

# 2024 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995  
Local Air Quality Management, as amended by the  
Environment Act 2021

Date: 7<sup>th</sup> August 2024

<b>Information</b>	<b>Lancaster City Council Details</b>
<b>Local Authority Officer</b>	Melissa Parnell
<b>Department</b>	Environmental Protection – Environment and Place
<b>Address</b>	Environmental Health, Morecambe Town Hall, Marine Road East, Morecambe, LA4 4AF
<b>Telephone</b>	01524 582166
<b>E-mail</b>	mparnell@lancaster.gov.uk
<b>Report Reference Number</b>	MP/ASR2024
<b>Date</b>	7 <sup>th</sup> August 2024

## Executive Summary: Air Quality in Our Area

### Air Quality in the Lancaster City Council District

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year<sup>1</sup>.

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution<sup>2</sup>.

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

**Table ES 1 - Description of Key Pollutants**

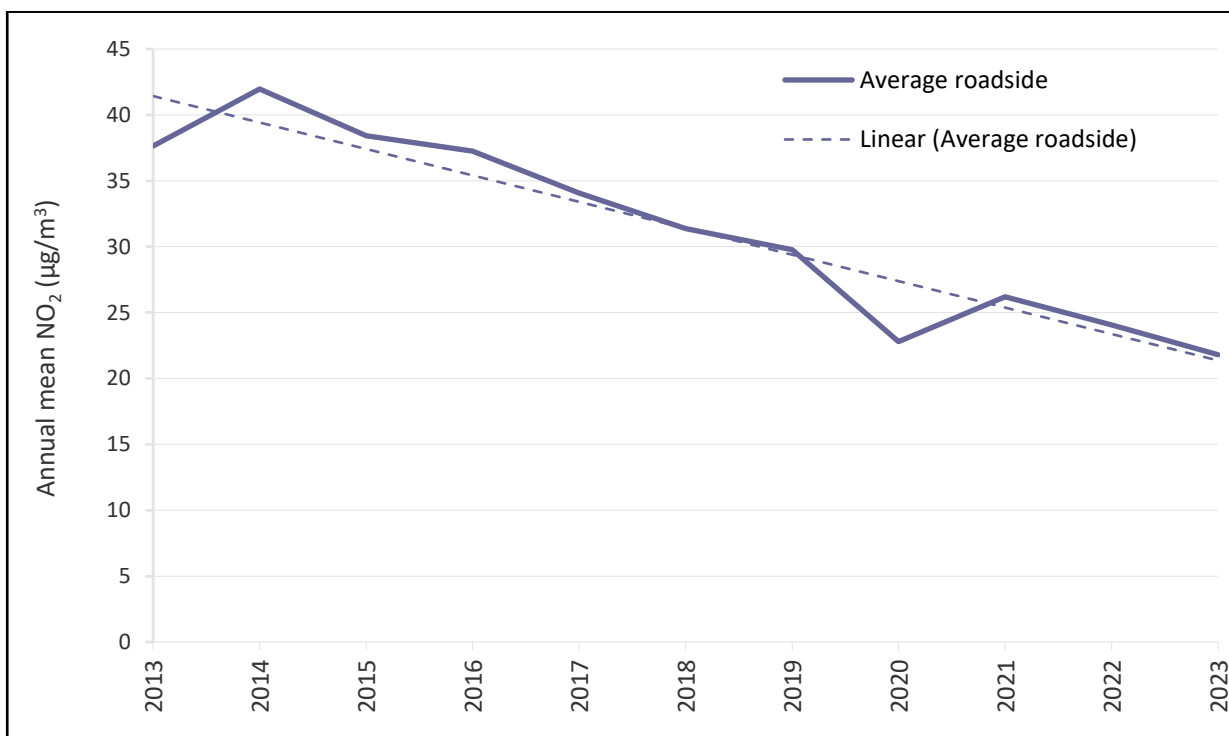
Pollutant	Description
Nitrogen Dioxide (NO <sub>2</sub> )	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO <sub>2</sub> )	Sulphur dioxide (SO <sub>2</sub> ) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM <sub>10</sub> and PM <sub>2.5</sub> )	<p>Particulate matter is everything in the air that is not a gas.</p> <p>Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes.</p> <p>PM<sub>10</sub> refers to particles under 10 micrometres. Fine particulate matter or PM<sub>2.5</sub> are particles under 2.5 micrometres.</p>

<sup>1</sup> UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

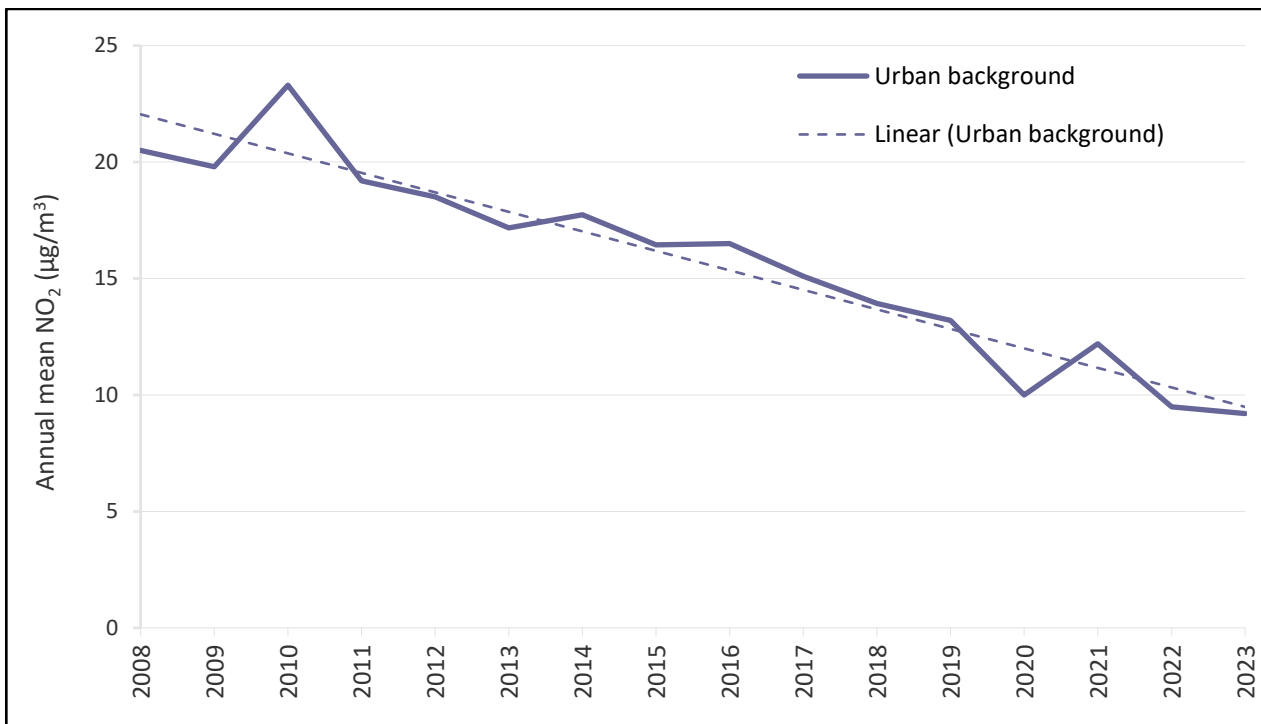
<sup>2</sup> Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

In 2023, nitrogen dioxide pollution levels in the Lancaster District generally indicated continued improvement. For the first time, no exceedances over the 40  $\mu\text{g}/\text{m}^3$  national objectives occurred at any monitoring site, although two sites (LC10 at Dalton Square and LC11 at Thurnham Street) within the City of Lancaster Air Quality Management Area (AQMA) were within 10% of the objective.

The Council reports two air quality key performance indicators (KPIs) to councillors annually which are based on local air quality monitoring within the district. One KPI reflects the average nitrogen dioxide concentration of all roadside diffusion tube monitoring sites (Figure ES.1) and the other indicates the urban background concentration of nitrogen dioxide (Figure ES.2). The average nitrogen dioxide concentration at roadside monitored sites was 21.8  $\mu\text{g}/\text{m}^3$  and 9.2  $\mu\text{g}/\text{m}^3$  at the urban background site. These indicators continue to show improvement in air quality across the district, at both the roadside and away from roads (urban background). The exposure to pollution away from the road decreased by 3%, and exposure at the roadside decreased by 10% between 2022 and 2023. The general decline in nitrogen dioxide concentrations is in line with the national trend and is likely attributed to the use of less polluting vehicles (tighter emission standards) including electric vehicles. Road transport continues to be the major contributor for nitrogen dioxide concentrations both locally and nationally.



**Figure ES.1 – Roadside diffusion tube nitrogen dioxide concentrations 2013-2023. Dashed lined indicates linear trend.**



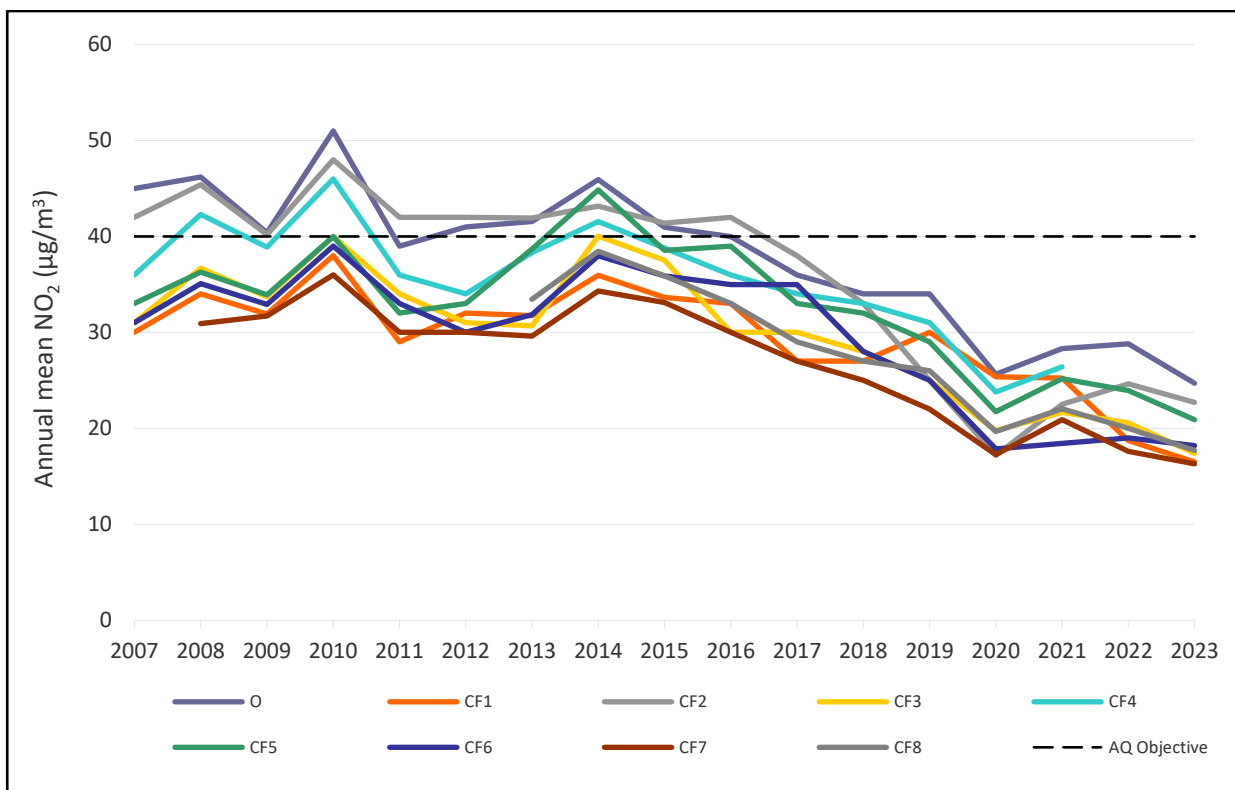
**Figure ES.2 – Urban background diffusion tube nitrogen dioxide concentration 2008-2023. Dashed lined indicates linear trend.**

Improving nitrogen dioxide levels across the district have led to the revocation of Carnforth and Galgate AQMAs where no exceedances in the national objectives have occurred since 2016. Defra technical guidance<sup>3</sup> stipulates that a local authority must look to revoke an AQMA where no exceedances have been observed for five consecutive years or more. The declining nitrogen dioxide levels for Carnforth and Galgate are demonstrated in Figures ES.3 and ES.4, respectively, below. Simple linear regression was also used to demonstrate that future exceedances are very unlikely based on the current trend in declining nitrogen dioxide pollution levels.

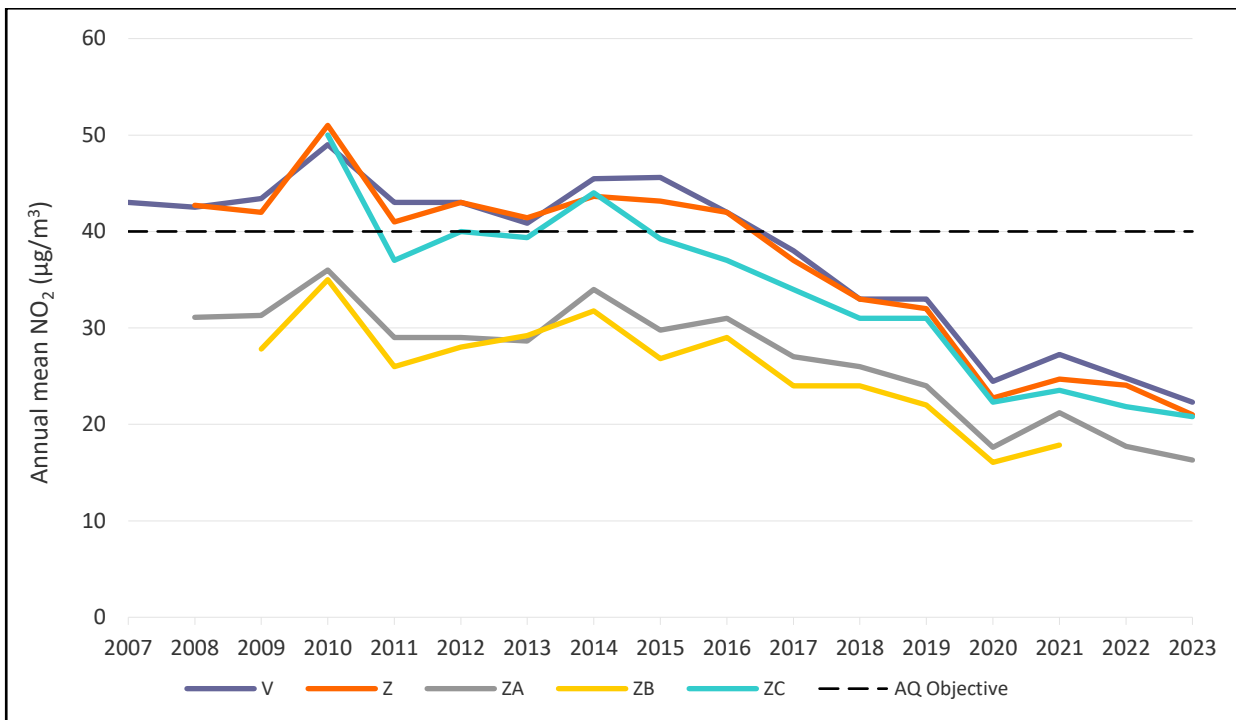
It is also recommended that that local authorities consult widely before deciding to revoke an AQMA. Initially, Defra was consulted and based on measured air pollution data, recommended Galgate and Carnforth AQMAs be revoked, as per Local Air Quality

<sup>3</sup> Defra LAQM Technical Guidance 2022. Accessible at: [UK Regions \(exc. London\) Technical Guidance | LAQM \(defra.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/103122/UK_Regions_(exc._London)_Technical_Guidance_LAQM.pdf).

Management Technical Guidance. Chief officers within Lancaster City Council Planning, Environmental Health and Public realm were consulted, as were relevant officers at Lancashire County Council. Carnforth and Ellel Parish Councillors were consulted in November 2023, and a public consultation was run between February and March 2024. No objections were received and the Revocation Orders for Carnforth and Galgate AQMAs were signed 28<sup>th</sup> June 2024. The City of Lancaster AQMA will remain in place until evidence suggests further exceedances are unlikely.



**Figure ES.3.** Nitrogen dioxide (NO<sub>2</sub>) concentrations (µg/m<sup>3</sup>) at nine diffusion tube sites within Carnforth AQMA from 2007 to 2023.



**Figure ES.4.** Nitrogen dioxide (NO<sub>2</sub>) concentrations (µg/m<sup>3</sup>) at five diffusion tube sites within Galgate AQMA from 2007 to 2023.

## Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan<sup>4</sup> sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter (PM<sub>2.5</sub>), the pollutant of most harmful to human health. The Air Quality Strategy<sup>5</sup> provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero<sup>6</sup> details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local

<sup>4</sup> Defra. Environmental Improvement Plan 2023, January 2023

<sup>5</sup> Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

<sup>6</sup> DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

community. This is extremely important given that cars are the most popular mode of personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Lancashire County Council, as the transport authority for the district, have been working with Lancaster City Council to explore potential changes to Lancaster City Centre's gyratory network. These changes would provide betterment for public transport, cycling and walking. As part of an initial phase of the work, a Lancaster City Centre Movement and Public Realm Strategy was published and was subject to public consultation. The consultation revealed broad support for the reallocation of road space for public transport, predominantly centred along the eastern corridor of the city centre. Three options were due to proceed to further detailed design. Work was paused due to the need for decisions to be made by all parties regarding wider plans for growth of the City Centre and associated funding arrangement given the relationship between the two plans. At the same time, a wider programme of highway and transport improvement across Lancaster was being progressed. The work would enable the delivery of significant housing growth, particularly South Lancaster, including at a new settlement called Bailrigg Garden Village. This programme was called the South Lancaster Growth Catalyst and would be part-funded by the national Housing Infrastructure Fund. However, due to increasing costs driven by unprecedented inflation, combined with other factors that increased the pressure on the public purse, a decision was made to suspend further work. Re-evaluation of the plans for both South Lancaster and the City Centre will be taking place. The decision to suspend the work on the South Lancaster Growth Catalyst will allow a wider consideration of other matters that will have an impact on the highway network including:

- The delivery of a New Royal Lancaster Infirmary (location yet to be confirmed)
- Proposals for the redevelopment of the existing Royal Lancaster Infirmary site, which occupies a prominent position within the city centre, can be appraised;
- In a post-Housing Infrastructure Fund era, confirmation of the timeframe and the delivery of the complementary traffic measures referred to in the Bay Gateway Consent Order.

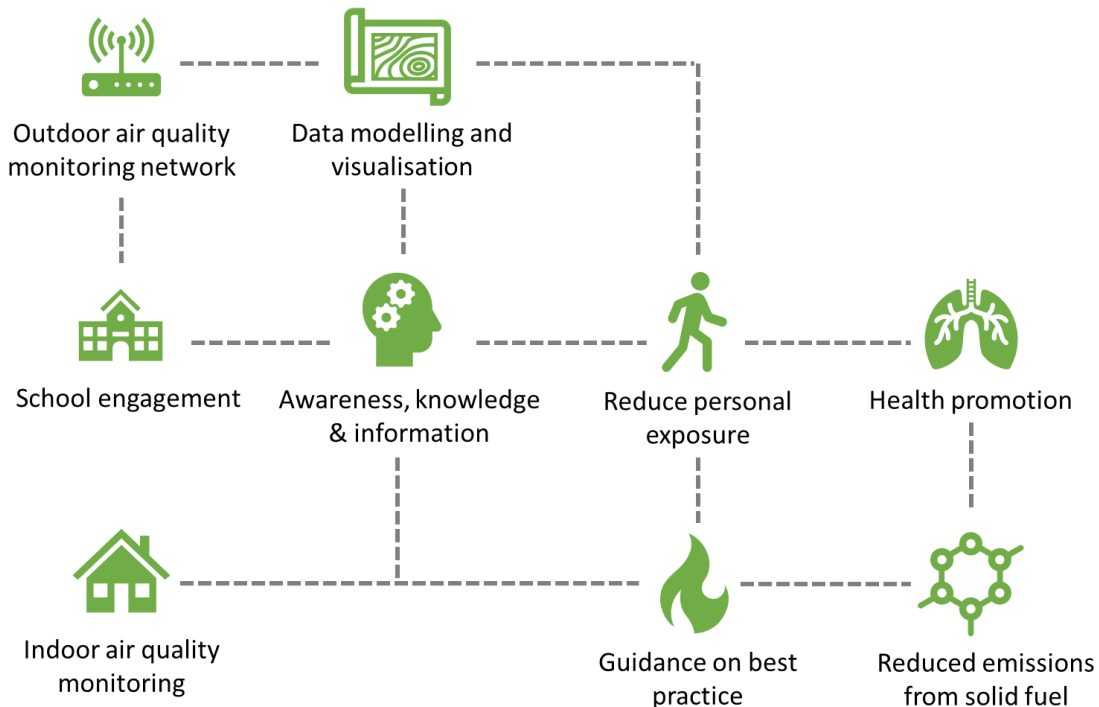
The Council has produced a new draft Air Quality Action Plan (AQAP) for the City of Lancaster AQMA. The draft has been accepted by Defra subject to minor amendments and will be going out for public consultation Summer 2024. The key components of the AQAP focus on reducing emissions from transport including a particular focus on busses, intelligent traffic management, facilitating the switch to low emission vehicles, encouraging



and supporting modal shift through cycling and walking infrastructure, and public engagement campaigns to inform and educate around air pollution.

Other actions to improve local air quality that Lancaster City Council is progressing in 2024/2025 are:

- Delivery of a Defra Air Quality Grant (2021) funded project which aims to improve public awareness of air pollution. The project will provide residents with up-to-date, real-time and high-definition local air quality information through a publicly accessible portal ([EarthSense](#)). The project is multi-faceted and the diagram below (Figure ES.5) demonstrates the various inter-related aspects of the project. In summary, the key aspects include a network of Zephyr sensors monitoring air quality across the district, data visualisation available to the public, engagement with schools, an informational campaign to improve knowledge and awareness. The original project plan included indoor air quality monitoring to explore the indoor air quality impacts of solid fuel burning, which may take place in late 2024. The ultimate aim of the project is to reduce the local population's exposure to air pollution from all sources, ultimately improving health.

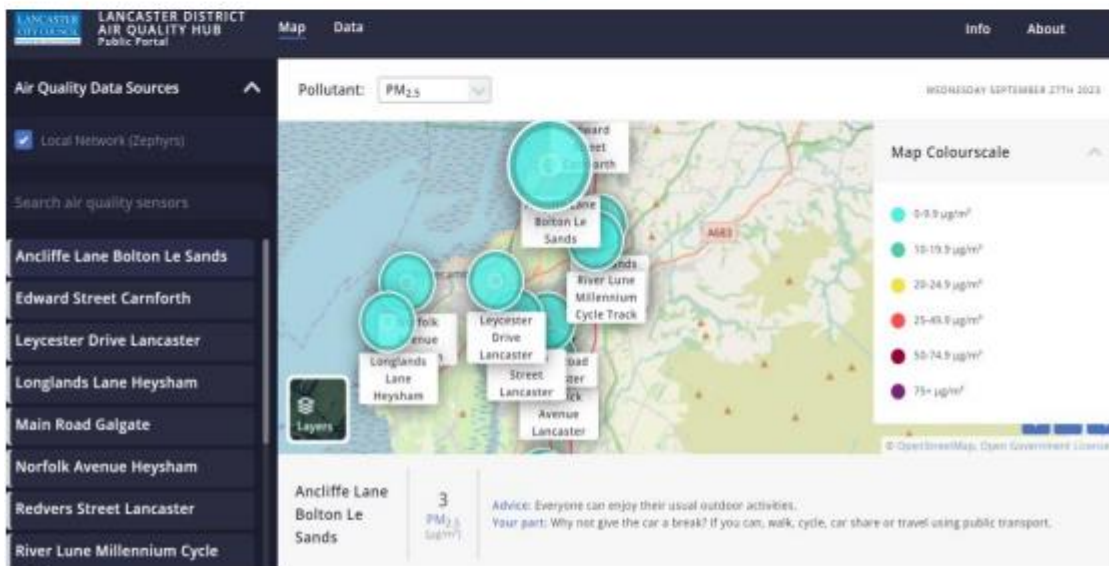


**Figure ES.5 – Project overview for the Defra funded Air Quality Project which aims to improve local awareness of air quality.**



To left - Photograph showing an example of the 12 air quality monitors installed/attached to lampposts across the district as part of the Defra Air Quality Grant funded project to provide better air quality information to residents within the Lancaster district.

Below - A screen snapshot of public information web site soon to be released.



**Figure ES.6.** Photograph of a Zephyr sensor attached to lamp post and screenshot of the EarthSense developed public portal.

- The Air That We Breathe school project (Figure ES.7). This project allows students to become air quality scientists for the day by measuring air pollution in and around schools using low-cost air quality sensors. A place-based scheme of work was developed with this project which maps onto the KS2 geography curriculum and Morecambe Bay Curriculum. The project is open to all schools within the Lancaster City Council district and can be adapted for use in secondary schools and further education. To register your interest or find out more, please contact Melissa Parnell at [mparnell@lancaster.gov.uk](mailto:mparnell@lancaster.gov.uk).



**Figure ES.7** – The project kit includes 12 low-cost sensors, Lesson Plans, Key Knowledge PowerPoints, and other equipment for suggested activities.

- Electric Tax Project. This Defra Air Quality Grant (2022) funded project aims to provide taxi drivers a ‘try before you buy’ trial of electric vehicles for taxi use. The project has been paused throughout 2024 due to staff resourcing issues and to allow the review of the deliverability of the project, and how it links to current priorities around air quality objectives.
- Lancaster City Council participated in Global Action Plan’s first Clean Air Night (January 2024) as a funding founder. The Council will continue to support this campaign as it aligns strongly with the Council’s own campaign to improve public awareness and knowledge around air pollution.
- A review of the Local Plan in light of the Climate Emergency declaration and suspended South Lancaster Growth Catalyst work ([Local Plan Review - Lancaster City Council](#)) is ongoing and is anticipated to be adopted in the near future. In addition, supplementary planning documents relating to sustainable travel ([PC draft Sustainable Travel SPD | KeepConnected \(lancaster.gov.uk\)](#)) and electric vehicle

charging infrastructure ([PC draft Provision of Electric Vehicle Charging Infrastructure Supplementary Planning Document \(SPD\) Consultation | KeepConnected \(lancaster.gov.uk\)](#)) are being developed.

- The Parking Strategy is currently under review and public consultation has been undertaken (<https://www.lancaster.gov.uk/parking/car-parking-strategy>).

## Conclusions and Priorities

There were no measured exceedances of the national air quality objectives based on annual averages for 2023. In the City of Lancaster AQMA, there were measured levels within 10% of the target, but overall, nitrogen dioxide concentrations are steadily declining across the district. Due to this decline, Carnforth and Galgate AQMAs were revoked 28<sup>th</sup> June 2024, whilst the City of Lancaster AQMA will remain in place until further evidence suggests future exceedance is unlikely. An AQAP has been developed for the City of Lancaster AQMA and will go to public consultation later this year. The key actions proposed by the AQAP feature around a transition to low emission (electric) busses, intelligent traffic management technology, facilitating the transition to low emission vehicles through EV charging infrastructure, local planning policy review, promoting modal shift through improved cycling and walking infrastructure, and educational campaigns.

## Local Engagement and How to get Involved

The new public portal for monitoring local air quality can be accessed at: [EarthSense](#)

Further information around how the Council monitors air quality and for information advising about air pollutants can be found here: [Air quality - Lancaster City Council](#)

We will be consulting on the draft Air Quality Action Plan later this year. If you would notified when this consultation goes live, please send email or write to:




FOA Dr Melissa Parnell  
Environmental Protection  
Lancaster City Council  
Morecambe Town Hall  
Marine Rd  
Morecambe  
LA4 5AF  
[mparnell@lancaster.gov.uk](mailto:mparnell@lancaster.gov.uk)

## Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Lancaster City Council with the support and agreement of the following officers and departments:

- Melissa Parnell, Senior Environmental Protection Officer (Air Quality Lead), Lancaster City Council
- Rachel Stainton, Community Protection Team Leader, Lancaster City Council
- Will Griffith, Chief Officer, Environment and Place, Lancaster City Council
- Jenifer Curtis, Licensing Manager, Environment and Place, Lancaster City Council
- Mark Cassidy, Chief Officer - Planning and Climate Change, Lancaster City Council
- Paul Hatch, Principal Planning Policy Officer, Lancaster City Council Development Control, Lancaster City Council
- Richard Camp, Planning Policy Officer, Lancaster City Council
- Elliot Grimshaw, Business Improvement & Project Delivery Lead, Corporate Climate Change, Lancaster City Council
- Michelle Holroyd, Team Leader, Transport Policy, Environment and Planning Service, Lancashire County Council
- Matthew Moll, Enhanced Bus Partnership Manager, Lancashire County Council
- Andrew Ashcroft, Lancashire County Council Public Health

This ASR has been approved by:

<b>Prepared by</b>	<b>Melissa Parnell – Senior Environmental Protection Officer</b>
<b>Qualifications</b>	BSc (Hons) Biological Sciences, MSc Environmental and Biochemical Toxicology, PGCE Secondary Science Education, PhD Public Health
<b>Signature</b>	
<b>Checked by</b>	Rachel Stainton – Community Protection Team Leader
<b>Signature</b>	
<b>Endorsed by</b>	Will Griffith – Chief Officer Environment and Place
<b>Signature</b>	

This ASR has not been signed off by a Director of Public Health but County Council Public Health input to the document has been provided and used in the report and the final document will be shared with the public health team at the county council.

If you have any comments on this ASR please send them to:

FAO Dr Melissa Parnell

Environmental Protection

Lancaster City Council

Morecambe Town Hall

Marine Rd

Morecambe

LA4 5AF

[mparnell@lancaster.gov.uk](mailto:mparnell@lancaster.gov.uk)



## Table of Contents

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>i</b>
Air Quality in the Lancaster City Council District .....	i
Actions to Improve Air Quality .....	v
Conclusions and Priorities .....	x
Local Engagement and How to get Involved.....	x
Local Responsibilities and Commitment .....	xi
<b>1 Local Air Quality Management</b> .....	<b>1</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>2</b>
<b>2.1 Air Quality Management Areas</b> .....	<b>2</b>
<b>2.2 Progress and Impact of Measures to address Air Quality in the Lancaster City Council District</b> .....	<b>5</b>
<b>2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations</b> .....	<b>20</b>
<b>4 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>31</b>
<b>4.1 Summary of Monitoring Undertaken</b> .....	<b>31</b>
4.1.1 Automatic Monitoring Sites .....	31
4.1.2 Non-Automatic Monitoring Sites .....	31
<b>4.2 Individual Pollutants</b> .....	<b>32</b>
4.2.1 Nitrogen Dioxide (NO <sub>2</sub> ) .....	32
4.2.2 Particulate Matter (PM <sub>10</sub> ) .....	35
4.2.3 Particulate Matter (PM <sub>2.5</sub> ).....	35
<b>Appendix A: Monitoring Results</b> .....	<b>36</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2023</b> .....	<b>54</b>
<b>Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC</b> .....	<b>56</b>
New or Changed Sources Identified Within Lancaster City Council during 2023.....	56
Additional Air Quality Works Undertaken by Lancaster City Council during 2023 .....	56
QA/QC of Diffusion Tube Monitoring .....	56
Diffusion Tube Annualisation .....	60
Diffusion Tube Bias Adjustment Factors .....	61
NO <sub>2</sub> Fall-off with Distance from the Road.....	62
QA/QC of Automatic Monitoring .....	62
PM <sub>10</sub> and PM <sub>2.5</sub> Monitoring Adjustment .....	64
Automatic Monitoring Annualisation .....	64
NO <sub>2</sub> Fall-off with Distance from the Road.....	64
<b>Appendix D: Map(s) of Monitoring Locations and AQMAs</b> .....	<b>66</b>
<b>Appendix E: Summary of Air Quality Objectives in England</b> .....	<b>75</b>



<b>Glossary of Terms</b> .....	<b>76</b>
<b>References</b> .....	<b>77</b>

## Figures

Figure A.1 – Trends in Annual Mean NO <sub>2</sub> Concentrations.....	48
Figure A.2 – Trends in Annual Mean PM <sub>10</sub> Concentrations .....	51
Figure D.1 – Map of Non-Automatic Monitoring Site.....	69

## Tables

Table 2.1 – Declared Air Quality Management Areas.....	3
Table 2.2 – Progress on Measures to Improve Air Quality.....	8
Table A.1 – Details of Automatic Monitoring Sites .....	36
Table A.2 – Details of Non-Automatic Monitoring Sites .....	37
Table A.3 – Annual Mean NO <sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m <sup>3</sup> ).....	44
Table A.4 – Annual Mean NO <sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m <sup>3</sup> ) ....	45
Table A.5 – 1-Hour Mean NO <sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m <sup>3</sup> .....	49
Table A.6 – Annual Mean PM <sub>10</sub> Monitoring Results (µg/m <sup>3</sup> ) .....	50
Table A.7 – 24-Hour Mean PM <sub>10</sub> Monitoring Results, Number of PM <sub>10</sub> 24-Hour Means > 50µg/m <sup>3</sup> .....	52
Table A.8 – Annual Mean PM <sub>2.5</sub> Monitoring Results (µg/m <sup>3</sup> ).....	53
Table B.1 – NO <sub>2</sub> 2023 Diffusion Tube Results (µg/m <sup>3</sup> ) .....	54
Table C.1 – Bias Adjustment Factor .....	61
Table E.1 – Air Quality Objectives in England .....	75

# 1 Local Air Quality Management

This report provides an overview of air quality in the Lancaster City Council District during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Lancaster City Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

## 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 should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by Lancaster City Council can be found in Table 2.1. The table presents a description of the three AQMA(s) that were designated within the Lancaster City Council District in 2023. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA(s) and also the air quality monitoring locations in relation to the AQMA(s). The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- NO<sub>2</sub> annual mean;
- NO<sub>2</sub> 1 hour mean.

It should be noted that the Council revoked Carnforth and Galgate AQMAs on the 28<sup>th</sup> June 2024.

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

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance : Declaration	Level of Exceedance : Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
City of Lancaster AQMA	2004	NO <sub>2</sub> Annual Mean	Covers gyratory system in Lancaster city centre	No	75 µg/m <sup>3</sup>	39 µg/m <sup>3</sup>	1 (from diffusion tube monitoring data only)	2007 (new AQAP out for consultation June 2024)	Available at:- <a href="http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality">http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality</a>
City of Lancaster AQMA	2017 (new order replaced 2004 order above and covered both annual and 1 hr Objectives for NO <sub>2</sub> . The area covered by the AQMA was unchanged.	NO <sub>2</sub> 1 Hour Mean	Covers gyratory system in Lancaster city centre	No	75 µg/m <sup>3</sup> (annual mean value)	No exceedance of hourly mean >200 µg/m <sup>3</sup>	6 (from diffusion tube monitoring and automatic monitoring station)	2007 (new AQAP out for consultation June 2024)	Available at:- <a href="http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality">http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality</a>

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance : Declaration	Level of Exceedance : Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Carnforth AQMA	2007	NO <sub>2</sub> Annual Mean	Covers main cross road area in Carnforth	N	42 µg/m <sup>3</sup>	25 µg/m <sup>3</sup>	7 (from diffusion tube monitoring data only)	2007 (AQMA revocation 2024)	Available at:- <a href="http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality">http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality</a>
Galgate AQMA	2009	NO <sub>2</sub> Annual Mean	Covers main cross road area in Galgate	No	43 µg/m <sup>3</sup>	22 µg/m <sup>3</sup>	7 (from diffusion tube monitoring data only)	2007 (AQMA revocation 2024)	Available at:- <a href="http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality">http://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality</a>

- Lancaster City Council confirm the information on UK-Air regarding their AQMA(s) is up to date.
- Lancaster City Council confirm that all current AQAPs have been submitted to Defra.

## 2.2 Progress and Impact of Measures to address Air Quality in the Lancaster City Council District

Defra's appraisal of last year's ASR concluded that the report was well structured, detailed and provided the information specified in the guidance, but highlighted a number of formatting issues which have been rectified in this issue.

Lancaster City Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Sixty measures are included within Table 2.2, with the type of measure and the progress Lancaster City Council and Lancashire County Council have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in the Lancaster Air Quality Action Plan (due to be published late 2024) and the following websites:

[Air quality - Lancaster City Council](#)

[EarthSense](#)

Key completed measures are:

- A draft Air Quality Action Plan for the City of Lancaster AQMA was submitted to Defra for appraisal. The draft has been accepted and will now be amended following stakeholder consultation, followed by public consultation before the final version is published.
- A local Lancaster City Council policy has been adopted to allow the utilisation of new smoke enforcement powers introduced by the Environment Act 2021 (adopted 18<sup>th</sup> September 2023).
- Lancaster City Council took part in the first national 'Clean Air Night' campaign (by Global Action Plan) and presented at the first Clean Air Night summit in January 2024.
- In response to a large industrial fire that impacted businesses and residents across a large radius, the Council was able to rapidly deploy Zephyr air quality sensors to monitor air quality around the site. The data was used by UKHSA to inform a public health risk assessment, to designate thresholds and alerts, and to advise the public and local residents.

- Revocation of Carnforth and Galgate AQMA designations due to ongoing compliance with air quality standards for nitrogen dioxide (June 2024)

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

Air Quality Grant (2022) funded project to operate an electric taxi 'try before you buy' scheme

- Continue to deliver the Defra Air Quality Grant (2021) funded public educational campaign project which utilises the use a public portal with real-time air quality data for the Lancaster District
- Continue to deliver the Air That We Breathe Air Quality Project
- Adoption of the new Local Plan following the Climate Emergency Review
- Adoption of the new Parking Strategy

Lancaster City Council's priorities for the coming year are:

- Support and encourage the transition to cleaner vehicles including electric vehicles. The Council will support this through planning policy aimed at improving electric vehicle charging infrastructure, an electric taxi 'try before you buy' scheme, and supporting future electric bus funding applications.
- Support and encourage modal shift to sustainable travel. The Local Cycling and Walking Infrastructure Plan for Lancaster has been published ([Local Cycling and Walking Infrastructure Plans \(LCWIPs\)](#)) and a Sustainable Travel Supplementary Planning Document is in development. The Canal Quarter Masterplan features a commitment to safe pedestrian and cycle friendly streets ([Canal Quarter masterplan unveiled - Lancaster City Council](#)).

Lancaster City Council worked to implement these measures in partnership with the following stakeholders during 2023:

- Lancashire County Council (the local transport and public health authority);
- EarthSense Systems Limited - to deliver publicly accessible air quality monitoring and modelling facilities)
- ESU1 Limited – to service and maintain the Council's automatic monitoring stations
- Air Quality Data Management – manage, monitor and ratify data from the Council's automatic air quality stations
- Bureau Veritas UK – consultant appointed to help in the delivery of the Air Quality Action Plan for the Lancaster City Centre AQMA



- Gradko International Limited – to supply and analyse nitrogen dioxide diffusion tubes
- Global Action Plan – to develop and deliver the ‘Clean Air Night’ campaign which is tied with the Council’s project aiming to reduce emissions from solid fuels

The principal challenges and barriers to implementation that Lancaster City Council anticipates facing are:

- Inflation and the associated cost of living crisis affecting most of us will no doubt impact on the delivery of air quality improvement actions. We anticipate that the increased cost of gas and electricity will be associated with a growth in the use of solid fuels.
- The increased cost of electricity may impact on the transition to use of electric vehicles. This may have further impact on LCC’s Defra funded electric taxi ‘try before you buy’ scheme.
- The significant action in LCC’s new AQAP is to deliver electric busses in the Lancaster City centre. Unfortunately the ZEBRA2 bid was unsuccessful, but Lancashire County Council and Stagecoach will seek alternative funding opportunities.

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

- Electric taxi project – delivery was initially delayed as no bids were received from suppliers in response to the tender offered, primary due to lack of availability of disabled access vehicles. The project has been further delayed due to staffing issues within the Council. It is expected that the project will be reviewed in September 2024 to consider deliverability and how it links to current priorities around air quality objectives.
- The Defra funded Domestic Buning Project was due to release a publicly available air quality portal in winter 2023. However, an industrial fire that had a great impact on the community meant that the Zephyr sensors were repurposed for air quality monitoring around this site. The release of the public was delayed until spring 2024, but has been further delayed due to the general election and pre-election period rules and the public release of the portal went live on 16<sup>th</sup> July 2024.

Lancaster City Council, following modelling carried out by Bureau Veritas UK, anticipates that the measures stated above and in Table 2.2 will achieve compliance in Lancaster City AQMA by 2027.

**Table 2.2 – Progress on Measures to Improve Air Quality**

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Electric low emission buses	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport			Lancashire County Council, Lancaster City Council, Stagecoach, Department for Transport	DfT ZEBRA 2	NO	Not Funded	£1 million - £10 million	Planning	Reduction of NOx across district and Lancaster AQMA in particular through low emission buses. Estimated 1-2 ug/m3 reduction in NO2.	Deployment of 31 electric buses in Lancaster by Stagecoach.	Alternative funding sought as ZEBRA bid unsuccessful.	Funding required
2	Traffic Light Technology - Intelligent Bus Priority	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane		2025	Lancashire County Council	Bus Services Improvement Plan	NO	Funded	£500k - £1 million	Planning	Smoothing of bus journeys, reducing congestion, improving traffic flow, and therefore reducing bus related emissions mainly in the Lancaster AQAP.	All traffic signal installations on Lancaster gyratory upgraded with UTC SCOOT.	High level desktop costing exercise and feasibility, BSIP Sponsors committed to scheme. Design work 2024 and implementation 2025.	Proposed expansion of this project using Intelligent Traffic Management Fund - application later 2024.
3	Local Cycling and Walking Infrastructure Plan (LCWIP)	Transport Planning and Infrastructure	Cycle network	2021	2032	Lancashire County Council, Lancaster City Council	Department for Transport	NO	Funded	£1 million - £10 million	Planning	Facilitating a modal shift away from private vehicles to increased rates of walking, cycling and wheeling will have positive impacts on air pollutants associated with vehicles.	Increased cycling, walking and wheeling rates across Lancaster and wider county.	Following extensive consultation, the Lancaster LCWIP has been approved by cabinet: <a href="https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/cycling-and-walking-strategy/">https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/cycling-and-walking-strategy/</a>	Next steps - prioritise all schemes in readiness for future funding opportunities, such as the anticipated Local Transport Fund (LTF), and any future tranches of Active Travel Funding (ATF). Interactive LCWIP map: <a href="https://lancashire.citizenspace.com/lcwip-engagement-stage-2/">https://lancashire.citizenspace.com/lcwip-engagement-stage-2/</a>

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
4	Lancaster Transport Masterplan (a)	Traffic Management	UTC, Congestion management, traffic reduction	2016	2031	Lancashire County Council, Lancaster City Council		NO			Planning	General air quality improvements from reduced traffic and congestion across district, including Lancaster AQMA	M6/Heysham link Road, Lancaster Caton Road Park and Ride, Renumbering A6, Strategic Multiuser cycle network, Lancaster Reach express Public Transport service, reconfiguration of J33 of M6, Lancaster South Park and Ride, Lancaster Movement Strategy (incorporating Lancaster Centre network review and restraint measures). ULEV Strategy, Morecambe Movement Strategy, Morecambe to Lancaster Rail services, Heysham supporting development, Carnforth Town Centre Improvements, Carnforth Railway Station, Rural connections	Plans arising from the Masterplan have been developed over 2019 to 2022/23 but currently halted. The County Council plan to progress this project once the City Council's Local Plan Review is complete ( <a href="https://www.lancaster.gov.uk/planning/planning-policy/local-plan-review">https://www.lancaster.gov.uk/planning/planning-policy/local-plan-review</a> ).	
5	Speed limits in residential areas	Traffic Management	Reduction of speed limits, 20mph zones	2012		Lancashire County Council	Lancashire County Council	NO	Funded	£1 million - £10 million	Completed	Improved air quality in residential areas.	Most residential areas designated 20 mph zones	Most residential zones in Lancaster District now covered	
6	Transport Masterplan for Lancaster (b)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2016	2031	Lancashire County Council, Lancaster City Council		NO			Planning	See above - Lancaster Transport Masterplan (a)	See above - Lancaster Transport Masterplan (a)	See above - Lancaster Transport Masterplan (a)	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
7	Lancaster Parking Strategy	Traffic Management	Emission based parking or permit charges	2015	2025	Lancaster City Council	N/A	NO			Planning	City of Lancaster AQMA air quality improvements through a reduction of circulating traffic and congestion within the city centre through accessing carparks.	Optimal use of space for car parks, reducing circulation through the city centre, with links to sustainable transport strategy, provision for EVs, and accommodates alternative transport modes.	Draft parking strategy has completed public consultation: <a href="https://www.lancaster.gov.uk/parking/car-parking-strategy">https://www.lancaster.gov.uk/parking/car-parking-strategy</a>	
8	AQ Station Traffic Management Link	Traffic Management	Other	2015	2025	Lancaster City Council, Lancashire County Council		NO			Planning	Assist with traffic management measures in Lancaster AQMA, improving congestion.	AQ station linked with traffic management.	Works to AQ station completed to facilitate link but management system awaited from County Council.	Potential links with Intelligent Traffic Management Fund project.
9	M6 / Heysham Link Road (The Bay Gateway)	Traffic Management	Other	2013	2016	Lancashire County Council	Department for Transport	NO	Funded	> £10 million	Completed	A maximum 10ug/m3 annual mean NO2 reduction in Carnforth AQMA. Traffic reduction in range of 3-9% within the Lancaster AQMA and potential of up to 5ug/m3 (annual mean NO2) in Galgate AQMA	Traffic reduction and reduced NO2 concentrations within the three AQMAs.	Monitoring in 2019 indicates a general reduction on levels reported for 2018. Levels monitored within the Carnforth and Galgate AQMAs indicate compliance with objective standards.	A Developmental Consent Order for the Bay Gateway has an implementation date of 31st October 2026.
10	Travel Plans for New Development	Promoting Travel Alternatives	Workplace Travel Planning			Lancashire County Council		NO			Implementation	General air quality improvements from reduced traffic and congestion across district.	New developments have sustainable transport plans.	Ongoing	Lancashire County Council Sustainability Team was disassembled in 2015 due to County Council budget cuts. Transport planning function in relation to new development transferred to County Council Highways Team.
11	School Travel Plans	Promoting Travel Alternatives	School Travel Plans		2015	Lancashire County Council		NO			Implementation	General air quality improvements from reduced traffic and congestion across district.	Lancaster district schools with travel plans	Sixty-six schools have travel plans	Most schools utilised grant funding to provide cycle storage facilities.
12	Promoting Home Working	Promoting Travel Alternatives	Encourage / Facilitate home-working	2020		Lancashire County Council, Lancaster City Council		NO			Implementation	A reduction in traffic related pollution due to a decreased number of trips for work.	Less trips for work.	The City and County Councils have flexible working policies which give employees the opportunity to work from home where appropriate.	The COVID-19 pandemic resulted in an increased number of employees working from home.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
13	Lancashire Cycle September and other events	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure								Implementation	Reduced traffic emissions through encouraging use of alternative transport (cycling) to reduce dependence on cars.	Increased cycling rates across Lancaster.	Love to Ride's Cycle September is an annual event that encourages cycling and both the City Council and County Council take part in. Further info on cycling in Lancashire: <a href="https://www.lancashire.gov.uk/cycling/">https://www.lancashire.gov.uk/cycling/</a>	Lancaster hosts the Bay Health Festival of which 'A Celebration of Cycling' is a theme: <a href="https://www.thebayhealthfestivals.org.uk/event-details/bay-health-festivals-cycling-extravaganza">https://www.thebayhealthfestivals.org.uk/event-details/bay-health-festivals-cycling-extravaganza</a>
14	Cycling Demonstration Town	Promoting Travel Alternatives	Promotion of cycling			Lancashire County Council		NO			Implementation	Reduced traffic emissions through encouraging use of alternative transport (cycling) to reduce dependence on cars.	Increased cycling rates across Lancaster.	Four contraflow cycle lanes, three toucan crossings, seven on-road cycle lanes, cycle links to canal tow path, cycling assess to pedestrian areas, twelve crossing upgrades, new path links, 1176 cycle parking spaces, signage, workplace engagement, events (25,000 contacts), cycle training, school engagement	
15	Lancaster Rail Station Park and Ride	Promoting Travel Alternatives	Promote use of rail and inland waterways					NO			Implementation	Reduced traffic emissions through encouraging use of alternative transport (rail) to reduce dependence on cars.	More rail journeys opted for over car journeys.	165 spaces at Lancaster Rail Station (operated by Avanti West Coast)	
16	Carnforth Rail Station Park and Ride	Promoting Travel Alternatives	Promote use of rail and inland waterways					NO			Implementation	Reduced traffic emissions through encouraging use of alternative transport (rail) to reduce dependence on cars.		Sixty-four fee charged spaces	
17	Bare Lane Rail Station Park and Ride	Promoting Travel Alternatives	Promote use of rail and inland waterways					NO			Implementation	Reduced traffic emissions through encouraging use of alternative transport (rail) to reduce dependence on cars.		Twelve free spaces	
18	Morecambe Rail Station Park and Ride	Promoting Travel Alternatives	Promote use of rail and inland waterways					NO			Implementation	Reduced traffic emissions through encouraging use of alternative transport (rail) to reduce dependence on cars.		One hundred fee payable spaces but fee refunded with rail ticket	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
19	Silverdale Rail Station Park and Ride	Promoting Travel Alternatives	Promote use of rail and inland waterways					NO			Implementation	Reduced traffic emissions through encouraging use of alternative transport (rail) to reduce dependence on cars.		Three free spaces	
20	Wennington Rail Station Park and Ride	Promoting Travel Alternatives	Promote use of rail and inland waterways					NO			Implementation	Reduced traffic emissions through encouraging use of alternative transport (rail) to reduce dependence on cars.		Seven free spaces	
21	Information via County Council website	Promoting Travel Alternatives	Other			Lancashire County Council		NO	Not Funded	< £10k	Implementation	Reduced traffic emissions through promoting travel alternatives.		County Council website updated regularly with public transport information	<a href="https://www.lancashire.gov.uk/roads-parking-and-travel/public-transport/">https://www.lancashire.gov.uk/roads-parking-and-travel/public-transport/</a>
22	Information via Lancaster City Council website	Public Information	Via the Internet			Lancaster City Council	N/A	NO	Not Funded	< £10k	Implementation	Behaviour change relating to travel and domestic burning, and so an overall reduction in transport and burning emissions.		A new web page to Council website was introduced in 2022 providing information about air quality pollutants and advice about what individuals can do to assist with local air quality matters and reduce their own exposure	<a href="https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/">https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/</a> AND <a href="https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/about-air-pollution">https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/about-air-pollution</a>
23	Burning of Waste Fact Sheet	Public Information	Via leaflets	2014		Lancaster City Council	N/A	NO	Not Funded	< £10k	Implementation	The leaflet aims to educate around the harms, hazards, and legalities of burning waste with the aim of discouraging waste burning, and therefore a reduction in particulate matter emissions.		The fact sheet is provided to residents and businesses that are alleged to have burn burning waste to educate and inform and prevent further waste burning. It is also publicly available online.	Fact sheet available at: <a href="https://www.lancaster.gov.uk/environmental-health/environmental-protection/smoke-control">https://www.lancaster.gov.uk/environmental-health/environmental-protection/smoke-control</a>
24	Direct Communication / Education and School Projects	Public Information	Via other mechanisms	2022		Lancashire County Council, Lancaster City Council	Defra and LA	YES	Partially Funded	< £10k	Implementation			Original programme planned through County Council Safe and Healthy Schools but County Council aspect currently undelivered. Following Defra grant funding (AQ grant 2021), Lancaster City Council has produced a school project of which seven local schools have participated (see below).	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
25	Cycle Hire	Transport Planning and Infrastructure	Public cycle hire scheme			Lancashire County Council	N/A	NO	Not Funded	< £10k	Implementation			Visit Lancashire website with information relating to bicycle hire.	Available at: <a href="https://www.visitlancashire.com/things-to-do/cycling-lancashire/cycle-hire">https://www.visitlancashire.com/things-to-do/cycling-lancashire/cycle-hire</a>
26	M6 / Heysham Link Road (The Bay Gateway) Conditional Complimentary Measures	Transport Planning and Infrastructure	Other	2016	2026	Lancashire County Council						See above - M6 Link / Bay Gateway		Development Consent Order requires delivery of complimentary measures by 2026 but current uncertainty over what will be delivered by this date.	For more info see: <a href="https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/highways-and-transport-masterplans/lancaster-district-highways-and-transport-masterplan/">https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/highways-and-transport-masterplans/lancaster-district-highways-and-transport-masterplan/</a>
27	Caton Road Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	2014	2016	Lancashire County Council	Department for Transport and NHS	NO	Funded	> £10 million	Implementation	Reduction in the number of car trips in and around the city centre and therefore a reduction in traffic related emissions (NO2) within the AQMA.	Park and ride usage	Park and ride usage has increased year on year and averaged at 238 passengers per day in 2023. Discounts available for University Hospital of Morecambe Bay NHS Foundation Trust staff. NHS funding contribution for additional bus frequency.	The park and ride has 650 free spaces and 18 electric vehicle charging points. More information at: <a href="https://www.lancashire.gov.uk/roads-parking-and-travel/public-transport/park-and-ride/lancaster-park-and-ride/">https://www.lancashire.gov.uk/roads-parking-and-travel/public-transport/park-and-ride/lancaster-park-and-ride/</a>
28	Co-Wheels Car Club - Car Share Scheme	Alternatives to private vehicle use	Car Clubs			Lancaster City Council									
29	Shared Wheels	Alternatives to private vehicle use	Car & lift sharing schemes			Lancashire County Council							Members registered	Currently 2951 members registered across Lancashire, down from 3892 previous year. 210 members registered from Lancashire County Council staff.	
30	Lancaster Community Car Club	Alternatives to private vehicle use	Car Clubs	2012		Lancaster Community Car Club - Community Interest Company								Currently has 30 individual members and 7 cars.	This Community Interest Group is part of Lancaster Cohousing
31	Sustainable Transport Fund Grants	Alternatives to private vehicle use	Other	2014	2015	Lancashire County Council	Local Sustainable Transport Fund	NO	Funded		Completed		Businesses engaged and grants provided	Thirteen further schemes during 2014/15. Over 100 businesses engaged and 50 grants provided over the period of the scheme	Main transport route between Lancaster and Preston targeted including Lancaster centre. Grants awarded for cycle storage, changing facilities and for pool bikes.
32	Local Transport Plan 3 (LTP3)	Policy Guidance and Development Control	Other policy	2019	2021	Lancashire County Council	N/A	NO	Not Funded		Completed		Production of Local Transport Plan	Current version (LTP3) sets out transport priorities until 2021	
33	Local Transport Plan 4 (LTP4)	Policy Guidance and Development Control	Other policy	2023	2025	Lancashire County Council and Atkins	N/A	NO	Not Funded		Planning		Production of Local Transport Plan	County Council have started work to update LTP and commissioned Atkins to start work on LTP4 which will establish priorities for next decade.	Expected provisional area-wide LTP by March 2025

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
34	Local Air Quality Planning Guidance	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2015	2025	Lancaster City Council	N/A	NO	Not Funded	< £10k	Planning	Planning policy to limit the contribution of new developments to air pollution and therefore impacts on a range of pollutants including oxides of nitrogen and particulate matter	Production of a Planning Advisory Note for Air Quality and Supplementary Planning Document	Planning advisory notes for air quality and walking and cycling complete. Supplementary planning documents relating to sustainable travel, and electric vehicle infrastructure are being drafted.	For info: <a href="https://keepconnected.lancaster.gov.uk/st-spdc">https://keepconnected.lancaster.gov.uk/st-spdc</a> AND <a href="https://keepconnected.lancaster.gov.uk/evci-spdc">https://keepconnected.lancaster.gov.uk/evci-spdc</a>
35	Lancashire Public Health Team Air Quality Coordination	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2015		Lancashire County Council					Planning			Initial meeting in 2015. Air quality briefing note produced in 2017. Public Health work was dominated by Covid in 2020. Public Health team looking to coordinate roles of stakeholders at County Council to improve air quality.	
36	Lancaster Air Quality Strategy	Policy Guidance and Development Control	Other policy	2013	2015	Lancaster City Council	N/A	NO	Not Funded	< £10k	Completed	General air quality strategy so all key air pollutants	Production of a local Air Quality Strategy	The Lancaster Air Quality Strategy 'Clearing the Air' was published in 2013. A new Air Quality Action Plan has been drafted for City of Lancaster AQMA and will be published in 2024.	Available at: <a href="https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/air-quality-reviews-and-assessments">https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/air-quality-reviews-and-assessments</a>
37	Local Plan Review - Planning Policy Lancaster City Council	Policy Guidance and Development Control	Other policy	2017	2024	Lancaster City Council								The Local Plan is currently under review and has recently been open to participation and engagement. Further consultation is being prepared.	More information: <a href="https://www.lancaster.gov.uk/planning/planning-policy/local-plan-review">https://www.lancaster.gov.uk/planning/planning-policy/local-plan-review</a>
38	Guidance on electric vehicle charging point requirements for new development	Policy Guidance and Development Control	Other policy	2015	2024	Lancaster City Council						Reduction in traffic related emission through encouraging the transition to electric vehicles.		Guidance reviewed in 2021/22 as part of Local Plan Review. Due for adoption in 2024. DM29 Policy adopted.	Barriers: electricity grid capacity issues. More information: <a href="https://www.lancaster.gov.uk/planning/planning-policy/planning-policy-consultations">https://www.lancaster.gov.uk/planning/planning-policy-consultations</a>
39	M6 / Heysham Link Road - Traffic Regulation Order	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2016	2016	Lancashire County Council								Order placed 2016	HGV traffic to use J34 Link Road (Bay Gateway). The link road must not be fully opened to vehicular traffic until the undertaker has completed statutory consultation upon a proposal to make traffic regulation order prohibiting HGVs from roads forming part of the A6 in central Lancaster and along the A589 Morecambe Road, east of the link road, except for access.



Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
40	Clean Bus Technology Fund Grant Phase 1	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2015	2025	Lancashire County Council, Stagecoach, and Lancaster City Council as partner	Clean Bus Technology Fund	NO	Funded	£100k - £500k	Planning	Estimated 4% reduction in NOx levels in Lancaster AQMA	NOx emissions from buses reduced by over 90%	£288,150 grant to upgrade eight buses with technology to reduce emissions. Spend amendment agreed in 2019 and potential further amendment in 2024.	
41	Clean Bus Technology Fund Grant Phase 2	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2017		Lancaster City Council and Stagecoach	Clean Bus Technology Fund	NO	Not Funded		Aborted	Estimated 12% reduction of NOx emissions in Lancaster AQMA	NOx emissions from buses reduced by over 90%	Grant application not successful (2017) as Defra air quality modelling indicated Lancaster was not exceeding air quality objectives (it was in fact exceeding according to measured data)	
42	Lancaster City Council Climate Emergency	Promoting Low Emission Plant	Public Procurement of stationary combustion sources	2019	2030	Lancaster City Council		NO			Implementation	Mainly CO2 reduction through climate action but direct benefits to air quality due to pollutants associated with combustion.	The Council estate to be net zero by 2030	The Climate Emergency declaration in 2019 was followed by steps to a net zero Council by 2023. Lancaster scored top of the Climate Emergency UK leaderboard. Buildings and heating - £1 million to improve energy efficiency of Council buildings, Salt Ayre Leisure Centre Decarbonisation Project, improvements to the Council housing stock, biodiversity, plus much more.	More information: <a href="https://www.lancaster.gov.uk/sites/climate-emergency/new-and-updates">https://www.lancaster.gov.uk/sites/climate-emergency/new-and-updates</a>
43	County Council Provision of roadside electric charging points for electric vehicles	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015	2020	Lancashire County Council, Highways					Completed	Reduction in traffic related emission through encouraging the transition to electric vehicles.	Charge points installed roadside (County Council are highways authority)	Grant monies awarded for 150 points across Lancashire. The Lancashire and Blackburn with Darwen Electric Vehicle Infrastructure Strategy was approved 2023.	More information: <a href="https://www.lancashire.gov.uk/roads-parking-and-travel/electric-vehicle-charge-points/">https://www.lancashire.gov.uk/roads-parking-and-travel/electric-vehicle-charge-points/</a> AND <a href="https://www.lancashire.gov.uk/media/945415/the-lancashire-and-blackburn-with-darwen-electric-vehicle-infrastructure-strategy.pdf">https://www.lancashire.gov.uk/media/945415/the-lancashire-and-blackburn-with-darwen-electric-vehicle-infrastructure-strategy.pdf</a>
44	City Council Provision of electric charging points in car parks	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2018	2023	Lancaster City Council					Completed	Reduction in traffic related emission through encouraging the transition to electric vehicles.	Charge points installed in district car parks.	Charge points have been provided in 10 carparks across the district. Locations here: <a href="https://www.zap-map.com/live/">https://www.zap-map.com/live/</a>	A strategy is required locally to direct future implementation. A draft EV infrastructure SPD is in production. A regional strategy has been produced by the County Council: <a href="https://www.lancashire.gov.uk/roads-parking-and-travel/electric-vehicle-charge-points">https://www.lancashire.gov.uk/roads-parking-and-travel/electric-vehicle-charge-points</a>

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
45	Provision of roadside electric charging points for electric vehicles 2	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2023	2026	Lancashire County Council	Local Electric Vehicle Infrastructure (LEVI)	NO	Funded	> £10 million	Planning	Reduction in traffic related emission through encouraging the transition to electric vehicles.		The County Council is one of 16 councils to secure funding from the LEVI extended pilot scheme. The trial aims to expand to more residents and trial lamp post integrated charge points in residential areas, helping those that do not have access to off-street parking.	In addition to the LEVI extended pilot, the County Council has been allocated indicative funding of £10.1 million from the LEVI capital fund for provision of local, low power, public on-street charging, subject to the submission of a delivery plan in early 2024 that is accepted by the DfT.
46	Roadside Green Barriers Research Project	Other	Other	2017	2020	Lancaster City Council, Lancaster University, Lancashire County Council		NO			Completed	Green barriers to prevent exposure to roadside pollution.		LCC worked with Lancaster University on deployment of green barriers in poor AQ locations and also to inform general planting schemes for AQ (AQ beneficial species).	Awaiting report.
47	Promoting use of electric vehicles as taxis	Promoting Low Emission Transport	Taxi emission incentives	2017	2026	Lancaster City Council	Defra	YES	Funded	£500k - £1 million	Planning	Reduction of NOx across district and Lancaster AQMA in particular through transition to EVs.	Number of electric taxis in local taxi fleet	Survey in 2022 into trade opinions on 'try before you buy' and subsequent leasing scheme. On the back of the response, the Council submitted a Defra AQ grant bid and was awarded £454,576. The Defra funded electric taxi project is on-hold until September 2024 due to resource issues across the City Council.	Resource issues with the Council and current taxi driver for electric vehicles are potential barriers
48	Grant bid for electric vehicle charging infrastructure from OLEV scheme	Promoting Low Emission Transport	Taxi emission incentives	2016	2022	Lancaster City Council and Lancashire County Council	OLEV	NO	Funded		Completed	Reduction of NOx across district and Lancaster AQMA in particular through transition to EVs.	Rapid chargers installed and operational.	Four rapid chargers for use by taxis are now delivered and operational at Heysham, Billy Hill, Morecambe and Spring Garden St Lancaster. Five other Lancashire authorities have also installed chargers through the Lancaster co-ordinated bid delivering 24 rapid chargers across the region.	Rapid charger fees have increased significantly over past year which may impact use.
49	Electrification of the City Council Fleet	Promoting Low Emission Transport	Company Vehicle Procurement -Prioritising uptake of low emission vehicles	2017	2030	Lancaster City Council	Lancaster City Council	NO	Funded	£1 million - £10 million	Implementation	Reduction of NOx across district and Lancaster AQMA in particular through transition to EVs.	Percentage of fleet electric	Fifty-seven vehicles (31% fleet) currently EVs, plus an electric bin wagon: <a href="https://www.lancaster.gov.uk/news/2022/apr/lancashire-s-first-electric-bin-wagon-takes-to-the-road">https://www.lancaster.gov.uk/news/2022/apr/lancashire-s-first-electric-bin-wagon-takes-to-the-road</a>	Increasing capital and electricity prices

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
50	Electric low emission buses	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport			Lancashire County Council, Lancaster City Council, Stagecoach, Department for Transport	DfT ZEBRA 2	NO	Not Funded	£1 million - £10 million	Planning	Reduction of NOx across district and Lancaster AQMA in particular through low emission buses. Estimated 1-2 ug/m3 reduction in NO2.	Deployment of 31 electric buses in Lancaster by Stagecoach.	Alternative funding sought as ZEBRA bid unsuccessful.	Funding required
51	Non-road mobile machinery emissions during construction	Promoting Low Emission Plant	Shift to installations using low emission fuels for stationary and mobile sources	2021		Lancaster City Council	N/A	NO			Planning	Reduction in range of air pollutants associated with combustion machinery, primarily involved with development.	Developments affected by this requirement	Potential for adoption of scheme to require use of low emission NRMM but not yet explored further.	National scheme not currently available.
52	Defra Air Quality Grant bid to support behaviour change measures	Public Information	Via other mechanisms	2021	2027	Lancaster City Council, EarthSense	Defra	YES	Funded	£100k - £500k	Implementation	Focus on a reduction in particulate matter from domestic burning through behaviour change, particularly in burning 'hotspots'.	Reduction in measured PM over winter months in burning 'hotspots'. Engagement with the public portal from local residents.	Twelve Zephyr sensors installed early 2023. Public perceptions survey carried out end of 2023. Public portal due to be released July 2024.	Staff resourcing issues, SuperSkips industrial fire required use of sensors, pre-election rules preventing release of public portal.
53	School Air Quality Project	Public Information	Via other mechanisms	2021		Lancaster City Council	Defra and Lancaster City Council	YES	Partially Funded	< £10k	Implementation	Education of children around all key aspects of air pollution and measures individuals and communities can take to limit emissions and exposure	Number of schools that engage with the project	The 'Air That We Breathe' project was developed in conjunction with local schools and mapped onto the KS2 Geography curriculum and 'Morecambe Bay Curriculum'. A kit box has been produced containing key knowledge for teachers, activity plans, and air quality measuring equipment. So far, seven schools have taken part - an initial 6 schools for the pilot and a further one school as part of British Science week 2024	Staff resourcing issues limiting the ability to advertise the project and put resource into delivery.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
54	Clean Air Night partnership	Public Information	Via other mechanisms	2022		Global Action Plan, Lancaster City Council, Hertfordshire County Council, and other local authorities	Global Action Plan, Lancaster City Council, Hertfordshire County Council, and other local authorities	NO	Partially Funded	£10k - 50k	Implementation	Focus on a reduction in particulate matter from domestic burning through education, improved awareness, and behaviour change.		Partnership bid (Sep 2022) with Hertfordshire County Council and Global Action Plan to take forward 'Clean Air Night' - proposal aimed at raising public awareness of impacts of domestic burning. The grant bid was unsuccessful but Hertfordshire have funded the campaign, with Lancaster and other LAs contributing as 'funding founders'. Lancaster City Council presented at the first 'Clean Air Night Summit' in Jan 2024, with the communications team sharing educational messages to encourage better burning practices.	
55	Information to farmers	Public Information	Via other mechanisms	2021	2023	Lancaster City Council					Completed	Reduced ammonia emissions (which lead to particulate matter formation in the atmosphere).		In 2021 a letter was sent to all farms within the district advising on best practice to minimise air quality impacts and odour associated with manure/slurry spreading and use of fertilisers. A further letter was sent in 2023 providing similar advice and details of organisations who offer assistance and national grant schemes available to help farmers reduce emissions.	
56	New schools associated with new housing development	Policy Guidance and Development Control	Other policy							£1 million - £10 million	Planning	School provision will reduce the need for additional trips for school travel.	Schools provided with major developments	The Local Plan contains the requirement for a series of new schools to meet future demand generated by new housing growth. Schools would be delivered in part through new development but also through funding via the Education Authority.	As yet, none of the strategic sites identified have sufficiently advanced to see the delivery of new school provision.
57	Lune Valley Cycle Path (Greenway) Improvements and Extension	Transport Planning and Infrastructure	Cycle network	2023		Sustrans, Lancashire County Council, Lancaster City Council	Department for Transport	NO	Partially Funded		Planning	Reduced traffic emissions through promoting active travel.	Greenway extended.	Upgrades to existing section of Greenway between Caton and Bull Beck Picnic Site. Family Fun Day hosted Feb 2024 to showcase improvements at Bull Beck. Exploring feasibility and funding options to extend the Lune Valley Greenway to Hornby, Wray, Wennington, and Kirkby Lonsdale.	More information and updates: <a href="https://storymaps.arcgis.com/stories/b17198f215ac4fb9efc15d8a61a5429">https://storymaps.arcgis.com/stories/b17198f215ac4fb9efc15d8a61a5429</a>
58	Bus Service Improvement Plan	Transport Planning and Infrastructure	Bus route improvements	2021		Lancashire County Council	Department for Transport	NO	Funded	> £10 million	Implementation	Reduced traffic emissions by promoting bus travel over private car use.		Reduced fare offers, enhanced bus services, bus priority schemes.	More info: <a href="https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/bus-service-improvement-plan/">https://www.lancashire.gov.uk/council/strategies-policies-plans/roads-parking-and-travel/bus-service-improvement-plan/</a>
59	Sandylands Project - Safer, greener, and healthier streets scheme	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including	2021		Lancashire County Council	Active Travel Fund	NO	Funded		Planning	General reduction in traffic related emissions due to measures aimed at reducing volume and speed of traffic		Autumn 2022 - traffic surveys. Early 2024 - public engagement with residents and production of co-discovery report. June 2024 - co-design workshop for local people and engagement survey currently open. Summer 2024 - scheme implementation.	More information: <a href="https://www.lancashire.gov.uk/roads-parking-and-travel/active-travel/sandylands/">https://www.lancashire.gov.uk/roads-parking-and-travel/active-travel/sandylands/</a>

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
			Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane									and rat running. Improved crossings, enhanced street environment, and cycle parking.			
60	MSc Research Project with Lancaster University Environment Centre – Using Zephyr data	Other	Other	2023	2024	Lancaster City Council, Lancaster University, EarthSense	N/A	NO			Completed		Research project exploring spatial-temporal patterns in air quality across Lancaster	Dissertation completed and received from Lancaster University. Report shows NO2 trends are traffic related whilst PM2.5 trends are most likely associated with domestic burning.	

## 2.3 PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy<sup>7</sup>, local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter (PM<sub>2.5</sub>). There is clear evidence that PM<sub>2.5</sub> (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Lancaster City Council is taking the following measures to address PM<sub>2.5</sub>:

Lancaster City Council monitors PM<sub>2.5</sub> pollution at one automatic station (Cable Street, Lancaster) which is a roadside location in close proximity to the city centre bus station. The site has measured an annual mean of 7 µg/m<sup>3</sup> in 2023, and 8 µg/m<sup>3</sup> in 2022 and 2021. Given the position of the site, it is likely indicative that the district in general is in compliance with the national 10 µg/m<sup>3</sup> target standard.

As part of the Defra Air Quality Grant funded project to improve public awareness around air pollution and to explore the local air quality impacts of solid fuel burning, 12 Zephyr sensors were installed on lampposts across the main residential areas of the district. The sensors monitor PM<sub>2.5</sub> in addition to PM<sub>10</sub>, PM<sub>1</sub>, ozone, and nitrogen dioxide and nitric oxide.

The annual averages for six pollutants are reported below for four locations: Redvers St Lancaster, Rydal Rd Lancaster, Leycester Dr Lancaster, and the cycle path near to Halton Bridge, Halton. The Halton Bridge Zephyr is at a location away from traffic and near to a rural residential area, whilst the other three locations are within residential areas away from roads with high levels of traffic. The sites were selected to demonstrate the air quality in residential areas, and better understand the impact of domestic burning in the residential microenvironment.

---

<sup>7</sup> Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

**Table 2.3 – Annual average concentrations in  $\mu\text{g}/\text{m}^3$  for four pollutants measured by Zephyrs at lamp-post locations.**

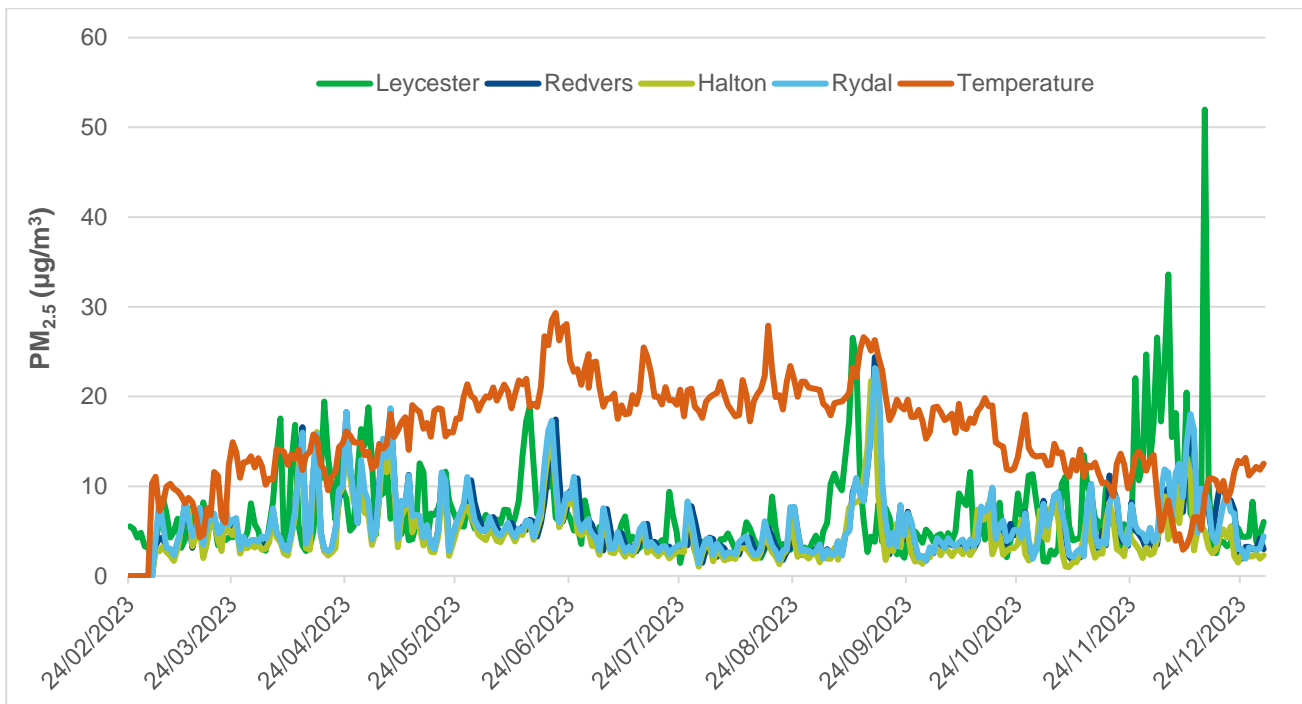
Location	NO <sub>2</sub>	NO	O <sub>3</sub>	PM <sub>1</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>
Redvers St	5.3	5.3	24.5	3.8	5.7	8.5
Rydal Rd	6.0	5.2	24.2	4.5	5.9	9.1
Leycester Dr	7.4	3.2	18.3	4.3	7.0	10.9
Halton Bridge	4.8	5.5	19.0	2.7	4.7	7.4

The annual averages indicate low levels of traffic related pollution at the Zephyr locations which is to be expected due to their residential locations. All annual averages for pollutants measured are below current UK Air Quality Objectives. For comparison, the annual average roadside concentration for pollutants at the Cable St monitoring station were as follows: PM<sub>2.5</sub> - 7  $\mu\text{g}/\text{m}^3$ , PM<sub>10</sub> – 14  $\mu\text{g}/\text{m}^3$ , and NO<sub>2</sub> – 26.6  $\mu\text{g}/\text{m}^3$ . Whilst the nitrogen dioxide concentrations in the residential locations were much lower than that of the roadside automatic station, particulate matter concentrations were in line with that of the roadside location, particularly PM<sub>2.5</sub> at Leycester Drive which matched that of the roadside station.

No exceedances in daily objectives were measured NO<sub>2</sub> at any Zephyr location, however two exceedances (83.4 and 51.7  $\mu\text{g}/\text{m}^3$ ) were observed at the Leycester Drive sensor for the PM<sub>10</sub> daily average objective of 50  $\mu\text{g}/\text{m}^3$ . Such exceedance is likely due to domestic burning.

The graph below demonstrates the daily average PM<sub>2.5</sub> concentration for the four Zephyr sensors at residential locations. Daily average temperature has been plotted to demonstrate trends associated with weather fluctuations.

In general, average daily particulate matter concentrations are lower in the summer months and higher during winter. However, peaks in PM<sub>2.5</sub> in summer which are correlated with temperature peaks which may be related to outdoor burning such as bonfires and barbeques. There are some observable peaks in winter following periods of cold weather which may be attributed to domestic solid fuel burning.



**Figure 2.3.** Daily average PM<sub>2.5</sub> µg/m<sup>3</sup> for at four Zephyr lamp-post locations between 24<sup>th</sup> February to 31<sup>st</sup> December 2023.

The air quality data collected by the twelve Zephyrs is publicly available on an easy to use web-app developed by EarthSense, available here:

<https://portal.earthsense.co.uk/LancasterCCPublic/>

### Tackling Smoke Pollution

During the period of 1<sup>st</sup> January 2023 to 31<sup>st</sup> December 2023, 45 service requests (complaints) relating to smoke pollution were received, and 39 warning letters, including six to commercial premises, were sent to alleged perpetrators. The incidence of actual environmental crime and potential nuisance relating to burning may be much higher than that reported by the public due to barriers to reporting such as ease of reporting, time to report, and apprehension about relationships between neighbours following reporting.

In 2014, a fact-sheet summarising the law around waste burning was produced by Lancaster City Council and is provided along with initial contact letters to those alleged to be burning waste. A preview of which can be found below.



# Burning of waste factsheet

LANCASTER CITY COUNCIL  
Promoting City, Coast and Countryside  
www.lancaster.gov.uk

The burning of waste is not an acceptable or safe way of disposal. As well as being a health hazard and harmful to the environment, it is a nuisance which may result in criminal prosecution and substantial fines.

This leaflet outlines the legal responsibilities for the correct disposal of waste.

- **The Environmental Protection Act 1990 (Section 33(1)(c))**

There is a general requirement that waste should not be kept, treated or disposed of in a manner likely to cause pollution to the environment or harm to human health. Disposing of waste by burning (including burning waste on construction or demolition sites) will pollute the environment and may cause harm to human health.

The maximum penalties for this offence on summary conviction are a £50,000 fine and/or twelve months' imprisonment. On conviction in a Crown Court the maximum penalties are an unlimited fine and/or five years' imprisonment.

- **The Environmental Protection Act 1990 (Section 79)**

The council has a duty to investigate complaints of smoke nuisance, which can result in a Statutory Nuisance Abatement Notice being served. Breach of such a notice on industrial, trade or business premises can result in fine of up to £20,000 (for domestic cases up to £5,000).

- **The Clean Air Act 1993 (Section 2)**

It is an offence to allow dark smoke to be emitted from any industrial or trade premises, with a fine of up to £20,000. Businesses are responsible to ensure this does not happen on their premises or from material arising from their business.

- **(Highways (Amendment) Act 1986)**

The police may prosecute for allowing smoke from a fire to drift across roads and endangering traffic.

- **Pollution Prevention and Control Act 1999/Environmental Permitting (England and Wales) Regulations 2010 (as amended).**

It is possible to burn certain types of material if it is properly controlled so that it does not cause a problem. These activities are controlled and regulated through permits and exemptions issued by the Environment Agency and the city council. If such material is burnt without a required permit or exemption then on conviction in the Crown Court the potential fine is unlimited and/or up to five years imprisonment.

Please contact the Environment Agency on 08708 506506 (general enquiries) / 0800 807060 (24 hour hotline number for reporting incidents) or Lancaster City Council on 01524 582935 for more information.



[www.lancaster.gov.uk/airquality](http://www.lancaster.gov.uk/airquality)

**Above:** Waste burning fact sheet developed in 2014.

More recently, the Environmental Protection team worked with the Communications team to produce a leaflet aimed at educating the public around the law and guidance in relation to waste burning, in addition to domestic burning for heat. A preview of which can be found below. In addition, public messaging around the environmental and health-harms related to domestic burning has been developed, of which some examples can be found below.

A survey aimed at exploring public perceptions around the environment, sustainable travel, and air pollution, with a particular focus on domestic burning, was conducted in

winter 2023. The results are yet to be analysed in full but will inform local bespoke public messaging.

**AIR POLLUTION FROM DOMESTIC BURNING**

EVERYTHING YOU NEED TO KNOW

### Effects of Burning: Health And The Environment

Stove and fire smoke contains tiny particulate matter called PM<sub>2.5</sub>, which has been identified by the World Health Organisation as the most harmful air pollutant to human health.

Burning solid fuel such as wood leads to poor air quality indoors and contributes to outdoor pollution. This fine particulate matter travels deep into our lungs and increases the risk of respiratory infections, asthma, heart disease and lung cancer.

People already suffering with lung and heart problems are more likely to be affected, as are older people, pregnant women, unborn babies and very young children.

#### The main culprits

Source	Percentage
Domestic burning	27%
Use of solvents and industrial processes	26%
Industrial combustion	13%
Road transport	13%



## Smoke control legislation what are the rules?

Lancaster City Council has **Smoke Control Areas** where smoke should not be emitted from a domestic chimney.

Under the Clean Air Act 1993, breaking these rules can result in a fine of up to £300.

Smoke from domestic chimneys may also cause a statutory nuisance under the Environmental Protection Act 1990. If a nuisance is confirmed, an abatement notice will be served - a breach can result in a potentially unlimited fine.

### Air quality regulations restrict fuel sold for domestic use:

Firewood in units less than 2m<sup>3</sup> and most manufactured solid fuels must be sold with the Ready to Burn scheme certification details

Firewood in units greater than 2m<sup>3</sup> must be sold with advice on drying, and with an explanation of the issues on burning wet wood

Coal merchants must stop selling loose or unsealed bags of bituminous coal to households by 30 April 2023. Breaking these regulations can result in a £300 fixed penalty notice or a more substantial court fine. From 2022 only Ecodesign stoves can be legally sold in the UK

## Costs and safety. Are you getting value for money?

The installation and running costs of a solidfuel burner may be more than you think:



The size of a room and current energysaving measures must be considered when choosing a suitable appliance; for example, a large room is likely to need a bigger stove



Installation work includes lining the chimney, installing a concrete lintel and laying a hearth



Poorly installed or maintained stoves can lead to carbon monoxide poisoning; a certified installer must carry out the work, or a competent person has to apply to Building Control and a fee will be charged



Solid fuel is typically more expensive and less efficient than mains gas. If your appliance is secondary heating and your home is already warm enough, just burn less to reduce your costs and impact on local air pollution and climate change.

If you still want the look and feel of a wood burning stove there are plenty of realistic alternative stoves available



Chimneys and flues need to be swept by a professional – either Guild of Master Sweeps or NACS member – at least once a year or the consequence could be a chimney fire



## Need to burn?

If you're going to burn, follow these good practice rules:

### DO

- Be aware of local Smoke Control Areas
- Always read appliance instructions
- Only burn seasoned wood (including Ready to Burn) or manufacturer recommended fuels
- Sweep chimneys regularly and maintain stoves
- Install a Carbon Monoxide (CO) monitor to alert you to dangerous fumes

### DON'T

- Burn waste or treated wood – it's toxic to you and the environment
- Allow the top of the chimney to smoke continuously; if you see smoke – adjust the air controls
- Ignore the signs of poor burning, such as:  
Blackened glass – indicates incomplete combustion  
Constant smoke from the chimney when not lighting or refuelling  
Unburned wood or charcoal left after the fire goes out

More information on better burning practices see the [Burn Better Guide](#).



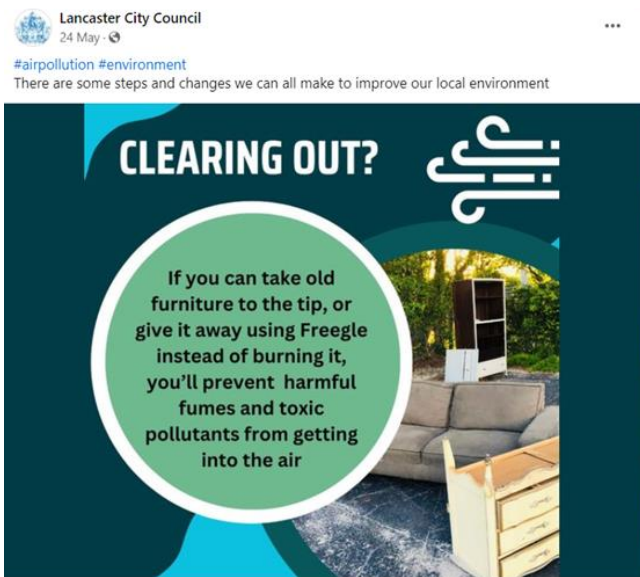
## Garden and allotment bonfires

Bonfires also contribute to air pollution and can be a nuisance to neighbours.

You should:

- Avoid having a bonfire to burn any waste, even from a garden or allotment
- Never burn items like painted wood, plastics and rubber
- Compost household or garden waste or put it the appropriate bin
- Don't burn bulky items, take them to Salt Ayre recycling centre or contact Bulky Matters. Find out more about how to [dispose of bulky items](#).

**Above:** Domestic burning advice leaflet produced by Lancaster City Council late 2023.



**Above:** Example public messaging aimed at increasing public awareness of air pollution.

**Lancashire County Council Public Health Summary for Air Quality**

Detail around how Lancashire County Council (Lancs CC) are addressing air pollution can be found here:

[Air quality - Lancashire County Council](#)

Working with district councils, Lancashire County Council has an important role to play in taking action to reduce the health impacts of air pollution. Responsible for transport planning, network management, highway maintenance, public health and procuring local

vehicle fleets, there are a number of ways Lancs CC can support local and county wide efforts to improve air quality. In summary, the following activities are underway or in development:

Lancashire's cycling and walking strategy, [Actively Moving Forward](#), sets out an ambitious plan for increasing the number of people walking and cycling in the county by 2028. By improving and increasing access to cycling and walking infrastructure, alongside training and promotional activities, it aims to significantly increase the amount of cycling and walking people do across the county. Information on the County Council's ongoing activities in this area can be found on the [Active Travel in Lancashire website](#).

As part of Lancashire's cycling and walking strategy, there are seven supplementary documents: [Local Cycling and Walking Infrastructure Plans \(LCWIPs\)](#). These are:

- Lancaster
- Central Lancashire
- West Lancashire
- Fylde Coast
- Ribble Valley
- Burnley and Pendle
- Rossendale and Hyndburn

As part of the LCWIP process, extensive public and stakeholder engagement was carried out. The LCWIPs were signed off by LCC cabinet in May 2024. They include a network plan for cycling and walking infrastructure and an aspirational list of schemes for delivery over short, medium, and long-term timeframes. They will be used to support future infrastructure decisions and to access new funding schemes as they become available.

The Road Safety Team (Education and Engagement) work with schools, workplaces and the community to reduce collisions and casualties on the road network. Initiatives for schools are promoted through the [Road Safety Education website](#) and includes a series of cycling and walking safety training programmes and guidance and resources for teachers to promote road safety which assists with safe and active travel.

Bus services across Lancashire operate in a deregulated market, meaning the County Council doesn't control the bus network, franchise routes or control fares. Buses in Lancashire are the most popular and well used form of public transport in the county so it's

vital we ensure everyone can maintain connections with their friends and family, reach essential services, and access opportunities for education and employment.

As part of our Bus Service Improvement Plan (BSIP), the county council will continue to work more closely with bus operators, alongside local communities, to create a network that people want and will use. The council has published a ten-year [Enhanced Partnership Plan and Scheme](#) alongside its [Bus Service Improvement Plan](#) which together will deliver measures to restore confidence and grow patronage across Lancashire.

Supporting the transition to electric vehicles

Lancashire County Council has already installed [150 fast and rapid charge points](#) around Lancashire, either on Lancs CC car parks or kerbside on our highways. These can typically allow vehicles to charge in less than an hour and are operated on our behalf by BP Pulse. The types of charge-points installed will depend on the specific location, power supply and demand.

The [Lancashire and Blackburn with Darwen EV Infrastructure Strategy](#) was approved in July 2023 and sets out our plan to provide more EV charge points across the county. It considers the future demand for charging infrastructure and identifies broad locations for different types of charging need, whilst it is modelled data it helps us to understand the size and type of public infrastructure that will be required.

This strategy supports LCC's application to the government's Local Electric Vehicle Infrastructure (LEVI) capital fund. The aim of the funding is predominately to deliver local, low power, on-street charging infrastructure, primarily benefiting residents who do not have access to off-street parking at home. An indicative £10.1m has been allocated to Lancashire, subject to the submission and approval of a full business case and application in the 2024/25 funding round. This will help us to scale up the deployment of local charge points and deliver our strategy aims. We will be working closely with district councils and other partners to ensure there is county-wide provision which is suitable for the needs of the local area.

In addition to preparing an application to the LEVI capital fund, LCC is one of 16 councils to secure funding from the LEVI extended pilot fund. This is to trial solutions that will help people who do not have access to off-street parking, including testing charging points integrated into street lighting columns and pavement cable channels. The cable channels provide a low cost and practical solution to support residents without off street parking charge at home.

The county council's Parking Services Team fleet vehicles are now fully electric, with charging infrastructure installed at the offices and depots where the vehicles are based, and regularly visit. LCC's Fleet Services team is committed to switching to electric commercial vehicles, where possible, as set out in the LCC [Highways Decarbonisation Strategy](#).

### 3 Creating cleaner, healthier road networks

Work to develop the next Local Transport Plan (LTP4) for Lancashire, Blackpool and Blackburn with Darwen is underway. The Public Health team has submitted an evidence base to inform the process, highlighting transport-related health challenges affecting the population of Lancashire and making recommendations about how local transport planning policy can contribute to addressing these. The local [Highways and Transport Masterplans](#) will be refreshed to align with the priorities of LTP4. This will provide an opportunity to identify longer-term network solutions that address issues in AQMAs and have a positive impact on air quality generally.

LCC's [Highways and Transport Strategy](#) published in early 2023 provides a helpful explanation of the county council's transport priorities and actions in support of public health improvements.

#### Embedding air quality into policy

LCC works with district planners to ensure air quality is a key consideration of Local Plans, alongside wider public health issues. It supports district councils in developing policies that seek to ensure new developments do not contribute to increasing levels of air pollutants and that requirements for appropriate mitigation are in place.

LCC, as part of its highways input into planning applications, actively encourages measures that aim to promote sustainable forms of travel. Working under the direction of the National Planning Policy Framework, the county council seeks measures that facilitate cycling and walking, increase the use of public transport and provide access to electric vehicle charge points. LCC also seeks funding from developers, through Section 106 contributions, to support existing bus services or to provide new bus services suitable to serve development sites once they are built.

#### Raising awareness and increasing engagement

Lancashire Insight provides information on the sources and health impacts of air pollution across the county. Webpages include a [Summary of Emissions Data](#) and [Monitoring of Air Quality and Health Impacts](#).

## Air quality and Public Health Report

Collective report from the Lancashire and Cumbria Directors of Public Health highlighting air quality issues across the region.

- [Air quality and Public Health report](#) (pdf)

### 5. Raising awareness and increasing engagement

The Lancashire Insight website provides information on the sources and health impacts of air pollution across the county. Webpages include a Summary of Emissions Data and Monitoring of Air Quality and Health Impacts.



## 4 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2023 by Lancaster City Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

### 4.1 Summary of Monitoring Undertaken

#### 4.1.1 Automatic Monitoring Sites

Lancaster City Council undertook automatic (continuous) monitoring at one site during 2023. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. The [Air pollution measurement and monitoring - Lancaster City Council](#) page presents automatic monitoring results for Lancaster City Council with automatic monitoring results also available through the UK-Air website .

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

#### 4.1.2 Non-Automatic Monitoring Sites

Lancaster City Council undertook non- automatic (i.e. passive) monitoring of NO<sub>2</sub> at 51 sites during 2023. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

## 4.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

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

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

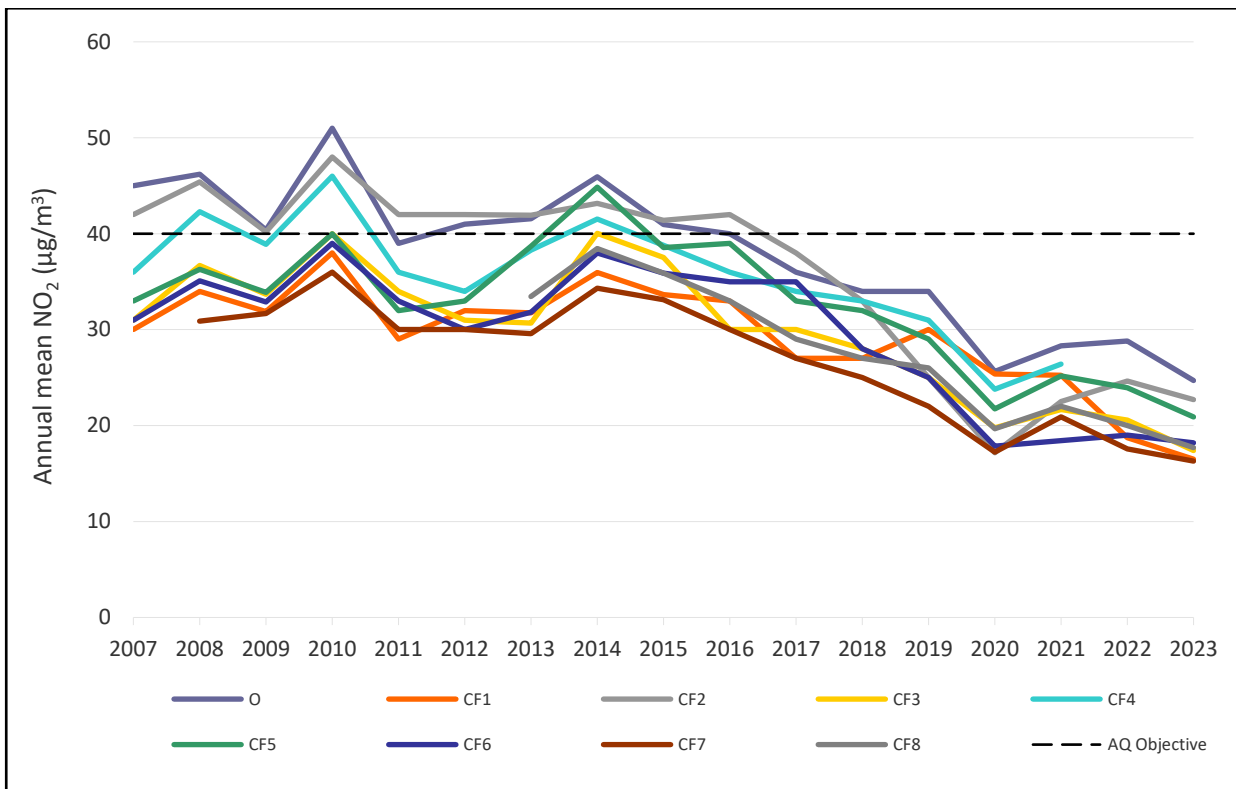
For diffusion tubes, the full 2023 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

For the first time, no exceedances of the annual mean objective were measured across the district, although two locations were within 10% of the objective. The highest concentrations were measured at Dalton Square, Lancaster (LC10) and Turnham Street, Lancaster (LC11) at 39.2 µg/m<sup>3</sup> and 36.8 µg/m<sup>3</sup> respectively.

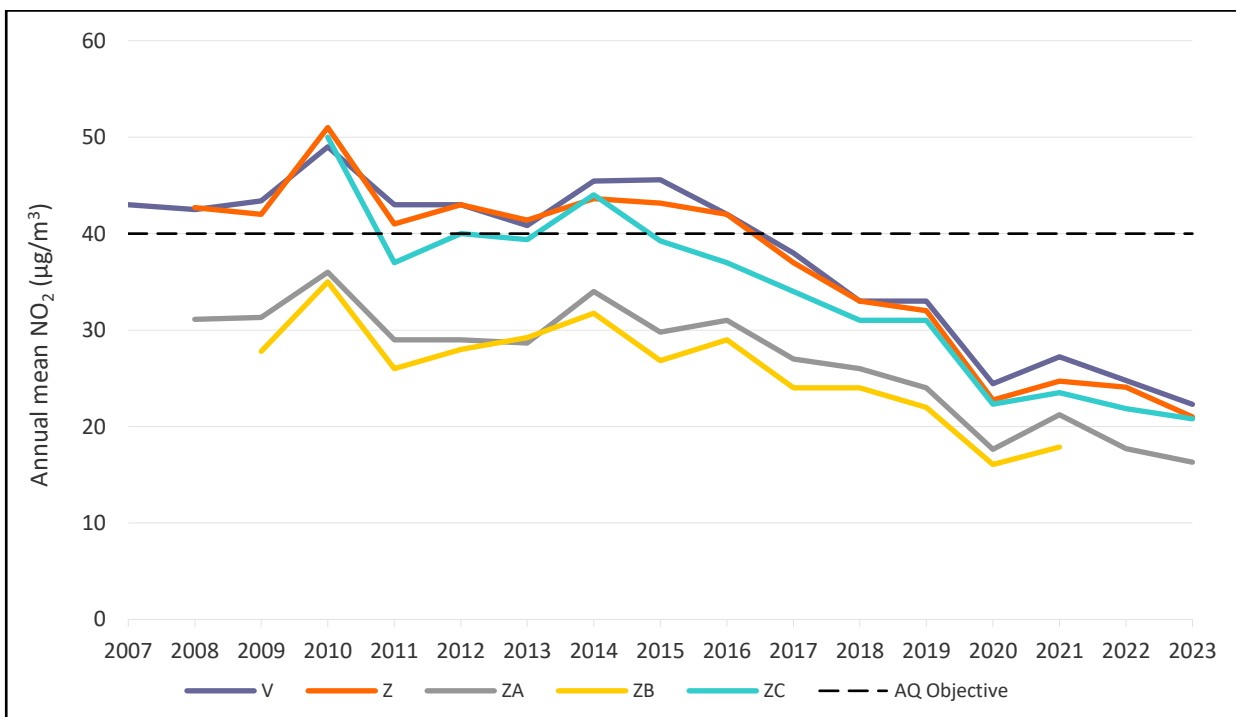
Improving nitrogen dioxide pollution levels across the district have led to the revocation of Carnforth and Galgate AQMAs where no exceedances in the national objectives have occurred since 2016. Defra technical guidance<sup>8</sup> stipulates that a local authority must look to revoke an AQMA where no exceedances have been observed for five consecutive years or more. The declining nitrogen dioxide levels for Carnforth and Galgate are demonstrated in Figures 4.2.1.a and 4.2.1.b, respectively, below. Simple linear regression was also used to demonstrate that future exceedances are very unlikely based on the current trend in declining nitrogen dioxide pollution levels.

---

<sup>8</sup> Defra LAQM Technical Guidance 2022. Accessible at: [UK Regions \(exc. London\) Technical Guidance | LAQM \(defra.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/103122/UK_Regions_(exc._London)_Technical_Guidance_LAQM.pdf).



**Figure 4.2.1.a.** Nitrogen dioxide (NO<sub>2</sub>) concentrations (µg/m<sup>3</sup>) at nine diffusion tube sites within Carnforth AQMA from 2007 to 2023.



**Figure 4.2.1.b.** Nitrogen dioxide (NO<sub>2</sub>) concentrations (µg/m<sup>3</sup>) at five diffusion tube sites within Galgate AQMA from 2007 to 2023.

It is also recommended that that local authorities consult widely before deciding to revoke an AQMA. Initially, Defra was consulted and based on measured air pollution data,

recommended Galgate and Carnforth AQMAs be revoked, as per Local Air Quality Management Technical Guidance. Chief officers within Lancaster City Council Planning, Environmental Health and Public realm were consulted, as were relevant officers at Lancashire County Council. Carnforth and Ellel Parish Councillors were consulted in November 2023, and a public consultation was run between February and March 2024. No objections were received and the Revocation Orders for Carnforth and Galgate AQMAs were signed 28<sup>th</sup> June 2024. The City of Lancaster AQMA will remain in place until measured NO<sub>2</sub> concentrations are at least 10% below the annual mean objective and evidence suggests further exceedances are unlikely.

From 2024, the number of diffusion tubes across the district will be reduced to 35 in order to save resources and avoid measuring in locations that the evidence suggests are very unlikely to exceed national objectives. Tube locations selected to be discontinued are in areas where NO<sub>2</sub> concentrations have been measured to be very low and/or very unlikely to exceed. The diffusion tubes continued will still span across key areas of the district including Lancaster AQMA, Morecambe, Heysham, Carnforth, and Galgate. The following diffusion tube monitoring sites will be discontinued from 2024: LC8, B1, B2, B3, Q, ZA, CF1, CF3, CF6, CF7, LC15, LC22, LC24, LC25, LC27, CF8, LC28, LC33, LC34. The justification for ceasing monitoring at these sites stems from the low measured nitrogen dioxide concentrations at these sites, combined with the fact that there are other monitoring sites within the area, whilst considering the cost of monitoring. In the case of LC15 and LC33, these locations were destroyed or became inaccessible and will be replaced with new nearby sites. B1-3 were triplicates paired with the Dalton Square automatic monitoring station which is no longer active. A review of the monitoring locations will be undertaken in November 2024 which may lead to further changes in monitoring locations.

Table A.5 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200 µg/m<sup>3</sup>, not to be exceeded more than 18 times per year. No exceedances were recorded for the hourly mean during 2023 or the previous four years. There were also no annual means greater than 60 µg/m<sup>3</sup> that might indicate daily exceedances.

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

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 40 µg/m<sup>3</sup>.

Table A.7 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50 µg/m<sup>3</sup>, not to be exceeded more than 35 times per year.

There is a decreasing trend for PM<sub>10</sub> monitored at the Cable Street automatic monitoring station. The annual mean of 14.4 µg/m<sup>3</sup> is compliant with the national objective. There were also no exceedances in the 24 hour mean objective compared to 2022 when there were four, indicating an overall decrease in the number of daily exceedances for PM<sub>10</sub> over recent years at the Cable St automatic monitoring station.

See Section 3.2 for information relating to the Zephyr sensor network where two exceedances were measured in a residential area by the low-cost sensors.

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

Table A.8 in Appendix A presents the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past five years.

PM<sub>2.5</sub> concentrations were measured at one automatic monitoring station (Cable Street) during 2023 where measurement commence in 2021. Annual mean concentrations declined by 1 µg/m<sup>3</sup> to 7 µg/m<sup>3</sup> during 2023.

Further information relating to particulate matter monitoring by the new low-cost Zephyr sensor network can be found in Section 3.2

## Appendix A: Monitoring Results

**Table A.1 – Details of Automatic Monitoring Sites**

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
AN1	Cable Street	Roadside	347684	461963	NO <sub>2</sub>	YES Lancaster	APNA-370 NO <sub>x</sub> analyser	0.4	4	2
APM1	Cable Street	Roadside	347684	461963	PM <sub>10</sub> and PM <sub>2.5</sub>	YES Lancaster	FIDAS	0.4	4	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**

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LC1	Great John Street, Lancaster AQMA	Roadside	347852	461682	NO <sub>2</sub>	City of Lancaster	2.5	2.5	No	3.5
LC4	Brunton Road, Lancaster	Urban Background	347904	460508	NO <sub>2</sub>	No	0.2	1.5	No	3.5
LC5	Owen Road, Lancaster AQMA(Resid)	Roadside	347846	462448	NO <sub>2</sub>	City of Lancaster	0.2	2.5	No	3.0
LC8	Rosemary Lane, Lancaster AQMA (Resid)	Roadside	347796	461853	NO <sub>2</sub>	City of Lancaster	0.2	1.7	No	3.5
LC9	Brock Street 1, Lancaster AQMA (Resid)	Roadside	347808	461564	NO <sub>2</sub>	City of Lancaster	0.2	2.7	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LC10	Dalton Square, Lancaster AQMA(Resid)	Roadside	347834	461596	NO <sub>2</sub>	City of Lancaster	0.2	3.3	No	3.0
LC11	Thurnham Street, Lancaster AQMA(Resid)	Roadside	347821	461404	NO <sub>2</sub>	City of Lancaster	0.2	3.1	No	3.0
LC13	King Street 1, Lancaster AQMA(Resid)	Roadside	347580	461593	NO <sub>2</sub>	City of Lancaster	0.2	2.4	No	3.0
LC14	King Street 2 Lancaster AQMA (Resid)	Roadside	347685	461389	NO <sub>2</sub>	City of Lancaster	0.2	2.2	No	3.0



Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
A	High School, Morecambe Road, Lancaster AQMA	Kerbside	347582	462451	NO <sub>2</sub>	City of Lancaster	N/A	0.3	No	3.0
B1,B2, B3	Dalton Square, Lancaster AQMA (Co-Located)	Roadside	347852	461611	NO <sub>2</sub>	City of Lancaster	N/A	3.3	No	2.0
C1,D1,E1	Cable Street, Lancaster AQMA(Co-Located)	Roadside	347685	461963	NO <sub>2</sub>	City of Lancaster	2.0	3.7	Yes	2.0
H	South Road 1, Lancaster (Resid)	Roadside	347859	461126	NO <sub>2</sub>	No	0.2	9.0	No	3.0
I	Parliament Street, Lancaster AQMA(Resid)	Roadside	347909	462015	NO <sub>2</sub>	City of Lancaster	0.2	3.5	No	3.0
J	North Road, Lancaster AQMA(Resid)	Roadside	347852	461909	NO <sub>2</sub>	City of Lancaster	0.2	1.9	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
K	Stonewell, Lancaster AQMA(Resid)	Roadside	347850	461791	NO <sub>2</sub>	City of Lancaster	0.2	4.4	No	3.0
L	King Street, Lancaster AQMA(Resid)	Roadside	347613	461523	NO <sub>2</sub>	City of Lancaster	0.2	1.5	No	2.5
CFO	Market Street, Carnforth AQMA (Resid)	Roadside	349909	470624	NO <sub>2</sub>	Carnforth	0.2	1.4	No	3.0
Q	King Street 3, Lancaster AQMA(Resid)	Roadside	347664	461449	NO <sub>2</sub>	City of Lancaster	0.2	2.0	No	3.0
V	Main Road, Galgate AQMA (Resid)	Roadside	348359	455352	NO <sub>2</sub>	Galgate	0.2	1.6	No	3.0
Z	Main Road, Galgate AQMA(Resid)	Roadside	348345	455272	NO <sub>2</sub>	Galgate	0.2	2.3	No	2.5
ZA	Salford Road, Galgate AQMA (Resid)	Roadside	348351	455381	NO <sub>2</sub>	Galgate	0.2	1.0	No	3.5
ZC	Main Road, Galgate AQMA(Resid)	Roadside	348375	455393	NO <sub>2</sub>	Galgate	0.4	2.3	No	3.0
CF1	Lancaster Road, Carnforth AQMA (Resid)	Roadside	349870	470524	NO <sub>2</sub>	Carnforth	0.2	5.9	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
CF2	Lancaster Road/Market Street, Carnforth AQMA (Resid)	Roadside	349934	470605	NO <sub>2</sub>	Carnforth	0.2	2.3	No	3.5
CF3	Market Street, Carnforth AQMA(Resid)	Roadside	349853	470615	NO <sub>2</sub>	Carnforth	0.2	2.0	No	3.5
CF5	Scotland Road, Carnforth AQMA(Resid)	Roadside	349962	470618	NO <sub>2</sub>	Carnforth	0.2	1.8	No	3.0
CF6	Scotland Road, Carnforth AQMA(Resid)	Roadside	350000	470667	NO <sub>2</sub>	Carnforth	0.2	2.6	No	3.5
CF7	Fernbank, Carnforth (Resid)	Roadside	349613	470223	NO <sub>2</sub>	No	0.2	5.9	No	2.5
T1	Lancaster Road Torrisholme (Resid)	Roadside	345631	463694	NO <sub>2</sub>	No	0.2	2.4	No	3.5
LC19	China Street 1 Lancaster AQMA( Bombay Balti Lamp Post)	Roadside	347502	461841	NO <sub>2</sub>	City of Lancaster	0.4	1.5	No	3.0
LC20	China Street 2 Lancaster AQMA(Public House Lamppost )	Roadside	347515	461835	NO <sub>2</sub>	City of Lancaster	0.2	1.5	No	3.0
LC22	South Road 2, Lancaster (No. 69 Resid)	Roadside	347928	461025	NO <sub>2</sub>	No	0.2	7.2	No	3.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LC23	Greaves Road 1 Lancaster (1 Alma Road - Resid)	Roadside	347948	460893	NO <sub>2</sub>	No	0.2	5.0	No	3.0
LC24	Greaves Road 2 Lancaster (No.138 Resid)	Roadside	347974	460514	NO <sub>2</sub>	No	0.2	2.8	No	3.0
LC25	Scotforth Road1, Scotforth (No.65 Resid.)	Roadside	348084	459844	NO <sub>2</sub>	No	0.2	5.2	No	3.0
LC26	Scotforth Road 2, Scotforth (No.100 Resid.)	Roadside	347990	459418	NO <sub>2</sub>	No	0.2	5.5	No	3.0
LC27	Scotforth Road 3, Scotforth (No.110 Resid.)	Roadside	347989	459396	NO <sub>2</sub>	No	0.2	6.5	No	3.0
BLS1	Main Road, Bolton Le Sands (11A Resid)	Roadside	348594	468500	NO <sub>2</sub>	No	0.2	4.0	No	3.0
H1	Heysham Road, Heysham (109 Resid - downspout)	Roadside	341964	463273	NO <sub>2</sub>	No	0.2	2.5	No	2.5
CF8	Lancaster Road Resid (No.101/103 downspout)	Roadside	349568	470044	NO <sub>2</sub>	No	0.2	2.4	No	3.0
LC28	Newton Terrace, Caton Road Lancaster (No 7)	Roadside	348517	463243	NO <sub>2</sub>	No	0.2	6.0	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
LC31	3 St Leonards Gate Lancaster	Roadside	348114	462071	NO <sub>2</sub>	No	0.4	3.0	No	3.0
LC32	The Pub, China Street, Lancaster	Roadside	347511	461744	NO <sub>2</sub>	City of Lancaster	0.2	2.0	No	3.5
MC4	Shrimp Roundabout Morecambe	Kerbside	345240	463663	NO <sub>2</sub>	No	20	1.0	No	3.0
LC34	Derwent Road Lancaster	Roadside	348623	461870	NO <sub>2</sub>	No	0	5.0	No	2.2

**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.3 – Annual Mean NO<sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
AN1	347684	461963	Roadside	N/A	99.9	34	28	32	27	26.6

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

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

Where exceedances of the NO<sub>2</sub> annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023.

#### Notes:

The annual mean concentrations are presented as µg/m<sup>3</sup>.

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

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(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 – Annual Mean NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
LC1	347852	461682	Roadside		100.0	<b>43</b>	34	38	36	31
LC4	347904	460508	Urban Background		100.0	13	10	12	10	9
LC5	347846	462448	Roadside		100.0	29	23	29	24	23
LC8	347796	461853	Roadside		100.0	29	20	24	22	21
LC9	347808	461564	Roadside		100.0	30	22	24	23	20
LC10	347834	461596	Roadside		100.0	<b>53</b>	<b>42</b>	<b>48</b>	<b>47</b>	39
LC11	347821	461404	Roadside		100.0	<b>48</b>	37	<b>43</b>	<b>41</b>	37
LC13	347580	461593	Roadside		100.0	32	26	27	27	25
LC14	347685	461389	Roadside		100.0	27	25	29	25	21
A	347582	462451	Kerbside		91.7	23	19	22	19	19
B1,B2, B3	347852	461611	Roadside		91.7	27	21	23	23	19
C1,D1,E1	347685	461963	Roadside		91.7	36	27	32	28	27
H	347859	461126	Roadside		100.0	26	21	25	23	21
I	347909	462015	Roadside		100.0	32	23	27	25	24
J	347852	461909	Roadside		100.0	<b>40</b>	28	35	33	29
K	347850	461791	Roadside		100.0	34	27	31	29	27
L	347613	461523	Roadside		100.0	34	22	29	27	25
CFO	349909	470624	Roadside		100.0	34	26	28	29	25
Q	347664	461449	Roadside		100.0	26	21	23	24	20
V	348359	455352	Roadside		100.0	33	24	27	25	22
Z	348345	455272	Roadside		91.7	32	23	25	24	21
ZA	348351	455381	Roadside		100.0	24	18	21	18	16
ZC	348375	455393	Roadside		100.0	31	22	24	22	21
CF1	349870	470524	Roadside		100.0	30	25	25	19	17
CF2	349934	470605	Roadside		100.0	25	17	22	25	23

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
CF3	349853	470615	Roadside		100.0	25	20	22	21	17
CF5	349962	470618	Roadside		91.7	29	22	25	24	21
CF6	350000	470667	Roadside		100.0	25	18		19	18
CF7	349613	470223	Roadside		100.0	22	17	21	18	16
T1	345631	463694	Roadside		100.0	24	21	21	20	18
LC19	347502	461841	Roadside		100.0	<b>45</b>	<b>40</b>	<b>42</b>	39	33
LC20	347515	461835	Roadside		100.0	38	29	33	31	27
LC22	347928	461025	Roadside		100.0	22	17	21	19	16
LC23	347948	460893	Roadside		75.0	26	20	23	19	18
LC24	347974	460514	Roadside		100.0	24	18	20	18	16
LC25	348084	459844	Roadside		91.7	19	14	16	15	13
LC26	347990	459418	Roadside		100.0	27	20	23	21	18
LC27	347989	459396	Roadside		100.0	25	18	21	18	17
BLS1	348594	468500	Roadside		91.7	24	18	20	17	16
H1	341964	463273	Roadside		100.0	20	15	17	15	15
CF8	349568	470044	Roadside		100.0	26	20	22	20	18
LC28	348517	463243	Roadside		91.7	26	19	23	20	18
LC31	348114	462071	Roadside		91.7	31	22	27	22	20
LC32	347511	461744	Roadside		100.0	37	N/A	N/A	N/A	30
MC4	345240	463663	Kerbside		100.0	26	22	25	21	21
LC34	348623	461870	Roadside		100.0	19	10	11	9	9

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

☒ Diffusion tube data has been bias adjusted.

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



**Notes:**

The annual mean concentrations are presented as  $\mu\text{g}/\text{m}^3$ .

Exceedances of the  $\text{NO}_2$  annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

$\text{NO}_2$  annual means exceeding  $60\mu\text{g}/\text{m}^3$ , indicating a potential exceedance of the  $\text{NO}_2$  1-hour mean objective are shown in **bold and underlined**.

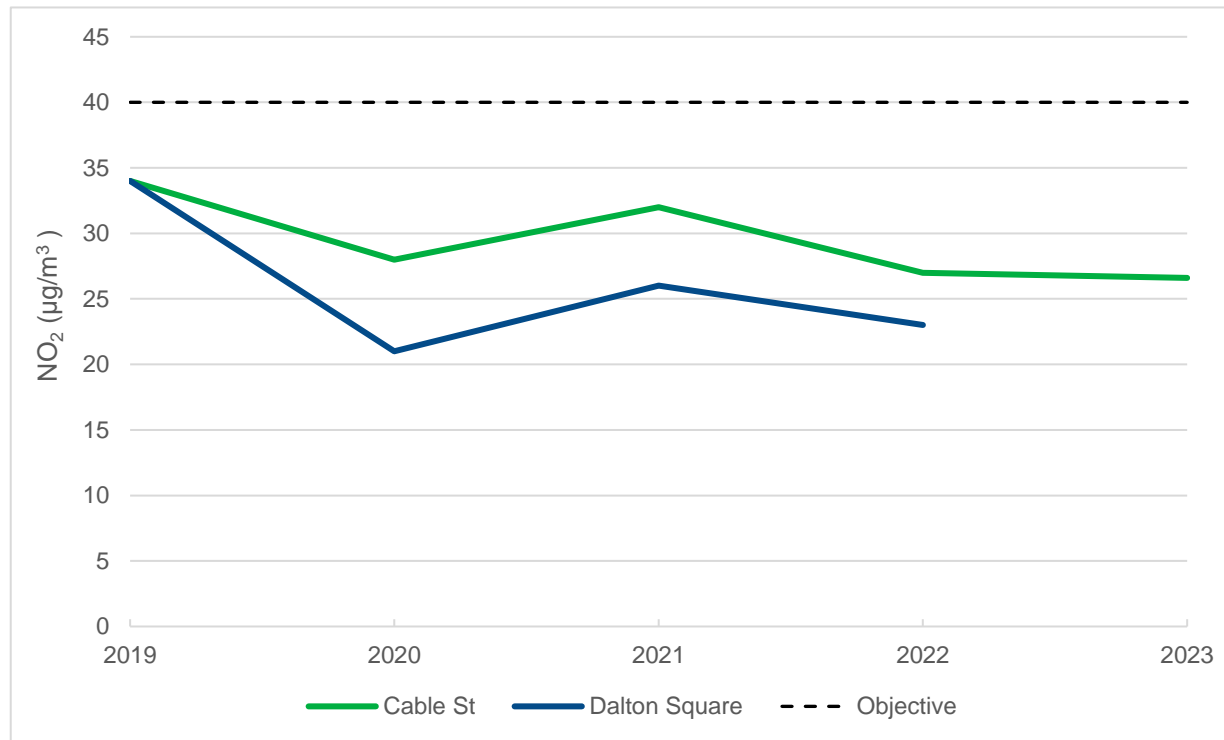
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

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

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

**Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations**



**Figure A.1.** Annual mean nitrogen dioxide concentrations at Cable Street and Dalton Square (no longer active) automatic monitoring stations 2019-2023.

**Table A.5 – 1-Hour Mean NO<sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m<sup>3</sup>**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
AN1	347684	461963	Roadside	N/A	99.9	0	0	0	0	0

**Notes:**

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m<sup>3</sup> have been recorded.

Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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.6 – Annual Mean PM<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
APM1	347684	461963	Roadside	N/A	92.2	17	17	17	15	14.4

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

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

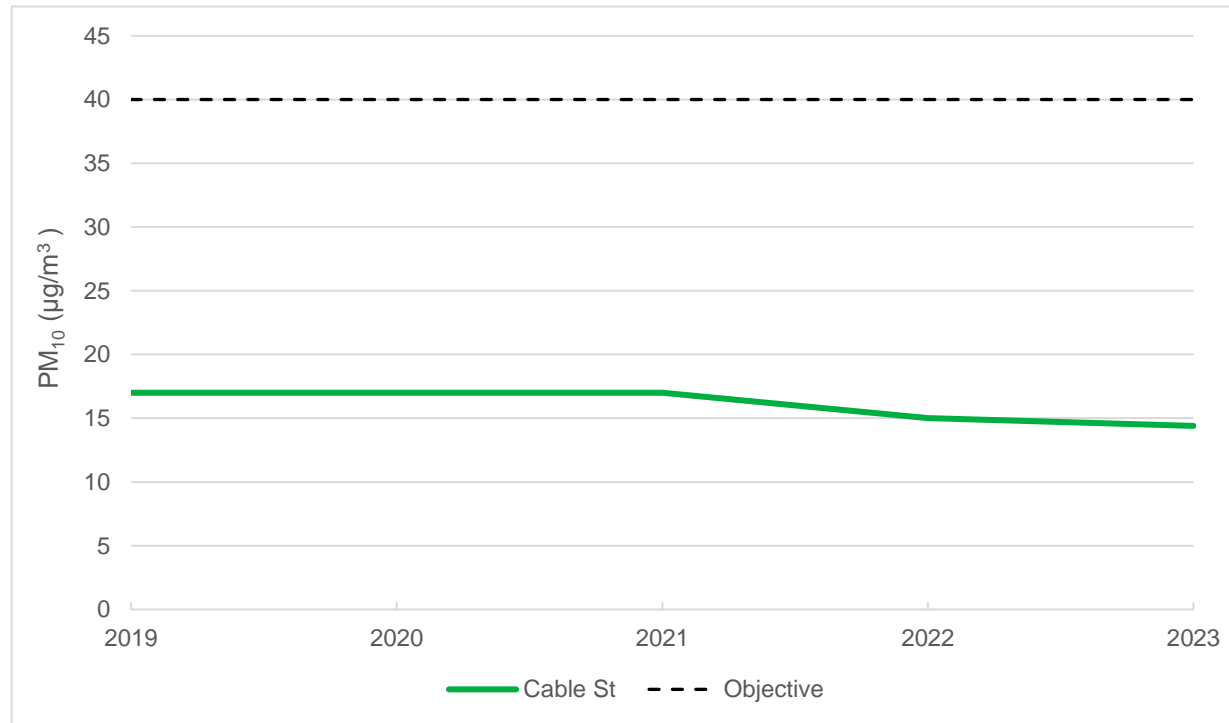
Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

**Figure A.2 – Trends in Annual Mean PM<sub>10</sub> Concentrations**



**Figure A.2.** Annual mean PM<sub>10</sub> concentrations at Cable Street automatic monitoring station 2019-2023.

**Table A.7 – 24-Hour Mean PM<sub>10</sub> Monitoring Results, Number of PM<sub>10</sub> 24-Hour Means > 50µg/m<sup>3</sup>**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
APM1	347684	461963	Roadside	N/A	92.2	1	0	2	4	0

**Notes:**

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m<sup>3</sup> have been recorded.

Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th 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.8 – Annual Mean PM<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2023 (%) <sup>(2)</sup>	2019	2020	2021	2022	2023
APM1	347684	461963	Roadside	N/A	92.2	N/A	N/A	8	8	7

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

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

All means have been “annualised” as per LAQM.TG22 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%).

## Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO<sub>2</sub> 2023 Diffusion Tube Results (µg/m<sup>3</sup>)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LC1	347852	461682	<b>47.0</b>	<b>45.3</b>	<b>42.0</b>	<b>44.1</b>	<b>40.2</b>	<b>40.0</b>	30.0	36.8	<b>41.0</b>	<b>42.5</b>	<b>41.3</b>	33.2	40.3	31.4		
LC4	347904	460508	23.8	15.7	11.3	10.6	8.0	7.3	6.4	10.0	9.4	10.4	18.3	10.9	11.9	9.2		
LC5	347846	462448	35.9	30.0	30.3	32.5	30.0	27.7	19.6	28.5	26.7	30.5	33.9	21.5	28.9	22.6		
LC8	347796	461853	33.7	30.0	27.8	28.1	24.5	25.2	17.5	22.6	24.1	28.5	31.5	22.6	26.3	20.5		
LC9	347808	461564	33.7	30.1	26.6	25.4	22.6	24.3	17.8	22.4	24.1	27.5	29.1	23.6	25.6	20.0		
LC10	347834	461596	<b>56.2</b>	<b>60.6</b>	<b>51.6</b>	<b>54.3</b>	<b>48.8</b>	<b>50.6</b>	<b>43.2</b>	<b>50.6</b>	<b>52.2</b>	<b>49.4</b>	<b>50.8</b>	35.6	50.3	39.2		
LC11	347821	461404	<b>49.9</b>	<b>53.1</b>	<b>45.1</b>	<b>46.9</b>	<b>47.9</b>	<b>44.9</b>	<b>40.5</b>	<b>49.8</b>	<b>47.0</b>	<b>43.6</b>	<b>53.4</b>	<b>44.6</b>	47.2	36.8		
LC13	347580	461593	36.0	37.7	32.5	32.5	29.0	30.1	25.2	29.4	34.6	27.7	33.9	28.9	31.5	24.5		
LC14	347685	461389	37.7	31.7	29.0	28.8	23.8	24.5	19.0	23.5	25.0	26.2	33.8	24.7	27.3	21.3		
A	347582	462451	31.3	25.8	21.1	20.8	18.3	20.2	19.1	21.9	22.4	24.1		<b>44.7</b>	24.5	19.1		
B1,B2, B3	347852	461611	33.4	33.3	25.5	22.7	18.3	21.8	19.0	21.8	24.2	23.6	30.3		24.9	19.4		Results are averages for triplicates
C1,D1,E1	347685	461963	36.9	37.2	35.8	39.4	37.0	34.7		33.7	29.5	34.7	38.9	24.8	34.8	27.1		Results are averages for triplicates
H	347859	461126	33.1	27.6	27.0	29.1	28.3	27.0	15.8	24.4	22.9	28.7	32.1	20.1	26.3	20.6		
I	347909	462015	<b>40.3</b>	33.6	32.9	31.7	27.9	26.6	20.9	26.9	29.2	32.1	33.6	25.5	30.1	23.5		
J	347852	461909	<b>47.0</b>	<b>43.7</b>	37.2	38.8	34.8	35.4	27.4	34.1	38.0	39.1	<b>42.4</b>	22.7	36.7	28.6		
K	347850	461791	39.6	<b>40.6</b>	37.5	37.7	34.3	34.3	23.8	30.8	31.2	34.2	36.4	28.6	34.1	26.6		
L	347613	461523	38.1	38.8	32.2	32.1	29.8	33.0	13.6	30.4	34.3	33.2	37.9	28.7	31.9	24.8		
CFO	349909	470624	37.8	<b>40.7</b>	31.8	34.8	31.0	29.6	24.9	33.4	24.2	30.1	36.7	24.7	31.6	24.7		
Q	347664	461449	39.0	29.3	27.1	26.5	22.9	22.0	15.5	22.6	22.6	28.8	32.8	20.2	25.8	20.1		
V	348359	455352	33.3	34.8	27.7	28.4	26.2	25.8	25.5	27.3	27.2	27.7	33.1	25.5	28.5	22.3		
Z	348345	455272		37.1	29.2	29.5	24.8	24.3	23.4	25.4	24.5	24.2	31.8	21.7	26.9	21.0		
ZA	348351	455381	28.4	26.4	23.7	21.3	18.3	18.3	13.6	17.5	17.6	21.7	25.6	18.2	20.9	16.3		
ZC	348375	455393	36.9	32.3	29.6	27.3	24.0	25.3	17.1	22.6	25.5	29.0	27.6	22.5	26.7	20.8		
CF1	349870	470524	27.5	28.8	22.3	21.4	18.8	17.6	17.0	19.7	18.3	20.4	25.7	17.1	21.2	16.5		
CF2	349934	470605	31.3	37.7	29.6	30.7	26.5	26.2	26.5	29.3	27.4	26.5	32.3	25.5	29.1	22.7		
CF3	349853	470615	31.5	29.5	25.1	25.6	0.5	23.2	17.9	22.0	21.4	21.4	28.0	21.2	22.3	17.4		
CF5	349962	470618	35.5	28.9	26.4	29.4	26.3	27.1	19.0	26.4	22.4		31.4	21.4	26.7	20.9		
CF6	350000	470667	30.2	26.4	25.1	23.2	22.4	24.0	16.7	22.1	21.5	23.8	26.6	17.4	23.3	18.2		
CF7	349613	470223	24.8	26.0	21.8	22.3	18.3	21.9	16.3	20.6	16.9	19.1	26.1	17.4	21.0	16.3		
T1	345631	463694	28.5	30.3	24.9	22.1	19.5	22.1	16.8	21.9	23.7	22.3	26.1	22.3	23.4	18.2		
LC19	347502	461841	<b>41.3</b>	<b>48.1</b>	<b>44.2</b>	<b>45.1</b>	39.6	<b>46.3</b>	39.0	<b>43.0</b>	<b>42.3</b>	<b>40.5</b>	38.8	<b>42.0</b>	42.5	33.2		
LC20	347515	461835	<b>42.6</b>	<b>41.4</b>	37.4	34.3	31.9	33.8	27.5	33.7	34.4	36.0	39.2	29.3	35.1	27.4		
LC22	347928	461025	30.0	26.3	21.7	20.7	16.9	15.5	13.6	18.1	17.0	21.6	28.6	18.1	20.7	16.1		
LC23	347948	460893	30.8	30.7	23.3	22.5	21.0		16.4	20.9	20.9	23.2			23.3	18.2		
LC24	347974	460514	29.1	26.3	20.7	19.7	16.6	16.8	15.1	18.6	18.1	19.9	25.9	18.7	20.5	16.0		
LC25	348084	459844	27.3	19.8	17.1	15.8	12.7	12.7	9.9		13.7	17.4	23.5	14.1	16.7	13.1		
LC26	347990	459418	31.9	29.1	23.1	24.2	19.6	19.6	17.9	22.3	20.9	21.9	29.7	17.7	23.2	18.1		



DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northng)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
LC27	347989	459396	32.3	25.2	21.6	21.2	17.7	16.3	14.0	18.3	17.2	22.0	29.3	20.0	21.3	16.6		
BLS1	348594	468500	27.9	23.6	21.7	20.2	18.1	17.7	16.5	17.7		18.2	26.9	16.3	20.4	15.9		
H1	341964	463273	32.7	22.5	22.1	19.2	15.1	14.2	9.8	16.3	13.5	19.5	22.7	15.7	18.6	14.5		
CF8	349568	470044	31.3	26.8	25.9	24.9	21.0	16.5	16.4	20.5	21.6	21.6	29.6	15.7	22.6	17.7		
LC28	348517	463243	31.7	27.8	25.2	24.2	20.1		16.9	13.4	19.6	23.3	29.0	19.7	22.8	17.8		
LC31	348114	462071	31.2	32.4	23.8	24.7	20.9		23.6	25.7	22.8	21.1	30.8	22.8	25.5	19.9		
LC32	347511	461744	<b>42.4</b>	<b>42.9</b>	<b>44.3</b>	<b>44.0</b>	37.9	<b>40.2</b>	28.0	36.0	31.6	38.6	<b>40.1</b>	28.5	37.9	29.5		
MC4	345240	463663	35.8	32.1	27.7	29.5	25.1	22.7	18.5	26.5	20.4	26.7	33.2	22.0	26.7	20.8		
LC34	348623	461870	19.3	16.2	10.9	10.2	7.5	7.4	7.0	8.8	9.4	11.1	16.6	11.4	11.3	8.8		

- All erroneous data has been removed from the NO<sub>2</sub> diffusion tube dataset presented in Table B.1.
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Lancaster City Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

**Notes:**

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

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

### **New or Changed Sources Identified Within Lancaster City Council during 2023**

Lancaster City Council has not identified any notable new significant sources impacting on local air quality within the reporting year of 2023. The industrial fire at the SupaSkips site early December 2023 had an acute impact on local air quality through the duration of the fire but it was not substantial enough to affect the annual averages.

### **Additional Air Quality Works Undertaken by Lancaster City Council during 2023**

Lancaster City Council has not completed any additional works within the reporting year of 2023, other than those already outlined above.

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

Diffusion tubes are provided and analysed by Gradko International Ltd. (20% TEA in water method). Laboratory certification and proficiency testing information from Gradko in relation to nitrogen dioxide diffusion tube services are provided below.

Monitoring has been completed in adherence with the 2023 Diffusion Tube Monitoring Calendar.

# Certificate of Accreditation



## **Gradko International Ltd (Trading as Gradko Environmental)**

Testing Laboratory No. 2187

**Is accredited in accordance with International Standard ISO/IEC 17025:2017  
- General Requirements for the competence of testing and calibration  
laboratories.**

This accreditation demonstrates technical competence for a defined scope specified in the schedule to this certificate, and the operation of a management system (refer joint ISO-ILAC-IAF Communiqué dated April 2017). The schedule to this certificate is an essential accreditation document and from time to time may be revised and reissued.

The most recent issue of the schedule of accreditation, which bears the same accreditation number as this certificate, is available from [www.ukas.com](http://www.ukas.com).

This accreditation is subject to continuing conformity with United Kingdom Accreditation Service requirements.

**Matt Gantley**, Chief Executive Officer  
United Kingdom Accreditation Service

Initial Accreditation: 31 January 2001  
Certificate Issued: 15 April 2020



Scan QR Code to  
verify

UKAS is appointed as the sole national accreditation body for the UK by The Accreditation Regulations 2009 (SI No 3155/2009) and operates under a Memorandum of Understanding (MoU) with the Department for Business, Energy and Industrial Strategy (BEIS).

## Schedule of Accreditation

issued by


### United Kingdom Accreditation Service

2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK

 <p><b>UKAS</b> TESTING</p> <p>2187</p> <p>Accredited to ISO/IEC 17025:2017</p>	<p><b>Gradko International Ltd</b> <b>(Trading as Gradko Environmental)</b></p> <p>Issue No: 026    Issue date: 10 November 2023</p>	
	<p>St Martins House 77 Wales Street Winchester Hampshire SO23 0RH</p>	<p>Contact: Mr A Poole Tel: +44 (0)1962 860331 Fax: +44 (0)1962 841339 E-Mail: <a href="mailto:diffusion@gradko.co.uk">diffusion@gradko.co.uk</a> Website: <a href="http://www.gradko.co.uk">www.gradko.co.uk</a></p>
Testing performed at the above address only		

#### DETAIL OF ACCREDITATION

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors	<u>Chemical Tests</u>	Documented In-House Methods
	Ammonia as ammonium (NH <sub>4</sub> <sup>+</sup> )	GLM 8 by Ion Chromatography
	Benzene Toluene Ethyl benzene Xylene	GLM 4 by Thermal Desorption/ FID Gas Chromatography
	Hydrogen chloride as chloride (Cl <sup>-</sup> ) Nitrogen dioxide as nitrite (NO <sub>2</sub> <sup>-</sup> ) Sulphur dioxide as sulphate (SO <sub>4</sub> <sup>2-</sup> ) Hydrogen fluoride as fluoride (F <sup>-</sup> )	GLM 3 by Ion Chromatography
	Hydrogen sulphide	GLM 5 by Colorimetric determination (UV Spectrophotometry)
	Ozone as nitrate (NO <sub>3</sub> <sup>-</sup> )	GLM 2 by Ion Chromatography
	Nitrogen Dioxide as nitrite (NO <sub>2</sub> <sup>-</sup> )	GLM 7 by Colorimetric determination (UV Spectrophotometry)
	Sulphur dioxide as sulphate (SO <sub>4</sub> <sup>2-</sup> )	GLM 1 by Ion Chromatography
	Formaldehyde as formaldehyde-DNPH	GLM 18 by HPLC
	Volatile Organic Compounds including: Benzene Toluene Ethylbenzene p-Xylene o-Xylene	GLM 13 by Thermal Desorption GC-Mass Spectrometry

 <p>Accredited to ISO/IEC 17025:2017</p>	<p><b>Schedule of Accreditation</b> Issued by <b>United Kingdom Accreditation Service</b> 2 Pine Trees, Chertsey Lane, Staines-upon-Thames, TW18 3HR, UK</p>
	<p><b>Gradko International Ltd</b> <b>(Trading as Gradko Environmental)</b> Issue No: 026 Issue date: 10 November 2023</p>
Testing performed at main address only	

Materials/Products tested	Type of test/Properties measured/Range of measurement	Standard specifications/ Equipment/Techniques used
ATMOSPHERIC POLLUTANTS Collected on diffusion (sorbent) tubes and monitors (cont'd)	<p><u>Chemical Tests</u> (cont'd)</p> <p>Qualitative Analysis and Estimation of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors</p> <p>Naphthalene Tetrachloroethylene Trichloroethylene Styrene 1,2,4-Trimethylbenzene 1,3,5-Trimethylbenzene Chlorobenzene 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene</p> <p>trans-1,2-Dichloroethene cis-1,2-Dichloroethene</p> <p>1,3-Butadiene</p> <p>Carbon Disulphide</p> <p><b>Flexible scope</b> for quantitative analysis of Volatile Organic Compounds on diffusion (sorbent) tubes and monitors in accordance with methods developed and validated by in-house procedure LWI 47</p>	<p>GLM 13 by Thermal Desorption GC-Mass Spectrometry with estimations in accordance with ISO standard 16000-6</p> <p>GLM 13-1 by Thermal Desorption GC-Mass Spectrometry</p> <p>GLM 13-3 by Thermal Desorption GC-Mass Spectrometry</p> <p>GLM 13-6 by Thermal Desorption GC-Mass Spectrometry</p> <p>GLM 13-7 by Thermal Desorption GC-Mass Spectrometry</p> <p>LWI 47 by Thermal Desorption GC-Mass Spectrometry</p>
END		

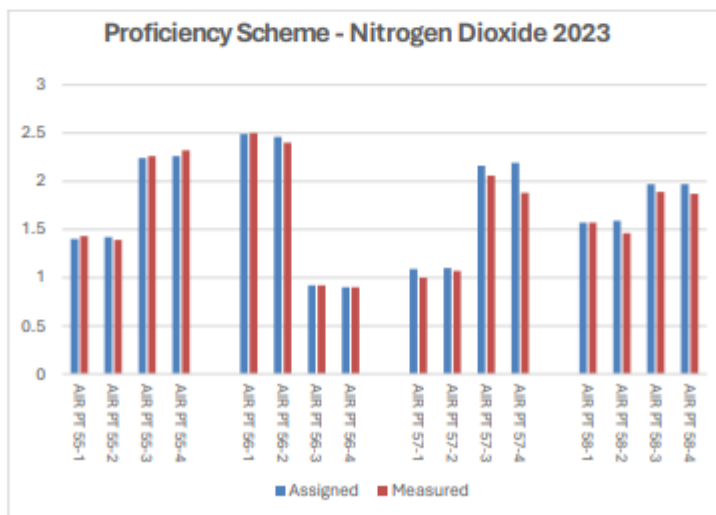


(A division of Gradko International Ltd.)  
 St. Martins House, 77 Wales Street Winchester, Hampshire SO23 0RH  
 tel.: 01962 860331 fax: 01962 841339 email:diffusion@gradko.com

**AIR PT Nitrogen Dioxide Proficiency Scheme Results 2023**

Methods: GLM 7 – CARY 60 Spectrophotometer

AIR PT Proficiency Scheme - Nitrogen Dioxide 2023					
Date	Round	Assigned value	Procedure GLM 7		
			Measured concentration	z-Score	% Bias
Feb-23	AIR PT 55-1	1.4	1.43	0.29	2.1%
Feb-23	AIR PT 55-2	1.42	1.39	-0.28	-2.1%
Feb-23	AIR PT 55-3	2.24	2.26	0.11	0.9%
Feb-23	AIR PT 55-4	2.26	2.32	0.34	2.7%
Jun-23	AIR PT 56-1	2.49	2.5	0.05	0.4%
Jun-23	AIR PT 56-2	2.46	2.4	-0.33	-2.4%
Jun-23	AIR PT 56-3	0.92	0.92	0	0.0%
Jun-23	AIR PT 56-4	0.9	0.9	0	0.0%
Aug-23	AIR PT 57-1	1.09	1.00	-1.1	-8.3%
Aug-23	AIR PT 57-2	1.10	1.07	-0.36	-2.7%
Aug-23	AIR PT 57-3	2.16	2.06	-0.62	-4.6%
Aug-23	AIR PT 57-4	2.19	1.88	-1.89	-14.2%
Oct-23	AIR PT 58-1	1.57	1.57	0	0.0%
Oct-23	AIR PT 58-2	1.59	1.46	-1.09	-8.2%
Oct-23	AIR PT 58-3	1.97	1.89	-0.54	-4.1%
Oct-23	AIR PT 58-4	1.97	1.87	-0.68	-5.1%



April 2024

**Diffusion Tube Annualisation**

All diffusion tube monitoring locations within Lancaster City Council recorded data capture of 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

## Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Lancaster City Council have applied a national bias adjustment factor of 0.78 to the 2023 monitoring data. A summary of bias adjustment factors used by Lancaster over the past five years is presented in Table C.1.

**Table C.1 – Bias Adjustment Factor**

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/24				
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of June 2024				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods							LAQM Helpdesk Website				
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.											
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.											
Step 1:		Step 2:	Step 3:	Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor <sup>3</sup> shown in blue at the foot of the final column.							
If a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data <sup>2</sup>	If you have your own co-location study then see footnote <sup>1</sup> . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953							
Analysed By <sup>1</sup>	Method <sup>2</sup>	Year <sup>3</sup>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>4</sup>	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	50% TEA in acetone	2023	UB	Sandwell Mbc	11	21	18	15.8%	G	0.86	
Gradko	50% TEA in acetone	2023	R	Sandwell Mbc	12	23	20	14.2%	S	0.88	
Gradko	20% TEA in water	2023	R	Blackburn With Darwen Bc	12	23	16	43.8%	G	0.70	
Gradko	20% TEA in water	2023	R	Lancaster City Council	10	35	27	28.6%	G	0.78	
SOCOTEC Didcot	50% TEA in acetone	2023	R	Cardiff Council / Shared Regulatory Services	11	41	34	22.2%	G	0.82	
SOCOTEC Didcot	50% TEA in acetone	2023	UB	Torfaen County Borough Council	11	12	9	43.9%	G	0.70	

**Figure C2.** (Above) Screenshot demonstrating the bias adjustment factor used by Lancaster City Council.

**Table C2.** (Below) Lancaster City Council bias adjustment factor history.

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	V03/24	0.78
2022	National	V03/23	0.83
2021	National	V06/22	0.84
2020	National	V06/21	0.81
2019	National	V09/20	0.91

### **NO<sub>2</sub> Fall-off with Distance from the Road**

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

No sites with measured levels above 36 µg/m<sup>3</sup> (the threshold above which distance correction should be applied) require distance correction as they were considered representative of exposure.

### **QA/QC of Automatic Monitoring**

For 2023 the Council had one operational automatic air quality monitoring station located at Cable Street Lancaster, which commenced monitoring in 2011. The station monitors nitrogen dioxide via a Horiba APNA 370 NO<sub>2</sub> analyser and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) via a FIDAS instrument. The monitors are maintained and serviced by ESU1 with servicing undertaken twice per year. Routine calibration is undertaken by Lancaster City Council on a monthly basis. The site is not independently audited but data monitoring, validation, and ratification is undertaken by Air Quality Data Management.

Live and historic data is available at: <http://www.ukairquality.net/>

Automatic station data provided in this report has been ratified by Air Quality Data Management. The QA/QC procedures are detailed below.





## QA/QC of Automatic Air Quality Instruments

Air quality measurements from the automatic instruments are validated and ratified by Air Quality Data Management (AQDM) <http://www.aqdm.co.uk> to the standards described in the Local Air Quality Management – Technical Guidance LAQM (TG22) <https://laqm.defra.gov.uk/technical-guidance>.

### Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NO<sub>x</sub>, O<sub>3</sub>, SO<sub>2</sub> and CO) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM<sub>10</sub> and PM<sub>2.5</sub>) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

### Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Generally this operates at three, six or twelve month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three and six monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include

- the correct scaling of data
- ignoring calibrations that were poor e.g. a spent zero scrubber
- closely tracking rapid drifts or eliminating the data
- comparing the measurements with other pollutants and nearby sites
- corrections due to span cylinder drift
- corrections due to flow drifts for the particulate instruments
- corrections for ozone instrument sensitivity drifts
- eliminating measurements for NO<sub>2</sub> conversion inefficiencies
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods where instruments are warming-up after a powercut
- identification of anomalies due to mains power spikes



- correcting problems with the date and time stamp
- observations made during the sites visits and services

The identification of data anomalies, the proper understanding of the effects and the application of appropriate corrections requires expertise gained over many years of operational experience. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. There are rarely simple faults that can be discovered by computer algorithms or can be understood without previous experience.

The PM<sub>10</sub> and PM<sub>2.5</sub> concentrations may require scaling into Gravimetric Equivalent concentration units by use of the Volatile Correction Model (VCM) <http://www.volatile-correction-model.info> or by corrections published by Defra <https://uk-air.defra.gov.uk/networks/monitoring-methods?view=mcerts-scheme> depending on the measurement technique.

Further information about air quality data management, expert data ratification and examples of bad practices are given on the Air Quality Data Management (AQDM) website <http://www.aqdm.co.uk>.

### **PM<sub>10</sub> and PM<sub>2.5</sub> Monitoring Adjustment**

The type of PM<sub>10</sub>/PM<sub>2.5</sub> monitor (a FIDAS instrument) utilised within Lancaster City Council does not required the application of a correction factor.

### **Automatic Monitoring Annualisation**

All automatic monitoring locations within Lancaster City Council district recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

### **NO<sub>2</sub> Fall-off with Distance from the Road**

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website. Where appropriate, automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table A.3.

No sites showing levels above  $36 \mu\text{g}/\text{m}^3$  (the threshold above which distance correction should be applied where appropriate) required distance correction as they were considered representative of exposure.

## Appendix D: Map(s) of Monitoring Locations and AQMAs

A map showing monitoring locations of Lancaster's automatic monitoring station and monitoring data can be found at: <http://www.ukairquality.net/home/map>.

A map showing the position of nitrogen dioxide diffusion tube monitoring locations and monitoring data can be found at: <https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/background-to-air-pollution-measurement-and-monitoring>

Details relating to AQMAs can be found below (please note Carnforth and Galgate AQMAs were revoked 28<sup>th</sup> June 2024).

City of Lancaster AQMA:

<https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/lancaster-air-quality-management-area-aqma>



**Figure D1.a.** City of Lancaster AQMA

Carnforth AQMA (revoked June 2024):

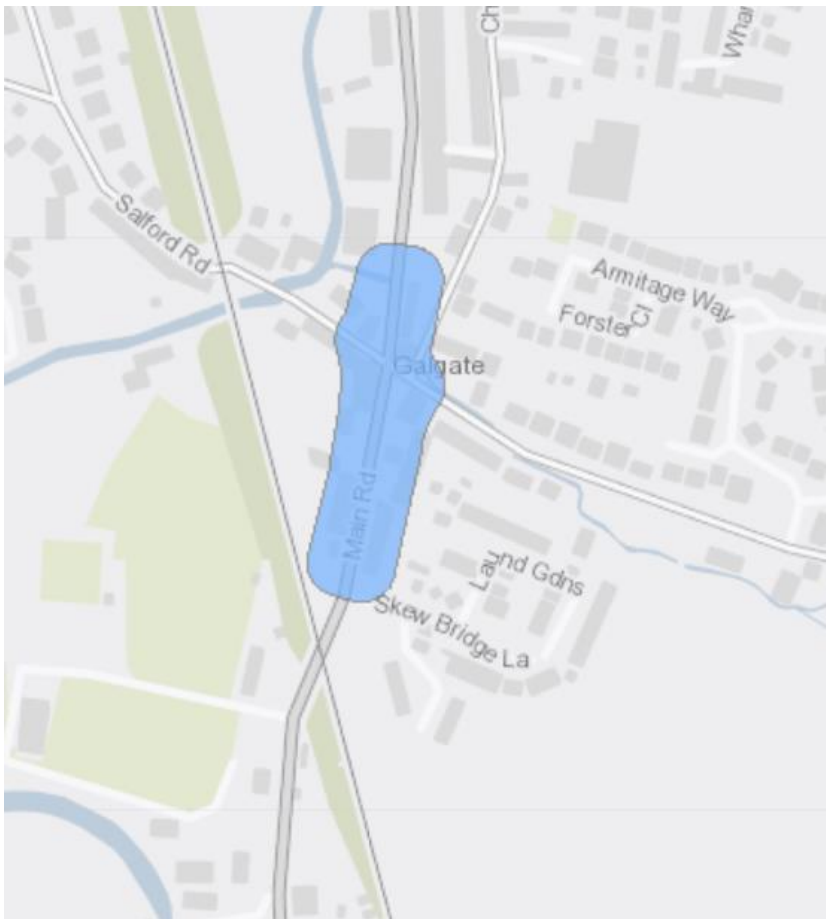
<https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/carnforth-air-quality-management-area-aqma>



**Figure D1.b.** Carnforth AQMA

Galgate AQMA (revoked June 2024):

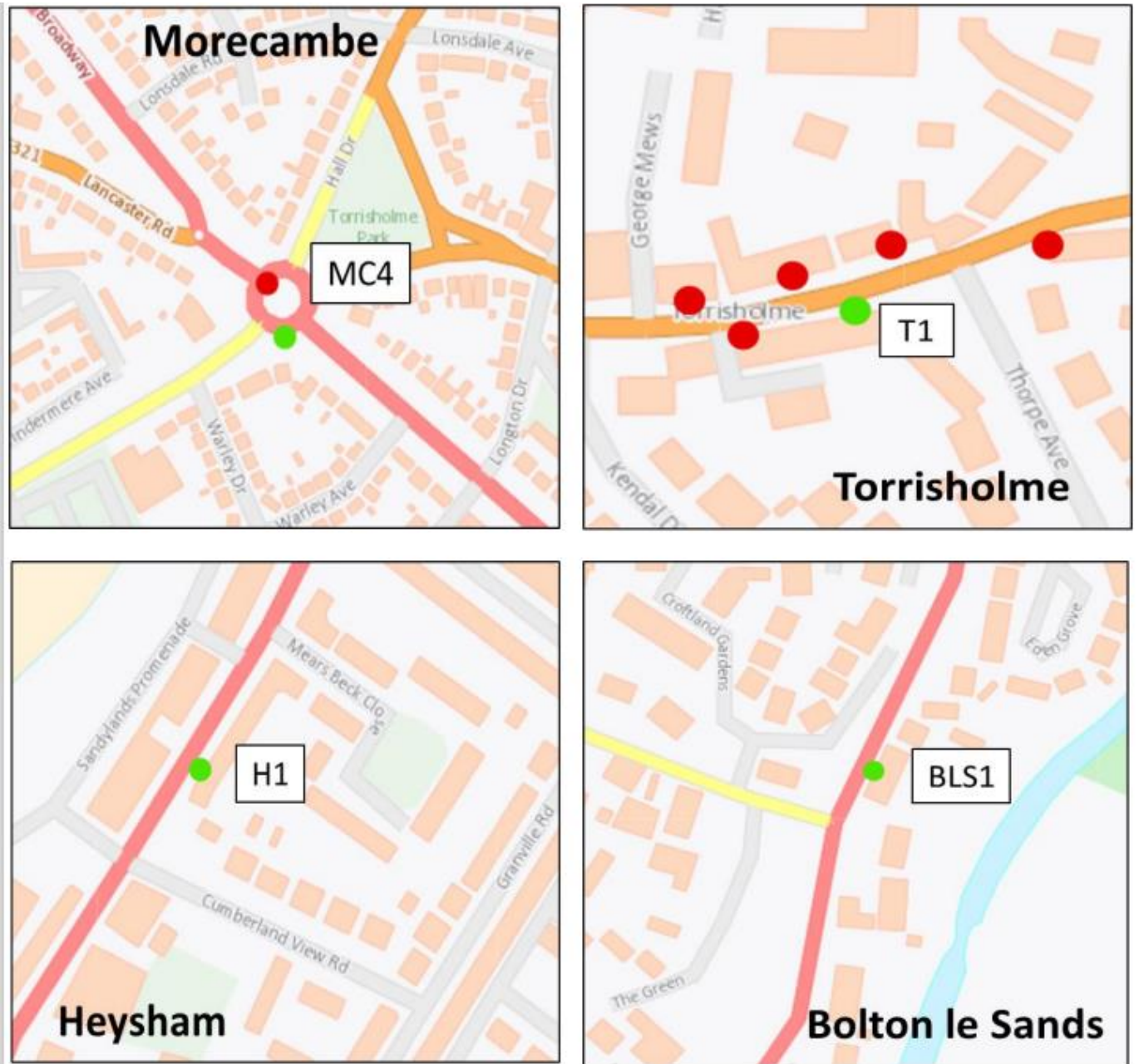
<https://www.lancaster.gov.uk/environmental-health/environmental-protection/air-quality/galgate-air-quality-management-area-aqma>



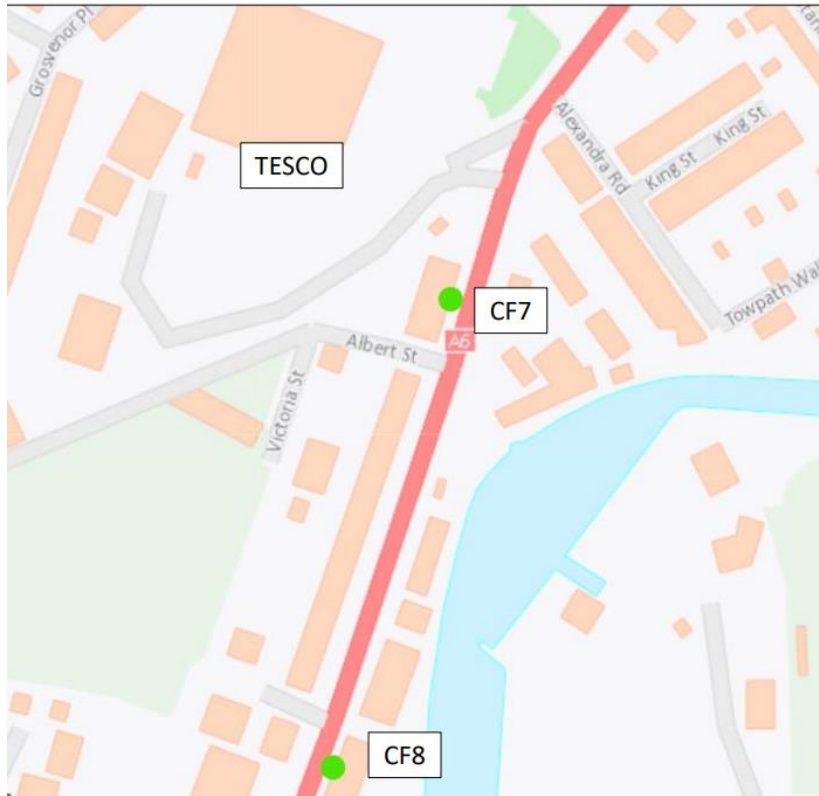
**Figure D1.c.** Galgate AQMA.

Maps showing current diffusion tube monitoring locations are also shown below.

Figure D.1.d – Map of Non-Automatic Monitoring Sites



### Carnforth Outskirts (2 tubes)

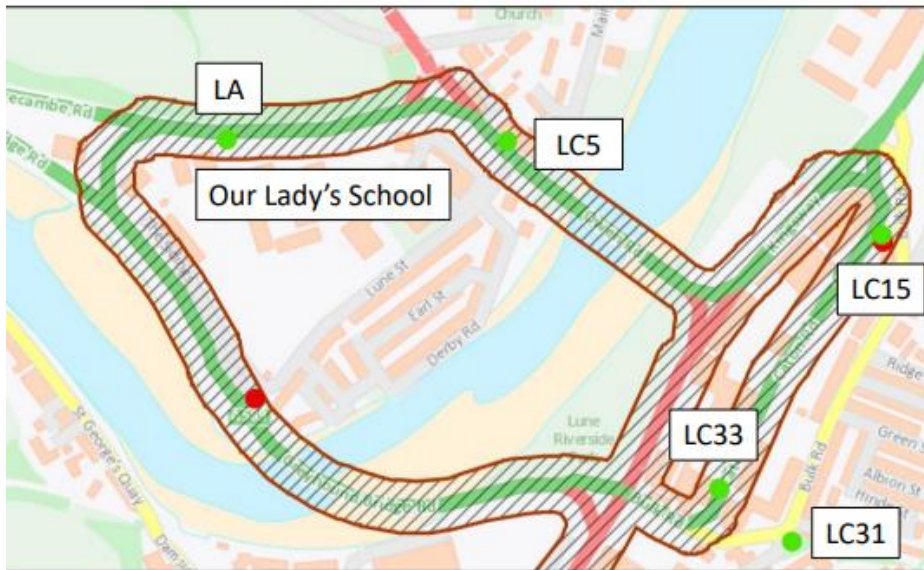


### Carnforth Centre (6 tubes)

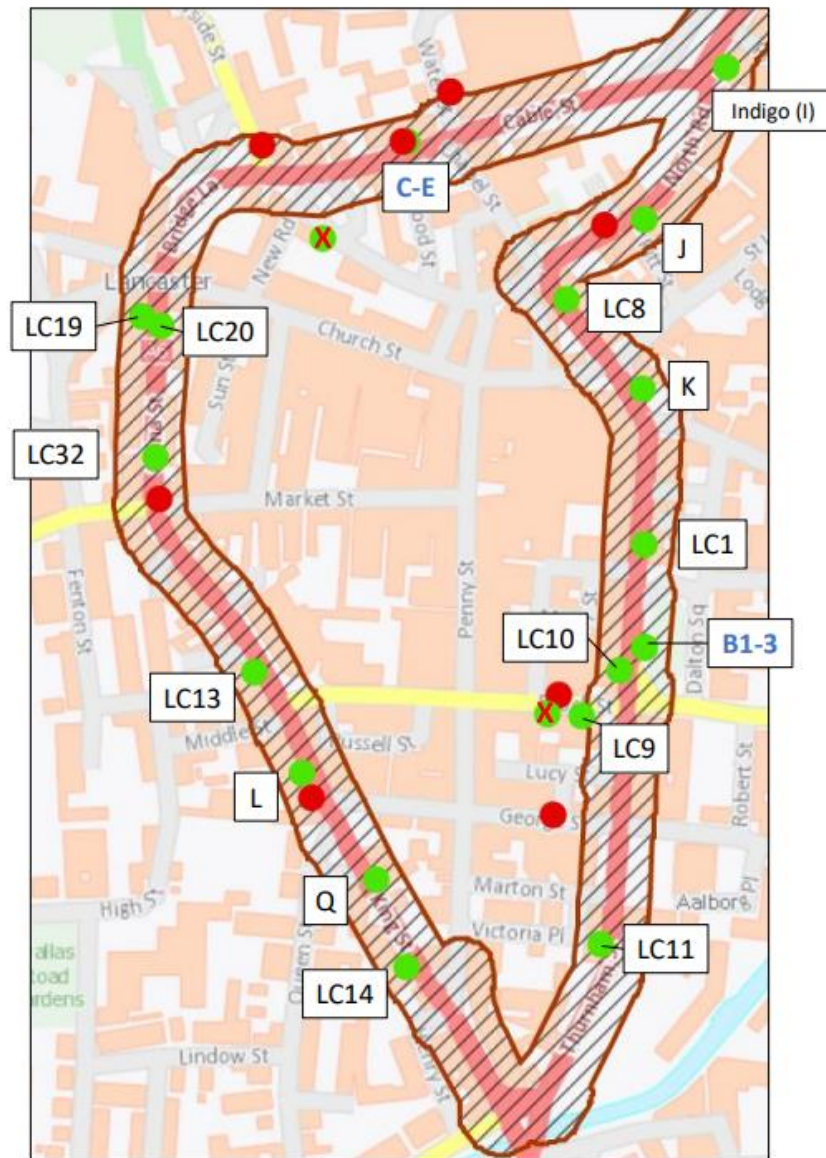




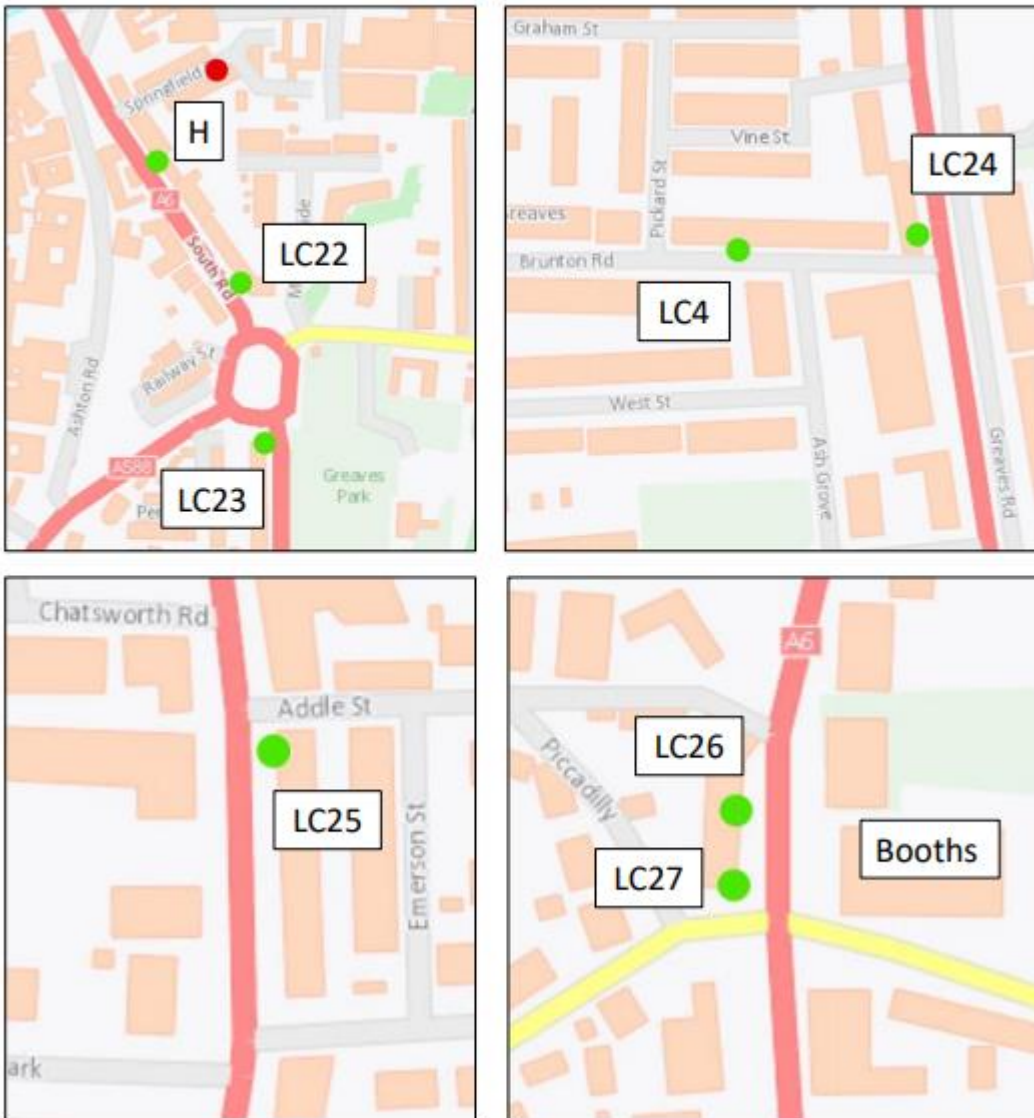
### Lancaster North (7 tubes)



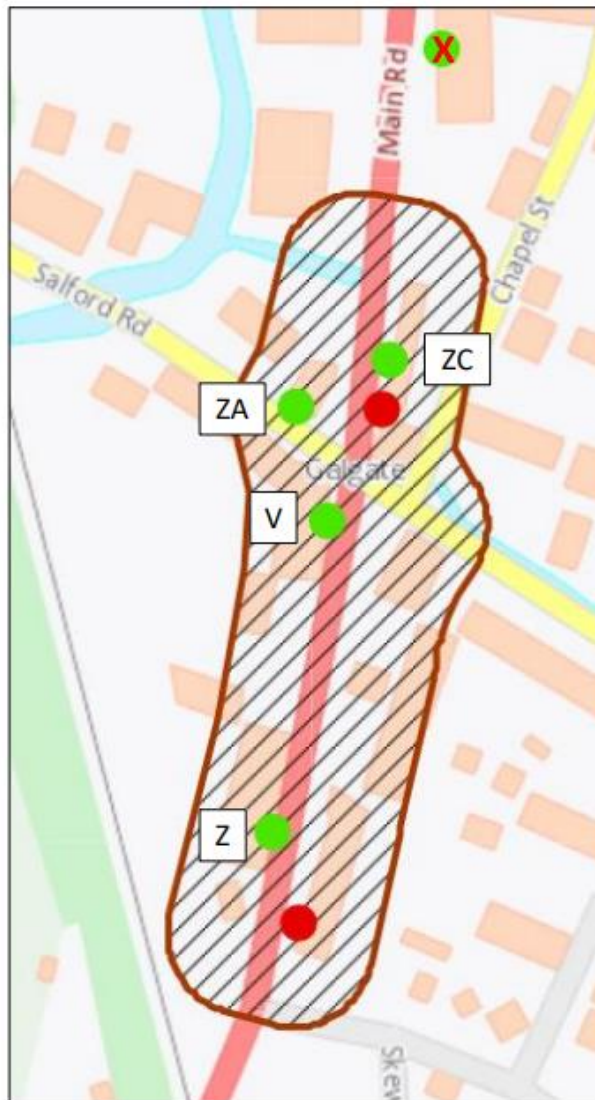
### Lancaster City Centre (21 tubes)



## Lancaster South A6 (8 tubes)



### Galgate (4 tubes)



## Appendix E: Summary of Air Quality Objectives in England

**Table E.1 – Air Quality Objectives in England<sup>9</sup>**

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO <sub>2</sub> )	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM <sub>10</sub> )	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>9</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority 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
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

## References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Chemical hazards and poisons report: Issue 28. June 2022. Published by UK Health Security Agency
- Air Quality Strategy – Framework for Local Authority Delivery. August 2023. Published by Defra.