Annual Progress Report (APR)

2022 Air Quality Annual Progress Report (APR) for Glasgow City Council

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

October 2022

Information	Glasgow City Council
Local Authority Officer	Dom Callaghan
Department	Neighbourhoods, Regeneration & Sustainability
Address	231 George St, Glasgow G1 1RX
Telephone	0141 287 6628
E-mail	dom.callaghan@glasgow.gov.uk
Report Reference Number	GCC/NRS/SG/APR22
Date	October 2022

Executive Summary: Air Quality in Our Area

Air Quality in Glasgow

During 2021, Glasgow City Council measured concentrations of Nitrogen Dioxide (NO_2) below the annual mean objective at all automatic monitoring stations within the city, including those within the City Centre Air Quality Management Area (AQMA), with the exception of the Glasgow Kerbside (Hope St) site. 2020 was the first year since monitoring began where all automatic monitoring locations had met the air quality objectives, however fewer restrictions due to the pandemic in 2021 has resulted in an increase in annual mean NO_2 levels at the majority of locations. Although an increase has been recorded, NO_2 remains below pre-pandemic levels and Glasgow Kerbside is the only automatic monitoring station to record a return to exceedance of the objective.

NO_2 levels are also recorded by diffusion tubes across Glasgow and in 2019, six monitoring locations within the city centre recorded exceedances of the objective. In 2020, all monitoring was within the objective except for one marginal exceedance which was within the margin for error of this form of monitoring. In 2021, this had increased to exceedances at two locations in the city centre, with a further 4 locations within 10% of the objective, reflecting the general increase recorded at the automatic monitoring stations

The NO_2 hourly mean objective was not exceeded at any of the automatic monitoring stations in 2021. This was consistent with measurements from previous years.

Levels of PM_{10} recorded across the city in 2021 were satisfactory with both the daily mean and annual mean objectives being met at all monitoring locations. This continued the trend of compliance in respect of this pollutant which has been observed for several years. It should be noted that the Scottish objective for this pollutant is set at just under half that of the UK and EU limits. The city is therefore doing relatively well in this area.

For Scottish Local Authorities particulates at $PM_{2.5}$ have now been prescribed in regulations with an annual mean objective of 10µg/m^3 to be achieved by 2020. This objective was not exceeded at any monitoring location during 2021.

Previous Air Quality Annual Progress Reports confirmed compliance with relevant Annual Mean Objectives for both Parkhead Cross and Byres Road / Dumbarton Road AQMA’s.

Proposals to revoke the AQMA's in place in respect of the Annual Mean Objective for NO_2 at Parkhead Cross and the Annual Mean Objective for PM_{10} at Byres Road / Dumbarton Road were approved by the Environment, Sustainability and Carbon Reduction City Policy Committee of Glasgow City Council. The amendment and revocation were formally approved by Order on 1st October 2020. Whilst the Byres Rd / Dumbarton Rd AQMA remained in effect in respect of the annual mean objective for NO_2, continued monitoring has shown no exceedances of this objective since 2017. This APR therefore proposes that the Byres Rd / Dumbarton Rd AQMA be revoked in terms of this objective.

Actions to Improve Air Quality

Air Quality Action Plans

In response to the implementation of the AQMA's in the city, Glasgow City Council produced Air Quality Action Plans (AQAP) in 2004 and 2009 introducing a range of measures aimed at reducing pollution in the city. The AQAP is an evolving project with several measures such as vehicle idling enforcement, vehicle emission testing and initiatives towards cleaner vehicles ongoing. Other measures such as the city car club and electric vehicle charging infrastructure continue to evolve.

A new AQAP has been prepared and is in draft form. Consultation and formal adoption have been paused due to development of the Glasgow Low Emission Zone but is expected to be completed in early 2023.

Low Emission Zone

The Scottish Programme for Government announced in 2017 that there would be Low Emission Zones (LEZ's) in 4 cities in Scotland. Glasgow City Council introduced Scotland's first LEZ in an area broadly equivalent to the city centre AQMA at the end of 2018.

The LEZ has been introduced in two phases, with the first phase targeting improvements in emissions arising from scheduled bus journeys going through the city centre. From December 2018 the LEZ required that 20% of bus journeys through the city centre meet the Euro VI emission standard. This target is to be increased by 20% each year, until 100% of buses are compliant by December 2022. Currently more than 80% of bus journeys through the city centre meet this emission standard due to the LEZ.

Public and stakeholder consultation on possible LEZ phase 2 options took place in February and March of 2020. The results of this were used, along with extensive option modelling, to identify the preferred LEZ scheme for non-bus traffic.

The second phase of the LEZ received Ministerial approval and came into effect on 31 May 2022. This began a statutory one-year grace period before general enforcement begins on 1 June 2023. A further year grace period for vehicles registered to residential properties within the zone means enforcement for these vehicles will begin on 1 June 2024. The Glasgow LEZ will apply to all vehicle types with the exception of motorcycles and mopeds.

The objectives of the Glasgow Low Emission Zone are as follows:

- Improve public health of residents of and visitors to, the City of Glasgow by contributing towards meeting the air quality objectives prescribed under section 87(1) of the Environment Act 1999.
- Contribute towards the emissions reduction targets set out in Part 1 of the Climate Change (Scotland) Act 2009 through the promotion of low and zero emissions vehicles and the promotion of public and sustainable transport options.
- Improve the amenity of Glasgow through the promotion of the Glasgow City Council Strategic Themes of A Vibrant City, A Healthier City and a Sustainable and Low Carbon City.

Link to Glasgow's LEZ.

https://www.glasgow.gov.uk/LEZ

Glasgow's Climate Plan

In 2019, Glasgow City Council set up a Climate Emergency Working Group, subsequently declaring a Climate Emergency in the city. In response to this, a Climate Plan has been prepared detailing a list of actions which the Council, its partners and stakeholders will take to ensure a just transition to a low carbon and resilient city. Many of the actions to move to a low carbon city have co-benefits for air quality pollutants. Development of the LEZ directly addresses actions 22 and 53 of the Glasgow Climate Plan. Expected improvements in LAQM pollutant emissions are a co-benefit of actions 26,33,54,55 and 56. The AQAP and LEZ complements those actions seeking to reduce carbon emissions

from traffic such as reducing private car use, improve public transport provision and transition the fleet to cleaner forms of transport.

Link to Glasgow's Climate Plan

https://www.glasgow.gov.uk/CHttpHandler.ashx?id=50623&p=0



Glasgow Transport Strategy

At the City Administration Committee of the 10th March 2022, the Committee gave approval to and adopted the Glasgow Transport Strategy: Policy Framework. This new local transport strategy is city-wide and provides a framework for investment and decision-making on transport issues up to 2030. Part 1 of the Glasgow Transport Strategy, a Policy Framework, has been produced and approved by the Council. Part 2, a Spatial Delivery Framework, is under development.

There are other separate but related transport strategies, all of which complement the LEZ – the Active Travel Strategy, Liveable Neighbourhoods Plan and City Centre Transformation Plan.

City Centre Transformation Plan

The City Centre Transformation Plan (CCTP) is particularly aligned with the development of the LEZ, given the overlap with the aims of the CCTP and the area covered by the strategy. Key aims of the CCTP which have the potential to improve air quality include:

- Re-allocate road space in Glasgow City Centre for active travel and green infrastructure;
- Deliver improved public transport and support/encourage a shift to more sustainable modes, particularly walking, cycling and public transport;
- Improve access for the mobility impaired;
- Achieve a 30-40% reduction in peak-hour private car traffic in Glasgow City Centre by 2030;
- Deliver improvements for servicing (e.g. goods, deliveries and waste collection) to improve the vitality of Glasgow City Centre;
- Support a doubling of Glasgow City Centre's population by 2035; and
- Support Glasgow's aim to be carbon neutral by 2030
- The CCTP will help to deliver a transformation of the centre and ensure the city makes a full contribution to our climate change commitments and transition to net zero carbon.

As part of the CCTP, several Area Based Catalysts for Change have been identified to deliver the transformational changes set out in the plan objectives. One of these is the ‘People First Zone’. The ‘People First Zone’ is proposed to be a central area where vehicular access would be limited to essential users only such as people with disabilities, buses, taxis, emergency services etc. This intervention would greatly reduce vehicle numbers in the core of the city centre and create opportunities to reallocate road space for active travel, public realm and greenery. On street parking would also be significantly reduced. The People First Zone coincides with a central area within the LEZ where air pollution levels are at their highest. It also complements the ongoing ‘Avenues project’.

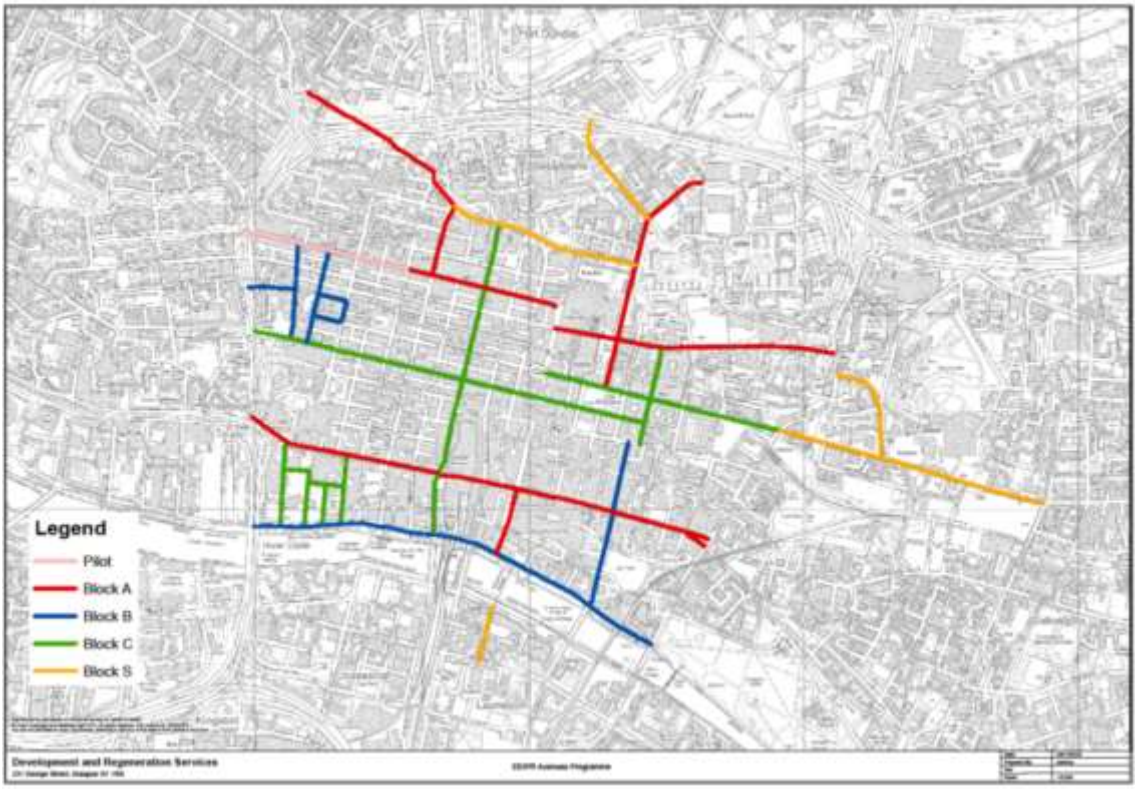
EIIPR Avenues Programme

Included in the Glasgow City Region City Deal funding, Glasgow City Council is investing approximately £115 million within the city centre to deliver on the Enabling Infrastructure - Integrated Public Realm (EIIPR) programme. More commonly known as the Avenues programme, this will see streetscape improvements made to the public realm, supporting a

key strategic objective of the City Centre Strategy and Action Plan 2014-19: the establishment of principal Avenues throughout the city centre to form an integrated network of continuous pedestrian and cycle priority routes.



Sauchiehall St on completion of Sauchiehall St West



Link to Glasgow Transport Strategy

https://www.glasgow.gov.uk/transportstrategy

Link to Glasgow City Centre Transformation Plan

https://www.glasgow.gov.uk/city-centre-transformation-plan

Link to Avenues Project

https://www.glasgow.gov.uk/avenues

Active Travel Strategy

Glasgow City Council is delivering an Active Travel Strategy to supersede the existing Strategic Plan for Cycling 2016-2025 and designed to achieve significant modal shift across the city to walking, wheeling and cycling. The strategy is a recognition of the positive impact that transport, and active travel in particular, can make towards city's wider policy objectives on Climate and the Environment, Health and Wellbeing, Inclusion and Equality and Wealth and Inclusive Growth.

The strategy is framed by three policy and action areas:

- Connectivity: people and place: rebalancing our streets and spaces - with a focus on networks and infrastructure in our street environments.
- Unlocking Change: enabling everyone to walk, wheel or cycle - focussing on training and education and working collaboratively.
- Thinking Differently: encouraging, motivating and sustaining change - focussing on communication and promotion and inspiring people through larger events and other activities.

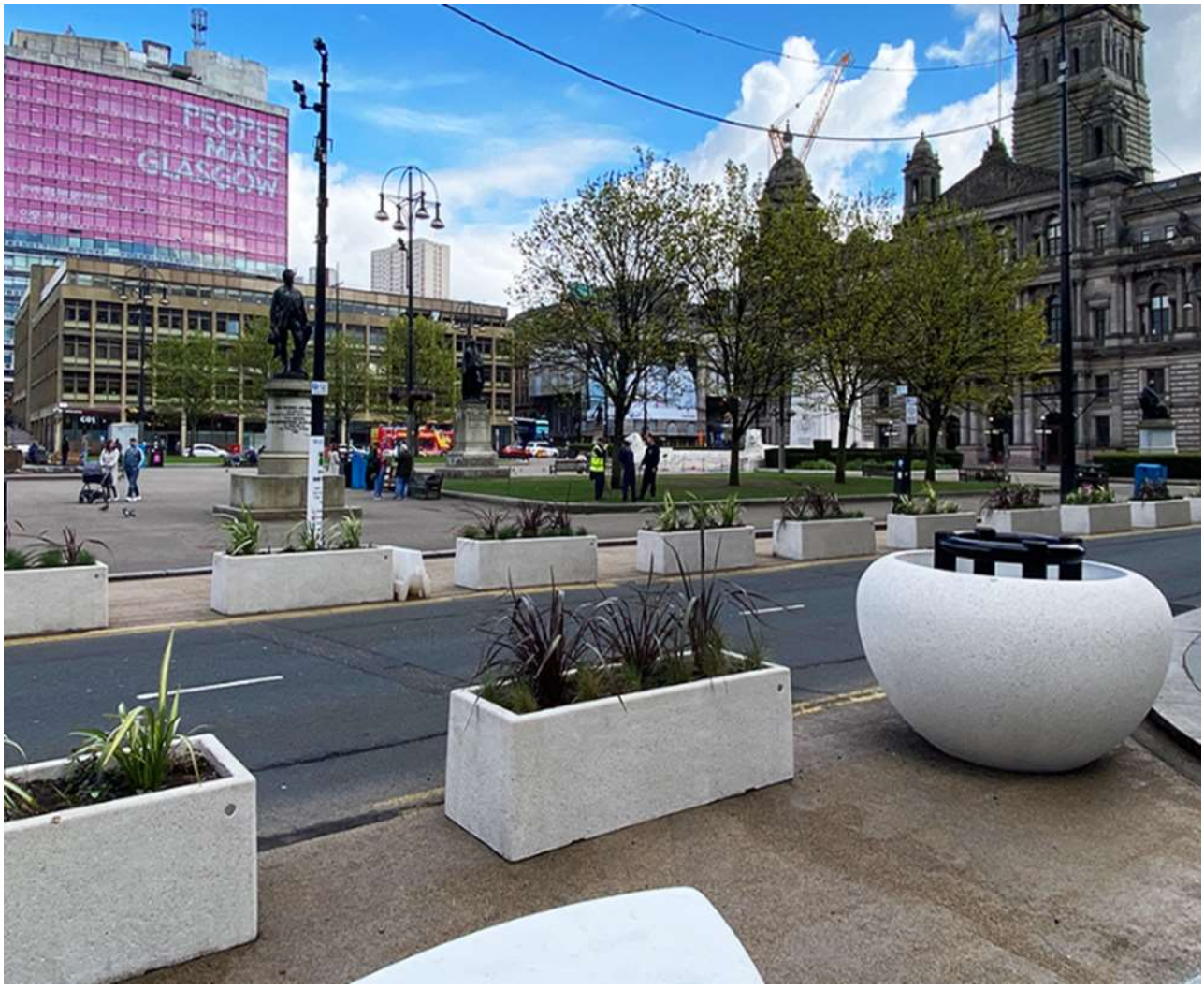
A key output from the strategy will be the City Network, which will provide an accessible, safe, coherent and direct active travel network across Glasgow. To be delivered by 2030, the City Network will connect key amenities and drivers of travel such as education, business, retail and culture. There will also be development of the Neighbourhood Network with a focus on walking and wheeling. This Neighbourhood Network will enable easy everyday active journeys within and between neighbourhoods.

Link to Active Travel Strategy

https://www.glasgow.gov.uk/activetravel

Spaces for People

Introduced at the start of Covid-19 to suppress the spread of the virus and help manage demand on public transport, Glasgow's Spaces for People programme has delivered a significant number of temporary travel interventions across the city to ease physical distancing in public places, mainly through the provision of widened footways, road closures and segregated cycle lanes. The majority of Spaces for People schemes will now be made permanent following consideration of an independent review which highlighted that the infrastructure could offer long-term active travel and sustainability benefits.



Spaces for People Improvements in George Square

Link to Spaces for People

https://glasgow.gov.uk/spacesforpeople

Glasgow Bus Partnership

Glasgow Bus Partnership brings together the eight Glasgow City Region local authorities, Strathclyde Partnership for Transport, bus operators (through their new alliance, GlasGo) and bus passenger representative groups as a voluntary partnership to address current challenges to bus travel and to improve the passenger experience for communities across the Region. The vision of the Glasgow Bus Partnership is of a City Region where bus services form part of a network of connectivity, enhancing the opportunities and wellbeing of those who live or visit here - providing safe, affordable, enjoyable connections and reducing road congestion, noise and air pollution. Aims of the GBP include:

- Improving bus priority mechanisms and reducing congestion to improve bus journey times and reliability
- Ensuring buses are given higher priority in any future city planning
- Improving the accuracy of real time passenger information and exploring options to introduce an integrated ticketing system

The GBP also supports the delivery of Glasgow's Low Emission Zone and brings together key partners to develop bus priority funding bids to Transport Scotland's Bus Partnership Fund. The work of the GBP seeks to positively impact upon the affordability and accessibility of the bus network and assist with creating the conditions that will increase bus patronage. A faster, cheaper, and better-connected bus network will benefit all bus passengers across the City Region as well as the environment.

Link to Glasgow Bus Partnership

https://www.glasgow.gov.uk/glasgowbuspartnership

STPR2

On 20 January 2022, the Scottish Government published the Strategic Transport Projects Review STPR2 Phase 2 - a key document which outlined 45 long term transport investment recommendations that seek to make transport in Scotland more sustainable, and support people to make better, more informed choices on how they travel. One of the standout recommendations was the inclusion of Clyde Metro - described as a multi-billion pound investment which, when complete, could better connect over 1.5 million people to employment, education, and health services in and around the Glasgow City Region:

- A metro transport system that transforms connectivity in the Glasgow City Region up to around 15km from the city centre. It would target areas where connections are currently poor, including places where there is deprivation.
- Metro transport systems include one of or a combination of bus rapid transit, light rail and metro rail. These options would complement the service provided by traditional railways and may include the conversion from existing railways to light rail or metro rail.
- Improving access across the city region supports Scottish Government policies aimed at tackling deprivation and health issues. Connecting Clyde Metro with active travel and existing transport networks would remove shorter distance trips from the heavy rail network and free up additional rail capacity for longer journeys.

The system would help to deliver environmental benefits and improve public transport journey times and journey time reliability, making sustainable travel options more attractive.

The final recommendations are expected to be confirmed later this year. Meantime, STPR2 recommends that Transport Scotland continues to work with the Council, Strathclyde Partnership for Transport (SPT) and other regional partners on developing the business cases and delivery plan for Clyde Metro.

Link to SPTR2

https://www.transport.gov.scot/our-approach/strategy/strategic-transport-projects-review-2/

Glasgow City Council Fleet Strategy

As a Local Authority, GCC operates a large vehicle fleet to support all aspects of Council services with over 1,300 vehicles in the fleet across the council “family”. The GCC Fleet Strategy for 2020 to 2030 sets out to minimise the Council’s carbon footprint and lead on our carbon neutrality and net zero commitments. Successful delivery of the fleet strategy will see alternative fuel solutions powering our fleet to support our operational objectives, significantly reducing our carbon footprint and advancing the Council’s drive towards net zero emissions.

Link to Glasgow Fleet Strategy

https://www.glasgow.gov.uk/councillorsandcommittees/viewSelectedDocument.asp?c=P62AFQDN0GZL81ZLDN

Other initiatives such as the provision, and promotion of, electric vehicle charge points, car clubs and cycle hire schemes, all serve to promote sustainable and low emission transport options. The LEZ can support the travel aspirations of Glasgow by encouraging modal shift, especially if delivered in tandem with active travel and bus priority improvements.

Clean Air Day

Glasgow City Council continues to support Clean Air Day, organised by Environmental Protection Scotland on behalf of the Scottish Government. Taking place on 17 June 2021, Clean Air Day remained a largely online campaign with a focus on education and promotion of learning activities related to air pollution and transport choices to school children.



Local Priorities and Challenges

Glasgow's Low Emission Zone (LEZ) is an intervention directed at protecting and improving public health. While the concept was introduced in the 2009 Action Plan it is also now part of a broader approach to enhancing the amenity and attractiveness of the city centre through providing cleaner air.

The LEZ scheme design was approved by the City Administration Committee of Glasgow City Council and by Scottish Ministers and came into effect on 31 May 2022. This began the mandatory grace period before general enforcement begins on 1 June 2023.

An LEZ Enforcement Working Group has been established to oversee the project planning for the operational phase of the LEZ. This working group comprises representatives from various internal GCC departments as well as partner organisations. This group complements the work undertaken by the national enforcement group, comprising representatives from the four LEZ cities, Transport Scotland and other organisations as required.

The priorities for 2022 / 2023 include ensuring the processes, back office, signage and enforcement systems for the LEZ are developed in line with the overall enforcement timescales.



Communications will increase in volume and frequency in the run up to LEZ enforcement next June and will include a high-profile television and radio campaign backed by online and offline advertising across a wide variety of channels.

Other priorities include:

- Proceeding with the implementation of actions within Glasgow's Climate Plan with a focus on those actions with local air quality co-benefits.
- Continuing to progress actions within the Air Quality Action Plans as well as to consult on and implement the new AQAP.
- Proceeding with the revocation of the Byres Rd / Dumbarton Rd AQMA
- Continuing to develop the Glasgow Transport Strategy and its related parts, the City Centre Transformation Plan, the Liveable Neighbourhoods Plan and the Active Travel Strategy.

How to Get Involved

Information relating to the LEZ, Local Air Quality Management (LAQM) and AQMA's in Glasgow is available via the Glasgow City Council website. This information includes Air Quality Action Plans, Progress Reports and Detailed Assessments.

Link to LAQM website

https://www.glasgow.gov.uk/index.aspx?articleid=18863

The website also contains links to the national Air Quality in Scotland webpage where the public can access both real time and historical monitoring data in addition to registering to receive text/email alerts where poor air quality is forecast.

Link to Scottish Air Quality website

http://www.scottishairquality.co.uk/

Table of Contents

Executive Summary: Air Quality in Our Area i

Air Quality in Glasgow i

Actions to Improve Air Quality ii

Local Priorities and Challenges xii

How to Get Involved xiv

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 3

2.2.1 Placemaking – Plans and Policies 4

2.2.2 Transport – Low Emission Zones 4

2.3 Progress and Impacts of Measures to address Air Quality in Glasgow 5

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives 16

3.1 Summary of Monitoring Undertaken 16

3.1.1 Automatic Monitoring Sites 16

3.1.2 Non-Automatic Monitoring Sites 17

3.1.3 Other Monitoring Activities 17

3.2 Individual Pollutants 18

3.2.1 Nitrogen Dioxide (NO_2) 18

3.2.2 Particulate Matter (PM_{10}) 19

3.2.3 Particulate Matter ($PM_{2.5}$) 20

3.2.4 Sulphur Dioxide (SO_2) 20

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene 20

3.2.6 Benzene 20

4 New Local Developments 21

4.1 Road Traffic Sources 21

4.2 Other Transport Sources 21

4.3 Industrial Sources 21

4.4 Commercial and Domestic Sources 21
4.5 New Developments with Fugitive or Uncontrolled Sources 21
5 Planning Applications 22
6 Conclusions and Proposed Actions 23
6.1 Conclusions from New Monitoring Data 23
6.2 Conclusions relating to New Local Developments 24
6.3 Proposed Actions 24
Appendix A: Monitoring Results 26
Appendix B: Full Monthly Diffusion Tube Results for 2021 48
Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC 54
New or Changed Sources Identified Within Glasgow City Council During 2021 54
Additional Air Quality Works Undertaken by Glasgow City Council During 2021 54
QA/QC of Diffusion Tube Monitoring 54
Diffusion Tube Annualisation 55
Diffusion Tube Bias Adjustment Factors 55
NO_2 Fall-off with Distance from the Road 55
QA/QC of Automatic Monitoring 56
PM_{10} and $PM_{2.5}$ Monitoring Adjustment 56
Automatic Monitoring Annualisation 56
NO_2 Fall-off with Distance from the Road 56
Glossary of Terms 58
References 59

List of Tables

Table 1.1 – Summary of Air Quality Objectives in Scotland 1

Table 2.1 – Declared Air Quality Management Areas 2

Table 2.2 – Progress on Measures to Improve Air Quality 7

Table 6.1 – Byres Rd / Dumbarton Rd AQMA Annual Mean NO_2 24

Table A.1 – Details of Automatic Monitoring Sites 26

Table A.2 – Details of Non-Automatic Monitoring Sites 28

Table A.3 – Annual Mean NO_2 Monitoring Results ($\mu g/m^3$) 36

Table A.4 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200$\mu g/m^3$ 43

Table A.5 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$) 44

Table A.6 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50$\mu g/m^3$ 45

Table A.7 – Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$) 46

Table A.8 – Benzene 2021 Monitoring Results 47

Table B.1 – NO_2 2021 Monthly Diffusion Tube Results ($\mu g/m^3$) 48

Table C.1 – Bias Adjustment Factor 55

Table C.2 – Annualisation Summary (concentrations presented in $\mu g/m^3$) 57

List of Figures

Figure 3.1 – Location of Automatic Monitoring Sites 19

Figure 3.2 - Location of nitrogen Dioxide (NO_2) Diffusion Tubes 20

Figure 3.3 – Annual Mean NO_2 Trend at Automatic Stations 20

Figure 6.1 – Byres Rd / Dumbarton Rd AQMA Annual Mean NO_2 25

1 Local Air Quality Management

This report provides an overview of air quality in Glasgow 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 being undertaken by Glasgow City 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.

A summary of AQMAs declared by Glasgow City 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 https://www.glasgow.gov.uk/localairqualitymanagement

It is proposed that the Byres Rd and Dumbarton Road AQMA be revoked (see monitoring and conclusions sections).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
City Centre AQMA	NO_2 annual mean PM_{10} annual mean NO_2 annual mean	Glasgow	The city centre AQMA is loosely bound by the M8 motorway to the west and north (with slight protrusions at North Street and Royston Road), by High Street and Saltmarket to the east and by the river Clyde to the south. This area was declared an AQMA in 2004 in respect of the annual mean NO2 Objective. In 2007 the area covered by this AQMA was extended and declared in respect of the annual mean PM_{10} Objective.	Glasgow City Council Air Quality Action Plan 2009 https://www.glasgow.gov.uk/CHttpHandler.ashx?id=32447&p=0

AQMA Name	Pollutants and Air Quality Objectives	City / Town	Description	Action Plan
			In 2012 a further extension of the AQMA was declared and the order amended in respect of the hourly mean NO2 Objective.	
Byres Road and Dumbarton Road AQMA	NO_2 annual mean	Glasgow	This AQMA extends from the junction of Byres Road and Great Western Road, south to Dumbarton Road and west along Dumbarton Road as far as Thornwood Drive roundabout. This area was declared an AQMA in 2007 in respect of the annual mean NO_2 Objective. In 2012 the area covered by this AQMA was extended northwards along Queen Margaret Drive to the junction with Oban Drive. In 2016 this AQMA was amended in respect of the annual mean PM_{10} Objective. In 2021 this AQMA was amended to revoke the annual mean PM_{10} designation.	Glasgow City Council Air Quality Action Plan 2009 https://www.glasgow.gov.uk/CHttpHandler.ashx?id=32447&p=0

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 Glasgow City 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.

Glasgow City Council has worked to ensure that air quality is embedded in Council policies going forward. It is a core consideration within the Glasgow Transport Strategy, the City Centre Transformation Plan, the Liveable Neighbourhoods Plan and the Active Travel Strategy. The LEZ was incorporated into the Strategic Environmental Assessment of the overarching Glasgow Transport Strategy.

Cross departmental working within Glasgow City Council has been enhanced by the actions within CAFS2, with greater interaction and consultation between departments responsible for environment, sustainability, transport, planning and design.

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.

Glasgow City Council introduced phase 2 of the LEZ on 31 May 2022, with general enforcement beginning on 1 June 2023. GCC continues to work with partners at SEPA to build on the traffic emissions modelling work undertaken as part of the National Modelling Framework (NMF) to develop carbon emissions inventories from city centre transport sources. This work will build on the existing assessment completed by SEPA – Consideration of Carbon Dioxide emissions within an LEZ scheme: Glasgow.

The Glasgow Transport Strategy has an ambitious target of reducing peak hour traffic in Glasgow City Centre by 30% by 2030. The transport and emissions models developed by SEPA will be updated and adapted to provide decision making evidence for actions within the GTS and CCTP such as the “People First Zone” – a low traffic area encompassing much of the city centre, including those areas where existing air pollution exceeds the objectives.

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

Glasgow City 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 2.2. More detail on these measures can be found in the air quality Action Plan relating to each AQMA. Key completed measures are:

- At the start of 2021 >60% of the bus fleet were compliant with the LEZ standards. This rose to >80% by the end of 2021.
- LEZ preferred scheme design was completed and subject to public comment / objection. This resulted in the development of the LEZ final scheme design which was formally introduced on 31 May 2022.
- Billboard and bus advertising campaign to raise awareness of, and reduce unnecessary vehicle idling.
- A retrofit fund for taxis was continued and promoted, providing exhaust treatment or engine replacement to LEZ standards for older vehicles.
- A hybrid working system was developed, reducing the need for travel.
- As at the end of the financial year in March 2022, the council had deployed 292 charge points across 151 units for public use in the city, more than any other Scottish Local Authority, including a significant number of 'Rapid' units that will charge most vehicles 80% in approximately 30 minutes.
- The Glasgow EcoStars scheme continued to expand with 277 members and 10,597 vehicles part of the scheme.

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

- Further develop the infrastructure and processes for the enforcement of the Glasgow LEZ.
- Continue with progress on the Avenues project.
- Expand the walking and cycling network and associated infrastructure.
- Further expand the electric vehicle charging network.
- Continue the Council fleet transition to zero emissions vehicles.
- Complete a feasibility study into the introduction of a Workplace Parking Levy.
- Continue to develop options for the city centre “People First Zone”.
- Further develop and consult on the draft AQAP before adoption. This AQAP will consider both the relevant Scottish objectives and the revised World Health Organisation guidelines.

Table 2.2 – 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	Vehicle Idling Council will expand program of vehicle idling enforcement	Public Information	Regular scheduled patrols to enforce and/or educate regarding vehicle idling.	NRS Public Health		2003 Onwards	No of complaints received re vehicle idling. No of interventions carried out by officers.	Low	Council continues to promote awareness and benefits in regard to reduction of vehicle idling via billboards and advertising campaign on PSV vehicles, around schools and bus stops. Enforcement patrols serve notice or information to drivers idling.	Ongoing	No fixed penalties issued during 2021. Enforcement patrols focussed on education around schools. Prominent education campaign carried out over local radio.
2	Vehicle Emissions Testing	Vehicle fleet efficiency	Emission Testing will now only take place during Multi Agency Days of action	NRS Public Health		2003 Onwards	No of vehicles tested.	Low	Emission testing continues in a reduced capacity. 40,000+ vehicles tested to date.	Ongoing in a limited capacity	No vehicles tested during 2021.
3	Low Emission Zone	Promoting low emission transport	Develop phase 1 of the LEZ as the compliance milestones for the LEZ are met.	NRS Sustainability	2015 onwards	2018 - 2024	Phase 1 – percentage bus compliance with emission limits.	Medium	Phase 1 compliance level to be minimum of 80% by end 2021.	Phase 1 – end 2022 Phase 2 – 2023/4	Compliance rate for bus journeys is >80% by end 2021, increasing by 20% each year until

			Develop the final scheme design for phase 2.				Phase 2 – develop final scheme design for formal approval in 2022		Phase 2 final scheme design developed and received Committee and Ministerial approval. Phase 2 came into effect on 31 May 2022.		100% of bus journeys are compliant by December 2022. Phase 2 of the LEZ will apply to all vehicle types and will be enforced from June 2023. It will require a minimum emission standard of Euro VI/6 for diesel vehicles and Euro IV/4 for petrol vehicles.
4	Cleaner Taxis	Promoting low emission transport	Council will prepare an emissions strategy to reduce emissions from taxi and private hire vehicles	Licensing	2009	Ongoing	Proportion of taxis / private hire vehicles meeting LEZ emissions standards	Low / Medium	GCC have adopted licensing conditions in line with the introduction of the LEZ enforcement. GCC have removed the five year age policy for taxi applications to facilitate the replacement of vehicles with a newer taxi which meets the required emission standard.	Ongoing	As part of the ongoing LEZ preparation funding has been provided by the Scottish Government for the conversion of older taxis from diesel to LPG, reducing emissions and meeting LEZ requirements. 84 taxis in Glasgow were retrofitted by March 2022.

									GCC have reduced testing frequency for newer vehicles and increased testing frequency for older vehicles. GCC have committed to all private hire fleet vehicles being zero emissions by 2030.		
5	Council Workplace Travel Plan	Promoting travel alternatives	Travel plan was launched in an updated form.	Glasgow City Council		2014	Proportion of staff using public /sustainable transport options Proportion of work related journeys reduced.	Low	GCC continues to support active and sustainable transport to places of work. This includes the refresh of the cycle to work scheme with an increase in the level of funding available being investigated to make e-bikes more attainable under the scheme. Repayment period is currently 18 months to improve accessibility of the scheme. Claims for cycle mileage for business travel have been clarified and clearer	Ongoing	Staff Travel Plan activities are no longer funded via AQAP (since April 2019). Active travel measures are still in place and maintained. Hybrid working patterns remain in place across much of the council which has a positive impact on LAQM & Scope 3 emissions. Staff travel Survey requires to be repeated

									information will be live o the GCC webpage shortly.		
6	Car Clubs	Alternatives to private vehicle use	Improving zero emission provision within the car club	Glasgow City Council	2009	2010 onwards 2015 onwards (award of new operator contract) 2020 – increased zero emissions provision	Car club membership	Low	Glasgow City Council has successfully provided a car club for use by residents and businesses for twelve years and requested funding of £15,000 to augment the feasibility and soft market testing of new operational models that would incorporate innovative technologies to remove the requirement for dedicated bays, providing a more customer friendly	Ongoing	

									operational model and introduce a substantially cleaner fleet through the introduction and an all EV fleet where possible. The scheme has been shown to reduce ownership of aging, more environmentally hazardous cars and negate the requirement for personal car ownership in an urban environment. Benefits include greater accessibility to the initiative through flexible with a reduction in dependency on carbon based fuels and the subsequent carbon and		

									pollution reduction.		
10	Air Quality Information	Public Information	The Council will provide data and information regarding current and longer term air quality monitoring on our web site	NRS Sustainability	2009	Ongoing		Low	GCC continues to publish air quality information on the main website and promote the use of the Scottish Air Quality Database "Know & Respond" information service. Ongoing engagement in relation to LEZ and vehicle idling highlights the air quality benefits.	Ongoing	
13	Cycling Strategy	Promoting travel alternatives	Provide cycling improvements throughout the city.	Glasgow City Council	2011	Ongoing	Proportion of journeys undertaken by cycling	Low	Early in 2022 the City adopted Glasgow's Active Travel Strategy 2022-2031 (ATS) which aims for walking, cycling and wheeling to be the first and natural choice for everyday journeys. The strategy details proposed changes to our street environments alongside a	Ongoing	Various on street and school cycle provision infrastructure installed in 2021/22. Infrastructure at further tower blocks delayed and carried onto future.

									range of behaviour change interventions, to be delivered in collaboration with community and other external organisations, to support and enable active journeys. The strategy also outlines proposals for the City Network, a functional and high density network of protected cycle lanes connecting all areas of the city and linking to key trip generators, deliverable by 2030. Working closely alongside the Liveable Neighbourhoods programme in particular, the ATS contributes to the outcomes for the city from transport, as detailed within the Glasgow Transport Strategy, which includes a		

									"successful and just transition to a net-zero carbon, clean and sustainable city.		
17	Promote Greener Vehicles	Promoting low emission transport	Provide and promote electric vehicle charging provision	Glasgow City Council		Ongoing	No of EV charging points	Low	292 charge points across 151 units, including significant numbers of rapid chargers, provided by GCC deployed for public use in the city	Ongoing	
18	Leading by Example	Promoting low emission transport	The Council will demonstrate best practice in the operation of its vehicle fleet The Council have introduced a fleet of electric vehicles through a government backed scheme and trained staff in the efficient use of these vehicles.	Glasgow City Council		Ongoing	Proportion of fleet with zero emissions	Low	GCC have committed to decarbonising the entire fleet by 2030. Additional fleet improvement plans have been put in place to ensure all GCC vehicles accessing the LEZ meet the emissions standards by time of enforcement.	Ongoing - 2030	
18	Leading by Example	Promoting low emission transport	The Glasgow ECO Stars Fleet Recognition Scheme is being promoted by	Glasgow City Council	2014	Ongoing	Membership of the Glasgow ECO Stars scheme	Low	The fleet recognition scheme has been operating since September 2014 and has	Ongoing	

			Glasgow City Council. The scheme is designed to raise awareness with both public and private organisations of the important role they can play in helping to improve air quality						currently recruited 277 members encompassing approximately 10,597 fleet vehicles including three of the largest bus companies operating within Glasgow. Glasgow Taxi's group also joined the Glasgow Eco Stars scheme in 2018.		

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives

3.1 Summary of Monitoring Undertaken

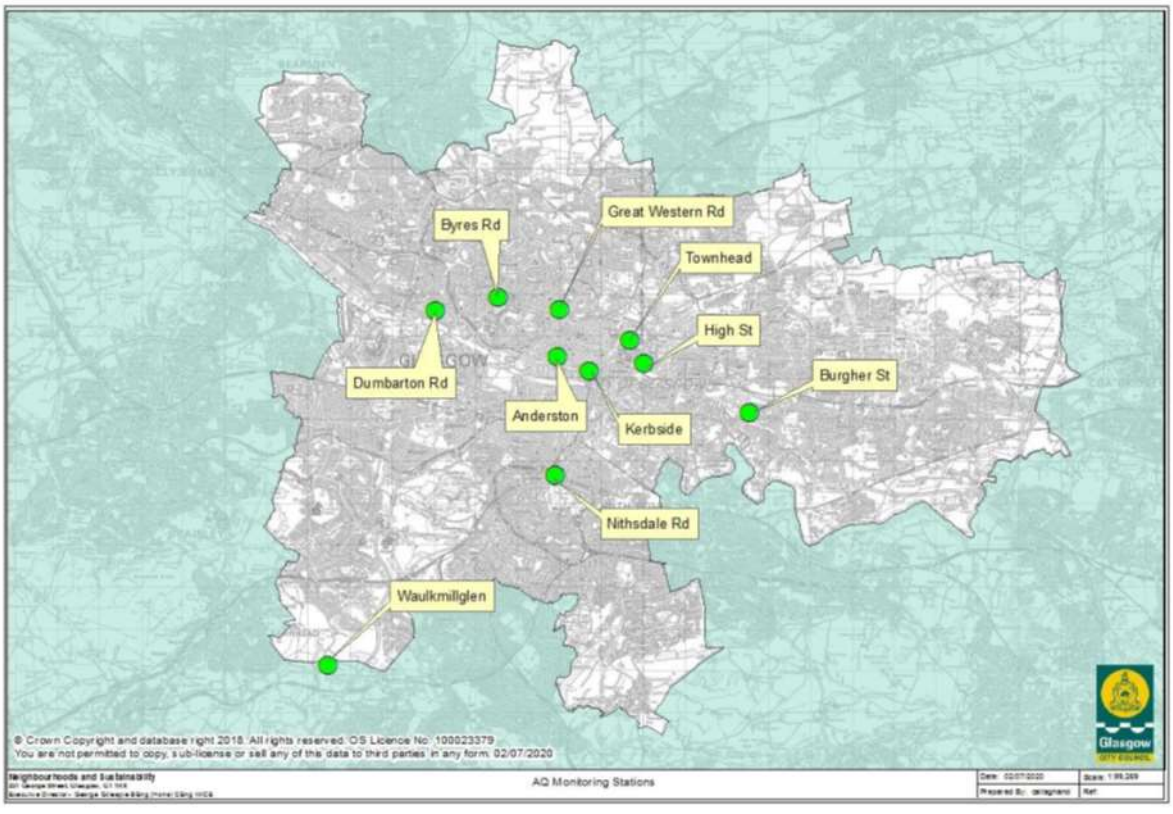
3.1.1 Automatic Monitoring Sites

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

Glasgow City Council undertook automatic (continuous) monitoring at 10 sites during 2021. Table A.1 in Appendix A shows the details of the sites. National monitoring results are available at http://www.scottishairquality.scot/

Maps showing the location of the monitoring sites are shown in Figure 3.1 below. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

Figure 3.1 - Location of Automatic Monitoring Sites



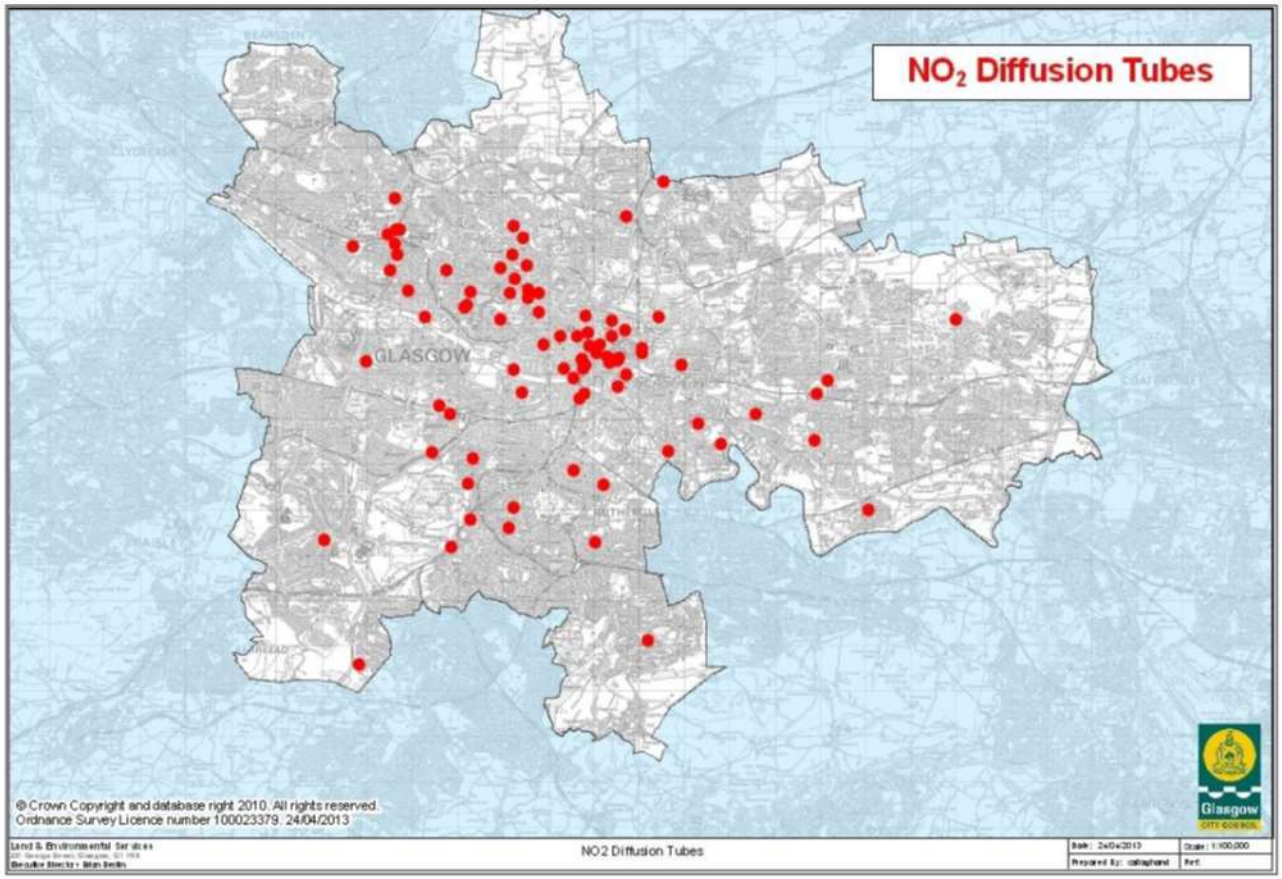
3.1.2 Non-Automatic Monitoring Sites

Glasgow City Council undertook non- automatic (passive) monitoring of NO_2 at 101 sites during 2021. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are shown in Figure 3.2 below. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

The full 2021 dataset of monthly mean values is provided in Appendix B.

Figure 3.2 - Location of Nitrogen Dioxide (NO_2) Diffusion Tubes



3.1.3 Other Monitoring Activities

Glasgow City Council undertook non- automatic (passive) monitoring of Benzene (C6H6) at 4 sites during 2021. Table A.2 in Appendix A shows the details of the sites.

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)

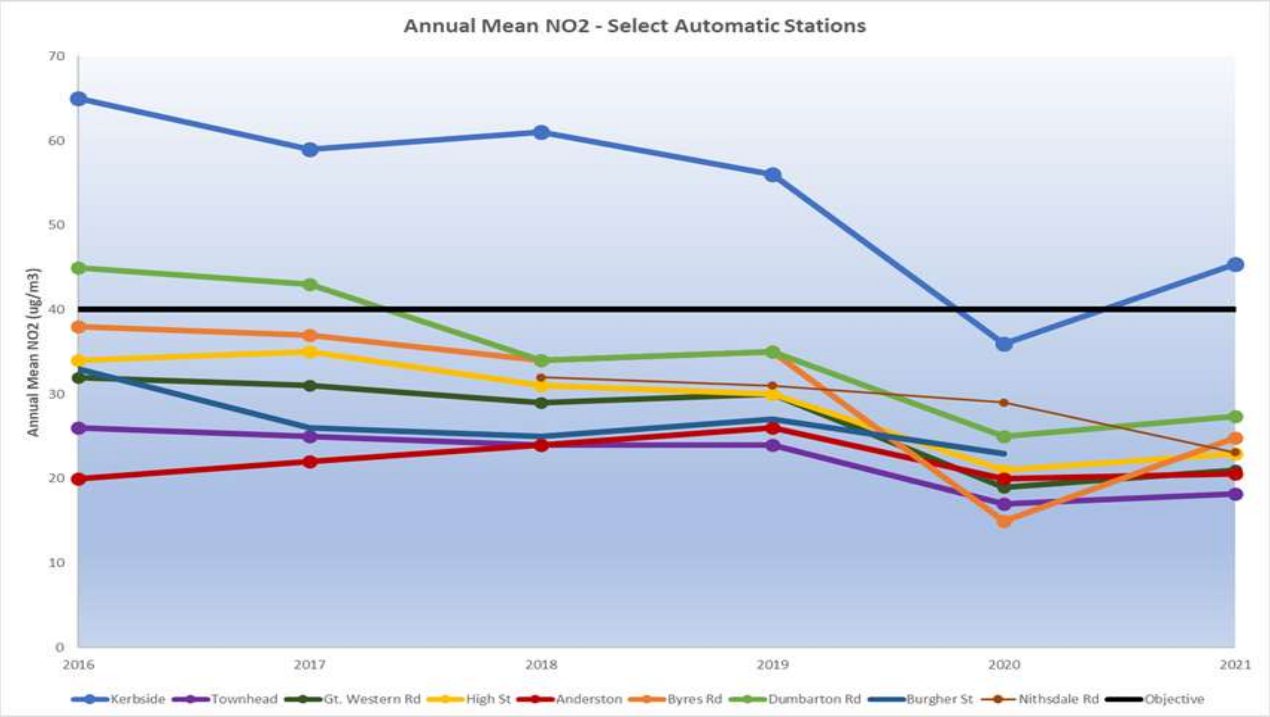
Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40 µg/m^3.

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.

During 2021, Glasgow City Council measured concentrations of NO_2 below the annual mean objective at all automatic monitoring stations within the city, including those within the City Centre AQMA, with the exception of the Glasgow Kerbside (Hope St) site. 2020 was the first year since monitoring began where all automatic monitoring locations had met the air quality objectives, however fewer restrictions due to the pandemic in 2021 has resulted in an annual increase in NO_2 levels at the majority of locations. Although an increase has been recorded, NO_2 remains below pre-pandemic levels and Glasgow Kerbside is the only automatic monitoring station to record a return to exceedance of the objective.

Figure 3.3 – Annual Mean NO_2 Trend at Automatic Stations



NO_2 levels are also recorded by diffusion tubes across Glasgow and in 2019, six monitoring locations within the city centre recorded exceedances of the objective. In 2020, all monitoring was within the objective except for one marginal exceedance which was within the margin for error of this form of monitoring. In 2021, this had increased to exceedances at two locations in the City Centre AQMA, with a further 4 locations within 10% of the objective, reflecting the general increase recorded at the automatic monitoring stations.

The NO_2 hourly mean objective was not exceeded at any of the automatic monitoring stations in 2021. This was consistent with measurements from previous years.

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.

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.

Levels of PM_{10} recorded across the city in 2021 were satisfactory with both the daily mean and annual mean objectives being met at all monitoring locations. This continued the trend of compliance in respect of this pollutant which has been observed for several years.

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. This objective was not exceeded at any monitoring location during 2021.

3.2.4 Sulphur Dioxide (SO_2)

Sulphur dioxide monitoring has been discontinued in Glasgow following a long period of compliance with the relevant Objectives.

3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene

Monitoring of these pollutants has been discontinued in Glasgow following a long period of compliance with the relevant Objectives.

3.2.6 Benzene

Table A.8 in Appendix A shows the monitored C_6H_6 annual mean concentrations with the air quality objective of 3.25µg/m3. The Annual Mean Objective was not exceeded at any monitoring location during 2021.

4 New Local Developments

No new local developments have been identified which require consideration in this report.

4.1 Road Traffic Sources

No new road traffic sources have been identified which require consideration in this report.

4.2 Other Transport Sources

No significant new transport sources have been identified which require consideration in this report.

4.3 Industrial Sources

No significant new industrial sources have been identified which require consideration in this report.

4.4 Commercial and Domestic Sources

No significant new commercial and domestic sources have been identified which require consideration in this report.

4.5 New Developments with Fugitive or Uncontrolled Sources

No significant new developments with fugitive or uncontrolled sources have been identified which require consideration in this report.

5 Planning Applications

There have been several planning applications for residential and commercial developments within the last year which required air quality assessments due to the introduction of new receptors or increased emissions due to additional vehicle movements. No assessments resulted in predictions of significant adverse impacts on air quality.

6 Conclusions and Proposed Actions

6.1 Conclusions from New Monitoring Data

During 2021, Glasgow City Council measured concentrations of NO_2 below the annual mean objective at all automatic monitoring stations within the city, including those within the City Centre AQMA, with the exception of the Glasgow Kerbside (Hope St) site. 2020 was the first year since monitoring began where all automatic monitoring locations had met the air quality objectives, however fewer restrictions due to the pandemic in 2021 has resulted in an annual increase in NO_2 levels at the majority of locations. Although an increase has been recorded, NO_2 remains below pre-pandemic levels and Glasgow Kerbside is the only automatic monitoring station to record a return to exceedance of the objective.

Previous Air Quality APRs confirmed compliance with relevant annual mean objectives for both the Parkhead Cross and the Byres Road / Dumbarton Road AQMAs. Proposals to revoke the AQMAs in place in respect of the Annual Mean Objective for NO_2 at Parkhead Cross and the Annual Mean Objective for PM_{10} at Byres Road / Dumbarton Road were noted by the Environment, Sustainability and Carbon Reduction City Policy Committee of Glasgow City Council. The amendment and revocation were formally approved by Order on 1st October 2020.

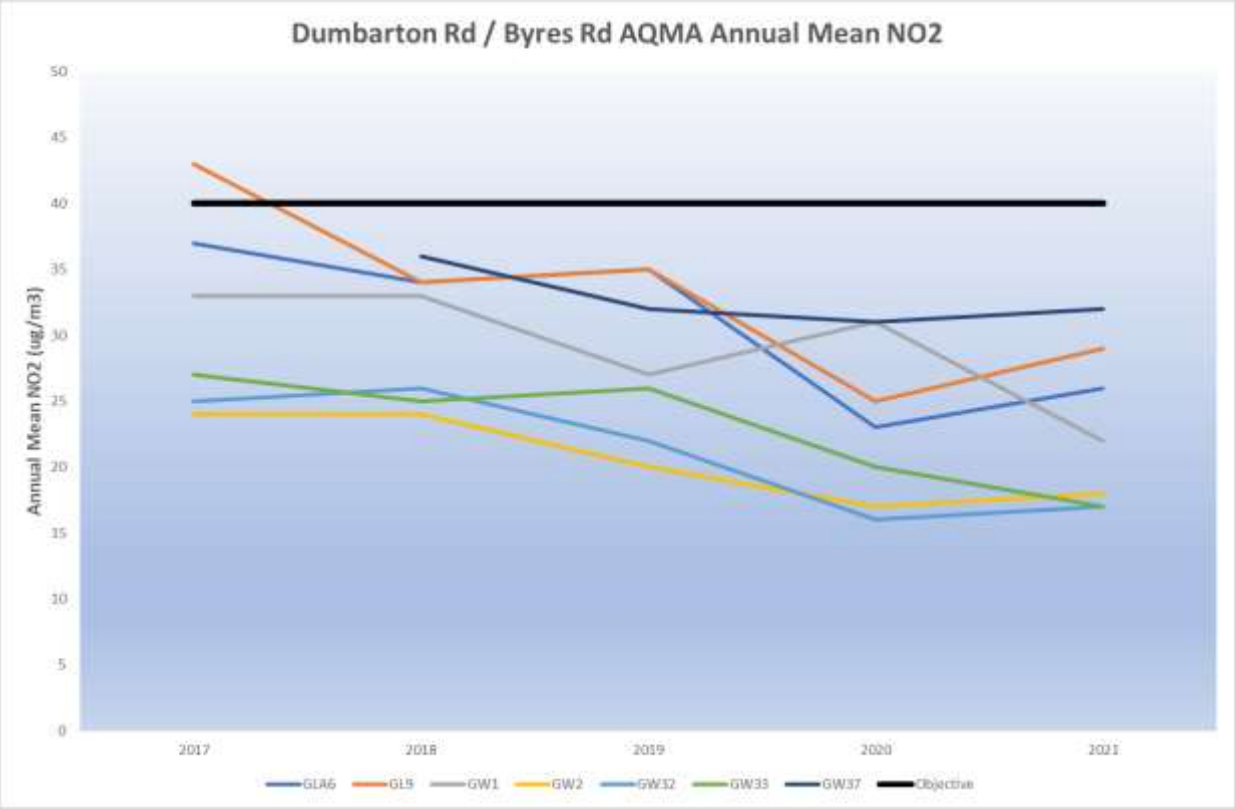
Whilst the Byres Rd / Dumbarton Rd AQMA remained in effect in respect of the annual mean objective for NO_2, continued monitoring has shown no exceedances of this objective since 2017. The 2022 APR therefore proposes that this AQMA be revoked in terms of this objective. GCC will maintain and continue all existing monitoring capability within and adjacent to this AQMA for the foreseeable future to ensure pollutant levels remain within the objectives.

Table 6.1 and Figure 6.1 below show the monitoring results for the last five years at locations within or adjacent to the AQMA.

Table 6.1 –Byres Rd / Dumbarton Rd AQMA Annual Mean NO_2

Site ID	Site Name	Monitoring Type	2017	2018	2019	2020	2021
GLA6	Glasgow Byres Rd	Automatic	37	34	35	23	26
GL9	Glasgow Dumbarton Rd	Automatic	**43**	34	35	25	29
GW1	Dumbarton Rd	Diffusion Tube	33	33	27	31	22
GW2	Lawrence St	Diffusion Tube	24	24	20	17	18
GW32	Partick Bus Station	Diffusion Tube	25	26	22	16	17
GW33	Great George St	Diffusion Tube	27	25	26	20	17
GW37	676 Dumbarton Rd	Diffusion Tube	-	36	32	31	32

Figure 6.1 –Byres Rd / Dumbarton Rd AQMA Annual Mean NO_2



6.2 Conclusions relating to New Local Developments

No new local developments have been identified which are expected to have significant impacts on air quality in the city.

6.3 Proposed Actions

Following the formal introduction of phase 2 of the LEZ on 31 May 2022, Glasgow City Council will continue to work with their partners in the Scottish Government, Transport Scotland and the Scottish Environment Protection Agency to prepare for enforcement of

the LEZ on 1 June 2023. The priorities for 2022 / 2023 include ensuring the processes, back office, signage and enforcement systems for the LEZ are developed in line with the overall enforcement timescales.

The draft update of the Air Quality Action Plan will be developed and subject to consultation before official adoption. The AQAP will consider both the relevant Scottish objective levels and the revised World Health Organisation guidelines.

Actions within the current AQAP will continue to be progressed.

The next Air Quality Progress Report will be produced and submitted in 2023.

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)
GLA4	Glasgow Kerbside	Kerbside	258708	665200	NO_2	City Centre	Chemiluminescent	0	1	3
GLKP	Glasgow Townhead	Urban Background	259675	665900	NO_2 PM_{10} $PM_{2.5}$ O_3	City Centre	Chemiluminescent FIDAS UV Photometric	0	120	3
GGWR	Glasgow Great Western Road	Roadside	258007	666649	NO_2	No	Chemiluminescent	0	5	2
GHSR	Glasgow High Street	Roadside	260013	665346	NO_2 PM_{10} $PM_{2.5}$	City Centre	Chemiluminescent FIDAS	0	3	3
GLA5	Glasgow Anderston	Urban Background	257925	665487	NO_2 PM_{10} $PM_{2.5}$	City Centre	Chemiluminescent FIDAS	0	40	3
GLA6	Glasgow Byres Road	Roadside	256526	666933	NO_2 PM_{10} $PM_{2.5}$	Byres Rd Dumbarton Rd	Chemiluminescent FIDAS	0	3	3
GL9	Glasgow Dumbarton Road	Roadside	255030	666608	NO_2 PM_{10} $PM_{2.5}$	Byres Rd Dumbarton Rd	Chemiluminescent FIDAS	0	3	2
GL2 (3)	Glasgow NithsdaleRoad	Roadside	257883	662673	NO_2 PM_{10} $PM_{2.5}$	No	Chemiluminescent FIDAS	0	3	2
GLA7	Glasgow Waulkmillglen Reservoir	Rural	252461	658154	NO_2 PM_{10} $PM_{2.5}$ O_3	No	Chemiluminescent FIDAS UV Photometric	N/A	N/A	3

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)
GL3	Glasgow Broomhill	Roadside	255030	667195	PM_{10} $PM_{2.5}$	No	FIDAS	0	3	2

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)
CC01	George Square	Urban Background	259296	665389	NO_2	Yes	N/A	30	No	3
CC02	Union Street	Roadside	258828	665204	NO_2	Yes	0	3	No	3
CC03	Bath Street	Roadside	258374	665826	NO_2	Yes	3	3	No	2.5
CC04	Glassford Street	Roadside	259361	665252	NO_2	Yes	0	3	No	2.5
CC05	Buchanan Street	Roadside	259055	665468	NO_2	Yes	0	3	No	2.5
CC06	Castle Street	Roadside	260068	665589	NO_2	Yes	0	3	No	2.5
CC07	Hope Street3	Kerbside	258856	665940	NO_2	Yes	N/A	1	No	2.5
CC08	Montrose Street	Roadside	259536	665313	NO_2	Yes	0	3	No	2.5
CC09	Cochrane Street	Roadside	259430	665316	NO_2	Yes	0	3	No	2.5
CC10	Renfield Street	Roadside	258896	665637	NO_2	Yes	0	3	No	2.5
CC11	GeorgeStreet	Kerbside	259551	665380	NO_2	Yes	N/A	1	No	2.5
CC12	North Street	Roadside	257906	665672	NO_2	Yes	N/A	3	No	2.5
CC13	Hope Street1	Roadside	258730	665322	NO_2	Yes	0	3	No	3
CC14	GordonStreet	Roadside	258756	665346	NO_2	Yes	N/A	3	No	3
CC15	Heilanmans Umbrella	Roadside	258770	665120	NO_2	Yes	0	3	No	3

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)
	North									
CC16	Saltmarket	Roadside	259545	664739	NO_2	Yes	0	3	No	2.5
CC17	High Street	Roadside	259732	664991	NO_2	Yes	0	3	No	2.5
CC18	DobbiesLoan	Urban Background	259415	666194	NO_2	Yes	0	3	No	2.5
CC20	Dundasvale Street	Urban Background	258820	666306	NO_2	Yes	0	15	No	2.5
CC21	RoystonRoad	Roadside	260429	666264	NO_2	Yes	5	3	No	2.5
CC22	St Mungo Avenue	Urban Background	259392	665866	NO_2	Yes	0	5	No	2.5
CC23	Brown Street	Roadside	258336	665122	NO_2	Yes	0	3	No	2.5
CC24	Broomielaw	Roadside	258562	664933	NO_2	Yes	N/A	3	No	2.5
CC25	McLeod Street	Urban Background	260077	665481	NO_2	Yes	0	8	No	2.5
CC26	Sauchiehall Street	Urban Background	258639	665852	NO_2	Yes	N/A	N/A	No	3
CC28	St Mungo's PS	Roadside	259983	665834	NO_2	Yes	10	1	No	2.5
CC29	Garnetbank PS	Roadside	258240	666033	NO_2	Yes	5	1	No	2.5
GE01	Westmuir Street	Roadside	262589	664139	NO_2	Yes	0	3	No	2.5
GE02	Hillcrest Road	Roadside	265075	662001	NO_2	No	5	3	No	2.5
GE03	Main Street (Bridgeton)	Roadside	260650	663319	NO_2	No	0	5	No	2.5

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)
GE04	Westercraigs	Urban Background	260942	665226	NO_2	No	0	15	No	2.5
GE06	Sacone SW	Urban background	263920	664569	NO_2	No	0	20	No	2.5
GE07	Easterhouse	Roadside	267005	666217	NO_2	No	0	5	No	2.5
GE10	TollcrossPark	Roadside	263864	663544	NO_2	No	0	3	No	2.5
GE14	St Michaels Lane	Roadside	262472	664214	NO_2	Yes	0	3	No	2.5
GE16	EllismuirRoad	Roadside	268413	663872	NO_2	No	9	1	No	2.5
GE17	Carmyle Avenue	Roadside	264792	662418	NO_2	No	0	7	No	2.5
GE18	Barrowfield Street	Roadside	261705	663993	NO_2	No	3	1	No	2.5
GE19	Dalmarnock Station	Roadside	261013	663169	NO_2	No	N/A	1	No	2.5
GN01	Springburn Road	Roadside	260541	669268	NO_2	No	0	6	No	2.5
GN02	KippenStreet	Urban Background	259731	668488	NO_2	No	5	3	No	2.5
GN03	RyesideRoad	Roadside	261778	668122	NO_2	No	10	1	No	2.5
GS02	Bridge Street	Roadside	258702	664480	NO_2	Yes	3	3	No	2.5
GS04	Haggs Road	Roadside	256295	661792	NO_2	No	0	3	No	2.5
GS06	OxfordStreet	Roadside	258798	664570	NO_2	No	0	3	No	2.5
GS07	DougrieRoad	Roadside	260203	659128	NO_2	No	N/A	3	No	2.5

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)
GS08	Aikenhead Road	Roadside	259225	662579	NO_2	No	0	6	No	2.5
GS09	Langside Primary School	Roadside	257138	661617	NO_2	No	5	3	No	3
GS10	Paisley Road West	Roadside	255599	664313	NO_2	No	0	3	No	2.5
GS11	Sutherland Avenue	Urban Background	256343	663153	NO_2	No	10	5	No	2.5
GS12	MallaigPlace	Urban background	253989	665298	NO_2	No	20	6	No	2.5
GS13	Govanhill Street	Roadside	258678	662901	NO_2	No	3	3	No	3
GS14	Invergarrie Road	Urban Background	253821	658590	NO_2	No	5	3	No	2.5
GS16	Silverburn	Roadside	253047	661349	NO_2	No	0	5	No	2.5
GS18	Paisley Rd West 2	Roadside	257415	664616	NO_2	No	0	3	No	2.5
GS19	Hampden	Urban Background	259038	661285	NO_2	No	0	3	No	2.5
GS20	45 Clifford Street	Roadside	256262	664308	NO_2	No	0	3	No	2.5
GS21	608 Scotland Street West	Roadside	256948	664270	NO_2	No	0	1	No	2.5
GS22	17 Kilbride Street	Roadside	259732	663032	NO_2	No	0	3	No	2.5
GS23	2 MyrtleDrive	Roadside	259246	661979	NO_2	No	0	3	No	2.5

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)
GS24	183 Crossloan Road	Roadside	254724	665407	NO_2	No	0	3	No	2.5
GS25	234 Berryknowes Road	Urban Background	253542	664443	NO_2	No	0	15	No	2.5
GS27	Battlefield Road	Roadside	258084	661642	NO_2	No	0	3	No	2.5
GS28	128 Mennock Road	Roadside	259871	660618	NO_2	No	0	3	No	2.5
GS30	Govan Road	Roadside	254021	665943	NO_2	No	0	2	No	3
GS31	Govan Road (Hospital)	Roadside	253865	666006	NO_2	No	2	2	No	2.5
GS34	1220 Govan Road	Roadside	254372	665902	NO_2	No	0	2	No	3
GS35	Shieldhall Road	Roadside	253554	665176	NO_2	No	0	3	No	2.5
GS36	Wallace Street	Roadside	258108	664514	NO_2	No	0	3	No	2.5
GS37	Dumbreck Road	Roadside	255477	663644	NO_2	No	7	1	No	2.5
GS45	Ben Glas Place	Urban Background	253609	659958	NO_2	No	5	1	No	2.5
GS46	Kirriemuir Avenue	Roadside	253471	663587	NO_2	No	20	1	No	2.5
GS47	1214 Paisley Road West	Roadside	254818	664109	NO_2	No	10	1	No	2.5

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)
GW01	Dumbarton Road	Roadside	256209	666525	NO_2	Yes	3	3	No	2.5
GW02	Lawrence Street	Roadside	256295	666816	NO_2	Yes	5	2	No	3
GW04	Finnieston Street	Roadside	257235	665108	NO_2	No	N/A	3	No	2.5
GW06	Napiershall Street	Roadside	257790	666791	NO_2	No	0	4	No	2.5
GW07	Queen Margaret Drive 2	Roadside	257216	667639	NO_2	Yes	0	3	No	3
GW08	Queen Margaret Drive 3	Roadside	257012	667433	NO_2	Yes	0	3	No	3
GW09	Anniesland Cross	Roadside	254613	668886	NO_2	No	0	15	No	2.5
GW10	Balshagray Avenue	Roadside	254498	667291	NO_2	No	0	10	No	2.5
GW11	Thornwood Drive	Roadside	254903	666855	NO_2	No	0	3	No	2.5
GW12	Belmont Street	Roadside	257533	667418	NO_2	No	N/A	3	No	2.5
GW13	Glasgow Harbour	Urban Background	255287	666276	NO_2	No	0	30	No	3
GW14	Crow Road	Roadside	254640	668203	NO_2	No	0	3	No	2.5
GW15	Hyndland Road	Roadside	255764	667297	NO_2	No	0	4	No	2.5
GW16	Park Road	Roadside	257555	666896	NO_2	No	0	3	No	2.5

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)
GW18	MaryhillRoad	Roadside	257243	668285	NO_2	No	0	3	No	3
GW19	Scotstoun	Urban Background	253592	667771	NO_2	No	0	>10	No	2.5
GW21	Milner Road	Roadside	254456	668108	NO_2	No	0	3	No	2.5
GW22	GibsonStreet	Roadside	257166	666787	NO_2	No	0	3	No	2.5
GW26	Great WesternRoad	Roadside	257255	667112	NO_2	No	0	3	No	2.5
GW30	South Street	Roadside	253193	667219	NO_2	No	0	2	No	2.5
GW31	HarlandStreet	Roadside	253139	667333	NO_2	No	2	3	No	2.5
GW32	Partick Bus Station	Roadside	255692	667333	NO_2	Yes	0	2	No	2.5
GW33	Great George Street	Roadside	256663	667100	NO_2	No	0	3	No	2.5
GW34	Blairdardie Road	Roadside	253080	670199	NO_2	No	8	1	No	2.5
GW35	CadderRoad	Roadside	257373	669164	NO_2	No	10	1	No	2.5
GW36	New City Road	Urban Background	258309	666457	NO_2	No	N/A	1	No	2.5
GW37	676 Dumbarton Road	Roadside	254946	666612	NO_2	No	0	1	No	2.5
GW38	1545 Dumbarton Road	Roadside	252993	667615	NO_2	No	0	5	No	2.5
GW39	Primrose Court	Roadside	253475	667289	NO_2	No	0	13	No	2.5

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)
CCB1	Heilanman's Umbrella North	Roadside	258770	665121	C6H6	No	0	3	No	2.5
CCB2	Hope Street	Kerbside	258738	665167	C6H6	No	3	1	No	3.5
GWB1	Ochiltree Avenue	Roadside	254839	669295	C6H6	No	3	5	No	3
GSB1	Pollokshaws Road	Roadside	255869	661185	C6H6	No	3	3	No	2.5

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 Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GLA4	Kerbside (Kerbside)	Automatic	98	98	**59**	**61**	**56**	36	**45**
GLKP	Townhead (U Background)	Automatic	99	99	25	24	24	17	18
GGWR	Gt. Western Rd (Roadside)	Automatic	99	99	31	29	30	19	22
GHSR	High St. (Roadside)	Automatic	98	98	35	31	30	21	23
GLA5	Anderston (U Background)	Automatic	65	65	22	24	26	20	22
GLA6	Byres Rd. (Roadside)	Automatic	99	99	37	34	35	23	26
GL9	Dumbarton Rd. (Roadside)	Automatic	95	95	**43**	34	35	25	29
GL2	Nithsdale Rd. (Roadside)	Automatic	90	90	-	32	31	-	24
GLA7	Waulkmillglen (Rural)	Automatic	95	95	9	9	9	5	7
CC01	GeorgeSquare	Diffusion Tube	83	83	37	35	32	19	25
CC02	Union Street	Diffusion Tube	100	100	**50 ***	**47**	**47**	28	38
CC03	Bath Street	Diffusion Tube	100	100	**42**	**41**	39	23	32
CC04	Glassford Street	Diffusion Tube	100	100	**41**	**40**	**40**	25	29
CC05	Buchanan Street	Diffusion Tube	100	100	**42**	**41**	38	24	26
CC06	Castle Street	Diffusion Tube	100	100	34	31	29	20	24
CC07	Hope Street3	Diffusion Tube	100	100	**45**	**40**	**40**	23	35
CC08	Montrose Street	Diffusion Tube	100	100	36	29	28	19	22

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CC09	Cochrane Street	Diffusion Tube	67	67	39	35	35	22	26
CC10	RenfieldStreet	Diffusion Tube	67	67	**51**	**45**	**42**	28	33
CC11	GeorgeStreet	Diffusion Tube	92	92	**40**	39 *	32	20	25
CC12	North Street	Diffusion Tube	92	92	28	30	27	21	19
CC13	Hope Street1	Diffusion Tube	92	92	**68**	**63**	**56**	**40**	**44**
CC14	GordonStreet	Diffusion Tube	75	75	**64**	**60**	**59**	36	**40**
CC15	Heilanmans Umbrella North	Diffusion Tube	100	100	**64**	**60**	**59**	36	36
CC16	Saltmarket	Diffusion Tube	92	92	38	27	31	23	26
CC17	High Street	Diffusion Tube	75	75	**43**	**40**	**42**	26	25
CC18	DobbiesLoan	Diffusion Tube	92	92	27	27	23	19	22
CC20	Dundasvale Street	Diffusion Tube	92	92	34	30	28	21	24
CC21	RoystonRoad	Diffusion Tube	100	100	34	29	29	21	24
CC22	St Mungo Avenue	Diffusion Tube	100	100	32	27	26	20	21
CC23	Brown Street	Diffusion Tube	92	92	27	29	24	17	19
CC24	Broomielaw	Diffusion Tube	92	92	**44**	39	37	23	32
CC25	McLeodStreet	Diffusion Tube	100	100	35	31	30	22	22
CC26	Sauchiehall Street	Diffusion Tube	92	92	**41**	31	32	21	24
CC28	St Mungo'sPS	Diffusion Tube	100	100	26	26	24	19	15
CC29	GarnetbankPS	Diffusion Tube	100	100	31	31	29	21	22
GE01	Westmuir Street	Diffusion Tube	83	83	36	32	32	23	28
GE02	Hillcrest Road	Diffusion Tube	100	100	20	16	16	13	13
GE03	Main Street	Diffusion Tube	100	100	20	22	20	13	16

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
	(Bridgeton)								
GE04	Westercraigs	Diffusion Tube	92	92	20	21	19	20	18
GE06	Sacone SW	Diffusion Tube	92	92	20	20	16	14	15
GE07	Easterhouse	Diffusion Tube	100	100	19	16	15	12	12
GE10	TollcrossPark	Diffusion Tube	92	92	20	22	21	14	11
GE14	St Michaels Lane	Diffusion Tube	100	100	37	35	36	29	27
GE16	EllismuirRoad	Diffusion Tube	100	100	20	19	19	13	13
GE17	Carmyle Avenue	Diffusion Tube	83	83	34	32	26	19	19
GE18	Barrowfield Street	Diffusion Tube	50	50	21	20	15	13	24
GE19	Dalmarnock Station	Diffusion Tube	100	100	22	20	19	13	14
GN01	Springburn Road	Diffusion Tube	100	100	24	23	19	16	15
GN02	KippenStreet	Diffusion Tube	100	100	22	19	19	15	13
GN03	RyesideRoad	Diffusion Tube	100	100	17	19	19	15	14
GS02	Bridge Street	Diffusion Tube	100	100	34	30	34	27	28
GS04	Haggs Road	Diffusion Tube	100	100	26	27	26	18	19
GS06	OxfordStreet	Diffusion Tube	83	83	31	27	25	19	21
GS07	DougrieRoad	Diffusion Tube	92	92	18	18	16	14	15
GS08	Aikenhead Road	Diffusion Tube	83	83	24	21	24	16	21
GS09	Langside Primary School	Diffusion Tube	92	92	15	17	16	13	12
GS10	Paisley Road West	Diffusion Tube	100	100	32	26	28	21	21
GS11	Sutherland Avenue	Diffusion Tube	100	100	16	16	13	10	12

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GS12	MallaigPlace	Diffusion Tube	92	92	19	20	18	14	14
GS13	Govanhill Street	Diffusion Tube	50	50	26	21	23	16	20
GS14	Invergarrie Road	Diffusion Tube	92	92	12	13	14	12	10
GS16	Silverburn	Diffusion Tube	92	92	19	21	18	12	14
GS18	Paisley Rd West 2	Diffusion Tube	100	100	36	36	36	23	22
GS19	Hampden	Diffusion Tube	92	92	15	19	17	12	10
GS20	45 Clifford Street	Diffusion Tube	100	100	29	29	33	19	19
GS21	608 Scotland Street West	Diffusion Tube	92	92	33	29	27	19	19
GS22	17 Kilbride Street	Diffusion Tube	100	100	25	25	22	13	15
GS23	2 MyrtleDrive	Diffusion Tube	100	100	22	20	17	12	10
GS24	183 Crossloan Road	Diffusion Tube	92	92	26	23	22	16	14
GS25	234 Berryknowes Road	Diffusion Tube	92	92	25	24	22	15	13
GS27	Battlefield Road	Diffusion Tube	100	100	29	26	25	17	19
GS28	128 Mennock Road	Diffusion Tube	92	92	24	24	21	13	13
GS30	Govan Road	Diffusion Tube	100	100	33	31	30	21	19
GS31	Govan Road (Hospital)	Diffusion Tube	92	92	38	32	30	22	23

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GS34	1220 Govan Road	Diffusion Tube	100	100	28	24	23	17	15
GS35	ShieldhallRoad	Diffusion Tube	100	100	25	23	24	14	14
GS36	WallaceStreet	Diffusion Tube	100	100	40	36	33	21	24
GS37	Dumbreck Road	Diffusion Tube	100	100	24	27	23	16	16
GS45	Ben GlasPlace	Diffusion Tube	100	100	14	15	14	10	11
GS46	Kirriemuir Avenue	Diffusion Tube	92	92	16	16 *	14	10	10
GS47	1214 Paisley Road West	Diffusion Tube	100	100	24	23	22	18	15
GW01	Dumbarton Road	Diffusion Tube	100	100	33	33	27	31	22
GW02	Lawrence Street	Diffusion Tube	100	100	24	24	20	17	18
GW04	Finnieston Street	Diffusion Tube	50	50	29	29	26	17	21
GW06	Napiershall Street	Diffusion Tube	100	100	28	26	27	20	20
GW07	Queen MargaretDrive 2	Diffusion Tube	92	92	32	29	24	22	24
GW08	Queen Margaret Drive 3	Diffusion Tube	92	92	37	32	27	21	25
GW09	Anniesland Cross	Diffusion Tube	100	100	27	23	26	17	22
GW10	Balshagray Avenue	Diffusion Tube	100	100	28	28	26	19	20
GW11	Thornwood Drive	Diffusion Tube	100	100	20 *	17	16	13	13

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GW12	BelmontStreet	Diffusion Tube	92	92	21	19	16	16	14
GW13	Glasgow Harbour	Diffusion Tube	100	100	24	23	19	16	17
GW14	Crow Road	Diffusion Tube	92	92	32	32	32	21	21
GW15	HyndlandRoad	Diffusion Tube	100	100	25	24	23	16	15
GW16	Park Road	Diffusion Tube	100	100	30	29	28	19	19
GW18	MaryhillRoad	Diffusion Tube	92	92	33	31	30	19	20
GW19	Scotstoun	Diffusion Tube	92	92	20	22	18	14	11
GW21	Milner Road	Diffusion Tube	92	92	18	19	18	12	10
GW22	GibsonStreet	Diffusion Tube	83	83	33	27	28	16	17
GW26	Great Western Road	Diffusion Tube	100	100	29	30	31	18	16
GW30	South Street	Diffusion Tube	100	100	27	24	22	16	18
GW31	HarlandStreet	Diffusion Tube	92	92	23	25	22	15	15
GW32	Partick Bus Station	Diffusion Tube	100	100	25	26	22	16	17
GW33	Great George Street	Diffusion Tube	100	100	27	25	26	20	17
GW34	Blairdardie Road	Diffusion Tube	92	92	16	15	14	12	10
GW35	CadderRoad	Diffusion Tube	100	100	19	19	17	14	12
GW36	New CityRoad	Diffusion Tube	100	100	33	31	29	23	23
GW37	676 Dumbarton Road	Diffusion Tube	92	92	-	36	32	31	32
GW38	1545 Dumbarton Road	Diffusion Tube	100	100	-	29	30	25	29
GW39	PrimroseCourt	Diffusion Tube	92	92	-	22	21	18	21

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%).

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

Site ID	Site Name	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GLA4	Kerbside (Kerbside)	Automatic	98	98	3	2	3	0	0
GLKP	Townhead (U Background)	Automatic	99	99	0	0	0	0	0
GGWR	Gt. Western Rd (Roadside)	Automatic	99	99	0	0	0	0	0
GHSR	High St. (Roadside)	Automatic	98	98	0	0	0	0	0
GLA5	Anderston (U Background)	Automatic	65	65	0	0(93)	0	0	0(82)
GLA6	Byres Rd. (Roadside)	Automatic	99	99	9	0	0	0	0
GL9	Dumbarton Rd. (Roadside)	Automatic	95	95	0	0	0	0	0
GL2	Nithsdale Rd. (Roadside)	Automatic	90	90	-	0	0	-	0
GLA7	Waulkmillglen (Rural)	Automatic	95	95	0	0	0	0	0

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 ($\mu g/m^3$)

Site ID	Site Name	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GLA4	Kerbside (Kerbside)	Automatic	98	-	-	-	11	13
GLKP	Townhead (U Background)	Automatic	99	13	11	11	9	9
GHSR	High St. (Roadside)	Automatic	100	13	14	11	9	10
GLA5	Anderston (U Background)	Automatic	99	15	12	12	9	11
GLA6	Byres Rd. (Roadside)	Automatic	96	13	14	15	11	11
GL9	Dumbarton Rd. (Roadside)	Automatic	68	15	14	13	10	12
GL2	Nithsdale Rd. (Roadside)	Automatic	99	15	14	15	7	9
GLA7	Waulkmillglen (Rural)	Automatic	99	11	9	9	4	7
GL3	Broomhill (Roadside)	Automatic	98	15	-	13	10	10

Notes:

Exceedances of the PM_{10} annual mean objective of 18 $\mu g/m^3$ 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%).

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

Site ID	Site Name	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GLA4	Kerbside (Kerbside)	Automatic	98	-	-	-	0	0
GLKP	Townhead (U Background)	Automatic	99	1	0	4	0	0
GHSR	High St. (Roadside)	Automatic	100	0	0	1	0	0
GLA5	Anderston (U Background)	Automatic	99	0(35)	0(29)	2	0 (24)	0
GLA6	Byres Rd. (Roadside)	Automatic	96	0	0	6	0	0
GL9	Dumbarton Rd. (Roadside)	Automatic	68	3	0	4	0	0(27)
GL2	Nithsdale Rd. (Roadside)	Automatic	99	0(32)	1	5	N/A(3)	0
GLA7	Waulkmillglen (Rural)	Automatic	99	1	0	1	0	0
GL3	Broomhill (Roadside)	Automatic	98	0	0	4	0	0

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 Name	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
GLA4	Kerbside (Kerbside)	Automatic	98	**-**	**-**	**-**	6	7
GLKP	Townhead (U Background)	Automatic	99	8	7	7	5	5
GHSR	High St. (Roadside)	Automatic	100	7	8	6	5	6
GLA5	Anderston (U Background)	Automatic	99	**-**	7	7	5	6
GLA6	Byres Rd. (Roadside)	Automatic	96	-	8	9	6	6
GL9	Dumbarton Rd. (Roadside)	Automatic	68	-	7	7	5	6
GL2	Nithsdale Rd. (Roadside)	Automatic	99	-	8	9	7	5
GLA7	Waulkmillglen (Rural)	Automatic	99	-	5	6	4	4
GL3	Broomhill (Roadside)	Automatic	98	-	-	8	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%).

Table A.8 – Benzene 2021 Monitoring Results

Site ID	Site Name	Valid Data Capture for monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	C6H6 Annual Mean Concentration µg/m3
CCB1	Heilanman's Umbrella North (Roadside)	50	50	1.03
CCB2	Hope St (Kerbside)	50	50	0.86
GWB1	Ochiltree Avenue (Roadside)	50	50	0.99
GSB1	Pollokshaws Rd (Roadside)	50	50	1.08

Notes:

Exceedances of the Benzene objectives are shown in bold (3.25µg/m^3 running annual mean)
Laboratory analysis was not possible January to June 2021 due to instrument failure

Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Monthly Diffusion Tube Results (µg/m^3)

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
CC01	GeorgeSquare	30	15.1	15.3	-	-	12.5	17	8.4	23.7	33.6	34.4	32.8	22.3	25.0
CC02	Union Street	19.7	47.1	42.4	19	20.9	33	25.5	12.4	45.9	48.9	48.3	38.9	33.5	37.5
CC03	Bath Street	15.1	22.6	24.1	16.2	15.6	20.5	28.8	33.2	37.4	39.7	41.8	44.2	28.3	31.7
CC04	Glassford Street	19.8	11.2	16.5	15.2	14.5	16.3	32.4	8.6	38.5	49.4	43.6	40	25.5	28.6
CC05	Buchanan Street	17.9	18.8	25.3	16.5	13	13.1	23	11.4	32.3	33.2	35.1	37.4	23.1	25.9
CC06	Castle Street	18.3	11.3	21	14.5	12.6	11.9	21.8	22.7	26.1	30.3	36.5	33.4	21.7	24.3
CC07	Hope Street3	24.5	30.7	29.9	16.5	17.9	28.7	23.5	43.7	36.5	38.6	43.1	43.2	31.4	35.2
CC08	Montrose Street	26.6	17.6	12.3	12.3	12.3	10.7	16	12.6	20.3	28.4	38.5	31.8	20.0	22.3
CC09	Cochrane Street	27.5	21.4	24.3	24.3	11.2	-	-	26.3	-	-	36.4	32.7	25.5	28.6
CC10	RenfieldStreet	24.1	17.9	27.4	-	-	21.5	26.7	30.7	-	41.3	46.7	-	29.5	33.1
CC11	GeorgeStreet	14.9	10.3	19.8	15.9	-	9.5	19.4	15	26.1	33.5	41.8	35	21.9	24.6
CC12	North Street	16.6	12.8	19.2	11	-	11	1.6	12.1	26.3	24.5	25.5	28.6	17.2	19.3
CC13	Hope Street1	30.6	34.8	45.7	18.6	47.8	36.8	36.9	13.8	48.6	60.7	52.7	-	38.8	43.5
CC14	GordonStreet	-	19.9	35	16.8	17.5	-	-	37.8	41.2	51.8	53.4	49.9	35.9	40.2
CC15	Heilanmans Umbrella North	21.9	27.1	41	20.1	17.5	27.8	33.3	9.9	52.1	45.9	43.2	42	31.8	35.6
CC16	Saltmarket	32.6	16.5	20.3	9.8	8.4	12.5	-	10.2	28.3	35.2	43.3	40	23.4	26.2
CC17	High Street	20.8	14.7	25.1	13.2	-	-	17.8	10.7	23.3	38.2	39.5		22.6	25.3
CC18	DobbiesLoan	15.6	14.9	20.8	18.4	7.5	11.5	-	11.4	18.7	36.2	28.5	30.2	19.4	21.8
CC20	Dundasvale Street	20	7.2	23.6	18.1	-	12.5	15.5	19.3	23.5	33.7	31.3	30.9	21.4	24.0

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
CC21	RoystonRoad	13.6	7.2	25.1	21.6	9.8	15.4	17.2	12.1	26.2	35.9	39.8	30.8	21.2	23.8
CC22	St Mungo Avenue	14	11.3	22.6	14.9	8.3	9.6	17.1	10.7	21.6	29.4	33.3	31.9	18.7	21.0
CC23	Brown Street	28.5	21.5	9.4	16.9	11	6.7	15.8	7.2	20.3	26.3	25.8	-	17.2	19.3
CC24	Broomielaw	30.5	23.7	22.4	21.7	19.4	18.3	-	20	38	36.8	44	37.8	28.4	31.8
CC25	McLeodStreet	25.8	11.4	26.3	13.4	9.4	8.6	18.4	8.5	22.4	30.1	31.6	30.7	19.7	22.1
CC26	Sauchiehall Street	14.5	16.6	17.9	12.1	10.6	15.6	21.3	20	-	31.8	36.9	36.4	21.2	23.8
CC28	St Mungo'sPS	15.2	7.1	20.6	15.2	11.7	4.9	7.2	11.8	10.7	14.9	12.9	25.4	13.1	14.7
CC29	GarnetbankPS	11.9	11.3	25.7	22.4	12.6	7.1	12.6	22	23.6	29.7	24.1	28.5	19.3	21.6
GE01	Westmuir Street	26.8	9.3	27.2	16.8	-	-	20.8	13.1	29.9	32.4	38.2	32.2	24.7	27.6
GE02	Hillcrest Road	11	11.1	15.5	6.3	6.2	3.4	8.3	11.1	12.8	16.4	13.6	20.6	11.4	12.7
GE03	Main Street (Bridgeton)	12.9	5.6	16.1	15.1	6.9	3.9	16.5	9.2	16.8	21.7	22.1	24.7	14.3	16.0
GE04	Westercraigs	17.3	6.7	45.2	6.1	6.8	4.6	-	11.9	12.3	20.2	22.3	23.1	16.0	18.0
GE06	Sacone SW	17.3	8.6	18.7	12.2	-	7.8	7.8	7.9	6.4	17.2	21.1	23.3	13.5	15.1
GE07	Easterhouse	15.1	3.9	10.7	6	4	2.5	11.8	7.2	9.4	17.1	21.2	18.4	10.6	11.9
GE10	TollcrossPark	14.5	6.8	4.9	9.7	-	3.9	5.2	6	5.6	15.1	16.7	21.9	10.0	11.2
GE14	St Michaels Lane	42.9	16	21.6	19.1	10.9	12.3	27.7	22	14.4	37.2	33.9	35.9	24.5	27.4
GE16	EllismuirRoad	11.1	5.9	15.4	10.9	11.9	3.3	5.9	8	10.3	16.1	16.8	23.7	11.6	13.0
GE17	Carmyle Avenue	-		13	23.9	10.2	10.3	13.4	11.1	20.7	23	19.1	27.3	17.2	19.3
GE18	Barrowfield Street	-	6.9	7.6	-	-	-	6.4	8.4	-	-	27.3	22.1	13.1	14.7
GE19	Dalmarnock Station	16.9	4.1	9.3	16.5	15.1	7.6	6.7	10	12.7	16.9	14.3	21.8	12.7	14.2
GN01	Springburn Road	19.3	9.8	13.2	16.2	8.9	5.1	10	8.7	16.8	14.6	19.6	22.2	13.7	15.3
GN02	KippenStreet	13.7	5.5	6.7	8.5	5	3.6	10.9	11.3	13.5	17.5	20.3	17.6	11.2	12.5
GN03	RyesideRoad	14.2	15	13.9	12.9	5.9	5.1	7.6	11	12.1	15	15.6	18.5	12.2	13.7

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
GS02	Bridge Street	29.9	21.4	24.6	16.1	11.3	16.6	23	13.6	30.9	33.1	43.4	35.6	25.0	28.0
GS04	Haggs Road	23.3	11	21.8	13.2	11.6	7.8	12.9	8.7	21.2	25.6	24.4	27.3	17.4	19.5
GS06	OxfordStreet	-	5	12.3	19.4	8.9	8.4	-	18.7	20.1	29.6	33.5	28.8	18.5	20.7
GS07	DougrieRoad	13.3	18.1	12	14.4	-	5.2	8.8	15.1	13.3	13.6	18.6	15.7	13.5	15.1
GS08	Aikenhead Road	14.5	13.1	17.9	11.7	-	-	15.8	14.7	20.2	23.8	27.3	27.8	18.7	20.9
GS09	Langside Primary School	14.9	8.6	10	9.8	4.2	2.2	7.2	12.9	12.1	14.3	-	16.4	10.2	11.5
GS10	Paisley Road West	23.2	8.4	8.9	13.4	9.3	10.6	19.1	19.2	26.8	26.6	28.7	31.3	18.8	21.0
GS11	Sutherland Avenue	15.2	3.8	8.4	6.5	2.9	2.8	8.8	9.1	19.1	12.3	18.3	16.5	10.3	11.5
GS12	MallaigPlace	17.9	3.8	13.9	8.4	5.6	3	-	7.7	12.4	24.3	20	22	12.6	14.2
GS13	Govanhill Street	-	19.3	-	-	-	-	-	9.7	19.8	17.6	25.7	22.9	19.2	21.5
GS14	Invergarrie Road	13.3	3.8	3.9	8.9	-	6.6	1.7	2.4	10.7	13.9	14.6	16.3	8.7	9.8
GS16	Silverburn	14.4	13.3	11.7	13	-	3.5	7.8	9.6	17.2	15.1	10.6	21.5	12.5	14.0
GS18	Paisley Rd West 2	26.9	7.7	22.2	24.3	11.1	7.9	15.1	14.4	21.3	30.9	22.5	35.5	20.0	22.4
GS19	Hampden	16.1	3.6	8	6.9	4.1	2.2	3.2	8.9	-	9.9	11.1	20.7	8.6	9.6
GS20	45 Clifford Street	17.9	8.9	9.2	16.6	9.4	8.7	9.8	20.6	14	31.8	22.3	33	16.9	18.9
GS21	608 Scotland Street West	14	-	12	16.9	10.2	8.6	12.7	11.7	15.8	28.8	26.2	31.7	17.1	19.2
GS22	17 Kilbride Street	16.6	9.2	12.1	9.1	10.4	8.1	5.4	9.5	12	23.7	17.7	27.6	13.5	15.1
GS23	2 MyrtleDrive	15.1	3.6	4.9	8.9	5.1	4.8	4.7	5.9	5.8	13.2	13.4	18.8	8.7	9.7
GS24	183 Crossloan Road	15.9	4.9	13.6	-	9.2	9.2	11.2	10.3	10.9	13.9	19.9	22.2	12.8	14.4

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
GS25	234 Berryknowes Road	17	5	15.8	8.5	5.9	8.6	6.6	11.5	13.9	14	16.6	-	11.2	12.6
GS27	Battlefield Road	26	9.9	18.1	12.8	11.2	9.5	13.5	20.6	15.8	17.1	21.2	26.6	16.9	18.9
GS28	128 Mennock Road	24.6	3.7	13.5	7.9	6.6	4.3	-	11.9	7.9	12.2	13	20	11.4	12.8
GS30	Govan Road	12	12.7	27	14.2	10.1	11	18.4	6.5	18.6	21.7	17.6	30.8	16.7	18.7
GS31	Govan Road (Hospital)	23.5	13.6	36.4	13.9	-	9.4	16	15.9	20.6	21.2	29.7	29.7	20.9	23.4
GS34	1220 Govan Road	13	3.8	14.1	11.2	7.5	8.3	9.8	15.2	14	20.5	16	26.6	13.3	14.9
GS35	Shieldhall Road	10.4	7.7	8	15	6.6	7.4	6.7	14.6	11.7	18.9	22	25.5	12.9	14.4
GS36	WallaceStreet	15.4	11.6	14.9	21.9	15	13.3	9.3	11.5	36.7	32.5	34.9	43.3	21.7	24.3
GS37	Dumbreck Road	17.6	5.9	7.4	18.2	13.3	14.6	11.4	7.6	20	14.9	13.8	21.4	13.8	15.5
GS45	Ben GlasPlace	19.1	3.9	7.4	11.4	9.6	2.7	3.5	9.5	10.5	10.5	18.6	12.8	10.0	11.2
GS46	Kirriemuir Avenue	17.2	3.8	6.8	9.3	3.9	2.2	4.2	8.7	8.5	-	11.2	17.5	8.5	9.5
GS47	1214 Paisley Road West	16.6	7.5	13.6	11.2	10.8	10.4	9.1	11.2	18.4	18.2	13.7	24.5	13.8	15.4
GW01	Dumbarton Road	27.9	10.4	21.8	21	10.6	9.8	15.8	13.6	19.4	24.5	31.6	31.3	19.8	22.2
GW02	Lawrence Street	15.3	14.7	18.7	11.4	8.1	5.7	9.8	13.6	16.7	26.9	26.2	23.7	15.9	17.8
GW04	Finnieston Street	26.7	-	12.1	-	-	12.1	-	26.2	-	-	25.3	21.6	20.7	23.1
GW06	Napiershall Street	17.8	19.1	19.3	9.9	12.6	12.8	16.5	10	22.3	27	18.7	26.5	17.7	19.8
GW07	Queen MargaretDrive 2	16.6	25	21.3	12.5	-	11.1	17.9	13.3	25.5	28.9	30.5	30.7	21.2	23.8

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
GW08	Queen Margaret Drive 3	13.7	26.4	31.3	18.3	11.5	15.7	17.8	13.6	25.1	34	35	-	22.0	24.7
GW09	Anniesland Cross	24.2	22	22.4	10.6	7.7	5.6	10.7	15.3	18.8	35.8	31.8	34.9	20.0	22.4
GW10	Balshagray Avenue	18.9	10.6	15.9	11.3	8.3	7.5	19.3	13.5	24.4	26.7	26.6	30.2	17.8	19.9
GW11	Thornwood Drive	12.4	4.8	13.1	10.5	5.8	6.4	10.7	9.4	12.2	17.7	18.6	19.5	11.8	13.2
GW12	BelmontStreet	11.2	5.4	13.5	6.6	5.7	-	8.3	7.6	15.3	18.8	21.7	24	12.6	14.1
GW13	Glasgow Harbour	18.6	4.8	17.3	14.6	7.2	5.4	17.1	8.3	15.5	22.2	25.9	24.5	15.1	16.9
GW14	Crow Road	30.7	10.4	22.8	19.5	14.3	10.9	-	7.1	15.7	18.6	25.7	29.8	18.7	20.9
GW15	HyndlandRoad	16.2	6.5	14.9	14.2	13.4	7.2	15	9.4	11.9	13.3	16.8	19.3	13.2	14.8
GW16	Park Road	25.3	13.7	21.1	17.8	11.3	6.6	11.5	11.8	15.5	14.3	23.4	34.3	17.2	19.3
GW18	MaryhillRoad	12.8	7.7	15.7	27.3	-	8	13	11.3	19	23.3	23.2	34.4	17.8	19.9
GW19	Scotstoun	8.3	8.1	11.8	7.3	-	3.5	3.9	9.7	9	14.2	13.6	20.5	10.0	11.2
GW21	Milner Road	11.2	4.8	9.2	7.4	-	3.4	2.7	9.5	7.8	13.3	13.3	19.1	9.2	10.4
GW22	GibsonStreet	12.2	18.7	-	14.8	6.6	8.5	9.3	10	14	-	30.9	26.6	15.2	17.0
GW26	Great Western Road	20.4	11.1	13.9	10.8	10.3	9.8	10.2	10.3	13	13.3	18.6	29	14.2	15.9
GW30	South Street	10.2	20.1	14.7	10.8	8.9	12.3	10.4	10	15.4	21.9	29.3	29.6	16.1	18.1
GW31	HarlandStreet	13.2	8.3	17.8	9.8	-	6.3	6.6	7.7	12.9	17	19.7	26.4	13.2	14.8
GW32	Partick Bus Station	11.9	7.4	15.2	13.8	12.8	8.1	14.4	14.9	16.8	13.1	22.6	26.2	14.8	16.5
GW33	Great George Street	17.2	5	9.6	18.2	10	13.3	9.5	14.6	17.7	21.7	21.2	24.6	15.2	17.0
GW34	Blairdardie Road	8.6	4.8	8.4	10.7	3.7	2.2	-	4.2	8.6	12.4	12.1	19.8	8.7	9.7
GW35	CadderRoad	13.4	4.8	8.8	13.2	6	6.6	5.4	7.5	12	16.3	14.4	19.2	10.6	11.9
GW36	New CityRoad	14.8	24.7	32.1	16.3	15.5	14.8	15	21.4	17.7	19.8	16.4	35.9	20.4	22.8

Site ID	Site Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Bias Adjusted (1)
GW37	676 Dumbarton Road	37.4	17.1	34.6	33.5	15.2	26	-	26.3	23.3	35.9	32.5	32.3	28.6	32.0
GW38	1545 Dumbarton Road	20.3	31.7	28.2	26.3	26.7	19.5	21.2	12.4	22	33.4	36.6	30.7	25.8	28.8
GW39	PrimroseCourt	21.4	-	20.9	20.6	15.8	12.3	9.9	15.4	15.1	20.4	37.3	20	19.0	21.3

Notes:

(1) See Appendix C for details on bias adjustment

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

New or Changed Sources Identified Within Glasgow City Council During 2021

Glasgow City Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Glasgow City Council During 2021

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

QA/QC of Diffusion Tube Monitoring

Diffusion tube monitoring is carried out in accordance with the procedures contained in the guidance 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users' and LAQM.TG 16

Monitoring was conducted in adherence with the 2021 Diffusion Tube Monitoring Calendar.

For 2021 all NO_2 diffusion tubes were supplied and analysed by Glasgow Scientific Services. The preparation method was 20% tri-ethanolamine in water. Glasgow Scientific Services is UKAS accredited for the analysis of diffusion tubes, participating in the AIR-PT Scheme for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise.

In the AIR-PT results available for 2021, AIR PT AR042 (January – February 2021) GSS scored 50%, in AIR PT AR043 (May – June 2021) GSS scored 100%, in AIR PT AR045 (July – August 2021) GSS scored 100%. No results were reported for AIR PT AR046 (September – October 2021). The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Diffusion Tube Annualisation

Annualisation was required for 5 diffusion tube sites, CC09, CC10, GE18, GS13 and GW04 due to low data collection. Annualisation was conducted in accordance with the annualization tool methodology and the results have been expressed in the main results table. The annualization method is shown in Table C.2

Diffusion Tube Bias Adjustment Factors

Glasgow City Council have applied a national bias adjustment factor of 1.12 to the 2021 monitoring data. A summary of bias adjustment factors used by Glasgow City Council over the past five years is presented in Table C.1.

Glasgow City Council contributed results from five local co-location studies to the national factor for the laboratory analysis.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	1.12
2020	National	03/21	0.96
2019	National	03/20	0.85
2018	National	06/19	0.89
2017	National	03/18	0.91

NO_2 Fall-off with Distance from the Road

Distance correction should be considered at any monitoring site where the annual mean concentration is greater than 36µg/m^3 and the monitoring site is not located at a point of relevant exposure (taking the limitations of the calculator into account).

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

QA/QC of Automatic Monitoring

The 10 permanent monitoring stations in Glasgow form part of the Air Quality in Scotland monitoring network. Instruments are calibrated by the Local Site Operators (LSO) according to the specific site guidelines and audits are carried out every six months by Ricardo EAE. Glasgow City Council Public Health act as LSO for seven of the stations while Ricardo AEA act as LSO for the three stations operated as part of the UK network operated by DEFRA. These stations are GLA4, GLKP and GHSR.

All of the automatic air quality data gathered, both current and historical is independently ratified by Ricardo AEA and made available for viewing by the public at the Scottish Government funded air quality website at:

http://www.scottishairquality.co.uk

All data within this report has been fully ratified.

This webpage also provides access to the QA/QC information relevant to LAQM report requirements. The instrument UKAS calibration certification generated by the six-monthly audit programme for Glasgow's monitoring stations is available at:

http://www.scottishairquality.co.uk/laqm/certificates-calibration

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

The type of PM_{10}/$PM_{2.5}$ monitors utilised within Glasgow do not require the application of a correction factor.

Automatic Monitoring Annualisation

Annualisation was required for 1 automatic NO2 monitoring site, GLA5, due to low data collection. Annualisation was conducted in accordance with the annualisation tool methodology and the results have been expressed in the main results table. The annualisation method is shown in Table C.2

NO_2 Fall-off with Distance from the Road

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

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

Site ID	Annualisation Factor GGWR	Annualisation Factor GHSR	Annualisation Factor GLA4	Annualisation Factor GLKP	Average Annualisation Factor	Raw Data Annual Mean	Bias adjusted (1.12) & Annualised Annual Mean	Comments
CC09	0.9005	0.8936	0.9451	0.8949	0.9085	25.5	25.9	
CC10	0.9966	0.9820	1.0274	0.9983	1.0011	29.5	33.1	
GE18	1.0324	0.9676	1.0309	1.0247	1.0139	20.7	23.5	
GS13	0.9399	0.9273	0.9816	0.9355	0.9461	19.2	20.3	
GW04	0.9096	0.8768	1.0155	0.8913	0.9233	20.7	21.4	
GLA5	1.0469	1.0277	1.0274	1.0453	1.0368	21.2	22.0	Automatic site - not bias adjusted

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

- Department of the Environment, Food and Rural Affairs (2000). Part IV The Environment Act 1995, Local Air Quality Management, Technical Guidance, LAQM.TG (16).
- Glasgow City Council (2004). Local Air Quality Action Plan.
- Glasgow City Council (2009). Local Air Quality Action Plan.
- Scottish Government (2016). ‘Cleaner Air for Scotland - Road to a Healthier Future’.
- Scottish Government (2017). ‘Cleaner Air for Scotland - The Road to a Healthier Future' - Annual Progress Report 2016.
- Scottish Government (2021) Cleaner Air for Scotland 2
- Glasgow’s Climate Plan
- Glasgow Transport Strategy: Policy Framework
- Glasgow City Council City Development Plan 2017
- Glasgow City Council City Centre Strategy and Action Plan 2014-19
- Glasgow City Council Strategic Plan for Cycling 2016 – 2025
- Glasgow City Council City Centre Transport Strategy 2014 – 2024
- Glasgow City Council Energy and Carbon Masterplan
- Glasgow City Council Carbon Management Plan 2