

## AIR QUALITY REVIEW AND ASSESSMENT: ADDENDUM TO DETAILED ASSESSMENT 2004 FOR STUDLEY

### Introduction

Stratford on Avon District Council have submitted a detailed assessment to DEFRA, which assesses the likelihood of exceedance of the UK objective for annual mean NO<sub>2</sub> in 2005 at the following location:

- A435 Alcester Road in the centre of Studley, south of Redditch

This report has been accepted by DEFRA on a temporary basis, pending further monitoring results, which it is hoped will clarify the likelihood of exceedance. This addendum to the report now considers the monitoring results obtained since completion of the report, and the recommended next steps, which should be taken by Stratford on Avon District Council.

### Results of the Detailed Assessment 2004

Following the outcome of their updating and screening report of July 2003, Stratford on Avon District Council undertook a Detailed Assessment for nitrogen dioxide along the A435 Alcester Road in the centre of Studley, south of Redditch. The risk of an exceedance of the UK objective for annual mean NO<sub>2</sub> in 2005 was predicted in the screening report at this location as a result of an elevated diffusion tube reading in 2003 (21c Alcester Road). This diffusion tube site had been located at a roadside location to the A435 and between February and May 2003 had recorded an average concentration of 62 µg/m<sup>3</sup>.

The resulting detailed assessment report (AEAT/ENV/R/1844) of November 2004 was based on dispersion modelling, validated using monitoring from an automatic monitoring site located approximately 14m back from the roadside, and a single diffusion tube site located on a building façade 3m from the kerbside. No collocation study was being undertaken at the automatic monitor at that time. The report concluded that the UK objective for annual mean NO<sub>2</sub> in 2005 was unlikely to be exceeded at roadside locations along the A435 in Studley. This was based on the fact that the model results indicated roadside concentrations well below the objective, and good agreement with the automatic monitor. Results from the diffusion tube site, originally the motivator for the detailed assessment were inconclusive, indicating results well above the objective in 2003 and clearly below in 2004, with no obvious reason for unusually high results in 2003. Given the absence of a collocation study, and the need to apply bias adjustment figures averaged from results published by UWE for previous years, uncertainty in the results from this single diffusion tubes site was considered to be high. Further uncertainty in the diffusion tube data resulted from a change in the preparation method used by the supplying laboratory (Kent Scientific) during 2004.

The results of the detailed assessment were accepted by DEFRA on a temporary basis pending further monitoring results to clarify the position. Concerns regarding the conclusions of the report were based on the limited amount of monitoring data available to validate

the modelling, given that the automatic monitor was not in a roadside location and the extent of diffusion tube monitoring was limited, with no collocation study for validating the modelling results.

### Monitoring Undertaken since the Detailed Assessment

Since completion of the detailed assessment report, a collocation study has commenced at the automatic monitoring site, and a further 5 diffusion tubes have been installed along the eastern side of Alcester Road from the location of the automatic monitor in the north (9 Alcester Rd) southwards along the buildings façades closest to the kerbside, especially between Bell Lane and Castle Road where the traffic is affected by congestion and queuing, at bus stops and a pedestrian crossing. The southernmost site is well beyond this area of concern. The sites are illustrated in Figure 1 below and Table 1 summarises the results obtained so far.

**Table 1 – NO<sub>2</sub> diffusion tube results for Studley A435 in 2005 (µg/m<sup>3</sup> )**

Site	6-month Period Mean* Unadjusted	6-month Period Mean* Bias Adjusted	2004 Estimate	2005 Estimate
Studley 1	35	37	<b>43</b>	<b>42</b>
Studley 2	38	40	<b>46</b>	<b>45</b>
Studley 3	<b>42</b>	<b>44</b>	<b>51</b>	<b>50</b>
Site 10	<b>46</b>	<b>49</b>	<b>56</b>	<b>55</b>
Studley 4	<b>52</b>	<b>55</b>	<b>64</b>	<b>62</b>
Studley 5	24	25	29	28

Sites are listed in order north to south

\* May – October 2005

Predicted exceedances of the UK annual mean objective 2005 in **BOLD**

Collocation work commenced during mid-May 2005. Therefore, for these new sites, only 6 months of collocation data is currently available, significantly less than the 9 months recommended for a collocation study (Technical Guidance LAQM.TG(03)). The automatic monitor is also not currently operation during November 2005. 9-months worth of monitoring data will not therefore be available until March 2006. By this stage the monitoring data will need to be reviewed as part of Stratford on Avon Council's Updating and Screening Assessment, to be submitted to DEFRA by the end of April 2006.

Above are therefore presented the results of the 6 months collocation. The period mean has been bias adjusted by a factor of 1.053 calculated from the collocation study (Automatic period mean = 23 µg/m<sup>3</sup> , Collocated diffusion tube mean = 22 µg/m<sup>3</sup> ) using the new NETCEN DifTPAB\_v01.xls spreadsheet.

From this period mean, an estimate of annual mean 2004 has then been calculated by comparing the corresponding period mean (May to October 2005) and annual means 2004 at 4 AURN sites in the West Midlands (Table 2). Finally, this estimate has been adjusted to an estimate of annual mean 2005 using the year scaling factors in TG(03).

**Table 2 – Comparison of annual mean NO<sub>2</sub> 2004 and period mean (15/05/05 – 03/11/05) at 4 AURN automatic monitoring stations surrounding Studley**

AURN Site	Site Location	NO <sub>2</sub> µg/m <sup>3</sup>		Ratio Am/Pm (annual mean/period mean) NO <sub>2</sub>
		Annual Mean	Period Mean	
Coventry Memorial Park		21.6	16.3	1.326
Walsall Alumwell		42.1	34.7	1.211
Walsall Willenhall		26.5	24.4	1.085
Sandwell-West Bromwich		27.1	27.2	0.997
<b>Average</b>				<b>1.155</b>

It may be seen from Table 1 that, on the basis of the monitoring undertaken so far in 2005 along Alcester Road, Studley, it is likely that the UK objective for annual mean for NO<sub>2</sub> in 2005 is exceeded at the façade of buildings close to the kerbside of this road at least around Site 10 and Studley 3 and 4, these being the sites closest to the pedestrian crossing, and possibly also at Studley 1 and 2. Indeed, concentrations are seen to increase progressively from north to south as the pedestrian crossing is approached from the north, suggesting that traffic queuing on the southbound (eastern) side of the road north of the crossing is likely to be the cause of the high concentrations.

## **Conclusions**

On the basis of the monitoring discussed above, Stratford on Avon District Council will declare an Air Quality Management Area along the facades of the buildings on the eastern side of Alcester Road, between the automatic monitor and the Castle Road corner, where there is relevant exposure.

Stratford on Avon Council will continue to monitor at the above locations, and the modelling work may be repeated in the light of new monitoring data as part of a Further Assessment following declaration.

# Monitoring Locations in Alcester Road, Studley

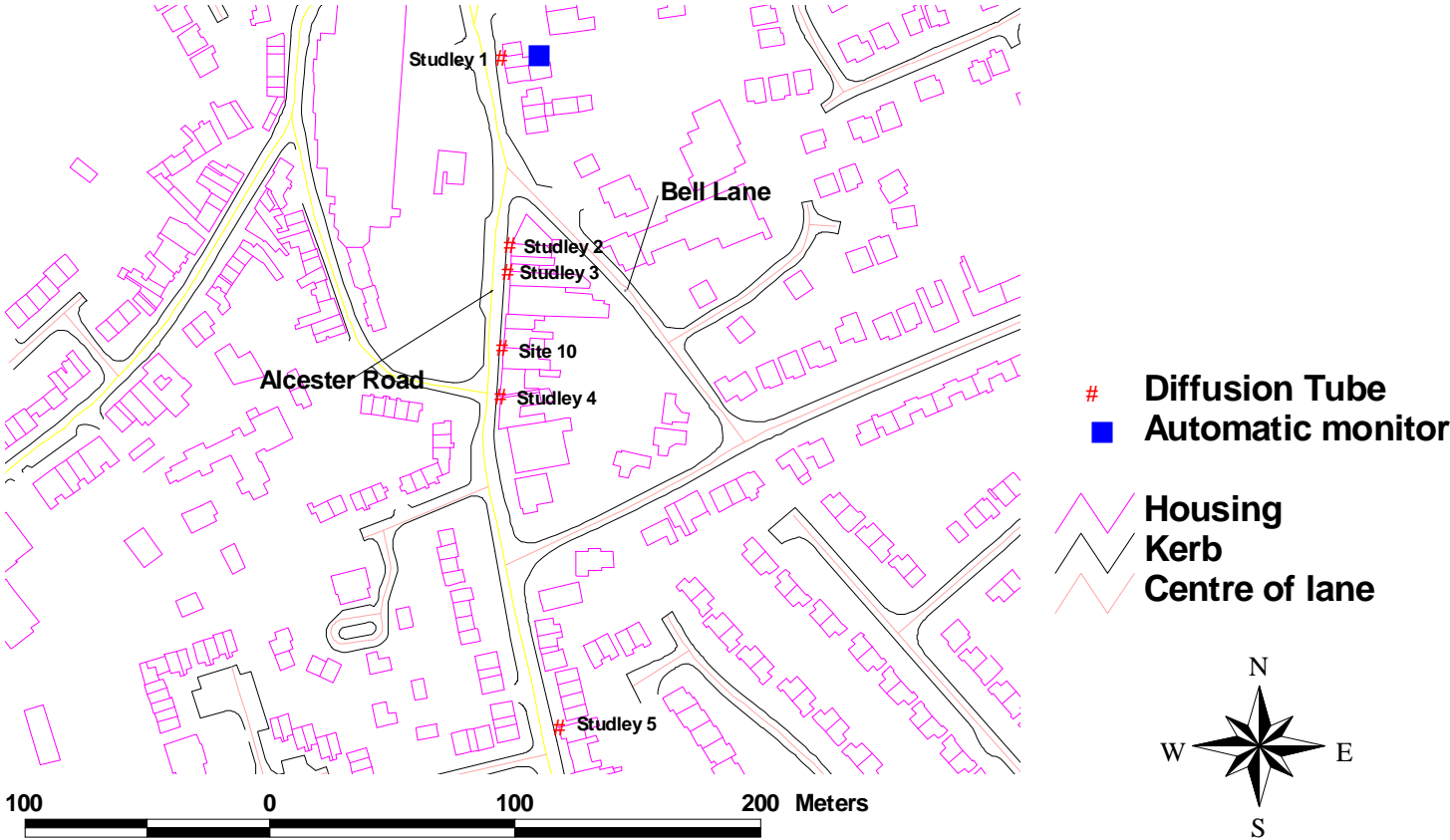


Figure 1 – Monitoring Locations in Alcester Road, Studley