

Worcestershire  
**Regulatory Services**

*Supporting and protecting you*

## 2018 Air Quality Annual Status Report (ASR)

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

November 2018

Local Authority Officer	Neil Kirby
Department	Land and Air Quality Team
Address	Wyre Forest House Finepoint Way Kidderminster Worcestershire DY11 7WF
Telephone	01905 822799
E-mail	wrsenquiries@worcsregservices.gov.uk
Report Reference number	RBC/ASR/2018
Date	November 2018

## Executive Summary: Air Quality in Our Area

### Air Quality in Redditch Borough Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children 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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

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  $40\mu\text{g}/\text{m}^3$  in 2017. Monitoring results demonstrate a significant decrease in concentrations at all four monitoring locations in 2017; this is consistent with trends across Worcestershire. This is attributed to the low bias adjustment factor of 0.77 applied to the raw NO<sub>x</sub> tube data as required.

There is no discernible upward or downward trend in concentrations over the 5 year period 2013- 2017.

No annual means greater than  $60\mu\text{g}/\text{m}^3$  have been recorded indicating that it is very unlikely that there have been any exceedences of the 1-hour mean objective for NO<sub>2</sub> at any monitoring sites.

---

<sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

<sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

## 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  $40\mu\text{g}/\text{m}^3$  in 2017. Monitoring results demonstrate a significant decrease in concentrations at the four monitoring locations in 2017; this is consistent with trends across Worcestershire. This is attributed to the low bias adjustment factor of 0.77 applied to the raw NO<sub>x</sub> tube data as required.

Following discussion with other Local Authorities and the National Physics Laboratory, WRS are aware that Defra produced national bias adjustment factors for 2017 are significantly lower than in previous years. Consequently this significantly reduces adjusted measurements of local nitrogen dioxide tubes to well below local trends. No satisfactory explanation has been provided to WRS as to why this is the

case and it does not provide confidence in the adjusted 2017 results. Therefore, in WRS opinion, the 2017 data should not be relied upon as indicative of local trends.

There were no significant residential or commercial/industrial developments or highway infrastructure works within the Borough in 2016; therefore no new diffusion tubes were deployed.

WRS on behalf of Redditch Borough Council will continue to monitor locations in 2018 to assess any improvements or degradation in NO<sub>2</sub> 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 2019 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>

# Table of Contents

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>i</b>
Air Quality in Redditch Borough Council .....	i
Actions to Improve Air Quality .....	ii
Conclusions and Priorities .....	ii
Local Engagement and How to get Involved .....	iii
<b>1 Local Air Quality Management</b> .....	<b>1</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>2</b>
2.1 Air Quality Management Areas.....	2
2.2 Progress and Impact of Measures to address Air Quality in Redditch Borough Council .....	3
2.3 PM <sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations.....	8
<b>3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>9</b>
3.1 Summary of Monitoring Undertaken .....	9
3.1.1 Automatic Monitoring Sites .....	9
3.1.2 Non-Automatic Monitoring Sites.....	9
3.2 Individual Pollutants .....	9
3.2.1 Nitrogen Dioxide (NO <sub>2</sub> ).....	9
3.2.2 Particulate Matter (PM <sub>10</sub> ).....	11
3.2.3 Particulate Matter (PM <sub>2.5</sub> ) .....	11
3.2.4 Sulphur Dioxide (SO <sub>2</sub> ).....	11
<b>Appendix A: Monitoring Results</b> .....	<b>12</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2017</b> .....	<b>14</b>
<b>Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC</b> .....	<b>16</b>
<b>Appendix D: Map(s) of Monitoring Locations and AQMAs</b> .....	<b>18</b>
<b>Appendix E: Summary of Air Quality Objectives in England</b> .....	<b>19</b>
<b>Glossary of Terms</b> .....	<b>20</b>
<b>References</b> .....	<b>21</b>

## List of Tables

Table 2.1 – Progress on Measures to Improve Air Quality .....	5
---	---

**List of Figures**

Figure 3.1 - Long Term Trend Graph of NO<sub>2</sub> Concentrations in Redditch.....10

Figure C.1 – Distance Correction OR1 – Other Road.....17

## 1 Local Air Quality Management

This report provides an overview of air quality in Redditch Borough Council during 2017. 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 provides the information specified in the Guidance.

1. It is noted that the local authority discontinued monitoring at 3 locations in 2016: 12N, 30N and 25N. This was because concentrations had been consistently below the AQO. This is supported.
2. In light of the above, it may be appropriate for the local authority to review its current monitoring strategy to ensure that sites close to busy traffic with relevant population exposure are being adequately reviewed and monitored where necessary.
3. It is acknowledged that the Worcestershire approach providing a centralised AQAP, co-ordinated for each district is a cost effective approach to local air quality management.
4. Table 2.2 has been completed and included in this ASR and this is supported. It should be updated on a regular basis and included in all future ASR reports so that it is clear which measures are having an impact in the local authority.
5. The maps are very clear and easy to read. This should be continued in future reports.
6. It is encouraging to see that comments made in last years appraisal have been taken note of and acted on in some circumstances.

There have been no exceedances of the annual mean objective for nitrogen dioxide at any monitoring location across the Redditch Borough in 2017. 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.	The draft SPD is currently out for consultation The draft SPD has been converted to a Technical Guidance Note for Planning document available on the WRS website.

## Redditch Borough Council

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 has indicated that development of such a facility would need to be supported by relevant policy before the case would be explored any further.	Unknown	
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 DfT's 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	

## Redditch Borough Council

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.	The draft SPD is currently out for consultation The draft SPD has been converted to a Technical Guidance Note for Planning document available on the WRS website.
7	Encourage developers to provide sustainable transport facilities and links serving new developments	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.	The draft SPD is currently out for consultation The draft SPD has been converted to a Technical Guidance Note for Planning document available on the WRS website.
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<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

There are currently no automatic PM<sub>2.5</sub> monitoring stations in Worcestershire. The nearest AURN PM<sub>2.5</sub> 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<sub>2.5</sub> concentrations within the Redditch Borough area for the 2017 calendar year. The average total PM<sub>2.5</sub> at 54 locations (centre points of 1km x 1km grids) across Redditch Borough is 9.89µg/m<sup>3</sup>, with a minimum concentration of 9.16µg/m<sup>3</sup> and a maximum concentration of 13.21µg/m<sup>3</sup>. This indicates that PM<sub>2.5</sub> concentrations within Redditch Borough are well below the annual average EU limit value for PM<sub>2.5</sub> of 25µg/m<sup>3</sup>.

As outlined in Policy Guidance LAQM.PG16 WRS have discussed the role of the DoPH and the details of PM<sub>2.5</sub> 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<sub>2.5</sub> 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<sub>2.5</sub> levels. However it is anticipated that any actions taken to improve NO<sub>2</sub> levels across the Borough will likely result in a linked improvement in PM<sub>2.5</sub> 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 2017.

#### 3.1.2 Non-Automatic Monitoring Sites

Redditch Borough Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at four sites during 2017. **Error! Reference source not found.** 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<sub>2</sub>)

During 2017, Redditch Borough Council monitored annual mean nitrogen dioxide concentrations using passive diffusion tubes at four locations across the Borough.

Table A. in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

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



**NO<sub>2</sub> Five Year Trends for Redditch Borough**

Figure 3.1 below demonstrates the five year trend for NO<sub>2</sub> concentrations for Redditch Borough Council where available.

**Figure 3.1 - Long Term Trend Graph of NO<sub>2</sub> Concentrations in Redditch**

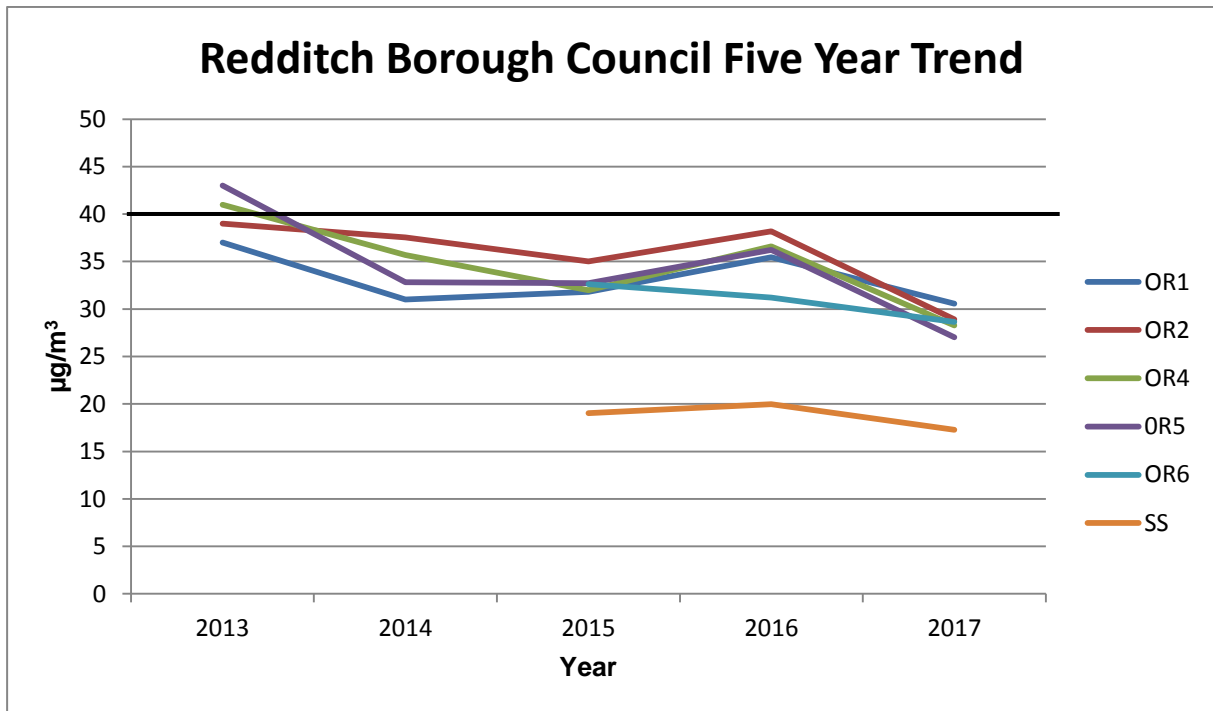


Table 3.1 above indicates there have been no exceedences of the annual average Air Quality Objective (AQO) for NO<sub>2</sub> concentrations recorded in 2017. There has been a significant decrease in NO<sub>2</sub> concentrations at the four locations in 2017 when compared to 2016 across the Borough; this is due in part to the low bias adjustment factor for diffusion tubes in 2017, in WRS opinion, the 2017 data should not be relied upon as indicative of local trends.

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<sub>2</sub> concentration for this location is 27.97µg/m<sup>3</sup>. Overall there is no discernible trend in NO<sub>2</sub> concentrations.

**3.2.2 Particulate Matter (PM<sub>10</sub>)**

PM<sub>10</sub> is not monitored within Redditch Borough Council.

**3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

PM<sub>2.5</sub> is not monitored within Redditch Borough Council.

**3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

SO<sub>2</sub> 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
OR1	Other Road Street Lamp 2237	Roadside	404599	267542	NO <sub>2</sub>	No	3m	1.5m	No	2.44m
OR2 (26N)	14 Other Road	Roadside	404620	267495	NO <sub>2</sub>	No	0m	3m	No	2.06m
OR4 (28N)	Other Road Misty Florist	Roadside	404629	267467	NO <sub>2</sub>	No	0m	4m	No	2.01m
OR5 (29N)	Other Road Misty Florist	Roadside	404629	267467	NO <sub>2</sub>	No	0m	4m	No	2.01m
OR6	Other Road Misty Florist	Roadside	404629	267467	NO <sub>2</sub>	No	0m	4m	No	2.01m
SS	7 Summer Street	Suburban	404376	267242	NO <sub>2</sub>	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<sub>2</sub> Monitoring Results**

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2017 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2013	2014	2015	2016	2017
OR1	Roadside	Diffusion Tube		75	37	31	31.8	35.44	30.55
OR2 (26N)	Roadside	Diffusion Tube		100	39	37.56	35	38.18	28.92
OR4 (28N)	Roadside	Diffusion Tube		83	<b>41</b>	35.69	31.99	36.61	28.27
OR5 (29N)	Roadside	Diffusion Tube		83	<b>43</b>	32.81	32.72	36.23	27.03
OR6	Roadside	Diffusion Tube		83			32.62	31.19	28.63
SS	Suburban	Diffusion Tube		75			19.04	19.98	17.28

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 2017

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2017

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean		
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (f0.77) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
OR1	<b>48.32</b>	<b>44.07</b>	37.48	36.33				29.65	38.36	<b>42.57</b>	<b>41.37</b>	38.98	39.68	30.55	26.80
OR2 (26N)	<b>56.62</b>	<b>43.73</b>	38.32	33.88	36.71	32.08	31.47	30.69	32.28	38.06	38.54	38.39	37.56	28.92	
OR4 (28N)	<b>48.19</b>	37.19	35.37	32.08	42.83			29.00	32.47	33.10	39.86	37.01	36.71	28.27	
OR5 (29N)	<b>46.37</b>	38.49	30.91	31.08	35.74			25.06	33.37	32.65	<b>41.42</b>	35.99	35.11	27.03	
OR6	<b>49.83</b>	38.94	33.86	34.70	39.14			31.46	32.83	33.15	<b>42.88</b>	34.98	37.18	28.63	
OR4/5/6 (Average)													36.33	27.97	
SS	34.30	23.74	19.96	17.07				15.21	18.64	20.82	26.78	24.69	22.36	17.28	

- 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 NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 (if available)

No local co-location studies for nitrogen dioxide have been undertaken in 2017.

#### Diffusion Tube Bias Adjustment Factors

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

Somerset Scientific Services,  
Unit 2A,  
Westpark 26  
Chelston  
Wellington  
Somerset  
TA21 9AD

01823 355906

sssmailbox@somerset.gov.uk

The 20% Triethanolamine (TEA) / De-ionised Water preparation method is used. The bias adjustment factor applied to the results in 2017 was 0.77 (Spreadsheet Version No. 09/18) which were derived from the national studies.

#### QA/QC of Automatic Monitoring

No Automatic Monitoring Data is available for 2017.

#### QA/QC of Diffusion Tube Monitoring



Under the AIR NO<sub>2</sub> PT (formerly WASP) Scheme Somerset Scientific Services performed 100% satisfactory for the period January to August 2017 and 75% for the period September to October 2017 (no data for the period November to December 2017). Tube precision was 'Good' throughout 2017.

## 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.1 below.

**Figure C.1 - OR1 - Other Road Street Lamp 2237**

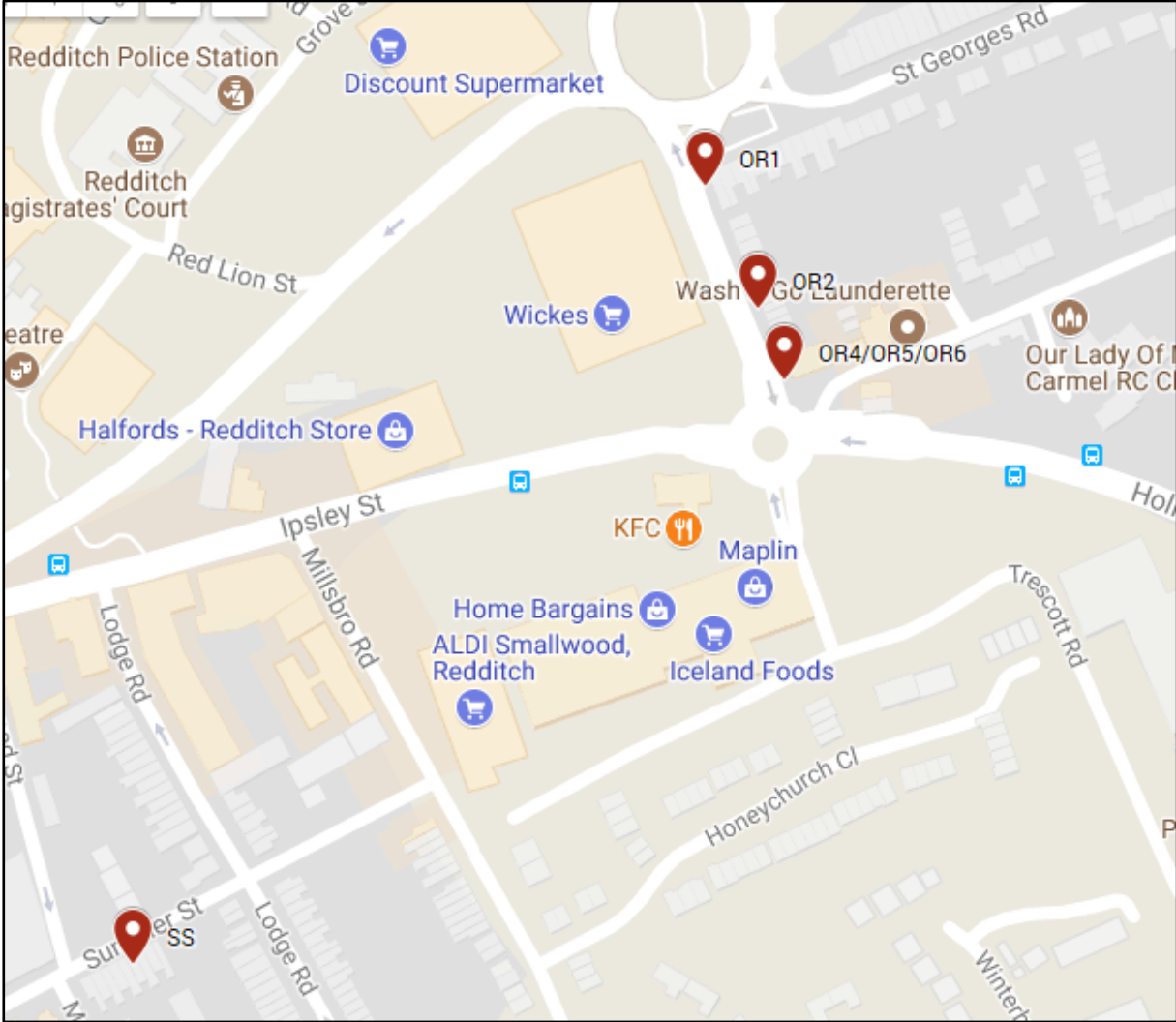
**Enter data into the red cells**

Step 1	How far from the KERB was your measurement made (in metres)?	1.5	metres
Step 2	How far from the KERB is your receptor (in metres)?	4.5	metres
Step 3	What is the local annual mean background NO <sub>2</sub> concentration (in µg/m <sup>3</sup> )?	14.88	µg/m <sup>3</sup>
Step 4	What is your measured annual mean NO <sub>2</sub> concentration (in g/m <sup>3</sup> )?	30.55	µg/m <sup>3</sup>
Result	The predicted annual mean NO <sub>2</sub> concentration (in µg/m <sup>3</sup> ) at your receptor	26.8	µg/m <sup>3</sup>



# 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 <sup>4</sup>	
	Concentration	Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>4</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## 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 <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
RBC	Redditch Borough Council
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	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 (2018) 'National Diffusion Tube Bias Adjustment Factor Spreadsheet v.09/18
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'
6. Worcestershire Regulatory Services (2016) 'Air Quality Action Plan Progress Report for Worcestershire April 2015 – April 2016'
7. Worcestershire Regulatory Services (2017) Air Quality Annual Status Report for Redditch Borough Council