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City of Lincoln Council

2024 Annual Status Report

July 2024

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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: July, 2024

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Report Reference Number	AIR21619929
Date	July 2024

Executive Summary: Air Quality in Our Area

Air Quality in City of Lincoln Council

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[1].

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[2].

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_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. 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. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

No sites within City of Lincoln Council reported concentrations within 10% of the annual mean AQS objective (36µg/m^3). The maximum reported annual mean NO_2 concentration in 2023 was 31.6µg/m^3, reported at Site 3 which is located at Drill Hall, Broadgate, within Lincoln AQMA. The Lincoln AQMA has now been compliant with the annual mean NO_2 objective for five years, and the Council therefore intends to proceed with revocation in 2024.

No sites reported an NO_2 concentration in excess of 60µg/m^3 in 2023 and the automatic monitoring location indicated that there have been no instances of 1-hour NO_2 concentrations greater than 200µg/m^3. Therefore, considering the number of allowable exceedances through the year (18), the 1-hour NO_2 AQS objective was not breached in 2023.

Monitored PM_{10} concentrations for 2023 have shown that the annual mean concentration remains well below the AQS objective of 40µg/m^3, and that there were three instances of 24-hour concentrations exceeding 50µg/m^3. Taking into account the number of allowable exceedances through the year (35), the 24-hour PM_{10} AQS objective was not breached in 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[3] 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 ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

The Road to Zero[5] 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 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.

During 2023, City of Lincoln Council (CoLC) has progressed the following measures:

- Implementation of the Lincolnshire Clean Air Project, which was funded by a Defra Air Quality Grant during 2023, the Clean Air Lincolnshire project worked with eight secondary schools across Lincolnshire and developed a website. The engagement consisted of four sessions with an emphasis on local air quality data collection and health impacts. There is an intention to develop an iteration of this project for future Defra funding rounds.
- Installation of 81 electric vehicle recharge points installed. This includes a 50kW super rapid charge point and 56 new rapid charge points for residents without access to off road parking.
- As a result of the completion of the Lincoln Eastern By-Pass, annual mean nitrogen dioxide levels at the Broadgate (A15) dropped from 36.4µg/m^3 in 2019 (pre-opening) to approximately 22.0µg/m^3 in 2023. Annual Average Daily Traffic (AADT) on Pelham Bridge (A15) reduced from 31,234 in 2019 to 22,389 in 2022.
- A trial bespoke staff car share scheme between CoLC and Lincolnshire County Council (LCC) was set up and commenced from April 2023 - March 2024. The outcomes will be reviewed, and an extension of the scheme considered.

Conclusions and Priorities

The priorities for City of Lincoln Council in addressing and managing air quality within their local areas in the coming year includes:

- Continued Implementation of the Clean Air Lincolnshire Project - In 2024, the same eight schools have completed air quality campaigns in their schools and attended an end of project event on Clean Air Day.

[5] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

- North Hykeham Relief Road (formerly Lincoln Southern Bypass) - Planning approval granted in May 2024, with legal orders and compulsory purchase and side road orders approved by Highways and Transport Scrutiny Committee on Monday 10th June. Construction is projected to start in 2025 (TBC).
- Continued provision of electric vehicle recharge points in car parks **-** 56 new rapid charge points for residents without access to off road parking installed in 2023, and the Council intends to continue with installations.

City of Lincoln Council also intends to proceed with the revocation of Lincoln AQMA due to continued compliance with the annual mean NO_2 objective.

Local Engagement and How to get Involved

The main source of air pollution within the City of Lincoln derives from transport sources. As such, a key way for the public to get involved with helping to improve air quality within the city would be to look at sustainable travel alternatives.

The following are suggested alternatives to private travel that would therefore contribute to improving air quality within City of Lincoln Council:

- Use of public transport – The use of the bus facilities, which in turn reduces pollutant concentration through the number of vehicles and reducing congestion (new Public Transport Hub);
- Walk or cycle if your journey allows – From choosing to walk or cycle for your journey the number of vehicles is reduced and also there is the added benefit of keeping fit and healthy;
- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools; and
- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel-efficient cars are available, and all have different levels benefits by reducing the amount of emissions released.

Local policies relating to/influencing air quality are publicly available and are detailed below:

Lincolnshire County Council Policies:

- Local Transport Plan 5
- Lincolnshire Cycling Strategy
- Lincolnshire Electric Vehicle Strategy
- Lincolnshire Walking Strategy
- Sustainable modes of travel to school (SMoTS) Strategy
- Lincoln Transport Strategy
- Lincolnshire Bus Service Improvement Plan (BSIP) -

City of Lincoln Council Policies:

- City of Lincoln Council's Environmental Policy
- Lincoln 2030 Climate Action Plan
- Lincoln 2030 Summary and Annual progress report

Local Responsibilities and Commitment

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

Ian Wicks – Pollution Control Officer

Kate Bell – Climate Change Manager

Mark Lancaster – Local Transport Plan Policy Team (Lincolnshire County Council)

Vanessa O'Brien – Sustainability Team (Lincolnshire County Council)

This ASR has been approved by:

Cllr Bob Bushell – Portfolio Holder for Portfolio Holder for Remarkable Place and Design Advocate.

This ASR has not been signed off by a Director of Public Health.

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

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Table of Contents

Figures

Tables

1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in 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 City of Lincoln 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 City of Lincoln Council can be found in Table 2.1. The table presents a description of the one AQMA that is currently designated within City of Lincoln Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO_2 annual mean.

We propose to revoke Lincoln AQMA (see Section 3.2.1).

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
Lincoln AQMA	Declared 01/12/2001 Amended 03/02/2014, 03/08/2018	NO_2 annual mean	The area generally follows the major road network in the City Centre and arterial routes and is primarily due to road traffic emissions.	NO	56.7µg/m^3	31.6µg/m^3	5 years	Interim Action Plan for Lincoln NO_2 AQMA, August 2019	Visit the AQAP for the Lincoln NO_2 AQMA

☒ **City of Lincoln Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **City of Lincoln Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in City of Lincoln Council

Defra's appraisal of last year's ASR concluded that the report contains some of the information specified in the Guidance.

The following comments are designed to help inform future reports:

1. Trend graphs have been provided for all monitoring data and are formatted in a way that is clear and easy to understand, it is also helpful that figures have been grouped by whether they are in the AQMA or not to allow for ease of comparison. The discussion could include more detail regarding the trend over the most recent 5-year period as well as the effects of projects and measures on these trends. Also the council should ensure that the AQO is visible on all figures, this has been left out for Figure A.4.

This has been addressed in this year's ASR to support revocation of the remaining AQMA.

2. The council have continued to see low pollutant concentrations throughout the borough, this is a testament to the councils detailed list of key actions which they undertaken to improve air quality over the reporting year. However, not all sections of Table 2.2 have been filled out a lot of the measures are missing key performance indicators, current status and/or funding status.

The measures table has been updated this year and extensive progress has been made – this is detailed in this ASR.

3. The NO_2 concentrations in LCC have continued to be well below the annual mean objective for NO_2, which is very encouraging and provides a good basis for revocation of the Lincoln NO_2 AQMA. The council have stated this is their intention and that they plan to have the AQMA revoked within 2023.

The Council will proceed with revocation in 2024.

4. The Council have provided extensive mapping of all monitoring locations within the district including AQMA boundaries. North arrows and scale bars could be added to maps for added clarity.

Maps have been amended to improve clarity in this year's ASR.

5. LCC have included the Public Health Outcomes Framework D01 indicator within their report, as well as a comparison to England and the South-East region. This

is an example of good practice and helps provide context for measures that tackle $PM_{2.5}$.

6. The council have included detailed notes on how they plan to tackle $PM_{2.5}$ emissions and have calculated the approximate $PM_{2.5}$ levels within the borough based on their PM_{10} data which is commendable. Details of the values used to calculate the $PM_{2.5}$ annual mean has been listed but there are no details regarding the methodology used, it would be good to add this either under the $PM_{2.5}$ section or as a separate appendix. And though the Chesterfield monitor is not located in the borough adding its annual means to the report would help understand the calculation of the $PM_{10}/PM_{2.5}$ conversion factor.

Values and results are included in Section 2.3. The methodology and calculations, including the annual averages for the Chesterfield Roadside reference site, are detailed in Section 3.2.3.

7. The date of declaration in Table 2.1 is not aligned with what has been declared within the Defra portal. Date of declaration has been listed as 2001 when the Defra Portal states the AQMA was declared in 2014. As well as this the table does not include years of compliance with the relevant AQO.

The AQMA is listed on both the LAQM Portal and on UK-Air as having been declared in 2001 and subsequently amended in 2014 and 2018. This is consistent with the information provided in Table 2.1 of this ASR.

8. It is recommended that Directors of Public Health approve draft ASRs as this is expected to increase support for measures to improve air quality.

City of Lincoln Council has taken forward a number of direct measures during the current reporting year of 2024 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 25 measures are included within Table 2.2, with the type of measure and the progress City of Lincoln Council have made during the reporting year of 2024 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 their respective Action Plans The City of Lincoln Interim AQAP[6] and the current City of Lincoln Council AQAP[7]. The Lincoln Transport Strategy[8] also provides key input into the measures to improve air quality across the city. Key completed measures are:

- **Implementation of the Clean Air Lincolnshire Project –** During 2023, the project worked with 8 secondary schools across Lincolnshire and developed a website. The engagement consisted of four sessions with an emphasis on local air quality data collection and health impacts.
- **Provision of electric vehicle recharge points in car parks –** A total of 81 recharge points installed. This includes a 50KW super rapid charge point and 56 new rapid charge points for residents without access to off road parking.
- **Lincoln Eastern By-pass –** New highway completed and operational by Dec 2020. Annual mean nitrogen dioxide levels at the Broadgate (A15) have dropped from 36.4µgm^{-3} in 2019 (pre-opening) to approximately 22.0µgm^{-3} in 2023. Annual Average Daily Traffic (AADT) on Pelham Bridge (A15) reduced from 31,234 in 2019 to 22,389 in 2022.
- **Promotion of sustainable transport -** a trial bespoke staff car share scheme between CoLC and LCC set up and due to commence April 2023 - March 2024. The outcomes will be reviewed, and an extension of the scheme considered.

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

City of Lincoln Council's priorities for the coming year are:

- **Continued Implementation of the Clean Air Lincolnshire Project -** In 2024, the same eight schools have completed air quality campaigns in their schools and attended an end of project event on Clean Air Day. There is an intention to develop an iteration of this project for future DEFRA funding rounds.
- **North Hykeham Relief Road (formerly Lincoln Southern Bypass) -** Planning approval granted in May 2024, with legal orders and compulsory purchase and side

[6] https://democratic.lincoln.gov.uk/documents/s47891/Interim%20AQAP%20Appendix.pdf

[7] http://aqma.defra.gov.uk/action-plans/LC%20AQAP%202006.pdf

[8] https://www.lincolnshire.gov.uk/downloads/file/3608/lincoln-transport-strategy#:~:text=The%20Lincoln%20Transport%20Strategy%20aims,area%20over%20the%20coming%20years.

road orders approved by Highways and Transport Scrutiny Committee Monday 10th June. Construction is projected to start in 2025 (TBC).

- **Provision of electric vehicle recharge points in car parks -** 56 new rapid charge points for residents without access to off road parking installed in 2023, and the Council intends to continue with installations. Council was awarded a grant in February 2023 by the Office for Zero Emission Vehicles (OZEV) as part of their On Street Resident Chargepoint Scheme along with match funding from Connected Kerb.

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

- Lincolnshire County Council
- City of Lincoln Council
- Other Lincolnshire district councils
- Selected schools
- Bus operators (Stagecoach)
- Lincoln BIG
- Local businesses (Waitrose)

City of Lincoln Council recognises that the measures stated above and in Table 2.2 have achieved compliance with the relevant AQS objective for more than 5 years. The Council will therefore proceed with plans to revoke Lincoln AQMA this year.

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	Clean Air Lincolnshire Project	Public Information	Other	Planning Phase 2022; Implementation Phase 2023 onwards	Ongoing	Lincolnshire County Council, City of Lincoln Council and other Lincolnshire district councils; selected schools	Defra AQ Grant	Yes	Fully Funded	£50k-£100k	Implementation	Not known	None	Website has been developed and can be viewed at: https://cleanairlincs.org.uk/. During 2023, the project worked with 8 secondary schools across Lincolnshire. The engagement consisted of four sessions with an emphasis on local air quality data collection and health impacts. In 2024, the same eight schools have completed air quality campaigns in their schools and attended an end of project event on Clean Air Day. There is an intention to develop an iteration of this project for future DEFRA funding rounds.	
2	North Hykeham Relief Road (formerly Lincoln Southern Bypass)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Planning Phase 2006; Implementation Phase not yet determined.	2028	Lincolnshire County Council	Lincolnshire County Council, Central Government and from third party developer contributions.	NO	Partially Funded	>£10 million	Planning			Outline Business Case prepared and submitted to DfT for funding support in July 2019, with £110 million being awarded in Nov 2020 by the DfT coming from government's Large Local Majors programme. The remaining budget will be funded by Lincolnshire County Council and developer contributions, which the council will forward fund. Planning approval granted in May 2024 Legal orders and compulsory purchase and side road orders approved by Highways and Transport Scrutiny Committee Monday 10th June TBC 2025: Construction starts, TBC 2028: Project complete - these dates are projected and subject to change dependent on external factors. The current scheme cost, included in the council's outline business case for funding, is £155 million.	
3	Provision of electric vehicle recharge points in CoLC car parks	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV	Planning Phase - 2010; Implementation Phase	Ongoing	City of Lincoln Council	City of Lincoln Council	NO	Fully Funded		Implementation	Not known	No. of recharge points available in CoLC car parks.	Total of 81 recharge points installed. This includes a 50KW super rapid charge point and 56 new rapid charge points for residents without access to off road parking.	Council was awarded a grant in February 2023 by the Office for Zero Emission Vehicles (OZEV) as part of their On Street Resident Chargepoint Scheme

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
			recharging, Gas fuel recharging	2012 - present											along with match funding from Connected Kerb
4	Lincoln Eastern Bypass	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Planning Phase 2011-2015; Implementation phase 2016-2020	2020	Lincolnshire County Council	Lincolnshire County Council, Central Government and from third party developer contributions.		Fully Funded	>£10 million	Completed	2.5µgm-3 reduction at Broadgate (A15) monitoring location (see comments)	Change in AADT, including split for HDV/LDV on Broadgate	New highway completed and operational by Dec 2020. Annual mean nitrogen dioxide levels at the Broagdate (A15) have dropped from 36.4µgm-3 in 2019 (pre-opening) to approximately 22µgm-3 in 2023. AADT on Pelham Bridge (A15) reduced from 31,234 in 2019 to 22,389 in 2022.	The target pollution reduction is based on the “with” and “without” LEB scenarios contained within the Council’s latest detailed air quality assessment.
5	Cycling Infrastructure	Transport Planning and Infrastructure	Cycle Network	On-going	On-going	Lincolnshire County Council	Lincolnshire County Council, Department for Transport		Partially Funded	£1 million - £10 million	Implementation	Not known	Length of new cycleway	Network continues to be developed as funding allows. Development of Local Cycling and Walking Network Plan on-going to assist in identifying future schemes. Separate cycleway constructed along the entire LEB, with provision also included to replicate the same alone the NHRR. Also improvement for cyclists were made on Wigford Way and Brayford Wharf East as part of LCC's award from the Access Fund. Lincoln Sincil Bank rejuvenation - The Sincil Bank improvement project aims to revitalise the area for both local residents and businesses. Provision of a new green corridor for cyclists and pedestrians along Sincil Bank, between the entrance to Lincoln City Football Club’s LNER Stadium and Kesteven Street. This would include the provision of a northbound cycleway; planted areas; and the resurfacing of several sections footway and carriageway along Sincil Bank.	With the reduction of budgets from DfT delivery of infrastructure enhancements has been limited. An options report for proposals for the development of Wigford Way in Lincoln has been completed as part of the Lincoln Town Deal. All four options include cycling infrastructure.
6	Real-time Bus Passenger Information	Transport Planning and Infrastructure	Bus route improvements	Planning Phase 2006-2010; Implementation Phase	On-going	Lincolnshire County Council and principal bus operators	Lincolnshire County Council, Department for Transport		Not Funded		Implementation	Not known	% of stops or routes with real-time info	Real time information is now available for all services provided by the three main operators within Lincoln. Real-time feed now provided direct to Traveline. Information also displayed at new Transport Hub and	

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
				2008-2010										available via commercial and operator-owned Apps. All vehicles operating in the City have now been fitted with tracking software to active bus priority access at signalised junctions.	
7	Bus Priority Measures at Traffic Signals	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Planning Phase 2013; Implementation Phase on-going	On-going	Lincolnshire County Council	Lincolnshire County Council		Fully Funded	£500k-£1 million	Implementation	Not known	No. of signals with bus priority	A total of 15 signalised junctions across the City now incorporate bus priority technology. Additional junctions in the north of the City to now be upgraded following the award of the contact to LCC's provider for these works R2P and agreement with traffic signals.	
8	Park and Ride	Alternatives to private vehicle use	Bus based Park & Ride	On-going	On-going	Lincoln BIG, Stagecoach and Waitrose	Lincolnshire County Council, Lincoln BIG		Partially Funded		Implementation	Not known	Passengers carried	This is service is currently operating with a grant from Lincoln BIG, with discussions for a potential permanent location being considered as part of the development /consultation for the new Bus Strategy	Lincolnshire County Council are currently investigating the possibility of developing a Mobility Hub at the A15/A46 Nettleham roundabout in conjunction with potential highway improvements at this location. As part of policy LCC are also looking at hubs in other location in Lincoln and in the wider county area.
9	Business Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	On-going	On-going	Lincolnshire County Council	Lincolnshire County Council					Not known	No of businesses with adopted travel plans	An online website has been launched for businesses and organisations to develop travel plans themselves. This is being signposted by planning if conditioned	Modeshift STARS is the Centre of Excellence for the delivery of Effective Travel Plans in Education, Business and Community settings. The scheme recognises schools, businesses and other organisations that have shown excellence in supporting cycling, walking and other forms of sustainable and active travel.
10	School Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	Planning Phase 2005; Implementation Phase 2012	On-going	Lincolnshire County Council	Lincolnshire County Council					Not known	No. of schools with approved travel plans	All local authority schools have an adopted travel plan. An updated travel plan is required as part of the planning process for school improvements. Sustainable Modes of Travel to School (SMOTS) strategy is	

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
														available to schools to assist in developing a travel plan. Currently supporting 17 schools as they work towards Modeshare awards	
11	Lincoln Local Cycling & Walking Infrastructure Plan	Transport Planning and Infrastructure	Cycle Network	2019	2019	Lincolnshire County Council, City of Lincoln Council, North Kesteven District Council	Lincolnshire County Council, Department for Transport		Fully Funded		Completed	Not known	KMs of new cycle lanes constructed	The first LCWIP for Lincoln has been completed. This consists of a plan for the greater Lincoln area, including surrounding villages, and a plan for the city centre. This will need review in the near future to ensure compliance with LTN 1/20	Review yet to be completed. See Cycling Infrastructure - above
12	Promotion of sustainable transport to work for City of Lincoln Staff	Promoting Travel Alternatives	Workplace Travel Planning	Planning Phase 2010; Implementation Phase ongoing	Ongoing	City of Lincoln Council	City of Lincoln Council					Not known	Change in travel to work behaviour	Mode of Travel Survey completed 2023, ColC employee survey results:- Car single jouney - 55% Cycling 7% Walking 18% Bus 8% Train 3% Working form home 3 days p/W -38%	Employee travel surveys to take place every 2 years. 234 people completed the survey (38%)
13	Introduction of electric vehicles into City of Lincoln Council Fleet	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	Planning Phase 2011; Implementation Phase 2013	Ongoing	City of Lincoln Council	City of Lincoln Council					Not known	No. of electric vehicles in fleet	The Council fleet includes 2 electric vehicles (Mayors Car and Parkin Services Van) Review of new fleet vehicle lease completed in 2021 and 5 ULEVs replace previous diesel vehicles. Review of next fleet vehcile lease due to start in 2025 and will consider options for increasing electric vehicles	The availablity of suitable electric vans and charing infrastructure limited the options to include more ULEVs in the current lease. A review of EV infrastructure requirements to support a full transition to ULEV in the next lease is currently underway.
14	Smarter Trip Planning for CoLC fleet	Vehicle Fleet Efficiency	Other	Planning Phase 2010; Implementation Phase ongoing		City of Lincoln Council	City of Lincoln Council					Not known	% reduction in CO2e emissions from CoLC fleet	Between 2022 and 2023 emissions from the Council's fleet vehciles reduced by 27%	
15	Provision of electric vehicle recharge point for CoLC fleet use	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Planning Phase - 2012; Implementation Phase - 2013		City of Lincoln Council	Defra AQ grant					Not known	No. of recharge points available for CoLC fleet	2 charge points installed at city hall .	The provision of further EVR points is subject to the outcome of the EV infrastructure review and additional electric vehicles into the CoLC fleet.

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
16	Promotion of car sharing to public	Promoting Travel Alternatives	Other	Planning Phase 2007; Implementation Phase 2009	Completed	City of Lincoln Council, Lincolnshire County Council and Lincoln Business Improvement Group	Defra AQ Grant					Not known	None	Lincolnshire liftshare Scheme is available to anyone to help people arrange car sharing. New trial bespoke staff car share scheme between CoIC and LCC set up and due to commence April 2023 - March 2024	We will review the outcomes from the new staff car share scheme in Jan 2024 and consider if this should be extended.
17	Energy efficiency measures to reduce natural gas consumption	Promoting Low Emission Plant	Other	2009	Ongoing	City of Lincoln Council	City of Lincoln Council					Not known	Gas consumption	The City of Lincoln's Domestic greenhouse gas emissions from gas consumption reduced by 35% since 2005 The City of Lincoln's total GHG emissions from gas consumption has reduced by 31% since 2005.	Public Sector Decarbonisation program is underway. A District Heat Network in the City Centre is due to commence in 2025. Domestic Home Energy Upgrade scheme to replace gas central heating and improve the efficiency of domestic properties has been underway since 2021.
Measures included in the Interim AQAP															
18	Adopt and implement East Midlands Air Quality Network's 'Air Quality and Emissions Mitigation – Planning Guidance'	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Planning Phase 2016 to present	Ongoing following adoption of guidance	City of Lincoln Council and East Midlands Air Quality Network	East Midlands Air Quality Network and City of Lincoln Council					Not quantified	Proposed KPI - % of planning approvals issued in accordance with development guidance.	The final draft of the guidance document was issued by EMAQN in July 2018 and was updated in March 2019.	Although not formally adopted at present, the guidance is being used on a good practice basis.
19	Review of Taxi Licencing Policy to include Emission Controls	Promoting Low Emission Transport	Taxi Licensing Conditions	Planning Phase 2020-2021	New policy planned to be adopted by 31st March 2021	City of Lincoln Council	-					Not quantified*	Proposed KPI - % of private hire/taxi vehicles meeting Euro 6 (diesel) and Euro 4 (petrol) emissions standards or better	Review of Taxi Licensing currently under way	* Baseline emissions data for existing fleet requires calculating
20	Eco recognition scheme for taxi/private hire vehicles	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	Planning Phase 2020-2021 as part of the taxi licensing	New policy planned to be adopted by 31st March 2021	City of Lincoln Council	City of Lincoln Council					Not quantified	Proposed KPI - % of private vehicles/taxis registered with the recognition scheme	Review of Taxi Licensing currently under way, which will consider proposals for an eco recognition scheme	

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
				policy review											
21	Review and implement CoLC Travel Plan	Promoting Travel Alternatives	Workplace Travel Planning	Review Phase - October 2018 to Summer 2019		City of Lincoln Council	City of Lincoln Council					Not quantified	TP Indicators:- - % single occupancy journeys - % Car Sharing - %Cycling/walking -% Public Transport	See P5 for 2021 data Travel Plan for 2019 to 2025 was published on the COlC website in June 2020 and last reviewed and updated December 2022	Action Plan includes a range of incentive schemes which are planned or underway such as Bicycle and ULEV salary sacrifice schemes, bespoke staff car share scheme.
22	Develop and implement an air quality guide to supplement CoLC's Social Value Procurement Policy	Policy Guidance and Development Control	Sustainable Procurement Guidance	-	Ongoing following adoption of agreed guidance	City of Lincoln Council	City of Lincoln Council					Not quantified	Specific indicators to be established as part of the development of the guide.	None	
23	Boiler Replacement Program for Council Housing Stock	Promoting Low Emission Plant	Public Procurement of stationary combustion sources	Ongoing	Ongoing replacement program	City of Lincoln Council	City of Lincoln Council					Not quantified	% of total no. of Council's housing stock fitted with low NOx boilers	Completed*	*Program completed.
24	Prepare a City of Lincoln Electric Vehicle Recharging Strategy	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	-	-	City of Lincoln Counicl	-					Not quantified	Specific indicators to be established as part of the development of the strategy	Greater Lincolnshire Electric Vehcile Infrastructure Study completed in 2021	Greater Lincolnshire EV study as part of the 5th Lincolnshire Transport Plan published in 2022.
25	Adoption of individual and business travel plans	Promoting Travel Alternatives	Personalised and workplace travel planning	Ongoing	On-going	Lincolnshire County Council and Lincoln BIG	-					Not quantified	To be confirmed	Personal Travel Plans offerred as part of the Access Lncoln Project which ended in March 2021	Funding for Access Lincoln ended in 2021.

2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[9], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

There is currently no monitoring of $PM_{2.5}$ within City of Lincoln Council. However, in accordance with LAQM.TG(22), $PM_{2.5}$ concentrations can be estimated from monitored PM_{10} concentrations using either a local PM_{10} and $PM_{2.5}$ monitoring PM_{coarse} split (the fraction of PM between 10µm and 2.5µm, i.e. PM_{10} minus $PM_{2.5}$), or a nationally derived factor[10]. The national factor for PM_{coarse} split was 5.9 for roadside sites in 2023.

Data from the Automatic Rural and Urban Network (AURN) monitoring station Chesterfield Roadside in Chesterfield (58km west of Lincoln) was used to calculate a local factor for PM_{coarse} split of 4.6. The Chesterfield Roadside site was chosen due to it being the closest AURN site to Broadgate where both PM_{10} and $PM_{2.5}$ are measured, as well as it being an Urban Traffic location and therefore likely representative of the roadside Broadgate site.

The local factor for PM_{coarse} split (4.6) was applied to the Broadgate 2023 PM_{10} annualised annual mean concentration (20.4µg/m^3) according to the methodology detailed within Box 7.7 of LAQM.TG(22). The local factor was chosen over the national factor due to it being a smaller value and therefore providing a more conservative estimate. This gives an estimated $PM_{2.5}$ annual mean of 15.8µg/m^3, which is below the $PM_{2.5}$ annual mean target (20µg/m^3). Further details on the calculation of the local factor are provided in Section 3.2.3.

Current Defra background maps (based on 2018 monitored concentrations) for City of Lincoln Council show that all 2023 background concentrations of $PM_{2.5}$ are far below the Stage 2 indicative annual mean $PM_{2.5}$ limit value of 20µg/m^3. The highest concentration is

[9] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

[10] Defra. Estimating $PM_{2.5}$ from PM_{10} Measurements. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/estimating-pm2-5-from-pm10-measurements/

predicted to be 9.57µg/m^3 within the 1 x 1km grid square with the centroid grid reference of 497500, 370500. This is an area to the south of the city centre that contains a section of the A57 and A15. The background maps also provide a breakdown of sources. For the highest background concentration grid square, the majority of the estimated $PM_{2.5}$ concentration (4.99µg/m^3) is attributed to secondary $PM_{2.5}$ formation, where $PM_{2.5}$ is formed from the chemical reactions of other gaseous atmospheric pollutants such as sulphur dioxide (SO_2) and nitrogen oxides (NO_x, NO and NO_2).

The Public Health Outcomes Framework data tool[11] compiled by Public Heath England quantifies the mortality burden of $PM_{2.5}$ within England on a county and local authority scale. The 2022 fraction of mortality attributable to particle air pollution (indicator D01) is 4.6% in Lincoln which is lower than the average for the East Midlands region (6.1%) and the average for England (5.8%). The 2022 estimates of the fraction of mortality attributable to $PM_{2.5}$ pollution range from 2.5% in West Devon to 8.3% in the City of London.

Many of the measures within Table 2.2 above, the interim AQAP and the City of Lincoln Transport Strategy will target improvements in NO_2 concentrations across the council. However, most of these measures will also help to improve $PM_{2.5}$ emissions as they target the reduction in vehicle flow and private vehicle usage as well as the uptake of sustainable modes of transport, some of the measures more targeted at improving $PM_{2.5}$ include:

- The creation of the Lincolnshire Clean Air Project, which was funded by a Defra Air Quality Grant. The project has involved the creation of a website and working with eight schools throughout the county. See https://cleanairlincs.org.uk/ for further details.
- Development of cycle network and infrastructure, including the Local Cycling and Walking Network Plan.
- Incentives scheme to increase number of ULEV or bicycles for City of Lincoln's vehicle fleet through salary sacrifice and car share; and
- Additional installations of EV charging points across the city and provision for more EV charging.

[11] Public Health Outcomes Framework, Public Health England. data tool available online at https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/1/gid/1000043/pat/6/par/E12000004/ati/501/are/E07000138/yrr/3/cid/4/tbm/1

Additionally, City of Lincoln Council has a number of smoke control areas, effectively covering the whole city. These are designated geographical areas where you cannot legally emit smoke from a chimney, unless using an authorised fuel, or using ‘exempt appliances’. Further information on smoke control and wood burning stoves can be found on the City of Lincoln website.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2023 by City of Lincoln 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.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

City of Lincoln Council undertook automatic (continuous) monitoring at two sites during 2023. Table A.1 in Appendix A shows the details of the automatic monitoring sites. Table A.3 and Table A.6 page presents automatic monitoring results for City of Lincoln 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.

3.1.2 Non-Automatic Monitoring Sites

City of Lincoln Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 18 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: Map(s) of Monitoring Locations and AQMAs. 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.

3.2 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.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. 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.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

All passive and automatic monitoring locations monitored concentrations below the annual mean NO_2 AQS objective of 40µg/m^3 in 2023. Traffic levels are understood to have returned to pre-COVID levels.

Lincoln AQMA

No sites within Lincoln AQMA reported concentrations within 10% of the annual mean AQS objective (36µg/m^3). The maximum reported annual mean NO_2 concentration within Lincoln AQMA in 2023 was 31.6 g/m^3, reported at Site 3 which is located at Drill Hall, Broadgate.

As the AQMA achieved compliance with the 40µg/m^3 AQS objective in 2019, followed by full compliance (within 10% of the AQS objective) from 2020-2023, the Council intends to proceed with the revocation of Lincoln AQMA this year.

Outside of AQMAs

The maximum concentration outside of Lincoln AQMA was 26.3µg/m^3 and was reported at site 18b. This site is located at a busy roundabout, so it is likely that slowing traffic is affecting local NO_2 concentrations, although they remain well below the annual mean AQS objective.

All sites showed an increase in NO_2 concentrations when compared to 2022 data, although this is most likely a result of the bias adjustment factor applied. A local factor was used from 2019-2022 but could not be applied to the 2023 data due to poor data capture at Lincoln Canwick Road automatic monitor, which occurred due to water ingress. A national bias adjustment factor was therefore applied (0.81) which was significantly larger than the local bias adjustment factor applied to the 2022 data (0.60). When compared to nationally bias adjusted 2022 monitoring data, 2023 concentrations decreased by 0.88µg/m^3 on average. A comparison of 2023 data with locally and nationally bias adjusted 2022 data is provided in Table C.2.

The Lincoln Canwick Road AURN did not report any hourly NO_2 concentrations exceeding 200µg/m^3. Additionally, there have been no diffusion tube monitoring sites with an annual mean greater than 60µg/m^3. As per LAQM.TG(22), an annual mean NO_2 concentration greater than 60µg/m^3 can be used as a proxy to indicate whether there is an exceedance of the NO_2 1-hour mean AQS Objective (no more than 18 hourly mean concentrations in exceedance of 200µg/m^3). It is therefore assumed that there have been no exceedances of the 1-hour mean objective of 200µg/m^3.

From 2019-2022, concentrations at all non-automatic sites showed a general downward trend. When compared to 2019 data, 2022 concentrations within Lincoln AQMA decreased by 6.4µg/m^3 on average, while those outside of the AQMA decreased by 5.6µg/m^3. 2022 concentrations were also decreased when compared to 2020 and 2021 COVID years. As detailed above, concentrations increased in 2023 when compared to 2022 at all diffusion tube sites, due to the use of the national bias adjustment factor. 2023 concentrations remain however comfortably below the AQS objective at all diffusion tube sites.

Annual NO_2 concentrations at Lincoln Canwick Road have consistently declined over the last five years; the annual average concentration in 2023 was 11.4 µg/m^3 lower than in 2019 and was also decreased when compared to 2020 and 2021 COVID-19 years.

The general decline in concentrations over the last five years indicates that Lincoln City Council's measures focusing on promoting travel alternatives and traffic management have been effective in decreasing emissions, as concentrations have continued to decrease despite the return to normal work and travel patterns.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

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

The annual average PM_{10} concentration report in 2023 at the automatic monitoring location Broadgate was 20.4µg/m^3, which is well below the annual average PM_{10} AQS objective of 40µg/m^3.

In 2023, there were three 24-hour mean concentrations greater than 50µg/m^3, therefore there has been compliance with the 24-hour AQS objective.

The 2023 annual average PM_{10} concentration was decreased by 4.1µg/m^3 when compared to 2022 (24.5µg/m^3). With the exception of 2022, annual average PM_{10} concentrations have showed a general decrease over the last five years, with 2023 annual average concentrations being 5.5µg/m^3 lower than in 2019.

3.2.3 Particulate Matter ($PM_{2.5}$)

As detailed in Section 2.3, a local factor for PM_{coarse} split was applied to the PM_{10} annualised average concentrations at Broadgate (20.4µg/m^3) to estimate the annual average $PM_{2.5}$ concentrations.

The local factor was calculated using PM concentrations recorded the Automatic Rural and Urban Network (AURN) monitoring station Chesterfield Roadside in Chesterfield, which had an annual data capture of 99.5% in 2023. The steps followed to calculate the local factor, in accordance with LAQM.TG(22) are set out below.

Step 1: Calculation of PM_{Coarse} at the reference site (Chesterfield Roadside):

Annual average PM_{10}: 11.9µg/m^3

Annual average $PM_{2.5}$: 7.3µg/m^3

PM_{coarse} split (locally derived): 11.9 – 7.3 = 4.6

Step 2: Subtract locally derived PM_{Coarse} split from annual average PM_{10} at Broadgate:

20.4 – 4.6 = 15.8

Step 3: Estimated annual mean $PM_{2.5}$ at Broadgate = 15.8µg/m^3.

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) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
LCR	Lincoln Canwick Road (AURN)	Roadside	497962	370375	NO_2	NO	Chemiluminescent	0(3)	1.5	2.65
B	Broadgate	Roadside	497783	371282	PM_{10}	YES(4)	Unheated BAM 1020, corrected by dividing by 1.21	21	2	1.7

Notes:

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

(2) N/A if not applicable

(3) The location of LCR is on a street with housing only on the opposite side to the monitor, it has been assumed that concentrations recorded by the monitor are representative of the opposite side of the street where the relevant exposure is located.

(4) The Broadgate monitor is located within the revised Lincoln NO_2 AQMA boundary, the AQMA has not been designated for exceedances of either of the PM_{10} objectives.

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
1	The Avenue	Roadside	497107	371510	NO_2	Yes – Lincoln AQMA	10.0	2.5	No	2.9
2	106 Yarborough Road	Roadside	496946	372027	NO_2	No	0.0	7.0	No	2.7
3	Drill Hall, Broadgate	Roadside	497785	371300	NO_2	Yes – Lincoln AQMA	0.0	2.5	No	2.9
4	City Hall	Urban Background	497326	371421	NO_2	No	16.5	N/A	No	5.6
5, 6, 7	Canwick Road	Roadside	497962	370375	NO_2	No	0.0	1.5	Yes	2.6
8	Dixon Street	Roadside	497190	370080	NO_2	No	0.0	4.0	No	2.8
9	St Catherines	Roadside	497112	369351	NO_2	No	4.5	2.5	No	2.3
10	High Street	Roadside	497467	370956	NO_2	Yes – Lincoln AQMA	N/A	0.5	No	2.9
11	Carholme Road	Roadside	496590	371571	NO_2	No	0.0	5.0	No	2.6
12	Monks Road	Roadside	497908	371421	NO_2	Yes – Lincoln AQMA	1.5	0.5	No	2.8
14	Portland St/Archer St	Roadside	497835	370584	NO_2	No	0.3	2.0	No	2.8
15	Skellingthorpe Rd East	Roadside	495541	369272	NO_2	No	7.5	2.3	No	2.7
16	Skellingthorpe Rd Central	Roadside	494158	370303	NO_2	No	6.5	2.5	No	2.7
17	Skellingthorpe Rd West	Roadside	493543	370838	NO_2	No	13.0	2.0	No	2.7
18b	South Park/High St	Roadside	497195	369616	NO_2	No	3.5	1.0	No	2.8
19b	Newark Rd/ Brant Rd	Roadside	496720	368181	NO_2	No	0.0	2.4	No	2.8
20	Newland/Wigford Way	Roadside	497383	371250	NO_2	Yes – Lincoln AQMA	0.0	6.0	No	2.9
21b	78 Canwick Road	Roadside	498005	370245	NO_2	No	0.5	2.1	No	2.7

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
LCR	497962	370375	Roadside	77.3	77.3	29.2	21.4	20.8	19.13	17.8

☒ **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_2 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^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 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_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
1	497107	371510	Roadside	100.0	100.0	26.8	21.0	21.7	19.1	25.1
2	496946	372027	Roadside	90.4	90.4	24.5	20.1	19.4	18.1	22.3
3	497785	371300	Roadside	100.0	100.0	36.4	29.6	24.2	23.6	31.6
4	497326	371421	Urban Background	100.0	100.0	12.3	9.3	9.6	8.6	11.1
5, 6, 7	497962	370375	Roadside	100.0	100.0	27.9	22.2	21.3	19.3	25.5
8	497190	370080	Roadside	100.0	100.0	22.9	18.1	20.6	18.7	24.9
9	497112	369351	Roadside	92.3	92.3	21.2	18.4	17.4	15.2	20.6
10	497467	370956	Roadside	100.0	100.0	18.8	14.4	15.9	14.2	19.4
11	496590	371571	Roadside	100.0	100.0	17.5	13.7	13.5	12.9	17.0
12	497908	371421	Roadside	100.0	100.0	21.3	16.3	18.0	18.7	24.4
14	497835	370584	Roadside	100.0	100.0	22.9	18.8	18.8	17.7	23.7
15	495541	369272	Roadside	84.6	84.6	20.7	17.6	18.9	16.7	23.4
16	494158	370303	Roadside	100.0	100.0	16.4	12.8	14.0	12.4	17.2
17	493543	370838	Roadside	100.0	100.0	20.5	15.5	17.1	15.4	19.2
18b	497195	369616	Roadside	100.0	100.0	26.2	22.2	21.7	20.3	26.3
19b	496720	368181	Roadside	100.0	100.0	21.1	17.6	18.6	16.1	23.5
20	497383	371250	Roadside	92.3	92.3	18.2	14.5	16.1	13.8	18.3
21b	498005	370245	Roadside	100.0	100.0	27.2	21.9	17.9	17.9	23.3

☒ **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 µg/m^3.

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

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

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.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_2 Concentrations – Lincoln AQMA

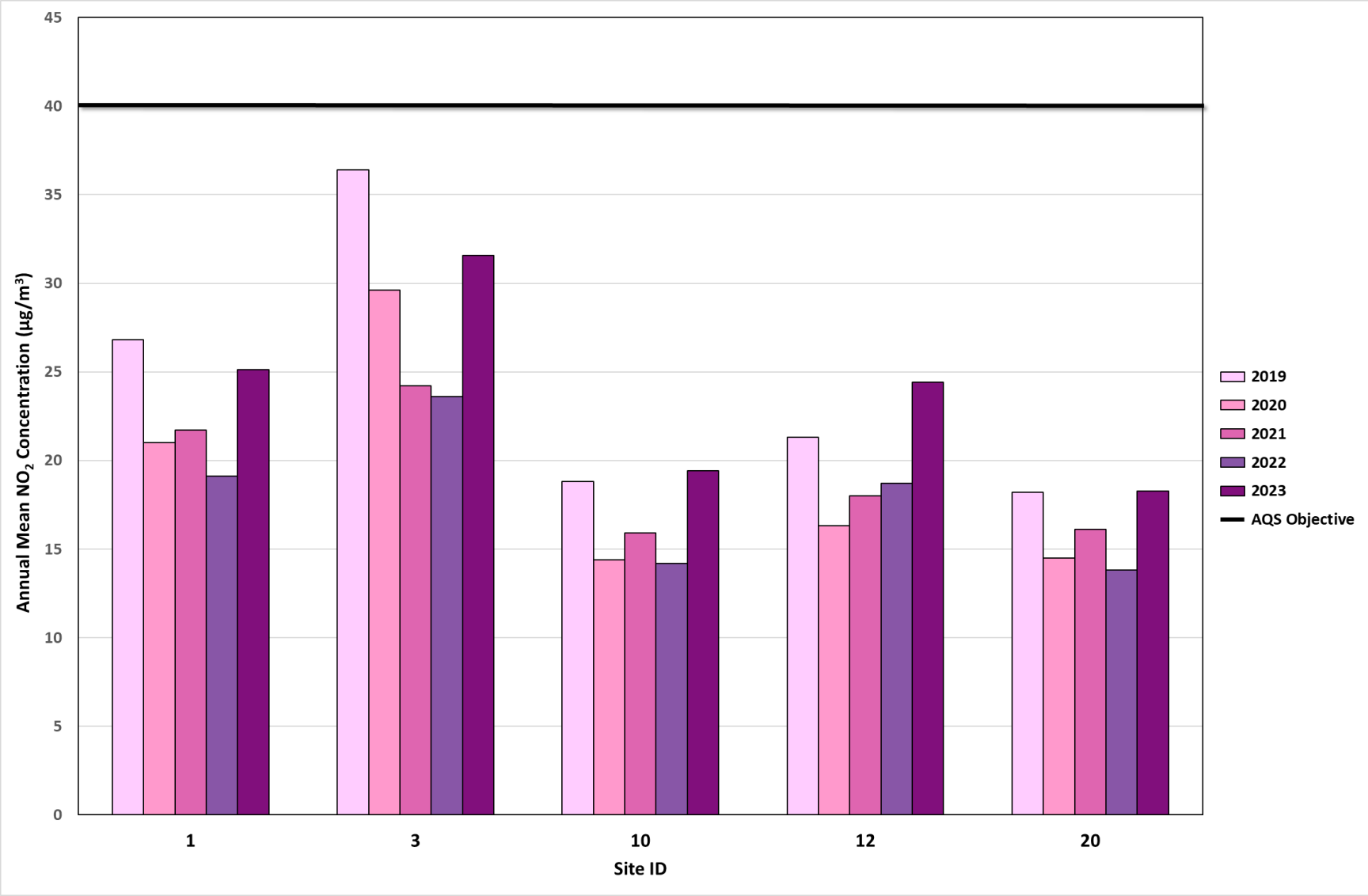


Figure A.2 – Trends in Annual Mean NO_2 Concentrations – Outside of Lincoln AQMA

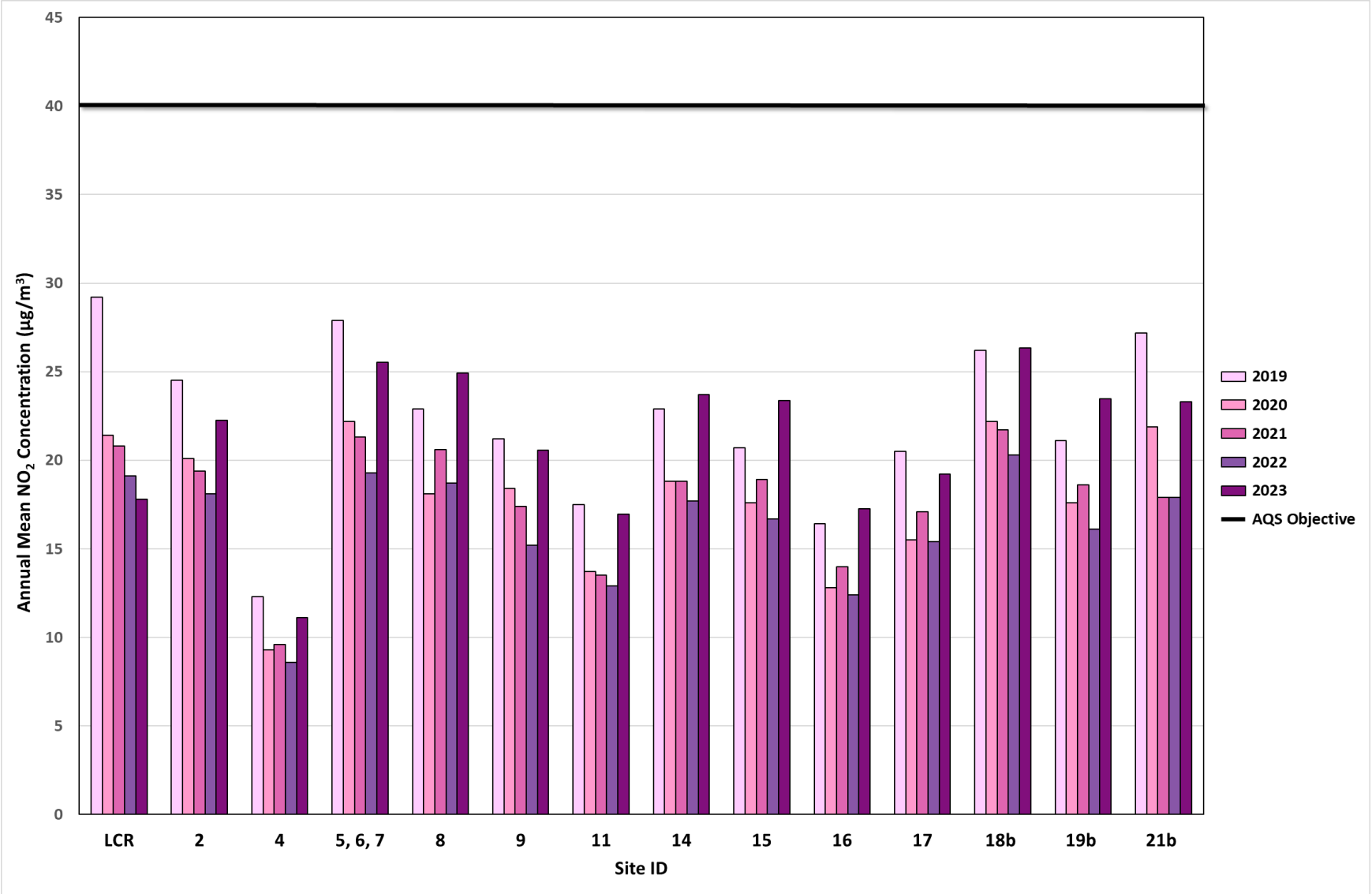


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
LCR	497962	370375	Roadside	77.8	77.8	0	0	0	0	0

Notes:

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

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

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

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

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

Table A.6 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
B	497783	371282	Roadside	96.7	96.7	25.9	24.6	22.4	24.5	20.4

☒ **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^3.

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 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.3 – Trends in Annual Mean PM_{10} Concentrations

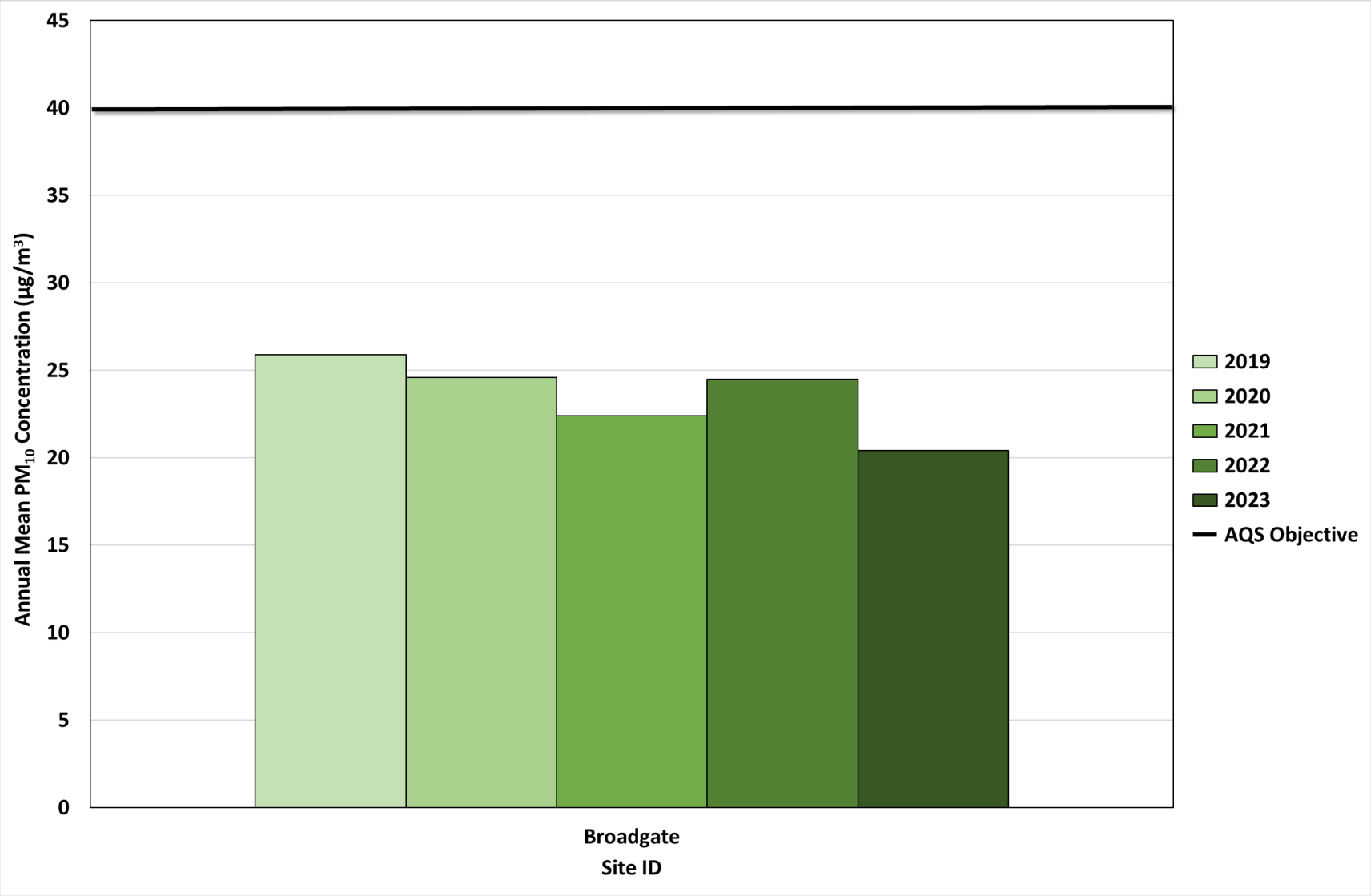


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
B	497783	371282	Roadside	98.4%	98.4%	22	7 (43.8)	1	9	3

Notes:

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

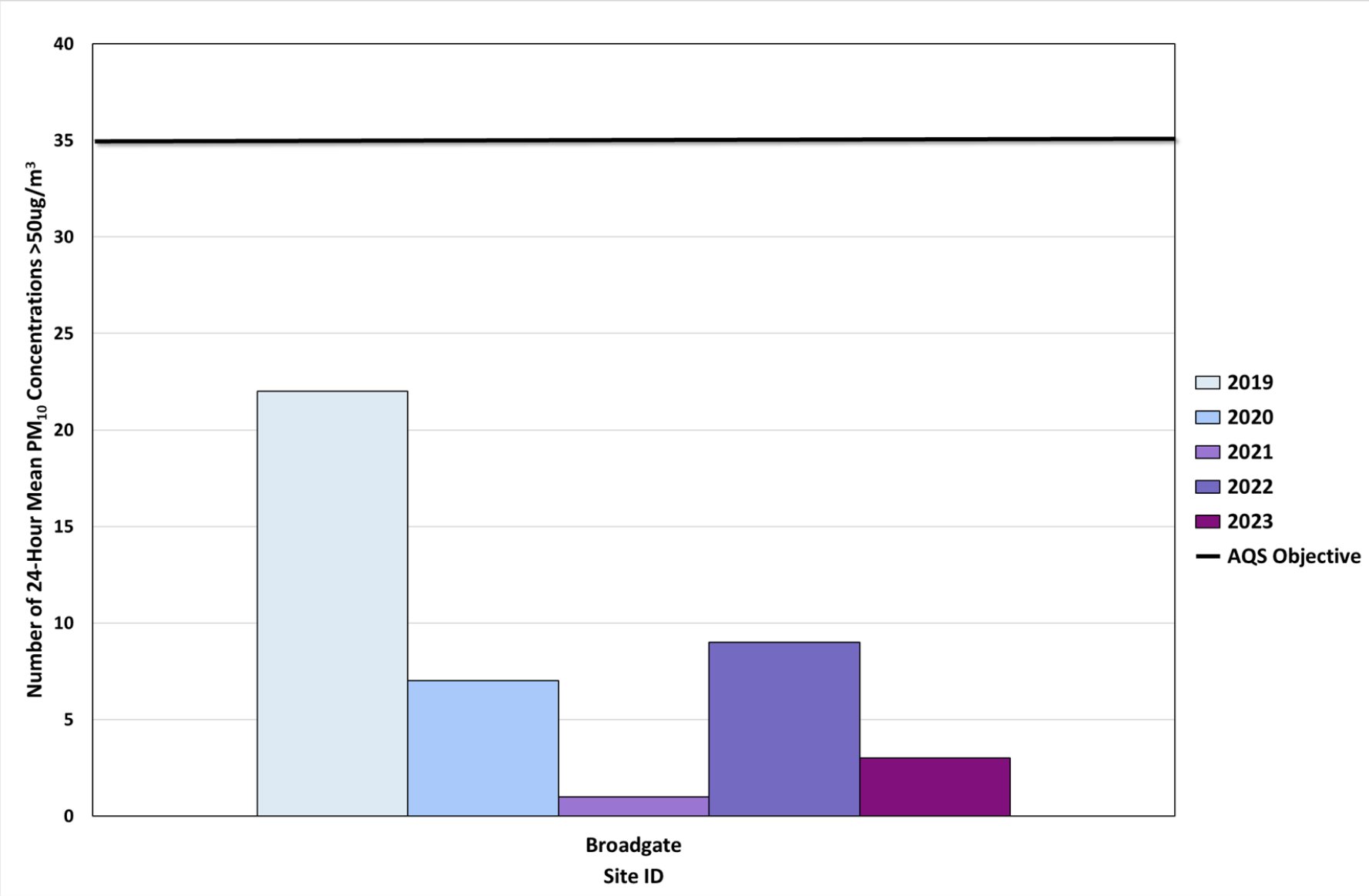
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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%).

Figure A.4 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	497107	371510	38.0	35.0	32.5	29.5	27.4	26.4	28.0	25.5	31.2	33.0	34.2	31.4	31.0	25.1	-	
2	496946	372027	35.3	33.0	27.9	24.0	22.5	20.9	25.3	23.6	30.2	30.2		29.5	27.5	22.3	-	
3	497785	371300	50.2	45.3	42.5	37.6	35.1	32.7	35.5	30.9	39.9	37.6	42.9	37.7	39.0	31.6	-	
4	497326	371421	20.7	18.1	13.4	11.0	9.1	9.0	9.6	10.0	12.9	16.3	19.1	15.2	13.7	11.1	-	
5	497962	370375	36.3	34.4	34.0	33.5	35.6	29.2	23.6	26.5	31.7	33.2	36.6	25.1	-	-	-	Triplicate Site with 5, 6 and 7 - Annual data provided for 7 only
6	497962	370375	34.4	37.5	34.4	31.8	35.8	29.9	22.6	26.8	31.3	33.2	36.3	26.4	-	-	-	Triplicate Site with 5, 6 and 7 - Annual data provided for 7 only
7	497962	370375	33.6	37.5	34.1	32.6	33.9	28.8	22.6	26.7	31.6	32.5	35.2	26.0	31.5	25.5	-	Triplicate Site with 5, 6 and 7 - Annual data provided for 7 only
8	497190	370080	32.4	36.4	32.2	33.4	33.6	32.2	22.7	26.9	30.0	31.1	33.9	24.2	30.8	24.9	-	
9	497112	369351		31.9	29.3	26.3	22.7	20.3	20.5	19.2	28.8	28.3	24.3	27.9	25.4	20.6	-	
10	497467	370956	30.4	29.8	23.7	22.1	18.7	18.7	18.3	20.1	23.7	25.6	29.5	27.3	24.0	19.4	-	
11	496590	371571	25.6	24.9	19.8	17.1	15.1	15.5	18.1	18.2	21.4	27.0	25.4	23.3	20.9	17.0	-	
12	497908	371421	37.0	36.9	30.0	27.2	24.6	24.7	26.3	25.3	30.2	32.5	35.5	31.6	30.1	24.4	-	
14	497835	370584	34.1	34.3	29.8	27.7	30.5	29.3	21.5	25.5	26.6	30.0	35.7	26.1	29.3	23.7	-	
15	495541	369272	30.7	34.5	29.2	28.3	28.8	29.0		22.3		29.7	30.2	25.9	28.9	23.4	-	
16	494158	370303	24.9	24.0	19.2	21.0	20.1	16.6	14.9	20.9	24.4	23.6	26.4	19.5	21.3	17.2	-	
17	493543	370838	31.1	28.1	26.0	23.7	22.2	19.8	17.6	19.7	23.4	24.2	28.5	20.6	23.7	19.2	-	
18b	497195	369616	37.2	36.2	31.5	31.9	28.8	29.6	29.7	27.3	34.9	35.5	35.5	32.1	32.5	26.3	-	
19b	496720	368181	39.2	37.0	32.1	28.1	27.7	26.5	19.6	21.8	26.8	27.7	33.2	27.9	29.0	23.5	-	
20	497383	371250		27.3	23.6	21.2	19.2	19.4	16.5	19.1	23.4	26.3	28.2	24.2	22.6	18.3	-	
21b	498005	370245	37.2	32.8	29.3	26.7	25.5	19.2	23.3	23.8	30.8	31.5	38.3	26.8	28.8	23.3	-	

☒ **All erroneous data has been removed from the NO_2 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.**

☒ **City of Lincoln Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

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

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

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 City of Lincoln Council During 2023

There have been no planning applications received in the reporting period that have required air quality impact assessments.

The Western Growth Corridor development (2019/0294/RG3) mentioned in previous ASRs is ongoing. The hybrid application for 3200 dwellings plus commercial and leisure village areas was granted in January 2022. Situated off Skellingthorpe road, the development will supply the city with 3,200 new homes, a neighbourhood centre, a business park and transport infrastructure. As part of the planning process, Air Quality has been considered as part of the Environmental Impact Assessment (EIA) and mitigation measure proposed. Due to the size of the project, there is a condition on the planning consent for the air quality assessment to be reviewed/updated prior to the commencement of each new phase of the development to ensure the assessment conclusions and recommendations remain valid.

Additional Air Quality Works Undertaken by City of Lincoln Council During 2023

City of Lincoln Council has not undertaken any additional air quality works during the 2023 monitoring year.

QA/QC of Diffusion Tube Monitoring

City of Lincoln Council's diffusion tubes in 2023 were supplied and analysed by Gradko International Ltd., using the 20% Triethanolamine (TEA) in water preparation method. Gradko's laboratory is UKAS accredited, participating in the AIR-PT Scheme for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2

concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance.

In the 2023 AIR NO_2 PT rounds, AIR-PT AR055 - AR059 (January - October 2023) Gradko scored 100%. The results for November - December 2023 have not yet been published. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ±2. Additionally, the precision of the NO_2 diffusion tubes (20% TEA in Water) supplied by Gradko has been classified as 'good' for all 21 observations in 2023. This precision reflects the laboratory's performance and consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Tubes are considered to have a "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more monitoring periods during a year is less than 20%. Further information on the precision summary results can be found on the LAQM website.

Monitoring in 2023 had been completed in adherence with the 2023 Diffusion Tube Monitoring Calendar, with all changeovers completed on the specified date.

Diffusion Tube Annualisation

As no sites had a data capture below 75%, diffusion tube annualisation was not required during the 2023 monitoring year.

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_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

City of Lincoln Council have applied a national bias adjustment factor of 0.81 to the 2023 monitoring data. This has been derived from the national bias adjustment calculator, as shown in

Figure C.1.

A triplicate co-location study is carried out with the AURN Lincoln Canwick Road Site and in previous years, City of Lincoln Council have used this to apply a local bias adjustment factor. In 2023, the Lincoln Canwick Road automatic monitoring site had poor overall data capture as a result of water ingress which occurred from October to December. A national factor was therefore applied in accordance with LAQM.TG22. A summary of bias adjustment factors used by City of Lincoln Council over the past five years is presented in Table C.1.

The 2023 national factor (0.81) is significantly higher than the local factors applied in previous years which has resulted in increased bias adjusted 2023 annual average NO_2 concentrations. Table C.2 presents a comparison of the 2023 concentrations calculated using the national bias adjustment factor, with the 2022 concentrations calculated using either the 2022 local or national bias adjustment factors for reference.

Figure C.1 - National Diffusion Tube 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
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2024

LAQM Helpdesk Website

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

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

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

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

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

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in Water	2023	R	Monmouthshire County Council	11	33	26	26.5%	G	**0.79**
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**
Gradko	20% TEA in water	2023	R	Eastleigh Borough Council	12	33	26	26.4%	G	**0.79**
Gradko	20% TEA in water	2023	R	Eastleigh Borough Council	12	22	19	12.5%	G	**0.89**
Gradko	20% TEA in water	2023	R	Plymouth City Council	12	35	26	38.3%	S	**0.72**
Gradko	20% TEA in water	2023	R	Plymouth City Council	10	39	31	24.2%	S	**0.80**
Gradko	20% TEA in water	2023	UC	Belfast City Council	10	26	19	38.3%	G	**0.72**
Gradko	20% TEA in water	2023	R	Cheshire West And Chester	12	35	32	10.0%	G	**0.91**
Gradko	20% TEA in water	2023	R	Cheshire West And Chester	10	32	28	14.6%	G	**0.87**
Gradko	20% TEA in water	2023	R	Dudley Mbc	12	27	23	17.1%	G	**0.85**
Gradko	20% TEA in water	2023	UB	Dudley Mbc	12	19	13	45.4%	G	**0.69**
Gradko	20% TEA in water	2023	R	Dudley Mbc	12	40	37	7.7%	G	**0.93**
Gradko	20% TEA in water	2023	R	Gateshead Council	12	23	20	17.7%	G	**0.85**
Gradko	20% TEA in water	2023	R	Gateshead Council	11	23	18	26.9%	G	**0.79**
Gradko	20% TEA in water	2023	R	Gateshead Council	12	27	22	20.7%	G	**0.83**
Gradko	20% TEA in water	2023	R	Gateshead Council	12	29	23	25.9%	G	**0.79**
Gradko	20% TEA in water	2023	R	Gateshead Council	12	30	33	-7.8%	G	**1.08**
Gradko	20% TEA in water	2023	KS	Marylebone Road intercomparison	11	45	38	20.3%	G	**0.83**
Gradko	20% TEA in water	2023	B	South Holland District Council	10	8	7	12.4%	G	**0.89**
Gradko	20% TEA in water	2023	R	Worcestershire	12	12	11	17.4%	G	**0.85**
Gradko	20% TEA in Water	2023	R	Ards And North Down Borough Council	12	33	21	60.2%	G	**0.62**
Gradko	20% TEA in Water	2023	R	Lisburn & Castlereagh City Council	11	24	20	22.1%	G	**0.82**
Gradko	20% TEA in water	2023		**Overall Factor[3] (23 studies)**				**Use**		**0.81**

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.81
2022	Local	-	0.60
2021	Local	-	0.63
2020	Local	-	0.63
2019	Local	-	0.68

Table C.2 – Comparison of 2023 Annual Average NO_2 concentrations (calculated using the National Bias Adjustment Factor) with 2022 Annual Average NO_2 concentrations (calculated using the National and Local Bias Adjustment Factors).

DT ID	2022 (*NF* = 0.83*)	2022 (*LF** = 0.60*)	2023 (*NF* = 0.81*)	Comparison of 2023 (NF*) with 2022 (NF*)	Comparison of 2023 (NF*) with 2022 (LF**)
1	26.4	19.1	25.1	-1.3	6.0
2	25.0	18.1	22.3	-2.7	4.2
3	32.7	23.6	31.6	-1.1	8.0
4	12.0	8.6	11.1	-0.9	2.5
5,6,7	26.3	19.0	25.5	-0.8	6.5
8	25.9	18.7	24.9	-1.0	6.2
9	21.0	15.2	20.6	-0.4	5.4
10	19.6	14.2	19.4	-0.2	5.2
11	17.8	12.9	17.0	-0.8	4.1
12	25.9	18.7	24.4	-1.5	5.7
14	24.4	17.7	23.7	-0.7	6.0
15	23.0	16.7	23.4	0.4	6.7
16	17.2	12.4	17.2	0.0	4.8
17	21.4	15.4	19.2	-2.2	3.8
18b	28.0	20.3	26.3	-1.7	6.0
19b	22.3	16.1	23.5	1.2	7.4
20	19.0	13.8	18.3	-0.7	4.5
21b	24.8	17.9	23.3	-1.5	5.4

***NF = National bias adjustment factor.**

****LF = Local bias adjustment factor.**

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within City of Lincoln required distance correction during 2023.

QA/QC of Automatic Monitoring

The Lincoln Canwick Road monitoring station is within the AURN, thus data and QA/QC are managed to AURN standards.

The Broadgate BAM monitoring station is run by the City of Lincoln Council. Local Site Operator duties, data management and QA/QC procedures are undertaken in-house in accordance with a written procedure. A service and maintenance contract is held by Enviro Technology Services plc. for servicing, maintenance and equipment support.

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

Correction of the Beta Attenuation Monitor (BAM) was conducted in accordance with the methodology stipulated in paragraph 7.168 in LAQM.TG22, namely a division by 1.21 of the monitored concentrations.

Automatic Monitoring Annualisation

All automatic monitoring locations within City of Lincoln 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_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM

Support website. Where appropriate, automatic annual mean NO_2 concentrations corrected for distance are presented in Table A.3.

The Lincoln Canwick Road automatic monitoring site did not require fall-off with distance correction in 2023.

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

Figure D.1 – Map of Non-Automatic Monitoring Sites – In and around Lincoln AQMA

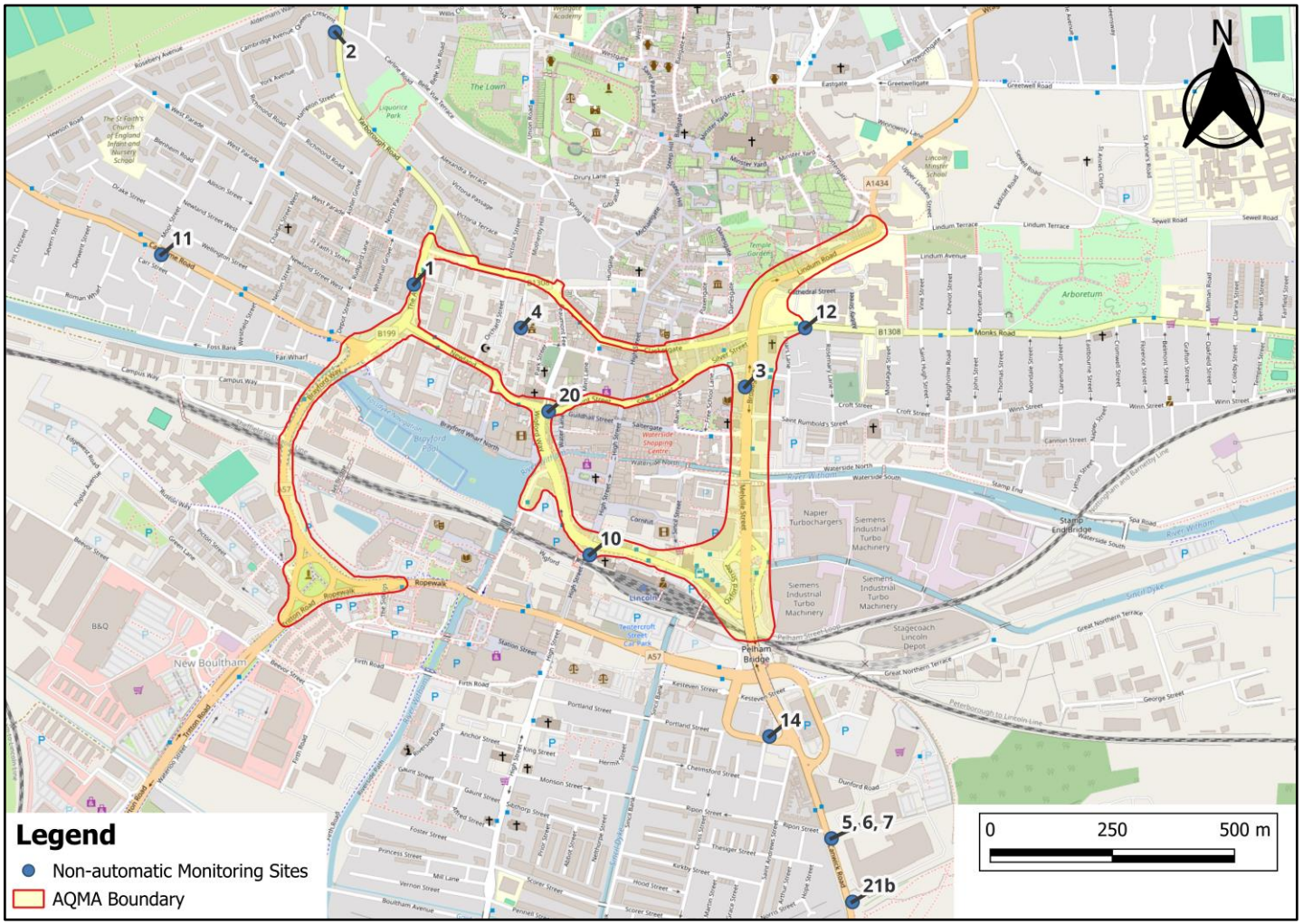


Figure D.2 – Map of Non-Automatic Monitoring Sites – Outside of Lincoln AQMA

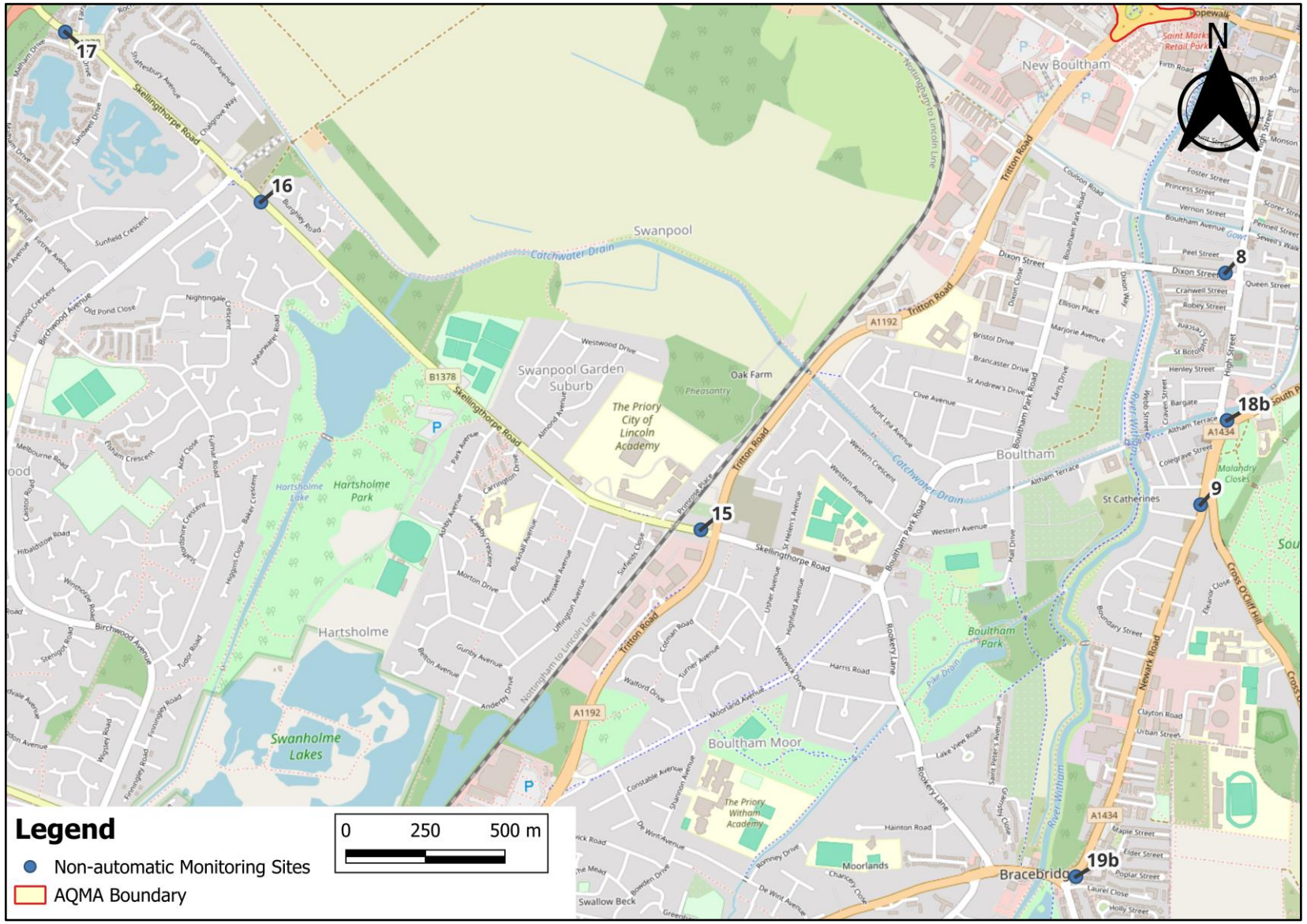
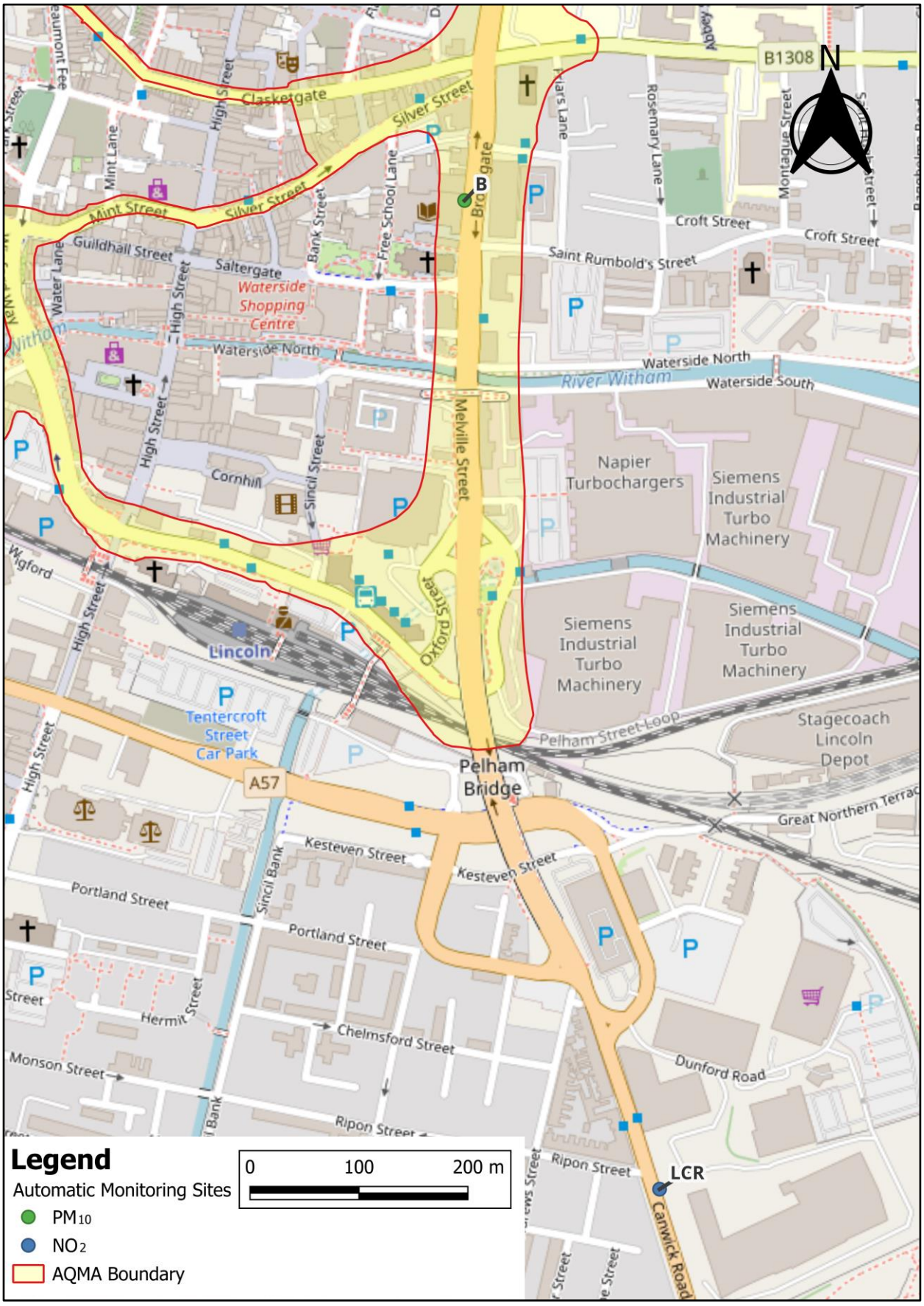


Figure D.3 – Map of Automatic Monitoring Sites



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[12]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[12] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

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_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- 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.
- City of Lincoln Council, Interim Action Plan, 2019
- City of Lincoln Council 2023 Annual Status Report.
- City of Lincoln Council 2023 Appraisal Letter
- City of Lincoln Transport Strategy, 2020-2026
- City of Lincoln Council Decarbonisation Strategy and Action Plan 2021-2025
- City of Lincoln Council's Environmental Policy, September 2021