

Progress Report 2006
Air Quality

Surrey Heath Borough Council
May 2006

Executive Summary

An Air Quality Progress Report has been performed for the Borough of Surrey Heath. The aim of this report is to summarise monitoring that has taken place in the Borough and to relate this to any existing or planned AQMAs or other changes that may impact air quality.

Monitoring has been performed for nitrogen dioxide and PM₁₀ in the Borough. One AQMA has been declared along part of the M3 corridor. No developments are planned that are likely to affect air quality in the Borough.

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1 Introduction

The Borough of Surrey Heath is located south west of London, outside the M25. The main population centres are Camberley and Frimley and the main thoroughfares through the Borough are A30, A325, A322, A331 and the M3 motorway.

1.1 **Legislation**

Air quality Progress Reports form part of the Local Air Quality Management (LAQM) system introduced in the Environment Act 1995 and subsequent Regulations. The LAQM regime is designed to play a key role in the UK Government's plans to achieve the air quality objectives outlined in the UK Air Quality Strategy and subsequent addendum. The present UK air quality standards and objectives are listed in Appendix A.

The need for Progress Reports was identified to develop a longer-term vision for both LAQM and the Review and Assessment process. Presently, the requirement is for Progress Reports to be prepared annually, except in years when an Updating and Screening Assessment (and potentially a Detailed Assessment) is carried out. This report has been conducted in accordance with the guidance outlined in the Progress Report Guidance, LAQM.PRG(03).

1.2 **Previous Assessments**

The previous air quality assessment performed in the Borough was the 2004 Stage 4 Air Quality Review and Assessment. This entailed the production of a detailed model of part of the M3 corridor, representing the existing AQMA.

The AQMA was modified based on the recommendations of the Stage 4 report so it currently extends from Frimley Road Camberley to Ravenswood Roundabout Camberley, including the M3 motorway and the facades of the properties on both sides of the highway. The AQMA has been declared for NO₂ and PM₁₀.

1.3 **Proposed Developments**

There are no proposed developments that have been identified that will significantly impact air quality in the Borough.

2 Monitoring

2.1 Monitoring Results

2.1.1

Nitrogen Dioxide Diffusion Tubes

Diffusion tubes have been used in the Borough to measure nitrogen dioxide at thirty one sites since 1993, with twenty four sites operating since 1997. Data recorded since 2001 are shown in Table 1. The locations and site types are shown in Appendix B, Table 7.

The tubes are supplied and analysed by Lambeth Scientific Services and prepared using a 50% v/v TEA in acetone solution.

Table 1: Measured NO₂ Diffusion Tube Concentrations

Site	2001 / µg/m ³	2002 / µg/m ³	2003 / µg/m ³	2004 / µg/m ³	2005 / µg/m ³	2010 / µg/m ³
A30 Bagshot SH1	29.4	33.4	25.2	21.8	23.7	20.0
Windle Valley Daycare Centre SH2	21.8	27.6	26.3	25.4	20.7	17.4
Snows Ride School Windlesham SH3	24.0	21.9	23.1	20.6	26.7	23.4
Shaftesbury Road Bisley SH4	18.5	21.9	19.4	14.5	16.5	13.9
Crawley Hill Camberley SH5	42.5	43.7	48.3	46.0	29.7	25.0
Church Lane Bisley SH6	27.3	26.5	30.5	24.2	19.7	19.6
M3 Brickhill roadside SH7	65.4	79.4	60.9	47.2	45.9	38.6
M3 Brickhill 50m back SH8	33.8	32.2	37.8	33.9	23.8	20.0
A30 Jolly Farmer SH9	29.4	34.5	37.8	35.1	24.5	20.6
A30 Homebase SH10	40.3	41.4	38.9	30.3	36.7	30.9
Watchetts School Camberley SH11	39.2	36.8	39.9	31.5	27.7	23.3
High Street Camberley SH12	43.6	40.3	38.9	39.9	23.2	19.5
Le Marchant Road SH13	43.6	46.0	42.0	37.5	35.0	29.4
Frimley Green Road SH14	41.4	33.4	34.7	-	-	27.4
Badgers Copse SH14	-	-	-	29.0	24.3	20.4
Frimley Interiors SH15	25.1	25.3	-	-	-	19.4
AQM Bisley SH15	-	-	34.7	16.9	24.4	20.5
The Hatches SH16	29.4	23.0	24.2	-	-	19.1
Wood Road SH16	-	-	-	21.8	29.7	25.0
Threshers, Mychett/Bisley SH17	24.0	23.0	-	-	-	17.6
Guildford Road, Bisley SH17	-	-	42.0	35.1	43.2	36.3
Deepcut Bridge Road SH20	29.4	24.2	37.8	21.8	25.7	21.6
Old Bisley Road SH21	24.0	27.6	-	-	-	21.1
Benner Lane SH21	-	-	23.1	12.1	21.0	18.4
Tremayne Walk SH22	27.3	27.6	-	-	-	21.1
AQM Bisley SH22	-	-	29.4	20.6	24.2	20.4
Red Road/Maultway SH23	32.7	36.8	37.8	29.0	25.4	21.4
High Street, Chobham SH24	28.3	26.5	25.2	19.4	27.0	22.7
A322 Bagshot/Portsmouth Rd SH25	55.6	52.9	-	-	-	40.5
AQM Bisley SH25	-	-	35.7	19.4	26.9	22.6
College Ride, Camberley SH26	33.8	29.9	26.3	24.2	22.6	19.8

Note: 2010 concentrations are predicted using guidance from LAQM TG(03)

The results from the NO₂ diffusion tube monitoring during 2004-5 are presented in Table 1, together with predicted concentrations in 2010. The data have been bias-adjusted based on co-location studies from Lambeth Scientific Services (50% TEA / acetone) published on the Air Quality Review and Assessment Website, managed by the University of the West of England.

The bias-adjustment factor for 2001 was 1.09, 2002 1.15, 2003 1.05, 2004 1.21 and 2005 1.13. The future year projections were calculated using factors provided in LAQM.TG(03).

Two of the monitoring results in 2005 have exceeded the annual mean objective of $40 \mu\text{g}/\text{m}^3$, at SH7, M3 Brickhill Roadside and SH17, Guildford Road. By 2010, projections indicate that none of the current sites are likely to exceed the annual mean objective, although the old site SH25, A322 Bagshot/Portsmouth Road indicates potential to exceed $40 \mu\text{g}/\text{m}^3$ in 2010.

One of the sites predicted to potentially exceed the annual mean objective is within the existing AQMA along the M3 corridor.

Table 2: NO₂ Diffusion Tube Data Capture

Site	2001 / %	2002 / %	2003 / %	2004 / %	2005 / %
A30 Bagshot SH1	75.0	100.0	91.7	91.7	66.7
Windle Valley Daycare Centre SH2	75.0	100.0	100.0	91.7	83.3
Snows Ride School Windlesham SH3	83.3	100.0	100.0	91.7	83.3
Shaftesbury Road Bisley SH4	83.3	58.3	100.0	91.7	83.3
Crawley Hill Camberley SH5	58.3	100.0	91.7	83.3	75.0
Church Lane Bisley SH6	75.0	100.0	100.0	75.0	75.0
M3 Brickhill roadside SH7	66.7	100.0	100.0	83.3	83.3
M3 Brickhill 50m back SH8	83.3	100.0	91.7	91.7	75.0
A30 Jolly Farmer SH9	83.3	100.0	100.0	91.7	75.0
A30 Homebase SH10	66.7	100.0	100.0	83.3	66.7
Watchetts School Camberley SH11	75.0	91.7	91.7	91.7	75.0
High Street Camberley SH12	66.7	75.0	91.7	91.7	75.0
Le Marchant Road SH13	83.3	100.0	100.0	91.7	75.0
Frimley Green Road SH14	50.0	100.0	50.0	-	-
Badgers Copse SH14	-	-	-	41.7	83.3
Frimley Interiors SH15	83.3	91.7	-	-	-
AQM Bisley SH15	-	-	83.3	83.3	83.3
The Hatches SH16	66.7	91.7	100.0	-	-
Wood Road SH16	-	-	-	83.3	75.0
Threshers, Mychett/Bisley SH17	75.0	66.7	-	-	-
Guildford Road, Bisley SH17	-	-	75.0	83.3	83.3
Deepcut Bridge Road SH20	83.3	100.0	100.0	91.7	58.3
Old Bisley Road SH21	58.3	75.0	-	-	-
Benner Lane SH21	-	-	91.7	75.0	83.3
Tremayne Walk SH22	66.7	75.0			-
AQM Bisley SH22	-	-	66.7	83.3	83.3
Red Road/Maultway SH23	83.3	100.0	100.0	83.3	83.3
High Street, Chobham SH24	83.3	100.0	100.0	91.7	66.7
A322 Bagshot/Portsmouth Rd SH25	66.7	91.7	-	-	-
AQM Bisley SH25	-	-	100.0	83.3	91.7
College Ride, Camberley SH26	75.0	91.7	100.0	91.7	41.7
Mean Capture Rate	73.6	92.0	92.7	85.1	76.0

Capture rates have varied at all sites, falling slightly in 2005 compared to previous years with only one site capturing over 90% (AQM Bisley) and no other sites capturing over 85%. None of the sites have been seasonally adjusted, although this should be performed if any of the results are used for any additional assessment purposes.

2.1.2

Nitrogen Dioxide Continuous Monitoring

There is one continuous analyser in the Borough measuring nitrogen dioxide. It was previously located at Bisley (OS grid ref. 495499, 158880), and was moved in 2005 to Castle Road (OS grid ref. 488634, 159799). The unratified data from this monitor are shown in Tables 3 and 4.

Table 3: Continuous NO₂ Monitoring Results

Period	Bisley	Castle Road
	Mean Conc. / $\mu\text{g}/\text{m}^3$	Mean Conc. / $\mu\text{g}/\text{m}^3$
Oct – Dec 2003	31	-
Jan – Dec 2004	23	-
Jan – April 2005	22	-
Oct - Dec 2005	-	36
Jan - Feb 2006	-	39

Table 4: Seasonally Adjusted Continuous NO₂ Monitoring Results

Period	Bisley	Castle Road
	Mean Conc. / $\mu\text{g}/\text{m}^3$	Mean Conc. / $\mu\text{g}/\text{m}^3$
2003 ¹	38	-
2004	23	-
2005 ¹	24	47
January 2006	-	40
February 2006	-	38
2010	20	40

Note: ¹ Seasonally adjusted based on Harwell, Portsmouth and Canterbury AURN data

The continuous monitoring data indicate that the annual mean objective for NO₂ is unlikely to be exceeded at the Bisley monitoring site. The annual mean concentration at the Castle Road site indicates that the annual mean objective was exceeded in 2005, although this exceedence is based on just 3 months' of monitoring data.

The concentrations predicted in 2010 indicate that the Bisley site is unlikely to exceed the UK objective for the annual mean concentration, although the annual mean concentration at Castle Road may continue to record concentrations exceeding 40 $\mu\text{g}/\text{m}^3$.

2.1.3

PM₁₀ Continuous Monitoring

There is one continuous analyser in the Borough measuring nitrogen dioxide. It was previously located at Bisley (OS grid ref. 495499, 158880), and was moved in 2005 to Castle Road (OS grid ref. 488634, 159799). The unratified data from this monitor are shown in Tables 5 and 6.

Table 5: Continuous PM₁₀ Monitoring Results

Period	Bisley		Castle Road	
	Mean Conc. / $\mu\text{g}/\text{m}^3$	Exceedences	Mean Conc. / $\mu\text{g}/\text{m}^3$	Exceedences
Oct – Dec 2003	18	0	-	-
Jan – Dec 2004	16	1	-	-
Jan – April 2005	16	0	-	-
Oct - Dec 2005	-	-	19	0
Jan - Feb 2006	-	-	21	0

Note: PM₁₀ results are gravimetric equivalent.

Table 6: Continuous PM₁₀ Monitoring Results

Period	Bisley		Castle Road	
	Mean Conc. / $\mu\text{g}/\text{m}^3$	Exceedences	Mean Conc. / $\mu\text{g}/\text{m}^3$	Exceedences
2003 ¹	20	0	-	-
2004	16	1	-	-
2005 ¹	16	0	19	0
January 2006	-	-	22	0
February 2006	-	-	19	0
2010 ²	16	-	17	-

Note: ¹ Seasonally adjusted based on Harwell, Portsmouth and Canterbury AURN data using guidance in LAQM TG(03). ² Predicted concentration using guidance in LAQM TG(03). PM₁₀ results are gravimetric equivalent.

The continuous monitoring data indicate that the annual objective for PM₁₀ is unlikely to be exceeded at either of the monitoring locations. The predictions for 2010 also indicate that the provisional UK objectives are unlikely to be exceeded at these locations.

2.2

New Monitoring Locations

There are no proposed changes to the monitoring network in the foreseeable future.

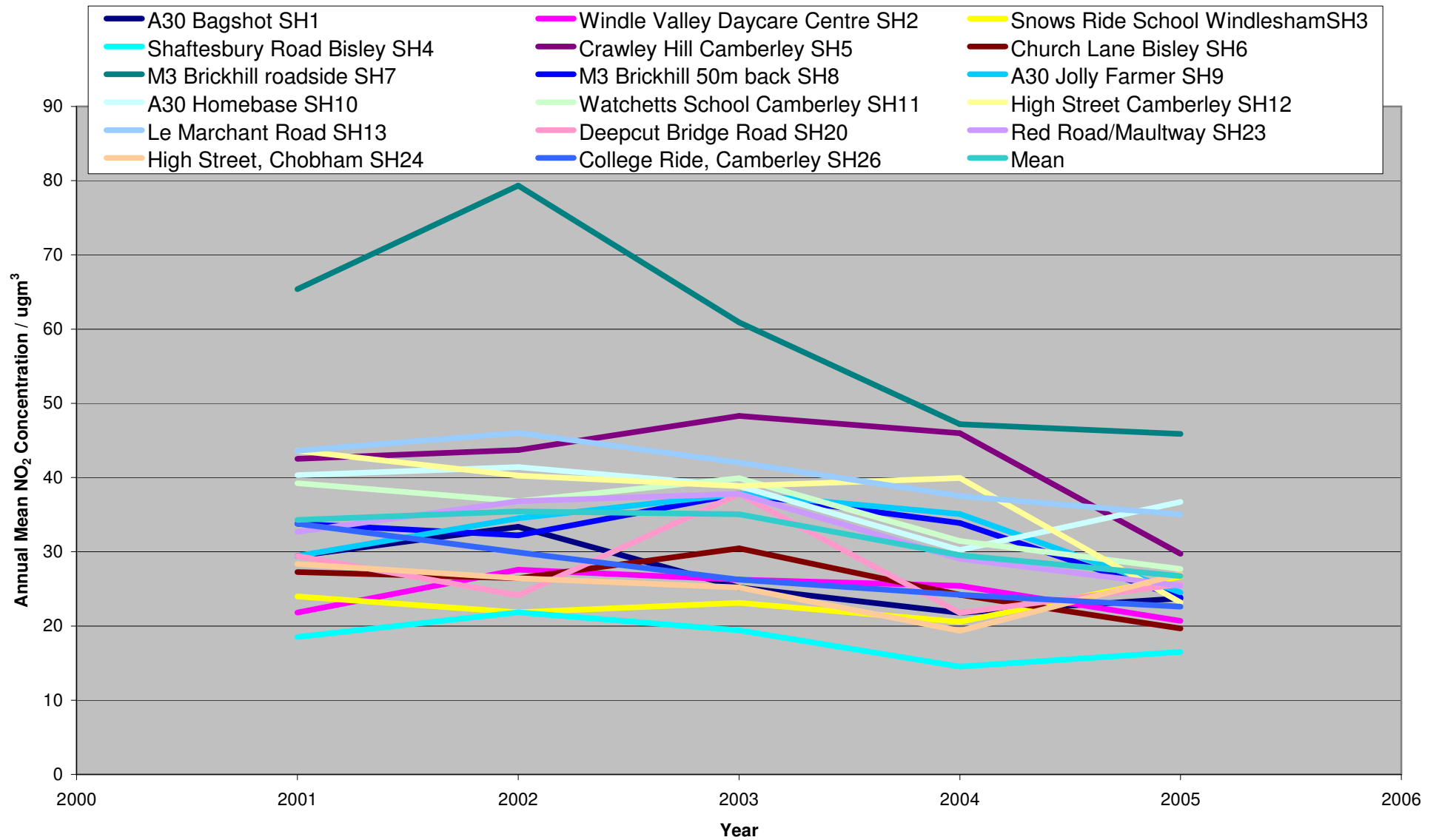
2.3

Comparison with Previous Monitoring

The diffusion tube data provide the greatest long term data. Records from 2001 to 2005 for the seventeen long-term sites are shown in Figure 1. The data indicate that the annual mean concentration of NO₂ is generally decreasing, although a peak in 2003 is associated with national meteorological conditions.

There is insufficient continuous monitoring data at this stage to determine long-term trends at the mobile lab monitoring sites.

Figure 1: Mean Annual Concentrations from Seventeen Long-term NO₂ Diffusion Tube monitoring Sites



3 Conclusions

Continuous monitoring results have been presented for 2003-2005, and passive monitoring results have been presented for 2001-2005.

The following conclusions can be drawn:

- Two exceedences of the NO₂ annual mean objectives have been monitored using diffusion tubes in 2005.
- One diffusion tube site within the AQMA has recorded a sufficiently high concentration of NO₂ to indicate that an exceedence is possible.
- One diffusion tube sit near to Guildford Road, Bisley, has indicated an exceedence of the UK annual mean objective outside the existing AQMA.
- The NO₂ continuous monitor at Castle Road indicates that an exceedence of the 2005 annual mean objective occurred in 2005. However, this exceedence is based on just 3 months' data.
- NO₂ concentrations in 2005 were generally lower than those recorded in the previous four years.
- The PM₁₀ continuous monitor at Castle Road indicates that the UK objectives were not exceeded in 2005 and that the provisional objectives for 2010 are not predicted to be exceeded.
- There are no known new or proposed developments where an air quality assessment has been carried out.

4 References

Defra, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2000, <http://www.defra.gov.uk/environment/airquality/strategy/index.htm>

Defra, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum, 2003, <http://www.defra.gov.uk/environment/airquality/strategy/abbedndum/index.htm>

Defra, Local Air Quality Management, Policy Guidance LAQM.PG (03), 2003

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Defra, Local Air Quality Management, Technical Guidance LAQM.TG (03) Update, 2006

Surrey Heath Borough Council, Local Air Quality Updating and Screening Assessment, 2003

University of the West of England, Review and Assessment Support, <http://www.uwe.ac.uk/aqm/review/mguidance.html#Bias%20Adjustment>

Appendix A: Air Quality Standards and Objectives

Table 7: UK Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$ <i>All authorities</i>	running annual mean	31.12.2003
	5.0 $\mu\text{g}/\text{m}^3$ <i>Authorities in England and Wales only</i>	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 <i>Authorities in England, Wales and N. Ireland.</i>	maximum daily running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$		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 (PM ₁₀) (gravimetric) <i>All authorities</i>	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
Particles (PM ₁₀) (gravimetric) <i>Provisional objectives for England (not London) and Wales</i>	50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 7 times a year	24 hour mean	31.12.2010
	20 $\mu\text{g}/\text{m}^3$	annual mean	31.12.2010
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

Appendix B: Monitoring Locations

Table 8: Monitoring Locations and Site Types

Site	Grid Reference	Site Type
AQM Bisley	495499E 158880N	Roadside
AQM Castle Road	488634E 159799N	Roadside
A30 Bagshot SH1	491111E 163461N	Kerbside
Windle Valley Daycare Centre SH2	491056E 163335N	Roadside
Snows Ride School Windlesham SH3	492810E 164408N	Urban Background
Shaftesbury Road Bisley SH4	494693E 159489N	Roadside
Crawley Hill Camberley SH5	489099E 160264N	Roadside
Church Lane Bisley SH6	494976E 159632N	Roadside
M3 Brickhill roadside SH7	496220E 164432N	Kerbside
M3 Brickhill 50m back SH8	496217E 164442N	Roadside
A30 Jolly Farmer SH9	489640E 161884N	Roadside
A30 Homebase SH10	485776E 160077N	Kerbside
Watchetts School Camberley SH11	486939E 158939N	Roadside
High Street Camberley SH12	487484E 160807N	Kerbside
Le Marchant Road SH13	488703E 159585N	Kerbside
Frimley Green Road SH14	488090E 157820N	Roadside
Badgers Copse SH14	489250E 160250N	Roadside
The Hatches SH16	488374E 156753N	Urban Background
Wood Road SH16	486750E 158250N	Roadside
Guildford Road, Bisley SH17	495250E 159250N	Kerbside
Deepcut Bridge Road SH20	490389E 157280N	Kerbside
Benner Lane SH21	494750E 161250N	Urban Background
Red Road/Maultway SH23	490710E 160438N	Kerbside
High Street, Chobham SH24	497341E 161734N	Kerbside
College Ride, Camberley SH26	487684E 161363N	Urban Background

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Progress Report 2006

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