

NPL REPORT AS 12

UK Non-Automatic Hydrocarbon Network:

Annual Report for 2006

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Kevin Whiteside &
Paul Quincey

NOT RESTRICTED

April 2007

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Paul Quincey

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Approved on behalf of the Managing Director, NPL
By Dr Stuart Windsor, Analytical Science Group

Executive Summary

This Report summarises operational matters and the data obtained by the Non-Automatic Hydrocarbon Network in the year 2006.

The background, methods used and site locations are given in Sections 1 and 2.

Annual average data for benzene and 1,3-butadiene, and data capture, are given in Section 3. No sites exceeded the European Union Limit Value for benzene or the UK Air Quality Objectives for benzene and 1,3-butadiene.

No notable anomalous measurements were observed during the year.

Section 5 examines long term trends for benzene and 1,3-butadiene and compares them with the trends expected from the UK National Atmospheric Emissions Inventory. Trends in concentration over the period 1994 to 2002 are significantly downward and agree well between the two methods. The apparent upward trend in benzene concentration in the early years of this Network, noted in the 2004 report, seems to have been the result of the unusual meteorological conditions in the summer of 2003. Trends in benzene since 2002 are generally downward, especially at the higher concentration sites.

Recent trends in concentration at Harwell and Marylebone Road, from the Automatic Hydrocarbon Network, are also presented.

Section 6 compares the 2006 Network data with the geographical distribution predicted by Defra-funded modelling data (for the year 2003). Although, as in previous years, measured concentrations of benzene at a majority of background sites are higher than those predicted by the model, this tendency is less pronounced because the measured concentrations have become lower. Concentrations of 1,3-butadiene are generally too low to allow any similar conclusion to be drawn.

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UK Non-Automatic Hydrocarbon Network

Annual Report for 2006

1. Introduction

1.1 General Background, History and Methods

The Hydrocarbon Networks exist within the framework of Defra's Air Quality Science Programme, the aims of which are to determine the magnitude of sources, exposure and effects of air pollutants on human health and the natural environment, to develop a better understanding of underlying processes, and to underpin the development and implementation of national and international strategies in order to reduce impacts. The Programme includes a combination of monitoring Networks, emission inventories, atmospheric modelling, strategic evaluation, scientific research and dissemination to assist in these aims.

The Automatic and Non-Automatic Hydrocarbon Networks were established in 2002, following on from the previous Hydrocarbon Network, which measured 25 species of hydrocarbon on an hourly basis at 13 sites. As more benzene monitoring sites were needed to comply with regulations, the Non-Automatic Network was set up using a less expensive method to produce benzene measurements as fortnightly averages at 35 sites. Some of the sites are at the same location as the previous Hydrocarbon Network sites, so that long term trends can be evaluated.

The benzene monitoring method involves pumping ambient air at a rate of about 10 ml/min through duplicate tubes containing the sorbent Carbopack X, with subsequent laboratory analysis of the benzene content of the tubes. This method was validated over a year-long pilot study, whose results are available through the Defra website:

http://www.airquality.co.uk/archive/reports/cat05/0407061411_btex_npl_pilot_final.pdf

The method is described in the paper:

Studies using the sorbent Carbopack X for measuring environmental benzene with Perkin-Elmer-type pumped and diffusive samplers, Nicholas A Martin, David J Marlow, Malcolm H Henderson, Brian A Goody and Paul G Quincey: *Atmospheric Environment* **37** (2003) 871-879.

In addition to the benzene measurements, 1,3-butadiene is measured at 10 sites using a diffusive technique, also using Carbopack X as the sorbent. The method is described in the paper:

Studies using the sorbent Carbopack X for measuring environmental 1,3-butadiene with pumped and diffusive samplers, Nicholas A Martin, Philippa Duckworth, Malcolm H Henderson, Nigel R W Swann, Simon T Granshaw, Robert P Lipscombe, Brian A Goody: *Atmospheric Environment* **39** (2005) 1069-1077

1.2 Regulatory Background - Update

The current ambient benzene legislation is given in The Air Quality Limit Values Regulations 2003 (UK), which came into force 9 Sept 2003. The requirements are identical to those of the EU Directive 2000/69/EC, and the relevant information is given below:

Benzene

	<i>Averaging period</i>	<i>Limit value</i>	<i>Margin of tolerance</i>	<i>Date by which limit value is to be met</i>
Limit value for the protection of human health	Calendar year	5 $\mu\text{g}/\text{m}^3$	5 $\mu\text{g}/\text{m}^3$ reducing on 1st January 2006 and every 12 months thereafter by 1 $\mu\text{g}/\text{m}^3$ to reach 0 $\mu\text{g}/\text{m}^3$ by 1st January 2010	1st January 2010

5 $\mu\text{g}/\text{m}^3$ is expressed at 293 K and 101.3 kPa and is equivalent to 1.54 ppb.

The Margin of Tolerance means that Member States can exceed the Limit Value for a limited period if necessary.

As part of the National Air Quality Strategy there are also Air Quality Objectives, which can be stricter than the Limit Value, and which also include 1,3-butadiene. These are published in the UK National Air Quality Strategy Addendum (2003).

The Objective for England and Wales is the same as in The Air Quality Limit Values Regulations above.

The Objective for Scotland and Northern Ireland is an annual average of 3.25 $\mu\text{g}/\text{m}^3$ (1 ppb), by 1/1/2010.

1,3-Butadiene does not feature in EU legislation except as an ozone precursor in the Ozone Directive 2002/3/EC. The annual average Objective in the National Air Quality Strategy is 2.25 $\mu\text{g}/\text{m}^3$ (1 ppb).

Standard methods for measuring benzene concentration, which include the method used in the Network, have been published by CEN as EN 14662 Parts 1 to 5.

1.3 Units of Measurement

Regulations in the United Kingdom have in the past expressed concentrations of gases in units of molar parts per billion (1,000,000,000) - ppb. This is the ratio of the number of benzene molecules, for example, to the total number of molecules in the volume of air of interest. These units have the advantage that if the temperature or pressure of the air changes, the concentration remains the same.

Current UK and European legislation sets limit value concentrations as micrograms of pollutant per cubic metre of air ($\mu\text{g}/\text{m}^3$). When these units are used without correcting to a

standard temperature and pressure, the same “packet” of air will have a different concentration as these properties of the air change. The legislation specifies that the air volume must be corrected to be at a standard temperature of 293 K (about 20°C), and a pressure of 101.3 kPa (about average atmospheric pressure at sea level).

Both sets of units are used in this report.

The conversion factors between the two sets of units are:

for benzene	$1 \text{ ppb} = 3.25 \mu\text{g.m}^{-3}$
for 1,3-butadiene	$1 \text{ ppb} = 2.25 \mu\text{g.m}^{-3}$.

2. Map and Table of Sites at the end of 2006

At the end of 2006, the sites in the Network were located as follows:

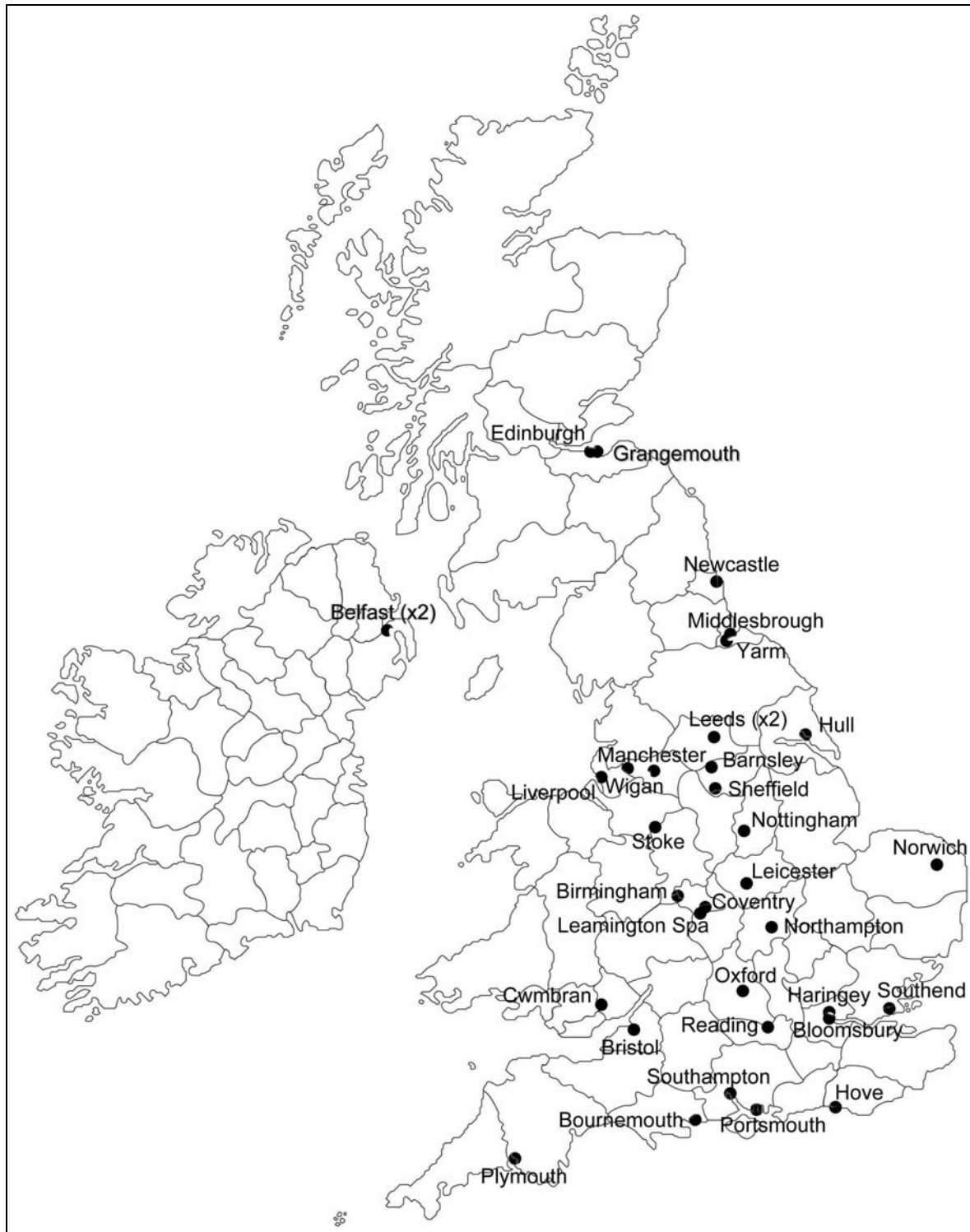


Figure 1: map of sites across the United Kingdom

Table 1 lists the sites with their Local Site Operators and whether they also measure 1,3-butadiene.

Table 1: Network sites

Site Name	Type	Local Site Operator	1,3-butadiene
Barnsley Gawber		Barnsley Council	
Belfast centre		Belfast City Council	Y
Belfast roadside	Roadside	Belfast City Council	Y
Birmingham roadside	Roadside	Birmingham City Council	Y
Bloomsbury		Casella Stanger	
Bournemouth		Bournemouth Borough C	
Bristol Old Market	Roadside	Bristol City Council	Y
Coventry Memorial Park		Coventry City Council	
Cwmbran		Torfaen CBC	
Edinburgh St Leonard's		City of Edinburgh Council	
Grangemouth	Industrial	Falkirk Council	Y
Haringey roadside	Roadside	King's College London	Y
Hove roadside	Roadside	Brighton and Hove City C	
Hull Freetown		Hull City Council	
Leamington Spa		Warwick District Council	
Leeds centre		Leeds City Council	Y
Leeds roadside	Roadside	Leeds City Council	Y
Leicester centre		Leicester City Council	
Liverpool Speke		Faber Maunsell	
Manchester Piccadilly		Manchester City Council	
Middlesbrough	Industrial	Middlesbrough Borough C	Y
Newcastle		Newcastle City Council	
Northampton		Northampton Borough C	
Norwich centre		Faber Maunsell	
Nottingham centre		Nottingham City Council	
Oxford centre		Oxford City Council	
Plymouth		Plymouth City Council	
Portsmouth		Portsmouth City Council	
Reading		Reading Borough Council	
Sheffield		Sheffield City Council	
Southampton		Southampton City Council	
Southend-on-sea		Southend-on-Sea BC	
Stoke centre		City of Stoke on Trent	
Wigan centre		Wigan Metropolitan BC	
Yarm	Roadside	Stockton on Tees BC	

All sites are Urban Background except where stated in the Type column. Further details on these sites can be found on the UK Automatic Urban and Rural Network Site Information Archive at:

<http://www.stanger.co.uk/siteinfo/>

2.1 Networks meeting and other dissemination activities

The Annual Meeting for the Automatic and Non-Automatic Hydrocarbon Networks was held at NPL on 4 July 2006. The Programme included:

Janet Dixon (DEFRA)	Update from the Department
David Butterfield and Paul Quincey (NPL)	Non-Automatic Network issues and related developments
Steve Telling (Netcen)	Automatic Network issues
Emma Yates (Bristol U)	Measurements of Non Methane Hydrocarbons at Mace Head
Jon Bower (Netcen)	The Buncefield Oil Depot Explosion

3. Data and Data Capture for 2006

3.1 Benzene: Comparison with Limit Values and Objectives

Table 2: Benzene Annual Average Concentrations 1/1/06 to 31/12/06

Site Name	ppb	$\mu\text{g.m}^{-3*}$
Barnsley Gawber	0.23	0.75
Belfast centre	0.27	0.88
Belfast roadside	0.51	1.66
Birmingham roadside	0.64	2.08
Bloomsbury	0.38	1.24
Bournemouth	0.22	0.72
Bristol Old Market	0.56	1.82
Coventry Memorial Park	0.21	0.68
Cwmbran	0.21	0.68
Edinburgh St Leonard's	0.25	0.81
Grangemouth	0.52	1.69
Haringey roadside	0.55	1.79
Hove roadside	0.41	1.33
Hull Freetown	0.37	1.2
Leamington Spa	0.26	0.85
Leeds centre	0.36	1.17
Leeds roadside	0.60	1.95
Leicester centre	0.30	0.98
Liverpool Speke	0.35	1.14
Manchester Piccadilly	0.29	0.94
Middlesbrough	0.48	1.56
Newcastle	0.25	0.81
Northampton	0.25	0.81
Norwich Centre	0.28	0.91
Nottingham centre	0.34	1.11
Oxford centre	0.35	1.14
Plymouth	0.39	1.27
Portsmouth	0.27	0.88
Reading	0.28	0.91
Sheffield	0.50	1.63
Southampton	0.43	1.40
Southend-on-sea	0.30	0.98
Stoke centre	0.39	1.27
Wigan centre	0.26	0.85
Yarm	0.60	1.95

* standardised to 293K and 101.3 kPa.

The annual average concentration of benzene at each site over the calendar year 2006 is given in Table 2. It should be noted that some of the later data is unratiified, but it is not expected that it will change significantly.

Annual average concentrations at all sites were below the Limit Value of $5 \mu\text{g.m}^{-3}$ set by the 2nd European Daughter Directive 2000/69/EC.

Within the UK Air Quality Strategy Addendum, published in 2003, the Objectives for benzene are:

- for England and Wales, an annual average of $5 \mu\text{g.m}^{-3}$ to be achieved by 31 December 2010;
- for Scotland and Northern Ireland, a running annual mean of $3.25 \mu\text{g.m}^{-3}$ to be achieved by 31 December 2010.

These Objectives were met in 2005 for all sites.

Data capture figures are given in Table 3.

Table 3: Benzene Data Capture 1/1/06 – 31/12/06 for sites < 99%

Site	Data capture, %
Sheffield	54
Leeds Centre	73
Hull Freetown	82
Wigan Centre	90
Southampton	92
Norwich	94
Coventry Memorial Park	93
Grangemouth	94
Belfast Roadside	96
Reading	96
Hove Roadside	98
Norwich Centre	98

The reasons for data loss at those sites with less than 90% data capture were:

Sheffield (54%)

20/04/06 to 04/10/06

The pipe between the sample manifold and the sampler was found to be disconnected at the site audit on 04/10/06. As there was no supplementary evidence to show when it was disconnected, data was deleted back to the previous site audit on 20/04/06.

Leeds Centre (73%)

12/04/06 to 19/07/06

There was a leak at the in-line filter before the mass flow controller.

Hull Freetown (82%)

13/04/06 to 19/06/06

There was a leak at the in-line filter before the mass flow controller.

3.2 1,3-Butadiene: Comparison with Limit Values and Objectives

Annual average concentrations and data capture for 1,3-butadiene are given in Table 4.

Table 4: 1,3-butadiene measurements and data capture 1/1/05 – 31/12/05

Site	ppb	$\mu\text{g.m}^{-3}$ *	Data Capture, %
Grangemouth	0.19	0.43	74
Bristol Old Market	0.09	0.20	88
Leeds Roadside	0.07	0.16	93
Haringey Roadside	0.04	0.09	97
Middlesbrough	0.04	0.09	96
Belfast Roadside	0.03	0.07	92
Birmingham Roadside	0.03	0.07	100
Leeds Centre	0.02	0.05	93
Belfast Centre	0.02	0.05	100

* standardised to 293K and 101.3 kPa.

The method has a much larger measurement uncertainty below 0.05 ppb, so that the values below the red line should be treated accordingly.

All measured concentrations are below the United Kingdom Air Quality Strategy Objective of $2.25 \mu\text{g/m}^3$ (1 ppb). There is no European Union Limit Value for 1,3-butadiene.

Reasons For Data Capture Below 90%:**Grangemouth (74%)**

27/01/06 to 08/02/06	Tubes stolen
09/03/06 to 20/03/06	Tubes stolen
20/04/06 to 28/04/06	Tubes not exposed by LSO
11/05/06 to 23/06/06	Tubes stolen
11/08/06 to 25/08/06	Tubes not exposed by LSO

A cage has been installed on the roof of the hut to house the diffusion tubes to help prevent theft. This cage was broken into in May, which resulted in the loss of the tubes.

Bristol Old Market (88%)

An interferent peak occasionally appears on Bristol tubes only. There is no obvious explanation for this.

4. Operational Summary

4.1 Local hydrocarbon source at Barnsley

The local source at the Barnsley Gawber site - coal tar deposits being uncovered by a new housing development - noted in previous Annual Reports, had ceased to affect measurements during 2006. The average benzene concentration was 0.23 ppb in 2006, compared with 1.39 ppb in 2005 and 0.41 ppb in 2004.

4.2 Other anomalous results

The only fortnightly value recorded above 1.6 ppb ($5 \mu\text{g}/\text{m}^3$) was at Plymouth during the last sample of the year, for the period covering 19 December 2006 to 4 January 2007, when 3.46 ppb ($11.2 \mu\text{g}/\text{m}^3$) was measured. However, this data has not yet been ratified. Concentrations have returned to normal in 2007.

4.3 Annual variation

The concentrations were generally highest at the start of the year, with lower concentrations over the summer and autumn. The data for London Haringey, given below, was typical:

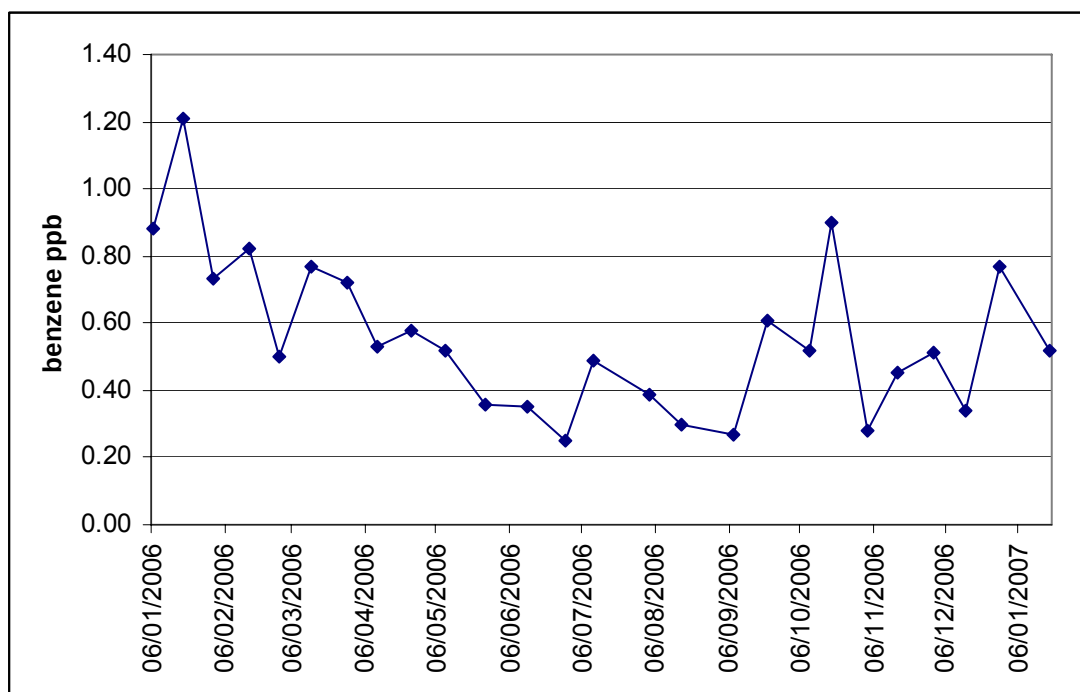


Figure 2: Benzene concentrations for London Haringey throughout 2006.

5. Long Term Trends and Comparisons with the UK Emission Inventory and Other Data

5.1 Benzene

5.1.1 Long term trends and Emissions Inventory

Benzene data from the five years of operation of the pumped samplers is shown in Figure 3. For clarity the number of sites have been divided into two graphs according to concentration in the first year. Benzene concentrations have generally dropped over the history of the Network except in 2003 when there were unusual meteorological conditions in the Summer affecting much of Europe. The reductions in concentration are more notable at the higher concentration (typically traffic influenced) sites.

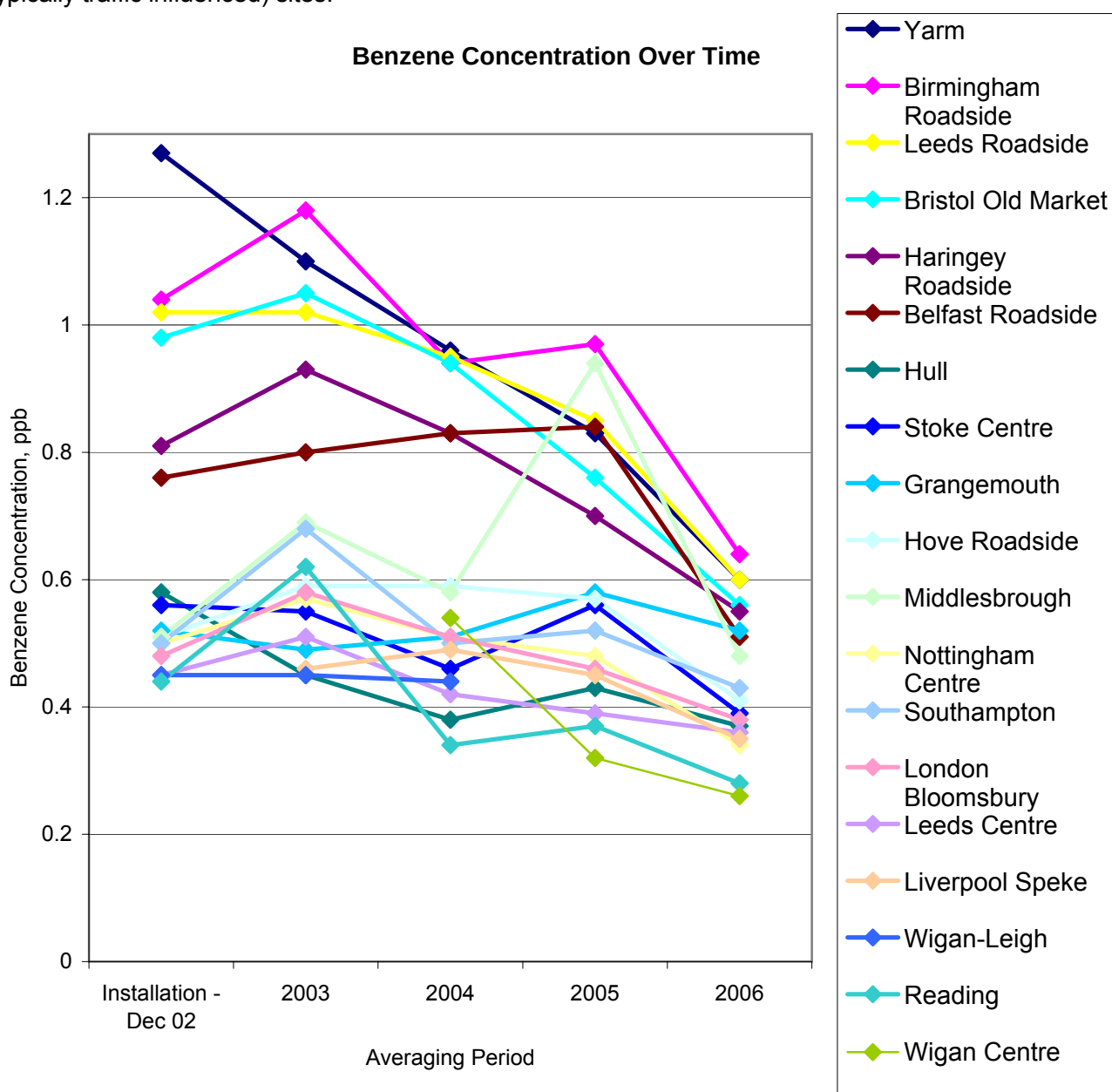


Figure 3a: Recent Annual Average Benzene Concentrations ("high" concentration)

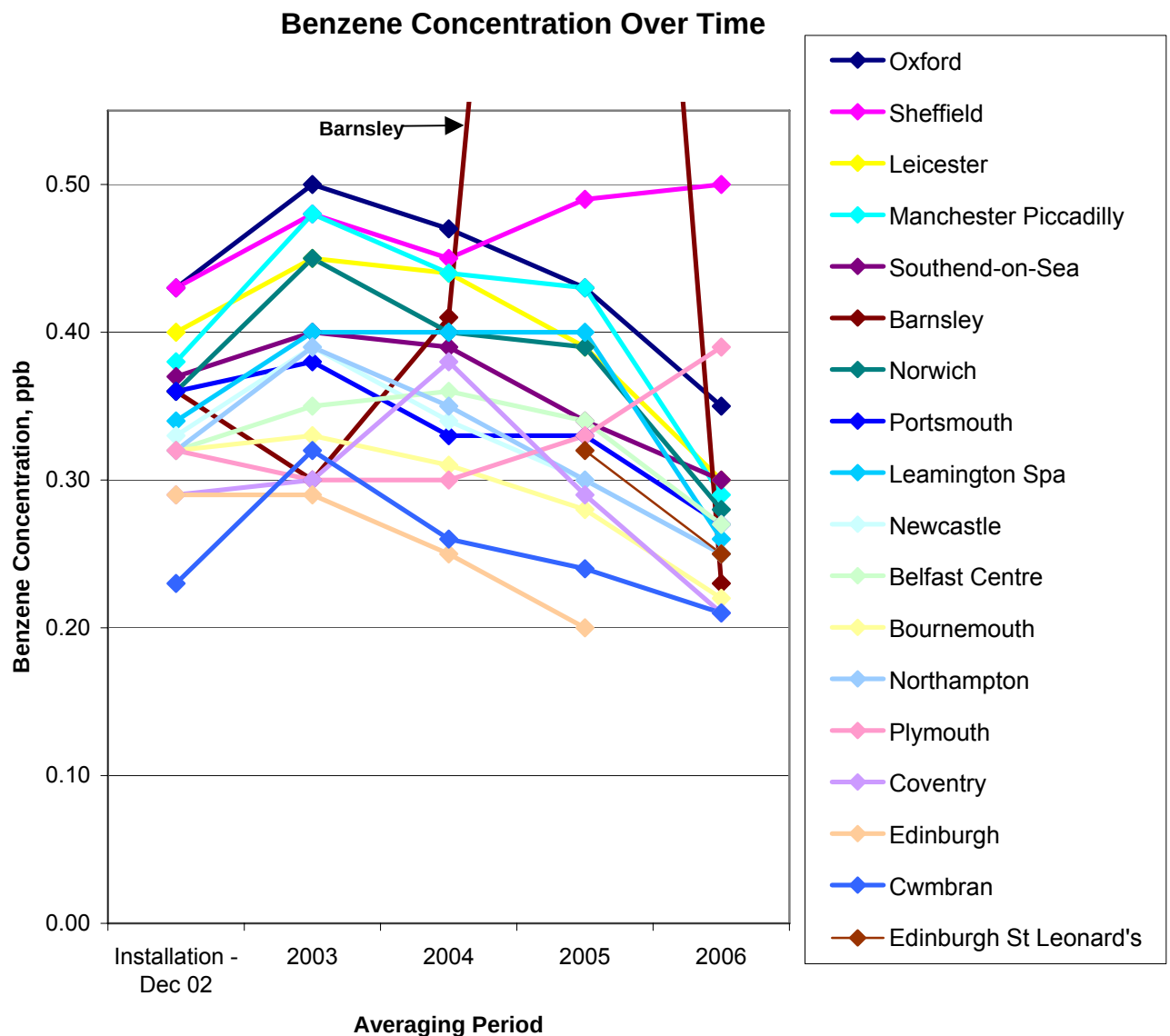


Figure 3b: Recent Annual Average Benzene Concentrations (‘low’ concentration)

Longer term trends can be gauged from data at sites that were monitoring benzene in the previous Hydrocarbon Network. These are shown in Figure 4. The results show that the recent small increase in 2003 follows a larger general decrease since 1994 and that concentrations continue to decrease in 2006. The anomalous increase in concentration at Middlesbrough in 2005 is attributed to a local source seen in July 2005.

This long term trend is well matched by the trend predicted by the National Atmospheric Emissions Inventory, shown in Figure 5.

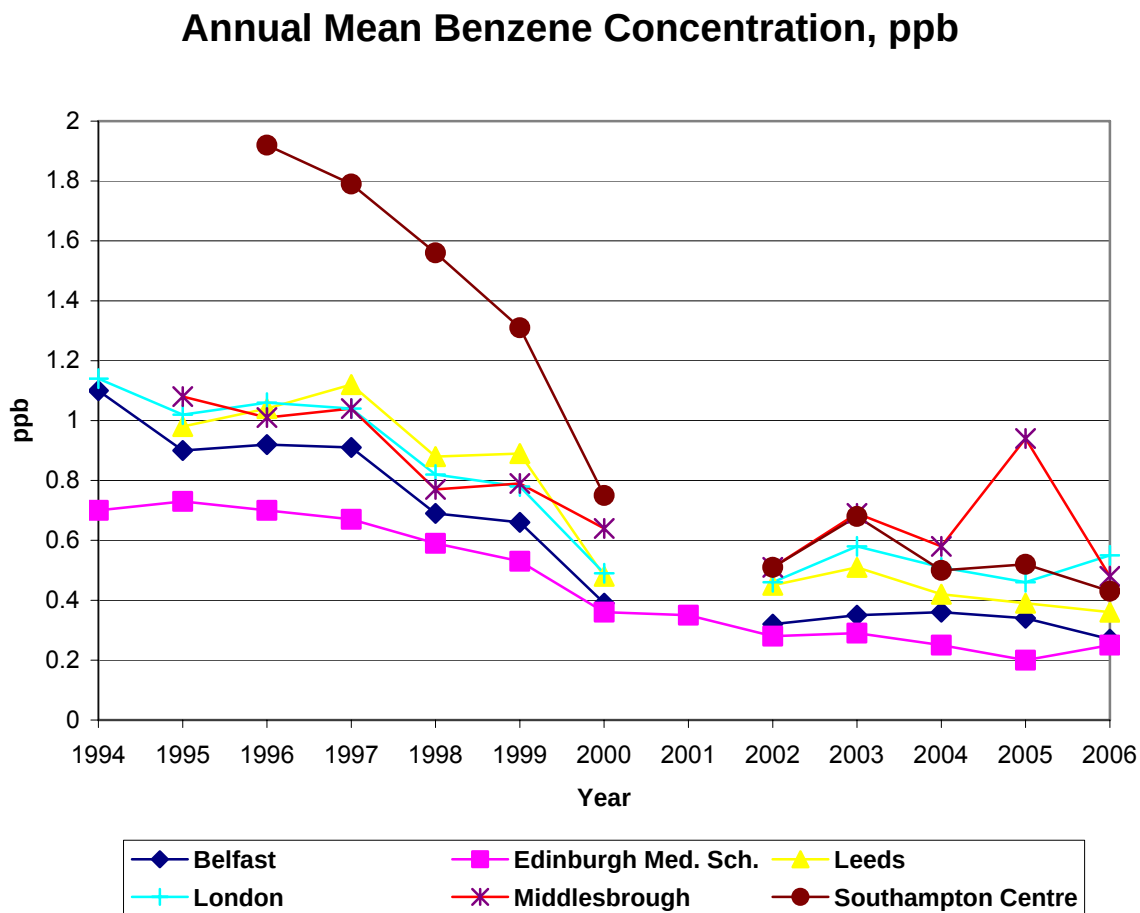


Figure 4: Long Term Trends in Benzene Concentration

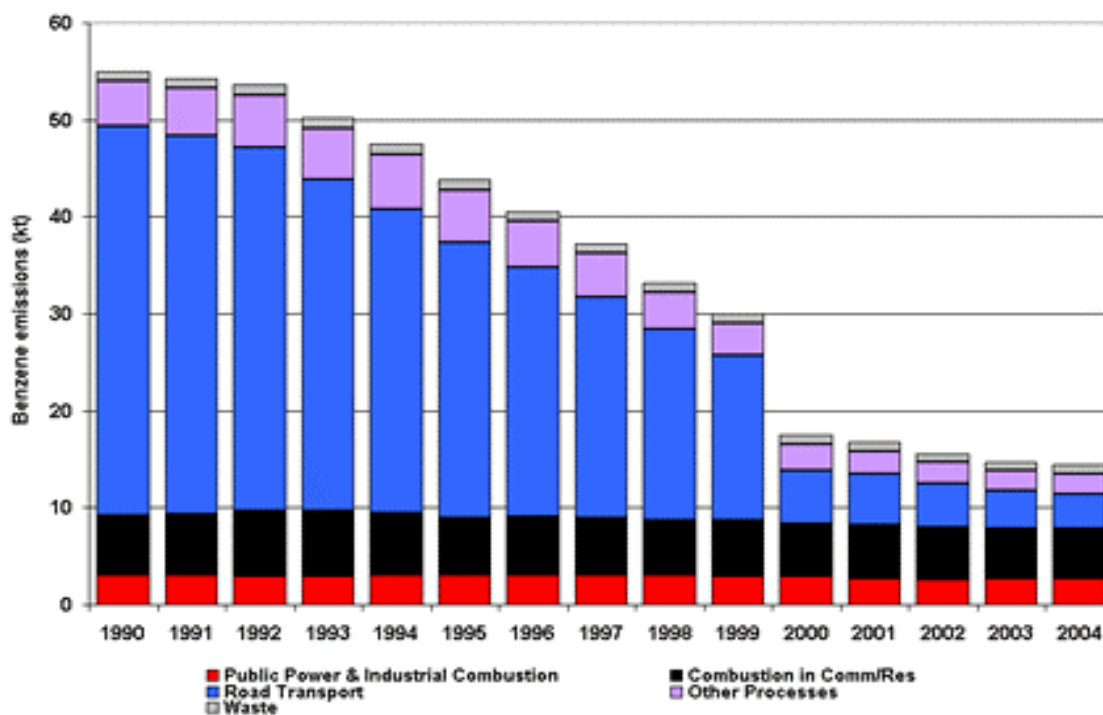


Figure 5: Emission Inventory Trend for Benzene

5.1.2 Automatic Hydrocarbon Network

The 2005 Annual Report described the anomalous situation whereby the benzene concentrations at Marylebone Road, a heavily trafficked London kerbside site, within the Automatic Network, were lower than at some sites in the Non-Automatic Network, when this was not expected to be so.

Parallel measurements with an NPL pumped system were made at Marylebone Road in August - October 2006, and have continued since January 2007. At the time of writing, the lack of ratified data from the Automatic Network, and poor automatic data capture in 2007, mean that further conclusions are limited.

	Pumped value, $\mu\text{g}/\text{m}^3$	(Provisional) Automatic value, $\mu\text{g}/\text{m}^3$	Difference, $\mu\text{g}/\text{m}^3$
11/08/06 - 23/08/06	1.78	1.22	-0.57
23/08/06 - 06/09/06	1.15	1.38	0.23
06/09/06 - 21/09/06	2.25	1.53	-0.72
23/09/06 - 04/10/06	3.43	2.10	-1.33
04/10/06 - 19/10/06	3.52	2.07	-1.45
10/01/07 - 24/01/07	2.22		
24/01/07 - 07/02/07	2.35	2.35	0.00
07/02/07 - 21/02/07	2.56	1.70	-0.86
21/02/07 - 08/03/07	1.46		
08/03/07 - 21/03/07	2.06		
21/03/07 - 04/04/07	1.80		

The results in general support the existence of a systematic difference between the two methods, averaging $0.7 \mu\text{g}/\text{m}^3$ (0.2 ppb), but the fortnightly values are quite variable and further results are needed.

The reported 2006 annual average concentrations for benzene on the Automatic Network were $0.98 \mu\text{g}/\text{m}^3$ at London Eltham, $1.14 \mu\text{g}/\text{m}^3$ at Cardiff Centre, and $1.01 \mu\text{g}/\text{m}^3$ at Glasgow Kerbside. These are all compatible with comparable measurements on the Non-Automatic Network.

5.1.3 Grangemouth survey

NPL carries out a regular survey of both background and industrially-influenced hydrocarbon concentrations around Grangemouth on behalf of Ineos Manufacturing (Scotland) Ltd, using diffusive samples. Annual average benzene concentrations at 20 background sites for 2006 were all in the range 0.2 – 0.4 ppb, while the two industrially-influenced sites recorded 0.6 and 1.6 ppb. This is compatible with the Network concentration for the semi-industrial Grangemouth site of 0.52 ppb.

5.2 1,3-Butadiene

Figure 6 shows recent 1,3-butadiene data at the five sites where long term measurements are available. The downward trend follows the trend predicted by the National Atmospheric Emissions Inventory, shown in Figure 7.

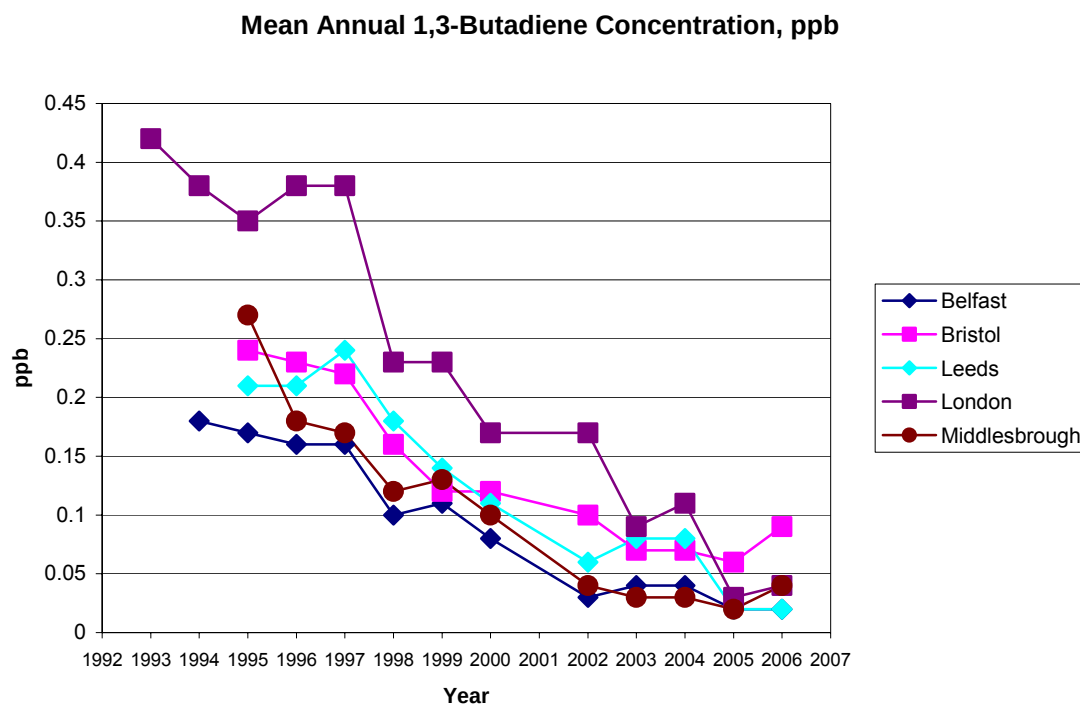


Figure 6: Long Term Trends in 1,3-Butadiene Concentration

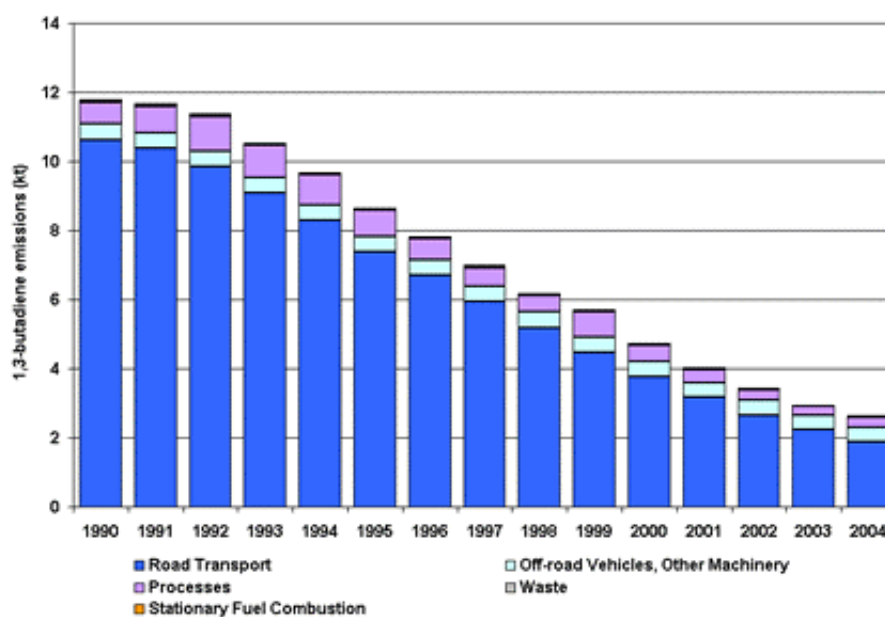


Figure 7: Emission Inventory Trend for 1,3-Butadiene

5.2.1 Automatic Hydrocarbon Network

The reported 2006 annual average concentrations for 1,3-butadiene on the Automatic Network were $0.09 \mu\text{g}/\text{m}^3$ at London Eltham, $0.29 \mu\text{g}/\text{m}^3$ at Cardiff Centre, and $0.27 \mu\text{g}/\text{m}^3$ at Glasgow Kerbside. These are all compatible with comparable measurements on the Non-Automatic Network.

5.1.3 Grangemouth survey

NPL carries out a regular survey of both background and industrially-influenced hydrocarbon concentrations around Grangemouth on behalf of Ineos Manufacturing (Scotland) Ltd, using diffusive samples. Annual average 1,3-butadiene concentrations at 20 background sites for 2006 ranged from below the limit of detection (0.05 ppb) to 0.09 ppb, while the two industrially-influenced sites recorded 0.35 and 0.97 ppb. This is compatible with the Network concentration for the semi-industrial Grangemouth site of 0.19 ppb.

6. Geographical Distribution and comparison with modelling data

6.1 Benzene

Figure 8 shows the estimated annual mean background benzene concentrations in 2003, from projections made in 2001. The method used is given in the report:

Projecting and mapping benzene concentrations in support of the Air Quality Strategy review
AEAT/ENV/R 0722

available through

www.aeat.co.uk/netcen/airqual/reports/naqs2001/aeat-env-r-0722.pdf

To quote from this report:

Site-specific analysis techniques and high resolution mapping approaches have been used to assess concentrations for a recent and future years. Approaches have been updated with the latest pollutant models and information from the National Atmospheric Emissions Inventory (NAEI), incorporating the 10-Year Plan for Transport (DETR, 2000a) in pollutant projections. Projections to 2010 have been made using both the current baseline emissions inventory and by way of a sensitivity analysis, an alternative emissions scenario which provides more optimistic estimates for benzene emissions reductions by taking into account the impact of lower benzene content in fuels upon emissions from non-catalyst vehicles.

More recent concentration mappings starting from 2004 did not include benzene or 1,3-butadiene.

Figure 8: Estimated Mean Benzene Concentrations in 2003
(from http://www.airquality.co.uk/archive/laqm/tools/aq_maps_2001.pdf)

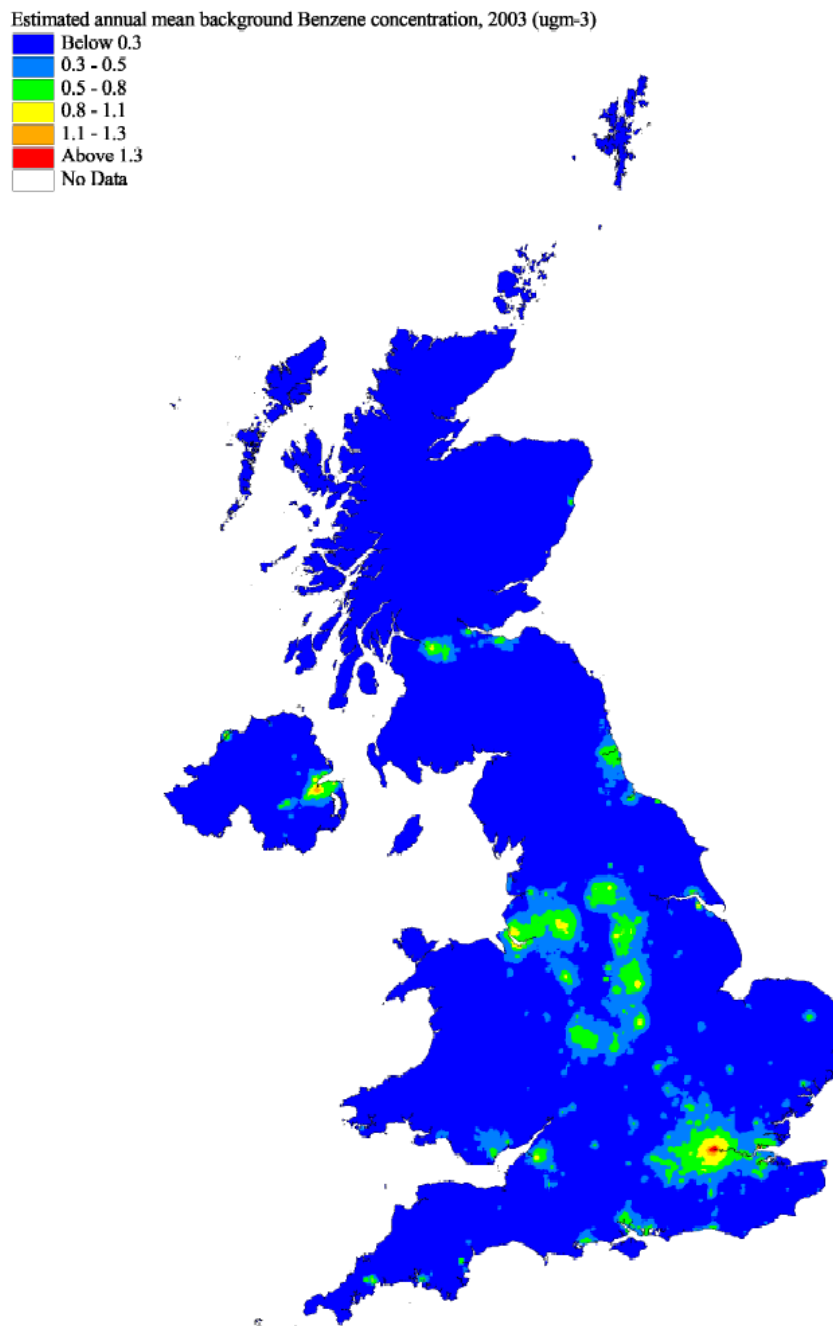


Table 5 compares the modelled concentration for each site in 2003, determined by inspection of the map, with the measured concentration for 2005.

Table 5: Comparison of Modelled and Measured Data for Benzene.

Site Name	Modelled zone ($\mu\text{g}/\text{m}^3$) 2003	Measured concentration ($\mu\text{g}/\text{m}^3$) 2006	Measured is High, Low, or Agrees?	Comment
Barnsley Gawber	0.5-0.8	0.75	A	Roadside site
Belfast centre	1.1-1.3	0.88	L	
Belfast roadside	1.1-1.3	1.66	H	
Birmingham roadside	0.5-0.8	2.08	H	
Bloomsbury	>1.3	1.24	A	Roadside site
Bournemouth	0.5-0.8	0.72	A	
Bristol Old Market	0.8-1.1	1.82	H	
Coventry Memorial Park	0.5-0.8	0.68	A	
Cwmbran	0.5-0.8	0.68	A	Industrial site
Edinburgh	0.5-0.8	0.81	A	
Grangemouth	0.3-0.5	1.69	H	
Haringey roadside	0.8-1.1	1.79	H	
Hove roadside	0.5-0.8	1.33	H	Roadside site
Hull Freetown	0.5-0.8	1.2	H	
Leamington Spa	0.5-0.8	0.85	H	
Leeds centre	0.8-1.1	1.17	H	
Leeds roadside	0.8-1.1	1.95	H	Roadside site
Leicester centre	0.8-1.1	0.98	A	
Liverpool Speke	0.8-1.1	1.14	A	
Manchester Piccadilly	0.8-1.1	0.94	A	
Middlesbrough	0.5-0.8	1.56	H	Industrial site
Newcastle	0.5-0.8	0.81	A	
Northampton	0.5-0.8	0.81	A	
Norwich Centre	0.5-0.8	0.91	H	
Nottingham centre	0.8-1.1	1.11	A	Roadside site
Oxford centre	0.5-0.8	1.14	H	
Plymouth	0.5-0.8	1.27	H	
Portsmouth	0.5-0.8	0.88	H	
Reading	0.5-0.8	0.91	H	Roadside site
Sheffield	0.8-1.1	1.63	H	
Southampton	0.5-0.8	1.40	H	
Southend-on-sea	0.5-0.8	0.98	H	
Stoke centre	0.8-1.1	1.27	H	Roadside site
Wigan centre	0.5-0.8	0.85	A	
Yarm	0.3-0.5	1.95	H	

The roadside and industrial sites all measured higher concentrations than the modelling estimates, as would be expected given that the estimates are for background concentrations. In contrast to previous years, many of the background sites now have measured concentrations that agree with the modelling estimates, with one site (Belfast Centre) being overestimated, though there is still an overall pattern of the modelled estimates being too low.

6.2 1,3-Butadiene

Figure 9 shows the estimated annual mean background 1,3-butadiene concentrations in 2003, from modelling of emissions using methods similar to those for benzene.

Figure 9: Estimated Mean 1,3-Butadiene Concentrations in 2003
(from http://www.airquality.co.uk/archive/laqm/tools/aq_maps_2001.pdf)

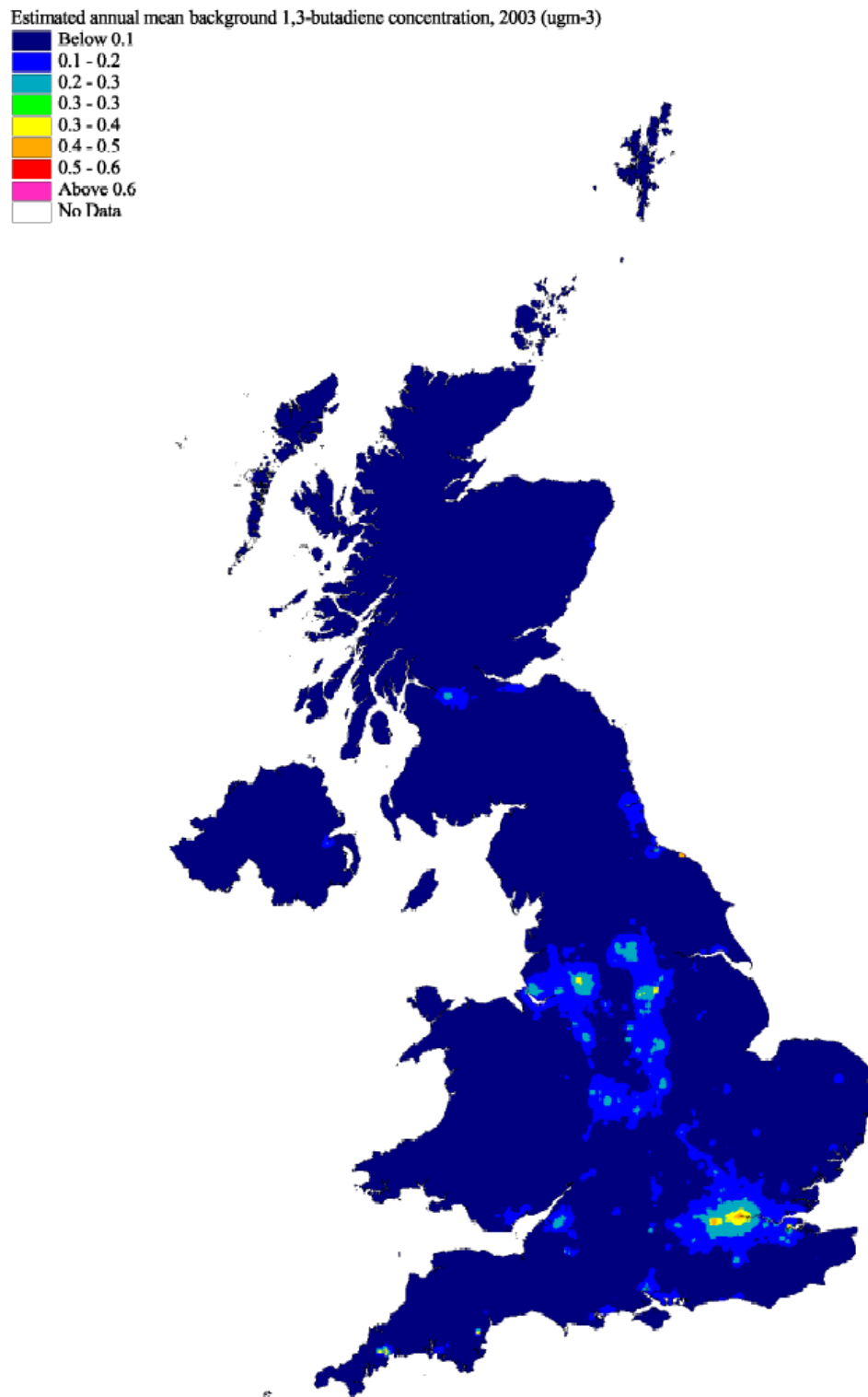


Table 6 compares the modelled concentrations for each site for 2003, determined by inspection of the map, with the measured concentration for 2006.

Table 6: Comparison of modelled and measured data for 1,3-butadiene.

Site Name	Modelled zone ($\mu\text{g}/\text{m}^3$) 2003	Measured concentration ($\mu\text{g}/\text{m}^3$) 2006	Measured is High, Low, or Agrees?	Comment
Belfast centre	0.1-0.2	0.0	L	
Belfast roadside	0.1-0.2	0.1	A	Roadside site
Birmingham roadside	0.2-0.3	0.1	L	Roadside site
Bristol Old Market	0.2-0.3	0.2	A	Roadside site
Grangemouth	0.1-0.2	0.4	H	Industrial site
Haringey roadside	0.2-0.3	0.1	L	Roadside site
Leeds centre	0.2-0.3	0.0	L	
Leeds roadside	0.2-0.3	0.2	A	Roadside site
Middlesbrough	0.1-0.2	0.1	A	Industrial site

Apart from Grangemouth, where the relatively elevated concentration can be attributed to the local oil refinery, measured concentrations of 1,3-butadiene are found to be on the low side of the modelled concentrations, in contrast to the benzene results. This might suggest that 1,3-butadiene estimates are overestimated, but the accuracy of the measurement technique at these low concentrations limits the conclusions that can be drawn from the comparison.

Annex 1a – Fortnightly data - Benzene

Site	Start Date	End Date	Benzene Concentration, ppb
Barnsley Gawber	29/12/2005	11/01/2006	0.47
	11/01/2006	25/01/2006	0.31
	25/01/2006	08/02/2006	0.55
	08/02/2006	22/02/2006	0.53
	22/02/2006	08/03/2006	0.41
	08/03/2006	21/03/2006	0.35
	21/03/2006	05/04/2006	0.28
	05/04/2006	19/04/2006	0.20
	19/04/2006	04/05/2006	0.18
	04/05/2006	18/05/2006	0.17
	18/05/2006	31/05/2006	0.10
	31/05/2006	13/06/2006	0.15
	13/06/2006	29/06/2006	0.13
	29/06/2006	12/07/2006	0.25
	12/07/2006	26/07/2006	0.20
	26/07/2006	09/08/2006	0.11
	09/08/2006	23/08/2006	0.17
	23/08/2006	06/09/2006	0.05
	06/09/2006	20/09/2006	0.32
	20/09/2006	04/10/2006	0.21
	04/10/2006	18/10/2006	0.21
	18/10/2006	01/11/2006	0.14
	01/11/2006	15/11/2006	0.18
	15/11/2006	29/11/2006	0.09
	29/11/2006	12/12/2006	0.10
	12/12/2006	27/12/2006	0.34
	27/12/2006	10/01/2007	0.34
Belfast Centre	28/12/2005	11/01/2006	0.54
	11/01/2006	25/01/2006	0.36
	25/01/2006	08/02/2006	0.83
	08/02/2006	22/02/2006	0.50
	22/02/2006	08/03/2006	0.44
	08/03/2006	22/03/2006	0.31
	22/03/2006	05/04/2006	0.40
	05/04/2006	19/04/2006	0.23
	19/04/2006	03/05/2006	0.26
	03/05/2006	17/05/2006	0.16
	17/05/2006	31/05/2006	0.10
	31/05/2006	14/06/2006	0.16
	14/06/2006	28/06/2006	0.11
	28/06/2006	11/07/2006	0.19
	11/07/2006	25/07/2006	0.22
	25/07/2006	08/08/2006	0.51

Site	Start Date	End Date	Benzene Concentration, ppb
Belfast Roadside	08/08/2006	22/08/2006	0.16
	22/08/2006	05/09/2006	0.08
	05/09/2006	19/09/2006	0.26
	19/09/2006	03/10/2006	0.22
	03/10/2006	17/10/2006	0.20
	17/10/2006	31/10/2006	0.19
	31/10/2006	14/11/2006	0.21
	14/11/2006	28/11/2006	0.20
	28/11/2006	12/12/2006	0.16
	12/12/2006	27/12/2006	0.39
	27/12/2006	09/01/2007	0.22
	29/12/2005	11/01/2006	1.05
	25/01/2006	08/02/2006	1.48
	08/02/2006	22/02/2006	0.97
	22/02/2006	08/03/2006	0.93
	08/03/2006	22/03/2006	0.56
	22/03/2006	05/04/2006	0.75
	05/04/2006	19/04/2006	0.62
	19/04/2006	03/05/2006	0.49
	03/05/2006	17/05/2006	0.46
	17/05/2006	31/05/2006	0.25
	31/05/2006	14/06/2006	0.41
	14/06/2006	28/06/2006	0.22
	28/06/2006	11/07/2006	0.41
	11/07/2006	25/07/2006	0.39
	25/07/2006	08/08/2006	0.33
	08/08/2006	22/08/2006	0.40
	22/08/2006	05/09/2006	0.28
	05/09/2006	19/09/2006	0.53
	19/09/2006	03/10/2006	0.52
	03/10/2006	17/10/2006	0.41
	17/10/2006	31/10/2006	0.29
	31/10/2006	14/11/2006	0.36
	14/11/2006	28/11/2006	0.28
	28/11/2006	12/12/2006	0.28
	12/12/2006	27/12/2006	0.67
	27/12/2006	09/01/2007	0.38
Birmingham Roadside	05/01/2006	19/01/2006	0.73
	19/01/2006	02/02/2006	1.64
	02/02/2006	16/02/2006	1.11
	16/02/2006	02/03/2006	0.78
	02/03/2006	16/03/2006	0.73
	16/03/2006	30/03/2006	1.06
	30/03/2006	13/04/2006	0.54
	13/04/2006	27/04/2006	0.54
	27/04/2006	11/05/2006	0.70

Site	Start Date	End Date	Benzene Concentration, ppb
Bloomsbury	11/05/2006	25/05/2006	0.37
	25/05/2006	08/06/2006	0.46
	08/06/2006	22/06/2006	0.37
	22/06/2006	06/07/2006	0.79
	06/07/2006	20/07/2006	0.54
	20/07/2006	03/08/2006	0.32
	03/08/2006	17/08/2006	0.88
	17/08/2006	31/08/2006	0.34
	31/08/2006	15/09/2006	0.59
	15/09/2006	28/09/2006	0.65
	28/09/2006	12/10/2006	0.48
	12/10/2006	27/10/2006	0.79
	27/10/2006	09/11/2006	0.44
	09/11/2006	24/11/2006	0.20
	24/11/2006	07/12/2006	0.19
	07/12/2006	21/12/2006	0.75
	21/12/2006	04/01/2007	0.71
	04/01/2006	17/01/2006	0.78
	17/01/2006	31/01/2006	0.69
	31/01/2006	14/02/2006	0.83
	14/02/2006	01/03/2006	0.46
	01/03/2006	16/03/2006	0.52
	16/03/2006	29/03/2006	0.41
	29/03/2006	11/04/2006	0.84
	11/04/2006	27/04/2006	0.26
	10/05/2006	24/05/2006	0.27
	24/05/2006	07/06/2006	0.16
	07/06/2006	19/06/2006	0.21
	19/06/2006	07/07/2006	0.28
	07/07/2006	31/07/2006	0.22
	31/07/2006	16/08/2006	0.14
	16/08/2006	30/08/2006	0.19
	30/08/2006	13/09/2006	0.33
	13/09/2006	26/09/2006	0.28
	26/09/2006	12/10/2006	0.28
	12/10/2006	23/10/2006	0.32
	23/10/2006	07/11/2006	0.24
	07/11/2006	22/11/2006	0.21
	22/11/2006	07/12/2006	0.18
	07/12/2006	20/12/2006	0.63
	20/12/2006	22/01/2007	0.51
Bournemouth	28/12/2005	10/01/2006	0.59
	10/01/2006	24/01/2006	0.38
	24/01/2006	07/02/2006	0.40
	07/02/2006	21/02/2006	0.41
	21/02/2006	07/03/2006	0.49

Site	Start Date	End Date	Benzene Concentration, ppb
Bristol Old Market	07/03/2006	21/03/2006	0.31
	21/03/2006	04/04/2006	0.25
	04/04/2006	18/04/2006	0.21
	18/04/2006	02/05/2006	0.22
	02/05/2006	16/05/2006	0.16
	16/05/2006	30/05/2006	0.08
	30/05/2006	13/06/2006	0.12
	13/06/2006	27/06/2006	0.11
	27/06/2006	11/07/2006	0.22
	11/07/2006	25/07/2006	0.20
	25/07/2006	08/08/2006	0.07
	08/08/2006	23/08/2006	0.10
	23/08/2006	05/09/2006	0.06
	05/09/2006	19/09/2006	0.16
	19/09/2006	03/10/2006	0.13
	03/10/2006	17/10/2006	0.35
	17/10/2006	31/10/2006	0.12
	31/10/2006	14/11/2006	0.27
	14/11/2006	28/11/2006	0.10
	28/11/2006	12/12/2006	0.12
	12/12/2006	27/12/2006	0.39
	27/12/2006	09/01/2007	0.20
	28/12/2005	11/01/2006	0.89
	11/01/2006	25/01/2006	0.85
	25/01/2006	08/02/2006	0.97
	08/02/2006	22/02/2006	1.02
	22/02/2006	09/03/2006	0.92
	09/03/2006	21/03/2006	0.85
	21/03/2006	05/04/2006	0.68
	05/04/2006	19/04/2006	0.49
	19/04/2006	03/05/2006	0.41
	03/05/2006	17/05/2006	0.47
	17/05/2006	31/05/2006	0.27
	31/05/2006	14/06/2006	0.42
	14/06/2006	28/06/2006	0.33
	28/06/2006	12/07/2006	0.44
	12/07/2006	26/07/2006	0.56
	26/07/2006	09/08/2006	0.29
	09/08/2006	23/08/2006	0.42
	23/08/2006	06/09/2006	0.40
	06/09/2006	20/09/2006	0.43
	20/09/2006	04/10/2006	0.49
	04/10/2006	18/10/2006	0.74
	18/10/2006	01/11/2006	0.34
	01/11/2006	15/11/2006	0.52
	15/11/2006	30/11/2006	0.34
	30/11/2006	13/12/2006	0.44

Site	Start Date	End Date	Benzene Concentration, ppb
Coventry Memorial Park	13/12/2006	27/12/2006	0.80
	27/12/2006	10/01/2007	0.58
	29/12/2005	10/01/2006	0.59
	10/01/2006	24/01/2006	0.42
	24/01/2006	07/02/2006	0.40
	07/02/2006	21/02/2006	0.41
	08/03/2006	21/03/2006	0.28
	21/03/2006	04/04/2006	0.24
	04/04/2006	19/04/2006	0.24
	19/04/2006	03/05/2006	0.18
	03/05/2006	16/05/2006	0.20
	16/05/2006	30/05/2006	0.09
	30/05/2006	13/06/2006	0.11
	12/06/2006	28/06/2006	0.14
	27/06/2006	11/07/2006	0.16
	25/07/2006	08/08/2006	0.12
	08/08/2006	22/08/2006	0.16
	22/08/2006	05/09/2006	0.09
	05/09/2006	19/09/2006	0.20
	19/09/2006	03/10/2006	0.16
	03/10/2006	17/10/2006	0.20
	17/10/2006	31/10/2006	0.09
	31/10/2006	14/11/2006	0.17
	14/11/2006	28/11/2006	0.12
	28/11/2006	12/12/2006	0.10
	12/12/2006	22/12/2006	0.32
	22/12/2006	11/01/2007	0.37
Cwmbran	03/01/2006	19/01/2006	0.46
	19/01/2006	01/02/2006	0.74
	01/02/2006	22/02/2006	0.12
	22/02/2006	06/03/2006	0.34
	06/03/2006	22/03/2006	0.28
	22/03/2006	04/04/2006	0.24
	04/04/2006	20/04/2006	0.22
	20/04/2006	05/05/2006	0.13
	05/05/2006	16/05/2006	0.15
	16/05/2006	30/05/2006	0.07
	30/05/2006	12/06/2006	0.10
	12/06/2006	28/06/2006	0.09
	28/06/2006	12/07/2006	0.19
	12/07/2006	26/07/2006	0.15
	26/07/2006	07/08/2006	0.08
	07/08/2006	23/08/2006	0.13
	23/08/2006	06/09/2006	0.16
	06/09/2006	21/09/2006	0.11
	21/09/2006	05/10/2006	0.16

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Site	Start Date	End Date	Benzene Concentration, ppb
Edinburgh St Leonard's	05/10/2006	19/10/2006	0.14
	19/10/2006	01/11/2006	0.17
	01/11/2006	08/12/2006	0.22
	08/12/2006	19/12/2006	0.19
	19/12/2006	02/01/2007	0.46
	29/12/2005	12/01/2006	0.47
	12/01/2006	26/01/2006	0.34
	26/01/2006	09/02/2006	0.47
	09/02/2006	23/02/2006	0.46
	23/02/2006	09/03/2006	0.40
	09/03/2006	23/03/2006	0.30
	23/03/2006	06/04/2006	0.34
	06/04/2006	20/04/2006	0.24
	20/04/2006	04/05/2006	0.18
	04/05/2006	18/05/2006	0.18
	18/05/2006	01/06/2006	0.11
	01/06/2006	15/06/2006	0.15
	15/06/2006	29/06/2006	0.15
	29/06/2006	13/07/2006	0.17
	13/07/2006	27/07/2006	0.19
	27/07/2006	10/08/2006	0.12
	10/08/2006	24/08/2006	0.17
	24/08/2006	15/09/2006	0.17
	15/09/2006	21/09/2006	0.19
	21/09/2006	05/10/2006	0.23
	05/10/2006	17/10/2006	0.19
	17/10/2006	02/11/2006	0.24
	02/11/2006	16/11/2006	0.13
	16/11/2006	30/11/2006	0.16
	30/11/2006	14/12/2006	0.21
	14/12/2006	28/12/2006	0.27
	28/12/2006	11/01/2007	0.28
Grangemouth	10/01/2006	27/01/2006	0.52
	27/01/2006	09/02/2006	0.61
	09/02/2006	09/03/2006	0.56
	09/03/2006	20/03/2006	0.95
	20/03/2006	06/04/2006	0.64
	06/04/2006	20/04/2006	0.21
	28/04/2006	11/05/2006	0.91
	11/05/2006	24/05/2006	0.42
	24/05/2006	14/06/2006	0.29
	23/06/2006	07/07/2006	0.86
	07/07/2006	27/07/2006	0.90
	27/07/2006	11/08/2006	0.15
	11/08/2006	25/08/2006	0.76
	25/08/2006	15/09/2006	0.31

Site	Start Date	End Date	Benzene Concentration, ppb
Haringey Roadside	15/09/2006	02/10/2006	0.61
	02/10/2006	19/10/2006	0.45
	19/10/2006	09/11/2006	0.33
	09/11/2006	24/11/2006	0.40
	24/11/2006	08/12/2006	0.13
	08/12/2006	04/01/2007	0.33
	06/01/2006	19/01/2006	1.21
	19/01/2006	01/02/2006	0.73
	01/02/2006	16/02/2006	0.82
	16/02/2006	28/02/2006	0.50
	28/02/2006	14/03/2006	0.77
	14/03/2006	29/03/2006	0.72
	29/03/2006	11/04/2006	0.53
	11/04/2006	25/04/2006	0.58
	25/04/2006	09/05/2006	0.52
	09/05/2006	26/05/2006	0.36
	26/05/2006	13/06/2006	0.35
	13/06/2006	29/06/2006	0.25
	29/06/2006	11/07/2006	0.49
	11/07/2006	03/08/2006	0.39
	03/08/2006	17/08/2006	0.30
	17/08/2006	08/09/2006	0.27
	08/09/2006	22/09/2006	0.61
	22/09/2006	10/10/2006	0.52
	10/10/2006	19/10/2006	0.90
	19/10/2006	03/11/2006	0.28
	03/11/2006	16/11/2006	0.45
	16/11/2006	01/12/2006	0.51
	01/12/2006	14/12/2006	0.34
	14/12/2006	29/12/2006	0.77
	29/12/2006	19/01/2007	0.52
Hove Roadside	11/01/2006	25/01/2006	0.51
	25/01/2006	07/02/2006	0.72
	07/02/2006	02/03/2006	0.45
	02/03/2006	13/03/2006	0.56
	13/03/2006	29/03/2006	1.22
	29/03/2006	12/04/2006	0.35
	12/04/2006	06/05/2006	0.44
	06/05/2006	20/05/2006	0.32
	20/05/2006	31/05/2006	0.15
	31/05/2006	14/06/2006	0.30
	14/06/2006	12/07/2006	0.33
	12/07/2006	02/08/2006	0.23
	02/08/2006	31/08/2006	0.16
	31/08/2006	22/09/2006	0.23
	22/09/2006	06/10/2006	0.29

Site	Start Date	End Date	Benzene Concentration, ppb
Hull Freetown	06/10/2006	25/10/2006	0.28
	25/10/2006	09/11/2006	0.34
	09/11/2006	20/11/2006	0.17
	20/11/2006	06/12/2006	0.19
	06/12/2006	19/12/2006	0.36
	19/12/2006	03/01/2007	0.92
	05/01/2006	19/01/2006	0.49
	19/01/2006	02/02/2006	1.01
	02/02/2006	16/02/2006	0.49
	16/02/2006	02/03/2006	0.33
	02/03/2006	16/03/2006	0.47
	16/03/2006	30/03/2006	0.47
	30/03/2006	13/04/2006	0.32
	19/06/2006	22/06/2006	0.12
	22/06/2006	07/07/2006	0.26
	07/07/2006	20/07/2006	0.18
	20/07/2006	03/08/2006	0.22
	03/08/2006	17/08/2006	0.12
	17/08/2006	31/08/2006	0.15
	31/08/2006	14/09/2006	0.36
	14/09/2006	28/09/2006	0.33
	28/09/2006	12/10/2006	0.26
	12/10/2006	26/10/2006	0.30
	26/10/2006	09/11/2006	0.25
	09/11/2006	23/11/2006	0.17
	23/11/2006	07/12/2006	0.24
	07/12/2006	21/12/2006	0.94
	21/12/2006	04/01/2007	0.70
Leamington Spa	28/12/2005	12/01/2006	0.66
	12/01/2006	23/01/2006	0.41
	23/01/2006	06/02/2006	0.42
	06/02/2006	20/02/2006	0.50
	20/02/2006	06/03/2006	0.49
	06/03/2006	20/03/2006	0.34
	20/03/2006	03/04/2006	0.28
	03/04/2006	19/04/2006	0.30
	19/04/2006	04/05/2006	0.25
	04/05/2006	15/05/2006	0.22
	15/05/2006	26/05/2006	0.22
	26/05/2006	12/06/2006	0.11
	12/06/2006	26/06/2006	0.16
	26/06/2006	10/07/2006	0.21
	10/07/2006	24/07/2006	0.23
	24/07/2006	04/08/2006	0.13
	04/08/2006	21/08/2006	0.21
	21/08/2006	04/09/2006	0.15

Site	Start Date	End Date	Benzene Concentration, ppb
Leeds Centre	04/09/2006	18/09/2006	0.27
	18/09/2006	02/10/2006	0.26
	02/10/2006	16/10/2006	0.33
	16/10/2006	01/11/2006	0.15
	01/11/2006	13/11/2006	0.33
	13/11/2006	27/11/2006	0.13
	27/11/2006	11/12/2006	0.17
	11/12/2006	28/12/2006	0.31
	28/12/2006	08/01/2007	0.25
	03/01/2006	18/01/2006	0.49
	18/01/2006	01/02/2006	0.47
	01/02/2006	15/02/2006	0.50
	15/02/2006	01/03/2006	0.34
	01/03/2006	15/03/2006	0.55
	15/03/2006	29/03/2006	0.46
	29/03/2006	12/04/2006	0.29
	19/07/2006	01/08/2006	0.29
	01/08/2006	16/08/2006	0.20
	16/08/2006	30/08/2006	0.15
	30/08/2006	13/09/2006	0.27
	13/09/2006	27/09/2006	0.33
	27/09/2006	11/10/2006	0.25
	11/10/2006	25/10/2006	0.50
	25/10/2006	08/11/2006	0.23
	08/11/2006	22/11/2006	0.27
	22/11/2006	06/12/2006	0.30
	06/12/2006	20/12/2006	0.48
	20/12/2006	03/01/2007	0.40
Leeds Roadside	11/01/2006	31/01/2006	0.81
	31/01/2006	16/02/2006	0.90
	16/02/2006	06/03/2006	0.94
	06/03/2006	22/03/2006	0.88
	22/03/2006	06/04/2006	0.61
	06/04/2006	20/04/2006	0.51
	20/04/2006	04/05/2006	0.59
	04/05/2006	18/05/2006	0.69
	18/05/2006	02/06/2006	0.37
	02/06/2006	15/06/2006	0.56
	28/06/2006	13/07/2006	0.69
	13/07/2006	09/08/2006	0.42
	09/08/2006	24/08/2006	0.43
	24/08/2006	07/09/2006	0.28
	07/09/2006	21/09/2006	0.99
	21/09/2006	29/09/2006	0.70
	29/09/2006	13/10/2006	0.50
	13/10/2006	02/11/2006	0.52

Site	Start Date	End Date	Benzene Concentration, ppb
Leicester Centre	02/11/2006	16/11/2006	0.53
	16/11/2006	28/11/2006	0.34
	28/11/2006	13/12/2006	0.24
	13/12/2006	02/01/2007	0.73
	04/01/2006	18/01/2006	0.45
	18/01/2006	02/02/2006	0.71
	02/02/2006	15/02/2006	0.61
	15/02/2006	01/03/2006	0.35
	01/03/2006	14/03/2006	0.51
	14/03/2006	28/03/2006	0.43
	28/03/2006	10/04/2006	0.29
	10/04/2006	24/04/2006	0.35
	24/04/2006	09/05/2006	0.25
	09/05/2006	25/05/2006	0.20
	25/05/2006	07/06/2006	0.19
	07/06/2006	21/06/2006	0.19
	21/06/2006	04/07/2006	0.26
	04/07/2006	19/07/2006	0.18
	19/07/2006	03/08/2006	0.20
	03/08/2006	15/08/2006	0.11
	15/08/2006	31/08/2006	0.16
	31/08/2006	20/09/2006	0.20
	20/09/2006	04/10/2006	0.24
	04/10/2006	18/10/2006	0.24
	18/10/2006	01/11/2006	0.18
	01/11/2006	16/11/2006	0.38
	16/11/2006	29/11/2006	0.14
	29/11/2006	06/12/2006	0.21
	06/12/2006	19/12/2006	0.29
	19/12/2006	04/01/2007	0.59
Liverpool Speke	05/01/2006	18/01/2006	0.61
	18/01/2006	30/01/2006	0.71
	30/01/2006	13/02/2006	0.60
	13/02/2006	27/02/2006	0.45
	27/02/2006	14/03/2006	0.53
	14/03/2006	30/03/2006	0.57
	30/03/2006	11/04/2006	0.26
	11/04/2006	26/04/2006	0.29
	26/04/2006	09/05/2006	0.27
	09/05/2006	23/05/2006	0.25
	23/05/2006	08/06/2006	0.21
	08/06/2006	20/06/2006	0.25
	20/06/2006	03/07/2006	0.27
	03/07/2006	18/07/2006	0.20
	18/07/2006	01/08/2006	0.45
	01/08/2006	14/08/2006	0.10

Site	Start Date	End Date	Benzene Concentration, ppb
Manchester Piccadilly	14/08/2006	29/08/2006	0.21
	29/08/2006	12/09/2006	0.25
	12/09/2006	28/09/2006	0.25
	28/09/2006	10/10/2006	0.19
	10/10/2006	23/10/2006	0.51
	23/10/2006	06/11/2006	0.31
	06/11/2006	21/11/2006	0.24
	21/11/2006	05/12/2006	0.32
	05/12/2006	21/12/2006	0.39
	21/12/2006	03/01/2007	0.35
	05/01/2006	19/01/2006	0.43
	19/01/2006	02/02/2006	0.53
	02/02/2006	16/02/2006	0.50
	16/02/2006	02/03/2006	0.38
	02/03/2006	17/03/2006	0.53
	17/03/2006	31/03/2006	0.45
	31/03/2006	13/04/2006	0.33
	13/04/2006	27/04/2006	0.22
	27/04/2006	11/05/2006	0.25
	11/05/2006	25/05/2006	0.45
	25/05/2006	08/06/2006	0.18
	08/06/2006	22/06/2006	0.14
	22/06/2006	06/07/2006	0.25
	06/07/2006	20/07/2006	0.24
	20/07/2006	03/08/2006	0.17
	03/08/2006	17/08/2006	0.10
	17/08/2006	31/08/2006	0.15
	31/08/2006	14/09/2006	0.28
	14/09/2006	28/09/2006	0.24
	28/09/2006	12/10/2006	0.15
	12/10/2006	26/10/2006	0.26
	26/10/2006	09/11/2006	0.34
	09/11/2006	23/11/2006	0.16
	23/11/2006	07/12/2006	0.19
	07/12/2006	21/12/2006	0.39
	21/12/2006	04/01/2007	0.27
Middlesbrough	03/01/2006	17/01/2006	0.58
	17/01/2006	31/01/2006	0.82
	31/01/2006	14/02/2006	0.51
	14/02/2006	28/02/2006	0.85
	28/02/2006	14/03/2006	0.56
	14/03/2006	29/03/2006	0.88
	29/03/2006	12/04/2006	0.29
	12/04/2006	25/04/2006	0.38
	25/04/2006	09/05/2006	0.49
	09/05/2006	23/05/2006	0.63

Site	Start Date	End Date	Benzene Concentration, ppb
Newcastle	23/05/2006	07/06/2006	0.31
	07/06/2006	20/06/2006	0.53
	20/06/2006	04/07/2006	0.74
	04/07/2006	18/07/2006	0.52
	18/07/2006	01/08/2006	0.80
	01/08/2006	15/08/2006	0.13
	15/08/2006	29/08/2006	0.53
	29/08/2006	12/09/2006	0.18
	12/09/2006	26/09/2006	0.55
	26/09/2006	10/10/2006	0.20
	10/10/2006	24/10/2006	0.96
	24/10/2006	07/11/2006	0.13
	07/11/2006	21/11/2006	0.12
	21/11/2006	05/12/2006	0.13
	05/12/2006	19/12/2006	0.22
	19/12/2006	02/01/2007	0.49
	03/01/2006	17/01/2006	0.63
	17/01/2006	31/01/2006	0.51
	31/01/2006	14/02/2006	0.38
	14/02/2006	28/02/2006	0.26
	28/02/2006	14/03/2006	0.42
	14/03/2006	29/03/2006	0.47
	29/03/2006	11/04/2006	0.24
	11/04/2006	25/04/2006	0.22
	25/04/2006	09/05/2006	0.29
	09/05/2006	23/05/2006	0.23
	23/05/2006	06/06/2006	0.11
	06/06/2006	20/06/2006	0.13
	20/06/2006	04/07/2006	0.18
	04/07/2006	18/07/2006	0.15
	18/07/2006	01/08/2006	0.16
	01/08/2006	15/08/2006	0.09
	15/08/2006	29/08/2006	0.12
	29/08/2006	12/09/2006	0.23
	12/09/2006	26/09/2006	0.27
	26/09/2006	10/10/2006	0.16
	10/10/2006	24/10/2006	0.34
	24/10/2006	07/11/2006	0.16
	07/11/2006	21/11/2006	0.13
	21/11/2006	05/12/2006	0.18
	05/12/2006	19/12/2006	0.21
	19/12/2006	02/01/2007	0.30
Northampton	29/12/2005	12/01/2006	0.43
	12/01/2006	26/01/2006	0.37
	26/01/2006	09/02/2006	0.50
	09/02/2006	23/02/2006	0.39

Site	Start Date	End Date	Benzene Concentration, ppb
Norwich Centre	23/02/2006	09/03/2006	0.45
	09/03/2006	23/03/2006	0.31
	23/03/2006	06/04/2006	0.23
	06/04/2006	20/04/2006	0.25
	20/04/2006	04/05/2006	0.18
	04/05/2006	18/05/2006	0.73
	18/05/2006	01/06/2006	0.15
	01/06/2006	15/06/2006	0.16
	15/06/2006	29/06/2006	0.11
	29/06/2006	13/07/2006	0.19
	13/07/2006	27/07/2006	0.13
	27/07/2006	10/08/2006	0.11
	10/08/2006	24/08/2006	0.18
	24/08/2006	07/09/2006	0.07
	07/09/2006	21/09/2006	0.18
	21/09/2006	05/10/2006	0.19
	05/10/2006	19/10/2006	0.28
	19/10/2006	02/11/2006	0.15
	02/11/2006	16/11/2006	0.19
	16/11/2006	30/11/2006	0.15
	30/11/2006	14/12/2006	0.17
	14/12/2006	28/12/2006	0.31
	28/12/2006	12/01/2007	0.36
	09/01/2006	24/01/2006	0.59
	24/01/2006	07/02/2006	0.40
	07/02/2006	22/02/2006	0.36
	22/02/2006	06/03/2006	0.46
	06/03/2006	27/03/2006	0.60
	27/03/2006	13/04/2006	0.28
	13/04/2006	27/04/2006	0.32
	27/04/2006	09/05/2006	0.31
	09/05/2006	26/05/2006	0.18
	26/05/2006	05/06/2006	0.14
	05/06/2006	21/06/2006	0.15
	21/06/2006	03/07/2006	0.21
	03/07/2006	24/07/2006	0.24
	24/07/2006	14/08/2006	0.13
	14/08/2006	23/08/2006	0.26
	23/08/2006	08/09/2006	0.09
	08/09/2006	22/09/2006	0.26
	22/09/2006	05/10/2006	0.23
	05/10/2006	18/10/2006	0.33
	18/10/2006	02/11/2006	0.14
	02/11/2006	17/11/2006	0.22
	17/11/2006	29/11/2006	0.15
	29/11/2006	11/12/2006	0.15
	11/12/2006	21/12/2006	0.58

Site	Start Date	End Date	Benzene Concentration, ppb
Nottingham Centre	21/12/2006	02/01/2007	0.34
	04/01/2006	18/01/2006	0.69
	18/01/2006	01/02/2006	0.66
	01/02/2006	16/02/2006	0.58
	16/02/2006	01/03/2006	0.43
	01/03/2006	15/03/2006	0.54
	15/03/2006	29/03/2006	0.48
	29/03/2006	12/04/2006	0.35
	12/04/2006	26/04/2006	0.37
	26/04/2006	10/05/2006	0.27
	10/05/2006	24/05/2006	0.21
	24/05/2006	08/06/2006	0.19
	08/06/2006	21/06/2006	0.20
	21/06/2006	05/07/2006	0.21
	05/07/2006	19/07/2006	0.23
	19/07/2006	02/08/2006	0.29
	02/08/2006	16/08/2006	0.13
	16/08/2006	31/08/2006	0.17
	31/08/2006	13/09/2006	0.25
	13/09/2006	27/09/2006	0.37
	27/09/2006	11/10/2006	0.26
	11/10/2006	25/10/2006	0.36
	25/10/2006	08/11/2006	0.22
	08/11/2006	21/11/2006	0.19
	21/11/2006	06/12/2006	0.17
	06/12/2006	19/12/2006	0.38
	19/12/2006	03/01/2007	0.55
Oxford Centre	03/01/2006	23/01/2006	0.71
	23/01/2006	07/02/2006	0.54
	07/02/2006	21/02/2006	0.47
	21/02/2006	06/03/2006	0.51
	06/03/2006	20/03/2006	0.34
	20/03/2006	31/03/2006	0.44
	31/03/2006	13/04/2006	0.29
	13/04/2006	28/04/2006	0.39
	28/04/2006	12/05/2006	0.45
	12/05/2006	26/05/2006	0.19
	26/05/2006	12/06/2006	0.21
	12/06/2006	30/06/2006	0.22
	30/06/2006	10/07/2006	0.34
	10/07/2006	21/07/2006	0.40
	21/07/2006	02/08/2006	0.31
	02/08/2006	11/08/2006	0.16
	11/08/2006	21/08/2006	0.41
	21/08/2006	05/09/2006	0.13
	05/09/2006	22/09/2006	0.36

Site	Start Date	End Date	Benzene Concentration, ppb
Plymouth	22/09/2006	09/10/2006	0.22
	09/10/2006	25/10/2006	0.37
	25/10/2006	06/11/2006	0.24
	06/11/2006	20/11/2006	0.36
	20/11/2006	04/12/2006	0.17
	04/12/2006	19/12/2006	0.35
	19/12/2006	02/01/2007	0.42
	03/01/2006	17/01/2006	0.53
	17/01/2006	31/01/2006	0.45
	31/01/2006	14/02/2006	0.52
	14/02/2006	28/02/2006	0.32
	28/02/2006	14/03/2006	0.38
	14/03/2006	27/03/2006	0.46
	27/03/2006	11/04/2006	0.26
	11/04/2006	26/04/2006	0.25
	26/04/2006	09/05/2006	0.22
	09/05/2006	23/05/2006	0.17
	23/05/2006	06/06/2006	0.12
	06/06/2006	20/06/2006	0.15
	20/06/2006	04/07/2006	0.16
	04/07/2006	18/07/2006	0.21
	18/07/2006	02/08/2006	0.13
	02/08/2006	15/08/2006	0.08
	15/08/2006	30/08/2006	0.12
	30/08/2006	13/09/2006	0.20
	13/09/2006	27/09/2006	0.18
	27/09/2006	10/10/2006	0.16
	10/10/2006	24/10/2006	0.26
	24/10/2006	07/11/2006	0.47
	07/11/2006	21/11/2006	0.23
	21/11/2006	05/12/2006	0.16
	05/12/2006	19/12/2006	0.53
	19/12/2006	04/01/2007	3.46
Portsmouth	03/01/2006	26/01/2006	0.69
	26/01/2006	13/02/2006	0.59
	13/02/2006	28/02/2006	0.23
	13/03/2006	11/04/2006	0.32
	11/04/2006	11/05/2006	0.30
	11/05/2006	30/06/2006	0.19
	30/06/2006	12/07/2006	0.23
	12/07/2006	21/08/2006	0.17
	21/08/2006	06/09/2006	0.09
	06/09/2006	29/09/2006	0.17
	29/09/2006	31/10/2006	0.11
	31/10/2006	14/11/2006	0.46
	14/11/2006	28/11/2006	0.20

Site	Start Date	End Date	Benzene Concentration, ppb
Reading	28/11/2006	12/12/2006	0.14
	12/12/2006	12/01/2007	0.24
	03/01/2006	17/01/2006	0.67
	17/01/2006	31/01/2006	0.66
	31/01/2006	14/02/2006	0.62
	14/02/2006	28/02/2006	0.30
	14/03/2006	28/03/2006	0.40
	28/03/2006	11/04/2006	0.24
	11/04/2006	25/04/2006	0.29
	25/04/2006	09/05/2006	0.22
	09/05/2006	23/05/2006	0.16
	23/05/2006	07/06/2006	0.13
	07/06/2006	20/06/2006	0.14
	20/06/2006	05/07/2006	0.23
	05/07/2006	17/07/2006	0.12
	17/07/2006	01/08/2006	0.17
	01/08/2006	15/08/2006	0.08
	15/08/2006	29/08/2006	0.12
	29/08/2006	11/09/2006	0.16
	11/09/2006	26/09/2006	0.21
	26/09/2006	10/10/2006	0.16
	10/10/2006	24/10/2006	0.26
	24/10/2006	07/11/2006	0.27
	07/11/2006	21/11/2006	0.26
	21/11/2006	04/12/2006	0.18
	04/12/2006	18/12/2006	0.23
	18/12/2006	02/01/2007	0.73
Sheffield	28/12/2005	11/01/2006	0.61
	11/01/2006	26/01/2006	0.68
	26/01/2006	10/02/2006	0.48
	10/02/2006	22/02/2006	0.74
	22/02/2006	08/03/2006	0.53
	08/03/2006	23/03/2006	0.49
	23/03/2006	05/04/2006	0.36
	05/04/2006	20/04/2006	0.33
	04/10/2006	19/10/2006	0.48
	19/10/2006	02/11/2006	0.23
	02/11/2006	15/11/2006	0.28
	15/11/2006	29/11/2006	0.21
	29/11/2006	13/12/2006	0.20
	13/12/2006	28/12/2006	1.01
	28/12/2006	11/01/2007	1.01
Southampton	03/01/2006	17/01/2006	0.92
	17/01/2006	31/01/2006	0.85
	31/01/2006	14/02/2006	0.89

Site	Start Date	End Date	Benzene Concentration, ppb
Southend-on-Sea	14/02/2006	28/02/2006	0.42
	14/03/2006	27/03/2006	0.61
	27/03/2006	11/04/2006	0.35
	11/04/2006	25/04/2006	0.44
	25/04/2006	09/05/2006	0.29
	09/05/2006	23/05/2006	0.28
	23/05/2006	06/06/2006	0.20
	06/06/2006	20/06/2006	0.24
	20/06/2006	03/07/2006	0.30
	03/07/2006	18/07/2006	0.43
	31/07/2006	15/08/2006	0.13
	15/08/2006	29/08/2006	0.15
	29/08/2006	12/09/2006	0.48
	12/09/2006	26/09/2006	0.28
	26/09/2006	10/10/2006	0.38
	10/10/2006	24/10/2006	0.42
	24/10/2006	07/11/2006	0.43
	07/11/2006	21/11/2006	0.27
	21/11/2006	05/12/2006	0.26
	05/12/2006	19/12/2006	0.63
	19/12/2006	02/01/2007	0.63
	05/01/2006	19/01/2006	0.80
	19/01/2006	01/02/2006	0.60
	01/02/2006	15/02/2006	0.53
	15/02/2006	01/03/2006	0.31
	01/03/2006	28/03/2006	0.45
	28/03/2006	12/04/2006	0.25
	12/04/2006	26/04/2006	0.33
	26/04/2006	11/05/2006	0.25
	11/05/2006	26/05/2006	0.18
	26/05/2006	06/06/2006	0.13
	06/06/2006	20/06/2006	0.19
	20/06/2006	04/07/2006	0.23
	04/07/2006	01/08/2006	0.06
	01/08/2006	16/08/2006	0.12
	16/08/2006	30/08/2006	0.10
	30/08/2006	13/09/2006	0.24
	13/09/2006	27/09/2006	0.27
	27/09/2006	09/10/2006	0.11
	09/10/2006	24/10/2006	0.24
	24/10/2006	07/11/2006	0.28
	07/11/2006	21/11/2006	0.13
	21/11/2006	05/12/2006	0.16
	05/12/2006	19/12/2006	0.36
	19/12/2006	02/01/2007	0.78
Stoke Centre	04/01/2006	18/01/2006	0.52

Site	Start Date	End Date	Benzene Concentration, ppb
Wigan Centre	18/01/2006	01/02/2006	0.39
	01/02/2006	15/02/2006	0.69
	15/02/2006	01/03/2006	0.42
	01/03/2006	29/03/2006	0.63
	29/03/2006	12/04/2006	0.37
	12/04/2006	26/04/2006	0.45
	26/04/2006	11/05/2006	0.32
	11/05/2006	24/05/2006	0.25
	24/05/2006	07/06/2006	0.31
	07/06/2006	22/06/2006	0.17
	22/06/2006	05/07/2006	0.35
	05/07/2006	19/07/2006	0.28
	19/07/2006	03/08/2006	0.21
	03/08/2006	16/08/2006	0.20
	16/08/2006	30/08/2006	0.30
	30/08/2006	14/09/2006	0.26
	14/09/2006	27/09/2006	0.73
	27/09/2006	11/10/2006	0.35
	11/10/2006	25/10/2006	0.48
	25/10/2006	09/11/2006	0.32
	09/11/2006	22/11/2006	0.27
	22/11/2006	06/12/2006	0.23
	06/12/2006	21/12/2006	0.67
	21/12/2006	03/01/2007	0.65
	09/01/2006	20/01/2006	0.20
	02/03/2006	20/03/2006	0.40
	20/03/2006	31/03/2006	0.40
	31/03/2006	13/04/2006	0.26
	13/04/2006	28/04/2006	0.17
	28/04/2006	12/05/2006	0.33
	12/05/2006	25/05/2006	0.18
	25/05/2006	12/06/2006	0.13
	12/06/2006	23/06/2006	0.13
	23/06/2006	12/07/2006	0.65
	12/07/2006	24/07/2006	0.19
	24/07/2006	17/08/2006	0.12
	17/08/2006	23/08/2006	0.22
	23/08/2006	07/09/2006	0.08
	07/09/2006	22/09/2006	0.31
	22/09/2006	06/10/2006	0.24
	06/10/2006	20/10/2006	0.23
	20/10/2006	30/10/2006	0.24
	30/10/2006	17/11/2006	0.34
	17/11/2006	27/11/2006	0.12
	27/11/2006	11/12/2006	0.13
	11/12/2006	20/12/2006	0.36
	20/12/2006	11/01/2007	0.66

Site	Start Date	End Date	Benzene Concentration, ppb
Yarm	06/01/2006	20/01/2006	0.84
	20/01/2006	03/02/2006	0.98
	03/02/2006	15/02/2006	0.72
	15/02/2006	28/02/2006	0.68
	28/02/2006	17/03/2006	0.78
	17/03/2006	03/04/2006	0.84
	03/04/2006	18/04/2006	0.43
	18/04/2006	02/05/2006	0.72
	02/05/2006	16/05/2006	0.71
	16/05/2006	30/05/2006	0.32
	30/05/2006	13/06/2006	0.55
	13/06/2006	28/06/2006	0.43
	28/06/2006	12/07/2006	0.22
	12/07/2006	26/07/2006	0.94
	26/07/2006	09/08/2006	0.40
	09/08/2006	23/08/2006	0.63
	23/08/2006	07/09/2006	0.41
	07/09/2006	21/09/2006	0.54
	21/09/2006	05/10/2006	0.83
	05/10/2006	19/10/2006	0.96
	19/10/2006	02/11/2006	0.35
	02/11/2006	16/11/2006	0.32
	16/11/2006	01/12/2006	0.45
	01/12/2006	14/12/2006	0.44
	14/12/2006	05/01/2007	0.62

Annex 1b – Fortnightly data – 1,3-Butadiene

Site	Start Date	End Date	1,3-Butadiene concentration, ppb
Belfast Centre	28/12/2005	11/01/2006	0.01
	11/01/2006	25/01/2006	0.01
	25/01/2006	08/02/2006	0.01
	08/02/2006	22/02/2006	0.01
	22/02/2006	08/03/2006	0.01
	08/03/2006	22/03/2006	0.05
	22/03/2006	05/04/2006	0.04
	05/04/2006	19/04/2006	0.04
	19/04/2006	03/05/2006	0.01
	03/05/2006	17/05/2006	0.01
	17/05/2006	31/05/2006	0.01
	31/05/2006	14/06/2006	0.01
	14/06/2006	28/06/2006	0.01
	28/06/2006	11/07/2006	0.01
	11/07/2006	25/07/2006	0.01
	25/07/2006	08/08/2006	0.01
	08/08/2006	22/08/2006	0.01
	22/08/2006	05/09/2006	0.01
	05/09/2006	19/09/2006	0.02
	19/09/2006	03/10/2006	0.01
	03/10/2006	17/10/2006	0.01
	17/10/2006	31/10/2006	0.01
	30/10/2006	14/11/2006	0.01
	14/11/2006	28/11/2006	0.01
	28/11/2006	12/12/2006	0.01
	12/12/2006	27/12/2006	0.01
	27/12/2006	09/01/2007	0.01
Belfast Roadside	29/12/2005	11/01/2006	0.01
	08/02/2006	22/02/2006	0.05
	22/02/2006	08/03/2006	0.01
	08/03/2006	22/03/2006	0.07
	22/03/2006	05/04/2006	0.07
	05/04/2006	19/04/2006	0.03
	19/04/2006	03/05/2006	0.11
	03/05/2006	17/05/2006	0.01
	17/05/2006	31/05/2006	0.01
	31/05/2006	14/06/2006	0.02
	14/06/2006	28/06/2006	0.04
	28/06/2006	11/07/2006	0.01
	11/07/2006	25/07/2006	0.01
	25/07/2006	08/08/2006	0.01
	08/08/2006	22/08/2006	0.02

Site	Start Date	End Date	1,3-Butadiene concentration, ppb
Birmingham Roadside	22/08/2006	05/09/2006	0.01
	05/09/2006	19/09/2006	0.01
	19/09/2006	03/10/2006	0.01
	03/10/2006	17/10/2006	0.01
	17/10/2006	31/10/2006	0.01
	31/10/2006	14/11/2006	0.01
	14/11/2006	28/11/2006	0.01
	28/11/2006	12/12/2006	0.01
	12/12/2006	27/12/2006	0.01
	27/12/2006	09/01/2007	0.01
	05/01/2006	19/01/2006	0.02
	19/01/2006	20/02/2006	0.06
	02/02/2006	16/02/2006	0.01
	16/02/2006	02/03/2006	0.12
	02/03/2006	16/03/2006	0.03
	16/03/2006	30/03/2006	0.02
	30/03/2006	13/04/2006	0.09
	13/04/2006	27/04/2006	0.01
	27/04/2006	11/05/2006	0.06
	11/05/2006	25/05/2006	0.01
	25/05/2006	08/06/2006	0.01
	08/06/2006	22/06/2006	0.01
	22/06/2006	06/07/2006	0.01
	06/07/2006	20/07/2006	0.01
	20/07/2006	03/08/2006	0.04
	03/08/2006	17/08/2006	0.08
	17/08/2006	31/08/2006	0.01
	31/08/2006	16/09/2006	0.01
	16/09/2006	28/09/2006	0.04
	28/09/2006	12/10/2006	0.01
	12/10/2006	27/10/2006	0.04
	27/10/2006	09/11/2006	0.05
	09/11/2006	24/11/2006	0.01
	24/11/2006	07/12/2006	0.01
	07/12/2006	21/12/2006	0.01
	21/12/2006	04/01/2007	0.01
Bristol Old Market	11/01/2006	25/01/2006	0.09
	25/01/2006	08/02/2006	0.14
	08/02/2006	22/02/2006	0.03
	22/02/2006	09/03/2006	0.55
	09/03/2006	21/03/2006	0.11
	21/03/2006	05/04/2006	0.13
	05/04/2006	19/04/2006	0.08
	19/04/2006	03/05/2006	0.04
	03/05/2006	17/05/2006	0.14

Site	Start Date	End Date	1,3-Butadiene concentration, ppb
Grangemouth	31/05/2006	14/06/2006	0.08
	28/06/2006	12/07/2006	0.04
	12/07/2006	26/07/2006	0.03
	26/07/2006	09/08/2006	0.07
	09/08/2006	23/08/2006	0.11
	23/08/2006	06/09/2006	0.09
	06/09/2006	20/09/2006	0.01
	20/09/2006	04/10/2006	0.12
	18/10/2006	01/11/2006	0.11
	01/11/2006	15/11/2006	0.05
	15/11/2006	30/11/2006	0.01
	30/11/2006	13/12/2006	0.01
	13/12/2006	27/12/2006	0.02
	27/12/2006	10/01/2007	0.01
	10/01/2006	27/01/2006	0.04
	08/02/2006	09/03/2006	0.10
	20/03/2006	06/04/2006	0.01
	06/04/2006	20/04/2006	0.07
	28/04/2006	11/05/2006	1.03
	23/06/2006	07/07/2006	0.51
	07/07/2006	27/07/2006	0.69
	27/07/2006	11/08/2006	0.14
	25/08/2006	15/09/2006	0.01
	15/09/2006	02/10/2006	0.01
	02/10/2006	19/10/2006	0.09
	19/10/2006	09/11/2006	0.03
	09/11/2006	24/11/2006	0.01
	24/11/2006	08/12/2006	0.03
	08/12/2006	04/01/2007	0.01
Haringey Roadside	06/01/2006	19/01/2006	0.02
	19/01/2006	01/02/2006	0.18
	01/02/2006	16/02/2006	0.18
	16/02/2006	28/02/2006	0.01
	28/02/2006	14/03/2006	0.05
	14/03/2006	29/03/2006	0.01
	29/03/2006	11/04/2006	0.01
	11/04/2006	25/04/2006	0.04
	25/04/2006	09/05/2006	0.01
	09/05/2006	26/05/2006	0.01
	26/05/2006	13/06/2006	0.01
	13/06/2006	29/06/2006	0.01
	29/06/2006	11/07/2006	0.01
	11/07/2006	03/08/2006	0.01
	03/08/2006	17/08/2006	0.04
	08/09/2006	22/09/2006	0.08

Site	Start Date	End Date	1,3-Butadiene concentration, ppb
Leeds Centre	22/09/2006	10/10/2006	0.01
	10/10/2006	19/10/2006	0.02
	19/10/2006	03/11/2006	0.08
	03/11/2006	14/11/2006	0.12
	16/11/2006	01/12/2006	0.01
	01/12/2006	14/12/2006	0.01
	14/12/2006	29/12/2006	0.01
	29/12/2006	19/01/2007	0.01
	03/01/2006	18/01/2006	0.01
	18/01/2006	01/02/2006	0.07
	01/02/2006	15/02/2006	0.01
	15/02/2006	01/03/2006	0.05
	01/03/2006	15/03/2006	0.01
	15/03/2006	29/03/2006	0.01
	12/04/2006	26/04/2006	0.06
	26/04/2006	10/05/2006	0.01
	10/05/2006	24/05/2006	0.01
	24/05/2006	07/06/2006	0.01
	07/06/2006	21/06/2006	0.02
	21/06/2006	05/07/2006	0.05
	19/07/2006	01/08/2006	0.03
	01/08/2006	16/08/2006	0.02
	16/08/2006	30/08/2006	0.03
	30/08/2006	13/09/2006	0.04
	13/09/2006	27/09/2006	0.01
	27/09/2006	11/10/2006	0.01
	11/10/2006	25/10/2006	0.01
	25/10/2006	08/11/2006	0.03
	08/11/2006	22/11/2006	0.01
	22/11/2006	06/12/2006	0.01
	06/12/2006	20/12/2006	0.01
	20/12/2006	03/01/2007	0.01
Leeds Roadside	28/12/2005	11/01/2006	0.02
	11/01/2006	31/01/2006	0.01
	31/01/2006	16/02/2006	0.08
	16/02/2006	06/03/2006	0.01
	06/03/2006	22/03/2006	0.04
	22/03/2006	06/04/2006	0.05
	06/04/2006	20/04/2006	0.10
	20/04/2006	04/05/2006	0.02
	04/05/2006	18/05/2006	0.06
	18/05/2006	02/06/2006	0.63
	02/06/2006	15/06/2006	0.12
	15/06/2006	28/06/2006	0.04
	28/06/2006	13/07/2006	0.04

Site	Start Date	End Date	1,3-Butadiene concentration, ppb
Middlesbrough	13/07/2006	09/08/2006	0.06
	09/08/2006	24/08/2006	0.01
	24/08/2006	07/09/2006	0.01
	07/09/2006	21/09/2006	0.09
	21/09/2006	29/09/2006	0.08
	29/09/2006	13/10/2006	0.03
	13/10/2006	02/11/2006	0.08
	02/11/2006	16/11/2006	0.07
	16/11/2006	28/11/2006	0.01
	28/11/2006	13/12/2006	0.04
	13/12/2006	02/01/2007	0.01
	03/01/2006	17/01/2006	0.03
	17/01/2006	31/01/2006	0.01
	31/01/2006	14/02/2006	0.02
	14/02/2006	28/02/2006	0.10
	14/03/2006	29/03/2006	0.01
	29/03/2006	12/04/2006	0.01
	12/04/2006	25/04/2006	0.01
	25/04/2006	09/05/2006	0.05
	09/05/2006	23/05/2006	0.01
	23/05/2006	07/06/2006	0.10
	07/06/2006	20/06/2006	0.04
	20/06/2006	04/07/2006	0.01
	04/07/2006	18/07/2006	0.27
	18/07/2006	01/08/2006	0.05
	01/08/2006	15/08/2006	0.01
	15/08/2006	29/08/2006	0.13
	29/08/2006	12/09/2006	0.05
	12/09/2006	26/09/2006	0.01
	26/09/2006	10/10/2006	0.01
	10/10/2006	24/10/2006	0.01
	24/10/2006	07/11/2006	0.01
	07/11/2006	21/11/2006	0.01
	21/11/2006	05/12/2006	0.01
	05/12/2006	19/12/2006	0.01
	19/12/2006	02/01/2007	0.01

Annex 2 – Audit dates

Site	Date	Date	Date
Barnsley Gawber	08/03/2006	21/09/2006	
Belfast Centre	25/01/2006	14/11/2006	
Belfast Roadside	25/01/2006	14/11/2006	
Birmingham Roadside	02/02/2006	31/08/2006	
Bloomsbury	29/03/2006	10/05/2006	23/11/2006
Bournemouth	24/04/2006	26/10/2006	
Bristol Old Market	05/05/2006	08/11/2006	
Coventry Memorial Park	27/04/2006	20/10/2006	
Cwmbran	11/05/2006	22/11/2006	
Edinburgh St Leonard's	16/05/2006	17/10/2006	
Grangemouth	16/05/2006	17/10/2006	
Haringey Roadside	10/05/2006	02/11/2006	
Hove Roadside	03/05/2006	01/11/2006	
Hull Freetown	19/04/2006	19/06/2006	04/12/2006
Leamington Spa	27/04/2006	20/10/2006	
Leeds Centre	18/04/2006	06/07/2006	05/10/2006
Leeds Roadside	18/04/2006	06/07/2006	05/10/2006
Leicester Centre	19/06/2006	07/12/2006	
Liverpool Speke	24/01/2006	14/08/2006	
Manchester Piccadilly	20/01/2006	14/08/2006	
Middlesbrough	27/06/2006	19/12/2006	
Newcastle	27/06/2006	19/12/2006	
Northampton	09/03/2006	07/09/2006	
Norwich Centre	06/06/2006	06/11/2006	
Nottingham Centre	08/03/2006	22/09/2006	
Oxford Centre	23/05/2006	21/11/2006	
Plymouth	04/05/2006	07/11/2006	
Portsmouth	28/02/2006	22/08/2006	
Reading	01/06/2006	06/12/2006	
Sheffield	19/04/2006	04/10/2006	
Southampton	16/06/2006	06/09/2006	
Southend-on-Sea	26/04/2006	27/10/2006	
Stoke Centre	08/03/2006	21/09/2006	
Wigan Centre	19/01/2006	17/05/2006	
Wigan Centre	12/07/2006	14/08/2006	
Yarm	28/06/2006	20/12/2006	