle/walk to work initiatives and investment in technology to allow video conferencing.
- Reduce the number of vehicles in Clackmannanshire Council's fleet and replace older inefficient vehicles with low emissions alternatives (when funding permits).
- Promote low emission transport through the installation of EV charging points.
- Review and develop policies which impact on air quality.

Clackmannanshire Council are also involved with the UK wide 'School Streets' scheme. The School Street within Clackmannanshire was developed initially to meet one of the main priorities identified in the Community Plan (Theme 3: Parking, Roads and Transport), but also has a beneficial impact upon air quality. This temporary road closure is in operation from 8:30 – 9:10am and 2:50 – 3:20pm on Lochies Road, Castle Terrace, Garden Terrace, and Bruce Street. Engagement in the national School Street initiative demonstrates the commitment of Clackmannanshire Council to further improve air quality within the area.

Subject to funding being available, Clackmannanshire Council are planning to expand the network of EV charging points from the 27 currently installed to 32, by adding 3 x 7kW and 2 x 22kW units. Despite no policy on EV charging points for new developments existing at present, Clackmannanshire Council are working to progress this with the planning team.

Local Priorities and Challenges

Clackmannanshire Council is committed to continuing the review and assessment of pollutants affecting the air quality in Clackmannanshire. The priority is to continue monitoring of the primary pollutants of concern (NO_2, PM_{10} and $PM_{2.5}$) and widen the area of coverage by utilising the AQ Mesh monitor. However, as in 2020 and 2021, this will remain at Hallpark Road during 2022.

Roads and Transportation will continue with plans for the promotion of low emission transport and sustainable travel alternatives as identified in the Local Transport Strategy. Consideration to be given to the newly developed strategy 'Clean Air for Scotland 2' that replaces the old strategy that was originally established in 2015. Another key priority for Clackmannanshire Council is to continue to work towards establishing an officer group to identify any required changes to policy and current working practices in relation to air quality. During 2022, a key priority for Clackmannanshire Council is to continue discussions with the Roads, Planning and Fleet services to form a small officer group that meets 2-3 times annually to discuss matters relating to air quality and, in particular, actions that can be taken.

How to Get Involved

Improving air quality in Clackmannanshire is not only the responsibility of Clackmannanshire Council. There are many ways in which members of the public, local businesses, logistics companies and transport operators can also get involved. Choosing to walk or cycle instead of using the car, car sharing and buying hybrid or lower emission vehicles will all play a part in reducing pollutant levels in the area. Careful consideration should also be given to the installation and use of biomass systems and domestic wood or multi-fire stoves as they have the potential to contribute to increased concentrations of gases and particulate matter in the air. Further information on such appliances is available on the Clackmannanshire Council website at http://www.clacksweb.org.uk/environment/woodburningstoves/.

The public can engage with Clackmannanshire Council's efforts by logging onto the www.Clacksweb.org.uk website and searching for air quality. Monitoring results for the Clackmannanshire area can be viewed by visiting www.scottishairquality.co.uk and typing in your postcode. On this website, there is an option to register to receive air quality alerts using the 'Know and Respond' system.

Clackmannanshire Council have also promoted 'Clean Air Day' (16th June 2022) on their website. Educational services are to be contacted by Clackmannanshire Council to outline the different ways schools can get involved by promoting clean air activities on the 16th June.

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1 Local Air Quality Management

This report provides an overview of air quality in Clackmannanshire during 2021. 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 that is being undertaken by Clackmannanshire 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 an Air Quality Action Plan (AQAP) within 12 months, setting out measures it intends to put in place in pursuit of the objectives.

Clackmannanshire Council currently does not have any declared AQMAs. There are also no recommendations in this year's report to declare any new AQMAs within the area.

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 Clackmannanshire 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.

Draft NPF4 included various references to air quality, including Policy 6 ('Design, Quality and Place') and Policy 14 ('Health and Wellbeing') and policies will be developed in the next Local Development Plan around those to contribute to NPF4 outcome B ('Improving the Health and Wellbeing of People Living in Scotland').

The land use planning system is an important tool to improve air quality in the longer term and ensure existing air quality does not deteriorate in the short term due to development protocols. The adopted Local Development Plan (LDP) seeks to help Clackmannanshire transition to a vibrant low carbon economy which delivers a high quality of life. One of its strategic objectives is to deliver environmental sustainability, including by managing and reducing pollution, to contribute to the improvement of air quality. LDP Policy EA11 (Environmental Quality) requires developers to demonstrate how any potential environmental impacts, in particular air pollution, can be avoided or satisfactorily mitigated. The LDP position informs the Planning Service's negotiations with developers about applications for planning permission, including those for larger residential and commercial developments where the potential impact on air quality is likely to be more significant. This process includes consultation with the Environmental Health Service and SEPA to help identify and address pollution issues. This ranges from site selection issues to help reduce the need to travel, ensuring the provision of infrastructure to encourage and support sustainable modes of transport, to requiring air quality impact assessments to be submitted where appropriate.

The Capital Programme for 2022 to 2042 includes a schedule of project for Sustainable Growth and Health and Wellbeing. In particular, within the programme for the next three years is projected finance for active travel routes for Alloa Train Station and Alloa Town Centre, Parking Management Systems and the infrastructure development of cycle routes.

2.2.2 Transport – Low Emission Zones

Local authorities working with Transport Scotland and SEPA will look at opportunities to promote zero-carbon city centres within the existing LEZs structure.

There are no plans currently for a Low Emission Zone within Clackmannanshire. It is something that will be explored further by Clackmannanshire Council in the future, along with other strategies, if the measured parameter levels demonstrate an increasing trend or if there is an unacceptable increase in the number of exceedances of permitted levels.

2.3 Progress and Impacts of Measures to address Air Quality in Clackmannanshire

Defra's appraisal of last year's APR concluded that the report is well structured, detailed, and provides the information specified in the guidance. It was also noted that:

"Good QA/QC procedures were applied appropriately and accurately to NO_2 and PM_{10} monitoring data; national bias adjustment factor has been determined. However, the Method 11 $PM_{2.5}$ data from FIDAS analysers should be corrected for slope by dividing by 1.06 before use, if not already done so, as per paragraph 7.162 of LAQM.TG(16)".

- The national bias adjustment factor applied to the monitoring data presented in the 2022 APR was determined from co-location studies that were of good precision. All automatic monitoring data has been ratified by Ricardo before downloading.

"Data monitored by the AQ Mesh Pod should be interpreted with caution as this is near-reference quality data only. The Council has set up another monitoring site for NO_2 at a sensitive receptor with passive sampling to help verify the AQ Mesh results accordingly".

- The AQ Mesh Pod data has not been included in the reporting tables in the 2022 APR to avoid direct comparisons being made with the other automatic monitoring site. This data is however provided in the Appendix D and commented on throughout the report to provide some useful supplementary data.

"The Council has provided a map of the diffusion tube monitoring network; trends are displayed but not discussed in the report".

- Data presented in the 2022 APR is contrasted to that in the previous reporting year, and that over a 5-year period. This provides both a short-term and long-term trend.

"A local co-location study could be carried out to obtain a local bias adjustment factor and the Council can then choose the more representative factor for calculation each year".

- Although no local co-location study was carried out in 2021, this may be considered in future reporting years. The national factor was used for consistency in reporting.

Clackmannanshire Council has taken forward a number of measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

Key completed measures are:

- **EV Charging Points:** Installation of EV charging points. A total of 27 have been installed to date, with 7 completed from April – November 2021.
- **School Streets:** Road closures are in place around Clackmannan Primary School during the morning drop-off and afternoon pick-up. Vehicles are excluded from entering the specified roads around the school during the times stated.

Progress on the following measures has been slower than expected due to:

- **Officer's Group:** Owing to COVID-19 restrictions and reduced staff numbers in the Roads Service department, the Officer's Group is still yet to be formed. However, verbal agreement has been reached to form this group to ensure that air quality remains high on the agenda within Clackmannanshire Council.

Clackmannanshire Council expects the following measures to be completed over the course of the next reporting year:

- **Air Conditioning Unit:** Replacement of the faulty air conditioning unit at the Alloa automatic monitoring station. During LSO calibrations it was noted that there was an alarm sounding on the analyser indicating that the cooler temperature was too high. The internal cabinet temperature was therefore too high for the NO_x analyser to operate within its operating parameters.
- **Officer's Group:** Verbal agreement has been reached with the Roads, Planning and Fleet Services to set up the Officer's Group that will meet two or three times annually to discuss air quality issues and, more importantly, identify any required changes.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Focus	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Grant Funding	Other	Funding	Local Authority, Environmental Health, Scottish Government	Ongoing	2022	Measured concentration of NO_x	N/A	New NOx analyser fitted May 2022	2022	-
2	Replace AC Unit	Other	AC Unit	Local Authority, Environmental Health, Scottish Government	Ongoing	2022	Internal cabinet temperature	N/A	Installation planned for 15th June 2022	2022	Proposed completion June 2022
3	Electric Vehicle Charging Points	Promoting Low Emission Transport	Encourage the use of EVs by providing charging points	Local Authority	Ongoing	2022	Measured concentration of NO_x, $PM_{2.5}$ & PM_{10}.	N/A	27 EV charging locations either live or due to be live soon	2022	-
4	School Streets Initiative	Promoting Travel Alternatives	Restricted access to vehicles	Local Authority	Ongoing	2022	Measured concentration of NO_x	N/A	One School Street in place	2022	-
5	Control of new builds	Policy guidance and development control	Monitor pollutant levels in the area	Development and Environment	Ongoing	Ongoing	Monitored emissions	N/A	Sufficient	Any new development will be monitored and necessary action taken	-
6	Cycle to work scheme	Promoting Travel Alternatives	Cycle to work scheme	Development and Environment (Transport)	Ongoing	Ongoing	None	N/A	Ongoing	Ongoing	-

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.

Clackmannanshire Council undertook automatic (continuous) monitoring at two sites during 2021. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at https://www.scottishairquality.scot/.

Maps showing the location of the monitoring sites are provided in Appendix A. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C. It should be noted that one monitor is an AQ Mesh, defined as a 'low-cost sensor'. For more information on 'low cost sensors' please see FAQ 140 on the LAQM website - https://laqm.defra.gov.uk/faqs/faq140/.

3.1.2 Non-Automatic Monitoring Sites

Clackmannanshire Council undertook non-automatic (passive) monitoring of NO_2 at six sites during 2021. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

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

There were no exceedances of the NO_2 annual mean objective in 2021. The highest NO_2 annual mean concentration recorded by passive diffusion tubes was 18.6 µg/m^3 at site DT4, whilst that recorded by the automatic monitoring stations was 17.9 µg/m^3 at site 'AQ Mesh'.

The maximum annual mean NO_2 concentration at a single site was 18.6 µg/m^3, which is greater than the 16.1 µg/m^3 recorded in 2020. This increase is likely reflective of the increased travel activity in 2021 as a result of fewer COVID-19 restrictions being in place compared with 2020. The NO_2 annual mean concentration at the automatic monitoring station CM1 was lower (17.7 µg/m^3) than that recorded in 2020 (19.0 µg/m^3). Conversely, the NO_2 annual mean concentration at the AQ Mesh site was higher (17.9 µg/m^3) than that in 2020 (14.6 µg/m^3).

For diffusion tubes, the full 2021 dataset of monthly mean values is provided in Appendix B.

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

There were no exceedances of the hourly mean NO_2 objective recorded at either of the two automatic monitoring sites (CM1 or AQ Mesh). No single passive diffusion tube recorded an annual mean NO_2 concentration greater than 60 µg/m^3, which indicates that the hourly NO_2 objective was not likely to have been exceeded at these sites.

As a result of both the automatic and passive monitoring recording NO_2 concentrations below the annual and hourly objective, no AQMA is needed to be declared within the area for NO_2.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 18µg/m^3.

There were no exceedances of the PM_{10} annual mean objective in 2021. An annual mean PM_{10} concentration of 10.7 µg/m^3 and 3.7 µg/m^3 were recorded at the CM1 and AQ Mesh

automatic monitoring site respectively. Relative to 2020, this is a slight increase and decrease respectively, where concentrations of 9.0 µg/m^3 and 3.9 µg/m^3 were recorded.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than seven times per year.

There were no exceedances of the daily mean objective for PM_{10} of 50 µg/m^3 at either of the automatic monitoring sites (CM1 or AQ Mesh) in 2021.

As a result of the automatic monitoring recorded PM_{10} concentrations below the annual and daily objective, no AQMA is needed to be declared within the area for PM_{10}.

3.2.3 Particulate Matter ($PM_{2.5}$)

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

There were no exceedances of the $PM_{2.5}$ annual mean objective in 2021. An annual mean $PM_{2.5}$ concentration of 5.6 µg/m^3 and 2.1 µg/m^3 were recorded at the CM1 and AQ Mesh automatic monitoring site, respectively. This is a slight increase from the previous year, when $PM_{2.5}$ concentrations of 5.0 µg/m^3 (CM1) and 2.0 µg/m^3 (AQ Mesh) were recorded.

3.2.4 Sulphur Dioxide (SO_2)

The concentration of SO_2 is not routinely monitored in Clackmannanshire, and there are no immediate plans to do so.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

The concentration of carbon monoxide, lead and 1,3-Butadiene is not routinely monitored in Clackmannanshire, and there are no immediate plans to do so.

4 New Local Developments

The following section has been completed based on consultation with other relevant Council services and departments including Roads & Transportation and Development Control.

4.1 Road Traffic Sources

The Transport Planning Department of Clackmannanshire Council was consulted in order to check if there were any new potential road traffic sources or significantly changed traffic sources with the area that could result in a likely exceedance of the air quality objective.

There were no new roads introduced within Clackmannanshire during 2021, and there are no plans in the future for the development of any new major roads.

In order to reduce the impact on air pollution from road traffic sources, Clackmannanshire Council intend to expand the extent of electrical vehicles from the 31 that are currently in the fleet. Clackmannanshire Council are also encouraging the use of electrical vehicles by providing additional charging infrastructure for fleet vehicles at Kilncraigs and Whins Road within the next financial year. This development helps reduce the overall contribution of road traffic sources to air pollution.

4.2 Other Transport Sources

Clackmannanshire Council can confirm that there are none of the following new or significantly changed transport sources:

- 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 exposure within 30m.
- Ports for shipping.

There is one train station within the Clackmannanshire Council area at Alloa which has been assessed in previous rounds of Review and Assessment for the potential impact from

stationary trains. The electrification of the Stirling/Alloa/Dunblane lines was completed in 2018 and there is no longer any diesel freight utilising this route.

No further assessment of rail emissions was therefore undertaken.

In August 2020, Network Rail advised nearby local residents to the railway boundary between Alloa Station and the former Longannet Power Station that ground investigation works were to be carried out in 2020. The purpose of the works is to help define a programme of enhancements which are to be made to the railway in this area. No further details of exact railway enhancement or changes are known at the time of writing this APR.

4.3 Industrial Sources

There were no new industrial sites proposed or installed within Clackmannanshire during 2021 which may have a negative effect on local air quality.

4.4 Commercial and Domestic Sources

The Environmental Health Department and Planning Department at Clackmannanshire Council were consulted on any new commercial and domestic emission sources within the area which may have a negative effect on local air quality.

Commercial Emission Sources:

The planning application (20/00220/FUL) involving the erection of a reserve gas generation facility with a proposed generation capacity of 22.5MW with associated infrastructure including ancillary buildings, access, fencing and landscaping was refused.

Domestic Emission Sources:

There have been no new areas of development with significant solid fuel burning and it is therefore not necessary to undertake any further assessment. Clackmannanshire Council have however continued to receive intermittent complaints regarding smoke from domestic wood burning stoves and garden bonfires and fire pits. These complaints are logged and a reminder is provided to residents of alternative ways to dispose garden waste. With regard to wood burning stoves, all residents are reminded to ensure they use the appropriate fuel for the wood burning stove.

4.5 New Developments with Fugitive or Uncontrolled Sources

Clackmannanshire Council confirms that there are none of the following new or significantly changed fugitive or uncontrolled sources:

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

5 Planning Applications

The Development and Planning section of Clackmannanshire Council was consulted with regard to any major planning application during 2021 which may affect air quality.

The applications and outcomes are summarised in Table 5.1.

A review of planning applications of new proposed developments within other council administrative areas which could have an effect on the air quality in Clackmannanshire was also carried out.

Table 5.1 – Planning Applications Requiring an Air Quality Assessment or Screening Assessment in Clackmannanshire

Date	Planning Application	Development Information	Air Quality Interest	Air Quality Assessment Required	Decision
Mar 21	21/00069/PPP	Carsebridge, Alloa Mixed use development, residential, education, on former distillery & warehouse site	390 – 650 houses. To be clarified. 1000sqm business use. EV charging points at business site for employees, No EV at residential	Yes	Awaiting decision
Jun 21	21/00144	Residential development 275 Houses	275 houses	No. If re-application made AQIA will be required.	Withdrawn
Jul 21	21/00171/PAN	OI manufacturing, Alloa	Air separation plant	Will be required at full planning stage	Response to Notice issued.

Date	Planning Application	Development Information	Air Quality Interest	Air Quality Assessment Required	Decision
Jul 21	21/00186/PAN Application Notice only	Meadowhill, Forestmill. Restoration of opencast coal site, Residential development, renewable energy, equestrian hub, tourism and leisure, forestry & woodland, active leisure.	Restoration of coal mine, Residential development, renewable energy.	Will be required at full planning stage.	Response to Notice issued.
Oct 21	21/00265/PAN (Proposal of Application Notice only).	OI Manufacturing. Alloa. Erection of Manufacturing Building & Chimney Stack to replace existing furnace	Furnace, Chimney Stack to replace existing furnace.	Will be required at full planning stage including chimney height assessment	Response to Notice issued
Nov 21	21/00294/Full	Phase 1 Residential Development Schawpark Golf Course	27 Houses, 16 Flats	Yes	Awaiting Decision
Nov 21	21/00295/FULL	Phase 2 Residential Development, Schawpark golf course	47 Houses.	Yes	Awaiting Decision

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

During 2021, Clackmannanshire Council undertook monitoring of NO_2, PM_{10} and $PM_{2.5}$ concentrations at locations detailed in the report. The results indicate that concentrations complied with the air quality objectives.

There are no existing AQMAs within the Council area and based on the monitoring data obtained during 2021, it is concluded that no AQMAs are required to be declared.

6.2 Conclusions relating to New Local Developments

This assessment has been conducted in accorded with the TG(16) Technical Guidance. Updated information has been obtained on road, rail, industrial, domestic and fugitive emission sources and compared to criteria and conditions described in the guidance.

The new/proposed local developments mentioned which could have a potential impact on local air quality in Clackmannanshire are presented in Table 5.1. Actions as to whether an air quality assessment was either required or requested are also detailed.

6.3 Proposed Actions

Clackmannanshire Council will continue to monitor and improve air quality, progressing the actions to improve air quality as outlined in Table 2.1. For example, work will continue towards forming the Officer's Group which will meet two or three times annually to ensure air quality remains high on the agenda within Clackmannanshire Council.

Clackmannanshire Council will maintain the current diffusion tube network to continue to monitor NO_2, and ensure that the air conditioning unit at the automatic monitoring station in Alloa (CM1) is replaced, so that data does not have to be removed as was the case in 2021. Installation of the air conditioning unit is planned for 15th June 2022. Automatic monitoring of PM_{10} and $PM_{2.5}$ will continue during the next reporting year.

Appendix A: Monitoring Results

Figure A.1 – Location of Air Quality Monitoring Sites within Clackmannanshire

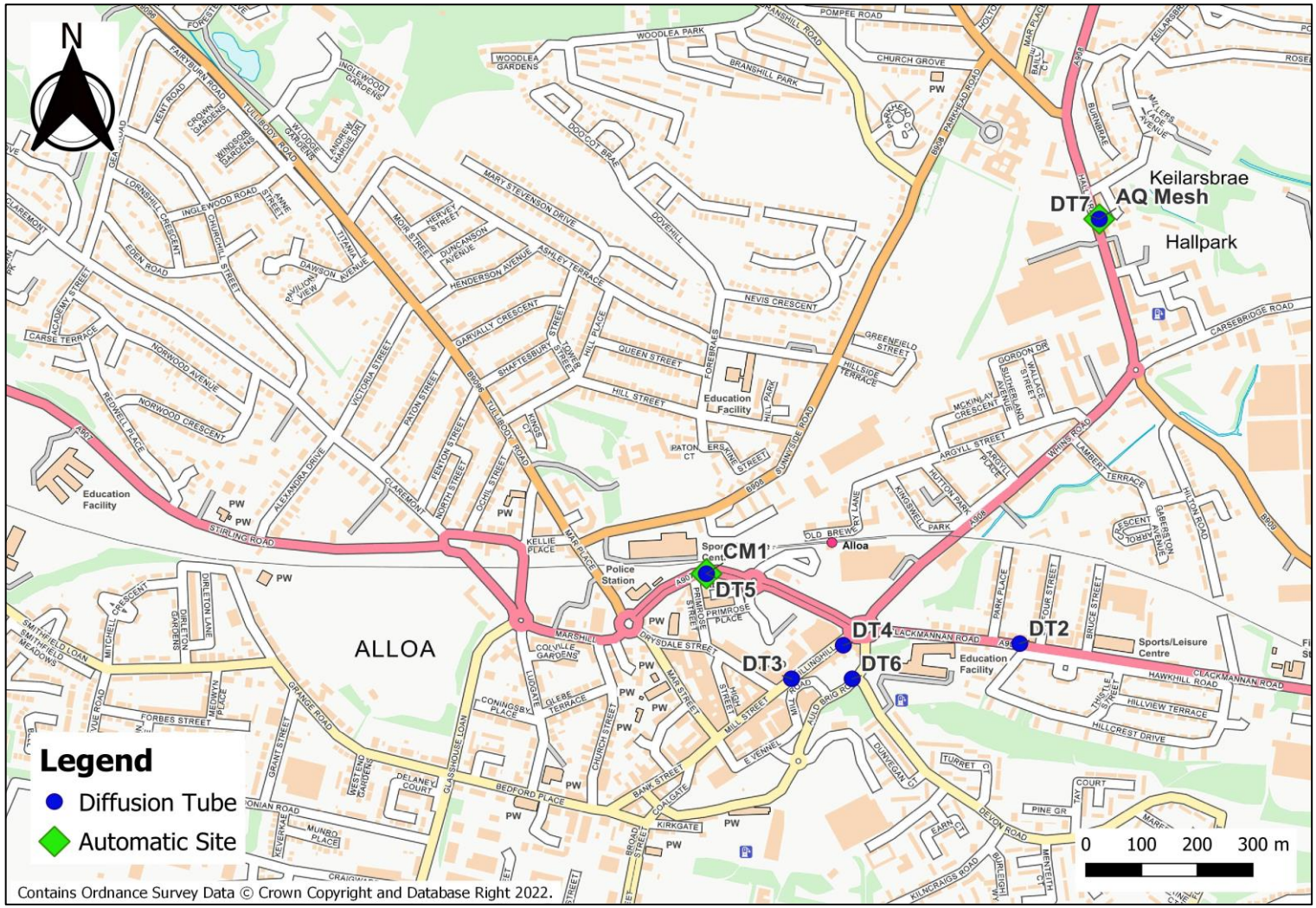


Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	King Street, Alloa	Roadside	288665	693072	NO_2; PM_{10}; $PM_{2.5}$	N	NO_2 Chemiluminescent; PM_{10} & $PM_{2.5}$ FIDAS	1.2	2.5	2.3
AQ Mesh	Hallpark Road A908	Roadside	289371	693727	NO_2; PM_{10}; $PM_{2.5}$	N	AQ Mesh 'Low Cost' sensor using NO_2 electrical sensors, PM_{10} & $PM_{2.5}$ using optical spectrometry.	0	2.4	2.7

Notes:

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

(2) N/A if not applicable.

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube co-located with a Continuous Analyser?	Tube Height (m)
DT2	Clackmannan Road, Alloa	Kerbside	289228	692943	NO_2	No	2.0	2.0	No	3.3
DT3	Bus Station, Alloa	Kerbside	288818	692878	NO_2	No	2.0	1.3	No	3.5
DT4	Shillinghill/Bridge Terrace, Alloa	Kerbside	288911	692940	NO_2	No	2.0	1.4	No	3.1
DT5	King Street, Alloa	Kerbside	288665	693072	NO_2	No	8.0	2.5	Yes	2.9
DT6	Auld Brig Road, Alloa	Kerbside	288927	692878	NO_2	No	3.0	1.8	No	3.3
DT7	Pearson View, Sauchie	Roadside	289371	693727	NO_2	No	0.0	2.4	Yes	2.4

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results ($\mu g/m^3$)

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	Automatic	59.0	59.0	22.6	23.0	22.0	19.0	17.7
DT2	Kerbside	Diffusion Tube	33.0	33.0	25.7	23.4	21.7	16.1	18.4
DT3	Kerbside	Diffusion Tube	40.9	40.9	27.7	26.3	25.2	15.6	17.7
DT4	Kerbside	Diffusion Tube	40.9	40.9	23.9	25.2	22.5	15.2	18.6
DT5	Kerbside	Diffusion Tube	33.0	33.0	22.2	21.9	18.3	13.0	15.8
DT6	Kerbside	Diffusion Tube	40.9	40.9	23.6	21.8	16.8	13.0	16.2
DT7	Roadside	Diffusion Tube	40.9	40.9	-	-	20.6	11.8	14.5

Notes:

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

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

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.

(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%).

Figure A.2 – Annual Mean NO_2 Monitoring Results from 2017 – 2021 within Clackmannanshire

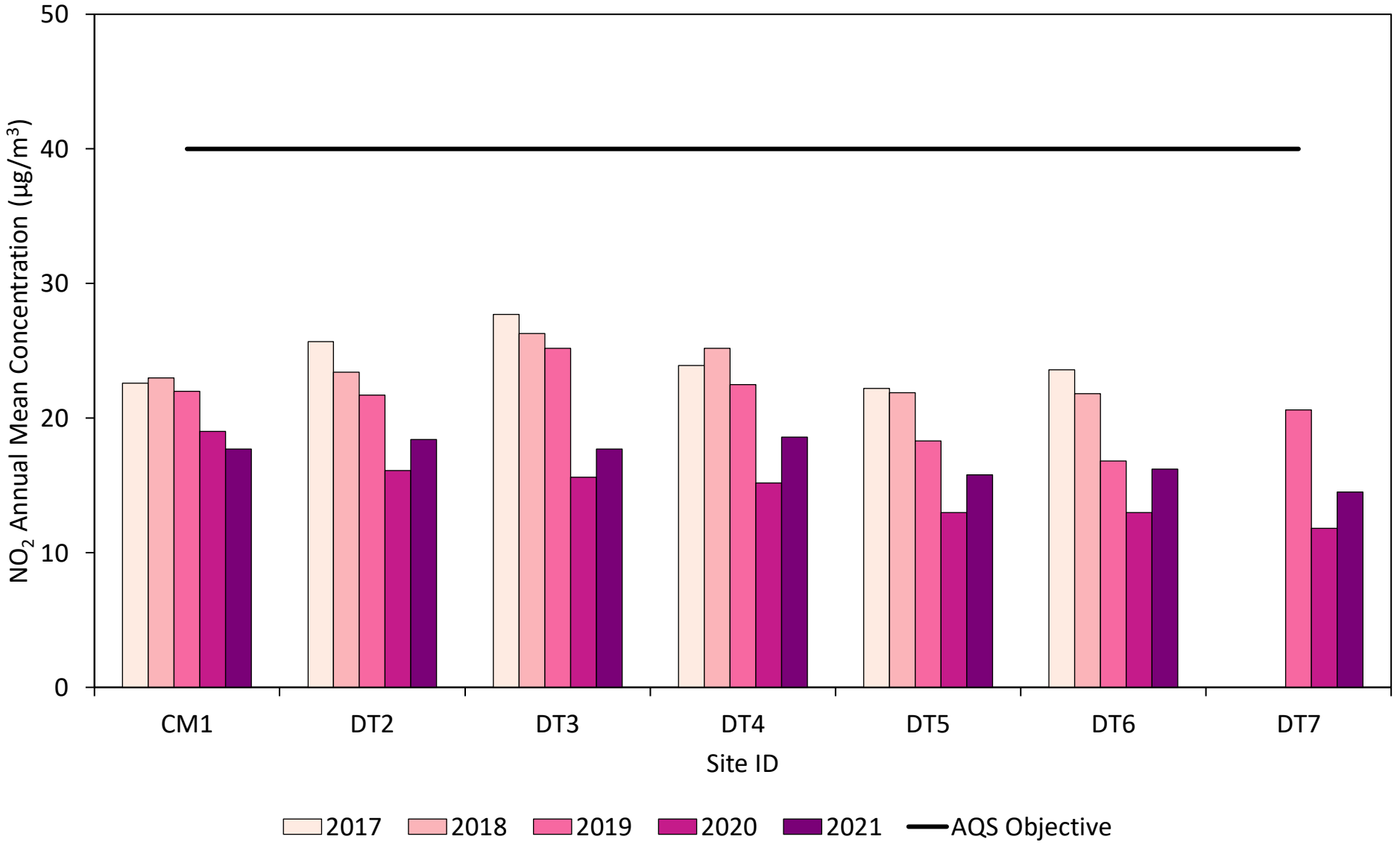


Table A.4 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	Automatic	59	59	0 (87)	0	0	0	0 (61.2)

Notes:

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

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

(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%).

Table A.5 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	100	100	12.0	11.0	11.0	9.0	10.7

Notes:

Exceedances of the PM_{10} annual mean objective of 18 µg/m^3 are shown in bold.

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.

(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%).

Figure A.3 – Annual Mean PM_{10} Monitoring Results from 2017 – 2021 within Clackmannanshire

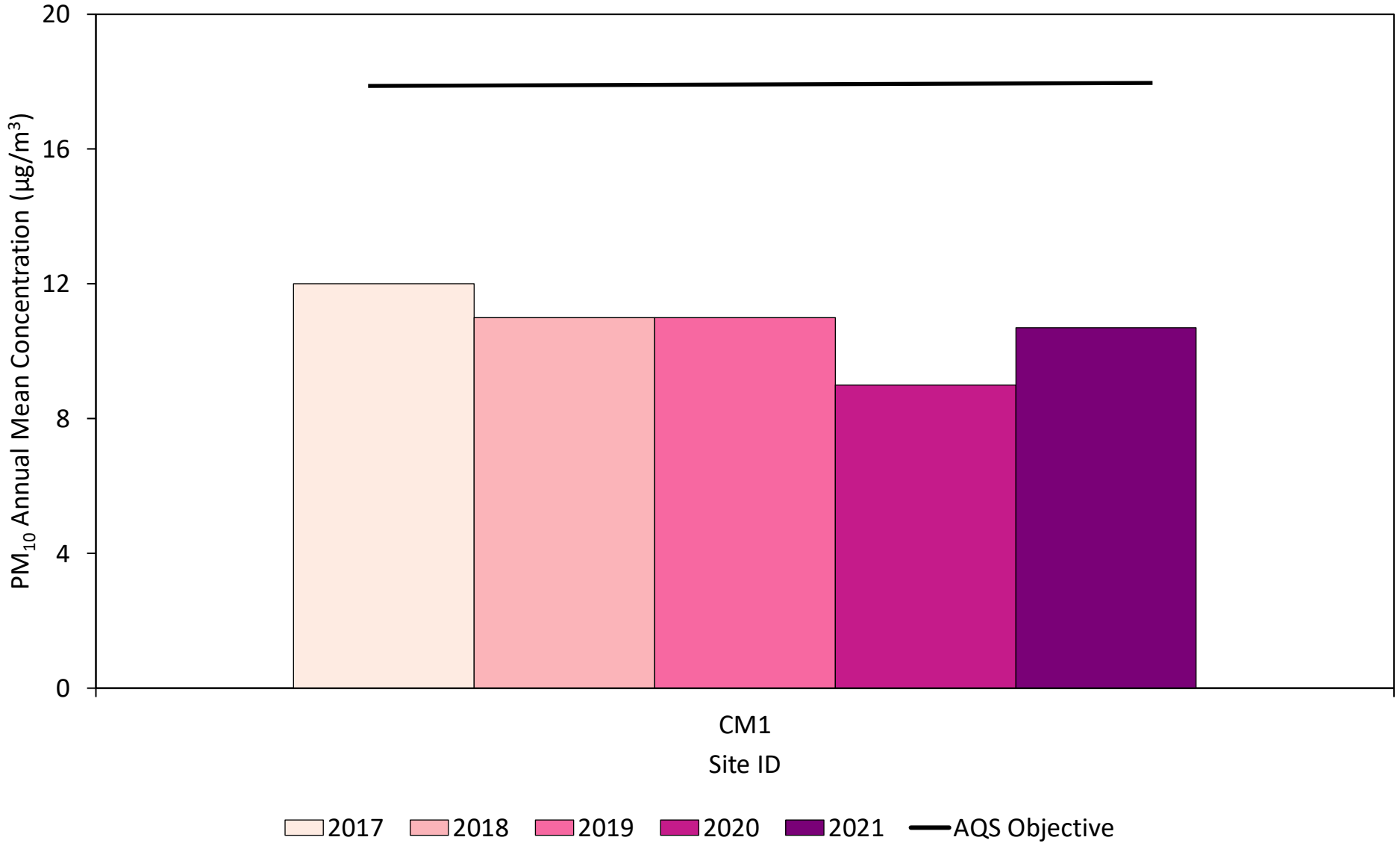


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	100	100	0	0	1	0	3

Notes:

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

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

(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%).

Table A.7 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	Roadside	100	100	-	6.0	6.0	5.0	5.6

Notes:

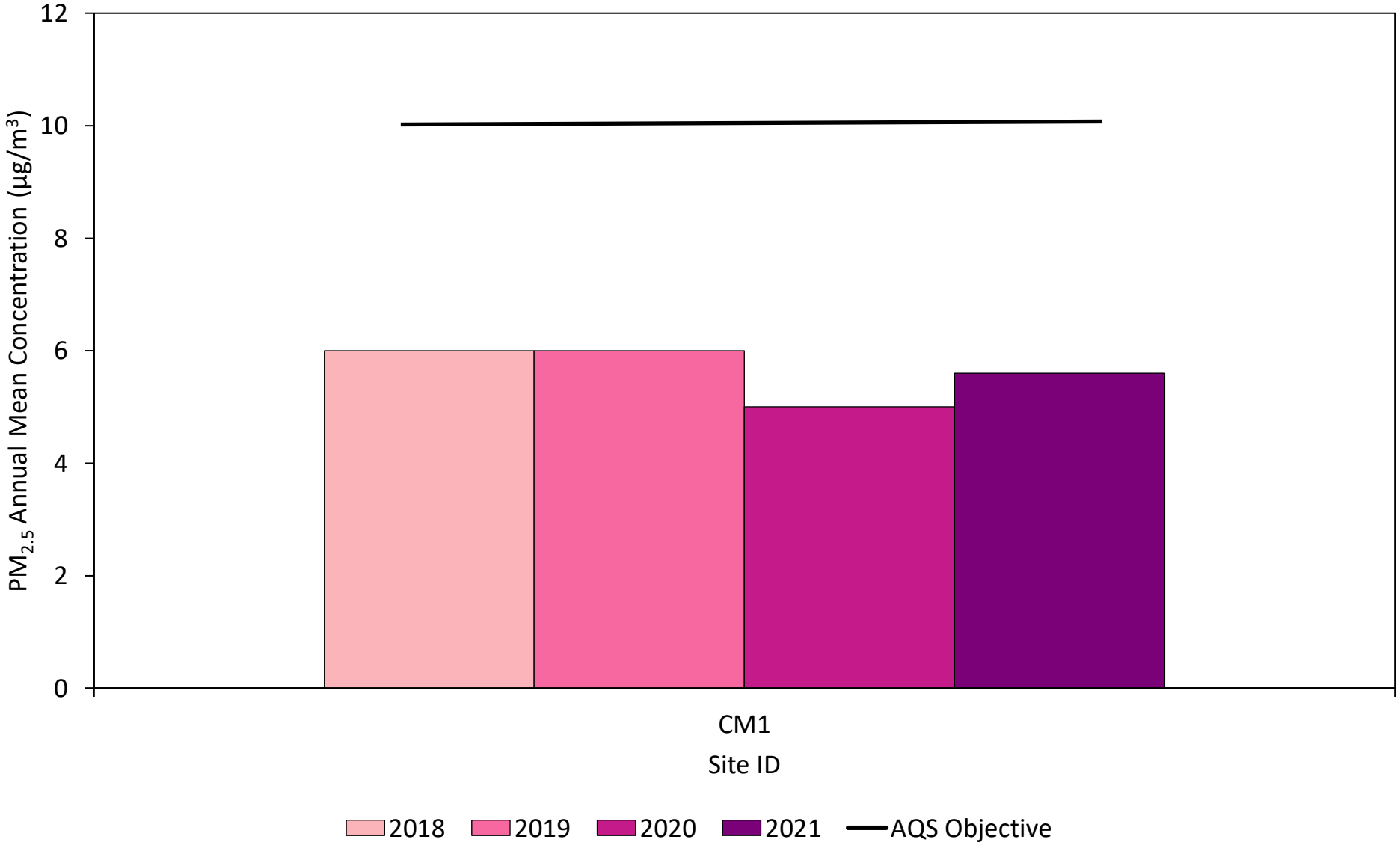
Exceedances of the $PM_{2.5}$ annual mean objective of 10 µg/m^3 are shown in bold.

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.

(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%).

Figure A.4 – Annual Mean $PM_{2.5}$ Monitoring Result s from 2017 – 2021 within Clackmannanshire



Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Monthly Diffusion Tube Results ($\mu g/m^3$)

Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Time-Weighted Annual Mean	
													Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (1)
DT2	8.2	-	-	7.1	7.9	-	6.2	-	19.5	24.1	23.0	27.8	18.8	18.4
DT3	12.9	-	-	7.3	11.3	-	9.1	19.4	14.8	24.5	19.2	27.8	18.1	17.7
DT4	9.2	-	-	7.8	11.5	-	15.9	19.9	18.2	24.0	20.4	31.3	19.0	18.6
DT5	8.2	-	-	7.2	9.9	-	13.2	16.0	16.3	21.5	-	19.2	16.2	15.8
DT6	-	-	-	10.7	8.0	-	11.1	16.4	16.9	23.0	17.6	26.8	16.6	16.2
DT7	8.7	-	-	11.3	8.5	-	7.6	17.7	14.1	16.7	16.7	20.3	14.8	14.5

Notes:

(1) See Appendix C for details on bias adjustment

(2) Red values were overexposed beyond the 4-5 week recommendation and were omitted from the annual mean calculation.

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

New or Changed Sources Identified Within Clackmannanshire During 2021

With the exception of the planning applications listed above, Clackmannanshire Council has not identified any new major sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Clackmannanshire During 2021

Clackmannanshire Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes deployed during 2021 were supplied and analysed by Glasgow Scientific Services (GSS), and were prepared using the 20% TEA in water preparation method. All results have been bias adjusted and annualised (where required). GSS is a UKAS accredited laboratory and participates in the AIR-PT scheme for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. In the latest AIR-PT results, AIR-PT AR042 (January – March 2021), GSS were awarded a score of 50%. At the time of writing this report, the AIR-PT results for the rest of 2021 (April – December) were not available. For the diffusion tubes included in the annual mean calculation, all were deployed in line with the national calendar (± 2 days). The months that were omitted from the annual mean calculation were all exposed for 6 weeks or longer.

Diffusion Tube Annualisation

As the data capture of the six diffusion tube sites was between 33.0 and 40.9%, all of the diffusion tube data was to be annualised. As per TG(16), using background monitoring sites within a 50 miles radius, the Automatic Urban and Rural (AURN) sites of Bush Estate (rural background) and Glasgow Townhead (urban background) were used for annualisation.

Details of the calculation method undertaken are provided in Table C.2.

Annualisation was completed on the data for the months where the tubes were deployed for a maximum of 4-5 weeks. This is owing to the fact that section 7.191 of TG(16) states that:

"If diffusion tubes are left out for significantly longer or shorter periods than the four and five weeks recommended, then the data may not be reliable as the diffusion rate may not have been accurately defined".

Therefore, the annual mean of each diffusion tube site was calculated based on the months of May, August, September, October and November. The data of the remaining months was omitted from the calculated as the diffusion tubes were overexposed. However, this data is presented in Appendix B for transparency.

Diffusion Tube Bias Adjustment Factors

Clackmannanshire Council have applied a national bias adjustment factor of 0.89 to the 2021 monitoring data. A summary of bias adjustment factors used by Clackmannanshire Council over the past five years is presented in Table C.1. The national bias adjustment spreadsheet (03/22) was used to derive the national bias adjustment factor for diffusion tubes analysed by Glasgow Scientific Services (GSS) during 2021. The national bias adjustment factor for GSS during 2021 is 1.12, and is derived from six co-location studies. However, five of these studies have low precision. Therefore, the one study of good precision has instead been used, resulting in a national bias adjustment factor of 0.89 being applied to the 2021 diffusion tube monitoring data.

Figure C.1 – 2021 National Bias Adjustment Factor for Glasgow Scientific Services

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/22

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

This spreadsheet will be updated at the end of June 2022
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

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

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

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

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[4]	Bias Adjustment Factor (A) (Cm/Dm)
Glasgow Scientific Services	20% TEA in water	2021	R	Glasgow City Council	12	26	25	4.1%	P	**0.96**
Glasgow Scientific Services	20% TEA in water	2021	R	Glasgow City Council	11	16	21	-22.1%	P	**1.28**
Glasgow Scientific Services	20% TEA in water	2021	R	Glasgow City Council	12	18	22	-19.8%	P	**1.25**
Glasgow Scientific Services	20% TEA in water	2021	KS	Glasgow City Council	12	37	44	-15.3%	P	**1.18**
Glasgow Scientific Services	20% TEA in water	2021	UB	Glasgow City Council	12	14	17	-19.3%	P	**1.24**
Glasgow Scientific Services	20% TEA in water	2021	KS	Marylebone Road Intercomparison	10	46	41	11.9%	G	**0.89**
Glasgow Scientific Services	20% TEA in water	2021		**Overall Factor[3] (6 studies)**				Use		**1.12**

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.89 (1)
2020	National	03/21	0.89 (1)
2019	National	03/20	0.82 (1)
2018	National	03/19	0.92 (1)
2017	National	03/18	0.91

(1) Adjustment factor derived from using only diffusion tubes with good precision.

NO_2 Fall-off with Distance from the Road

No diffusion tube NO_2 monitoring locations within Clackmannanshire required distance correction during 2021.

QA/QC of Automatic Monitoring

Automatic monitoring of NO_x, PM_{10} and $PM_{2.5}$ is completed within Clackmannanshire using Chemiluminescence (NO_x), FDMS (PM_{10}) and FIDAS (PM_{10} and $PM_{2.5}$) analysers.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

The type of PM_{10} and $PM_{2.5}$ monitors utilised at site CM1 within Clackmannanshire do not require the application of a correction factor. All PM_{10} and $PM_{2.5}$ data monitored by the AQ Mesh pod is managed and adjusted by AECOM as necessary.

Automatic Monitoring Annualisation

Annualisation was required for the CM1 automatic monitoring station in Alloa. This is owing to the problems with the NO_x analyser, resulting in a 59% data capture for NO_2 during 2021.

NO_2 Fall-off with Distance from the Road

No automatic NO_2 monitoring locations within Clackmannanshire required distance correction during 2021.

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Bush Estate	Annualisation Factor Glasgow Townhead	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
CM1	0.9055	0.9750	0.9403	18.8	17.7	
DT2	1.2162	0.9736	1.0949	18.8	20.6	
DT3	1.1719	1.0257	1.0988	18.1	19.9	
DT4	1.1719	1.0257	1.0988	19.0	20.9	
DT5	1.0925	1.1041	1.0983	16.2	17.7	
DT6	1.1719	1.0257	1.0988	16.6	18.2	
DT7	1.1719	1.0257	1.0988	14.8	16.3	

Appendix D: Supplementary Monitoring (AQ Mesh Pod)

Table D.1 – AQ Mesh Pod Monitoring Data

		Valid Data Capture for Monitoring Period (%)	Valid Data Capture 2021 (%)	2017	2018	2019	2020	2021
NO_2	Annual Mean ($\mu g/m^3$)	100.0	100.0	37.3	**43.0**	15.2	14.6	17.9
	1-hr Means > 200 $\mu g/m^3$	100.0	100.0	0 (117)	0	0 (91.1)	0	0
PM_{10}	Annual Mean ($\mu g/m^3$)	100.0	100.0	9.2	6.5	4.8	3.9	3.7
	24-hr Means > 50 $\mu g/m^3$	100.0	100.0	2	0	0	0	0
$PM_{2.5}$	Annual Mean ($\mu g/m^3$)	100.0	100.0	3.9	3.5	2.8	2.0	2.1

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
NPF	National Planning Framework
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. Air Quality in Scotland – Scottish Air Quality Data. Scottish Government. 2022.

2. Automatic Urban and Rural Network (AURN) – Data Selector. Defra. 2022.

3. Clackmannanshire Local Development Plan. Clackmannanshire Council. 2015.

4. Local Air Quality Management Technical Guidance – LAQM.TG(16). Department for Environment, Food and Rural Affairs (Defra). 2021.