

Air Pollution in the UK: 2005

Part 2

In this part of the report, we provide a detailed summary of the measurements made for each pollutant within the Automatic Urban and Rural Network (AURN) and Automatic Hydrocarbon Network. 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 2005. Finally, we include graphs to show variations in pollutant concentrations throughout the day and over the year as a whole, as well as time series showing long-term changes in concentrations over many years.

9. Benzene-Measurement Sites, Instrumentation and Statistics

9.1 Measurement Method

Benzene is measured using automated Gas Chromatograph or 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 OPA

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

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

Uncertainty 15%

Minimum data capture 90%

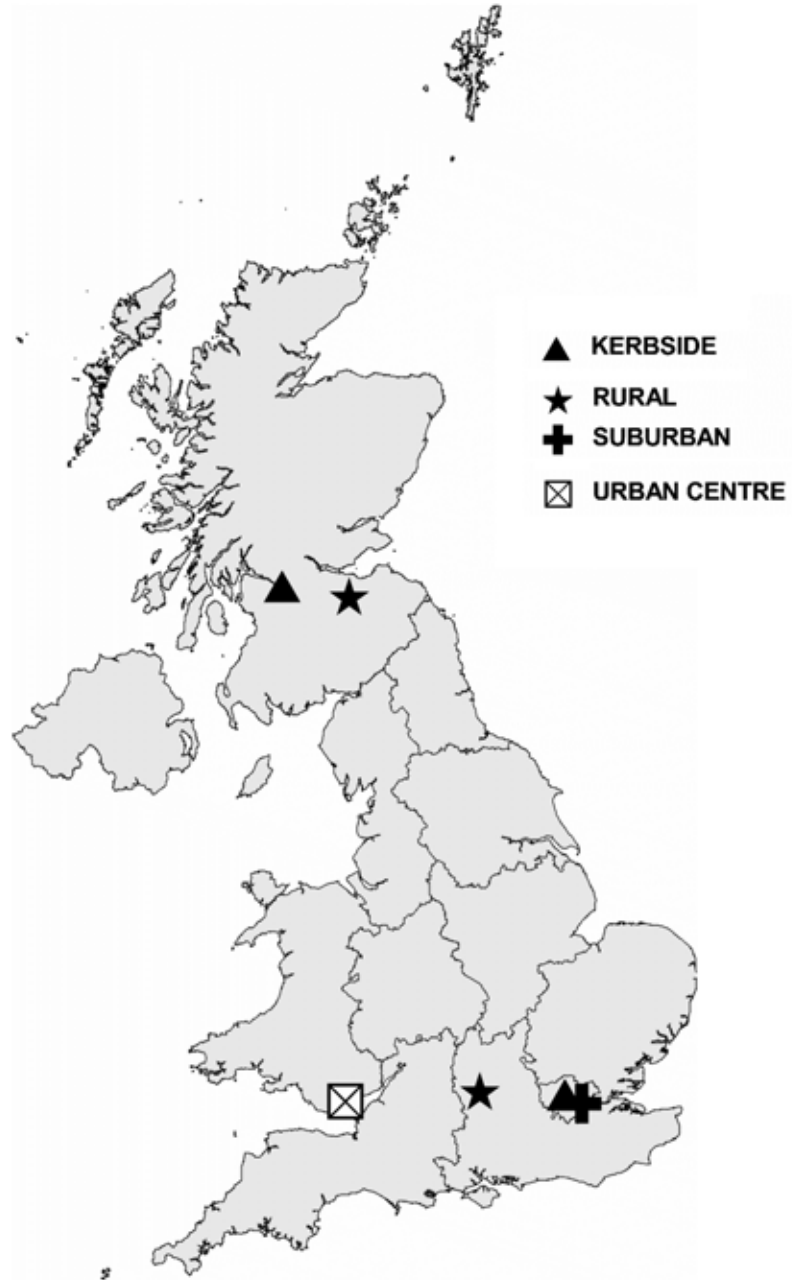
9.4 Objectives and Bandings

Summary of objectives of Air Quality Strategy			
	Objective*	Measured as	To be achieved by
Benzene	16.25 $\mu\text{g m}^{-3}$	Running Annual Mean	31 December 2003
England and Wales only	5 $\mu\text{g m}^{-3}$	Annual Mean	31 December 2010
Scotland and Northern Ireland only	3.25 $\mu\text{g m}^{-3}$	Maximum Running Annual Mean	31 December 2010

No bandings are set for benzene, as there are no known short-term health effects for this pollutant.

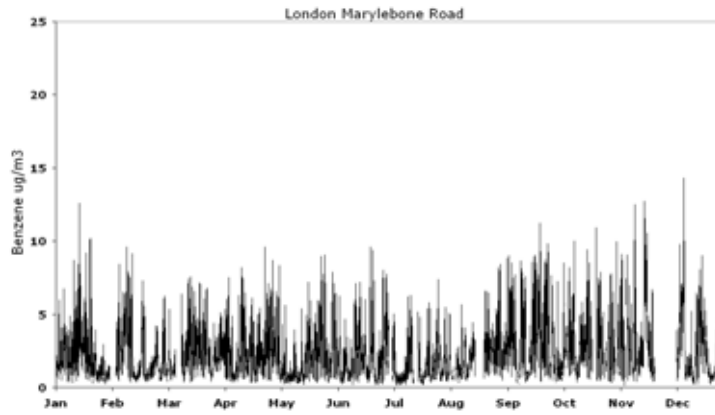
9.5 Site Locations

UK AUTOMATIC BENZENE MONITORING SITES 2005

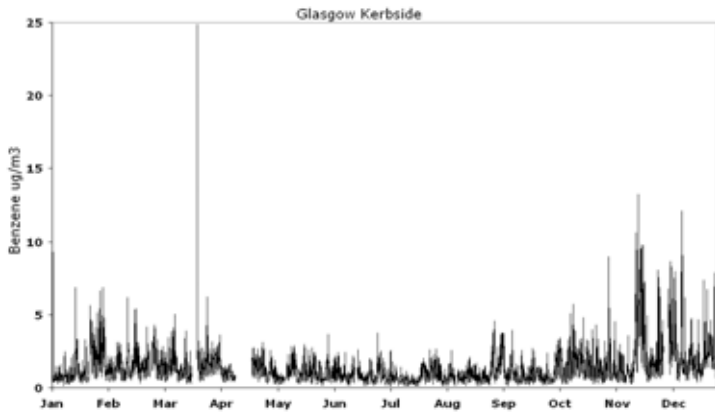


9.6 Hourly Average Concentrations

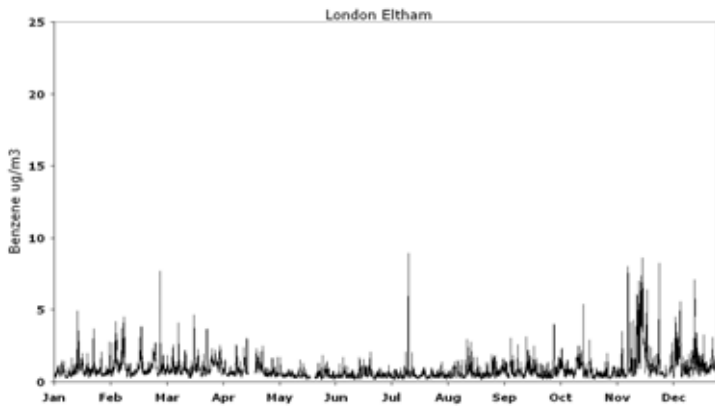
These figures show time series graphs of hourly average benzene concentrations at four typical site types for 2005.



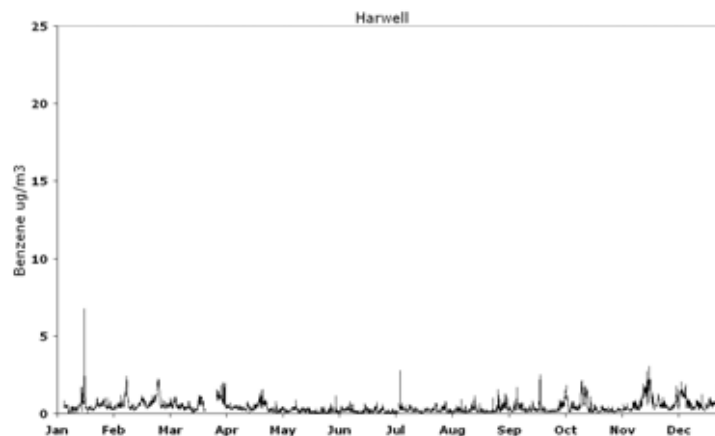
Kerbside Site
(Marylebone Road)



Roadside Site
(Glasgow)



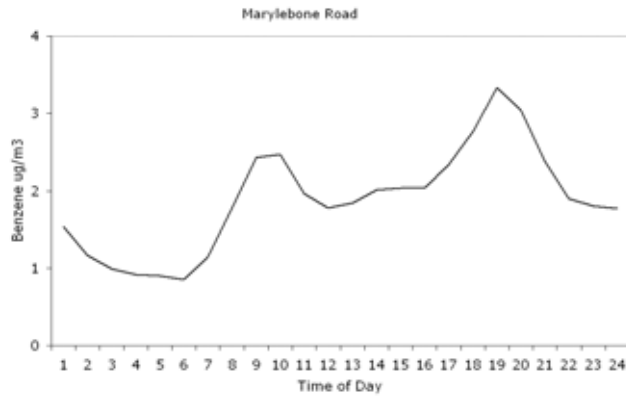
Suburban Site
(London Eltham)



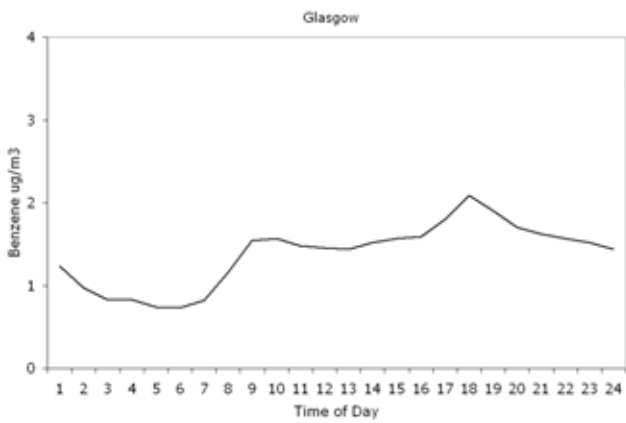
Rural Site
(Harwell)

9.7 Diurnal Variations

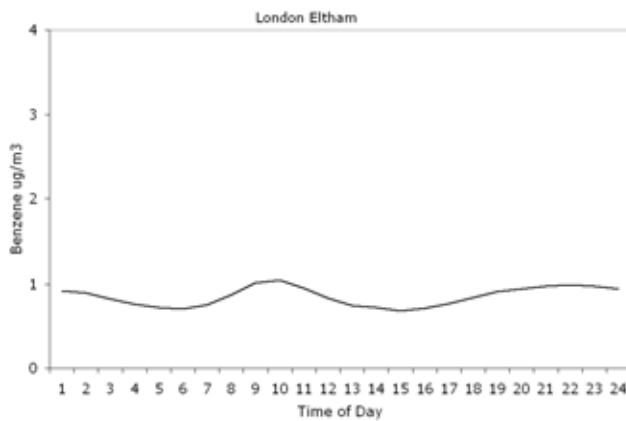
These figures show how benzene concentrations vary on average for each hour of day during 2005, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



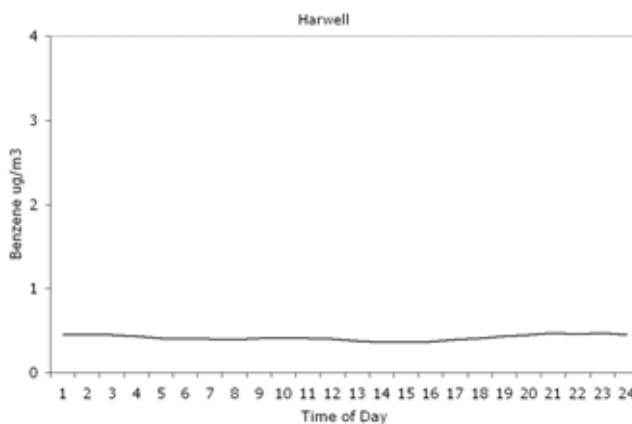
Kerbside Site
(*Marylebone Road*)



Roadside Site
(*Glasgow*)



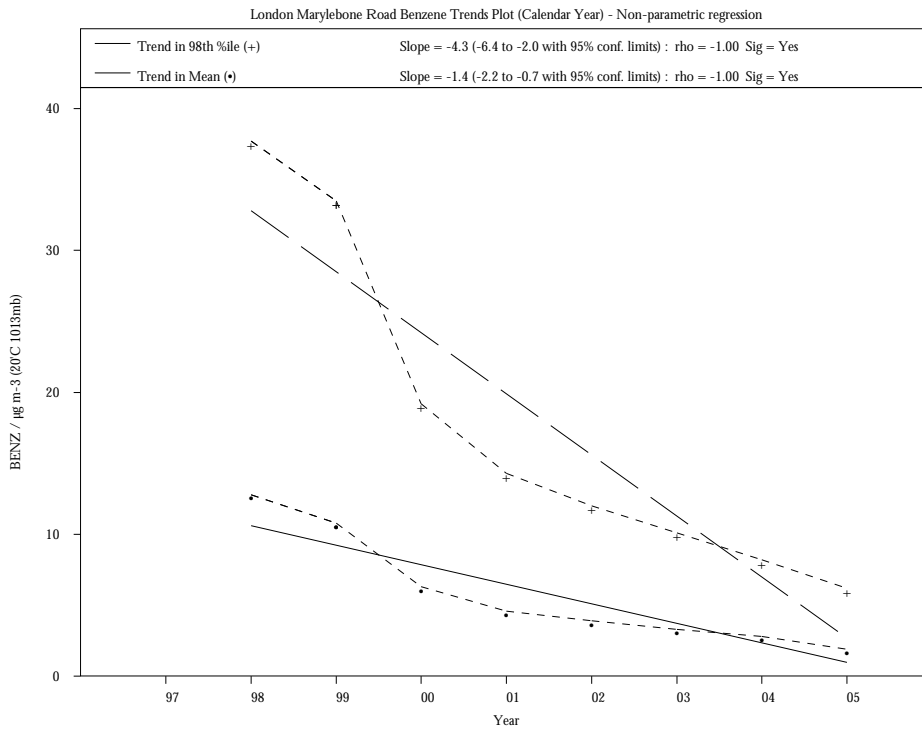
Suburban Site
(*London Eltham*)



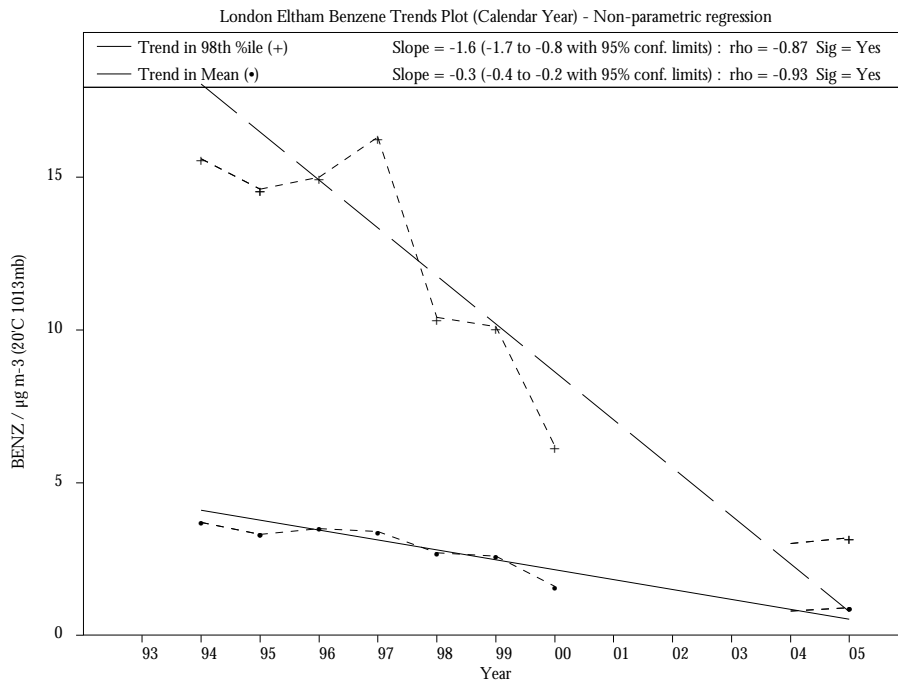
Rural Site
(*Harwell*)

9.8 Trends in annual concentrations

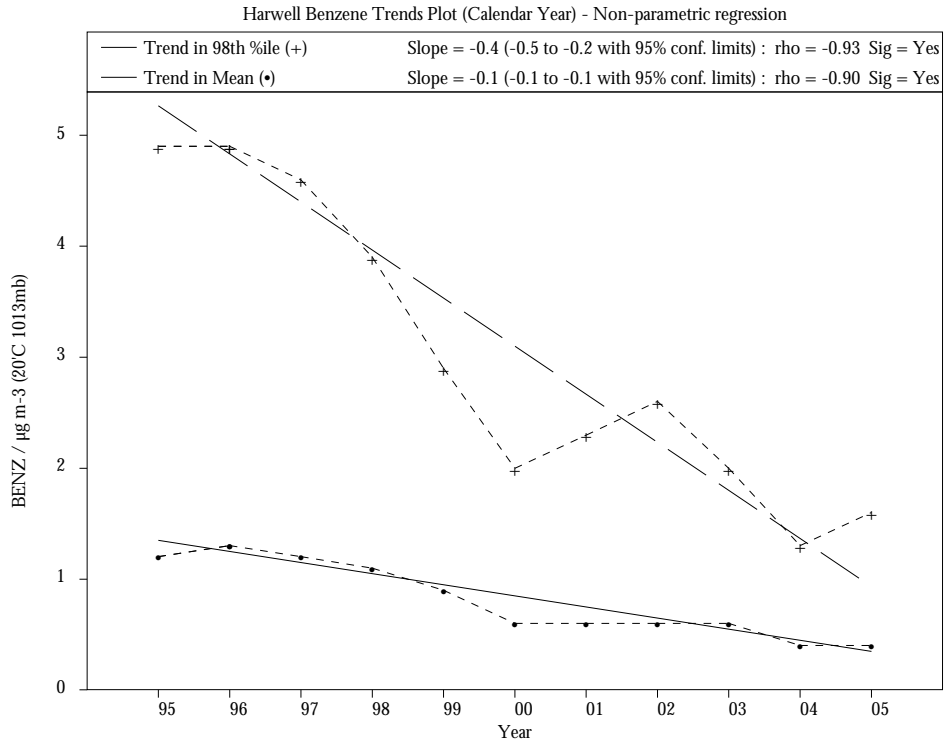
Statistically significant trends in concentrations are shown for sites with at least ≥ 5 years of measurement.



Kerbside Site
(Marylebone Road)



Suburban Site
(London Eltham)



Rural Site
(Harwell)

9.9 Benzene Statistical Summary 2005

i) Annual Statistics

Site	Site Type	Annual Average of hourly means	Annual data capture of hourly means %	Maximum hourly mean
England				
Harwell	RU	0.42	95.2	6.76
London Eltham	SU	0.85	94.8	8.94
London Marylebone Road	KB	2.28	86.0	14.30
Scotland				
Glasgow Kerbside	KB	1.38	93.4	24.86
Wales				
Cardiff Centre	UC	0.91	51.1	8.78

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 Eltham	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

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10. 1,3-Butadiene- Measurement Sites, Instrumentation and Statistics

10.1 Measurement Method

1,3-Butadiene is measured using automated GC or 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.

10.2 Instrumentation

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

- ▶ Environnement VOC 71M
- ▶ Perkin Elmer OPA

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

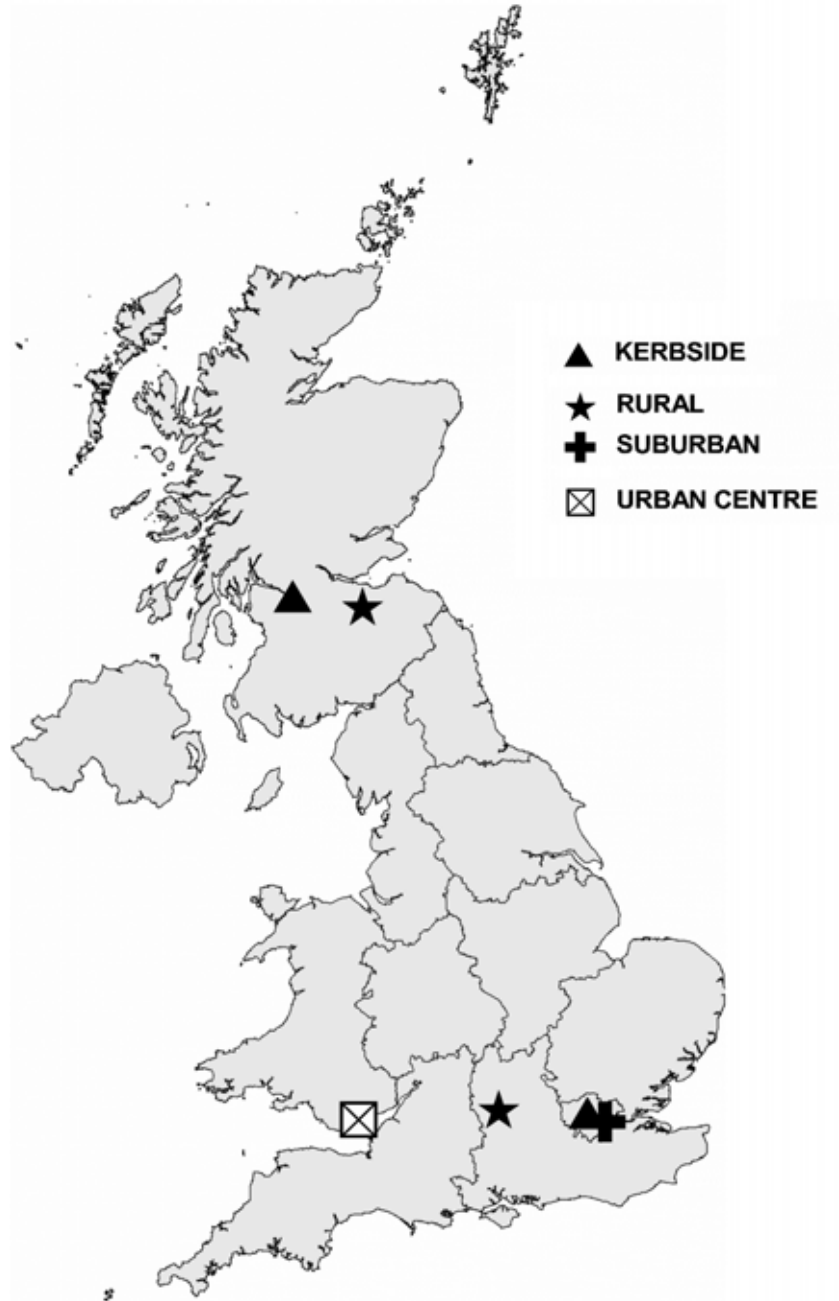
10.3 Objectives and Bandings

Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
1,3-Butadiene	2.25 $\mu\text{g m}^{-3}$	Maximum Running Annual Mean	31 December 2003

No bandings are set for 1,3-Butadine, as there are no known short-term effects of this pollutant.

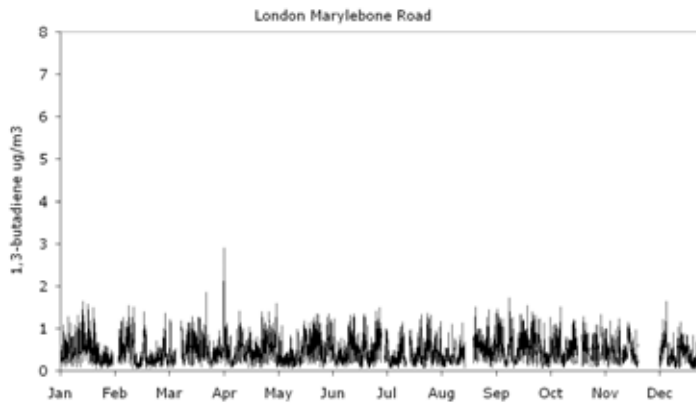
10.4 Site Locations

UK Automatic 1,3-Butadiene Monitoring Sites 2005

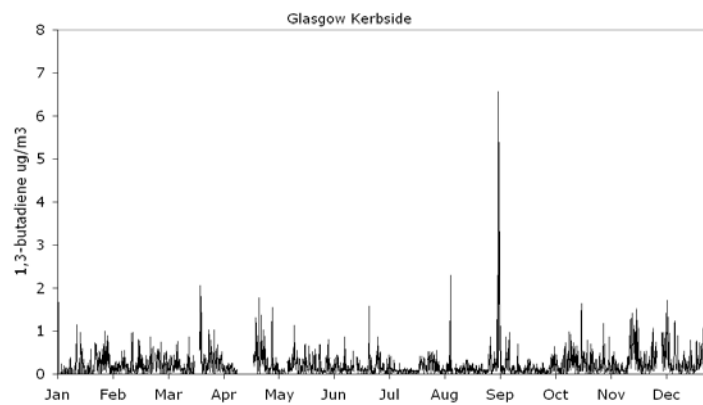


10.5 Hourly Average Concentrations

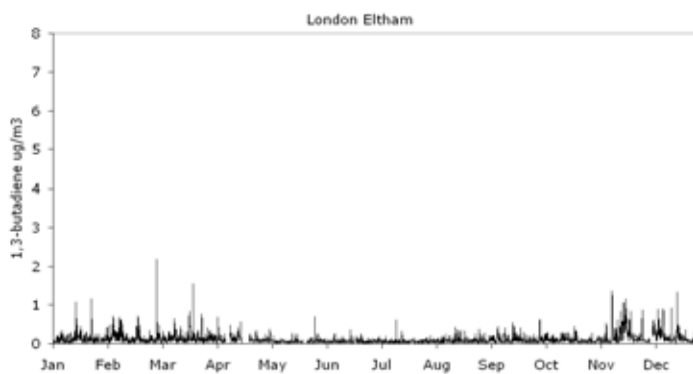
These figures show time series graphs of hourly average 1,3-Butadiene concentrations at four *typical* site types for 2005.



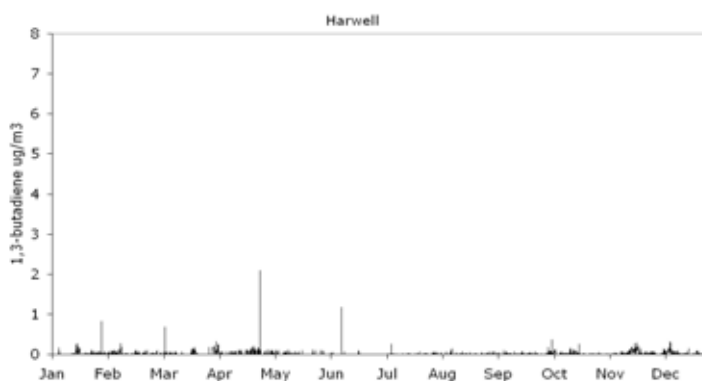
Kerbside Site
(Marylebone Road)



Roadside Site
(Glasgow)



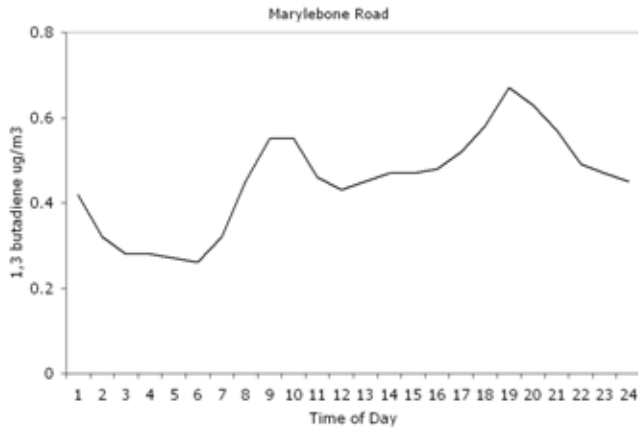
Suburban Site
(London Eltham)



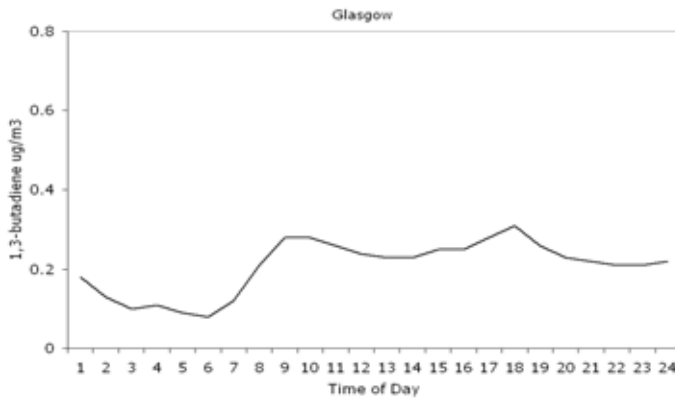
Rural Site
(Harwell)

10.6 Diurnal Variations

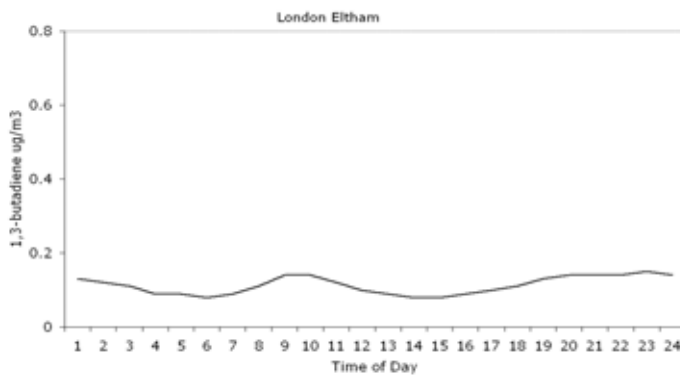
These figures show how 1,3-Butadiene concentrations vary on average for each hour of day during 2005, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



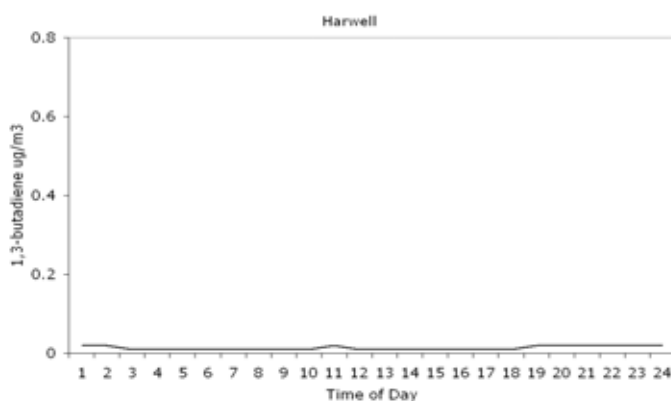
Kerbside Site
(Marylebone Road)



Kerbside Site
(Glasgow)



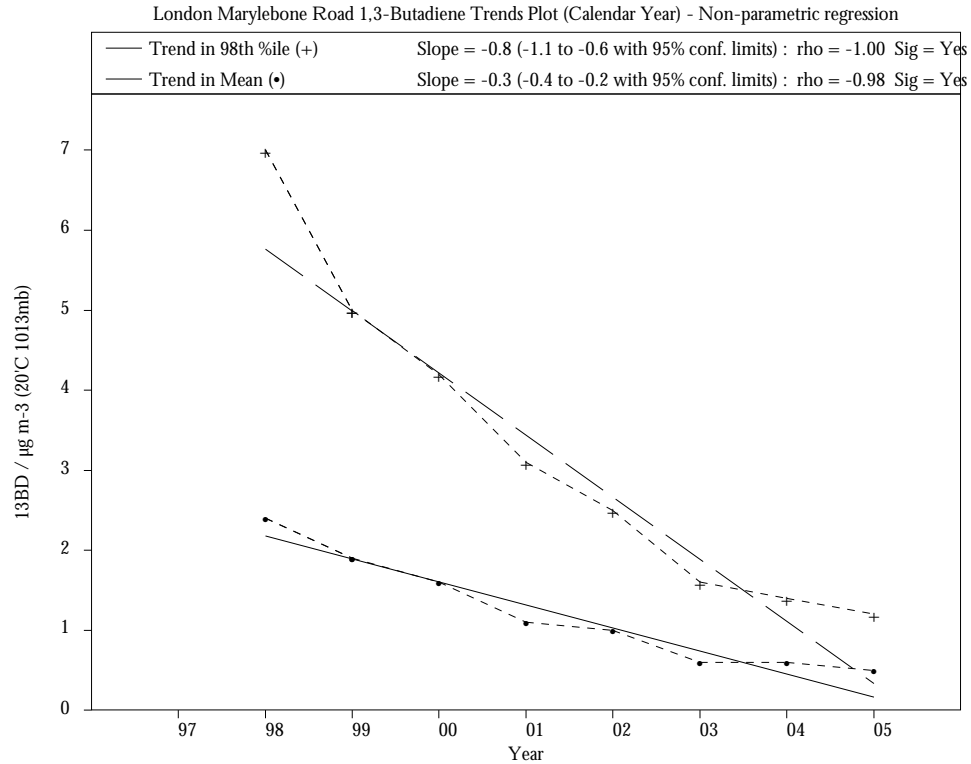
Urban Centre Site
(Cardiff)



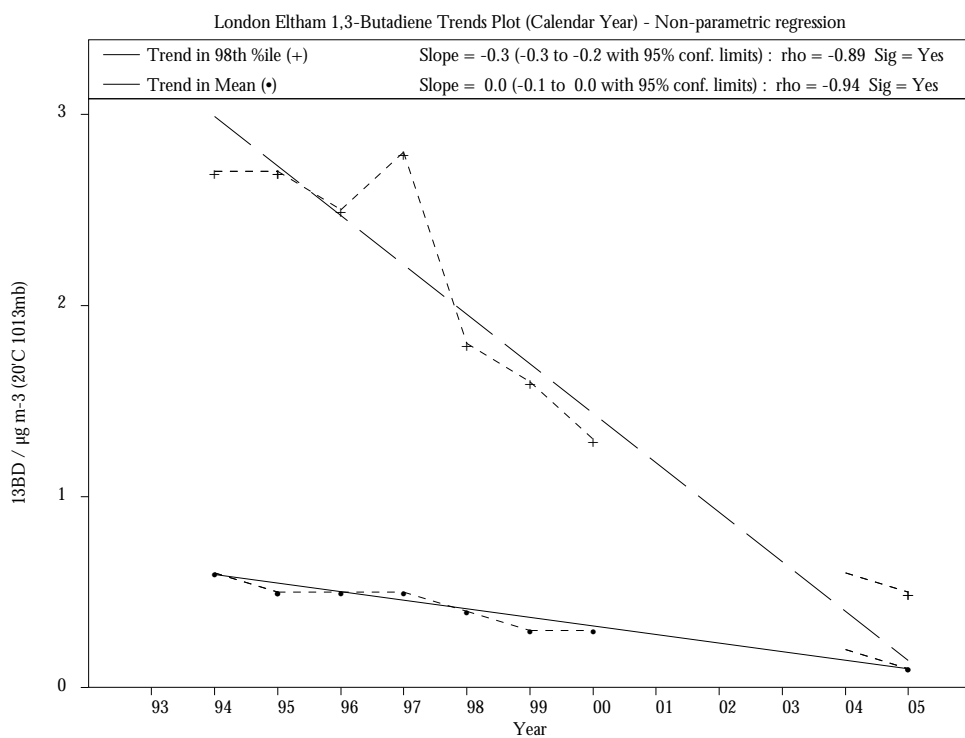
Rural Site
(Harwell)

10.7 Trends in annual concentrations

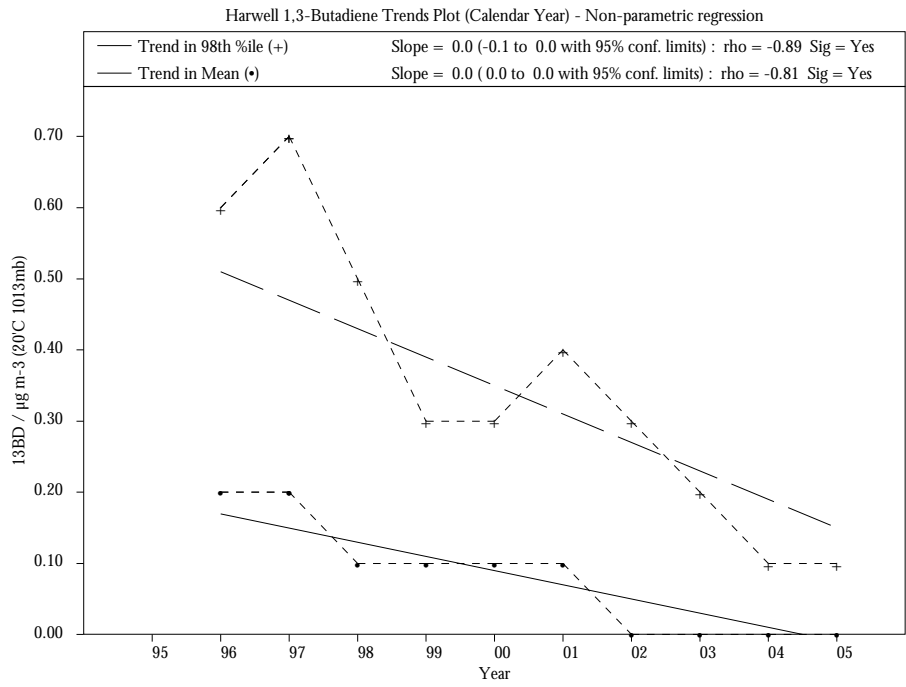
Statistically significant trends in concentrations are shown for sites with at least ≥ 5 years of measurement.



Kerbside Site
(Marylebone Road)



Suburban Site
(London Eltham)



Rural Site
(Harwell)

10.8 1,3-Butadiene Statistical Summary 2005

i) Annual Statistics

Site	Site Type	Annual Average of hourly means	Annual data capture of hourly means %	Maximum hourly mean
England				
Harwell	RU	0.01	95.2	2.09
London Eltham	SU	0.11	93.5	2.18
London Marylebone Road	KB	0.45	89.1	2.90
Scotland				
Glasgow Kerbside	KB	0.21	93.4	6.57
Wales				
Cardiff Centre	UC	0.14	51.1	6.98

ii) Exceedence Statistics

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

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11. CO - Measurement Sites, Instrumentation and Statistics

11.1 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.

11.2 Instrumentation

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

- ▶ Ambirak 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

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

Uncertainty 15%
Minimum data capture 90%

11.4 Objectives and Bandings

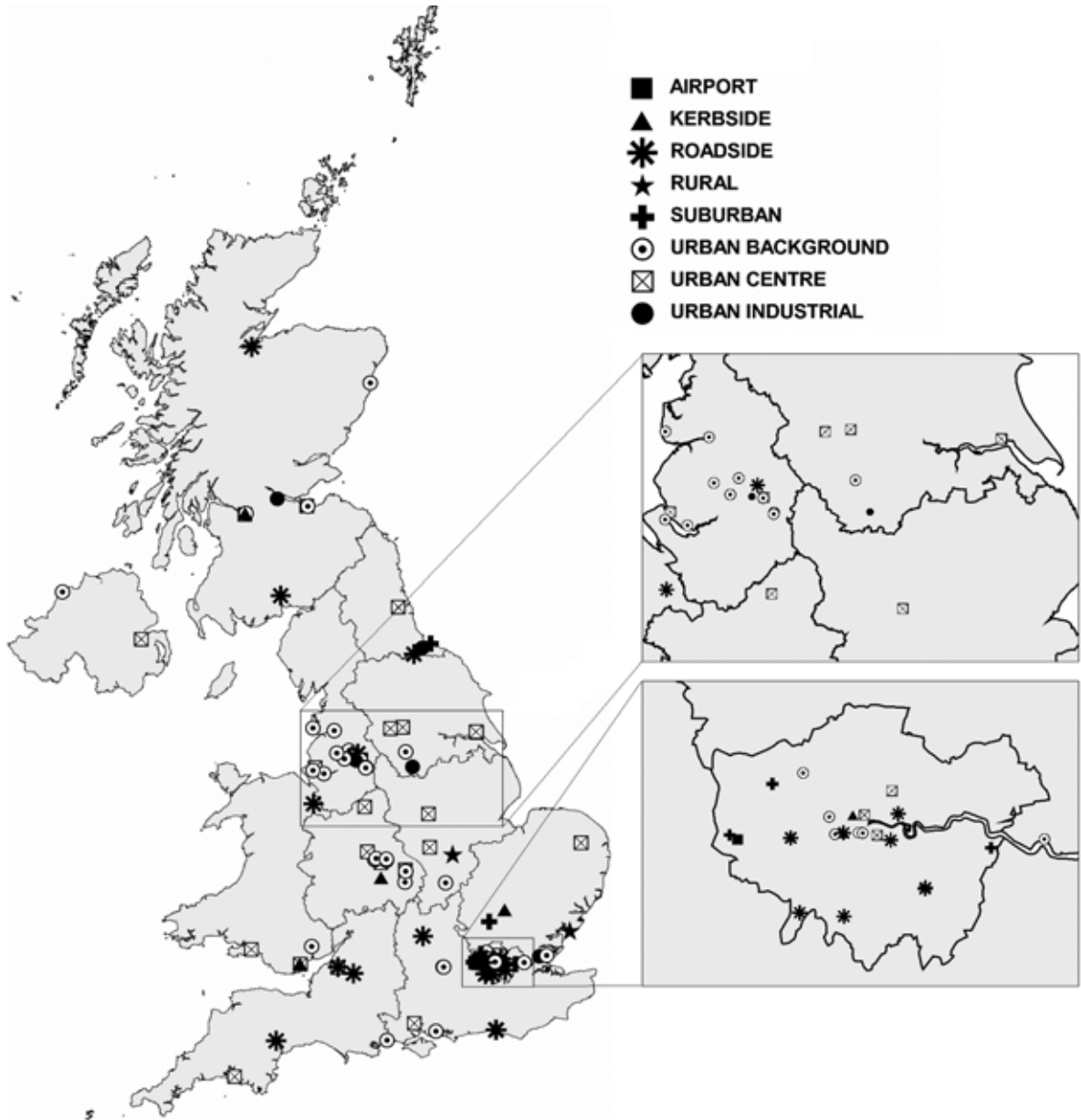
Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
Carbon Monoxide England and Wales	10.0 mg m ⁻³	Maximum daily running 8 Hour Mean	31 December 2003
Scotland only	10.0 mg m ⁻³	Running 8 Hour Mean ^a	31 December 2003
Northern Ireland only	10.0 mg m ⁻³	Maximum 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
Low	1	0-3.8
	2	3.9-7.6
	3	7.7-11.5
Moderate	4	11.6-13.4
	5	13.5-15.4
	6	15.5-17.3
High	7	17.4-19.2
	8	19.3-21.2
	9	21.3-23.1
Very High	10	23.2 or more

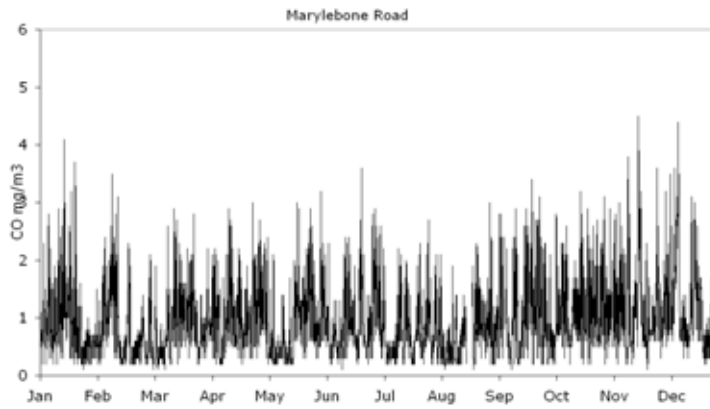
11.5 Site Locations

UK AUTOMATIC CARBON MONOXIDE MONITORING SITES 2005

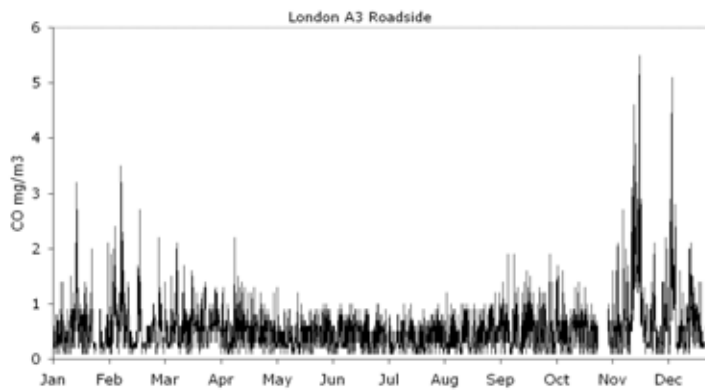


11.6 Hourly Average Concentrations

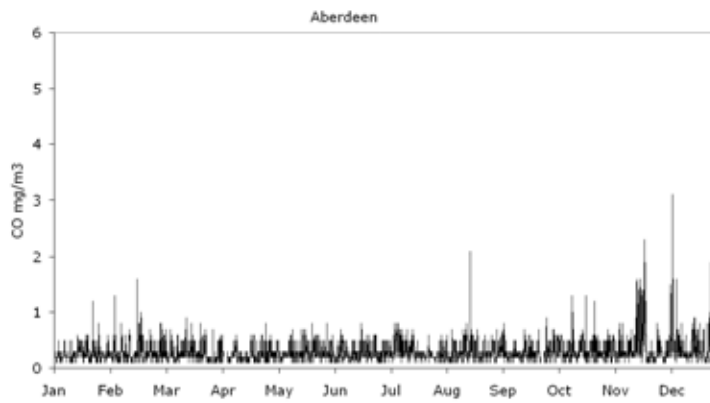
These figures show time series graphs of hourly average carbon monoxide concentrations at four *typical* site types for 2005.



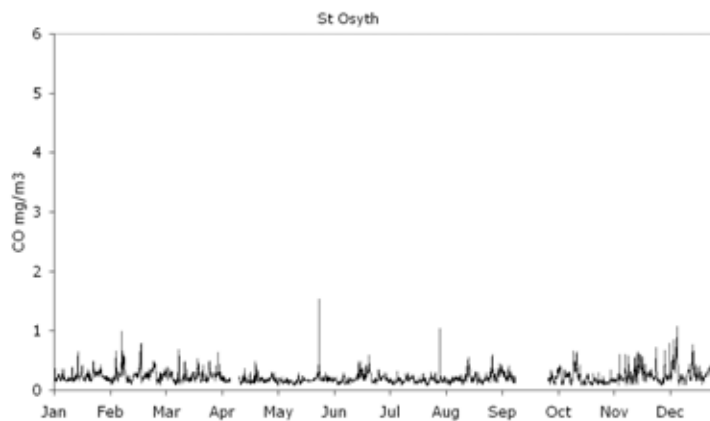
Kerbside Site
(Marylebone Road)



Roadside Site
(London A3)



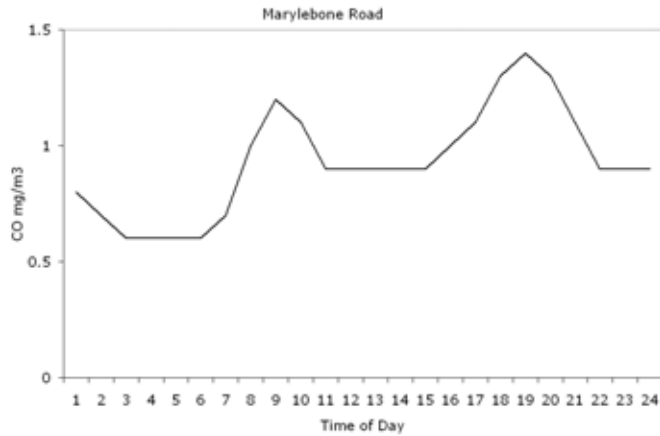
Urban Background Site
(Aberdeen)



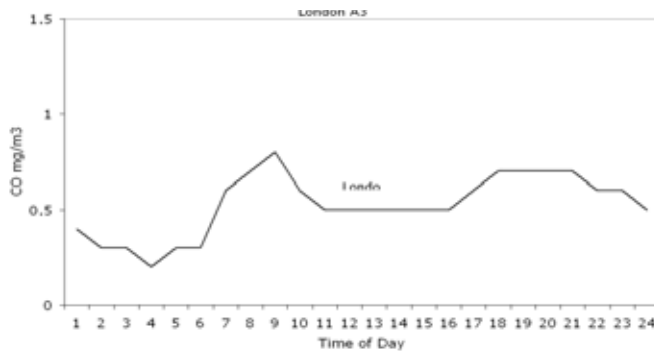
Rural Site
(Harwell)

11.7 Diurnal Variations

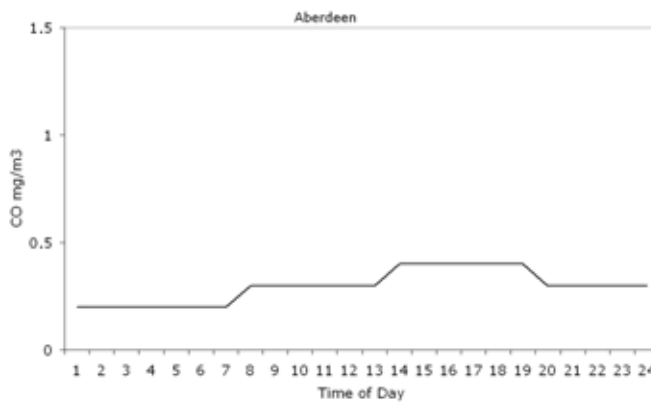
These figures show how carbon monoxide concentrations vary on average for each hour of day during 2005, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



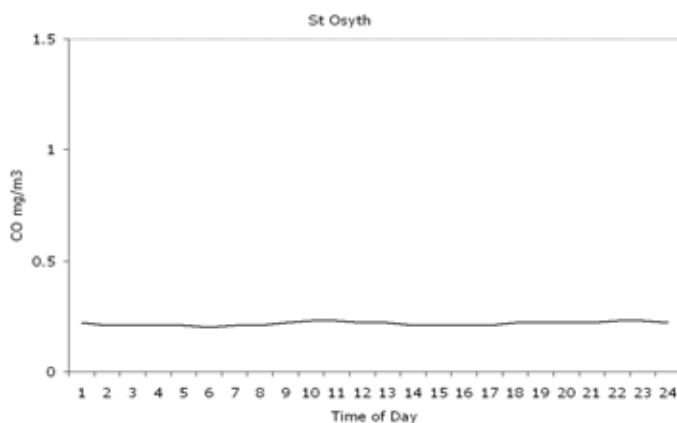
Kerbside Site
(Marylebone Road)



Roadside Site
(London A3)



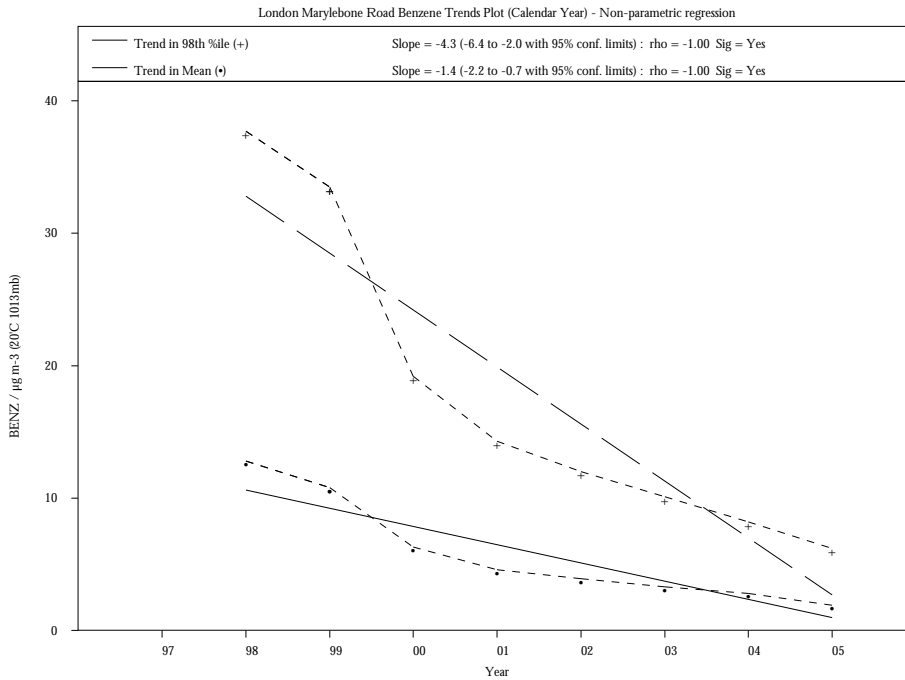
Urban Background Site
(Aberdeen)



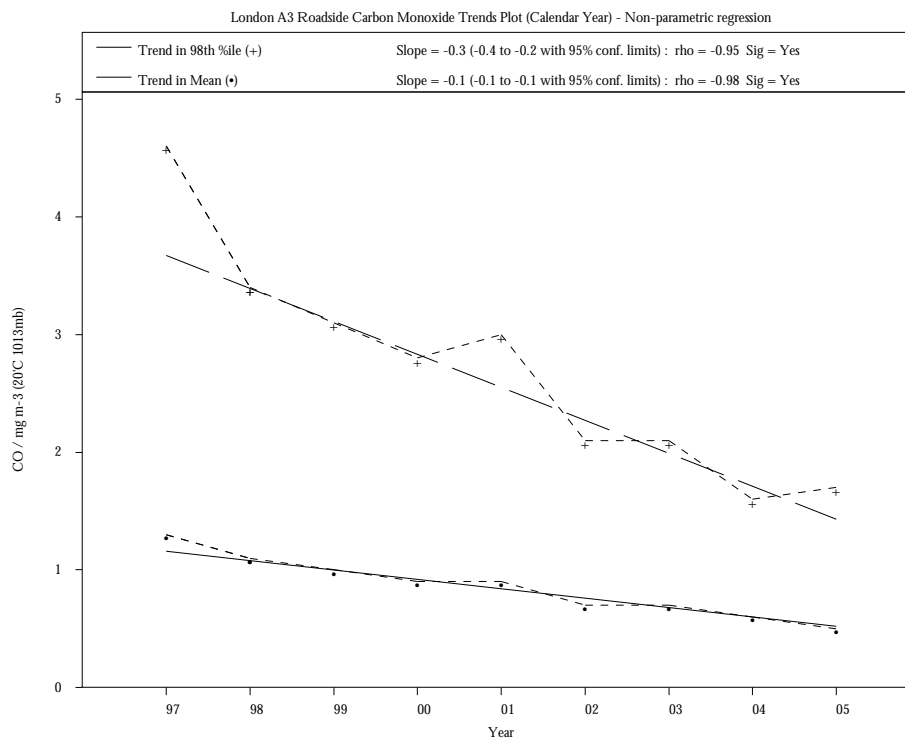
Rural Site
(Harwell)

11.8 Trends in annual concentrations

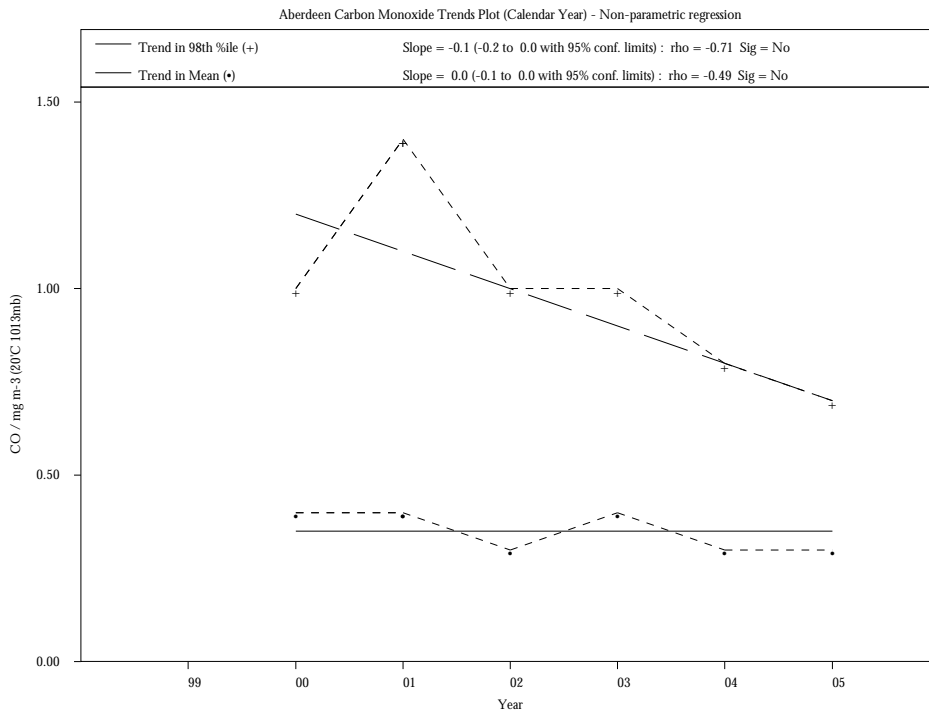
Statistically significant trends in concentrations are shown for sites with at least ≥ 5 years of measurement.



Kerbside Site
(Marylebone Road)



Roadside Site
(London A3)



**Urban
Background Site
(Aberdeen)**

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

11.9 Carbon Monoxide Statistical Summary 2005

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	56.8	2.8	1.6	21/11/2005
Bath Roadside	RD	0.8	93.8	4.5	3.3	30/11/2005
Birmingham Centre	UC	0.3	85.0	2.4	1.4	08/12/2005
Birmingham Tyburn	UB	0.3	99.2	3.8	3.4	20/11/2005
Blackpool Marton	UB	---	49.2	2.0	1.3	20/11/2005
Bolton	UB	0.3	97.8	4.1	2.6	14/01/2005
Bournemouth	UB	0.3	98.4	3.6	2.4	29/11/2005
Bradford Centre	UC	0.4	90.2	4.8	4.1	09/12/2005
Brentford Roadside	RD	0.8	83.6	4.6	4.0	19/11/2005
Brighton Roadside	RD	0.5	90.3	4.5	2.7	21/12/2005
Bristol Centre	UC	0.4	67.8	3.0	1.5	07/02/2005
Bristol Old Market	RD	0.6	99.2	4.6	3.2	17/11/2005
Bury Roadside	RD	0.6	78.0	4.2	3.3	29/11/2005
Coventry Memorial Park	UB	0.2	98.7	2.4	1.7	21/11/2005
Exeter Roadside	RD	0.7	76.9	5.3	2.8	13/01/2005
Hove Roadside	RD	0.4	97.1	3.9	2.1	13/01/2005
Hull Freetown	UC	0.2	62.9	3.0	2.5	21/11/2005
Leamington Spa	UB	0.3	74.6	3.2	2.2	18/11/2005
Leeds Centre	UC	0.3	92.2	3.6	2.8	22/11/2005
Leicester Centre	UC	0.2	97.2	2.9	1.9	19/11/2005
Liverpool Speke	UB	0.2	96.1	3.2	2.1	21/11/2005
London A3 Roadside	RD	0.5	97.0	5.5	4.1	21/11/2005
London Bexley	SU	0.3	97.1	3.1	2.2	09/12/2005
London Bloomsbury	UC	0.5	91.9	3.6	2.9	20/11/2005
London Brent	UB	0.3	56.3	5.1	3.2	10/12/2005
London Bromley	RD	---	46.3	2.7	2.0	13/01/2005
London Cromwell Road 2	RD	0.7	94.0	4.9	3.6	20/11/2005
London Hackney	UC	0.3	95.7	4.5	3.5	09/12/2005
London Harlington	A	0.3	99.3	2.9	2.4	10/12/2005
London Hillingdon	SU	0.5	89.2	4.8	3.0	10/12/2005
London Marylebone Road	KB	---	98.0	---	---	---
London N. Kensington	UB	0.4	96.2	3.7	2.9	20/11/2005
London Southwark	UC	0.4	95.9	3.9	3.2	20/11/2005
London Westminster	UB	0.5	52.0	4.2	3.6	20/11/2005
Manchester Piccadilly	UC	0.4	97.9	3.4	2.5	20/11/2005
Manchester Town Hall	UB	0.4	66.3	2.7	1.9	17/11/2005
Market Harborough	RU	0.2	98.8	1.2	1.1	20/11/2005
Middlesbrough	I	0.3	93.7	2.3	1.5	08/12/2005
Newcastle Centre	UC	0.2	97.4	3.7	2.4	08/12/2005
Northampton	UB	0.2	99.2	3.4	1.6	21/11/2005
Norwich Centre	UC	0.3	96.9	2.7	2.4	09/12/2005
Nottingham Centre	UC	0.4	86.5	4.2	3.1	22/11/2005
Oxford Centre Roadside	RD	0.2	95.7	5.9	2.6	21/11/2005
Plymouth Centre	UC	0.3	97.6	2.3	1.4	20/12/2005
Portsmouth	UB	0.3	94.4	4.2	2.8	30/11/2005
Preston	UB	0.3	79.8	4.5	2.1	20/11/2005
Reading New Town	UB	0.3	80.9	3.8	2.5	14/01/2005
Redcar	UB	0.3	88.2	2.7	1.4	21/11/2005
Salford Eccles	SU	0.2	95.4	4.5	2.9	29/11/2005
Sandwell West Bromwich	I	0.2	89.0	2.3	1.6	17/11/2005
Sheffield Centre	UB	0.4	96.9	3.8	3.0	23/11/2005
Sheffield Tinsley	UC	0.4	99.0	3.5	2.3	23/11/2005
Southampton Centre	I	0.3	87.8	5.0	3.2	20/12/2005
Southend-on-Sea	UC	0.3	94.6	3.0	1.4	04/02/2005
Southwark Roadside	UB	0.7	91.9	4.3	3.4	09/12/2005
St Osyth	RD	0.22	93.0	1.53	0.80	11/12/2005
Stockport Shaw Heath	RU	0.2	75.5	2.4	1.5	22/11/2005
Stockton-on-Tees Yarm	UB	0.4	97.9	3.8	2.2	23/11/2005
Stoke-on-Trent Centre	RD	0.4	93.3	4.9	3.0	20/11/2005

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 Tyburn	0	0	0	0	0	0	0	0	0	0
Blackpool Marton	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	0	0	0	0	0	0	0	0	0	0
London Hackney	0	0	0	0	0	0	0	0	0	0
London Harlington	0	0	0	0	0	0	0	0	0	0
London Hillingdon	0	0	0	0	0	0	0	0	0	0
London Marylebone	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 Roadside	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 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	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

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
Thurrock	UC	0.3	93.9	3.8	2.3	09/12/2005
Tower Hamlets Roadside	UB	0.6	88.3	14.6	6.4	30/06/2005
West London	RD	0.4	93.7	1.9	1.6	13/11/2005
Wigan Centre	UC	0.3	98.3	3.5	2.9	18/11/2005
Wirral Tranmere	UB	0.2	61.3	2.1	1.7	08/12/2005
Wolverhampton Centre	UC	0.4	96.2	4.2	3.0	21/11/2005
N Ireland						
Belfast Centre	UC	0.2	94.4	4.4	3.5	22/11/2005
Derry	UB	0.3	96.3	3.4	2.3	21/11/2005
Scotland						
Aberdeen	UB	0.3	98.9	3.1	1.7	08/12/2005
Dumfries	RD	0.6	97.2	4.6	2.7	08/12/2005
Edinburgh St Leonards	UB	0.3	98.8	2.7	1.7	18/11/2005
Glasgow Centre	UC	0.3	94.6	3.5	2.3	18/11/2005
Glasgow City Chambers	UB	0.4	79.4	2.7	2.0	20/11/2005
Glasgow Kerbside	KB	0.4	91.3	3.9	3.0	13/12/2005
Grangemouth	I	0.3	99.3	2.1	1.4	17/11/2005
Inverness	RD	0.5	97.3	3.9	2.4	18/11/2005
Wales						
Cardiff Centre	UC	0.4	58.3	2.6	1.7	30/11/2005
Cwmbran	UB	---	29.4	3.1	2.1	14/01/2005
Swansea	UC	0.3	97.3	3.8	1.8	21/03/2005
Wrexham	UC	0.6	98.6	4.6	2.3	21/11/2005

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
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 Centre	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
Scotland										
Aberdeen	0	0	0	0	0	0	0	0	0	0
Dumfries	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

12. NO₂ - 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:

- ▶ Ambirak 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%

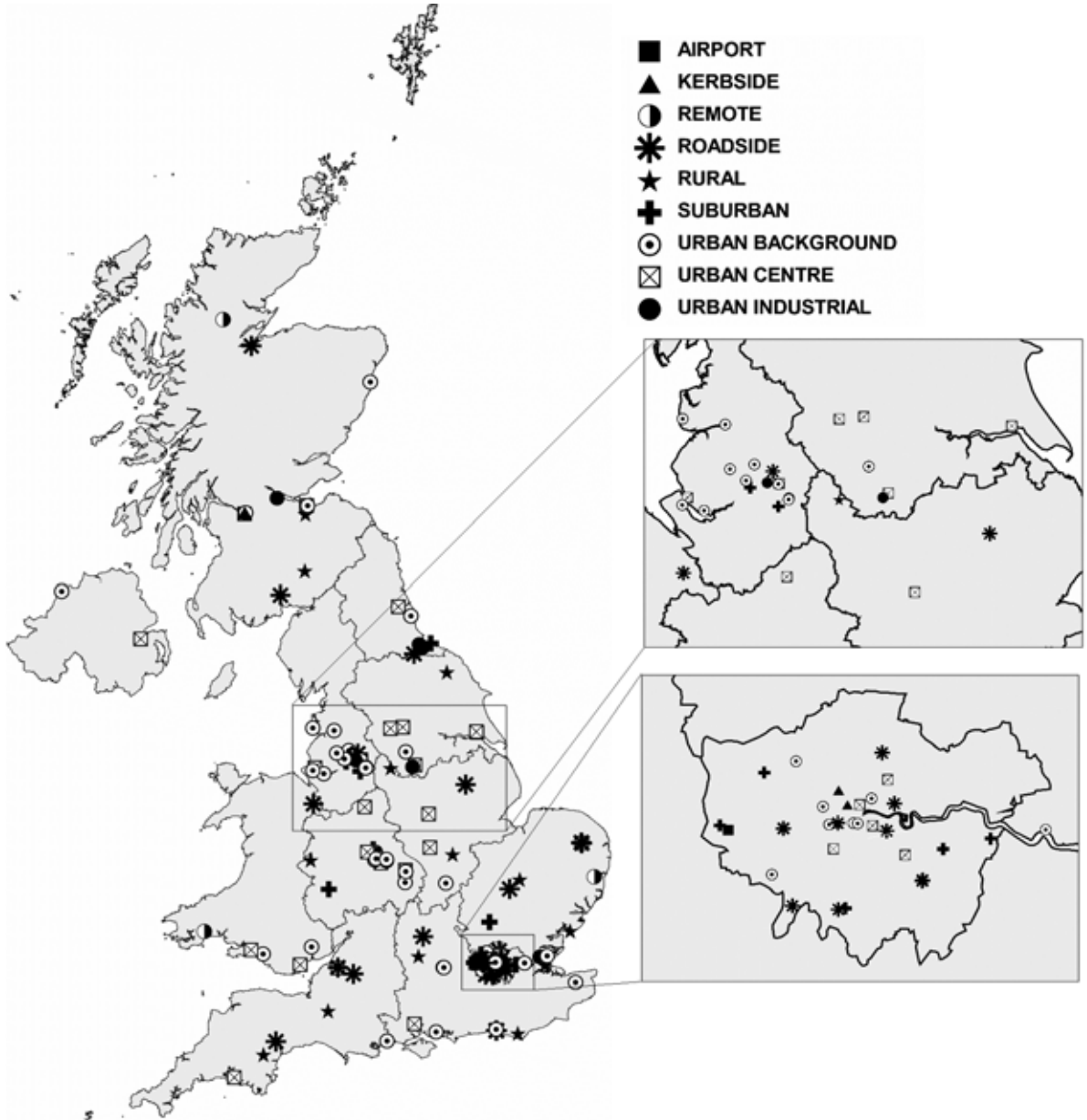
12.4 Objectives and Bandings

Summary of objectives of the 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 m ⁻³
Low	1	0-95
	2	96-190
	3	191-286
Moderate	4	287-381
	5	382-477
	6	478-572
High	7	573-635
	8	636-700
	9	701-763
Very High	10	764 or more

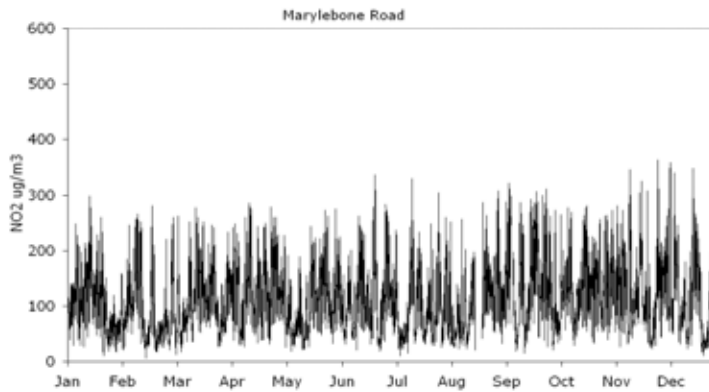
12.5 Site Locations

UK AUTOMATIC NITROGEN DIOXIDE MONITORING SITES 2005

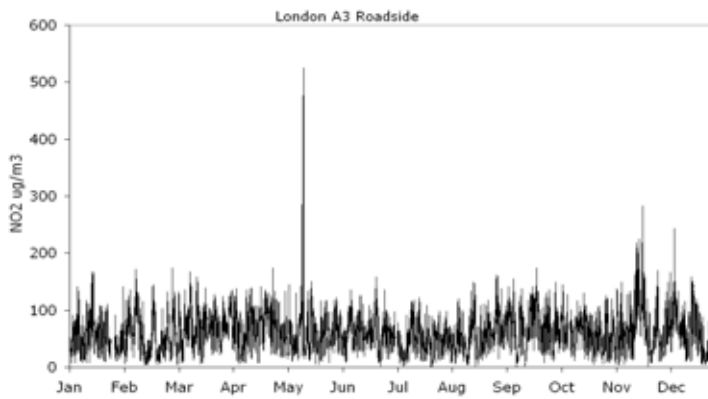


12.6 Hourly Average Concentrations

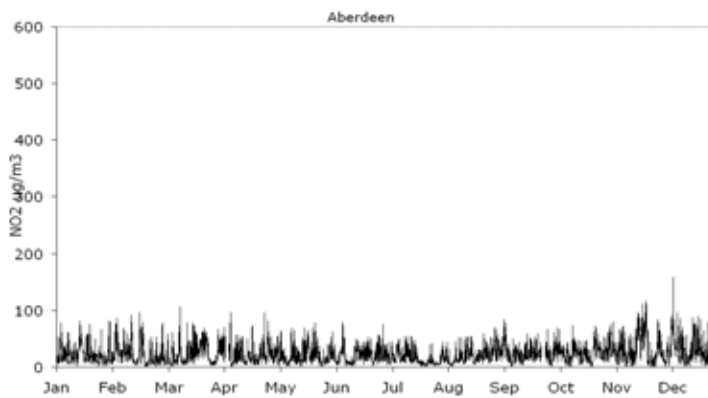
These figures show time series graphs of hourly average nitrogen dioxide concentrations at four *typical* site types for 2005.



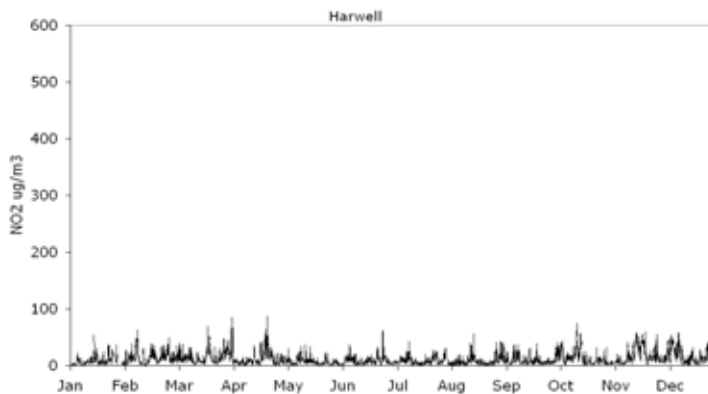
Kerbside Site
(*Marylebone Road*)



Roadside Site
(*London A3*)



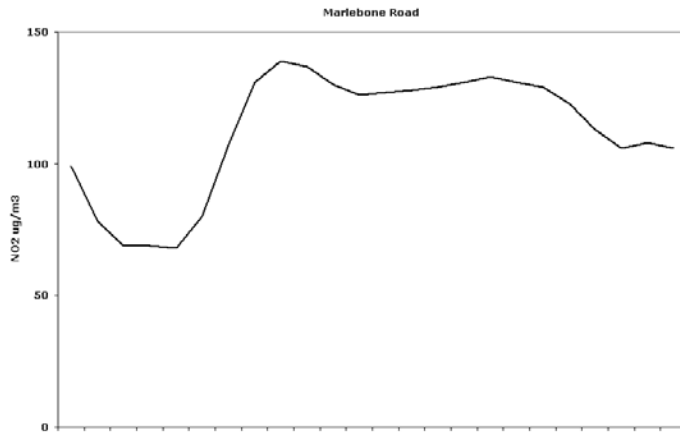
Urban Background Site
(*Aberdeen*)



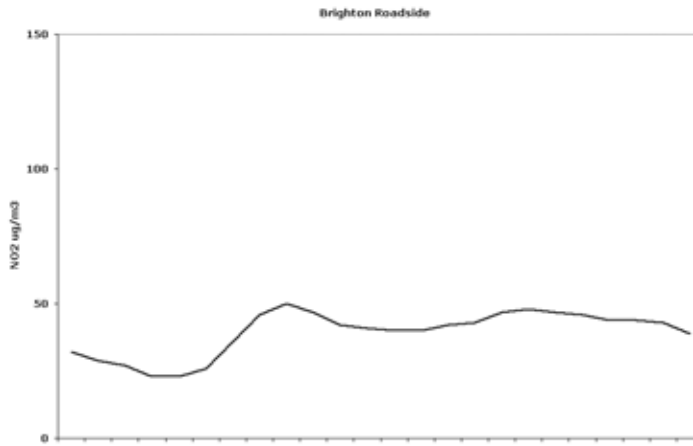
Rural Site
(*Harwell*)

12.7 Diurnal Variations

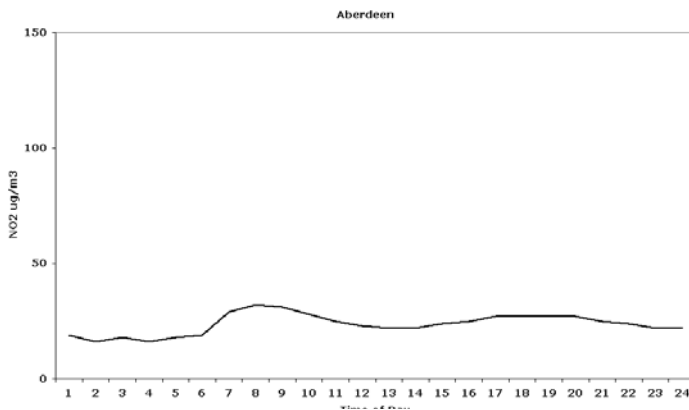
These figures show how nitrogen dioxide concentrations vary on average for each hour of day during 2005, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



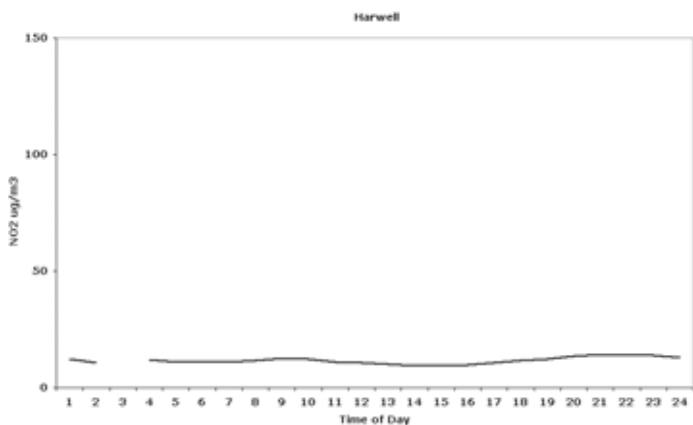
Kerbside Site
(*Marlebone Road*)



Roadside Site
(*Brighton*)



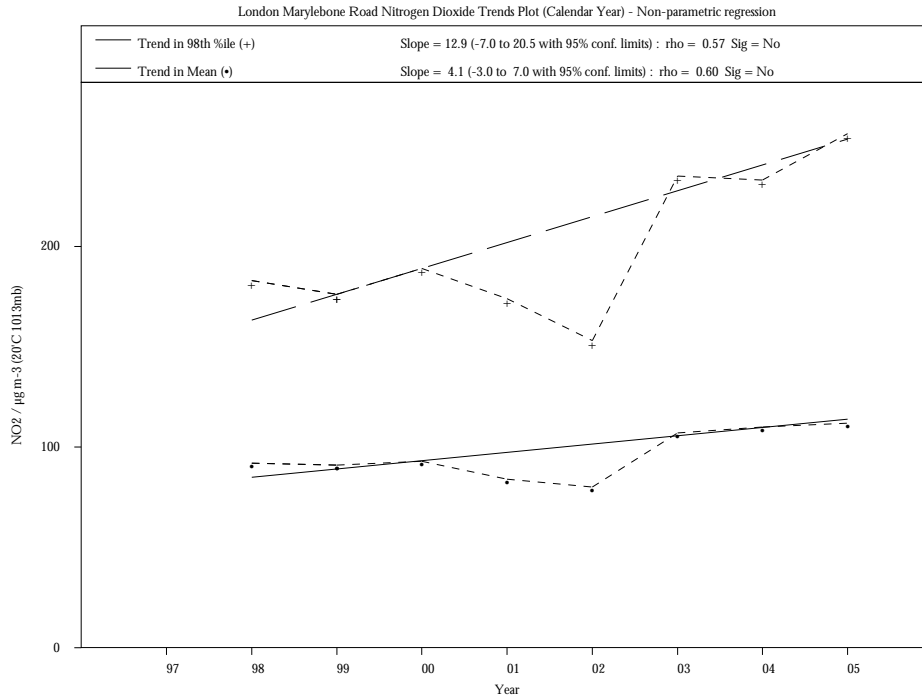
Urban Background Site
(*Aberdeen*)



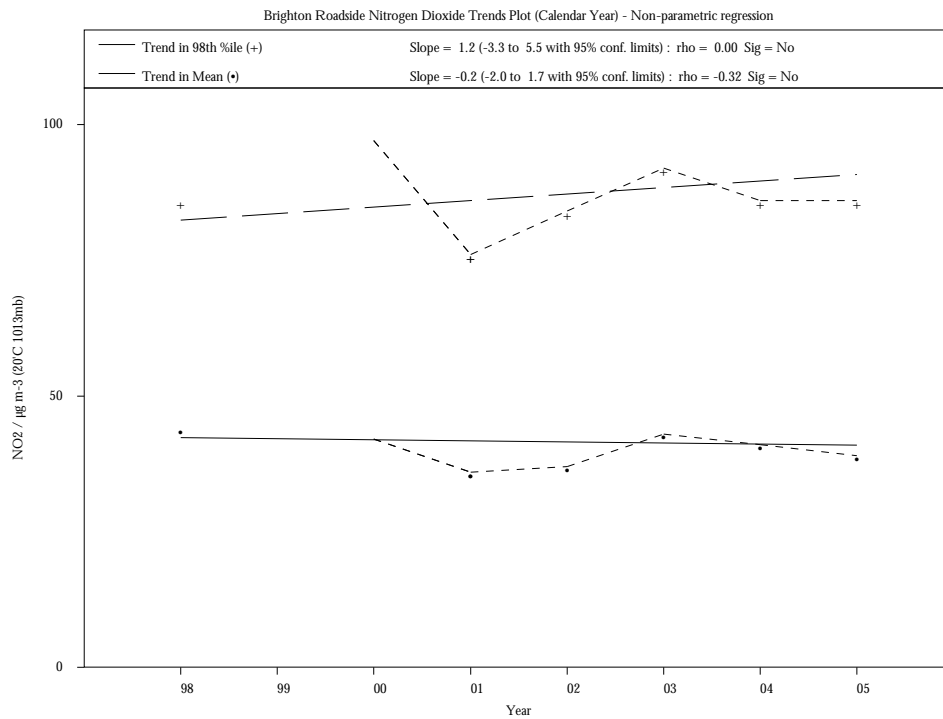
Rural Site
(*Harwell*)

12.8 Trends in annual concentrations

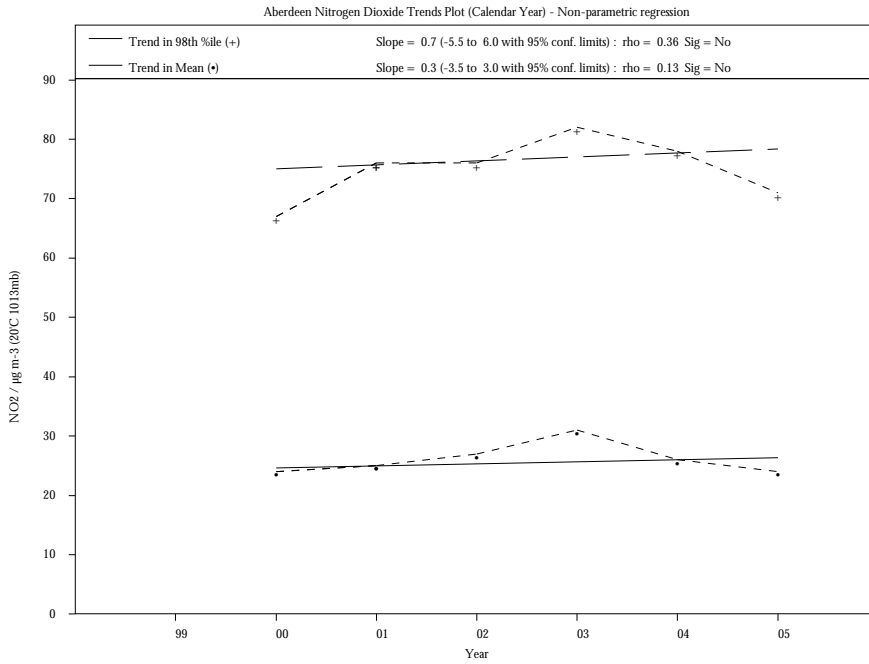
Statistically significant trends in concentrations are shown for sites with at ≥ 5 years of measurement.



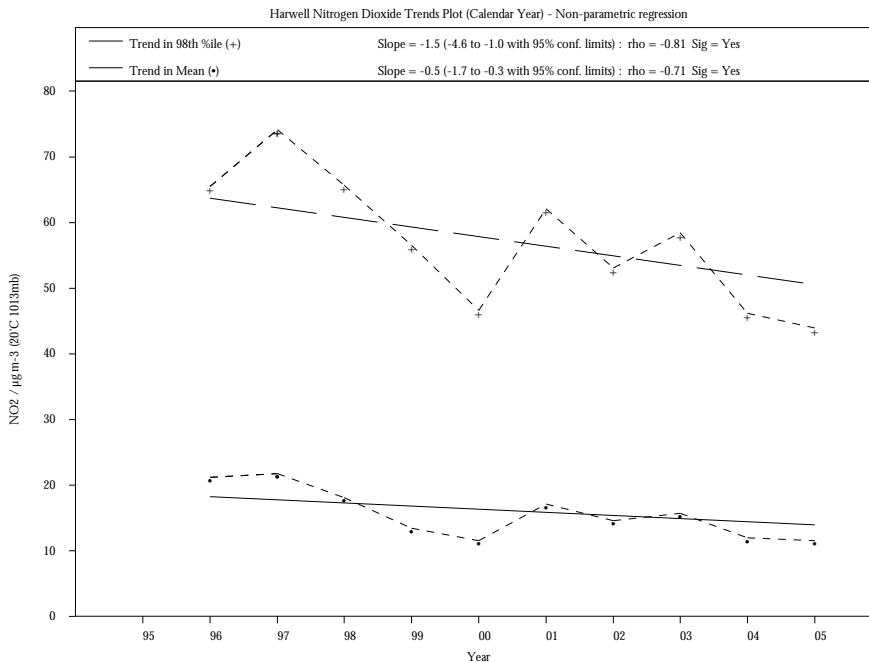
Kerbside Site
(Marylebone Road)



Roadside Site
(Brighton)



Urban Background
(Aberdeen)



Rural Site
(Harwell)

12.9 Nitrogen Dioxide Statistical Summary 2005

i) ANNUAL STATISTICS- I

Site	Site Type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$	99.8%ile of hourly means $\mu\text{g m}^{-3}$
England					
Barnsley Gawber	UB	20	81.0	132	94
Bath Roadside	RD	64	93.8	208	170
Billingham	I	27	97.5	252	147
Birmingham Centre	UC	33	81.1	128	99
Birmingham Tyburn	UB	34	99.0	212	147
Blackpool Marton	UB	19	52.1	105	90
Bolton	UB	25	58.9	111	90
Bournemouth	UB	18	94.4	118	82
Bradford Centre	UC	29	88.4	139	109
Brentford Roadside	RD	49	99.4	250	172
Brighton Preston Park	UB	22	96.3	134	94
Brighton Roadside	RD	39	99.0	164	118
Bristol Centre	UC	34	68.7	185	115
Bristol Old Market	RD	60	98.9	258	204
Bury Roadside	RD	64	90.4	183	162
Cambridge Roadside	RD	45	96.4	239	109
Camden Kerbside	KB	76	84.8	308	204
Canterbury	UB	17	95.5	118	71
Coventry Memorial Park	UB	22	98.9	134	101
Exeter Roadside	RD	43	83.4	189	155
Glazebury	SU	17.8	91.6	144.2	112.7
Haringey Roadside	RD	43	97.0	202	139
Harwell	RU	11.6	91.4	87.7	63.6
High Muffles	RU	7.5	88.7	61.1	54.6
Hove Roadside	RD	36	95.7	139	107
Hull Freetown	UC	21	66.2	97	82
Ladybower	RU	8.6	91.8	68.8	47.9
Leamington Spa	UB	25	69.8	118	88
Leeds Centre	UC	31	91.9	162	97
Leicester Centre	UC	33	97.0	201	136
Leominster	SU	---	42.4	90	---
Liverpool Speke	UB	24	98.2	149	113
London A3 Roadside	RD	61	98.0	525	212
London Bexley	SU	36	95.3	168	124
London Bloomsbury	UC	57	93.8	222	124
London Brent	UB	33	89.0	180	128
London Bromley	RD	49	94.9	202	141
London Cromwell Road 2	RD	79	93.7	246	183
London Eltham	SU	29	84.5	141	99
London Hackney	UC	49	97.2	260	191
London Harlington	A	38	99.0	202	113
London Hillingdon	SU	45	93.6	185	132
London Lewisham	UC	51	99.2	233	174
London Marylebone Road	KB	112	97.7	363	311
London N. Kensington	UB	40	95.8	237	185
London Southwark	UC	49	98.7	183	139
London Teddington	UB	25.5	94.6	125.5	97.6
London Wandsworth	UC	54	96.4	262	166
London Westminster	UB	48	82.6	183	130
Lullington Heath	RU	10.1	86.1	79.1	62.1
Manchester Piccadilly	UC	---	48.6	279	---
Manchester South	SU	---	6.5	59	---
Manchester Town Hall	UB	43	94.9	183	141
Market Harborough	RU	12.7	93.2	72.6	59.2
Middlesbrough	I	25	92.6	514	124
Newcastle Centre	UC	28	95.2	166	92

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 Standard	Days
England									
Barnsley Gawber	0	0	0	0	0	0	0	0	0
Bath Roadside	0	0	0	0	0	0	1	3	3
Billingham	0	0	0	0	0	0	0	3	3
Birmingham Centre	0	0	0	0	0	0	0	0	0
Birmingham Tyburn	0	0	0	0	0	0	0	2	1
Blackpool Marton	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	0	0
Brentford Roadside	0	0	0	0	0	0	1	3	3
Brighton Preston Park	0	0	0	0	0	0	0	0	0
Brighton Roadside	0	0	0	0	0	0	0	0	0
Bristol Centre	0	0	0	0	0	0	0	0	0
Bristol Old Market	0	0	0	0	0	0	1	22	8
Bury Roadside	0	0	0	0	0	0	1	0	0
Cambridge Roadside	0	0	0	0	0	0	1	1	1
Camden Kerbside	1	1	0	0	0	0	1	17	11
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
Glazebury	0	0	0	0	0	0	0	0	0
Haringey Roadside	0	0	0	0	0	0	1	1	1
Harwell	0	0	0	0	0	0	0	0	0
High Muffles	0	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	1	1
Leominster	0	0	0	0	0	0	---	0	0
Liverpool Speke	0	0	0	0	0	0	0	0	0
London A3 Roadside	3	1	0	0	0	0	1	23	6
London Bexley	0	0	0	0	0	0	0	0	0
London Bloomsbury	0	0	0	0	0	0	1	1	1
London Brent	0	0	0	0	0	0	0	0	0
London Bromley	0	0	0	0	0	0	1	1	1
London Cromwell Road 2	0	0	0	0	0	0	1	9	4
London Eltham	0	0	0	0	0	0	0	0	0
London Hackney	0	0	0	0	0	0	1	15	5
London Harlington	0	0	0	0	0	0	0	1	1
London Hillingdon	0	0	0	0	0	0	1	0	0
London Lewisham	0	0	0	0	0	0	1	3	2
London Marylebone Road	51	25	0	0	0	0	1	853	155
London N. Kensington	0	0	0	0	0	0	0	14	3
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	10	2
London Westminster	0	0	0	0	0	0	1	0	0
Lullington Heath	0	0	0	0	0	0	0	0	0
Manchester Piccadilly	0	0	0	0	0	0	---	6	3
Manchester South	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	0
Middlesbrough	1	1	0	0	0	0	0	4	4
Newcastle Centre	0	0	0	0	0	0	0	0	0

iii) ANNUAL STATISTICS- II

Site	Site type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$	99.8%ile of hourly means $\mu\text{g m}^{-3}$
Northampton	UB	23	52.0	101	80
Norwich Centre	UC	23	83.1	82	71
Norwich Forum Roadside		34	70.1	105	88
Norwich Roadside	RD	---	11.8	88	---
Nottingham Centre	UC	33	91.9	149	113
Oxford Centre Roadside	RD	67	97.7	246	191
Plymouth Centre	UC	25	98.0	287	94
Portsmouth	UB	23	98.0	136	88
Preston	UB	22	73.9	71	65
Reading New Town	UB	23	95.3	132	96
Redcar	SU	25	50.7	88	82
Rochester	RU	18.8	95.3	89.8	75.3
Rotherham Centre	UC	34	92.5	164	118
Salford Eccles	I	39	83.2	208	160
Sandwell West Bromwich	UB	27	96.2	136	101
Sheffield Centre	UC	35	66.0	88	82
Sheffield Tinsley	I	32	97.4	244	145
Somerton	RU	8.3	87.1	55.4	50.8
Southampton Centre	UC	31	87.2	113	88
Southend-on-Sea	UB	23	91.9	149	88
Southwark Roadside	RD	60	98.8	218	162
St Osyth	RU	16.2	93.0	86.1	72.4
Stockport Shaw Heath	UB	31	91.0	145	118
Stockton-on-Tees Yarm	RD	34	99.1	275	117
Stoke-on-Trent Centre	UC	33	95.6	166	132
Sunderland Silksworth	UB	16	92.7	124	84
Thurrock	UB	35	84.7	139	107
Tower Hamlets Roadside	RD	61	99.0	202	147
Walsall Alumwell	UB	42	99.0	311	145
Walsall Willenhall	SU	28	69.6	147	118
West London	UB	50	94.6	202	134
Wicken Fen	RU	10.6	98.7	75.4	57.1
Wigan Centre	UB	25	97.6	118	97
Wirral Tranmere	UB	17	63.9	120	84
Wolverhampton Centre	UC	28	91.6	267	117
Yarner Wood	RU	9.2	81.5	45.5	37.4
N Ireland					
Belfast Centre	UC	33	54.5	254	168
Derry	UB	12	92.0	107	61
Scotland					
Aberdeen	UB	24	96.6	159	94
Bush Estate	RU	---	45.7	66.1	---
Dumfries	RD	36	96.8	243	134
Edinburgh St Leonards	UC	25	96.0	134	94
Eskdalemuir	RU	3.8	92.8	47.0	25.2
Glasgow Centre	UC	33	95.6	225	143
Glasgow City Chambers	UB	46	94.6	187	136
Glasgow Kerbside	KB	62	98.3	269	189
Grangemouth	I	16	99.2	120	101
Inverness	RD	21	95.1	130	99
Wales					
Aston Hill	RU	4.7	97.8	75.6	44.7
Cardiff Centre	UC	35	56.3	117	109
Cwmbran	UB	17	99.3	94	80
Narberth	RU	5.0	92.2	57.7	41.4
Port Talbot	UB	19	97.1	101	74
Swansea	UC	34	94.7	138	105
Wrexham	RD	19	94.6	113	76

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 Standard	Days
Northampton	0	0	0	0	0	0	0	0	0
Norwich Centre	0	0	0	0	0	0	0	0	0
Norwich Forum Roadside	0	0	0	0	0	0	0	0	0
Norwich Roadside	0	0	0	0	0	0	---	0	0
Nottingham Centre	0	0	0	0	0	0	0	0	0
Oxford Centre Roadside	0	0	0	0	0	0	1	12	7
Plymouth Centre	1	1	0	0	0	0	0	2	2
Portsmouth	0	0	0	0	0	0	0	0	0
Preston	0	0	0	0	0	0	0	0	0
Reading New Town	0	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	4	2
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	0	3	1
Somerton	0	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	0	0
Stockton-on-Tees Yarm	0	0	0	0	0	0	0	1	1
Stoke-on-Trent Centre	0	0	0	0	0	0	0	0	0
Sunderland Silksworth	0	0	0	0	0	0	0	0	0
Thurrock	0	0	0	0	0	0	0	0	0
Tower Hamlets Roadside	0	0	0	0	0	0	1	1	1
Walsall Alumwell	2	1	0	0	0	0	1	3	1
Walsall Willenhall	0	0	0	0	0	0	0	0	0
West London	0	0	0	0	0	0	1	1	1
Wicken Fen	0	0	0	0	0	0	0	0	0
Wigan Centre	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	0
N Ireland									
Belfast Centre	0	0	0	0	0	0	0	4	3
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	1	1
Edinburgh St Leonards	0	0	0	0	0	0	0	0	0
Eskdalemuir	0	0	0	0	0	0	0	0	0
Glasgow Centre	0	0	0	0	0	0	0	1	1
Glasgow City Chambers	0	0	0	0	0	0	1	0	0
Glasgow Kerbside	0	0	0	0	0	0	1	9	5
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	0
Cardiff Centre	0	0	0	0	0	0	0	0	0
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

13. NO_x- Measurement Sites, Instrumentation and Statistics

13.1 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).

13.2 Instrumentation

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

- ▶ Ambirak 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

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

Uncertainty 15%
Minimum data capture 90%

13.4 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. Also note this objective is for the protection of vegetation and ecosystems

No bandings are set for oxides of nitrogen, as there are no known short-term effects of this pollutant.

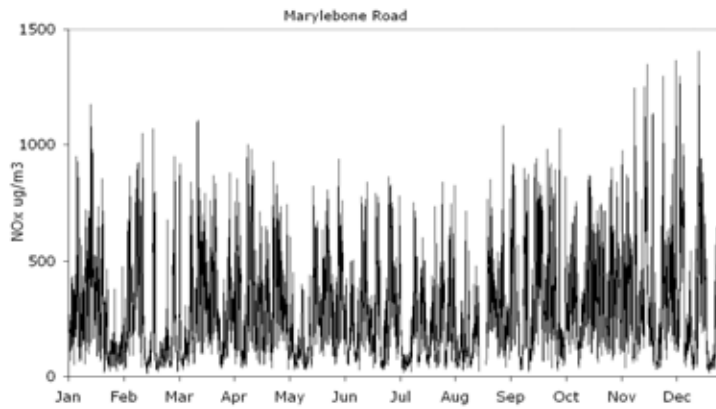
13.5 Site Locations

UK AUTOMATIC NITROGEN OXIDES MONITORING SITES 2005

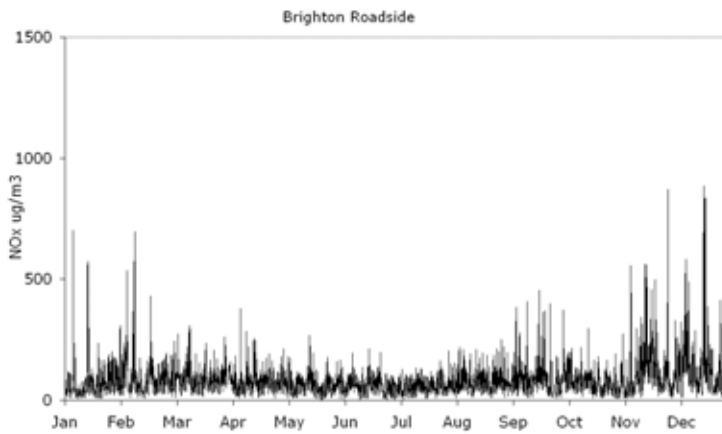


13.6 Hourly Average Concentrations

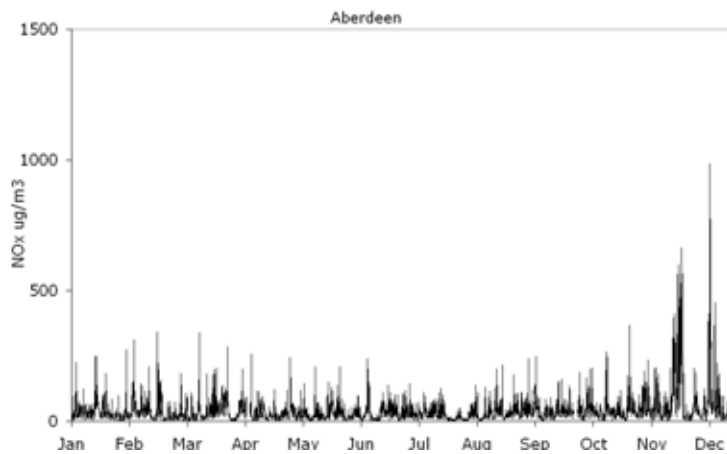
These figures show time series graphs of hourly average nitrogen oxides concentrations at four *typical* site types for 2005.



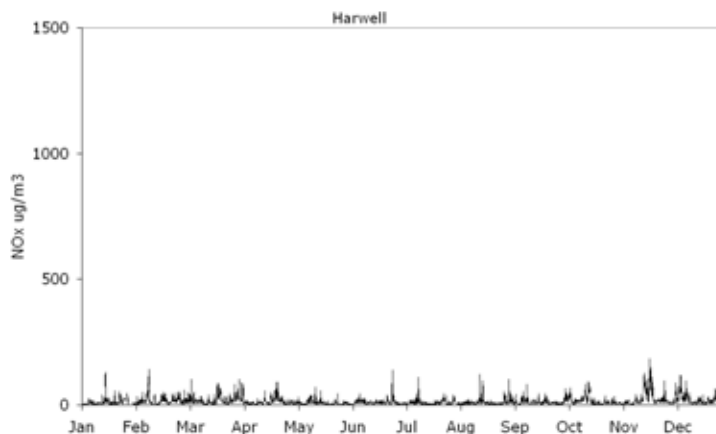
Kerbside Site
(Marylebone Road)



Roadside Site
(Brighton)



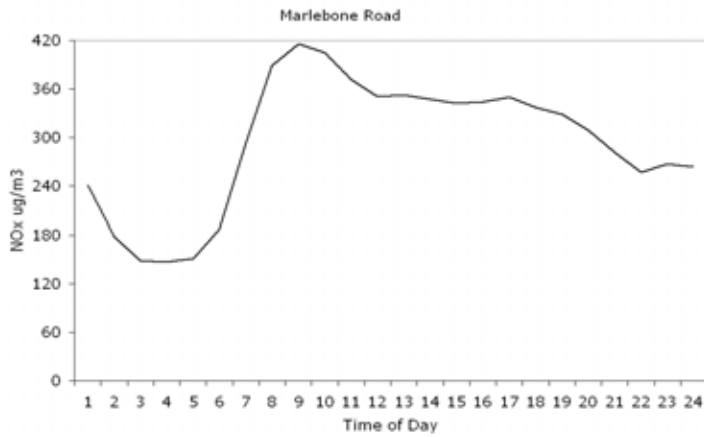
Urban Background Site
(Aberdeen)



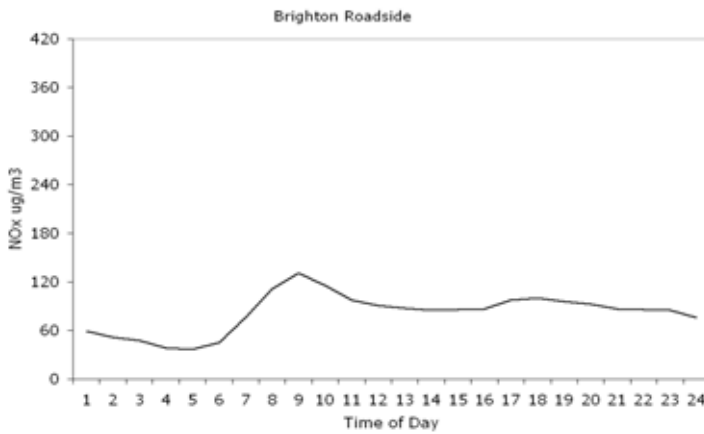
Rural Site
(Harwell)

13.7 Diurnal Variations

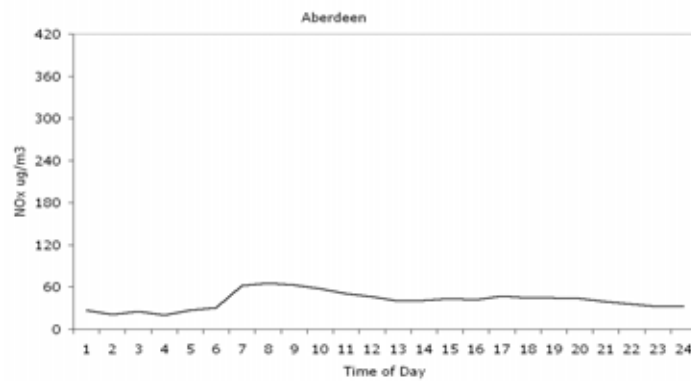
These figures show how nitrogen oxides concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



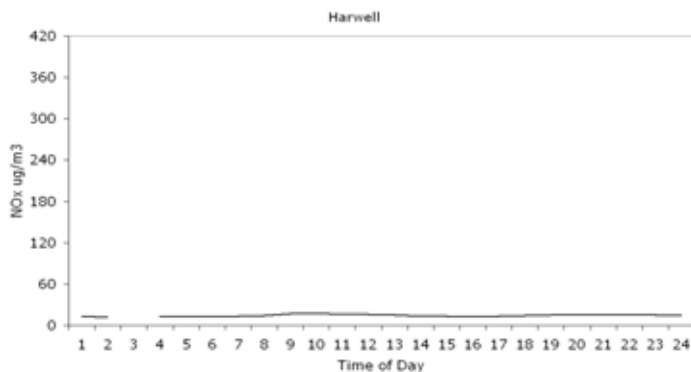
Kerbside Site
(*Marlebone Road*)



Roadside Site
(*Brighton*)



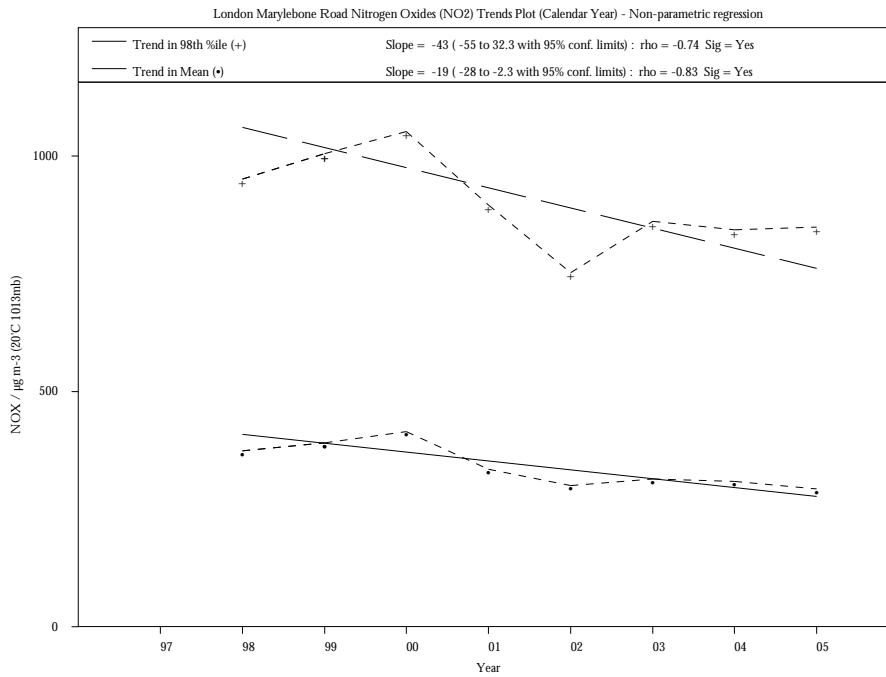
Urban Background Site
(*Aberdeen*)



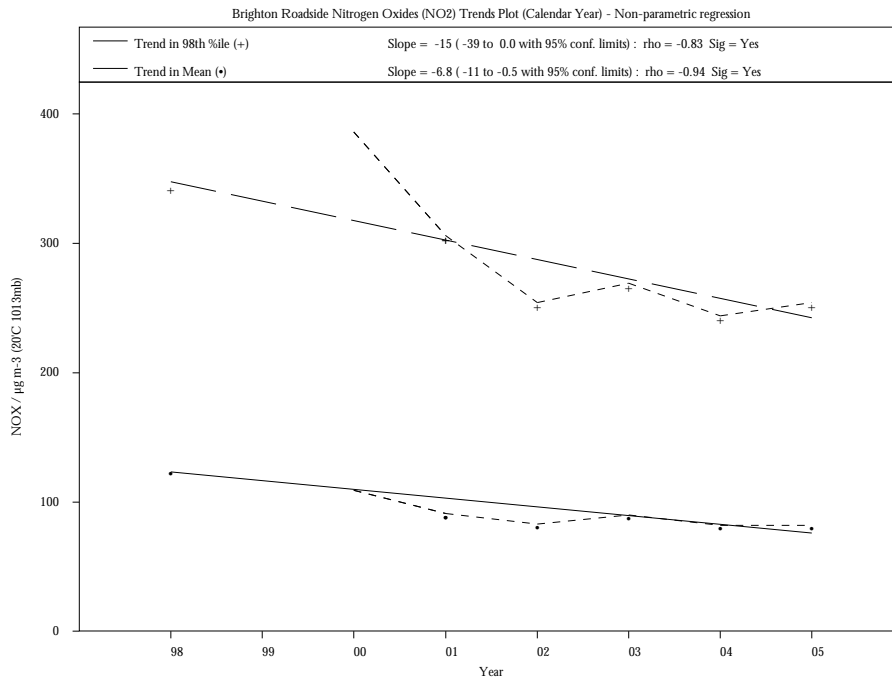
Rural Site
(*Harwell*)

13.8 Trends in annual concentrations

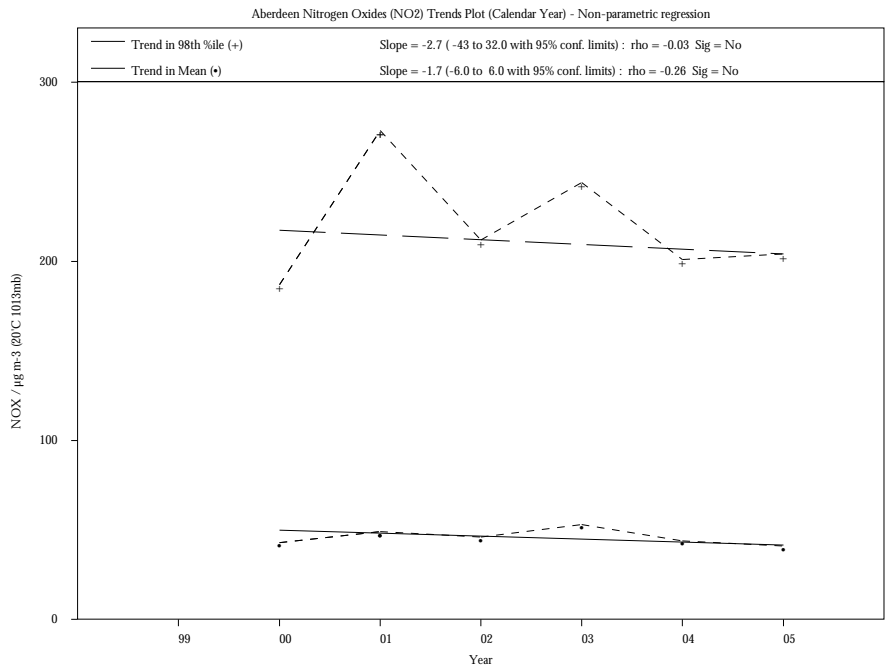
Statistically significant trends in concentration are shown for sites with at least ≥ 5 years of measurement.



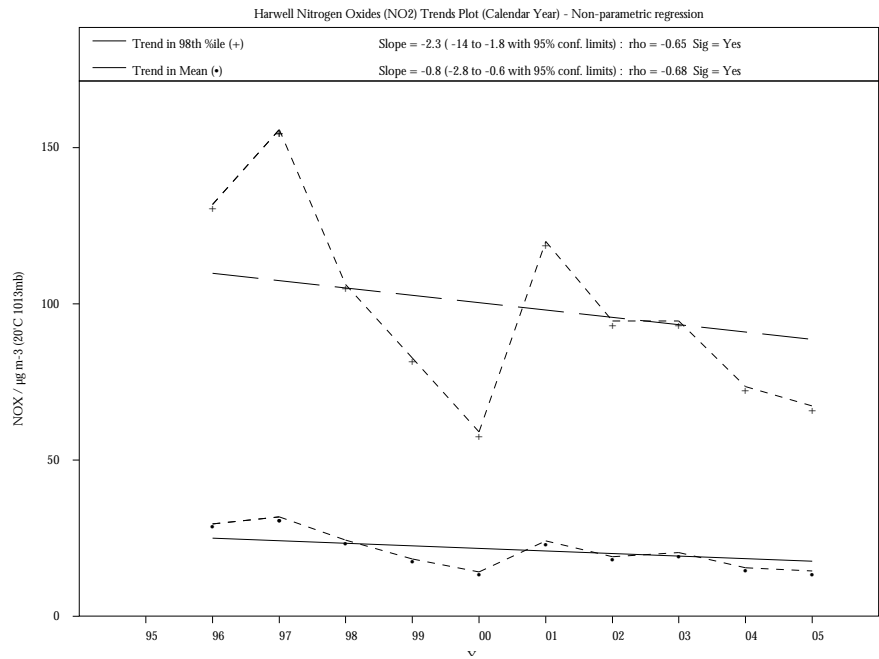
Kerbside Site
(Marylebone Road)



Roadside site
(Brighton)



Urban Background
(Aberdeen)



Rural Site
(Harwell)

13.9 Nitrogen Oxides Statistical Summary 2005

i) ANNUAL STATISTICS- I

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				
Barnsley Gawber	UB	37	81.0	926
Bath Roadside	RD	179	93.8	984
Billingham	I	50	97.5	989
Birmingham Centre	UC	53	81.1	558
Birmingham Tyburn	UB	66	99.0	1371
Blackpool Marton	UB	36	52.1	581
Bolton	UB	35	58.9	636
Bournemouth	UB	26	94.4	523
Bradford Centre	UC	58	88.4	1112
Brentford Roadside	RD	147	99.4	1526
Brighton Preston Park	UB	34	96.3	800
Brighton Roadside	RD	82	99.0	884
Bristol Centre	UC	68	68.7	1060
Bristol Old Market	RD	171	98.9	1253
Bury Roadside	RD	188	90.4	1186
Cambridge Roadside	RD	113	96.4	701
Camden Kerbside	KB	193	84.8	1629
Canterbury	UB	29	95.5	481
Coventry Memorial Park	UB	34	98.9	739
Exeter Roadside	RD	99	83.4	888
Glazebury	SU	31.7	91.6	764.6
Haringey Roadside	RD	91	97.0	1203
Harwell	RU	14.6	91.4	184.3
High Muffles	RU	9.7	88.7	121.9
Hove Roadside	RD	65	95.7	697
Hull Freetown	UC	33	66.2	288
Ladypower	RU	10.5	91.8	124.0
Leamington Spa	UB	40	69.8	583
Leeds Centre	UC	63	91.9	892
Leicester Centre	UC	59	97.0	1010
Leominster		---	42.4	420
Liverpool Speke	UB	39	98.2	846
London A3 Roadside	RD	158	98.0	1713
London Bexley	SU	63	95.3	1215
London Bloomsbury	UC	103	93.8	1115
London Brent	UB	56	89.0	1198
London Bromley	RD	87	94.9	796
London Cromwell Road 2	RD	187	93.7	1242
London Eltham	SU	46	84.5	741
London Hackney	UC	92	97.2	1390
London Harlington	A	72	99.0	1310
London Hillingdon	SU	106	93.6	1268
London Lewisham	UC	104	99.2	987
London Marylebone Road	KB	293	97.7	1406
London N. Kensington	UB	67	95.8	1083
London Southwark	UC	88	98.7	913
London Teddington	UB	42.7	94.6	763.6
London Wandsworth	UC	115	96.4	1268
London Westminster	UB	84	82.6	921
Lullington Heath	RU	12.3	86.1	126.4
Manchester Piccadilly	UC	---	48.6	1190
Manchester South	SU	---	6.5	344
Manchester Town Hall	UB	71	94.9	942
Market Harborough	RU	14.8	93.2	216.2
Middlesbrough	I	36	92.6	1028
Newcastle Centre	UC	49	95.2	1083
Northampton	UB	36	52.0	489
Norwich Centre	UC	35	83.1	510
Norwich Forum Roadside	RD	64	70.1	623

ii) EXCEEDENCE STATISTICS- I

Site	Daughter Directive Ecosystem and Air Quality Standard (Annual Mean) > 30 $\mu\text{g m}^{-3}$
England	
Barnsley Gawber	1
Bath Roadside	1
Billingham	1
Birmingham Centre	1
Birmingham Tyburn	1
Blackpool Marton	1
Bolton	1
Bournemouth	0
Bradford Centre	1
Brentford Roadside	1
Brighton Preston Park	1
Brighton Roadside	1
Bristol Centre	1
Bristol Old Market	1
Bury Roadside	1
Cambridge Roadside	1
Camden Kerbside	1
Canterbury	0
Coventry Memorial Park	1
Exeter Roadside	1
Glazebury	1
Haringey Roadside	1
Harwell	0
High Muffles	0
Hove Roadside	1
Hull Freetown	1
Ladybower	0
Leamington Spa	1
Leeds Centre	1
Leicester Centre	1
Leominster	---
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 Harlington	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
Lullington Heath	0
Manchester Piccadilly	---
Manchester South	---
Manchester Town Hall	1
Market Harborough	0
Middlesbrough	1
Newcastle Centre	1
Northampton	1
Norwich Centre	1
Norwich Forum Roadside	1

iii) ANNUAL STATISTICS- II

Site	Site Type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$
Norwich Roadside	RD	---	11.8	405
Nottingham Centre	UC	62	91.9	1148
Oxford Centre Roadside	RD	182	97.7	1291
Plymouth Centre	UC	42	98.0	844
Portsmouth	UB	38	98.0	919
Preston	UB	42	73.9	800
Reading New Town	UB	40	95.3	928
Redcar	SU	36	50.7	464
Rochester	RU	28.0	95.3	417.3
Rotherham Centre	UC	65	92.5	1129
Salford Eccles	I	69	83.2	1133
Sandwell West	UB	41	96.2	850
Sheffield Centre	UC	55	66.0	411
Sheffield Tinsley	I	74	97.4	1643
Somerton	RU	10.5	87.1	115.4
Southampton Centre	UC	67	87.2	1171
Southend-on-Sea	UB	37	91.9	579
Southwark Roadside	RD	137	98.8	1060
St Osyth	RU	20.1	93.0	225.0
Stockport Shaw Heath	UB	52	91.0	712
Stockton-on-Tees Yarm	RD	110	99.1	1259
Stoke-on-Trent Centre	UC	68	95.6	1631
Sunderland Silksworth	UB	24	92.7	701
Thurrock	UB	65	84.7	1039
Tower Hamlets Roadside	RD	147	99.0	1175
Walsall Alumwell	UB	79	99.0	1988
Walsall Willenhall	SU	40	69.6	447
West London	UB	85	94.6	976
Wicken Fen	RU	15.3	98.7	212.4
Wigan Centre	UB	46	97.6	837
Wirral Tranmere	UB	27	63.9	447
Wolverhampton Centre	UC	53	91.6	930
Yarner Wood	RU	10.4	81.5	57.3
N Ireland				
Belfast Centre	UC	67	54.5	1364
Derry	UB	18	92.0	800
Scotland				
Aberdeen	UB	41	96.6	987
Bush Estate	RU	---	45.7	237.8
Dumfries	RD	90	96.8	844
Edinburgh St Leonards	UC	36	96.0	611
Eskdalemuir	RU	4.7	92.8	48.5
Glasgow Centre	UC	66	95.6	1303
Glasgow City Chambers	UB	98	94.6	1043
Glasgow Kerbside	KB	251	98.3	2122
Grangemouth	I	30	99.2	724
Inverness	RD	44	95.1	642
Wales				
Aston Hill	RU	6.1	97.8	102.9
Cardiff Centre	UC	59	56.3	626
Cwmbran	UB	25	99.3	520
Narberth	RU	6.6	92.2	81.6
Port Talbot	UB	30	97.1	607
Swansea	UC	77	94.7	626
Wrexham	RD	38	94.6	749

iv) EXCEEDENCE STATISTICS- II

Site	Daughter Directive Ecosystem and Air Quality Standard (Annual Mean) > 30 $\mu\text{g m}^{-3}$
Norwich Roadside	---
Nottingham Centre	1
Oxford Centre Roadside	1
Plymouth Centre	1
Portsmouth	1
Preston	1
Reading New Town	1
Redcar	1
Rochester	0
Rotherham Centre	1
Salford Eccles	1
Sandwell West Bromwich	1
Sheffield Centre	1
Sheffield Tinsley	1
Somerton	0
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
Sunderland Silksworth	0
Thurrock	1
Tower Hamlets Roadside	1
Walsall Alumwell	1
Walsall Willenhall	1
West London	1
Wicken Fen	0
Wigan Centre	1
Wirral Tranmere	0
Wolverhampton Centre	1
Yarner Wood	0
N Ireland	
Belfast Centre	1
Derry	0
Scotland	
Aberdeen	1
Bush Estate	---
Dumfries	1
Edinburgh St Leonards	1
Eskdalemuir	0
Glasgow Centre	1
Glasgow City Chambers	1
Glasgow Kerbside	1
Grangemouth	0
Inverness	1
Wales	
Aston Hill	0
Cardiff Centre	1
Cwmbran	0
Narberth	0
Port Talbot	0
Swansea	1
Wrexham	1

14. PM₁₀ - Measurement Sites, Instrumentation and Statistics

14.1 Measurement Methods

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.

The **Partisol** is a gravimetric sampler that collects daily samples onto a filter for subsequent weighing to determine the PM₁₀ concentration.

14.2 Instrumentation

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

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

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

Please also see detailed information on particle measurements and conversion factors used in this report (Appendix 6).

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

Uncertainty 25%

Minimum data capture 90%

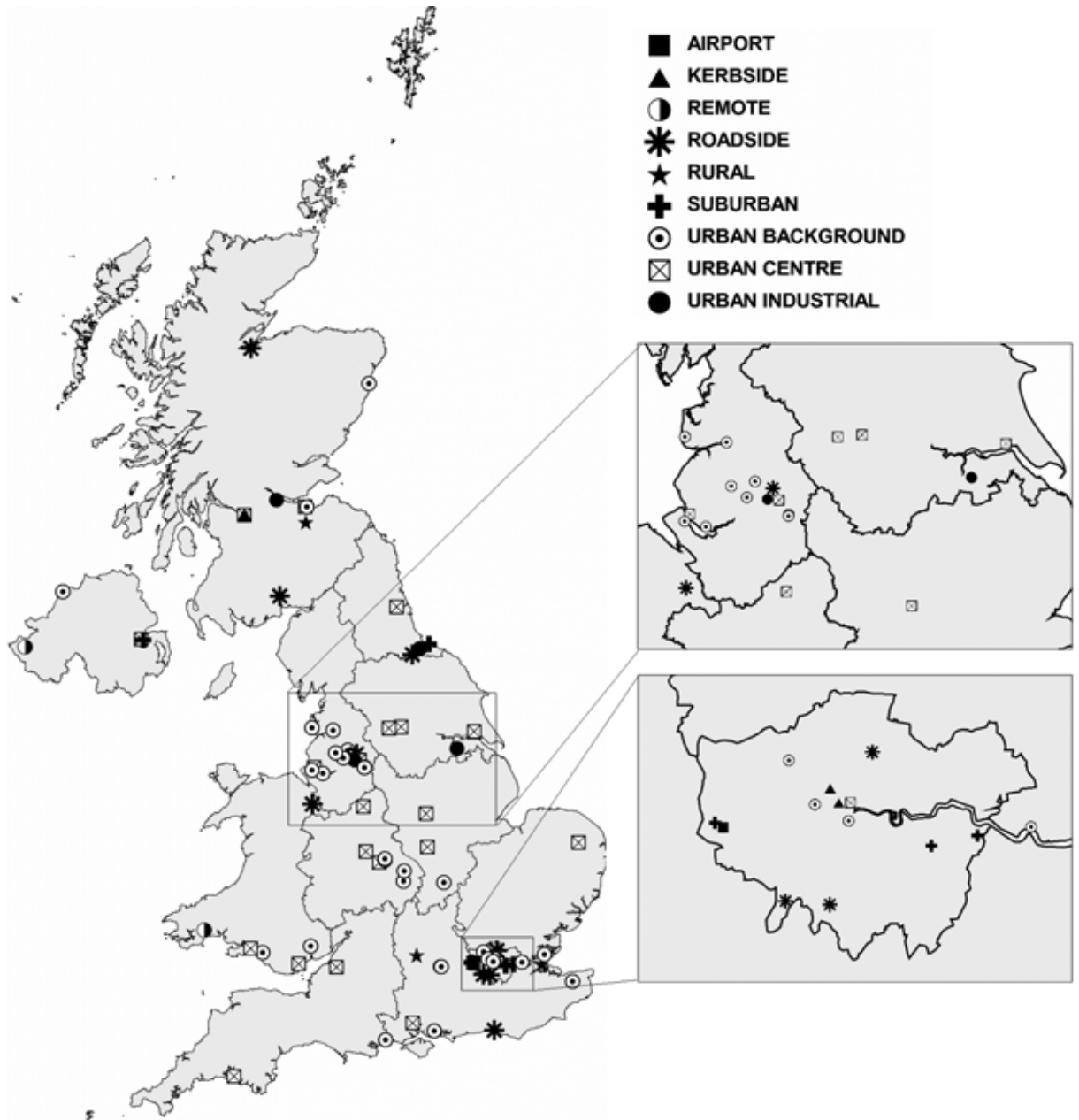
14.4 Objectives and Bandings

Summary of objectives of the Air Quality Strategy			
	Objective	Measured as	To be achieved by
Particles (PM₁₀) (gravimetric) All authorities	50 µg m ⁻³ Not to be exceeded more than 35 times per year	Daily Mean	31 December 2005
	40 µg m ⁻³	Annual Mean	31 December 2005
Particles (PM₁₀) Authorities in Scotland only	50 µg m ⁻³ Not to be exceeded more than 7 times per year	Daily Mean	31 December 2010
	18 µg m ⁻³	Annual Mean	31 December 2010

Air Quality Bands and Index Values		
Band	Index	PM ₁₀ µg m ⁻³ (Gravimetric)
<i>Low</i>	1	0-21
	2	22-42
	3	43-64
<i>Moderate</i>	4	65-74
	5	75-86
	6	87-96
<i>High</i>	7	97-107
	8	108-118
<i>Very High</i>	9	119-129
	10	130 or more

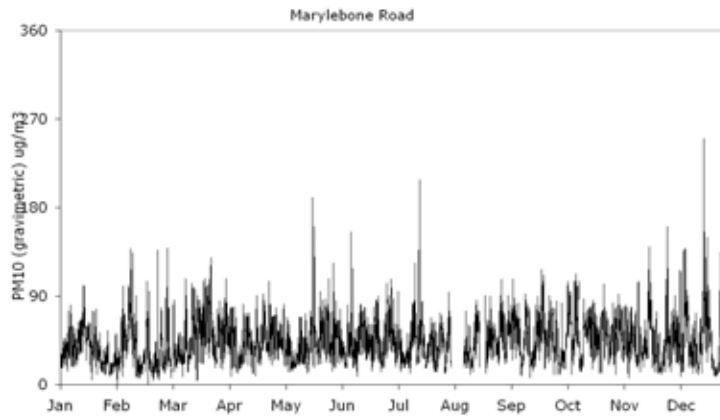
14.5 Site Locations

UK PM₁₀ Monitoring Sites 2005

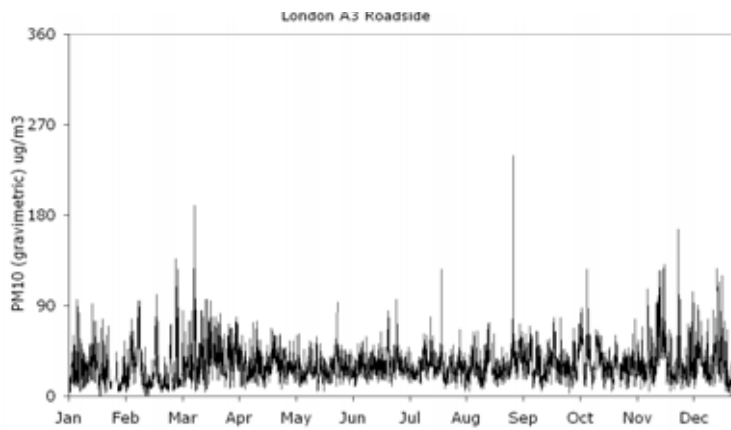


14.6 Hourly Average Concentrations

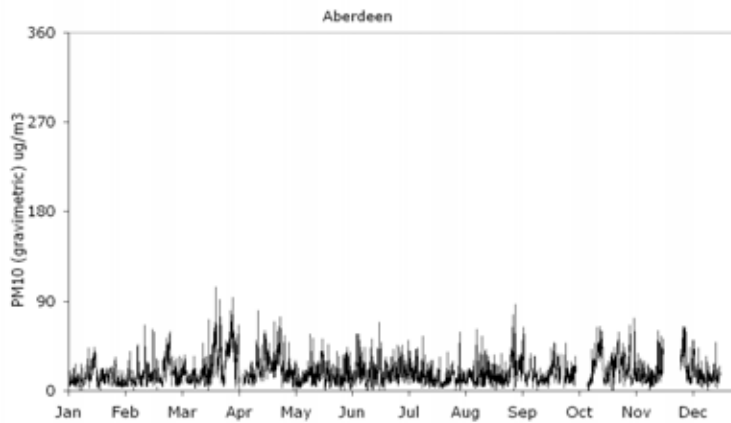
These figures show time series graphs of hourly average PM₁₀ concentrations at four *typical* site types for 2005. Units are gravimetric equivalent (TEOM*1.3).



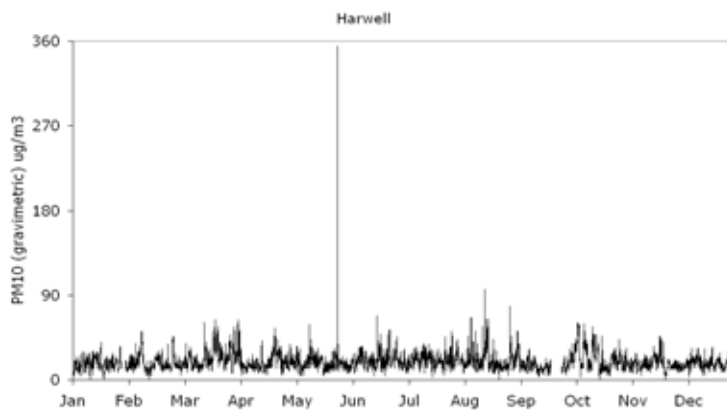
Kerbside Site
(Marylebone Road)



Roadside Site
(London A3)



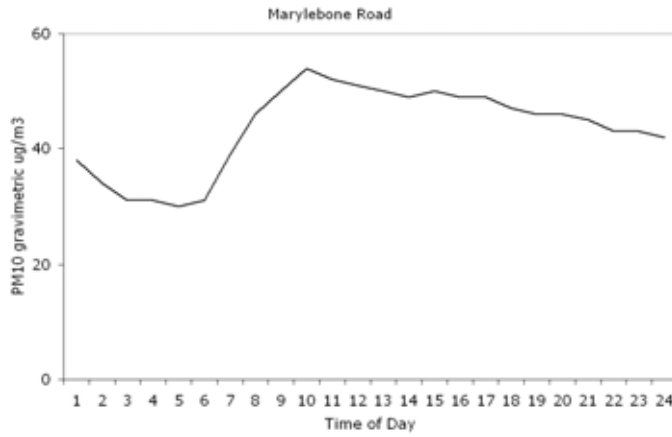
Urban Background Site
(Aberdeen)



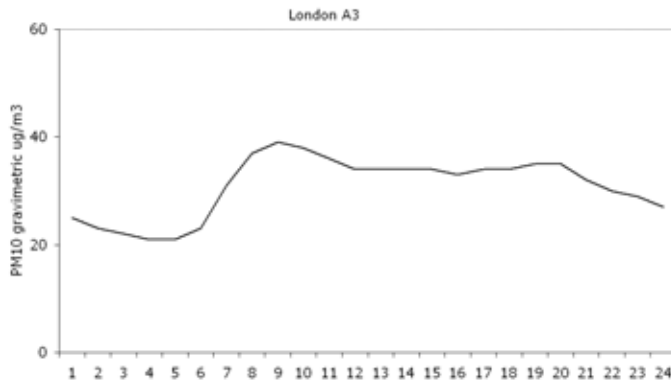
Rural Site
(Harwell)

14.7 Diurnal Variations

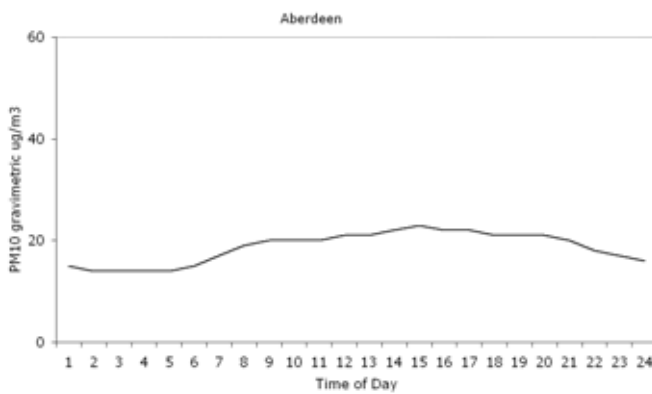
These figures show how PM₁₀ concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



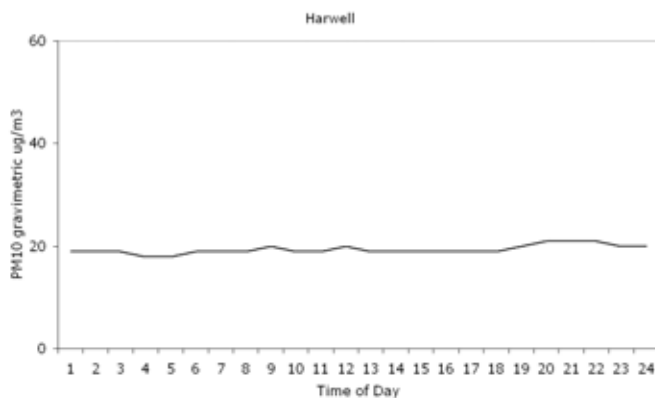
Kerbside Site
(Marylebone Road)



Roadside Site
(London A3)

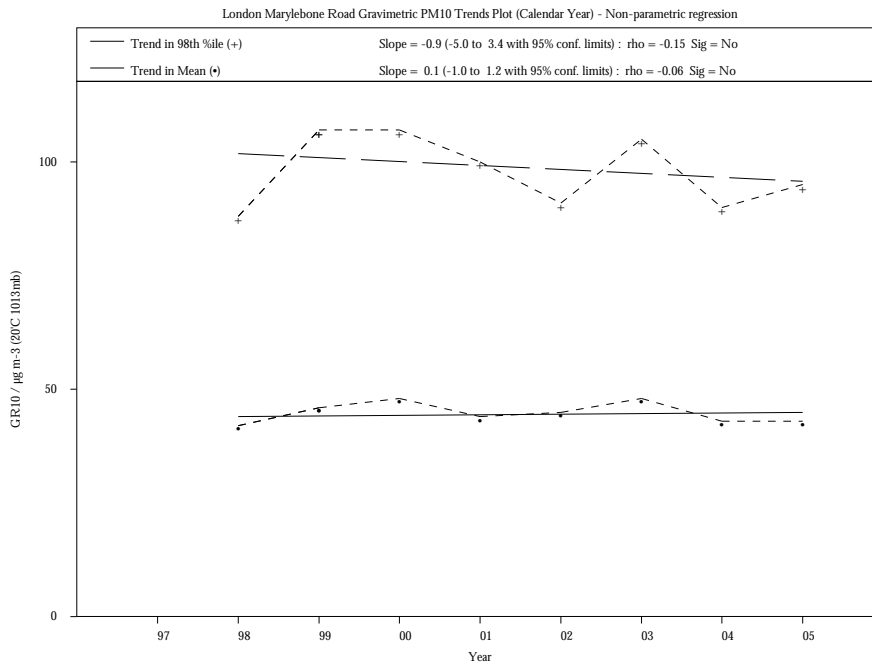


Urban Background Site
(Aberdeen)

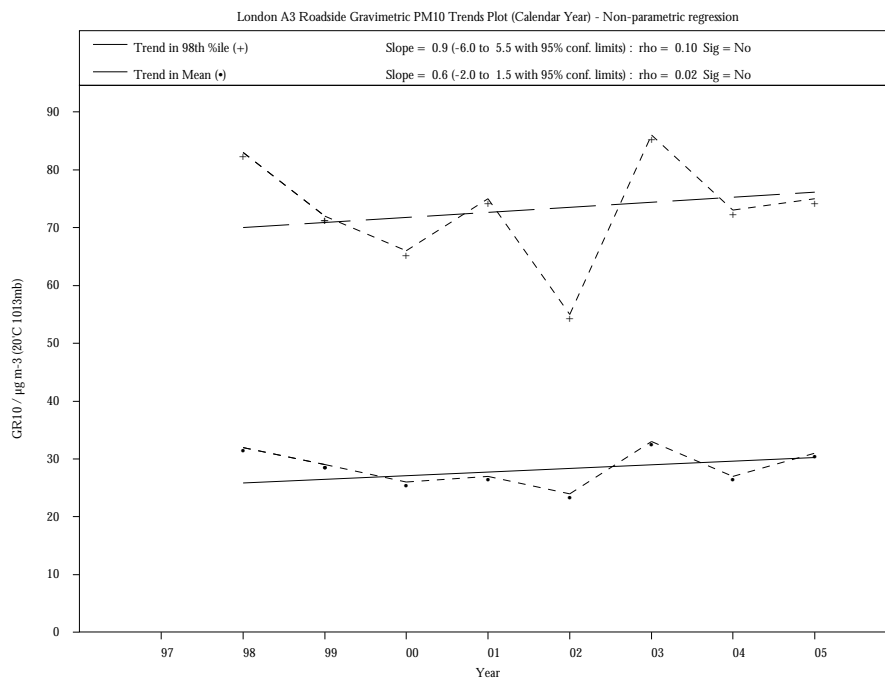


Rural Site
(Harwell)

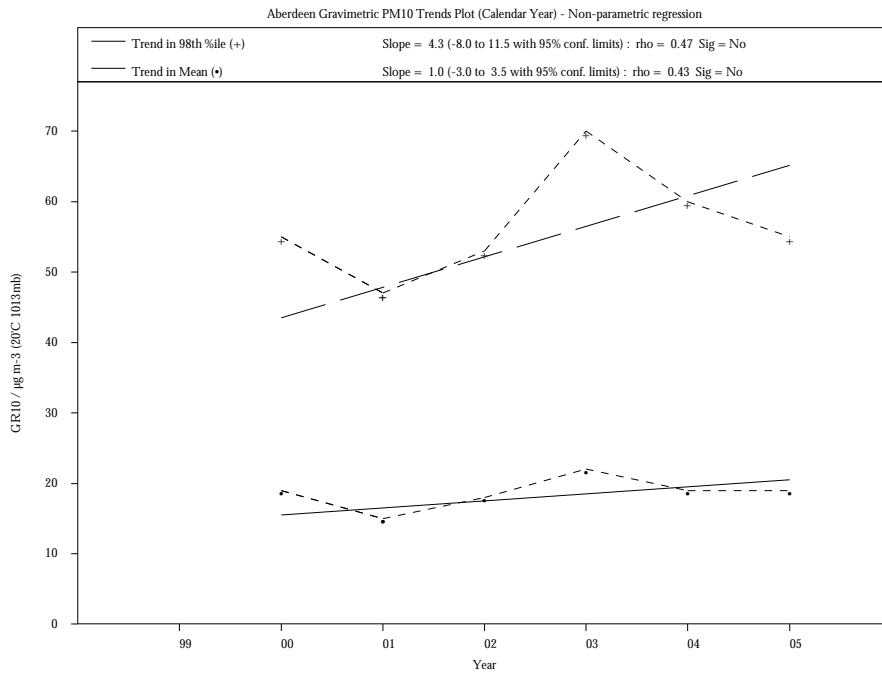
14.8 Trends in annual concentrations



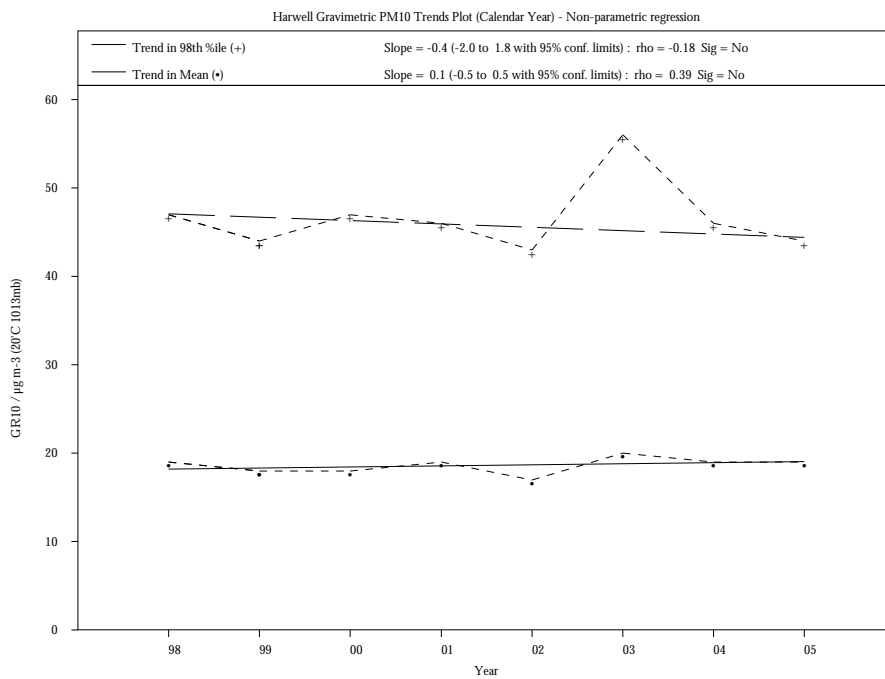
Kerbside Site
(Marylebone Road)



Roadside Site
(London A3)



**Urban
Background Site
(Aberdeen)**



**Rural Site
(Harwell)**

14.9 PM₁₀ Statistical Summary 2005

i) ANNUAL STATISTICS- I

Site	Site Type	Annual average $\mu\text{g m}^{-3}$	Annual data capture of hourly means % (for Partisol, capture of daily means)	Maximum hourly mean $\mu\text{g m}^{-3}$	Maximum running 24-hour mean $\mu\text{g m}^{-3}$	Date of maximum running 24-hour mean	90%ile of daily means $\mu\text{g m}^{-3}$	98%ile of daily means $\mu\text{g m}^{-3}$
England								
Birmingham Centre	UC	25	87.4	259	63	06/10/2005	38	48
Birmingham Tyburn	UB	22	98.6	131	74	20/11/2005	32	44
Blackpool Marton	UB	24	53.1	593	65	04/08/2005	33	44
Bolton	UB	20	96.5	213	64	21/11/2005	31	46
Bournemouth	UB	25 *	94.2	---	---	---	40	58
Bradford Centre	UC	32	92.8	774	168	15/12/2005	52	81
Brighton Roadside PM10	RD	35 *	93.7	---	---	---	51	72
Bristol Centre	UC	24	68.4	283	56	08/02/2005	39	44
Bury Roadside	RD	28	96.2	163	68	30/11/2005	42	53
Camden Kerbside	KB	37	96.8	254	88	20/11/2005	54	67
Canterbury	UB	23	99.1	264	63	06/10/2005	33	47
Coventry Memorial Park	UB	19	98.9	459	61	25/01/2005	30	42
Haringey Roadside	RD	26	95.6	198	68	10/12/2005	40	48
Harwell	RU	19	96.8	355	55	08/10/2005	28	37
Hull Freetown	UC	23	97.7	105	61	22/11/2005	35	43
Leamington Spa	UB	21	72.9	78	52	19/11/2005	31	42
Leeds Centre	UC	27	75.3	399	92	22/11/2005	43	59
Leicester Centre	UC	22	97.1	113	68	19/11/2005	31	43
Liverpool Speke	UB	20	96.9	118	65	21/11/2005	31	42
London A3 Roadside	RD	31	98.2	239	82	22/11/2005	44	61
London Bexley	SU	23	70.3	130	58	02/04/2005	35	49
London Bloomsbury	UC	27	94.6	107	65	08/10/2005	39	49
London Brent	UB	22	82.8	138	62	08/02/2005	34	42
London Eltham	SU	23	78.7	363	57	02/04/2005	36	46
London Harlington	A	25	84.9	230	62	08/02/2005	38	48
London Hillingdon	SU	27	96.1	150	70	08/02/2005	42	55
London Marylebone Road	KB	43	96.2	250	112	21/12/2005	63	74
London N. Kensington	UB	25	99.0	153	75	20/11/2005	38	48
London Westminster	UB	30 *	95.1	---	---	---	49	68
Manchester Piccadilly	UC	25	97.8	621	74	21/11/2005	38	52
Middlesbrough	I	27	95.7	906	116	06/09/2005	43	64
Newcastle Centre	UC	17	97.4	285	68	06/11/2005	27	40
Northampton	UB	19	98.3	113	49	31/03/2005	28	36
Northampton PM10	UB	25 *	94.2	---	---	---	41	59
Norwich Centre	UC	17	96.5	90	46	24/06/2005	25	34
Nottingham Centre	UC	23	96.9	155	95	22/11/2005	35	45
Plymouth Centre	UC	17	97.4	165	50	22/03/2005	28	38
Portsmouth	UB	22	98.7	90	53	21/12/2005	30	41
Preston	UB	17	94.9	150	45	31/03/2005	27	36
Reading New Town	UB	21	97.0	142	58	22/11/2005	31	40
Redcar	UB	24	94.7	261	86	02/02/2005	38	50
Rochester	SU	21	98.2	995	145	04/08/2005	33	44
Salford Eccles	RU	22	88.0	117	75	21/11/2005	35	49
Scunthorpe Town	I	25	98.1	205	92	22/03/2005	40	70
Sheffield Centre	UC	22	96.6	117	81	31/03/2005	35	49
Southampton Centre	UC	25	91.0	122	65	08/10/2005	37	47
Southend-on-Sea	UB	22	93.6	100	59	08/10/2005	34	45
Stockport Shaw Heath	UB	---	43.2	100	51	13/01/2005	---	---
Stockton-on-Tees Yarm	RD	26	99.0	156	81	31/03/2005	39	50
Stoke-on-Trent Centre	UC	25	97.8	151	73	20/11/2005	35	45
Thurrock	UB	24	94.6	191	75	14/07/2005	38	49
Wigan Centre	UB	22	95.7	429	109	13/05/2005	34	52

* Measurements made using the Partisol gravimetric sampler- the se provide daily averages only

ii) EXCEEDENCE STATISTICS- I

Site	Moderate band	Days	High band	Days	Very High band	Days	Daughter Directive Limit Value Daily Mean & Air Quality Standard	Days	Daughter Directive Limit Value Annual Mean and Air Quality Standard	Annual Mean Standard (Scotland)
England										
Birmingham Centre	0	0	0	0	0	0	2	2	0	--
Birmingham Tyburn	14	2	0	0	0	0	3	3	0	--
Blackpool Marton	7	1	0	0	0	0	3	3	0	--
Bolton	0	0	0	0	0	0	3	3	0	--
Bournemouth	-	-	-	-	-	-	14	14	0	--
Bradford Centre	348	32	73	9	34	4	37	37	0	--
Brighton Roadside PM10	-	-	-	-	-	-	37	37	0	--
Bristol Centre	0	0	0	0	0	0	4	4	0	--
Bury Roadside	10	3	0	0	0	0	12	12	0	--
Camden Kerbside	227	26	0	0	0	0	52	52	0	--
Canterbury	0	0	0	0	0	0	4	4	0	--
Coventry Memorial Park	0	0	0	0	0	0	1	1	0	--
Haringey Roadside	16	3	0	0	0	0	5	5	0	--
Harwell	0	0	0	0	0	0	1	1	0	--
Hull Freetown	0	0	0	0	0	0	1	1	0	--
Leamington Spa	0	0	0	0	0	0	0	0	0	--
Leeds Centre	83	11	0	0	0	0	14	14	0	--
Leicester Centre	16	3	0	0	0	0	4	4	0	--
Liverpool Speke	1	1	0	0	0	0	5	5	0	--
London A3 Roadside	137	12	0	0	0	0	19	19	0	--
London Bexley	0	0	0	0	0	0	2	2	0	--
London Bloomsbury	2	1	0	0	0	0	5	5	0	--
London Brent	0	0	0	0	0	0	3	3	0	--
London Eltham	0	0	0	0	0	0	3	3	0	--
London Harlington	0	0	0	0	0	0	3	3	0	--
London Hillingdon	32	2	0	0	0	0	10	10	0	--
London Marylebone	685	59	19	2	0	0	118	118	1	--
London N. Kensington	26	2	0	0	0	0	6	6	0	--
London Westminster	-	-	-	-	-	-	32	32	0	--
Manchester Piccadilly	32	4	0	0	0	0	9	9	0	--
Middlesbrough	137	19	40	4	0	0	24	24	0	--
Newcastle Centre	9	1	0	0	0	0	2	2	0	--
Northampton	0	0	0	0	0	0	0	0	0	--
Northampton PM10	-	-	-	-	-	-	22	22	0	--
Norwich Centre	0	0	0	0	0	0	0	0	0	--
Nottingham Centre	47	4	0	0	0	0	6	6	0	--
Plymouth Centre	0	0	0	0	0	0	0	0	0	--
Portsmouth	0	0	0	0	0	0	1	1	0	--
Preston	0	0	0	0	0	0	0	0	0	--
Reading New Town	0	0	0	0	0	0	1	1	0	--
Redcar	35	4	0	0	0	0	7	7	0	--
Rochester	1	1	17	2	4	1	3	3	0	--
Salford Eccles	19	1	0	0	0	0	6	6	0	--
Scunthorpe Town	253	24	0	0	0	0	25	25	0	--
Sheffield Centre	24	2	0	0	0	0	6	6	0	--
Southampton Centre	2	1	0	0	0	0	3	3	0	--
Southend-on-Sea	0	0	0	0	0	0	2	2	0	--
Stockport Shaw Heath	0	0	0	0	0	0	1	1	---	--
Stockton-on-Tees Yarm	34	3	0	0	0	0	5	5	0	--
Stoke-on-Trent Centre	30	4	0	0	0	0	4	4	0	--
Thurrock	18	2	0	0	0	0	5	5	0	--
Wigan Centre	23	4	21	2	0	0	8	8	0	--

* Measurements made using the Partisol gravimetric sampler- the se provide daily averages only

iii) ANNUAL STATISTICS- II

Site	Site Type	Annual average $\mu\text{g m}^{-3}$	Annual data capture of hourly means % (for Partisol, capture of daily means)	Maximum hourly mean $\mu\text{g m}^{-3}$	Maximum running 24-hour mean $\mu\text{g m}^{-3}$	Date of maximum running 24-hour mean	90%ile of daily means $\mu\text{g m}^{-3}$	98%ile of daily means $\mu\text{g m}^{-3}$
Wirral Tranmere	UB	19	60.2	78	55	20/03/2005	27	43
Wolverhampton Centre	UC	23	95.1	1017	138	23/08/2005	36	56
N Ireland								
Belfast Centre	UC	19	95.1	252	90	22/11/2005	30	48
Belfast Clara St	SU	13	94.7	228	85	16/10/2005	28	50
Derry	UB	21	97.1	259	100	22/11/2005	33	46
Lough Navar	RE	11	99.3	111	33	16/10/2005	15	23
Scotland								
Aberdeen	UB	19	91.8	105	66	31/03/2005	31	45
Dumfries	RD	20 *	97.5	---	---	---	33	47
Edinburgh St Leonards	UC	18	97.6	1375	155	21/05/2005	26	37
Glasgow Centre	UC	20	97.9	421	79	06/10/2005	31	49
Glasgow Kerbside	KB	29	90.8	239	93	26/02/2005	49	68
Grangemouth	I	15	98.9	170	49	31/03/2005	23	34
Inverness	RD	17*	94.0	---	---	---	28	41
Wales								
Cardiff Centre	UC	26	53.8	452	82	05/10/2005	37	47
Cwmbran	UB	18	99.2	2695	200	07/12/2005	25	35
Narberth	RU	16	82.9	191	44	29/03/2005	23	31
Port Talbot	UB	30	86.6	447	103	29/05/2005	49	76
Swansea	UC	25	97.6	103	56	04/09/2005	36	47
Wrexham	RD	22 *	91.8	---	---	---	40	71

* Measurements made using the Partisol gravimetric sampler– these provide daily averages only

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)
Wirral Tranmere	0	0	0	0	0	0	0	0	0	--
Wolverhampton Centre	97	12	3	2	20	2	10	10	0	--
N Ireland										
Belfast Centre	44	3	0	0	0	0	6	6	0	--
Belfast Clara St	230	17	15	2	0	0	7	7	0	--
Derry	31	4	11	1	0	0	3	3	0	--
Lough Navar	0	0	0	0	0	0	0	0	0	--
Scotland										
Aberdeen	4	1	0	0	0	0	4	4	0	1
Dumfries	-	-	-	-	-	-	6	6	0	1
Edinburgh St Leonards	2	2	0	0	23	2	3	3	0	0
Glasgow Centre	65	6	0	0	0	0	6	6	0	1
Glasgow Kerbside	196	14	0	0	0	0	27	27	0	1
Grangemouth	0	0	0	0	0	0	0	0	0	0
Inverness	-	-	-	-	-	-	2	2	0	0
Wales										
Cardiff Centre	24	2	0	0	0	0	3	3	0	--
Cwmbran	47	4	0	0	24	2	3	3	0	--
Narberth	0	0	0	0	0	0	0	0	0	--
Port Talbot	293	28	24	6	0	0	29	29	0	--
Swansea	0	0	0	0	0	0	1	1	0	--
Wrexham	-	-	-	-	-	-	22	22	0	--

* Measurements made using the Partisol gravimetric sampler– these provide daily averages only

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

15.1 Measurement Method

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

15.2 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

Please also see detailed information on particle measurements and conversion factors used in this report (Appendix 6).

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

Uncertainty 25%

Minimum data capture 90%

15.4 Objectives and Bandings

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

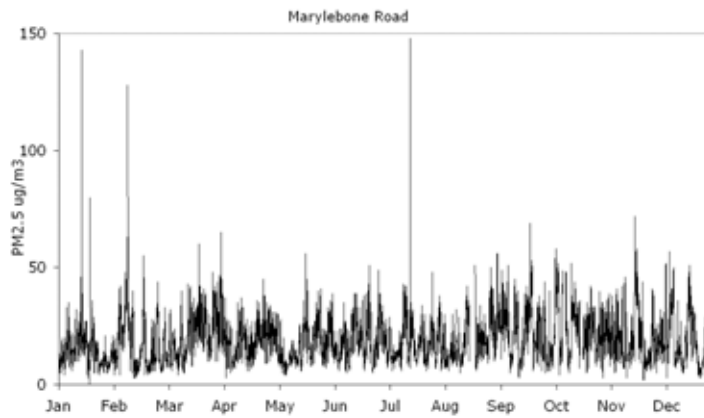
15.5 Site Locations

UK Automatic PM_{2.5} Monitoring Sites 2005

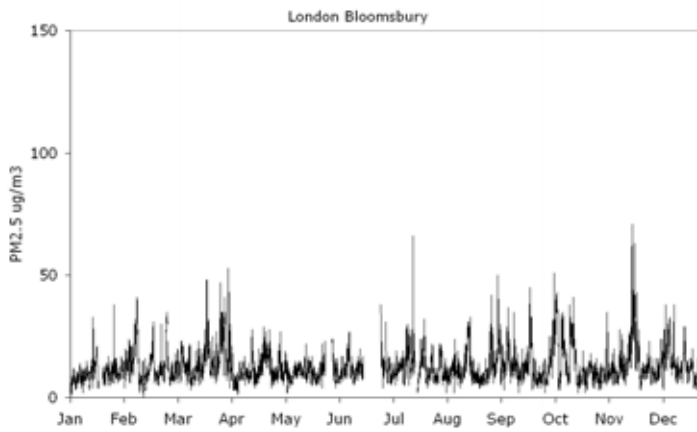


15.6 Hourly Average Concentrations

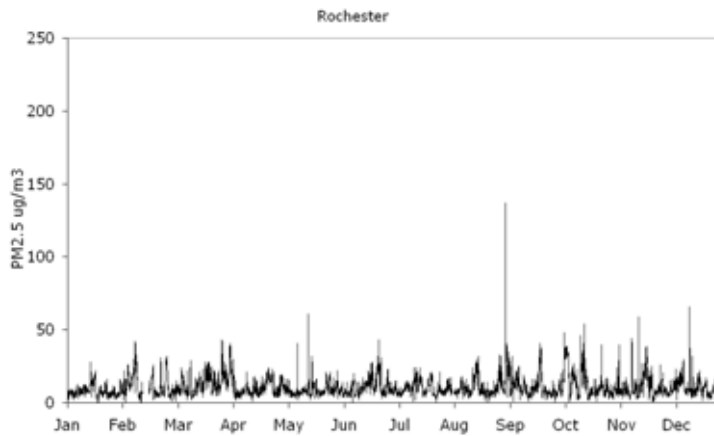
These figures show time series graphs of hourly average PM_{2.5} concentrations at four typical site types for 2005.



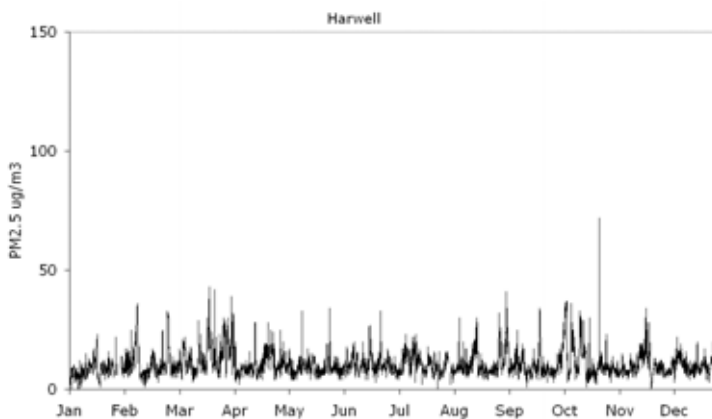
Kerbside Site
(*Marylebone Road*)



Urban Centre Site
(*Bloomsbury*)



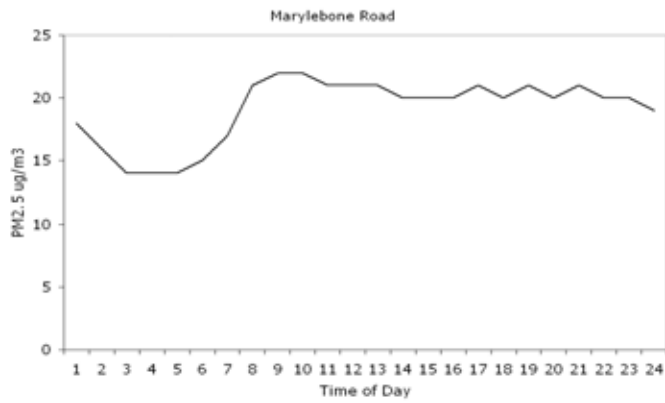
Rural Site
(*Rochester*)



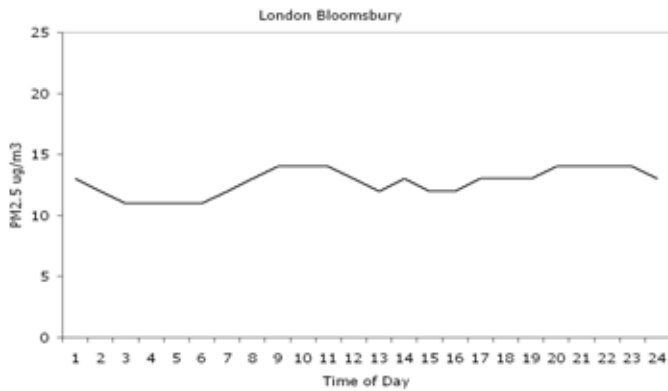
Rural Site
(*Harwell*)

15.7 Diurnal Variations

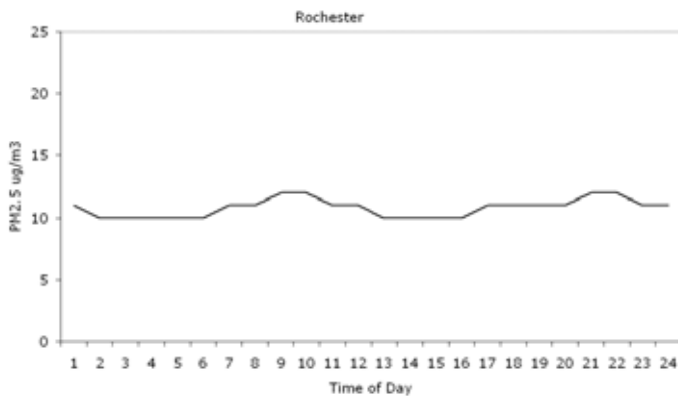
These figures show how PM_{2.5} concentrations vary on average for each hour of day during 2005, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



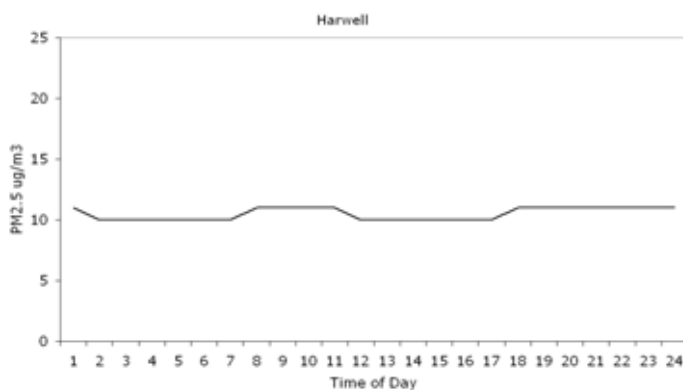
Kerbside Site
(*Marylebone Road*)



Urban Centre Site
(*Bloomsbury*)

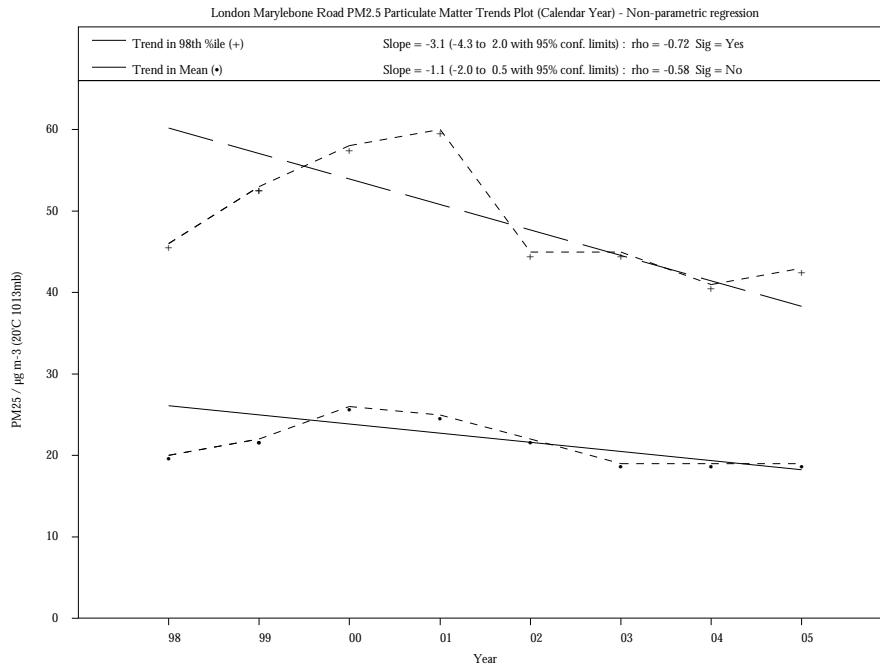


Rural Site
(*Rochester*)

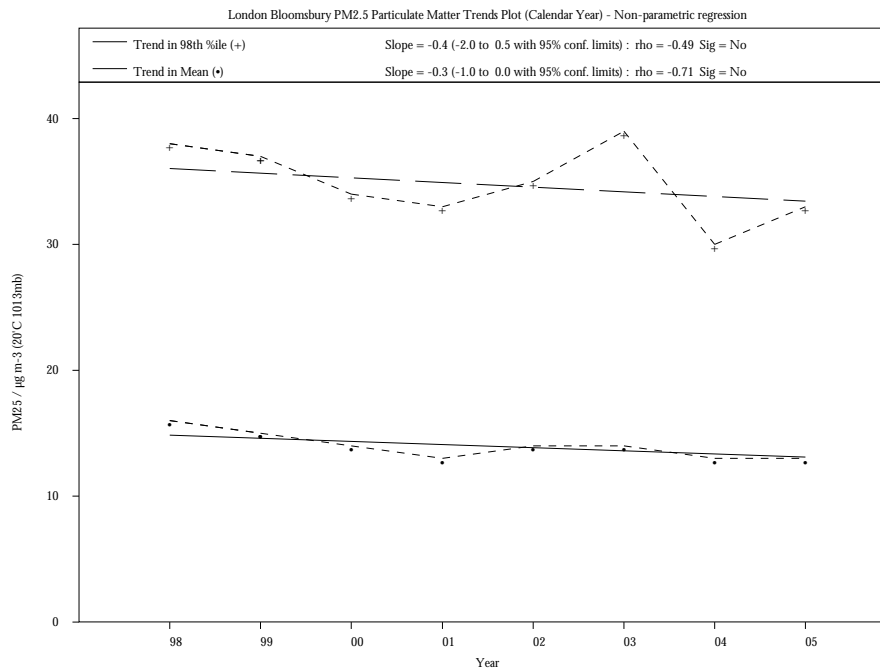


Rural Site
(*Harwell*)

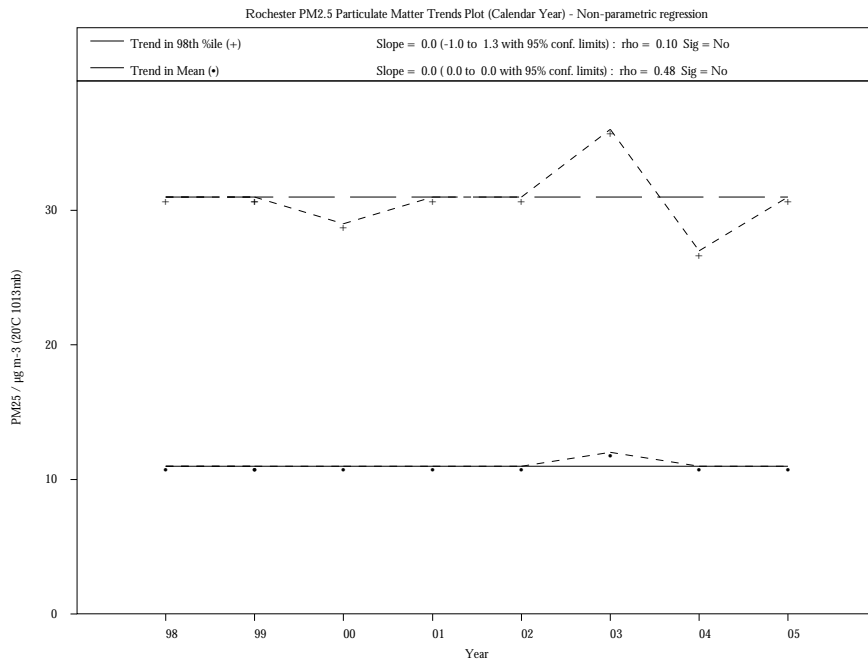
15.8 Trends in annual concentrations



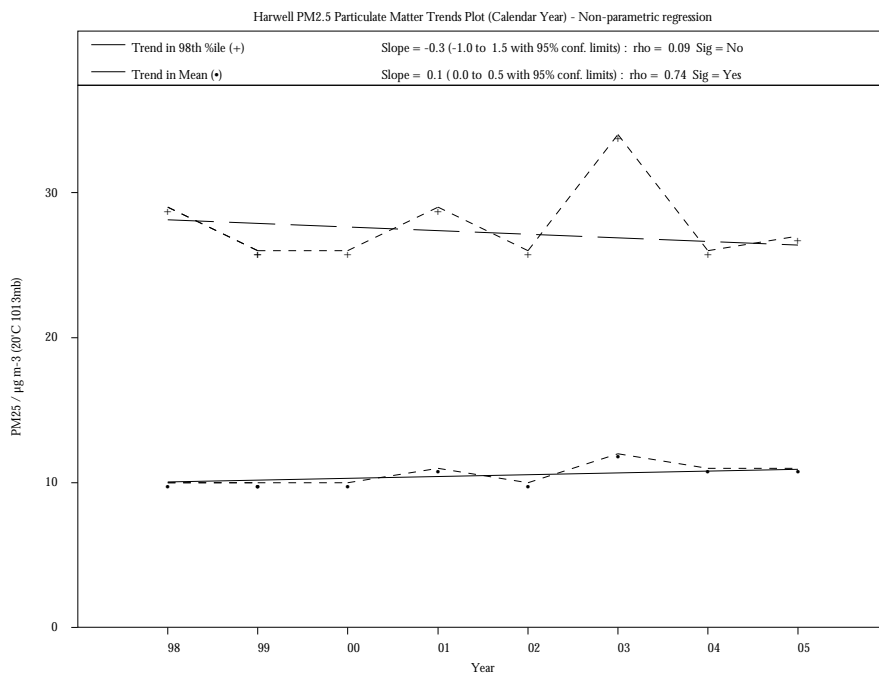
Kerbside Site
(Marylebone Road)



Urban Centre Site
(London Bloomsbury)



Rural Site
(Rochester)



Rural Site
(Harwell)

15.9 PM_{2.5} Statistical Summary 2005

i) ANNUAL STATISTICS- I

Site	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	11	98.3	72
London Bloomsbury	13	94.4	71
London Marylebone Road	19	97.5	148
Rochester	11	98.3	137

ii) Exceedence Statistics-

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

16. SO₂ - Measurement Sites, Instrumentation and Statistics

16.1 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 intensity proportional to the concentration of SO₂ in the sample.

16.2 Instrumentation

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

- ▶ Ambirak 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

16.3 Data Quality Requirements of EC Directive 1999/30/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
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 2005
	125 µg m ⁻³ Not to be exceeded more than 3 times per year	24 Hour Mean	31 December 2005
	(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
<i>Low</i>	1	0-88
	2	89-176
	3	177-265
<i>Moderate</i>	4	266-354
	5	355-442
	6	443-531
<i>High</i>	7	532-708
	8	709-886
	9	887-1063
<i>Very High</i>	10	1064 or more

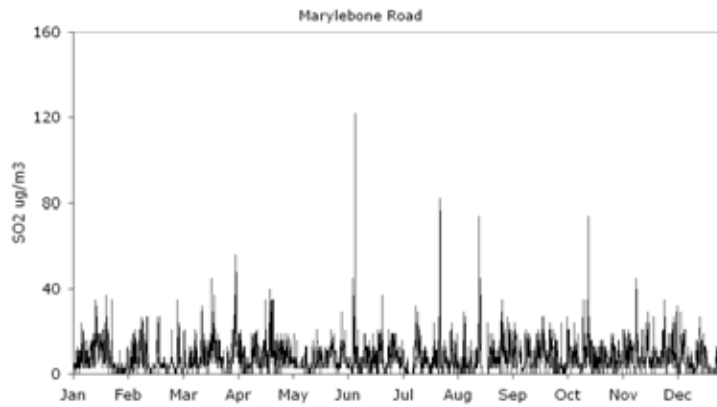
16.5 Site Locations

UK Automatic Sulphur Dioxide Monitoring Sites 2005

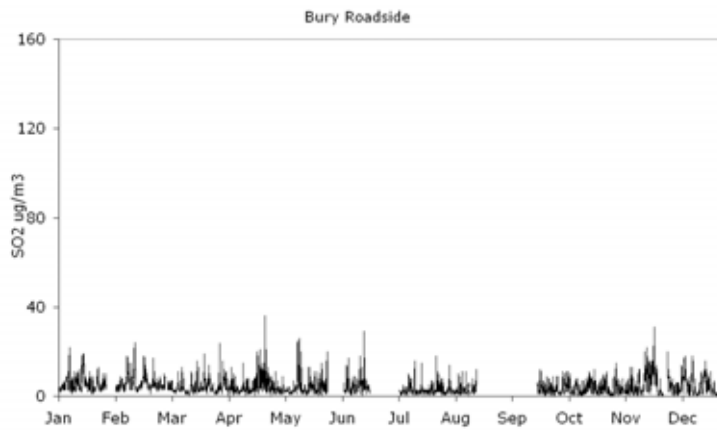


16.6 Hourly Average Concentrations

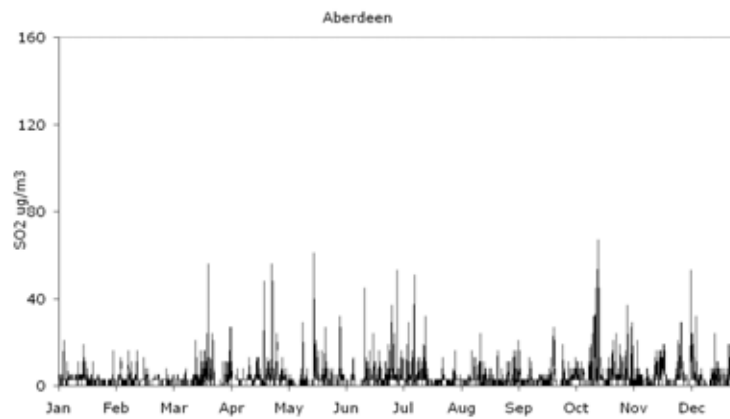
These figures show time series graphs of hourly average sulphur dioxide concentrations at four *typical* site types for 2005.



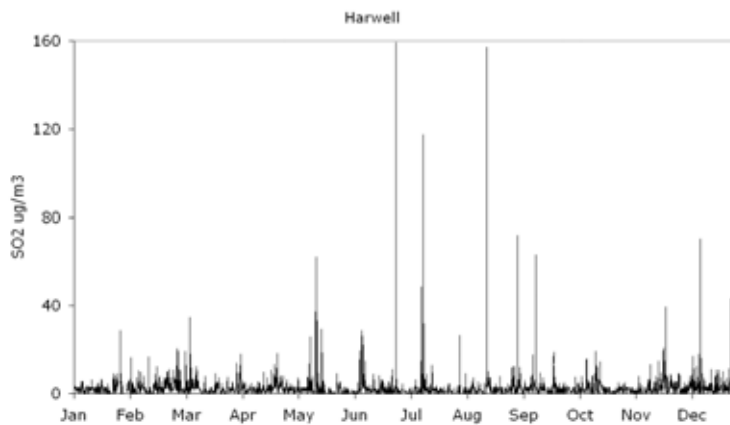
Kerbside Site
(London Marylebone Road)



Roadside Site
(Bury)



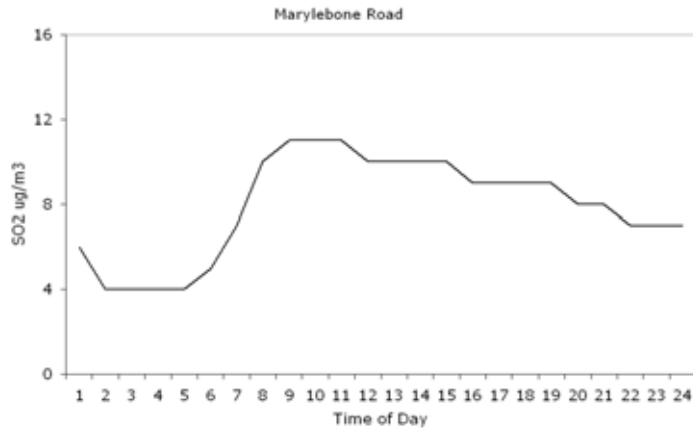
Urban Background Site
(Aberdeen)



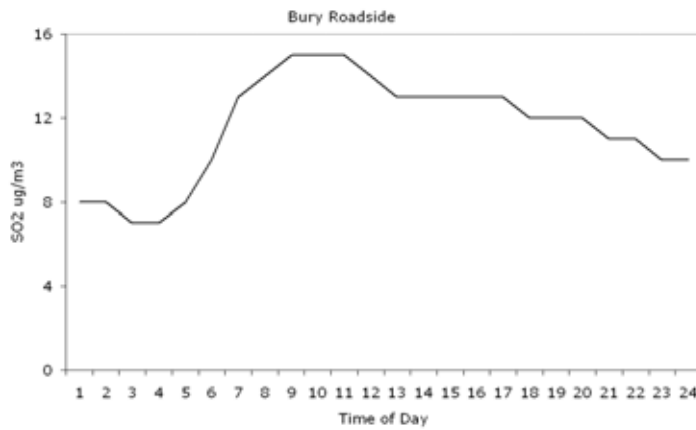
Rural Site
(Harwell)

16.7 Diurnal Variations

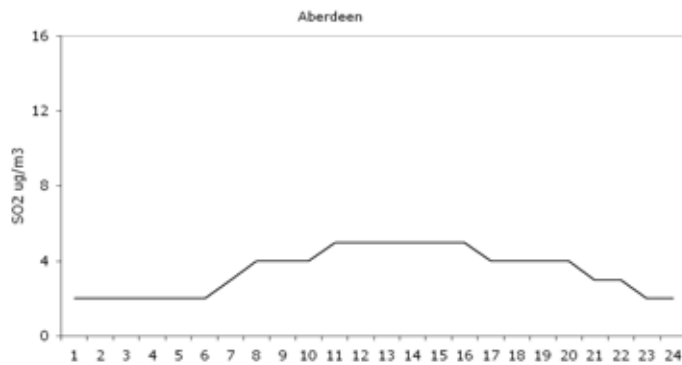
These figures show how sulphur dioxide concentrations vary on average for each hour of day during 2005, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



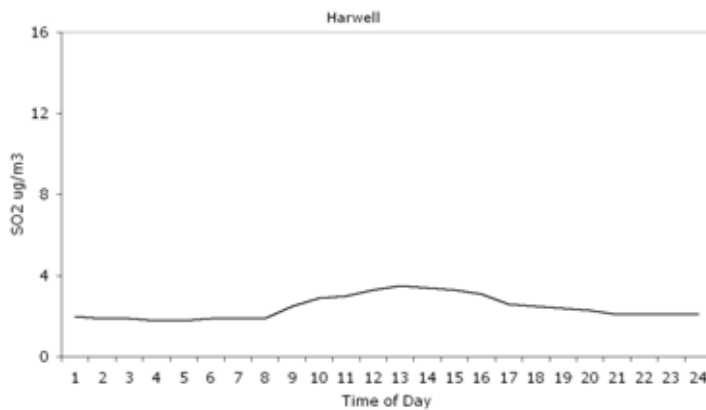
Kerbside Site
(Marylebone Road)



Roadside Site
(Bury)

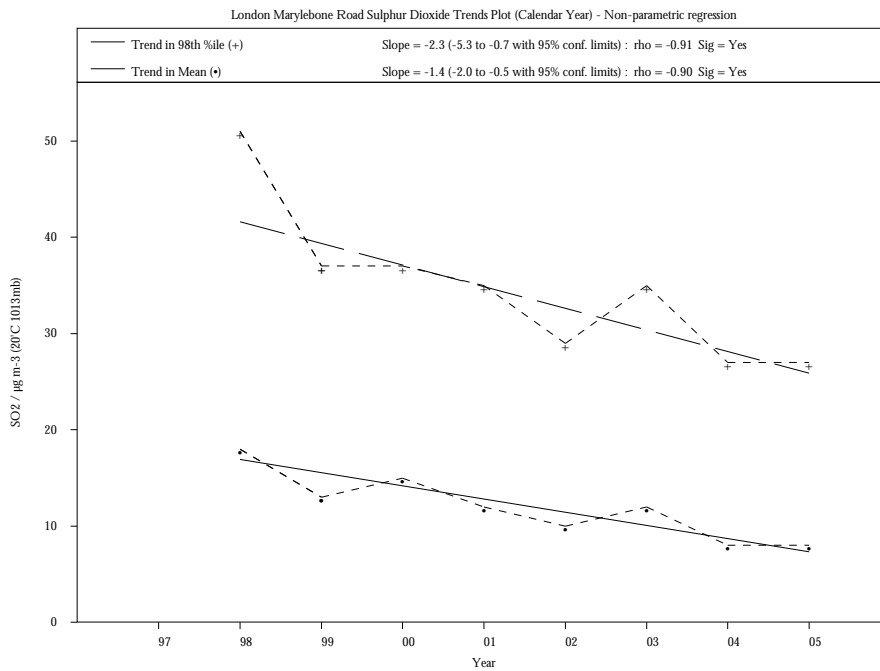


Urban Background Site
(Aberdeen)

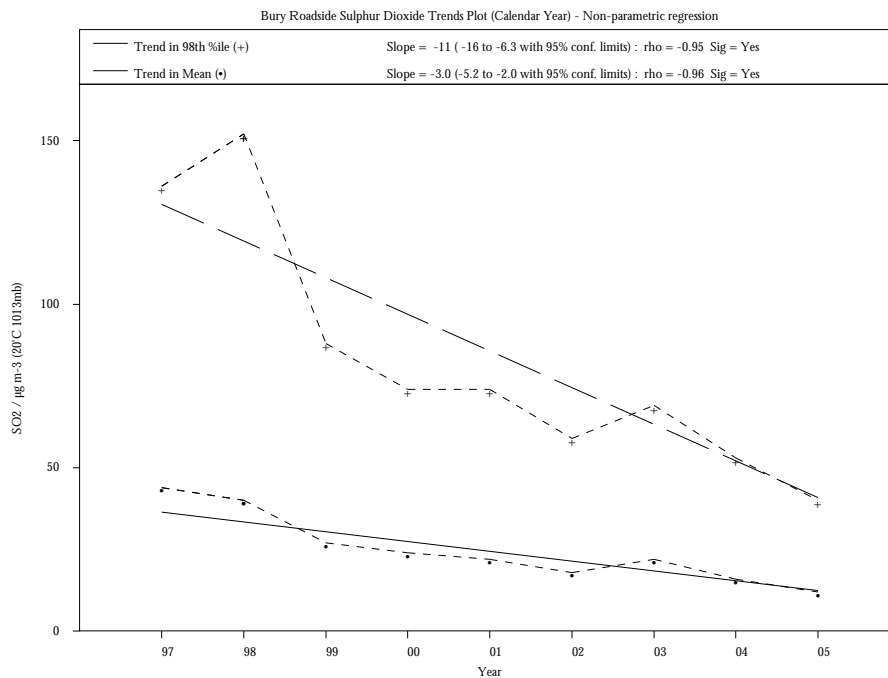


Rural Site
(Harwell)

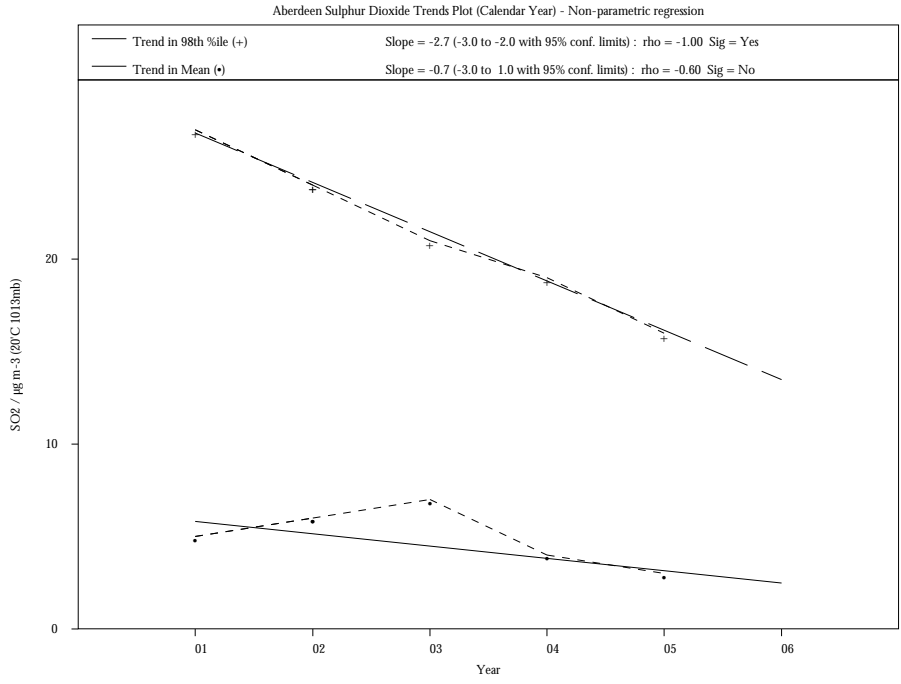
16.8 Trends in annual concentrations



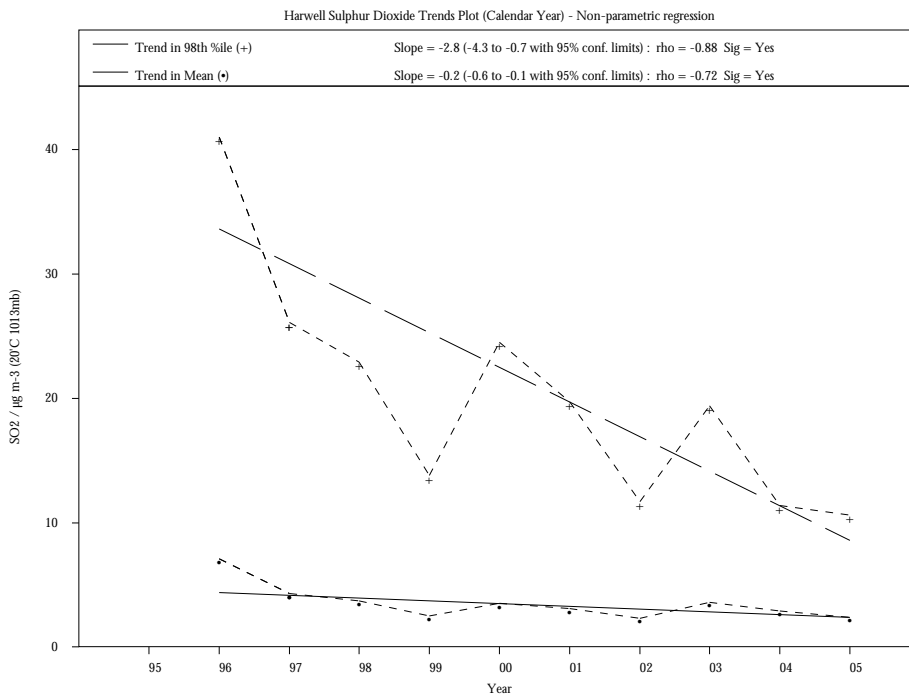
Kerbside Site
(Marylebone Road)



Roadside Site
(Bury Roadside)



Urban Background
(Aberdeen)



Rural Site
(Harwell)

16.9 Sulphur Dioxide Statistical Summary 2005

i) ANNUAL STATISTICS- I

Site	Site Type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$	Maximum 15-minute mean $\mu\text{g m}^{-3}$	Date of maximum 15-minute mean	99.9 %ile of 15-min means $\mu\text{g m}^{-3}$	99.7 %ile of hourly means $\mu\text{g m}^{-3}$	99 %ile of daily means $\mu\text{g m}^{-3}$
England									
Barnsley 12	UB	6	97.2	80	202	07/01/200	56	40	20
Barnsley Gawber	UB	15	89.3	98	109	11/05/200	67	56	28
Birmingham Centre	UC	4	85.5	146	160	20/06/2005	48	32	14
Birmingham Tyburn	UB	2	98.9	43	56	06/03/2005	27	21	10
Blackpool Marton	UB	3	50.6	45	53	02/09/2005	35	21	8
Bolton	UB	2	94.2	80	120	08/06/200	29	24	13
Bournemouth	UB	2	98.2	80	136	11/06/200	21	16	7
Bradford Centre	UC	11	90.0	128	144	28/06/200	61	51	25
Bristol Centre	UC	3	67.5	40	82	06/05/200	35	24	10
Bury Roadside	RD	12	80.8	96	101	23/04/200	77	56	31
Coventry Memorial Park	UB	2	98.8	37	45	23/11/2005	27	19	9
Exeter Roadside	RD	2	81.1	13	16	13/01/200	11	11	5
Harwell	RU	2.4	97.9	159.3	247.4	27/06/200	90.4	41.5	11.1
Hove Roadside	RD	3	96.3	37	48	21/11/200	24	16	10
Hull Freetown	UC	5	82.3	88	125	19/08/200	51	35	14
Ladybower	RU	2.9	94.6	64.9	91.5	18/11/200	45.0	27.4	11.6
Leamington Spa	UB	3	74.6	37	59	16/05/200	24	16	7
Leeds Centre	UC	4	92.8	88	104	12/05/200	64	45	16
Leicester Centre	UC	3	94.1	85	104	30/05/200	32	21	9
Liverpool Speke	UB	7	98.3	117	136	12/09/200	74	51	17
London Bexley	SU	5	97.2	160	181	08/06/200	101	69	27
London Bloomsbury	UC	5	93.9	128	146	08/06/2005	61	35	19
London Brent	UB	4	94.9	96	117	08/06/200	35	27	12
London Cromwell Road 2	RD	5	95.0	69	85	02/04/2005	37	27	15
London Eltham	SU	4	94.6	125	162	27/06/200	72	51	20
London Hillingdon	SU	3	96.1	45	138	27/05/2005	32	21	10
London Lewisham	UC	4	97.0	96	109	27/06/2005	59	43	16
London Marylebone Road	KB	8	97.8	122	141	08/06/2005	64	40	21
London N. Kensington	UB	3	99.3	93	104	08/06/2005	56	32	14
London Southwark	UC	7	98.3	93	125	26/07/2005	51	37	17
London Teddington	UB	3.0	98.9	59.9	79.0	19/03/2005	39.9	28.2	13.0
London Westminster	UB	4	95.6	80	109	26/07/2005	51	32	17
Lullington Heath	RU	2.7	97.5	33.5	59.1	30/04/200	23.7	17.6	9.0
Manchester Piccadilly	UC	---	21.4	29	32	18/11/2005	---	---	---
Manchester South	SU	---	20.0	27	29	18/11/2005	---	---	---
Middlesbrough	I	4	97.0	160	186	09/07/200	96	67	20
Newcastle Centre	UC	3	95.8	90	152	13/10/2005	56	35	11
Northampton	UB	3	95.0	43	85	12/06/200	27	21	8
Norwich Centre	UC	9	96.9	51	74	14/03/200	45	32	25

ii) EXCEEDENCE STATISTICS- I

Site	Mod. 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 Tyburn	0	0	0	0	0	0	0	0	0	0	0	0
Blackpool Marton	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	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	0	0	0	0
Leamington Spa	0	0	0	0	0	0	0	0	0	0	0	0
Leeds Centre	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	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	0	0	0	0	0	0	0	0	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

iii) ANNUAL STATISTICS- II

Site	Site Type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$	Maximum 15-minute mean $\mu\text{g m}^{-3}$	Date of maximum 15-minute mean	99.9 %ile of 15-min means $\mu\text{g m}^{-3}$	99.7 %ile of hourly means $\mu\text{g m}^{-3}$	99 %ile of daily means $\mu\text{g m}^{-3}$
Nottingham Centre	UC	10	92.6	51	69	17/01/2005	51	37	23
Oxford Centre Roadside	RD	3	98.1	29	32	17/11/2005	21	16	10
Plymouth Centre	UC	3	94.8	19	21	14/03/2005	13	13	9
Portsmouth	UB	4	98.9	59	80	31/05/2005	43	24	9
Preston	UB	3	96.5	59	64	11/09/2005	37	24	11
Reading New Town	UB	5	69.8	56	106	23/11/2005	35	27	17
Redcar	SU	9	93.2	125	202	16/06/2005	112	74	29
Rochester	RU	6.1	95.8	136.5	211.7	16/08/2005	83.0	50.0	17.0
Rotherham Centre	UC	---	0.0	---	---	---	---	---	---
Salford Eccles	I	10	95.7	285	442	21/11/2005	104	61	32
Sandwell West Bromwich	UB	2	92.2	109	133	20/06/2005	35	19	9
Scunthorpe Town	I	8	73.6	165	205	30/08/2005	101	69	33
Sheffield Centre	UC	9	98.1	37	45	12/05/2005	29	21	15
Southampton Centre	UC	4	89.9	239	247	06/04/2005	72	40	17
Southend -on-Sea	UB	6	93.6	104	205	16/08/2005	56	37	17
Southwark Roadside	RD	4	98.7	82	85	08/06/2005	40	27	11
Stockport Shaw Heath	UB	4	99.0	67	96	02/08/2005	35	27	12
Stoke-on-Trent Centre	UC	5	50.7	59	67	13/07/2005	32	24	11
Sunderland	UB	2	98.5	37	67	13/07/2005	21	13	6
Thurrock	UB	5	94.0	154	192	13/07/2005	90	61	20
Wicken Fen	RU	3.9	93.5	33.8	47.9	17/11/2005	25.3	18.6	10.2
Wigan Centre		3	96.7	93	125	12/09/2005	35	27	14
Wirral Tranmere	UB	6	51.9	80	141	11/07/2005	61	40	21
Wolverhampton Centre	UC	3	90.9	106	112	20/01/2005	51	27	11
N Ireland									
Belfast Centre	UC	6	95.2	109	122	29/05/2005	72	56	28
Belfast East	UB	5	99.3	109	149	29/05/2005	74	53	25
Derry	UB	5	91.8	85	120	02/12/2005	56	37	19
Scotland									
Aberdeen	UB	3	98.7	67	184	02/07/2005	61	35	13
Edinburgh St Leonards	UB	3	98.6	90	213	08/03/2005	51	32	12
Glasgow Centre	UC	1	97.5	35	59	14/04/2005	19	16	7
Grangemouth	I	7	98.9	202	503	28/01/2005	141	96	41
Wales									
Cardiff Centre	UC	3	55.4	59	85	20/10/2005	45	21	8
Cwmbran	UB	3	94.0	24	48	19/09/2005	19	13	8
Narberth	RU	2.2	94.5	44.2	52.9	18/11/2005	26.6	15.7	7.2
Port Talbot	UB	7	93.3	223	287	04/04/2005	130	82	24
Swansea	UC	4	91.8	69	80	22/04/2005	43	29	14
Wrexham	RD	3	98.7	43	53	03/03/2005	27	21	10

iv) EXCEEDENCE STATISTICS- II

Site	Mod. 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
Nottingham Centre	0	0	0	0	0	0	0	0	0	0	0	0
Oxford Centre Roadside	0	0	0	0	0	0	0	0	0	0	0	0
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 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	---	---	---	---	---	---	---	---	---	---	---	---
Salford Eccles	6	3	0	0	0	0	6	3	0	0	0	0
Sandwell West Bromwich	0	0	0	0	0	0	0	0	0	0	0	0
Scunthorpe Town	0	0	0	0	0	0	0	0	0	0	0	0
Sheffield	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	0	0	0	0	0	0	0	0	0	0	0	0
Wicken Fen	0	0	0	0	0	0	0	0	0	0	0	0
Wigan Centre	0	0	0	0	0	0	0	0	0	0	0	0
Wirral	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 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	4	2	0	0	0	0	4	2	0	0	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	2	2	0	0	0	0	1	1	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

17. Ozone - Measurement Sites, Instrumentation and Statistics

17.1 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.

17.2 Instrumentation

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

- ▶ Ambirak 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

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

Uncertainty 15%

Minimum data capture 90%

17.4 Objectives and Bandings

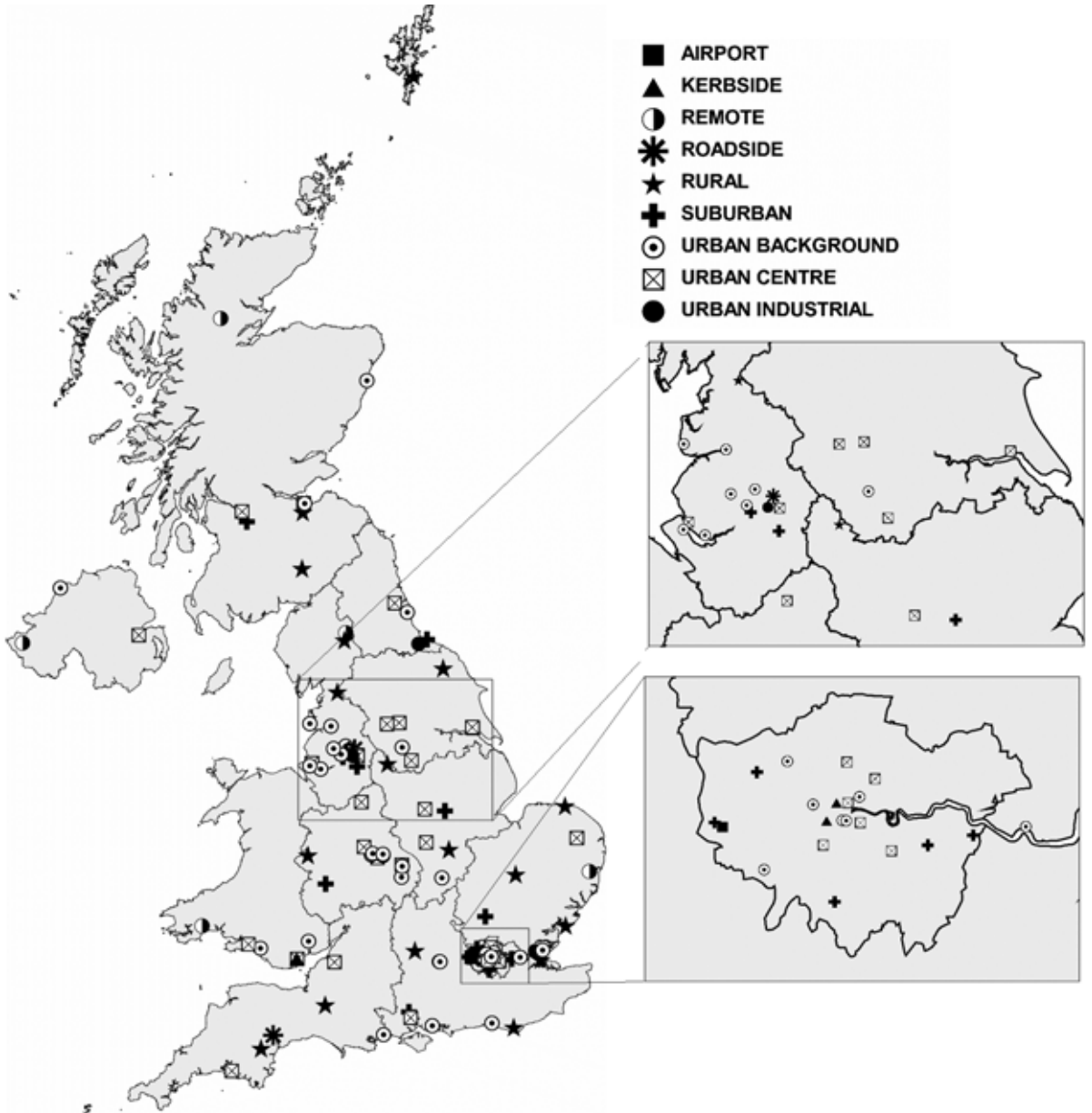
Summary of objectives of the Air Quality Strategy			
	Objective*	Measured as	To be achieved by
Ozone	100 $\mu\text{g m}^{-3}$ Not to be exceeded more than 10 times per year	Daily maximum of running 8-hour mean	31 December 2005

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

Air Quality Bands and Index Values		
Band	Index	Ozone μgm^{-3}
Low	1	0-33
	2	34-65
	3	66-99
Moderate	4	100-125
	5	126-153
	6	154-179
High	7	180-239
	8	240-299
	9	300-359
Very High	10	360 or more

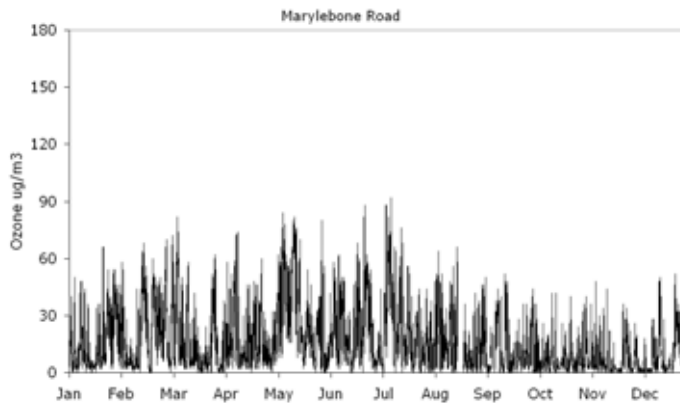
17.5 Site Locations

UK AUTOMATIC OZONE MONITORING SITES 2005

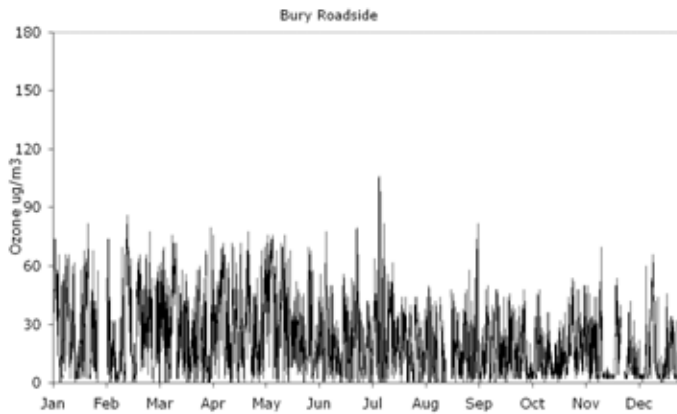


17.6 Hourly Average Concentrations

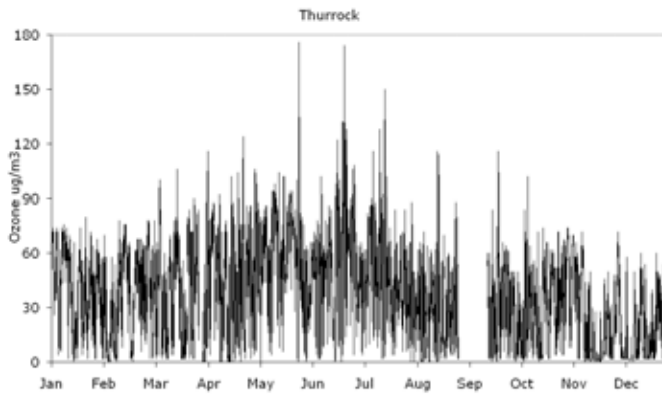
These figures show time series graphs of hourly average ozone concentrations at four *typical* site types for 2005.



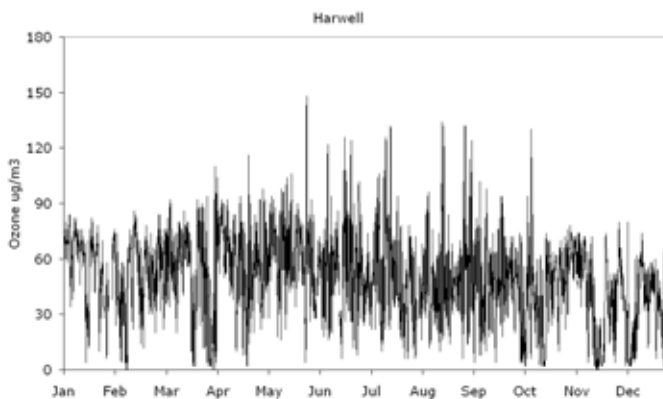
Kerbside Site
(*Marylebone Road*)



Roadside Site
(*Bury*)



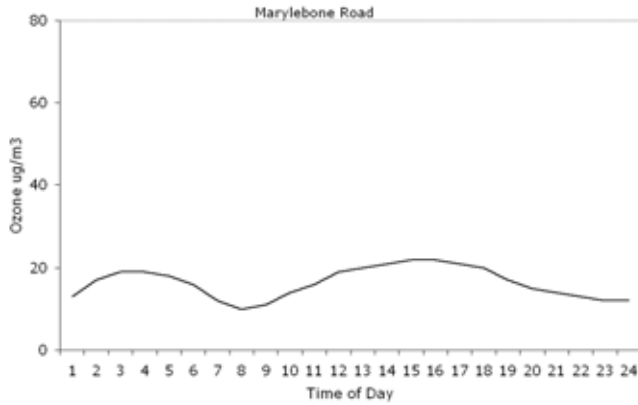
Urban Background Site
(*Thurrock*)



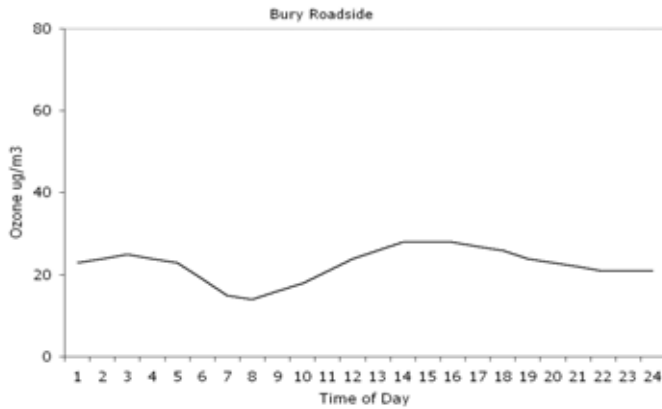
Rural Site
(*Harwell*)

17.7 Diurnal Variations

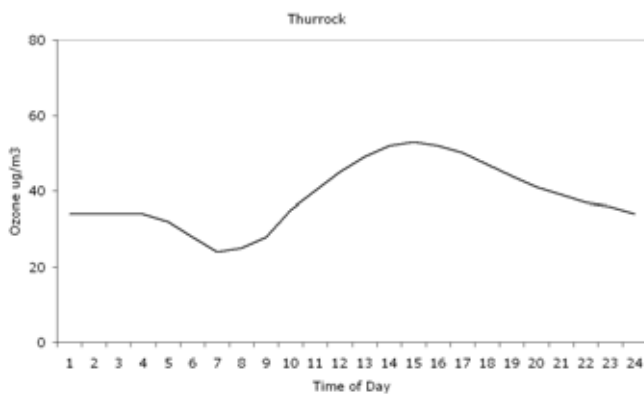
These figures show how ozone concentrations vary on average for each hour of day during the year, at a number of selected *typical* monitoring site types. Local time is used, rather than GMT, since this will more closely reflect the daily cycle of man-made emissions.



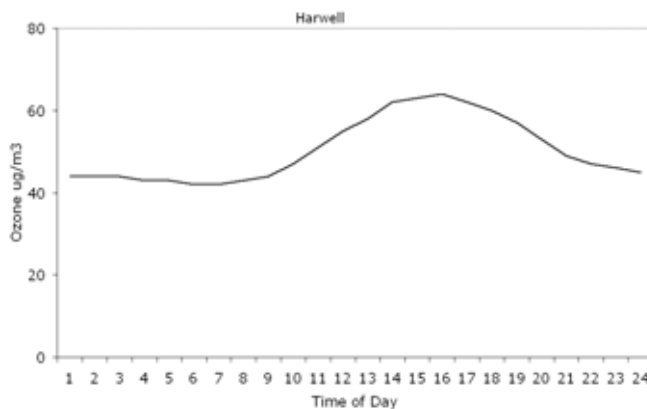
Kerbside Site
(Marylebone Road)



Roadside Site
(Bury)

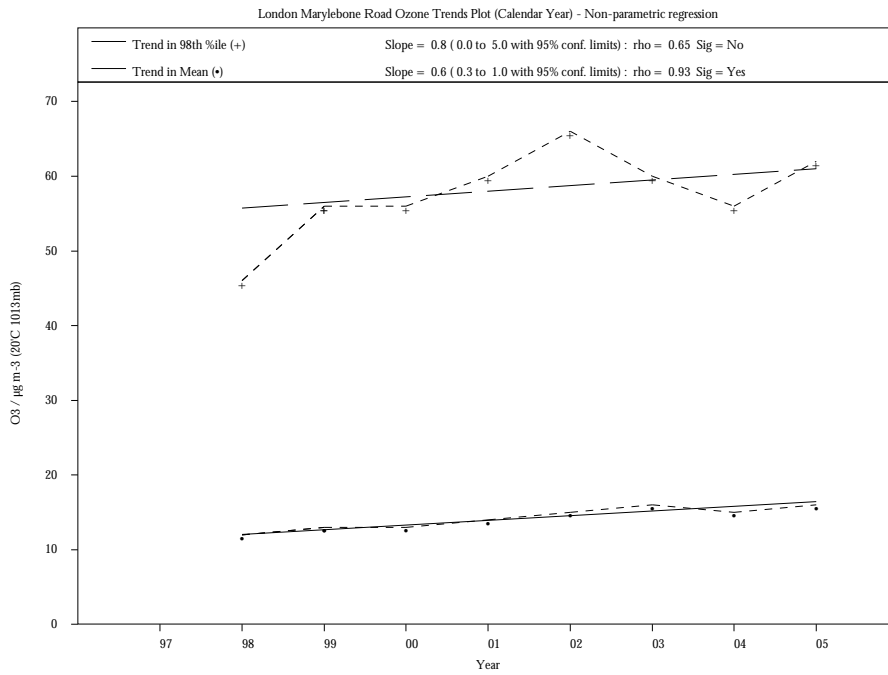


Urban Background Site
(Thurrock)

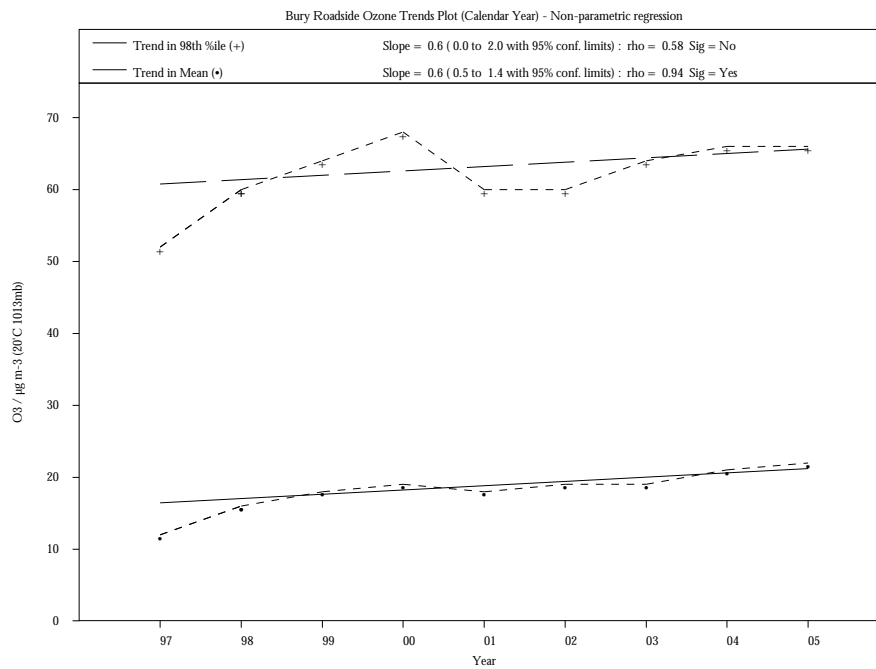


Rural Site
(Harwell)

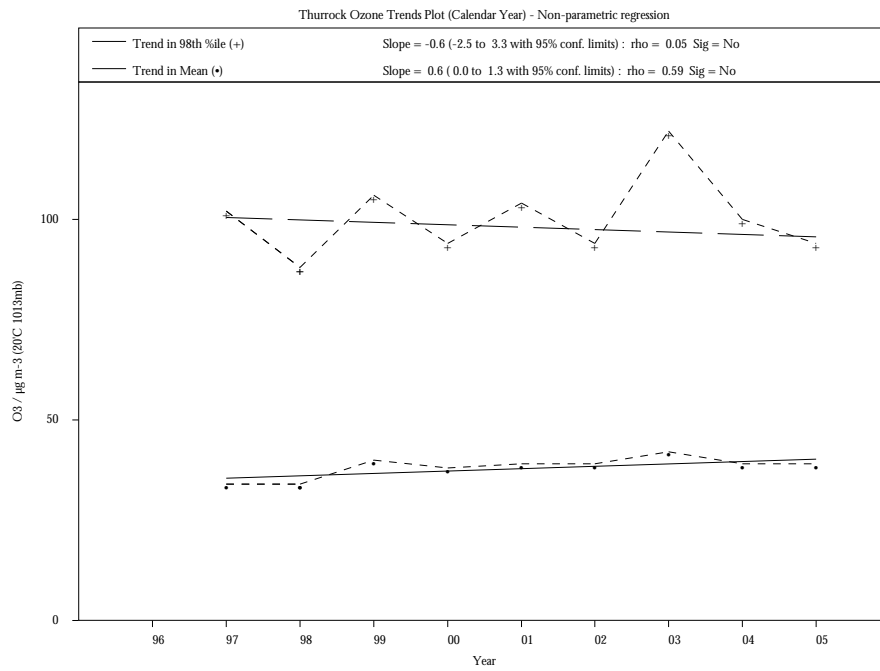
17.8 Trends in annual concentrations



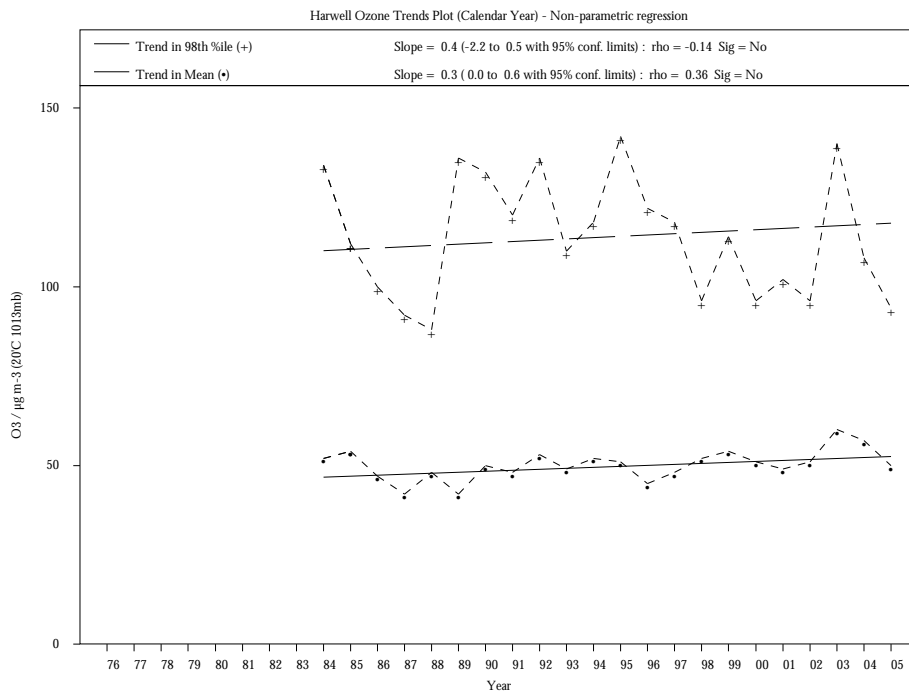
Kerbside Site
(Marylebone Road)



Roadside Site
(Bury)



Urban Background
(Thurrock)



Rural Site
(Harwell)

17.9 Ozone Statistical Summary 2005

i) ANNUAL STATISTICS- I

	Site Type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$	Maximum running 8-hour mean $\mu\text{g m}^{-3}$	Date of maximum running 8-hour mean	97%ile of daily max run 8hr $\mu\text{g m}^{-3}$
England							
Barnsley Gawber	UB	43	96.2	142	129	10/07/2005	95
Birmingham Centre	UC	40	87.0	146	123	27/05/2005	93
Birmingham Tyburn	UB	41	99.2	142	127	10/07/2005	100
Blackpool Marton	UB	45	52.8	132	104	04/09/2005	86
Bolton	UB	41	97.6	116	104	02/04/2005	87
Bottesford	SU	47	99.3	170	137	18/08/2005	106
Bournemouth	UB	51	98.5	180	144	19/06/2005	112
Bradford Centre	UC	35	93.1	102	89	08/06/2005	78
Brighton Preston Park	RD	51	98.6	178	162	27/05/2005	115
Bristol Centre	UC	45	68.8	136	124	10/07/2005	97
Bury Roadside	RD	22	95.7	106	88	09/07/2005	68
Coventry Memorial Park	UB	45	98.7	170	155	27/05/2005	110
Exeter Roadside	RD	34	98.8	110	99	17/08/2005	80
Glazebury	SU	46	98.3	134	119	02/04/2005	99
Great Dun Fell	RU	60	99.4	136	127	25/04/2005	97
Harwell	RU	50	97.9	148	140	27/05/2005	104
High Muffles	RU	60	93.3	150	126	25/04/2005	113
Hull Freetown	UC	43	97.7	150	132	24/06/2005	100
Ladybower	RU	50	96.5	128	115	10/07/2005	88
Leamington Spa	UB	41	72.8	152	139	27/05/2005	107
Leeds Centre	UC	36	92.7	122	113	09/07/2005	85
Leicester Centre	UC	37	97.3	152	133	14/07/2005	105
Leominster		---	45.4	140	123	18/08/2005	---
Liverpool Speke	UB	47	98.3	124	102	02/04/2005	97
London Bexley	SU	38	97.5	192	159	23/06/2005	101
London Bloomsbury	UC	23	91.2	138	130	17/07/2005	81
London Brent	UB	40	96.4	188	167	27/05/2005	111
London Eltham	SU	39	98.0	182	167	23/06/2005	105
London Hackney	UC	37	77.9	168	143	04/09/2005	113
London Haringey	UC	39	99.6	192	171	23/06/2005	118
London Harlington	A	32	99.1	154	141	23/06/2005	101
London Hillingdon	SU	26	92.4	126	108	10/07/2005	90
London Lewisham	UC	32	99.2	172	140	27/05/2005	104
London Marylebone	KD	16	98.0	92	84	10/07/2005	66
London N. Kensington	UB	35	97.7	176	155	27/05/2005	101
London Southwark	UC	32	96.3	136	123	27/05/2005	88
London Teddington	UB	48	99.0	186	169	27/05/2005	120
London Wandsworth	UC	27	97.5	138	119	27/05/2005	85
London Westminster	UB	33	95.9	168	146	27/05/2005	95
Lullington Heath	RU	59	98.2	202	179	27/05/2005	134
Manchester Piccadilly	UC	28	97.9	144	118	10/07/2005	84
Manchester South	SU	30	95.0	130	101	09/07/2005	75

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	89	18	0	0	0	0	27	6
Birmingham Centre	64	13	0	0	0	0	19	5
Birmingham Tyburn	152	28	0	0	0	0	50	11
Blackpool Marton	17	6	0	0	0	0	4	1
Bolton	46	11	0	0	0	0	6	3
Bottesford	191	31	0	0	0	0	85	16
Bournemouth	298	52	1	1	0	0	127	22
Bradford Centre	2	2	0	0	0	0	0	0
Brighton Preston Park	345	53	0	0	0	0	157	26
Bristol Centre	67	16	0	0	0	0	22	7
Bury Roadside	2	1	0	0	0	0	0	0
Coventry Memorial Park	232	40	0	0	0	0	106	22
Exeter Roadside	10	4	0	0	0	0	0	0
Glazebury	150	33	0	0	0	0	48	11
Great Dun Fell	154	19	0	0	0	0	92	10
Harwell	163	27	0	0	0	0	68	14
High Muffles	406	51	0	0	0	0	235	31
Hull Freetown	154	27	0	0	0	0	56	11
Ladybower	60	10	0	0	0	0	25	4
Leamington Spa	120	22	0	0	0	0	51	10
Leeds Centre	36	7	0	0	0	0	16	3
Leicester Centre	158	24	0	0	0	0	79	15
Leominster	54	8	0	0	0	0	22	4
Liverpool Speke	85	24	0	0	0	0	10	6
London Bexley	165	29	3	2	0	0	75	12
London Bloomsbury	23	5	0	0	0	0	10	2
London Brent	273	42	1	1	0	0	128	24
London Eltham	181	32	2	2	0	0	90	15
London Hackney	155	28	0	0	0	0	79	15
London Haringey	284	49	2	2	0	0	124	21
London Harlington	132	19	0	0	0	0	60	12
London Hillingdon	34	8	0	0	0	0	7	3
London Lewisham	187	33	0	0	0	0	78	14
London Marylebone	0	0	0	0	0	0	0	0
London N. Kensington	159	30	0	0	0	0	73	12
London Southwark	56	11	0	0	0	0	26	5
London Teddington	409	67	2	1	0	0	186	32
London Wandsworth	57	9	0	0	0	0	20	6
London Westminster	110	19	0	0	0	0	57	10
Lullington Heath	487	69	7	3	0	0	271	39
Manchester Piccadilly	25	8	0	0	0	0	7	2
Manchester South	19	6	0	0	0	0	1	1

v) ANNUAL STATISTICS- II

	Site Type	Annual average of hourly means $\mu\text{g m}^{-3}$	Annual data capture of hourly means %	Maximum hourly mean $\mu\text{g m}^{-3}$	Maximum running 8-hour mean $\mu\text{g m}^{-3}$	Date of maximum running 8-hour mean	97%ile of daily max run 8hr $\mu\text{g m}^{-3}$
Market Harborough	RU	47	98.9	150	129	27/05/2005	102
Middlesbrough	I	44	95.8	114	101	22/04/2005	89
Newcastle Centre	UC	44	97.4	120	111	25/04/2005	88
Northampton	UB	44	96.5	166	144	27/05/2005	104
Norwich Centre	UC	41	93.6	166	147	23/06/2005	106
Nottingham Centre	UC	34	97.7	134	112	10/07/2005	84
Plymouth Centre	UC	42	88.2	118	112	10/07/2005	85
Portsmouth	UB	46	99.2	204	162	27/05/2005	112
Preston	UB	48	95.6	130	122	24/04/2005	95
Reading New Town	UB	46	96.6	188	168	27/05/2005	111
Redcar	SU	47	80.3	124	113	22/04/2005	96
Rochester	RU	45	98.7	172	151	27/05/2005	101
Rotherham Centre	UC	31	91.6	130	118	10/07/2005	83
Salford Eccles	I	35	95.9	138	108	17/08/2005	86
Sandwell West Bromwich	UB	40	95.8	134	124	10/07/2005	98
Sheffield Centre	UC	31	98.3	128	115	10/07/2005	80
Sibton	RU	59	91.3	190	177	23/06/2005	137
Somerton	RU	55	95.4	152	126	27/05/2005	110
Southampton Centre	UC	33	91.3	112	90	14/07/2005	76
Southend-on-Sea	UB	42	93.2	162	149	23/06/2005	113
St Osyth	RU	53	94.4	186	164	19/06/2005	112
Stoke-on-Trent Centre	UC	42	96.1	126	111	17/08/2005	89
Sunderland Silksworth	UB	50	88.6	118	108	25/04/2005	94
Thurrock	UB	39	94.2	176	150	23/06/2005	106
Weybourne	RU	68	86.1	202	188	24/06/2005	126
Wicken Fen	RU	53	89.7	178	165	31/08/2005	127
Wigan Centre	UB	44	98.2	146	119	24/04/2005	96
Wirral Tranmere	UB	49	66.3	122	102	24/04/2005	89
Wolverhampton Centre	UC	42	96.6	140	121	27/05/2005	96
Yarner Wood	RU	60	96.4	154	133	11/07/2005	113
N Ireland							
Belfast Centre	UC	40	95.4	112	100	23/04/2005	86
Derry	UB	52	86.7	130	119	25/04/2005	95
Lough Navar	RU	50	98.3	140	127	25/04/2005	91
Scotland							
Aberdeen	UB	50	98.9	120	105	24/04/2005	94
Bush Estate	RU	55	98.1	128	113	12/07/2005	88
Edinburgh St Leonards	UB	53	93.3	120	110	13/05/2005	102
Eskdalemuir	RU	51	96.0	128	102	31/08/2005	87
Glasgow Centre	UC	33	97.0	98	87	20/01/2005	79
Lerwick		56	57.8	104	93	03/07/2005	84
Strath Vaich	RE	67	92.7	126	122	26/04/2005	106
Wales							
Aston Hill	RU	70	98.8	158	139	27/05/2005	116
Cardiff Centre	UC	38	58.3	114	104	02/04/2005	80
Cwmbran	UB	52	99.5	156	124	10/07/2005	105
Narberth	RU	63	60.5	110	103	08/11/2005	95
Port Talbot	UB	53	94.8	144	123	31/08/2005	100
Swansea	UC	43	97.5	130	116	10/07/2005	97

vi) EXCEEDENCE STATISTICS- II

Site	Moderate band	Days	High band	Days	Very High band	Days	Air Quality Standard (Running 8-hour Mean)	Days
Market Harborough	156	24	0	0	0	0	71	13
Middlesbrough	28	10	0	0	0	0	1	1
Newcastle Centre	38	7	0	0	0	0	19	2
Northampton	180	30	0	0	0	0	76	14
Norwich Centre	162	24	0	0	0	0	96	14
Nottingham Centre	58	12	0	0	0	0	13	4
Plymouth Centre	42	10	0	0	0	0	10	3
Portsmouth	232	37	2	1	0	0	120	22
Preston	91	21	0	0	0	0	34	6
Reading New Town	249	39	1	1	0	0	115	22
Redcar	101	14	0	0	0	0	43	6
Rochester	190	35	0	0	0	0	75	13
Rotherham Centre	30	10	0	0	0	0	7	1
Salford Eccles	41	9	0	0	0	0	11	4
Sandwell West Bromwich	104	19	0	0	0	0	38	10
Sheffield Centre	19	6	0	0	0	0	5	1
Sibton	816	97	9	2	0	0	482	63
Somerton	238	34	0	0	0	0	113	20
Southampton Centre	6	3	0	0	0	0	0	0
Southend-on-Sea	196	25	0	0	0	0	115	15
St Osyth	321	54	3	1	0	0	152	29
Stoke-on-Trent Centre	40	14	0	0	0	0	8	2
Sunderland Silksworth	66	10	0	0	0	0	30	6
Thurrock	162	30	0	0	0	0	71	13
Weybourne	626	74	11	4	0	0	391	43
Wicken Fen	345	55	0	0	0	0	160	29
Wigan Centre	88	20	0	0	0	0	32	7
Wirral Tranmere	32	9	0	0	0	0	2	1
Wolverhampton Centre	84	22	0	0	0	0	21	8
Yarner Wood	223	35	0	0	0	0	112	19
N Ireland								
Belfast Centre	20	7	0	0	0	0	0	0
Derry	61	14	0	0	0	0	22	4
Lough Navar	45	11	0	0	0	0	14	3
Scotland								
Aberdeen	87	14	0	0	0	0	26	6
Bush Estate	19	6	0	0	0	0	6	1
Edinburgh St Leonards	192	28	0	0	0	0	80	13
Eskdalemuir	22	5	0	0	0	0	1	1
Glasgow Centre	0	0	0	0	0	0	0	0
Lerwick	2	2	0	0	0	0	0	0
Strath Vaich	293	38	0	0	0	0	140	18
Wales								
Aston Hill	447	64	0	0	0	0	228	36
Cardiff Centre	13	3	0	0	0	0	3	1
Cwmbran	210	33	0	0	0	0	85	17
Narberth	37	11	0	0	0	0	5	2
Port Talbot	142	32	0	0	0	0	56	11
Swansea	107	27	0	0	0	0	31	8