

Working better with you

2019 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management

June 2019

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Executive Summary: Air Quality in Our Area

Air Quality in Reading Borough Council



Air pollution is increasingly linked to number of adverse health impacts. It is recognised as a contributing factor in the onset of respiratory illness, heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around ± 16 billion³.

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.

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Reading Borough Council's monitoring of these pollutants indicates that after years of stagnation the levels are beginning to fall again.

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 majority of the AQMA does not exceed national objective levels, but there are hotspot locations along each route that do. <u>https://uk-air.defra.gov.uk/aqma/details?aqma_id=263</u>

Vehicle emissions standards mean that newer vehicles should cause less pollution than older vehicles. However, air pollution has not fallen as expected. It is now known that emissions standards have not been effective in real world driving conditions, especially in diesel vehicles. 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. Utilising low emission technologies, including vehicles that run on hydrogen or electricity is increasingly a viable alternative.

These alternative modes of transport have additional advantages of reducing our carbon emissions, making Reading a more pleasant place to be and promoting a healthier lifestyle.

Actions to Improve Air Quality

Reading is one of the third wave local authorities required to carry out a targeted feasibility study with the aim of bringing forward NO₂ compliance in the shortest time possible. This study modelled what measures would be most effective at improving air quality in the road links identified as exceeding compliance in 2020. Of the measures put forward the retrofit of Reading's bus fleet to EUROVI was the single most effective measure. The Joint Air Quality Unit (JAQU) has now provided funding and we are in the process of implementing this measure. This is scheduled to be completed before the end of 2019.

Reading is also in the process of installing electric vehicle charge points in residential streets with no off street parking. This project is expected to result in 15 lamp column charge points and several other EV charge points at strategic locations for community use. The lamp column chargers are scheduled to be installed in

September, with the remaining charge points installed towards the back end of the year.

Reading Borough Council installed 3 double headed EV charge points at the Bennet Road site to charge 4 new electric vans (Renault Kangoo) that have been introduced to the Council fleet. 2 electric cars (Renault Zoe) have also been introduced for staff to use as pool cars.

Reading Borough Council are continuing to building on the work already done in our no idling campaign by carrying out idling action campaign days. Last year we carried out 3 campaign days, 1 in the town centre and 2 at schools. This year we carried out a further campaign day to coincide with Clean Air Day.

Conclusions and Priorities

Reading Borough Council's monitoring shows that NO_2 is the only pollutant that currently exceeds a national objective within the AQMA. Monitoring also indicates that in general, levels of NO_2 are falling. Caversham Road is the only continuous analyser to exceed (40μ g/m³) the annual average objective for NO_2 , an increase on the previous 3 years. In 2018 NO_2 diffusion tubes in 15 locations indicated an exceedance. Some diffusion tubes have been relocated, but no exceedances have been identified outside the AQMA. PM_{10} and $PM_{2.5}$ are also pollutants of concern due to their effects on health even at low concentrations.

Priorities over the coming year are to complete the retrofit of the Reading Bus fleet to EURO6. We will also complete the project to install electric charging points to serve residential areas with no off street parking and continue our no idling campaign to reduce pollutants at idling hotspots.

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 Borough Council have been carrying out no idling campaign days and is appealing to local citizens to come forward and help persuade motorists to switch of their engines. Volunteers receive training where they learn about the strong link between idling engines and poor health. They will be given tips on how best to approach drivers who have left car engines running, including providing them with information to help them quash some common myths like leaving your car engine running is bad for your vehicle, or that re-starting your engine burns more fuel than leaving it idling.

Drivers are invited to become part of the campaign to improve air quality by switching off. Volunteering is easy. Go to <u>http://www.reading.gov.uk/idlingaction</u> to register or to find out more.

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. Anyone looking to reduce their own impact on air pollution is encourage 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: <u>https://www.cleanairday.org.uk/pages/category/clean-air-hub</u>

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1 Local Air Quality Management

This report provides an overview of air quality in Reading Borough Council during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual 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 can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Reading Borough Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <u>https://uk-</u>

<u>air.defra.gov.uk/aqma/details?aqma_ref=467</u>. Alternatively, see Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of	Polluta nts and Air Quality Objecti ves	City/	Oneline	Is air quality in the AQMA influenc ed by	Le m c	evel of Ex (maxi onitored concentra ocation o expo	(Ceeo mum /moc ation of rele sure)	dance I Ielled at a evant		Ac	tion Plan
	Declarati on		ves	Description	roads controlle d by Highway s England ?	At Declaratio n		Now		Name	Date of Publication	Link
Reading AQMA	19/08/2009	NO2 Annual Mean	Reading	An area encompassin g all the main arterial routes in and out of Reading and central area.	YES	? µg/m3		47	μg/m 3	Reading Borough Council AQAP 2015	2015	http://www.reading.gov.uk/media/6 389/Air-Quality-Action- Plan/pdf/AQAP_Update_2016.pdf

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

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

Defra's appraisal of last year's ASR accepted the conclusions made for all sources and pollutants, though the below comments were made and have been addressed in this year's ASR where stated.

- The first 2018 ASR submitted by the Council could not be accepted due to the omission of annual mean diffusion tube concentrations from 2013 to 2017 in Table A.3. This data was also omitted from Table A.3 in the accompanying excel file.
- The Council have resubmitted their 2018 ASR with the missing 2013 to 2017 diffusion tube data now included. The report can therefore now be accepted.
- 3. The 2017 monitoring results presented in the report demonstrate continuing exceedances within the AQMA, at 16 diffusion tube sites. No exceedances of air quality objectives for NO₂ and PM₁₀ have been demonstrated at automatic monitoring sites.
- O₃ is monitored at the AURN, but no results are presented and the report does not comment or provide a discussion on this. This should be included in future reporting, as it is unclear whether results comply with O₃ objectives. – O₃ monitoring results have been included in the 2019 ASR.
- 5. The monitoring results have been adjusted as appropriate for bias (using a national bias adjustment factor), and for distance. However, no details distance correction calculations have been provided. These should be included in Appendix C in future reports. – The NO₂ fall-off with distance calculator available on the LAQM website was used for these calculations, this is stated in Appendix C.

- 6. It is noted that there are no diffusion tube monitoring sites outside of the declared AQMA. The Local Authority may wish to consider whether it is appropriate to monitor at any locations outside of the AQMA. There may be sites of relevant exposure, where exceedances are potentially occurring outside the AQMA. A number of diffusion tubes have been relocated to check for other exceedances both inside and outside the AQMA.
- 7. Some progress has been made towards AQAP measures in the last year. However, the AQAP measures presented in Table 2.2 are sometimes inconsistent with the table format. This makes it difficult to know the exact number of AQAP measures, and the status of some of the – i.e. whether they are active or not. – An attempt has been made to make this clearer.
- 8. Table 2.2 therefore requires some improvement to the formatting of measures, and clearly identifying the statuses of the measures. The Council should also consider developing estimated reductions in pollutant/emissions, following the Technical Guidance rather than stating "Reduced vehicle emissions" for each measure in this column. Developing these will assist the Council in determining which measures are likely to be most effective, and therefore help in assigning priority. Where possible some form of quantification of emissions improvement has been included although this is not possible for all measures.
- The Council is undertaking a Targeted Feasibility Study to identify measures to reach compliance with the annual mean NO₂ objective. The outcomes of this study and identified measures will be reported in next years' ASR. – This has been included.
- 10. The Council have developed measures to address PM_{2.5} in the Borough, and are working together with Public Health. It would be useful if future reports could make reference to the Public Health Outcomes Framework, and the local indicator for PM_{2.5} for the Borough.

11. The map presented in Appendix D is of low resolution and difficult to read. It also does not demonstrate the AQMA boundary, or monitoring site locations in relation to surrounding roads and buildings. Future reports should therefore include a map which demonstrate the AQMA boundary, and smaller scale maps of the monitoring sites. - A new improved map has been added and smaller scale maps of the AQMS have also been added.

Reading has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

Key completed measures are:

- Targeted Feasibility Study this identified retrofitting the bus fleet to EURO6 standard as being the single measure able to be implemented in the time available to bring forward compliance with NO₂ targets in the quickest time possible.
- Installation of 3x fast chargers at the Council's Bennet Road site.
- Introduction of 4x electric vans to replace old fleet diesel vans and 2 x electric cars for use on the Council's pool car system.
- No-idling campaign 2x event days were held in the town centre and 2x event days were held at schools. These events were to raise people's awareness of the impact of vehicle idling on air pollution and health.
- Cow lane bridges improvements enables vehicles including HGVs avoid Oxford Road, improving congestion. Modelling predicts a 1µg/m³ improvement on Chatham Street

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

- The retrofit of the bus fleet to EURO6 emissions standard. This is predicted to bring forward compliance on 3 of the 4 road links that are modelled to still have an exceedance of the annual mean objective for NO2 after 2020.
- The completion of the 'Go Electric Reading' project to Installation EVCP in residential areas without off street parking. – This is based on the output from a resident's survey and will encourage the uptake of EVs in these areas where demand has been indicated.

Reading Borough Council's priorities for the coming year are to complete the tasks set out above and to look for funding to enable the pursuit of further projects to improve air quality.

The principal challenges and barriers to implementation that Reading Borough Council anticipates facing are gaining funding to help implement any additional measures. Without further external funding implementation of further actions will not be possible.

Whilst the measures stated above and in Table 2.2 and the bus retrofit program will help to contribute towards compliance, Reading Borough Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the Reading AQMA.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
RDAQ1	Railway upgrade	Transport Planning and Infrastruct ure	Public transport improvements- interchanges stations and services	Network Rail	Complete	Sep-17	Reduced congestion Improved journey times Improved air quality	modelled to reduce NO2 levels by 1µg/m3 on Chatham street.	Interchange works complete. Cow Lane opened to two-way traffic in March 2019 and further improvements to walking and cycling facilities have been completed.	Apr-19	
RDAQ2	Green Park Station	Transport Planning and Infrastruct ure	Public transport improvements- interchanges stations and services	RBC, GWR & Network Rail Funded by LEP	Ongoing	Jan-18	Reduced congestion on A33	Provide alternative route into Reading from Green Park Village. Reduced vehicle emissions	Implementation ongoing. GRIP 1-3 (NR standard) designs delayed overall progress. Works to commence from Dec 19.	Nov-19	Revised Planning approval from West Berks / Wokingham. Network Rail Governance process (network change etc). Failure to agree scope freeze with TOC. Increased costs as a result of delay and scope creep. The risks associated with this project are being managed with DfT involvement being sought to support these particular challenges.
RDAQ3	Southern Mass Rapid Transit (MRT)	Transport Planning and Infrastruct ure	Bus route improvements	RBC Funded by LEP	Ongoing	Date	Improved journey times for public transport Increase in the number of people using public transport for local journeys	Reduced vehicle emissions	Phase 1 and 2 complete. Phase 3 is under construction expected completion Summer 2019. Construction of Phase 4 is expected to commence by December 2019. Further phases continuing to be developed in accordance with LEP	Jul-19	Subject to ongoing funding approval from LEP.

Table 2.2 – Progress on Measures to Improve Air Quality

									plan.		
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RDAQ4	Eastern MRT	Transport Planning and Infrastruct ure	Bus route improvements	RBC Funded by LEP		-	Improved journey times for public transport Increase in the number of people using public transport for local journeys Improved accessibility for pedestrians and cyclists		Planning consent refused by WBC and funding was subsequently reallocated by LEP.	N/A	Planning consent refused by WBC and funding was subsequently reallocated by LEP.
RDAQ5	Southern (Mereoak) Park & Ride	Transport Planning and Infrastruct ure	Public transport improvements- interchanges stations and services	RBC, WBC	Complete	Complete	Increased use of park and ride facilities	Reduced vehicle emissions	Car park opened August 2015, served by Greenwave buses as a pre-MRT service. Continued increased use of park and ride and Greenwave services.	Aug-15	Service improvements dependent upon delivery of future phases of MRT South.
RDAQ6	Winnersh Park & Ride	Transport Planning and Infrastruct ure	Public transport improvements- interchanges stations and services	RBC, WBC	Complete	Complete	Increased use of park and ride facilities	Reduced vehicle emissions	Complete with full commercial operation October 2015. Due to scheme success plans in place and funding allocated by LEP for 'decking' of the car park to increase capacity. Bus company intends to increase service frequency following completion of decking.	Oct-15	
RDAQ7	East (Thames Valley Park) Park & Ride	Transport Planning and Infrastruct ure	Public transport improvements- interchanges stations and services	WBC Funded by LEP	Ongoing	Summer 2019	Increased use of park and ride facilities	potentially result in 554 less car journeys into town each day.Reduced vehicle	Construction commenced summer 2018.	Sep-19	Full benefits unlikely to be reached due to non- delivery of East MRT

								emissions			
RDAQ8	Traffic signal upgrading	Traffic Managem ent	UTC, Congestion management, traffic reduction							N/A	not taken forward due to unexpected costs relocating services
RDAQ9	A33 Congestio npinchpoi nt relief scheme	Transport Planning and Infrastruct ure	Other	RBC Funded by DfT	Complete	Complete	Improved journey times	Reduced vehicle emissions	Complete	Spring 2015	
RDAQ10	A4 Congestio n relief pinchpoint scheme	Transport Planning and Infrastruct ure	Other							N/A	not taken forward due to unexpected costs relocating services
RDAQ11	Work towards electrificati on of vehicle fleet	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	RBC	Complete		procurement of electric charge points and vehicles	Reduced vehicle emissions	4 charge points installed at civic offices. 3 at Bennet Rd. 5 electric vans on RBC fleet. 2 EV pool cars. Successful bid to fund installation of EV charge points in residential locations without off street parking	On-going. EV charge point scheme first installs in Sept 2019	funding
RDAQ12	Expansion of Ready Bike cycle scheme	Promoting Travel Alternativ es	Promotion of cycling	RBC, Hourbike	Complete	Ongoing	Increase in the number of journeys made by ReadyBike	Providing a readily available alternative to cars, buses or taxis leading to a reduction in vehicle emissions. Potentially 193384g NO2 over lifetime of scheme	ReadyBike monitoring data shows that 109,468 rentals and 19,229 subscriptions over an estimated 483,460 miles were made by ReadyBike since the scheme launch in June 2014 to April 2019.	Jun-14	Hourbike was appointed in September 2017 to manage and operate ReadyBike at zero subsidy for a minimum 3 year period. However in February 2019 Hourbike informed RBC that it was no longer able to operate ReadyBike. The service is currently not operating whilst RBC investigate options with potential operators.

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RDAQ13	Cross boundary cycle routes	Transport Planning and Infrastruct ure	Cycle network	RBC, West Berks, Wokingham Council & Bracknell Forest Council Funded by LEP	Ongoing	Ongoing	Increase number of people cycling along cross- boundary routes	Providing infrastruture to enable people to feel safe when riding to increase uptake in cycling rather than personal vehicle. Not quantified, but measure should lead to a reduction in vehicle emissions	Phase 1 complete (with exception of retaining wall at Honey End Lane - ongoing issue) and Phase 2 nearing completion. Phase 3 works commenced in April 2019 and are expected to be complete Summer 2019.	Dec-19	Options to improve footway, adjacent to poorly maintained retaining wall near New Lane Hill, to be identified and delivered.
RDAQ14	Cycle route infrastruct ure improvem ents	Transport Planning and Infrastruct ure	Cycle network	RBC	Ongoing	Ongoing	Increase in the number of people cycling for local journeys	Improve cycle routes to increase cycle usage.	Currently developing Local Cycling and Walking Infrastructure Plan in partnership with Wokingham and West Berkshire. Recent workshop held with Cycle Forum to identify possible improvements along proposed routes. The Plan is expected to be completed and submitted to DfT by Nov 2019.	Nov-19	Delivery of improvements identified in LCWIP and other new schemes, subject to funding being secured.
RDAQ15	Thames pedestrian /cycle bridge	Transport Planning and Infrastruct ure	Cycle network	RBC Funded by DfT	Complete	Complete	Increase in number of cycling & walking trips to/from Caversham	Increased walking and cycling into town.	Complete September 2015. Post-LSTF monitoring data shows an increase in the number of pedestrians and cyclists crossing the River Thames. The Council is now planning to expand the cycle network in the vincity of the bridge by changing the legal status of the footpath to shared- use. Public	Sep-15	

									consultation carried out in Summer 2017 resulted in 191 objections to the proposal, which will now be passed to the Secretary of State for determination.		
RDAQ16	Minimising industrial emissions	Environm ental Permits	Other measure through permit systems and economic instruments	RBC	ongoing	ongoing	inspections of permitted installations carried out. EP Annual subscriptions and applications. Annual search for unpermitted processes	Reduce industrial emissions to air			
RDAQ17	Through Reading Climate Change Partnershi p increase business participati on in reducing emissions through measures such as cycle to work schemes, reducing building energy, low emission delivery vehicles.	Policy Guidance and Developm ent Control	Regional Groups Co- ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	RBC, Sustainability	Complete	ongoing	Reading climate change partnership			2020	

RDAQ18	Through planning process ensuring that future developm ent does not result in further deteriorati on of air quality and where possible results in an improvem ent	Policy Guidance and Developm ent Control	Air Quality Planning and Policy Guidance	RBC	Ongoing	ongoing	Air Quality assessements produced for new developments. Monitoring results	Strategic AQ assessment completed in 2017/18 to focus on cumulative impact of developments	Jan-18	
RDAQ19	Ensure that measures to address air quality do not conflict with climate change actions, by considerin g the interlinked causal factors and promoting mutually beneficial solutions	Policy Guidance and Developm ent Control	Air Quality Planning and Policy Guidance	RBC	Ongoing	Ongoing			ongoing	

RDAQ20	Continue Reading Buses investmen t Programm e to ensure the bus fleet has the lowest emissions it can.	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	RBC, Reading Buses	Ongoing	Ongoing		Retrofit to bring forward compliance with No2 target by upto 2 years. Predicted to reduce level of NO2 by 8µg/m3 on Friar Street	Bus fleet in June 2018 included 62 x CNG buses or 33%. The percentage of the fleet now Euro 5 or 6 emissions compliant is 81%. Following the 2018 Targeted Feasibility Study to Deliver Nitrogen Dioxide Concentration Compliance in the shortest possible time, funding awarded to retrofit all RTL fleet to Euro 6 compliance by December 2019	Jan-20	
RDAQ21	Continue to explore and implement ways to improve emissions from Readings taxi fleet.	Vehicle Fleet Efficiency	Other	RBC	Ongoing	ongoing	measures introduced to improve emissions from taxis	Reduce taxi emissions	taxi emissions policy introduced to incrementally improve emissions standards of fleet	2020	
			Promoting Low Emission Public Transport	RBC	Ongoing	ongoing	measures introduced to improve emissions from taxis	Reduce taxi emissions	telematics devices fitted to a number of taxis to investigate feasibility of converting to electric and identifying EV charge point locations	2018	
RDAQ22	Reduce emissions from idling vehicles at hotspot locations within the AQMA.	Public Informatio n	Via other mechanisms	RBC	Complete	ongoing	reducion on emissions in idling hotspots		competition for children to design a sign to be put out at idling hotspots underway	2018	to be followed up with officers talking to drivers and issuing FPNs where necessary

							-				
			Via other mechanisms	RBC	Complete	ongoing	reducion on emissions in idling hotspots		Idling action campaign days in town and at schools to increase awareness	2018	
RDAQ23			Via other mechanisms	RBC	Complete	ongoing	Raise awareness reduction of emissions in idling hortspots	aquired 39 pledges from drivers that they would not idle in the future	Idling action campaign day in town for Clean Air Day	2019	
	Continue to offer Bikeability cycle training to all schools across Reading	Promoting Travel Alternativ es	Promotion of cycling	RBC Funded by DfT	on-going	on-going	Increase the number of children cycling to school		Participation in Bikeability continues to increase with over 1782 childen receiving Bikeability training in 2018/19.	Mar-20	Funding secured for the delivery of Bikeability until March 2020, including new Bikeability Plus modules.
RDAQ24	Continued funding for a Cycle developm ent officer to help promote cycling and deliver the Cycling Strategy.	Promoting Travel Alternativ es	Promotion of cycling	RBC Funded by DfT	Complete	Complete	Increase the number of people cycling for local journeys		Complete	Mar-16	RBC to investigate new funding opportunities to continue delivering a range of cycling initiatives in the future.
											Technical support for RBC to develop a Local Cycling & Walking Infrastructure Plan is now available. The Plan will be developed over the summer/autumn to further encourage people to travel by these modes for local journeys.
RDAQ25	Continue to inspire people to walk more via	Promoting Travel Alternativ es	Promotion of walking	RBC Funded by DfT & CCG	Complete	Complete	Increase the number of people walking for local journeys		Complete	Jul-15	RBC to seek new funding opportunities to continue delivering a range of walking initiatives in the future.

	initiatives such as Beat the Street.										RBC in process of developing a Local Cycling & Walking Infrastructure Plan to encourage more people to consider travelling by these modes for local journeys.
RDAQ26	Continue to monitor air pollution at existing monitoring locations and make results available to view on RBC website.	Public Informatio n	Other	RBC	Complete	Ongoing	Monitoring data available on RBC website. Achieve a good level of data capture.	none	Ongoing	ongoing	
RDAQ27	Investigat e the feasibility of introducin g locally based alert system to inform residents of forecasted pollution episodes.	Public Informatio n	Other	RBC	Complete	Complete	complete an assessment of the feasibility of such a system	none	Investigations show that uptake would be limited. Cost benefit indicates that it is not currently feasible.	2016	Funding
RDAQ28	Bonfires - Provide advice to residents and take enforceme nt action where appropriat e to discourag	Public Informatio n	Via the Internet	RBC	Complete	Ongoing	number of enquiries			ongoing	

	e the use										
	of bonfires										
	when										
	disposing										
	of wasta										
	OI waste										
	material.										
	Solid Fuel										
	Burning -										
	The										
	Smoke										
	Control										
	Survey										
	2014										
	2014, Chausad										
	Snowed										
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	now								of 4000 surveys sent		
	proposed								our 720 responses		
	to inform								were received Press		
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BDA 020	the	Fublic	Via other	PPC	Complete	Complete	responses to	unknown	out and webpages	2016	
KDAQ29	existence	momaio	mechanisms	RDC	Complete	Complete	survey	UNKNOWN	out and webpages	2010	
	of smoke	n							were updated with		
	control								information in an		
	areas								attempt to raise		
	how to								peoples awareness		
	find cut if										
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	to promote best practice for people heating their homes using wood, coal and other solid fuels.									
							Press release in run up to winter			
RDAQ30	Provide advice, guidance and support to improve home energy efficiency through the private sector renewal scheme and winter watch.	Public Informatio n	Via other mechanisms	RBC	Ongoing	Ongoing	Home energy conservation act report, EPC ratings of houses	unknown		
RDAQ31	Generate a larger proportion of energy from renewable sources.	Promoting Low Emission Plant	Other Policy				Government registration	unknown	2020	
	8% by 2020									

RDAQ32	Railway and Interchang e Upgrade	Transport Planning and Infrastruct ure	Public transport improvements- interchanges stations and services	RBC, GWR - Funded by LEP	Ongoing	Ongoing	Increase number of people using station, reduce congestion and improve air quality	Reduced vehicle emissions	Scheme granted programme entry by BLTB in Feb 2019. Work currently to produce Full Business Case, undertake utility service survyes and comission Design and Build Consultant.	Mar-21	Complexities of dealing with rail projects could see scheme costs and timeframe increase.
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2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), 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.

The indicator for PM2.5 on the Public Health Outcomes Framework (PHOF) is: 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 have included the following target in the corporate plan -Narrow the gap to the national average (5.3%) of deaths in over 25s linked to $PM_{2.5}$.

In order to do this it is proposed to continue to implement the AQAP. The action plan targets anthropogenic emissions of pollution from vehicles, industry and other sources. Although the action plan was drawn up to address exceedances of NO_2 objectives, $PM_{2.5}$ is a pollutant that is emitted from the same sources, so where an action reduces emissions of NO_2 , $PM_{2.5}$ will also be reduced.

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. RDAQ16 (industrial emissions), RDAQ27 (bonfires) and RDAQ28 (solid wood burning)

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how it compares with objectives.

Reading Borough Council undertook automatic (continuous) monitoring at 3 sites during 2018. Table A.1 in Appendix A shows the details of the 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. National monitoring results are available at

http://www.airqualityengland.co.uk/local-authority/?la_id=278.

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 (passive) monitoring of NO_2 at 56 sites during 2018. Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in <u>http://www.airqualityengland.co.uk/local-authority/reading-diffusion-tubes.</u> 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" and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of $40\mu g/m^3$. For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past 5 years with the air quality objective of $200\mu g/m^3$, not to be exceeded more than 18 times per year.

As can be seen from figure A.1 below, levels of nitrogen dioxide have generally fallen slightly which continues the recent downwards trend. Caversham Road is the one monitoring station that did not follow this trend last year. Concentrations at the Caversham Road AQMS increased by $4\mu g/m^3$ here raised a little to $40\mu g/m^3$. This increase means that this location exceeds the annual mean objective for NO2.

The Kings Road AQMS was moved to London Road to become DEFRA affiliated in 2016. This site has continued to monitor levels of NO₂ below the annual average NAQO for NO₂ (30μ g/m³). NO₂ levels at Oxford Road (28μ g/m³) our other roadside monitoring station is also below the annual mean NAQO for NO₂.

None of the continuous monitoring stations indicate an exceedence of the 1- hour mean objective.

3.2.2 Particulate Matter (PM₁₀)

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of $40\mu g/m^3$.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of $50\mu g/m^3$, not to be exceeded more than 35 times per year.

The tables show that there are no exceedances of any air quality objectives for PM_{10} .

3.2.3 Particulate Matter (PM_{2.5})

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years.

3.2.4 Ozone (O₃)

Table A.8 in Appendix A shows the ratified continuous monitored O_3 concentrations for 2018 compared with results for previous years.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	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) Om 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.

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m)	Tube collocated with a Continuous Analyser?	Height (m)
DT01	Kings Oak Flats, Queens Road	Roadside	472015	173223	NO2	Y	0	5.5m	Ν	2.5
DT02	AUN Co- location	Urban Background	473467	173207	NO2	Ν	N/A	N/A	Y	2.5
DT03	AUN Co- location	Urban Background	473467	173207	NO2	Ν	N/A	N/A	Y	2.5
DT04	AUN Co- location	Urban Background	473467	173207	NO2	Ν	N/A	N/A	Y	2.5
DT05	Wycliffe Church	Roadside	472071	173157	NO2	YES	10	3.5	NO	2.5
DT06	17 Church Road (Earley)	Roadside	474421	172054	NO2	Y	0	3m	Ν	2.5
DT07	162 London Road	Roadside	473490	173326	NO2	Y	0	6.5m	N	2.5
DT08	419 London Road	Roadside	473729	173432	NO2	Y	0	9m	N	2.5
DT09	276 Kings Road	Roadside	472716	173218	NO2	Y	0	10m	N	2.5
DT10	10-20 Hieatt Close	Roadside	471919	172684	NO2	Y	0	5m	N	2.5
DT11	Shinfield Rd above hedge	Roadside	473338	170269	NO2	Y	10	5m	N	2.5
DT12	Shinfield Rd side of shop	Roadside	473354	170482	NO2	Y	5	1	N	2.5
DT13	495 Basingstoke Road	Roadside	471709	170043	NO2	Y	10	8m	N	2.5
DT14	102 Whitley Street	Roadside	472002	172158	NO2	Y	0	6.5m	N	2.5

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

DT15	Red Cow, Southampton Street	Roadside	471685	172853	NO2	Y	0	1.5m	Ν	2.5
DT16	44 Crown Street	Roadside	471717	172856	NO2	Y	0	4.5m	N	2.5
DT17	4 Tilehurst Road	Roadside	470628	173076	NO2	Y	2	3m	Ν	2.5
DT18	162a Castle Hill	Roadside	470835	172992	NO2	Y	0	8m	Ν	2.5
DT19	128 Castle Hill	Roadside	470987	173016	NO2	Y	0	2.5m	Ν	2.5
DT20	Blenheim Terrace	Roadside	471061	173018	NO2	Y	2	3m	N	2.5
DT21	144 Bath Road	Roadside	468287	172172	NO2	Y	0	5m	Ν	2.5
DT22	Tilehurst Rd / Water Road	Roadside	468866	173071	NO2	Y	5	2m	Ν	2.5
DT23	Norcot/School Lane	Roadside	467041	174000	NO2	Y	5	5m	N	2.5
DT24	689 Oxford Road	Roadside	468978	173895	NO2	Y	0	2.5m	N	2.5
DT25	744 Oxford Road	Roadside	468967	173935	NO2	Y	0	2.5m	Ν	2.5
DT26	Sidmouth Street - Trinity Hall	Roadside	472071	173157	NO2	YES	3	3	NO	2.5
DT28	494 Oxford Road	Roadside	469470	173715	NO2	Y	0	5m	Ν	2.5
DT29	Cow Lane Bridges	Roadside	470230	173818	NO2	Y	20	1m	Ν	2.5
DT30	327 Oxford Road	Roadside	470057	173489	NO2	Y	0	7.5m	N	2.5
DT31	252 Oxford Road	Roadside	470080	143511	NO2	Y	0	3.5m	N	2.5
DT32	281 Oxford Road	Roadside	470294	173445	NO2	Y	0	6.5m	N	2.5

DT33	165 Oxford Road	Roadside	470717	173373	NO2	Y	0	4m	Ν	2.5
DT34	10 Trinity Place	Roadside	470738	173433	NO2	Y	0	7.5m	Ν	2.5
DT35	Picture House	Roadside	471113	173487	NO2	Y	0	5m	N	2.5
DT36	Sackville Street	Roadside	471177	173641	NO2	Y	0	0.5m	Ν	2.5
DT37	Vachel Street	Roadside	471174	173705	NO2	Y	0	25m	N	2.5
DT38	Garrard Street	Roadside	471422	173694	NO2	Y	0	1.5m	Ν	2.5
DT39	Friar Street nr Nandos	Roadside	471437	173589	NO2	Y	7	5m	Ν	2.5
DT40	Station 1	Roadside	471413	173808	NO3	YES	20	1m	N	2.5
DT41	Station 2	Roadside	471325	173818	NO4	YES	25	1m	N	2.5
DT42	33 Caversham Road	Roadside	471123	173734	NO2	Y	0	3m	Ν	2.5
DT43	59a Caversham Road	Roadside	471169	173869	NO2	Y	0	4m	Ν	2.5
DT44	50 Cardiff Rd	Roadside	470828	174076	NO2	Y	4	4m	N	2.5
DT45	125 Cardiff Road	Roadside	470866	174059	NO2	Y	0	2m	N	2.5
DT46	Railway Depot	Roadside	470899	174017	NO2	Y	20	N/A	Ν	1.5
DT47	197 Caversham Road	Roadside	471161	174379	NO2	Y	0	7m	Ν	2.5
DT48	Caversham Co-location	Roadside	471156	174424	NO2	Y	5	5m	Y	1.5
DT49	Caversham Co-location	Roadside	471156	174424	NO2	Y	5	5m	Y	1.5
DT50	Caversham Co-location	Roadside	471156	174424	NO2	Y	5	5m	Y	1.5

DT51	108 Caversham Road	Roadside	471293	174236	NO2	Y	0	6.5m	Ν	2.5
DT52	31a Vastern Road (lampost)	Roadside	471420	174129	NO2	Y	3	3m	N	2.5
DT53	131 Caversham Road	Roadside	471261	174236	NO2	Y	0	7m	Ν	2.5
DT54	14 Church Road (Caversham)	Roadside	471103	174774	NO2	Y	0	2.5m	Ν	2.5
DT55	Caversham Café	Roadside	471401	174790	NO2	Y	0	2m	Ν	2.5
DT56	Baron Cadogan PH	Roadside	471461	174840	NO2	Y	0	5m	Ν	2.5
DT57	45 Prospect Street	Roadside	471558	174919	NO2	Y	0	1.5m	Ν	2.5
DT58	59 Prospect Street	Roadside	471599	174966	NO2	Y	0	1m	Ν	2.5
DT59	60 Prospect Street	Roadside	471557	174944	NO2	Y	0	3m	N	2.5
DT60	241 Gosbrook Road	Roadside	471942	174600	NO2	Y	0	6m	N	2.5
DT61	68 George Street (Caversham)	Roadside	471913	174490	NO2	Y	0	3m	N	2.5
DT62	40 George Street	Roadside	471909	174543	NO2	Y	0	3.5m	N	2.5

Notes:

(1) Om if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Site ID	Cite Turne	Monitoring	Valid Data Capture for	Valid Data	NO ₂ Annual Mean Concentration (μg/m ³) ⁽³⁾					
Site ID	Site Type	Туре	Monitoring Period (%) ⁽¹⁾	2018 (%) ⁽²⁾	2014	2015	2016	2017	2018	
AURN	Urban Background	Automatic	99	99	27	22	34	29	26	
RD1	Roadside	Automatic	97	97	41	38	39	37	40	
RD3	Roadside	Automatic	99	99	35	31	30	28	28	
RD4	Roadside	Automatic	97	97			32	28	30	
Kings Oak Flats, Queens Road	Urban Centre	Diffusion Tube	100	100	38	33	33	31	32	
Wycliffe Church	Roadside	Diffusion Tube	75	75	-	-	49	40	37	
AUN Co- location	Urban Background	Diffusion Tube	100	100	20	18	19	18	18	
AUN Co- location	Urban Background	Diffusion Tube	100	100	21	18	18	19	19	
AUN Co- location	Urban Background	Diffusion Tube	100	100	21	18	19	18	19	
17 Church Road (Earley)	Roadside	Diffusion Tube	100	100	45	42	40	42	38	
162 London Road	Roadside	Diffusion Tube	100	100	50	48	42	43	40	
419 London Road	Roadside	Diffusion Tube	100	100	46	43	42	44	39	
276 Kings Road	Roadside	Diffusion Tube	83	83	37	33	32	32	30	
Sidmouth Street - Trinity Hall	Roadside	Diffusion Tube							37	
10-20 Hieatt	Roadside	Diffusion	92	92	38	34	32	32	31	

Table A.3 – Annual Mean NO2 Monitoring Results

Close		Tube							
Shinfield Rd above hedge	Roadside	Diffusion Tube	100	100	33	30	34	31	31
Shinfield Rd side of shop	Kerbside	Diffusion Tube	75	75	43	39	42	38	34
495 Basingstoke Road	Roadside	Diffusion Tube	92	92	34	31	33	34	28
102 Whitley Street	Roadside	Diffusion Tube	100	100	36	32	29	30	28
Red Cow, Southampton Street	Roadside	Diffusion Tube	100	100	45	38	38	35	38
44 Crown Street	Roadside	Diffusion Tube	100	100	43	36	37	35	34
Blenheim Terrace	Roadside	Diffusion Tube	92	92	41	40	39	39	33
128 Castle Hill	Roadside	Diffusion Tube	100	100	52	45	45	46	42
162a Castle Hill	Roadside	Diffusion Tube	100	100	40	36	37	35	35
4 Tilehurst Road	Roadside	Diffusion Tube	92	92	35	29	30	30	29
Tilehurst Rd / Water Road	Roadside	Diffusion Tube	100	100	37	34	32	32	31
144 Bath Road	Roadside	Diffusion Tube	100	100	31	30	29	28	29
Norcot/School Lane	Roadside	Diffusion Tube	92	92	32	28	28	29	26
689 Oxford Road	Roadside	Diffusion Tube	100	100	45	40	40	41	37
744 Oxford Road	Roadside	Diffusion Tube	100	100	55	47	46	42	47
494 Oxford Road	Roadside	Diffusion Tube	100	100	38	35	37	32	35

Cow Lane Bridges	Kerbside	Diffusion Tube	92	92	37	31	32	33	29
252 Oxford Road	Roadside	Diffusion Tube	100	100	37	32	35	34	34
327 Oxford Road	Roadside	Diffusion Tube	100	100	49	43	40	40	39
281 Oxford Road	Roadside	Diffusion Tube	100	100	48	45	44	45	42
10 Trinity Place	Roadside	Diffusion Tube	100	100	32	31	31	29	32
165 Oxford Road	Roadside	Diffusion Tube	100	100	51	47	44	47	42
Picture House	Roadside	Diffusion Tube	100	100	34	30	32	30	31
Sackville Street	Roadside	Diffusion Tube	83	83	43	40	37	37	38
Vachel Street	Roadside	Diffusion Tube	92	92	38	33	35	34	35
Friar Street nr Nandos	Kerbside	Diffusion Tube	83	83	53	47	52	50	42
Station (bus stops wn sign)	Roadside	Diffusion Tube	100	100	-	-	50	47	35
Station (nr entrance)	Roadside	Diffusion Tube	92	92	-	-	47	49	33
33 Caversham Road	Roadside	Diffusion Tube	100	100	51	48	43	45	44
59a Caversham Road	Roadside	Diffusion Tube	92	92	47	42	41	43	39
50 Cardiff Rd	Roadside	Diffusion Tube	100	100	36	32	29	30	28
125 Cardiff Road	Roadside	Diffusion Tube	100	100	33	32	28	28	23
131 Caversham Road	Roadside	Diffusion Tube	100	100	47	40	36	36	35

31a Vastern Road (lampost)	Roadside	Diffusion Tube	100	100	40	36	37	38	33
108 Caversham Road	Roadside	Diffusion Tube	100	100	48	41	41	40	42
Caversham Co-location	Roadside	Diffusion Tube	83	83	41	38	37	38	35
Caversham Co-location	Roadside	Diffusion Tube	83	83	40	37	38	36	37
Caversham Co-location	Roadside	Diffusion Tube	92	92	41	37	36	37	37
197 Caversham Road	Roadside	Diffusion Tube	100	100	43	39	35	36	34
Railway Depot	Roadside	Diffusion Tube	100	100	42	39	35	34	27
14 Church Road (Caversham)	Roadside	Diffusion Tube	100	100	42	35	37	36	37
Caversham Café	Roadside	Diffusion Tube	92	92	45	42	42	37	42
Baron Cadogan PH	Roadside	Diffusion Tube	100	100	50	44	46	44	41
45 Prospect Street	Roadside	Diffusion Tube	100	100	44	39	38	37	36
59 Prospect Street	Roadside	Diffusion Tube	100	100	58	49	48	45	46
60 Prospect Street	Roadside	Diffusion Tube	92	92	38	35	34	33	34
68 George Street (Caversham)	Roadside	Diffusion Tube	92	92	38	34	33	31	33
40 George Street	Roadside	Diffusion Tube	100	100	52	42	44	47	45
241 Gosbrook	Roadside	Diffusion	92	92	40	35	35	34	35

Road Tube

☑ Diffusion tube data has been bias corrected

☑ Annualisation has been conducted where data capture is <75%

Notes:

Exceedances of the NO₂ annual mean objective of $40\mu g/m^3$ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.



Figure A.1 – Trends in Annual Mean NO₂ Concentrations

Site ID	Site Type	Monitoring	Valid Data Capture	Valid Data	N	D₂ 1-Hour	Means >	200µg/m [:]	3 (3)
	Sile Type	Туре	Period (%) ⁽¹⁾	2018 (%) ⁽²⁾	2014	2015	2016	2017	2018
AURN	Urban Background	Automatic	99	99	0	0	4(112)	0	0
RD1	Roadside	Automatic	95	95	0	1	0	0	7
RD3	Roadside	Automatic	98	98	0	0	0	1	0
RD4	Roadside	Automatic	97	97			0	0	0

Table A.4 – 1-Hour Mean NO2 Monitoring Results

Notes:

Exceedances of the NO₂ 1-hour mean objective $(200 \mu g/m^3 \text{ not to be exceeded more than 18 times/year)}$ are shown in **bold**.

(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%).

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

Table A.5 - Annual Mean PM10 Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	PN	I ₁₀ Annual Me	ean Concent	ration (µg/m ³	⁽³⁾
				2014	2015	2016	2017	2018
AURN	Urban Background	78	78	14	12	13	12	13
RD1	Roadside	91	91	33	28	20	23	24
RD3	Roadside	98	98	20	23	22	21	23
RD4	Roadside	93	93			19(19)	18	17

☑ Annualisation has been conducted where data capture is <75%

Notes:

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

(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%).

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.



Figure A.2 – Trends in Annual Mean PM₁₀ Concentrations

	Site Turne	Valid Data Capture for Monitoring	Valid Data Capture	РМ	₁₀ 24-Ηοι	ır Means	> 50µg/m	າ ^{3 (3)}
Site ID	Site Type	Period (%) ⁽¹⁾	2018 (%) ⁽²⁾	2014	2015	2016	2017	2018
AURN	Urban Background	78	78	0	0	3	3	1(24)
RD1	Roadside	91	91	31(51)	8(41)	5	7	3
RD3	Roadside	95	95	3	7	3	8	2
RD4	Roadside	94	94			2(30)	3	1

Table A.6 – 24-Hour Mean PM₁₀ Monitoring Results

Notes:

Exceedances of the PM_{10} 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

(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%).

(3) If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

Table A.7 – PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring	Valid Data Capture	PM _{2.5}	Annual Mea	an Concen	tration (µg/	m ³) ⁽³⁾
		Perioa (%) ` '	2018 (%) `'	2014	2015	2016	2017	2018
AURN	Urban Background	93	93	10	7	9	10	7

\boxtimes Annualisation has been conducted where data capture is <75%

Notes:

(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%).

(3) All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Table A.8 – O₃ Monitoring Results

Year	Annual Mean (µg/m³)
2014	39
2015	41
2016	37
2017	39
2018	47

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO2 Monthly Diffusion Tube Results - 2018

							NO ₂ Mea	n Concen	trations (ug/m³)					
														Annual Mea	n
Site ID	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Νον	Dec	Raw Data	Bias Adjusted (0.92) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure
King Oak Flats	31.54	31.75	34.80	29.30	39.86	36.72	34.07	29.52	32.54	39.73	37.87	40.63	34.86	32.07	
Wycliffe Baptist Church	49.18	43.06	40.47	42.13		45.65	48.97	42.83	45.64	55.26	51.10	52.36	46.97	43.21	39.70
AURN	25.53	24.47	22.76	17.79	17.80	15.42	14.50	15.93	16.86	20.80	25.49	23.27	20.05	18.45	
AURN	26.55	24.20	25.29	17.63	16.75	15.65	13.89	15.65	17.99	22.07	24.65	22.96	20.27	18.65	
AURN	27.00	24.40	24.36	17.87	17.34	15.34	13.99	15.52	18.66	21.89	26.17	24.91	20.62	18.97	
17 Church Rd Earley	39.29		24.11	38.77	41.89		44.00		39.70	49.40	45.87	46.07	41.01	37.73	
162 London Rd	43.91	41.03	48.06	47.24	41.47	40.67	43.88	35.06	38.15	40.40	50.82	45.41	43.01	39.57	
419 London Rd	38.48	48.79	43.29	38.92	41.27	55.79	52.70	36.47	41.53	38.70	37.54	40.20	42.81	39.38	
276 Kings Road		33.04	34.62	30.73	29.83	26.95	27.32	28.80	30.50	34.67	39.88	36.86	32.11	29.54	
Sidmouth Street - Trinity Hall			39.39	40.40		33.21	42.03	34.33		38.39	45.64	40.94	39.29	37.23	

Hieatt Close	36.00	32.55	36.45	33.56	31.11	22.54	32.41	32.91	31.41	36.07	38.17	37.47	33.39	30.72	
Shinfield Rd/Whitley Wood Rd	37.14	35.96	40.24	32.05	33.12	31.94	31.79	27.92		38.34	40.72		34.92	32.13	30.90
Shinfield Rd/Cedar Rd	42.65	38.68	45.81	39.42	44.95	41.40	42.67	34.67	35.68	42.41	48.81	44.09	41.77	38.43	34.40
495 Basingstoke Rd	37.38		35.16	34.49	28.00	23.33	29.57	25.22	27.99		33.34		30.50	28.06	27.90
102 Whitley Street	32.09	30.73	34.90	30.61	29.23	26.68	27.73	24.47	28.15	33.12	36.59	37.29	30.97	28.49	
Red Cow	34.62	40.31	40.99	46.26	46.70	45.27	44.01	34.83	32.31	46.02	40.20	38.36	40.82	37.56	
44 Crown Street	36.12	37.45	39.82	35.11	33.77	35.23	38.71	34.47	32.82	43.27	37.15	38.90	36.90	33.95	
Blenheim Terrace, Castle Hill	48.22	38.56	48.02	41.09	42.71	43.09	40.53	36.24	38.36	36.31	44.37	47.28	42.07	38.70	
128 Castle Hill	47.10	48.17	52.35	43.20	54.99	51.24	46.85	42.88	43.84	51.71	42.83	27.86	46.09	42.40	
162a Castle Hill	34.49	37.18	38.78	32.01	44.68	39.50	39.31	32.31	34.23	44.39	39.31	44.56	38.40	35.32	
6 Tilehurst Rd	33.09	33.28	38.59	26.38	30.35	25.53	26.89	27.27	27.44	33.14	38.15	36.77	31.41	28.89	
306 Tilehurst Rd/Water Rd	35.86	43.70	45.22	36.18	39.76	36.69	31.78	31.16	24.85	38.45	24.55	36.47	35.39	32.56	30.60
144 Bath Rd	32.71	30.29	34.10	26.88	33.20	27.54	30.88	24.99	29.74	35.54	35.07	36.29	31.44	28.92	
Norcot Rd/School Lane	36.11	27.05	32.99	29.54	26.43	24.02		23.42		28.11		28.48	28.46	26.18	26.10
689 Oxford Rd	43.37	38.52	43.97	44.38	41.18	40.94	43.67	38.61	38.90	32.92	46.10	29.57	40.18	36.96	
744 Oxford	47.23	50.91	49.82	52.88	57.59	57.41	51.32	40.72	43.06	50.28	61.16	46.48	50.74	46.68	

Rd															
494 Oxford Rd	34.67	39.88	39.28	34.44	48.33	48.83	31.68	29.80	31.01	39.97	40.52	35.27	37.81	34.78	
Cow Lane Bridges	29.21	31.15	36.91	35.62	34.80	29.54	33.60	30.51	36.35	33.52	45.28	36.64	34.43	31.67	29.00
252 Oxford Rd	34.57	38.70	42.00	33.95	39.02	40.30	37.32	28.41	34.55	35.68	41.78	36.04	36.86	33.91	
327 Oxford Rd	41.68	40.78	45.63	44.27	42.30	43.44	42.83	36.83	34.29	42.58	51.69		42.39	39.00	
281 Oxford Rd	48.28	46.84	53.61	47.55	43.30	43.58	46.69	40.02	41.83	44.40	53.97	43.87	46.16	42.47	
10 Trinity Place	36.73	34.51	39.11	32.78	36.97	38.38	30.16	25.58	28.38	33.84	42.26	37.83	34.71	31.93	
165 Oxford Rd	53.44	44.52	51.79	49.39	44.87	41.83	43.13	41.11	42.17	42.45	48.38	49.23	46.03	42.34	
Picture House, Thorn St	31.03	34.29	39.58	34.02	39.67	34.40	29.51	26.27	28.22	36.77	37.62	36.08	33.95	31.24	
Sackville Street	43.17	44.26	46.69	42.88	44.09	37.38	43.46	36.16	34.51	42.34		35.44	40.94	37.67	
Vachel Rd	38.15	41.80	39.87	39.37	42.17	38.18	34.33				36.63	36.37	38.54	35.46	
Friar St (Nandos)	51.92	53.69	49.54	43.66	61.78	53.22	51.03	47.33	44.48	53.52	50.98	55.21	51.36	47.25	41.70
Station Hill (Near Bus stop WN)	53.88	57.54	73.08	51.89	69.62	65.97	49.06	45.43	41.20		53.71	48.16	55.41	50.98	34.60
Station Hill (Near Taxi Station)	51.02	54.91	56.27	43.91	42.83	42.52	42.09		43.88				47.18	43.40	32.90
33 Caversham Rd	49.34	48.26	53.76	46.46	53.40	46.22	47.50	41.97	44.99	42.26	53.47	48.67	48.03	44.18	
59A Caversham Rd	47.23	40.99	47.12			46.59			39.96				44.38	39.20	
50 Cardiff	38.69	39.99	40.87	28.42	27.86	23.69	22.69	23.03	26.61	28.81	39.72	30.55	30.91	28.44	28.00

Rd															
125 Cardiff Rd	35.89	29.56	34.28	22.73	20.15	15.84	20.35	21.34	22.28	24.36	33.20	26.52	25.54	23.50	
131 Caversham Rd	41.14	37.86	44.41	41.66	34.73	30.67	37.76	33.73	33.27	36.97	43.53	37.88	37.80	34.78	
31a Vastern Rd	42.38	35.88	46.09	42.02	27.03	24.59	40.19	38.12	35.18	38.22	45.45	36.34	37.62	34.61	33.10
108 Caversham Rd	45.22	42.47	44.84	47.90	55.32	53.96	46.40	40.99	37.17	45.81	39.85	41.98	45.16	41.55	
Caversham AQMS	38.72	47.87	48.48	24.67	47.35	49.67	39.91	35.94	35.75	40.96	46.99	33.78	40.84	37.57	35.20
Caversham AQMS	40.06	46.47	56.94	31.46	46.24	49.63	44.94	38.43	34.15	40.06	49.99	36.45	42.90	39.47	36.70
Caversham AQMS	42.86	46.19	53.81	31.40	45.96	51.48	44.49	36.99	34.28	43.15	44.61	36.27	42.62	39.21	36.50
197 Caversham Rd	45.57	43.89	47.96	46.07	31.41	32.25	25.92	27.31	22.68	30.24	44.45	39.73	36.46	33.54	
Railway Depot	48.64	35.76	39.13	27.34	22.35	18.18	24.54	26.23	26.72	30.39	31.36	29.99	30.05	27.65	26.70
14 Church Road	44.45	40.44	46.35	39.85	34.85	36.43				37.01	42.15	41.07	40.29	37.07	
Cavesham Café	46.89	44.29	47.74	44.24	51.69	45.46	45.07	40.36	40.86	46.69			45.33	41.70	
Baron Cadagon	52.43	44.20	45.51	44.95	47.29	42.82	55.38	44.69	48.24	43.93	19.12	44.32	44.41	40.86	
45 Prospect Street	45.35	37.72			36.42	35.53	43.75	33.79	37.66	42.95	42.57	38.61	39.43	36.28	
59 Prospect Street	56.80	46.16	54.42	46.79	54.26	53.71	53.89	41.83	49.21	47.93	52.95	44.51	50.21	46.19	
60 Prospect Street	41.81	37.25	38.39	35.40	39.49	35.24	34.60	30.41	32.65	39.02	42.37	32.81	36.62	33.69	
68 George Street	40.54	39.02	36.81	33.80	33.65	29.61	40.61	32.26	35.55	37.53	36.82	32.44	35.72	32.86	

40 George Street	53.71	46.97	50.63	47.26	46.61	43.26	61.22	48.60	52.03	43.85	46.16	46.37	48.89	44.98	
241 Gosbrook Road	45.42	37.92	42.08	38.82	30.13	29.74	42.95	24.18	36.44	39.63	49.29	34.43	37.59	34.58	

□ Local bias adjustment factor used

☑ National bias adjustment factor used

Annualisation has been conducted where data capture is <75%

☑ Where applicable, data has been distance corrected for relevant exposure

Notes:

Exceedances of the NO₂ annual mean objective of $40\mu g/m^3$ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC

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 colocation 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 Gradko tubes were found to have satisfactory performance under the new criteria using Z- score performance for the most recent AIR-PT rounds 21 to 30 (April 2017 – Feb 2019) as in all previous rounds.

Reading carry out two local co-location studies; one is situated at the Defra AURN urban background analyser, and the other is situated at the RBC owned continuous roadside monitor on Caversham Road. This year only the co-location study located at the AURN was submitted to be included in the national spreadsheet of bias adjustment factors this year (1.29).

Although co-location study data was available, the average from the national dataset has been applied to the RBC 2018 data (0.91). The national figure was chosen because it has been used as the bias adjustment factor in the previous 11 years, creating a consistent approach, enabling trends in the historic data to be more easily identified

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

It has been necessary to carry out annualisation on 2 of the diffusion tubes this year (Sidmouth Street and 59a Caversham Road) due to less than >75% data being collected for these sites. The workings for this process are provided in table C.1 and C.2 below.

Table C.1. – Annualisation for Sidmouth Street

						Sidmouth Street		Pm New		Pm St
		london Rd	New Town	Hillingdon	St Ebbs	DT	Pm london rd	Town	Pm Hillingdon	Ebbs
03/01/2018	30/01/2018	33	32	54	16					
30/01/2018	28/02/2018	39	36	50	19					
28/02/2018	28/03/2018	34	33	55	17	39	34	33	55	17
28/03/2018	02/05/2018	27	25	56	14	40	27	25	56	14
02/05/2018	06/06/2018	34	26	42	13					
06/06/2018	04/07/2018	32	21	30	10	33	32	21	30	10
04/07/2018	01/08/2018	24	18	47	11	42	24	18	47	11
01/08/2018	05/09/2018	23	18	42	12	34	23	18	42	12
05/09/2018	04/10/2018	24	21	40	13					
04/10/2018	31/10/2018	31	24	33	16	38	31	24	33	16
31/10/2018	05/12/2018	29	27	54	18	46	29	27	54	18
05/12/2018	09/01/2019	30	31	49	17	41	30	31	49	17
	Average	30	26	46	15	39	28.75	25	46	14
	Ratio	1.04	1.06	1.00	1.03					
	Average Ratio	1.03			Annualised	40.33327247	_			

Table C.2. – Annualisation for 59a Caversham Road

						59a Caverhsam		Pm New		Pm St
		london Rd	New Town	Hillingdon	St Ebbs	Rd	Pm london rd	Town	Pm Hillingdon	Ebbs
03/01/2018	30/01/2018	33	32	55	17	47	33	32	55	17
30/01/2018	28/02/2018	40	36	50	18	41	40	36	50	18
28/02/2018	28/03/2018	34	33	55	17	47	34	33	55	17
28/03/2018	02/05/2018	27	25	56	14					
02/05/2018	06/06/2018	34	26	41	13					
06/06/2018	04/07/2018	32	21	31	10	47	32	21	31	10
04/07/2018	01/08/2018	23	18	47	11					
01/08/2018	05/09/2018	23	18	41	12					
05/09/2018	04/10/2018	23	21	41	13	40	23	21	41	13
04/10/2018	31/10/2018	32	25	34	17					
31/10/2018	05/12/2018	29	27	54	18					
05/12/2018	09/01/2019	31	31	47	18					
	Average	30	26	46	15	44	32.4	28.6	46.4	15
	Ratio	0.93	0.91	0.99	0.99					
	Average	0.04				12 12115000				
	Ratio	0.96	-		Annualised	42.43115089	_			

Table C.3. – Annualisation for Station Hill 1

								Pm New		Pm St
		london Rd	New Town	Hillingdon	St Ebbs	Station Hill 1	Pm london rd	Town	Pm Hillingdon	Ebbs
03/01/2018	30/01/2018	34	32	55	17	51.02	33	32	55	17
30/01/2018	28/02/2018	40	36	49	18	54.91	40	36	50	18
28/02/2018	28/03/2018	33	33	57	18	56.27	34	33	55	17
28/03/2018	02/05/2018	27	25	55	14	43.91	27	25	55	14
02/05/2018	06/06/2018	34	26	40	13	42.83	34	26	40	13
06/06/2018	04/07/2018	31	21	32	10	42.52	32	21	31	10
04/07/2018	01/08/2018	23	18	47	11	42.09	23	18	47	11
01/08/2018	05/09/2018	24	18	40	12					
05/09/2018	04/10/2018	23	21	41	13	43.88	23	21	41	13
04/10/2018	31/10/2018	33	25	34	17					
31/10/2018	05/12/2018	28	27	54	18					
05/12/2018	09/01/2019	31	32	47	18					
	Average	30	26	46	15	47	30.75	26.5	46.75	14.125
	Ratio Average	0.98	0.99	0.98	1.05					
	Ratio	1.00			Annualised	47.18619931	-			

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







Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutont	Air Quality Objective ⁴								
Fonutant	Concentration	Measured as							
Nitrogen Dioxide	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean							
(100_2)	40 μg/m ³	Annual mean							
Particulate Matter	50 μg/m ³ , not to be exceeded more than 35 times a year	24-hour mean							
(F IVI ₁₀)	40 μg/m ³	Annual mean							
	350 μg/m ³ , not to be exceeded more than 24 times a year	1-hour mean							
Sulphur Dioxide (SO ₂)	125 μg/m ³ , not to be exceeded more than 3 times a year	24-hour mean							
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean							

⁴ The units are in microgrammes of pollutant per cubic metre of air (μ g/m³).

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	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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 (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5 μ m or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

RBC 2018 Annual Status Report Reading Borough council Targeted Feasibility Study Development Control and Planning (EPUK) Policy Guidance (PG16) Technical Guidance (TG16)