2010 Air Quality Progress Report and Action Plan Progress Report for *Rugby Borough Council*

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

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Executive Summary

In fulfilment of Local Air Quality Management duties AECOM Ltd. was commissioned by Rugby Borough Council to compile an Air Quality Progress Report.

The report documents changes within the Borough since the 2009 Updating and Screening Assessment that have the potential to impact upon local air quality and the implications for compliance with air quality objectives. Rugby Borough Council also has in place an Air Quality Action Plan. This report therefore incorporates a discussion of the implementation of measures included in the Action Plan during the past twelve months and assesses the ability of the Council to implement the measures going forwards.

With the exception of nitrogen dioxide concentrations all of the key air pollutants remain below the relevant air quality objectives in the Borough. Updated monitoring results indicate that the annual mean nitrogen dioxide objective continues to be exceeded at two locations of relevant exposure. It is recommended that the currently declared Air Quality Management Area for nitrogen dioxide remains.

It is proposed to maintain the present level of monitoring within the Borough for nitrogen dioxide and particulate matter. The addition of diffusion tube monitoring for benzene in the area surrounding a new petrol station in Rugby should be considered to ensure that the air quality objectives are not being exceeded.

Several new developments have been identified since the last Review and Assessment report that have the potential to impact upon local air quality. These have been highlighted and will be included for assessment in the 2012 Updating and Screening Assessment.

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1 Introduction

1.1 Description of Local Authority Area

Rugby Borough Council is situated in north east Warwickshire to the west of the M1 and east of Coventry and is bound to the north by the M6. The Borough covers an area of 138 square miles surrounding the town of Rugby. The main pollutants of concern in Rugby Borough, as in most urban areas of the UK, are associated with road traffic, in particular NO_2 and particulate matter at locations close to busy, congested roads where people may live, work or shop. Previous Review and Assessment reports and local knowledge have identified areas where UK objectives may be exceeded.

Rugby Borough Council has six Part A1 installations that are regulated and inspected by the Environment Agency under the Pollution Prevention and Control (England and Wales) Regulations 2000, including the cement works, which are located close to the town centre and are a source of NO_X, SO_2 and PM_{10}.

The Borough has a number of other industrial installations of significance in terms of air quality. There is one Part A2 process for the manufacturing of drinks cans which involves solvent based coating processes. In addition there are 34 minor (Part B) installations. Each process / installation is regulated under the Pollution Prevention and Control (England and Wales) Regulations 2000. The processes / installations are regularly inspected by the Rugby Borough Council Regulatory Services unit (formerly Environmental Health) to ensure they are controlling their emissions to atmosphere

The majority of the urban area of Rugby town is classed as a smoke control area making it an offence under the Clean Air Act 1993 to emit smoke from a chimney caused by the burning of unauthorised fuel or the use of an unauthorised appliance.

1.2 Purpose of Progress Report

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.

This document reports on the progress made by Rugby Borough Council in implementing LAQM, the impacts of new developments within the Borough on local air quality and the progress made towards achieving the air quality objectives. It also serves to report on progress made in implementing measures detailed in the Air Quality Action Plan and the successes and shortcomings of the Action Plan.

1.3 Air Quality Objectives

The air quality objectives applicable to Local Air Quality Management (LAQM) **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928) and the Air Quality (England) (Amendment) Regulations 2002 (SI 3043). They are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (for carbon monoxide the units used are milligrammes per cubic metre, mg/m^3). Table 1.1 includes the number of permitted exceedences in any given year (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in England.

Pollutant	Concentration	Measured as	Date to be achieved by
Benzene	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	5.00 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Rugby Borough Council completed the required three rounds of Review and Assessment of air quality in its administrative area between 1998 and 2008, consisting of the stages described below:

Round One comprised two stages conducted between 1998 and 2001:

- **Stage 1 (Review and Assessment)** involved the identification of the main sources of air pollution within and around Rugby Borough, reviewing the levels of air pollutants for which prescribed standards and objectives have been set, and estimating the likely future levels.
- **Stage 2/3** required the local authority to provide further screening of pollutant concentrations within the area to assess whether the air quality objectives would be achieved by the target date and a more complex assessment of monitoring and modelling which in Rugby Borough identified no exceedances of national air quality objectives.

Round Two was completed between 2003 and 2006 and involved a modified approach to the Review and Assessment process.

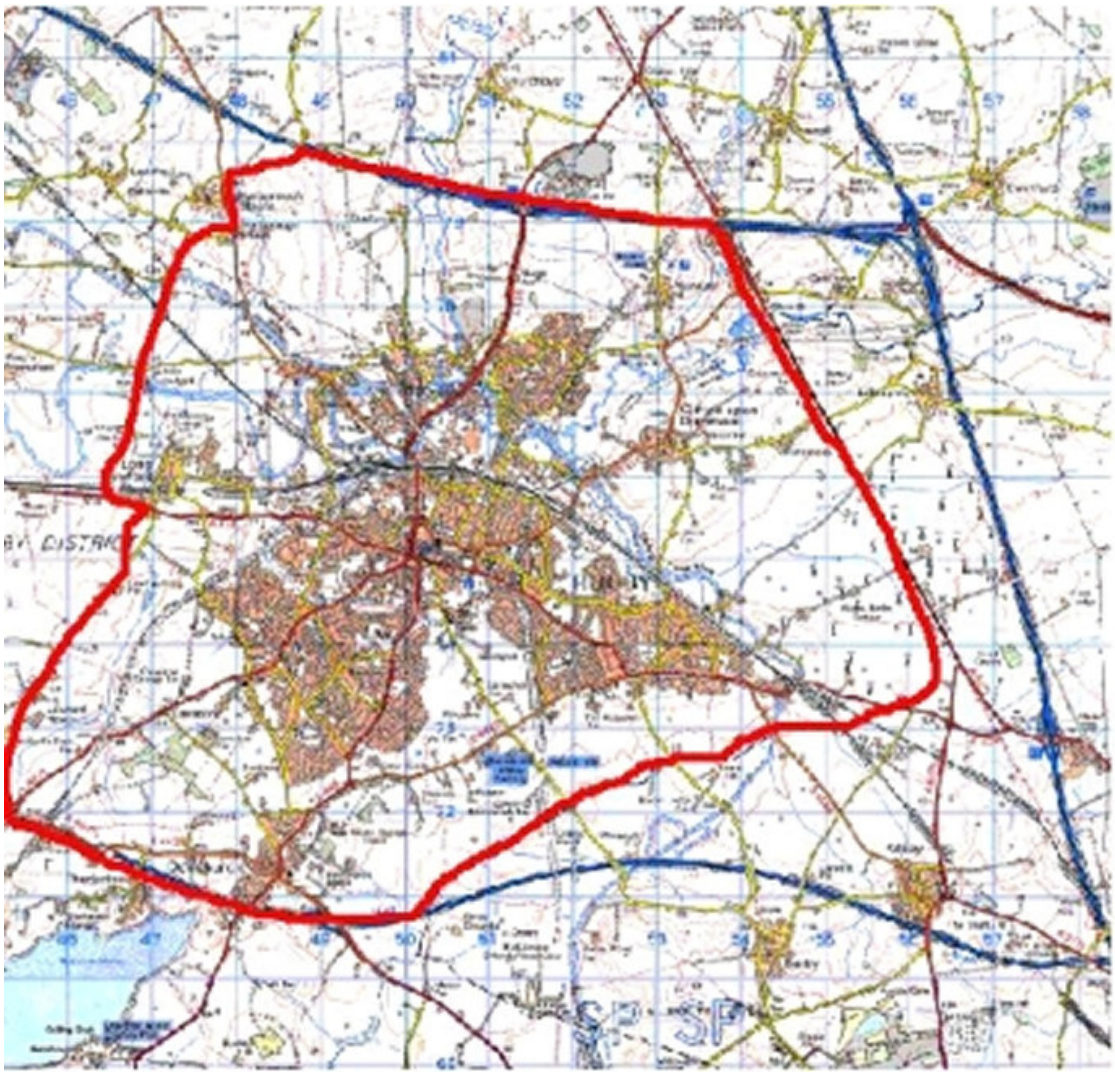
The first stage of the second round was an **Updating and Screening Assessment** [i] (USA) that was completed in 2003. The USA identified a number of areas that may lead to exceedances of the air quality objectives, thus requiring Rugby Borough Council to proceed to a **Detailed Assessment** [ii].

The Detailed Assessment was published in 2004 and involved an accurate and detailed study of current and future air quality. The assessment identified that annual average levels of NO_2 were at risk of being exceeded on a number of major roads in the centre of Rugby town and in Dunchurch. These findings led to the declaration of Rugby's AQMA in 2004. A map depicting the extent of the AQMA is shown in Figure 1.1 below.

During the Detailed Assessment, a risk of exceedance of the PM_{10} national air quality objectives was identified because of emissions (stack, low level point source and fugitive) from the CEMEX cement plant in Rugby. A **Detailed Assessment of Particulate Matter**[iii] was completed in 2005 which predicted that the national air quality objectives for PM_{10} would be met.

The **Further Assessment**[iv] required the local authority to undertake further detailed monitoring of the air quality within the AQMAs in order to confirm that the decision to declare the areas as AQMAs was justified. The Further Assessment involved calculations to predict the scale of improvement that was needed for each pollutant exceeding the air quality objectives to satisfy those objectives. Consideration of the extent to which different sources contribute to the problem was also made. The Further Assessment was undertaken in respect of the AQMA and was completed in December 2005. It was subsequently amended following comments received by Defra, the amended version being published in February 2006. It identified that only one property in the Borough was likely to be exposed to levels above the national air quality objective and that decreasing NO_2 emissions and the planned Rugby by-pass (the Rugby Western Relief Road) would result in compliance within 2 years.

Figure 1.1: Geographical Boundary of the Rugby Borough AQMA



Note: Following the Detailed Assessment of 2004, Rugby Borough Council declared an AQMA for nitrogen dioxide encompassing the whole Borough. The area covers the whole urban area of Rugby bounded by the southern boundary with Daventry District Council, the A5 and the M6, minor roads to the west of Long Lawford, the A45 and the M45

Round 3 of the Review and Assessment process commenced in 2006 with the production of a **USA** [v]. The USA concluded that the air quality objectives were unlikely to be exceeded at any location within the Borough for six of the seven pollutants assessed. It was concluded that exceedances of the NO_2 objective persisted at several locations within the present AQMA in respect of diffusion tube monitoring results. The declaration of the AQMA was upheld and there was no need to proceed to a Detailed Assessment.

The **Fourth Round** of Review and Assessment commenced in 2009 with the production of the **Updating and Screening Assessment (2009)** [vi]. The conclusion of the USA was to proceed to a Detailed Assessment in light of a new superstore development and the proposed extension of the pedestrianised zone in the town centre, and to investigate the implications of the developments in the Council's ability to implement its Air Quality Action Plan. Updated monitoring results indicated continued exceedances of the annual mean NO_2 objective at a number of locations of relevant exposure. It was concluded that exceedances of the air quality objectives for any of the other key pollutants was very unlikely. Consequently, it was recommended that no amendments be made to the existing AQMA order.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Monitoring Location Details

Since the 2009 USA there have been no changes to the continuous monitoring network in Rugby. AQMS 5, located at the junction of Newbold Road and Essex Street is the only continuous monitoring station at present in the Borough. This station monitors concentrations of oxides of nitrogen (NO_X) and particulate matter (PM_{10}).

AQMS 5 is equipped with a Thermo Electron Chemiluminescence Analyser for monitoring NO_X. Measurements of PM_{10} are made using a TEOM-FDMS. Airborne Particulate Matter concentrations are monitored at a further five locations using Turnkey Osiris dust monitors. Further details of the monitoring methods are presented below. Maps indicating the positions of the monitoring locations are shown in Figures 2.1 to 2.3. Tabulated details of the automatic monitoring sites can be found in Table 2.1.

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location ?
AQMS 5 Newbold Road	Roadside	450130, 275849	NO_2, PM_{10}	Y	Y (1m)	6 m	Y
T2 Lawford Farm [A]	Rural	444865, 274125	TSP, PM_{10}, $PM_{2.5}$, PM_1	N	N	N/A	N
T8 Townsend Lane [A]	Industrial	448135, 275856	TSP, PM_{10}, $PM_{2.5}$, PM_1	Y	Y	3 m	N
T10 Avenue Road [A]	Industrial	449289, 275607	TSP, PM_{10}, $PM_{2.5}$, PM_1	Y	Y	<1 m	Y
T14 Russelheim Way [A]	Roadside	450016, 274966	TSP, PM_{10}, $PM_{2.5}$, PM_1	Y	Y	2 m	Y
T16 Murray Road [A]	Roadside	451132, 275887	TSP, PM_{10}, $PM_{2.5}$, PM_1	Y	Y	2 m	Y

[A] Turnkey Osiris Analysers

PM_{10} concentrations at AQMS 5 Newbold Road are determined by TEOM-FDMS and therefore the data require no correction to ensure gravimetric equivalence. Measurements of airborne particulate matter by the Turnkey Osiris monitors is presented uncorrected as previous co-location studies in Rugby indicated a good agreement between TEOM measurements and Turnkey Osiris measurements.

Further details on the continuous monitoring equipment used in Rugby and QA/QC procedures can be found in Appendix 1.

2.1.1 Non-Automatic Monitoring

Rugby Borough Council has operated a network of NO_2 diffusion tubes since 2000. Details of the sixteen diffusion tube locations are provided in Table 2.2 below and Figures 2.1 to 2.4. One change has been made to the NO_2 Diffusion Tube Network as of January 2010. Site DT2 at Alwyn Road, Bilton (labelled as DT2(a) in Figure 2.2) was relocated to a new site at a roadside location adjacent to the A423 in Marton (labelled as DT2(b) in Figure 2.4) in the South-west of the Borough. This change was made in response to concerns raised by residents relating to potential future development of the former Peugeot Car Factory site at Ryton that may result in increases in HGV movements through the village. All further references and results in this report to site DT2 relate to Alwyn Road, Bilton.

Table 2.2 Details of NO_2 Diffusion Tube Monitoring Sites

Site Reference	Site Name	Site Type [A]	OS Grid Ref	In AQMA ?	Relevant Exposure ? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location?
DT 1	10 Newbold Rd, Opposite Shops	K	449000, 277178	Y	Y (5 m)	<1 m	N
DT 2	62 Alwyn Rd, Bilton [B]	UB	448184, 273308	Y	Y (7 m)	10 m	N
	Marton A423 [C]	R	440815 269039	Y	Y (5m)	<1 m	N
DT 3	69 School St, Long Lawford	UB/I	447314, 276168	Y	Y	15 m	N
DT 4	St Margaret's School, Wolston	UB	441131, 275648	N	N	90 m	N
DT 5	Ryton Village Hall, High Street	R/I	438642, 274418	N	Y	5 m	Y
DT 6	2 Westfield Rd, Bilton	UB	449671, 274795	Y	Y	10 m	N
DT 7	68 Cymbeline Way, Bilton	UB	448853, 272782	Y	Y	20 m	N
DT 8	EHO Dept, Newbold Rd	R	450139, 275557	Y	Y	<1 m	Y
DT 9	Cambridge St. / Argyle St.	UC	451187, 275333	Y	Y	5 m	N
DT 10	Webb Ellis Pub, Corporation St.	R	450071, 275039	Y	Y	5 m	Y
DT 11	15 Oliver St., New Bilton	R	449783, 275230	Y	Y	5 m	N
DT 12	Boughton Leigh School, Brownsover	UB	451447, 277242	Y	N	56 m (However school parking available <1 m)	N
DT 13	Avon Mill Pub, Newbold Rd	I	450094, 276239	Y	Y	17 m	N
DT 14	Binley Woods Village Hall	UB	439450, 277523	N	Y	20 m	N
DT 15	Lawford / Jubilee St, Arnie's Batch	K	449167, 275409	Y	Y	<1 m	Y
DT 16	Marriot / Courtyard Hotel, A45, Ryton	R/I	436848, 275852	N	Y	19 m	Y

[A] Site types: K: Kerbside; R: Roadside, I: Intermediate, UB: Urban Background; UC: Urban Centre.
[B] Diffusion tube monitoring at 62 Alwyn Road discontinued end 2009.
[C] Diffusion tube monitoring at Marton commenced January 2010.

Details relating to bias adjustment of diffusion tube measurements, short-term to long-term measurement conversion and QA/QC procedures for diffusion tube monitoring are supplied in Appendix 1.

Figure 2.1 Monitoring Locations in Rugby Town Centre

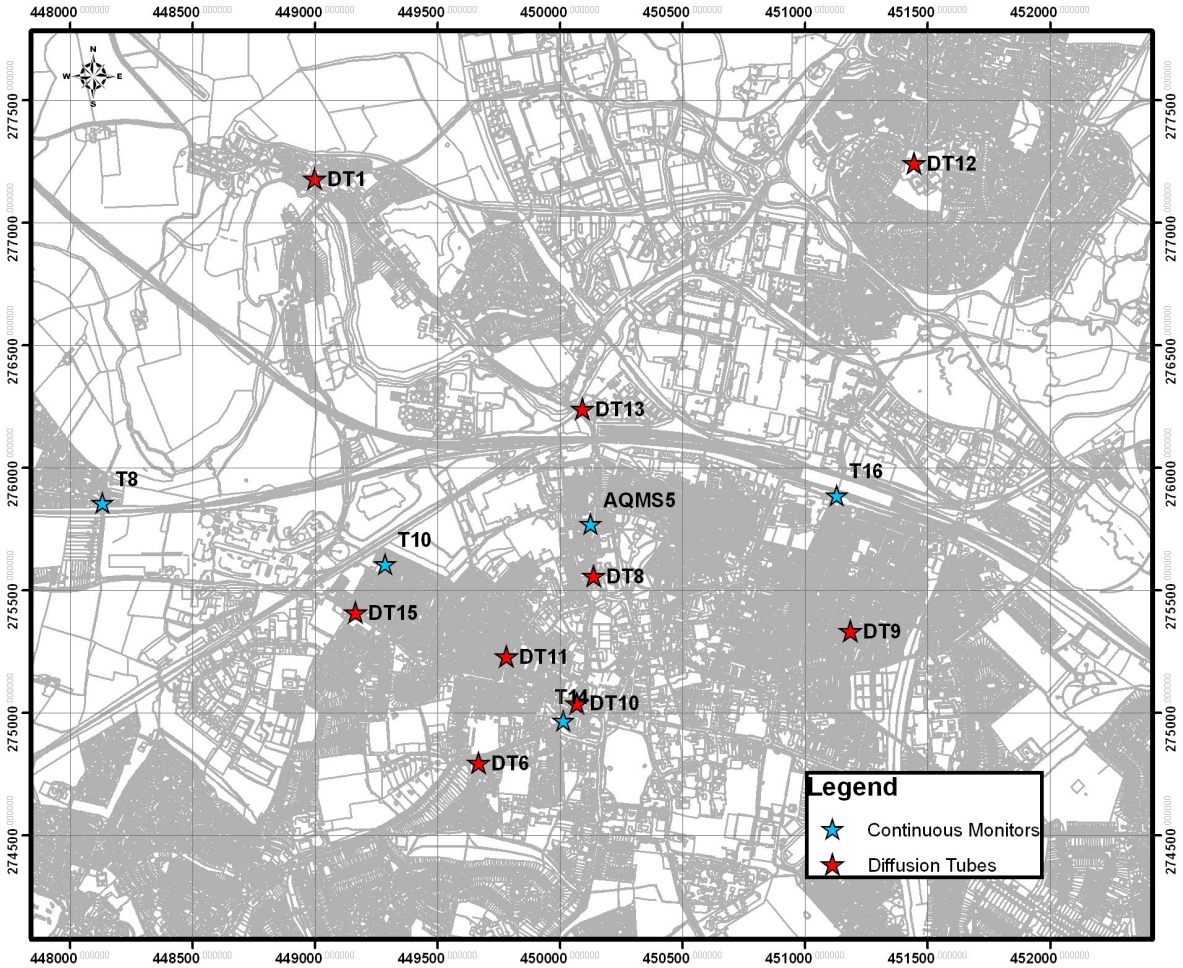


Figure 2.2 Other Monitoring Locations in the Borough of Rugby

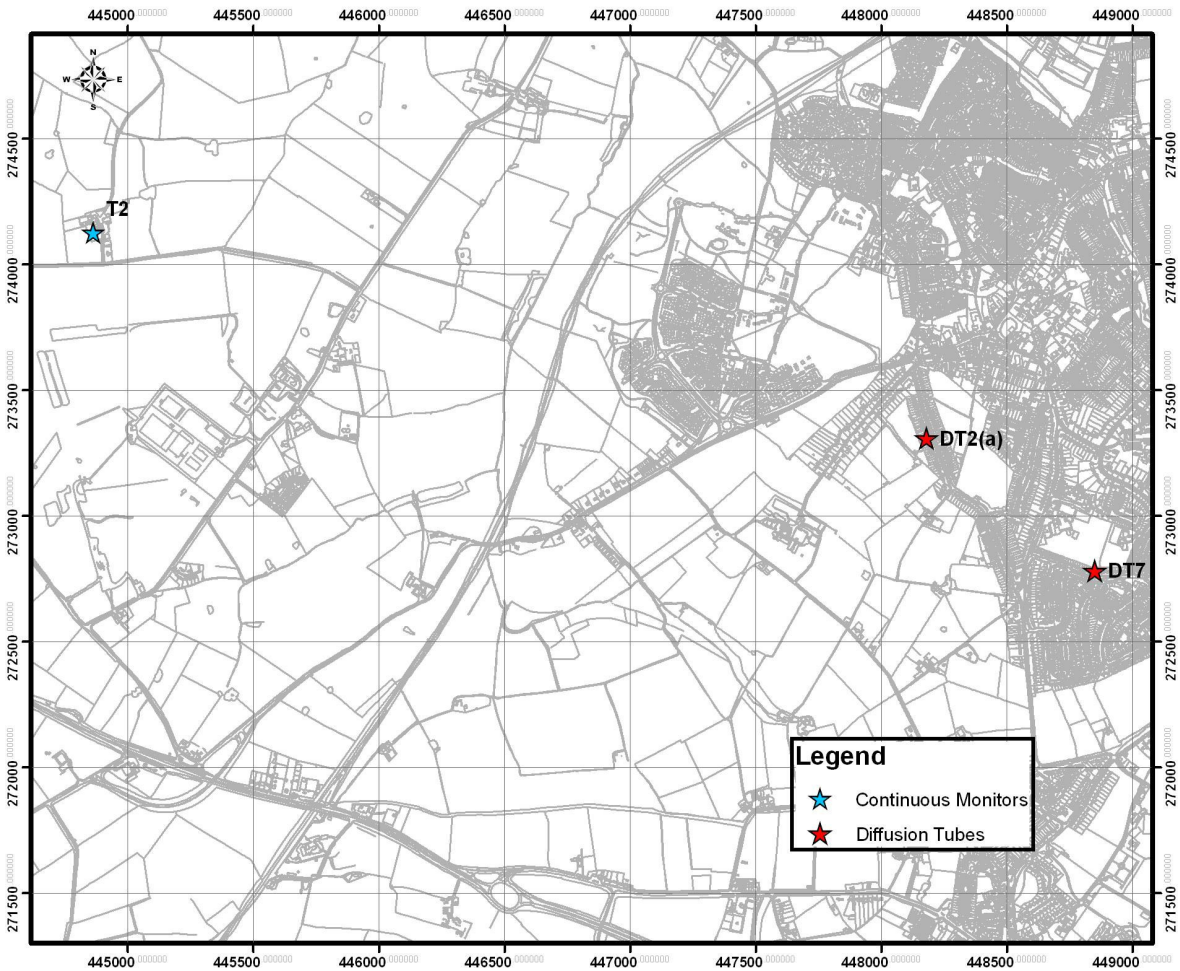


Figure 2.3 Other Monitoring Locations in the Borough of Rugby

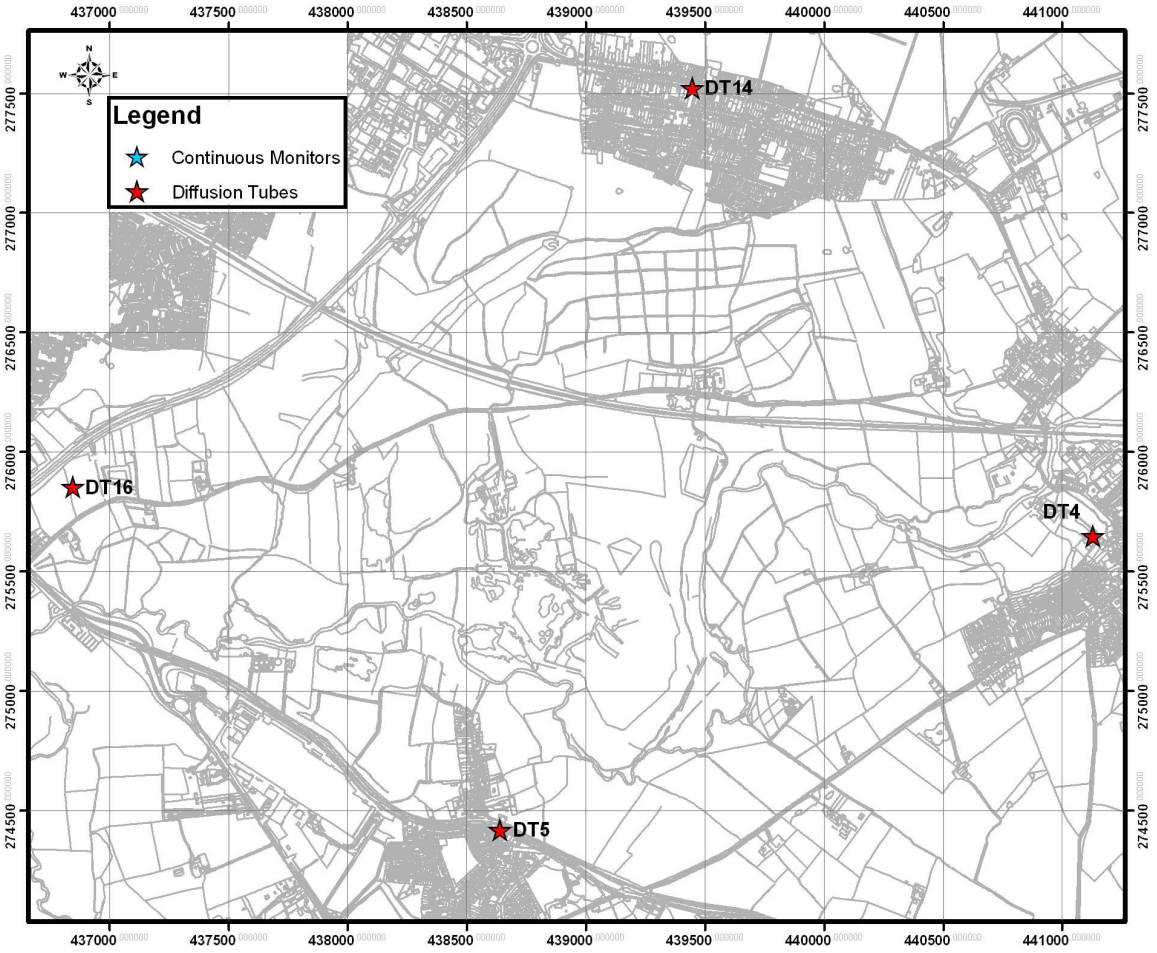
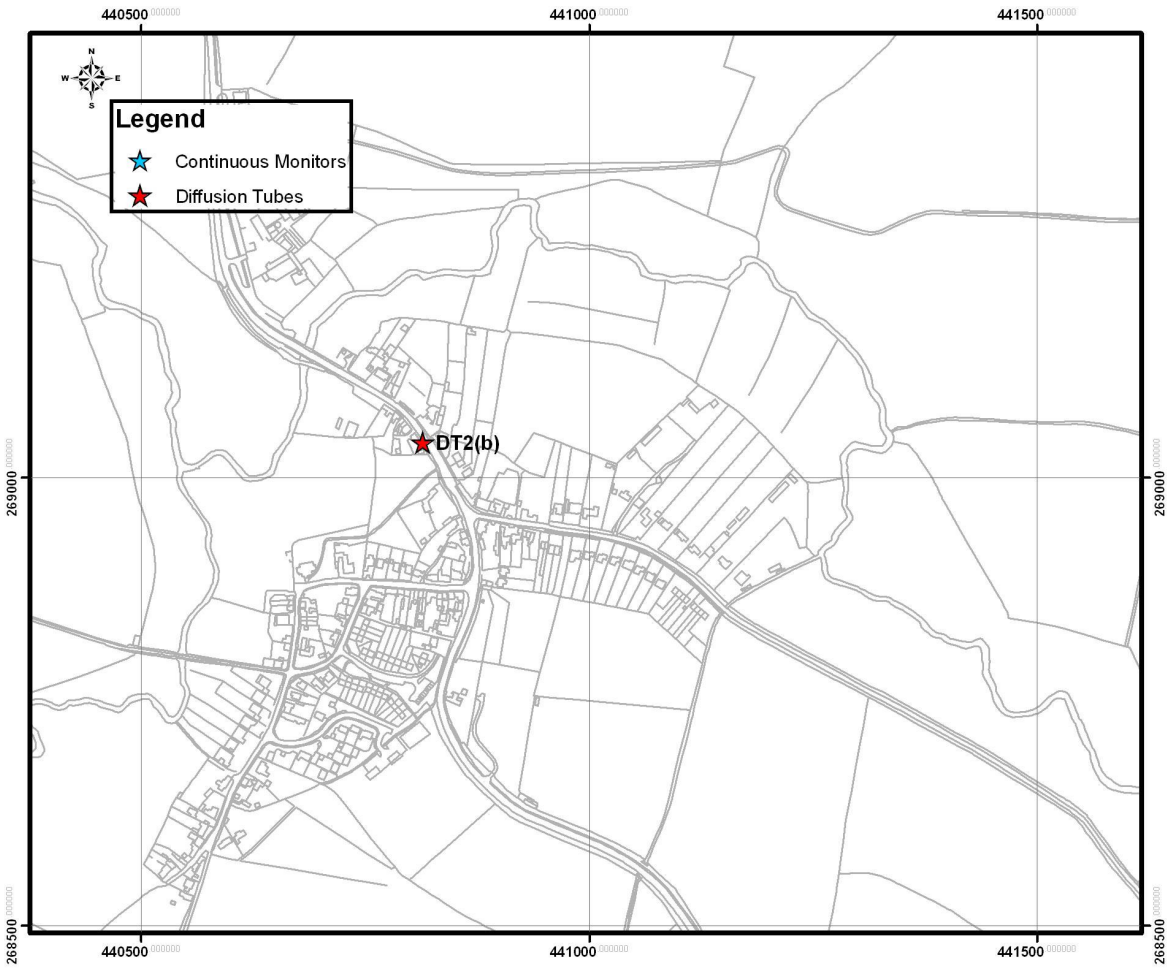


Figure 2.4 Other Monitoring Locations in the Borough of Rugby



2.2 Comparison of Monitoring Results with Air Quality Objectives

An overview of the data from each of the Rugby automatic monitoring locations are presented in Sections 2.2.1 to 2.2.5 below. An overview of non-automatic monitoring undertaken within the Borough is also given. Summary tables comparing the measured concentrations with the air quality objectives and providing data capture statistics are included.

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

Nitrogen dioxide concentrations in Rugby are monitored by one continuous monitor. The annual mean concentration measured by the continuous analyser confirms that the annual mean NO_2 objective was achieved at this location in all years between 2004 and 2009 (Table 2.3). The trend between 2004 and 2007 was one of a general decrease in annual mean NO_2 concentrations at Newbold Road. Since 2007 the monitoring data suggests a slight increase in annual mean NO_2 concentrations. Figure 2.5 shows the trend in quarterly mean NO_2 concentrations at Newbold Road.

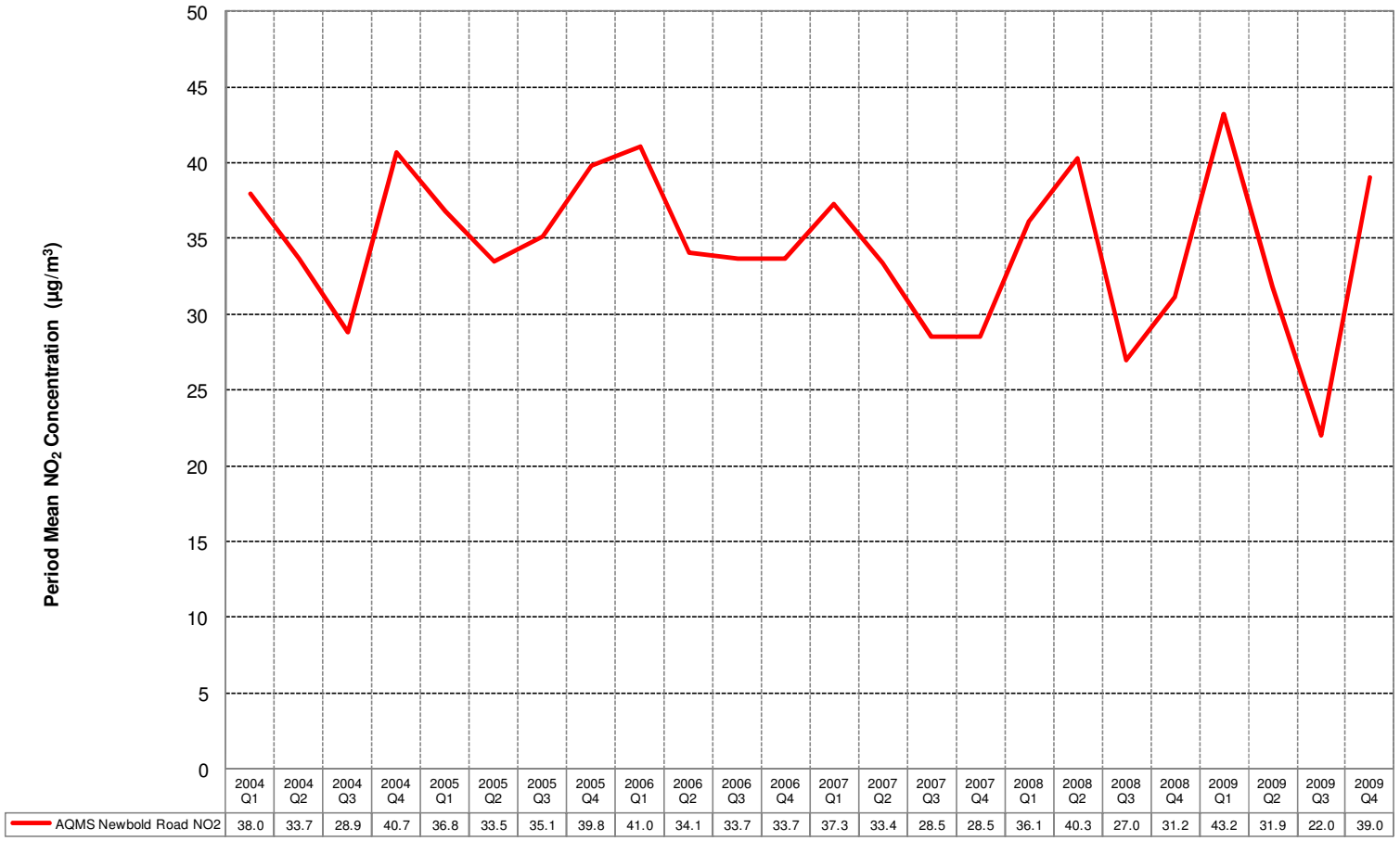
The continuous monitoring data shows there have been no exceedences of the hourly NO_2 standard of 200 µg/m^3 since monitoring began at Newbold Road in 2004, and therefore the hourly NO_2 objective has been achieved in all years to date.

Table 2.3 Results of Automatic Monitoring for Nitrogen Dioxide: Data Capture Rates, Comparison with Annual Mean and Hourly Exceedences Objectives, 2004 to 2009.

Site Reference	Location	Within AQMA?		2004	2005	2006	2007	2008	2009
AQMS 5	Newbold Road	Y	Data Capture (%)	99	99	95	88	99	99
			Annual Mean Concentration (µg/m^3)	35.3 [A]	36.3 [A]	35.7 [A]	32.4 [B]	33.6	34.0
			Number of Exceedences of Hourly Mean (200 µg/m^3) [C]	0	0	0	0(115)	0	0

[A] Monitoring station located outside the council offices at Newbold Road.
[B] Monitoring station moved to new location in October 2007 (see 2009 Updating and Screening Assessment for full details). 2007 Annual mean result incorporates data collected at both monitoring locations.
[C] Where data capture is less than 90% of a full year a 99.8th %ile concentration of hourly means has been calculated and is shown in brackets.

Figure 2.5 Quarterly Mean NO_2 Concentrations at Newbold Road, Rugby Since 2004



	2004 Q1	2004 Q2	2004 Q3	2004 Q4	2005 Q1	2005 Q2	2005 Q3	2005 Q4	2006 Q1	2006 Q2	2006 Q3	2006 Q4	2007 Q1	2007 Q2	2007 Q3	2007 Q4	2008 Q1	2008 Q2	2008 Q3	2008 Q4	2009 Q1	2009 Q2	2009 Q3	2009 Q4
AQMS Newbold Road NO2	38.0	33.7	28.9	40.7	36.8	33.5	35.1	39.8	41.0	34.1	33.7	33.7	37.3	33.4	28.5	28.5	36.1	40.3	27.0	31.2	43.2	31.9	22.0	39.0

Diffusion Tube Monitoring Data

Diffusion tube monitoring was continued at seventeen locations (including triplicate site, Newbold Road) throughout the Borough in 2009. Thirteen of the locations lie within the currently designated AQMA and fifteen are located at sites with relevant exposure. Consistent with the results of 2008, the 2009 survey highlighted potential exceedences of the annual mean NO_2 objective at a number of locations after bias adjustment.

For comparison, annual mean NO_2 concentrations for 2009 based on the national bias-adjustment factor are presented alongside the local bias-adjusted results. Details on the derivation of the bias-adjustment factors, the choice of factor to apply and raw unadjusted tube results can be found in Appendices 1 and 2. Five locations exceeded the annual mean NO_2 objective after correction by a local bias adjustment factor. Two locations were identified as likely to exceed the annual mean NO_2 objective after the application of the national bias adjustment factor (Table 2.4).

It was decided to use the national bias adjustment factor to correct the raw diffusion tube results and the following discussion of diffusion tube monitoring relates to national bias adjusted NO_2 concentrations. The decision to use the national bias adjustment factor resulted from it being identified that the triplicate co-located tubes at Newbold Road may have been incorrectly positioned thereby giving an inaccurate local bias adjustment factor. The same issue may account for the higher NO_2 concentrations as monitored by diffusion tubes throughout the Borough in 2008. The triplicate tubes were appropriately co-located in January 2010 so that future co-location studies for Rugby should provide a valid and accurate local bias adjustment factor.

After bias adjustment the highest annual mean NO_2 concentration in 2009 was monitored at Oliver Street, New Bilton (DT 11; 44.7 $\mu g/m^3$) representing an exceedance of the annual mean NO_2 objective of 40 $\mu g/m^3$. This is consistent with previous diffusion tube monitoring results at this site. Since 2007 the annual mean NO_2 concentrations at this site have been amongst the highest in Rugby. The annual mean NO_2 objective was also exceeded at the Webb Ellis Pub monitoring site (DT 10), where an annual mean concentration of 43.0 $\mu g/m^3$ was recorded.

Twelve sites achieved data capture rates of greater than 90%. A further three sites had greater than 80% data capture. The Boughton Leigh School site suffered from vandalism throughout the year resulting in 67% data capture in 2009 (Table 2.4). Consequently, an annualisation factor has been calculated and applied to the Boughton Leigh School data according to the methodology outlined in LAQM.TG(09) Box 3.2. Details of the annualisation calculation can be found in Appendix 1.

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes, 2009

Site Reference	Location	Within AQMA?	Data Capture (%)	Annual Mean Concentration 2009 (µg/m^3)	
				Local Bias Factor [A]	National Bias Factor [B]
DT 1	10 Newbold Rd, Opposite Shops	Y	100	26.0	21.5
DT 2	62 Alwyn Rd, Bilton	Y	92	18.7	15.5
DT 3	69 School St, Long Lawford	Y	100	21.0	17.4
DT 4	St Margaret's School, Wolston	N	83	16.1	13.3
DT 5	Ryton Village Hall, High Street	N	92	30.8	25.5
DT 6	2 Westfield Rd, Bilton	Y	100	23.9	19.8
DT 7	68 Cymbeline Way, Bilton	Y	100	16.5	13.6
DT 8	EHO Dept, Newbold Rd	Y	92	**46.8**	38.6
DT 9	Cambridge St. / Argyle St.	Y	100	25.6	21.2
DT 10	Webb Ellis Pub, Corporation St.	Y	92	**52.0**	**43.0**
DT 11	15 Oliver St., New Bilton	Y	100	**54.1**	**44.7**
DT 12	Boughton Leigh School, Brownsover	Y	67	32.2 [C]	26.6 [C]
DT 13	Avon Mill Pub, Newbold Rd	Y	100	**42.2**	34.9
DT 14	Binley Woods Village Hall	N	83	24.6	20.4
DT 15	Lawford / Jubilee St, Arnie's Batch	Y	83	**44.6**	36.9
DT 16	Marriot / Courtyard Hotel, A45, Ryton	N	100	25.6	21.1

[A] Local bias adjustment factor from co-location study at Newbold Road – 0.98.
[B] National bias adjustment factor taken from Review and Assessment Helpdesk Spreadsheet of Bias Adjustment Factors Version 03/10 – 0.81.
[C] Annual mean concentrations for DT12 include an annualisation factor of 1.011 due to data capture being lower than 75%. See Appendix 1 for further details of annualisation methodology.
Figures in **BOLD** represent exceedances of the annual mean NO_2 objective.

Bias-adjusted NO_2 concentrations at all of the operational diffusion tube locations between 2004 and 2009 are shown in Table 2.5 and are displayed graphically in Figure 2.6 and Figure 2.7. The bias adjustment factors used for each year are shown in the table footnote.

The data display a similar trend to the continuous monitoring data, with evidence of decreasing concentrations between 2004 and 2007 and a gradual increase from 2007 to 2009. The 2008 data were bias adjusted using the local bias factor. It has come to light that this factor may be inappropriate and the 2008 may require revision. The application of the national bias factor for 2008 (0.80) to the data would bring NO_2 concentrations into line with those of 2004. This may provide evidence that the use of a local bias factor is, in the case of 2008, inappropriate.

The trend charts of diffusion tube data indicate that DT 8, DT 10 and DT 11 tend to exhibit the highest NO_2 concentrations. DT 10 and DT 11 exceeded the annual mean NO_2 objective in 2004 and 2007 to 2009. Additional exceedances were recorded at DT 8 in 2004 and 2008.

The continued monitored exceedance of the annual mean NO_2 objective at Oliver Street may be accounted for by the ongoing construction of the Rugby Western Relief Road and the rerouting of traffic closer to the town centre, principally along Oliver Street, the Warwick Gyratory system, Newbold Road and Corporation Street as a result of the closure of Parkfield Road. The data in Tables 2.4 and 2.5 support this suggestion as annual mean NO_2 concentrations at sites in these areas have displayed the largest increases in NO_2 concentration.

Table 2.5 Trend Analysis of Nitrogen Dioxide Diffusion Tubes

Site Reference	Location	Annual Mean Concentration Bias Adjusted [A] (µg/m^3)					
		2004	2005	2006	2007	2008 [B]	2009 [C]
DT 1	10 Newbold Rd, Opposite Shops	21.0	16.8	16.9	22.2	26.0	21.5
DT 2	62 Alwyn Rd, Bilton	15.7	13.8	13.7	16.8	21.6	15.5
DT 3	69 School St, Long Lawford	18.8	15.1	13.6	15.2	21.7	17.4
DT 4	St Margaret's School, Wolston	15.4	14.0	12.0	14.9	19.2	13.3
DT 5	Ryton Village Hall, High Street	29.0	23.6	22.1	27.2	37.4	25.5
DT 6	2 Westfield Rd, Bilton	17.9	17.3	15.0	20.7	24.4	19.8
DT 7	68 Cymbeline Way, Bilton	16.3	12.3	13.3	17.5	21.8	13.6
DT 8	EHO Dept, Newbold Rd	**46.4**	34.3	30.7	37.2	**47.0**	38.6
DT 9	Cambridge St. / Argyle St.	24.9	18.6	18.4	22.5	26.7	21.2
DT 10	Webb Ellis Pub, Corporation St.	**48.8**	37.2	38.0	**42.2**	**58.6**	**43.0**
DT 11	15 Oliver St., New Bilton	**42.5**	29.6	33.4	**40.0**	**59.3**	**44.7**
DT 12	Boughton Leigh School, Brownsover	25.5	17.0	21.2	26.9	29.5	26.6 [D]
DT 13	Avon Mill Pub, Newbold Rd	30.6	22.6	23.9	28.9	**40.6**	34.9
DT 14	Binley Woods Village Hall	20.6	16.7	16.1	18.9	22.5	20.4
DT 15	Lawford / Jubilee St, Arnie's Batch	22.9	23.3	25.4	29.5	**40.5**	36.9
DT 16	Marriot / Courtyard Hotel, A45, Ryton	22.3	19.8	18.9	22.7	27.7	21.1

[A] Local bias adjustment factors used: 2004 = 0.79; 2005 =0.74; 2006 = 0.66; 2007 = 0.78; 2008 = 0.99;
[B] Co-located tubes used to derive local bias adjustment factor in 2008 may have been incorrectly positioned leading to higher than expected bias adjusted NO_2 concentrations.
[C] 2009 = National Bias Adjustment Factor Used = 0.81
[D] Annual mean concentrations for DT12 include an annualisation factor of 1.011 due to data capture being lower than 75%. See Appendix 1 for further details of annualisation methodology.

Figure 2.6 Diffusion Tube Annual Mean NO_2 Concentrations in Rugby Since 2004 (DT1-DT8)

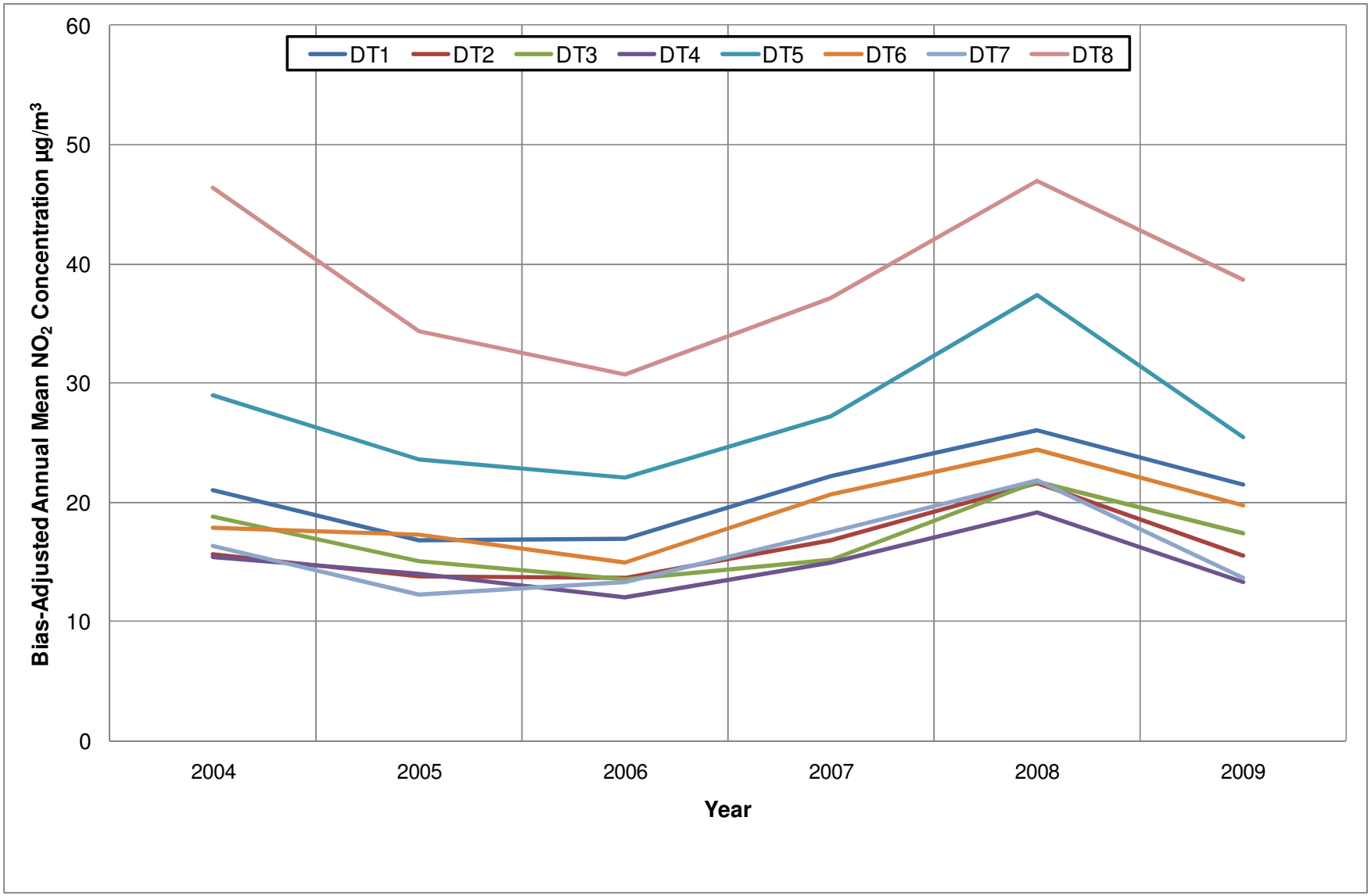
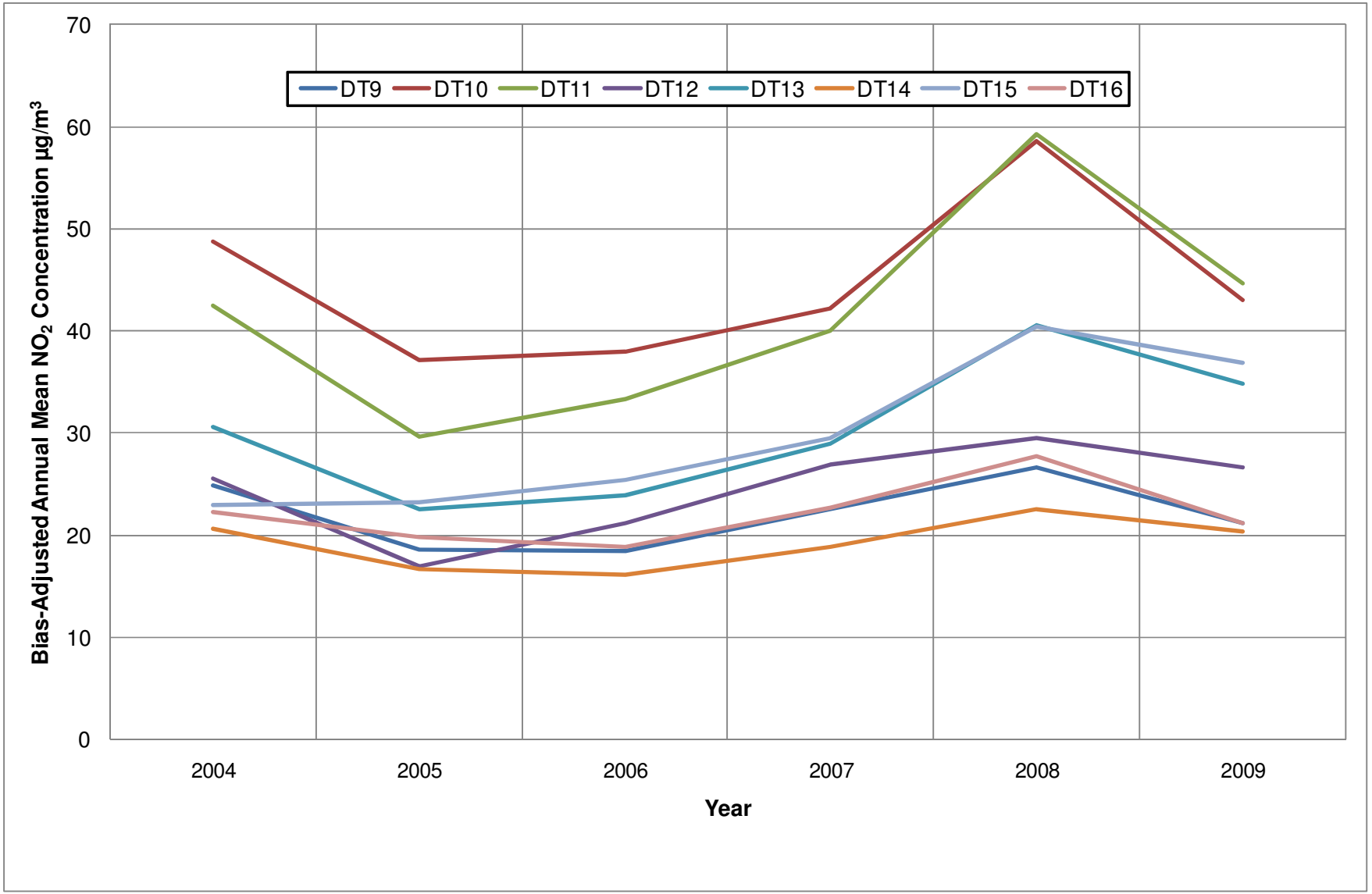


Figure 2.7 Diffusion Tube Annual Mean NO_2 Concentrations in Rugby Since 2004 (DT9-DT16)



2.2.2 PM_{10}

Continuous monitoring of PM_{10} is monitored at one location in Rugby using a TEOM-FDMS (AQMS 5 – Newbold Road), with additional monitoring performed at five other locations by Turnkey Osiris instruments. Data from AQMS 5 require no correction for gravimetric equivalence. Earlier co-location studies of Turnkey instruments with TEOM systems demonstrated a good agreement between Turnkey and gravimetric equivalent TEOM data[vii] in Rugby. Consequently, the Turnkey monitoring data are presented without the application of a gravimetric correction factor.

Monitoring data from the sites indicate that the annual mean objective for PM_{10} was met at all monitoring locations between 2004 and 2009 (Table 2.7) and is unlikely to be breached at these locations. Data capture at all sites in all years exceeded 80%; in 2009 four of the six continuous monitors for PM_{10} achieved greater than 90% data capture.

Trend analysis of the PM_{10} data (Table 2.7) suggests that concentrations in Rugby have generally decreased from 2004 to 2008 before levelling off in 2009. Newbold Road, Townsend Lane and Avenue Road have recorded evidence of decreasing concentrations. The annual mean PM_{10} concentrations at Lawford Farm have remained similar during this period although the annual mean PM_{10} concentration at the site in 2009 was actually the highest since monitoring began in 2004. The high annual mean PM_{10} reported for Murray Road in 2007 can be attributed to construction activity.

Whilst all of the monitoring locations have recorded at least one instance of the 24-hour mean standard of 50 µg/m^3 being exceeded only T16 Murray Road breached the permitted 35 instances of the objective. This occurred in 2007 when the site was affected by long-term construction work leading to elevated dust concentrations throughout the year and which continued into the early part of 2008. No exceedances have been monitored at the Newbold Road site.

In 2009, all sites met the 24-hour mean exceedances objective or achieved 90th percentile concentrations lower than 50 µg/m^3. There are no apparent trends in the number of recorded exceedances per year and the number of exceedances has shown considerable variation from year to year (Table 2.8). However, with the exception of Murray Road during 2007, there have been no exceedances of the objective and it is unlikely to be exceeded at any monitoring site.

Table 2.6 PM_{10} Automatic Monitoring: Data Capture Rates, 2004 to 2009.

Site Reference	Location	Within AQMA?	Data Capture (%)					
			2004	2005	2006	2007	2008	2009
AQMS 5	Newbold Road	Y	97	99	99	89	98	98
T2	Lawford Farm	N	93	80	82	95	89	97
T8	Townsend Lane	Y	90	96	87	99	80	82
T10	Avenue Road	Y	95	98	86	89	96	82
T14	Russelheim Way	Y	87	96	89	97	95	94
T16	Murray Road	Y	86	97	89	99	81	97

Table 2.7 PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective, 2004 to 2009.

Site Reference	Location	Annual Mean Concentration (µg/m^3)					
		2004	2005	2006	2007	2008	2009
AQMS 5	Newbold Road	25.7	25.6	27.7	26.0	20.9	21.5
T2	Lawford Farm	20.9	21.0	19.8	21.4	20.7	22.2
T8	Townsend Lane	24.4	17.1	19.0	18.3	16.1	17.3
T10	Avenue Road	28.6	22.1	22.2	21.0	19.2	19.6
T14	Russelheim Way	23.9	20.9	17.9	24.0	20.7	15.9
T16	Murray Road	23.8	23.9	24.7	30.6	24.3	20.0

Table 2.8 PM_{10} Automatic Monitoring: Comparison with 24-Hour Mean Exceedences Objective, 2004 to 2009.

Site Reference	Location	Number of Exceedences of 24-hour Mean (50 µg/m^3) [A]					
		2004	2005	2006	2007	2008	2009
AQMS 5	Newbold Road	5	4	17	14 (40.8)	13	10
T2	Lawford Farm	8	10 (34.8)	5 (32.0)	11	5 (31.4)	11
T8	Townsend Lane	16	7	6 (29.3)	9	2 (25.3)	4 (26.1)
T10	Avenue Road	28	14	10 (33.0)	9 (33.0)	5	7 (30.9)
T14	Russelheim Way	12 (38.4)	10	6 (27.4)	8	5	6
T16	Murray Road	7 (37.3)	15	11 (38.2)	**43**	11 (40.6)	7

[A] Where data capture is less than 90% of a full year a 90th %ile concentration of daily means has been calculated and is shown in brackets.

2.2.3 Sulphur Dioxide

No continuous monitoring of SO_2 is carried out in Rugby. SO_2 Diffusion Tubes were used to measure SO_2 concentrations at 12 locations in the Borough until March 2008. In March 2008 the scope of the SO_2 diffusion tube monitoring was reduced to 3 sites. Owing to the short timescales over which the SO_2 objectives apply the diffusion tube results cannot be compared against the objectives. However they do provide an indication of the historical levels and trends of SO_2 concentrations within the Borough. Furthermore, the results of the SO_2 diffusion tube monitoring may help inform decisions on the need for any future continuous monitoring programme.

Continuous monitoring of SO_2 was previously undertaken at the Rugby Lions FC Ground at Webb Ellis Road (AQMS 1; Figure 2.1). The site was decommissioned in 2007. The results published in previous Review and Assessment documents indicated that the prescribed objectives were unlikely to be breached in the Borough. There were no exceedences of any of the objectives relevant to SO_2 during the continuous monitoring period between 2004 and 2007. The results of SO_2 monitoring in the Borough are presented in Table 2.9 and Appendix 2.

Table 2.9 Trend Analysis of Sulphur Dioxide Monitoring in Rugby Borough, 2004 to 2009.

Site Reference	Location	Annual Mean Concentration (µg/m^3)					
		2004	2005	2006	2007	2008	2009
AQMS 1	Webb Ellis Road, Rugby Lions FC	3.2	2.8	3.1	3.2[A]	ND	ND
DT A	Main Street, Newbold	4.2	4.8	8.0	7.3	5.0	ND
DT B	Bilton Evangelical Church	11.3	5.7	4.7	3.3	5.9	ND
DT C	69 School Street	4.3	5.3	6.7	6.0	7.1	8.2
DT D	St. Margaret's School	5.7	4.5	6.1	7.0	3.9	ND
DT E	Ryton Village Hall	5.3	6.6	17.5	5.0	4.4	ND
DT F	Wolvey Village Hall	5.4	6.0	6.6	5.7	9.5	9.7
DT G	Tanser Court	4.4	3.8	5.5	4.6	2.0	ND
DT H	EHD The Retreat	10.1	6.1	8.7	4.2	2.9	ND
DT I	Binley Woods Village Hall	6.1	9.0	7.2	6.8	3.9	ND
DT J	15 Oliver Street	5.0	4.4	7.6	5.8	4.9	ND
DT K	Boughton Leigh School	4.9	4.8	8.8	5.7	3.3	ND
DT L	Courtyard Marriot Hotel	6.6	4.6	5.9	2.8	2.2	ND
DT M	Avenue Road	ND	ND	ND	ND	10.3	6.0

Notes: Continuous monitoring at Webb Ellis Road ceased in April 2007;
Monitoring at DT A and DT B, DT D and DT E, and DT G to DT L ceased in March 2008;
Monitoring at DT M commenced in April 2008.
DT C, DT F and DT M are the only operational sites at present.

2.2.4 Benzene

No monitoring of benzene is undertaken within the Borough. It is considered that there are no significant sources that might give rise to exceedances of the air quality objective for benzene at any receptor location within the Borough.

2.2.5 Other pollutants monitored

Rugby Borough Council does not perform monitoring activities for any other air pollutants.

2.2.6 Summary of Compliance with AQS Objectives

Rugby Borough Council has examined the results from monitoring in the Borough.

Exceedances of the annual mean NO_2 objective continue to be monitored at two locations within the Borough. However, these locations are within the current boundary of the AQMA, therefore there is no need to proceed to a Detailed Assessment on the basis of the findings of this report. However, Rugby Borough Council is committed to producing a Detailed Assessment based on the findings of the 2009 Updating and Screening Assessment.

The concentrations of all other key pollutants are below the prescribed objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

3.1 Road Traffic Sources

There have been no major changes identified to the existing road network since the production of the 2009 Updating and Screening Assessment (USA) report. The usual routes remain a concern for local air quality including the Warwick Gyratory system, Newbold Road, Oliver Street, Bilton Road, Corporation Street, Lawford Road and the north and south corridors. Parkfield Road remains closed to through traffic due to the continuing construction of the Rugby Western Relief Road. As a consequence traffic has been diverted along roads closer to Rugby town centre. Oliver Street, Warwick Gyratory System, Newbold Road and Corporation Street were the main routes affected by the temporary closure. The relief road is scheduled to open in Winter 2010.

Proposed modifications to the Parkfield Road / Rugby Western Relief Road junction have been put forward. Original plans included a roundabout although in view of safety concerns raised by road safety engineers and the police, amended plans were submitted for a priority road junction allowing left-in and left-out turns only. AECOM Ltd. carried out a DMRB Screening Assessment of the proposed junction and concluded that the proposed modifications would have no significant impact upon air quality in the area relative to the previously approved roundabout configuration.

Rugby Borough Council has been informed of the opening of a new rail freight terminal in Rugby. The facility is located on Hunters Lane, to the east of Newbold Road on the north side of the railway line on the site of the former permitted coal unloading facility. As the development is on railway owned land no planning permission is required. It is predicted that the terminal will handle approximately 50,000 freight containers per year, creating three train movements per day and around 200 heavy goods vehicle movements per day into and out of the terminal. The additional HGV movements generated by the development are likely to have implications for local air quality and Rugby Borough Council will assess the impacts as part of the Detailed Assessment. The idling of stationary trains may also be an issue arising from the freight terminal development and Rugby Borough Council will consider the impact of train movements in future Review and Assessment work.

There have been no other changes to road traffic sources within the Borough since the 2009 USA.

3.2 Other Transport Sources

Since the 2009 USA there have been no changes to airport operations or aviation pollutant sources within the Borough. There are no airports within the administrative area of Rugby Borough Council. The nearest airport is Coventry Airport in neighbouring Warwick District Council. The airport closed in 2009 after downsizing of operations and the withdrawal of the major flight operator. However, the Coventry Airport site was bought in April 2010 with the new owners proposing to reopen the airport to handle cargo and light aircraft, private jets and helicopters. Scheduled passenger flights may be resumed sometime in the future.

Previous assessments have shown that the site does not cause significant impact on air quality in Rugby. Rugby Borough Council will keep the situation under review and if future changes in operations from Coventry Airport are considered likely to impact upon air quality within the Borough then the airport may need to be reassessed.

The opening of the new rail freight terminal in Rugby (see Section 3.1) may have implications for local air quality as a result of diesel locomotive movements during the loading and unloading of containers at the facility. The terminal is anticipated to create up to three train movements per day, handling around 50,000 cargo containers per year. Rugby Borough Council understands that haulage of the trains will be predominantly undertaken by electric locomotives. However, there are likely to be some shunting movements that are performed by diesel locomotives and the idling of diesel locomotives may also be an issue. Where diesel locomotives are used to haul the trains it is likely that the

locomotives will be idling for significant time periods during the transfer of containers to and from HGVs. At present no details are known of potential idling times. Rugby Borough Council will consider the impact of the new rail freight terminal and associated locomotive movements in future Review and Assessment work.

It is recommended to source more detailed information relating to the terminal operations in order to carry out an Air Quality Assessment of the terminal as part of future Review and Assessment work.

3.3 Industrial Sources

There are currently 38 Industrial Pollution Processes in the Borough. During 2009 four facilities surrendered their permits or ceased to continue their operations, whilst three industrial operations were granted new permits. All of the permitted installations were inspected during 2009 / 2010. The compliance rate was greater than 97%. Details of all permit changes since the 2009 USA are included in Appendix 4.

The new permitted processes include two waste oil burners at Woodlands Service Station and T W Tyres Ltd and a permit for the unloading of petrol into storage tanks at the BP Filling Station on Corporation Street. In isolation the impact of the waste oil burners are unlikely to have a significant effect on local air quality provided the burners are operated in accordance with the Process Guidance Note for waste oil burners [viii]. Collectively such burners may have implications for local air quality and so Rugby Borough Council will keep the situation under review.

The unloading of petrol at the BP filling station at Corporation Street represents a potential source of pollutants, notably benzene. The petrol station has an annual throughput of 1300 m^3 per year and is fitted with a Stage 2 recovery system. Furthermore, there is no relevant exposure within 10 metres. For the purpose of Local Air Quality Review and Assessment the filling station will not need to be investigated further at this stage.

Permission was granted for the construction of the Climafuel Manufacturing Facility in November 2009 despite objections raised by a number of interested parties (Application Reference R08/1499/CM).

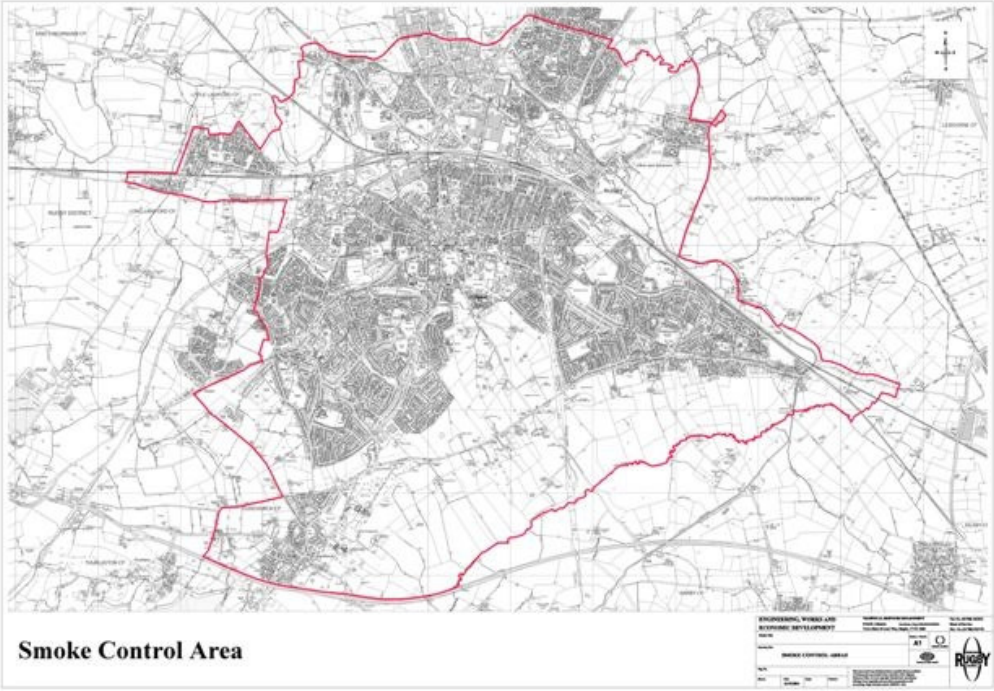
The facility will combine a range of waste treatment, sorting, recycling and processing equipment to separate and recycle materials from the mixed wastes and to shred and bio-dry non-recyclable materials to create a usable fuel for use by Rugby Cement. Further details of the proposal can be found on the Rugby Planning Portal Website[ix] and the Warwickshire County Council Planning webpage[x]. An air quality assessment[xi] submitted in conjunction with the planning application concluded, based on a worst-case scenario, that both short- and long-term emissions of NO_2, PM_{10} and SO_2 are likely to be below the relevant air quality objectives at all locations within the modelled area and at specific receptor locations. The air quality assessment also indicated that additional traffic generated by the facility was not likely to be significant in terms of exceedance of the air quality objectives for the key traffic pollutants NO_2 and PM_{10} within the local area.

3.4 Commercial and Domestic Sources

There are currently no biomass combustion plants in operation within the Borough of Rugby. Plans for the proposed Gateway Rugby Sustainable Urban Extension include provision for a Combined Heat and Power (CHP) energy centre. No planning application has yet been made to Rugby Borough Council and so an Air Quality Assessment is not required at this stage. However, the impact of an energy centre, and the development site as a whole, would have to be assessed prior to any planning decision being made.

The domestic use of smokeless fuels or coal in Rugby remains limited. Knowledge of the local area suggests there are no areas where the collective burning of solid fuel in domestic properties is likely to give rise to significant local air quality impacts. At present domestic solid fuel combustion is mainly confined to individual dwellings in rural areas surrounding the town. A Smoke Control Area (Figure 3.1) is enforced in the town centre area. Rugby Borough Council will continue to monitor domestic solid fuel usage and review the situation in the future.

Figure 3.1 Smoke Control Area Enforced by Rugby Borough Council



3.5 New Developments with Fugitive or Uncontrolled Sources

Since the 2009 USA there have been no new developments with the potential to generate fugitive or uncontrolled pollutant emissions.

Rugby Borough Council has identified the following new or previously unidentified local developments which may impact on air quality in the Local Authority area:

- Climafuel Manufacturing Facility to supply Rugby Cement works with solid recovered fuel from household, commercial and industrial waste.
- New rail freight terminal at Hunter's Lane, Rugby.
- Gateway Rugby Sustainable Urban Extension.

These will be taken into consideration in the next Updating and Screening Assessment, scheduled for 2012.

4 Local / Regional Air Quality Strategy

The improvement of local air quality in Rugby is an underlying theme of the Warwickshire County Council Local Transport Plan (LTP). The Air Quality Strategy incorporated into the LTP is dealt with in detail in Section 7. The measures in the LTP are deliberately generic to allow each local authority within the County to develop its own strategy tailored to address air quality issues that are specific to the local authority area in question.

Rugby Borough Council has expanded upon the more generic measures outlined in the LTP Air Quality Strategy to set out clear actions for tackling air quality issues in the Borough. These actions include:

- Specific proposals for the AQMA.
- Non-specific proposals for general improvement of air quality in the Borough.
- Reducing vehicle emissions.
- Alternative transport modes/policies.
- Non-transport measures.

Further details of Air Quality Action Planning by Rugby Borough Council are presented in Section 9.

5 Planning Applications

There are a number of future developments in Rugby that have the potential to impact upon local air quality in the Borough. Details are presented below.

Climafuel Manufacturing Facility – Rugby Cement

CEMEX submitted an application (Reference R08/1499/CM) for the development of a climafuel manufacturing facility to supply Rugby Cement works with solid recovered fuel, manufactured from mixed household and commercial and industrial waste. This was dealt with in greater detail in Section 3.3.

A number of objections were raised against the application by Rugby Borough Council. Permission was granted in November 2009.

Tee Tong Road / Back Lane Long Lawford

Approval has been granted for the construction of 120 two and three storey affordable dwellings and associated site development works at Tee Tong Road adjacent to Back Lane, Long Lawford (Reference R10/0122). The application represents an amendment of an earlier approved planning application (Ref: R00/471/08787/OP dated 26th June 2003).

A number of large developments that form a part of the Regional Spatial Strategy have yet to be granted approval but have the potential to have an impact on local air quality in the Borough. The new UK Government has removed the requirement for local authorities to implement the requirements of Regional Spatial Strategies. However, Rugby Borough Council has decided to commit to already agreed and planned developments within the Borough. Therefore the Gateway Rugby and Radio Station Sustainable Urban Extension developments are still proceeding.

Rugby Radio Station Sustainable Urban Extension Development

The Rugby Radio Station Sustainable Urban Extension development proposal is part of the Government's Regional Spatial Strategy. It is anticipated to provide up to 6,200 residential properties. The development extends beyond the Rugby Borough Council boundary into Daventry Borough Council, incorporating commercial and industrial units and the proposed extension of the DIRFT Freight Terminals 1 and 2. However, the majority of the DIRFT extension development will be within the neighbouring borough of Daventry.

The construction of a new road would be essential for the development to link the site with Rugby town and surrounding motorway network. The specific details of the access route are yet to be finalised but it is anticipated that it will be a mixed traffic route with bus priority. The favoured new road link is proposed to join Clifton Road in the vicinity of its junction with Butlers Leap. No new connection to the motorway network is proposed. The impact on local air quality will be investigated as part of the Environmental Impact Assessment (EIA) of the Rugby Radio Station Sustainable Urban Extension.

The Gateway Rugby Sustainable Urban Extension Development

The development proposals are for a mixed-use development on a 125.3 ha site to the north of Rugby town centre and south of the M6. Preliminary plans indicate the development would include the following:

- 40 ha of residential development providing around 1300 dwellings;
- A community hub covering 2.8 ha and consisting of:
    - D1 uses including primary school, community space, nursery and health; and
    - A1/A5 retail uses and A3/A4 food and drink units.
- 21.9 ha of B8 development (Storage and Distribution units) and 14.1 ha of B2 development (General Industry;

- Combined Heath and Power (CHP) Energy Centre; and
- Green space with strategic landscaping and recreation space.

Proposed access to the site would be via two points. Access to the north of the site would be from the existing roundabout at the junction of the A426 Leicester Road and Central Park Drive. Access to the southern end of the site would be from the Brownsover Lane / Leicester Road roundabout with realignment works on Brownsover Lane. It is also proposed to provide bus links, pedestrian and cycle routes, incorporating existing public rights of way.

Rugby Town Centre Pedestrianisation Scheme

Options for the extension of the pedestrianised area of Rugby town centre were presented in the Transport Management Plan for Rugby town centre. The meeting of the Warwickshire County Council Rugby Area Committee on 21st April 2009 agreed that Option 1 was the preferred option that would be taken forward to the Detailed Design stage. Option 1 proposes the complete pedestrianisation of a section of North Street and Church Street around the Clock Tower, with traffic being diverted via Regent Street and Albert Street. Road traffic increases are expected along Park Road, Henry Street, Regent Place and Albert Street (East) with corresponding decreases on North Street and Church Street.

AECOM Ltd carried out an assessment of the potential impacts of the scheme on air quality on behalf of Rugby Borough Council. It was concluded that some areas would see beneficial impacts on local air quality, whilst others would experience deterioration with the implementation of the scheme. Work on the detailed design of the pedestrianisation scheme is currently under preparation.

Rugby Western Relief Road (RWRR) – Parkfield Road / RWRR Junction Amendments

Details of the junction amendments are presented in Section 3.1.

DB Schenker Rail Freight Terminal, Hunters Lane, Rugby

Details of the Rail Freight Terminal proposals are given in Sections 3.1 and 3.2.

6 Air Quality Planning Policies

Rugby Borough Council is committed to the control of pollution from both existing sources and future developments. To safeguard natural resources and the environment from potential pollution sources the Rugby Borough Development Plan (adopted July 2006) incorporates policies that make environmental issues a material consideration in the planning process. Direct reference to the consideration of air quality in planning application decisions is made in two policy statements, as reproduced below.

"Policy GP11 – Pollution control

Planning permission will be granted where it is demonstrated through an appropriate assessment, taking full account of previous and proposed uses, that the proposal would not result in material harm in relation to:

1. Surface or ground water, particularly potable sources,
2. Air quality,
3. Soil conditions,

Or result in unacceptable levels of noise, light or air pollution.

It may be necessary to prevent developments with the potential to pollute, separate them from other land uses liable to be affected, or require mitigation measures sufficient to satisfactorily reduce, or avoid the risk of harm."

And

"Policy GP12 – Air Quality Management Area

Development proposals within the Air Quality Management Area (AQMA) that fulfil the requirements specified for air quality assessments (Table 2), or are likely to hinder the achievement of the Council's air quality objectives, will be required to demonstrate their impact on air quality.

Development that is likely to have a net adverse impact on air quality in the AQMA will not be permitted, unless such effects are mitigated to the satisfaction of the Council.

Table 2: AQMA thresholds

Land Use	***Threshold Above Which an Air Quality Assessment Will Generally be Necessary (m^2)***
A1, A2 and A3 retail development	*1000*
B1 including offices	*2500*
B2 general industry	*5000*
B8 storage and distribution	*5000*
Educational establishments	*2500*
D2 Assembly and leisure facilities, including stadia	*1000*
C3 residential development	*100*
Health establishments	*2500*

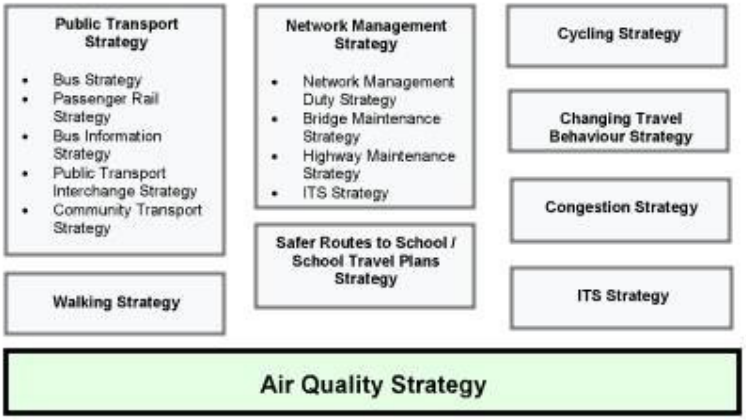
7 Local Transport Plans and Strategies

The improvement of local air quality in Rugby is an underlying theme of the Warwickshire County Council Local Transport Plan (LTP)[xii] forming one of main Core Strategies. The fundamental vision of the strategy is **'to take a proactive approach to maintaining and improving air quality within the County where transport is causing unacceptable levels of air pollution, in order to improve quality of life for all'.** Five key policies are laid out in the LTP, as summarised below:

- Improving poor air quality through partnership working;
- Maintaining air quality in areas without existing air quality problems;
- The promotion and education of the general public as widely as possible about air quality, to provide information about transport choices and their implications for air quality and health;
- Regular reviews of the Air Quality Strategy to keep it up to date with the current air quality situation in the County, developments in policy and legislation and air quality knowledge and best practice techniques;
- Integration of air quality and transport planning goals.

Figure 7.1 below highlights the key links between the Air Quality Strategy and the other LTP strategies.

Figure 7.1 Key Links Between the Air Quality Strategy and Other LTP Strategies



Action Plans for delivering the elements of the Air Quality Strategy are summarised in Table 7.1.

The current LTP Air Quality Strategy is available for download from the Warwickshire County Council webpage (www.warwickshire.gov.uk/ltp). Access to the internet is available in most libraries for those who do not have access at home. Hard copies of the plan can be made available on request, as can an electronic version on CD-ROM.

The Air Quality Strategy is currently being reviewed as part of the preparation of the County Council's next Local Transport Plan (LTP3). Public Consultation on LTP3 commenced on 3rd June 2010. The final LTP will be submitted to the Department for Transport at the end of March 2011.

Table 7.1 Summary of Local Transport Plan Actions Relating to Local Air Quality

Action	Description of Activities and Progress Made
Action AQA1 - Improving poor air quality through partnership working	Improving air quality in the County will include assisting the District/Borough Councils in drawing up Air Quality Action Plans as required (if and when Air Quality Management Areas are declared) and providing support in implementing the Plans. Regular communication with the District/Borough Councils, as well as neighbouring authorities and other organisations such as the Highways Agency, will be carried out to ensure maximum awareness of all air quality issues. The County Council will seek to implement traffic management schemes where air quality is poor, particularly within town centres. Air quality monitoring will be carried out in support of the District/Borough Councils, in order to foresee any potential air quality problems, improve the local and regional air quality data set, and improve the knowledge and understanding of the air quality situation in the County. The County Council has recently published a Lorry Route Map for Warwickshire, which aims to take road freight vehicles away from sensitive locations, such as residential areas and onto more appropriate routes. The County Council also aims to operate a "cleaner" vehicle fleet by introducing alternative-fuel vehicles, as they become economically viable. The County Council currently operates 344 vehicles, of which 222 are diesel, 94 are petrol (largely motor scooters used in the "Wheels To Work" scheme) and 28 are rebated diesel. The County Council Fleet vehicles are currently purchased according to the carbon dioxide performance of the vehicle.
Action AQA2 - Maintaining areas of good air quality	Maintaining on-going communication with the District/Borough Councils to ensure full awareness of potential future air quality issues. Implementation and promotion of a Lorry Route Map for the County, encouraging goods vehicles to remain on designated routes.
Action AQA3 - Education and information	Increasing public awareness of road transport-related air quality issues, through a number of initiatives, including a dedicated air quality page on the Warwickshire County Council website. Promoting the use of public transport and alternative methods of transport to the private car, including Travel Wise initiatives and travel plans for schools and workplaces. Promotion of cycling and walking as alternative methods of transport, highlighting the health benefits that both these modes can bring. Continued promotion of the Safer Routes to School initiative, including Walk to School Weeks throughout the County and possible introduction of Car Free Days to the main town centres of the County. Improving route signage, particularly in town centres, in order to alert drivers to more preferable, possibly less congested routes. It is anticipated that the County Council's use of "cleaner" vehicle technology will encourage other employers to make use of similar types of vehicles.
Action AQA4 - Strategy review	The Air Quality Strategy is to be reviewed no less than once a year and is to be informed by the District/Borough Council reviews of air quality.
Action AQA5 - Integration of air quality and transport planning goals	Traffic will be managed, where possible, to take account of the need to minimise impacts on local air quality. In new developments, air quality issues will be considered in all situations, including the consideration that all new developments are to have reasonable access to public transport and sufficient provision is made for pedestrians and cyclists. Local bus services will be improved, by increasing the accessibility, affordability and safety of services. The County Council will contribute to the national targets on greenhouse gases, which includes an overall reduction of 20% in CO_2 emissions by 2010.

8 Climate Change Strategies

Rugby Borough Council has signed up to the Warwickshire Climate Change Strategy. The Climate Change Strategy lays out a range of actions **"to reduce greenhouse gas emissions in Warwickshire to at least the level set out by Government policy, 15%-18% reduction by 2010 and a 60% reduction by 2050 (against 1990 levels). We will achieve this whilst maintaining and improving the quality of life of Warwickshire residents through the implementation of a policy of sustainable development".**

The Warwickshire Climate Change Partnership includes organisations from the public, private and voluntary sectors, understanding that they must unite to effectively reduce carbon dioxide (CO_2) emissions through targeted actions in five key areas: transport; energy; resource efficiency; adaptation; and communications and education.

9 Implementation of Action Plans

Rugby Borough Council compiled an Air Quality Action Plan Progress Report[xiii] in February 2010. The report documented the measures in place to improve air quality within the Borough of Rugby including measures specific to the declared AQMA. A summary of the Action Plan measures and progress towards achieving them are outlined in Table 9.1. A review of the Action Plan is proposed to be undertaken by Rugby Borough Council towards the end of 2010 / beginning of 2011.

Table 9.1 Summary of Rugby Borough Council's Progress in Implementing Air Quality Action Plan Measures

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
A	**Rugby Western Relief Road**	Serve new development at Cawston, Swift Valley, Malpass Farm and Coton Park, and reduce the impact of traffic within the town centre.	WCC	1996-2007	2007-2011	Implementation of the scheme in full	12%	The construction of the road began in 2007, but has been delayed due to a variety of reasons.	Substantial progress has been made with the southern section of the road between Lawford Road and Potford's Dam. This is due to open in early Summer 2010.	Winter 2010/11	
B	**Improvements to the Warwick Street Gyratory**	Reduce the impact of traffic on the town centre, and allow better access for pedestrians and cyclists. Manage the impact of housing and employment growth on the transport network of the town.	WCC	2007-2010	2011-2015	Implementation of the various measures (see section on progress to date)	Not specified	Improvements to Warwick Street Gyratory were considered as part of the Rugby Transport Study, concluding that although no major changes should be made there was an opportunity for improvements to be made to allow better access to the town centre for pedestrians and cyclists. Improvements to the Gyratory are again under consideration as part of the wider changes to the town necessary to deliver the major growth proposed in the RBC's Local Development Framework.	The final stage of the Rugby Transport Study was completed in February 2010. The County Council's Paramics traffic model of Rugby is currently being used to test the impact of the proposed LDF growth on the transport network of the town.	It is planned to deliver the pedestrian and cycle improvements in the next five years, subject to the availability of funding. A timescale for any wider improvements to come forward has not yet been identified.	
C	**Improvements to Church Street/North Street**	Reduce the impact of traffic on the town centre, and allow better access for pedestrians and cyclists. Support the regeneration of the town centre and the growth proposals within the Borough.	WCC	2007-2011	2012-2014	Implementation of the scheme in full	Not specified	Pedestrianisation of the area around the Clock Tower on Church Street/North Street has been considered as part of the Rugby Transport Study. This will extend the existing pedestrianised area and allow the delivery of a new civic space within the town centre.	A preferred scheme has been identified and agreed by Members. Detailed design and further consultation on the scheme is due to take place in 2010/11.	2013/14	

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
D	**Decriminalisation of Parking Enforcement within Rugby Borough**	Improve the management of traffic within the town centre and the impact of illegal parking.	WCC	2000-2005	2005-2006	Implementation of the scheme in full	Not specified	Scheme fully implemented	N/A	N/A	Since the commencement of Decriminalisation of Parking (now referred to as Civil Parking Enforcement- CPE) on 02/10/06, in Rugby, the introduction of parking charges on some town centre streets together with a high level of enforcement has resulted in less vehicles being parked on the streets and less congestion due to inconsiderate parking.
E	**Rugby Town Centre 20:20 Vision**	Improve public transport. Improve access for pedestrians and cyclists.	RBC	N/A – ongoing initiative	N/A – ongoing initiative	N/A	Not specified	On Schedule and ongoing. Various target dates.	On Schedule and ongoing. Various target dates.	N/A	
F	**Re-routing traffic – Lorry Route Maps and agreements**	Reduce the impact of heavy goods vehicles on the transport network of the Borough.	WCC	N/A – ongoing initiative	N/A – ongoing initiative	Reduction in complaints regarding inappropriate lorry movements	Not specified	An initial Advisory Lorry Route Map for the County was produced in 2005. This was subsequently revised and reissued in 2008/9	N/A	N/A	
G	**Variable Message Signing**	Reduce the impact of circulating traffic seeking access to the town centre car parks.	WCC	2006-2008	2009	Implementation of the scheme in full	Not specified	Scheme implemented but technical issues with sensors to be resolved	Technical issues with sensors investigated	End 2010 / Early 2011	
H	**Enforcement of Idling Vehicle Legislation**	Reduce number of idling vehicle improving local air quality by reducing emissions to air.	RBC/WCC	Under investigation, but unlikely to be implemented. Limitations in the Traffic Management Act means that Civil Enforcement Officers will be unable to enforce	Currently N/A	Currently N/A	Currently N/A	Feasibility of scheme investigated. Decision taken not to proceed with the scheme due to the restrictions in enforcement actions that can be carried out by Civil Enforcement Officers	Decision made not to proceed with scheme to restrictions on enforcement actions that can be carried out by Civil Enforcement Officers.		
I	**Improve the Borough Council Fleet (interims of emissions)**	As vehicles are replaced, they are replaced with lower emission vehicles.	RBC	N/A – ongoing initiative	N/A – ongoing initiative	Not specified	Not specified	3 vehicles were replaced with Euro V vehicles in 2007/8 and 2008/9. To date during 2009/10, 2 further vehicles have been replaced with Euro V vehicles.	2 further vehicles have been replaced with Euro V vehicles.	Ongoing N/A	

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
J	**Improve Bus Emissions**	The County Council is working with the major bus operator within the town (Stagecoach) to reduce bus emissions through its fleet renewal process, and on individual routes when they are upgraded to QBC status.	RBC/WCC	Ongoing	Ongoing	Not specified.	Not specified	Recent Urban Quality Bus Corridor improvements have been made on routes between the Town Centre and Lower Hillmorton/Long Lawford. Further improvements are planned for the route between Woodlands and the Town Centre, and on the Inter-Urban route between Rugby and Coventry (both due to be implemented in 2009/10)		Ongoing initiative	
K	**Cycling**	Reduce the impact of traffic on the transport network of the Borough (particularly within the urban area of Rugby) by encouraging a shift towards sustainable modes of transport.	WCC	N/A – ongoing initiative	N/A – ongoing initiative	Increase in cycling as a result of individual scheme implementation	Not specified	The basis of a cycle network has been delivered in Rugby over the last 12-15 years, using a combination of on and off-carriageway routes. Additional routes will come forward as part of the LTP process and in conjunction with new development. The County Council and RBC provide cycle training for young people and adults who are keen to improve their cycle skills.	Improvements to the Black Path bridge for pedestrians and cyclists over the West Coast Main Line have been implemented. Work is ongoing by Sustrans and RBC to deliver the Connect2 scheme to reopen the Leicester Road viaduct to cyclists. A number of cross-town cycle improvements have been identified as part of the Rugby Transport Study, including changes to the Warwick Street Gyratory and measures to complement the proposed pedestrianisation around the Clock Tower. Cycle routes to complement future growth within the Borough are in the process of being identified. Cycle facilities are being provided as part of the Rugby Western Relief Road	2010-2012 2011-2015 Post-2012 Winter 2010/11	

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
L	**Walking**	Reduce the impact of traffic on the transport network of the Borough (particularly within the urban area of Rugby) by encouraging a shift towards sustainable modes of transport.	WCC	N/A – ongoing initiative	N/A – ongoing initiative	Increase in walking (footfall) as a result of individual scheme implementation	Not specified	The LTP Walking Strategy sets out a series of improvements for pedestrians, including new or upgraded pedestrian crossings, new/widened footways, improved street lighting, provision of new dropped kerbs, and footway resurfacing/ reconstruction.	Along with the area-wide improvements described in the progress to date section, a preferred scheme for the expansion of the pedestrianised area of the town centre has been agreed. Detailed design and further consultation on the scheme is due to take place in 2010/11.	2013/14	
M	**Workplace Travel Plans**	Reduce the impact of traffic on the transport network of the Borough (particularly within the urban area of Rugby) by encouraging a shift towards sustainable modes of transport.	WCC	N/A – ongoing initiative	N/A – ongoing initiative	Number of Travel Plans agreed with existing employers and as part of new development	Not specified	Workplace Travel Plans are secured through a S106 agreement as part of new development.	Travel Plans covered by Planning Condition -NPIA Training Centre - Ryton - Rugby Cattle Market, Hotel Use Travel Plans covered by S106 - Herbert Grey College / Caldecott Square Residential Travel Plan - Coton Park East (awaiting outcome of appeal)	N/A	
N	**School Travel Plans and Safer Routes to School**	Reduce the impact of traffic on the transport network of the Borough (particularly within the urban area of Rugby) by encouraging a shift towards sustainable modes of transport.	WCC	N/A – ongoing initiative	N/A – ongoing initiative	Reduction in the number of car-based journeys to school	Not specified	A School Travel Plan must be produced prior to any Safer Routes to School improvements being implemented. An ongoing programme of schemes is implemented across the County. The most recent scheme to be delivered within the Borough relates to Avon Valley School.	N/A	N/A	
O	**Public Transport Strategy, including the Bus Strategy**	Reduce the impact of traffic on the transport network of the Borough (particularly within the urban area of Rugby) by encouraging a shift towards sustainable modes of transport.	WCC	N/A – ongoing initiative	N/A – ongoing initiative	Increase in bus patronage	Not specified	Ongoing implementation of the various strategies which make up the Public Transport Strategy, including the Bus Strategy, Passenger Rail Strategy, Community Transport Strategy, Public Transport Information Strategy and Public Transport Interchange Strategy.	Over the last 12 months, the Rugby – Wolston – Coventry (boundary) Inter-Urban Quality Bus Corridor and Woodlands – Rugby Town Centre Quality Bus Corridor improvements have been implemented.	N/A	

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
P	**Travel Awareness Campaigns**	Reduce the impact of traffic on the transport network of the Borough (particularly within the urban area of Rugby) by encouraging a shift towards sustainable modes of transport.	WCC	N/A – ongoing initiative	N/A – ongoing initiative	Reduction in the number of car-based journeys being made within the Borough	Not specified	Ongoing implementation of the Changing Travel Behaviour Strategy and other relevant LTP strategies.	Regular annual events include Bike Week, Walk to School week, and In Town Without My Car Day. The County and Borough Councils both support the national Travel wise initiative.	N/A	
Q	**Energy efficiency improvements to Rugby housing & the reduction of fuel poverty.**	Reduction of carbon emissions from domestic dwellings, the reduction of residents' fuel bills & the alleviation of ill health due to cold, damp housing.	Rugby Borough Council	N/A – ongoing initiative	Ongoing	NI 187 (reduction of fuel poverty); NI 186 (per capita reduction in CO_2 emissions in the LA area).	15% increase in households receiving energy efficiency improvements; 1.5% improvements in SAP Ratings.	Ongoing promotion of energy efficiency measures across the Borough.	Improvement in the energy efficiency performance of housing the encouraging the installation of cavity wall insulation, loft insulation & high energy efficiency condensing boilers through discounts & grants. Households receiving energy efficiency improvements = 352 (well over target, even without complete data for the full year). *Warm Front* Grants funding to Rugby Borough residents for energy efficiency improvements totalled £419,921 in 2008-2009 & £521,847 in 2009-2010 (does not include March stats). NI 187 2009-2010 survey results: %<SAP35 = 7.61% - change from previous year = -1.03% (slightly under target) & %>=SAP65 = 44.29% - change from previous year = 13.20% (well over target).	Ongoing	
R	**Control Of Industrial Emissions**	Reduce the environmental impact of industrial processes through pollution control regulation	RBC	N/A – ongoing initiative	N/A – ongoing initiative	97.36% compliance improvements	Not specified	Annual inspection programme complete.	38 Industrial Pollution Processes (100% of inspections completed). All were inspected through 2009/2010 - 97.36% compliance improvements where required for pollution at these sites.	N/A	

No.	Measure	Focus	Lead authority	Planning phase	Implementation phase	Indicator	Target annual emission reduction in the AQMA	Progress to date	Progress in last 12 months	Estimated completion date	Comments relating to emission reductions
S	**Emissions from Domestic and Commercial Sources**	Prevent and/or reduce environmental impacts from domestic and commercial emissions.	RBC	N/A – ongoing initiative	N/A – ongoing initiative	Reduction in complaints.	Not specified	Low priority. Low number of complaints.	Ongoing	N/A	
T	**Control of Bonfires**	Prevent and/or reduce environmental impacts from domestic and commercial emissions.	RBC	N/A – ongoing initiative	N/A – ongoing initiative	Reduction in complaints	Not specified	Low priority. Low number of complaints.	Ongoing		
U	**Planning Development and Planning Applications**	Air quality assessments have been requested for land use planning developments that meet AQMA thresholds in the Rugby Borough Local Plan (July 2006). This is to ensure that new development does not result in a significant increase in the production of air pollutants and that opportunities are taken to improve air quality, where possible. In some instances where an AQMA threshold has not been met, officer discretionary measures have been utilised where it is felt that a proposed land use development has potential to impact on air quality and should be a material consideration.	RBC	Ongoing	Ongoing	Not specified	Not specified	CEMEX Climafuel Facility Malpass Farm, rugby. Mast Site Regional Spatial Strategy Development Gateway Rugby Sustainable Urban Extension Lime Tree Village Extension, Cawston Rugby. Long Lawford residential development Rugby Western Relief Road Priority Junction. Town Centre Pedestrianisation Rugby Western Relief Road including proposed changes to include priority Junction Priory Road, Wolston Residential Development	Ongoing		

10 Conclusions and Proposed Actions

10.1 Conclusions from New Monitoring Data

The latest monitoring data from throughout the Borough has indicated that the annual mean objective for NO_2 continues to be exceeded at locations of relevant exposure within the existing AQMA boundary. The same sites continue to be affected as were reported in the 2009 USA, namely Webb Ellis Pub, Corporation Street (DT 10) and 15 Oliver Street, New Bilton (DT 11). The monitoring sites at the EHO Department, Newbold Road (DT 8) and Avon Mill Pub (DT 15) are close to the annual mean NO_2 objective.

Continuous NO_2 monitoring at Newbold Road shows that the annual mean NO_2 objective is being achieved at this location. The hourly mean NO_2 objective is also being achieved at this site. No monitoring sites outside of the existing AQMA exceeded the annual mean NO_2 objective during 2009. Furthermore, as none of the NO_2 diffusion tube monitoring sites displayed concentrations close to or exceeding 60 µg/m^3 it is very unlikely that the hourly mean NO_2 objective is currently being exceeded at any location.

Continuous monitoring of PM_{10} at six locations throughout the Borough has shown that annual mean PM_{10} concentrations are well below the annual mean objective of 40 µg/m^3. The number of exceedances of the daily mean standard at all six monitoring sites was well within the allowed 35 exceedances outlined in the daily mean objective.

AECOM Ltd has recommended to Rugby Borough Council to maintain the current monitoring programme within the Borough with particular attention being paid to pollutant concentrations at locations where exceedences have been identified. It is anticipated that the objectives at these locations will be achieved upon completion of the Rugby Western Relief Road scheme as road traffic sources are rerouted away from the town centre, relieving the current congestion around Corporation Street, the Warwick Street Gyratory, Newbold Road and Oliver Street. Rugby Borough Council are therefore not planning to change the present monitoring programme but are planning to conduct a full review by elected members and officers in 2011 when the Council will be better informed of the impact of the Rugby Western Relief Road scheme on local air quality.

10.2 Conclusions relating to New Local Developments

The Progress Report has identified several local developments of importance for local air quality. The developments requiring more detailed consideration in the forthcoming Updating and Screening Assessment include:

- Climafuel Manufacturing Facility at Malpass Farm.
- Rugby Radio Station Sustainable Urban Extension Development.
- Gateway Rugby Sustainable Urban Extension Development
- DB Schenker Rail Freight Terminal at Hunter's Lane.
- Development at Tee Tong Road / Back Lane, Long Lawford.
- Two waste oil burners granted PPC permits during 2009.

10.3 Other Conclusions

Rugby Borough Council has assessed the recently opened BP Filling Station at Corporation Street against the criteria outlined in LAQM.TG(09) to investigate whether the 2010 objective for benzene may be likely to be exceeded. The station does not meet any of the criteria outlined in the guidance and so will not require any further assessment at this stage.

10.4 Proposed Actions

Based on the findings of this Progress Report the following conclusions have been drawn:

- Exceedances of the annual mean NO_2 objective continue to be monitored at two locations within the town centre. Two additional diffusion tube monitoring sites are less than 10% below the annual mean objective;
- The current AQMA for NO_2 covering the whole Borough of Rugby should remain;
- There were no exceedances of any other air quality objectives at any location throughout the Borough; and
- Several proposed future developments have been identified that have the potential to impact upon local air quality and the ability of Rugby Borough Council to implement actions detailed in their Air Quality Action Plan.

The following actions are to be undertaken by Rugby Borough Council:

- Continue the current level of monitoring within the Borough with particular attention being paid to the locations currently indicating exceedances of the annual mean NO_2 objective;
- Complete and submit the Detailed Assessment that was recommended in light of the 2009 USA;
- Seven new developments identified as having the potential to affect local air quality will be assessed as part of the forthcoming USA;
- Prepare and submit a Progress Report in 2011;
- Continue to implement the measures outlined in the Air Quality Action Plan to bring about improvements in local air quality;

11 Appendices

Appendix 1: QA/QC Procedures

Monitoring in Rugby was performed in accordance with the guidelines outlined in Technical Guidance Notes LAQM.TG(09), LAQM.TG(03) and LAQM.TG1(00). All the analysers were set up and calibrated in strict accordance with the manufacturers' recommended procedures prior to and during use. An overview of QA/QC procedures are provided below.

Continuous Monitoring QA/QC Procedures

Automatic remote calibrations of the NO_X analyser are conducted daily. These automatic calibrations are supplemented by manual calibrations every two to three weeks to quantitatively determine instrumental drift. Air Liquide specialist calibration gases are used to obtain span values and instrumental drift is accounted for during the processing of the data. Analyser filters are also changed during these routine calibrations, with span and zero determinations being made before and after. Any instrument span or zero drift was assumed to be linear between discrete checks, and the data corrected linearly in accordance with any drift.

All fittings in contact with the sample gas stream are either polytetrafluoroethene (PTFE) or stainless steel, so that surface losses are kept to a minimum. Qualified engineers service the analysers at six monthly intervals.

The TEOM-FDMS analyser filters are changed every four weeks during routine site visits. The sampling head is cleaned regularly. Visual inspection of the analyser along with remote access to diagnostic information ensures problems can be identified quickly and dealt with effectively, thus ensuring good data capture rates. Qualified engineers service the TEOM-FDMS every six months.

The five Turnkey Osiris Dust Monitors are inspected every four to six weeks during routine site visits. The filters are changed and sample flow rates are checked and adjusted as necessary. The monitors are returned to the manufacturer annually for recalibration and servicing.

All site visits are documented to describe any adjustments made and to record any problems encountered. Results of all analyser tests and calibrations are recorded. Following scheduled service visits service reports are issued by the service engineers to provide documentation of maintenance performed.

PM Monitoring Adjustment

PM_{10} concentrations at AQMS 5 Newbold Road are measured by TEOM-FDMS and so do not require any correction for gravimetric equivalence. Particulate matter concentrations measured by the Turnkey Osiris Dust Monitors are presented without any correction because the optical measurement method used by the Osiris analysers is not accepted as an Equivalence measurement method either with or without correction. Previous studies in Rugby indicated a good agreement between co-located Turnkey and TEOM instruments and thus it is considered acceptable to present the Turnkey concentrations without adjustment.

Diffusion Tube Monitoring QA/QC Procedures

Diffusion Tube Bias Adjustment Factors

All NO_2 diffusion tubes used by Rugby Borough Council are supplied and analysed by Harwell Scientific using a 50% TEA in Acetone preparation method. Analysis is performed in accordance with standard operating procedure HS/WI/1015 Issue 14. This method conforms to the guidelines set out in Defra's 'Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance'[xiv].

Harwell Scientifics participates in the WASP intercomparison scheme for comparing spike NO_2 Diffusion Tubes. In the most recent quarterly summary report[xv], Harwell Scientifics is currently ranked as a Category "Good" laboratory.

A national bias adjustment factor for 2009 of 0.81, based on nineteen diffusion tube studies using the same preparation method and analytical laboratory was obtained from the Review and Assessment Helpdesk[xvi] Spreadsheet version 03/10 (Table 11.2).

Factor from Local Co-location Studies

A local bias adjustment factor for NO_2 Diffusion Tube monitoring was derived from a co-location study. Triplicate tubes were placed alongside the NO_X Analyser at AQMS 5 Newbold Road. The AEA_DifTPAB_v03 Spreadsheet obtained from the Air Quality Archive website[xvii] was used to calculate a local bias adjustment factor. Details of the local bias adjustment calculation are shown in Figure 11.1 below.

The factor calculated from the co-location study yielded a factor of 0.98. The average CV of 12 of the 13 monitoring periods in 2009 was 8%, which corresponds to "Good" precision.

It was noted in December 2009 that the triplicate tubes at Newbold Road may not have been positioned correctly in accordance with the guidance on the use of diffusion tubes. The tubes were mounted on the meteorological mast of the monitoring station which is approximately 3 metres further from the roadside than the sampling inlet of the continuous monitor. It is likely therefore that the bias adjustment factor calculated for 2009 was too high as the raw diffusion tube concentrations are likely to have been lower than if the diffusion tubes had been located alongside the sampling inlet.

It is unclear when the co-located tubes were moved to the position on the meteorological mast but the high bias adjustment factor obtained for 2008 suggests that the triplicate tubes were incorrectly positioned during 2008. As a consequence of these findings a national bias adjustment factor was applied to the raw diffusion tube results for 2009. The 2008 data remain unchanged at present but the situation will be reviewed.

Figure 11.1: NO_2 Diffusion Tube Bias Adjustment Calculation, Rugby 2009

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

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
1	15/12/2008	13/01/2009	46.5	41.9	46.0	45	2.5	6	6.3
2	13/01/2009	11/02/2009	59.6	51.6	47.1	53	6.3	12	15.7
3	11/02/2009	06/03/2009	41.2	44.2	38.9	41	2.7	6	6.6
4	06/03/2009	06/04/2009	38.5	61.4	64.1	55	14.1	26	34.9
5	06/04/2009	24/04/2009	43.9	42.0	40.8	42	1.6	4	3.9
6	24/04/2009	05/06/2009	23.9	18.4	23.8	22	3.1	14	7.8
7	05/06/2009	03/07/2009	31.6	29.5	25.2	29	3.3	11	8.1
8	03/07/2009	03/08/2009	17.4	16.7	17.4	17	0.4	2	1.0
9	03/08/2009	04/09/2009	19.7	19.2	19.2	19	0.3	1	0.7
10	04/09/2009	02/10/2009	31.6	22.5	26.0	27	4.6	17	11.4
11	02/10/2009	04/11/2009	39	41.6	39.8	40	1.3	3	3.3
12	04/11/2009	04/12/2009	27.1	34.5	33.1	32	3.9	12	9.8
13	04/12/2009	05/01/2010	52.1	42.1	50.1	48	5.3	11	13.1

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

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
37.6	99.8	Good	Good
44.8	100.0	Good	Good
43.2	100.0	Good	Good
40.8	100.0	Poor Precision	Good
42.7	99.8	Good	Good
26.0	100.0	Good	Good
32.1	98.2	Good	Good
19.8	100.0	Good	Good
19.4	100.0	Good	Good
25.8	99.9	Good	Good
37.1	99.7	Good	Good
36.8	100.0	Good	Good
43.1	100.0	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Rugby Newbold Rd

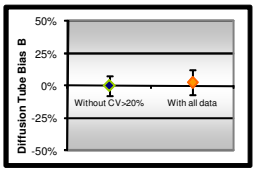
Precision: 12 out of 13 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%

Bias calculated using 12 periods of data
Bias factor A: 0.98 (0.91 - 1.07)
Bias B: 2% (-6% - 10%)
Diffusion Tubes Mean: 35 µgm^{-3}
Mean CV (Precision): 8
Automatic Mean: 34 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 34 (31 - 37) µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA

Bias calculated using 13 periods of data
Bias factor A: 0.96 (0.88 - 1.05)
Bias B: 5% (-5% - 14%)
Diffusion Tubes Mean: 36 µgm^{-3}
Mean CV (Precision): 10
Automatic Mean: 35 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 35 (32 - 38) µgm^{-3}



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Version 03 - November 2006

Selection of Bias Adjustment Factor for Diffusion Tube Correction

Local and national bias adjustment factors have been derived for correction of the NO_2 diffusion tube results for Rugby, as described above. In applying bias-adjustment to the raw diffusion data for 2009 it was decided to use the national factor. The reasons for choosing the national factor are:

- The co-location of triplicate tubes alongside the continuous monitoring site was not performed in accordance with the guidance.
- A comparison of the national bias adjustment factor for 2009 with the local bias adjustment factors used to adjust previous years diffusion tube data showed a good agreement (with the exception of 2008, which is also under review).

In comparison with the national bias-adjustment factor the locally-derived factor is larger and results in higher bias-adjusted NO_2 concentrations in Rugby. As described in the above section, the local bias adjustment factor is likely to be too high resulting in overestimates of NO_2 concentrations.

Short-Term to Long-Term Data adjustment

All monitoring data included in the report are based on full-year data collection periods. Due to vandalism at Boughton Leigh School, Brownsover, data capture was 67% and so it was necessary to calculate and apply an annualisation factor. This factor was calculated according to the methodology outlined in Box 3.2 of LAQM.TG(09). Annual and period mean NO_2 concentrations were taken from three nearby AURN urban background sites and used to derive the annualisation factor (Table 11.1). The bias-adjusted measured mean NO_2 concentration at DT12 was multiplied by the annualisation factor to derive an estimate of the annual mean NO_2 concentration in 2009.

Table 11.1: Annualisation of Short-Term Monitoring Data, 2009

Site Name	Annual Mean ($\mu g/m^3$)	Period Mean[A] ($\mu g/m^3$)	Ratio Annual Mean : Period Mean
Birmingham Tyburn	32.0	32.2	0.994
Coventry Memorial Park	17.0	17.0	1.003
Leamington Spa	27.0	26.1	1.037
Average			**1.011**

Note: [A] Period mean the periods for which diffusion tube data at site DT12 were not available (see Appendix 2, Table 11.3). Missing diffusion tube periods: 06/04/2009 – 24/04/2009; 05/06/2009 – 03/07/2009; 04/09/2009 – 02/10/2009; 04/12/2009 – 05/01/2010.

Table 11.2: National NO_2 Diffusion Tube Bias Adjustment, 2009

Analysed By[1]	Method To undo your selection, choose (All) from the pop-up list	Year[5] To undo your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m3)	Automatic Monitor Mean Conc. (Cm) (µg/m3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Harwell Scientific Services	50% TEA in Acetone	2009	R	Falkirk Council	12	39	27	44.6%	G	**0.69**
Harwell Scientific Services	50% TEA in Acetone	2009	UB	Falkirk Council	12	27	23	20.8%	G	**0.83**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Hambleton DC	11	28	23	22.9%	G	**0.81**
Harwell Scientific Services	50% TEA in Acetone	2009	UB	Medway Council	9	23	21	12.1%	G	**0.89**
Harwell Scientific Services	50% TEA in Acetone	2009	Rural	Medway Council	10	26	17	57.6%	G	**0.63**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Adur DC	9	53	46	16.7%	G	**0.86**
Harwell Scientific Services	50% TEA in Acetone	2009	UB	Ashford BC	12	23	22	2.6%	P	**0.97**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Vale of the White Horse DC	9	34	30	15.1%	G	**0.87**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Cambridge CC	12	50	42	20.0%	G	**0.83**
Harwell Scientific Services	50% TEA in Acetone	2009	B	Canterbury CC	11	20	16	26.6%	G	**0.79**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Canterbury CC	12	49	37	30.1%	G	**0.77**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Gateshead Council	10	39	34	15.8%	G	**0.86**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Gateshead Council	10	38	28	36.6%	P	**0.73**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Gateshead Council	10	41	30	37.8%	G	**0.73**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Gateshead Council	9	35	30	14.4%	P	**0.87**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Rugby BC	12	35	34	3.8%	G	**0.96**
Harwell Scientific Services	50% TEA in Acetone	2009	I	Swale BC	12	26	22	18.8%	G	**0.84**
Harwell Scientific Services	50% TEA in Acetone	2009	R	Swale BC	12	44	30	46.1%	P	**0.68**
Harwell Scientific Services	50% TEA in Acetone	2009	K	AEA Tech Intercomparison	11	129	108	20.3%	G	**0.83**
Harwell Scientific Services	50% TEA in Acetone	2009		**Overall Factor[3] (19 studies)**				**Use**		**0.81**

Appendix 2: Diffusion Tube Monitoring Data

Table 11.3: Monthly Nitrogen Dioxide Diffusion Tube Results, 2009 (µg/m^3. No Bias Adjustment)

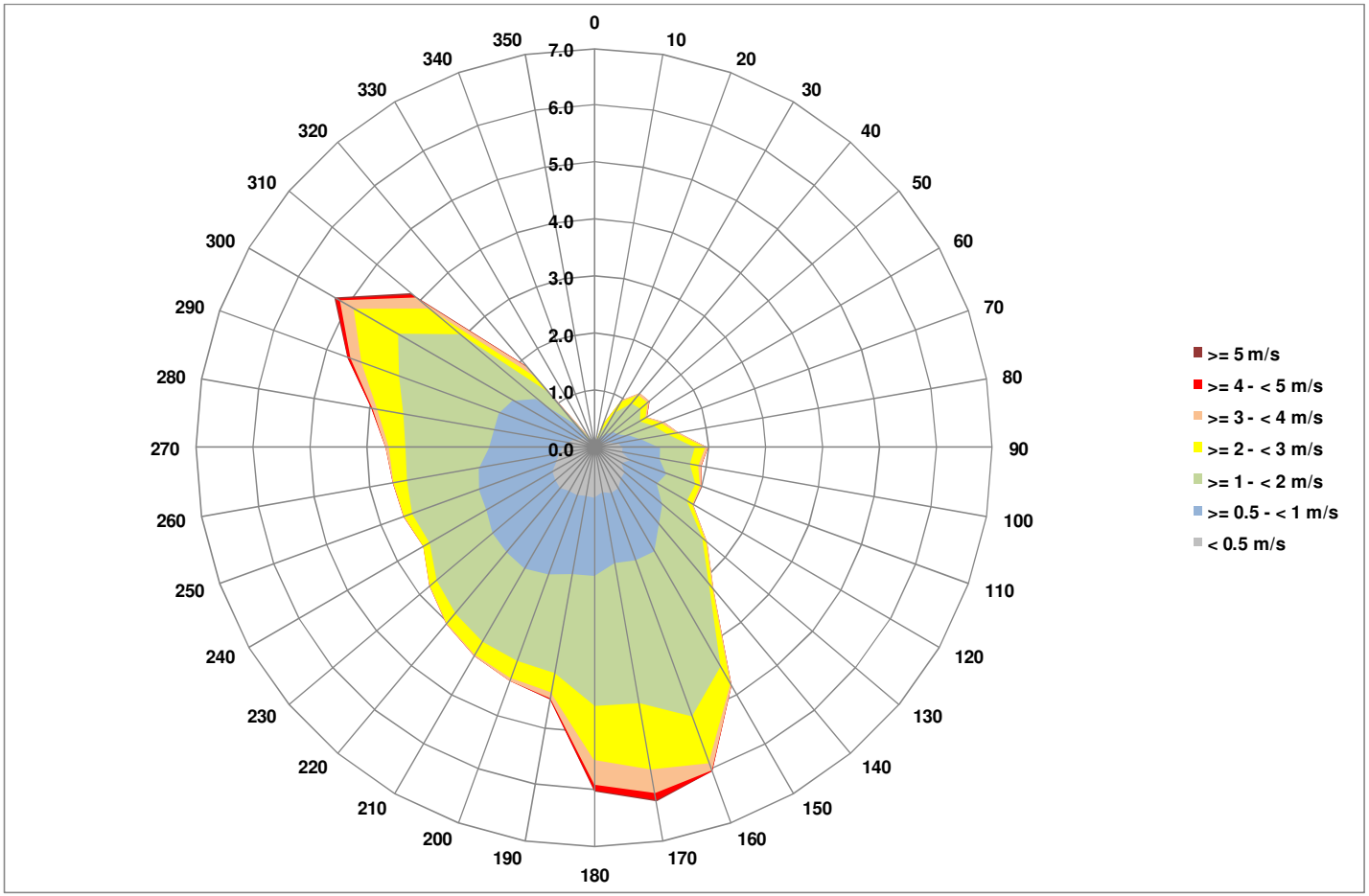
Site Ref	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	Data Capture (%)
DT 1	10 Newbold Rd, Opposite Shops	46.5	41.4	26.3	28.7	16.3	21.3	10.5	15.5	17.8	32.5	27.2	34.9	26.6	100.0
DT 2	62 Alwyn Rd, Bilton	ND	27.9	21.9	20.8	9.2	18	7.9	10.5	15.4	25.7	20.7	32.4	19.1	91.7
DT 3	69 School St, Long Lawford	44.5	29.4	23.1	20.2	12.7	18.5	8	9.9	14.9	25.1	22.1	28.7	21.4	100.0
DT 4	St Margaret's School, Wolston	ND	28.4	15	12.9	ND	13.2	7.7	7.4	14.1	21.3	18.2	25.8	16.4	83.3
DT 5	Ryton Village Hall, High Street	53.3	ND	37.1	37.5	21.1	36	16.7	17.4	31.2	35.1	24.5	36.1	31.5	91.7
DT 6	2 Westfield Rd, Bilton	40	36.6	27.2	24.5	13.5	22.2	13.4	13.9	22.4	25.7	21.8	31.4	24.4	100.0
DT 7	68 Cymbeline Way, Bilton	21.6	29.1	19.6	18.2	10	12.8	6.9	8.9	10.9	19.6	16.4	27.6	16.8	100.0
DT 8	EHO Dept, Newbold Rd	72.1	58.9	31.5	63.3	32.7	52.9	31.4	29.2	ND	52.7	44.8	55.3	47.7	91.7
DT 9	Cambridge St. / Argyle St.	42.5	41	26.7	27.6	13.3	17.5	10.9	16.5	23.7	30	26.4	37.9	26.2	100.0
DT 10	Webb Ellis Pub, Corporation St.	76	74.8	55.4	61.5	37.3	ND	15.4	40.8	43.8	61.1	58.3	59.2	53.1	91.7
DT 11	15 Oliver St., New Bilton	93.4	96.7	61.9	47.8	28.7	36.9	29.5	26.5	35.4	56.5	66.5	82.6	55.2	100.0
DT 12	Boughton Leigh School, Brownsover	53.2	41.9	45.6	ND	18.7	ND	14.2	16	ND	36.4	33.9	ND	32.5	66.7
DT 13	Avon Mill Pub, Newbold Rd	57.6	56.5	34.8	33.3	1.4	39.6	41.7	37.8	41.9	55.1	54	62.7	43.0	100.0
DT 14	Binley Woods Village Hall	ND	37.7	39	23.6	13.5	18.7	ND	13.8	20.9	27	21.9	35.2	25.1	83.3
DT 15	Lawford / Jubilee St, Arnie's Batch	65.8	56.2	45.3	38.3	19.4	ND	25.4	ND	65.7	48.1	42.9	47.9	45.5	83.3
DT 16	Marriot / Courtyard Hotel, A45, Ryton	40.1	40.3	27.1	21.3	16.5	28.6	15.5	13.6	24	30.5	21.6	34	26.1	100.0

Table 11.4: Monthly Sulphur Dioxide Diffusion Tube Results, 2009 (µg/m^3. No Adjustment)

Site Ref	Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	Data Capture (%)
DT C	69 School St	7.8	4.6	9.8	ND	ND	4.3	3.5	6.2	6.7	19.3	13.0	7.0	8.2	83.3
DT F	Wolvey Village Hall	7.7	24.5	7.3	9.6	5.7	7.2	4.6	8.0	10.2	16.6	9.1	6.2	9.7	100.0
DT M	Avenue Road	5.4	7.9	8.2	5.3	6.4	5.5	2.1	6.4	3.3	9.0	7.4	5.4	6.0	100.0

Appendix 3: Meteorological Data – AQMS Newbold Road, 2009

Figure 11.2: Wind Rose Based on Data Collected at Newbold Road AQMS, 2009



Appendix 4: Pollution Prevention and Control

Table 11.5: Changes to Pollution Prevention and Control Register Since 2009 USA

Ref No.	Date Authorised	Applicant	Address to which relates	O S Grid Ref.	Process
New Permits 2009 / 2010					
75/PPC/1.3(e)	14/05/2009	Woodlands Service Station 37 Cymbeline Way Bilton Rugby Warwickshire Cv22 6JZ	As Applicant Contact Jackie Sewell	TBC	Waste Oil Burner
77/PPC/1.3(e)	23/03/09	T W Tyres 11 Paynes Lane New Bilton Rugby Warwickshire CV21 2UH	As Applicant Contact Mr M. Furner	TBC	Waste Oil Burner
78/PPC/1.4b	08/05/2009	BP Oil (UK) Limited, Witan Gate House 500-600 Witan Gate Milton Keynes MK9 1ES Tel. 01908 853000 (Mr Stuart Wright)	Kestrel Filling Station, Corporation Street Rugby Warwickshire CV21 2DN	TBC	Unloading of petrol into stationary storage tanks at a service station – Stage II Vapour Recovery Included
Variations to Existing Permits					
13/PPC/6.5(a)	14.6.93 2.11.00 Part A Issued 31.01.07	Ball Packaging Pretorian Way, Glebe Farm Industrial Estate, RUGBY. CV21 2RN.	(as applicant)	SP 502772	
32/PPC/1.4(b)	24.9.98 31.03.03 12.03.04	Sainsbury's Supermarkets Ltd 33 Holborn London EC1N 2HT Tel. 02076956000 Fax 020 7695 7610 www.sainsbury.co.uk	Sainsbury's Supermarkets Limited Petrol Station 385 Dunchurch Road, RUGBY. CV22 6HU.	SP 495726	Petroleum Station Stage II Vapour Recovery
34/PPC/1.4(b)	25.9.98 30.06.04	**Total UK Limited** 40 Clarendon Road, Watford, Hertfordshire, WD17 1QT.	Great Central Service Station 89 Hillmorton Road, RUGBY. CV22 5AG.	SP 513749	Petroleum Station Stage II Vapour Recovery
35/PPC/1.4(b)	25.9.98 16.03.04 3.03.04	Tesco Stores Limited, P.O. Box 400, Cirrus Building, Shire Park, Welwyn Garden City, Herts, AL7 1AB. Contact: Lynda Vick 01707 634088	Tesco Stores Limited, 1 Leicester Road, RUGBY. CV21 1RG.	SP 506769	Petroleum Station Stage II Vapour Recovery

Ref No.	Date Authorised	Applicant	Address to which relates	O S Grid Ref.	Process
Surrendered Permits					
31/PPC/3.4	03.10.1997 30.03.2004 15.12.2005 01.05.2009	DB Schenker Rail (UK) Limited Lakeside Business Park, Carolina Way, Doncaster, DN4 5PN. Tel. 0870 1406279 (Darren Thompson) Darren.Thompson@ Dbschenker.com	DB Schenker No 6 Siding Rugby Up Sidings Yard, Off Hunters Lane, RUGBY.	SP 504762	Coal and Pet. Coke unloading and loading
61/PPC/3.1(a)	06.09.06	Premier Mortars Birkby Grange Birkby Hall Road Birkby Huddersfield HD2 2YA	Premier Mortars Brinklow Quarry Coventry Road Brinklow Rugby Warwickshire CV23 ONJ	TBC	Concrete Batching
Cease To Exist					
17/PPC/6.9(a) **Ceased to Exist on 2.6.09**	22.2.93 2.10.00 11.10.04	The Secretary Bakers Mill Ltd, Laughing Dog Bakery London Road, Dunchurch, RUGBY, Warwickshire. CV23 9LP	Laughing Dog Bakery, London Road, Dunchurch, RUGBY. CV23 9LP.	SP 459719	Animal Feed Stuff
Transferrals					
43/PPC/1.4(b)	25.3.99 02.02.06	Mr N. Navanathan 339 Hillmorton Road, RUGBY. CV22 5EZ.	Paddox Service Station, 339 Hillmorton Road, RUGBY. CV22 5EZ.	SP 527738	Unloading of petrol into stationary storage tanks at a service station
Permit Change Due Change in Legislation					
30/PPC/1.1(a) Gas Odourisation no longer part of EP 2010 Regulations	06.03.98 02.04.04	National Grid Gas plc (Company Registered Address) 1-3 strand London WC2N 5EH Contact Michelle Booth 01455 231624 (admin address) National Grid Block 4 Area 7 Brick Kiln Street Hinckley Leicestershire LE10 ONA Email michelle.booth@uk.ngrid.com	Coventry Road, Church Lawford (Site occupier)	Withheld	Gas Odourisation

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