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2013 Air Quality Progress Report for Redditch Borough Council

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

November 2013

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Executive Summary

This progress report presents the findings of Redditch Borough Council's review and assessment of air quality within the borough. Results from 2012 monitoring within the borough are presented and evaluated in relation to the objectives; the likelihood of an exceedence at relevant locations is discussed, as is the requirement to proceed to a Detailed Assessment.

To date, no Air Quality Management Areas (AQMAs) have been declared.

Monitoring data for 2012 confirm that concentrations of nitrogen dioxide remain well below the annual mean objective, and that there are no locations requiring Detailed Assessment.

The progress report has not identified any significant changes in emissions sources within the Redditch Borough Council area.

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1 Introduction

1.1 Description of Local Authority Area

The Borough of Redditch is situated in the north east of the County of Worcestershire. It is bounded by three other local authorities, Bromsgrove, Stratford-on-Avon and Wychavon District Councils. It lies 21km south of Birmingham within the green belt and covers an area of approximately 5,435 hectares. The Borough is split into two halves of roughly equal size; the northern area of the Borough comprises the urban area of Redditch, whilst the southern area is rural, comprising villages such as Astwood Bank and Feckenham. Since the town was designated as a 'new town' in 1964 extensive development has taken place and the population has more than doubled to its present level of around 84,200 (2011 national census data).

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 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 exceedences are considered likely, the local authority must then 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.

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should

undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre µg/m^3 (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	5.00 µg/m^3	Annual mean	31.12.2010
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

The Council has been reviewing air quality annually since the Local Air Quality Management system was introduced, producing Progress Reports or Updating and Screening Assessments as required by Defra.

The principal source of air pollution within the borough of Redditch is related to road traffic emissions, and the principal pollutant of concern is nitrogen dioxide. This has been measured using diffusion tubes across the borough and in Round 4 identified the need for a Detailed Assessment of air quality in Other Road. This concluded that an Air Quality Management Area was not required.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are no automatic monitoring sites in the Redditch Borough Council area.

2.1.2 Non-Automatic Monitoring Sites

During 2012, Redditch Borough Council monitored annual mean nitrogen dioxide concentrations using passive diffusion tubes at fifteen locations across its area (Figure 2.1). Table 2.1 provides details of each of the monitoring sites.

For the first three months of 2012 the diffusion tubes were prepared and analysed by Gradko using the 20% TEA in water method. A change in supplier was implemented in April 2012 and the diffusion tubes for the remaining nine months of 2012 were prepared and analysed by ESG also using the 20% TEA in water method. Tubes are changed on a monthly basis. Further details of the diffusion tube QA/QC are presented at Appendix A.

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Figure 2.1 Non-Automatic Monitoring Sites in Redditch

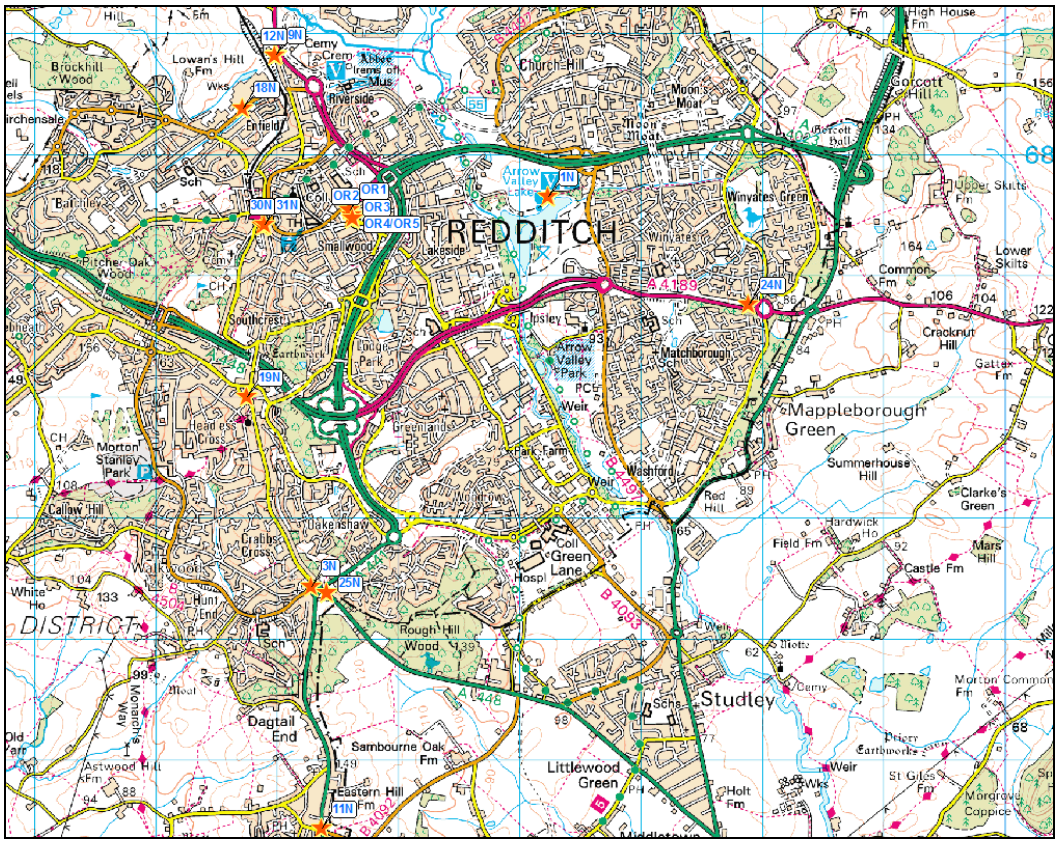

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Table 2.1 Details of Non- Automatic Monitoring Sites

Site ID	Site Type	X OS Grid Reference	Y OS Grid Reference	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
1N	Rural	406238	267652	NO_2	N	N	N	N/A	N
3N	Roadside	404284	264433	NO_2	N	N	N (43m)	2m	Y
9N	Kerbside	403998	268824	NO_2	N	N	N (15m)	1m	Y
11N	Kerbside	404370	262436	NO_2	N	N	N (22m)	0.5m	Y
12N	Façade	403983	268815	NO_2	N	N	Y (<1m)	16m	Y
OR3	Kerbside	404625	267479	NO_2	N	N	N (3.5m)	0.5 m	Y
18N	Kerbside	403724	268381	NO_2	N	N	N (45m)	1m	Y
19N	Roadside	403754	265999	NO_2	N	N	N (11m)	3m	Y
24N	Suburban	407860	266767	NO_2	N	N	N (5m)	17.8m	Y
25N	Roadside	404415	264384	NO_2	N	N	Y (<1m)	2m	Y
OR2	Roadside	404620	267495	NO_2	N	N	Y (<1m)	3m	Y
OR1	Roadside	404599	267542	NO_2	N	N	Y (3m)	1.5m	Y
OR4/OR5	Roadside	404629	267467	NO_2	N	N	Y (<1m)	4m	Y
30N	Façade	403883	267414	NO_2	N	N	Y (<1m)	18m	Y
31N	Roadside	403898	267420	NO_2	N	N	Y(2.5m)	2m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

There are no automatic monitoring locations within the Redditch Borough Council area.

Diffusion Tube Monitoring Data

Measured concentrations at the fifteen diffusion tube monitoring sites in 2012 are presented in Table 2.2. Concentrations since 2008, at all sites where monitoring data are available, are presented in Table 2.3.

Due to a change in tube supplier the first three months of data have been excluded from the reporting year following advice from the LAQM helpdesk, the remaining nine months of data have been bias adjusted using the national bias adjustment factor. The data has been annualised where there is less than nine months i.e. <75% data capture.

Further details are provided in Appendix A.

Measured concentrations in 2012 were well below the annual mean objective at all monitoring locations, including worst-case locations adjacent to junctions of busy roads.

Concentrations have reduced in 2012 relative to 2011 concentrations at all monitoring locations where data is available. Figure 2.3 presents data for those sites where at least five years of data are available and where there are monitoring tubes located in 2012. A rationalisation of tubes was undertaken in early 2012 and three locations were removed due to continued low results. Overall, between 2008 and 2012, concentrations have remained fairly stable at all long-term sites. There was an exceedance reported in the USA for 2012 based on the 2011 data at location 12N, it is clear from the data that this is an anomalous point and the data should be disregarded for 2011 at that point.

Table 2.2 Results of NO_2 Diffusion Tubes 2012

Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2012 (Number of Months) [a]	2012 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.69
1N	Arrow Valley Park	Rural	N	N	8	12.5
3N	Rough Hill Drive Roundabout	Roadside	N	N	9	29.7
9N	o/s 287 Birmingham Rd	Kerbside	N	N	9	30.1
11N	Astwood Bank Park	Kerbside	N	N	8	23.2
12N	287 Birmingham Rd	Façade	N	N	9	16.3
OR3	Other Road	Kerbside	N	N	9	33.5
18N	Windsor Road	Kerbside	N	N	8	23.2
19N	Headless Cross Drive	Roadside	N	N	9	16.4
24N	Linton Mews	Suburban	N	N	8	20.7
25N	41 The Slough	Roadside	N	N	9	21.8
OR2	14 Other Road	Roadside	N	N	9	29.7
OR1	Other Road	Roadside	N	N	8	32.2
OR4/OR5	Other Rd Florist	Roadside	N	N	9	28.5
30N	34 Oakly Road	Façade	N	N	9	16.0
31N	o/s 34 Oakly Road	Roadside	N	N	5	26.2
Objective						40

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Annualised mean as in Box 3.2 of TG(09)(http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38, where full calendar year data capture is less than 75%

Table 2.3 Results of NO_2 Diffusion Tubes (2008 to 2012)

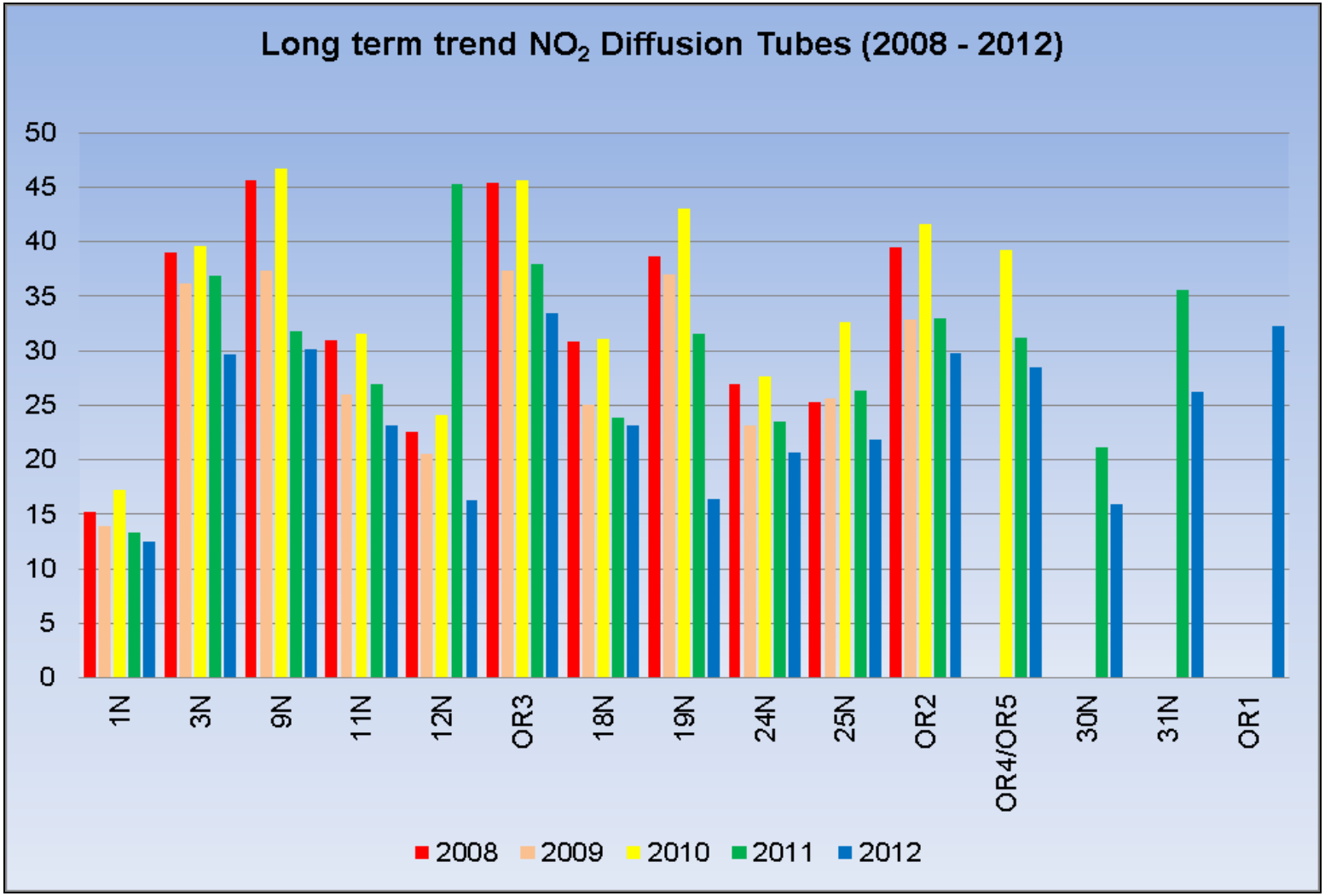
Site Name	Site Type	In AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2008 (Bias Adjustment Factor = 0.92)	2009 (Bias Adjustment Factor = 0.90)	2010 (Bias Adjustment Factor = 0.95)	2011 (Bias Adjustment Factor = 0.89)	2012 (Bias Adjustment Factor = 0.69)
1N	Urban Background	N	15.2	13.9	17.2	13.3	12.5
3N	Roadside	N	39.0	36.2	39.6	36.9	29.7
9N	Kerbside	N	**45.7**	37.3	**46.7**	31.8	30.1
11N	Kerbside	N	31.0	26.0	31.6	26.9	23.2
12N	Façade	N	22.6	20.5	24.1	**45.3**	16.3
OR3	Kerbside	N	**45.4**	37.4	**45.7**	38.0	33.5
18N	Kerbside	N	30.8	25.1	31.1	23.9	23.2
19N	Roadside	N	38.7	37.0	**43.0**	31.5	16.4
24N	Roadside	N	26.9	23.1	27.7	23.5	20.7
25N	Roadside	N	25.3	25.6	32.6	26.3	21.8
OR2	Roadside	N	39.5	32.8	**41.6**	33.0	29.7
OR4/OR5	Roadside	N	-	-	39.3	31.2	28.5
30N	Façade	N	-	-	-	21.1	16.0
31N	Roadside	N	-	-	-	35.6	26.2
OR1	Roadside	N	-	-	-	-	32.2
Objective			40	40	40	40	40

In bold, exceedence of the NO_2 annual mean AQS objective of 40µg/m^3

Underlined, annual mean > 60µg/m^3, indicating a potential exceedence of the NO_2 hourly mean AQS objective

[a] Means "annualised" as in Box 3.2 of TG(09) (http://laqm.defra.gov.uk/technical-guidance/index.html?d=page=38), where full calendar year data capture is less than 75% .

Figure 2.2 Trends in Annual Mean Nitrogen Dioxide Concentrations Measured at Diffusion Tube Monitoring Sites



2.2.2 Particulate Matter (PM_{10})

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

2.2.1 Sulphur Dioxide

Sulphur Dioxide is not monitored within the Redditch Borough Council area.

2.2.2 Benzene

Benzene is not monitored within the Redditch Borough Council area.

2.2.3 Other pollutants monitored

No other pollutants are measured within the Redditch Borough Council area.

2.2.4 Summary of Compliance with AQS Objectives

Redditch Borough Council has examined the results from monitoring in the district. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

Redditch Borough Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Redditch Borough Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Local / Regional Air Quality Strategy

In 2008 the Herefordshire Council and the local authorities of Worcestershire set out a unified approach to managing local air quality across the two Counties in three documents:

- Herefordshire and Worcestershire Air Quality Strategy
- Herefordshire and Worcestershire Air Quality Planning Protocol
- Herefordshire and Worcestershire Air Quality Supporting Documents

The general aims of the strategy is to raise profile of air quality as an issue for consideration within a wide range of local government and regional policies and frameworks including local planning, transport planning, health, industry, housing and environmental protection. Additionally the AQS provides a framework for a consistent approach to local air quality considerations in development control (planning) processes and links to other initiatives such as Climate Change programmes and future Local Transport Plans. The strategy set out a number of commitments under different subject areas including Planning, Transport, Climate Change and Energy, Health, Industry and domestic sources to achieve those aims. The full document is available to download from the Pollution pages of the WRS website http://www.worcsregservices.gov.uk

It is noted that since production in 2008 many local and national policies and guidelines referred to in the H & W AQ Strategy and Planning Protocol documents have changed and that an update of these documents is now due. However at this time it is considered appropriate to focus WRS resources on the Countywide Action Plan. Amendment to these documents will occur at a later date.

5 Planning Applications

Redditch Borough Council confirms that there are no new or newly identified Planning Applications which may have an impact on air quality within the Local Authority area.

6 Air Quality Planning Policies

Redditch Borough Council adopted the Hereford & Worcestershire Planning Protocol in November 2008.

http://www.herefordshire.gov.uk/docs/Hford_and_Worc_AQ_Strategy_2009_Planning_protocol.pdf

This Air Quality and Planning Protocol is intended to support local planning decision-making in respect to all future developments within the local authorities of Herefordshire and Worcestershire, and to ensure a consistent process is used to assess the likely impact of development on local air quality.

In March 2012 the existing Planning Policy Guidance notes were superseded by the National Planning Policy Framework (NPPF). This document sets out the Government's requirements for the planning system with an emphasis on enabling local people and councils to produce their own local and neighbourhood plans.

The NPPF is based on 12 core planning principles. Three of these are relevant to local air quality management and are summarised below:

Core principle number 7 states that planning should *"…contribute to conserving and enhancing the natural environment and reducing pollution…"*
Core principle number 9 states that planning should *"…actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling…"*
Core principle number 10 states that planning should *"…take account of and support local strategies to improve health, social and cultural wellbeing for all…"*

Further detail can be found in the Air Quality Action Plan for Worcestershire at http://www.worcsregservices.gov.uk/ and full details can be found at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

7 Local Transport Plans and Strategies

The third Worcestershire Local Transport Plan (LTP3) 2011-2026 outlines strategic transport planning for the county and recognises the critical importance of efficient transport networks for the social and economic wellbeing of Worcestershire.
http://www.worcestershire.gov.uk/cms/pdf/LTP3_MAIN_DOC_PUBLIC_FINAL.pdf

8 Climate Change Strategies

Redditch Borough Council have signed up to the Worcestershire Climate Change Pledge, as part of this pledge, they have committed to a number of actions to tackle climate change.

- Raise awareness of climate change issues with our staff and in our activities.
- Monitor and reduce our energy use
- Insulate our buildings and encourage our staff to do so.
- Minimise our waste by using less and recycling more.
- Set ourselves a target to reduce carbon emissions.
- Assess likely impacts of climate change and make plans to adapt.
- Implement a staff travel plan.
- Operate a sustainable purchasing policy.
- Use renewable energy

Redditch Borough Council are also signatories of the Nottingham Declaration, over 300 local councils have signed up to the Nottingham Declaration, each pledging to actively tackle climate change in their area and help the UK deliver its national climate change targets. Redditch Borough Council are additionally key partners in the delivery of the Worcestershire Local Area Agreement (LAA), a three year agreement negotiated between key partner organisations to tackle key issues in the county. Redditch Borough Council have jointly (with Bromsgrove District Council) produced a combined Climate Change Strategy and Action Plan 2010 – 2013. Section 7 of the climate change strategy identifies a number of themes and transport is the most relevant theme to local air quality. Key strategic transport actions identified are:

- Encourage partner organisations to ensure that key services are accessible to everyone via public transport
- Planning Departments to influence sustainable travel options in new developments
- Identify vulnerabilities relating to transport in a changing climate
- Encourage use of walking and cycling to achieve significant health benefits
- Establish a Council Travel Plan for own business miles including options of car sharing and public transport
- Review staff mileage reimbursement rates

9 Implementation of Action Plans

A new action plan[1] encompassing the six district councils of Worcestershire has been produced and has been consulted on; the final plan was adopted in October & November by the Local Authorities. The Steering Group to move the Action Plan forward is currently being prepared.

[1] Worcestershire Air Quality Action Plan September, 2013 www.worcsregservices.gov.uk

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

Concentrations of nitrogen dioxide measured at fifteen monitoring sites across the Redditch Borough Council area were well below the annual mean objective in 2012.

Concentrations have remained similar at all sites over a five year period (2008 - 2011) where data is available, although there was a reduction in concentrations at all sites in 2012 relative to 2011 data.

A Detailed Assessment is not required based on monitoring data.

A rationalisation of monitoring sites within the area was carried out in early 2012, and a number of locations were decommissioned and one relocated, in addition, one new monitoring site has been established.

10.2 Conclusions relating to New Local Developments

Redditch Borough Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

10.3 Proposed Actions

Redditch Borough Council confirms that there is no requirement to proceed to a detailed assessment for any pollutant.

Redditch Borough Council proposes to submit its action plan shortly as part of a county wide action plan.

Redditch Borough Council confirms it will submit a 2013 Progress Report in 2014.

References

- Peter Brett Associates – Redditch Borough Council USA Report: July 2012.
- Air Quality Review & Assessment Helpdesk.
- Defra (2009) Review & Assessment: Technical Guidance LAQM.TG(09), available at: http://archive.defra.gov.uk/environment/quality/air/airquality/local/guidance/documents/tech-guidance-laqm-tg-09.pdf
- Defra (2012) Data Archive, available at: http://uk-air.defra.gov.uk/data
- H&W Councils (2009) Herefordshire & Worcestershire Air Quality Planning Protocol
- Worcestershire Air Quality Action Plan September, 2013
- H&W Councils (2009b) Herefordshire & Worcestershire Air Quality Strategy H&W Councils (2009c)
- WCC (2011) Worcestershire Local Transport Plan 3:
- NPPF https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

Appendices

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by ESG, Didcot utilising the 20% TEA[2] in water preparation method. ESG participates in the Workplace Analysis Scheme for Proficiency (WASP) for NO_2 diffusion tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre.

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent HSL WASP NO2 PT rounds and the percentage (%) of results submitted which were subsequently determined to be satisfactory.

Table A1 Details of WASP rounds for 2012.

Wasp Round	**WASP R116**	**WASP R117**	**WASP R118**	**WASP R119**
Round conducted in the period	January – March 2012	April – June 2012	July – September 2012	October – December 2012
Aberdeen Scientific Services	100 %	100 %	100 %	100 %
Bristol City Council [5]	-	-	-	-
Cardiff Scientific Services	100 %	100 %	100 %	100 %
Edinburgh Scientific Services	100 %	100 %	100 %	100 %
Environmental Services Group, Didcot (formerly Bureau Veritas Laboratories, Glasgow and Harwell Scientifics) [1] [2]	100 %	100 %	100 %	100 %
Exova (formerly Clyde Analytical)	0 %	0 %	100 %	25 %
Glasgow Scientific Services	100 %	50 %	100 %	100 %
Gradko International [2]	100 %	100 %	100 %	100 %
Kent Scientific Services	75 %	100 %	75 %	100 %
Kirklees MBC	100 %	100 %	75 %	100 %
Lambeth Scientific Services	75 %	100 %	0 %	100 %
Lancashire County Analysts [3]	-	-	-	-
Milton Keynes Council	100 %	100 %	75 %	100 %
Northampton Borough Council	100 %	100 %	100 %	100 %
Somerset Scientific Services [4]	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %
Staffordshire County Council	100 %	100 %	75 %	100 %
Tayside Scientific Services (formerly Dundee CC)	100 %	100 %	100 %	100 %
West Yorkshire Analytical Services	75 %	75 %	50 %	100 %

Tube results are then bias adjusted annually using the AEAT calculator[3] provided by the air quality helpdesk funded by DEFRA.

[2] TEA-Triethanolamine
[3] Version 07/13

Table A2: Bias adjustment spread sheet.

Analysed By[1]	Method	Year[5]	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (mg/m^3)	Automatic Monitor Mean Conc. (Cm) (mg/m^3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
ESG Didcot	20% TEA in water	2012	KS	SOUTH LAKELAND DISTRICT COUNCIL	9	45	29	54.8%	G	**0.65**
ESG Didcot	20% TEA in Water	2012	KS	Marylebone Road Intercomparison	11	129	95	36.2%	G	**0.73**
ESG Didcot	20% TEA in water	2012		**Overall Factor[3] (2 studies)**				**Use**		**0.69**

Short-term to Long-term Data adjustment

The tubes supplier was changed from Gradko International Limited to a new supplier ESG in April 2012 and following advice from the LAQM helpdesk the data from the tubes for 2012 for Jan to March was discounted and only the nine months of data from 1st April 2012 was considered representative for the year. Nine months data is 75% data capture for the year and where less than nine months data has been available the data has been annualised using the adjustment factor calculated from data as shown in the following table.

Table A.3 Short-Term to Long-Term Monitoring Data Adjustment

Site	Site Type	Annual Mean ($\mu g/m^3$)
Birmingham Acocks Green	Urban Background	31.75
Birmingham Tyburn	Urban Background	30.78
Leominster	Suburban Background	8.78
Leamington Spa	Urban Traffic	20.52

Redditch	ID	Excluding Month Number	PM Acocks Green	PM Tyburn	PM Leominster	PM Leamington	AM/PM Acocks Green	AM/PM Tyburn	AM/PM Leominster	AM/PM Leamington	Average Adjustment factor
	18N	9	29.07	30.32	8.46	17.91	1.09	1.02	1.04	1.15	**1.07**
	OR1	5	27.41	30.54	8.18	18.08	1.16	1.01	1.07	1.13	**1.09**
	31N	6 8 9 12	30.61	31.98	9.22	18.28	1.04	0.96	0.95	1.12	**1.02**
	1N	6	28.61	30.93	8.61	18.76	1.11	1.00	1.02	1.09	**1.05**
	24N	4	28.04	29.30	8.26	17.69	1.13	1.05	1.06	1.16	**1.10**
	11N	9	29.07	30.32	8.46	17.91	1.09	1.02	1.04	1.15	**1.07**