2024 Air Quality Annual Status Report (ASR)

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

Date: June, 2024

Information	<Local Authority Name> Details
Local Authority Officer	Ross Jarvis
Department	Regulatory Services
Address	Civic Offices, Bridge Street, Reading, RG1 2LU
Telephone	0118 937 2314
E-mail	Ross.jarvis@reading.gov.uk
Report Reference Number	
Date	June 2024

Executive Summary: Air Quality in Our Area

Air Quality in Reading Borough Council

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

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

Reading is a heavily built-up area, in which the roads get congested during peak times. The main air quality issue identified in Reading are vehicle emissions. NO_2 is the only pollutant exceeding a national objective, but PM_{10} and $PM_{2.5}$ are also pollutants of concern due to their effects on health even at low concentrations.

Reading Borough Council's monitoring of these pollutants indicates that the levels are now falling. Levels of air pollution fell significantly in 2020 and 2021 because of less traffic being on the roads during the lockdown restrictions brought in to control the COVID-19 pandemic. Although levels rose gain in 2022, they did not quite returned to the levels seen previously. This was likely due to changes to peoples working patterns since COVID-19 resulting in less traffic on the roads. Levels of pollution were generally lower in 2023 than 2022. This is most likely, predominantly due to the continuing gradual improvements in vehicle emissions as more and more newer vehicles come onto the road.

There is currently 1 large AQMA in Reading covering all the major arterial roads in and out of the town as well as the central area. The AQMA does not exceed national objective levels, but after bias and distance correction there are still several locations that are borderline exceedances. https://uk-air.defra.gov.uk/aqma/details?aqma_id=263

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

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

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

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

Actions to Improve Air Quality

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

The Environmental Improvement Plan[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

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

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

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

In the past twelve months a number of measures that will help to improve air quality have been completed.

Readings AQAP has been reviewed and was recently approved by Defra and adopted. This introduces new actions to help us to prioritise action to improve air quality between 2024-29: 2024 – 2029 Air quality action plan - Reading Borough Council

Our Electric Vehicle Charging Infrastructure Strategy was recently adopted: Appendix A - Reading EVCI Strategy - June 2023.pdf

A Whole Borough Smoke Control Area has been approved by Defra and will come into force on 1st December 2024.

The Active Travel Fund, Tranche 2 cycle scheme on Shinfield Road has been constructed and further Tranche 3 schemes have been approved and are currently being refined before being delivered.

Reading Local Plan is already delivering zero or reduced emission developments through use of heat pumps etc, and a planned update of this provides an opportunity to develop this further.

Conclusions and Priorities

In 2023 no continuous monitoring sites exceeded any objective for NO_2. Only one diffusion tube at Malcolm Place on the IDR (42.6 µg/m^3) exceeded the objective for NO_2. Once distance corrected to the nearest receptor this reduced to 35µg/m^3. Friar street is another location with diffusion tubes close to exceedance before bias and distance correction. PM_{10} and $PM_{2.5}$ are also pollutants of concern due to their effects on health even at low concentrations, although they do not exceed any objectives.

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

Priorities over the coming year are to complete measures listed in section 2.2, such as the procurement of a chargepoint operator for the rollout of EV infrastructure in residential areas without off street parking across the borough to encourage the uptake of EVs.

We will undertake an air quality assessment into the impact of traffic signal upgrades near to the location of highest NO_2 on the IDR. If a significant improvement can be brought about by the proposed scheme this will be implemented.

We will continue to complete to implement our Defra AQ grant funded CALM:ER programme, raising awareness of air quality in schools and the wider community.

In relation to particulate pollution, we will carry out a publicity campaign in the run up to the new SCA coming into force to ensure residents are aware of the changes and their implications. We will also carry out a joint project with Public Health to increase our particulate monitoring network. This will provide hyper-local data on the levels and sources of $PM_{2.5}$ around the borough that can be used to inform further appropriate targeted interventions.

Local Engagement and How to get Involved

Local interest in air quality has never been higher; this is reflected in the number of enquiries that the Council is getting from interested local community groups and Councillors trying to find out more on the subject.

Reading has a good bus service, as well as dedicated cycle and walking routes. These options reduce the amount of pollutants an individual is responsible for emitting and are cheaper and often quicker than driving. Walking and cycling became an even more important way of getting around during the COVID-19 emergency, in response Reading Borough Council has introduced additional infrastructure to help make these even more attractive options, which it is hoped will encourage a permanent increase in the numbers using sustainable transport. Anyone looking to reduce their own impact on air pollution is encouraged to use these options and help make Reading a healthier and more pleasant place to live.

If you are sensitive to the effects of air pollution, you may wish to take measures to minimise your exposure such as:

- Limiting the length of time spent in busy roadside locations where the highest pollution concentrations occur.
- Exercise in the morning when ozone levels are lower.

It is particularly important for those sensitive to pollution to take these actions on days when air pollution is forecast to be high. A five-day forecast can be found at: https://uk-air.defra.gov.uk/

Up to date local monitoring data can be found at: https://www.airqualityengland.co.uk/local-authority/?la_id=278

More general up to date information on air quality can be found at: https://www.cleanairhub.org.uk/

Local Responsibilities and Commitment

This ASR was prepared by the <Environmental Health Department> of <Reading Borough Council with the support and agreement of the following officers and departments:

Chis Maddocks & James Turner - Transportation Services

This ASR has been approved by:

James Crosbie, …  ..Assistant Director, Planning, Transport & Public Protection, Directorate of Economic Growth & Neighbourhood Services

Councillor John Ennis  Lead Member for Strategic Environment, Planning and Transport

This ASR has been signed off by a Director of Public Health.

John Ashton Director of Public Health

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

Reading Borough Council

Civic Offices

Bridge Street

Reading

01189373738

Environmental.protection@reading.gov.uk

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1 Local Air Quality Management

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

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Reading Borough 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 Reading Borough Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within Reading Borough Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO_2 annual mean

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Reading AQMA	19/08/2009	NO2 Annual Mean	An area encompassing all the main arterial routes in and out of Reading and central area.	NO	52	35	3	Reading Borough Council AQAP 2024-29	https://images.reading.gov.uk/2024/05/Reading-AQAP-2024-2029_-Final.pdf

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

☒ **Reading Borough Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Reading Borough Council

Defra's appraisal of last year's ASR concluded that overall, the report was detailed, concise and satisfied the criteria of the relevant standards. The Council should continue their good work. The following comments were provided:

- The council discussed the measures to tackle air quality in detail. Progress on key measures was clearly described and priorities for the upcoming year were highlighted and justified. This level of detail is encouraged for future reports.
- A detailed QA/QC section was provided, and procedure was robust. The national bias adjustment factor (0.82) was selected, with justification based on consistency with previous years. It has been previously suggested that the Council consider using the local factor, as this is higher (0.84) and represents a more conservative factor. It has been decided to use the national bias adjustment factor this year, as it is the more conservative, (0.83) compared with the local factor (0.82).
- A good quality map has been included in the report. However, as highlighted in the two previous ASR appraisal comments, the map could be improved by labelling the sites. This would aid in understanding the distribution of the monitoring network and allow trends in the data to be visually linked to a location.
- Throughout the report text and tables pollutant names and units are not subscripted or superscripted correctly (eg. PM10, instead of PM_{10}). The council should endeavour to correctly format these in future reports.
- In Table 2.2 there is a question mark under Level of Exceedance: Declaration. The council should include the highest concentration exceedance for the year the AQMA was declared or else clarify if the value is unknown.
- It would be beneficial to include the AQMS acronym in the glossary of terms. This would aid those who are less familiar with air quality terms understand the report.
- Overall, the report is detailed, concise and satisfies the criteria of the relevant standards. The Council should continue their good work.

Reading Borough Council has taken forward a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 35 measures are included within Table 2.2, with the type of measure and the progress Reading Borough Council have made during the reporting year of 2023 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

Key completed measures are:

- Readings AQAP has been reviewed, then been out for consultation and was recently approved by Defra and adopted. This introduces new actions to help us to prioritise action to improve air quality between 2024-29: 2024 – 2029 Air quality action plan - Reading Borough Council
- Introduction of a Whole borough Smoke Control Area – the order has been approved by Defra and comes into force on 1st December 2024. This will discourage burning of inappropriate solid fuel reducing $PM_{2.5}$ levels in residential areas where solid fuel burning is prevalent: https://www.reading.gov.uk/climate-and-pollution/smoke-control-areas-smoke-control-areas/
- Our Electric Vehicle Charging Infrastructure Strategy was adopted in March 2024: Appendix A - Reading EVCI Strategy - June 2023.pdf
- The Active Travel Fund, Tranche 2 cycle scheme on Shinfield Road is nearing completion. Tranche 3 and 4 schemes have been approved and are currently being refined before being delivered.

Reading Borough Council expects the following measures to be completed over the course of the next reporting year:

- The Defra funded school air quality awareness campaign CALM:ER will finish in the first have of 2025.
- We will carry out a publicity campaign in the run up to the whole borough SCA going live in December.

As well as the above measures Reading Borough Council's priorities for the coming year are.

- Procurement of service provider(s) under the LEVI scheme for the rollout of EV infrastructure in residential areas without off street parking across the borough to encourage the uptake of EVs.

- We will commence a joint project with Public Health to increase our particulate monitoring network to increase knowledge of the levels and sources of $PM_{2.5}$ around the borough to enable appropriate future targeted interventions.
- Traffic Signal Upgrades – we will carry out an air quality assessment into the effectiveness of traffic signal optimisation on key locations in order to improve air quality.

Reading Borough Council worked to implement these measures in partnership with the following stakeholders during 2023:

- Defra
- Local Enterprise Partnership
- Neighbouring local authorities (West Berkshire, Wokingham, Slough, Bracknell, Windsor & Maidenhead)

The principal challenges and barriers to implementation that Reading Borough Council anticipates facing are the competing pressures on time and resources to carry out the work. Although the AQAP review and EV Infrastructure Strategy work are funded, work outside this is reliant on successfully being awarded funding, most likely from an external source.

Reading Borough Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in Reading AQMA.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ1_Transport	Vehicle access/ speed management (road/ bridge access)	Traffic management	Reduction of speed limits, 20mph zones	2023	TBC	RBC	RBC(CIL)/DFT	No	Funded/partially funded/ not funded	<£1m	Implementation/Planning	Very minor benefits to PM on a select few kilometres of residential roads	No. of roads made 20mph		Smoother driving leading to a reduction of PM from tyre and brake wear. The scheme is likely to be limited to a handful of residential streets.
RDAQ2_Transport	Parking standards – diesel/ EV differential parking rates	Traffic Management	Emission based parking or permit charges	2024	2026	RBC	RBC	No	Not funded	< £100k	Planning	Alongside RDAQ5, reductions in NO2 concentrations of up to 2 µg/m3 estimated (b)	Implementation of scheme/ reduction of higher rate vehicles over time		Encourages uptake of cleaner vehicles
RDAQ3_Transport	Reading Buses investment programme and support	Vehicle Fleet Efficiency	Public Transport Improvement	2024	2029	RBC/Reading Buses	Defra/ JAQU/DFT	Yes	Not funded	£1m-10m	Planning	Reductions in NO2 concentrations along heavily used bus routes of up to 0.3 µg/m3 (c)	Buses decarbonised	ZEBRA funding bid successful Reading Buses to take delivery of 24 zero emission electric buses in May 2025. Existing compressed national gas buses will be cascaded in the fleet with older diesels to be disposed of.	
RDAQ4_Transport	Neighbourhood and Highway Management	Traffic Management	UTC, Congestion management, traffic reduction	2024	2029	RBC	RBC/DFT	No	Not funded	< £100k	Planning	To be quantified at a later date, once further details become available	emission reductions at key locations. Traffic signals upgraded.	Undertaking an air quality assessment into impact of traffic signal upgrades near location of highest NO2 on IDR.	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ5_Transport	Implementation of EV Infrastructure Strategy	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2024	2025	RBC	RBC/DFT/Private investment	No	Part funded	£10k - £50k	Implementation	Alongside RDAQ2, reductions in NO2 concentrations of up to 2 µg/m3 estimated (b)	Policy adoption	Reading's Electric Vehicle Charging Infrastructure (EVCI) Strategy adopted March 2024. Council proceeding with Local Electric Vehicle Infrastructure funded contract to implement on-street charging across borough	Facilitating and encouraging EV vehicle uptake rates
RDAQ6_Transport	Improve taxi fleet emissions	Promoting low emission transport	Taxi licensing conditions	2024	2029	RBC	RBC	No	Not funded	£10k - £20k	Planning	On Caversham Road, NO2 reductions of up to 6 µg/m3 are considered possible (d)	Hackneys all EVs by 2029, key milestones achieved on way	Emissions policy in place for hackney fleet	
RDAQ7_Transport	School Streets	Promoting Travel Alternatives	Other	2024	2027	RBC/Schools	RBC/DFT/Schools	No	Part funded	< £10k	Implementation	Via RDAQ7 and RDAQ12, reductions in NO2 of 0.1 - 0.2 µg/m3 estimated (e), more on the school streets themselves	New schemes investigated, new school streets implemented	4 schools streets implemented covering 7 schools. 2 further school streets due for implementation in July 2024.	
RDAQ8_Transport	Continue to promote active and low emission travel options	Promoting Travel Alternatives	All	2024	2029	RBC	RBC/DFT	No	Part funded	£50-£100k per annum	Implementation	Via RDAQ8 and RDAQ16, reductions in NO2 concentrations of up to 0.3 µg/m3 estimated (f)		Council continuing with ourActive Travel Capability programme promiting walking and cycling including free cycle training and maintenance workshops, led walks	

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														and cycles and working with schools to promote active and sustainable transport.	
RDAQ9_Transport	Multi-modal enhancements(Traffic corridor, IDR, Oxford Rd)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2024	2029	RBC	RBC/DFT	No	Part funded	£10-£15m (BSIP)	Implementation	Minimal impacts expected initially, with modal shift benefits likely cancelled out by slight increases in congestion of other vehicle types (g)	Implementation of schemes	Through Council's Bus Service Improvement Plan (BSIP) funding Council delivering 5 bus lane schemes across the borough including Oxford Road (2), London Road (2) and Southampton Street. Schemes involve mix of reallocation of highway to bus and cycle lane as well as additional bus lane where space permits.	To improve wider connectivity with the outskirts of Reading, while reducing traffic congestion.
RDAQ11_Transport	Healthy Streets and Quiet Neighbourhoods	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2025	2029	RBC	RBC/DFT	No	No funding	<1m	Planning	To be quantified at a later date, once further details become available	Investigation of potential schemes, implementation of schemes		Plan is to enable more direct routes between neighbourhoods, key mobility hubs and employment areas, hopefully via sustainable transport improvements, to reduce through travel on the IDR.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ12_Transport	Concessionary and Discounted Travel for Students	Promoting Low Emission Transport	School Travel Plans	2023	2025	RBC/DFT	DFT	No	Funded	<100k	Implementation	Via RDAQ7 and RDAQ12, reductions in NO2 of 0.1 - 0.2 µg/m3 estimated (e), more on the school streets themselves	% Increase use of buses	Through Council's Bus Service Improvement Plan (BSIP) funding Council delivering reduced multi-operator daily bus ticket including rate for Younger People and Children.	Discounted bus fares for young people, to discourage parents driving kids to schools
RDAQ13_Transport	Travel demand management charges	Traffic Management	Other	2024	2029	RBC	RBC/DFT	No	Unfunded	£100-£1m	planning	To be quantified once further feasibility studies have been carried out	Investigation of schemes, implementation of scheme.		Vehicles travelling through Reading ('rat-runs') without the need to be in Reading to be charged.
RDAQ14_Transport	Bus Rapid Transit Schemes	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2024	2029	RBC	RBC/DFT	No	Part funded	£10-£15m (BSIP)	Implementation	Minimal impacts expected initially, with modal shift benefits likely cancelled out by slight increases in congestion of other vehicle types (g)	Implementation of schemes, % increase use of buses	Council delivering Phase 5 of its South Reading (A33) Bus Rapid Transit Scheme due for completion summer 2025.	Bus Rapid Transit Schemes from the South, Southeast, Southwest, East and West, to connect Central Reading to the wider town.
RDAQ15_Transport	Park and Ride Expansions	Alternatives to Private Vehicle Use	Bus based Park & Ride	2024	2029	RBC	RBC/DfT	No	Part Funded	£500k	Implementation	Associated air quality improvements likely to occur after the life cycle of this AQAP, so shall be quantified at a later date	Number of extra parking spacing, number of extra people using the buses	Winnersh Park and Ride site expanded with services due to recommence from summer 2024. Use of Mereoak Park and Ride	

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														monitored. Hospital and University Park and Ride service introduced from Mereoak and Thames Valley Park Park and Ride sites.	
RDAQ16_Transport	New pedestrian and cycling routes	Transport planning and Infrastructure	Cycle network/ Other	2024	2029	RBC	RBC/DFT	No	Part funded	£1-£5m (Active Travel England Tranche Funding))	Implementation	Via RDAQ8 and RDAQ16, reductions in NO2 concentrations of up to 0.3 µg/m3 estimated (f)	Completion of cycling routes, % increase in cycling	Active Travel Scheme under construction including ATF2 Shinfield Road (part complete) and ATF3 Bath Road - due for construction late 2024. ATF4 Upper Redlands Road crossing due for construction summer 2024.	In line with Local Cycling and Walking Infrastructure Plan
RDAQ17_Transport	Freight and Delivery. Investigate Introduction of last mile, low emission delivery	Freight and Delivery Management	Delivery and Service Plans	2024	2029	RBC	RBC/DFT	No	Not funded	<100K	Planning	To be quantified once feasibility studies have been carried out	Investigation of schemes	Through Council's new LTP4; Reading Transport Strategy 2040, commitment to produce Freight Strategy in co-ordination with neighbouring LAs	Such as encouraging 'last-mile' deliveries to be made by zero-emission vehicles
RDAQ18_Transport	Council Fleet Electrification	Promoting Low Emission Transport	Low Emisson Vehicles	2024	2029	RBC	RBC	No	Not funded	100k-1m	Implementation	4000kg NOx per annum	Number of vehicles replaced by EV/ULEV, Reduction of NOx emissions.	Council continuing roll-out of Electric Vehicles within its fleet.	

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RDAQ19_Transport	Cross-Thames Travel Scheme	Traffic Management	Strategic highway improvements	2024	2029	RBC	RBC/DFT	No	Not funded	>10m	planning	Major benefits to NO2 and PM on the IDR and existing bridges. To be quantified once feasibility studies undertaken.	Investigate feasibility	Council has retained commitment to new Cross Thames Travel scheme in its new LTP4, the Reading Transport Strategy 2040.	Associated air quality improvements likely to occur after the life cycle of this AQAP, so shall be quantified at a later date
RDAQ20_Policy	Air quality planning guidance for construction sites and operational developments	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2024	2026	RBC	RBC	No	Not funded	< £10k	Planning	No pollutant concentration reductions expected, but this will act to minimise incremental pollutant increases from new development emissions	Implementation of guidance/ policy document		Government may phase out SPDs therefore we need to consider how best to achieve this aim.
RDAQ21_Policy	Wood burning policy and expansion of Smoke Control Area	Policy Guidance and Development Control	Other	2024	2024	RBC	RBC	No	Not funded	< £10k	Implementation	PM emissions reductions of 10%	Expansion of SCA, Implementation of policy	Public consultation process undertaken. Whole Borough SCO approved by Defra. Comes into force on 1st December 2024	
RDAQ22_Policy	Use of Wood Burning Enforcement Powers	Policy Guidance and Development Control	Other	2024	ongoing	RBC	RBC/Defra	No	Not funded	<100k	Planning	PM emissions reductions of 10%	Number of enforcement actions taken		Resourcing
RDAQ23_Policy	Retrofitting Buildings to support Net Zero Ambitions	Policy Guidance and Development Control	Other	2024	ongoing	RBC	RBC/DESNZ	No	Part funded	100k-1m	Implementation	NO2 background emission reductions of 5%	Number of retrofitting measures completed, % decarbonised		In line with ambitions of Reading Climate Action Network. This should reduce the need to rely on gas boilers and solid fuel burning

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RDAQ24_Policy	Encourage commercial cooking establishments to incorporate fine particulate filtration systems in their vents	Policy Guidance and Development Control	Other	2025	ongoing	RBC	RBC	No	Not funded	<10k	Planning	Minor regional benefits to PM	Number of businesses reached, percentage of businesses with filtrations systems		
RDAQ25_Policy	Develop a Non-Road Mobile Machinery Emissions Policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2025	2026	RBC	RBC	No	Not funded	<10k	Planning	Minor regional benefits to PM	Implementation of policy		London have stringent NRMM policies in place to ensure heavy construction vehicles use as low-emission technologies as practically possible, which could be replicated in Reading
RDAQ26_Policy	Tree Planting and greening	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2024	ongoing	RBC	RBC	No	Not funded	<10k	Implementation	Minor local benefits	Number of trees planted		Align with Tree Strategy, maximise tree planting and greening in 'tree corridors' along the AQMA giving careful consideration to the choice of species to maximise the tolerance to and pollution trapping potential
RDAQ27_Public	airAlert service (pollution warning service)	Public information	Via other mechanisms	2024	2024	RBC	RBC/Defra	no	Not funded	£5k CAPEX, £5k OPEX	Planning	No direct influence on pollutant concentrations, but provides the public with the opportunity to better protect themselves from pollution spikes	Implementation, number of subscriptions.		Ongoing cost of running service. Link with RDAQ29 & RDAQ31

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
RDAQ28_Public	School awareness events	Promoting Travel Alternatives	Other	2023	2027	RBC/Design Nature/University of Reading/ Stantec	AQ Grant	yes	Funded	£100k-£300k	Implementation	No direct influence on pollutant concentrations, but increases awareness	Number of school/pupils reached	AQ grant secured. CALM:ER programme being delivered over two years 2024-25	
RDAQ29_Public	Health promotion work with NHS	Public information	Other	2024	2029	RBC/NHS/PHE		no	Not funded	£100k-£200k	Planning	No direct influence on pollutant concentrations, but increases awareness	Number of people/ patients reached		Link with better monitoring of PM2.5 (RQAQ31) develop stats on local health impact, increase understanding
RDAQ30_Public	Mobility as a Service (MaaS) scheme	Public Information	Via other mechanisms	2023	2027	RBC		no	Not funded		Planning	Minor regional benefits to NO2 and PM by encouraging public transport use	% increase in public transport		Enable travellers to reach destinations confidently and conveniently, without the need for private vehicles, utilising a user-friendly transport services mobile app
RDAQ31_Public	Increase PM2.5 Monitoring to help understanding of levels and sources in Reading	Public Information	Other	2024	2028	RBC/Defra/EA	RBC/EA	no	Not funded	100k-500k	Planning	No direct influence on pollutant concentrations, but enables greater understanding to better target measures in the future	Number of monitoring locations	AQ grant application submitted, EA has installed an additional PM2.5 monitor at part of AURN. There are now 2 PM2.5 monitoring sites in RBC.	Carry out monitoring of PM2.5 at more locations in Reading, to better understand current situation and trends.
RDAQ32_Public	Smoke Control Area Awareness Campaign	Public Information	Other	2023	2025	RBC/Defra	RBC	no	Not funded	<10K	Planning	No direct influence on pollutant concentrations, but improves awareness	Publicity measures taken, surveys.	Information on RBC website. To be delivered in runup to new SCA going live on 1st	Develop and deliver awareness campaign to educate residents of the adverse air quality impacts of

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
														December 2024	solid fuel burning. Materials re-published every winter for maximum impact.
RDAQ33_Public	Bonfire/ garden waste fire awareness campaign	Public Information	Other	2024	2027	RBC	RBC	no	Not funded	<10K	Planning	No direct influence on pollutant concentrations, but improves awareness	Publicity measures taken, letters sent.		Develop and deliver awareness campaign to educate residents of the adverse air quality impacts of burning garden waste/ bonfires. Materials re-published every autumn for maximum impact.
RDAQ34_Public	Engagement in National Clean Air Day	Public information	Other	2024	ongoing	RBC	RBC	no	Not funded	<10k	Planning	No direct influence on pollutant concentrations, but improves awareness	Events held locally, Publicity of campaign.	Event held at UoR - workshop with 4 secondary schools. Part of CALM:ER programme	Encourage schools to be engaged in the topic of air quality. Awareness raising for residents.
RDAQ35_Public	Indoor Air Quality Awareness Campaign	Public Information	Other	2025	ongoing	RBC	RBC	no	Not funded	<10k	Planning	No direct influence on pollutant concentrations, but improves awareness	Publicity measures taken, surveys.	The importance of good indoor air quality and what affects it is being covered in our CALM:ER programme	Knowledge of the importance of indoor air quality is starting to pick up traction, but public awareness remains limited. No targets or legislation in place.

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The indicator for $PM_{2.5}$ on the Public Health Outcomes Framework (PHOF) is: D01 - Fraction of mortality attributable to particulate air pollution. The PHOF shows this to currently be 6% in Reading, compared to 5.3% nationally.

Reading Borough Council is taking the following measures to address $PM_{2.5}$:

In order to reduce the impact of particulates on health in Reading, it is proposed to implement measures from the AQAP. Our new action plan targets anthropogenic emissions of pollution from vehicles, industry and other sources. $PM_{2.5}$ is a pollutant that is emitted from many of the same sources as NO_2, so where an action reduces emissions of NO_2, $PM_{2.5}$ will also be reduced.

Although the primary focus of action plan is to address exceedances of NO_2 objectives, we have included actions targeting $PM_{2.5}$ reduction to align with the increasing evidence around $PM_{2.5}$ being extremely harmful to health. The following non transport related measures from table 2.2 above may more directly help to address mortality from anthropogenic $PM_{2.5}$:

Measure No. RDAQ21 – (wood burning policy & SCA expansion,) RDAQ22 – (wood burning enforcement,) RDAQ24 – (fine particulate filters at commercial kitchens,) RDAQ25 – (NRMM emission policy,) RDAQ30 – (Increase PM2.5 monitoring,) RDAQ31 – (SCA awareness campaign,) RDAQ32 – (Bonfire awareness campaign.)

Reading Borough Council currently has 21 Smoke Control Areas covering approximately 62% of the borough, but these are being revoked for a single Smoke

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

Control Area to replace it covering 100% of the borough. This was recently approved by the Secretary of State and will come into force on 1st December 2024. There will be a publicity campaign in the leadup to the Smoke Control Areas going live to raise awareness around the requirements and the reasons for this. This along with enforcement action where breaches of the rules are identified will help reduce harmful emissions of particulate pollution, including $PM_{2.5}$.

Reading Borough Council plan to increase $PM_{2.5}$ monitoring across the borough to further our understand of levels, to raise awareness and enable better targeted actions to be implemented.

A major road resurfacing programme is currently being undertaken. As the breakdown of road surfaces contributes to the suspension of particulates in the air, this work will help to reduce $PM_{2.5}$ from this source.

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

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

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

3.1.2 Non-Automatic Monitoring Sites

Reading Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 57 sites during 2023. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

3.2 Individual Pollutants

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

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

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

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

As can be seen from figure A.3 below, levels of nitrogen dioxide fell significantly in 2020 and 2021 due to COVID-19 restrictions. Data from 2022 shows that levels did increase again as people adjusted back to a new normal after the restrictions were lifted., although levels were still significantly lower than in 2019. This is likely to be due to a combination of the change to working patterns since COVID-19 resulting in lower numbers of vehicles on the roads and improving vehicle emissions standards. In 2023 the levels monitored at our AQMS are lower than in 2022, this could indicate that levels have stabilised since COVID-19 restrictions were lifted and that the improving emissions standards of vehicles and other measures taken are resulting in lower levels of NO_2.

All three continuous monitoring stations were significantly below the annual mean objective for NO_2. Concentrations at the Caversham Road AQMS fell from 27µg/m^3 in 2022 to 24µg/m^3 in 2023. The Kings Road AQMS was moved to London Road to become DEFRA affiliated in 2016. This site has continued to monitor levels of NO_2 below the

annual average NAQO for NO_2 (19µg/m^3). NO_2 levels at Oxford Road (23µg/m^3) our other roadside monitoring station is also below the annual mean NAQO for NO_2.

The diffusion tube monitoring results follow a similar pattern, being generally lower than in 2022. There is only one exceedance in 2022, at Malcolm Place (43.3 µg/m^3) although when distance corrected to the nearest exposure this reduces to 37.7µg/m^3.

None of the continuous monitoring stations or diffusion tube locations indicate an exceedence of the 1- hour mean objective.

3.2.2 Particulate Matter (PM_{10})

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

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

The tables show that levels of PM_{10} in 2023 have reduced siginficantly on those monitored in 2022 in all but one location, (London Road AQMS) although levels here were already the lowest of our roadside locations. It is also encouraging that levels at our background site (Reading New Town AURN) as this had been static or even rising in recent years. There are no exceedances of any air quality objectives for PM_{10}.

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.

PM2.5 was 7µg/m^3 in 2022. Table A.8 shows that this is a slight reduction on the previous previous three years when it was measured at 8 µg/m^3. Before that levels fluctuated a between 7-10µg/m^3.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Reading AURN	AURN	Urban Background	473441	173198	NO2; PM10; PM2.5; O3	NO	Chemiluminescent; TEOM FDMS; UV Photometrics	N/A	100	2.5
RD1	Caversham Rd	Roadside	471153	174429	NO2, PM10	YES	Chemiluminescent; Beta-Attenuation Mass	2	3	1.5
RD3	Oxford Rd	Roadside	468700	174126	NO2, PM10	YES	Chemiluminescent; Beta-Attenuation Mass	9	6	1.5
RD4	London Rd	Roadside	473703	173409	NO2, PM10	YES	Chemiluminescent; Beta-Attenuation Mass	16	3.5	1.5

Notes:

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

(2) N/A if not applicable

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

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)
RD001	10 Trinity Place	Roadside	470738	173433	NO2	Reading AQMA	0.0	7.5	No	2.3
RD002	108 Caversham Rd	Roadside	471293	174236	NO2	Reading AQMA	0.0	6.5	No	1.5
RD003	128 Castle Hill	Roadside	470987	173016	NO2	Reading AQMA	0.0	2.5	No	2.3
RD004	131 Caversham Rd	Roadside	471261	174236	NO2	Reading AQMA	0.0	7.0	No	2.3
RD005	14 Church Road	Roadside	471103	174774	NO2	Reading AQMA	0.0	2.5	No	2.3
RD006	15 Southcote Lane	Roadside	469899	172528	NO2	Reading AQMA	9.0	2.0	No	2.3
RD007	162a Castle Hill	Roadside	470835	172992	NO2	Reading AQMA	0.0	8.0	No	2.3
RD008	165 Oxford Rd	Roadside	470717	173373	NO2	Reading AQMA	0.0	4.0	No	2.3
RD009	17 Church Rd Earley	Roadside	474425	172053	NO2	Reading AQMA	0.0	3.0	No	1.5
RD010	17a Southcote Lane	Roadside	469845	172462	NO2	Reading AQMA	5.0	2.0	No	2.3
RD011	181 Kings road	Roadside	472513	173281	NO2	Reading AQMA	12.0	2.0	No	2.3
RD012	197 Caversham Rd	Roadside	471161	174379	NO2	Reading AQMA	0.0	7.0	No	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)
RD013	21A Friars Walk, Friars Street	Roadside	471373	173584	NO2	Reading AQMA	3.0	1.0	No	2.3
RD014	241 Gosbrook Road	Roadside	471942	174600	NO2	Reading AQMA	0.0	6.0	No	2.3
RD015	252 Oxford Rd	Roadside	470081	173517	NO2	Reading AQMA	0.0	3.5	No	2.3
RD016	276 Kings Road	Roadside	472715	173227	NO2	Reading AQMA	0.0	10.0	No	2.3
RD017	281 Oxford Rd	Roadside	470294	173445	NO2	Reading AQMA	0.0	6.5	No	2.3
RD018	31a Vastern Rd	Roadside	471420	174129	NO2	Reading AQMA	3.0	3.0	No	2.3
RD019	327 Oxford Rd	Roadside	470057	173489	NO2	Reading AQMA	0.0	7.5	No	2.3
RD020	33 Caversham Rd	Roadside	471123	173734	NO2	Reading AQMA	0.0	3.0	No	2.3
RD021	34 Crescent Road	Roadside	473833	172719	NO2	Reading AQMA	6.0	1.5	No	2.3
RD022	40 George Street	Roadside	471909	174543	NO2	Reading AQMA	0.0	3.5	No	2.3
RD023	40 Redlands Road	Roadside	472521	172469	NO2	None	10.0	2.5	No	2.3
RD024	419 London Rd	Roadside	473729	173432	NO2	Reading AQMA	0.0	9.0	No	2.3
RD025	42 Shinfield Rd (Opposite)	Kerbside	472953	171764	NO2	Reading AQMA	20.0	1.0	No	2.3

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)
RD026	44 Crown Street	Roadside	471717	172856	NO2	Reading AQMA	0.0	4.5	No	2.3
RD027	45 Prospect Street	Roadside	471558	174919	NO2	Reading AQMA	0.0	1.5	No	2.3
RD028	494 Oxford Rd	Roadside	469470	173715	NO2	Reading AQMA	0.0	5.0	No	1.5
RD029	60 Prospect Street	Roadside	471557	174944	NO2	Reading AQMA	0.0	3.0	No	2.3
RD030	68 George Street	Roadside	471913	174490	NO2	Reading AQMA	0.0	3.0	No	2.3
RD031	689 Oxford Rd	Roadside	468978	173895	NO2	Reading AQMA	0.0	2.5	No	2.3
RD032	744 Oxford Rd	Roadside	468967	173935	NO2	Reading AQMA	0.0	2.5	No	1.8
RD033	78 Crescent Road	Roadside	473717	172677	NO2	none	7.0	1.5	No	2.3
RD034	Amity Road	Roadside	473233	173244	NO2	Reading AQMA	1.0	0.5	No	2.3
RD035	Baron Cadagon/Clays	Roadside	471461	174840	NO2	Reading AQMA	0.0	5.0	No	2.3
RD036	Blenheim Terrace, Castle Hill	Roadside	471061	173018	NO2	Reading AQMA	2.0	3.0	No	2.3
RD037, RD038, RD039	Caversham AQMS	Roadside	471156	174424	NO2	Reading AQMA	5.0	5.0	No	2.3

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)
RD040	Caversham Road (Old Post Office)	Roadside	471202	173869	NO2	Reading AQMA	25.0	4.0	No	2.3
RD041	Caversham Road (Pinnacle)	Roadside	471401	174790	NO2	Reading AQMA	3.0	2.0	No	2.3
RD042	Cavesham Café	Roadside	471401	174790	NO2	Reading AQMA	0.0	2.0	No	2.3
RD043	Charles Place, 246 Kings Road	Roadside	472592	173253	NO2	Reading AQMA	8.5	2.5	No	2.3
RD044	Christchurch Road (Cintra)	Roadside	472706	172047	NO2	Reading AQMA	4.0	3.0	No	2.3
RD045	Cow Lane Bridges	Kerbside	470230	173818	NO2	Reading AQMA	20.0	1.0	No	2.3
RD046	Friar St (Nandos)	Roadside	471437	173589	NO2	Reading AQMA	7.0	5.0	No	2.3
RD047	King Oak Flats	Roadside	472015	173223	NO2	Reading AQMA	0.0	5.5	No	2.3
RD048	Malcolm Place	Roadside	471174	173846	NO2	Reading AQMA	4.0	2.0	No	2.3
RD049	Malmaison	Roadside	471509	173705	NO2	Reading AQMA	0.0	2.0	No	2.3
RD050	Malthouse Lane	Roadside	470808	173512	NO2	Reading AQMA	0.0	2.5	No	2.3
RD051	Marlborough House Christchurch Road	Roadside	472742	172024	NO2	Reading AQMA	10.0	4.0	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)
RD052	Red Cow	Roadside	471685	172853	NO2	Reading AQMA	0.0	1.5	No	2.3
RD053	Redlands Road Zebra Crossing	Roadside	472496	172563	NO2	none	10.0	0.0	No	2.3
RD054	Sackville Street	Roadside	471177	173641	NO2	Reading AQMA	0.0	0.5	No	2.3
RD055	Sainsburys 52-55 Friar Street	Kerbside	471320	173577	NO2	Reading AQMA	3.0	1.0	No	2.3
RD056	Shinfield Rd/Cedar Rd	Kerbside	473363	170479	NO2	Reading AQMA	5.0	1.0	No	2.3
RD057	Shinfield Rd/Whitley Wood Rd	Roadside	473329	170269	NO2	Reading AQMA	10.0	5.0	No	2.3
RD058	Sidmouth Street - Trinity Hall	Roadside	472071	173157	NO2	Reading AQMA	3.0	3.0	No	2.3
RD059	Station Hill (Near Bus stop WN)	Roadside	471324	173820	NO2	Reading AQMA	25.0	1.0	No	2.3
RD060	Station Hill (Near Taxi Rank)	Roadside	471413	173808	NO2	Reading AQMA	20.0	1.0	No	2.3
RD061	Tamar House	Roadside	471508	173663	NO2	Reading AQMA	3.0	2.0	No	2.3
RD062	The Butler	Roadside	470906	173517	NO2	Reading AQMA	5.0	3.5	No	2.3
RD063	Wilson Primary	Roadside	469368	173530	NO2	Reading AQMA	2.0	1.5	No	2.0
RD064	Wycliffe Baptist Church	Roadside	473068	173204	NO2	Reading AQMA	20.0	3.5	No	2.3

Notes:

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
AURN	473441	173198	Urban Background	92.5	92.5	22	15	20	**22***	13
RD1	471153	174429	Roadside	95.5	95.5	35	25	26	27	24
RD3	468700	174126	Roadside	96.9	96.9	26	20	22	23	23
RD4	473703	173409	Roadside	99.5	99.5	27	18	21	21	19

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

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

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023.**

Notes:

The annual mean concentrations are presented as µg/m^3.

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

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

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

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

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

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2023 (%) [2]	2019	2020	2021	2022	2023
RD001	470738	173433	Roadside	100	100.0	26.1	21.3	22.3	22.4	26.5
RD002	471293	174236	Roadside	100	100.0	35.3	26.5	28.7	29.4	27.6
RD003	470987	173016	Roadside	100	100.0	38.6	26.0	32.2	30.3	27.5
RD004	471261	174236	Roadside	100	100.0	32.0	22.2	27.3	26.2	23.2
RD005	471103	174774	Roadside	100	100.0	32.6	24.0	26.1	25.3	24.2
RD006	469899	172528	Roadside	100	57.7		17.3	19.0	18.1	16.2
RD007	470835	172992	Roadside	100	100.0	33.7	25.3	29.6	26.3	25.0
RD008	470717	173373	Roadside	100	100.0	36.5	28.2	30.5	29.9	23.9
RD009	474425	172053	Roadside	100	100.0	34.0	27.7	31.5	30.1	28.7
RD010	469845	172462	Roadside	100	57.7		18.2	21.1	19.9	19.0
RD011	472513	173281	Roadside	100	100.0	34.9	27.9	35.2	32.7	31.7
RD012	471161	174379	Roadside	100	100.0	30.5	25.0	29.7	29.3	26.2
RD013	471373	173584	Roadside	57.5	57.7	38.9	30.6	37.6	38.8	33.9

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 2023 (%) [2]	2019	2020	2021	2022	2023
RD014	471942	174600	Roadside	92.3	92.3	31.0	22.9	24.1	24.1	21.9
RD015	470081	173517	Roadside	100	100.0	31.3	23.3	27.5	26.0	24.4
RD016	472715	173227	Roadside	100	100.0	26.5	18.7	21.4	22.0	20.8
RD017	470294	173445	Roadside	32.6	32.7	35.7	29.6	30.8	27.5	22.7
RD018	471420	174129	Roadside	100	100.0	27.9	23.7	25.4	24.8	23.9
RD019	470057	173489	Roadside	100	100.0	33.7	28.5	31.1	31.0	29.9
RD020	471123	173734	Roadside	82.5	82.7	35.5	27.0	32.4	30.1	32.9
RD021	473833	172719	Roadside	82.7	82.7			17.0	15.4	15.4
RD022	471909	174543	Roadside	5.1	75.0	38.4	27.2	32.0	33.6	29.5
RD023	472521	172469	Roadside	100	100.0	34.8	25.5	27.3	27.4	17.1
RD024	473729	173432	Roadside	100	100.0				20.0	26.4
RD025	472953	171764	Kerbside	58.1	57.7					15.5
RD026	471717	172856	Roadside	92.3	92.3	29.4	22.3	26.8	24.2	21.7
RD027	471558	174919	Roadside	100	100.0	33.2	24.6	26.9	25.1	24.2

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 2023 (%) [2]	2019	2020	2021	2022	2023
RD028	469470	173715	Roadside	82.7	40.4	29.2	22.9	27.5	24.5	25.7
RD029	471557	174944	Roadside	100	100.0	28.8	21.3	24.9	22.9	23.0
RD030	471913	174490	Roadside	82.7	82.7	27.1	18.5	21.9	23.3	24.2
RD031	468978	173895	Roadside	100	100.0	35.5	28.8	28.7	30.9	27.9
RD032	468967	173935	Roadside	100	100.0	39.1	32.6	33.1	32.3	30.2
RD033	473717	172677	Roadside	100	100.0			16.6	16.0	14.1
RD034	473233	173244	Roadside	92.3	92.3	29.1	21.1	24.1	22.6	22.6
RD035	471461	174840	Roadside	82.7	82.7	36.4	28.5	31.5	27.2	25.2
RD036	471061	173018	Roadside	84.1	84.6	34.1	26.8	29.8	27.6	26.8
RD037, RD038, RD039	471156	174424	Roadside	100	100.0					24.3
RD040	471202	173869	Roadside	100	42.3					37.1
RD041	471401	174790	Roadside	100	34.6					36.1
RD042	471401	174790	Roadside	82.7	100.0	34.5	25.6	29.8	27.8	25.9
RD043	472592	173253	Roadside	100	82.7	**40.8**	28.2	30.6	32.1	30.9

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 2023 (%) [2]	2019	2020	2021	2022	2023
RD044	472706	172047	Roadside	100	32.7					22.8
RD045	470230	173818	Kerbside	100	100.0	34.0	27.4	30.1	30.3	26.2
RD046	471437	173589	Roadside	100	100.0	**41.0**	28.5	35.9	38.0	36.7
RD047	472015	173223	Roadside	92.1	100.0	27.9	20.1	24.1	22.5	21.1
RD048	471174	173846	Roadside	100	92.3	**52.4**	**40.0**	**42.1**	**43.3**	**42.6**
RD049	471509	173705	Roadside	100	100.0		29.1	33.6	35.0	33.2
RD050	470808	173512	Roadside	100	100.0	30.9	23.7	25.1	24.9	23.2
RD051	472742	172024	Roadside	100	25.0					18.1
RD052	471685	172853	Roadside	92.3	100.0	31.4	24.5	28.7	26.9	24.6
RD053	472496	172563	Roadside	100	92.3					17.4
RD054	471177	173641	Roadside	100	100.0	32.0	23.6	27.3	26.8	25.8
RD055	471320	173577	Kerbside	100	100.0	**40.3**	30.0	38.2	37.6	38.9
RD056	473363	170479	Kerbside	82.7	100.0	34.1	23.8	30.7	28.7	26.9
RD057	473329	170269	Roadside	90.4	82.7	26.2	20.1	24.3	22.2	20.9

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 2023 (%) (2)	2019	2020	2021	2022	2023
RD058	472071	173157	Roadside	92.1	90.4	34.0	23.2	25.2	25.2	25.0
RD059	471324	173820	Roadside	90.4	92.3	38.0	31.3	32.6	29.0	31.9
RD060	471413	173808	Roadside	42.5	90.4	35.4	26.9	29.1	27.4	29.8
RD061	471508	173663	Roadside	100	42.3					36.5
RD062	470906	173517	Roadside	100	100.0	32.0	24.7	28.8	30.4	27.2
RD063	469368	173530	Roadside	100	57.7			15.7	14.9	13.2
RD064	473068	173204	Roadside	100	100.0	39.2	28.5	33.3	31.5	31.3

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

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

The annual mean concentrations are presented as µg/m^3.

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

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

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

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

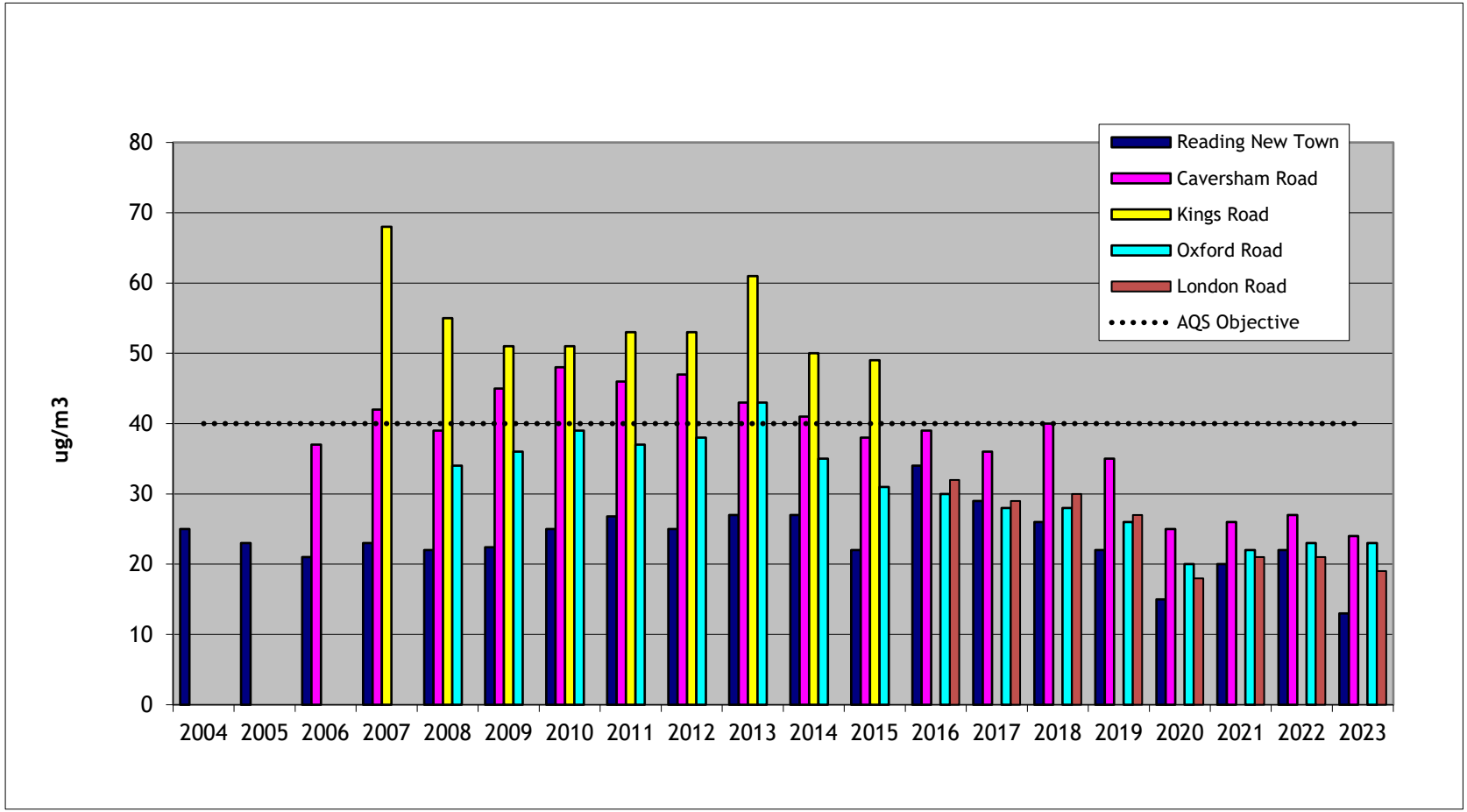


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
AURN	473441	173198	Urban Background	92.5	92.5	**0(84)**	0	0	**0(95)**	0
RD1	471153	174429	Roadside	95.5	95.5	0	0	0	1	0
RD3	468700	174126	Roadside	96.9	96.9	0	0	0	0	0
RD4	473703	173409	Roadside	99.5	99.5	0	0	0	0	0

Notes:

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

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

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

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

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

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
AURN	473441	173198	Urban Background	91.2	91.2	13	15	15	16	12
RD1	471153	174429	Roadside	97	97	24	20	20	25	21
RD3	468700	174126	Roadside	97.5	97.5	21	18	17	20	17
RD4	473703	173409	Roadside	95.3	95.3	17	19	17	18	18

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

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

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

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

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

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

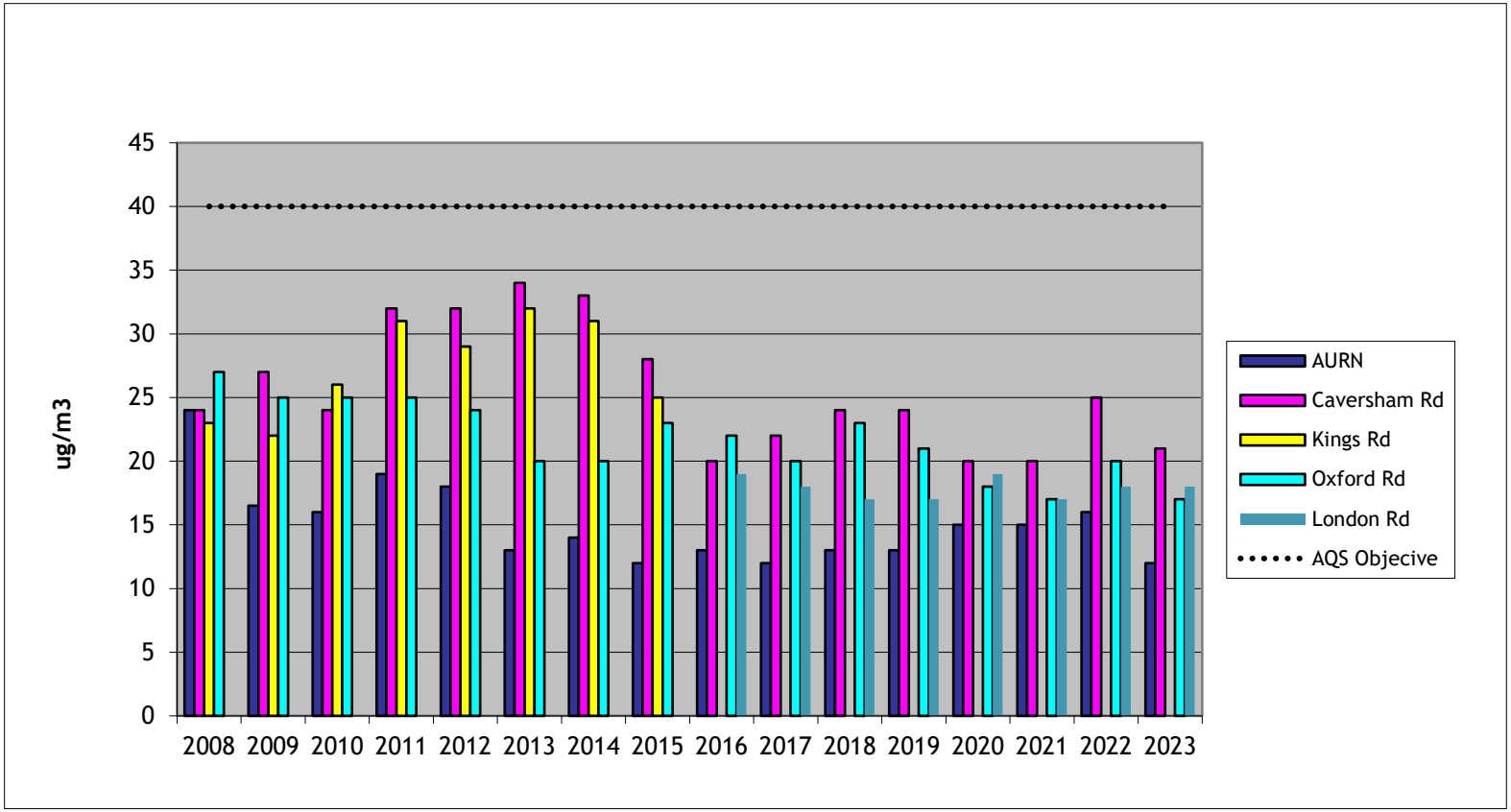


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2023 (%) (2)	2019	2020	2021	2022	2023
AURN	473441	173198	Urban Background	91.2	91.2	**0(20)**	0	1	0	0
RD1	471153	174429	Roadside	97	97	11	5	2	6	0
RD3	468700	174126	Roadside	97.5	97.5	11	2	0	1	0
RD4	473703	173409	Roadside	95.3	95.3	4	3	2	0	2

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%).

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 2023 (%) (2)	2019	2020	2021	2022	2023
AURN	473441	173198	Urban Background	89.8	89.8	8	8	8	8	7

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

Notes:

The annual mean concentrations are presented as µg/m^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%).

Appendix B: Full Monthly Diffusion Tube Results for 2023

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

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
RD001	470738	173433	29.4	28.4	22.0	25.8	30.2	21.7	32.3	32.2	45.8	39.6	40.2	35.7	31.9	26.5	-	
RD002	471293	174236	35.8	37.9	32.8	33.0	32.1	34.5	25.3	35.1	37.9	35.7	36.0	22.2	33.2	27.6	-	
RD003	470987	173016	41.0	41.8	31.0	32.9	32.4	35.9	26.0	31.4	33.5	33.8	36.4	21.7	33.1	27.5	-	
RD004	471261	174236	37.7	33.3	33.1	23.2	23.4	21.7	21.6	22.7	28.1	29.3	31.7	29.9	28.0	23.2	-	
RD005	471103	174774	33.7	34.1	29.1	29.4	23.6	25.9	26.1	28.1	31.9	31.1	32.7	24.0	29.1	24.2	-	
RD006	469899	172528	25.7	23.1	17.6	22.1	18.4	17.8	12.7						19.6	16.2	-	
RD007	470835	172992	39.2	34.8	29.9	31.8	29.7	29.2	22.3	27.8	25.8	30.0	36.7	23.5	30.1	25.0	-	
RD008	470717	173373	43.3	42.2	34.7	35.9	22.0	32.5	16.6	22.5	24.4	26.4	28.5	16.7	28.8	23.9	-	
RD009	474425	172053	46.1	42.0	35.2	33.6	29.8	30.8	27.9	31.5	34.6	35.6	37.8	29.8	34.6	28.7	-	
RD010	469845	172462	25.5	29.9	23.9	24.7	21.8	21.8	14.2						23.1	19.0	-	
RD011	472513	173281	48.9	40.9	37.5	37.4	41.1	37.1	32.0	33.1	42.7	37.7	44.2	26.0	38.2	31.7	-	
RD012	471161	174379	39.6	37.7	36.1	31.8	26.5	25.0	24.3	27.6	30.5	30.3	35.9	33.1	31.5	26.2	-	
RD013	471373	173584	46.1	53.0			56.0		33.3	32.6		38.9	43.3		43.3	33.9	-	
RD014	471942	174600	31.9	29.4	28.6	24.0	18.7	21.0		22.9	30.5	29.2	31.0	23.4	26.4	21.9	-	
RD015	470081	173517	31.7	34.0	29.3	33.1	27.2	30.7	20.3	28.1	32.9	32.6	31.0	22.3	29.4	24.4	-	
RD016	472715	173227	28.6	28.8	25.7	23.7	21.2	22.7	21.7	23.3	30.6	28.4	27.6	18.8	25.1	20.8	-	
RD017	470294	173445	36.5	33.7	33.8	31.3									33.8	22.7	-	
RD018	471420	174129	39.8	33.7	25.5	24.5	17.0	18.8	27.8	26.4	34.4	33.1	34.3	30.1	28.8	23.9	-	

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
RD019	470057	173489	37.9	36.3	36.1	36.7	33.1	35.0	32.6	30.8	42.3	40.5	38.3	31.9	36.0	29.9	-	
RD020	471123	173734	45.3	42.8		39.9	37.1	35.6	28.4	34.8		39.5	34.5	58.8	39.7	32.9	-	
RD021	473833	172719	26.3	25.8	19.6	19.1			9.5	13.3	17.2	19.4	23.5	11.4	18.5	15.4	-	
RD022	471909	174543	43.8	42.8	34.0	34.7				32.3	27.2	41.1	26.7	37.8	35.6	29.5	-	
RD023	472521	172469	28.7	27.1	21.6	22.3	23.1	9.3	12.4	17.5	21.7	24.0	24.3	15.9	20.6	17.1	-	
RD024	473729	173432	37.2	38.3	32.6	32.0	28.8	30.9	26.9	30.0	35.7	30.9	31.9	26.0	31.8	26.4	-	
RD025	472953	171764				19.3	13.5	12.9	11.8	14.5	17.9	21.7			15.9	15.5	-	
RD026	471717	172856		31.7	25.0	27.3	23.3	26.2	20.2	25.9	29.5	29.9	29.7	19.5	26.2	21.7	-	
RD027	471558	174919	36.4	34.7	32.7	28.0	23.9	27.8	20.2	25.7	26.4	33.5	33.5	26.5	29.1	24.2	-	
RD028	469470	173715	43.2	34.3			31.7	30.4	16.6						31.2	25.7	-	
RD029	471557	174944	32.0	33.0	28.8	25.9	28.2	25.9	25.3	22.8	32.4	27.0	30.6	20.5	27.7	23.0	-	
RD030	471913	174490	30.7	27.7	26.9	24.4	28.7			22.3	41.5	27.9	39.8	21.4	29.1	24.2	-	
RD031	468978	173895	36.5	32.3	35.6	36.9	29.1	33.6	28.1	28.4	38.5	37.8	36.0	30.4	33.6	27.9	-	
RD032	468967	173935	37.7	37.3	36.0	41.2	37.0	42.7	29.3	34.6	36.7	38.9	38.2	27.2	36.4	30.2	-	
RD033	473717	172677	21.7	23.1	18.1	17.9	16.5	15.2	9.8	14.4	16.2	17.9	21.1	11.8	17.0	14.1	-	
RD034	473233	173244	33.2	31.8	25.3	24.0		22.6	22.0	24.6	30.9	32.4	27.5	25.1	27.2	22.6	-	
RD035	471461	174840	46.9	42.0	36.4	34.7	28.2	28.2			18.1	15.7	22.7	30.7	30.4	25.2	-	
RD036	471061	173018	45.7	44.5	31.0	32.6	30.2	28.0	24.4	26.1			36.2	24.1	32.3	26.8	-	
RD037	471156	174424	28.3	31.3	28.1	26.8	31.4	32.6	21.9	32.0	32.8	33.9	30.1	20.8	-	-	-	Triplicate Site with RD037, RD038 and RD039 - Annual data provided for RD039 only
RD038	471156	174424	24.4	31.9	27.5	31.2	32.6	32.4	22.3	28.5	32.6	34.4	30.8	20.4	-	-	-	Triplicate Site with RD037, RD038 and RD039 - Annual data provided for RD039 only
RD039	471156	174424	29.6	30.9	28.6	31.0	31.9	32.5	22.2	29.3	34.2	32.7	31.7	19.9	29.3	24.3	-	Triplicate Site with RD037, RD038 and RD039 - Annual data provided for RD039 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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
RD040	471202	173869								29.8	68.6	41.0	47.7	32.6	43.9	37.1	23.7	
RD041	471401	174790								46.0	38.7		52.1	30.4	41.8	36.1	31.1	
RD042	471401	174790	37.3	35.8	33.4	32.6	34.9	25.9	23.4	27.9	31.6	31.3	36.3	24.4	31.2	25.9	-	
RD043	472592	173253	45.0	44.7	34.8	34.0		30.8	33.7		41.9	35.5	41.2	31.2	37.3	30.9	-	
RD044	472706	172047									29.9	28.5	32.8	23.4	28.7	22.8	-	
RD045	470230	173818	41.1	36.0	15.8	34.0	32.2	31.3	25.9	28.6	37.5	36.3	32.8	26.8	31.5	26.2	-	
RD046	471437	173589	51.7	49.5	42.0	50.2	49.5	44.5	34.2	40.1	43.0	46.3	48.5	31.3	44.2	36.7	30.5	
RD047	472015	173223	31.8	29.0	24.9	27.1	23.7	24.0	17.8	23.4	27.3	27.0	30.4	18.9	25.4	21.1	-	
RD048	471174	173846	60.9	47.6	55.5	52.4	44.3	48.9	52.4	53.9		59.2	59.2	30.3	51.3	**42.6**	37.7	
RD049	471509	173705	47.0	46.4	39.8	39.6	34.9	36.4	35.4	36.8	38.6	44.5	45.4	35.2	40.0	33.2	-	
RD050	470808	173512	34.2	34.9	26.9	27.3	21.8	25.1	21.5	25.2	31.9	33.0	31.7	22.4	28.0	23.2	-	
RD051	472742	172024										25.3	22.4	21.7	23.1	18.1	-	
RD052	471685	172853	34.6	35.8	29.9	31.3	33.2	31.8	19.3	28.3	33.1	27.9	32.7	18.1	29.6	24.6	-	
RD053	472496	172563	27.3	28.3	19.3	19.9		18.3	14.1	17.8	23.2	24.3	22.8	15.7	21.0	17.4	-	
RD054	471177	173641	35.3	36.7	30.7	35.6	28.5	28.4	22.7	23.6	41.1	32.2	32.4	25.3	31.0	25.8	-	
RD055	471320	173577	53.0	59.5	42.3	54.3	61.7	51.2	34.7	40.8	45.4	42.7	45.7	30.7	46.8	38.9	31.6	
RD056	473363	170479	37.2	39.3	31.9	32.2	29.3	30.1	27.0	27.2	38.6	36.4	33.4	26.9	32.5	26.9	-	
RD057	473329	170269	33.1	32.0		25.5	19.6	22.8		20.8	31.4	23.5	26.0	17.6	25.2	20.9	-	
RD058	472071	173157	38.1	35.2	31.0	26.6	23.9	20.9	20.4		33.6	35.6	37.4	28.3	30.1	25.0	-	
RD059	471324	173820	43.8	37.9	38.1	42.9	48.0	44.0	27.8	33.9		38.3	38.1	29.5	38.4	31.9	-	
RD060	471413	173808	49.7	44.9	32.7	33.4	26.6	26.5	27.9		53.8	29.3	38.2	31.4	35.9	29.8	-	

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 (0.83)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
RD061	471508	173663								43.0	33.8	46.5	51.5	41.5	43.3	36.5	31.5	
RD062	470906	173517	36.7	38.4	31.4	37.7	30.5	31.4	22.5	32.0	37.6	33.9	36.8	24.9	32.8	27.2	-	
RD063	469368	173530	22.7	22.1	16.8	15.7	12.0	13.3	9.4						16.0	13.2	-	
RD064	473068	173204	46.7	45.6	37.0	38.2	38.3	35.3	31.0	30.3	43.2	34.7	42.4	30.3	37.7	31.3	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

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

☐ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

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

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

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

New or Changed Sources Identified Within Reading Borough Council During 2023

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

Additional Air Quality Works Undertaken by Reading Borough Council During 2023

Reading Borough Council has not completed any additional works within the reporting year of 2022.

QA/QC of Diffusion Tube Monitoring

Reading Borough Council operate a network of NO_2 passive diffusion tubes, the tubes are supplied and analysed by Gradko International using the preparation method 50% TEA in acetone. The tubes are exposed for approximately one month following the standard exposure calendar, all sites use single tubes other than the co-location studies where triplicate tubes are deployed.

The Gradko laboratory is UKAS accredited, follows the procedures set out in the harmonisation practical guidance and participates in the AIR-PT NO2 proficiency testing scheme.

Under the AIR-PT scheme AIR-PT round 46-59, (Sept 2021 – Oct 2023) Gradko tubes were found to have 100% satisfactory results for samples tested using Z- score performance.

Distance correction has been applied to NO2 diffusion tube results where monitoring sites are not representative of public exposure using the NO_2 fall-off with distance calculator.

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. Annualisation was required at one diffusion tube location in 2022. This was calculated in accordance with LAQM TG (22) using the diffusion Tube Data Processing Tool and is presented in Table C.1 below

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

Site ID	Annualisation Factor <Site 1 Name>	Annualisation Factor <Site 2 Name>	Annualisation Factor <Site 3 Name>	Annualisation Factor <Site 4 Name>	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
RD006	0.9172	0.9668	1.0355	1.0476	0.9918	19.6	19.5
RD010	0.9172	0.9668	1.0355	1.0476	0.9918	23.1	22.9
RD013	0.9315	0.9671	0.9130	0.9589	0.9426	43.3	40.8
RD017	0.6854	0.8559	0.8152	0.8729	0.8074	33.8	27.3
RD025	1.2120	1.0849	1.2282	1.1511	1.1691	15.9	18.6
RD028	0.9232	0.9633	1.0137	1.0699	0.9925	31.2	31.0
RD040	1.1234	1.0494	0.9565	0.9417	1.0178	43.9	44.7
RD041	1.1510	1.0569	0.9721	0.9790	1.0397	41.8	43.5
RD044	1.0538	1.0151	0.8953	0.8731	0.9593	28.7	27.5
RD051	1.0214	0.9950	0.8989	0.8568	0.9430	23.1	21.8
RD061	1.1234	1.0494	0.9565	0.9417	1.0178	43.3	44.0
RD063	0.9172	0.9668	1.0355	1.0476	0.9918	16.0	15.9

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube

monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Reading Borough Council have applied a national bias adjustment factor of 0.83 to the 2023 monitoring data. A summary of bias adjustment factors used by Reading Borough Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/23	0.83
2022	National	03/22	0.82
2021	National	03/21	0.83
2020	National	03/21	0.82
2019	National	03/20	0.87
2018	National	03/19	0.92

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
Periods used to calculate bias	11				
Bias Factor A	0.82 (0.77 - 0.89)				
Bias Factor B	21% (13% - 30%)				
Diffusion Tube Mean (µg/m^3)	21				
Mean CV (Precision)	29.2				
Automatic Mean (µg/m^3)	3.2%				
Data Capture					
Adjusted Tube Mean (µg/m^3)	24.0				

Notes:

Reading carried out one local co-location study at the RBC owned continuous roadside monitor on Caversham Road (combined adjustment factor 0.82). The average bias correction factor from the national dataset was 0.83. We have used the national figure, (as in the previous 16 years) in order to create a consistent approach, enabling trends in the historic data to be more easily identified. This year the national figure is also marginally more conservative than the local figure.

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.

Table C.4 – Non-Automatic NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
RD040	4.0	29.0	37.1	13.0	23.7	*Warning: your receptor is more than 20m further from the kerb than your monitor - treat result with caution.*
RD041	2.0	5.0	36.1	13.0	31.1	
RD046	5.0	12.0	36.7	13.0	30.5	
RD048	2.0	6.0	42.6	13	35.0	

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
RD055	1.0	4.0	38.9	13	31.6	
RD061	2.0	5.0	36.5	13.0	31.5	

QA/QC of Automatic Monitoring

The data management and Local Site Operator (LSO) duties for any automatic monitoring sites within Reading Borough Council are completed by Ricardo Energy and Environment. Calibrations, audits and servicing are all carried out in accordance with Defra best practice. The data ratification process is fully LAQM TG (22) compliant. All data presented in the report has been ratified. Live and historic data is available at the Air Quality England website.

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

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

Automatic Monitoring Annualisation

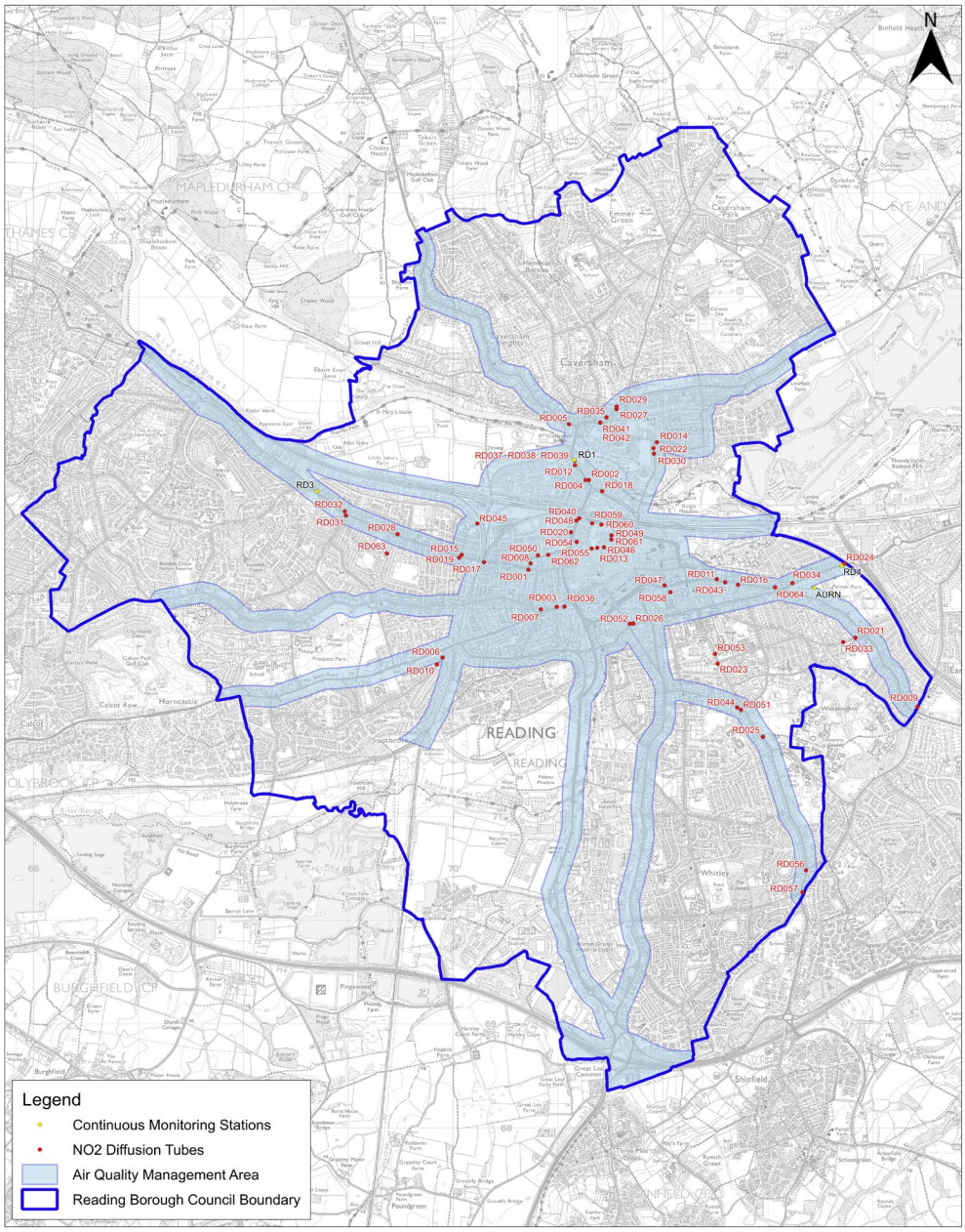
All automatic monitoring locations within Reading Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, automatic annual mean NO_2 concentrations corrected for distance are presented in Table A.3.

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

Figure D.1 – Map of Automatic and Non-Automatic Monitoring Site



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
AQMS	Air Quality Monitoring Station
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

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