2023 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: September 2023

Information	<Local Authority Name> Details
Local Authority Officer	Paul Spandler Christina Terro
Department	Environmental Health
Address	Leeds City Council, Environmental Health, Leeds Building Service, Seacroft Ring Road, Seacroft, Leeds, LS14 1NZ
Telephone	0113 3785959
E-mail	epteam@leeds.gov.uk
Report Reference Number	Leeds ASR 2023
Date	28/09/2023

Executive Summary: Air Quality in Our Area

Air Quality in Leeds City Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

Outdoor air quality in most of Leeds meets the UK's air quality objectives in 2022. Overall air quality in Leeds has remained at similar levels compared to results in 2021. It is also noted that concentrations of Nitrogen Dioxide have not returned to the same levels measured before the COVID-19 pandemic (2019). However, there are some locations, mainly in the city centre that remain above the annual mean air quality objective for Nitrogen Dioxide.

There are two primary pollutants of concern for Leeds:

- **Nitrogen dioxide (NO_2)** of which the main source is vehicle emissions and the burning of other fossil fuels.
- **Particulate matter (PM_{10} and $PM_{2.5}$)** There are a number of sources of Particulate Matter. A small proportion of the concentrations of PM that people are exposed to come from naturally occurring sources such as pollen, sea salt and airborne dust. A

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

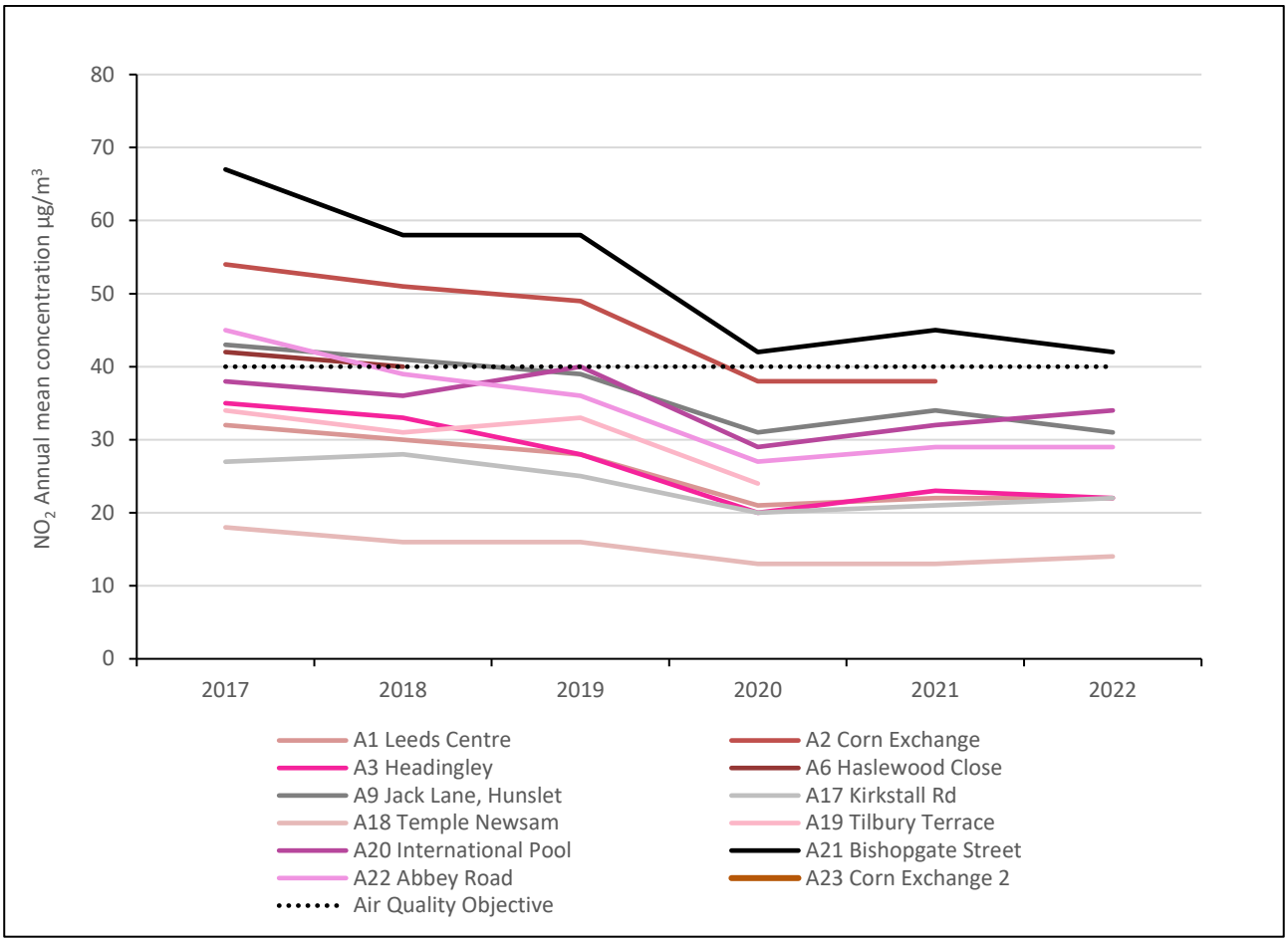
[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

third of all PM in the UK is from sources outside of the UK. However, around half of UK concentrations comes from domestic wood burning and transport emissions.

Trend in NO_2 Annual Mean Concentrations at Leeds Air Quality Monitoring Stations

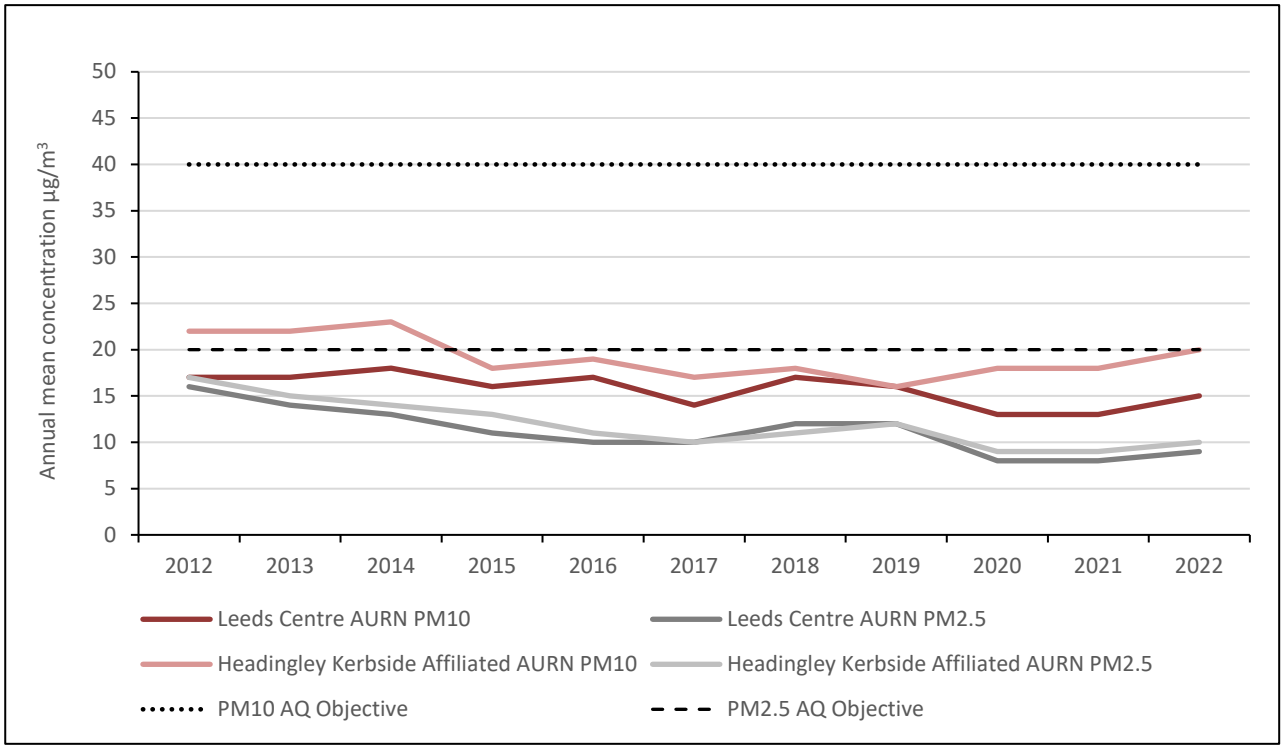


The UK Air Quality Objective also limits the number of hours where nitrogen dioxide (NO_2) concentrations should exceed 200µg/m^3. No single location should exceed this limit more than 18 hours in a single year. In 2022 every location monitored in Leeds met this NO_2 hourly limit. Most automatic monitoring stations recorded no hourly exceedances of nitrogen dioxide concentrations above 200µg/m^3 , the exception to this being Bishopgate Street which recorded two hours above this concentration in 2022.

In 2022 national statistics for annual mean concentrations of NO_2 decreased by 1% at AURN urban background sites and 5% at roadside sites from 2021 levels. Leeds sites recorded similar decreases in 2022 to the national trend, with a 0% decrease at the AURN urban background site and a 4% decrease at the roadside site. NO_2 annual average concentrations recorded in Leeds in 2022 remain significantly below 2019 (pre-pandemic) concentrations, showing a decrease of 21%.

Particulate matter is monitored at Leeds Centre AURN and Headingley Kerbside AURN sites and both PM_{10} and $PM_{2.5}$ were well within UK Air Quality Objectives in 2022.

Trend in PM_{10} and $PM_{2.5}$ Annual Mean Concentrations at Leeds Centre AURN and Headingley Kerbside Affiliated AURN sites



In 2022 national statistics for annual mean concentrations of PM2.5 at both urban background and roadside sites rose by 5% from 2021 levels. Leeds sites recorded greater increases than the national average with increases of 12% at the AURN urban background site and 11% at the roadside site.

National statistics for annual mean concentrations of PM10 at urban background and roadside locations increased from 2021, by an average of 8% and 6% respectively. Leeds sites recorded increases of 15% and 11% respectively.

Leeds City Council has previously declared six Air Quality Management Areas (AQMA's) within the district due to exceedances of NO_2 objectives. Comprehensive monitoring within the AQMA's has identified that air quality within five of the AQMA's is now within UK Objectives and has been consistently so for a number of years. It is therefore proposed to implement the AQMA revocation process in 2023. The AQMA areas to be revoked are:

- Ebor Gardens, Burmantofts
- Caspar Apartments, North Street
- The Normans, Kirkstall

- The Tilburys, Holbeck
- Chapel Hill, Morley

Further information on our AQMA's can be found at:

https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=143

The Leeds Air Quality Strategy sets out how the council intends to continue to ensure the ongoing improvement in air quality. The plan includes actions to tackle air pollution from transport, home, industry and agriculture. We will also work with the health and care sector to ensure that the most vulnerable residents understand how best to protect themselves from pollutants.

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[5] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[6] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Leeds City Council is committed to reducing Leeds' emissions to protect the health of everyone in the city. Doing so supports the strategic pillars (inclusive growth, zero carbon, health and wellbeing) of our Best City Ambition.

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

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

The council recognises that there are no truly ‘safe’ levels of air pollution: any exposure to polluted air can have a detrimental impact on our health.

The Leeds Air Quality Strategy sets out actions that the council is taking to reduce exposure to, and underlying levels of, air pollution. The strategy also set new targets for local air quality that seek more rapid improvements than required by UK law.

More information about the steps we are taking to protect residents from air pollution can be found on the ‘What we are doing about air pollution’ webpage on the Clean Air Leeds website. A summary detailing a few recent examples of completed work is included below.

Recent examples of actions to improve local air quality

Supporting businesses to switch to cleaner vehicles

Leeds City Council paid out more than £7.9 million of government funded grants and interest-free loans to local businesses to contribute towards the costs of switching to a less polluting vehicle ahead of (now discontinued) plans to introduce a charging Clean Air Zone. This policy saw an accelerated uptake of cleaner taxis, buses, coaches, HGVs, and private hire vehicles over a four year period.

Improving charging infrastructure for cleaner plug-in vehicles

Plug-in vehicles are significantly cleaner and greener than petrol or diesel models. Official data shows that there are now more than 47,000 registered in Leeds. By facilitating the installation of plug-in vehicle charge points at more locations, Leeds City Council is making it easier and attractive for drivers to use these cleaner vehicles.

We have worked with several partners to secure funding and install vehicle charge points at dozens of off-street locations. According to official data, there are now 514 public charge points available in Leeds.

Since 2019, local planning policies have required developers to install vehicle charge points in all new developments, both residential and non-residential, with parking.

The council is also supporting work by the West Yorkshire Combined Authority to develop a regional strategy for the development of plug-in vehicle infrastructure.

More information about work to improve plug-in vehicle charging in Leeds can be found on our website.

Incentivising use of cleaner plug-in vehicles with discounted parking

Ultra-low emission vehicles (ULEVs) are significantly cleaner and greener than traditional models. In 2016, Leeds City Council introduced a parking permit for residents who drive ULEVs to encourage more drivers to switch to cleaner vehicles and help offset some of the initial cost.

The ultra-low emission vehicle permit gives drivers discounted parking at council-operated and council-owned car parks. More than 1,400 drivers currently benefit from the scheme.

Progressively switching our fleet to cleaner zero emission vehicles

Electric vehicles are significantly cleaner and greener than traditional models and can be cheaper to run and maintain.

Leeds City Council is leading by example to demonstrate the capability and cost-effectiveness of electric vehicles by gradually replacing our fleet of council vehicles with EVs where doing so can be shown to save money over the long-term. We believe our current fleet of more than 380 electric vehicles is the largest of any local authority.

The council is also a proud signatory of the Clean Van Commitment.

Lending electric vehicles through a 'try-before-you-buy' scheme

Electric vehicles are significantly cleaner and greener than traditional models and can be cheaper to run and maintain. Leeds City Council offered free trials of a range of different electric vehicles as part of its 'EV Trials' scheme.

In partnership with Highways England, the council launched free electric van trials for local businesses and charities in January 2020. More than 200 trials have since taken place, with participants driving 300,000 zero emission miles using borrowed vehicles. 97% of participants reported satisfaction with the scheme and over half say that they will (or have already) now purchase or lease electric vehicles following the trial.

A similar e-cargo bike trial scheme for businesses launched in March 2021.

The council also launched free trials of electric bikes for residents in September 2020. 162 trials took place, with participants collectively travelling around 13,600 miles by bike. Nearly three-quarters (72%) of participants said that they were likely to purchase an e-bike following their trial.

Opening Park and Ride sites to reduce car journeys into the city centre

Leeds City Council has worked in partnership with the West Yorkshire Combined Authority and First Leeds to introduce major new park and ride sites at Elland Road, Temple Green, and Stourton.

The Stourton facility is served by electric double decker buses and is the UK's first fully solar powered park and ride site. Collectively, the three sites can help reduce city centre traffic by up to 3,949 vehicles at any one time.

Promoting sustainable travel in and around schools

Children are amongst the most vulnerable to the health effects of breathing polluted air. Leeds City Council works with schools to promote sustainable travel, helping to tackle local air pollution around schools and create healthy, sustainable habits in young people. Around 98% of schools in Leeds have an approved school travel plan.

Every year, we also work with local schools to offer free bike and scooter training, competitions and sustainable travel events for school pupils.

'School Streets' introduce targeted traffic restrictions to specific roads around participating schools at certain times of the day to make it safer for people to walk, scoot and cycle. We supported fourteen schools to introduce 'School Streets' in 2020. Initial feedback showed that pupils, staff and families welcomed the extra space, fresher air, quieter neighbourhood and safer roads. The scheme is now being evaluated by Living Streets.

In 2021, the council and West Yorkshire Combined Authority secured funding to install scooter and bike parking at nineteen schools from the Department for Transport's Active Travel Fund. 162 secure bicycle parking spaces and 200 scooter parking spaces will make it even more convenient for children and their parents to choose cleaner, healthier transport.

Raising awareness of pollution caused by idling

Some Leeds schools report problems with vehicles idling and emitting unnecessary pollution outside of school gates and roads immediately adjacent, despite children being amongst the most vulnerable to the health effects of breathing polluted air.

To help raise awareness of the harms of idling, Leeds City Council has designed and distributed more than 190 large weatherproof anti-idling banners to dozens of Leeds schools completely free of charge. The banners have been positively received by schools that have installed them.

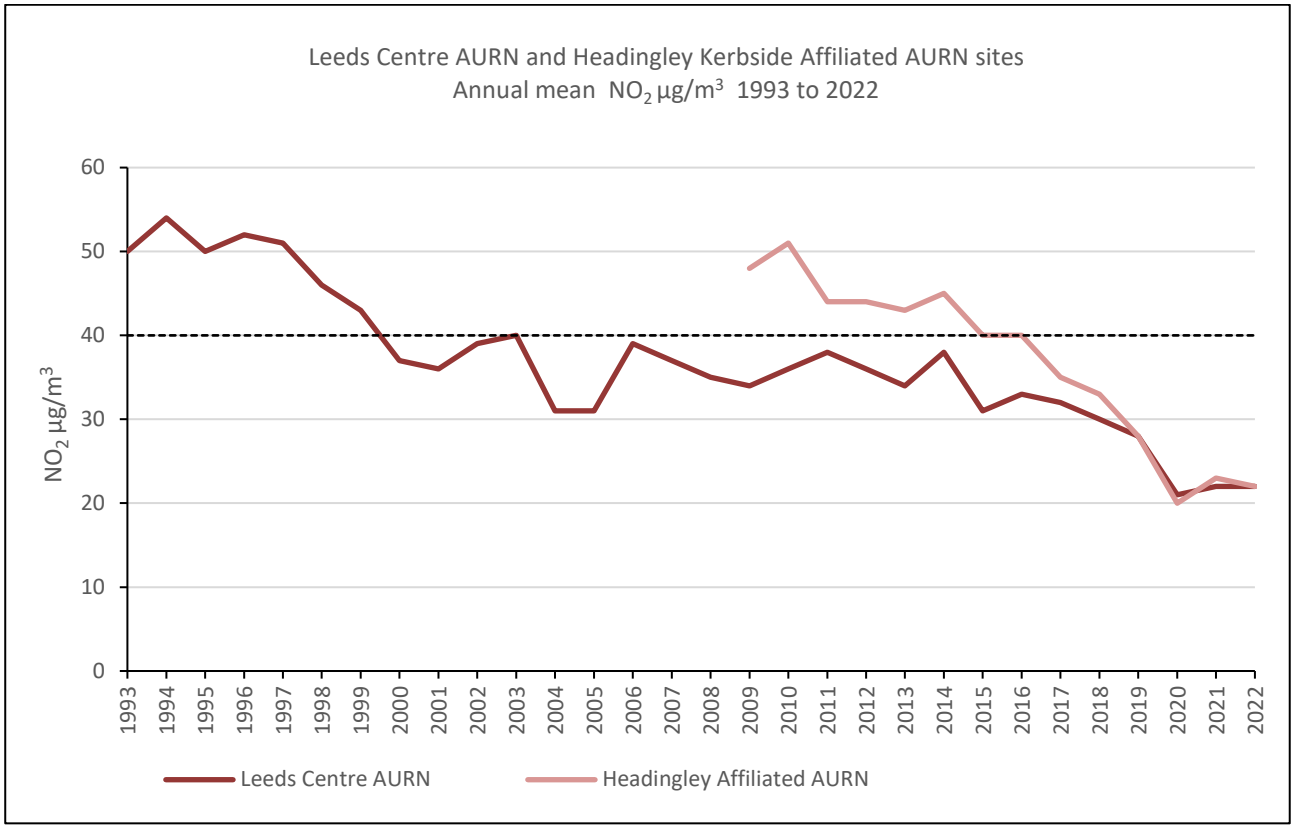
Improving public transport services by installing new infrastructure

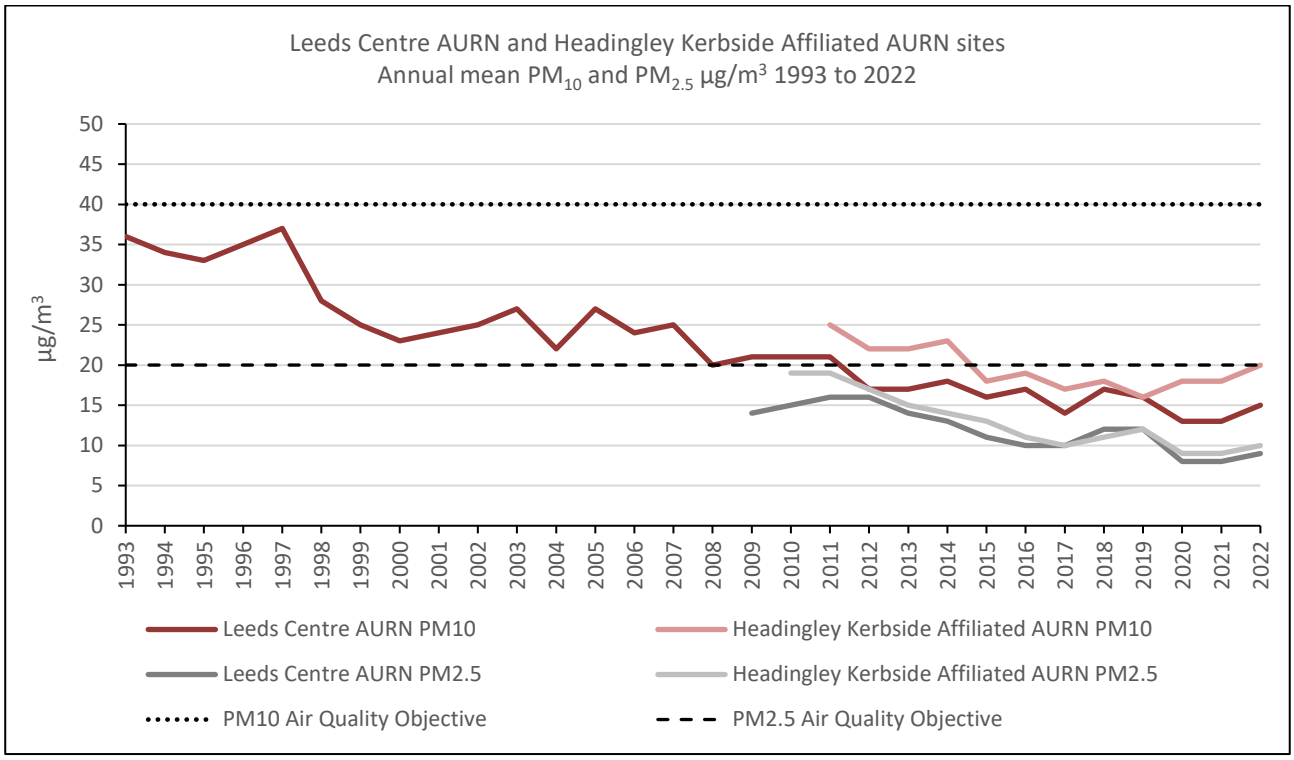
Leeds City Council has recently installed a £173.5m programme of transport improvements including bus priority lanes, cycle lanes, modernised transport facilities and improved public spaces.

The work supports the Connecting Leeds transport strategy vision of transforming travel in Leeds to make it easy and convenient to get around without a car. The upgrades support modal shift towards cycling and public transport and will help reduce emissions from private transport.

Conclusions and Priorities

Air quality in Leeds has improved significantly in recent years. Concentrations of Nitrogen Dioxide in particular have reduced considerably since 2019. So much so that it is proposed to revoke five of our six Air Quality Management Areas. Monitored concentrations of Particulate Matter remain well within UK Air Quality Objectives.





Air quality in most of the city, it's suburbs and surrounding rural areas meet the UK's Air Quality Objectives in 2022. However, there are some locations that remain above the annual mean objective for NO_2. The annual mean objective for NO_2 was exceeded at one of our automatic monitoring stations. The Bishopgate Street monitoring station recorded an annual mean concentration for NO_2 of 42 µg/m^3 .

Diffusion tube monitoring results from 176 sites during 2022 show that the NO_2 annual mean air quality objective of 40ugm^{-3} was exceeded at 12 sites.

Ten of these sites were located in the city centre around Bishopgate Street, Wellington Street, Josephs Well, Neville Street and City Square. Exceedances ranged between 40.5 µg/m^3 to 62.9 µg/m^3. The highest annual mean of 62.9 µg/m^3 was recorded at the D183 Neville Street monitoring site and is a reduction from the 2021 result of 68.8 µg/m^3 . Nearby diffusion tubes located on Neville Street, City Square and Bishopgate Street also exceeded the 40µg/m^3 annual mean objective and it is anticipated that the Leeds Station Sustainable Travel Gateway scheme will improve these results when the scheme is completed.

Diffusion tubes on Wellington Street (41.4 µg/m^3), Joseph's Well (42.0 µg/m^3) and Yorkshire Post (40.9 µg/m^3) show an increase on their 2021 annual mean results. However these sites continue to follow their pre-Covid trend of long term improvement.

The two remaining sites showing exceedance were located outside the city centre at Kirkstall Road adjacent to Cardigan Fields Leisure Park and at one location in the Pool in Wharfedale AQMA. At the Kirkstall Road location the annual mean concentration recorded in 2022 was 40.6µg/m^3 which is a reduction from 42.3 µg/m^3 in 2021. Further monitoring will be undertaken at this site to further understand the reason for exceedance of the UK air quality objective.

The Corn Exchange Gateway project was completed in 2022, delivering a series of improvements to the bus, pedestrian, and cycling infrastructure around the Corn Exchange. Annual mean results for NO_2 at the Corn Exchange in 2022 were 32 µg/m^3, a reduction from 38 µg/m^3 in 2021.

Local Engagement and How to get Involved

Leeds City Council has published extensive information and advice online at the Clean Air Leeds website. The website has been designed and written to be as accessible as possible to facilitate public understanding and transparency. It fully complies with the public sector accessibility regulations. Content includes:

- air pollution and air quality in Leeds
- what we are doing about air pollution
- how to reduce your emissions
- protect yourself from air pollution
- report air quality and pollution issues
- watch a video about air pollution in Leeds

The council regularly engages with residents about air quality and related issues on social media through the dedicated Climate Emergency and Air Quality account on Twitter (@LeedsCC_CEAQ) and other social media channels. A monthly email newsletter with the latest updates and opportunities relating to climate action and air quality is also published and currently has more than 6,900 subscribers.

Additionally, the council marks awareness days including national Clean Air Day with a range of events, announcements, and campaigns to raise awareness of important key messages. Among other activities, Clean Air Day 2022 saw the launch of a new air pollution alert service and the promotion of a dedicated virtual conference for health professionals highlighting the impacts of air quality.

The council regularly engages with businesses one-to-one and encourages organisations to sign up to the West Yorkshire Travel Plan Network to create cost-effective, sustainable ways to travel for business and to commute to work. 2022 saw the conclusion of the popular EV Trials scheme. Over the scheme's lifetime, trial participants from more than 200 organisations travelled over 300,000 zero emission miles in 52 borrowed vans. More than half of participating organisation said they were now considering switching (or had already switched) one or more vehicles to cleaner, greener electric models. To mark the conclusion of the scheme, the council hosted a 'Journey to Zero' virtual conference for organisations with expert speakers from the Office for Zero Emission Vehicles, Energy Saving Trust, Society of Motor Manufacturers and Traders, Element Energy, Fore Consulting, National Highways, EB Charging, and the Institute for Transport Studies. In

July 2022, the council hosted the GB EV Rally at Stourton Park & Ride, a project aimed at highlighting the impressive capability of zero emission vehicles to a national audience.

The council's Influencing Travel Behaviour service regularly engages with schools and school pupils to encourage safe and sustainable travel.

Finally, council officers and councillors meet with the Leeds Clean Air Alliance local action group by attending meetings several times a year and ensuring the group can feedback on policy proposals.

Local Responsibilities and Commitment

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

- Climate, Energy & Green Spaces
- Environmental Advisory Service
- Health Protection
- Transport
- Web team

This ASR has been approved by:

- Helen Hayden, executive member for Sustainable Development and Infrastructure
- Salma Arif, executive member for Adult Social Care, Public Health and Active Lifestyles
- Mohammed Rafique, executive member for Climate, Energy, Environment and Green Space
- Victoria Eaton, Director of Public Health
- Polly Cook, Chief Officer for Climate, Energy & Green Spaces

If you have any comments on this ASR please send them to epteam@leeds.gov.uk

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in Leeds City Council during 2022. 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 Leeds 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 Leeds City Council can be found in Table 2.1. The table presents a description of the six AQMAs that are currently designated within Leeds City Council. Appendix D: Maps of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean

In 2022 five of our AQMAs have shown annual mean concentrations of NO_2 to be within the UK Air Quality Objective (see Figures A.2 to A.7 in Appendix A). We are currently in the process of revoking AQMA status from our AQMAs that show long term compliance, including Ebor Gardens (AQMA1/2017), Caspar Apartments (AQMA 2/2017), The Normans (AQMA 3/2017), The Tilburys (AQMA 4/2017) and Chapel Hill (AQMA 6/2017).

In 2022 one location within the AQMA in Pool in Wharfedale (AQMA 5/2017) had an annual mean NO_2 diffusion tube result of 42.0µg/m^3 and monitoring continues in the AQMA to assess the long term trend.

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 Leeds Air Quality Strategy
Ebor Gardens (AQMA 1/2017)	Declared 1 July 2001; Amended 1 July 2010; Endorsed 1 July 2017	NO2 Annual Mean	An area encompassing a number of properties adjacent to the A64 at the eastern end of the Inner Ring Road.	NO	46µg/m^3 (2010)	Not exceeding (25.6 µg/m^3)	4 years (≤36 µg/m^3)	AQAP 2004, AQAP Progress Report Dec 2008	Leeds Air Quality Strategy
Caspar Apartments (AQMA 2/2017)	Declared 1 July 2001; Amended 1 July 2010; Endorsed 1 July 2017	NO2 Annual Mean	An area encompassing a block of properties adjacent to the A64 at the eastern end of the Inner Ring Road, surrounded by the slip road access from North Street.	NO	43µg/m^3 (2002) Initial declaration based on modelling	Not exceeding (27.0 µg/m^3)	4 years (≤36 µg/m^3)	AQAP 2004, AQAP Progress Report Dec 2008	Leeds Air Quality Strategy
The Normans (AQMA 3/2017)	Declared 1 July 2010; Endorsed 1 July 2017	NO2 Annual Mean	An area encompassing a small number of properties at the ends of streets perpendicular and immediately adjacent to the A65 Abbey Road.	NO	56µg/m^3 (2010)	Not exceeding (31.1 µg/m^3)	4 years (≤36 µg/m^3)	AQAP 2004, AQAP Progress Report Dec 2008	Leeds Air Quality Strategy
The Tilburys (AQMA 4/2017)	Declared 1 July 2010; Endorsed 1 July 2017	NO2 Annual Mean	An area encompassing a number of properties adjacent to the eastbound slip road of Junction 2 of the M621 and A653 Ingram Road Distributor	YES	44µg/m^3 (2010)	Not exceeding (22.4 µg/m^3)	6 years (≤36 µg/m^3)	AQAP 2004, AQAP Progress Report Dec 2008	Leeds Air Quality Strategy
Main Street, Pool-in-Wharfedale (AQMA 5/2017)	Declared 1 July 2017	NO2 Annual Mean	An area encompassing a number of properties in the immediate vicinity of the A658 Main Street	NO	59µg/m^3 (2016)	42.0 µg/m^3	Not compliant	AQAP 2004, AQAP Progress Report Dec 2008	Leeds Air Quality Strategy
Chapel Hill, Morley (AQMA 6/2017)	Declared 1 July 2017	NO2 Annual Mean	An area encompassing a number of properties adjacent to a narrow, inclined road leading away from Morley town centre	NO	41µg/m^3 (2015)	Not exceeding (23.4 µg/m^3)	4 years (≤36 µg/m^3)	AQAP 2004, AQAP Progress Report Dec 2008	Leeds Air Quality Strategy

☒ Leeds City Council confirm the information on UK-Air regarding their AQMAs is up to date .

☒ Leeds City Council confirm that all current AQAPs have been submitted to Defra.

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

Defra's appraisal of last year's ASR concluded:

1. The Council have provided a thorough report which contains the required content.
2. The Council has included discussion and review of its monitoring strategy. This demonstrates the Councils proactive and dedicated approach to improving air quality across the area.
3. Comments from last year's ASR have been mentioned and most of these have been addressed. This is welcomed, and we encourage this to continue in future ASRs.
4. The Council has adopted the Leeds Air Quality Strategy 2021 to 2030 and Action Plan in July 2021. Though this is referenced in the text, there is no link to this in the relevant tables of the report. This would be welcomed.
5. The Public Health Outcomes Frameworks were mentioned, this is welcomed and encouraged in future reporting.
6. The Council have provided a clear map of the diffusion tube monitoring network; trends are displayed and discussed in the report, this is welcomed.
7. One AQMA is published on the LAQM Portal, covering each of the six AQMAs. It is recommended that these are individually listed for clarity.
8. The Council plan to revoke AQMA status from those areas that show long term compliance. The revocation of an AQMA should be considered following three consecutive years of compliance with the relevant objective as evidenced through monitoring. Where there have been no exceedances for the past five years, the Council must proceed with plans to revoke the AQMA. This should be considered for the following AQMAs: Ebor Gardens (1), The Tilburys (4) and Chapel Hill (6).
9. Valid Data Capture for monitoring periods has only been completed for 10 monitoring sites and has been left blank for all other monitoring sites, as also highlighted in the Appraisal Letter for the 2021 ASR. This column differs from the 'Data capture in 2021' as there may be some instances where monitoring was employed for only a short period intentionally (e.g. a 6-month survey) in this example, the data capture for the monitoring period would be 100% assuming 6 months of data capture, but 50% data capture for 2021. If monitoring was undertaken for the whole year, then both columns would be the same. This column should be completed in future ASRs and the council should contact the LAQM Helpdesk if further assistance is required on these calculations.

10. Distance to relevant exposure in Table A.2 has been listed as N/A for some Kerbside and Roadside sites. Distance to relevant exposure is applicable for these site types and should be completed in future ASR reports.

Defra's appraisal of last year's ASR concluded that the council have provided a thorough report that has included discussion and review of its monitoring strategy which demonstrates the Council's proactive and dedicated approach to improving air quality across the area. All comments in Defra's appraisal of last year's ASR are noted. Observations regarding the listing of AQMAs on the LAQM Portal will be addressed during the revocation of AQMAs currently being carried out by the Council. The presentation of data capture in relation to diffusion tubes has been noted and monitoring was carried out for the full year at all locations other than the 10 sites mentioned.

Leeds City Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Fifty seven measures are included within Table 2.2, with the type of measure and the progress Leeds City Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure these are also presented within Table 2.2.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	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	Retrofit technologies to Public Service Vehicles	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2014	2015	LCC and WY Combined Authority	Bus operators and CBTF 2015	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions		146 Euro III and IV Public Service Vehicles were retrofitted to Euro V+ emission standards	Some vehicles were rotated away from Leeds in order to comply with intended CAZ compliance requirement in 2020
2	Retrofit technologies to Public Service Vehicles	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2017	2020	LCC and WY Combined Authority	Bus operators and CBTF and ULEB	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions		479 buses retrofitted across WY. 262 operating within Leeds brought up to Euro VI NO2 standard	Some of these buses will have replaced buses retrofitted to Euro V+ standard previously
3	Retrofit Technology - EV retrofit to RCV fleet	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2019	2025	LCC	LCC	NO	Funded	£500k - £1 million	Planning	Reduced vehicle emissions		New waste Depot completed with Infrastructure to support 20 e-RCVs.	First three e-RCVs just ordered Spring 2023. In discussion with companies to retrofit other larger vehicles to ZE technology
4	Regional Centre of Excellence for LEV	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2020	2022	LCC and National Highways	CAZ additional measures fund	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Uptake in demand for trials of LEV vehicles from local business	167 businesses and 26 Private Hire drivers have taken part in EV trials offset over 200,000 petrol/diesel miles	Trial Project closed April 2022
5	EST Fleet Review	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2021	2022	LCC and EST	LCC	NO	Funded	< £10k	Completed	Reduced vehicle emissions		Fleet review to determine roadmap to zero emissions for own fleet	Review report completed, recommendations now being worked through and more general fleet assessment being undertaken.
6	LPTIP Bus Partnership	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2018	2022	LCC, WYCA and First Group	First Group	NO	Funded	> £10 million	Implementation	Reduced vehicle emissions	Increased Bus Patronage	284 new buses to be delivered in to operation in Leeds as part of LPTIP partnership	Currently a total of 21 Zero Emission Buses operating in Leeds
7	Introduced ECOStars bus rating System within West Yorkshire	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2018	2020	EST, WYCA and Bus Operators	WYCA	NO	Funded	£10k - 50k	Completed	Reduced vehicle emissions		33 access buses fitted with particulate traps 8 HEV buses introduced on Park and Ride routes	Part of the Bus18 strategy. But Bus 18 Strategy no longer current.
8	Vehicle Upgrade Grants	Promoting Low Emission Plant	Other Policy	2018	2021	LCC and JAQU	JAQU	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Increased number of CAZ compliant vehicles	Vehicles upgraded (including retrofitting) to CAZ standard. 303 HGVs 71 Non-scheduled Bus & Coach 68% of LCC T&PH vehicles are now either Hybrid or EV	Following delay in the start date of the CAZ and Covid the CAZ was not implemented. Vehicle fleet data shows the fleet still upgraded to the standard expected with the CAZ in place

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
9	Beneficial Parking permits for EVs	Promoting Low Emission Transport	Priority parking for LEV's	2015	2022	LCC	LCC	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Uptake in demand low and zero emission vehicles	Approximately 500 EV parking permits were provided for 2022. this a fall of 30% on 2021.	A £30 fee introduced for previously free permit in 2022. Scheme to be closed April 23.. No of permits issued very small compared to no of registered Evs in Leeds. (Costs based on lost revenue from parking fees)
10	Introduce residential vehicle charge hubs Phase 1	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2019	2022	LCC and EST	LCC and OZEV ORCS funding	NO	Funded	£50k - £100k	Completed	Reduced vehicle emissions	Uptake in demand low and zero emission vehicles	Phase 1 delivered 6 sites providing 30 EVCPs	
11	Introduce residential vehicle charge hubs Phase 2	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2023	LCC and EST	LCC and OZEV ORCS funding	NO	Not Funded	£50k - £100k	Planning	Reduced vehicle emissions	Uptake in demand low and zero emission vehicles	Revised scheme now to deliver 54 EVCPs over 9 locations	Funding secured. Delivery planned summer 2023
12	Provide Public access chargepoint network on LCC Estate	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2025	LCC	LCC, OZEV funding and third party investment	NO	Partially Funded	£50k - £100k	Implementation	Reduced vehicle emissions	Uptake in demand low and zero emission vehicles	A pilot scheme progressing with a CPO to fund installs on & off street, installations due 23/24 financial year	
13	Develop a Public access rapid chargepoint network across district	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2017	2023	LCC and WYCA	ULEV Taxi fund private investment	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Uptake in demand low and zero emission vehicles	`	Reliability issues with installed units delayed further installations. 4 new sites planned in Leeds in 2023. 1.7M miles worth of energy discharged during 2022 making a total of 5.6M miles worth since late 2019
14	Develop Local electric vehicle infrastructure (LEVI) biid	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015	2025	LCC and WYCA	Bid developed to LEVI grant funding programme	NO	Partially Funded	> £10 million	Planning	Reduced vehicle emissions	Uptake in demand low and zero emission vehicles	Overall strategy and delivery/ procurement routes being developed.	West Yorkshire as a whole was allocated a total of £17.2M as of April 2023 to deliver a WY LEVI scheme.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
15	Exemplar Local Authority Ultra low emission Fleet	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2015	2025	LCC	LCC and grant funding where possible	NO	Partially Funded	> £10 million	Implementation	Reduced vehicle emissions	Uptake in demand low and zero emission vehicles	380 ZE Vehicles now operating within LCC fleet	Believe that LCC currently has the greenest fleet of any Local Authority. New vehicle purchases MUST consider alternative fuel availability as part of procurement
16	e-bikes trials	Promoting Travel Alternatives	Other	2019	2021	LCC	Emergency Active Travel Fund (DFT)	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions	Uptake in active travel	134 e-bike trials completed	LCC owned ebikes are being loaned intermittently. After servicing, will be redeployed to other teams including Bike libraries (Active Leeds). ITB implementing Leeds City Bikes – dockable, e-bike share scheme. See Measure 25.
17	E-Cargo Bikes trials	Promoting Travel Alternatives	Other	2020	2024	LCC and EST	Emergency Active Travel Fund and EST (DFT)	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions	Uptake in demand for trials of LEV vehicles from local business	Scheme expanded from the original 4 bikes to a total of 16 bikes as part of the Leeds Scheme. Relaunch of the scheme planned for summer 2023 to support Leeds City Bikes service area	Successful bid for EST funding allowed the purchase of 26 additional bikes, with 10 for Bradford, and the remainder allocated to WYCA. The new bikes seek to tackle some of the barriers to take up in relation to storage and size of bikes
18	Scoot to School Scheme	Promoting Travel Alternatives	School Travel Plans	2019	2021	LCC	LCC and Defra	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions	Reduction in car based "school runs"	1st tranche of 10 schools showed average reduction in car trips of 4.5% across whole school but 9.3% within year 5 only	400 micro scooters delivered to 30 schools. Legacy measures now embedded. Scoot to School now promoted annually and Scooter training is delivered by LCC for schools to book. Some delivery (tranche 3) impacted by Covid19.
19	Bikeability	Promoting Travel Alternatives	Promotion of cycling	2010		LCC Bikeability Trust / ATE	LCC	NO	Funded	£100k - £500k	Implementation	Reduced vehicle emissions	Uptake in active travel	13,700 Bikeability places delivered in FY 2022/23: 10,000 'core' places and 7,000 'plus' modules. Similar contract awarded for FY 2023/24.	Delivery was impacted by Covid 19 but has now returned to pre-pandemic levels with growth seen in delivery for 2022/23.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
20	school travel plans	Promoting Travel Alternatives	Workplace Travel Planning	2010		LCC	LCC	NO	Funded		Implementation	Reduced vehicle emissions	Uptake in active travel and Travel Plans	Every school in Leeds had a TP in 2010 as per government guidelines. In 2022/23 approx 92 schools were registered on the school TP database (Modeshift STARs)	5 School Travel Plans consulted on 2022/23. Resources diverted to other projects during Covid. There are approx. 32 live planning obligated School Travel Plans to review.
21	Workplace and Residential Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	2010		LCC	Travel Plan Review Fee from s106 Planning contributions	NO	Funded		Implementation	Reduced vehicle emissions		Monitored approx. 209 live planning obligated Travel Plans in 2022/23. Of these 103 (49%) were residential, 59 (28%) were employment sites, 27 (13%) were mixed use, 17 (8%) were education (FE/HE) and 3 (1%) were other.	
22	Personalised travel plans	Promoting Travel Alternatives	Personalised Travel Planning	2010	2020	LCC	Travel Plan Review Fee from s106 Planning contributions	NO	Funded		Completed	Reduced vehicle emissions			Promotion of personalised Travel Plans no longer implemented as a separate/standalone measure. Some workplace/residential development Travel Plans include this as a measure but data to monitor implementation/impact is not collated separately.
23	School Streets	Promoting Travel Alternatives	Other	2020	2024	LCC	Emergency Active Travel Fund (DFT)	NO	Funded	£10k - 50k	Implementation	Reduced vehicle emissions	Travel Mode split for journey to school	Phases 1 and 2 = 14no. School Street trial sites implemented in 2020 and 2021. 2 no. withdrawn and 12 retained post trial and evaluation. An average of 6 percentage point reduction in car driver travel to school at Phase 1 and 2 School Streets. Parents and staff report improved perceptions of road safety and air quality.	ATF3 secured to deliver Phase 3 and introduce up to 5 new School Streets in 2023/24. ATF4 awarded for 12 more school streets across West Yorkshire (don't know how many in Leeds yet).

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
24	Bicycle and Scooter parking installation in schools	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2021	2022	LCC	Emergency Active Travel Fund (DFT)	NO	Funded	£100k - £500k	Completed	Reduced vehicle emissions	Uptake in active travel	172 no. cycle parking spaces, 250 scooter parking spaces at 23 no schools	Funding spent to deliver the project in 2021/22
25	Leeds Public Bike Hire Scheme	Promoting Travel Alternatives	Promotion of cycling	2021	2026	LCC	Carbon Mitigation Fund via TCF/ CRSTS	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Uptake in active travel	On track to deliver early 2023 – over 5 years.	Funding signed off at Transport Committee May 2023 .
26	Air Quality and Active Travel education in schools	Other	Other	2021		LCC	LCC	NO	Funded	Staff cost: £50k - £100k	Implementation	Reduced vehicle emissions	Travel Mode split for journey to school	Pedestrian training (Year 4 & Year 2): 2516 places delivered in 2021/22, 3884 places delivered in 2022/23 (to May 23) Scooter training (across Y1 - Y6): 2287 places delivered in 2021/22, 2503 places delivered in 2022/23 (to May 23)	Road Safety training review commenced in April 2022. Pedestrian and scooting lesson plans now incorporate AQ themes. These will be subject to ongoing review for 2023.
27	Leeds City Car Club partnership	Alternatives to private vehicle use	Car Clubs	2010		LCC, WYCA Enterprise	WYCA and LCC	NO	Funded		Implementation	Reduced vehicle emissions	Uptake in membership and use	Car club has continued to expand through securing bays, trial membership and usage through the planning process. " and "100% of vehicles in AQMAs to be ULEVs". EV vehicles currently make up 11% of the fleet in Leeds (6/55).	The WYCA contract was renewed in July 2022 and includes targets to "Grow member numbers by at least 5% per year of contract (split by personal/business) split by District" and "75% of fleet to be zero emission by 2026
28	EVCPs at new Car Club Bays	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2021		LCC and WYCA	LCC and Developer contributions	NO	Funded		Implementation	Reduced vehicle emissions	Uptake in use of EV vehicles	4 no. installed (Portland Cres, Wellington Place, City Low Fold), 6 no. requested through planning but not yet installed	Funding secured via LEVI / CRSTS (WYCA) to electrify all existing Car Club bays. LCC project with Liberty (believe) that could also be used to electrify car club bays. Need to decide which funding mechanism to be used.
29	New Railway at Apperley Bridge with 297 parking spaces	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2011	2015	CBMDC, Network Rail, Northern Rail and DfT	DfT	NO	Funded	> £10 million	Completed	Reduced vehicle emissions	Increased use of P&R service	394,558 trips in 2019/20	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
30	New Railway station at Kirkstall Forge with 129 parking spaces	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2010	2016	LCC, Network Rail, Northern Rail and DfT, CEG	DfT	NO	Funded	> £10 million	Completed	Reduced vehicle emissions	Increased use of P&R service	163,308 trips in 2019/20	Train service has increased from 1 train /hour to 2 trains /hour since opening
31	New Rail Station - LBA Parkway	Alternatives to private vehicle use	Rail based Park & Ride		2026	LCC, WYCA, Northern and NWR	DfT and private sector	NO	Partially Funded	> £10 million	Planning	Reduced vehicle emissions	Increased use of P&R service	Working towards FBC	Current funding shortfall being investigated.
32	New rail Station - White Rose	Alternatives to private vehicle use	Rail based Park & Ride	2020	2023	LCC, WYCA, Northern and NWR	DfT and private sector	NO	Funded	> £10 million	Implementation	Reduced vehicle emissions	Increased use of P&R service	Construction commenced on site.	Developer delivery - but still on track
33	New Rail Station - Thorpe Park	Alternatives to private vehicle use	Rail based Park & Ride	2020	2025	LCC, WYCA, Northern and NWR	DfT and private sector	NO	Partially Funded	> £10 million	Planning	Reduced vehicle emissions	Increased use of P&R service	Working towards FBC	NWR pricing the project to ascertain funding gap. TRU interface.
34	Extension to Garforth Rail Station car park	Alternatives to private vehicle use	Rail based Park & Ride	2018	2019	LCC, Northern, and WYCA	DfT	NO	Funded	£500k - £1 million	Completed	Reduced vehicle emissions	Increased use of P&R service	November 2022 survey showed 82% occupancy levels	
35	Extension to Pudsey Rail Station car park	Alternatives to private vehicle use	Rail based Park & Ride	2019	2024	LCC, Northern and WYCA	DfT	NO	Funded	£1 million - £10 million	Planning	Reduced vehicle emissions	Increased use of P&R service	Not yet completed, no data.	Scheme Paused
36	Introduction of Bus based P&R to Leeds with ROUTE PR1 (Elland Rd)	Alternatives to private vehicle use	Bus based Park & Ride	2014	2020	LCC	LCC and DfT	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Increased use of P&R service	Improved journey experience, including congestion relief and improved ticketing	Opened with 425 parking spaces the site has been extended twice and now has 1350 spaces and 10 EVCPs. Second extension completed in 2020
37	Extension of Bus based P&R with ROUTE PR2 (Temple Green)	Alternatives to private vehicle use	Bus based Park & Ride	2017	2022	LCC	LCC and DfT	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Increased use of P&R service	Improved journey experience, including congestion relief and improved ticketing	Opened with 1000 spaces including 20 EVCPs. It is currently being extended to provide 400 extra a spaces due to be completed by Summer 2022
38	Expansion of bus based P&R with ROUTE PR3 (Stourton)	Alternatives to private vehicle use	Bus based Park & Ride	2018	2020	LCC	LCC, DfT and ERDF	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Increased use of P&R service	Improved journey experience, including congestion relief and improved ticketing	100% solar powered, operating 5 ZE double deck buses with 1200 parking spaces and 28 EVCP.
39	HOV Lanes	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2010		LCC	LCC and DfT	NO	Funded	£500k - £1 million	Completed	Reduction and Displacement of vehicle emissions	Reduced delay for bus and increased occupancy rate for private vehicles	A647 HOV lane is planned to become a Bus only Lane as pat of LPTIP	Enforcement costs are a limiting factor to the success

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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	HOV / HGV Lane	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2011		LCC	LCC and DfT	NO	Funded	£500k - £1 million	Completed	Reduction and Displacement of vehicle emissions	Reduced delay for HGV & Buses and iv	A63 HGV/HOV lane provides part of the bus priority measures for P&R route 2.	Enforcement costs are a limiting factor to the success
41	City Connect 1 Leeds to Bradford Superhighway	Transport Planning and Infrastructure	Cycle network	2014	2016	LCC	Local Authority	No	Funded	> £10 million	Completed	Reduced vehicle emissions	Uptake in active travel	In operation: 14km of connected cycle ways linking from Church Bank in Bradford to Leeds City Centre via Barker End Road, Leeds Old Road, Stanningley, Bramley and Armley.	1.7 million trips made along the Leeds Bradford cycle superhighway as of July 2021. Cycle superhighway has resulted in a 18% increase in cycling volume
42	City Connect 2	Transport Planning and Infrastructure	Cycle network	2017	2021	LCC	Local Authority	No	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Uptake in active travel	5km extension of high-quality, segregated links connecting the City Centre Loop and areas of Seacroft and the 23km City Connect 1 superhighway between Leeds and Bradford	Need monitoring of trips
43	City Connect 3	Transport Planning and Infrastructure	Cycle network	2019	2023	LCC	Local Authority	No	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Uptake in active travel	1.3km Castleford Greenway completed. 5km of segregated cycling routes in key locations across the city including Clay Pit Lane, Elland Road and Dewsbury Road.	Areas of Kirklees, York and Bradford still under development
44	Installation of Variable Message Signs	Traffic Management	UTC, Congestion management, traffic reduction	2012	2020	LCC	LCC	NO	Funded		Completed	Reduced emission through prevention of congestion	No	48 VSM installed by 2021	No further VSMs are planned
45	Inclusion of SCOOT in to Leeds UTMC for the A65 corridor	Traffic Management	UTC, Congestion management, traffic reduction	2018	2020	LCC	LCC and National Productivity Improvement Fund	NO	Funded		Completed	Reduced emission through prevention of congestion	No	A65 Corridor Completed.	No further Installation of SCOOT is now superseded by a new transport strategy in providing shorter waiting times for pedestrians.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
46	Leeds Public Transport Improvement Programme (LPTIP) bus corridor improvements	Transport Planning and Infrastructure	Bus route improvements	2019	2023	LCC, WYCA and DfT	WYCA and DfT	NO	Funded	> £10 million	Implementation	Reduced vehicle emissions	Increased Bus Patronage	Majority of schemes completed. One final scheme to improve King Lane/Gledhow Valley Road junction planned for delivery Autumn 2023.	Improved journey experience, including congestion relief and improved ticketing
47	LPTIP Bus Gateways	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2019	2022	LCC	LCC and DfT	NO	Funded	> £10 million	Completed	Reduced vehicle emissions	Increased Bus Patronage	Third gateway completed.	
48	Leeds Public Transport Improvement Programme (LPTIP) bus station improvements	Other	Other	2019	2022	LCC and WYCA	WYCA and DfT	NO	Funded	£1 million - £10 million	Completed	Reduced vehicle emissions	Modest increase in bus use due to more desirable bus station	Completed - but no data yet	
49	Introduction of MOVA traffic control system on transport corridors	Traffic Management	UTC, Congestion management, traffic reduction	2019		LCC	LCC	NO	Funded		Implementation	Reduced vehicle emissions	Increase in active travel	MOVA installed on 3 transport corridors (A61 South, A660 and A61 North)	Part of the LPTIP improvements is to introduce junction control strategies to improve waiting times for pedestrians and provide improved cycling facilities
50	City Centre Package	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2020	2023	LCC and National Highways	LCC and DfT	NO	Funded	> £10 million	Implementation	Reduction and Displacement of vehicle emissions	Reduction in traffic flows within the City Centre	LCC scheme started preliminary enabling works in Autumn 2021	Full Benefits rely on the combined impact of both the NH and LCC schemes
51	Bus18 Partnership	Alternatives to private vehicle use	Other	2017	2018	LCC, WYCA and Bus Operators		NO	Partially Funded	> £10 million	Completed	Reduced vehicle emissions	Increased Bus Patronage	Under the strategy set out a number of initiatives to improve the attractiveness of bus travel including initiatives on ticketing, routes, service reliability, facilities and vehicle emissions some of which are reported on separately	Improved journey experience, including congestion relief and improved ticketing

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
52	Zero Emission Bus Regional Area (ZEBRA) Scheme	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2020	2024	LCC, WYCA and Bus Operators	DfT and Bus Operators	NO	Funded	> £10 million	Implementation	Reduced vehicle emissions	Increased number of ZE buses in Leeds	Additional funding awarded January 2023 increasing scope of No. buses and infrastructure. buses ordered and expected in to service in April 2024	Expected to deliver 57 ZE buses on 11 routes in Leeds Routes have changed due to First Group operational changes since bid but all routes still meet objectives.
53	East Leeds FlexiBus (Demand Responsive Transport) Service	Alternatives to private vehicle use	Other	2019	2022	LCC, WYCA and First Leeds	LCC, WYCA, Planning contributions and DFT (Better Deal for Bus Users Fund)	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Reducing car trips	The scheme is in Operation using 7 ZEBs	Trial of a digitally enabled Demand Responsive Transport (DRT) service in two areas of East Leeds. A flexible and agile bus service based on demand rather than traditional fixed route, scheduled bus services.
54	ATF Cycleways	Transport Planning and Infrastructure	Cycle network	2021	2023	LCC	ATF	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Uptake in active travel	Balm Road Scheme. Complete bar snagging?	
55	TCF Cycleways	Transport Planning and Infrastructure	Cycle network	2021	2023	LCC	TCF	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Uptake in active travel	Dewsbury Road connector/ Sovereign Street. Dewsbury Rd nearing completion. .Sovereign Street to start summer 23.	Both fill links in network
56	Eco Driving Courses	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2010		LCC	LCC	NO	Funded	£10k - 50k	Implementation	Reduced vehicle emissions	No	Embedded in all CPC driver training	
57	Active Travel Neighbourhoods	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2020	2023	LCC	EATF and ATF	NO	Funded	£1 million - £10 million	Implementation	Reduced vehicle emissions	Uptake in active travel	2 existing ATNs (in place since late early 21) have been redesigned and completed in response to community engagement . 3 more are expected to be delivered this financial year.	

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Leeds City Council is taking the following measures to address $PM_{2.5}$:

- Particulate pollution from domestic sources is recognised as an area of concern in Leeds as it is across much of the country. Most areas of Leeds are designated as Smoke Control Areas. Advice and enforcement protocols are in place within the Council's Cleaner Neighbourhood Team to take the appropriate action in cases of non-compliance with smoke control and environmental protection legislation.
- The Council's Air Quality Strategy and Action Plan launched in 2021 includes planned communications to raise public awareness of PM emissions from domestic solid fuel use and the introduction "Ready to Burn" rules on sales of solid fuels.
- Leeds City Council supports residents to dispose of garden waste responsibly and provides a free of charge green waste collection service to 60% of households. Domestic garden waste is also accepted free of charge at all eight household waste sites in Leeds.
- Dust from demolition and construction is controlled by planning conditions and site management plans.
- Emissions from a range of industrial and commercial processes are regulated by Leeds City Council under the provisions of the Local Authority Integrated Pollution Prevention and Control regime.
- A number of the measures described in Table 2.2 of this report seek to reduce the more polluting vehicle types, while increasing the use of ULEV's, the use of Park & Ride sites and more sustainable modes of transport.
- The Council is working in partnership with the University of Leeds to develop a network of low cost PM2.5 sensors across the City, providing publicly available real

time information on local air quality. There are currently 38 sensors in place, many located at schools and other public access buildings.

- An additional reference method (FIDAS) particulate monitor was installed at the Corn Exchange area of Leeds Centre in 2022. The monitor provides an additional automatic monitoring site and will provide further insight into air quality close to the bus station transport hub.

Headingley Kerbside AURN, Leeds Centre AURN and the recently introduced Corn Exchange $PM_{2.5}$ monitoring sites recorded annual mean concentrations in 2022 of 10µg/m^3, 9 µg/m^3 and 9µg/m^3 respectively, all within current air quality objectives.

The Public Health Outcomes Framework (PHOF) includes an air quality indicator based on annual average background concentrations of $PM_{2.5}$. The indicator measures the percentage of all deaths in people aged 30 and over in a single year that long-term exposure to current levels of man-made $PM_{2.5}$ is an attributable factor. The most up to date data available is for 2021. In 2021 it was estimated that $PM_{2.5}$ was an attributable factor in 5.4% of adult deaths in Leeds. This is comparable with the average for the Yorkshire & Humber region (5.0%) and for England (5.5%).

The Leeds Health Protection Board priorities for 2021 -2023 includes a priority to reduce the impact of poor air quality on health. The Board is chaired by the Director of Public Health. Members represent Leeds City Council services including Environmental Health, Resilience and Emergency, and Adults and Health. Other organisations represented include UKHSA, NHS Leeds CCG, GP Confederation, Leeds Teaching Hospitals (LTHT), Leeds and York Partnership Foundation Trust (LYPFT), Leeds Community Health Trust (LCH), and NHS England.

The Board's focus in 2022 -23 includes:

- Establishing a greater understanding of the complex relationship between air pollution and health outcomes using a range of monitoring and reporting data.
- Raising awareness and promotion to key health organisations the impact of air pollution on health and how they can contribute to this agenda.
- The implementation of an alert system to communicate high pollution episodes to the public as well as health and social care services.

- The education of health care professionals, schools' staff, parents, workplaces across Leeds and the public on the impact of air pollution on health and mitigating actions to protect health.

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

This section sets out the monitoring undertaken within 2022 by Leeds City Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Leeds City Council had 9 automatic (continuous) monitoring sites in the city during 2022. Seven of the sites were operated exclusively by the city council, one is part of the Automatic Urban and Rural Network (AURN) and one an affiliated AURN site owned by the city council with results accepted into the national network. Table A.1 in Appendix A shows the details of the automatic monitoring sites.

National monitoring results are available at https://uk-air.defra.gov.uk/data where a full data set for the Leeds Centre AURN site is available (monitoring includes NOx/NO2, PM10, PM2.5, SO2, CO, O3). Data from the Leeds Headingley Kerbside AURN site (NOx/NO2, PM10 and PM2.5) is also available from this website. Monitoring results are also available for Defra's Non-Automatic Hydrocarbon Network monitoring of benzene at Leeds Centre AURN site, and Polycyclic Aromatic Hydrocarbon monitoring at Leeds Millshaw – PAH Digitel (solid phase) site. Further details are 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

Leeds City Council undertook non-automatic (i.e. passive) monitoring of NO_2 at 176 sites during 2022. Thirty-five new diffusion tube sites were introduced to support infrastructure improvements and resident's queries.

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.

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 2022 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.

Figure A.1 in Appendix A shows the trend in annual mean NO2 concentration at the automatic sites.

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.

Figure A.8 shows the trend in number of NO_2 1-hour means >200µg/m^3.

Data capture above 75% was achieved at all automatic monitoring sites in 2022 with the exception of the Bishopgate Street site which achieved a data capture of 62.1%. This low data capture at Bishopgate Street was due to loss of electricity supply to the analyser due to works being carried out on the Leeds Station Sustainable Travel Gateway scheme.

In March 2022 the Corn Exchange NOx analyser was re-housed in a new cabin along with a new FIDAS particulate monitor.

The automatic monitoring results for 2022 results show that the automatic monitoring site Bishopgate Street (A21) exceeded the NO_2 annual mean air quality objective of 40ugm^{-3} in 2022 with an annual mean result of 42.0 µg/m^3 . This result is a reduction from the 2021 result of 45µg/m^3 .· In 2022 all other automatic monitoring sites had annual mean results less than the air quality objective of 40ugm^{-3} and were within the range of 14.0 to 34.0 µg/m^3 .

The Bishopgate Street automatic monitoring site (A21) was established in 2017 as close as reasonably practicable to the elevated diffusion tube results obtained on the north side of the Neville street tunnel/bridge with the rail station platforms and station approach above. The long term trend from both the automatic and diffusion tube monitoring in the area has been one of improvement. The Bishopgate Street, New Station Street and City Square area is curently being redeveloped as part of the Leeds Station Sustainable Travel Gateway scheme and it is anticipated that this scheme will bring further improvements to the air quality in the area.

The results for 2022 show that Bishopgate Street recorded two 1-hour periods where concentrations were greater than 200µg/m^3 . However the 1-hour mean objective 200µgm^{-3} not to be exceeded more than 18 times/year was not exceeded at any site.

Diffusion tube monitoring results from 176 sites during 2022 show that the NO_2 annual mean air quality objective of 40ugm^{-3} was exceeded at 12 sites.

Ten of these sites were located in the city centre around Bishopgate Street, Wellington Street, Josephs Well, Neville Street and City Square. Exceedances ranged between 40.5 µg/m^3 to 62.9 µg/m^3. The highest annual mean of 62.9 µg/m^3 was recorded at the D183 Neville Street monitoring site and is a reduction from the 2021 result of 68.8 µg/m^3 . Nearby diffusion tubes located on Neville Street, City Square and Bishopgate Street also exceeded the 40µg/m^3 annual mean objective and it is anticipated that the Leeds Station Sustainable Travel Gateway scheme will improve these results when the scheme is completed.

Diffusion tubes on Wellington Street (41.4 µg/m^3), Joseph's Well (42.0 µg/m^3) and Yorkshire Post (40.9 µg/m^3) show an increase on their 2021 annual mean results. However these sites continue to follow their pre-Covid trend of long term improvement.

The two remaining sites showing exceedance were located outside the city centre at Kirkstall Road adjacent to Cardigan Fields Leisure Park and at one location in the Pool in Wharfedale AQMA. At the Kirkstall Road location the annual mean concentration recorded in 2022 was 40.6µg/m^3 which is a reduction from 42.3 µg/m^3 in 2021.

AQMA monitoring data for 2022 shows that with the exception of one site, D114 in AQMA Pool in Wharfedale (AQMA 5/2017), the NO_2 annual mean air quality objective of 40ugm^{-3} was met at all other monitoring sites within the city's AQMAs. The annual mean result for D114 of 42.0µg/m^3 was an increase on the 2021 result of 37.6µg/m^3. However comparison to the 2019 result of 44.9µg/m^3 suggests that the site has returned to its pre-Covid long term trend of improvement.

Figures A.2 to A.7 in Appendix A show trends in annual mean concentration in NO_2 in the Leeds City Council AQMA's.

No changes were made to any of the AQMA's in 2022. Ebor Gardens, Caspar Apartments, The Normans, The Tilburys and Chapel Hill AQMAs are now in the process of being revoked as they are compliant and meet over 3 years with consecutive annual mean concentrations of 36µg/m^3 and below. Monitoring will continue in these AQMAs after revocation in order to continue to monitor the long term trends.

Diffusion tube monitoring continues at all sites that exceeded the air quality objective in order to understand the scope and duration of any exceedances.

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.

Figure A.9 in Appendix A shows trends in annual mean PM_{10} concentrations at Leeds AURN sites.

Figure A.10 in Appendix A shows trends in the number of 24-hour mean PM_{10} results > 50µg/m^3 at Leeds AURN sites.

In 2022 PM_{10} was measured at both Leeds Centre AURN site and Headingley Kerbside Affiliated AURN site. A BAM10 is used to measure PM_{10} at Leeds Headingley Kerbside AURN site and a FIDAS is used at Leeds Centre AURN site. QA/QC for these sites is carried out by Ricardo Energy & Environment.

In March 2022 Leeds City Council introduced a FIDAS particulate monitor into its air quality monitoring network at a new Corn Exchange site. The FIDAS measures both PM2.5 and PM10. The FIDAS data is ratified by Air Quality Data Management (AQDM) and is included in Tables A.6 and A.7 in Appendix A.

There have been no exceedances of either of the air quality objectives for several years in Leeds and annual mean concentrations monitored in Leeds in 2022 were well within the objectives.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years at the two AURN sites in Leeds where $PM_{2.5}$ is monitored. A BAM2.5 is used to measure $PM_{2.5}$ at Leeds Headingley Kerbside AURN site and a FIDAS is used at Leeds Centre AURN site. QA/QC for these sites is carried out by Ricardo Energy & Environment.

In March 2022 Leeds City Council introduced a FIDAS particulate monitor into its air quality monitoring network at a new Corn Exchange site. The FIDAS measures both PM2.5 and PM10. The FIDAS data is ratified by Air Quality Data Management (AQDM) and is included in Table A.8 in Appendix A.

Figure A.11 in Appendix A shows trends in annual mean $PM_{2.5}$ concentrations.

Annual mean concentrations monitored in Leeds in 2022 were well within the air quality objective.

3.2.4 Sulphur Dioxide (SO_2)

Table A.9 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2022 with the air quality objectives for SO_2.

Although air quality issues around SO_2 were confidently dismissed more than ten years ago, monitoring of this pollutant continues at the Leeds Centre AURN site to inform the national network. In recent years there have been no breaches of any of the objectives

applying to this pollutant. QA/QC for this site is carried out by Ricardo Energy & Environment.

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)
A1	Leeds Centre (AURN)	Urban Centre	429969	434259	NO_2; PM_{10}; $PM_{2.5}$; SO_2; CO; O_3	NO	Chemiluminescent FIDAS	N/A	30	2.7
A2	Corn Exchange	Kerbside	430358	433422	NO_2	NO	Chemiluminescent TEOM	N/A	1	2.7
A3	Headingley (AURN Affiliated)	Kerbside	427989	436045	NO_2; PM_{10}; $PM_{2.5}$	NO	Chemiluminescent BAM	N/A	1	2.7
A6	Haslewood Close	Roadside	431268	433701	NO2	Ebor Gardens(AQMA 1/2017)	Chemiluminescent	0	7	3.3
A9	Jack Lane, Hunslet	Roadside	430731	431911	NO_2	NO	Chemiluminescent	17	5	2.7
A17	Kirkstall Rd	Roadside	427147	434789	NO_2	NO	Chemiluminescent	6	5	2.7
A18	Temple Newsam	Other	435940	432271	NO_2	NO	Chemiluminescent	N/A	N/A	2.4
A19	Tilbury Terrace	Roadside	428830	431657	NO_2	The Tilburys (AQMA 4/2017)	Chemiluminescent	0	15	1.5
A20	International Pool	Roadside	429329	433672	NO_2	NO	Chemiluminescent	N/A	4	1.5
A21	Bishopgate Street	Roadside	429932	433370	NO_2	NO	Chemiluminescent	N/A	3	1.5
A22	Abbey Road	Roadside	426286	435784	NO_2	The Normans (AQMA 3/2017)	Chemiluminescent	28	2	1.5
A23	Corn Exchange 2	Kerbside	430365	433446	NO_2; PM10; PM2.5	NO	Chemiluminescent FIDAS	1.5	1	2.7

Notes:

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

(2) N/A if not applicable

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

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)
D6	Haslewood Close Wall corner (R)	Roadside	431268	433701	NO2	YES Ebor Gardens AQMA 1/2017	0.0	7.0	No	3.3
D7	Haslewood Close Wall corner (L)	Roadside	431268	433701	NO2	YES Ebor Gardens AQMA 1/2017	0.0	7.0	No	3.3
D8	Haslewood Close Gable	Roadside	431264	433704	NO2	YES Ebor Gardens AQMA 1/2017	0.0	8.0	No	2.4
D9	Haslewood Cl (facing open area)	Roadside	431269	433720	NO2	YES Ebor Gardens AQMA 1/2017	0.0	27.0	No	2.4
D20	25 Ladybeck Close rear block	Roadside	430727	433834	NO2	No	0.0	6.0	No	2.4
D26, D27, D28	Leeds AURN (M)	Urban Centre	429969	434259	NO2	No	N/A	30.0	Yes	2.7
D35	110 Jack Lane, Hunslet	Roadside	430720	431898	NO2	No	0.0	7.0	No	2.4
D45	2 Norman Row, pipe	Roadside	426276	435820	NO2	YES The Normans AQMA 3/2017	0.0	2.0	No	2.4

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)
D46	4 Delacey Mount, Kirkstall	Roadside	426214	435955	NO2	YES The Normans AQMA 3/2017	0.0	7.0	No	2.4
D74	Norman Street, Kirkstall Rd LP	Roadside	426294	435800	NO2	No	15.0	1.5	No	2.4
D105	76 Selby Road	Kerbside	440034	432364	NO2	No	0.0	4.0	No	2.4
D109	107 Bradford Rd, Otley	Roadside	419598	445168	NO2	No	0.0	3.0	No	2.4
D114	8 Main Street, Pool	Roadside	424507	445151	NO2	YES Pool in Wharfedale AQMA 5/2017	0.0	2.0	No	2.4
D118	1 Rein Road, Morley	Roadside	426914	426605	NO2	No	0.0	2.0	No	2.4
D120	2 Chapel Lane, Morley	Roadside	426362	428162	NO2	YES Chapel Hill AQMA 6/2017	0.0	2.0	No	2.7
D121	adj 32 Otley Road, Headingley	Roadside	427906	436195	NO2	No	0.0	2.0	No	2.4
D122	North St,LS2 (Northern Intelligence)	Roadside	430522	434022	NO2	No	0.0	2.0	No	2.4
D125	12 Tilbury Terrace	Roadside	428824	431658	NO2	YES The Tilburys AQMA 4/2017	1.0	17.0	No	2.4

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)
D135	Gotts Road (L)	Roadside	428866	433332	NO2	No	N/A	7.0	No	2.4
D136	Gotts Road (R)	Roadside	428858	433327	NO2	No	N/A	7.0	No	2.4
D149	Tilbury Row	Kerbside	428762	431670	NO2	YES The Tilburys AQMA 4/2017	0.0	35.0	No	2.4
D165	Yorkshire Post	Roadside	428980	433435	NO2	No	N/A	9.0	No	2.4
D166	Gotts Rd Exit	Roadside	428926	433394	NO2	No	N/A	6.0	No	2.4
D167	Graingers Way	Roadside	428779	433252	NO2	No	N/A	6.0	No	2.4
D168	Spence Lane	Roadside	428633	432860	NO2	No	N/A	9.0	No	2.4
D169	Arco	Roadside	428582	432656	NO2	No	N/A	19.0	No	2.4
D170	Canal Place	Roadside	428766	433294	NO2	No	N/A	7.0	No	2.4
D171	Harley Davidson	Roadside	428833	433358	NO2	No	N/A	10.0	No	2.4
D178	City Sq TL (SW Queens Hotel)	Kerbside	429839	433401	NO2	No	N/A	1.0	No	2.4
D179	City Sq TL (Majestic)	Kerbside	429837	433410	NO2	No	N/A	1.0	No	2.4

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)
D180	City Square (north side)	Kerbside	429905	433473	NO2	No	N/A	1.0	No	2.4
D181	City Sq TL (SE Boar Ln side)	Kerbside	429939	433403	NO2	No	N/A	1.0	No	2.4
D182	City Sq TL (SE Queens Hotel)	Kerbside	429932	433397	NO2	No	N/A	1.0	No	2.4
D183	Neville St TL (NW tunnel exit)	Kerbside	429965	433295	NO2	No	N/A	1.0	No	2.4
D184	Neville St TL (NE tunnel entrance)	Kerbside	429989	433291	NO2	No	N/A	1.0	No	2.4
D186	Neville St Bus Stop (SE tunnel exit)	Kerbside	429965	433173	NO2	No	N/A	1.0	No	2.4
D187	Neville St Pipe (SW tunnel entrance)	Kerbside	429958	433176	NO2	No	N/A	3.0	No	2.4
D191	Skyliner Apartments Rentals	Roadside	430774	433566	NO2	No	13.0	1.0	No	2.4
D192	St Peter's Sq/Duke St	Roadside	430779	433515	NO2	No	N/A	1.0	No	2.4
D193	LP Opp Millgarth Police Stn site	Roadside	430699	433684	NO2	No	N/A	1.0	No	2.4
D195	273 Elland Road	Roadside	428213	431181	NO2	No	0.0	15.0	No	2.4
D197	Bishopgate Street	Roadside	429932	433370	NO2	No	N/A	3.0	Yes	1.5

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D198	Norman Row gable	Roadside	426278	435811	NO2	YES The Normans AQMA 3/2017	0.0	2.0	No	3.0
D199	Knowsthorpe Gate met station	Industrial	433134	432248	NO2	No	N/A	25.0	No	2.1
D200	New Station Street Lamp post 1	Roadside	430061	433276	NO2	No	N/A	5.0	No	2.4
D201	New Station Street Lamp post 2	Roadside	430042	433272	NO2	No	N/A	3.0	No	2.4
D202	57 Royston Hill, East Ardsley	Roadside	430629	424716	NO2	No	0.0	3.0	No	2.4
D203	Telegraph post, Main St, Pool	Roadside	424418	445268	NO2	YES Pool in Wharfedale AQMA 5/2017	1.0	1.0	No	2.4
D204	11 Farnham Close	Suburban	435562	438338	NO2	No	0.0	14.0	No	1.8
D208	Pool Hall Cottage	Roadside	424589	445084	NO2	YES Pool in Wharfedale AQMA 5/2017	0.0	7.0	No	1.8
D209	Old School House, Pool	Roadside	424381	445348	NO2	YES Pool in Wharfedale AQMA 5/2017	3.0	2.0	No	2.4
D210	White Hart PH, Pool	Roadside	424627	445118	NO2	YES Pool in Wharfedale AQMA 5/2017	27.0	2.0	No	2.4

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)
D211	Pool Bank New Road	Roadside	424617	445064	NO2	No	9.0	2.0	No	2.4
D215	TP after Image studio chapel Hill	Roadside	426504	428285	NO2	No	1.0	3.0	No	2.4
D216	LP outside Peking Express Chapel Hill	Roadside	426431	429197	NO2	YES Chapel Hill AQMA 6/2017	1.0	2.0	No	2.4
D217	Brunswick St, Morley opp No. 19	Roadside	426253	428192	NO2	YES Chapel Hill AQMA 6/2017	1.0	1.0	No	2.4
D235	Casper appt on LP at entrance	Roadside	430497	434032	NO2	YES Caspar Apartments AQMA 2/2017	14.0	3.0	No	2.4
D236	Casper appt on 1st pole to right	Roadside	430490	434044	NO2	YES Caspar Apartments AQMA 2/2017	0.0	17.0	No	2.1
D237	Casper appt right round to last pole	Roadside	430423	434058	NO2	YES Caspar Apartments AQMA 2/2017	0.0	19.0	No	2.1
D263	B&B Wakefield Road TP	Roadside	432000	430828	NO2	No	N/A	3.0	No	2.4
D269	LP o/s 1 Whitfield Way	Roadside	431192	431799	NO2	No	3.0	19.0	No	2.4
D272	Hunslet Rd/Black Bull St LP inb'd	Roadside	430631	432610	NO2	No	1.0	2.0	No	2.4

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)
D273	Hunslet Rd/Black Bull St LP outb'd	Roadside	430608	432672	NO2	No	N/A	2.0	No	2.4
D286	131 Ring Road Wortley	Roadside	426670	431713	NO2	No	0.0	11.0	No	2.1
D288	Int'l Pool overbridge LP	Roadside	429332	433668	NO2	No	N/A	10.0	No	2.4
D290	Yorks Post slip road to IRR (Sth)	Roadside	428964	433432	NO2	No	N/A	1.0	No	2.4
D291	Gotts Road adj to R Aire and hsg	Roadside	428986	433355	NO2	No	N/A	75.0	No	2.4
D292	Yorks Post slip road to IRR (Nth)	Roadside	429063	433495	NO2	No	N/A	3.0	No	2.4
D293	Wellington Street	Roadside	429127	433500	NO2	No	N/A	3.0	No	2.4
D295	Joseph's Well/IRR LP (North)	Roadside	429414	433974	NO2	No	N/A	4.0	No	2.4
D296	Joseph's Well/IRR LP (South)	Roadside	429395	433893	NO2	No	N/A	4.0	No	2.4
D298	Adj. IRR/Fountain St slip road	Roadside	429304	433708	NO2	No	N/A	1.0	No	2.4
D299	32 Westbury Terrace	Roadside	431793	430435	NO2	No	0.0	6.0	No	2.4
D301	LP at end of Enterprise Way	Roadside	431639	430105	NO2	No	4.0	18.0	No	2.4
D318	A647(AMT) LP42 A279	Roadside	427662	433719	NO2	No	N/A	2.0	No	2.4

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)
D319	HOV lane(s) LP60 S796	Roadside	426086	434106	NO2	No	10.0	2.0	No	2.4
D339	St Marks Road LP60 W881	Roadside	429553	434803	NO2	No	4.0	2.0	No	2.4
D376	Between Potternewton Lane/Stainbeck LP94	Roadside	429895	436842	NO2	No	10.0	2.0	No	2.4
D379	New Rd Side - Horsforth shops LP40 N370	Kerbside	423313	437470	NO2	No	1.5	1.0	No	2.4
D383	Osmanthorpe Lane back lane	Roadside	433144	433998	NO2	No	17.0	2.0	No	2.4
D384	Harehills lane LP119 Y12	Roadside	433132	434034	NO2	No	27.0	2.0	No	2.4
D395	Meadow Pk Dr/Bradford Rd	Kerbside	420802	434420	NO2	No	9.0	1.0	No	2.4
D399	243/245 Bradford Rd LP	Roadside	421019	434470	NO2	No	3.0	2.0	No	2.4
D403	Bishopgate Street LP	Kerbside	429934	433368	NO2	No	N/A	1.0	No	3.0
D411	Arium	Suburban	437483	438380	NO2	No	30.0	135.0	No	2.4
D414	LP 8M563 A58 Collingham	Roadside	439264	446059	NO2	No	10.0	1.5	No	2.4
D417	LP 10M58 Manor House Lane	Suburban	431903	440554	NO2	No	23.0	1.5	No	2.4

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)
D420	LP 17 R239	Roadside	427257	438450	NO2	No	N/A	1.5	No	2.4
D421	LP R239	Roadside	427274	438436	NO2	No	N/A	1.5	No	2.4
D427	LP20 N110	Kerbside	430630	433901	NO2	No	N/A	1.0	No	2.4
D429	LP19 B636 Briggate	Urban Centre	430247	433614	NO2	No	N/A	N/A	No	3.0
D433	LP96 D121 Dewsbury Rd	Kerbside	429614	430367	NO2	No	N/A	0.5	No	2.4
D434	LP95 D121 Dewsbury Road	Roadside	429596	430383	NO2	No	N/A	3.0	No	2.4
D436	LP39 V107 Victoria Rd	Suburban	426701	428886	NO2	No	N/A	1.5	No	2.5
D439	LP19 R174 Richardshaw Lane	Roadside	422081	434201	NO2	No	10.0	2.0	No	2.5
D447	85 W417	Roadside	427510	431956	NO2	No	8.0	2.0	No	2.4
D448	Screwfix LP 46 G80	Roadside	427796	431729	NO2	No	N/A	2.5	No	2.4
D449	25 C898 25	Roadside	430760	433165	NO2	No	6.0	2.5	No	2.5
D450	24 C898 24	Roadside	430743	433170	NO2	No	N/A	3.5	No	2.5
D451	Jack Lane LP 2J1	Roadside	429613	432352	NO2	No	N/A	2.5	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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D453	Fleet Lane 21 F244	Suburban	437954	428274	NO2	No	N/A	1.0	No	3.0
D457	Elland Rd (new)	Roadside	428236	431206	NO2	No	10.0	1.5	No	2.4
D458	Elland Rd P&R roundabout	Roadside	428012	431305	NO2	No	N/A	2.5	No	3.0
D463	Tommy Wass jnctn /pharmacy	Roadside	428915	429864	NO2	No	0.0	8.0	No	2.5
D468	O/S Middleton Pk Primary School LP	Roadside	429922	427433	NO2	No	7.0	3.0	No	3.0
D469	O/S new Bay Horse/ Balm Rd on LP	Roadside	431024	430746	NO2	No	2.3	1.3	No	2.5
D470	Balmoral Chase LP dead end	Roadside	431519	431442	NO2	No	6.0	3.0	No	3.0
D472	Beeston Primary School	Roadside	428293	430706	NO2	No	32.0	1.8	No	2.5
D473	Beeston Hill Health Centre	Roadside	429378	431389	NO2	No	4.0	2.0	No	3.0
D474	183 Beeston Rd	Roadside	429374	431335	NO2	No	0.0	6.0	No	2.7
D477	268 Tempest Rd	Roadside	429761	430654	NO2	No	0.0	5.5	No	2.5
D481	Whitehall Rd LP13	Roadside	429371	433265	NO2	No	N/A	3.5	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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D482	Wellington St LP17	Kerbside	429390	433477	NO2	No	N/A	1.0	No	2.5
D483	East Parade LP	Kerbside	429786	433652	NO2	No	N/A	1.0	No	2.4
D497	Crossley St Schl, Wetherby	Roadside	440201	448425	NO2	No	11.0	1.5	No	2.4
D498	North St Wetherby	Kerbside	440453	448226	NO2	No	N/A	1.0	No	2.7
D499	St James St, Wetherby	Roadside	440450	448396	NO2	No	0.0	7.0	No	2.4
D500	Caxton St, Wetherby	Roadside	440078	448355	NO2	No	N/A	1.5	No	2.4
D501	Barclays Bank, Manor Sq, Otley	Roadside	420152	445577	NO2	No	N/A	3.0	No	2.7
D503	Ladbrokes, Otley	Roadside	420173	445519	NO2	No	N/A	1.5	No	2.4
D506	Bright Horizons, LS4, front	Roadside	427673	434494	NO2	No	0.0	3.0	No	2.4
D507	Bright Horizons, LS4, LP side	Roadside	427699	434495	NO2	No	21.0	1.5	No	2.4
D508	Bright Horizons, LS4, LP back	Roadside	427690	434523	NO2	No	8.5	20.0	No	2.4
D509	Beech Hill car park , Otley	Roadside	420106	445534	NO2	No	N/A	1.5	No	2.4
D510	Skelton Hall Farm tennis ct	Suburban	436780	438452	NO2	No	12.0	160.0	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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D2, D516, D517	Headingley right co-located	Kerbside	427989	436045	NO2	No	N/A	1.0	Yes	2.7
D518, D519, D520	Jack Lane R co-located	Roadside	430731	431911	NO2	No	17.0	5.0	Yes	2.7
D283, D521, D522	Abbey Rd 3 co-located	Roadside	426286	435784	NO2	No	28.0	2.0	Yes	1.5
D60, D525, D526	Kirkstall Rd cage 3	Roadside	427147	434789	NO2	No	6.0	5.0	Yes	2.7
D163, D527, D528	International pool cage 3	Roadside	429329	433672	NO2	No	N/A	4.0	Yes	1.5
D529	70 Corporation Street	Roadside	425930	427949	NO2	No	0.0	15.0	No	2.4
D531	35 Troy Road	Roadside	426563	428101	NO2	No	0.0	3.0	No	2.4
D533	Wellington Rd, Brunce Gardens, LP 77W127	Roadside	428359	432907	NO2	No	N/A	2.0	No	2.5
D534	Armley Road (Verone) LP 6A279	Roadside	428632	433341	NO2	No	N/A	1.5	No	2.5
D535	Domestic Street LP 25D148	Roadside	428903	432458	NO2	No	19.0	1.5	No	2.5
D536	Water Lane, Globe Road LP 21G193	Roadside	429648	432937	NO2	No	N/A	2.4	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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D537	Water Lane, Bridgewater LP 36W783	Roadside	429875	432979	NO2	No	N/A	3.3	No	2.5
D538	Sweet Street LP 851024	Roadside	429796	432527	NO2	No	18.0	2.0	No	2.5
D539	Top Moor Side LP 5T315	Roadside	429151	432009	NO2	No	N/A	1.5	No	2.4
D540	Baron Close, drain pipe of no 6	Roadside	428992	431678	NO2	No	0.0	4.0	No	2.5
D541	Headrow, Town Hall LP 45T135	Kerbside	429738	433787	NO2	No	N/A	1.0	No	2.5
D542	Opposite church on Kirkgate	Kerbside	430633	433345	NO2	No	N/A	0.5	No	2.5
D543	LP on the calls	Kerbside	430295	433250	NO2	No	N/A	0.5	No	2.5
D544	Dragon Road No6, Wortley,LP 2 D171	Kerbside	427515	432204	NO2	No	5.0	1.0	No	2.5
D545	Dixon Lane Church, Wortley LP22 D131	Roadside	427147	432339	NO2	No	N/A	1.9	No	2.5
D546	Lower Wortley Rd. Wortley LP11 L485	Kerbside	426927	432256	NO2	No	5.0	0.3	No	2.5
D547	165 Outgang Lane, Bramley LPLP8 O194	Roadside	425246	435269	NO2	No	10.0	1.5	No	2.5
D548	Raynville Road jnc with Hall Way, Bramley LP12 R83	Roadside	425607	435046	NO2	No	N/A	1.5	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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D549	Victoria Park Ave / Kirkstall Ave, Bramley, Give Way	Kerbside	425724	435151	NO2	No	4.5	0.5	No	2.5
D550	Colton Road, Armley LP2 C559	Kerbside	427037	433164	NO2	No	0.5	1.0	No	2.5
D551	Wesley Road No13, Armley LP15 W175	Roadside	427209	433471	NO2	No	1.3	3.5	No	2.5
D552	Town Street Armley, nr The Royal LP14 T353	Kerbside	427011	433453	NO2	No	N/A	0.5	No	2.5
D553	Town Street Armley, Poundland CCTV mast	Roadside	427103	433493	NO2	No	N/A	1.5	No	2.5
D554	Hyde Park Rd, LP2 H786	Roadside	428939	435435	NO2	No	0.0	1.5	No	2.5
D555	Woodhouse Street LP2 W611	Kerbside	428987	435478	NO2	No	1.7	0.5	No	2.5
D556	Rodley Lane Roundabout LP12 R487	Roadside	421984	436505	NO2	No	3.0	3.8	No	2.5
D567	Horsforth New Road LP5 H716	Roadside	422079	436582	NO2	No	N/A	3.0	No	2.7
D568	Ring Road Beeston LP141 R223	Kerbside	428372	429587	NO2	No	10.0	1.0	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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
D569	Ring Road Beeston R'Bout LP121 R223	Roadside	428314	429625	NO2	No	9.0	2.0	No	2.5
D600	Cottingley Grove (nr Ring Road) LP3 C1080	Roadside	427881	430427	NO2	No	13.7	13.0	No	2.5
D601	Path between Cottingley Cres and Ring Road LP7 C1080	Roadside	427907	430351	NO2	No	1.5	28.0	No	2.5
D602	Elland Rd South no parking/loading sign	Roadside	428955	431699	NO2	No	4.0	12.0	No	2.5
D603	Stocks Hill, Armley LP2 825	Kerbside	427265	433514	NO2	No	N/A	0.5	No	2.5
D604	Theaker Lane Junction LP16 T189	Roadside	427015	433574	NO2	No	N/A	2.0	No	2.5
D605	Quebec Street j/w City Square LP1 Q15	Kerbside	429838	433433	NO2	No	N/A	1.0	No	2.5
D606	62 Monkbridge Rd	Kerbside	428507	436864	NO2	No	0.0	1.0	No	2.4
D607	76 Monkbridge Rd	Roadside	428581	436916	NO2	No	0.0	3.0	No	2.4
D608 (D265)	Thwaite Gate LP o/s Skoda Garage	Roadside	432063	431150	NO2	No	N/A	2.0	No	2.4
D609 (D267)	Low Rd LP opp Dental surgery	Roadside	431409	431610	NO2	No	N/A	3.0	No	2.4

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)
D610 (D271)	Hunslet Rd/Brookf'ld Terr LP	Roadside	430851	432360	NO2	No	N/A	1.0	No	2.4
D611 (D274)	TP o/s 155 Belle Isle Rd	Roadside	431150	430079	NO2	No	8.0	3.0	No	2.4
D612 (D276)	LP adj 1 Middlecroft Close	Roadside	431889	429630	NO2	No	10.0	2.0	No	2.4
D613 (D485)	New Briggate LP LP5N 77	Kerbside	430272	433787	NO2	No	N/A	1.0	No	2.4
D614 (D486)	Vicar Lane LP 6V 37	Kerbside	430433	433854	NO2	No	N/A	1.0	No	2.4
D615 (D487)	Headrow LP 16 T 135	Kerbside	430224	433759	NO2	No	N/A	1.0	No	2.4
D649	Corn Exchange 2	Kerbside	430365	433446	NO2	No	1.5	1.0	Yes	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 2022 (%) (2)	2018	2019	2020	2021	2022
A1	429969	434259	Urban Centre	98.0	98.0	30.0	28.0	21.0	22.0	22.0
A2	430358	433422	Kerbside	n/a	n/a	**51.0**	**49.0**	38.0	38.0	n/a
A3	427989	436045	Kerbside	94.0	94.0	**33.0**	28.0	20.0	23.0	22.0
A6	431268	433701	Roadside	n/a	n/a	**40.0**	n/a	n/a	n/a	n/a
A9	430731	431911	Roadside	93.4	93.4	**41.0**	39.0	31.0	32.0	31.0
A17	427147	434789	Roadside	98.8	98.8	28.0	25.0	20.0	21.0	22.0
A18	435940	432271	Other	99.1	99.1	16.0	16.0	13.0	13.0	14.0
A19	428830	431657	Roadside	n/a	n/a	31	33	24	n/a	n/a
A20	429329	433672	Roadside	99.6	99.6	36.0	**40.0**	29.0	32.0	34.0
A21	429932	433370	Roadside	62.1	62.1	**58.0**	**58.0**	**42.0**	**45.0**	**42.0**
A22	426286	435784	Roadside	98.9	98.9	39.0	36.0	27.0	29.0	29.0
A23	430365	433446	Kerbside	97.2	75.4					32.0

☒ **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.**

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 2022 (%) [2]	2018	2019	2020	2021	2022
D6	431268	433701	Roadside	92.3	92.3	33.5	32.1	22.0	26.4	25.6
D7	431268	433701	Roadside	84.6	84.6	35.3	30.0	23.5	25.6	25.6
D8	431264	433704	Roadside	84.6	84.6	34.8	30.4	23.6	22.6	23.2
D9	431269	433720	Roadside	100.0	100.0	32.7	29.2	19.7	22.1	22.7
D20	430727	433834	Roadside	100.0	100.0	38.8	30.1	22.0	25.0	25.4
D26, D27, D28	429969	434259	Urban Centre	100.0	100.0	30.0	27.0	19.3	23.3	22.9
D35	430720	431898	Roadside	90.4	90.4	34.1	28.2	26.9	29.4	24.8
D45	426276	435820	Roadside	92.3	92.3	36.9	32.1	24.3	26.5	29.2
D46	426214	435955	Roadside	100.0	100.0	25.7	23.9	17.9	19.3	19.7
D74	426294	435800	Roadside	100.0	100.0	31.8	28.4	20.9	24.1	24.4
D105	440034	432364	Kerbside	100.0	100.0	**42.6**	36.6	28.4	32.7	32.1
D109	419598	445168	Roadside	100.0	100.0	33.4	29.0	21.6	24.6	24.4

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 2022 (%) [2]	2018	2019	2020	2021	2022
D114	424507	445151	Roadside	92.3	92.3	**52.3**	**44.9**	30.2	37.6	**42.0**
D118	426914	426605	Roadside	100.0	100.0	34.2	32.9	25.6	27.1	26.1
D120	426362	428162	Roadside	92.3	92.3	35.2	31.4	24.8	24.2	23.4
D121	427906	436195	Roadside	67.3	67.3	39.6	33.5	24.2	31.7	34.1
D122	430522	434022	Roadside	100.0	100.0	36.7	32.7	21.2	26.2	27.9
D125	428824	431658	Roadside	100.0	100.0	27.6	25.1	19.6	22.2	22.4
D135	428866	433332	Roadside	90.4	90.4	37.9	**40.1**	30.8	35.2	34.1
D136	428858	433327	Roadside	100.0	100.0	**41.3**	35.5	27.7	33.8	31.5
D149	428762	431670	Kerbside	76.9	76.9	29.0	27.9	20.9	24.6	21.2
D165	428980	433435	Roadside	100.0	100.0	**48.1**	**40.1**	33.4	37.8	36.5
D166	428926	433394	Roadside	100.0	100.0	**44.1**	**41.1**	32.1	38.8	37.9
D167	428779	433252	Roadside	100.0	100.0	**47.1**	**43.9**	33.2	38.4	37.5
D168	428633	432860	Roadside	84.6	84.6	**42.8**	39.1	29.6	34.5	32.1
D169	428582	432656	Roadside	100.0	100.0	35.0	31.8	23.9	29.3	27.5

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 2022 (%) [2]	2018	2019	2020	2021	2022
D170	428766	433294	Roadside	100.0	100.0	**41.4**	36.4	27.6	35.2	33.4
D171	428833	433358	Roadside	100.0	100.0	**43.6**	38.7	30.9	36.8	34.0
D178	429839	433401	Kerbside	100.0	100.0	**45.7**	**43.5**	29.5	38.4	38.3
D179	429837	433410	Kerbside	100.0	100.0	**47.4**	**47.3**	32.3	**41.4**	37.2
D180	429905	433473	Kerbside	84.6	84.6	**47.9**	**51.7**	34.7	33.5	30.1
D181	429939	433403	Kerbside	100.0	100.0	**60.4**	**58.6**	**40.4**	**47.0**	**40.7**
D182	429932	433397	Kerbside	90.4	90.4	**50.9**	**47.7**	35.5	**42.7**	39.8
D183	429965	433295	Kerbside	42.3	42.3	**87.9**	**83.0**	**54.8**	**68.6**	**62.9**
D184	429989	433291	Kerbside	100.0	100.0	**65.1**	**57.9**	**43.3**	**51.4**	**43.3**
D186	429965	433173	Kerbside	90.4	90.4	**53.2**	**47.5**	34.5	**45.4**	**42.6**
D187	429958	433176	Kerbside	84.6	84.6	**54.8**	**50.6**	39.6	**48.2**	**40.5**
D191	430774	433566	Roadside	92.3	92.3	**47.0**	37.4	28.2	37.6	31.7
D192	430779	433515	Roadside	100.0	100.0	**53.2**	**41.4**	33.0	**40.4**	39.5
D193	430699	433684	Roadside	100.0	100.0	**51.6**	**40.0**	30.8	38.1	37.2

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 2022 (%) [2]	2018	2019	2020	2021	2022
D195	428213	431181	Roadside	100.0	100.0	25.5	22.7	16.7	18.8	19.0
D197	429932	433370	Roadside	65.4	65.4	**55.4**	**49.0**	38.2	**46.1**	**44.1**
D198	426278	435811	Roadside	90.4	90.4	**41.4**	37.9	29.0	32.8	31.1
D199	433134	432248	Industrial	84.6	84.6	27.5	26.1	22.1	25.4	21.3
D200	430061	433276	Roadside	92.3	92.3	**52.7**	**47.0**	36.1	35.9	36.7
D201	430042	433272	Roadside	100.0	100.0	**54.8**	**50.3**	39.0	**46.0**	39.2
D202	430629	424716	Roadside	75.0	75.0	**42.7**	**42.1**	32.6	34.4	36.7
D203	424418	445268	Roadside	63.5	63.5	39.4	29.8	25.7	26.3	27.6
D204	435562	438338	Suburban	100.0	100.0	18.9	17.1	14.1	12.5	12.4
D208	424589	445084	Roadside	100.0	100.0	20.7	16.9	15.7	18.2	16.7
D209	424381	445348	Roadside	84.6	84.6	20.4	18.0	14.9	14.5	14.6
D210	424627	445118	Roadside	100.0	100.0	28.9	24.1	16.7	20.2	21.1
D211	424617	445064	Roadside	100.0	100.0	**45.0**	38.0	28.9	33.9	32.7
D215	426504	428285	Roadside	92.3	92.3	32.1	27.6	20.0	21.4	19.7

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 2022 (%) [2]	2018	2019	2020	2021	2022
D216	426431	429197	Roadside	92.3	92.3	31.4	29.0	22.4	23.6	19.7
D217	426253	428192	Roadside	92.3	92.3	38.6	30.7	22.0	25.2	22.0
D235	430497	434032	Roadside	100.0	100.0	35.6	29.7	21.3	26.0	27.0
D236	430490	434044	Roadside	100.0	100.0	30.2	25.9	18.7	22.8	22.6
D237	430423	434058	Roadside	92.3	92.3	29.6	27.8	17.9	20.4	21.9
D263	432000	430828	Roadside	65.4	65.4	30.9	29.2	23.1	25.5	30.2
D269	431192	431799	Roadside	100.0	100.0	27.5	24.9	18.7	22.2	18.6
D272	430631	432610	Roadside	69.2	69.2	**46.6**	**40.7**	30.6	29.1	32.7
D273	430608	432672	Roadside	100.0	100.0	34.9	28.4	21.4	23.1	25.2
D286	426670	431713	Roadside	92.3	92.3	28.7	23.5	16.5	21.8	21.3
D288	429332	433668	Roadside	65.4	65.4	35.0	31.1	27.3	28.5	26.1
D290	428964	433432	Roadside	90.4	90.4	**53.8**	**49.3**	37.3	39.6	38.7
D291	428986	433355	Roadside	84.6	84.6	31.8	31.8	21.9	32.8	23.3
D292	429063	433495	Roadside	84.6	84.6	**51.7**	**44.7**	35.0	36.1	**40.9**

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 2022 (%) [2]	2018	2019	2020	2021	2022
D293	429127	433500	Roadside	92.3	92.3	**40.4**	**41.7**	33.0	36.9	**41.4**
D295	429414	433974	Roadside	82.7	82.7	**50.3**	**46.5**	37.1	**44.3**	**42.0**
D296	429395	433893	Roadside	82.7	82.7	**43.0**	39.4	29.8	35.1	32.3
D298	429304	433708	Roadside	100.0	100.0	36.4	29.1	21.9	25.6	25.4
D299	431793	430435	Roadside	90.4	90.4	27.1	25.1	18.1	22.0	21.2
D301	431639	430105	Roadside	100.0	100.0	18.0	18.3	11.9	17.0	15.7
D318	427662	433719	Roadside	92.3	92.3	38.7	34.7	28.9	32.7	31.8
D319	426086	434106	Roadside	100.0	100.0	30.1	28.6	20.8	22.1	26.0
D339	429553	434803	Roadside	84.6	84.6	**47.6**	**40.8**	16.1	14.3	17.0
D376	429895	436842	Roadside	92.3	92.3	**44.1**	38.5	28.5	34.7	35.4
D379	423313	437470	Kerbside	90.4	90.4	25.9	27.9	20.7	22.3	21.6
D383	433144	433998	Roadside	100.0	100.0	**43.1**	39.7	32.9	37.3	34.9
D384	433132	434034	Roadside	100.0	100.0	**44.1**	39.5	33.9	38.1	36.6
D395	420802	434420	Kerbside	67.3	67.3	26.9	26.5	20.5	26.1	25.4

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 2022 (%) [2]	2018	2019	2020	2021	2022
D399	421019	434470	Roadside	100.0	100.0	34.6	33.5	24.7	27.7	26.7
D403	429934	433368	Kerbside	42.3	42.3	**60.4**	**60.4**	39.3	**47.7**	**47.7**
D411	437483	438380	Suburban	92.3	92.3		13.3	11.2	11.6	13.2
D414	439264	446059	Roadside	90.4	90.4		19.8	19.4	24.7	25.8
D417	431903	440554	Suburban	92.3	92.3		11.9	8.6	8.7	9.5
D420	427257	438450	Roadside	100.0	100.0		27.4	19.5	20.3	31.8
D421	427274	438436	Roadside	76.9	76.9		**40.6**	27.9	35.5	23.4
D427	430630	433901	Kerbside	82.7	82.7		35.4	24.7	29.6	29.8
D429	430247	433614	Urban Centre	92.3	92.3		29.9	20.1	20.6	23.9
D433	429614	430367	Kerbside	67.3	67.3		33.3	26.8	24.2	23.2
D434	429596	430383	Roadside	90.4	90.4		28.4	24.9	26.4	25.7
D436	426701	428886	Suburban	84.6	84.6		21.9	16.1	20.2	20.7
D439	422081	434201	Roadside	100.0	100.0		30.5	19.7	27.8	27.4
D447	427510	431956	Roadside	100.0	100.0		32.4	19.7	29.7	29.5

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 2022 (%) [2]	2018	2019	2020	2021	2022
D448	427796	431729	Roadside	82.7	82.7		32.6	22.3	26.3	24.1
D449	430760	433165	Roadside	76.9	76.9		**42.1**	32.3	34.7	35.1
D450	430743	433170	Roadside	76.9	76.9		**40.8**	30.7	38.4	35.2
D451	429613	432352	Roadside	100.0	100.0		30.4	21.1	26.5	24.0
D453	437954	428274	Suburban	90.4	90.4		14.8	11.5	13.5	13.9
D457	428236	431206	Roadside	92.3	92.3		29.8	21.6	23.5	20.8
D458	428012	431305	Roadside	67.3	67.3		27.6	21.6	23.2	24.5
D463	428915	429864	Roadside	100.0	100.0		21.5	17.5	21.1	20.5
D468	429922	427433	Roadside	84.6	84.6		22.9	19.7	18.9	17.8
D469	431024	430746	Roadside	84.6	84.6		26.0	21.4	26.6	26.4
D470	431519	431442	Roadside	100.0	100.0		23.5	18.9	19.7	20.5
D472	428293	430706	Roadside	100.0	100.0		23.7	19.1	22.9	20.9
D473	429378	431389	Roadside	100.0	100.0		29.6	23.5	27.5	27.0
D474	429374	431335	Roadside	100.0	100.0		26.8	23.5	27.3	26.3

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 2022 (%) [2]	2018	2019	2020	2021	2022
D477	429761	430654	Roadside	100.0	100.0		27.1	24.0	26.6	25.5
D481	429371	433265	Roadside	92.3	92.3		28.6	26.5	30.1	29.1
D482	429390	433477	Kerbside	82.7	82.7		39.1	24.7	38.1	35.0
D483	429786	433652	Kerbside	92.3	92.3		30.8	35.1	36.3	35.6
D497	440201	448425	Roadside	100.0	100.0		16.1	12.9	14.3	13.9
D498	440453	448226	Kerbside	84.6	84.6		19.9	17.3	19.2	17.7
D499	440450	448396	Roadside	84.6	84.6			17.6	20.2	18.3
D500	440078	448355	Roadside	92.3	92.3		19.7	17.8	22.3	21.2
D501	420152	445577	Roadside	100.0	100.0		21.8	21.2	22.1	22.3
D503	420173	445519	Roadside	80.8	80.8			21.0	29.2	28.1
D506	427673	434494	Roadside	75.0	75.0			33.0	**42.3**	**40.6**
D507	427699	434495	Roadside	92.3	92.3		25.6	21.5	25.2	26.9
D508	427690	434523	Roadside	100.0	100.0		23.0	16.0	17.7	19.7
D509	420106	445534	Roadside	92.3	92.3		23.0	19.9	23.2	19.5

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 2022 (%) [2]	2018	2019	2020	2021	2022
D510	436780	438452	Suburban	100.0	100.0			8.3	8.8	8.3
D2, D516, D517	427989	436045	Kerbside	100.0	100.0			22.1	26.5	24.9
D518, D519, D520	430731	431911	Roadside	100.0	100.0				32.7	31.2
D283, D521, D522	426286	435784	Roadside	100.0	100.0				30.9	30.6
D60, D525, D526	427147	434789	Roadside	100.0	100.0					23.0
D163, D527, D528	429329	433672	Roadside	100.0	100.0					32.7
D529	425930	427949	Roadside	100.0	100.0				16.6	17.1
D531	426563	428101	Roadside	100.0	100.0				15.4	15.2
D533	428359	432907	Roadside	100.0	100.0				22.5	22.0
D534	428632	433341	Roadside	100.0	100.0					20.8
D535	428903	432458	Roadside	100.0	100.0				26.3	28.3
D536	429648	432937	Roadside	84.6	84.6				26.6	28.0
D537	429875	432979	Roadside	84.6	84.6					26.0

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 2022 (%) [2]	2018	2019	2020	2021	2022
D538	429796	432527	Roadside	84.6	84.6					23.2
D539	429151	432009	Roadside	92.3	92.3				25.5	29.4
D540	428992	431678	Roadside	92.3	92.3				23.4	22.6
D541	429738	433787	Kerbside	100.0	100.0				36.7	34.6
D542	430633	433345	Kerbside	100.0	100.0					27.9
D543	430295	433250	Kerbside	90.4	90.4					38.5
D544	427515	432204	Kerbside	100.0	100.0					18.1
D545	427147	432339	Roadside	92.3	92.3					20.5
D546	426927	432256	Kerbside	100.0	100.0					22.0
D547	425246	435269	Roadside	100.0	100.0					13.6
D548	425607	435046	Roadside	100.0	100.0					16.3
D549	425724	435151	Kerbside	100.0	100.0					14.3
D550	427037	433164	Kerbside	59.6	59.6					18.8
D551	427209	433471	Roadside	100.0	100.0					21.3

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 2022 (%) [2]	2018	2019	2020	2021	2022
D552	427011	433453	Kerbside	100.0	100.0					29.6
D553	427103	433493	Roadside	63.5	63.5					35.1
D554	428939	435435	Roadside	90.4	90.4					20.9
D555	428987	435478	Kerbside	100.0	100.0					26.2
D556	421984	436505	Roadside	100	92.3					30.7
D567	422079	436582	Roadside	90.9	84.6					22.5
D568	428372	429587	Kerbside	100	92.3					28.9
D569	428314	429625	Roadside	63.6	57.7					28.9
D600	427881	430427	Roadside	81.8	76.9					20.5
D601	427907	430351	Roadside	100	92.3					20.2
D602	428955	431699	Roadside	100	92.3					25.5
D603	427265	433514	Kerbside	100	92.3					23.0
D604	427015	433574	Roadside	100	92.3					16.6
D605	429838	433433	Kerbside	90.9	82.7					37.6

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 2022 (%) [2]	2018	2019	2020	2021	2022
D606	428507	436864	Kerbside	100	84.6					20.0
D607	428581	436916	Roadside	100	84.6					21.0
D608 (D265)	432063	431150	Roadside	100	67.3					33.5
D609 (D267)	431409	431610	Roadside	100	67.3					25.4
D610 (D271)	430851	432360	Roadside	75	51.9					28.3
D611 (D274)	431150	430079	Roadside	100	67.3					21.9
D612 (D276)	431889	429630	Roadside	100	67.3					19.0
D613 (D485)	430272	433787	Kerbside	100	67.3					30.2
D614 (D486)	430433	433854	Kerbside	100	67.3					31.7
D615 (D487)	430224	433759	Kerbside	100	67.3					38.6
D649	430365	433446	Kerbside	88.8	69.2					38.8

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

☒ **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

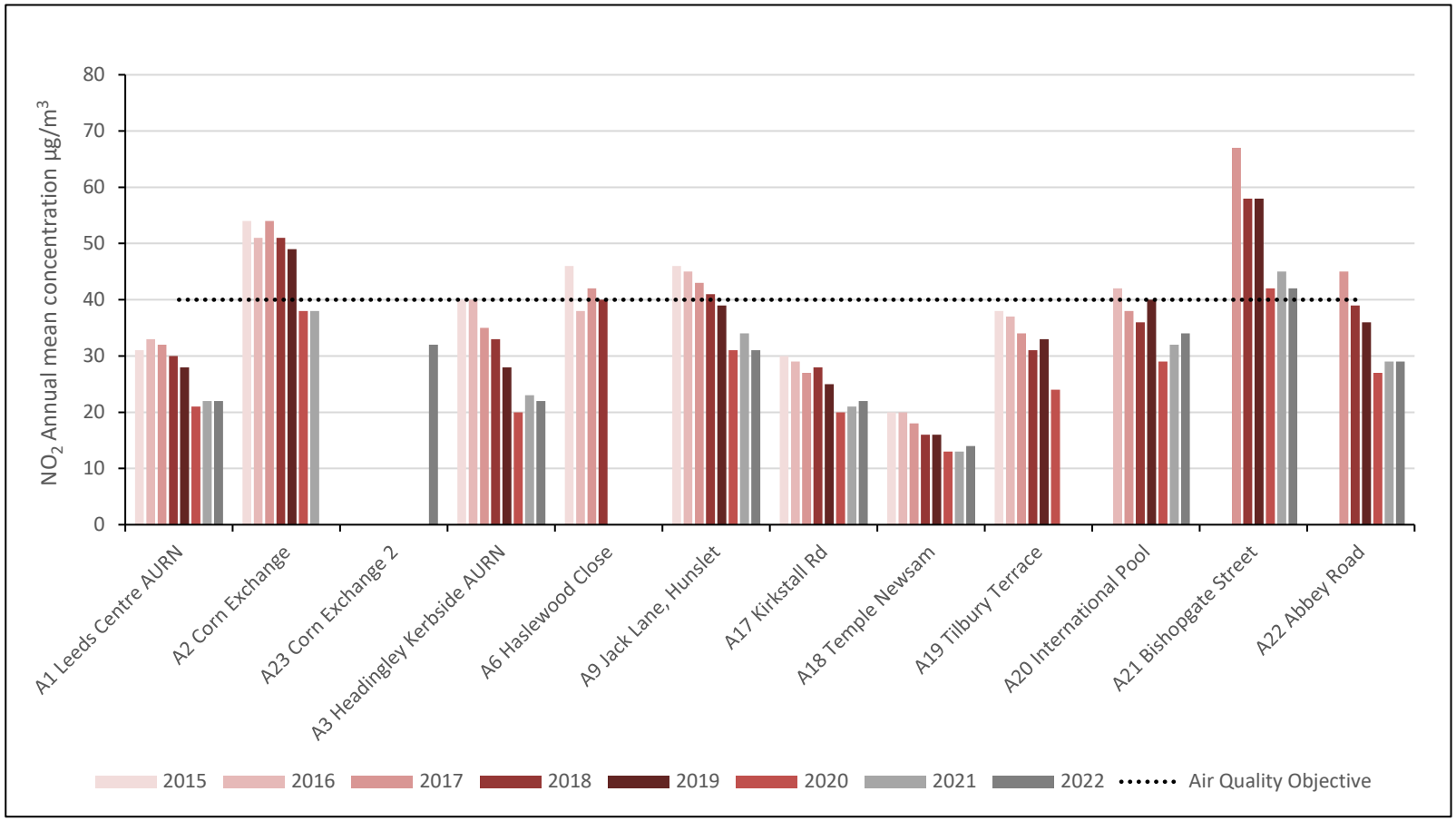


Figure A.2 – AQMA Ebor Gardens 1/2017. Trend in Annual Mean NO_2 Concentrations

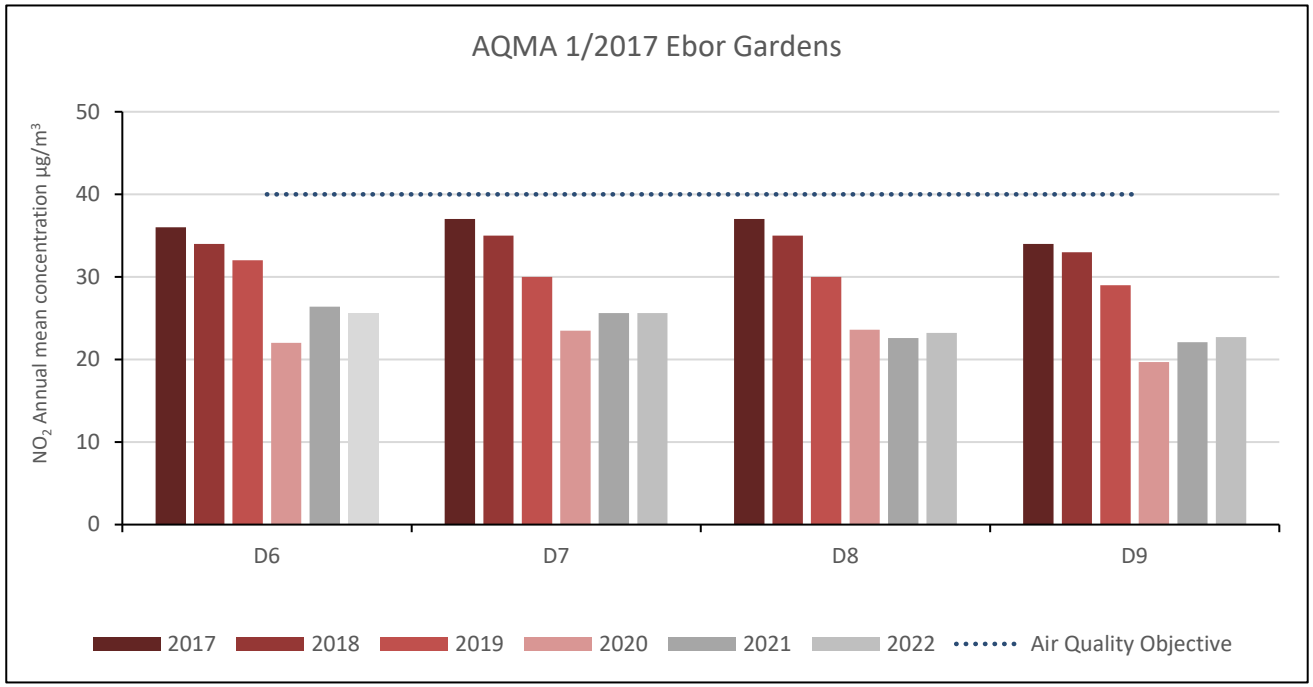


Figure A.3 – AQMA Caspar Apartments 2/2017. Trend in Annual Mean NO_2 Concentrations

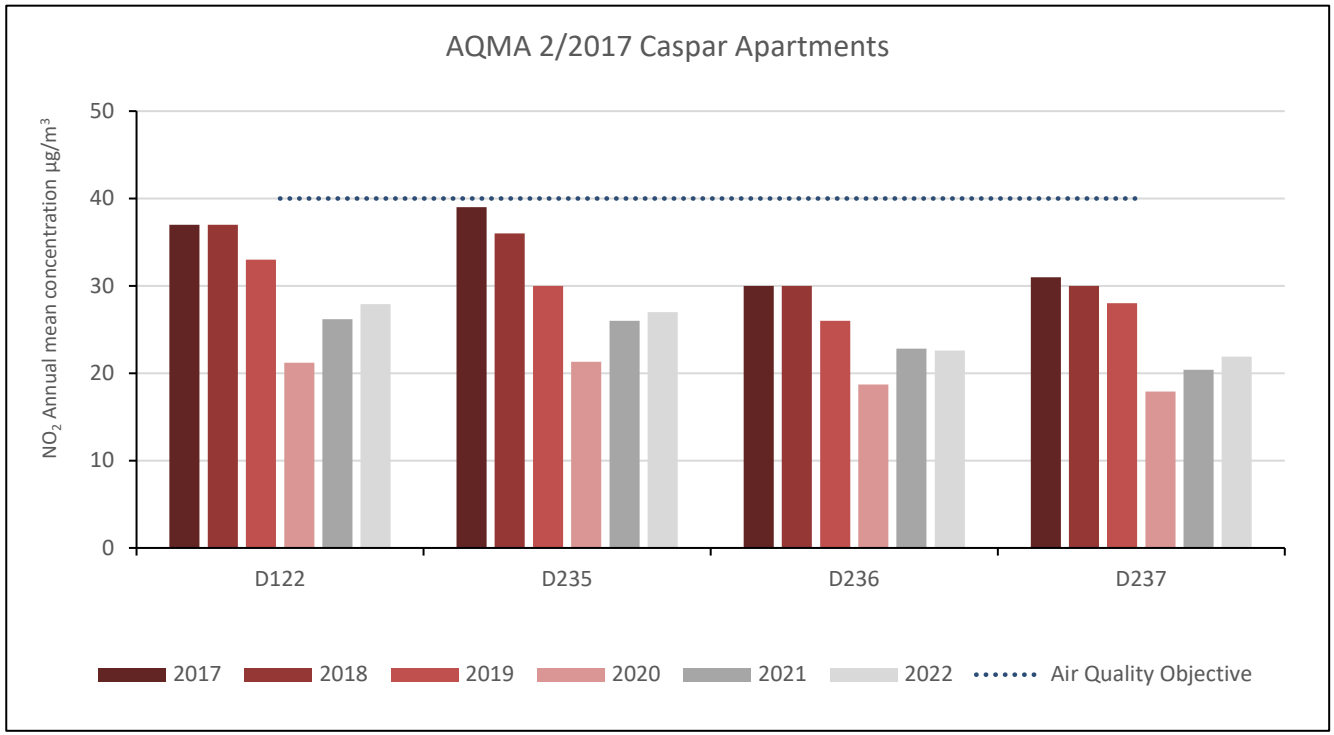


Figure A.4 – AQMA The Normans 3/2017. Trend in Annual Mean NO_2 Concentrations

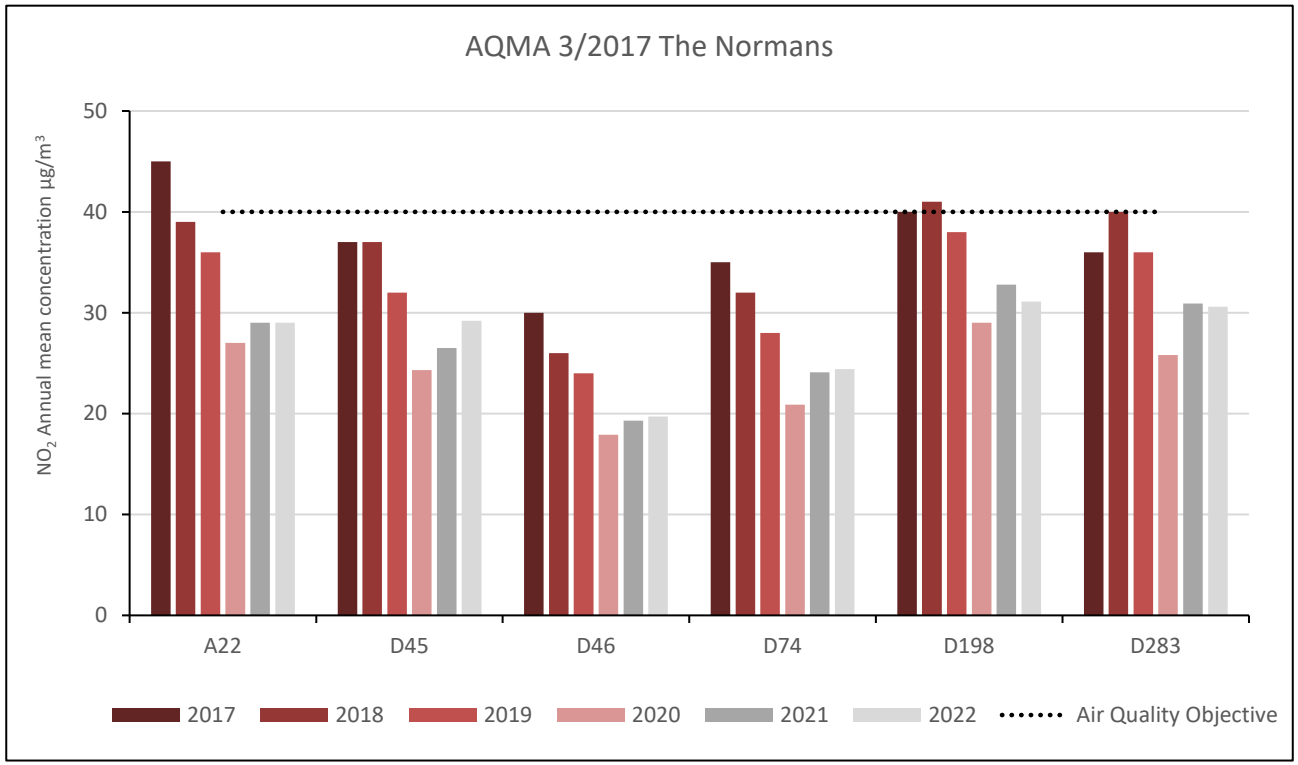


Figure A.5 – AQMA The Tilburys 4/2017 Trend in Annual Mean NO_2 Concentrations

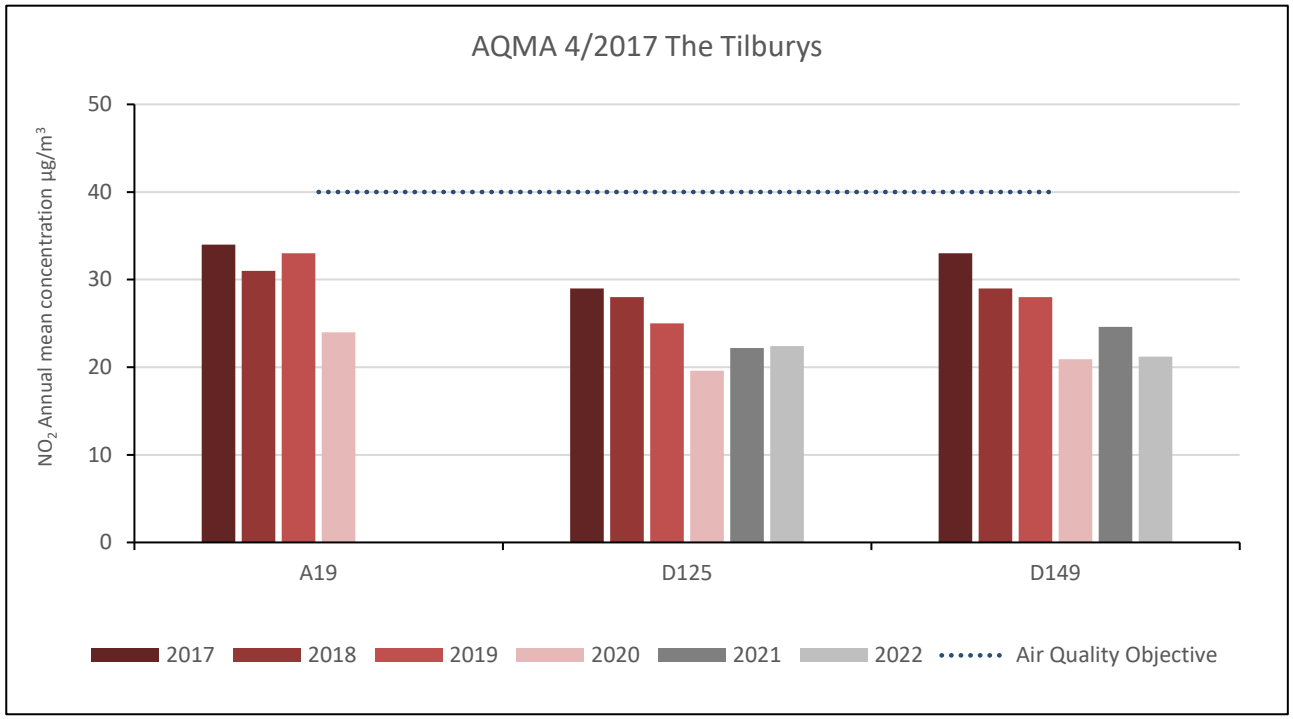


Figure A.6 – AQMA Pool in Wharfedale 5/2017 Trend in Annual Mean NO_2 Concentrations

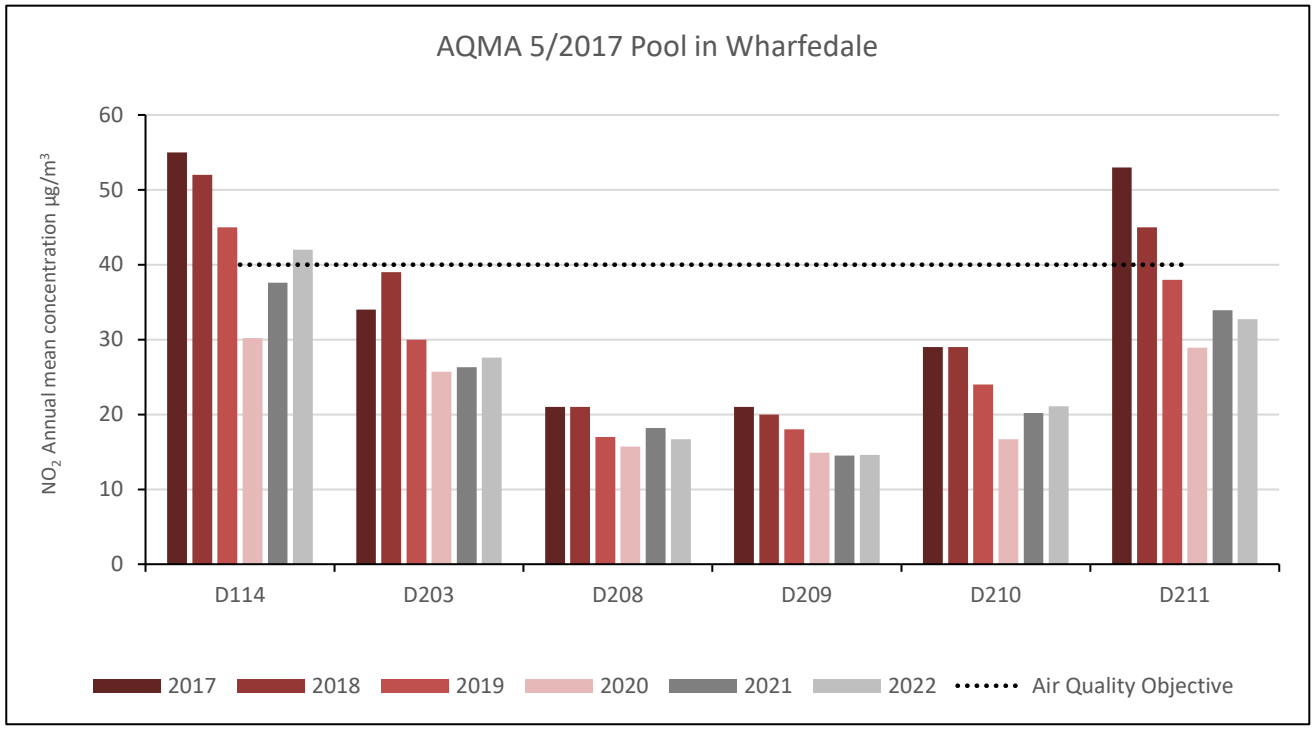


Figure A.7 – AQMA Chapel Hill 6/2017 Trend in Annual Mean NO_2 Concentrations

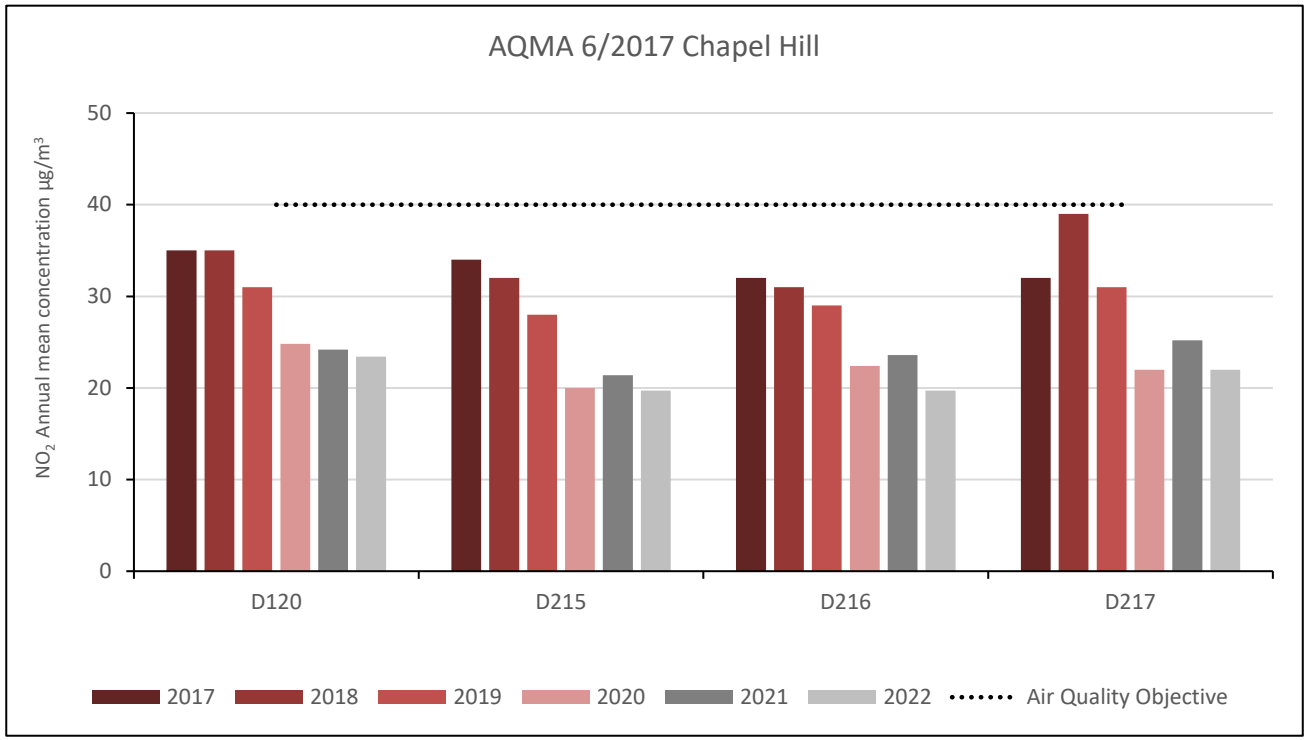


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
A1	429969	434259	Urban Centre	98.0	98.0	0	0	0	0	0
A2	430358	433422	Kerbside	n/a	n/a	0	0	0	0	n/a
A3	427989	436045	Kerbside	94.0	94.0	0	0	0	0 (75)	0
A6	431268	433701	Roadside	n/a	n/a	0 (105)	n/a	n/a	n/a	n/a
A9	430731	431911	Roadside	93.4	93.4	1	0	3	0 (94)	0
A17	427147	434789	Roadside	98.8	98.8	0	0	0	0	0
A18	435940	432271	Other	99.1	99.1	0	1	0	0	0
A19	428830	431657	Roadside	n/a	n/a	0	0	0	n/a	n/a
A20	429329	433672	Roadside	99.6	99.6	0 (98)	0	0	0	0
A21	429932	433370	Roadside	62.1	62.1	0	2(153)	1	0 (109)	2 (113)
A22	426286	435784	Roadside	98.9	98.9	0	0	0	0	0
A23	430365	433446	Kerbside	97.2	75.4					0 (92)

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%).

Figure A.8 – Trends in Number of NO_2 1-Hour Means > 200µg/m^3

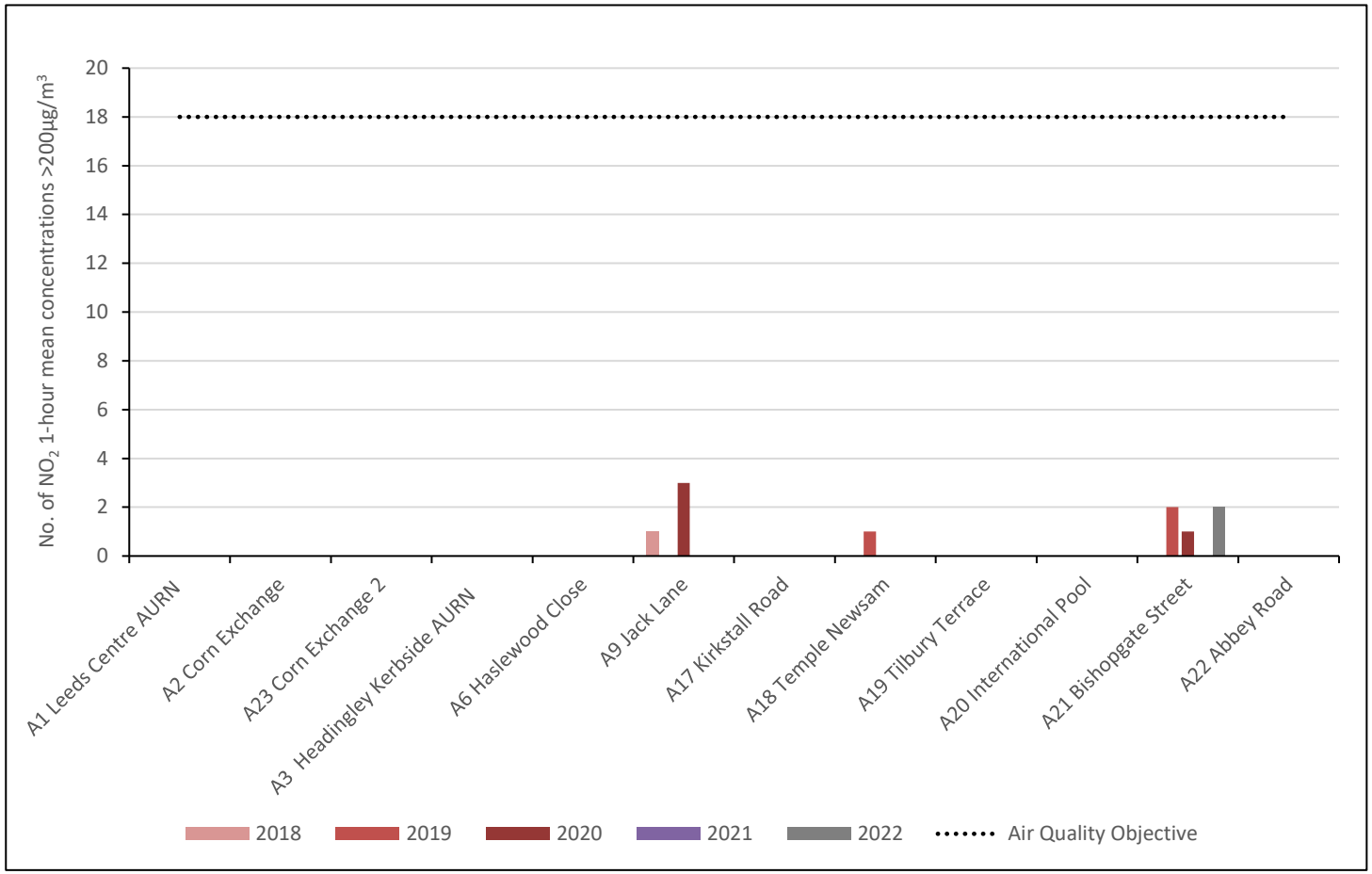


Table A.6 – Annual Mean PM_{10} Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
A1	429969	434259	Urban Centre	99.0	99.0	17.0	16.0	13.0	13.0	15.0
A3	427989	436045	Kerbside	96.0	96.0	18.0	16.0	18.0	18.0	20.0
A23	430365	433446	Kerbside	98.1	76.1					16.0

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

Notes:

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

Exceedances of the PM_{10} annual mean objective of 40$\mu g/m^3$ 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.9 – Trends in Annual Mean PM_{10} Concentrations

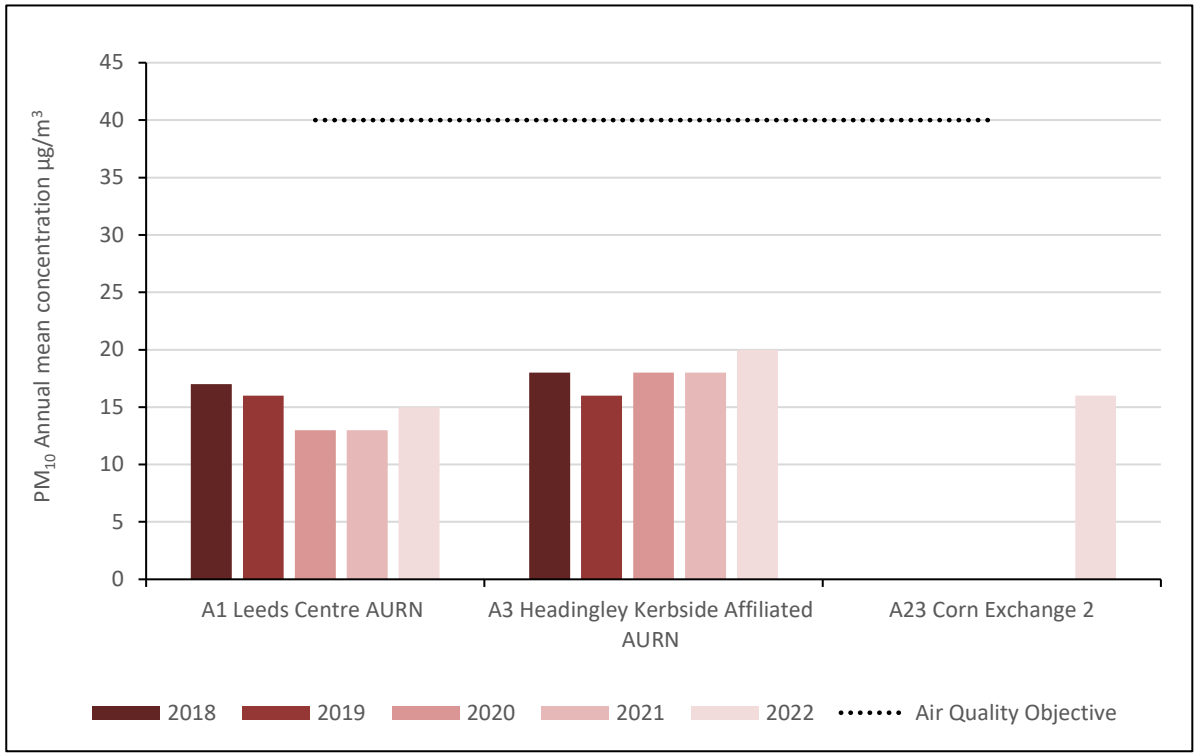


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
A1	429969	434259	Urban Centre	99.0	99.0	2	6	1	0	6
A3	427989	436045	Kerbside	96.0	96.0	3	3	2	4	7
A23	430365	433446	Kerbside	98.1	76.1					0 (27)

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

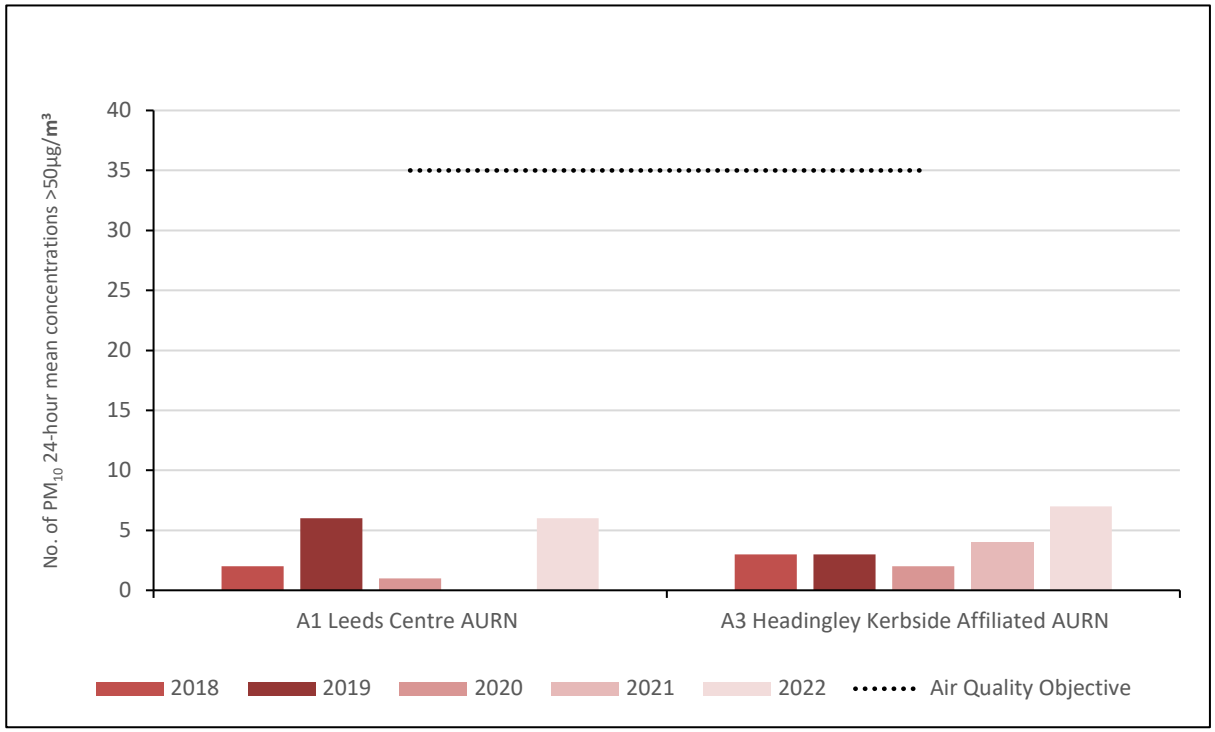


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
A1	429969	434259	Urban Centre	99.0	99.0	12.0	12.0	8.0	8.0	9.0
A3	427989	436045	Kerbside	96.0	96.0	11.0	12.0	9.0	9.0	10.0
A23	430365	433446	Kerbside	98.1	76.1					9.0

☒ **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.

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.11 – Trends in Annual Mean $PM_{2.5}$ Concentrations

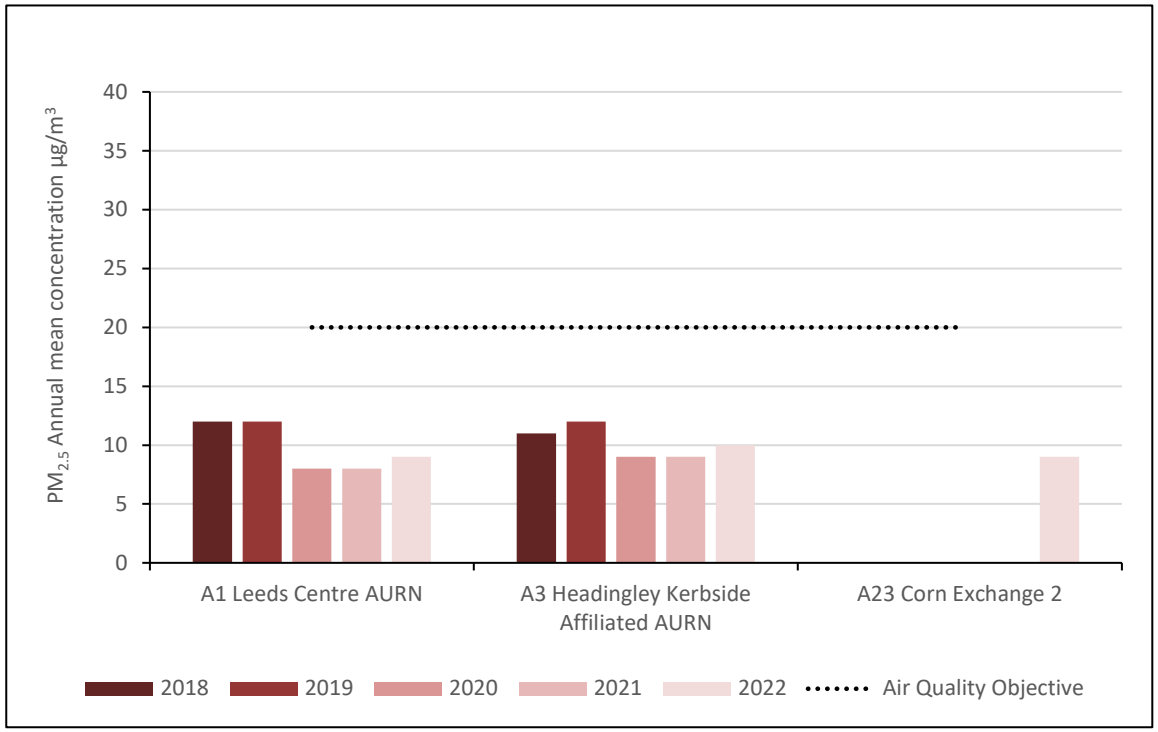


Table A.9 – SO_2 2022 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	Number of 15-minute Means > 266µg/m^3	Number of 1-hour Means > 350µg/m^3	Number of 24-hour Means > 125µg/m^3
A1	429969	434259	Urban Centre	99.0	99.0	0	0	0

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are 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%).

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO_2 2022 Diffusion Tube Results (µg/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 <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
D2	427989	436045	38.2	30.3	44.8	32.3	27.3	21.0	25.0	27.9	33.1	31.5	39.3	34.7	-	-	-	Triplicate Site with D2, D516 and D517 - Annual data provided for D517 only
D6	431268	433701	42.5	35.2	44.2	26.5	29.3	29.4	31.5	24.6	27.8	39.4		40.8	33.7	25.6	-	
D7	431268	433701	38.8		44.9	27.9	26.6	25.9		26.5	28.1	35.6	41.0	41.7	33.7	25.6	-	
D8	431264	433704			43.7	23.7	27.9	26.6	28.0	25.7	27.8	33.7	39.8	28.8	30.6	23.2	-	
D9	431269	433720	38.2	33.3	39.4	20.3	25.0	23.6	25.0	21.7	23.8	33.6	37.0	37.6	29.9	22.7	-	
D20	430727	433834	40.5	31.3	46.9	30.3	25.7	21.3	24.6	26.3	30.7	37.1	43.0	43.1	33.4	25.4	-	
D26	429969	434259	43.2	38.6	40.1	26.1	20.8	22.0	22.0	22.2	25.8	26.5	43.4	35.2	-	-	-	Triplicate Site with D26, D27 and D28 - Annual data provided for D28 only
D27	429969	434259	30.5		40.6	20.3	22.2	20.4	22.7		24.5	36.2	40.3	31.2	-	-	-	Triplicate Site with D26, D27 and D28 - Annual data provided for D28 only
D28	429969	434259	43.1		44.6	25.4	20.3	21.0	23.7	22.1	25.0	31.4	34.7	37.8	30.1	22.9	-	Triplicate Site with D26, D27 and D28 - Annual data provided for D28 only
D35	430720	431898	43.6	34.7	42.3	32.0	31.7	24.6	30.9	31.2	31.0		36.8	20.4	32.7	24.8	-	
D45	426276	435820		34.9	44.8	29.9	36.8	37.0	38.8	36.9	36.8	42.2	49.7	35.5	38.5	29.2	-	
D46	426214	435955	29.8	22.9	37.5	22.5	20.0	17.4	21.6	24.1	25.7	26.6	31.5	32.2	26.0	19.7	-	
D60	427147	434789			43.0	23.6	20.6		24.2	25.0	25.7	31.1	38.4	38.4	-	-	-	Triplicate Site with D60, D525 and D526 - Annual data provided for D526 only
D74	426294	435800	35.7	30.0	36.8	29.6	28.4	29.8	31.3	31.5	31.3	29.4	32.7	38.3	32.1	24.4	-	
D105	440034	432364	59.7	45.6	51.2	33.5	28.2	36.3	37.8	37.6	36.3	45.5	47.3	48.6	42.3	32.1	-	
D109	419598	445168	37.0	34.2	36.6	30.0	27.6	29.5	30.6	29.8	29.8	29.6	36.2	34.4	32.1	24.4	-	

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
D114	424507	445151	54.6		63.7	49.3	50.4	48.7	54.5	51.5	57.6	56.1	62.3	59.1	55.3	**42.0**	-	
D118	426914	426605	33.1	32.7	47.7	36.0	30.1	29.2	33.5	33.2	32.1	32.2	37.8	34.1	34.3	26.1	-	
D120	426362	428162	39.5		44.2	29.5	24.1	19.6	25.2	28.4	28.0	30.0	37.7	32.3	30.8	23.4	-	
D121	427906	436195			51.9	32.5	38.8	37.5	39.1	39.9	43.5	43.0			40.8	34.1	-	
D122	430522	434022	46.6	37.7	46.1	30.0	29.0	28.2	29.9	28.5	30.1	41.5	48.8	44.6	36.8	27.9	-	
D125	428824	431658	40.4	31.1	42.7	23.9	24.5	22.5	25.1	23.7	23.1	27.3	34.5	35.3	29.5	22.4	-	
D135	428866	433332	23.5	41.7	54.0		42.6	42.6	44.8	47.8	51.4	48.3	49.4	47.5	44.9	34.1	-	
D136	428858	433327	56.0	43.8	47.3	40.8	35.5	34.8	36.1	39.6	40.9	35.6	45.3	42.0	41.5	31.5	-	
D149	428762	431670			45.2	28.0	26.5	19.3	25.3	23.3	24.3	32.8		26.4	27.9	21.2	-	
D163	429329	433672	55.2	50.7	54.4	38.4	37.3	35.1	36.8	39.3	41.3	42.2	49.7	49.8	-	-	-	Triplicate Site with D163, D527 and D528 - Annual data provided for D528 only
D165	428980	433435	60.9	53.5	51.9	47.2	40.2	43.1	39.9	39.5	44.9	46.8	50.6	57.8	48.0	36.5	-	
D166	428926	433394	69.6	57.4	55.2	40.4	39.8	43.5	44.1	43.4	44.0	50.6	55.1	55.2	49.9	37.9	-	
D167	428779	433252	60.0	48.5	63.8	46.0	42.8	38.2	43.8	46.4	51.2	50.0	51.2	50.4	49.4	37.5	-	
D168	428633	432860			51.9	35.4	37.8	37.3	41.1	38.5	42.7	41.9	47.1	48.3	42.2	32.1	-	
D169	428582	432656	42.7	33.9	54.8	38.1	26.5	23.5	25.9	32.8	36.1	35.9	39.9	43.8	36.2	27.5	-	
D170	428766	433294	41.8	44.7	58.9	45.7	35.9	30.6	33.9	41.4	42.9	48.5	51.6	52.1	44.0	33.4	-	
D171	428833	433358	38.5	44.5	54.8	41.6	36.6	29.1	37.2	39.4	39.6	58.5	59.6	57.3	44.7	34.0	-	
D178	429839	433401	57.0	58.7	74.3	44.5	40.4	37.4	43.9	43.0	42.4	53.2	56.8	53.7	50.4	38.3	-	
D179	429837	433410	62.8	53.7	71.1	48.3	42.2	35.5	39.2	43.9	44.1	46.8	50.1	49.4	48.9	37.2	-	
D180	429905	433473			60.4	42.2	32.3	25.7	16.9	32.9	40.3	47.4	46.7	50.8	39.6	30.1	-	
D181	429939	433403	59.9	58.5	93.4	65.6	46.6	34.3	22.8	49.7	46.6	43.9	64.9	56.4	53.6	**40.7**	-	

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
D182	429932	433397	60.9	57.6	73.1	52.9	48.9	43.6	25.2	60.7	44.7	54.5	53.6		52.3	39.8	-	
D183	429965	433295	84.1	91.9	99.4	86.0	81.5								88.6	**62.9**	-	
D184	429989	433291	56.5	62.0	84.0	62.1	55.2	49.0	30.2	46.2	60.2	57.1	61.3	60.2	57.0	**43.3**	-	
D186	429965	433173	48.5	60.4	62.2		61.8	56.1	31.5	66.5	56.1	59.5	51.0	62.3	56.0	**42.6**	-	
D187	429958	433176			60.7	58.3	61.0	57.9	28.7	66.4	55.5	42.4	49.9	51.5	53.2	**40.5**	-	
D191	430774	433566		39.4	71.2	41.2	40.2	30.9	18.7	43.2	41.1	45.2	34.1	53.8	41.7	31.7	-	
D192	430779	433515	56.3	52.6	73.1	52.5	48.5	39.3	23.4	51.7	53.6	54.9	67.5	49.5	51.9	39.5	-	
D193	430699	433684	52.1	54.0	64.1	42.5	40.4	39.8	42.5	45.5	45.0	50.4	55.3	55.0	48.9	37.2	-	
D195	428213	431181	35.9	25.8	33.8	22.1	17.2	15.9	18.2	20.8	20.0	25.4	30.6	35.0	25.1	19.0	-	
D197	429932	433370	60.4	49.4	71.5	57.8	53.4	49.3	49.7	42.7					54.3	**44.1**	-	
D198	426278	435811	37.9	34.1	49.1	32.1		36.1	41.6	43.2	40.3	40.7	45.8	49.9	41.0	31.1	-	
D199	433134	432248			36.3	27.6	22.7	20.8	23.8	24.0	27.1	30.4	31.7	36.0	28.0	21.3	-	
D200	430061	433276	57.2		56.0	50.5	44.0	40.4	44.6	42.8	44.8	45.1	51.5	54.2	48.3	36.7	-	
D201	430042	433272	63.4	61.5	65.9	51.0	51.4	45.5	45.7	41.0	42.9	50.4	54.5	45.5	51.6	39.2	-	
D202	430629	424716	55.7	46.6	61.2	42.6	42.9	42.2	47.6	49.7		46.3			48.3	36.7	-	
D203	424418	445268	26.5	35.5	50.8			31.0	34.7	36.4	39.2	35.6			36.2	27.6	-	
D204	435562	438338	23.2	19.2	20.3	11.6	13.0	13.2	13.8	12.7	11.6	16.9	20.9	18.9	16.3	12.4	-	
D208	424589	445084	30.3	24.0	30.5	26.0	19.7	11.7	13.5	14.3	16.7	18.2	25.7	32.3	21.9	16.7	-	
D209	424381	445348			26.2	20.1	14.7	14.2	16.7	18.1	19.2	18.2	24.4	20.2	19.2	14.6	-	
D210	424627	445118	31.4	29.6	32.0	23.4	22.6	23.7	25.8	22.6	26.4	28.8	33.8	33.3	27.8	21.1	-	
D211	424617	445064	36.5	41.5	50.5	41.4	43.2	45.6	46.4	49.6	46.3	40.1	46.1	28.4	43.0	32.7	-	

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
D215	426504	428285	33.8		38.6	22.1	16.6	16.3	20.0	20.1	21.1	26.3	36.0	34.8	26.0	19.7	-	
D216	426431	429197		31.0	35.7	27.2	21.5	18.5	23.9	27.6	26.2	28.4	34.4	10.3	25.9	19.7	-	
D217	426253	428192	42.0		37.6	20.8	21.0	18.2	23.1	26.7	27.3	28.5	34.8	37.8	28.9	22.0	-	
D235	430497	434032	48.7	40.8	41.3	27.5	28.2	27.7	28.8	26.2	28.9	39.7	44.4	43.4	35.5	27.0	-	
D236	430490	434044	40.6	36.3	32.8	24.0	25.6	24.1	25.5	22.0	24.0	32.4	35.6	34.1	29.8	22.6	-	
D237	430423	434058	31.3	33.0	37.6	21.9	19.5	21.6	24.6		24.1	33.2	38.8	31.8	28.9	21.9	-	
D263	432000	430828	46.7	35.7		28.0	29.0	30.1	31.8	30.3	37.1				33.6	30.2	-	
D269	431192	431799	29.6	24.1	38.7	26.5	17.3	15.0	15.9	21.5	24.3	23.2	29.7	27.3	24.4	18.6	-	
D272	430631	432610			60.9	37.3	41.3		38.9	35.7	39.7	43.7		51.4	43.6	32.7	-	
D273	430608	432672	39.5	32.9	48.3	30.9	23.5	20.2	26.1	30.6	30.8	34.2	42.9	37.4	33.1	25.2	-	
D283	426286	435784	46.9	38.8	45.3	38.4	34.3	36.2	40.9	42.4	43.0	37.7	41.0	42.6	-	-	-	Triplicate Site with D283, D521 and D522 - Annual data provided for D522 only
D286	426670	431713	33.7		42.7	32.6	20.4	17.1	19.4	26.9	28.8	23.8	32.1	30.2	28.0	21.3	-	
D288	429332	433668	44.8	41.3	48.5			27.9		28.3		38.5	44.8	42.0	39.5	26.1	-	
D290	428964	433432	66.3	59.3	66.9		41.6	36.9	43.7	45.1	45.9	50.5	53.1	50.8	50.9	38.7	-	
D291	428986	433355			45.3	26.7	23.8	18.7	22.5	25.7	27.2	36.9	42.2	38.1	30.7	23.3	-	
D292	429063	433495	39.2			46.4	52.2	44.5	51.0	55.3	55.0	61.3	66.6	66.4	53.8	**40.9**	-	
D293	429127	433500	59.8		55.4	57.6	48.3	37.0	48.0	55.5	58.0	52.8	62.9	64.5	54.5	**41.4**	-	
D295	429414	433974	56.0	57.4			55.4	51.6	51.1	56.2	50.3	56.7	56.3	61.7	55.3	**42.0**	-	
D296	429395	433893	47.8	53.1	56.4	35.4	39.3	38.5	41.9		36.8		52.2	24.1	42.6	32.3	-	
D298	429304	433708	36.4	32.8	74.7	25.2	22.7	20.5	21.3	24.1	25.9	35.1	40.1	42.3	33.4	25.4	-	
D299	431793	430435	37.8	24.4	40.5	28.5		16.5	18.7	23.6	25.6	23.9	31.6	35.5	27.9	21.2	-	

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
D301	431639	430105	28.7	18.9	31.7	15.7	18.3	10.5	14.1	17.3	17.8	19.5	25.5	29.9	20.7	15.7	-	
D318	427662	433719	56.8		54.6	36.4	35.4	33.0	35.1	34.6	34.7	44.6	47.1	48.4	41.9	31.8	-	
D319	426086	434106	88.7	31.4	45.0	24.2	21.1	20.3	23.7	23.1	25.6	31.4	39.3	37.1	34.2	26.0	-	
D339	429553	434803			35.0	17.1	16.5	14.9	15.8	17.3	18.6	27.2	31.6	29.4	22.3	17.0	-	
D376	429895	436842	50.4		58.3	40.7	39.6	34.9	34.9	39.7	45.8	49.2	59.1	59.8	46.6	35.4	-	
D379	423313	437470	43.5	37.4	38.1		17.3	13.6	20.6	25.2	25.1	26.1	33.2	31.9	28.4	21.6	-	
D383	433144	433998	53.9	39.5	67.7	51.9	34.8	29.0	37.9	45.2	48.5	43.8	42.5	56.4	45.9	34.9	-	
D384	433132	434034	60.0	41.1	57.2	36.6	42.8	43.2	46.1	41.3	42.8	50.6	62.5	54.2	48.2	36.6	-	
D395	420802	434420		32.8	52.2	27.4	28.4			30.0	25.7	35.5	40.0		34.0	25.4	-	
D399	421019	434470	42.6	35.5	48.6	29.0	29.0	29.3	30.7	32.1	28.5	35.6	41.3	39.0	35.1	26.7	-	
D403	429934	433368			68.6	59.2	53.3	49.3	50.2						56.1	**47.7**	-	
D411	437483	438380		21.2	20.2	11.9	13.7	15.1	14.1	12.6	10.7	22.7	26.7	22.3	17.4	13.2	-	
D414	439264	446059	39.5	30.7	47.4		29.0	27.4	30.6	33.3	32.1	28.9	37.8	36.6	33.9	25.8	-	
D417	431903	440554	17.4	14.3	17.2	8.0	7.7	6.7		8.0	7.7	13.2	19.0	18.1	12.5	9.5	-	
D420	427257	438450	33.2	27.9	49.9	41.4	36.9	37.8	38.7	44.9	42.0	46.9	51.7	51.0	41.9	31.8	-	
D421	427274	438436	41.0		42.6	25.4	22.9			26.0	24.9	35.3	24.7	34.3	30.8	23.4	-	
D427	430630	433901	48.3		47.4		31.2	29.8	29.5	28.6	34.1	42.4	53.9	46.4	39.2	29.8	-	
D429	430247	433614	34.6		45.5	26.1	25.3	25.5	24.5	22.5	25.1	35.3	39.1	42.9	31.5	23.9	-	
D433	429614	430367	34.1		47.7	31.2				27.2	28.3	29.8	41.2	48.3	36.0	23.2	-	
D434	429596	430383	43.7	35.5	51.1	31.0	29.2	21.4	26.3	30.0	28.9	36.9	37.3		33.8	25.7	-	
D436	426701	428886		26.1	37.6	22.7	18.8		19.4	20.9	22.9	29.4	36.0	38.6	27.2	20.7	-	

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
D439	422081	434201	38.4	32.5	57.8	32.7	28.6	26.3	31.9	31.3	36.2	34.4	42.9	39.7	36.1	27.4	-	
D447	427510	431956	35.7	38.9	54.2	35.7	31.3	29.6	33.0	35.7	34.9	42.2	48.4	46.8	38.9	29.5	-	
D448	427796	431729	38.7	30.1	54.2	32.1	25.2	22.4	26.2	30.6	32.1			25.7	31.7	24.1	-	
D449	430760	433165				47.5	40.5	34.7	40.6	45.5	47.0	47.4	51.1	61.7	46.2	35.1	-	
D450	430743	433170	63.5		67.5	50.2	38.3	35.0	41.3	40.5		37.1		43.5	46.3	35.2	-	
D451	429613	432352	41.0	34.4	52.2	25.8	22.3	21.1	23.5	25.3	26.5	33.0	40.6	32.8	31.5	24.0	-	
D453	437954	428274	26.0	17.6	26.6		11.1	11.9	12.8	14.6	14.7	16.5	25.7	23.0	18.2	13.9	-	
D457	428236	431206		32.2	37.1	28.6	20.7	18.7	20.5	24.7	23.5	24.4	34.5	36.0	27.4	20.8	-	
D458	428012	431305	45.2	31.9			26.1		24.2	28.1	25.2	35.6		37.0	31.7	24.5	-	
D463	428915	429864	34.6	22.2	41.2	25.8	19.6	15.3	18.5	22.8	23.3	29.9	34.7	35.7	27.0	20.5	-	
D468	429922	427433			38.6	23.6	15.8	15.2	17.1	18.9	21.1	24.9	32.0	27.5	23.5	17.8	-	
D469	431024	430746			49.0	31.8	26.4	27.5	27.1	31.1	33.9	33.9	41.5	45.4	34.8	26.4	-	
D470	431519	431442	40.7	27.1	39.0	19.8	17.8	16.1	16.4	21.7	24.4	27.5	34.2	38.2	26.9	20.5	-	
D472	428293	430706	32.2	28.0	38.2	24.7	21.7	21.4	22.2	28.0	23.2	27.9	26.4	35.9	27.5	20.9	-	
D473	429378	431389	49.3	34.9	48.8	29.4	27.8	22.7	30.3	25.4	34.5	35.6	41.6	46.1	35.5	27.0	-	
D474	429374	431335	28.2	33.0	50.2	30.4	32.3	27.1	30.3	30.4	32.1	36.3	44.0	40.2	34.5	26.3	-	
D477	429761	430654	40.9	34.6	44.7	32.1	25.0	24.0	26.4	28.0	29.6	36.6	42.6	37.6	33.5	25.5	-	
D481	429371	433265	54.3	40.8		34.7	32.9	24.6	32.4	36.1	36.9	43.6	43.7	41.1	38.3	29.1	-	
D482	429390	433477	56.0		50.2	42.8		34.1	38.7	43.5	44.8	47.0	53.1	50.2	46.0	35.0	-	
D483	429786	433652		50.9	75.4	45.6	38.9	35.3	38.5	41.8	40.6	64.5	34.1	49.4	46.8	35.6	-	
D497	440201	448425	25.7	19.4	26.1	14.8	13.5	12.2	14.6	15.1	13.1	19.9	23.9	21.2	18.3	13.9	-	

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
D498	440453	448226			32.0	21.3	19.0	16.6	18.5	20.0	18.8	25.8	30.9	29.8	23.3	17.7	-	
D499	440450	448396			29.9	20.7	20.3	18.9	20.9	21.0	18.6	26.9	30.8	32.9	24.1	18.3	-	
D500	440078	448355		26.3	39.0	26.8	22.7	21.4	26.4	27.2	25.2	26.8	32.5	32.1	27.9	21.2	-	
D501	420152	445577	38.2	36.6	33.8	24.6	25.3	23.0	25.9	24.0	22.9	28.4	34.9	34.0	29.3	22.3	-	
D503	420173	445519	49.2	43.1	39.6	29.8		34.4	33.4	31.2	29.0		39.9	39.6	36.9	28.1	-	
D506	427673	434494	65.2		65.1	51.0	46.1	46.4	46.8		54.5		50.4	54.8	53.4	**40.6**	-	
D507	427699	434495	42.0	36.8	46.4	26.7	26.1	28.2	29.0	27.9		38.8	43.9	44.2	35.5	26.9	-	
D508	427690	434523	35.4	27.0	39.9	19.7	18.0	16.3	16.9	19.3	20.3	29.7	35.8	32.4	25.9	19.7	-	
D509	420106	445534	20.6		38.1	29.4	24.1	19.2	21.0	25.1	19.8	25.9	27.2	31.3	25.6	19.5	-	
D510	436780	438452	13.0	13.0	17.1	8.2	7.9	6.8	7.9	8.1	7.0	14.0	17.8	9.7	10.9	8.3	-	
D516	427989	436045	36.0	30.8	46.6	34.5	27.8	23.4	24.7	28.7	30.9	31.4	36.3	39.7	-	-	-	Triplicate Site with D2, D516 and D517 - Annual data provided for D517 only
D517	427989	436045	36.4	32.4	46.4	29.1	30.2	22.6	25.9	30.8	34.9	33.1	40.9	39.8	32.7	24.9	-	Triplicate Site with D2, D516 and D517 - Annual data provided for D517 only
D518	430731	431911	50.9	31.9	45.8	41.0	38.9	34.9	33.6	38.3	38.9	38.9	42.0	48.9	-	-	-	Triplicate Site with D518, D519 and D520 - Annual data provided for D520 only
D519	430731	431911	61.7	48.5	44.0	41.8	31.9	36.2	35.7	39.9	38.4	39.7	42.4	49.1	-	-	-	Triplicate Site with D518, D519 and D520 - Annual data provided for D520 only
D520	430731	431911	43.5	48.3	44.8	40.5	37.8	33.4	36.4	39.4	38.9	40.9	43.2	36.7	41.0	31.2	-	Triplicate Site with D518, D519 and D520 - Annual data provided for D520 only
D521	426286	435784	48.4	35.8	41.2	37.0	36.4	36.5	39.4	40.8	41.3	30.9	40.5	42.7	-	-	-	Triplicate Site with D283, D521 and D522 - Annual data provided for D522 only
D522	426286	435784		36.0	46.6	38.5	37.9	39.4	40.4	41.5	39.7		41.3	45.6	40.2	30.6	-	Triplicate Site with D283, D521 and D522 - Annual data provided for D522 only
D525	427147	434789	32.8			25.3	21.4	19.4			24.5	29.6	34.7	36.8	-	-	-	Triplicate Site with D60, D525 and D526 - Annual data provided for D526 only
D526	427147	434789		42.5	43.0	25.5	22.7	20.6	23.7	26.2	23.7	31.3		35.9	30.3	23.0	-	Triplicate Site with D60, D525 and D526 - Annual data provided for D526 only
D527	429329	433672	53.8	50.5	51.1	35.1	35.3	33.0	36.1	39.8	39.1	46.9	48.1	54.3	-	-	-	Triplicate Site with D163, D527 and D528 - Annual data provided for D528 only

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
D528	429329	433672	55.1	46.2	50.2	35.9	37.2	35.8	35.9	38.1	38.3	43.8	43.1	36.5	43.0	32.7	-	Triplicate Site with D163, D527 and D528 - Annual data provided for D528 only
D529	425930	427949	30.0	25.0	32.6	20.8	16.7	14.8	17.7	18.3	18.4	19.2	27.2	30.0	22.6	17.1	-	
D531	426563	428101	18.9	19.4	31.0	19.3	16.4	13.0	16.2	16.8	17.9	18.7	24.7	28.2	20.0	15.2	-	
D533	428359	432907	16.5	34.7	48.3	27.1	22.0	18.1	21.3	25.0	25.9	35.0	41.4	31.6	28.9	22.0	-	
D534	428632	433341	11.9	30.4	49.1	24.7	21.5	19.1	21.7	23.5	22.3	35.2	40.9	28.2	27.4	20.8	-	
D535	428903	432458	25.5	38.3	54.8	40.7	29.3	28.1	32.7	37.8	37.4	26.5	47.1	48.1	37.2	28.3	-	
D536	429648	432937	27.7		51.9	41.9	32.2	26.5	31.2	35.2	34.2	39.9		47.3	36.8	28.0	-	
D537	429875	432979			56.5	31.8	24.6	20.2	25.8	27.3	32.2	34.7	48.0	40.6	34.2	26.0	-	
D538	429796	432527		36.6	44.6	26.1	22.3	19.2		23.9	24.2	32.8	39.7	36.2	30.6	23.2	-	
D539	429151	432009	13.5		55.8	35.7	34.7	34.7	35.6	34.3	37.6	44.1	49.7	49.2	38.6	29.4	-	
D540	428992	431678		33.8	40.8	27.6	29.3	24.1	25.6	27.7	23.6	29.9	32.0	33.3	29.8	22.6	-	
D541	429738	433787	29.7	52.7	64.8	47.7	40.2	38.5	39.6	44.0	38.1	38.3	61.4	51.5	45.5	34.6	-	
D542	430633	433345	52.5	40.4	44.3	34.9	32.8	28.8	30.1	32.0	31.4	35.5	37.5	40.0	36.7	27.9	-	
D543	430295	433250	63.2	61.4	62.0		46.8	44.5	44.6	47.9	38.2	49.0	44.2	55.0	50.6	38.5	-	
D544	427515	432204	28.9	24.8	37.3	19.4	15.0	13.9	15.7	17.9	18.1	26.9	33.3	34.7	23.8	18.1	-	
D545	427147	432339	30.9		43.2	25.9	16.7	16.3	17.7	21.1	22.2	29.5	37.4	35.4	26.9	20.5	-	
D546	426927	432256	32.4	29.4	40.7	28.2	20.9	20.6	21.7	24.0	25.1	30.7	35.8	37.6	28.9	22.0	-	
D547	425246	435269	21.7	19.7	30.6	14.9	10.4	10.5	11.7	13.1	13.2	20.5	23.9	24.2	17.9	13.6	-	
D548	425607	435046	24.7	23.9	32.4	21.7	13.6	12.3	14.0	16.4	17.4	23.1	26.5	31.2	21.4	16.3	-	
D549	425724	435151	23.1	19.4	29.0	17.2	11.7	11.2	11.8	13.8	13.6	20.5	27.3	26.5	18.8	14.3	-	
D550	427037	433164			37.0	23.0	19.3	16.5	18.4		20.7	25.2			22.9	18.8	-	

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
D551	427209	433471	32.4	27.1	44.2	29.6	18.8	20.2	20.9	26.3	27.0	29.2	23.7	36.9	28.0	21.3	-	
D552	427011	433453	39.8	39.1	48.1	43.2	31.8	29.5	33.0	39.7	40.6	36.5	43.4	42.2	38.9	29.6	-	
D553	427103	433493		49.1	61.2	42.4		38.1	41.3	38.3	39.8		47.4		44.7	35.1	-	
D554	428939	435435	13.6	27.3	45.1		20.9	20.7	21.7	22.9	26.2	32.7	36.3	34.7	27.5	20.9	-	
D555	428987	435478	19.9	39.3	55.2	29.7	25.4	26.4	27.1	27.0	33.8	40.7	44.8	43.9	34.4	26.2	-	
D556	421984	436505		34.1	52.8	41.8	33.6	30.0	37.3	42.7	40.8	38.6	46.3	46.0	40.4	30.7	-	
D567	422079	436582			34.9	29.6	30.0	28.7	30.8	33.1	28.0	33.5	14.4	32.8	29.6	22.5	-	
D568	428372	429587		34.7	50.2	39.8	31.0	26.5	32.9	37.0	37.3	35.4	44.6	48.2	38.0	28.9	-	
D569	428314	429625		43.1	51.3	38.5		32.0			40.3		43.9	45.9	42.1	28.9	-	
D600	427881	430427		24.5		27.9	19.7		20.4	25.9	29.7	26.9	33.5	34.2	27.0	20.5	-	
D601	427907	430351		22.3	40.3	28.0	18.8	13.7	18.4	24.1	26.6	28.4	35.0	37.4	26.6	20.2	-	
D602	428955	431699		34.7	49.8	36.3	29.0	21.4	27.6	31.2	31.4	33.7	39.5	34.7	33.6	25.5	-	
D603	427265	433514		29.4	40.7	33.2	25.5	23.9	24.2	28.8	28.5	30.5	36.4	31.2	30.2	23.0	-	
D604	427015	433574		23.1	37.5	19.0	14.5	14.6	15.5	17.0	18.2	22.0	32.7	26.4	21.9	16.6	-	
D605	429838	433433		58.6	67.0	51.4	46.5	35.9	39.4	43.3	44.2		55.6	52.6	49.5	37.6	-	
D606	428507	436864			51.4	25.7	20.8	16.6	19.2	20.2	22.2	20.3	32.9	33.5	26.3	20.0	-	
D607	428581	436916			48.1	24.7	23.2	22.3	23.0	26.0	25.2	30.9	34.6	18.7	27.7	21.0	-	
D608 (D265)	432063	431150					33.1	34.3	38.0	41.0	42.8	46.4	54.7	44.2	41.8	33.5	-	
D609 (D267)	431409	431610					23.0	18.7	25.7	29.5	32.6	33.8	47.4	43.2	31.7	25.4	-	
D610 (D271)	430851	432360					30.5			30.5	35.5	42.1	48.9	44.8	38.7	28.3	-	
D611 (D274)	431150	430079					21.6	19.0	20.9	24.9	26.3	29.0	38.7	38.0	27.3	21.9	-	

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
D612 (D276)	431889	429630					16.8	15.9	20.6	22.5	22.9	28.8	34.2	28.3	23.8	19.0	-	
D613 (D485)	430272	433787					30.0	29.8	30.5	29.5	31.5	48.1	54.7	48.0	37.8	30.2	-	
D614 (D486)	430433	433854					33.2	31.5	34.0	35.1	38.0	56.8	39.5	48.5	39.6	31.7	-	
D615 (D487)	430224	433759					40.5	39.5	46.2	49.2	51.7	46.5	56.9	55.2	48.2	38.6	-	
D649	430365	433446				48.1	48.0		45.8	44.5	45.4	52.0	58.5	57.8	50.0	38.8	-	

☒ **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**

☒ **National bias adjustment factor used**

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

☒ **Leeds City Council confirm that all 2022 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 Leeds City Council During 2022

Leeds City Council has not identified any new sources relating to air quality within the reporting year of 2022.

Additional Air Quality Works Undertaken by Leeds City Council During 2022

Leeds City Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

In 2022 the diffusion tubes were supplied by SOCOTEC (Didcot). The diffusion tube monitoring was completed in adherence with the 2022 Diffusion Tube Monitoring Calendar.

The diffusion tube were prepared by spiking acetone:triethanolamine (50:50) onto the grids inside the tubes prior to the tubes being assembled. After exposure the tubes were desorbed with distilled water and the extract analysed using a segmented flow auto analyser with ultraviolet detection.

Diffusion tubes analysed by SOCOTEC have been analysed in accordance with the laboratory's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes For Ambient NO_2 Monitoring: Practical Guidance'. This analysis of diffusion tube samples to determine the amount of nitrogen dioxide present is within the scope of SOCOTEC's UKAS schedule.

The National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/23 results for precision testing show that SOCOTEC had 26 'Good' tube diffusion tube precision results

in 2022 and the laboratory took part in the inter-comparison exercise carried out at Marylebone Road, London.

AIR NO_2 PT performance

AIR NO_2 PT is an independent analytical proficiency testing scheme and is part of the UK NO_2 Network's QA/QC and it assesses the analytical performance of laboratories supplying diffusion tubes to Local Authorities for Local Air Quality Management monitoring. Performance reports on all analytical laboratories taking part in AIR NO_2 PT are described as % of results determined to be satisfactory. SOCOTEC take part in the Air NO_2 Proficiency Testing Scheme.

For the 2022 period the AIR NO_2 PT scheme reported that the percentage of results submitted by SOCTEC that were determined as being satisfactory was 100% for all rounds reported to date:

AIR PT Round	January to February 2022 AIR PT AR049	May to June 2022 AIR PT AR050
SOCOTEC	100%	100%

SOCOTEC subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round. Further information about the AIR NO_2 PT scheme is available on the DEFRA webpage QA QC Framework | LAQM (defra.gov.uk)

Diffusion Tube Annualisation

Annualisation is required for diffusion tube sites which have a data capture of less than 75% but greater than 25% (LAQM.TG16). The purpose of annualisation is to scale the available data to provide an estimate of the annual mean NO_2 concentration. Annualisation was required for 23 Leeds City Council diffusion tube sites in 2022. Data capture was reduced at these sites due to diffusion tubes out on site being missing at the end of the exposure period or occasionally due to them being found on the ground. Annualisation was carried out by using the Bureau Veritas Diffusion Tube Data Processing Tool (DTDPT). Continuous analyser data used to annualise the diffusion tube results was the appropriate periods of the ratified hourly data from the three AURN sites at Leeds Centre, Barnsley Gawber and Dewsbury Ashworth Grange. The annualisation summary is shown in Table C.2 below.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Leeds Centre AURN site	Annualisation Factor Barnsley Gawber AURN site	Annualisation Factor Dewsbury Ashworth Grange AURN site	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
D121	1.1074	1.0651	1.1312		1.1012	40.8	44.9
D183	0.9412	0.9361	0.9245		0.9339	88.6	82.7
D197	1.0625	1.0610	1.0838		1.0691	54.3	58.0
D203	0.9771	0.9889	1.0400		1.0020	36.2	36.3
D263	1.1464	1.1753	1.2225		1.1814	33.6	39.7
D272	1.0204	0.9482	0.9928		0.9871	43.6	43.1
D288	0.8649	0.8527	0.8876		0.8684	39.5	34.3
D395	0.9766	0.9595	1.0126		0.9829	34.0	33.4
D403	1.1458	1.0877	1.1235		1.1190	56.1	62.8
D433	0.8771	0.8167	0.8485		0.8474	36.0	30.5
D458	0.9966	1.0049	1.0522		1.0179	31.7	32.2
D550	1.0832	1.0497	1.1106		1.0812	22.9	24.7
D553	1.0299	1.0025	1.0643		1.0322	44.7	46.1
D569	0.9205	0.8747	0.9088		0.9013	42.1	38.0
D608 (D265)	1.0406	1.0156	1.1048		1.0537	41.8	44.1
D609 (D267)	1.0406	1.0156	1.1048		1.0537	31.7	33.4
D610 (D271)	0.9643	0.9232	0.9952		0.9609	38.7	37.2
D611 (D274)	1.0406	1.0156	1.1048		1.0537	27.3	28.8
D612 (D276)	1.0406	1.0156	1.1048		1.0537	23.8	25.0
D613 (D485)	1.0406	1.0156	1.1048		1.0537	37.8	39.8
D614 (D486)	1.0406	1.0156	1.1048		1.0537	39.6	41.7
D615 (D487)	1.0406	1.0156	1.1048		1.0537	48.2	50.8
D649	1.0303	0.9824	1.0513		1.0213	50.0	51.1
A9	1.009204	1.056488	1.008492		1.024728	41.0	42.0

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 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.

Leeds City Council have applied a national bias adjustment factor of 0.76 to the 2022 monitoring data. A summary of bias adjustment factors used by Leeds City Council over the past five years is presented in Table C.2.

The overall 2022 bias correction factor from the National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/23 for SOCOTEC Didcot based on 26 studies prepared by spiking acetone:triethanolamine (50:50) was 0.76. Leeds City Council have applied the national bias adjustment factor of 0.76 to the 2022 monitoring data. The bias adjustment was carried out using the DTDPT. The use of the national bias correction factor is consistent with previous years' diffusion tube reporting. Leeds City Council contributes to the National Diffusion Tube Bias Adjustment study every year and submitted 6 co-location studies for inclusion in the study for the bias correction factor for 2022 for SOCOTEC Didcot.

For 2022 Leeds City Council used the DTDPT to calculate a combined local bias adjustment factor of 0.74 based on a triplicate co-location studies at Leeds Centre AURN site, Leeds Headingley Affiliated AURN site, and the Jack Lane, Abbey Road, Kirkstall Road and International Pool sites and details of this are provided in Table C.3

Leeds City Council chose to use the national bias adjustment factor again for 2022 as historically this is consistent with previous years' use of the national factor. The combined local bias correction factor was calculated to be 0.74 which being lower than the national factor for SOCOTEC of 0.76 would have reduced the results further, resulting in some tubes with annual means above the 40µg/m^3 air quality objective being corrected to an annual mean result below the objective. As the local bias adjustment factor was lower than previous years' national bias adjustment factors used to correct the results the use of the national factor gives consistency to the results. The bias adjustment factor is kept under review annually to determine whether to apply the national or local factor.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.76
2021	National	03/22	0.78
2020	National	03/21	0.77
2019	National	03/20	0.80
2018	National	03/19	0.80

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5	Local Bias Adjustment Input 6
Periods used to calculate bias	12	11	10	12	10	12
Bias Factor A	0.68 (0.64 - 0.73)	0.76 (0.73 - 0.79)	0.75 (0.71 - 0.79)	0.73 (0.68 - 0.77)	0.76 (0.73 - 0.79)	0.79 (0.75 - 0.84)
Bias Factor B	47% (37% - 57%)	31% (26% - 36%)	34% (27% - 41%)	38% (29% - 46%)	32% (27% - 36%)	26% (19% - 33%)
Diffusion Tube Mean (µg/m^3)	32.7	29.3	40.5	40.2	28.8	43.0
Mean CV (Precision)	4.9%	8.1%	6.0%	4.3%	3.6%	5.2%
Automatic Mean (µg/m^3)	22.3	22.3	30.2	29.2	21.9	34.2
Data Capture	100%	100%	97%	99%	100%	100%
Adjusted Tube Mean (µg/m^3)	22 (21 - 24)	22 (21 - 23)	30 (29 - 32)	29 (27 - 31)	22 (21 - 23)	23 (22 - 24)
Combined Local Bias Adjustment Factor	**0.74**					

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 Leeds City Council required distance correction during 2022.

QA/QC of Automatic Monitoring

The Leeds City Council monitoring network is managed and operated by officers within the Environmental Protection Team of the Communities, Housing and Environment Directorate. The team covers all aspects of the management of the network from routine site procedures through calibration to data verification. Appropriate training both internal and from external agencies such as EMAQ has been received by officers within the team.

The QA/QC for the Leeds Centre AURN site and the affiliated Leeds Headingley Kerbside site is carried out by Ricardo Energy & Environment. Officers within the Environmental Protection Team provided LSO support for the Leeds Centre AURN site between 1993 and 2009 and continue in the LSO role at the Headingley Kerbside AURN Affiliated site.

Leeds City Council data ratification is carried out by Air Quality Data Management (AQDM). The monitoring data presented within this ASR is ratified. Data is available on request from epteam@leeds.gov.uk

Instrumentation

In 2022 Teledyne API T200 analysers were used to monitor oxides of nitrogen (NOx) to establish NO_2 concentrations in the council's network and a FIDAS was used to monitor PM_{10} and $PM_{2.5}$. At Leeds Centre AURN site and Headingley Kerbside AURN Affiliated site monitoring of PM_{10} and $PM_{2.5}$ as part of the national AURN was carried out using a FIDAS and BAMs respectively. NO_2 was measured using a Teledyne API T200 at Headingley Affiliated Kerbside AURN and a Thermo Electron analyser at Leeds Centre AURN.

Servicing

A service contract is in place with Enviro Technology Services and all analysers are serviced every 6 months together with 6 monthly GPT testing of the NO_2 analyser at the Headingley Kerbside AURN site and annual GPT testing elsewhere. The service contract requires engineer attendance to breakdowns within 48 hours of callout. Air conditioning units are inspected and serviced annually.

All service and breakdown visits by engineers are recorded in the form of engineers' reports and stored within the Department for later use (during data ratification, assessment of long-term analyser performance etc).

Calibration

Sites are attended for regular manual calibrations, routine site checks and maintenance. The procedures for these site visits are documented in internal guidance documents based on the instrument manufacturers' operation manuals and the AURN Site Operators Manual.

Pre-calibration checks are made which check ancillary equipment such as modems and air conditioning and to record instrument status.

Zero response to clean air is carried out through the use of in-line scrubbers.

Span checks are carried out using nitric oxide calibration gas of known concentration with a certified concentration.

Instrument filters are changed followed by post-calibration checks to ensure that everything is operational before leaving site.

All Calibration visits are recorded on calibration forms and site specific spreadsheets kept within the Department.

Data collection

Automatic data collection from the stations is achieved using the Airviro data administration module. 15-minute un-scaled data is collected from the on-board memory of each analyser.

The data is reviewed twice daily to determine that the collection protocols are working, that the data looks sensible and to identify faults. This involves viewing and comparing data from different locations.

Site Audits

In addition to regular calibrations and six monthly servicing of the equipment, an annual GPT test (when testing is carried out on the equipment with a separate calibration gas) to confirm the ongoing acceptable performance of the analysers is carried out.

Site audits of the Headingley Kerbside and Leeds Centre AURN sites are carried out independently as part of the AURN national network.

Data ratification

In recent years data ratification has been carried out externally by AQDM and this continued in 2022.

Electronic analysers suffer drifts in their response to the zero (baseline) gas and sensitivity changes with time. Raw data from the NOx instruments are therefore scaled into concentrations using the latest values derived from the manual and automatic calibrations.

The ratification process finalises the data to produce the measurements suitable for reporting. All available information (including calibrations results, service records and audit reports) 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.

In addition to overcoming the drift in analyser performance, anomalies in the collected data can occur for a variety of reasons that could result in data being discarded. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. This may include:

- ignoring calibrations that were poor eg. 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
- eliminating measurements for NO_2 conversion inefficiencies
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods where instruments are warming-up after a power cut
- 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.

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

PM_{10} and $PM_{2.5}$ monitoring in 2022 in Leeds was carried out at Leeds Centre and Leeds Headingley Affiliated Kerbside AURN sites and the QA/QC for these sites is carried out by Ricardo Energy & Environment.

In March 2022 Leeds City Council introduced a PALAS FIDAS particulate monitor into the council's air quality monitoring network. Leeds City Council data ratification is carried out by Air Quality Data Management (AQDM). The FIDAS monitoring data presented within this ASR is ratified.

Automatic Monitoring Annualisation

With the exception of the A21 Bishopgate Street site the automatic monitoring locations within Leeds City Council recorded data capture of greater than 75%.

At the Bishopgate Street site data capture was 62.1% in 2022. Continuous analyser data used to annualise the results was the appropriate periods of the ratified hourly data from the three AURN sites at Leeds Centre, Barnsley Gawber and Dewsbury Ashworth Grange. The annualisation summary is shown in Table C.1.

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, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within Leeds City Council required distance correction during 2022.

Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Ebor Gardens AQMA

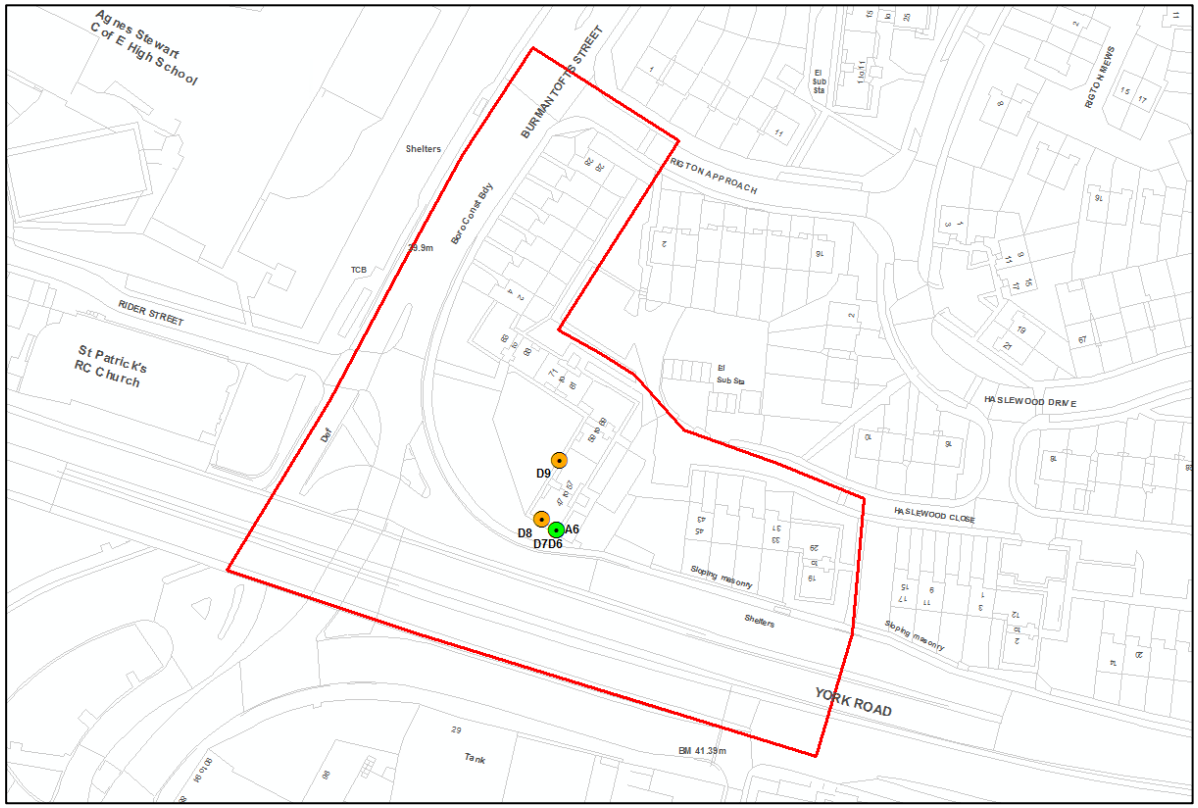


Figure D.2 – Caspar Apartments AQMA

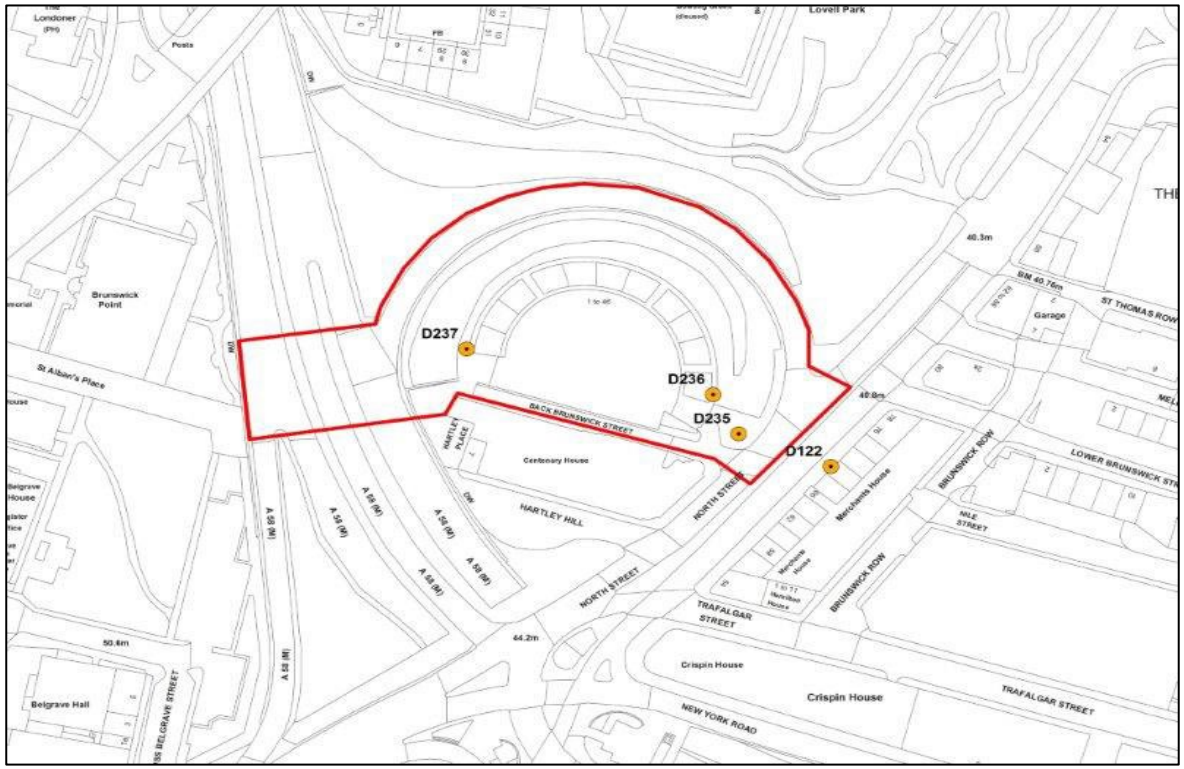


Figure D.3 – The Normans AQMA

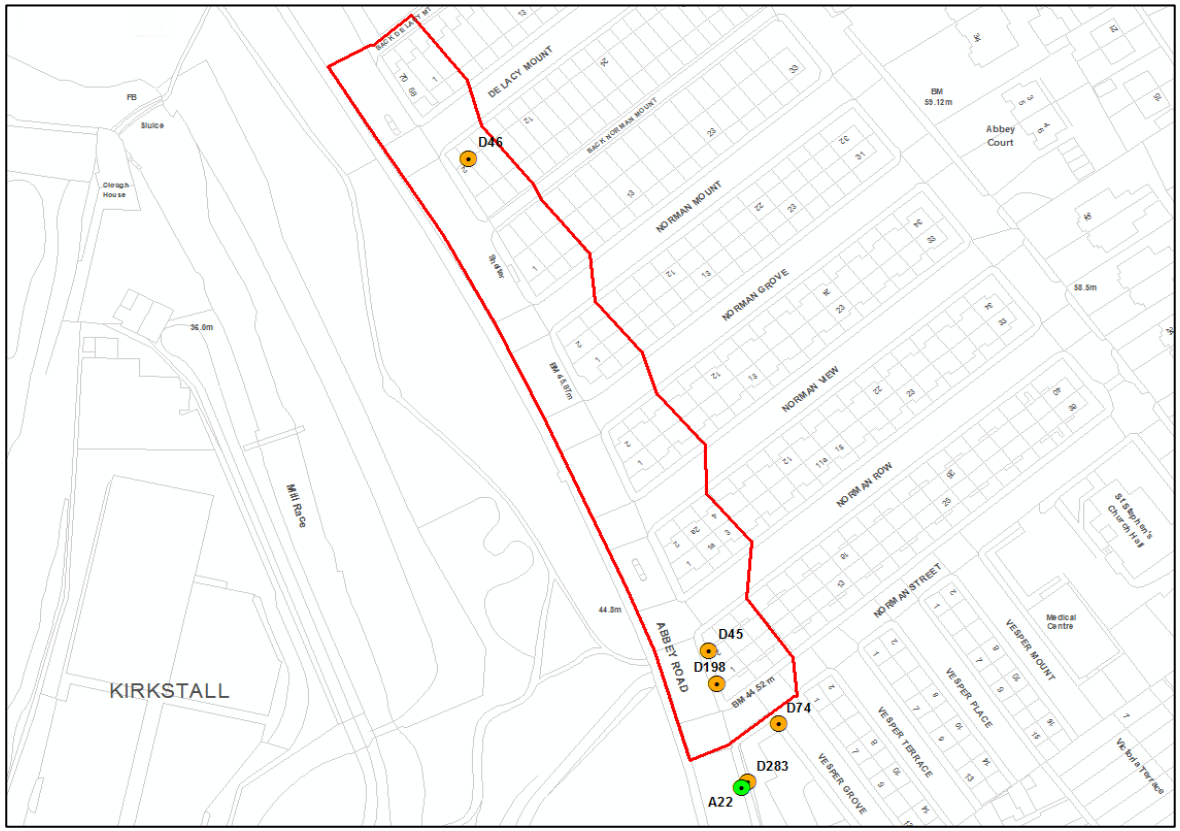


Figure D.4 – The Tilburys AQMA

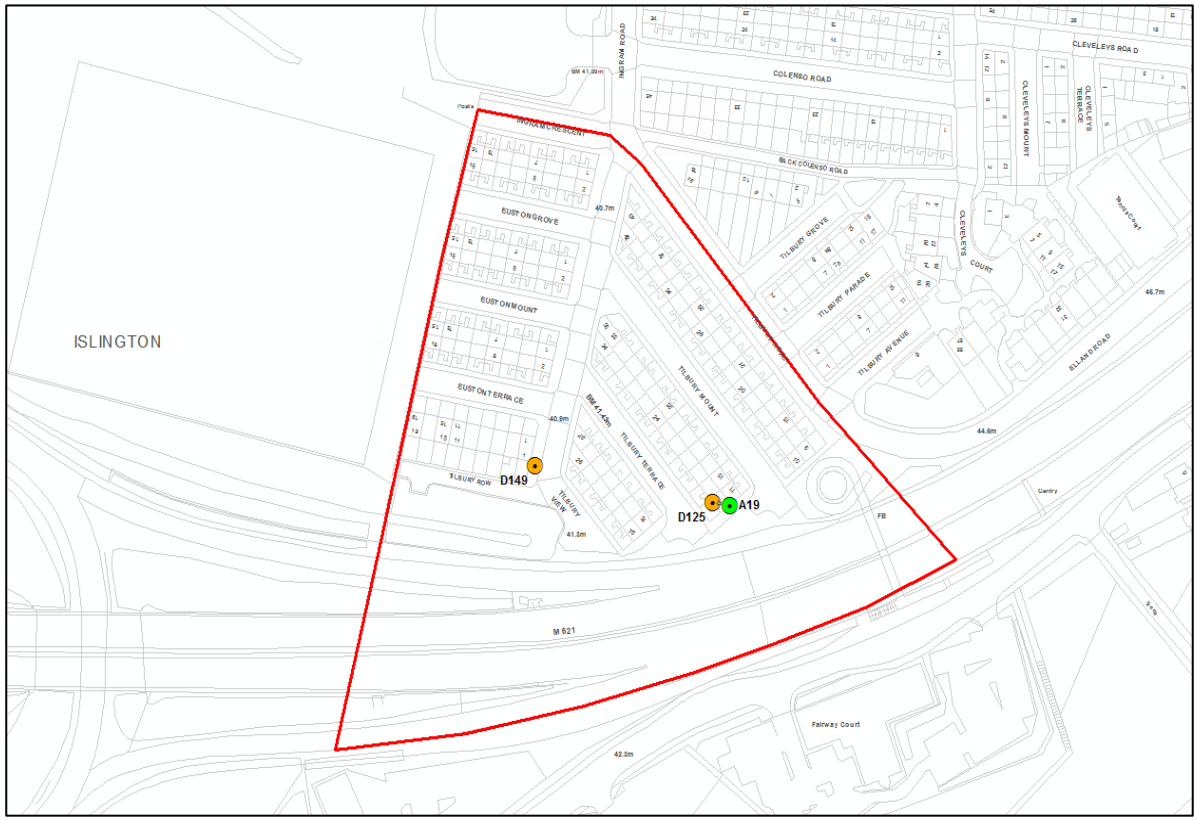


Figure D.5 – Pool in Wharfedale AQMA

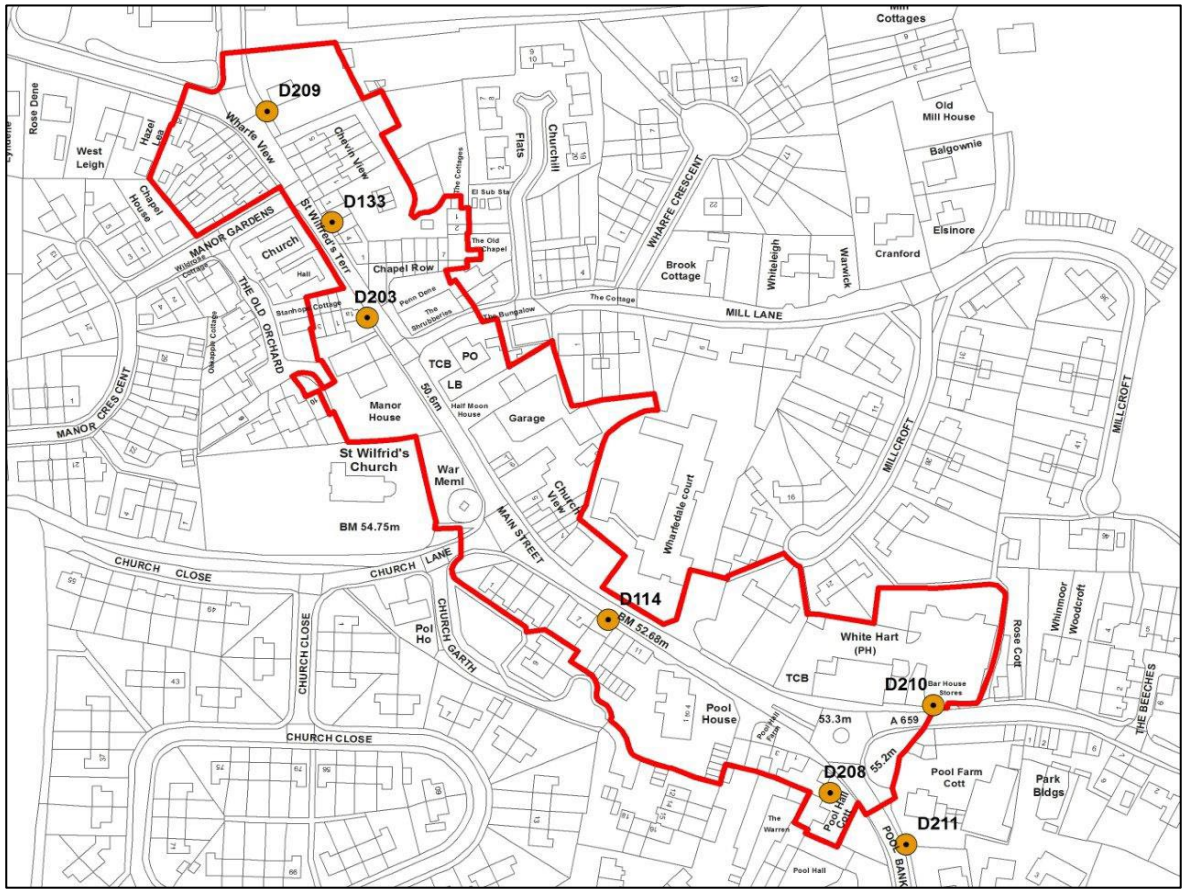


Figure D.6 – Chapel Hill AQMA

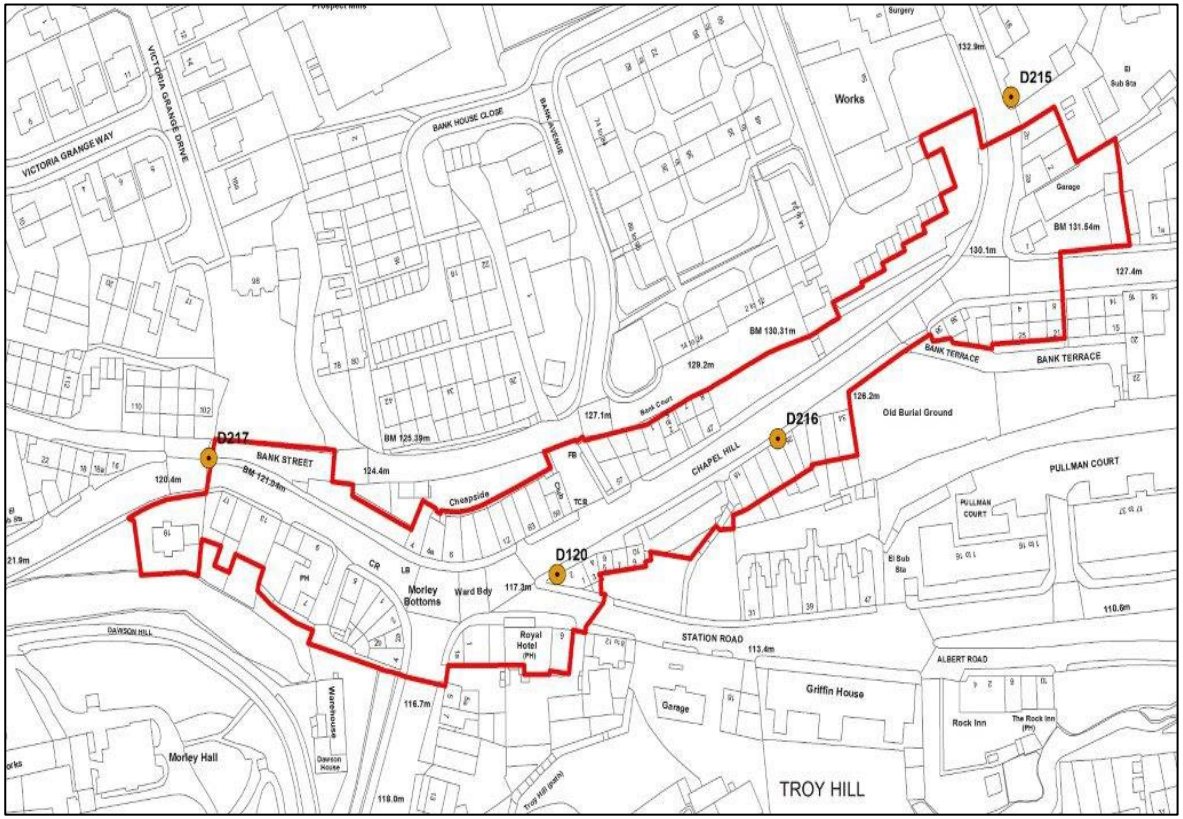


Figure D.7 – Map showing extent of 2022 diffusion tube monitoring.

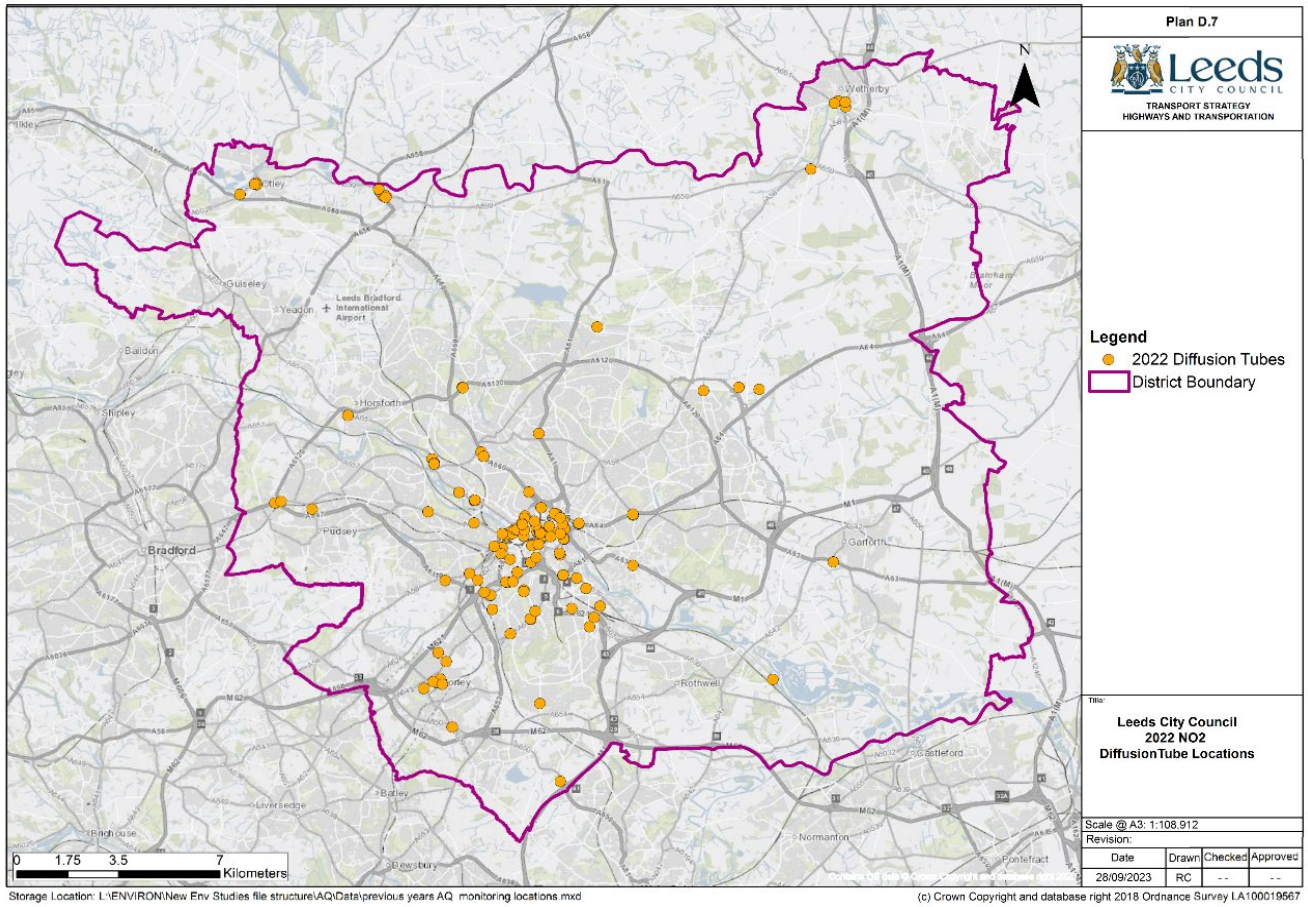
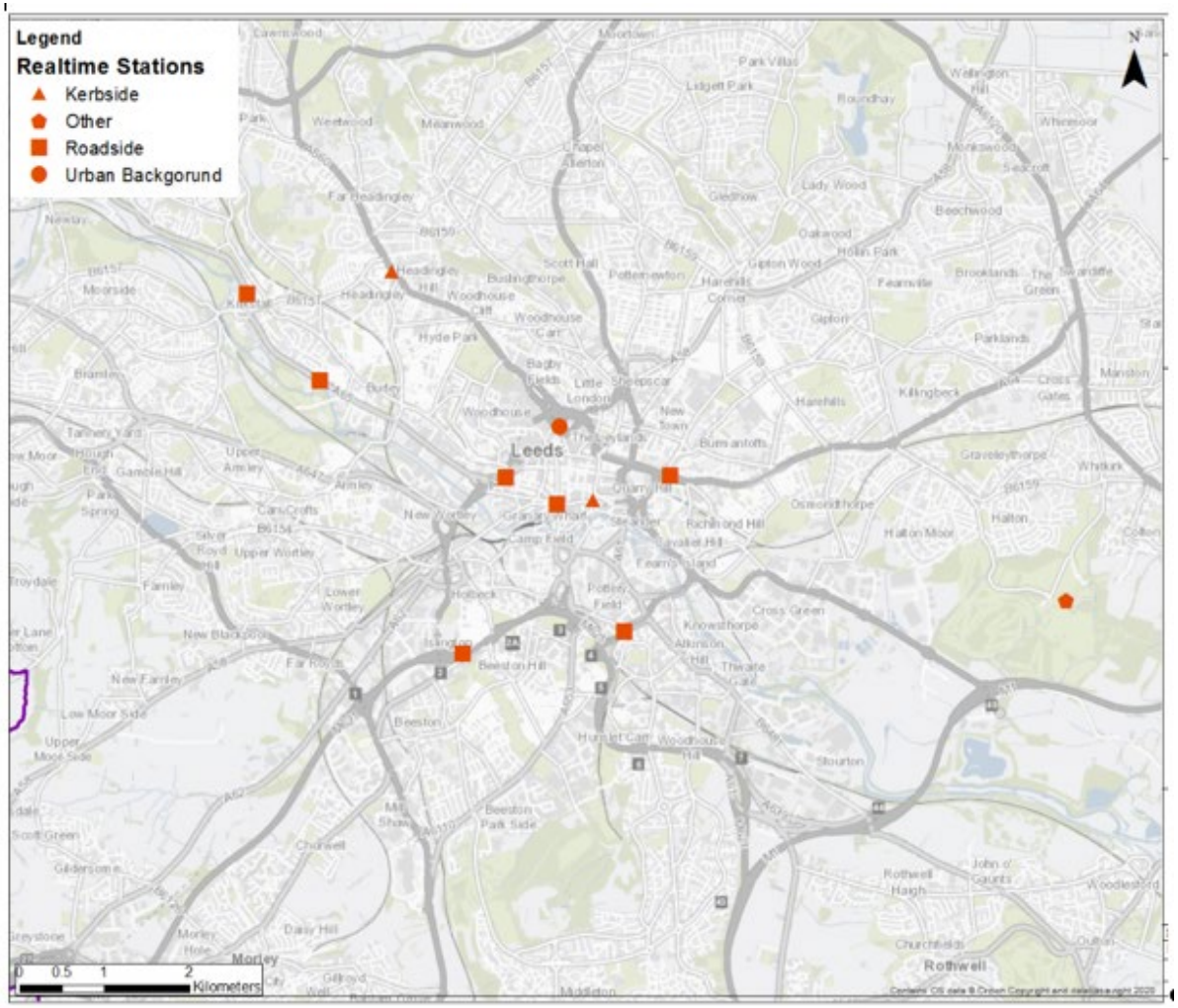


Figure D.8 – Map showing automatic monitoring site locations.



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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

[7] 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.
- Defra Diffusion Tube Bias Adjustment Factors Spreadsheet http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html
- Defra LAQM Helpdesk Summary of Laboratory Performance in AIR NO2 PT Scheme https://laqm.defra.gov.uk/assets/tubeprecision2019version0319finalfull.pdf

  https://laqm.defra.gov.uk/assets/laqmno2performancedatauptonovember2019v1.pdf
- Defra Nitrogen Dioxide Fall Off With Distance Calculator https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html
- Diffusion Tube Data Processing Tool | LAQM (defra.gov.uk)