Worcestershire
Regulatory Services
Supporting and protecting you

2017 Air Quality Annual Status Report (ASR)

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

April 2018

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Executive Summary: Air Quality in Our Area

Air Quality in Redditch Borough

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children 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 billion[3].

Worcestershire Regulatory Services (WRS) have been responsible for managing (monitoring and reporting of) local air quality in the six Worcestershire District Councils since April 2011.

There are currently no Air Quality Management Areas (AQMAs) in the Redditch Borough Council area.

Monitoring results within the Redditch Borough area demonstrate that there were no exceedences of the air quality objective of 40µg/m^3 in 2016. There have been increases in NO_2 concentrations at five diffusion tube locations and a slight reduction at one diffusion tube location between 2015 and 2016, but there is no discernible upward or downward trend in concentrations over the 5 year period 2012- 2016.

No annual means greater than 60ug/m^3 have been recorded indicating that it is very unlikely that there have been any exceedances of the 1-hour mean objective for NO_2 at any monitoring sites.

Monitoring at three locations was discontinued in 2016 due to concentrations being consistently under the annual mean objective:

- 12N (287 Birmingham Road)

[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

- 30N (34 Oakley Road)
- 25N (41 The Slough)

Actions to Improve Air Quality

In 2013, WRS produced a countywide Air Quality Action Plan (AQAP) for Worcestershire which was adopted by Redditch Borough Council on 15th October 2013. WRS have produced two updates to the AQAP, the latest in September 2016. For details of all measures completed, in progress or planned, please refer to the 'Air Quality Action Plan Progress Report for Worcestershire April 2015-2016'. A copy of this, the previous update, and the AQAP is available to view or download at:

http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx

In 2014, WRS set up the Worcestershire Air Quality Steering Group and sub-groups to facilitate progressing implementation of prioritised actions identified in the AQAP. To date the Redditch Borough area does not form a specific part of the AQAP as there is no current AQMA in the area. However the general actions to improve air quality detailed in the AQAP apply across Worcestershire as a whole, including the Redditch Borough area.

Conclusions and Priorities

There are currently no Air Quality Management Areas (AQMAs) in the Redditch Borough area.

Over the past five years monitoring results have remained below the objective with the exception of 2013. Monitoring results within the Redditch Borough Council area demonstrate that there were no exceedences of the air quality objective of 40µg/m^3 in 2016. There have been increases in NO_2 concentrations across the Borough between 2015 and 2016, diffusion tube location OR2 (14 Other Road) was within 5% of the objective in 2016.Rationalisation of monitoring locations conducted at the end of 2015 led to the decommissioning of three diffusion tubes where concentrations had been recorded well below the annual mean objective.

WRS on behalf of Redditch Borough Council will continue to monitor locations in 2017 to assess any improvements or degradation in NO_2 concentrations. The data gathered will assist in further assessment of areas of poor air quality within the Borough. Further update on monitoring and action progress will be provided in the 2018 Annual Status Report.

Local Engagement and How to get Involved

There are a number of ways members of the public can help to improve local air quality:

- Walk or cycle around the District instead of driving;
- Worcestershire County Council have launched a car sharing website, LiftShare, to help people find others journeying to the same destinations to share journeys and costs, and reduce traffic and emissions. Visit this link for more information: https://worcestershire.liftshare.com
- General travel planning advice is available on Worcestershire County Council's website (including walking, cycling and bus maps and timetables).
- If you have to drive follow fuel efficient driving advice, often known as 'Smarter Driving Tips', to save on fuel and reduce your emissions. A number of websites promote such advice including:
    - http://www.energysavingtrust.org.uk/travel/driving-advice
    - http://www.theaa.com/driving-advice/fuels-environment/drive-smart
    - http://www.dft.gov.uk/vca/fcb/smarter-driving-tips.asp

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1 Local Air Quality Management

This report provides an overview of air quality in Redditch Borough Council during 2016. 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 Redditch 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.

Redditch Borough Council currently does not have any AQMAs. Concentrations continue to fall below the annual mean objective for nitrogen dioxide.

For reference, a map of Redditch Borough Council's monitoring locations is available in Appendix D.

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

Defra's appraisal of last year's ASR concluded the report was well structured, detailed and provided the information specified in the Guidance.

1. It is noted that the District Council are continuing to carry out routine monitoring with the use of passive diffusion tubes for nitrogen dioxide at 7 sites across the Borough, with results significantly below objective levels.
2. The Borough Council may wish to consider reviewing the current monitoring programme in light of these results, the same locations have been monitored for the last six years or more, in order to determine whether there may be any further locations with relevant exposure above objective levels.
3. It will be helpful if the labelling on Figure 3.1 can be updated to show the locations of the individual trend lines.
4. We acknowledge that the Worcestershire approach providing a centralised AQAP, co-ordinated for each district is a cost effective approach to local air quality management, and there is clear evidence of significant progress in developing action plans.
5. However, in order to fulfil the requirements of the annual reports submitted to DEFRA as Annual Status Reports (ASR), we must emphasise that the expectation within ASR's is that the measures table is used to provide a straightforward summary of measures the Council has been delivering and expects to deliver in future to improve air quality in hotspot locations. We fully understand that Worcestershire have produced a Countywide Action Plan, with measures designed for each AQMA that have been updated within the Progress Report. However this information for each district needs to be presented each year, within the ASR in Table 2.2 in the ASR Template.

There have been no exceedances of the annual mean objective for nitrogen dioxide at any monitoring location across the Redditch Borough in 2016. Concentrations have remained below the objective.

No specific actions have been progressed to improve air quality in the Redditch Borough area as there is currently no declared AQMA. However the general actions to improve air quality detailed in the AQAP apply across Worcestershire as a whole, including the Redditch Borough Council area.

More detail on these measures can be found in the Air Quality Action Plan for Worcestershire at:

http://www.worcsregservices.gov.uk/pollution/air-quality/air-quality-action-plan.aspx

Table 2.1 – Progress on Measures to Improve Air Quality

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
1	Promote flexible working arrangements	Promoting Travel Alternatives	Encourage / Facilitate home-working	WCC & RBC	2015 - 2016	2017	Increase in uptake of personal travel planning services. Change in behaviour towards more sustainable modes of transport	<1%	Implementation on-going	On-going	
2	Installing electric vehicle charging points	Promoting Low Emission Transport	alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	RBC & WCC	2013	2014 onwards	Increase in availability of EV charging points and corresponding increase in use of electric vehicles	1%	Recommendations for installation of EV Charging Points routinely recommended by WRS on relevant planning consents. To be formalised in SPD drafted by WRS officers.	Estimate formal adoption by District Councils in 2018.	Draft SPD currently out for consultation
3	Greening Council and Business Fleets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	BDC/RBC & WCC	2015 - 2017	2018 onwards	Increase in number of Council and business fleet vehicles of higher Euro Standard and/or utilising alternative fuels	1%	Proposed Compressed Natural Gas Station in Bromsgrove/Redditch has stalled due to a number of obstacles (financial, strategic, political) plus specific industrial constraints and limitations of the existing highway network. WCC	Unknown	It is anticipated that the Local Transport Plan 2017 will be developed to incorporate policy on alterative fuels and associated infrastructure.

									has indicated that development of such a facility would need to be supported by relevant policy before the case would be explored any further.		
4	Travel Planning	Promoting Travel Alternatives	Personalised Travel Planning	WCC	Currently taking place	2017 onwards	Increased uptake of alternative modes of transport	<1%	Personalised travel planning program planned as part of wider health improvement drives from County Council who are currently preparing a bid for the DfTs Access Fund to move project forward. County Council currently developing a "one-stop-shop" online travel portal due to be rolled out in 2017.	Estimated end 2017	
5	Car Sharing	Alternatives to private vehicle use	Car & lift sharing schemes	WCC	2014 – 2015	Liftshare Scheme launched Autumn 2015	Increase in number of people car sharing	<1%	Liftshare Scheme launched in Autumn 2015	Liftshare website scheme launched Autumn 2015. Currently operating	
6	Produce Air Quality Supplementary Planning Document	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WRS & District Councils	On-going	Draft completed in August 2017. Start of formal adoption processes by November 2017	Formally adopted and utilised SPD at all six LPAs across County	<1%	SPD drafted by WRS officers	Estimate formal adoption by District Councils in 2018.	Draft SPD currently out for consultation
7	Encourage developers to provide sustainable transport facilities and links	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WRS & District Councils	On-going	Draft completed in August 2017. Start of formal adoption processes by November 2017	Formally adopted and utilised a by all six LPAs across County	<1%	SPD drafted by WRS officers	Estimate formal adoption by District Councils in 2018.	Draft SPD currently out for consultation

	serving new developments										
8	Air Quality Networks	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	RBC & WRS	2014	2014 onwards	Improved cross boundary working between local authorities in Worcestershire	1%	WRS hold position of Air Quality technical coordinator for the Midlands Joint Advisory Council (MJAC). Provision of AQ services to Tewkesbury DC& Herefordshire Council 2015-16	On- going	
9	Forge closer links with local health agencies	Other	Other	WRS & WCC	N/A	On-going	Participation of relevant health agencies in the Worcestershire Air Quality Steering Group	<1%	WRS officers have met with the Director of Public Health at Worcestershire County Council to highlight the air quality agenda in relation to NO2 and PM2.5. Discussions are on-going as role of DoPH is considered	On- going	

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.

There are currently no automatic $PM_{2.5}$ monitoring stations in Worcestershire. The nearest AURN $PM_{2.5}$ monitoring station is the Birmingham Acocks Green site approximately 22 kilometres to the north east of the Redditch Borough Council area.

WRS has reviewed the DEFRA national background maps to determine projected $PM_{2.5}$ concentrations within Redditch Borough for the 2016 calendar year. The average total $PM_{2.5}$ at 54 locations (centre points of 1km x 1km grids) across Redditch Borough is 8.65µg/m^3, with a minimum concentration of 7.83µg/m^3 and a maximum concentration of 10.32µg/m^3. This indicates that $PM_{2.5}$ concentrations within Redditch Borough are well below the annual average EU limit value for $PM_{2.5}$ of 25µg/m^3.

As outlined in Policy Guidance LAQM.PG16 WRS have discussed the role of the DoPH and the details of $PM_{2.5}$ levels across the County, with the Director of Public Health for Worcestershire County Council. The DoPH has not confirmed to WRS that they are advocating or supporting any specific actions to reduce $PM_{2.5}$ concentrations across the County at this time.

In light of the above no additional actions are currently planned by Redditch Borough Council in relation to the reduction of $PM_{2.5}$ levels. However it is anticipated that any actions taken to improve NO_2 levels across the Borough will likely result in a linked improvement in $PM_{2.5}$ levels.

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

No automatic (continuous) monitoring was undertaken within the Redditch Borough area during 2016.

3.1.2 Non-Automatic Monitoring Sites

Redditch Borough Council undertook non- automatic (passive) monitoring of NO_2 at four sites during 2016. Table A.1 in Appendix A shows the details of the 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” and distance correction. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

During 2016, Redditch Borough Council monitored annual mean nitrogen dioxide concentrations using passive diffusion tubes at four locations across the Borough compared to seven locations in 2015.

Monitoring at three locations was discontinued in 2016 due to concentrations being consistently under the annual mean objective:

- 12N (287 Birmingham Road)
- 30N (34 Oakley Road)
- 25N (41 The Slough)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2016 dataset of monthly mean values is provided in Appendix B.

NO_2 Five Year Trends for Redditch Borough

Figure 3.1 below demonstrates the five year trend for NO_2 concentrations for Redditch Borough Council where available.

Figure 3.1 - Long Term Trend Graph of NO_2 Concentrations in Redditch

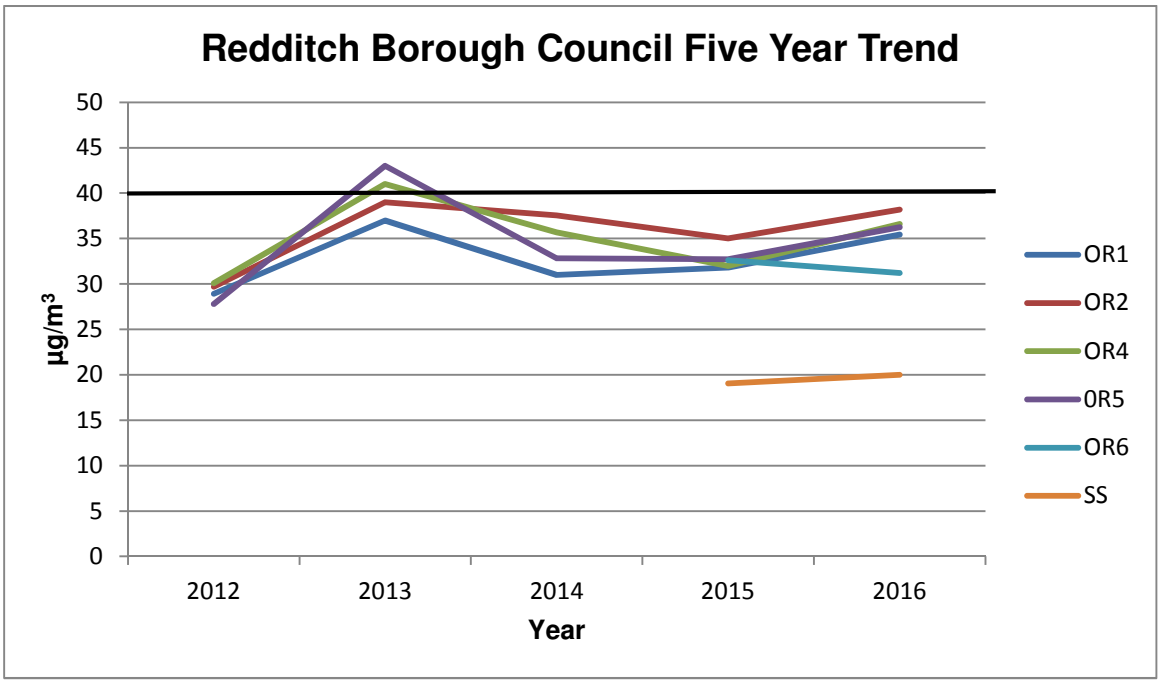


Table 3.1 above indicates there have been no exceedences of the annual average Air Quality Objective (AQO) for NO_2 concentrations recorded in 2016. There has been an increase in NO_2 concentrations at five locations (OR1, OR2, OR4, OR5 and SS) and decrease at one location (OR6) in 2016 when compared to 2015 across the Borough. It should be noted that diffusion tubes OR4, OR5 and OR6 is a triplicate location (Misty Florist, Other Road), when averaged and bias adjusted the NO_2 concentration for this location is 35.83µg/m^3. Overall there is no discernible trend in NO_2 concentrations.

3.2.2 Particulate Matter (PM_{10})

PM_{10} is not monitored within Redditch Borough Council.

3.2.3 Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ is not monitored within Redditch Borough Council.

3.2.4 Sulphur Dioxide (SO_2)

SO_2 is not monitored within Redditch Borough Council.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

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) (2)	Tube collocated with a Continuous Analyser?	Height (m)
OR1	Other Road Street Lamp 2237	Roadside	404599	267542	NO_2	No	3m	1.5m	No	2.44m
OR2 (26N)	14 Other Road	Roadside	404620	267495	NO_2	No	0m	3m	No	2.06m
OR4 (28N)	Other Road Misty Florist	Roadside	404629	267467	NO_2	No	0m	4m	No	2.01m
OR5 (29N)	Other Road Misty Florist	Roadside	404629	267467	NO_2	No	0m	4m	No	2.01m
OR6	Other Road Misty Florist	Roadside	404629	267467	NO_2	No	0m	4m	No	2.01m
SS	7 Summer Street	Suburban	404376	267242	NO_2	No	0m	2.63m	No	1.97m

Notes:

(1) 0m 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.

Table A.2 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2016 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3)				
					2012	2013	2014	2015	2016
OR1	Roadside	Diffusion Tube		92	28.9	37	31	31.8	35.44
OR2 (26N)	Roadside	Diffusion Tube		83	29.7	39	37.56	35	38.18
OR4 (28N)	Roadside	Diffusion Tube		100	30.06	**41**	35.69	31.99	36.61
OR5 (29N)	Roadside	Diffusion Tube		83	27.79	**43**	32.81	32.72	36.23
OR6	Roadside	Diffusion Tube		67				32.62	31.19
SS	Suburban	Diffusion Tube		100				19.04	19.98

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **If applicable, all data has been distance corrected for relevant exposure**

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.**

(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.

Appendix B: Full Monthly Diffusion Tube Results for 2016

Table B.1 – NO_2 Monthly Diffusion Tube Results

Site ID	NO_2 Mean Concentrations (µg/m^3)														
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
													Raw Data	Bias Adjusted (0.89) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
OR1	**41.18**		**41.59**	38.07	37.20	39.94	35.48	32.82	39.54	**41.57**	**44.23**	**46.38**	39.82	35.44	30.7
OR2 (26N)	**43.70**	**43.67**	**42.99**	**48.51**			29.01	32.41	**40.95**	**48.00**	**50.95**	**48.83**	**42.90**	38.18	
OR4 (28N)	36.77	**40.81**	**42.76**	**49.00**	**43.89**	**47.66**	25.81	29.07	35.78	**47.20**	**48.53**	**46.29**	**41.13**	36.61	
OR5 (29N)	39.58			**47.61**	**41.54**	**43.87**	27.92	28.13	36.66	**49.47**	**47.30**	**45.05**	**40.71**	36.23	
OR6	33.28			**49.30**	**43.24**	**48.19**	23.70	30.01	35.15			**48.62**	38.94	31.19[1]	
OR4/5/6 (Av)													**40.26**	35.83	
SS	26.82	28.49	24.65	17.99	20.30	18.34	12.90	12.27	20.90	25.65	28.97	32.18	22.45	19.98	

☒ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75**

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.**

(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

Sources of pollution

Redditch Borough Council has not identified any new or significant changes to sources as described in Chapter 7, section 1 of Technical Guidance LAQM.TG(16)

QA/QC Data

Factor from Local Co-location Studies

The bias adjustment factor applied to the results in 2016 is 0.89 which has been derived from a local co-location study at Worcester Road, Wychbold. The co-location study was undertaken in accordance with LAQM.TG16 and the local bias-adjustment factor calculated using the AEA Environment & Technology spreadsheet tool provided by DEFRA, see Figure C.1 below.

Figure C.1 - Local Bias-adjustment Factor Calculation

Checking Precision and Accuracy of Triplicate Tubes — AEA Energy & Environment, From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	26/04/2016	25/05/2016	59.4	57.4	55.5	57	1.9	3	4.8	53	96.4	Good	Good
2	25/05/2016	28/06/2016	60.4	62.6	61.6	62	1.1	2	2.8	57	96.4	Good	Good
3	28/06/2016	26/07/2016	50.0	55.2	58.6	55	4.4	8	10.8	53	96.4	Good	Good
4	26/07/2016	23/08/2016	47.9	51.3	50.9	50	1.8	4	4.5	41	96.4	Good	Good
5	23/08/2016	27/09/2016	56.1	52.9	54.4	54	1.6	3	3.9	44	96.4	Good	Good
6													
7													
8													
9													
10													
11													
12													
13													
											Overall survey -->	Good precision	Good Overall

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

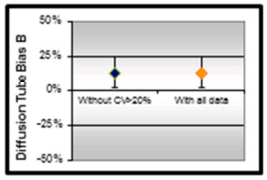
Site Name/ ID: Wychbold

Precision: 5 out of 5 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 5 periods of data	
Bias factor A	0.89 (0.81 - 0.99)
Bias B	12% (1% - 23%)
Diffusion Tubes Mean:	56 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	50 μgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	49 (45 - 55) μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 5 periods of data	
Bias factor A	0.89 (0.81 - 0.99)
Bias B	12% (1% - 23%)
Diffusion Tubes Mean:	56 μgm^{-3}
Mean CV (Precision):	4
Automatic Mean:	50 μgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	49 (45 - 55) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Diffusion Tube Bias Adjustment Factors

The national bias-adjustment factor published by DEFRA in April 2017 (spreadsheet version number 03/17 V2) is 0.88 indicating good agreement between the national bias-adjustment figure and that calculated following the local co-location study at Worcester Road, Wychbold. The local bias-adjustment factor of 0.89 is considered to be more conservative than the national figure and has therefore been adopted for use across Worcestershire for bias-adjustment of 2016 diffusion tube data.

QA/QC of Automatic Monitoring

No Automatic Monitoring Data is available for 2016.

QA/QC of Diffusion Tube Monitoring

The following UKAS accredited company provides Redditch Borough Council with nitrogen dioxide diffusion tubes and analysis:

Somerset Scientific Services,
The Crescent
County Hall Taunton
TA1 4DY

0300 123 2224

somersetscientific@somerset.gov.uk

The 20% Triethanolamine (TEA) / De-ionised Water preparation method is used

Under the WASP scheme Somerset Scientific Services performed 100% satisfactory for all periods between January 2016 and February 2017. Tube precision was “Good” throughout 2016.

Data Annualisation

Short-term to Long-term Data Adjustment

Only 8 months of data was recorded for OR6 – Misty Florist, Other Road. The data has been annualised in accordance with Technical Guidance LAQM TG(16) as shown in Table C.1 below.

Table C.1 - Annualisation calculation for OR6 – Misty Florist, Other Road

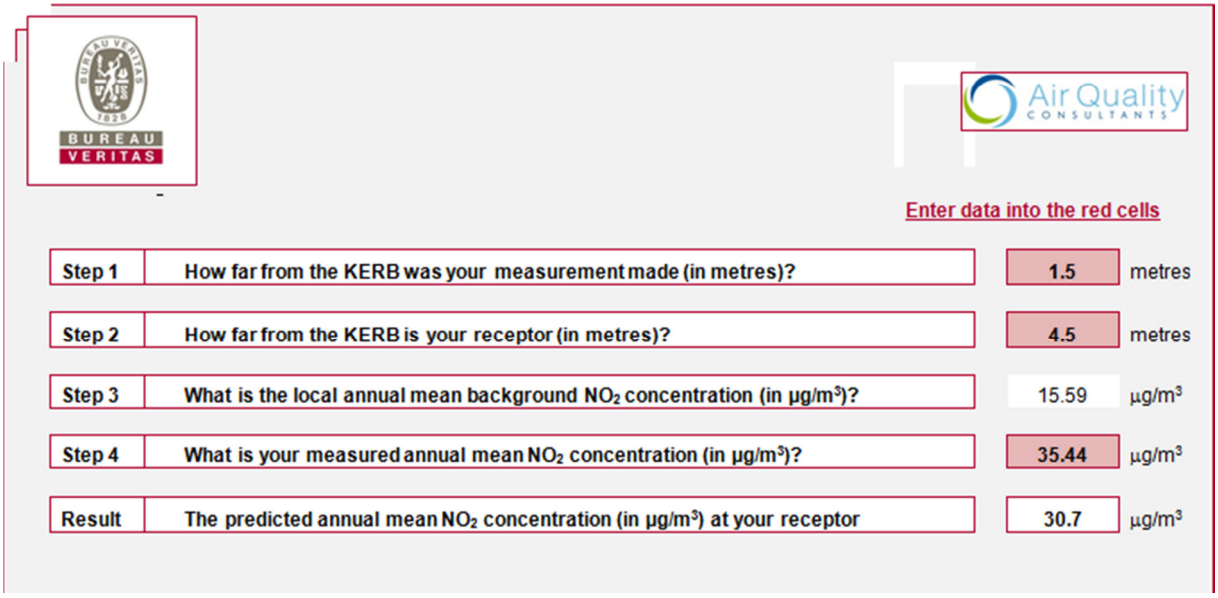
Site	Site Type	Annual Mean	Period Mean	Ratio
Birmingham Acocks Green	Urban Background	21.00	18.75	0.89
Birmingham Tyburn	Urban Background	29.00	26.75	0.92
Coventry Allesley	Urban Background	22.00	20.25	0.92
Leamington Spa	Urban Background	21.00	18.63	0.88
			Average	0.90
			OR6 Result	34.66
			OR6 Annualised	**31.19**

Distance Correction

Estimate of concentration at the nearest receptor

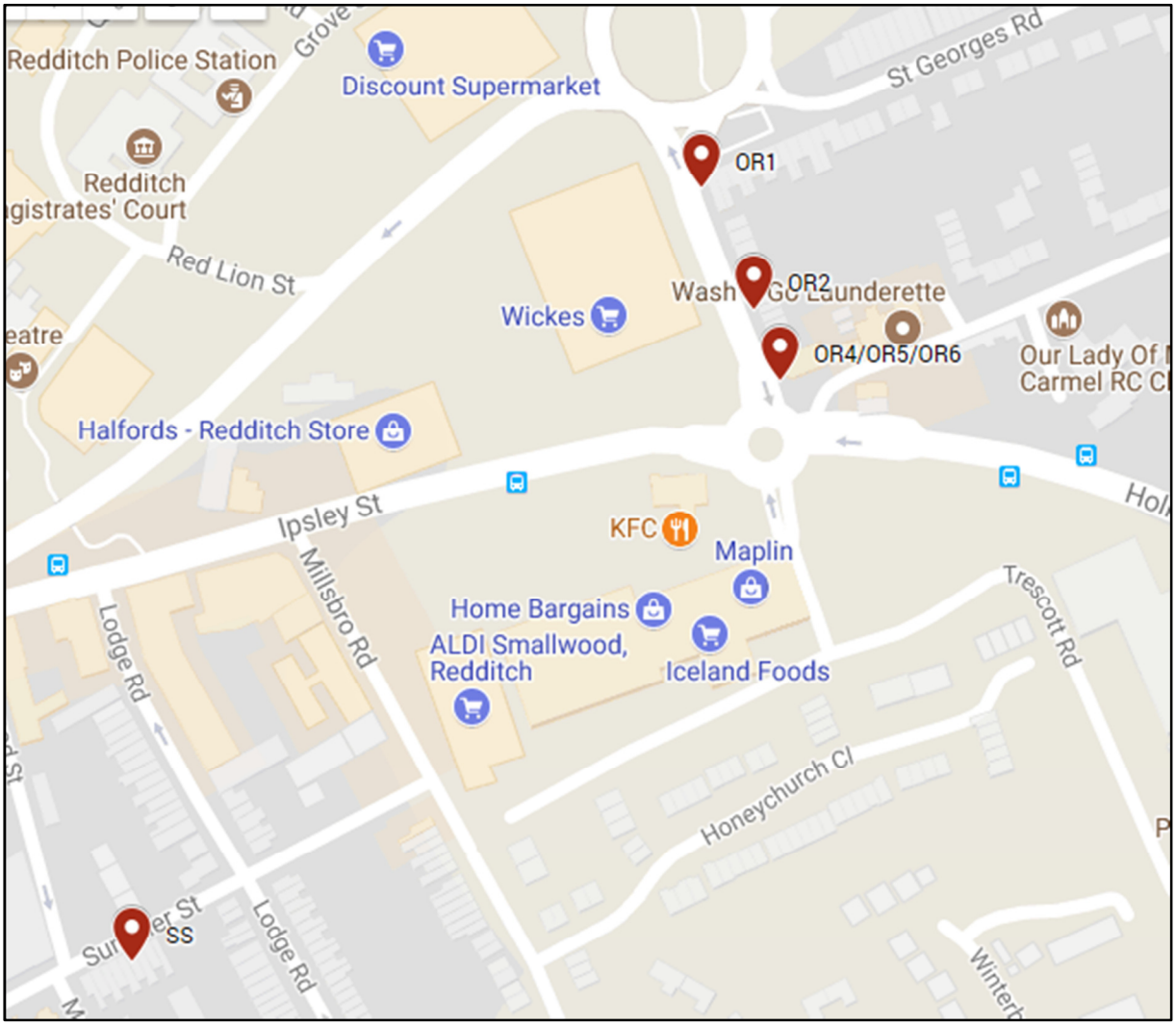
If an exceedance is measured at a monitoring site (or close to the air quality objective) which is not representative of public exposure, the procedure specified in Technical Guidance LAQM.TG(16) has been used to estimate the concentration at the nearest receptor where applicable. The result is presented in Figure C.2 below.

Figure C.2 - OR1 - Other Road Street Lamp 2237



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

Figure D.1 Redditch Borough Council Monitoring Locations



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	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 (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DoPH	Director of Public Health
EU	European Union
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 2.5µm or less
QA/QC	Quality Assurance and Quality Control
RBC	Redditch Borough Council
SO_2	Sulphur Dioxide
WRS	Worcestershire Regulatory Services

References

1. DEFRA (2016) Local Air Quality Management Policy Guidance LAQM PG.(16)

2. DEFRA (2016) 'Local Air Quality Management Technical Guidance LAQM TG.(16)

3. DEFRA (2017) 'National Diffusion Tube Bias Adjustment Factor Spreadsheet v.03/17 V2

4. Worcestershire Regulatory Services (2013) 'Air Quality Action Plan for Worcestershire'

5. Worcestershire Regulatory Services (2015) 'Air Quality Action Plan Progress Report for Worcestershire April 2013-April 2015'

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7. Worcestershire Regulatory Services (2016) Air Quality Annual Status Report for Redditch Borough Council