



2009 Air Quality Updating and Screening Assessment for *South Cambridgeshire District Council*

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

April 2009

Local Authority Officer	Adam Finch Scientific Officer (Air Quality)
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Department	Health and Environmental Services
Address	South Cambridgeshire Hall, Cambourne Business Park, Cambourne Cambridgeshire CB23 6EA
Telephone	01954 713319
e-mail	adam.finch@scambs.gov.uk

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Executive Summary

South Cambridgeshire District Council remains committed to the process known as Local Air Quality Management and support Government plans to protect and improve ambient air quality. This report sets out the findings of the 1st stage (Updating and Screening Assessment) of the third review and assessment of local air quality within the District.

The Updating and Screening Assessment (USA) has involved the Council analysing the prescribed parameters for each pollutant to see if they require further detailed assessment. The Council has used the template provided by Defra and all assessment has been made in line with the new Technical Guidance LAQM TG(09), to assess air quality within the locality – thus ensuring a common and acceptable approach.

This report forms the basis for consultation with statutory consultees.

The previous round of review and assessment is still progressing with the development of an Air Quality Action Plan, which will be completed in the Summer of 2009. This USA has not indicated any further areas of concern other than the stretch of the A14 between Bar Hill and Milton which is a designated Air Quality Management Area (AQMA) and has already been the subject of detailed and further assessments.

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1 Introduction

1.1 Description of Local Authority Area / Future Growth

South Cambridgeshire is a rural district in East Anglia which entirely surrounds but does not include the city of Cambridge. It is the southernmost district of the county of Cambridgeshire and borders Bedfordshire to the west, Hertfordshire to the south, Essex to the south-east and Suffolk to the east. The district is comprised of 102 parishes with all settlements classified as villages. The landscape and villages are equally varied.

The area has good road and rail links with London and the South-East. The M11/A11 and A14 corridors pass through the District to the west/south and north of Cambridge respectively. To date, air quality issues within the District of South Cambridgeshire have been linked directly to the volume of traffic that runs through the District, specifically along the A14. The A14 is congested on a regular basis between Bar Hill (to the West of Cambridge) and Milton (to the North North-East of Cambridge). This has resulted in the declaration of an Air Quality Management Area for nitrogen dioxide (NO₂) and PM₁₀ along a stretch of the A14 between Bar Hill and Milton. Traffic levels have continued to grow along the A14 through the District so that the road is now almost at its maximum capacity.

The government has identified South Cambridgeshire as one of four growth areas. Substantial development is proposed over the next 10-12 years with plans to increase the population of the District to 162,000 by 2016. Future traffic and development proposals have the potential to cause the air quality management areas to increase in size.

South Cambridgeshire District Council is within the eastern region growth area and is therefore subject to a significant amount of new mixed-use development. All applications received are screened to ensure that any impacts on air quality are identified and mitigated as far as possible. Whilst applications are awaited for most of the growth area schemes, work is continuing in supplying information for the production of environmental statements and assessments.

The most significant development is for the proposed new town of Northstowe. An application was submitted to the Council in December 2007 relating to the redevelopment of 605 hectares of land previously used as the Oakington Airfield. The development is to comprise highway link improvements, a core area containing retail and businesses and approximately 9500 new homes to include associated open spaces and parkland.

The development will cover an area of approximately 605 Hectares with 22,800m² floorspace set aside for hotels and indoor leisure facilities, 49,500m² floorspace for A1, A2, A3, A4 and A5 retail use and 156,000 m² floorspace set aside for B1, B2, B8 and *sui generis* industrial and commercial uses.

It is likely that there will be a biomass combined cooling heat and power plant incorporated in to the development but subject to a separate application.

An air quality impact assessment has been submitted by the developer with the application and its conclusions will inform the decision making process. It is thought likely that there will be an impact on local air quality but discussions are still taking place to determine its significance.

The potential for significant impact is magnified by the proximity to the development of the A14 corridor, subject of an AQMA for NO₂ and PM₁₀. It is the location of these transport links that led to the identification of the proposed site for development. Improvements to the road network are proposed by the Highways Agency, but may not be brought forward prior to commencement of development. In-depth negotiations are currently underway to determine the exact nature of the impact of both projects and to phase development accordingly to mitigate pressure on the highway and ensure that current service levels are maintained.

In addition, an outline planning application was submitted in 2007 for the development of Upper Cambourne. This is to include up to 950 dwellings, a community centre, open space and play areas. Owing to the recent improvements on the local network A428, it is thought that traffic movements will not cause a significant impact to air quality.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgram's per cubic metre $\mu\text{g}/\text{m}^3$ (milligram's per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

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

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Map of the Air Quality Management Area within South Cambridgeshire



Summary of Automatic Monitoring Results Along the A14 in 2008

	Bar Hill				Impington			
	Annual Mean		Hourly mean		Annual mean		Hourly mean	
	Measured conc. $\mu\text{g}/\text{m}^3$	Objective $\mu\text{g}/\text{m}^3$	No. days of exceedence	Objective	Measured conc. $\mu\text{g}/\text{m}^3$	Objective $\mu\text{g}/\text{m}^3$	No. days of exceedence	Objective
2005	42	40	0	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times per year	31	40	1	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times per year
2006	43		0		30		0	
2007	34		0		41		0	

Nitrogen dioxide

	Bar Hill				Impington			
	Annual Mean		Hourly mean		Annual mean		Hourly mean	
	Measured conc. $\mu\text{g}/\text{m}^3$	Objective $\mu\text{g}/\text{m}^3$	No. days of exceedence	Objective	Measured conc. $\mu\text{g}/\text{m}^3$	Objective $\mu\text{g}/\text{m}^3$	No. days of exceedence	Objective
2005	27	40	25	50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times per year	32	40	37	50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times per year
2006	34		51		36		42	
2007	36		49		34		34	

PM10

Timeline of Significant Reports Prepared and Submitted by South Cambridgeshire District Council

Report	Year	Conclusion
Review and Assessment	1998	The report progressed benzene, 1-3 butadiene, lead, carbon monoxide, PM ₁₀ and nitrogen dioxide to a Stage 2 assessment. The overall conclusion was that all objectives were likely to be met.
Review and Assessment	2000	All objectives likely to be met, however, given the increasing traffic on the A14 and the introduction of new industrial sources, it was concluded that detailed monitoring would be required for nitrogen dioxide, PM ₁₀ and sulphur dioxide.
Updating and Screening Assessment	2003	Based on monitoring results, it was concluded that all objectives were likely to be met.
Progress Report	2004	Monitoring results were showing exceedences of the annual mean for nitrogen dioxide along a stretch of the A14, therefore a Detailed Assessment was required for NO ₂ . All other objectives were predicted as likely to be met.
Detailed Assessment of Nitrogen Dioxide Along the A14 Corridor	2006	The annual mean objective for nitrogen dioxide was not likely to be met along the A14 between Bar Hill and Milton, therefore, it was necessary to declare an Air Quality Management Area.
Progress Report	2007	Monitoring results were showing exceedences of the daily mean for PM ₁₀ along a stretch of the A14, therefore a Detailed Assessment was required for PM ₁₀ . Monitoring of NO ₂ along the A14 continued to show exceedences of the annual mean objective. Further assessment of NO ₂ was required. All other objectives were predicted as likely to be met.
Detailed Assessment of PM ₁₀ Along the A14 Corridor	2008	The daily mean objective for PM ₁₀ was not likely to be met along the A14 between Bar Hill and Milton, therefore, it was necessary to declare an Air Quality Management Area.
Progress Report	2008	A Further Assessment of NO ₂ and PM ₁₀ was required. Objectives for all other pollutants were predicted as likely to be met.
Further Assessment of nitrogen dioxide and PM ₁₀ Along the A14 Corridor	2008	The AQMA for NO ₂ and PM ₁₀ was declared. An Air Quality Action Plan (AQAP) is required and consultation is underway in its' development.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

Nitrogen dioxide monitoring within South Cambridgeshire is carried out by two techniques: automatic real time monitoring and diffusion tube monitoring. Details of the automatic monitoring stations are provided in Table 2.1 and diffusion tubes in Table 2.2.

Ozone chemiluminescence is the reference method specified by the EC NO₂ Directives. The analysers are calibrated with traceable gas mixtures certified to ISO17025 by the National Environment Technology Centres' (NETCEN) Gas Standards Calibration Laboratory. This provides traceability of measurement to recognised national standards held at NPL or equivalent organisations. The expected accuracy of the method for Nitrogen dioxide is approximately +/- 11% with a precision of +/- 3.5ppb. NETCEN undertake data audit management and audit of the real-time results using documented procedures.

Measurement of Nitrogen dioxide is also undertaken by diffusion tube monitoring with a network of locations across the district, which have been monitored since 1995. There are currently 19 sites throughout the District. The tubes are supplied and analysed by Harwell Scientifics a UKAS accredited laboratory (0322). The tube preparation method is 50% TEA in Acetone and analysis is by desorption with distilled water, and the extract analysed using a segmented flow auto analyser with ultraviolet detection. The exposure periods for the diffusion tubes are those of the UK Nitrogen Dioxide Diffusion Tube Network run by NETCEN which effectively is a four or five week duration. QA/QC procedures are as detailed in the UK NO₂ Diffusion Tube Network Instruction Manual, this document can be found at www.airquality.co.uk/archive/reports/cat06/no2instr.pdf.

Continuous monitoring of particulate matter is undertaken at three locations for fine particulate matter: Orchard Park Primary School (OS Grid Reference 554558, 261579), Bar Hill (OS Grid Reference 538685,263760) and Impington (OS Grid Reference 543740,261626) using Beta Attenuation Monitors (BAMs).

BAMs work by passing a small beta ray (¹⁴C) transmission across a clean filter paper. The filter paper is then automatically passed through the sample inlet at which point, particulate matter is drawn onto the filter. The beta ray transmission is then re-measured and the particulate concentration is calculated using the difference between the 1st and 2nd beta ray transmission measurements.

The site at Orchard Park School is new and was commissioned in April 2009. The Bar Hill site has been in operation since 2001 and the Impington site since January 2003. All locations have been chosen due to the closeness to the A14 and all 3 sites are within the existing AQMA. Bar Hill and Impington are considered to be sites representative of nearby receptors situated alongside the A14, whilst the Orchard Park monitor is located within the grounds of a school, and is therefore a relevant receptor. It has been set up within the Air Quality Management Area to monitor nitrogen dioxide and PM₁₀.

Map of monitoring locations along the A14



★ = nitrogen dioxide diffusion tube, ■ = continuous monitoring station

2.1.1 Automatic Monitoring Sites

South Cambridgeshire District Council currently operates automatic monitoring stations at 3 sites within the District. Details of these sites is provided in Table 2.1. It should be noted that the sulphur dioxide analyser at Barrington is no longer polling data and is awaiting removal owing to Cemex mothballing its Barrington plant due to the current economic downturn.

- QA/QC of automatic monitoring data is carried out by AEA Technology (<http://www.aeat.co.uk>).
- An annual audit of the monitoring stations is carried out by AEA Technology.
- Services are carried out bi-annually by the equipment suppliers. In the case of Barrington, Bar Hill and Impington, this is Thermo-Unicam and the new site at Orchard Park School is serviced by Enviro-Technology.
- The sites are manually calibrated on a bi-monthly basis by the Local Site Operative. The output from the calibrations is forwarded to AEAT.

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- South Cambridgeshire District Council is a member of the Calibration Club, operated by AEAT.
- All NO_x analysers are chemiluminescence analysers
- All particulate matter analysers are BAMs. In line with current guidance, BAM data is multiplied by 1.3 to give the gravimetric equivalent.
- The SO₂ monitor is a pulsed fluorescence monitor

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	Analyser Model	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?
Bar Hill (A14)	Roadside	X 538685 Y 263760	NO _x (NO ₂) PM ₁₀ PM _{2.5}	Thermo 42C Eberline BAM (FH62) Eberline BAM (FH62)	Y	Y (8m)	N/A	Y
Impington (A14)	Roadside	X 543739 Y 261625	NO _x (NO ₂) PM ₁₀	Thermo 42C Eberline BAM (FH62)	Y	Y (12m)	N/A	Y
Barrington (Cement works)	Rural (set up to monitor SO ₂ from nearby cement works)	X 539949 Y 251467	SO ₂	Thermo 43C	N	N	N/A	N
Orchard Park Primary School (A14)	Urban background	X 544558 Y 261579	NO _x (NO ₂) PM ₁₀	ET 200E ET BAM1020	Y	Y (1m)	N/A	Y

N.B:

- Barrington ceased monitoring in October 2008 when the process it was monitoring ceased operating.
- Orchard Park Primary School monitoring station commissioned on 22nd April 2009

2.1.2 Non-Automatic Monitoring

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?
1 The Coppice, Histon	Urban background	544230 262048	NO ₂	N	Y (7m)	0.5m	Y
Narrow Lane, Histon	Roadside	544026 264165	NO ₂	N	Y (10m)	0.5m	N
The Gables, High Street, Histon	Roadside	543976 263675	NO ₂	N	Y (5m)	1m	Y
White Lion, 96 High Street, Sawston	Urban background	548600 249136	NO ₂	N	Y (5m)	1m	Y
15 Paddock Way, Sawston	Roadside	548777 249373	NO ₂	N	Y (5m)	0.5m	N
22 Water Lane, Histon	Roadside	544050 263306	NO ₂	N	Y (2m)	0.5m	Y
1 Brook Close, Histon	Urban background	543955 263588	NO ₂	N	Y (2m)	1m	Y
72 Cambridge Road, Impington	Urban background	544243 261819	NO ₂	Y	Y (7m)	0.5m	Y
19 Lonetree Avenue	Roadside	544119 261862	NO ₂	Y	Y (7m)	0.5m	Y
1A New Road, Sawston	Roadside	548400 249753	NO ₂	N	Y (10m)	1m	N
5 Mill Lane, Sawston	Roadside	548545 249366	NO ₂	N	Y (15m)	1m	N
Heath House, A505, Thriplow	Urban background	544034 244585	NO ₂	N	Y (10m)	1m	Y
64 High Street, Linton	Roadside	556179 246815	NO ₂	N	Y (7m)	0.5m	Y
47 High Street, Harston	Urban background	542554 251002	NO ₂	N	Y (5m)	1m	Y
20 High Street, Tadlow	Roadside	528131 247399	NO ₂	N	Y (10m)	2m	N
1A Weavers Field, Girton	Urban background	542537 261467	NO ₂	Y	Y (15m)	1m	Y
3 Garner Close, Milton	Urban background	547452 263175	NO ₂	N	Y (5m)	1m	N
1 Catchall Farm Cottages	Roadside	540509 262290	NO ₂	Y	Y (1m)	10m	Y
Crafts Way, Bar Hill	Roadside	538472 263675	NO ₂	N	Y (15m)	1m	N
Orchard Park School	Urban background	544557 261571	NO ₂	Y	Y (1m)	50m	Y
Orchard Park School	Urban background	544557 261571	NO ₂	Y	Y (1m)	50m	Y
Orchard Park School	Urban background	544557 261571	NO ₂	Y	Y (1m)	50m	Y
Chieftain Way, Arbury Park	Roadside	544828 261738	NO ₂	Y	Y (1m)	0.5m	Y
Topper Street, Arbury Park	Roadside	545056 261784	NO ₂	Y	Y (1m)	0.5m	Y
Grange Farm Cottages	Roadside	541056 261910	NO ₂	Y	Y (5m)	4.5m	Y

- Analysing lab: Scientifics Ltd
551 South Becquerel Avenue
Harwell Science and Innovation Campus
Didcot
Oxfordshire
OX11 0TB
- Diffusion tube preparation method used: 50:50 (acetone:triethanolamine)
- Scientifics Ltd confirm that the methods and procedures they follow meet the guidelines set out in Defra's "Diffusion Tubes For Ambient Monitoring: Practical Guidance". A copy of the confirmation is provided in Appendix A.
- South Cambridgeshire District Council currently relies on the Bias Adjustment Factors provided on the Air Quality Archive web database, however, a co-location study has recently started at Orchard Park Primary School (grid reference 544557, 261571).
- The bias adjustment factor used 2008 is the national average supplied on the Review and Assessment website and as of April 2009 is 0.8.
- From the "Summary of Laboratory Performance in WASP R98-102" (prepared by AEA on behalf of Defra, 2008), the performance of Scientifics Ltd against both the old and new criteria was rated as "good".

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

The monitoring stations at Bar Hill and Impington are considered to be sites representative of nearby receptors situated alongside the A14, whilst the Orchard Park monitor is located within the grounds of a school. All 3 are located within the existing Air Quality Management Area for nitrogen dioxide and PM₁₀.

During 2008, the automatic monitoring stations at Bar Hill and Impington both exceeded relevant national objectives for nitrogen dioxide and PM₁₀ whilst the nitrogen dioxide diffusion tubes all showed compliance with the objectives with the exception of the tube located within the Air Quality Management Area at Grange Farm Cottages (72.2µg/m³). These cottages are to be demolished as part of the scheme for improvement of the A14.

Automatic Monitoring Data

- At Bar Hill, the annual mean objective for nitrogen dioxide was exceeded (measured as 42µg/m³).
- At Impington, all objectives were met for nitrogen dioxide.
- Results are given in Tables 2.3a and 2.3b, below.

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Location	Within AQMA?	Proportion of year with valid data 2008 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
			2006	2007	2008
Bar Hill	Y	96.5	43	34	42
Impington	Y	98.4	30	41	35

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of hourly mean ($200 \mu\text{g}/\text{m}^3$)		
			2006	2007	2008
Bar Hill	Y	96.5	0	0	0
Impington	Y	98.4	0	0	0

If the period of valid data is less than 90% of a full year, include the 99.8th %ile of hourly means in brackets.

Diffusion Tube Monitoring Data

After bias correction (see the previous section 2.1.2), all diffusion tube results show compliance with the national annual mean objective for nitrogen dioxide, with one exception. The exception is the tube located within the Air Quality Management Area at Grange Farm Cottages. This tube is soon to be relocated due to forthcoming demolition of the cottages in preparation for the improvements to the A14.

The only other diffusion tube close to the objective is located at The Gables, High Street, Histon. Histon is a narrow village road which although is not subject to excessive traffic flows can become congested at peak times owing to vehicles parking on the road and causing obstructions to the flow of traffic. The tube is adjacent to a residential façade and is therefore in a relevant location. Historically, whilst it has been close to the objective, there has never been an exceedence at this location.

All 2008 diffusion tube results are presented in Table 2.4a, below.

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations
			2008 ($\mu\text{g}/\text{m}^3$) Adjusted for bias
1 The Coppice, Histon	N	100	21.8
Narrow Lane, Histon	N	100	19.9
The Gables, High Street, Histon	N	100	37.9
White Lion, 96 High Street, Sawston	N	100	33.6
15 Paddock Way, Sawston	N	100	17.7
22 Water Lane, Histon	N	100	34.7
1 Brook Close, Histon	N	92	26.5
72 Cambridge Road, Impington	Y	92	27.8
19 Lonetree Avenue	Y	100	25.0
1A New Road, Sawston	N	92	20.0
5 Mill Lane, Sawston	N	100	19.1
Heath House, A505, Thriplow	N	100	31.5
64 High Street, Linton	N	100	33.7
47 High Street, Harston	N	100	27.0
20 High Street, Tadlow	N	100	14.6
1A Weavers Field, Girton	N	100	34.0
3 Garner Close, Milton	N	100	22.8
1 Catchall Farm Cottages	Y	100	30.1
Crafts Way, Bar Hill	Y	100	27.0
Orchard Park School	Y	42*	23.4
Orchard Park School	Y	42*	24.5
Orchard Park School	Y	42*	25.0
Chieftain Way, Arbury Park	Y	42*	30.3
Topper Street, Arbury Park	Y	42*	28.9
Grange Farm Cottages	Y	42*	72.2

****Tubes with 42% data capture are new tubes installed at the end of July 2008. For 2008, five months of data are available for these sites. Although this data is shorter than an annual period, it is not deemed necessary to adjust to an annual mean because the sites have been set up as long-term sites, monitoring nitrogen dioxide within the AQMA.***

Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes

Location	Within AQMA?	Annual mean concentrations ($\mu\text{g}/\text{m}^3$) Adjusted for bias		
		2006*	2007*	2008
1 The Coppice, Histon	N	21.5	21.9	21.8
Narrow Lane, Histon	N	18.8	20.0	19.9
The Gables, High Street, Histon	N	37.7	37.7	37.9
White Lion, 96 High Street, Sawston	N	30.1	33.5	33.6
15 Paddock Way, Sawston	N	17.6	18.7	17.7
22 Water Lane, Histon	N	32.2	34.3	34.7
1 Brook Close, Histon	N	23.7	25.8	26.5
72 Cambridge Road, Impington	Y	27.0	27.3	27.8
19 Lonetree Avenue	Y	24.2	22.5	25.0
1A New Road, Sawston	N	20.5	25.3	20.0
5 Mill Lane, Sawston	N	19.2	18.8	19.1
Heath House, A505, Thriplow	N	29.5	22.7	31.5
64 High Street, Linton	N	31.2	33.4	33.7
47 High Street, Harston	N	26.6	26.1	27.0
20 High Street, Tadlow	N	14.0	13.5	14.6
1A Weavers Field, Girton	N	32.7	32.4	34.0
3 Garner Close, Milton	N	22.2	22.3	22.8
1 Catchall Farm Cottages	Y	N/A	N/A	30.1
Crafts Way, Bar Hill	Y	N/A	N/A	27.0
Orchard Park School	Y	N/A	N/A	23.4
Orchard Park School	Y	N/A	N/A	24.5
Orchard Park School	Y	N/A	N/A	25.0
Chieftain Way, Arbury Park	Y	N/A	N/A	30.3
Topper Street, Arbury Park	Y	N/A	N/A	28.9
Grange Farm Cottages	Y	N/A	N/A	72.2
The Elms Haslingfield	N	14.9	16.9	Removed
Barrington	N	15.8	Removed	Removed

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- **Bias adjustment factors for 2006 and 2007 used are 0.78 and 0.8 respectively (as taken from the Bias Adjustment Spreadsheet on the AQRA Helpdesk Website)*
- *N/A represents sites that had not yet been commissioned in 2006/07*
- *It should also be noted that the diffusion tube at Grange Farm Cottages is due to be relocated because the receptors at this point will soon be demolished.*
- *“Removed” indicates where a diffusion tube has been relocated to a more relevant locations.*

2.2.2 PM₁₀

During 2008, fine particles were monitored at two locations in South Cambridgeshire, on the A14(E) (TL385 637) at Bar Hill and on the A14(W) (TL437 616) at Impington. Measurements at both sites are made using an Eberline FH 62-IR Beta-attenuation Monitor. This instrument has a heated inlet manifold, which is held at 40°C, the temperature is sufficient to drive off the volatile content of the sample and therefore the guidance given in LAQM.TG(03) is to correct for this by multiplying all measurements by a factor of 1.3 prior to comparison with the air quality objective. Results are quoted as µg/m³ gravimetric equivalent.

The PM₁₀ results measured at Bar Hill are quality assured and reported by “netcen”. The site was commissioned in March 2001 there is a fully scaled and ratified dataset available pursuant to this period.

A 3rd location has been added in April 2009 within the AQMA at Orchard Park Primary School (grid reference 554558, 261579).

At Bar Hill, the daily mean objective for PM₁₀ was exceeded (52 days over the limit of 50µg/m³).

Monitoring at the A14(W) in Impington has been operating since 19 February 2002. The analyser is identical to the one at Bar Hill and therefore the data has been handled in the same manner. Air Quality Monitoring Services Ltd provided data ratification and auditing services at this site until 2004, since then NETCEN have provided a full data audit and ratification process for this dataset.

At Impington, the daily mean objective for PM₁₀ was exceeded (43 days over the limit of 50µg/m³).

Results of the PM₁₀ monitoring are supplied in Tables 2.5a and 2.5b, below:

Table 2.5a Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations (µg/m ³)		
			2006	2007	2008
Bar Hill	Y	98.5	26	36	36
Impington	Y	94.8	28	34	33

Table 2.5b Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of hourly mean (50 µg/m ³) <i>If data capture < 90%, include the 90th %ile of hourly means in brackets.</i>		
			2006	2007	2008
Bar Hill	Y	98.5	51	49	52

Impington	Y	94.8	42	34	43
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2.2.3 Sulphur Dioxide

South Cambridgeshire District Council monitored Sulphur Dioxide at the Cemex Cement Works, Barrington until October 2008.

The site was initially installed to monitor ground level sulphur dioxide concentrations, which were thought to be at risk of exceeding the objective in the vicinity of the cement works at Barrington. Emissions modelling was undertaken to determine the maximum ground level concentration at a relevant receptor site. Subsequently, an API sulphur dioxide analyser utilising the ultra-violet fluorescence technique to obtain continuous 15-minute average ambient sulphur dioxide concentrations was commissioned in July 2003 at Barrington Fruit Farm (grid reference 539949, 251467).

Concentrations of sulphur dioxide from the plant dropped to negligible levels when the process changed fuel types from oil to gas and since the summer of 2008, the process has ceased to operate.

The monitoring station is currently awaiting removal.

Results are presented below:

Location	Within AQMA?	Data Capture 2008 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
			2006	2007	2008
Barrington	N	99.5	2	2	3

Location	Within AQMA?	Data Capture 2008 %	Number of Exceedences of 15-minute mean ($266 \mu\text{g}/\text{m}^3$) <i>If the period of valid data is less than 90% of a full year, include the 99.8th %ile of hourly means in brackets.</i>		
			2006	2007	2008
Barrington	N	99.5	0	0	0

2.2.4 Benzene

South Cambridgeshire District Council does not monitor for benzene

2.2.5 Other pollutants monitored

South Cambridgeshire District Council monitors $\text{PM}_{2.5}$ at the continuous monitoring station in Bar Hill.

3 Road Traffic Sources

Improvement measures to the local transport infrastructure are already underway with the development of the Cambridge Guided Busway. This is seen as an alternative mode of transport for commuters wanting to travel along the A14 between St Ives and Cambridge and will include two new park and ride sites. It is hoped that this will achieve a target of removing 2-3% of current car commuters off this section of the A14. The busway is planned to open in spring 2009. Given that the Guided Busway will have its own dedicated route through the District, it is not thought that extra buses will cause local air quality problems.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

South Cambridgeshire District Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

South Cambridgeshire District Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

Since the last round of review and assessment, a new Cambridge Park and Ride site has opened off the A14 at Milton. This has introduced approximately 100 new bus movements per day to a stretch of the A10 between Milton and the border with South Cambridgeshire and Cambridge City, approximately 1km to the South of the site.

Prior to the opening of the Park and Ride site, this stretch of the A10 carried approximately 21500 vehicles per day to and from Cambridge and the A14, of which approximately 3% was comprised of HDV traffic. The addition of 100 bus movements per day increases the percentage HDV to 3.4% although it will not be necessary to proceed further with this site given that the nearest relevant receptor is approximately 42m from the carriageway.

The DMRB calculations for the additional bus/coach movements is supplied in Appendix B.

South Cambridgeshire District Council has assessed newly identified road(s) with high flows of buses or HDVs in a busy street where people may spend 1 hour or more close to traffic that it has not previously been assessed, and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.4 Junctions

South Cambridgeshire District Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

There are two major projects involving roads within South Cambridgeshire. These are as follows:

- 1) Improvements to the A14, to include:
 - Widening of the A14 carriageway between Fen Drayton and Histon – increasing the number of lanes from 2 to 3 on both Eastbound and Westbound carriageways should help to alleviate congestion and speed traffic through-flow.
 - Widening of the A14 carriageway between Histon and Fen Ditton
- 2) Link roads to the proposed new town of Northstowe and associated local routes throughout the proposed development.

For both of these projects, South Cambridgeshire District Council is awaiting satisfactory air quality assessments, although the detail of the improvements to the A14 forms part of the Councils' Priority Actions within the forthcoming Air Quality Action Plan and are presently deemed to be essential works to help improve air quality along the A14 and lead to a reduction in pollutant concentrations in and around the existing Air Quality Management Area.

South Cambridgeshire District Council is awaiting air quality assessments for 2 projects that will involve the creation of a new road network and major changes to the existing road network. The new/newly identified roads and junctions will be further assessed upon receipt of the outstanding air quality assessments.

3.6 Roads with Significantly Changed Traffic Flows

South Cambridgeshire District Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

The new Cambridge Park and Ride site at Milton is approximately 70m from the nearest relevant receptor and buses run to and from the site every 15 minutes, therefore, the public should not be present at the site for a duration that will expose them to short-term pollutant objectives. With this in mind, it not deemed necessary to progress this site any further.

South Cambridgeshire District Council has assessed new/newly identified bus stations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

4 Other Transport Sources

4.1 Airports

Cambridge Airport is the largest airfield within the District. The predicted annual throughput of passengers and tonnes of freight equivalent is expected to be less than 5 million passengers per annum in 2010, based on a predicted throughput of less than 5mppa (passengers and freight combined). With this throughput in mind, it is not deemed necessary to proceed to a detailed assessment.

South Cambridgeshire District Council confirms that there are no airports that meet the criteria in Box 5.4 (B1) of Technical Guidance TG(09) within the Local Authority area.

4.2 Railways (Diesel and Steam Trains)

There have been no significant changes to the rail network within South Cambridgeshire since the last round of review and assessment.

4.2.1 Stationary Trains

There have been no significant changes to the rail network and no receptors added to areas where stationary trains may be present within the District since the last round of Review and Assessment.

South Cambridgeshire District Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

There have been no significant changes to the rail network within South Cambridgeshire since the last round of review and assessment.

South Cambridgeshire District Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

South Cambridgeshire District Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

There have been no new industrial sources since completion of the last round of Review and Assessment

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

South Cambridgeshire District Council is currently awaiting the air quality assessment for a proposed CCHP to be sited at the proposed new town of Northstowe. At present, this is the only significant proposal for an industrial unit awaiting approval within the District. It is likely that the plant will be between 5-10MW and is proposed to be designed to meet the emissions requirements of the Waste Incineration Directive 2000.

South Cambridgeshire District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been introduced

South Cambridgeshire District Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

South Cambridgeshire District Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

South Cambridgeshire District Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

After consultation with the Councils' Food Hygiene team and the Defra Egg Inspectorate for the Anglian region, it was confirmed that there are no poultry farms meeting the criteria in guidance document TG(09).

South Cambridgeshire District Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Two small-scale biomass boilers were granted planning permission for a development located on the edge of Histon / Impington in 2007 for a site located at grid reference 543738, 262568 (approximately 500m north of the AQMA). No air quality assessment is available for these biomass burners and the Council is awaiting full detail as to type, size, output and throughput of the units.

There are currently no biomass burners operating within the District.

South Cambridgeshire District Council confirms that there are no biomass combustion plant in the Local Authority area.

6.2 Biomass Combustion – Combined Impacts

South Cambridgeshire District Council confirms that there are no biomass combustion plant in the Local Authority area.

6.3 Domestic Solid-Fuel Burning

From the last round of Review and Assessment, it was extrapolated from existing data that the maximum percentage of properties burning solid fuel would be 24.4% in a village without mains gas and 18.1% in those villages with a mains gas connection.

Previous figures obtained from the Anglia West Energy Efficiency Advice Centre states that only 4% of households in the District use solid fuel as a source of heating.

South Cambridgeshire is comprised of 101 villages, the largest being Sawston with only 2823 properties. GIS analysis of the densest area of residential development in a 500*500m grid square shows that the Victorian area of Cottenham (a small village to the North of the District) comprises 433 properties. Four percent of these properties yields only 17 which would use solid fuel as the main source of heating. With this in mind, it is not necessary to progress domestic areas to a further stage of assessment.

South Cambridgeshire District Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Since the last round of review and assessment, there are no new locations where fugitive dust emissions will have a significant impact within the District.

South Cambridgeshire District Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

New monitoring data has shown that exceedences of both the annual mean nitrogen dioxide objective and the PM₁₀ daily mean objective are occurring within the Air Quality Management Area. An Air Quality Action Plan is currently under development and will be in place by Summer 2009. The AQAP has recently gone out to public and stakeholder consultation and the finalised document is expected to be ready by Summer 2009. Once adopted by the Council, the AQAP will be used to aid in the decision-making processes and influence policy and future projects. It is envisaged that the actions detailed within the AQAP will help to reduce the levels of NO₂ and PM₁₀ within the AQMA. Under present conditions, the AQMA cannot be revoked.

Monitoring and assessment of areas within the District and outside the AQMA has shown that there are currently no other areas of concern and no reason to carry out further or detailed assessment.

8.2 Conclusions from Assessment of Sources

This review and Assessment process has not identified any new sources of pollution that need further assessment. The air quality in and around the A14 between Bar Hill and Milton still requires improvement to achieve the national air quality objectives. The designation of the Air Quality Management Area along this stretch of the A14 has led to the development of the above-mentioned Air Quality Action Plan.

It is acknowledged that the District will experience major growth within the next 5-20 years which is going to add to the burden on the local road networks and introduce further emissions from domestic and industrial sources. The impact on air quality of the proposed growth has been modelled by Cambridge Environmental Research Consultants (CERC) in a project carried out in liaison with South Cambridgeshire District Council and Cambridge City Council. The modelling has been carried out to give baseline conditions and dispersion modelling has been carried forward into 2016 and 2025 (in line with proposed timescales for major development projects).

The results of the modelling will be submitted by CERC shortly but it will help to give a better understanding of the challenges faced within the District in terms of air quality as the District grows.

8.3 Proposed Actions

During the previous round of review and assessment, detailed assessments for nitrogen dioxide and PM₁₀ were completed, which has resulted in the declaration of an Air Quality Management Area along the A14 between Bar Hill and Milton. Following this, a further assessment for both pollutants confirmed that South Cambridgeshire District Council was correct in declaring the AQMA. A joint Air Quality Action Plan is currently being developed with Huntingdonshire District Council and Cambridge City Council.

This Updating and Screening Assessment has not identified the need to carry out any further Detailed Assessments.

Additional monitoring has already been proposed for and around the proposed new town of Northstowe. The proposal includes an NO₂ diffusion tube network within Northstowe, 3 continuous "traffic-box" monitors to be located in existing settlements within 1km of the Northstowe development and the provision and setting up of a community web-based air quality information

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service for future residents of Northstowe and residents of the outlying settlements. No other additional monitoring is considered to be necessary.

The existing AQMA is for NO₂ and PM₁₀. This report has not identified any need for the AQMA to be updated, modified or revoked.

The Air Quality Action Plan, outstanding from the previous round of review and assessment is expected to be in place by the Summer of 2009. Following this, a 2010 progress report for the 4th round of review and assessment will be submitted to Defra followed by the 2010 Progress report on the Air Quality Action Plan.

9 References

Deriving NO₂ from NO_x for Air Quality Assessments of Roads – Updated to 2006
Air Quality Consultants

The Environment Act 1995

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2000)
Department for Environment, Food and Rural Affairs

Air Quality Regulations 2000 and (Amendment) regulations 2002

Local Air Quality Management, Policy Guidance LAQM. PG(03) (2003)
Department for Environment, Food and Rural Affairs

Local Air Quality Management, Technical Guidance LAQM. TG(03) (2003)
Department for Environment, Food and Rural Affairs

The Detailed Assessment of Nitrogen Dioxide Along the A14 Corridor (2006)
South Cambridgeshire District Council

The Detailed Assessment of PM₁₀ Along the A14 Corridor (2007)
South Cambridgeshire District Council

The Further Assessment of Nitrogen Dioxide and PM₁₀ Along the A14 Corridor (2008)
South Cambridgeshire District Council

Cambridgeshire Authorities Progress Report (2007)
South Cambridgeshire District Council, Huntingdonshire District Council, East Cambridgeshire District Council, Cambridge City Council, Fenland District Council, Cambridgeshire County Council

Cambridgeshire County Council
Traffic Monitoring Report 2008

Appendices

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

- Suppliers and Analysing lab: Scientifics Ltd
551 South Becquerel Avenue
Harwell Science and Innovation Campus
Didcot
Oxfordshire
OX11 0TB

Factor from Local Co-location Studies (if available)

The bias adjustment factor used 2008 is the national average supplied on the Review and Assessment website and as of April 2009 is 0.8.

QA/QC of diffusion tube monitoring

Attached is the confirmation of the methods applied by Scientifics Ltd when analysing diffusion tubes.

PM Monitoring Adjustment

The BAMs in use in South Cambridgeshire are non-gravimetric with heated inlets. In order that PM₁₀ data is supplied as gravimetric equivalent, all PM₁₀ data has been multiplied by a factor of 1.3.

Short-term to Long-term Data adjustment

Refer to Box 3.2 of TG(09)
Long-term sites chosen for calculation
State dates for Period Mean

DELETE THIS INSTRUCTION BOX BEFORE SUBMITTING THE REPORT.

Site	Site Type	Annual Mean	Period Mean	Ratio
			Average	

QA/QC of automatic monitoring

- QA/QC of automatic monitoring data is carried out by AEA Technology (<http://www.aeat.co.uk>).
- An annual audit of the monitoring stations is carried out by AEA Technology.
- Services are carried out bi-annually by the equipment suppliers. In the case of Barrington, Bar Hill and Impington, this is Thermo-Unicam and the new site at Orchard Park School is serviced by Enviro-Technology.

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- The sites are manually calibrated on a bi-monthly basis by the Local Site Operative. The output from the calibrations is forwarded to AEAT.

Appendix B: DMRB Results

DMRB: Assessment of Local Air Quality					INPUT SHEET																																																																																																																																																																																																																												
Step 1	Receptor name	A14 Milton	Receptor number	1	Step 6	CALCULATE																																																																																																																																																																																																																											
Step 2	Year	2009			Step 7	STORE RESULTS FOR THIS RECEPTOR																																																																																																																																																																																																																											
Step 3	Number of links	2																																																																																																																																																																																																																															
Step 4	Background concentrations for 2009						CLEAR INPUT DATA																																																																																																																																																																																																																										
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DMRB: Assessment of Local Air Quality					OUTPUT SHEET			
Current receptor					CLEAR RESULTS - CURRENT RECEPTOR		CLEAR RESULTS - ALL RECEPTORS	
Receptor Name	A14 Milton	Receptor number	1					
Assessment year	2009							
Results								
Pollutant	Annual mean				For comparison with Air Quality Standards			
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units	
CO	0.00	0.02	0.02	mg/m ³	Annual mean*	0.02	mg/m ³	
Benzene	0.00	0.01	0.01	µg/m ³	Annual mean	0.01	µg/m ³	
1,3-butadiene	0.00	0.03	0.03	µg/m ³	Annual mean	0.03	µg/m ³	
NO _x	28.0	10.2	38.2	µg/m ³	Not applicable			
NO ₂	19.1	2.9	22.0	µg/m ³	Annual mean*	22.0	µg/m ³	
PM ₁₀	25.0	0.91	25.91	µg/m ³	Annual mean	25.9	µg/m ³	
					Days >50µg/m ³	15	Days	
* See Footnote 32 in DMRB Volume 11 Chapter 3								
Contribution of each link to annual mean								
Link number	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	PM ₁₀ (µg/m ³)			
1	0.03	0.03	0.07	15.31	1.33			
2	-0.01	-0.02	-0.04	-5.11	-0.42			
3								
4								
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