

Annual Progress Report (APR)



2024 Air Quality Annual Progress Report (APR) for Angus Council

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

Local Air Quality Management

July 2024

Information	Angus Council
Local Authority Officer	Iain Graham
Department	Housing, Regulatory, and Protective Services
Address	Angus House Orchardbank Business Park Forfar DD8 1AN
Telephone	01307 492026
E-mail	GrahamIH@angus.gov.uk
Report Reference Number	82066-SRL-RP-YQ-01-S2-P5
Date	July 2024

Executive Summary: Air Quality in Our Area

Air Quality in Angus

The 2023 air quality monitoring data confirm that air quality across Angus remains good. Measured concentrations of nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) are below the relevant objectives.

Previous Review and Assessments have concluded that concentrations of carbon monoxide, benzene, 1,3-butadiene, lead, sulphur dioxide, PM₁₀, PM_{2.5}, and NO₂ are compliant with the relevant objectives, and no Air Quality Management Areas (AQMAs) have been declared.

There are no significant air quality issues in Angus.

Actions to Improve Air Quality

Angus Council has implemented numerous actions to improve air quality as detailed in the current [Angus Local Development Plan](#) (LDP). Angus LDP is now supplemented by National Planning Framework 4 (NPF4) adopted by the Scottish Government in February 2023. Together, the Angus LDP and NPF4 make up the development plan in Angus. Angus Council is currently in the early stages of preparing a new LDP which will be based on new legislative requirements.

Angus Council's Transition to Net Zero Action Plan: 2022 To 2030 was approved in September 2022.

The SECAP is now being delivered and monitored, with a new team member in the Environment and Climate team to support the review process. The SECAP and associated work programme will be reviewed regularly, with a full review of the actions taking place every two years to monitor progress and identify remedial actions, or new actions, that need to occur to achieve targets. This will ensure the SECAP fully considers and reflects changes to technology, market conditions, and environmental concerns. A progress review was completed in 2023, which showed the SECAP group to be bringing together key industry partners from across the region to collaborate and enable sustainability improvements across a variety of sectors, with a key focus on a transition to net zero.

Active Travel – Angus Council has asked ARCADIS to look at options available to improve active travel to some routes in Angus. This includes Brechin to Montrose, Kirriemuir to Forfar, Friockheim to Arbroath, School Road (Tealing), and National Cycle Network (NCN) Route 1 between Elliot Links and East Haven.

Construction of the Arbroath Places for Everyone scheme commenced in April 2024 and is expected to be completed by early Autumn 2025.

Angus Council has installed 5 School Friendly Zones in 2022/23 at Letham Primary School, Carlogie Primary School, Andover Primary School, Liff Primary School, and Southesk Primary School. The zones prohibit traffic from driving on the roads directly outside the schools at the start and end of the school day. The Zones are provided to help promote active travel to and from school with the associated benefit of air quality improvement.

Angus Council is running a Smarter Choices Smarter Places programme, with projects funded by Paths For All, which is a series of behaviour change initiatives to promote active travel and encourage walking and cycling.

Angus Council has commissioned a concept design project for the Newtyle to Dundee Green Circular Active Travel Scheme.

Local Priorities and Challenges

Angus Council will:

- Continue to monitor NO₂, PM₁₀, and PM_{2.5} concentrations during 2024 and will report on progress in 2025
- Continue to provide a fleet of electric powered vehicles for staff to use when making business trips.

How to Get Involved

We can all help to maintain good air quality within Angus. Travel choices can have a significant impact on pollutant emissions. Reducing single-occupancy car travel, using alternatives such as public transport, and walking or cycling for short journeys all help to reduce emissions.

Several online tools are available to help you plan your journey at www.travelinescotland.com.

Avoid excessive acceleration and hard braking when you do travel by car to reduce the pollution impacts of the journey.

If you would like further information on Air Quality within Angus, please visit our website, or contact us via ACCESSline (08452 777 778).

Table of Contents

Executive Summary: Air Quality in Our Area	i
Air Quality in Angus	i
Actions to Improve Air Quality	i
Local Priorities and Challenges	ii
How to Get Involved	iii
1 Local Air Quality Management	1
2 Actions to Improve Air Quality	2
2.1 Air Quality Management Areas	2
2.2 Cleaner Air for Scotland 2.....	2
2.2.1 Placemaking – Plans and Policies.....	2
2.2.2 Transport – Low Emission Zones	3
2.3 Implementation of Air Quality Action Plan(s) and/or measures to address air quality	3
3 Air Quality Monitoring Data and Comparison with Air Quality Objectives	7
3.1 Summary of Monitoring Undertaken	7
3.1.1 Automatic Monitoring Sites	7
3.1.2 Non-Automatic Monitoring Sites	7
3.2 Individual Pollutants.....	8
3.2.1 Nitrogen Dioxide (NO ₂)	8
3.2.2 Particulate Matter (PM ₁₀)	8
3.2.3 Particulate Matter (PM _{2.5})	9
3.2.4 Sulphur Dioxide (SO ₂)	9
3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene.....	9
4 New Local Developments	10
4.1 Road Traffic Sources.....	10
4.2 Other Transport Sources	10
4.3 Industrial Sources.....	10
4.4 Commercial and Domestic Sources.....	10
4.5 New Developments with Fugitive or Uncontrolled Sources	10

5	Planning Applications.....	11
6	Conclusions and Proposed Actions.....	13
6.1	Conclusions from New Monitoring Data.....	13
6.2	Conclusions relating to New Local Developments	13
6.3	Proposed Actions	13
	Appendix A: Monitoring Results	14
	Appendix B: Full Monthly Diffusion Tube Results for 2023	22
	Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC	23
	New or Changed Sources Identified Within Angus Council During 2023	23
	Additional Air Quality Works Undertaken by Angus Council During 2023	23
	QA/QC of Diffusion Tube Monitoring	23
	Diffusion Tube Annualisation.....	23
	Diffusion Tube Bias Adjustment Factors	23
	NO ₂ Fall-off with Distance from the Road.....	24
	QA/QC of Automatic Monitoring	24
	PM ₁₀ and PM _{2.5} Monitoring Adjustment	24
	Automatic Monitoring Annualisation	24
	Appendix D: Air Quality Monitoring Sites Map	26
	Glossary of Terms	27

List of Tables

Table 1.1 – Summary of Air Quality Objectives in Scotland.....	1
Table 2.1 – Progress on Measures to Improve Air Quality.....	4
Table 5.1 – Planning Application Key Information	12
Table 5.2 – Target Emission Rates from Biomass Calculator for Woodhill, Barry (Application 22/00333/FULL)	12
Table A.1 – Details of Automatic Monitoring Sites	14
Table A.2 – Details of Non-Automatic Monitoring Sites	15
Table A.3 – Annual Mean NO ₂ Monitoring Results: Non-Automatic Monitoring (µg/m ³)	16
Table A.4 – Annual Mean PM ₁₀ Monitoring Results (µg/m ³)	19
Table A.5 – 24-Hour Mean PM ₁₀ Monitoring Results, Number of PM ₁₀ 24-Hour Means > 50µg/m ³	19
Table A.6 – Annual Mean PM _{2.5} Monitoring Results (µg/m ³)	21
Table B.1 – NO ₂ 2023 Monthly Diffusion Tube Results (µg/m ³).....	22
Table C.1 – Bias Adjustment Factor	24
Table C.2 – Non-Automatic Annualisation Summary (concentrations presented in µg/m ³)	25
Table C.3 – Automatic Annualisation Summary (concentrations presented in µg/m ³)	25

List of Figures

Figure A.1. Trend in Annual Mean NO ₂ Concentrations	18
Figure A.2. Trend in Annual Mean PM ₁₀ Concentrations	20
Figure D.1. Current air quality monitoring sites in Angus	26

1 Local Air Quality Management

This report provides an overview of air quality in Angus Council during 2023. 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 Angus 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 and publish 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. Angus currently does not have any AQMAs.

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 Angus 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.

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.

Angus has no plans to introduce LEZs within its administrative area.

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

Angus Council does not have to implement an Air Quality Action Plan, but has taken forward a number of measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1 .

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Expected/Actual Completion year	Measure Status	Funding Status	Key Milestones	Progress	Barriers to implementation
1	Smarter Choices Smarter Places	Promoting low emission transport; Public information. Promoting travel alternatives	TBC Ongoing	Ongoing	Grant funding used to promote active and sustainable travel	Measures have been implemented or are ongoing (e.g., the Cycle Hub) Funding Secured from European Regional Development Fund	<ul style="list-style-type: none"> • Promotion of bus travel with on-bus adverts and display in shelters • Provision of cycle racks and cycle training in schools • Provision of active travel training in schools • Promoting sustainable travel choices to some of the main trip attractors in Angus • Angus Cycle Hub will roll out a new Rural Towns Active Travel Project and funding will continue to promote the Angus Get on the Go brand. • Informing young people about travel alternatives • Raise awareness and use of active and sustainable modes by residents • Lift share system and count challenge introduction • 3 months free bus travel for 23-59 year olds who are living on a low income in Angus • 3 months free bus travel for refugees who settle in Angus • Implementation of a rural demand responsive 	N/A

							<p>transport scheme within the Sidlaw area</p> <ul style="list-style-type: none"> • Assistance within Angus schools for pupils to request a National Entitlement Card with the u22 free bus travel entitlement • Free school holiday travel for children with ASN and their families to access Angus wide child poverty initiatives (ended October 2023 due to loss of funding) • Behaviour change funding administered by Paths for All that supported a community planning project in Montrose, a bike bus trial in Newtyle, supporting bike recycling and community engagement by Angus Cycle Hub and a Tactran region – wide social media campaign. 	
2	Switched on Towns and Cities feasibility bid	Transport planning and infrastructure	2025	Ongoing	Feasibility study for in-depth support from the Scottish Government for improving electric vehicle infrastructure in the town	Feasibility study completed	<ul style="list-style-type: none"> • Winning the bid • Feasibility of Angus towns to be electrified fully to receive vast infrastructure boost • Number of electric cars in the town 	N/A
3	Cycling Walking Safer Streets Program	Transport planning and infrastructure Promoting travel alternatives; Vehicle fleet efficiency	Ongoing TBC	Ongoing	Grant funding used to promote active and sustainable travel	Upgraded footpaths at Keptie Pond; Arbroath; Lordburn Park, Forfar; and King George's Field. Upgraded cycle stands for schools.	Drumachlie Loan, Brechin - Improvement of links between core path routes, nature reserve and housing in Brechin including enabling fully segregated travel and accessibility.	N/A

4	Angus Sustainable Energy & Climate Action Plan	Policy guidance and development control	Ongoing TBC	Ongoing	Angus Sustainable Energy & Climate Action Plan	SECAP approved in 2021.	Angus SECAP has now been approved and is in use.	N/A
5	A Place for Everyone	Transport planning and infrastructure; Promoting travel alternatives; Traffic management	2025	Ongoing	Grant funding used to promote active and sustainable travel	Design Development Completed	Milton Place, Monifieth - Removing existing stile and creating step and incline free access between Ferry Rd and the Green Circular via Milton Place. Arbroath to Arbirlot 40mph Walking Cycling Friendly Road - Trial initiative to provide a low cost, safer route for cyclists and pedestrians using the popular route. To be extended to various routes across Angus if successful. Construction of the Arbroath A Place for Everyone project commenced in April 2024 and is expected to be completed by early autumn 2025.	N/A
6	Active Travel	Transport planning and infrastructure Promoting travel alternatives	Ongoing TBC	Ongoing	Feasibility study for in-depth support from the Scottish Government for improving electric vehicle infrastructure in the town	Public Consultation phase	Inchbarr and Barry Feasibility Studies - Feasibility studies that look at a number of options for improving active travel within both settlements.	N/A

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.

Angus Council undertook automatic (continuous) monitoring at 2 sites during 2023. A gravimetric Partisol sampler is located at the Burnside Drive, Arbroath whilst an automatic Fidas 200 analyser is located at the Glamis Road, Forfar site. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at <http://www.scottishairquality.co.uk/>. Angus Council does not carry out automatic monitoring of NO₂. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

Maps showing the location of the monitoring sites are provided in Appendix D.

3.1.2 Non-Automatic Monitoring Sites

Angus Council undertook non- automatic (passive) monitoring of NO₂ at 12 sites during 2023. Table A.2 in Appendix A shows the details of the sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO₂)

Table A3 in Appendix A compares the adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40 µg/m³ at non automatic monitoring sites.

For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Appendix B.

Concentrations at all 12 sites were well below the annual mean objective limit in 2023. The highest annual mean concentration was 16.0µg/m³ at monitoring site A3 located on Keptie Street, Arbroath. The annual mean NO₂ concentration at 4 of the locations have decreased from 2022 to 2023. The remaining 8 monitors have remained constant or risen slightly from 2022 figures. The concentrations at all 12 sites remain below the annual mean objective limit.

3.2.2 Particulate Matter (PM₁₀)

Table A.4 in Appendix A compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 18µg/m³. The concentrations at AA1 and AFR1 were significantly below the annual mean objective limit in 2023.

Table A.5 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³. There were 0 exceedances of the 24-hour mean objective limit at either monitor in 2023, which is a decrease from 3 at AA1 and 2 at AFR1 in 2022.

3.2.3 Particulate Matter (PM_{2.5})

Table A.6 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/m³. The concentration at AFR1 was again below the objective of 10µg/m³, and below last year's concentration.

3.2.4 Sulphur Dioxide (SO₂)

Angus Council does not currently monitor SO₂ concentrations and has no plans to do so in the future.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Angus Council does not currently monitor Carbon Monoxide, Lead, or 1,3-Butadiene concentrations and has no plans to do so in the future.

4 New Local Developments

4.1 Road Traffic Sources

Angus Council confirms that no new Road Traffic sources have been identified which may have a significant impact on local air quality.

4.2 Other Transport Sources

Angus Council confirms that no new Other Transport sources have been identified which may have a significant impact on local air quality.

4.3 Industrial Sources

Angus Council confirms that no new Industrial sources have been identified which may have a significant impact on local air quality.

4.4 Commercial and Domestic Sources

Angus Council confirms that no new Commercial or Domestic sources have been identified which may have a significant impact on local air quality.

4.5 New Developments with Fugitive or Uncontrolled Sources

Angus Council confirms that no new fugitive or uncontrolled sources have been identified which may have a significant impact on local air quality.

5 Planning Applications

The following are new or substantially varied applications under the Pollution Prevention & Control (PPC) and Waste Management Licensing (WML) Regulations in Angus during 2023:

- PPC/A/5003791: Easter Meathie Free Range Egg farm, Forfar, Angus, DD8 2LF
Application type: PPC(A) – Intensive Agriculture (Pig and Poultry)
- PPC/B/5003871: CHP, Hatton Wastewater Treatment Works, Hatton, Near Arbroath, DD11 2PJ
Application type: PPC(B) – Combustion of Fuels
- PPC/A/1008743: Cobden Street, Montrose, Angus, DD10 8EA
Application type: PPC(A) – Pharmaceutical Production
- WML/E/0000238: Old Gagie Station Yard, Kellas, Dundee, DD5 3PD
Application type: Waste - Material Recovery Facility (MRF); Waste - Other Waste Storage and Treatment Sites
- WML/L/SEPA2021-8003: Montrose Port, South Quay, Ferryden, Montrose, DD10 9SL
Application type: Waste - Other Waste Management Activities

There is one planning applications relevant to air quality considered by Angus Council in 2023:

- 23/00531/FULL: Office East Memus Farm, East Memus, Forfar, DD8 3TY
Application type: Drying Biomass

Table 5.1 – Planning Application Key Information

Location	Source	Building Height (m)	Stack Diameter (m)	Stack Height (m)	Background Concentration ($\mu\text{g}/\text{m}^3$)		Emission Rates (g/s)	
					PM ₁₀	NO ₂	PM ₁₀	NO ₂
East Memus Farm	Biomass Boiler	6.8	0.35	8	11.8	2.62	0.0093	0.0250

Table 5.2 – Target Emission Rates from Biomass Calculator for Woodhill, Barry (Application 22/00333/FULL)

Location	PM ₁₀ Annual Mean		Nitrogen Dioxide Annual Mean		Nitrogen Dioxide Hourly Mean	
	Target Emission Rate (g/s)	Detailed Assessment Required?	Target Emission Rate (g/s)	Detailed Assessment Required?	Target Emission Rate (g/s)	Detailed Assessment Required?
East Memus Farm	0.0196	N	0.1183	N	0.1573	N

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

Concentrations of NO₂ measured at 12 monitoring sites across the Angus Council area were well below the annual mean objective limit in 2023. The annual mean NO₂ concentration at 4 of the locations have decreased from 2022 to 2023. The remaining 8 concentrations have remained constant or only risen slightly, with the highest at location A3 at 16.0µg/m³.

The measured annual mean PM₁₀ concentrations were significantly lower in 2023 than in 2022 and remain below the annual mean objective limit. There were 0 exceedances of the 24-hour mean objective limit at the Burnside Drive monitor in 2023, which is a decrease from 2022.

Considering the above, a detailed assessment is not required for either pollutant.

6.2 Conclusions relating to New Local Developments

Angus Council is satisfied there have been no new local developments proposed or completed during 2023 that have the potential to introduce new exceedances of any relevant air quality objectives.

6.3 Proposed Actions

Monitoring in 2023 has shown no exceedances of any relevant air quality objectives, meaning a detailed assessment is not required for any pollutants.

Monitoring locations will continue to be reviewed to ensure the locations are still relevant, though relocation may not be necessary.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
AA1	Burnside Drive, Arbroath	Kerbside	364169	740861	PM ₁₀	No	Gravimetric	4.0	1.0	1.5
AFR1	Glamis Road, Forfar	Roadside	345249	750386	PM ₁₀ , PM _{2.5}	No	FDMS	20.0	6.0	1.5

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)
A1	Ethie Terrace, Arbroath	Urban Background	364585	742349	NO2	N	0.0	1.0	No	2.4
A2	Arbirlot Road, Arbroath	Roadside	362534	740848	NO2	N	9.0	2.0	No	2.4
A3	Keptie Street, Arbroath	Roadside	363881	740904	NO2	N	0.0	2.0	No	2.4
A4	22 Lordburn, Arbroath	Kerbside	364158	741122	NO2	N	3.0	1.0	No	2.4
B1	High St, Brechin	Kerbside	359727	760170	NO2	N	2.0	1.0	No	2.4
B2	Sacone 1, Brechin	Industrial	361216	759644	NO2	N	N/A	8.0	No	2.4
CAR	High St, Carnoustie	Roadside	356243	734526	NO2	N	3.0	2.0	No	2.4
FOR	High St, Forfar	Kerbside	345825	750674	NO2	N	3.0	1.0	No	2.4
F1	St James Road, Fordar	Roadside	345628	750307	NO2	N	1.0	2.0	No	2.4
KIR	Manse Close, Kirriemuir	Roadside	338621	754032	NO2	N	5.0	6.0	No	2.4
M1	High St, Monifieth	Roadside	349759	732549	NO2	N	0.0	2.0	No	2.4
M2	High St, Montrose	Kerbside	371418	757767	NO2	N	2.0	1.0	No	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 NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2023 (%) ⁽²⁾	2019	2020	2021	2022	2023
A1	364585	742349	Urban Background	100	66.8	8.0	7.1	5.1	5.7	5.5
A2	362534	740848	Roadside	100	66.8	11.1	8.3	8.0	7.2	6.6
A3	363881	740904	Roadside	100	66.8	23.4	15.6	18.9	16.9	16.0
A4	364158	741122	Kerbside	100	66.8	17.9	14.0	12.9	10.8	11.4
B1	359727	760170	Kerbside	87.5	54.6	12.6	7.8	8.2	7.4	9.6
B2	361216	759644	Industrial	100	66.8	5.6	4.1	4.9	4.2	5.0
CAR	356243	734526	Roadside	87.5	62.0	14.8	10.3	12.0	9.3	11.1
FOR	345825	750674	Kerbside	100	66.8	14.7	10.0	10.1	9.7	9.9
F1	345628	750307	Roadside	100	66.8	19.0	13.2	13.7	11.9	11.9
KIR	338621	754032	Roadside	62.5	43.2	10.9	5.5	7.8	7.1	10.0
M1	349759	732549	Roadside	100	66.8	13.9	10.0	10.2	10.6	9.2
M2	371418	757767	Kerbside	75	46.5	18.1	13.1	14.8	13.3	14.2

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Diffusion tube data has been bias adjusted.

Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in bold.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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(22) 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.1. Trend in Annual Mean NO₂ Concentrations

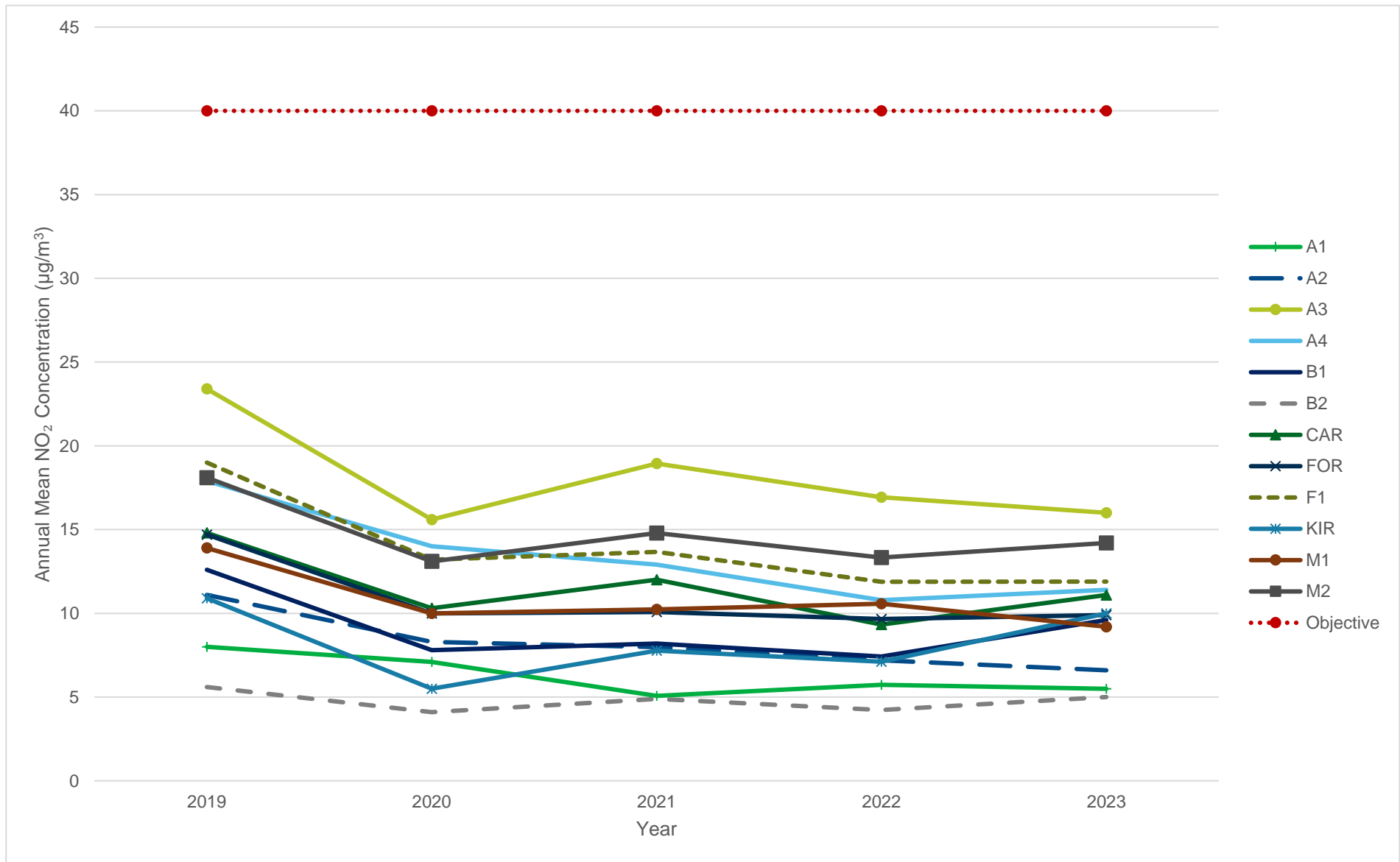


Table A.4 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2023 (%) ⁽²⁾	2019	2020	2021	2022	2023
AA1	Kerbside	74.6	37.0	11.8	11.4	10.9	11.7	9.7
AFR1	Roadside	96.5	96.5	12.7	10.0	9.1	9.6	8.8

Notes:

Exceedances of the PM₁₀ annual mean objective of 18 µg/m³ are shown in bold.

All means have been “annualised” as per LAQM.TG(22), 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%).

Table A.5 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2023 (%) ⁽²⁾	2019	2020	2021	2022	2023
AA1	Kerbside	74.6	37.0	0 (27.6)	0 (27.0)	0 (27.9)	3	0 (29.5)
AFR1	Roadside	96.5	96.5	0	0 (23.5)	3 (23.7)	2	0

Notes:

Exceedances of the PM₁₀ 24-hour mean objective (50 µg/m³ 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%).

Figure A.2. Trend in Annual Mean PM₁₀ Concentrations

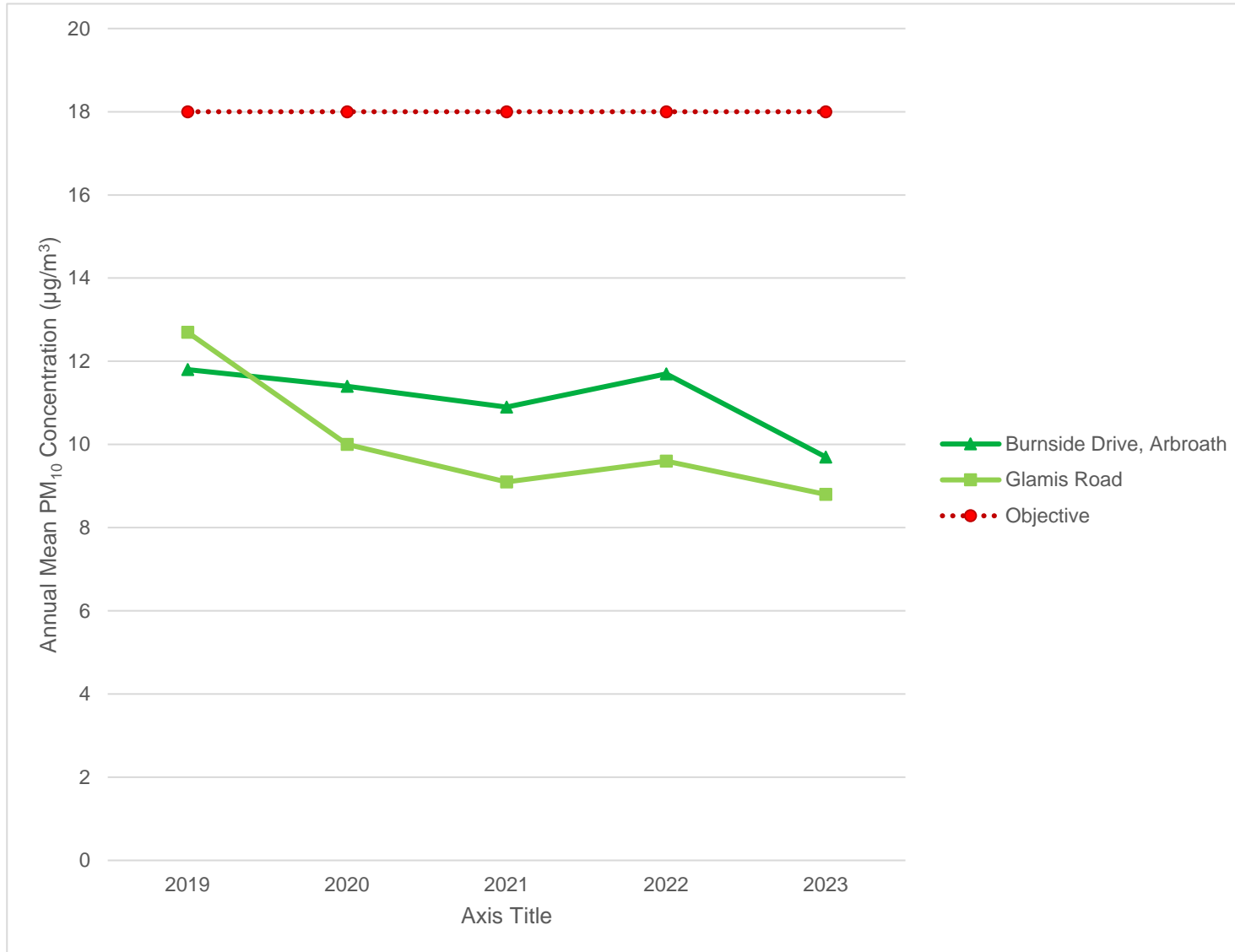


Table A.6 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2023 (%) ⁽²⁾	2019	2020	2021	2022	2023
AFR1	Roadside	96.5	96.5	-	-	-	5.4	4.7

Notes:

Exceedances of the PM_{2.5} annual mean objective of 10 µg/m³ are shown in bold.

All means have been “annualised” as per LAQM.TG(22), 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%).

Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO₂ 2023 Monthly Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.68)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
A1	364585	742349					8.1	5.5	7.3	7.5	8.0	6.5	9.0	9.5	7.6	5.5		
A2	362987	740642					10.6	4.2	7.2	10.4	10.5	7.3	12.5	12.0	9.1	6.6		
A3	364299	741225					26.4	18.1	18.9	25.1	21.5	17.8	25.7	23.4	22.1	16.0		
A4	364158	741122					16.7	11.4	11.9	15.9	15.5	13.8	22.9	18.1	15.7	11.4		
B1	359727	760170					17.0		8.8	12.2	10.0	13.2	20.0	14.3	13.8	9.6		
B2	361216	759644					6.5	3.7	5.5	6.9	5.5	6.8	12.3	9.5	6.9	5.0		
CAR	356243	734526					17.2	11.6		19.1	13.2	13.4	20.0	17.3	15.7	11.1		
FOR	345825	750674					12.2	8.5	8.3	12.5	12.9	13.6	24.1	18.6	13.7	9.9		
F1	345628	750307					16.1	12.6	11.4	14.7	14.5	16.6	25.5	20.3	16.4	11.9		
KIR	338621	754032					14.7	10.6	7.1	11.9	10.8				11.3	10.0		
M1	349759	732549					13.1	8.6	10.8	10.9	10.6	13.5	21.3	14.9	12.7	9.2		
M2	371418	757767							15.3	21.8	23.2	15.7	25.3	21.7	20.9	14.2		

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Local bias adjustment factor used.

National bias adjustment factor used.

Where applicable, data has been distance corrected for relevant exposure in the final column.

Angus Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Angus Council During 2023

Angus Council has not identified any new sources relating to air quality within the reporting year of 2023.

Additional Air Quality Works Undertaken by Angus Council During 2023

Angus Council has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

Angus Council deploy diffusion tubes prepared and analysed by Tayside Scientific Services (TSS; 20% TEA in water method). There have been major deviations from the DEFRA calendar due to serious staffing and workload issues. Unfortunately, this has meant that we were unable to undertake passive sampling for NO₂ in Angus between January and May. These issues have now been resolved.

Diffusion Tube Annualisation

All diffusion tubes required annualisation. The calculation method is in Table C.3.

Diffusion Tube Bias Adjustment Factors

Angus Council have applied a national bias adjustment factor of 0.68 to the 2023 monitoring data. A summary of bias adjustment factors used by Angus Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	06/24	0.68
2022	National	03/23	0.75
2021	National	03/22	0.77
2020	National	03/21	0.80
2019	National	03/20	0.80

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within Angus Council required distance correction during 2023.

QA/QC of Automatic Monitoring

The Partisol is a gravimetric reference equivalent PM₁₀ analyser. It contains 16 filters that are exposed for 24 hours and allow 2 weeks of continuous operation (usually with two blanks). The filters are supplied by the equipment manufacturer and conditioned and weighed before and after the sampling period by Tayside Scientific Services using in-house methodologies. The samplers are serviced annually by AECOM UK Ltd.

The Fidas monitor is serviced twice a year by AECOM UK Ltd.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀ and PM_{2.5} monitor utilised within Angus does not require the application of a correction factor.

Automatic Monitoring Annualisation

AA1 required annualisation. The calculation method is in Table C.3.

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

Site ID	Annualisation Factor Dundee Mains Loan	Annualisation Factor Edinburgh Nicolson Street	Annualisation Factor Grangemouth	Annualisation Factor Aberdeen Union Street	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
A1	1.0985	1.0325	1.0540	1.0774	1.0656	7.6	8.0	
A2	1.0985	1.0325	1.0540	1.0774	1.0656	9.1	9.7	
A3	1.0985	1.0325	1.0540	1.0774	1.0656	22.1	23.5	
A4	1.0985	1.0325	1.0540	1.0774	1.0656	15.7	16.7	
B1	1.0070	0.9722	1.0285	1.0673	1.0188	13.8	14.1	
B2	1.0985	1.0325	1.0540	1.0774	1.0656	6.9	7.4	
CAR	1.0595	1.0271	1.0326	1.0326	1.0380	15.7	16.3	
FOR	1.0985	1.0325	1.0540	1.0774	1.0656	13.7	14.6	
F1	1.0985	1.0325	1.0540	1.0774	1.0656	16.4	17.5	
KIR	1.5098	1.1999	1.2249	1.2506	1.2963	11.3	14.7	
M1	1.0985	1.0325	1.0540	1.0774	1.0656	12.7	13.5	
M2	0.9489	0.9493	1.0173	1.0715	0.9968	20.9	20.8	

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

Site ID	Annualisation Factor Grangemouth	Annualisation Factor Auchencorth Moss	Annualisation Factor Glasgow High Street	Annualisation Factor Glasgow Townshead	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
AA1	0.8798	0.8496	0.8819	0.8467	0.8645	11.2	9.7	

Appendix D: Air Quality Monitoring Sites Map

Figure D.3. Current air quality monitoring sites in Angus



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
DT	Diffusion Tube
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