

Local Air Quality Management

**Detailed Assessment
August 2010**

Herd Street, Marlborough

Wiltshire Council
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Wiltshire Council – report log

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Executive summary

This Detailed Assessment (DA) forms part of the statutory duties surrounding the process of Local Air Quality Management (LAQM) and the on-going process of air quality assessment within the Wiltshire Council area. Part IV of the Environment Act 1995 requires local authorities to periodically review air quality within their areas. This process of LAQM is integral to delivering the UK Air Quality Objectives (AQO).

This report develops further the information gathered and the conclusions reached from previous rounds of the process of LAQM within the former Kennet District Council area, now part of the unitary Wiltshire Council.

This Detailed Assessment aims to identify with reasonable certainty whether the Air Quality Objectives are likely to be exceeded at relevant locations¹ and the requirement to declare an Air Quality Management Area (AQMA) in these areas.

The report concludes that an AQMA is required to cover an area of exceedence identified within Herd Street, Marlborough. Three options for the extent of an AQMA are to be presented for consultation with the aim of formally declaring the AQMA within 4 months of the date of this report.

Air quality monitoring is to be enhanced in the area with a view to modelling the air quality at the further assessment stage of the air quality management process.

¹ Relevant exposure is defined in the most recent DEFRA technical guidance, LAQM TG(09), as locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective. For the annual mean objective, Box 1.4 clarifies this to be; 'All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc'.

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Chapter 1 – Introduction

1.1 The scope of the Detailed Assessment

This Detailed Assessment considers the air quality in the immediate vicinity of Herd Street, the A346 in Marlborough. It has been prepared by Wiltshire Council to form part of the statutory duties surrounding Local Air Quality Management (LAQM) under Part IV of the Environment Act, 1995 and subsequent regulations.

The report develops the conclusions reached in the Progress Report submitted by the former Kennet District Council in April 2008, which indicated the likelihood of a possible exceedance at a relevant location. This was reinforced in the 2009 Updating and Screening Assessment and the requirement to complete a detailed assessment was reported

Where a Detailed Assessment indicates that a UK national Air Quality Objectives (AQO's) may potentially be exceeded, the local authority has a duty to declare an Air Quality Management Area (AQMA). The declaration of an AQMA triggers the requirement to carry out a further assessment of the air quality, collecting additional air quality monitoring data over a 12 month period and if the need is confirmed to develop an air quality action plan within 18 months of the original declaration, in consultation with the public.

The air quality action plan details how the authority will work towards reducing air pollution levels so that the relevant air quality objectives are met.

This Detailed Assessment concerns the A346 in Marlborough, from the roundabout with the A4 to the top of Herd Street itself. The road is a single carriageway heading due north/south rising up a reasonably steep incline as it leaves / enters the town. A pedestrian crossing is located approximately a third of the way up the hill which periodically causes traffic to lose momentum while leaving the town. The location is shown in Figure 1.1.

Following the submission of the 2008 progress report, monitoring in the vicinity of the initial exceedance was expanded due to the likelihood of a wider area being affected.

Figure 1.1 – Location of Herd Street study area, Marlborough



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1.2 The Local Air Quality Management framework

Part IV of the Environment Act, 1995 requires that local authorities periodically review air quality within their areas. This process of Local Air Quality Management (LAQM) is an integral part of delivering the UK AQO's first detailed in 1997 with updates in the Air Quality (England) Regulations 2000 and again in the Air Quality Standards Regulations 2007 (hereafter referred to as the Regulations).

The Regulations seek to simplify air quality regulation and provide a new transposition of the European Union (EU) Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive, relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air. The Air Quality Limit Values are transposed into the updated Regulations as 'Air Quality Standards' (AQS) with attainment dates in line with the European directives.

The pollutants specified in the Regulations and to be assessed in the review and assessment process, with their relevant AQS/AQO concentrations, are shown in table 1.1. In addition to the regulations, the EU set limit values for NO₂ and benzene and indicative values for PM₁₀, to be achieved by 1 January 2010. This report provides an assessment against the annual mean and 1-hour mean standards for NO₂.

Table 1.1 – UK air quality standards

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

1.3 Previous Kennet District Council assessments

1.3.1 Updating and Screening Assessment (USA) 2006

This document did not identify any risk of exceedance of the UK AQO's at any location in the former Kennet District Council area. Levels of NO₂ have been monitored at the bottom of Herd Street, Marlborough since 1996 with no previous reports highlighting a potential exceedance.

1.3.2 Progress report 2007

Levels of NO₂ at the tube located at the bottom of Herd Street (Barn Street – the Green) were reported as well below the exceedance level with a predicted 2010 mean of 32 ug/m³.

1.3.3 Progress report 2008

The 2008 progress report was the first to include the reporting of monitoring from a new site located on the façade of a property located higher up Herd Street. A local resident had complained to the Council in July 2007 that the installation of the pedestrian crossing had led to a decline of Air Quality in the area.

The 2008 report noted that than exceedance of the 2010 Air Quality Standards was likely but also that this was based on only 5 months monitoring and that further reporting would be required. An additional 3 monitoring sites were located in Herd Street during 2008 to assist with the investigation of air quality in the area as it was considered likely that a Detailed Assessment would be required.

1.3.4 Updating and Screening Assessment 2009

The Updating and Screening Assessment for Wiltshire was compiled by the University of the West of England. The report assessed the monitoring carried out in Herd Street and confirmed that an exceedance of the UK Air Quality Objectives for nitrogen dioxide was likely and that the proposed Detailed Assessment would be required.

Chapter 2 – Review of existing air quality and traffic monitoring data

2.1 Passive diffusion tube monitoring

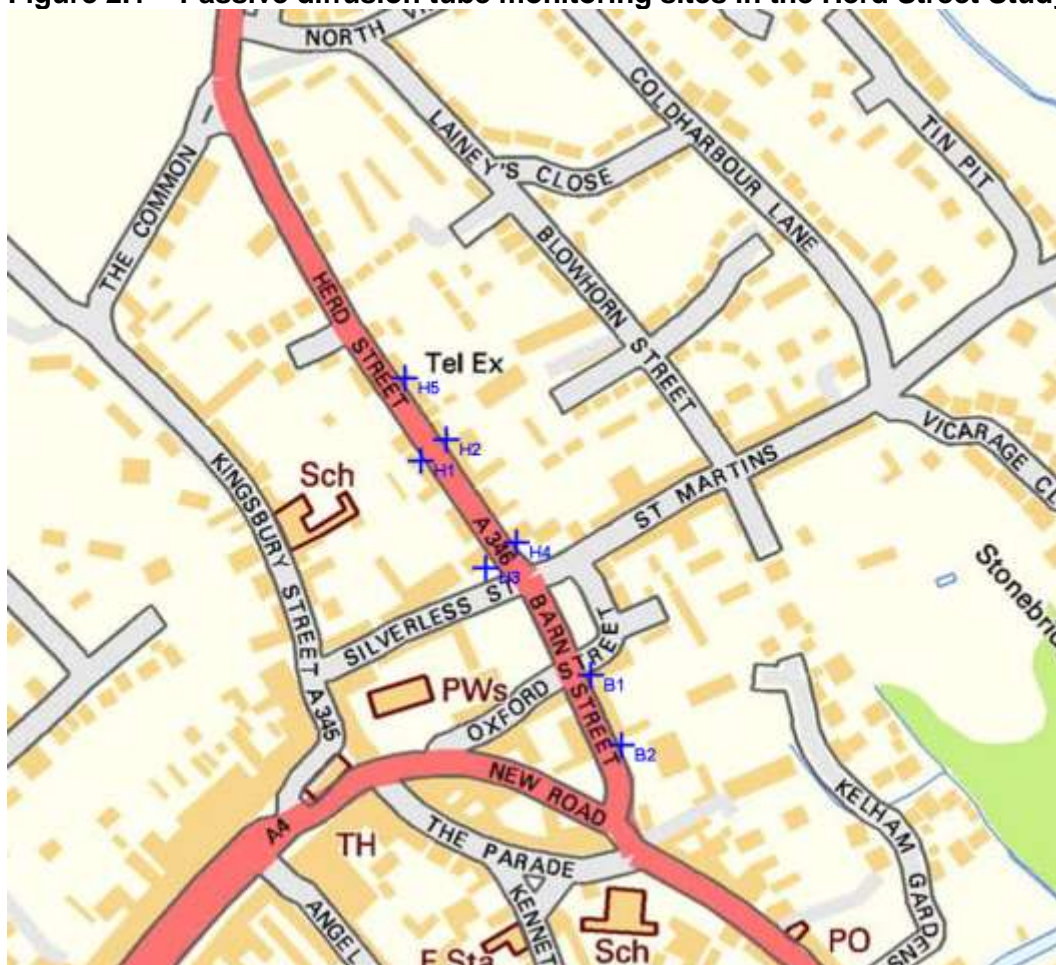
In order to undertake a robust assessment of air quality it is necessary to have suitable monitoring data. This Detailed Assessment is based solely upon the results obtained from the enhanced monitoring program for Herd Street, initiated as a consequence of the elevated NO₂ levels originally noted in the 2008 Progress Report.

There are currently 6 passive diffusion tube monitoring sites located within the Herd Street Detailed Assessment area.

The tubes are located outside domestic residences on both sides of the street. Unfortunately the site adjacent to the northbound (uphill) carriageway located on the façade of a house close to the junction with Silverless Street was relocated after being constantly stolen. 2 sites are located in Barn Street and a further 4 remain in Herd Street, 3 adjacent to the southbound (downhill) carriageway.

The purpose of these locations is discussed and the results are included in this Detailed Assessment. The location of all the monitoring sites employed is shown in Figure 2.1.

Figure 2.1 – Passive diffusion tube monitoring sites in the Herd Street Study Area



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The details of the monitoring locations are set out Table 2.1 below.

Table 2.1 – Details of monitoring sites

Site Name	Ref.	Site Type	OS Grid Reference		Relevant Exposure?	Dist to Kerb
Barn Street – The Green	B1	Roadside	419031	169260	Y(1m)	1m
6 Barn Street	B2	Roadside	419048	169228	Y(1m)	1m
6 Herd St	H1	Roadside	418942	169383	Y(1m)	1m
Old School House, Herd St	H2	Roadside	418958	169386	Y(1m)	2m
Herd St 3*	H3	Roadside	418963	169354	Y(1m)	1m
Corner Hse, 5 Herd St	H4	Roadside	418994	169337	Y(3m)	2m
27 Herd St	H5	Roadside	418910	169448	Y(1m)	1m

* relocated as frequently taken

The results from the Herd Street monitoring are presented in table 2.2 below. All data has been corrected using the relevant diffusion tube precision, accuracy and bias spreadsheet obtained from the University of the West of England (UWE) review and assessment website at: <http://www.uwe.ac.uk/aqm/review/R&Asupport/diffusiantube310310.xls>.

This spreadsheet compares bias correction factors from a number of surveys, categorising results on the basis of the laboratory preparing and analysing the tubes and a bias adjustment factor of 0.84 was derived from the spreadsheet for the tubes employed in this survey². This was then combined with a local bias adjustment factor of 0.75 established from 2 co-location studies of diffusion tubes and real time analysers located in Salisbury City Centre to create an overall Wiltshire factor of 0.79³.

2.2 Traffic Monitoring Data

A summary of existing traffic monitoring data⁴ is set out in table 2.2 below. This indicates how traffic levels have risen over the past 10 years, with a rise in total vehicle numbers of approximately 15% during the study period. While HGV numbers have remained consistent over this period, their contribution to the overall percentage of the traffic has fallen although it should be noted that the data examined covered the period 7am to 7pm only.

² For tubes prepared and analysed by Bristol Scientific Services in 2009

³ The method and the calculated factor were approved by the DEFRA Review and Assessment helpdesk.

⁴ Taken from the Wiltshire County Council Manual Traffic Counts for the A346

Fig 2.2 - Summary of Wiltshire County Council Manual Traffic Counts (7am – 7pm) for Herd Street, Marlborough 2000 – 2008.

Date	All Motor Vehicles	Heavy Goods Vehicles	% HGV's
April 2000 – North	5824	528	9
April 2000 – South	5566	518	9.3
April 2002 – North	6033	555	9.2
April 2002 – South	5891	529	9
May 2004 – North	6831	569	8.3
May 2004 – South	6589	545	8.3
October 2006 - North	6046	494	8.2
October 2006 – South	6146	469	7.6
Sept 2008 – North	6433	455	7.1
Sept 2008 – South	7097	538	7.6

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Table 2.2 – Summary of the passive diffusion tube monitoring in the Herd Street study area, 2009 (and bias adjusted 2008 mean - NO₂ ug/m³)

Site Name	2008 mean	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	Mean (bias)
Barn Street – The Green	38	48	46	48	51	36	45	39	31	41	48	45	41	43	34
6 Barn Street	-	-	-	-	-	51	71	37	32	58	61	47	60	52	41
6 Herd St	57	56	75	81	Lost	65	79	71	50	71	75	59	60	67	53
Old School House, Herd St	44	48	44	56	64	44	61	33	26	60	57	41	57	49	39
Herd St 3	57	Lost	Lost	Lost	Lost	-	-	-	-	-	-	-	-	-	-
Corner Hse, 5 Herd St	42	55	54	57	65	50	53	39	34	65	Lost	49	55	52	41
27 Herd St	50	51	47	53	68	50	69	34	29	61	57	44	66	52	41

Bias adjustment factor of 0.79 for 2009 as discussed

Chapter 3 – Conclusions and recommendations

3.1 Discussion of monitoring results

The monitoring results presented in table 2.2 indicate that an exceedance of the UK Air Quality Standard for annual mean levels of Nitrogen Dioxide is occurring in Herd Street and Barn Street. Based on these results the predicted area in which this exceedance is occurring is set out in below.

Figure 3.1 Predicted area of exceedence



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Paragraph 6.18 of the technical guidance (LAQM TG09) requires that the total number of people living within this zone of exceedence is required to be estimated.

Although no properties lie within the above zone, a total of 50 residences are located adjacent to the proposed area of exceedence, assuming a total of 2 adult residents per property it is estimated that 100 people at the boundary of the proposed zone.

3.2 Dispersion modelling

No dispersion modelling has been carried out to support the Detailed Assessment. This was agreed with DEFRA and the monitoring helpdesk prior to commencing the report. It is proposed to model dispersion as part of the Further Assessment to be carried out for the Herd Street study area within 12 months of any formal declaration of an AQMA at the site.

3.3 Conclusions to the Detailed Assessment

It is recommended that an AQMA is declared to cover the zone of exceedence and that Wiltshire Council begin the process of consultation around this zone.

It is proposed to present three options for the extent of the AQMA for consultation with the aim of declaring an AQMA within 4 months of the date of publication of this document. The proposed options are essentially;

- The Zone of Exceedence itself
- Herd Street zone of exceedence and the major roads feeding traffic to Herd Street
- The town of Marlborough

It is proposed that the further assessment will include modelling of the air quality in the area based upon an expanded monitoring programme. Additional sites are to be incorporated to ensure that the known, monitored area of exceedance does not extend further than the reported boundaries and to provide a robust source of information for the computer model.

Any modelling carried out at the further assessment stage of the process of AQM will also include information relating to the nature and profile of the traffic in the area. A full traffic survey is therefore likely to be required as part of the on-going process.

3.4 Recommendations

- On the basis of the results set out in this Detailed Assessment, Wiltshire Council should consider declaring an AQMA in relation to the exceedences of the annual mean AQO for nitrogen dioxide.
- The extent of the proposed AQMA is to be confirmed following consultation with the Marlborough Area Board and other relevant consultees. It is aimed to confirm the extent of the AQMA within 4 months of the date of this detailed assessment.
- The zone of exceedence should remain as defined in Figure 3.1 until the opportunity to run dispersion modelling based upon the more robust monitoring data has been completed as part of a further assessment.
- A detailed traffic survey will be required in order to determine factors such as the diurnal profile of vehicles and the fleet mix, to include HGV levels. This will ensure that future uncertainty in modelling assessments can be reduced. The information will also help in the formation of an action plan to reduce emissions and move towards attainment of the annual mean AQO for nitrogen dioxide.