

Air Pollution in the UK: 2003

Part 2

In this part of the report, we provide a detailed summary of the measurements made for each pollutant. We also present information on measurement techniques, site locations and relevant UK, European and WHO pollutant criteria.

We then provide for each pollutant a table summarising measurements and exceedences of the UK Air Quality objectives during 2003. Finally, we include graphs to show variations in pollutant concentrations throughout the day and over the year as a whole.

8. Benzene-Measurement Sites, Instrumentation and Statistics

8.1 Measurement Method

Benzene is either measured using BTEX monitors- that measure concentrations of benzene, toluene, ethylbenzene and xylene isomers as well as 1,3-butadiene – or Gas Chromatographs measuring a wide range of VOC species.

8.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ Environnement VOC 71M
- ▶ Perkin Elmer GC

*Defra does not give approval or endorsement for any products or equipment

8.3 Data Quality Requirements of EC Directive 2000/69/EC

Uncertainty 15%

Minimum data capture 90%

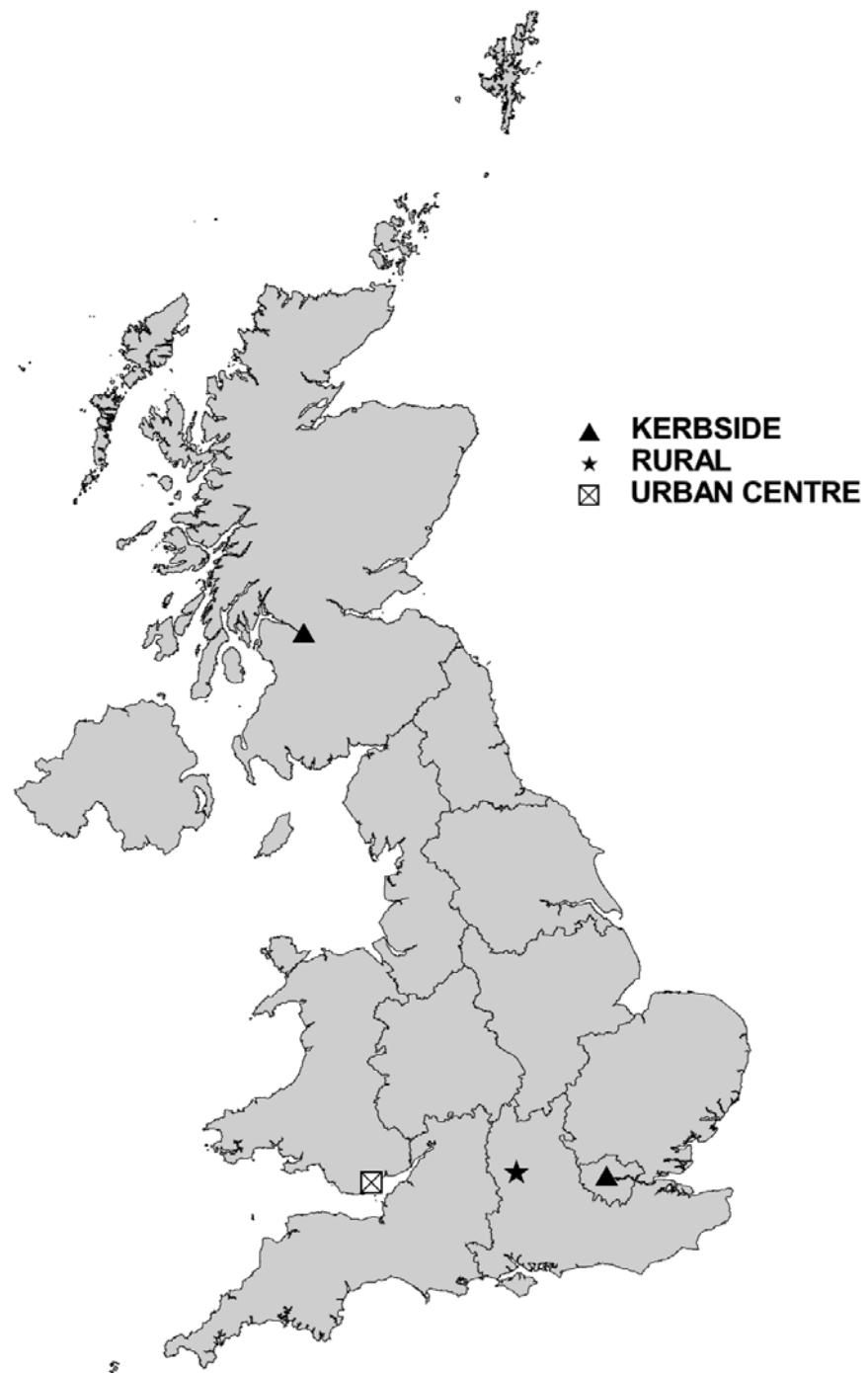
8.4 Objectives and Bandings

Summary of objectives of Air Quality Strategy			
	Objective*	Measured as	To be achieved by
Benzene	16.25 µg/m ³	Running Annual Mean	31 December 2003
England and Wales only	5 µg/m ³	Annual Mean	31 December 2010
Scotland and Northern Ireland only	3.25 µg/m ³	Running Annual Mean	31 December 2010

No bandings have yet been set for benzene

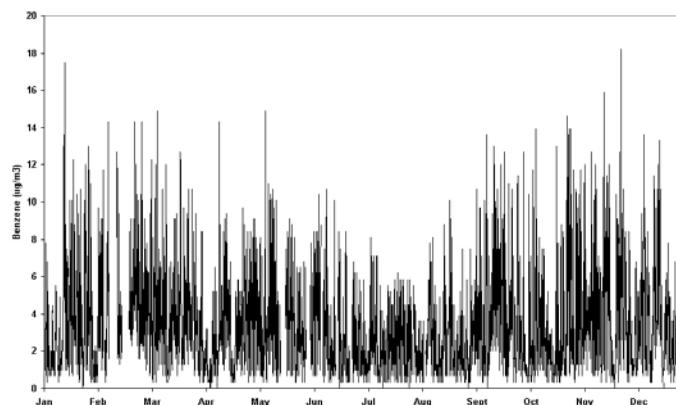
8.5 Site Locations

UK Automatic Benzene Monitoring Sites 2003

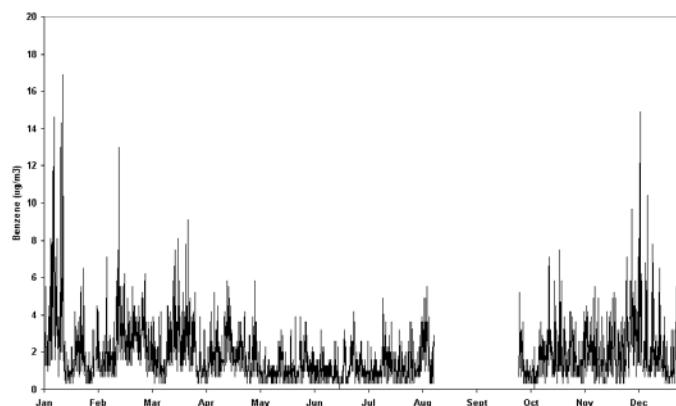


8.6 Hourly Average Concentrations

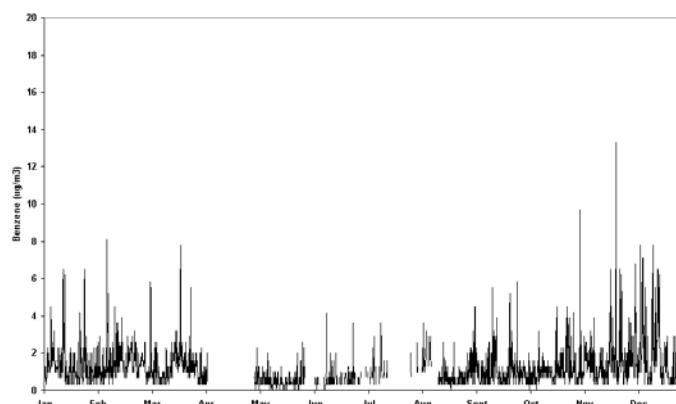
These figures show time series graphs of hourly average benzene concentrations at four *typical* site types for 2003.



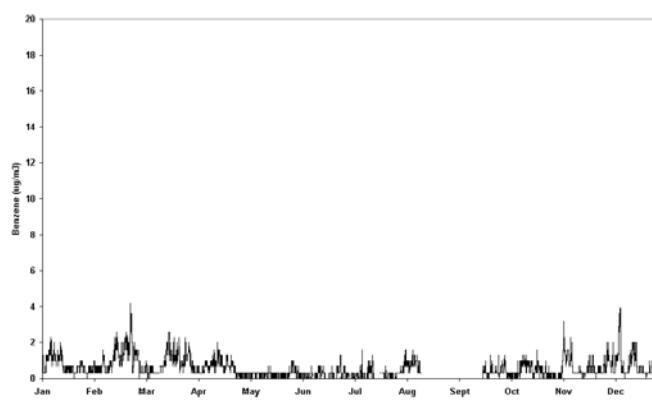
**Kerbside Site
(Marylebone Road)**



**Kerbside Site
(Glasgow)**



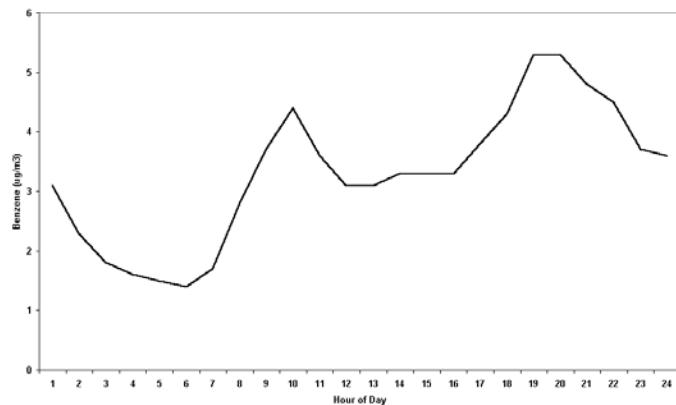
**Urban Centre Site
(Cardiff)**



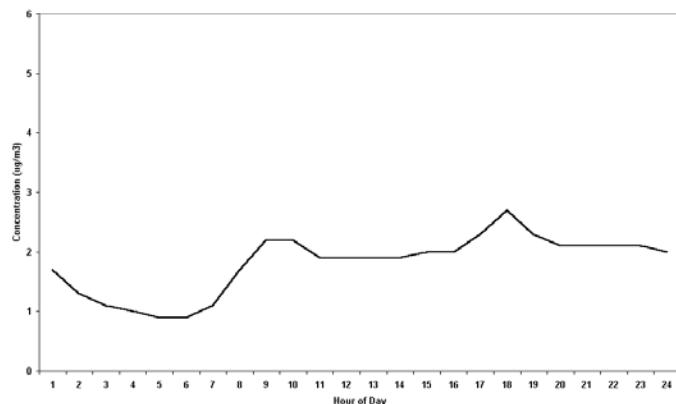
**Rural Site
(Harwell)**

8.7 Diurnal Variations

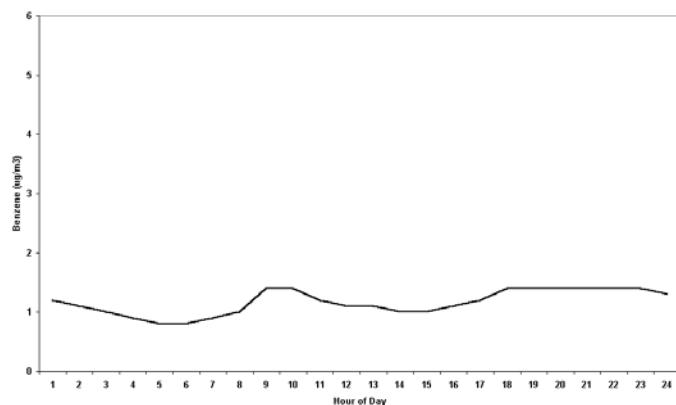
These figures show how nitrogen dioxide concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



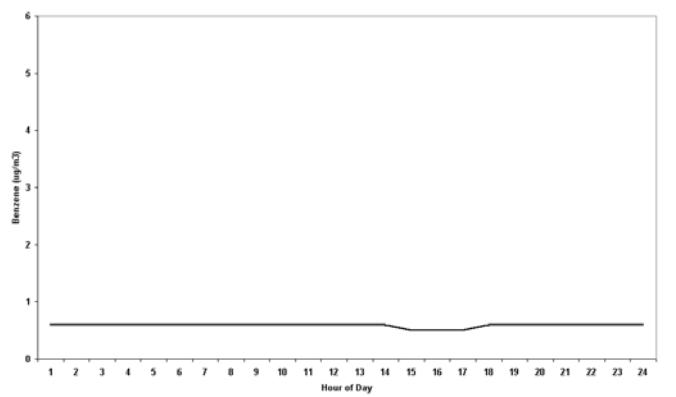
**Kerbside Site
(Marylebone Road)**



**Kerbside Site
(Glasgow)**



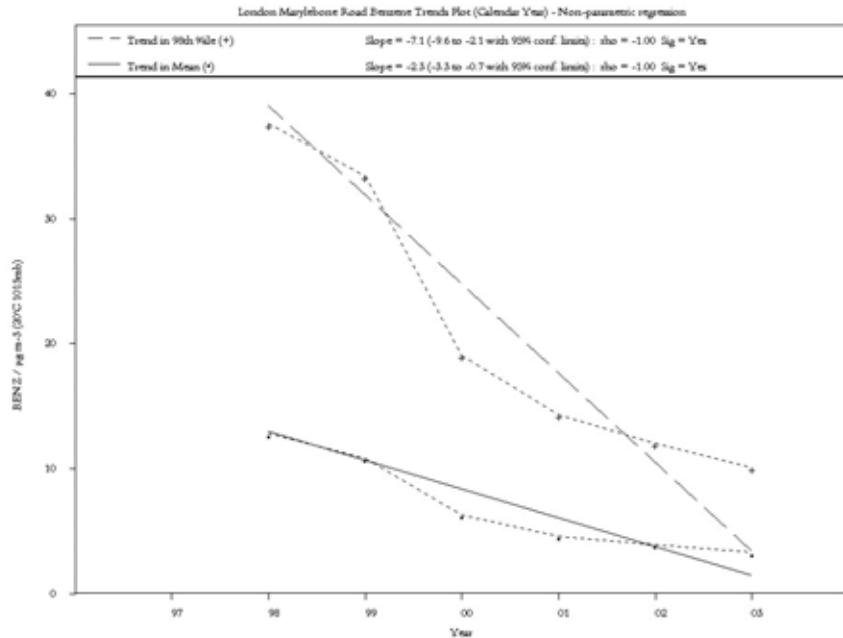
**Urban Centre Site
(Cardiff)**



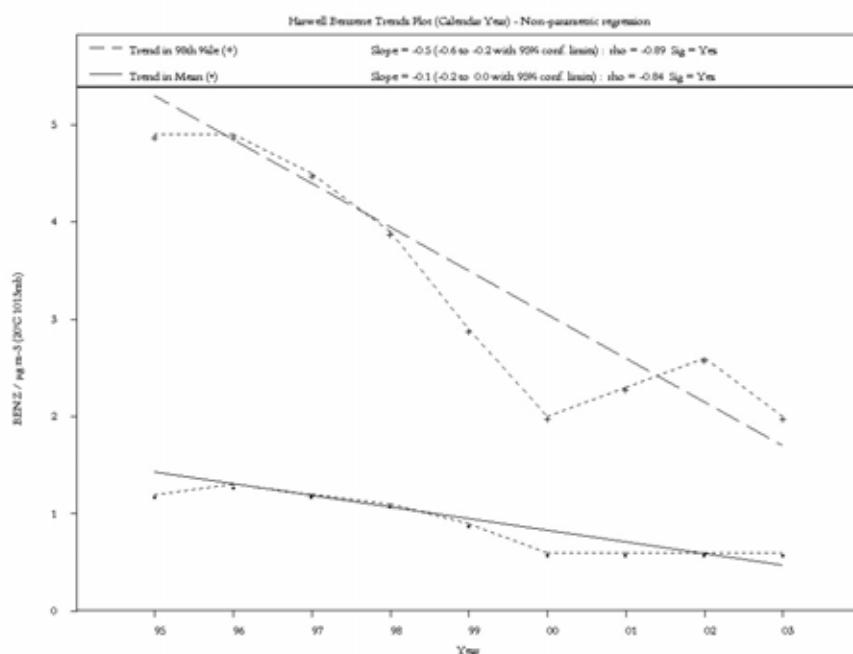
**Rural Site
(Harwell)**

8.8 Trends in annual concentrations

Statistically significant trends in concentrations are shown for sites with at least ≥ 5 years of measurement.



**Kerb-side Site
(Marylebone
Road)**



**Rural Site
(Harwell)**

There are no urban background or roadside benzene measurement sites with sufficient data to determine annual trends

8.9 Benzene Statistical Summary 2003

i) Annual Statistics

Site	Site type	Annual average of hourly means µg/m³	Annual data capture of hourly means %	Maximum hourly mean µg/m³
England				
Harwell	RU	0.6	84.7	4.2
London Marylebone Road	KB	3.3	90.6	18.2
Scotland				
Glasgow Kerbside	KB	1.8	84.9	16.9
Wales				
Cardiff Centre	UC	1.2	75.9	13.3

RU= rural, KB= kerbside, UC=urban centre

ii) Exceedence Statistics

Site	Air Quality Standard	Days	Daughter Directive and Air Quality Standard (England and Wales)	Annual Mean Standard (Scotland)
England				
Harwell	0	0	0	0
London Marylebone Road	0	0	0	0
Scotland				
Glasgow Kerbside	0	0	0	0
Wales				
Cardiff Centre	0	0	0	0

9. 1,3-Butadiene- Measurement Sites, Instrumentation and Statistics

9.1 Measurement Method

1,3-Butadiene is measured using BTEX monitors; these measure concentrations of benzene, toluene, ethylbenzene and xylene isomers as well as 1,3-butadiene. This type of instrument uses an adsorption tube for sample collection.

9.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ Environnement VOC 71M
- ▶ Perkin Elmer GC

*Defra does not give approval or endorsement for any products or equipment

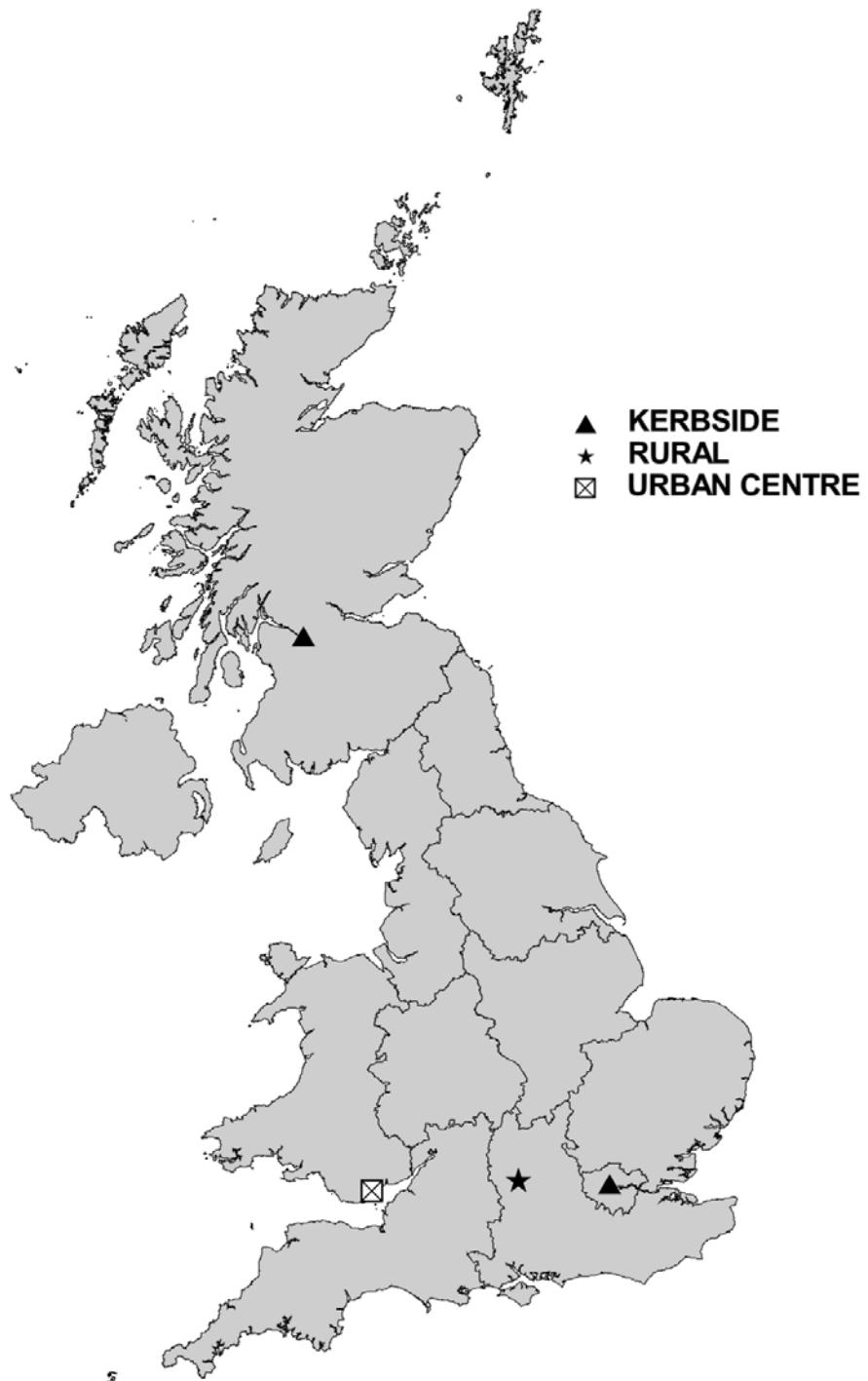
9.3 Objectives and Bandings

Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
1,3-Butadiene	2.25 µg/m ³	Running Annual Mean	31 December 2003

No Bandings have yet been set for 1,3-Butadiene

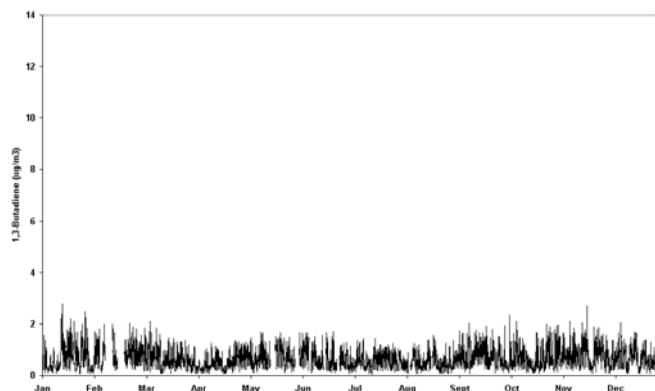
9.4 Site Locations

UK Automatic 1,3-Butadiene Monitoring Sites 2003

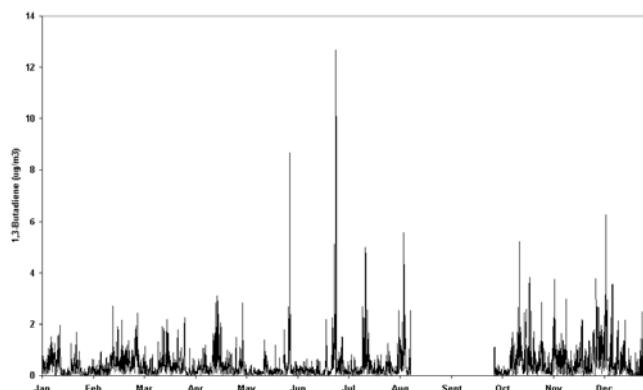


9.5 Hourly Average Concentrations

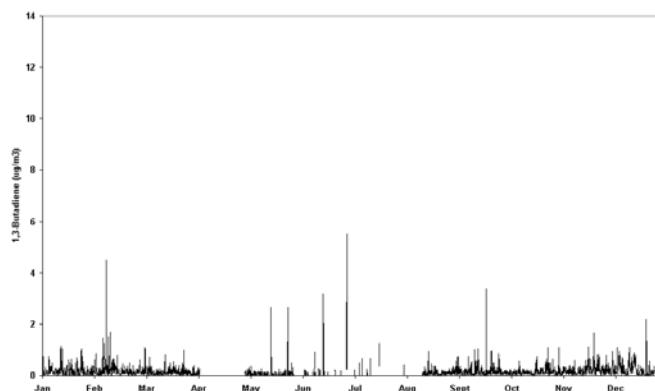
These figures show time series graphs of hourly average 1,3-Butadiene concentrations at four *typical* site types for 2003.



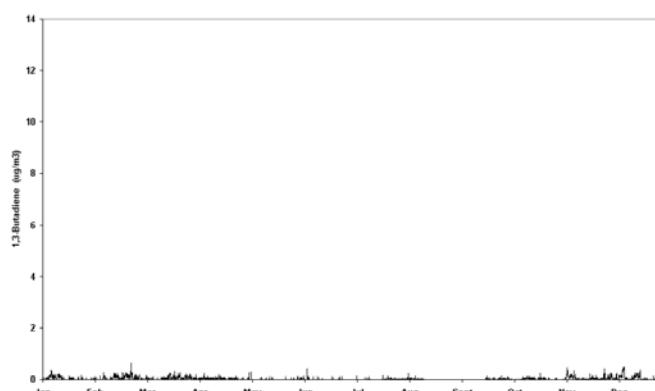
Kerbside Site
(*Marylebone Road*)



Kerbside Site
(*Glasgow*)



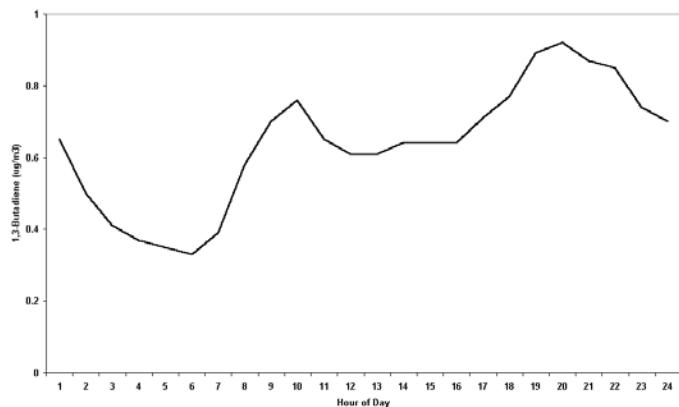
Urban Centre Site
(*Cardiff*)



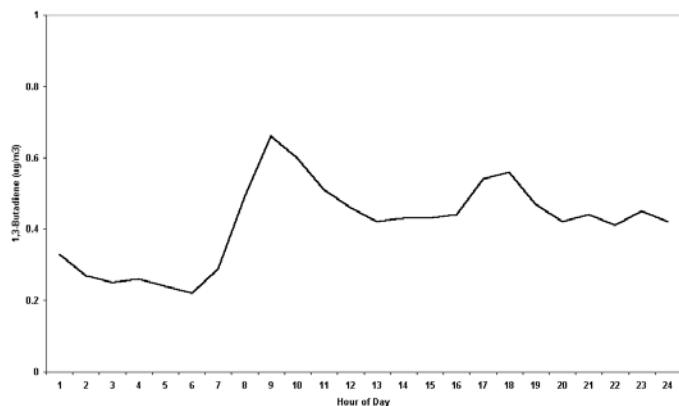
Rural Site
(*Harwell*)

9.6 Diurnal Variations

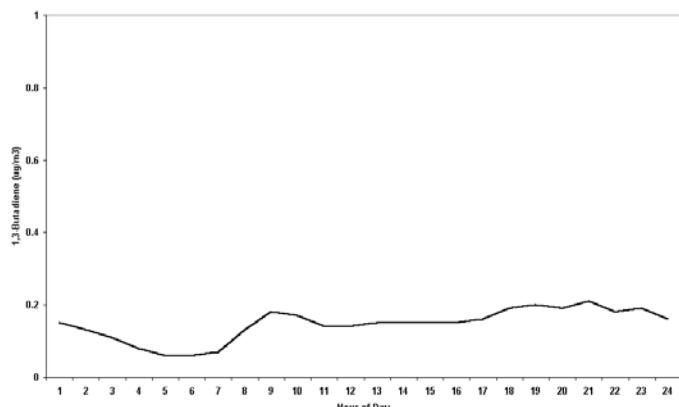
These figures show how nitrogen dioxide concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



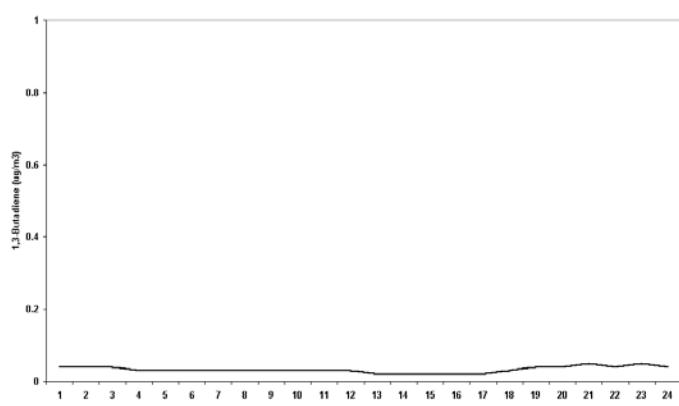
**Kerbside Site
(Marylebone Road)**



**Kerbside Site
(Glasgow)**



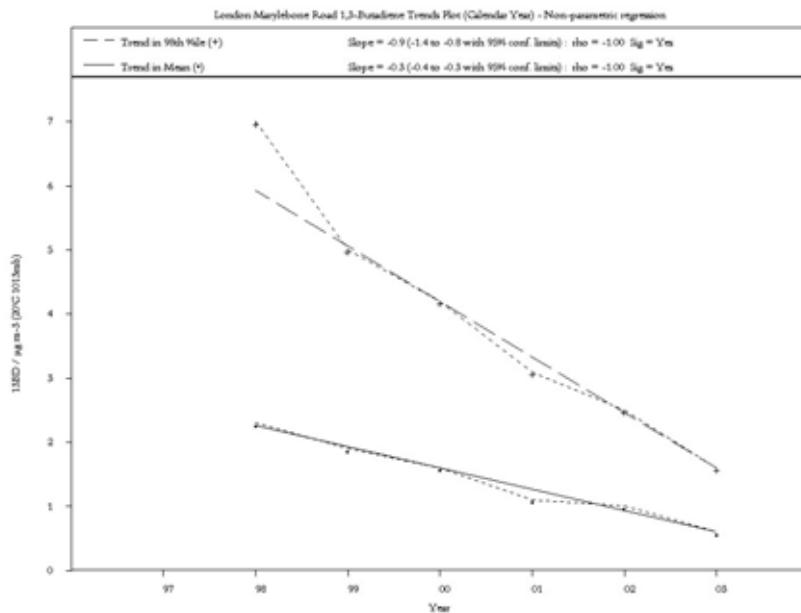
**Urban Centre Site
(Cardiff)**



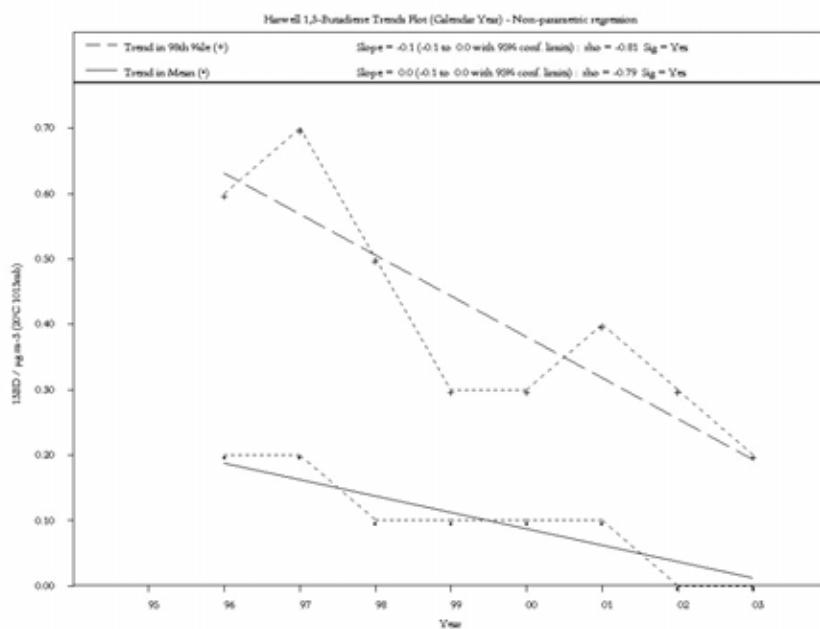
**Rural Site
(Harwell)**

9.7 Trends in annual concentrations

Statistically significant trends in concentrations are shown for sites with at least ≥ 5 years of measurement.



**Kerbside Site
(Marylebone Road)**



**Rural Site
(Harwell)**

There are no urban background or roadside 1,3-butadiene measurement sites with sufficient data to determine annual trends

9.8 1,3-Butadiene Statistical Summary 2003

i) Annual Statistics-

Site	Site type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$
England				
Harwell	RU	0.03	84.9	0.63
London Marylebone Road	KB	0.64	92.3	2.76
Scotland				
Glasgow Kerbside	KB	0.42	84.6	12.66
Wales				
Cardiff Centre	UC	0.15	76.1	5.50

RU= rural, KB= kerbside, UC=urban centre

ii) Exceedence Statistics

Site	Air Quality Standard	Days
England		
Harwell	0	0
London Marylebone Road	0	0
Scotland		
Glasgow Kerbside	0	0
Wales		
Cardiff Centre	0	0

10. CO - Measurement Sites, Instrumentation and Statistics

10.1 Measurement Method

CO concentrations in ambient air are measured by the absorption of infrared radiation at 4.5 to 4.9 μm wavelength. A reference detection system is used to alternately measure absorption due to CO in the sampled air stream and absorption by interfering species. An infrared detector and amplification system produces output voltages proportional to the CO concentration.

10.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ Ambirack CO
- ▶ API M300
- ▶ Environnement SA 11M
- ▶ Horiba APMA 350E
- ▶ Horiba APMA 360
- ▶ Monitor Labs 9830
- ▶ Rotork 416
- ▶ Thermo Electron 48

*Defra does not give approval or endorsement for any products or equipment

10.3 Data Quality Requirements of EC Directive 2000/69/EC

Uncertainty 15%
Minimum data capture 90%

10.4 Objectives and Bandings

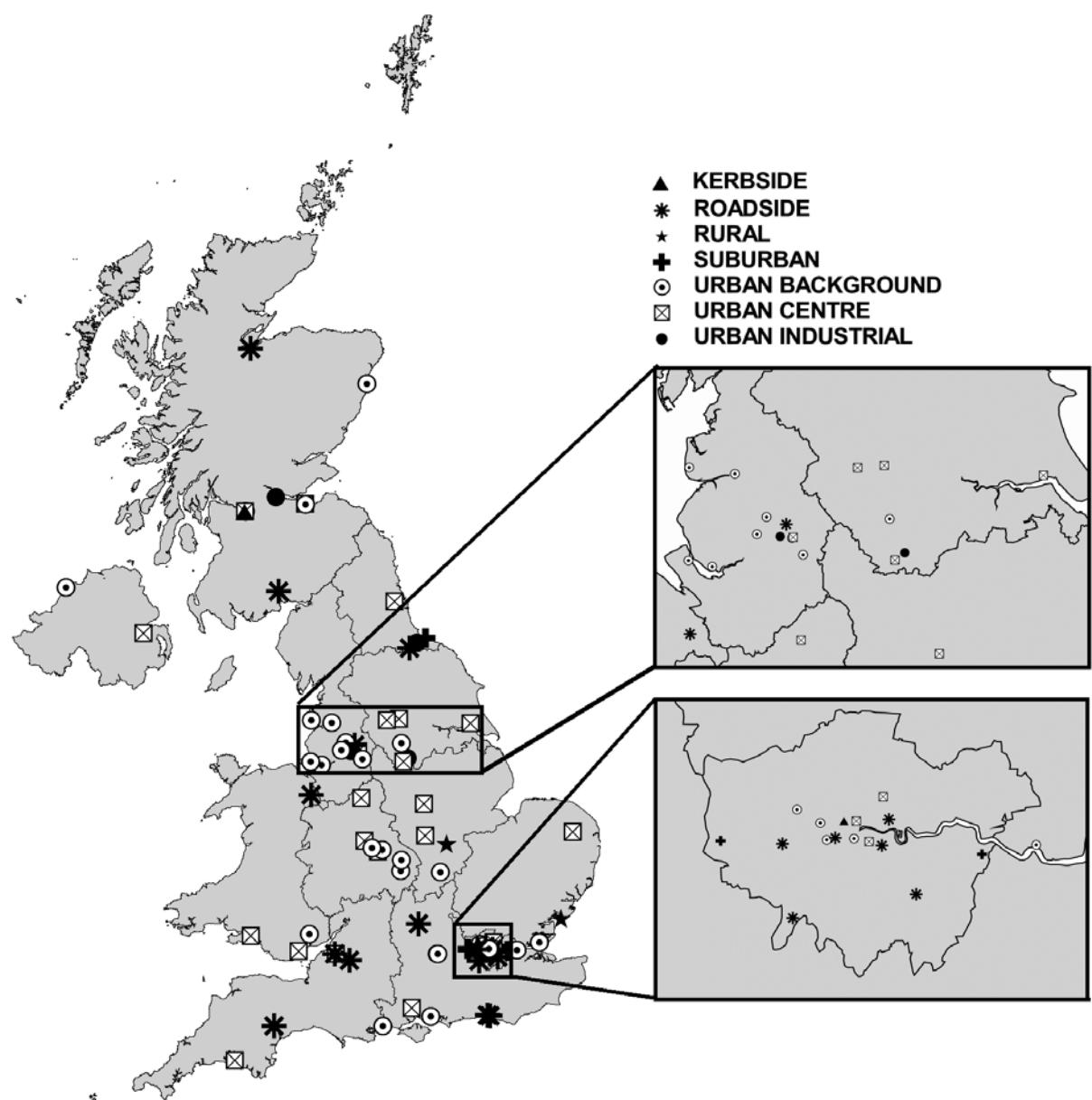
Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
Carbon Monoxide England and Wales	10.0 mg/m ³	Maximum daily running 8 Hour Mean	31 December 2003
Scotland only	10.0 mg/m ³	Running 8 Hour Mean ^a	31 December 2003
Northern Ireland only	10.0 mg/m ³	Maximum daily running 8 Hour Mean	1 January 2005

a. The Quality Objective in Scotland has been defined in Regulations as the running 8-hour mean; in practice, this is equivalent to the maximum daily running 8-hour mean

Air Quality Bands and Index Values		
Band	Index	Carbon Monoxide mg/m ³
<i>Low</i>	1	0-3.8
	2	3.9-7.6
	3	7.7-11.5
<i>Moderate</i>	4	11.6-13.4
	5	13.5-15.4
	6	15.5-17.3
<i>High</i>	7	17.4-19.2
	8	19.3-21.2
	9	21.3-23.1
<i>Very High</i>	10	23.2 or more

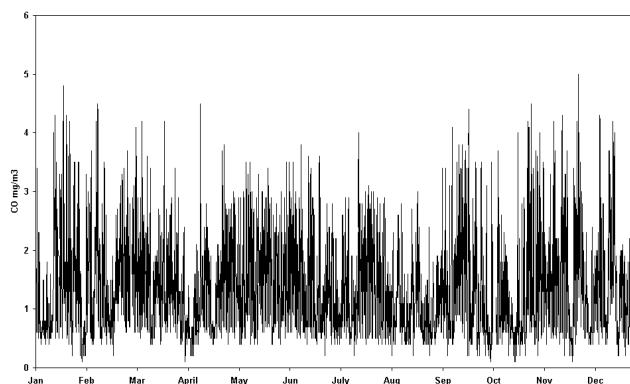
10.5 Site Locations

UK Automatic Carbon Monoxide Monitoring Sites 2003

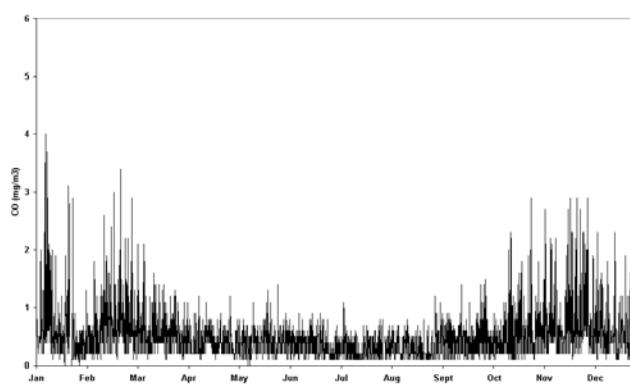


10.6 Hourly Average Concentrations

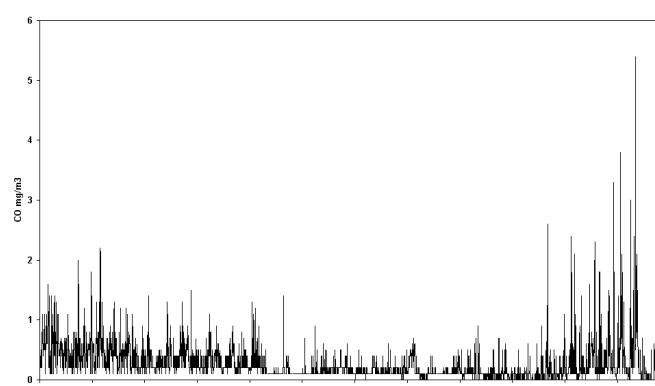
These figures show time series graphs of hourly average carbon monoxide concentrations at four *typical* site types for 2003.



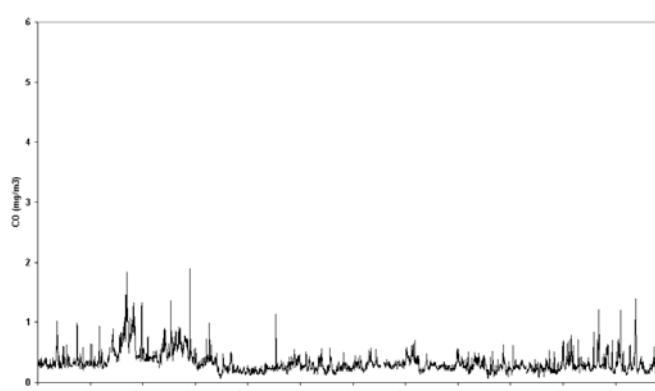
Kerbside Site
(*Marylebone Road*)



Roadside Site
(*Inverness*)



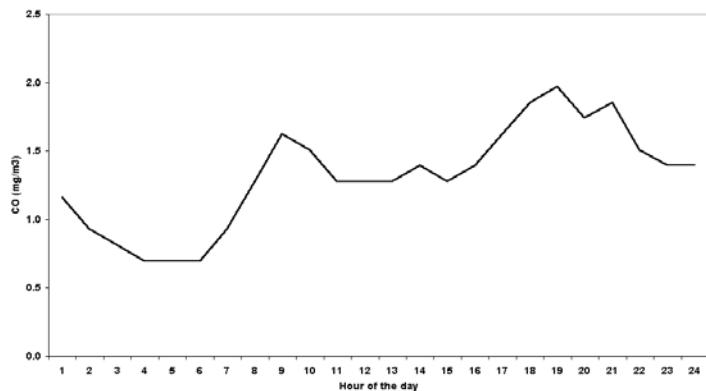
Urban Background Site
(*Leamington Spa*)



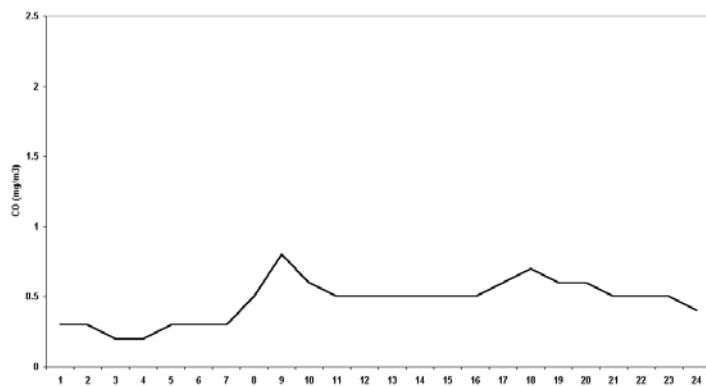
Rural Site
(*St Osyth*)

10.7 Diurnal Variations

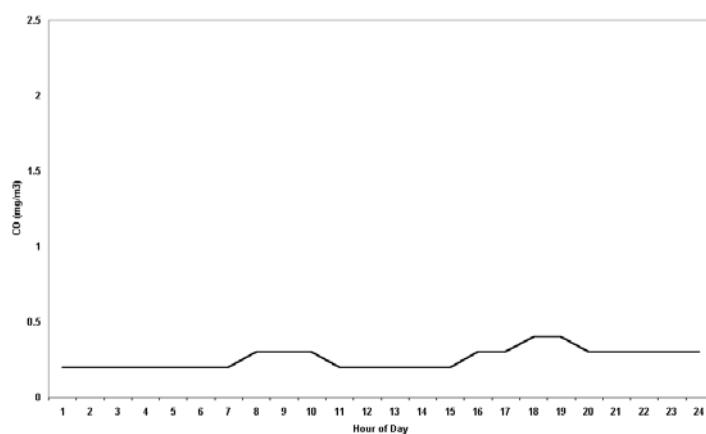
These figures show how carbon monoxide concentrations vary on average for each hour of day during 2003, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



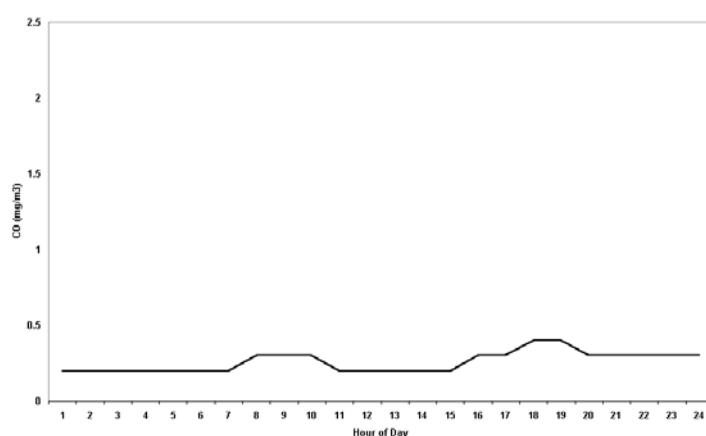
Kerbside Site
(Marylebone Road)



Roadside Site
(Inverness)



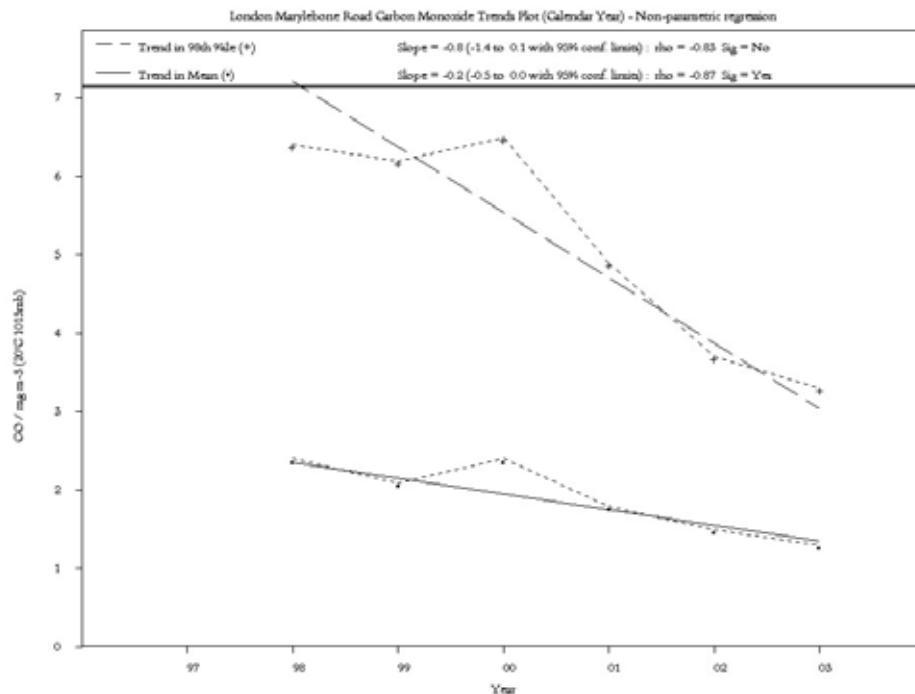
Urban Background Site
(Leamington Spa)



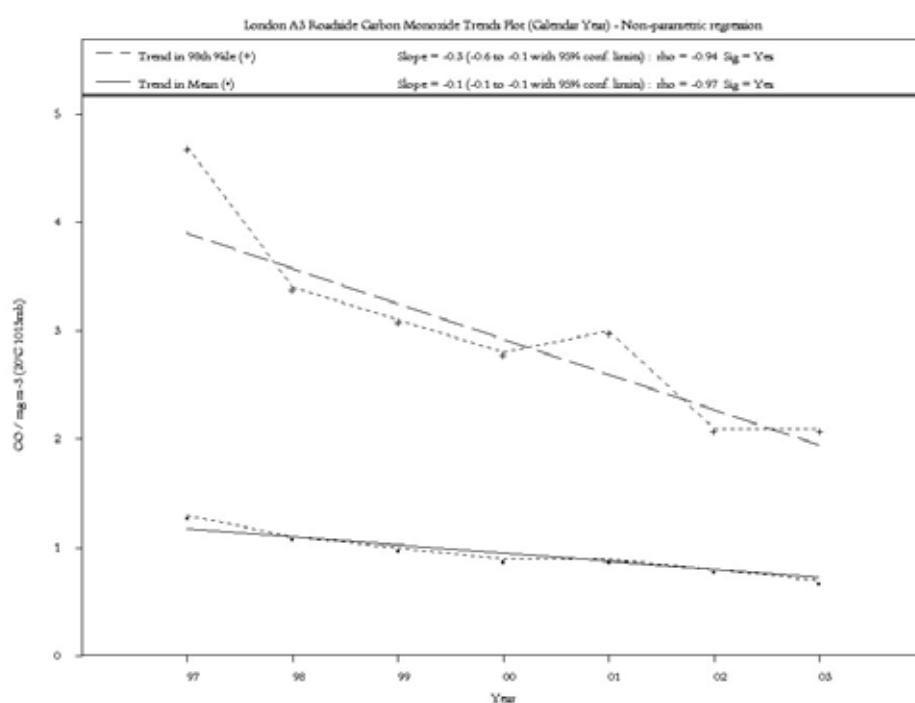
Rural Site
(St Osyth)

10.8 Trends in annual concentrations

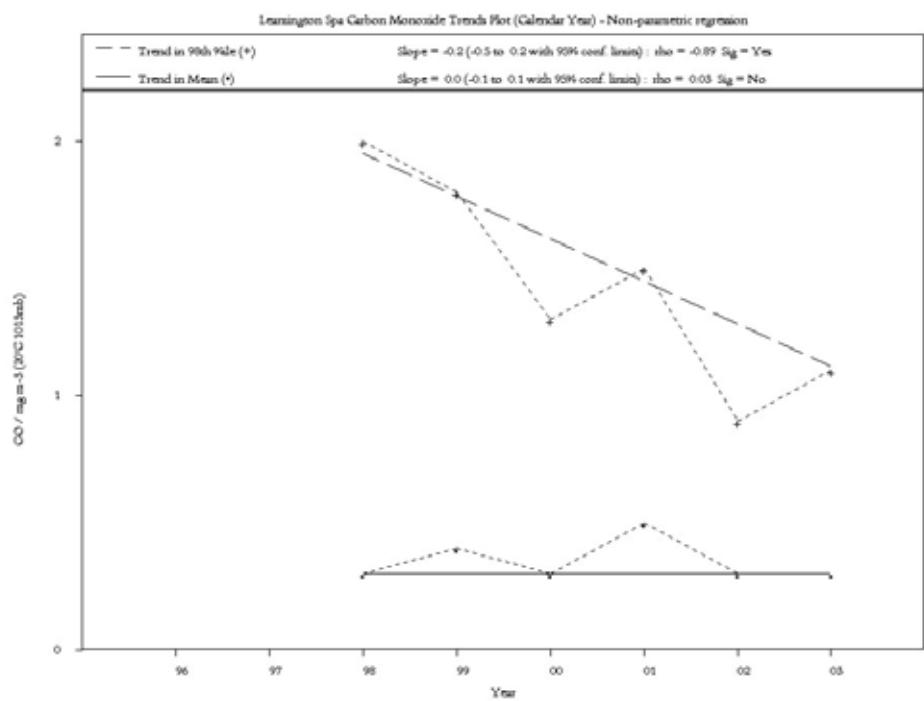
Statistically significant trends in concentrations are shown for sites with at least ≥ 5 years of measurement.



**Kerbside Site
(Marylebone Road)**



**Roadside Site
(London A3 Roadside)**



Urban Background Site (Leamington Spa)

There are no rural CO measurement sites with sufficient data to determine annual trends

10.9 Carbon Monoxide Statistical Summary 2003

i) Annual Statistics- I

Site	Site Type	Annual average of hourly means mg/ m ³	Annual data capture of hourly means %	Maximum hourly mean mg/ m ³	Maximum running 8-hour mean mg/m ³	Date of maximum running 8-hour mean
England						
Barnsley Gawber	UB	0.2	97.2	3.4	1.7	28/02/2003
Bath Roadside	RD	1.0	92.9	6.2	3.2	12/01/2003
Birmingham Centre	UC	0.5	90.0	3.4	2.1	21/11/2003
Birmingham East	UB	0.4	69.7	7.5	5.8	16/12/2003
Blackpool	UB	0.4	95.5	3.6	2.5	04/12/2003
Bolton	UB	0.2	94.1	5.2	4.2	09/12/2003
Bournemouth	UB	0.3	98.3	3.5	2.7	10/12/2003
Bradford Centre	UC	0.6	79.7	4.7	3.2	31/12/2003
Brentford Roadside	RD	---	34.0	6.3	3.4	06/12/2003
Brighton Roadside	RD	0.6	97.0	6.9	3.7	10/12/2003
Bristol Centre	UC	0.6	85.8	7.0	4.7	10/12/2003
Bristol Old Market	RD	1.2	93.4	7.8	5.2	10/12/2003
Bury Roadside	RD	0.4	97.8	4.7	3.8	17/12/2003
Coventry Memorial Park	UB	0.3	82.0	2.7	1.7	05/12/2003
Exeter Roadside	RD	0.9	89.7	5.6	3.8	11/01/2003
Hove Roadside	RD	0.5	98.0	6.9	2.8	10/12/2003
Hull Freetown	UC	0.3	84.4	2.9	2.0	21/11/2003
Leamington Spa	UB	0.3	98.3	5.4	2.4	18/12/2003
Leeds Centre	UC	0.6	86.7	3.3	2.7	21/11/2003
Leicester Centre	UC	0.6	80.3	2.8	2.0	23/01/2003
Liverpool Speke	UB	0.1	56.8	2.9	2.4	24/11/2003
London A3 Roadside	RD	0.7	97.0	4.5	3.2	22/02/2003
London Bexley	SU	0.4	94.5	3.6	2.2	18/12/2003
London Bloomsbury	UC	0.5	93.2	3.6	1.7	27/11/2003
London Brent	UB	0.3	96.9	8.6	5.3	19/12/2003
London Bromley	RD	0.4	76.1	5.7	3.6	18/12/2003
London Cromwell Road 2	RD	0.9	88.9	4.3	2.9	17/12/2003
London Hackney	UC	0.5	95.2	5.8	4.5	18/12/2003
London Hillingdon	SU	0.5	95.5	9.3	4.0	17/12/2003
London Marylebone Road	KB	1.3	98.4	5.0	3.7	12/01/2003
London N. Kensington	UB	0.5	92.0	3.4	2.5	12/01/2003
London Southwark	UC	0.4	97.5	4.2	2.7	12/01/2003
London Westminster	UB	0.5	97.4	5.5	2.2	12/01/2003
Manchester Piccadilly	UC	0.4	96.8	6.1	3.6	17/12/2003
Manchester Town Hall	UB	0.5	96.3	4.8	3.3	23/11/2003
Market Harborough	RU	---	5.4	0.9	0.8	19/12/2003
Middlesbrough	I	0.4	87.4	4.0	2.1	05/12/2003
Newcastle Centre	UC	0.2	76.4	3.1	2.2	23/11/2003
Northampton	UB	0.3	97.4	2.4	1.5	18/12/2003
Norwich Centre	UC	0.5	55.9	4.2	2.2	09/12/2003
Nottingham Centre	UC	0.5	94.0	3.6	3.0	19/12/2003
Oxford Centre	RD	0.4	98.5	4.7	2.7	09/12/2003
Plymouth Centre	UC	0.3	89.6	2.9	1.9	27/11/2003
Portsmouth	UB	0.2	94.5	4.8	2.5	28/10/2003
Preston	UB	0.4	97.1	3.6	2.4	04/01/2003
Reading	UB	---	9.3	2.1	1.3	12/01/2003
Reading New Town	UB	---	20.5	4.7	3.0	18/12/2003
Redcar	SU	0.3	91.1	3.3	1.7	30/12/2003
Salford Eccles	I	0.2	97.4	5.2	3.5	23/11/2003
Sandwell West Bromwich	UB	0.5	73.1	3.1	2.1	15/12/2003
Sheffield Centre	UC	0.4	95.4	4.4	2.9	05/12/2003
Sheffield Tinsley	I	0.2	57.3	2.8	2.1	05/12/2003
Southampton Centre	UC	0.6	73.6	4.4	3.3	20/12/2003
Southend-on-Sea	UB	0.3	86.5	5.0	1.8	27/11/2003
Southwark Roadside	RD	---	38.4	5.1	3.5	12/01/2003
St Osyth	RU	0.33	98.5	1.89	1.50	22/02/2003
Stockport Shaw Heath	UB	0.1	72.1	5.2	3.2	17/12/2003
Stockton-on-Tees Yarm	RD	0.7	99.1	16.3	4.4	23/12/2003
Stoke-on-Trent Centre	UC	0.6	91.1	5.2	3.3	05/02/2003
Thurrock	UB	0.3	98.1	5.4	2.7	27/11/2003
Tower Hamlets Roadside	RD	0.7	97.9	4.1	2.1	05/02/2003
West London	UB	0.4	94.9	2.6	2.1	12/01/2003
Wigan Leigh	UB	0.6	97.2	5.6	3.7	23/11/2003
Wirral Tranmere	UB	0.3	94.1	3.5	1.9	05/01/2003
Wolverhampton Centre	UC	0.5	85.6	5.0	3.7	22/11/2003
N Ireland						
Belfast Centre	UC	0.2	79.3	3.5	2.7	18/12/2003
Derry	UB	0.2	97.5	2.3	1.7	05/01/2003

KB=kerbside, RD=roadside, UC=urban centre, UB= urban background,
 SU=suburban, I=industrial, RU=rural

ii) Exceedence Statistics- I

Site	Moderate band	Days	High band	Days	Very High band	Days	Daughter Directive and Air Quality Standard	Days	Air Quality Standard (Scotland)	Days
England										
Barnsley Gawber	0	0	0	0	0	0	0	0	0	0
Bath Roadside	0	0	0	0	0	0	0	0	0	0
Birmingham Centre	0	0	0	0	0	0	0	0	0	0
Birmingham East	0	0	0	0	0	0	0	0	0	0
Blackpool	0	0	0	0	0	0	0	0	0	0
Bolton	0	0	0	0	0	0	0	0	0	0
Bournemouth	0	0	0	0	0	0	0	0	0	0
Bradford Centre	0	0	0	0	0	0	0	0	0	0
Brentford Roadside	0	0	0	0	0	0	0	0	0	0
Brighton Roadside	0	0	0	0	0	0	0	0	0	0
Bristol Centre	0	0	0	0	0	0	0	0	0	0
Bristol Old Market	0	0	0	0	0	0	0	0	0	0
Bury Roadside	0	0	0	0	0	0	0	0	0	0
Coventry Memorial Park	0	0	0	0	0	0	0	0	0	0
Exeter Roadside	0	0	0	0	0	0	0	0	0	0
Hove Roadside	0	0	0	0	0	0	0	0	0	0
Hull Freetown	0	0	0	0	0	0	0	0	0	0
Leamington Spa	0	0	0	0	0	0	0	0	0	0
Leeds Centre	0	0	0	0	0	0	0	0	0	0
Leicester Centre	0	0	0	0	0	0	0	0	0	0
Liverpool Speke	0	0	0	0	0	0	0	0	0	0
London A3 Roadside	0	0	0	0	0	0	0	0	0	0
London Bexley	0	0	0	0	0	0	0	0	0	0
London Bloomsbury	0	0	0	0	0	0	0	0	0	0
London Brent	0	0	0	0	0	0	0	0	0	0
London Bromley	0	0	0	0	0	0	0	0	0	0
London Cromwell Road 2	0	0	0	0	0	0	0	0	0	0
London Hackney	0	0	0	0	0	0	0	0	0	0
London Hillingdon	0	0	0	0	0	0	0	0	0	0
London Marylebone Road	0	0	0	0	0	0	0	0	0	0
London N. Kensington	0	0	0	0	0	0	0	0	0	0
London Southwark	0	0	0	0	0	0	0	0	0	0
London Westminster	0	0	0	0	0	0	0	0	0	0
Manchester Piccadilly	0	0	0	0	0	0	0	0	0	0
Manchester Town Hall	0	0	0	0	0	0	0	0	0	0
Market Harborough	0	0	0	0	0	0	0	0	0	0
Middlesbrough	0	0	0	0	0	0	0	0	0	0
Newcastle Centre	0	0	0	0	0	0	0	0	0	0
Northampton	0	0	0	0	0	0	0	0	0	0
Norwich Centre	0	0	0	0	0	0	0	0	0	0
Nottingham Centre	0	0	0	0	0	0	0	0	0	0
Oxford Centre	0	0	0	0	0	0	0	0	0	0
Plymouth Centre	0	0	0	0	0	0	0	0	0	0
Portsmouth	0	0	0	0	0	0	0	0	0	0
Preston	0	0	0	0	0	0	0	0	0	0
Reading	0	0	0	0	0	0	0	0	0	0
Reading New Town	0	0	0	0	0	0	0	0	0	0
Redcar	0	0	0	0	0	0	0	0	0	0
Salford Eccles	0	0	0	0	0	0	0	0	0	0
Sandwell West Bromwich	0	0	0	0	0	0	0	0	0	0
Sheffield Centre	0	0	0	0	0	0	0	0	0	0
Sheffield Tinsley	0	0	0	0	0	0	0	0	0	0
Southampton Centre	0	0	0	0	0	0	0	0	0	0
Southend-on-Sea	0	0	0	0	0	0	0	0	0	0
Southwark Roadside	0	0	0	0	0	0	0	0	0	0
St Osyth	0	0	0	0	0	0	0	0	0	0
Stockport Shaw Heath	0	0	0	0	0	0	0	0	0	0
Stockton-on-Tees Yarm	0	0	0	0	0	0	0	0	0	0
Stoke-on-Trent Centre	0	0	0	0	0	0	0	0	0	0
Thurrock	0	0	0	0	0	0	0	0	0	0
Tower Hamlets Roadside	0	0	0	0	0	0	0	0	0	0
West London	0	0	0	0	0	0	0	0	0	0
Wigan Leigh	0	0	0	0	0	0	0	0	0	0
Wirral Tranmere	0	0	0	0	0	0	0	0	0	0
Wolverhampton Centre	0	0	0	0	0	0	0	0	0	0
N Ireland										
Belfast Centre	0	0	0	0	0	0	0	0	0	0
Derry	0	0	0	0	0	0	0	0	0	0

iii) Annual Statistics- II

Site	Site Type	Annual average of hourly means mg/m ³	Annual data capture of hourly means %	Maximum hourly mean mg/m ³	Maximum running 8-hour mean mg/m ³	Date of maximum running 8-hour mean
Scotland						
Aberdeen	UB	0.4	96.9	3.1	1.9	04/12/2003
Dumfries	RD	0.6	97.4	5.2	2.9	08/01/2003
Edinburgh Centre	UC	---	33.8	1.3	0.9	30/09/2003
Edinburgh St Leonards	UB	---	10.4	2.3	1.9	30/12/2003
Glasgow Centre	UC	0.4	80.4	4.8	2.5	06/01/2003
Glasgow City Chambers	UB	0.6	97.3	3.5	2.8	05/01/2003
Glasgow Kerbside	KB	0.5	96.3	4.4	2.9	11/01/2003
Grangemouth	I	0.2	52.7	2.8	1.5	23/01/2003
Inverness	RD	0.5	98.9	4.0	2.3	06/01/2003
Wales						
Cardiff Centre	UC	0.4	88.0	3.0	1.8	16/12/2003
Cwmbran	UB	0.3	99.3	3.1	2.0	12/01/2003
Swansea	UC	0.4	96.2	4.4	2.2	24/11/2003
Wrexham	RD	0.6	98.7	4.7	2.2	03/12/2003

iv) Exceedence Statistics- II

Site	Moderate band	Days	High band	Days	Very High band	Days	Daughter Directive and Air Quality Standard	Days	Air Quality Standard (Scotland)	Days
Scotland										
Aberdeen	0	0	0	0	0	0	0	0	0	0
Dumfries	0	0	0	0	0	0	0	0	0	0
Edinburgh Centre	0	0	0	0	0	0	0	0	0	0
Edinburgh St Leonards	0	0	0	0	0	0	0	0	0	0
Glasgow Centre	0	0	0	0	0	0	0	0	0	0
Glasgow City Chambers	0	0	0	0	0	0	0	0	0	0
Glasgow Kerbside	0	0	0	0	0	0	0	0	0	0
Grangemouth	0	0	0	0	0	0	0	0	0	0
Inverness	0	0	0	0	0	0	0	0	0	0
Wales										
Cardiff Centre	0	0	0	0	0	0	0	0	0	0
Cwmbran	0	0	0	0	0	0	0	0	0	0
Swansea	0	0	0	0	0	0	0	0	0	0
Wrexham	0	0	0	0	0	0	0	0	0	0

11. NO₂ - Measurement Sites, Instrumentation and Statistics

11.1 Measurement Method

The determination of oxides of nitrogen is based on the chemiluminescent energy emitted when nitric oxide (NO) is reacted with ozone (O₃) in an evacuated chamber to form chemiluminescent nitrogen dioxide (NO₂).

11.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ Ambirack NO₂
- ▶ API M200
- ▶ Environnement AC 31M
- ▶ Horiba APNA 360
- ▶ Monitor Labs 9841
- ▶ Rotork 447
- ▶ Thermo Electron 42

*Defra does not give approval or endorsement for any products or equipment

11.3 Data Quality Requirements of EC Directive 1999/30/EC

Uncertainty 15%

Minimum data capture 90%

11.4 Objectives and Bandings

Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
Nitrogen Dioxide	200 µg/m ³ Not to be exceeded more than 18 times per year	1 Hour Mean	31 December 2005
	40 µg/m ³	Annual Mean	31 December 2005

Air Quality Bands and Index Values		
Band	Index	Nitrogen Dioxide µg/m³
<i>Low</i>	1	0-95
	2	96-190
	3	191-286
<i>Moderate</i>	4	287-381
	5	382-476
	6	478-572
<i>High</i>	7	573-635
	8	363-700
	9	701-763
<i>Very High</i>	10	764 or more

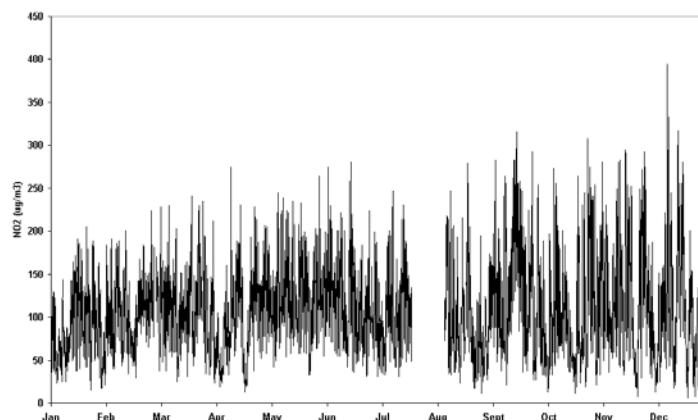
11.5 Site Locations

UK Automatic Nitrogen Dioxide Monitoring Sites 2003

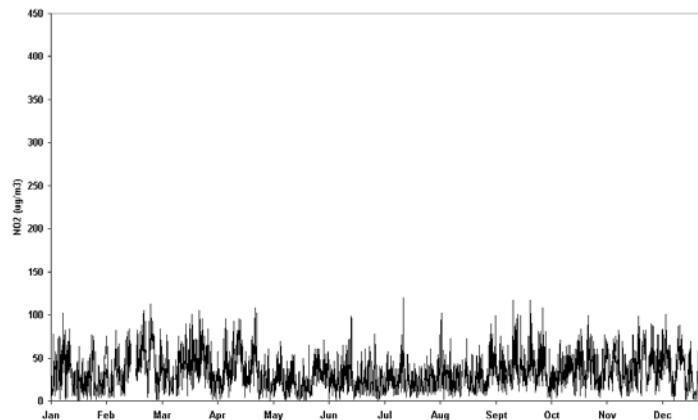


11.6 Hourly Average Concentrations

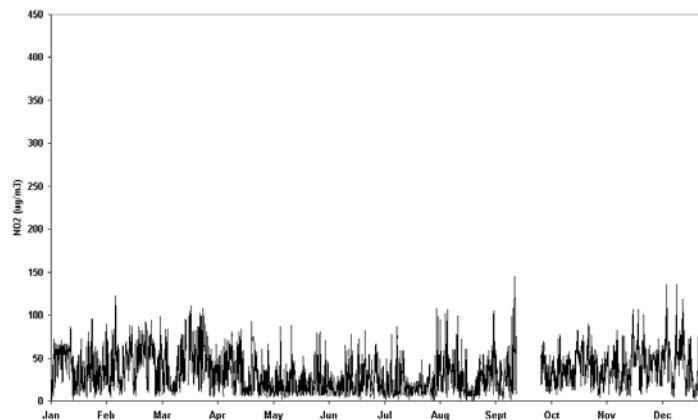
These figures show time series graphs of hourly average nitrogen dioxide concentrations at four *typical* site types for 2003.



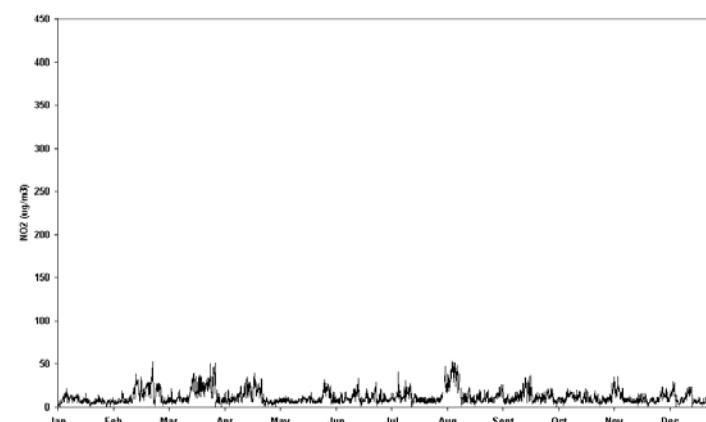
Kerbside Site
(Marylebone Road)



Roadside Site
(Norwich)



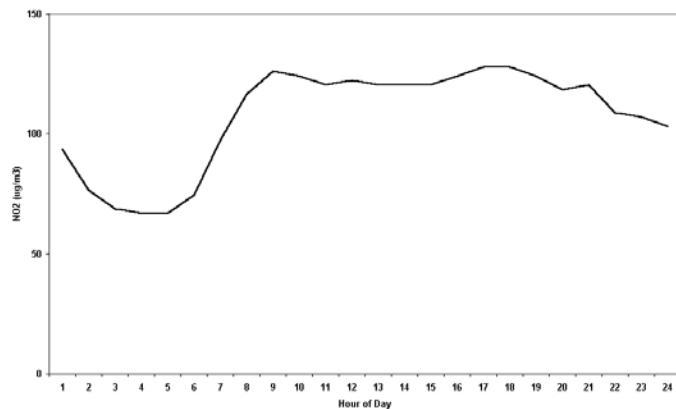
Urban Background Site
(Birmingham East)



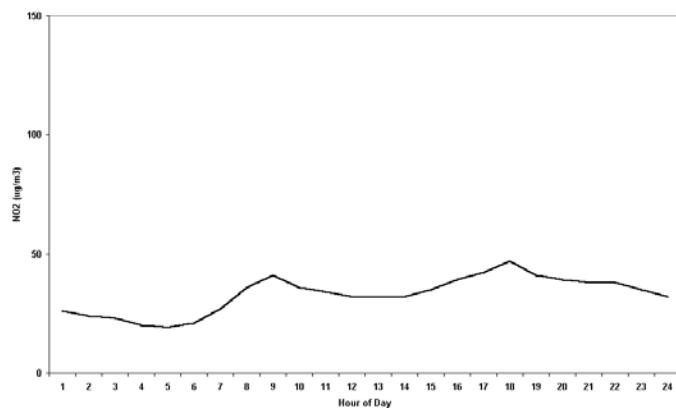
Rural Site
(Harwell)

11.7 Diurnal Variations

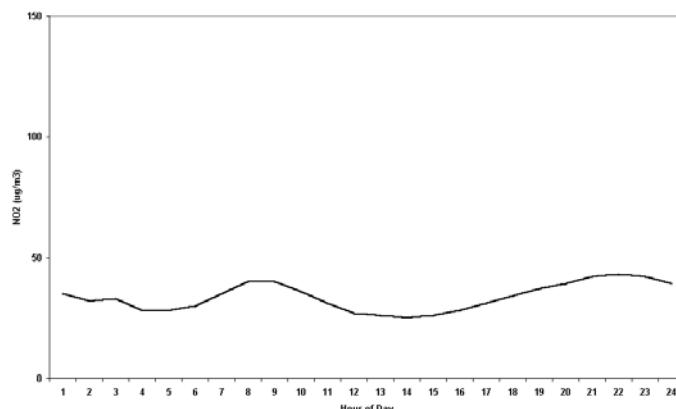
These figures show how nitrogen dioxide concentrations vary on average for each hour of day during 2003, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



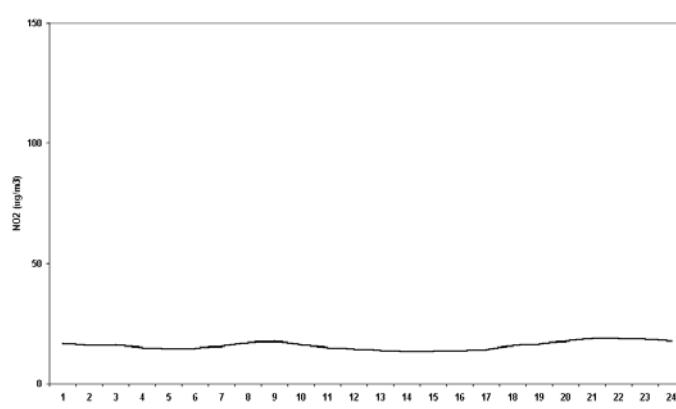
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Norwich)**



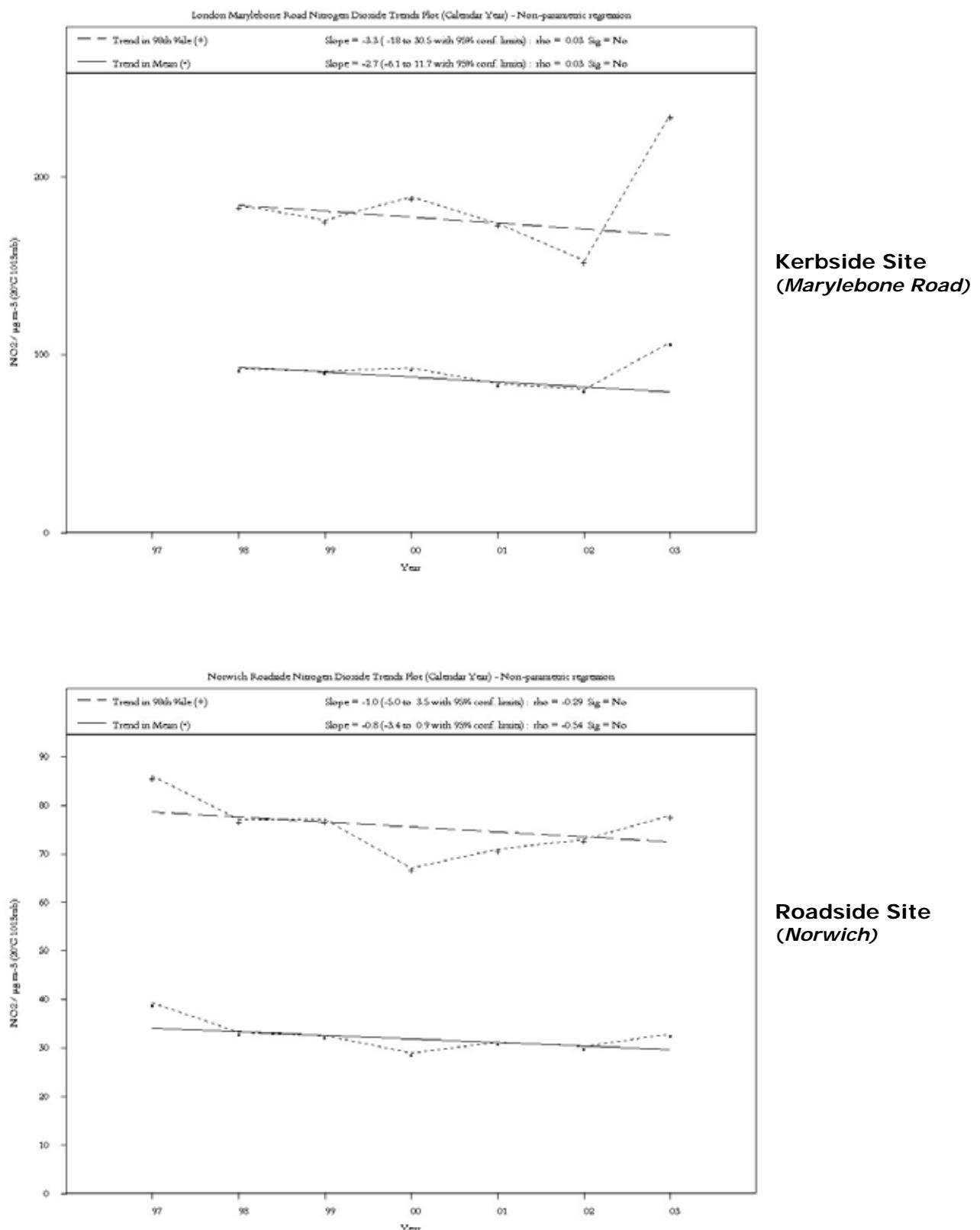
**Urban Background Site
(Birmingham East)**

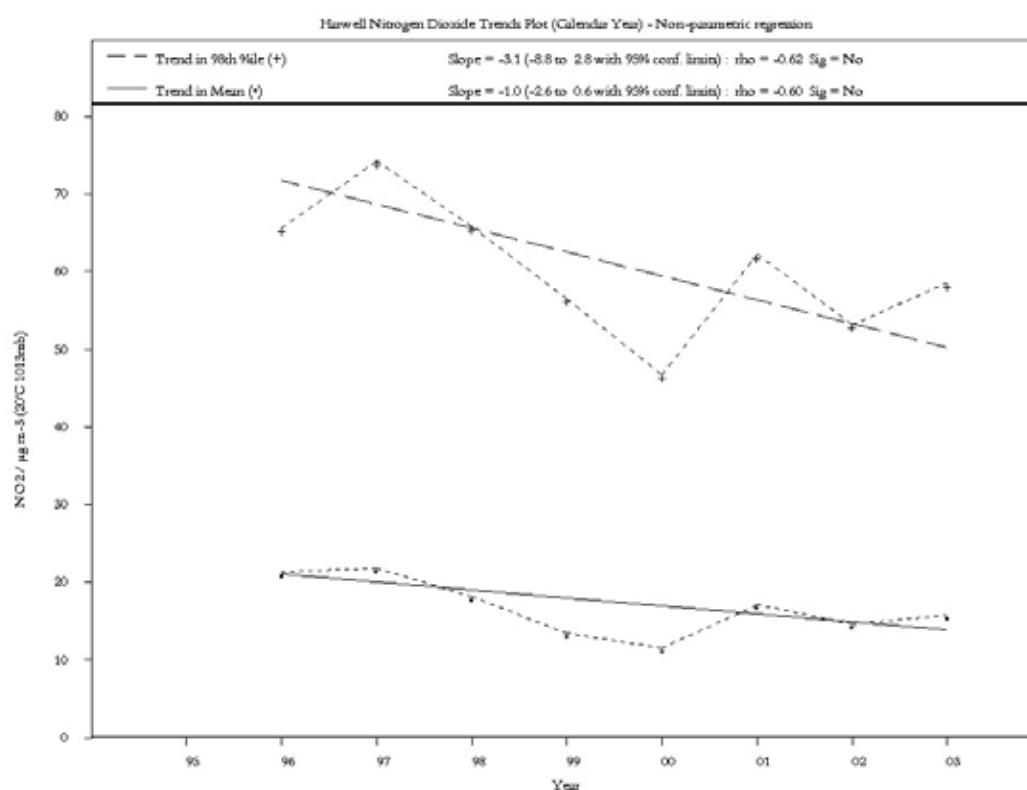
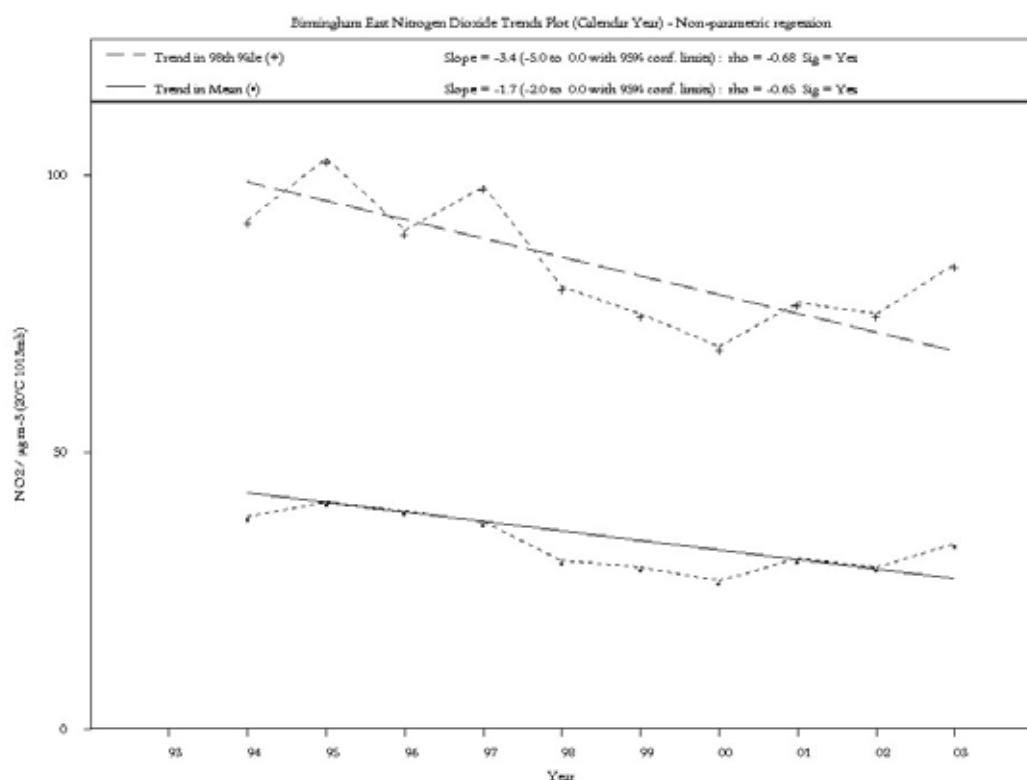


**Rural Site
(Harwell)**

11.8 Trends in annual concentrations

Statistically significant trends in concentrations are shown for sites with at ≥ 5 years of measurement.





11.9 Nitrogen Dioxide Statistical Summary 2003

i) Annual Statistics- I

Site	Site Type	Annual average of hourly means $\mu\text{g}/\text{m}^3$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g}/\text{m}^3$	99.8 %ile of hourly means $\mu\text{g}/\text{m}^3$
England					
Barnsley Gawber	UB	25	97.2	117	80
Bath Roadside	RD	61	94.5	180	134
Billingham	I	32	96.6	252	105
Birmingham Centre	UC	34	87.6	128	90
Birmingham East	UB	34	93.0	145	94
Blackpool	UB	24	93.7	120	82
Bolton	UB	36	97.9	182	98
Bournemouth	UB	22	93.0	117	77
Bradford Centre	UC	38	93.6	210	101
Brentford Roadside	RD	---	41.6	195	---
Brighton Roadside	RD	43	86.6	184	103
Bristol Centre	UC	37	87.5	164	103
Bristol Old Market	RD	71	63.5	210	166
Bury Roadside	RD	76	89.1	203	157
Cambridge Roadside	RD	47	89.3	159	103
Camden Kerbside	KB	---	43.6	207	---
Canterbury	UB	22	99.0	105	71
Coventry Memorial Park	UB	25	87.4	122	80
Exeter Roadside	RD	41	95.3	168	103
Haringey Roadside	RD	52	87.9	170	119
Harwell	RU	15.8	87.1	95.4	67.1
High Muffles	RU	---	18.5	61.8	---
Hove Roadside	RD	37	96.2	149	105
Hull Freetown	UC	33	93.7	143	88
Ladybower	RU	12.9	97.8	130.6	66.6
Leamington Spa	UB	33	66.5	197	101
Leeds Centre	UC	40	86.2	168	107
Leicester Centre	UC	37	93.4	142	92
Liverpool Speke	UB	27	56.9	142	86
London A3 Roadside	RD	73	80.3	493	161
London Bexley	SU	38	88.6	151	101
London Bloomsbury	UC	57	67.8	153	117
London Brent	UB	34	95.1	208	105
London Bromley	RD	42	97.4	170	99
London Cromwell Road 2	RD	76	93.3	224	153
London Eltham	SU	38	97.6	157	113
London Hackney	UC	51	91.2	245	126
London Hillingdon	SU	54	82.6	199	130
London Lewisham	UC	55	99.6	233	136
London Marylebone Road	KB	107	93.7	394	254
London N. Kensington	UB	45	94.1	195	119
London Southwark	UC	48	73.2	174	115
London Teddington	UB	28.1	95.6	131.0	89.9
London Wandsworth	UC	63	91.3	220	145
London Westminster	UB	50	68.9	153	115
Lullingstone Heath	RU	12.5	88.3	89.3	53.2
Manchester Piccadilly	UC	45	97.8	262	105
Manchester South	SU	22	98.4	117	77
Manchester Town Hall	UB	44	98.6	159	109
Market Harborough	RU	---	5.3	69.0	---
Middlesbrough	I	25	92.6	195	86
Newcastle Centre	UC	32	92.7	119	88
Northampton	UB	24	99.3	124	77
Norwich Centre	UC	25	94.4	111	80
Norwich Roadside	RD	33	97.9	120	86
Nottingham Centre	UC	36	78.7	113	84
Oxford Centre	RD	72	98.2	260	180
Plymouth Centre	UC	28	91.7	105	71
Portsmouth	UB	26	95.2	111	78
Preston	UB	28	93.2	142	82
Reading	UB	---	9.2	82	---
Reading New Town	UB	---	20.4	115	---
Redcar	SU	25	96.4	117	80
Rochester	RU	21.6	98.1	90.5	68.1
Rotherham Centre	UC	35	96.7	161	88
Salford Eccles	I	40	96.3	189	115
Sandwell West Bromwich	UB	39	85.7	166	107
Sheffield Centre	UC	39	94.8	149	98
Sheffield Tinsley	I	46	96.6	174	109

KB=kerbside, RD=roadside, UC=urban centre, UB= urban background,
 SU=suburban, I=industrial, RU=rural

ii) Exceedence Statistics- I

Site	Moderate band	Days	High band	Days	Very High band	Days	Air Quality Standard (Annual Mean)	Daughter Directive Hourly Mean and Air Quality Standard (Hourly Mean)	Days
England									
Barnsley Gawber	0	0	0	0	0	0	0	0	0
Bath Roadside	0	0	0	0	0	0	1	0	0
Billingham	0	0	0	0	0	0	0	2	2
Birmingham Centre	0	0	0	0	0	0	0	0	0
Birmingham East	0	0	0	0	0	0	0	0	0
Blackpool	0	0	0	0	0	0	0	0	0
Bolton	0	0	0	0	0	0	0	0	0
Bournemouth	0	0	0	0	0	0	0	0	0
Bradford Centre	0	0	0	0	0	0	0	1	1
Brentford Roadside	0	0	0	0	0	0	---	0	0
Brighton Roadside	0	0	0	0	0	0	1	0	0
Bristol Centre	0	0	0	0	0	0	0	0	0
Bristol Old Market	0	0	0	0	0	0	1	6	3
Bury Roadside	0	0	0	0	0	0	1	1	1
Cambridge Roadside	0	0	0	0	0	0	1	0	0
Camden Kerbside	0	0	0	0	0	0	---	2	2
Canterbury	0	0	0	0	0	0	0	0	0
Coventry Memorial Park	0	0	0	0	0	0	0	0	0
Exeter Roadside	0	0	0	0	0	0	1	0	0
Haringey Roadside	0	0	0	0	0	0	1	0	0
Harwell	0	0	0	0	0	0	0	0	0
High Muffles	0	0	0	0	0	0	---	0	0
Hove Roadside	0	0	0	0	0	0	0	0	0
Hull Freetown	0	0	0	0	0	0	0	0	0
Ladybower	0	0	0	0	0	0	0	0	0
Leamington Spa	0	0	0	0	0	0	0	0	0
Leeds Centre	0	0	0	0	0	0	0	0	0
Leicester Centre	0	0	0	0	0	0	0	0	0
Liverpool Speke	0	0	0	0	0	0	0	0	0
London A3 Roadside	3	2	0	0	0	0	1	16	8
London Bexley	0	0	0	0	0	0	0	0	0
London Bloomsbury	0	0	0	0	0	0	1	0	0
London Brent	0	0	0	0	0	0	0	3	2
London Bromley	0	0	0	0	0	0	1	0	0
London Cromwell Road 2	0	0	0	0	0	0	1	6	4
London Eltham	0	0	0	0	0	0	0	0	0
London Hackney	0	0	0	0	0	0	1	5	3
London Hillingdon	0	0	0	0	0	0	1	0	0
London Lewisham	0	0	0	0	0	0	1	1	1
London Marylebone Road	17	8	0	0	0	0	1	471	106
London N. Kensington	0	0	0	0	0	0	1	0	0
London Southwark	0	0	0	0	0	0	1	0	0
London Teddington	0	0	0	0	0	0	0	0	0
London Wandsworth	0	0	0	0	0	0	1	8	6
London Westminster	0	0	0	0	0	0	1	0	0
Lullingstone Heath	0	0	0	0	0	0	0	0	0
Manchester Piccadilly	0	0	0	0	0	0	1	2	1
Manchester South	0	0	0	0	0	0	0	0	0
Manchester Town Hall	0	0	0	0	0	0	1	0	0
Market Harborough	0	0	0	0	0	0	---	0	0
Middlesbrough	0	0	0	0	0	0	0	0	0
Newcastle Centre	0	0	0	0	0	0	0	0	0
Northampton	0	0	0	0	0	0	0	0	0
Norwich Centre	0	0	0	0	0	0	0	0	0
Norwich Roadside	0	0	0	0	0	0	0	0	0
Nottingham Centre	0	0	0	0	0	0	0	0	0
Oxford Centre	0	0	0	0	0	0	1	23	13
Plymouth Centre	0	0	0	0	0	0	0	0	0
Portsmouth	0	0	0	0	0	0	0	0	0
Preston	0	0	0	0	0	0	0	0	0
Reading	0	0	0	0	0	0	---	0	0
Reading New Town	0	0	0	0	0	0	---	0	0
Redcar	0	0	0	0	0	0	0	0	0
Rochester	0	0	0	0	0	0	0	0	0
Rotherham Centre	0	0	0	0	0	0	0	0	0
Salford Eccles	0	0	0	0	0	0	0	0	0
Sandwell West Bromwich	0	0	0	0	0	0	0	0	0
Sheffield Centre	0	0	0	0	0	0	0	0	0
Sheffield Tinsley	0	0	0	0	0	0	1	0	0

iii) Annual Statistics- II

Site	Site Type	Annual average of hourly means µg/m³	Annual data capture of hourly means %	Maximum hourly mean µg/m³	99.8 %ile of hourly means µg/m³
England					
Somerton	RU	---	40.4	59.9	---
Southampton Centre	UC	36	95.0	126	90
Southend-on-Sea	UB	25	82.6	134	77
Southwark Roadside	RD	67	91.2	231	138
St Osyth	RU	18.1	93.4	104.2	64.6
Stockport Shaw Heath	UB	38	98.2	210	98
Stockton-on-Tees Yarm	RD	43	88.9	226	113
Stoke-on-Trent Centre	UC	31	94.6	124	77
Thurrock	UB	38	93.5	268	94
Tower Hamlets Roadside	RD	67	97.5	245	147
Walsall Alumwell	UB	42	95.3	189	107
Walsall Willenhall	SU	31	97.3	189	96
West London	UB	55	96.4	186	134
Wicken Fen	RU	18.0	59.8	122.8	64.5
Wigan Leigh	UB	31	92.3	113	82
Wirral Tranmere	UB	27	95.6	132	92
Wolverhampton Centre	UC	34	95.8	235	107
Yarner Wood	RU	---	29.4	59.3	---
N Ireland					
Belfast Centre	UC	32	94.8	170	92
Derry	UB	17	95.4	96	61
Scotland					
Aberdeen	UB	31	88.4	170	92
Bush Estate	RU	---	22.1	57.2	---
Dumfries	RD	38	97.9	272	115
Edinburgh Centre	UC	---	45.8	142	---
Edinburgh St Leonards	UB	---	10.4	113	---
Glasgow Centre	UC	---	42.6	182	---
Glasgow City Chambers	UB	50	95.6	193	122
Glasgow Kerbside	KB	75	98.7	279	182
Grangemouth	I	22	99.3	145	77
Inverness	RD	23	98.3	130	84
Wales					
Aston Hill	RU	---	18.7	61.2	---
Cardiff Centre	UC	35	87.5	203	88
Cwmbran	UB	19	87.7	101	71
Narberth	RU	8.8	79.4	58.9	39.6
Port Talbot	UB	22	96.8	111	69
Swansea	UC	34	97.5	164	90
Wrexham	RD	26	97.6	107	78

iv) Exceedence Statistics- II

Site	Moderate band	Days	High band	Days	Very High band	Days	Air Quality Standard (Annual Mean)	Daughter Directive Hourly Mean and Air Quality Standard (Hourly Mean) >	Days
England									
Somerton	0	0	0	0	0	0	---	0	0
Southampton Centre	0	0	0	0	0	0	0	0	0
Southend-on-Sea	0	0	0	0	0	0	0	0	0
Southwark Roadside	0	0	0	0	0	0	1	2	2
St Osyth	0	0	0	0	0	0	0	0	0
Stockport Shaw Heath	0	0	0	0	0	0	0	1	1
Stockton-on-Tees Yarm	0	0	0	0	0	0	1	1	1
Stoke-on-Trent Centre	0	0	0	0	0	0	0	0	0
Thurrock	0	0	0	0	0	0	0	1	1
Tower Hamlets Roadside	0	0	0	0	0	0	1	6	3
Walsall Alumwell	0	0	0	0	0	0	1	0	0
Walsall Willenhall	0	0	0	0	0	0	0	0	0
West London	0	0	0	0	0	0	1	0	0
Wicken Fen	0	0	0	0	0	0	0	0	0
Wigan Leigh	0	0	0	0	0	0	0	0	0
Wirral Tranmere	0	0	0	0	0	0	0	0	0
Wolverhampton Centre	0	0	0	0	0	0	0	1	1
Yarner Wood	0	0	0	0	0	0	---	0	0
N Ireland									
Belfast Centre	0	0	0	0	0	0	0	0	0
Derry	0	0	0	0	0	0	0	0	0
Scotland									
Aberdeen	0	0	0	0	0	0	0	0	0
Bush Estate	0	0	0	0	0	0	---	0	0
Dumfries	0	0	0	0	0	0	0	2	2
Edinburgh Centre	0	0	0	0	0	0	---	0	0
Edinburgh St Leonards	0	0	0	0	0	0	---	0	0
Glasgow Centre	0	0	0	0	0	0	---	0	0
Glasgow City Chambers	0	0	0	0	0	0	1	0	0
Glasgow Kerbside	0	0	0	0	0	0	1	36	13
Grangemouth	0	0	0	0	0	0	0	0	0
Inverness	0	0	0	0	0	0	0	0	0
Wales									
Aston Hill	0	0	0	0	0	0	---	0	0
Cardiff Centre	0	0	0	0	0	0	0	1	1
Cwmbran	0	0	0	0	0	0	0	0	0
Narberth	0	0	0	0	0	0	0	0	0
Port Talbot	0	0	0	0	0	0	0	0	0
Swansea	0	0	0	0	0	0	0	0	0
Wrexham	0	0	0	0	0	0	0	0	0

12. NO_x- Measurement Sites, Instrumentation and Statistics

12.1 Measurement Method

The determination of oxides of nitrogen is based on the chemiluminescent energy emitted when nitric oxide (NO) is reacted with ozone (O₃) in an evacuated chamber to form chemiluminescent nitrogen dioxide (NO₂).

12.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ Ambirack NO₂
- ▶ API M200
- ▶ Environnement AC 31M
- ▶ Horiba APNA 360
- ▶ Monitor Labs 9841
- ▶ Rotork 447
- ▶ Thermo Electron 42

*Defra does not give approval or endorsement for any products or equipment

12.3 Data Quality Requirements of EC Directive 1999/30/EC

Uncertainty 15%
Minimum data capture 90%

12.4 Objectives and Bandings

Summary of objectives of the National Air Quality Strategy			
	Objective*	Measured as	To be achieved by
	30 µg/m ³	Annual Mean	31 December 2000

*Assuming NO_x is taken as NO₂

No bandings have yet been set for oxides of nitrogen

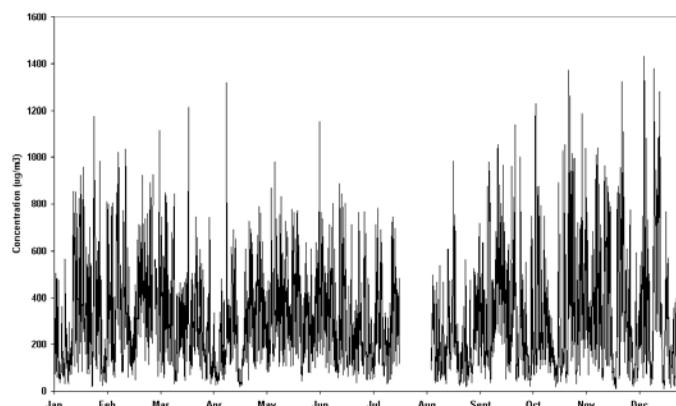
12.5 Site Locations

UK Automatic Nitrogen Oxides Monitoring Sites 2003

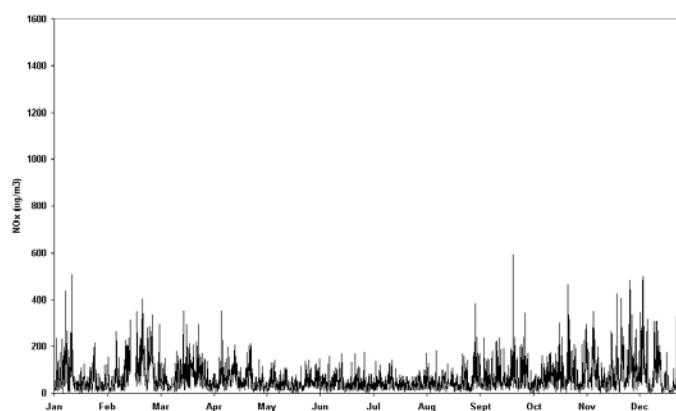


12.6 Hourly Average Concentrations

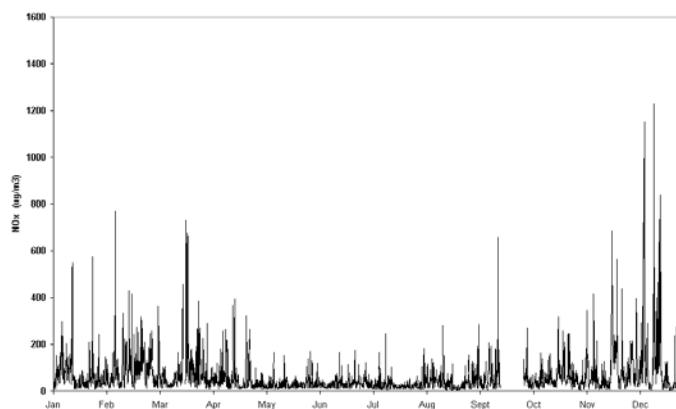
These figures show time series graphs of hourly average nitrogen oxides concentrations at four *typical* site types for 2003.



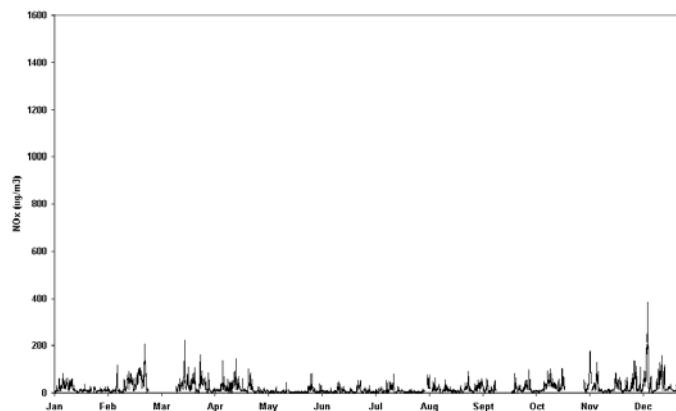
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Norwich)**



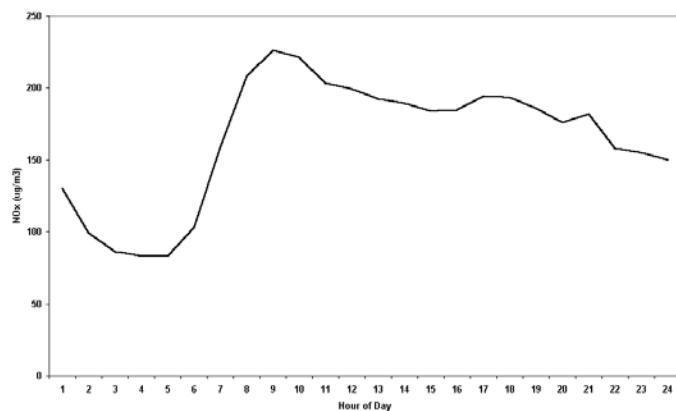
**Urban Background Site
(Birmingham East)**



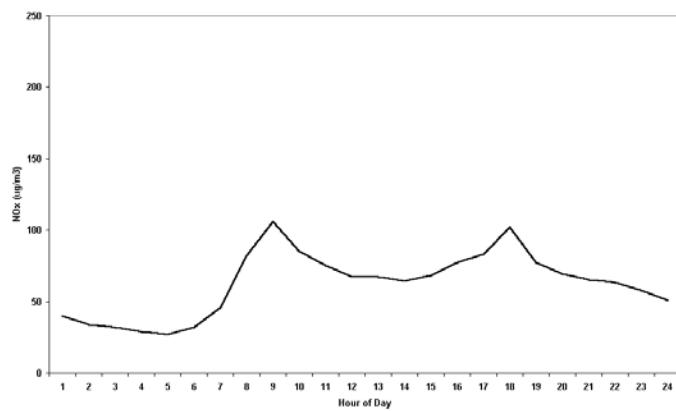
**Rural Site
(Harwell)**

12.7 Diurnal Variations

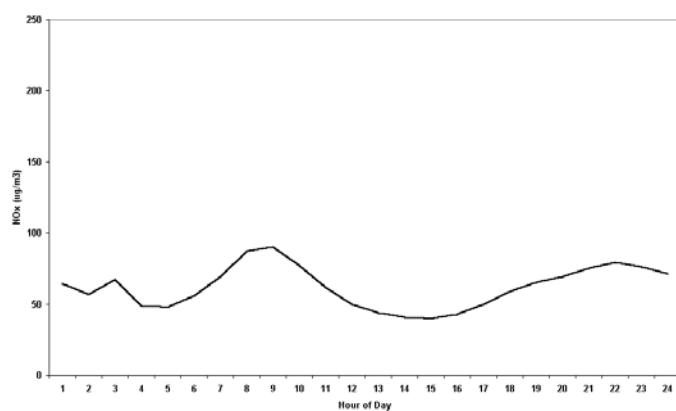
These figures show how nitrogen oxides concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



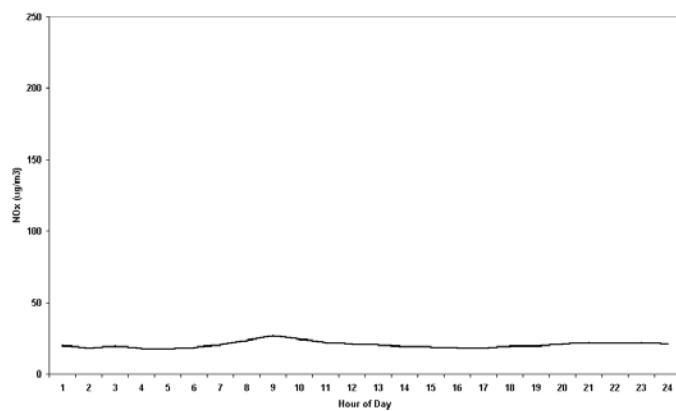
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Norwich)**



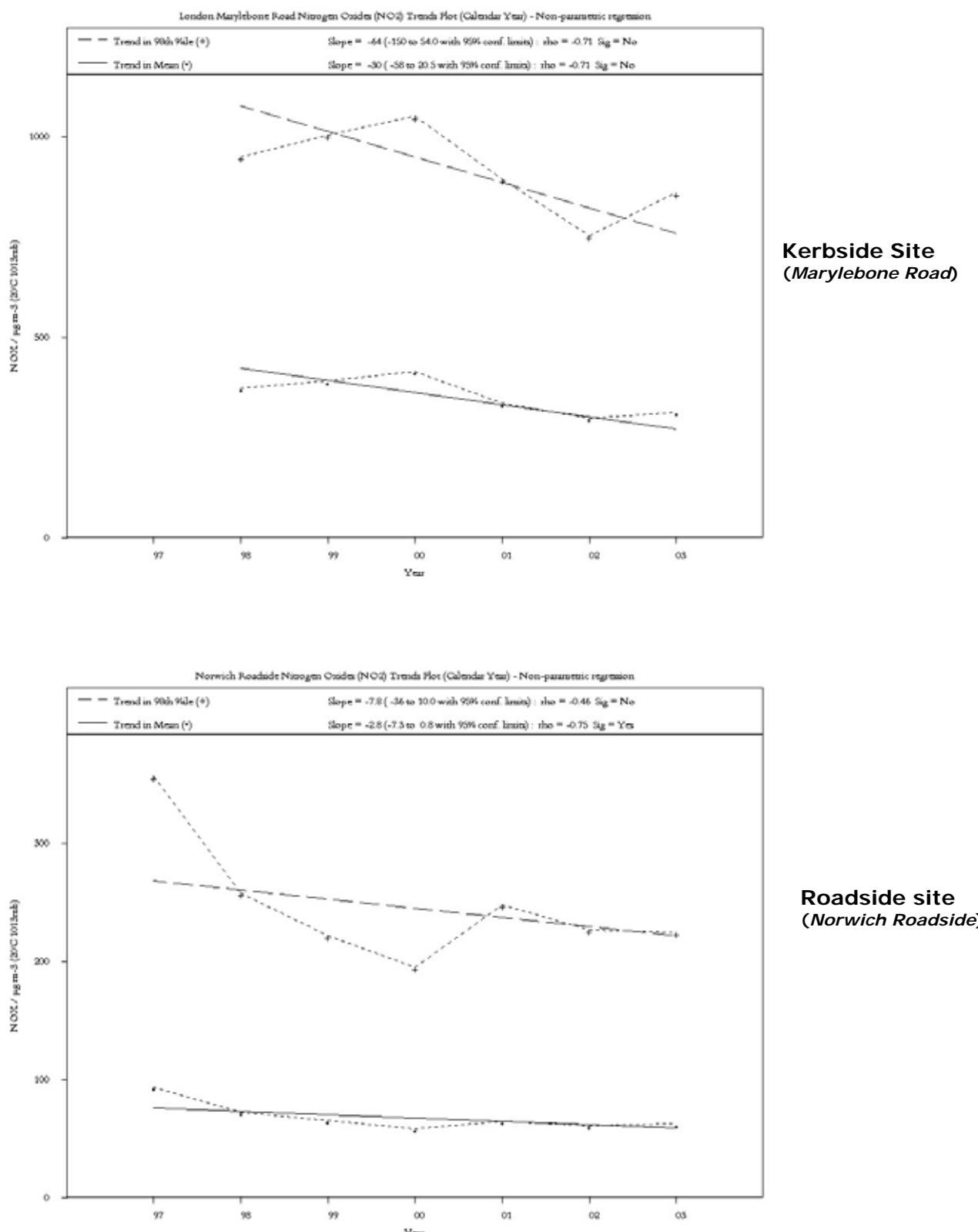
**Urban Background Site
(Birmingham East)**

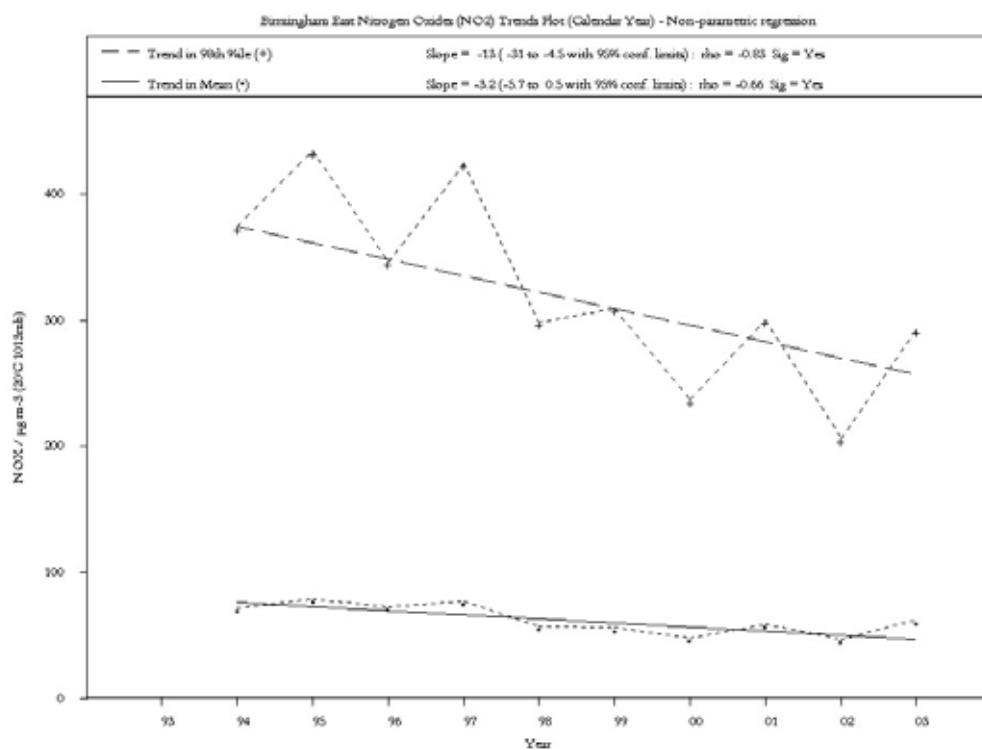


**Rural Site
(Harwell)**

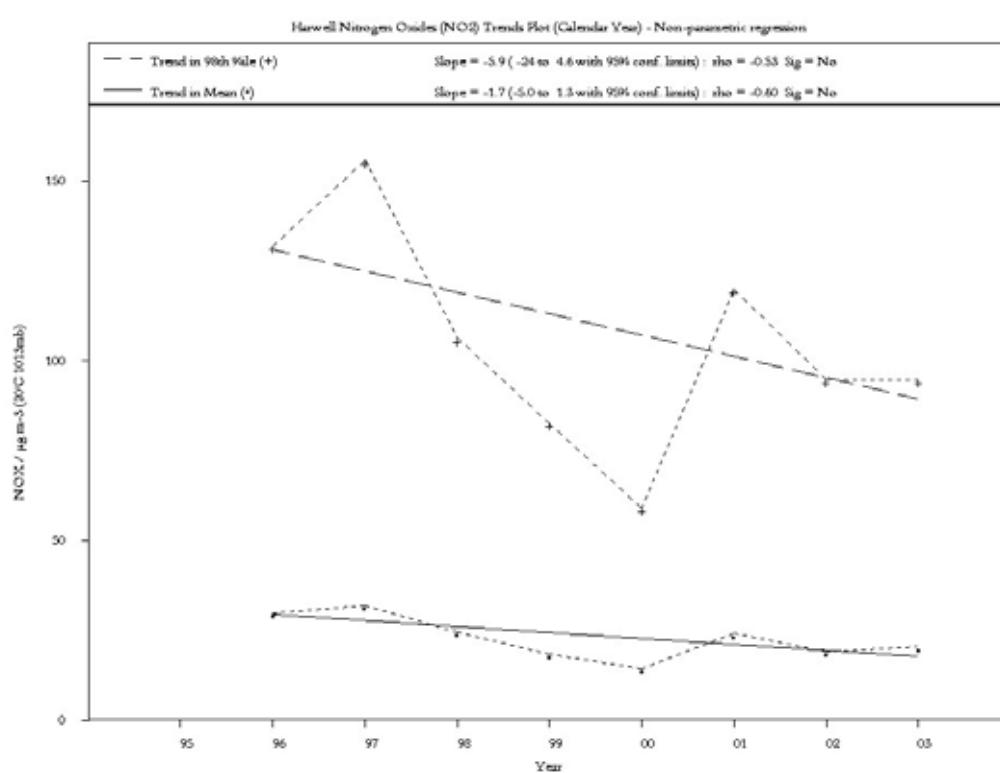
12.8 Trends in annual concentrations

Statistically significant trends in concentrations are shown for sites with at least ≥ 5 years of measurement.





**Urban Background Site
(Birmingham East)**



**Rural Site
(Harwell)**

12.9 Nitrogen Oxides Statistical Summary 2003

i) Annual Statistics- I

Site	Site Type	Annual average of hourly means $\mu\text{g}/\text{m}^3$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g}/\text{m}^3$
England				
Barnsley Gawber	UB	44	97.2	766
Bath Roadside	RD	167	94.5	858
Billingham	I	63	96.6	1096
Birmingham Centre	UC	62	87.6	647
Birmingham East	UB	62	93.0	1228
Blackpool	UB	39	93.7	707
Bolton	UB	64	97.9	1177
Bournemouth	UB	31	93.0	588
Bradford Centre	UC	87	93.6	1614
Brentford Roadside	RD	---	41.6	1408
Brighton Roadside	RD	90	86.6	1215
Bristol Centre	UC	103	87.5	1377
Bristol Old Market	RD	207	63.5	1303
Bury Roadside	RD	247	89.1	1293
Cambridge Roadside	RD	116	89.3	861
Camden Kerbside	KB	---	43.6	1087
Canterbury	UB	34	99.0	499
Coventry Memorial Park	UB	37	87.4	558
Exeter Roadside	RD	102	95.3	995
Haringey Roadside	RD	116	87.9	1014
Harwell	RU	20.4	87.1	384.7
High Muffles	RU	---	18.5	195.0
Hove Roadside	RD	71	96.2	953
Hull Freetown	UC	58	93.7	642
Ladybower	RU	15.0	97.8	219.3
Leamington Spa	UB	60	66.5	907
Leeds Centre	UC	86	86.2	1188
Leicester Centre	UC	68	93.4	900
Liverpool Speke	UB	48	56.9	697
London A3 Roadside	RD	192	80.3	1522
London Bexley	SU	67	88.6	926
London Bloomsbury	UC	110	95.0	844
London Brent	UB	60	95.1	1411
London Bromley	RD	81	97.4	798
London Cromwell Road 2	RD	192	93.3	873
London Eltham	SU	59	97.6	674
London Hackney	UC	107	91.2	1564
London Hillingdon	SU	129	82.6	1398
London Lewisham	UC	118	99.6	1394
London Marylebone Road	KB	314	93.7	1431
London N. Kensington	UB	74	94.1	890
London Southwark	UC	87	73.2	775
London Teddington	UB	43.9	95.6	629.9
London Wandsworth	UC	121	91.3	1029
London Westminster	UB	83	68.9	504
Lullingstone Heath	RU	15.3	88.3	182.0
Manchester Piccadilly	UC	86	97.8	1669
Manchester South	SU	39	98.4	628
Manchester Town Hall	UB	75	98.6	955
Market Harborough	RU	---	5.3	241.6
Middlesbrough	I	41	92.6	659
Newcastle Centre	UC	57	92.7	712
Northampton	UB	39	99.3	441
Norwich Centre	UC	42	94.4	613
Norwich Roadside	RD	62	97.9	592
Nottingham Centre	UC	65	78.7	691
Oxford Centre	RD	213	98.2	1427
Plymouth Centre	UC	45	91.7	787
Portsmouth	UB	41	95.2	900
Preston	UB	50	93.2	562
Reading	UB	---	9.2	481
Reading New Town	UB	---	20.4	1247
Redcar	SU	35	96.4	544
Rochester	RU	30.5	98.1	363.7
Rotherham Centre	UC	76	96.7	987
Salford Eccles	I	79	96.3	1199
Sandwell West Bromwich	UB	66	85.7	930

KB=kerbside, RD=roadside, UC=urban centre, UB= urban background, SU=suburban, I=industrial, RU=rural

ii) Exceedence Statistics- I

Site	Daughter Directive Ecosystem and Air Quality Standard (Annual Mean)
England	
Barnsley Gawber	1
Bath Roadside	1
Billingham	1
Birmingham Centre	1
Birmingham East	1
Blackpool	1
Bolton	1
Bournemouth	1
Bradford Centre	1
Brentford Roadside	---
Brighton Roadside	1
Bristol Centre	1
Bristol Old Market	1
Bury Roadside	1
Cambridge Roadside	1
Camden Kerbside	---
Canterbury	1
Coventry Memorial Park	1
Exeter Roadside	1
Haringey Roadside	1
Harwell	0
High Muffles	---
Hove Roadside	1
Hull Freetown	1
Ladybower	0
Leamington Spa	1
Leeds Centre	1
Leicester Centre	1
Liverpool Speke	1
London A3 Roadside	1
London Bexley	1
London Bloomsbury	1
London Brent	1
London Bromley	1
London Cromwell Road 2	1
London Eltham	1
London Hackney	1
London Hillingdon	1
London Lewisham	1
London Marylebone Road	1
London N. Kensington	1
London Southwark	1
London Teddington	1
London Wandsworth	1
London Westminster	1
Lullingston Heath	0
Manchester Piccadilly	1
Manchester South	1
Manchester Town Hall	1
Market Harborough	---
Middlesbrough	1
Newcastle Centre	1
Northampton	1
Norwich Centre	1
Norwich Roadside	1
Nottingham Centre	1
Oxford Centre	1
Plymouth Centre	1
Portsmouth	1
Preston	1
Reading	---
Reading New Town	---
Redcar	1
Rochester	1
Rotherham Centre	1
Salford Eccles	1
Sandwell West Bromwich	1

iii) Annual Statistics- II

Site	Site Type	Annual average of hourly means µg/m³	Annual data capture of hourly means %	Maximum hourly mean µg/m³
England				
Sheffield Centre	UC	87	94.8	1383
Sheffield Tinsley	I	104	96.6	1142
Somerton	RU	---	40.4	192.2
Southampton Centre	UC	74	95.0	814
Southend-on-Sea	UB	40	82.6	646
Southwark Roadside	RD	159	91.2	1356
St Osyth	RU	23.1	93.4	334.4
Stockport Shaw Heath	UB	66	98.2	1073
Stockton-on-Tees Yarm	RD	139	88.9	1690
Stoke-on-Trent Centre	UC	59	94.6	1066
Thurrock	UB	68	93.5	1178
Tower Hamlets Roadside	RD	182	97.5	1083
Walsall Alumwell	UB	82	95.3	1450
Walsall Willenhall	SU	53	97.3	1436
West London	UB	92	96.4	823
Wicken Fen	RU	23.9	59.8	277.3
Wigan Leigh	UB	66	92.3	806
Wirral Tranmere	UB	42	95.6	575
Wolverhampton Centre	UC	65	95.8	1421
Yarner Wood	RU	---	29.4	90.3
N Ireland				
Belfast Centre	UC	59	94.8	1066
Derry	UB	25	95.4	573
Scotland				
Aberdeen	UB	53	88.4	753
Bush Estate	RU	---	22.1	128.0
Dumfries	RD	100	97.9	844
Edinburgh Centre	UC	---	45.8	604
Edinburgh St Leonards	UB	---	10.4	510
Glasgow Centre	UC	---	42.6	1104
Glasgow City Chambers	UB	104	95.6	961
Glasgow Kerbside	KB	294	98.7	1904
Grangemouth	I	39	99.3	869
Inverness	RD	51	98.3	562
Wales				
Aston Hill	RU	---	18.7	104.3
Cardiff Centre	UC	61	87.5	634
Cwmbran	UB	29	87.7	607
Narberth	RU	10.5	79.4	92.4
Port Talbot	UB	35	96.8	472
Swansea	UC	73	97.5	858
Wrexham	RD	51	97.6	516

iv) Exceedence Statistics- II

Site	Daughter Directive Ecosystem and Air Quality Standard (Annual Mean)³
England	
Sheffield Centre	1
Sheffield Tinsley	1
Somerton	---
Southampton Centre	1
Southend-on-Sea	1
Southwark Roadside	1
St Osyth	0
Stockport Shaw Heath	1
Stockton-on-Tees Yarm	1
Stoke-on-Trent Centre	1
Thurrock	1
Tower Hamlets Roadside	1
Walsall Alumwell	1
Walsall Willenhall	1
West London	1
Wickern Fen	0
Wigan Leigh	1
Wirral Tranmere	1
Wolverhampton Centre	1
Yarner Wood	---
N Ireland	
Belfast Centre	1
Derry	0
Scotland	
Aberdeen	1
Bush Estate	---
Dumfries	1
Edinburgh Centre	---
Edinburgh St Leonards	---
Glasgow Centre	---
Glasgow City Chambers	1
Glasgow Kerbside	1
Grangemouth	1
Inverness	1
Wales	
Aston Hill	---
Cardiff Centre	1
Cwmbran	0
Narberth	0
Port Talbot	1
Swansea	1
Wrexham	1

13. PM₁₀ - Measurement Sites, Instrumentation and Statistics

13.1 Measurement Method

The tapered element oscillating microbalance (TEOM) system determines particulate concentration by continuously weighing particles deposited on a filter.

The beta-gauge (BAM) monitor consists of a paper band filter located between a source of beta rays and a radiation detector. A pump draws ambient air through the filter and the reduction in intensity of beta-radiation measured at the detector is proportional to the mass of particulate deposited on the filter.

13.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ R&P TEOM 1400
- ▶ Met One BAM 1020

*Defra does not give approval or endorsement for any products or equipment

13.3 Data Quality Requirements of EC Directive 1999/30/EC

Uncertainty 25%

Minimum data capture 90%

13.4 Objectives and Bandings

Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
PM ₁₀	200 µg/m ³ Not to be exceeded more than 18 times per year	1 Hour Mean	31 December 2005
	40 µg/m ³	Annual Mean	31 December 2005

Air Quality Bands and Index Values		
Band	Index	PM10µgm-3 (TEOM)
<i>Low</i>	1	0-16
	2	17-32
	3	33-49
<i>Moderate</i>	4	50-57
	5	58-66
	6	67-75
<i>High</i>	7	75-82
	8	83-91
	9	92-99
<i>Very High</i>	10	100 or more

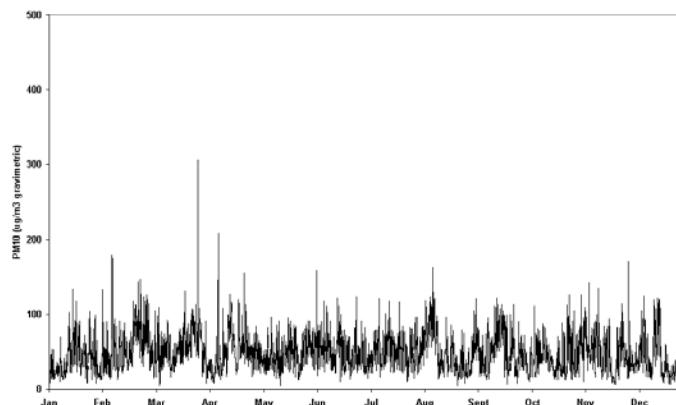
13.5 Site Locations

UK Automatic PM₁₀ Monitoring Sites 2003

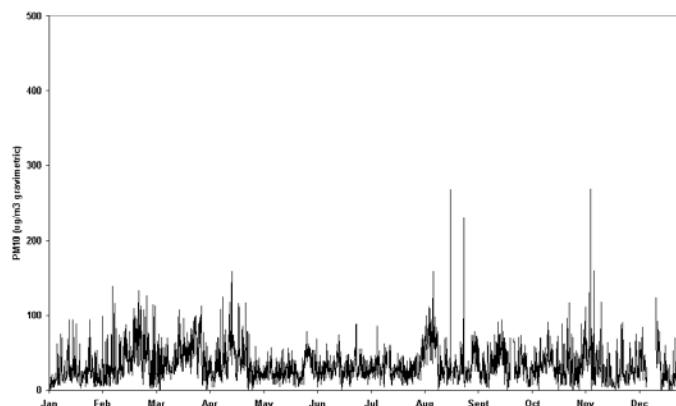


13.6 Hourly Average Concentrations

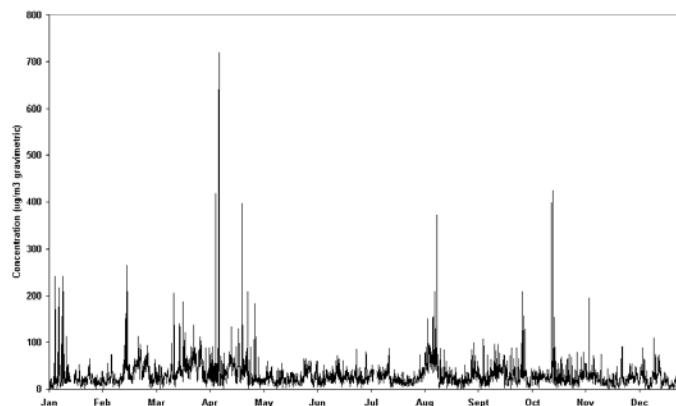
These figures show time series graphs of hourly average PM₁₀ concentrations at four *typical* site types for 2003. Units are gravimetric equivalent (TEOM*1.3).



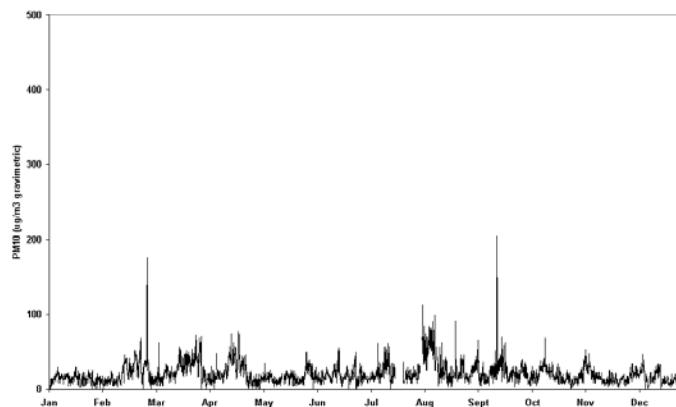
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(London A3)**



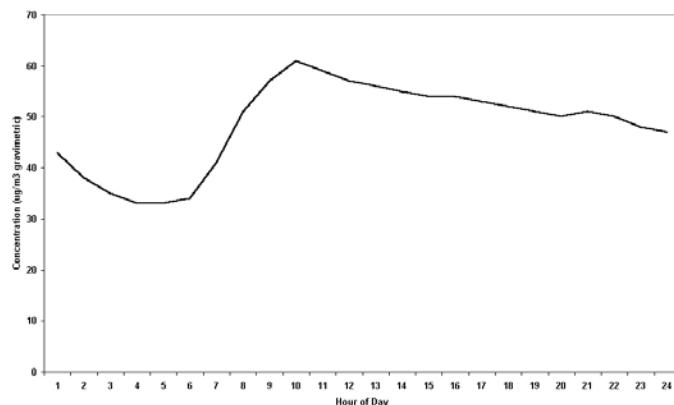
**Urban Background Site
(Thurrock)**



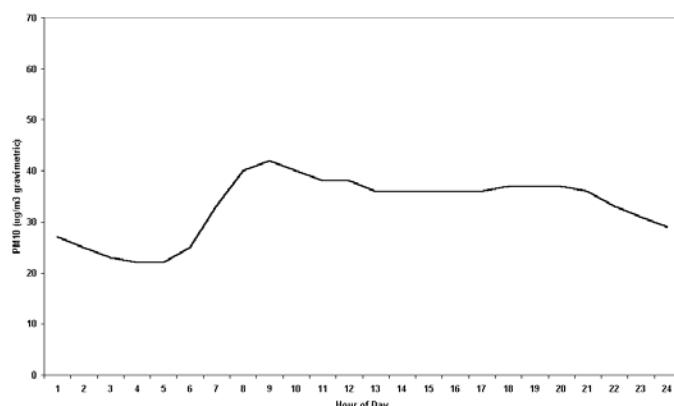
**Rural Site
(Harwell)**

13.7 Diurnal Variations

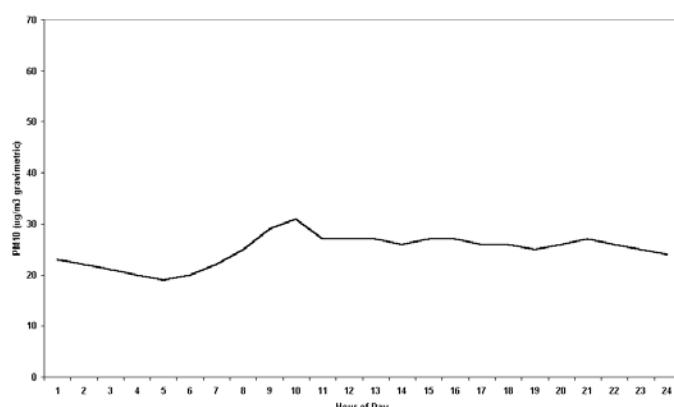
These figures show how PM₁₀ concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



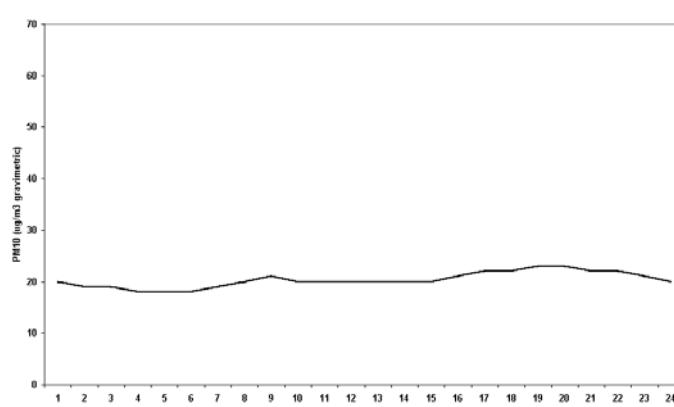
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(London A3)**

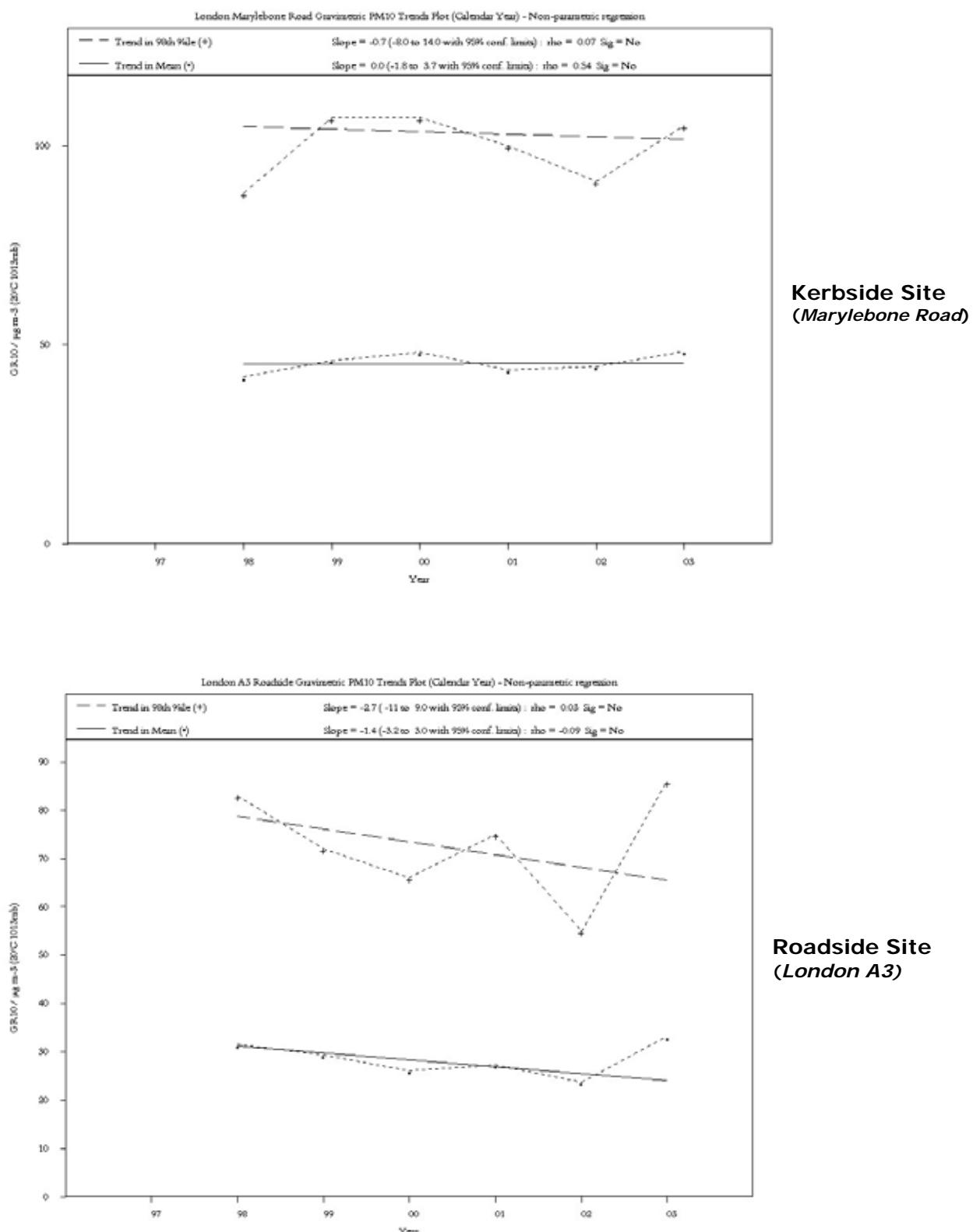


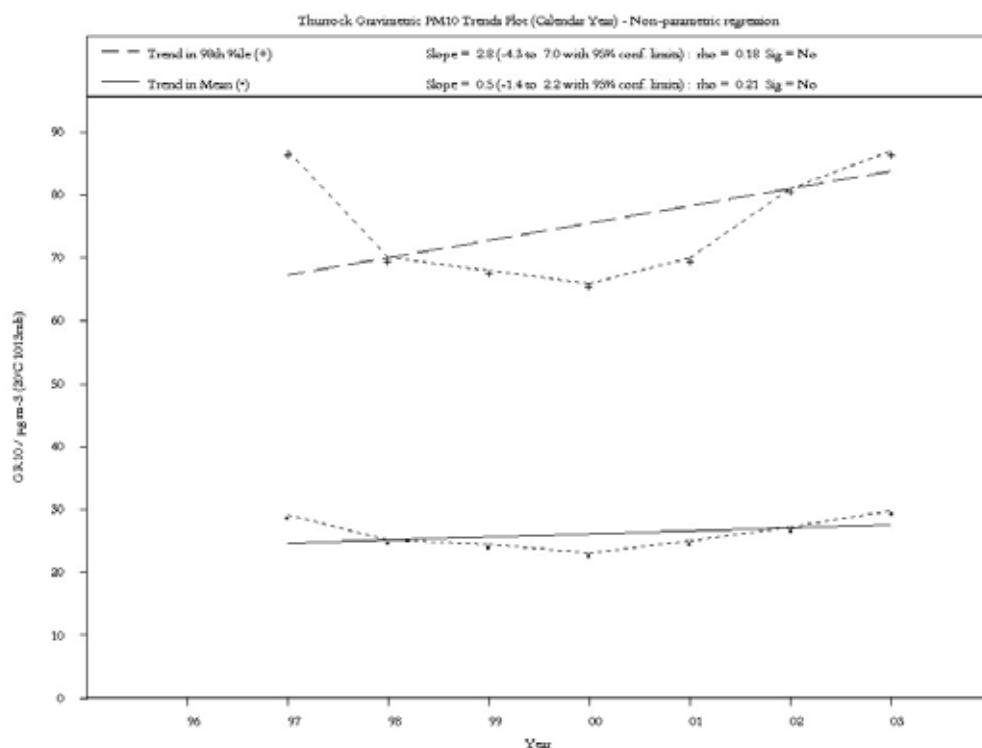
**Urban Background Site
(Thurrock)**



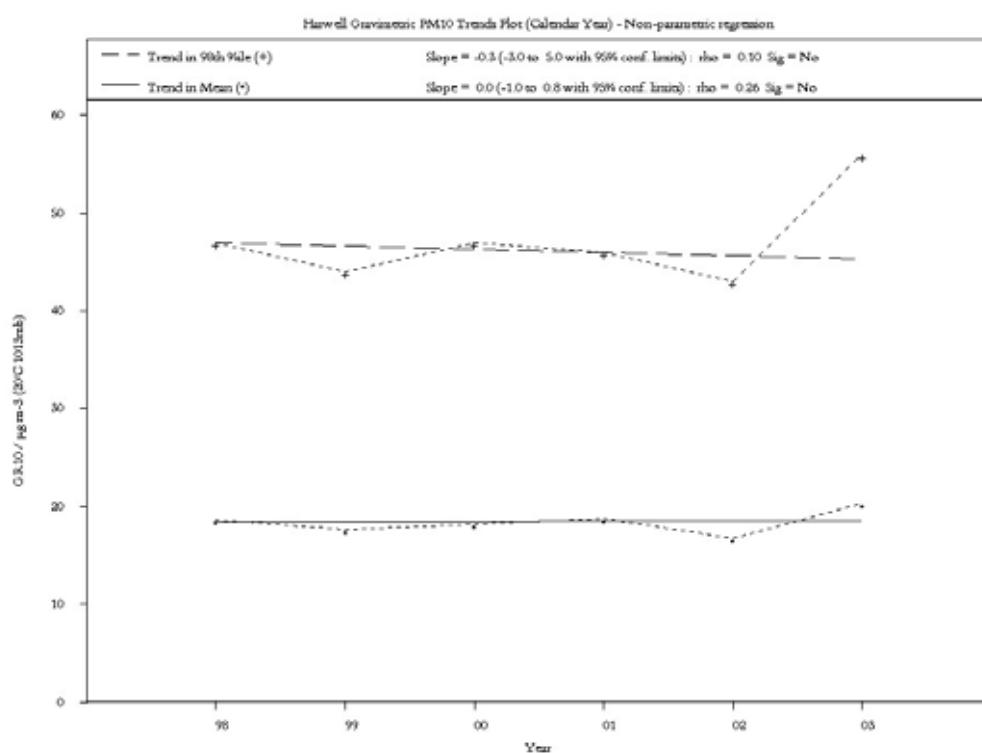
**Rural Site
(Harwell)**

13.8 Trends in annual concentrations





**Urban
Background Site
(Thurrock)**



**Rural Site
(Harwell)**

13.9 PM₁₀ Statistical Summary 2003

i) Annual Statistics- I

Site	Site Type	Annual average of hourly means µg/m ³	Annual data capture of hourly means %	Maximum hourly mean µg/m ³	Maximum running 24-hour mean µg/m ³	Date of maximum running 24-hour mean	90%ile of daily means µg/m ³	98%ile of daily means µg/m ³
57England								
Birmingham Centre	UC	19	85.7	196	66	01/10/2003	35	54
Birmingham East	UB	---	29.0	124	46	10/12/2003	---	---
Blackpool	UB	20	96.3	117	57	29/03/2003	35	51
Bolton	UB	18	98.1	360	63	29/03/2003	32	50
Bournemouth		27 *	93.4	---	---	---	---	---
Bradford Centre	UC	21	96.6	186	73	29/03/2003	39	61
Brighton Roadside PM10		36 *	75.1	---	---	---	---	---
Bristol Centre	UC	22	93.2	108	65	19/12/2003	42	62
Bury Roadside	RD	27	97.4	257	75	30/11/2003	48	70
Camden Kerbside	KB	27	99.0	206	74	09/08/2003	46	64
Canterbury	UB	20	99.3	116	58	11/08/2003	34	51
Coventry Memorial Park	UB	14	81.6	84	55	21/04/2003	27	44
Haringey Roadside	RD	22	97.9	190	61	23/02/2003	40	57
Harwell	RU	16	97.5	157	56	09/08/2003	28	43
Hull Freetown	UC	22	88.7	141	63	16/04/2003	40	59
Leamington Spa	UB	21	85.8	654	104	25/03/2003	34	61
Leeds Centre	UC	21	97.1	216	73	29/03/2003	39	61
Leicester Centre	UC	19	88.8	544	98	10/11/2003	34	50
Liverpool Speke	UB	19	56.9	202	55	09/08/2003	33	52
London A3 Roadside	RD	26	96.5	208	67	26/03/2003	47	66
London Bexley	SU	21	96.5	355	61	26/03/2003	39	60
London Bloomsbury	UC	23	58.2	231	68	09/08/2003	38	58
London Brent	UB	20	95.6	195	63	23/02/2003	37	54
London Eltham	SU	21	99.1	421	88	06/12/2003	38	59
London Hillingdon	SU	23	88.9	116	62	09/08/2003	43	62
London Marylebone Road	KB	37	98.7	235	78	09/08/2003	62	81
London N. Kensington	UB	22	98.4	145	64	09/08/2003	39	58
London Westminster		35 *	64.4	---	---	---	---	---
Manchester Piccadilly	UC	22	98.0	190	67	29/03/2003	40	62
Middlesbrough	I	21	85.5	632	118	15/07/2003	40	80
Newcastle Centre	UC	16	96.2	94	55	16/04/2003	31	45
Northampton	UB	17	99.4	89	64	09/08/2003	30	45
Northampton PM10		26 *	61.9	---	---	---	---	---
Norwich Centre	UC	18	96.9	105	58	20/04/2003	32	46
Nottingham Centre	UC	20	91.0	121	62	10/08/2003	36	54
Plymouth Centre	UC	17	97.7	74	59	09/08/2003	31	45
Portsmouth	UB	18	97.0	124	54	10/08/2003	31	46
Preston	UB	16	96.7	198	71	19/03/2003	31	48
Reading	UB	---	9.2	53	28	12/01/2003	---	---
Reading New Town	UB	---	20.4	85	43	19/12/2003	---	---
Redcar	SU	21	97.9	170	94	16/04/2003	38	61
Rochester	RU	19	76.4	324	67	21/08/2003	33	52
Salford Eccles	I	18	96.1	137	62	21/04/2003	34	53
Scunthorpe	I	30	98.8	357	121	18/04/2003	67	106
Sheffield Centre	UC	21	97.6	171	90	28/02/2003	41	64
Southampton Centre	UC	21	91.3	188	59	26/03/2003	37	53
Southend-on-Sea	UB	16	83.5	118	55	09/08/2003	31	47
Stockport Shaw Heath	UB	15	98.8	184	54	29/03/2003	28	42
Stockton-on-Tees Yarm	RD	25	96.0	204	78	27/02/2003	45	70
Stoke-on-Trent Centre	UC	13	56.3	76	54	29/03/2003	27	43
Thurrock	UB	23	98.1	554	117	09/04/2003	41	67
Wigan Leigh	UB	20	97.9	142	61	29/03/2003	36	56
Wirral Tranmere	UB	16	97.0	118	59	21/04/2003	31	47
Wolverhampton Centre	UC	19	98.2	131	62	29/03/2003	35	56
N Ireland								
Belfast Centre	UC	19	97.3	507	88	05/09/2003	37	61
Belfast Clara St	SU	22 *	94.7	442 *	128 *	28/03/2003	54	95
Derry	UB	18	97.2	218	69	18/03/2003	34	60
Lough Navar	RE	12	98.5	112	43	21/04/2003	22	34

KB=kerbside, RD=roadside, UC=urban centre, UB= urban background, SU=suburban, I=industrial, RU=rural, RE=remote

* these data are in gravimetric units

ii) Exceedence Statistics- I

Site	Moderate band	Days	High band	Days	Very High band	Days	Daughter Directive Limit Value Daily Mean and Air Quality Standard (Daily Mean)	Days	Daughter Directive Limit Value Annual Mean and Air Quality Standard (Annual Mean)	Annual Mean Standard (Scotland)
England										
Birmingham Centre	115	11	0	0	0	0	15	15	0	1
Birmingham East	0	0	0	0	0	0	0	0	---	---
Blackpool	52	5	0	0	0	0	15	15	0	1
Bolton	38	3	0	0	0	0	15	15	0	1
Bournemouth	-	-	-	-	-	-	28	28	0	1
Bradford Centre	255	18	0	0	0	0	30	30	0	1
Brighton Roadside PM10	-	-	-	-	-	-	34	34	0	1
Bristol Centre	216	16	0	0	0	0	37	37	0	1
Bury Roadside	507	37	3	2	0	0	54	54	0	1
Camden Kerbside	303	23	0	0	0	0	47	47	0	1
Canterbury	86	8	0	0	0	0	17	17	0	1
Coventry Memorial Park	28	3	0	0	0	0	5	5	0	1
Haringey Roadside	201	19	0	0	0	0	34	34	0	1
Harwell	63	4	0	0	0	0	7	7	0	1
Hull Freetown	232	16	0	0	0	0	25	25	0	1
Leamington Spa	95	13	73	7	1	1	19	19	0	1
Leeds Centre	265	20	0	0	0	0	28	28	0	1
Leicester Centre	78	11	21	2	0	0	15	15	0	1
Liverpool Speke	33	3	0	0	0	0	8	8	0	1
London A3 Roadside	396	31	0	0	0	0	42	42	0	1
London Bexley	285	25	0	0	0	0	33	33	0	1
London Bloomsbury	129	10	0	0	0	0	14	14	0	1
London Brent	139	12	0	0	0	0	24	24	0	1
London Eltham	273	22	19	1	0	0	25	25	0	1
London Hillingdon	258	19	0	0	0	0	32	32	0	1
London Marylebone Rd	1387	101	20	3	0	0	161	161	1	1
London N. Kensington	262	19	0	0	0	0	29	29	0	1
London Westminster	-	-	-	-	-	-	35	35	0	1
Manchester Piccadilly	236	22	0	0	0	0	33	33	0	1
Middlesbrough	337	31	53	6	24	3	32	32	0	1
Newcastle Centre	36	2	0	0	0	0	8	8	0	1
Northampton	65	5	0	0	0	0	9	9	0	1
Northampton PM10	-	-	-	-	-	-	20	20	0	1
Norwich Centre	15	2	0	0	0	0	9	9	0	1
Nottingham Centre	64	5	0	0	0	0	23	23	0	1
Plymouth Centre	34	2	0	0	0	0	6	6	0	1
Portsmouth	46	7	0	0	0	0	8	8	0	1
Preston	50	4	0	0	0	0	12	12	0	1
Reading	0	0	0	0	0	0	0	0	---	---
Reading New Town	0	0	0	0	0	0	1	1	---	---
Redcar	157	13	25	2	0	0	19	19	0	1
Rochester	116	9	0	0	0	0	15	15	0	1
Salford Eccles	79	8	0	0	0	0	17	17	0	1
Scunthorpe	1113	89	274	27	89	5	95	95	0	1
Sheffield Centre	309	21	26	3	0	0	31	31	0	1
Southampton Centre	69	6	0	0	0	0	14	14	0	1
Southend-on-Sea	52	6	0	0	0	0	13	13	0	1
Stockport Shaw Heath	14	2	0	0	0	0	6	6	0	1
Stockton-on-Tees Yarm	495	35	16	1	0	0	46	46	0	1
Stoke-on-Trent Centre	11	1	0	0	0	0	4	4	0	0
Thurrock	378	30	19	4	21	2	38	38	0	1
Wigan Leigh	109	12	0	0	0	0	25	25	0	1
Wirral Tranmere	26	3	0	0	0	0	10	10	0	1
Wolverhampton Centre	153	14	0	0	0	0	21	21	0	1
N Ireland										
Belfast Centre	152	15	7	1	0	0	26	26	0	1
Belfast Clara St	593	49	219	18	48	4	34	34	0	1
Derry	140	12	0	0	0	0	20	20	0	1
Lough Navar	0	0	0	0	0	0	1	1	0	0

iii) Annual Statistics- II

Site	Site Type	Annual average of hourly means µg/m³	Annual data capture of hourly means %	Maximum hourly mean µg/m³	Maximum running 24-hour mean µg/m³	Date of maximum running 24-hour mean	90%ile of daily means µg/m³	98%ile of daily means µg/m³
Scotland								
Aberdeen	UB	17	98.4	249	77	28/02/2003	33	54
Dumfries		23 *	93.4	---	---	---	---	---
Edinburgh Centre	UC	---	44.1	106	67	22/04/2003	---	---
Edinburgh St Leonards	UB	---	3.4	46	27	31/12/2003	---	---
Glasgow Centre	UC	16	96.2	99	54	19/03/2003	32	49
Glasgow Kerbside	KB	24	93.1	371	98	21/02/2003	51	84
Grangemouth	I	15	98.2	107	62	19/03/2003	28	45
Inverness		17 *	93.4	---	---	---	---	---
Wales								
Cardiff Centre	UC	27	89.6	844	126	21/01/2003	45	77
Cwmbran	UB	16	99.2	99	49	21/04/2003	29	41
Narberth	RU	17	59.0	213	67	26/03/2003	32	49
Port Talbot	UB	24	98.4	340	75	23/04/2003	46	77
Swansea	UC	19	97.8	358	52	18/04/2003	34	49
Wrexham		26 *	86.6	---	---	---	---	---

iv) Exceedence Statistics- II

Site	Moderate band	Days	High band	Days	Very High band	Days	Daughter Directive Limit Value Daily Mean and Air Quality Standard (Daily Mean)	Days	Daughter Directive Limit Value Annual Mean and Air Quality Standard (Annual Mean)	Annual Mean Standard (Scotland)
Scotland										
Aberdeen	137	9	5	1	0	0	14	14	0	1
Dumfries	-	-	-	-	-	-	22	22	0	1
Edinburgh Centre	44	4	0	0	0	0	5	5	---	---
Edinburgh St Leonards	0	0	0	0	0	0	0	0	---	---
Glasgow Centre	51	4	0	0	0	0	13	13	0	1
Glasgow Kerbside	481	37	100	8	0	0	47	47	0	1
Grangemouth	64	6	0	0	0	0	11	11	0	1
Inverness	-	-	-	-	-	-	10	10	0	0
Wales										
Cardiff Centre	370	34	42	5	23	2	53	53	0	1
Cwmbran	0	0	0	0	0	0	4	4	0	1
Narberth	52	4	0	0	0	0	10	10	0	1
Port Talbot	366	32	3	1	0	0	43	43	0	1
Swansea	22	3	0	0	0	0	11	11	0	1
Wrexham	-	-	-	-	-	-	38	38	0	1

14. PM_{2.5} - Measurement Sites, Instrumentation and Statistics

14.1 Measurement Method

The tapered element oscillating microbalance (TEOM) system determines particulate concentration by continuously weighing particles deposited on a filter.

14.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ R&P TEOM 1400

*Defra does not give approval or endorsement for any products or equipment

14.3 Data Quality Requirements of EC Directive 1999/30/EC

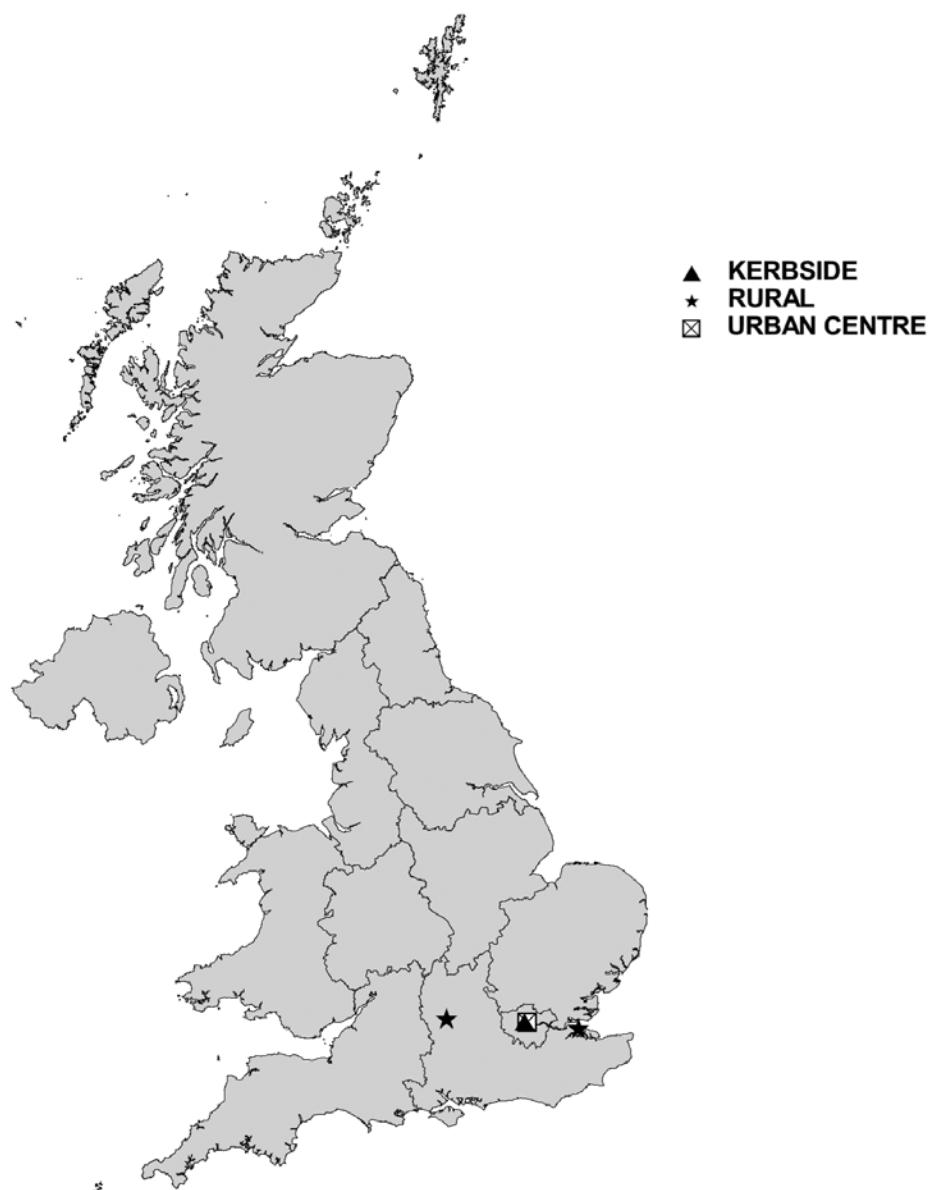
Uncertainty 25%
Minimum data capture 90%

14.4 Objectives and Bandings

No Objectives or Bandings have yet been set for PM_{2.5}

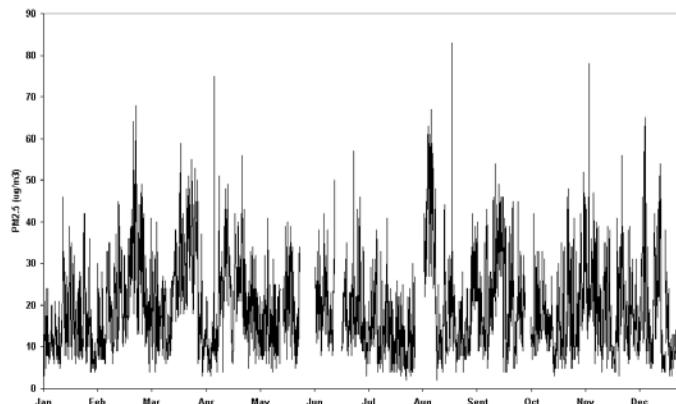
14.5 Site Locations

UK Automatic PM_{2.5} Monitoring Sites 2003

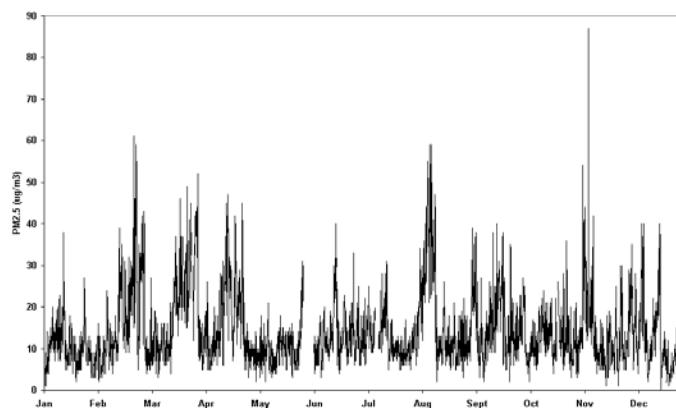


14.6 Hourly Average Concentrations

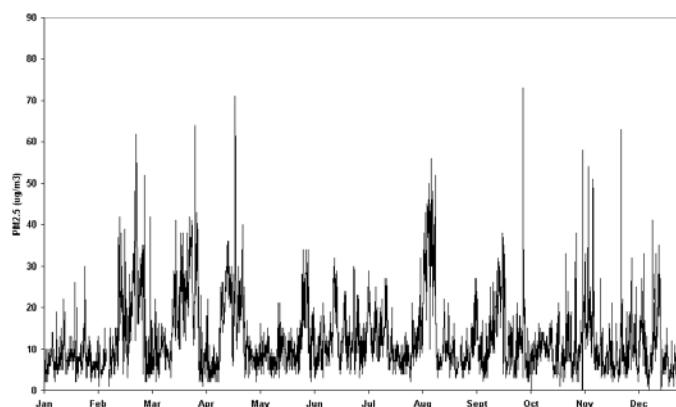
These figures show time series graphs of hourly average PM_{2.5} concentrations at four *typical* site types for 2003.



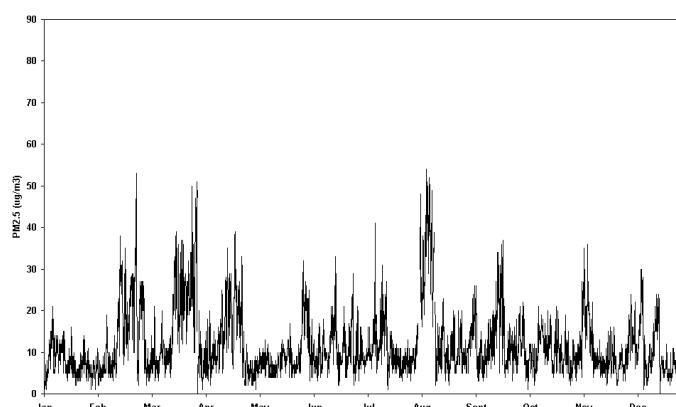
Kerbside Site
(London Marylebone Road)



Urban Centre Site
(London Bloomsbury)



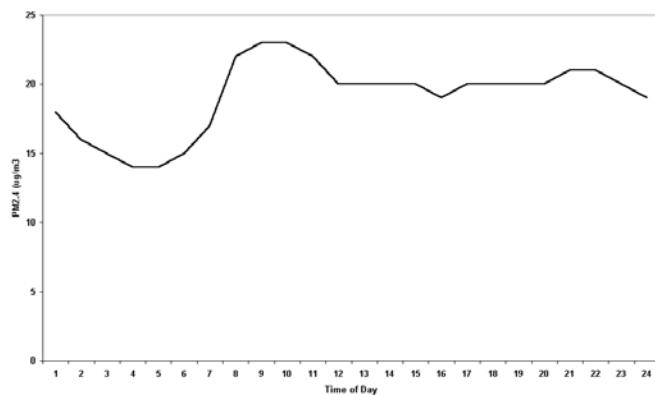
Rural Site
(Rochester)



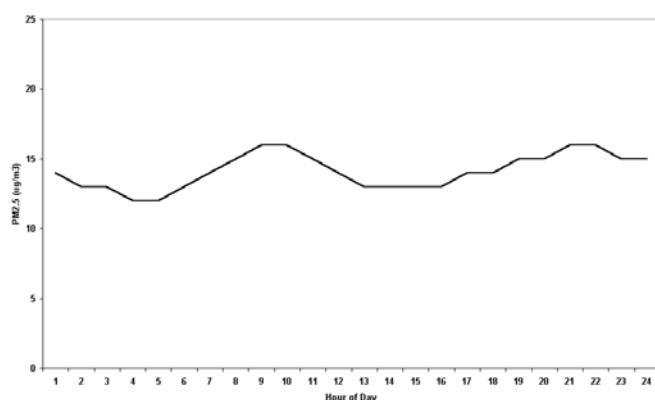
Rural Site
(Harwell)

14.7 Diurnal Variations

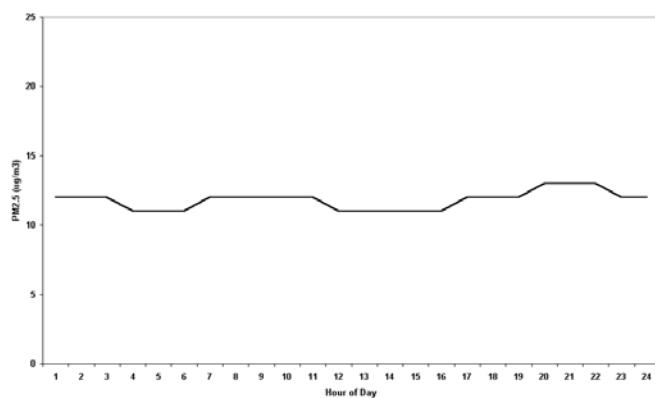
These figures show how PM_{2.5} concentrations vary on average for each hour of day during 2003, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



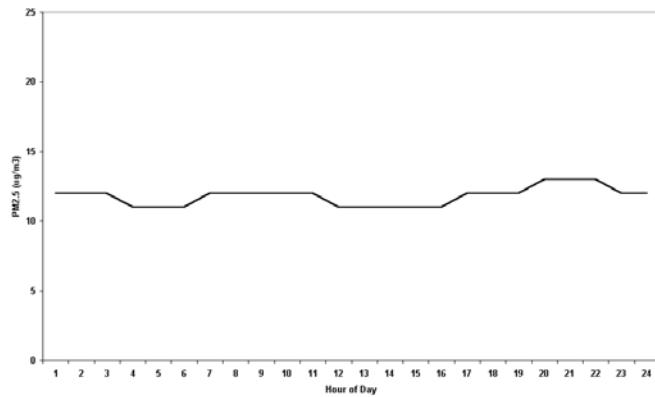
Kerbside Site
(Marylebone Road)



Urban Centre Site
(London Bloomsbury)

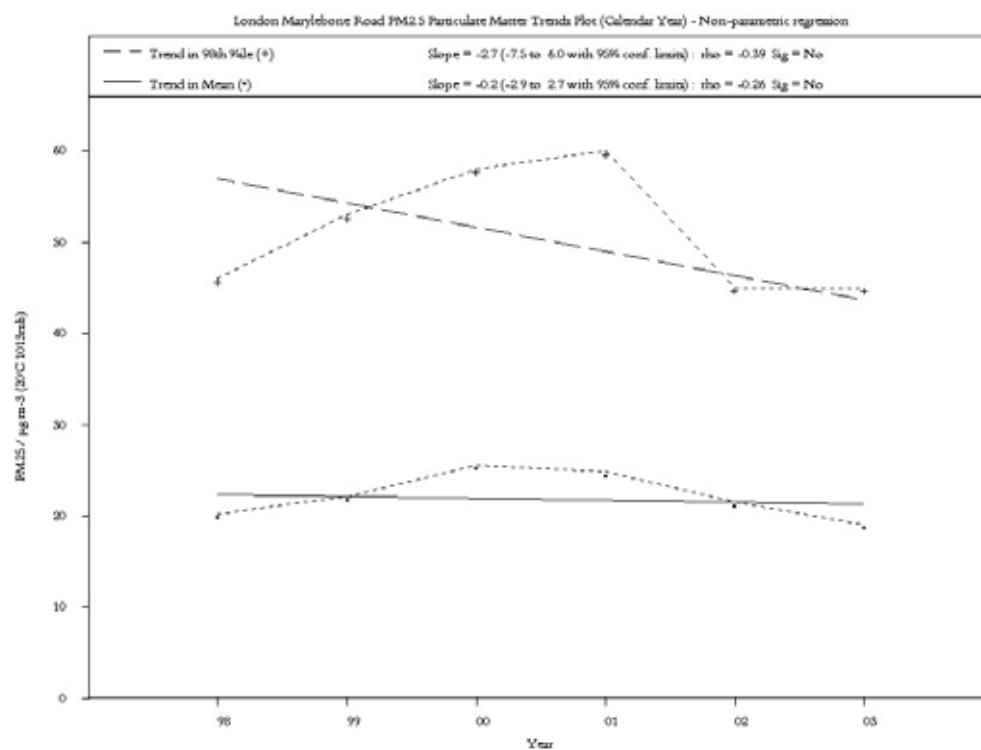


Rural Site
(Rochester)

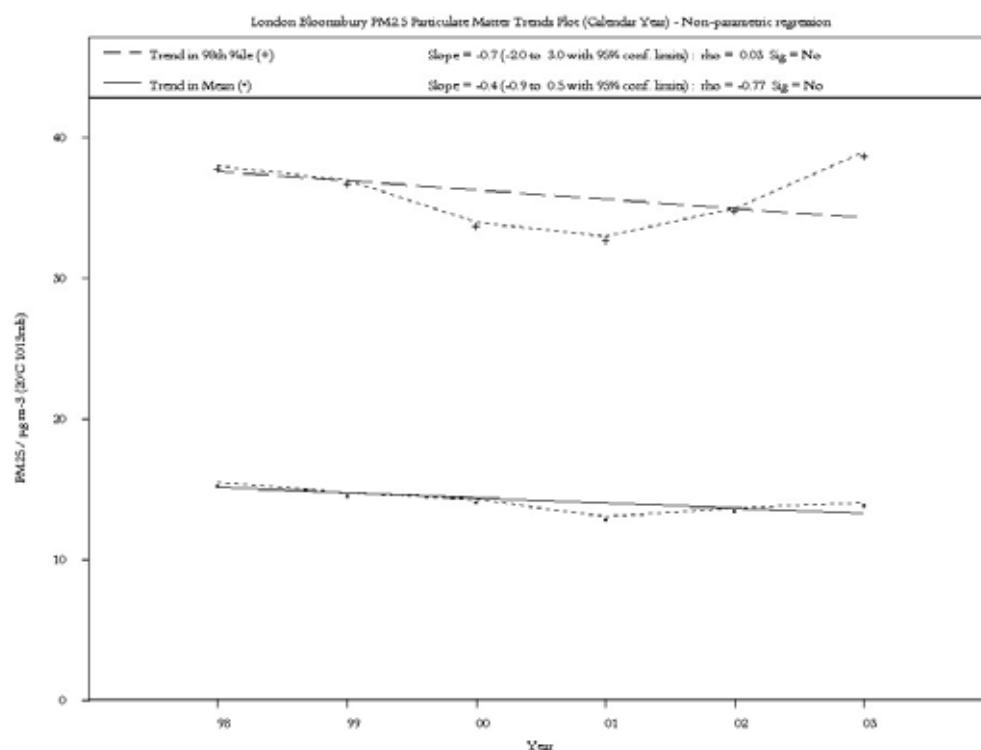


Rural Site
(Harwell)

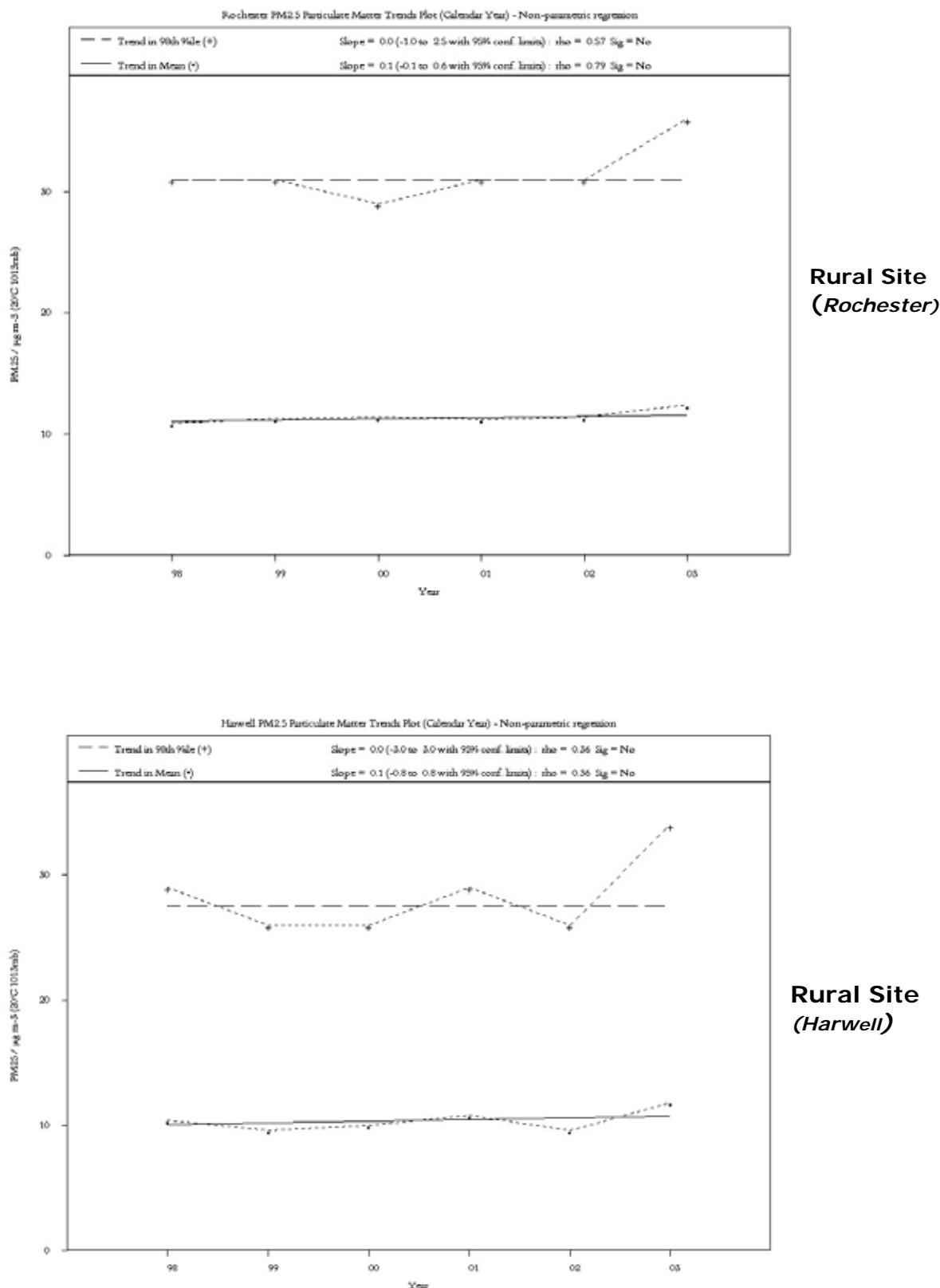
14.8 Trends in annual concentrations



Kerbside Site
*(London
Marylebone Road)*



Urban Centre Site
*(London
Bloomsbury)*



14.9 PM_{2.5} Statistical Summary 2003

i) Annual Statistics

Site	Site Type	Annual average of hourly means µg m ⁻³	Annual data capture of hourly means %	Maximum hourly mean µg m ⁻³
England				
Harwell	RU	12	98.7	54
London Bloomsbury	UC	14	96.5	87
London Marylebone Road	KB	19	93.3	83
Rochester	RU	12	98.4	157

KB=kerbside, UC=urban centre, RU=rural

ii) Exceedence Statistics-

There are no exceedence statistics for PM_{2.5} Particulate Matter

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15. SO₂ - Measurement Sites, Instrumentation and Statistics

15.1 Measurement Method

The sulphur dioxide analyser works on the principle of ultra violet (UV) fluorescence. SO₂ molecules are excited to energy states by UV radiation. These energy states decay causing an emission of secondary fluorescent radiation with an intensity proportional to the concentration of SO₂ in the sample.

15.2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ Ambirack SO₂
- ▶ API M100
- ▶ Environnement AF 21M
- ▶ Horiba APSA 360
- ▶ Monitor Labs 9850
- ▶ Rotork 477
- ▶ Thermo Electron 43

*Defra does not give approval or endorsement for any products or equipment

15.3 Data Quality Requirements of EC Directive 1999/30/EC

Uncertainty 15%

Minimum data capture 90%

15.4 Objectives and Bandings

Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
Sulphur Dioxide	266 µg/m ³ Not to be exceeded more than 35 times per year	15 Minute Mean	31 December 2005
	350 µg/m ³ Not to be exceeded more than 24 times per year	1 Hour Mean	31 December 2004
	125 µg/m ³ Not to be exceeded more than 3 times per year	24 Hour Mean	31 December 2004
	(V) 20 µg/m ³	Annual Mean	31 December 2000
	(V) 20 µg/m ³	Winter Mean (01 October - 31 March)	31 December 2000

Air Quality Bands and Index Values		
Band	Index	Sulphur Dioxide µg/m ³
Low	1	0-88
	2	89-176
	3	177-265
Moderate	4	266-354
	5	355-442
	6	443-531
High	7	532-708
	8	709-886
	9	887-1063
Very High	10	1064 or more

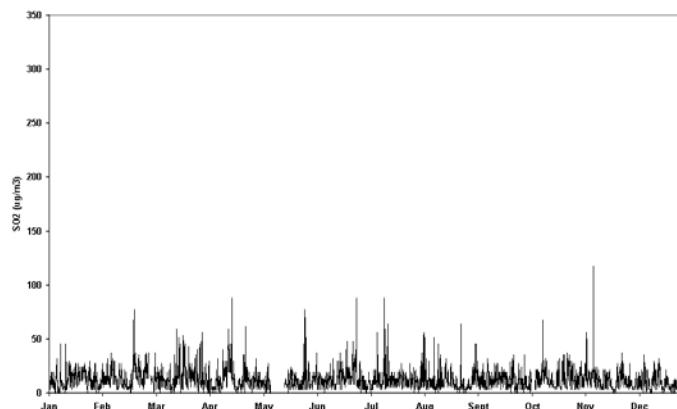
15.5 Site Locations

UK Automatic Sulphur Dioxide Monitoring Sites 2003

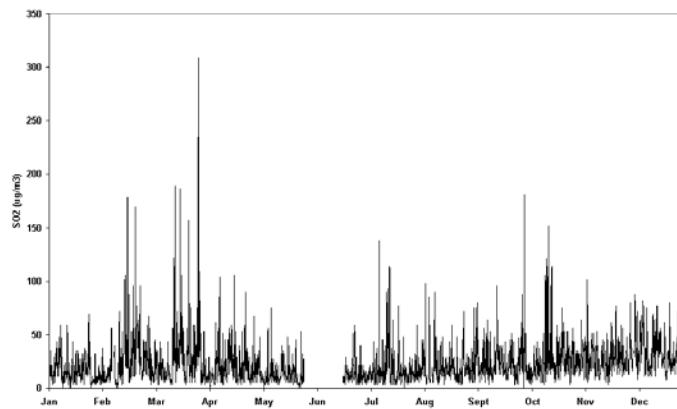


15.6 Hourly Average Concentrations

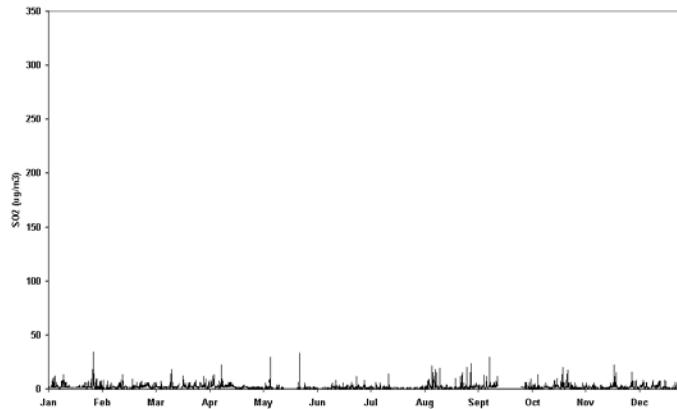
These figures show time series graphs of hourly average carbon monoxide concentrations at four *typical* site types for 2003.



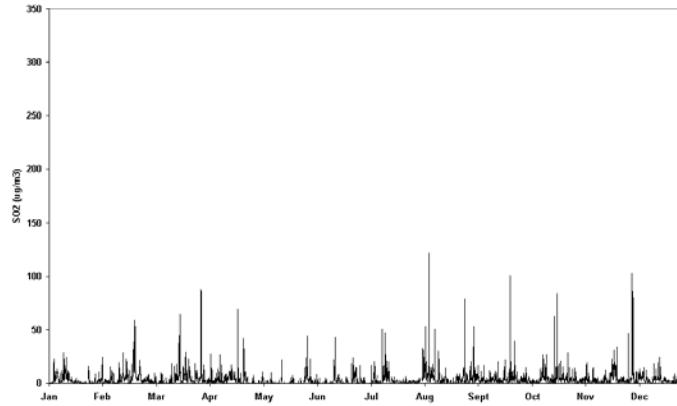
Kerbside Site
(London Marylebone Road)



Roadside Site
(Bury)



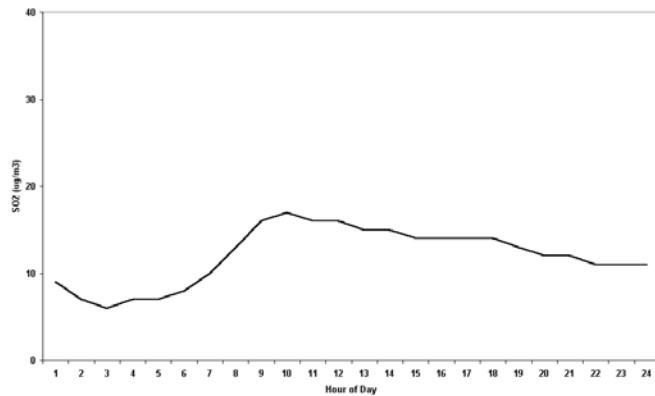
Urban Background Site
(Birmingham East)



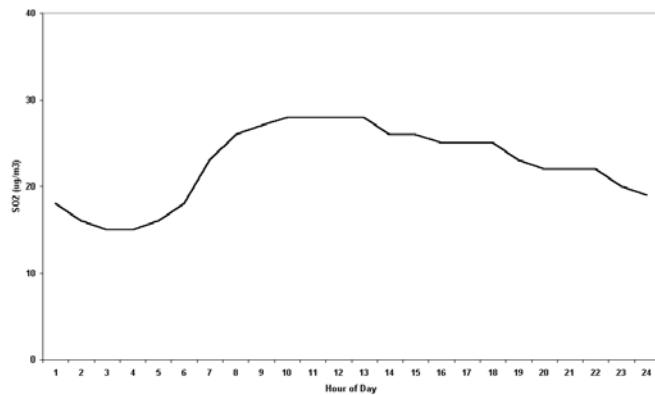
Rural Site
(Harwell)

15.7 Diurnal Variations

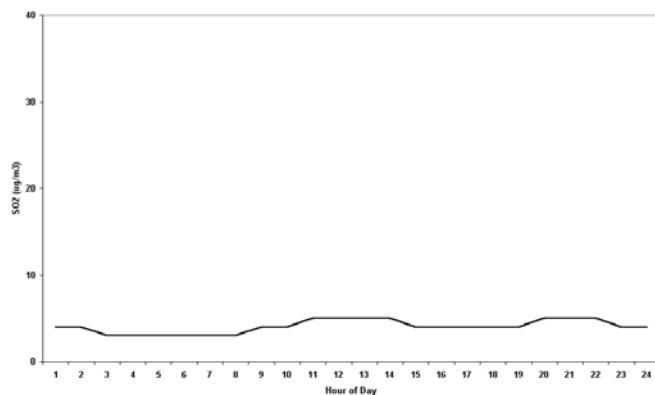
These figures show how sulphur dioxide concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



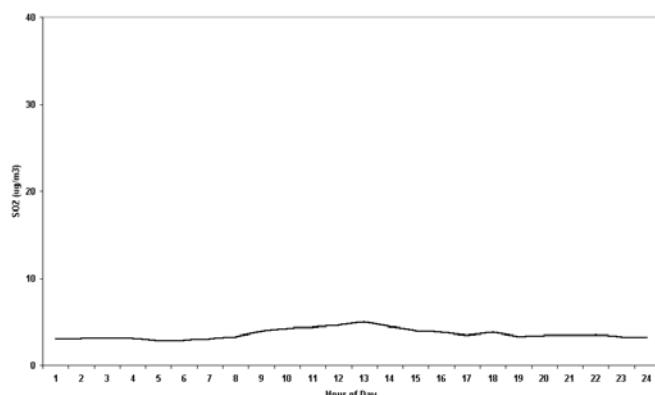
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Bury)**

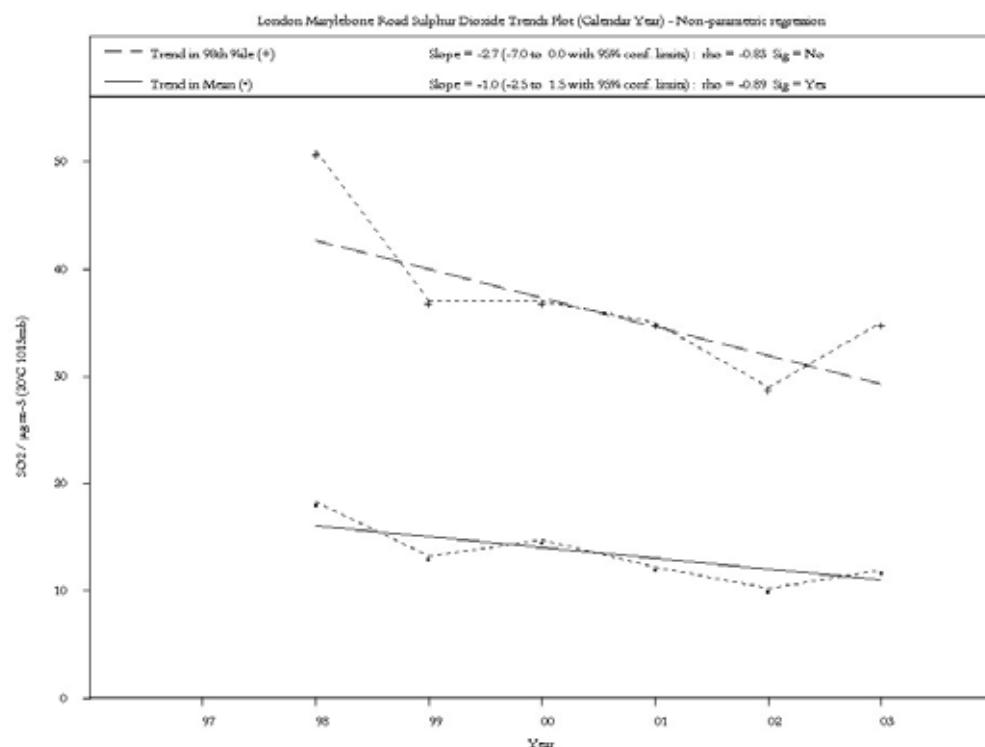


**Urban Background Site
(Birmingham East)**

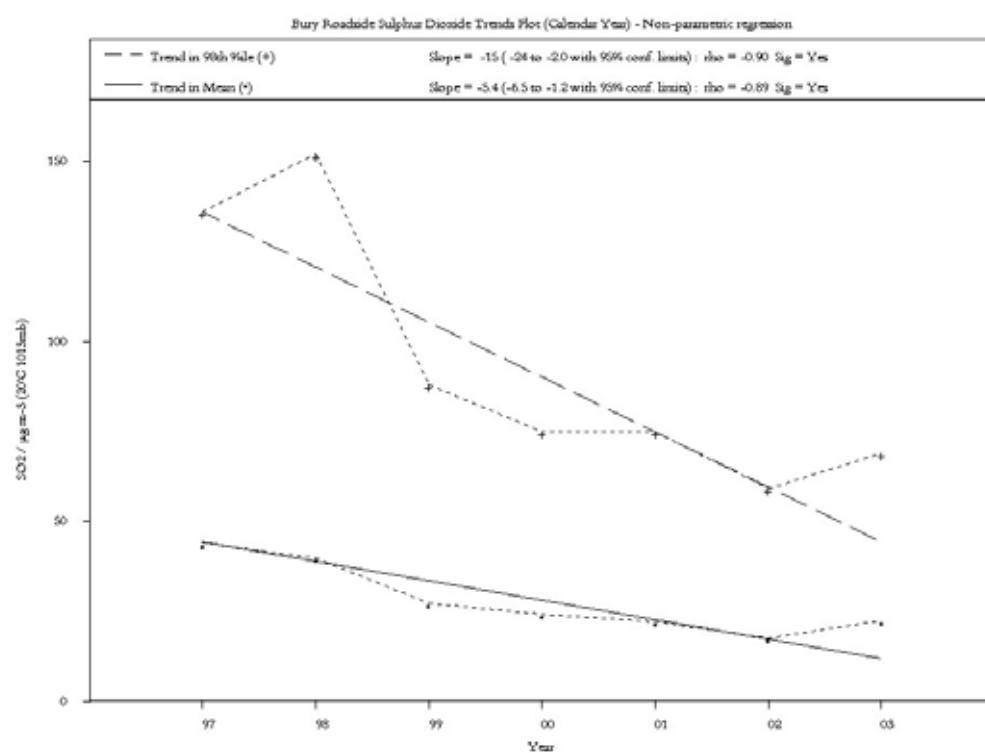


**Rural Site
(Harwell)**

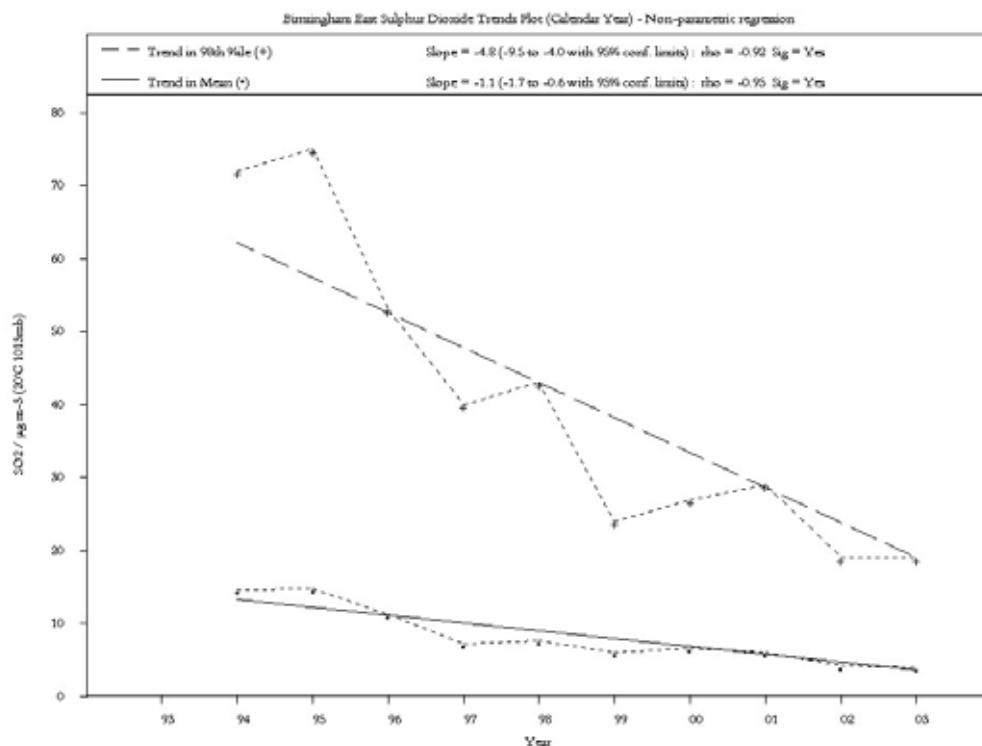
15.8 Trends in annual concentrations



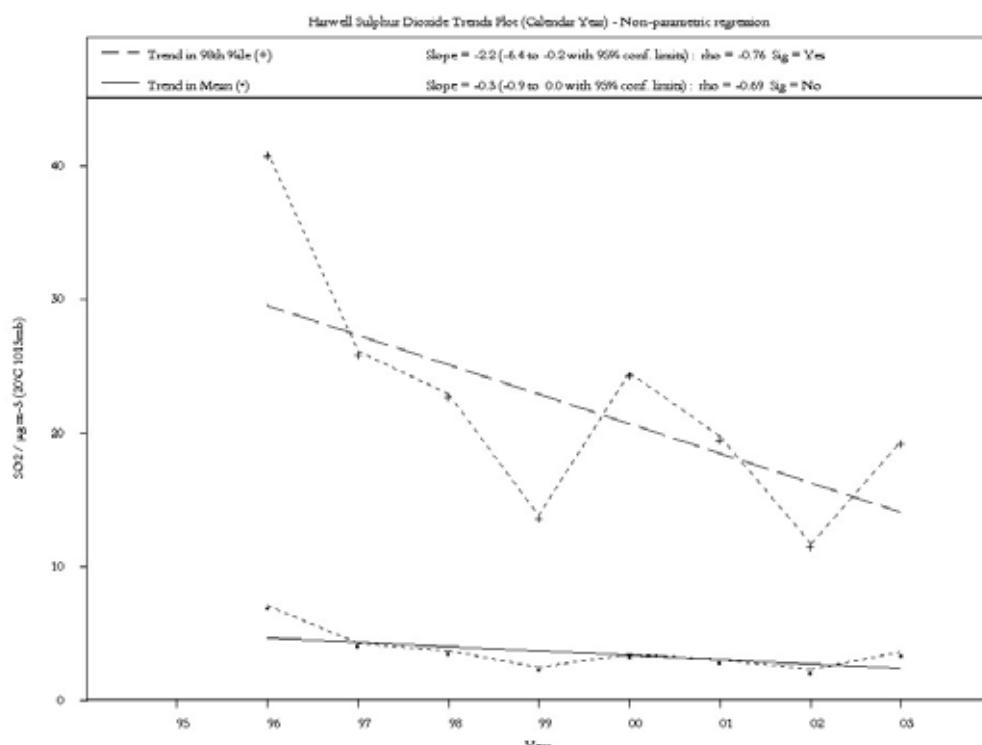
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Bury Roadside)**



Urban Background Site
(Birmingham East)



Rural Site
(Harwell)

15.9 Sulphur Dioxide Statistical Summary 2003

i) Annual Statistics I

Site	Site type	Annual average of hourly means µg/m³	Annual data capture of hourly means %	Maximum hourly mean µg/m³	Maximum 15-minute mean µg/m³	Date of maximum 15-minute mean	99.9%ile of 15-minute means µg/m³	99.7%ile of hourly means µg/m³	99%ile of daily means µg/m³
England									
Barnsley 12	UB	11	98.8	226	253	28/03/2003	160	88	88
Barnsley Gawber	UB	17	97.2	213	258	28/03/2003	130	72	72
Birmingham Centre	UC	7	89.7	218	245	26/01/2003	61	35	35
Birmingham East	UB	4	94.6	90	109	25/05/2003	64	27	27
Blackpool	UB	19	54.9	114	141	15/02/2003	88	53	53
Bolton	UB	5	97.9	154	178	15/02/2003	93	40	40
Bournemouth	UB	3	97.6	56	69	17/03/2003	35	19	19
Bradford Centre	UC	14	96.3	178	242	22/02/2003	122	64	64
Bristol Centre	UC	7	92.4	80	173	13/08/2003	45	29	29
Bury Roadside	RD	23	91.9	309	341	28/03/2003	170	85	85
Coventry Memorial Park	UB	17	86.9	106	247	29/04/2003	75	45	45
Exeter Roadside	RD	3	98.3	27	32	23/11/2003	21	13	13
Harwell	RU	3.6	98.0	122.1	208.1	03/12/2003	79.0	26.6	26.6
Hove Roadside	RD	5	96.7	37	43	10/07/2003	32	19	19
Hull Freetown	UC	7	94.7	160	224	11/09/2003	104	45	45
Ladybower	RU	5.5	89.7	154.9	269.0	07/11/2003	108.6	46.0	46.0
Leamington Spa	UB	4	81.7	77	85	17/03/2003	48	24	24
Leeds Centre	UC	8	91.8	226	303	05/08/2003	146	67	67
Leicester Centre	UC	6	98.2	109	117	30/08/2003	48	29	29
Liverpool Speke	UB	8	51.0	200	221	16/07/2003	101	43	43
London Bexley	SU	10	91.3	189	282	11/11/2003	136	69	69
London Bloomsbury	UC	8	94.2	130	157	11/11/2003	69	37	37
London Brent	UB	4	96.6	136	144	11/11/2003	53	29	29
London Cromwell Road 2	RD	6	88.4	88	125	19/02/2003	53	27	27
London Eltham	SU	6	98.6	162	192	15/07/2003	88	51	51
London Hillingdon	SU	8	98.1	138	231	01/11/2003	59	35	35
London Lewisham	UC	6	99.6	226	285	23/04/2003	82	43	43
London Marylebone Road	KB	12	96.1	117	146	11/11/2003	69	43	43
London N. Kensington	UB	5	98.9	80	138	16/04/2003	56	29	29
London Southwark	UC	8	98.0	120	146	19/02/2003	77	40	40
London Teddington	UB	5.2	99.0	124.3	178.6	26/03/2003	75.6	37.3	37.3
London Westminster	UB	6	69.2	112	141	19/02/2003	69	37	37
Lullingstone Heath	RU	3.3	85.8	38.9	59.3	30/03/2003	27.1	18.1	18.1
Manchester Piccadilly	UC	14	93.1	130	154	24/04/2003	85	45	45
Manchester South	SU	10	93.8	98	146	15/02/2003	69	32	32
Middlesbrough	I	6	96.4	154	192	04/08/2003	112	53	53
Newcastle Centre	UC	5	96.7	138	152	16/02/2003	61	29	29
Northampton	UB	5	99.3	122	170	29/03/2003	67	32	32
Norwich Centre	UC	14	82.8	80	101	03/10/2003	45	29	29
Nottingham Centre	UC	14	96.5	146	194	21/10/2003	90	45	45
Oxford Centre	RD	5	96.7	59	69	05/09/2003	43	21	21

KB=kerbside, RD=roadside, UC=urban centre, UB= urban background, SU=suburban, I=industrial, RU=rural, RE=remote

ii) Exceedence Statistics I

Site	Moderate band	Days	High band	Days	Very High band	Days	Air Quality Standard (15-Minute Mean)	Days	Daughter Directive Hourly Mean and Air Quality Standard (Hourly Mean)	Days	Daughter Directive Daily Mean and Air Quality Standard (Daily Mean)	Days
England												
Barnsley 12	0	0	0	0	0	0	0	0	0	0	0	0
Barnsley Gawber	0	0	0	0	0	0	0	0	0	0	0	0
Birmingham Centre	0	0	0	0	0	0	0	0	0	0	0	0
Birmingham East	0	0	0	0	0	0	0	0	0	0	0	0
Blackpool	0	0	0	0	0	0	0	0	0	0	0	0
Bolton	0	0	0	0	0	0	0	0	0	0	0	0
Bournemouth	0	0	0	0	0	0	0	0	0	0	0	0
Bradford Centre	0	0	0	0	0	0	0	0	0	0	0	0
Bristol Centre	0	0	0	0	0	0	0	0	0	0	0	0
Bury Roadside	5	3	0	0	0	0	5	3	0	0	0	0
Coventry Memorial Park	0	0	0	0	0	0	0	0	0	0	0	0
Exeter Roadside	0	0	0	0	0	0	0	0	0	0	0	0
Harwell	0	0	0	0	0	0	0	0	0	0	0	0
Hove Roadside	0	0	0	0	0	0	0	0	0	0	0	0
Hull Freetown	0	0	0	0	0	0	0	0	0	0	0	0
Ladybower	1	1	0	0	0	0	1	1	0	0	0	0
Leamington Spa	0	0	0	0	0	0	0	0	0	0	0	0
Leeds Centre	4	2	0	0	0	0	4	2	0	0	0	0
Leicester Centre	0	0	0	0	0	0	0	0	0	0	0	0
Liverpool Speke	0	0	0	0	0	0	0	0	0	0	0	0
London Bexley	1	1	0	0	0	0	1	1	0	0	0	0
London Bloomsbury	0	0	0	0	0	0	0	0	0	0	0	0
London Brent	0	0	0	0	0	0	0	0	0	0	0	0
London Cromwell Road 2	0	0	0	0	0	0	0	0	0	0	0	0
London Eltham	0	0	0	0	0	0	0	0	0	0	0	0
London Hillingdon	0	0	0	0	0	0	0	0	0	0	0	0
London Lewisham	2	1	0	0	0	0	2	1	0	0	0	0
London Marylebone Road	0	0	0	0	0	0	0	0	0	0	0	0
London N. Kensington	0	0	0	0	0	0	0	0	0	0	0	0
London Southwark	0	0	0	0	0	0	0	0	0	0	0	0
London Teddington	0	0	0	0	0	0	0	0	0	0	0	0
London Westminster	0	0	0	0	0	0	0	0	0	0	0	0
Lullington Heath	0	0	0	0	0	0	0	0	0	0	0	0
Manchester Piccadilly	0	0	0	0	0	0	0	0	0	0	0	0
Manchester South	0	0	0	0	0	0	0	0	0	0	0	0
Middlesbrough	0	0	0	0	0	0	0	0	0	0	0	0
Newcastle Centre	0	0	0	0	0	0	0	0	0	0	0	0
Northampton	0	0	0	0	0	0	0	0	0	0	0	0
Norwich Centre	0	0	0	0	0	0	0	0	0	0	0	0
Nottingham Centre	0	0	0	0	0	0	0	0	0	0	0	0
Oxford Centre	0	0	0	0	0	0	0	0	0	0	0	0

iii) Annual Statistics II

Site	Site type	Annual average of hourly means $\mu\text{g}/\text{m}^3$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g}/\text{m}^3$	Maximum 15-minute mean $\mu\text{g}/\text{m}^3$	Date of maximum 15-minute mean	99.9%ile of 15-minute means $\mu\text{g}/\text{m}^3$	99.7%ile of hourly means $\mu\text{g}/\text{m}^3$	99%ile of daily means $\mu\text{g}/\text{m}^3$
Plymouth Centre	UC	5	97.5	64	98	29/01/03	27	16	16
Portsmouth	UB	6	81.9	80	101	06/08/03	45	24	24
Preston	UB	9	95.3	160	255	15/02/03	72	40	40
Reading	UB	---	9.3	43	48	05/01/03	---	---	---
Reading New Town	UB	---	13.7	67	77	21/10/03	---	---	---
Redcar	SU	10	95.4	125	210	07/09/03	88	56	56
Rochester	RU	6.7	96.6	170.0	202.5	17/01/03	99.0	42.3	42.3
Rotherham Centre	UC	12	90.9	157	186	28/03/03	90	43	43
Salford Eccles	I	7	86.2	149	170	28/03/03	82	40	40
Sandwell West Bromwich	UB	5	93.8	269	333	26/01/03	93	32	32
Scunthorpe	I	11	96.0	258	298	27/03/03	165	96	96
Sheffield Centre	UC	7	92.7	149	239	15/07/03	106	29	29
Southampton Centre	UC	6	95.9	120	152	15/04/03	64	32	32
Southend-on-Sea	UB	13	81.6	98	130	16/09/03	88	53	53
Southwark Roadside	RD	6	90.5	168	234	09/09/03	72	35	35
Stockport Shaw Heath	UB	5	98.0	130	138	17/03/03	85	35	35
Stoke-on-Trent Centre	UC	16	96.8	136	162	17/03/03	98	45	45
Sunderland	UB	3	94.8	77	96	21/02/03	29	16	16
Thurrock	UB	7	91.1	460	1038	03/09/03	120	56	56
Wicken Fen	RU	2.6	94.9	49.0	58.8	31/01/03	40.5	16.5	16.5
Wigan Leigh	UB	4	86.5	117	279	10/07/03	98	37	37
Wirral Tranmere	UB	8	91.7	149	162	16/07/03	80	48	48
Wolverhampton Centre	UC	7	97.9	101	192	16/09/03	64	32	32
N Ireland									
Belfast Centre	UC	8	91.1	186	609	14/02/03	109	56	56
Belfast East	UB	8	96.7	194	567	14/02/03	120	56	56
Derry	UB	11	96.7	125	700	05/01/03	88	48	48
Scotland									
Aberdeen	UB	7	97.7	75	258	16/06/03	53	29	29
Edinburgh Centre	UC	---	44.1	197	460	07/08/03	---	---	---
Edinburgh St Leonards	UB	---	10.4	35	48	29/12/03	---	---	---
Glasgow Centre	UC	5	81.0	122	154	13/11/03	69	27	27
Grangemouth	I	7	99.3	373	516	10/04/03	176	75	75
Wales									
Cardiff Centre	UC	4	88.9	138	210	03/04/03	35	19	19
Cwmbran	UB	4	91.5	53	101	22/04/03	35	19	19
Narberth	RU	---	9.3	25.0	27.4	17/12/03	---	---	---
Port Talbot	UB	7	98.3	154	231	15/05/03	93	51	51
Swansea	UC	4	97.8	112	261	24/09/03	72	29	29
Wrexham	RD	5	98.6	128	149	17/03/03	72	32	32

iv) Exceedence Statistics II

Site	Moderate band	Days	High band	Days	Very High band	Days	Air Quality Standard (15-Minute Mean)	Days	Daughter Directive Hourly Mean and Air Quality Standard (Hourly Mean)	Days	Daughter Directive Daily Mean and Air Quality Standard (Daily Mean)	Days
Plymouth Centre	0	0	0	0	0	0	0	0	0	0	0	0
Portsmouth	0	0	0	0	0	0	0	0	0	0	0	0
Preston	0	0	0	0	0	0	0	0	0	0	0	0
Reading	0	0	0	0	0	0	0	0	0	0	0	0
Reading New Town	0	0	0	0	0	0	0	0	0	0	0	0
Redcar	0	0	0	0	0	0	0	0	0	0	0	0
Rochester	0	0	0	0	0	0	0	0	0	0	0	0
Rotherham Centre	0	0	0	0	0	0	0	0	0	0	0	0
Salford Eccles	0	0	0	0	0	0	0	0	0	0	0	0
Sandwell West Bromwich	4	1	0	0	0	0	4	1	0	0	0	0
Scunthorpe	2	2	0	0	0	0	2	2	0	0	0	0
Sheffield Centre	0	0	0	0	0	0	0	0	0	0	0	0
Southampton Centre	0	0	0	0	0	0	0	0	0	0	0	0
Southend-on-Sea	0	0	0	0	0	0	0	0	0	0	0	0
Southwark Roadside	0	0	0	0	0	0	0	0	0	0	0	0
Stockport Shaw Heath	0	0	0	0	0	0	0	0	0	0	0	0
Stoke-on-Trent Centre	0	0	0	0	0	0	0	0	0	0	0	0
Sunderland	0	0	0	0	0	0	0	0	0	0	0	0
Thurrock	8	5	1	1	0	0	9	5	1	1	0	0
Wicken Fen	0	0	0	0	0	0	0	0	0	0	0	0
Wigan Leigh	1	1	0	0	0	0	1	1	0	0	0	0
Wirral Tranmere	0	0	0	0	0	0	0	0	0	0	0	0
Wolverhampton Centre	0	0	0	0	0	0	0	0	0	0	0	0
N Ireland												
Belfast Centre	0	0	0	0	0	0	0	0	0	0	0	0
Belfast East	0	0	0	0	0	0	0	0	0	0	0	0
Derry	0	0	0	0	0	0	0	0	0	0	0	0
Scotland												
Aberdeen	0	0	0	0	0	0	0	0	0	0	0	0
Edinburgh Centre	1	1	0	0	0	0	1	1	0	0	0	0
Edinburgh St Leonards	0	0	0	0	0	0	0	0	0	0	0	0
Glasgow Centre	0	0	0	0	0	0	0	0	0	0	0	0
Grangemouth	19	5	0	0	0	0	18	5	1	1	0	0
Wales												
Cardiff Centre	0	0	0	0	0	0	0	0	0	0	0	0
Cwmbran	0	0	0	0	0	0	0	0	0	0	0	0
Narberth	0	0	0	0	0	0	0	0	0	0	0	0
Port Talbot	0	0	0	0	0	0	0	0	0	0	0	0
Swansea	0	0	0	0	0	0	0	0	0	0	0	0
Wrexham	0	0	0	0	0	0	0	0	0	0	0	0

16. Ozone - Measurement Sites, Instrumentation and Statistics

16.1 Measurement Method

The measurement of ozone is based on the absorption of ultra violet light by ozone. The absorption by an air path with no ozone present is measured to give a reference intensity. The absorption of the ozone containing sample is then measured. The ozone concentration is calculated using the Beer-Lamberts absorption equation.

16. 2 Instrumentation

The following instrument types* are currently deployed in the AURN:

- ▶ Ambirack O₃
- ▶ API M400
- ▶ Environnement O341M
- ▶ Horiba APOA 360
- ▶ Monitor Labs 9850
- ▶ Rotork 427
- ▶ Thermo Electron 49

*Defra does not give approval or endorsement for any products or equipment

16.3 Data Quality Requirements of EC Directive 2002/3/EC

Uncertainty 15%

Minimum data capture 90%

16.4 Objectives and Bandings

Summary of objectives of the Air Quality Strategy			
	Objective*	Measured as	To be achieved by
Ozone	100 µg/m ³ Not to be exceeded more than 10 times per year	Daily maximum of running 8-hour mean	31 December 2005

*Not included in the Regulations for the purpose of Air Quality Management

Air Quality Bands and Index Values		
Band	Index	Ozone µgm-3
<i>Low</i>	1	0-32
	2	33-66
	3	67-99
<i>Moderate</i>	4	100-126
	5	127-152
	6	153-179
<i>High</i>	7	180-239
	8	240-299
	9	300-359
<i>Very High</i>	10	360 or more

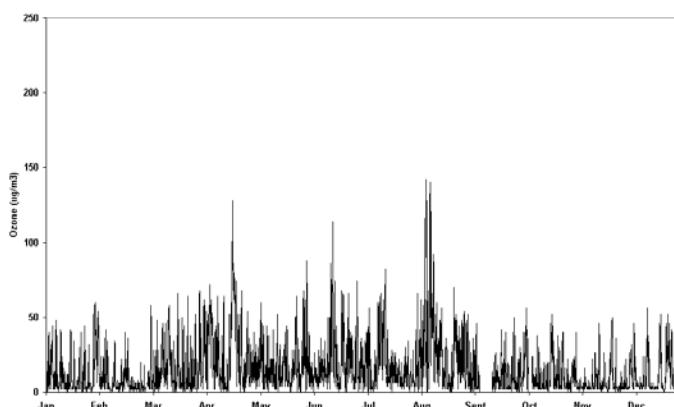
16.5 Site Locations

UK Automatic Ozone Monitoring Sites 2003

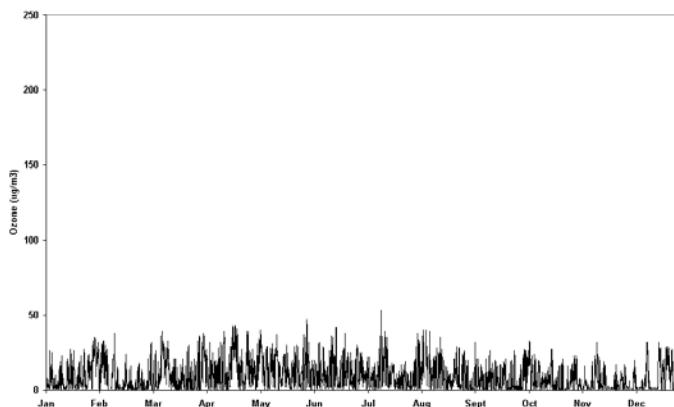


16.6 Hourly Average Concentrations

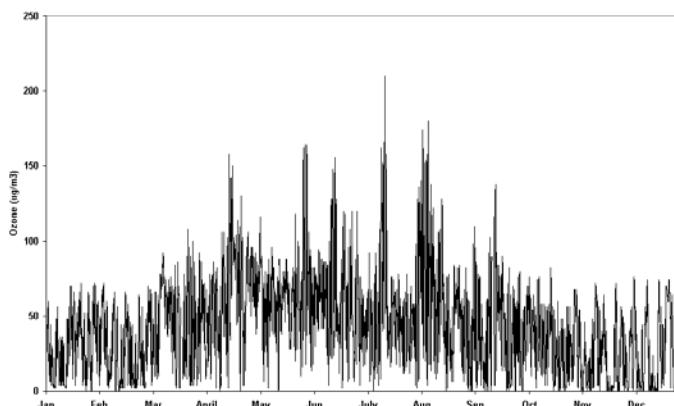
These figures show time series graphs of hourly average ozone concentrations at four *typical* site types for 2003.



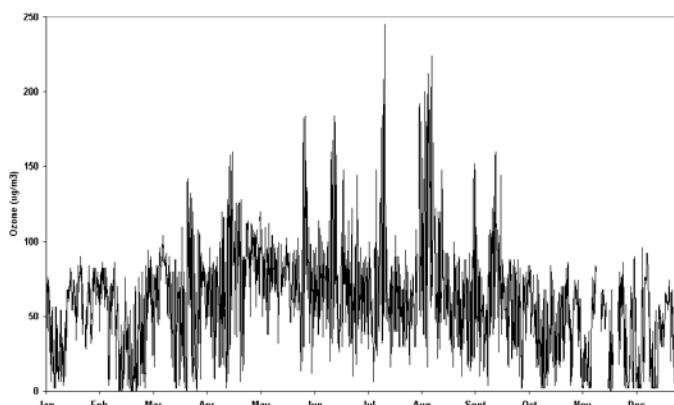
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Bury)**



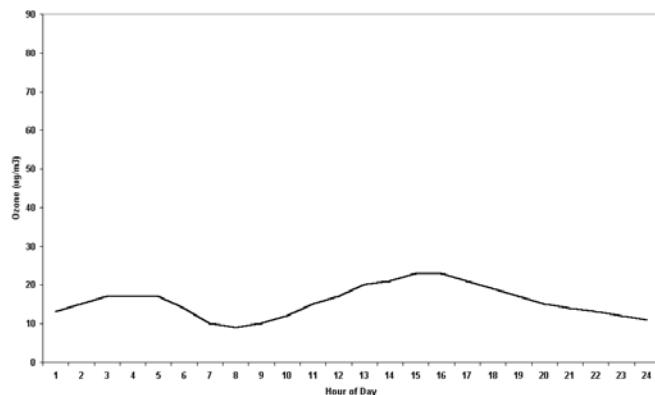
**Urban Background Site
(Leamington Spa)**



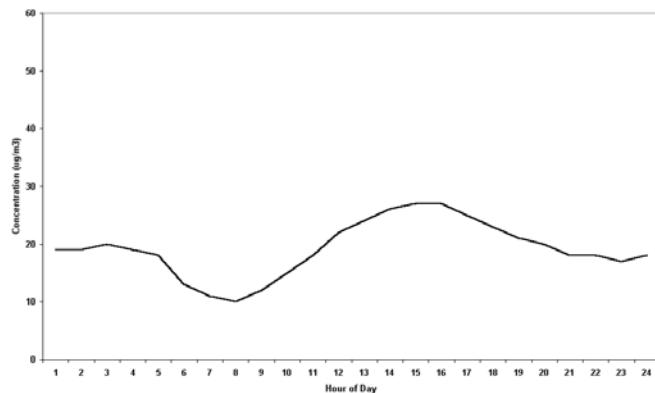
**Rural Site
(Harwell)**

16.7 Diurnal Variations

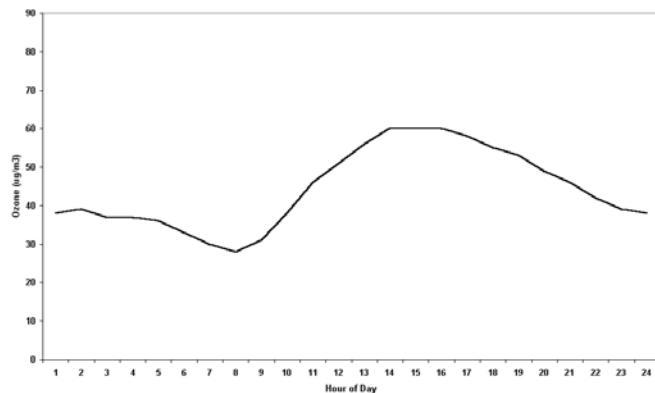
These figures show how ozone concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



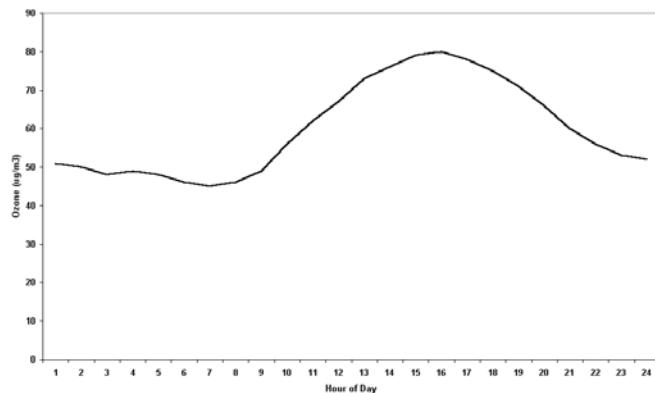
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Bury)**



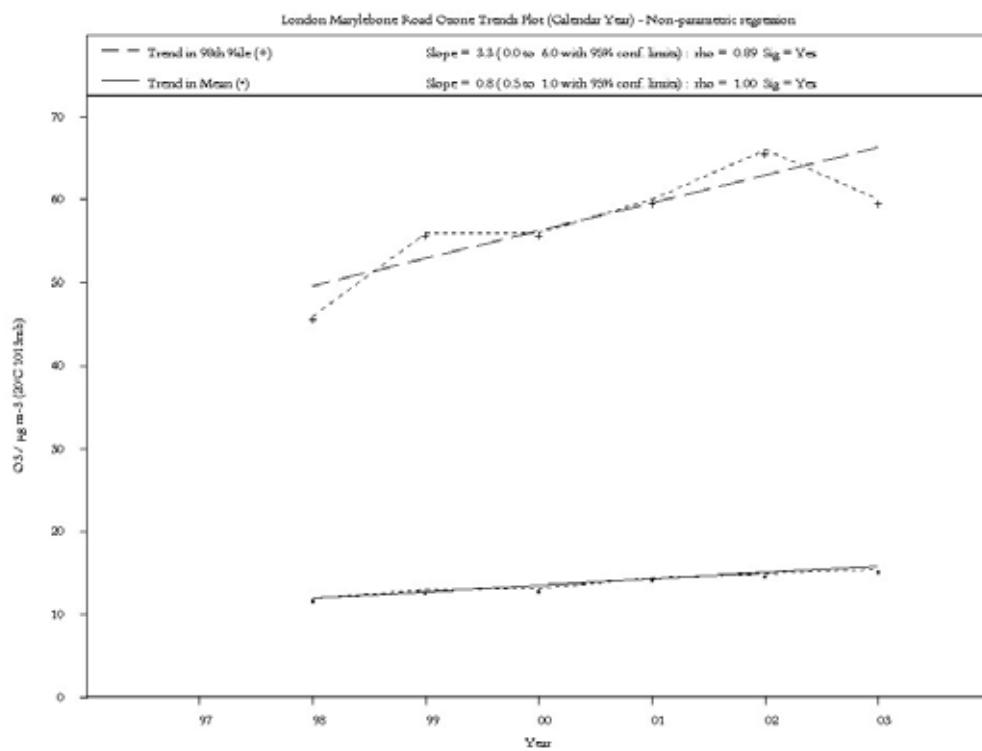
**Urban Background Site
(Leamington Spa)**



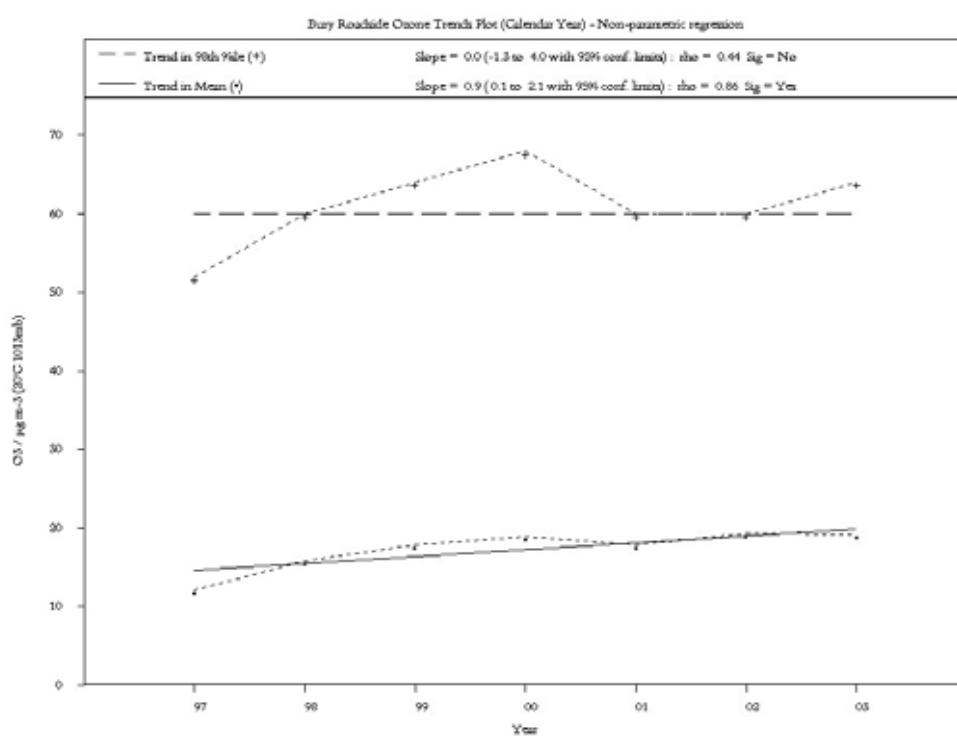
**Rural Site
(Harwell)**

16.8 Trends in annual concentrations

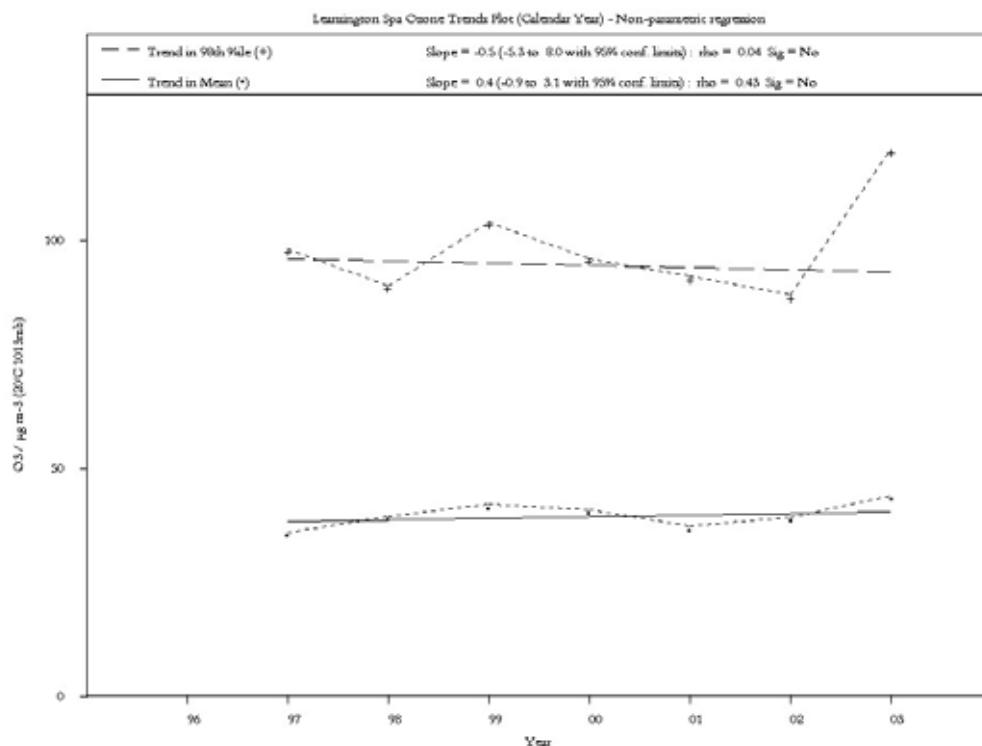
Statistically significant trends in concentrations are shown for sites with at ≥ 5 years of measurement.



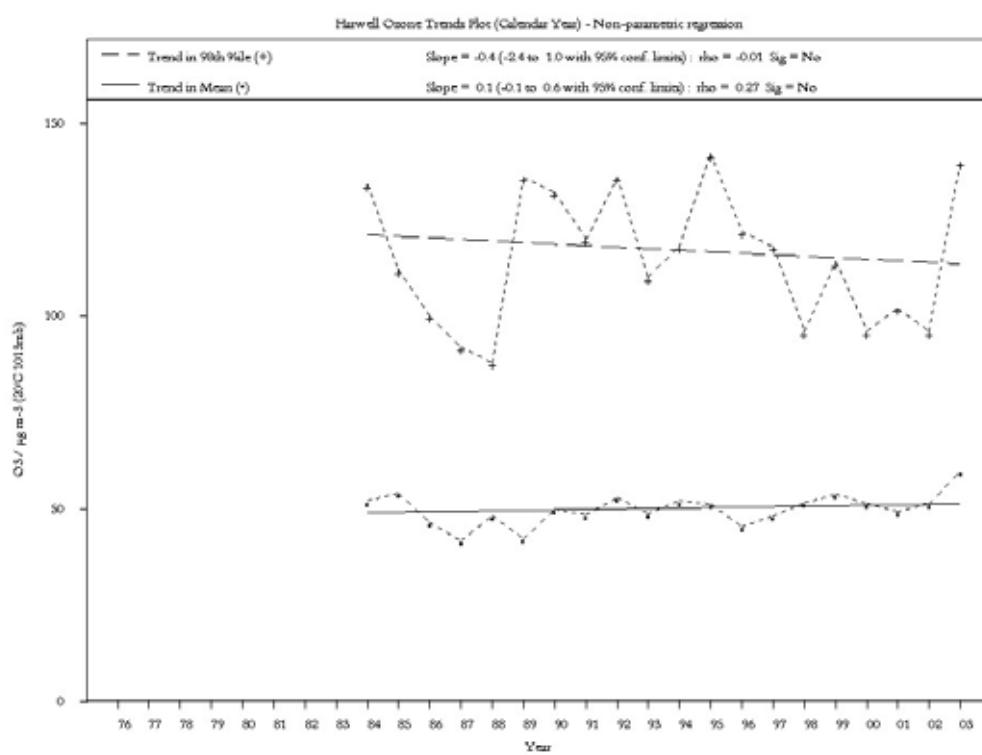
**Kerbside Site
(Marylebone Road)**



**Roadside Site
(Bury)**



**Urban Background Site
(Leamington Spa)**



**Rural Site
(Harwell)**

16.9 Ozone Statistical Summary 2003

Annual Statistics- I

Site	Site Type	Annual average of hourly means µg/m³	Annual data capture of hourly means %	Maximum hourly mean µg/m³	Maximum running 8-hour mean µg/m³	Date of maximum running 8-hour mean	97%ile of daily max run 8-hr mean µg/m³
England							
Barnsley Gawber	UB	47	96.6	174	149	31/05/2003	121
Birmingham Centre	UC	41	90.2	158	145	15/07/2003	113
Birmingham East	UB	43	94.8	186	173	15/07/2003	134
Blackpool	UB	50	93.0	212	189	09/08/2003	118
Bolton	UB	44	97.8	190	173	09/08/2003	122
Bottesford	SU	47	98.9	196	174	06/08/2003	129
Bournemouth	UB	57	83.5	230	210	09/08/2003	149
Bradford Centre	UC	32	95.4	152	136	13/07/2003	93
Bristol Centre	UC	40	95.6	168	139	18/04/2003	104
Bury Roadside	RD	19	98.0	106	97	13/07/2003	67
Coventry Memorial Park	UB	47	89.9	198	180	15/07/2003	140
Exeter Roadside	RD	39	97.5	164	146	05/08/2003	106
Glazebury	SU	37	88.7	174	158	09/08/2003	114
Great Dun Fell	RU	67	99.0	182	166	09/08/2003	130
Harwell	RU	60	96.1	245	208	15/07/2003	160
High Muffles	RU	54	98.7	144	132	06/08/2003	104
Hull Freetown	UC	44	97.6	144	132	15/06/2003	110
Ladybower	RU	57	98.1	182	152	04/08/2003	131
Leamington Spa	UB	44	98.6	210	189	15/07/2003	137
Leeds Centre	UC	37	93.6	150	135	13/07/2003	104
Leicester Centre	UC	41	97.9	206	185	15/07/2003	140
Liverpool Speke	UB	48	56.9	202	172	15/07/2003	145
London Bexley	SU	41	97.6	206	186	09/08/2003	130
London Bloomsbury	UC	30	82.3	178	158	11/08/2003	106
London Brent	UB	42	89.8	237	200	11/08/2003	155
London Eltham	SU	39	91.9	202	191	06/08/2003	141
London Hackney	UC	34	96.4	222	169	06/08/2003	122
London Haringey	UC	38	93.3	214	164	11/08/2003	137
London Hillingdon	SU	28	97.9	210	179	08/08/2003	115
London Lewisham	UC	30	97.9	202	149	08/08/2003	105
London Marylebone Road	KB	16	96.3	142	111	08/08/2003	65
London N. Kensington	UB	37	98.7	235	193	06/08/2003	139
London Southwark	UC	37	98.2	200	174	06/08/2003	130
London Teddington	UB	50	98.9	222	204	11/08/2003	153
London Wandsworth	UC	29	89.8	172	152	06/08/2003	104
London Westminster	UB	33	95.5	214	176	06/08/2003	116
Lullingstone Heath	RU	63	95.5	235	220	11/08/2003	158
Manchester Piccadilly	UC	30	97.9	172	154	09/08/2003	101
Manchester South	SU	38	96.7	170	150	09/08/2003	103
Market Harborough	RU	---	5.5	78	75	27/12/2003	---
Middlesbrough	I	50	94.9	279	163	31/05/2003	116
Newcastle Centre	UC	41	89.9	166	129	13/07/2003	105
Northampton	UB	53	77.5	226	192	09/08/2003	151
Norwich Centre	UC	45	96.7	247	175	16/07/2003	122
Nottingham Centre	UC	33	97.5	162	130	15/07/2003	105
Plymouth Centre	UC	46	86.6	188	170	09/08/2003	112
Portsmouth	UB	52	67.2	237	216	09/08/2003	145
Preston	UB	45	91.3	186	170	09/08/2003	118
Reading	UB	---	9.3	86	80	21/01/2003	---
Reading New Town	UB	---	19.1	90	84	19/10/2003	---
Redcar	SU	54	97.3	172	142	31/05/2003	116
Rochester	RU	55	98.8	226	187	09/08/2003	138
Rotherham Centre	UC	34	98.3	156	130	13/07/2003	107
Salford Eccles	I	36	97.7	180	167	09/08/2003	113
Sandwell West Bromwich	UB	42	94.1	186	172	09/08/2003	120
Sheffield Centre	UC	37	98.1	170	138	13/07/2003	105
Sibton	RU	55	91.8	188	165	06/08/2003	123
Somerton	RU	60	97.3	192	166	15/07/2003	143
Southampton Centre	UC	40	92.7	228	188	09/08/2003	123
Southend-on-Sea	UB	47	86.6	214	191	09/08/2003	127
St Osyth	RU	54	98.6	220	176	11/08/2003	125
Stoke-on-Trent Centre	UC	42	94.9	184	161	09/08/2003	123
Thurrock	UB	42	97.5	222	197	09/08/2003	137
Weybourne	RU	64	99.4	184	166	06/08/2003	128
Wicken Fen	RU	49	98.6	230	202	06/08/2003	132
Wigan Leigh	UB	37	96.8	184	171	09/08/2003	107
Wirral Tranmere	UB	48	95.3	198	178	15/07/2003	116
Wolverhampton Centre	UC	43	98.1	180	169	09/08/2003	117
Yarner Wood	RU	64	98.8	200	192	05/08/2003	146

KB=kerbside, RD=roadside, UC=urban centre, UB= urban background,
 SU=suburban, I=industrial, RU=rural, RE=remote

ii) Exceedence Statistics- I

Site	Moderate band	Days	High band	Days	Very High band	Days	Air Quality Standard (Running 8-hour Mean)	Days
England								
Barnsley Gawber	350	47	0	0	0	0	179	31
Birmingham Centre	236	29	0	0	0	0	123	19
Birmingham East	403	51	3	2	0	0	221	32
Blackpool	436	55	11	2	0	0	254	38
Bolton	390	55	3	1	0	0	199	32
Bottesford	441	55	11	5	0	0	245	33
Bournemouth	655	78	21	4	0	0	410	53
Bradford Centre	89	15	0	0	0	0	33	7
Bristol Centre	190	35	0	0	0	0	76	16
Bury Roadside	4	1	0	0	0	0	0	0
Coventry Memorial Park	438	53	8	3	0	0	249	36
Exeter Roadside	158	24	0	0	0	0	87	15
Glazebury	213	37	0	0	0	0	97	14
Great Dun Fell	597	50	2	1	0	0	443	37
Harwell	855	90	55	12	0	0	568	68
High Muffles	174	23	0	0	0	0	95	16
Hull Freetown	340	41	0	0	0	0	191	31
Ladybower	420	52	1	1	0	0	263	28
Leamington Spa	476	56	9	2	0	0	280	37
Leeds Centre	150	27	0	0	0	0	72	14
Leicester Centre	482	52	14	3	0	0	288	38
Liverpool Speke	257	33	4	2	0	0	149	23
London Bexley	438	59	17	3	0	0	242	34
London Bloomsbury	189	26	0	0	0	0	80	16
London Brent	451	54	40	8	0	0	297	38
London Eltham	392	52	18	4	0	0	244	31
London Hackney	286	40	3	1	0	0	151	22
London Haringey	421	48	6	3	0	0	249	36
London Hillingdon	217	33	14	7	0	0	122	19
London Lewisham	197	28	2	1	0	0	108	17
London Marylebone Road	31	6	0	0	0	0	9	3
London N. Kensington	374	50	24	6	0	0	229	29
London Southwark	409	48	6	2	0	0	249	35
London Teddington	630	75	27	6	0	0	391	51
London Wandsworth	162	27	0	0	0	0	61	13
London Westminster	250	37	7	2	0	0	131	21
Lullingston Heath	1000	100	56	8	0	0	736	64
Manchester Piccadilly	152	26	0	0	0	0	66	12
Manchester South	160	22	0	0	0	0	87	12
Market Harborough	0	0	0	0	0	0	0	0
Middlesbrough	348	59	3	2	0	0	172	27
Newcastle Centre	160	29	0	0	0	0	89	16
Northampton	686	71	24	4	0	0	454	52
Norwich Centre	400	48	4	1	0	0	221	30
Nottingham Centre	153	21	0	0	0	0	73	15
Plymouth Centre	270	35	2	1	0	0	174	22
Portsmouth	460	52	17	3	0	0	296	36
Preston	241	37	3	2	0	0	129	21
Reading	0	0	0	0	0	0	0	0
Reading New Town	0	0	0	0	0	0	0	0
Redcar	520	74	0	0	0	0	294	37
Rochester	658	87	36	7	0	0	385	56
Rotherham Centre	182	26	0	0	0	0	89	18
Salford Eccles	252	34	1	1	0	0	137	21
Sandwell West Bromwich	245	32	3	1	0	0	137	21
Sheffield Centre	163	29	0	0	0	0	63	14
Sibton	497	60	3	1	0	0	271	37
Somerton	679	68	3	1	0	0	430	45
Southampton Centre	287	41	10	2	0	0	155	24
Southend-on-Sea	405	54	20	5	0	0	232	32
St Osyth	506	73	7	3	0	0	281	39
Stoke-on-Trent Centre	311	36	1	1	0	0	200	25
Thurrock	448	56	23	5	0	0	281	40
Weybourne	802	98	2	1	0	0	475	57
Wicken Fen	569	72	11	2	0	0	306	46
Wigan Leigh	213	33	2	1	0	0	102	19
Wirral Tranmere	279	40	6	2	0	0	157	24
Wolverhampton Centre	268	38	1	1	0	0	137	23
Yarner Wood	748	73	17	5	0	0	505	50

iii) Annual Statistics- II

Site	Site Type	Annual average of hourly means $\mu\text{g}/\text{m}^3$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g}/\text{m}^3$	Maximum running 8-hour mean $\mu\text{g}/\text{m}^3$	Date of maximum running 8-hour mean	97%ile of daily max run 8-hr mean $\mu\text{g}/\text{m}^3$
N Ireland							
Belfast Centre	UC	42	96.9	142	118	09/08/2003	98
Derry	UB	52	93.1	164	149	16/07/2003	111
Lough Navar	RE	47	63.7	154	138	08/08/2003	93
Scotland							
Aberdeen	UB	---	39.8	100	93	17/09/2003	---
Bush Estate	RU	59	98.5	144	132	31/05/2003	111
Edinburgh Centre	UC	---	45.7	108	98	05/09/2003	---
Edinburgh St Leonards	UB	---	10.4	80	78	27/12/2003	---
Eskdalemuir	RU	51	96.4	146	133	31/05/2003	113
Glasgow Centre	UC	34	95.9	138	122	09/08/2003	91
Strath Vaich	RE	73	86.8	154	148	17/04/2003	126
Wales							
Aston Hill	RU	62	99.1	188	182	15/07/2003	132
Cardiff Centre	UC	41	87.1	188	165	29/05/2003	120
Cwmbran	UB	56	66.7	190	170	09/08/2003	144
Narberth	RU	56	88.6	170	158	09/08/2003	127
Port Talbot	UB	58	97.3	186	178	15/07/2003	138
Swansea	UC	45	97.8	178	155	15/07/2003	119

iv) Exceedence Statistics II

Site	Moderate band	Days	High band	Days	Very High band	Days	Air Quality Standard (Running 8-hour Mean)	Days
N Ireland								
Belfast Centre	105	21	0	0	0	0	35	9
Derry	221	28	0	0	0	0	138	16
Lough Navar	74	16	0	0	0	0	32	6
Scotland								
Aberdeen	2	1	0	0	0	0	0	0
Bush Estate	276	43	0	0	0	0	145	24
Edinburgh Centre	16	7	0	0	0	0	0	0
Edinburgh St Leonards	0	0	0	0	0	0	0	0
Eskdalemuir	244	29	0	0	0	0	130	18
Glasgow Centre	59	14	0	0	0	0	17	4
Strath Vaich	659	72	0	0	0	0	415	48
Wales								
Aston Hill	545	53	8	1	0	0	360	39
Cardiff Centre	226	33	4	3	0	0	126	20
Cwmbran	453	53	4	2	0	0	274	38
Narberth	416	40	0	0	0	0	274	32
Port Talbot	635	67	7	3	0	0	403	47
Swansea	419	54	0	0	0	0	254	36

