West Lothian Council

ENVIRONMENT ACT 1995

PROGRESS REPORT 2008

AIR QUALITY IN WEST LOTHIAN

MARCH 2008

www.air-quality.net

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1. INTRODUCTION

1.1. Purpose of Report

This is a Progress Report of Air Quality in West Lothian. It covers the period 1 January 2007 to 31st December 2007 inclusive.

1.2. Local Air Quality Management Areas

There are currently no local air-quality management areas in West Lothian.

1.3. Detailed Assessments

The Progress Report submitted in April 2007 concluded that it would not be necessary for West Lothian to proceed to a detailed assessment for any of the pollutants.

1.4. Commentary on Progress Report 2007

The Scottish Environment Protection Agency (SEPA) and the Scottish Executive agreed with the conclusions in the report.

1.5. Current Monitoring

1.5.1. Contaminates measured

West Lothian Council has continued to monitor for Carbon monoxide(CO), Oxides of Nitrogen (NOX), Particulate Matter (PM_{10}) and Sulphur dioxide (SO_2).

1.5.2. Automated Sites

West Lothian Council has continued to monitor for Carbon monoxide(CO), Oxides of Nitrogen (NOX), Particulate Matter (PM_{10}) and Sulphur dioxide (SO_2) using the mobile air-quality monitoring unit (Groundhog). The results can be viewed on pages 10, 15, 19 and 22.

West Lothian has continued to monitor NOX and PM_{10} at Linlithgow High St with a roadside real-time analyser (Romon300). The results can be viewed on pages 16 and page 20.

A capital bid to the Scottish Executive for a further Romon300 to be located in Broxburn Town Centre has been successful. This was based on the higher levels of Nitrogen dioxide than at other diffusion tube sites in West Lothian. Monitoring of PM_{10} has not been carried out in Broxburn, but is appropriate given the Nitrogen dioxide levels found and the nature of the site. The Romon300 has now been purchased and is due to be located at 47-51 East Main Street, Broxburn by the end of March 2008.

1.5.3. Diffusion tubes

West Lothian Council has reconfigured the diffusion tube survey to incorporate another three sites. The new sites were chosen due to the topography of the land and were identified to be busy roads as indicated by current traffic flows.

Nine sites were in operation during 2007, details can be seen on page 14. The new sites are:

- King St, Bathgate(Grid Ref:NS 975 687)

- Armadale Cross(Grid Ref:NS 938 686); and
- Orchardfield Terrace, Wilkieston(Grid Ref: NT 122 684).

Diffusion tubes were located at these new sites from the end of January 2008 and results will be shown in next years Updating and Screening assessment.

1.5.4. Monitoring of former Polkemmet Colliery Site

The Groundhog has been located at Cairnie Place, Whitburn since 31st January 2005 to monitor local air-quality at the open cast activities and reclamation of the burning spoil heaps at the former Polkemmet Colliery. Results for Cairnie Place can also be viewed at www.air-quality.net.

1.6. Site relocation

Redevelopment of a site immediately adjacent to the Linlithgow High Street Romon has been ongoing since the end of July 2007. It has been decided that it is not necessary to re-locate the Romon in Linlithgow High St as this development work does not appear to have affected the data from this site.

1.7. New Developments

There have been no new developments within West Lothian during 2007 that are likely to impact on local air quality.

However there are continuing high levels of general development in West Lothian which will cumulatively significantly increase traffic levels throughout. The population in West Lothian is predicted to increase by 21% by 2024 from a population of 162,840 (2004) to a population of 196,439.

2. AIR QUALITY: QA/QC

2.1. Automated Sites and Equipment

2.1.1. Groundhog, Cairnie Place, Whitburn

The Groundhog is a mobile air-quality monitoring unit, which has been with West Lothian Council, Environmental Health since September 1999. The Groundhog is used to house real-time analysers measuring Carbon monoxide (CO), Nitrogen dioxide (NO_2), Oxides of nitrogen (NOX), Nitric oxide (NO), Sulphur dioxide (SO_2), and Particulate matter (PM_{10}). This was originally provided by Casella Eti. The results can be viewed on pages 10, 15, 19 and 22.

2.1.2. Romon 300, Linlithgow High Street

The Romon300 roadside analyser has been with Environmental Health since December 2005 and this unit houses two real-time analysers measuring Nitrogen dioxide (NO_2), Oxides of nitrogen (NOX), Nitric oxide (NO) and Particulate matter (PM_{10}). The results can be viewed on pages 16 and page 20.

2.1.3. Reliability

Both the Groundhog and Romon have an air-conditioning unit to maintain a constant temperature throughout the year. Analysers are therefore less likely to break down. There are also alarm settings on each of the analysers, so that any fault with an analyser can be detected and resolved quickly.

There have been sporadic problems with the power tripping at both sites. Some limited data loss has occurred when this has happened at weekends or during holidays.

2.2. Analyser Maintenance and calibration

2.2.1. In house procedures

Weekly quality control/quality assurance procedures are in place to ensure data validity. This includes checking gas levels. Records are kept of new gas cylinder installations, filter changes and other site visits.

The gases zero air, Nitric oxide, Carbon monoxide and Sulphur dioxide are used to calibrate the real-time analysers to ensure the data is valid. These are supplied by Air Liquide.

West Lothian Council performs a manual calibration of the Groundhog and Romon300. This is completed once a fortnight and these results are recorded to establish if there is any kind of drift. A sudden drift between the span measured and span reference would indicate that there may be a fault with the analyser.

If after a manual calibration has been carried out there is still a large drift, Casella Eti will be notified and are contracted to investigate the fault within 48 hours. In such instances, a diagnostics sheet is filled out and faxed through to Casella. This gives the engineer an idea of what the problem is before the visit.

2.2.2. Procedures specific to the TEOM (tapered element oscillating microbalance) - PM10 Analyser

The filter in the TEOM is changed before the lifetime of the filter reaches 85%. Before the filter is changed, a pre-calibration checklist is completed. Once the

filter has been changed, a post-calibration checklist is completed one hour later. This reduces the likelihood of faults induced or associated with the filter change. The TEOM head is also cleaned each time the filter is changed.

2.2.3. Contracted in services

West Lothian Council has a maintenance contract with Casella Eti for both automated sites. This includes:

- Technical support 9am to 5pm, Monday to Friday for the Enview 2000 software;
- Maintenance of the equipment, with a service carried out every six months;
- 48-hour call-out for any equipment breakdown so that the fault can be quickly identified and rectified to minimise data loss; and
- Daily checks of the ambient data, automatic calibrations and communications. Any anomalies identified are reported to West Lothian council.

2.3. Data Acquisition, Security and Dissemination

2.3.1. Data Aquisition

Data is downloaded to a stand-alone computer for both units through a modem link using Enview 2000 software twice a day. This permits levels to be checked daily and to identify any exceedences.

2.3.2. Data Security

There are strategies in place to minimise data loss. When a monthly periodic report is carried out the data is transferred into Excel and saved onto CD-ROM to back up the data.

2.3.3. Data Dissemination

Casella Eti provide a web-site for displaying West Lothian Council's air quality data. This includes a twice daily data collection and automatic posting of data onto the web-site.

2.4. Data Validation

A Periodic report in Enview software is carried out once a month for the pollutants NO_2, SO_2, CO & PM10. This is to screen the data and to ensure that any large peaks or high concentrations due to breakdowns of the analyser can be invalidated.

3. PROGRESS REPORT FOR BENZENE

3.1. Introduction

West Lothian Council ceased to monitor for Benzene in October 2006 due to levels being consistently below the Standard and Objective for Benzene and a SEPA recommendation to this effect.

3.2. Standard and Objective for Benzene

The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:

- All authorities: Running annual mean of 16.25µg/m³ to be achieved by 31.12.2003
- Authorities in Scotland and Northern Ireland only: Running annual mean of 3.25µg/m³ to be achieved by 31.12.2010

3.3. Conclusion for Benzene

Due to consistently low levels over the years, West Lothian Council ceased monitoring of Benzene.

There are no significant industrial sources of benzene located either within West Lothian or neighbouring areas which are likely to adversely affect air quality.

4. PROGRESS REPORT FOR 1,3 – BUTADIENE

4.1. Introduction

No monitoring of 1,3 – Butadiene is carried out in West Lothian.

There are no significant industrial sources of this pollutant within West Lothian and this situation has not changed. There have been no new developments in West Lothian that are likely to emit 1,3 – Butadiene in 2007.

4.2. Standard and Objective for 1,3 – Butadiene

The Air Quality (Scotland) Regulations 2000 and amendment regulations set the following objectives:-

- Running annual mean of 2.25µg/m³ to be achieved by 31.12.2003

4.3. Conclusion for 1,3 – Butadiene

No monitoring of 1,3 – Butadiene is carried out in West Lothian. It is not considered necessary due to the lack of industrial sources within or immediately upwind of West Lothian.

5. PROGRESS REPORT FOR CARBON MONOXIDE

5.1. Introduction

Monitoring for Carbon monoxide has continued during 2007 and is measured with the real-time analyser located within the Groundhog. The Groundhog has been located at Cairnie Place, Whitburn since 31st January 2005. Once the reclamation of the former Polkemmet Colliery has ceased the Groundhog will be located elsewhere within West Lothian.

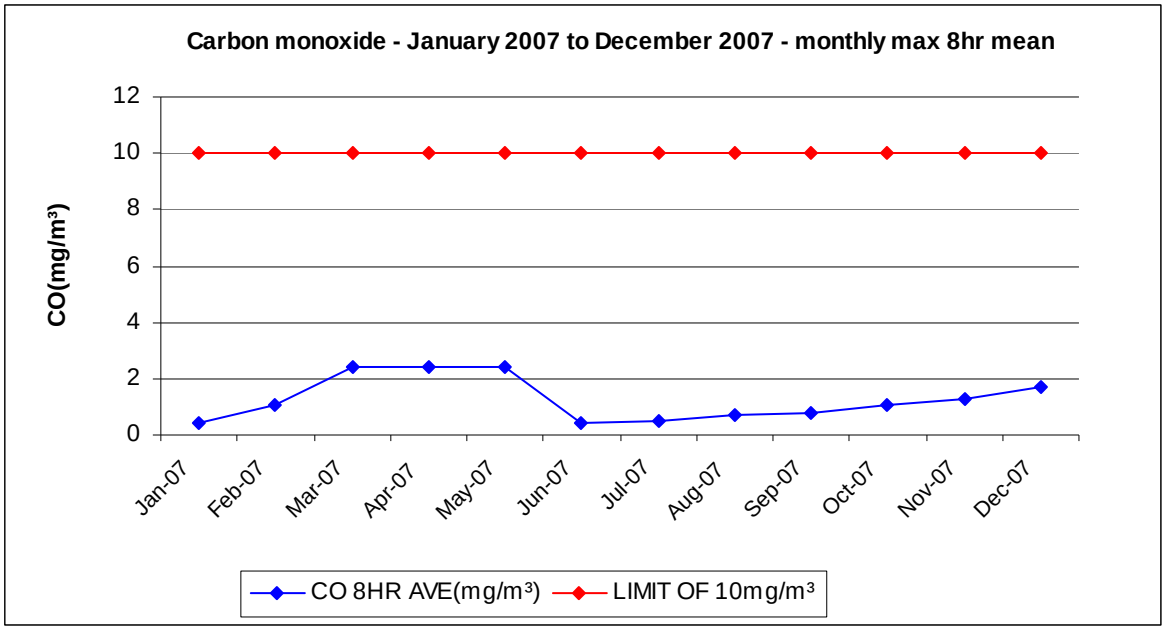
5.2. Standard and Objective for Carbon monoxide

The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-

- Maximum daily 8-hr mean of 10.0mg/m³ to be achieved by 31.12.2003

5.3. Monitoring Results: 2007

Figure 5.1 – Cairnie Place – January 2007 to December 2007 – monthly 8hr mean



5.4. Conclusion for Carbon monoxide

There have been no exceedences of the air quality standard for Carbon monoxide. Therefore there remains no need to proceed to a detailed assessment. No changes in Carbon monoxide levels have been observed due to the reclamation of the burning bing at Polkemmet.

6. PROGRESS REPORT FOR LEAD

6.1. Introduction

No monitoring of Lead is carried out within West Lothian as there are no significant sources of lead. There have been no new industrial sources identified this year.

6.2. Standard and Objective for Lead

The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-

- Annual mean of 0.5µg/m³ to be achieved by 31.12.2004
- Annual mean of 0.25µg/m³ to be achieved by 31.12.2008

6.3. Industrial Sources

The position stated previously in the last Progress Report submitted in April 2007 remains unchanged. There are no new industrial sources of lead in West Lothian that are likely to affect the air quality objective.

6.4. Conclusion for Lead

No monitoring of lead is carried out in West Lothian. There is no need to proceed to a detailed assessment.

7. PROGRESS REPORT FOR NITROGEN DIOXIDE

7.1. Introduction

Monitoring of Nitrogen dioxide in West Lothian has continued using two real-time analysers and a network of passive diffusion tubes.

7.1.1. Automated real-time analysers

Real-time analysers are located within the air-quality monitoring unit (Groundhog) at Cairnie Place, Whitburn and within the Romon300 at Linlithgow High Street.

7.1.2. Diffusion Tubes

West Lothian Council has continued monitoring with passive diffusion tubes. The diffusion tube survey was extended again at the end of January 2008 and now includes a total of ten sites. Two tubes are located at nine of the sites and three tubes have now been co-located with the real-time analyser at Linlithgow High St. Traffic flows were checked for potential sites and a further three sites were chosen as King St, Bathgate, Armadale Cross, Armadale and Orchardfield Terrace, Wilkieston. Results for these sites will be shown in next year's Updating and Screening assessment.

Diffusion tube data remains valuable and West Lothian Council is committed to making it publicly available. The council has therefore continued to input data on the web based data entry system provided by AEA Technology Environment (NETCEN). AEA continue to provide local authorities with a calendar of suggested exposure periods for monthly changes of the diffusion tubes. Details of the locations of the diffusion tube sites and results can be seen on page 14. The locations of the diffusion tubes have been plotted on a map and can be seen in Appendix 4, page 55.

7.2. Standard and Objective for Nitrogen Dioxide

The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-

- 1-hr mean of 200µg/m³ not to be exceeded more than 18 times a year and to be achieved by 31.12.2005
- Annual mean of 40µg/m³ to be achieved by 31.12.2005

7.3. Monitoring Data

7.3.1. Automated real-time analysers

The real-time results for both real-time analysers (Groundhog at Cairnie Place, Whitburn and the Romon 300 at Linlithgow High Street) have been reported from January 2007 to December 2007. The results can be seen on page 15 and 16 respectively.

7.3.2. Diffusion Tubes

The diffusion tubes are prepared and analysed by Analytical & Scientific Services, Edinburgh City Council, 4 Marine Esplanade, Edinburgh. The tubes

are prepared using method 1 which is 50% v/v TEA in acetone and the tubes are exposed for 4 or 5 weeks at a time.

7.4. Groundhog and Diffusion tube comparison

7.4.1. Background

Three diffusion tubes have been co-located with the Groundhog since January 2005. A comparison of the diffusion tubes with the real-time analyser and how the bias factors have been calculated are shown below. These can then be applied to the diffusion tube results for other sites in West Lothian.

The bias correction factors for the diffusion tubes were taken from TG.03, Box 6.4, page 6-7 of the technical guidance.

7.4.2. Bias Correction factors: Bias factor Method A:

A= Cm/Dm, where:

- Cm = annual mean real-time analyser result; and
- Dm = annual mean diffusion tube result

7.4.3. Bias Correction factors: Bias factor Method B:

B = (Dm – Cm) / Cm

7.4.4 Diffusion Tube Results at Cairnie Place, Whitburn – January 2007 to December 2007

Three diffusion tubes have been co-located at this site during 2007.

Table 7.1

Whitburn	**Groundhog (Real-time) Monthly Average(µg/m³)**	**Co-located diffusion tubes (average)**
January 2007	14.3	25
February 2007	24.3	32
March 2007	19	7
April 2007	24	20
May 2007	21	19
June 2007	19	27
July 2007	17	15
August 2007	21	21
September 2007	21	17
October 2007	29	22
November 2007	29	27
December 2007	33	17
Annual Average (12 MONTHS)	**23µg/m³**	**21µg/m³**

Bias factor method A: = 23/21 = 1.10

Diffusion tube correction = 1.10 x 21 = 23 µg/m³

Bias factor method B : (21-23)/23 = -0.09 (9% UNDER READ)

During this 12-month period the diffusion tubes were under reading by 9%

7.5. Diffusion Tube Results: 2007

Table 7.2 – Diffusion tube Results – Year 2007 – Results in µg/m³

DATE	WL 1	WL 7	WL 3	WL 8	WL 4	WL 9	WL 5	WL 10	WL 6	WL 11	WL 12	WL 13	WL 14	WL 15	WL 18	WL 16	WL 19	WL 17	WL 20
Location	East Main Street, Whitburn		72 Cedric Rise, Dedridge, Livingston		59 High Street, Bathgate		East Main Street, Broxburn		212 High Street, Linlithgow		Groundhog, Cairnie Place, Whitburn,			High Port, Linlithgow		Uphall Station, Uphall, (Roadside site – Grid		Alderstone Road, Livingston	
Grid Reference	NS 948 651		NT 064 664		NS 978 693		NT 083 722		NS 999 771		NS 944 641			NT 005 771		NT 062 706		NT 047 674	
Type	Roadside		Background		Background		Roadside		Roadside		Co- located with real-time analyser			Roadside		Roadside		Roadside	
JAN 07	19	17	17	16	14	11	39	35	22	21	22		28	35	35	23	22	22	27
FEB 07	33	30	23	21	12	24	51	53	39	35		32	32	45	45	36	33	37	~
MAR 07	5	12	5	13	5	6	17	23	7	9	5	8	8	18	19	24	12	5	<1
APR 07	29	27	15	15	13	15	48	38	32	26	17	20	22	33	37	26	26	23	23
MAY 07	22	19	11	12	12	10	42	37	27	29	18	19	19	33	34	24	23	20	<1
JUN 07	38	32	27	24	16	15	~	~	38	35	29	27	26	49	51	51	46	33	37
JUL 07	21	18	~	11	6	8	29	24	23	24	15	14	17	~	~	23	26	17	17
AUG 07	22	23	13	13	12	11	27	33	31	29	21	18	23	23	25	27	25	20	<1
SEP 07	15	22	15	13	12	18	~	~	28	32		17	17	26	26	26	28	31	22
OCT 07	25	22	17	17	23	21	29	34	35	32	23		20	35	11	26	29	22	20
NOV 07	29	32	21	19	26	23	39	33	46	37	29	27	25	37	43	34	36	32	32
DEC 07	22	21	13	19	14	14	35	38	22	30	18	17	16	24	27	28	24	33	<1
AVERAGE	**23**	**23**	**15**	**16**	**14**	**15**	**36**	**35**	**35**	**28**	**20**	**20**	**21**	**33**	**32**	**29**	**28**	**25**	**15**
Bias correction (1.10)	**25**	**25**	**17**	**18**	**15**	**17**	**40**	**39**	**39**	**31**	**22**	**22**	**23**	**36**	**35**	**32**	**31**	**28**	**17**

7.6. Real-time monitoring results: Cairnie Place, Whitburn

7.6.1. Monthly and Annual averages

Table 7.3 – Cairnie Place, Whitburn – monthly & annual averages

MONTHLY AVERAGE	NO_2 (µg/m³)
January 2007	14
February 2007	24
March 2007	19
April 2007	24
May 2007	21
June 2007	19
July 2007	17
August 2007	21
September 2007	21
October 2007	29
November 2007	29
December 2007	33
ANNUAL AVERAGE (12 MONTHS)	**23µg/m³**

Table 7.3 shows that there was a 12 month average of 23µg/m³ for Nitrogen dioxide when the Groundhog was located at Cairnie Place, Whitburn which meets the annual mean of 40µg/m³.

Figure 7.3 – Monthly highest 1hr average – Cairnie Place, Whitburn

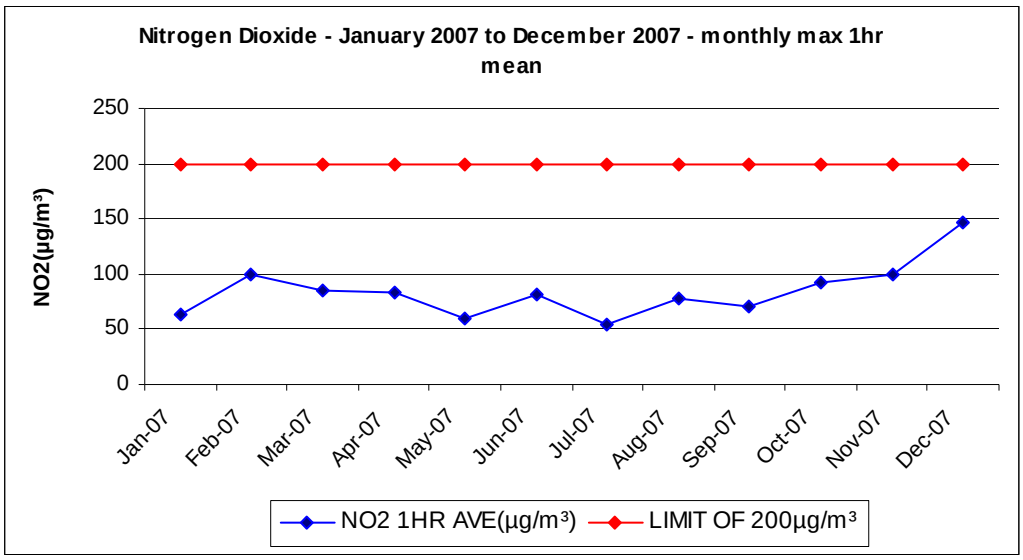


Figure 7.3 shows that the highest reading for the 1hr mean for Nitrogen dioxide from January 2007 to December 2007 was 147.1µg/m³ , which meets the 1hr standard of 200µg/m³ for 31.12.2005. Monthly graphs can be viewed in Appendix 2 pages 32-37.

7.7. Real-time monitoring results: Linlithgow High Street

7.7.1. 1 Hour averages

Table 7.4 – High St, Linlithgow– monthly & annual averages

MONTHLY AVERAGE	NO2(µg/m³)
January 2007	23
February 2007	29
March 2007	25
April 2007	25
May 2007	18
June 2007	16
July 2007	14
August 2007	16
September 2007	16
October 2007	29
November 2007	29
December 2007	34
ANNUAL AVERAGE (12 MONTHS)	**23µg/m³**

Table 7.4 above shows that there was a 12 month average of 23µg/m³ for Nitrogen dioxide at Linlithgow High St, which meets the annual mean of 40µg/m³. Monitoring of Nitrogen dioxide will continue at Linlithgow High Street.

Figure 7.4 – Monthly highest 1hr average – Linlithgow High Street

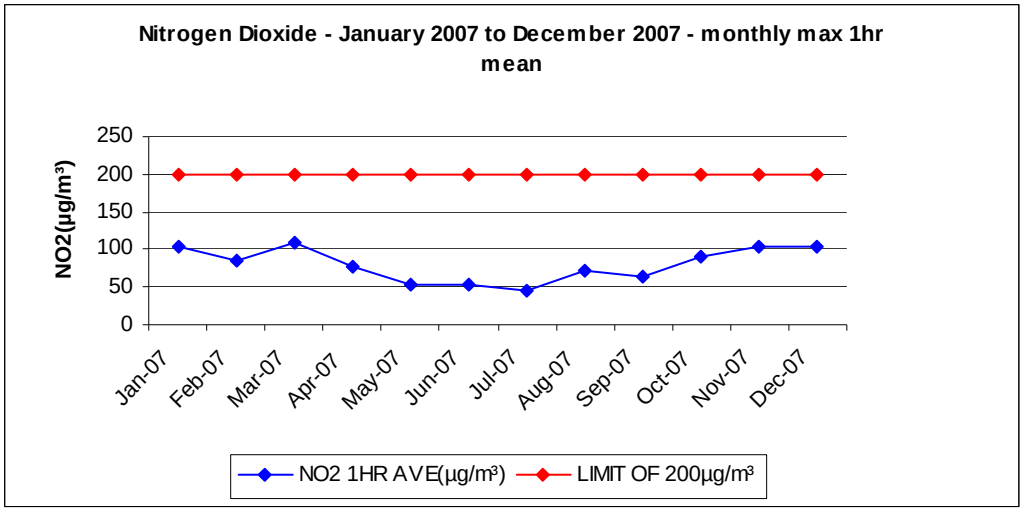


Figure 7.4 shows that the highest reading for the 1hr mean for Nitrogen dioxide at Linlithgow High Street from January 2007 to December 2007 was 105.1µg/m³ , which meets the 1hr standard of 200µg/m³ for 31.12.2005. Monthly graphs can be viewed in Appendix 2 on pages 38-43.

7.8. Conclusion for Nitrogen Dioxide

The real-time monitoring data for Cairnie Place, Whitburn and High Street, Linlithgow indicates that that there were no exceedences in the last twelve months. There is no need for West Lothian to proceed to a detailed assessment for Nitrogen dioxide.

West Lothian has continued with the existing diffusion tube sites with some sites removed in January 2008 and additional sites added in January 2008. West Lothian now has a total of ten sites. Details of the existing sites can be seen on page 14. The locations of the new diffusion tube sites can be viewed on a map in Appendix 4.

Real-time monitoring of Nitrogen dioxide will continue at Cairnie Place, Whitburn and High St, Linlithgow. Passive monitoring using diffusion tubes will continue at the ten sites identified in this chapter.

West Lothian has purchased an additional Romon for measuring Nitrogen dioxide and PM10 which is to be placed in East Main Street, Broxburn by the end of March 2008.

8. PROGRESS REPORT FOR PM_{10}

8.1. Introduction

Monitoring for PM_{10} has continued during 2007 using the TEOM analysers in the Groundhog located at Cairnie Place, Whitburn and in the Romon at Linlithgow High Street.

West Lothian Council submitted a bid to the Scottish Executive to purchase an additional TEOM fitted Romon with the intention of locating this in Broxburn Town Centre. This has been approved and will be installed by the end of March 2008.

In addition, the Scottish Executive has approved funding to upgrade the TEOM at Linlithgow High Street to FDMS. This is to ensure the best quality of data for this site. PM_{10} levels are nearing those at which a Local Air Quality Management Area may be required under the 2010 standards.

8.2. Standard and Objective for PM_{10}

The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-

- 24-hour mean of 50µg/m³ not to be exceeded more than 35 times a year to be achieved by 31.12.2004
- Annual mean of 40µg/m³ to be achieved by 31.12.2004

For local authorities in Scotland only there are two objectives for 2010:-

- 24-hour mean of 50µg/m³ not to be exceeded more than 7 times a year to be achieved by 31.12.2010
- Annual mean of 18µg/m³ to be achieved by 31.12.2010

8.3. Monitoring Data Results

The PM_{10} data from the TEOM has been converted into gravimetric concentrations by multiplying the monthly results by the 1.3 default factor. The annual average results have been multiplied by both the 1.3 and 1.14 factor.

8.4. PM_{10} Results: Cairnie Place, Whitburn

8.4.1. Monthly & Annual Average

Table 8.1 – Monthly and annual averages for PM10 – January 2007 to December 2007

MONTHLY AVERAGE	PM_{10}(µg/m³)
January 2007	9
February 2007	14
March 2007	18
April 2007	17
May 2007	15
June 2007	15
July 2007	14
August 2007	14
September 2007	15
October 2007	16
November 2007	14
December 2007	12
Annual Average (1.3 factor)	**14µg/m³**
Annual Average (1.14 factor)	**13µg/m³**

Table 8.1 shows an annual average of 14µg/m³ when multiplied by the 1.3 default factor and an annual average of 13µg/m³ when multiplied by the 1.14 default factor. The PM_{10} 2010 objective of 18µg/m³ is therefore being achieved at Cairnie Place.

8.4.2. 24 Hour Averages

Figure 8.1– Cairnie Place, Whitburn - Highest monthly 24hr average – 2007

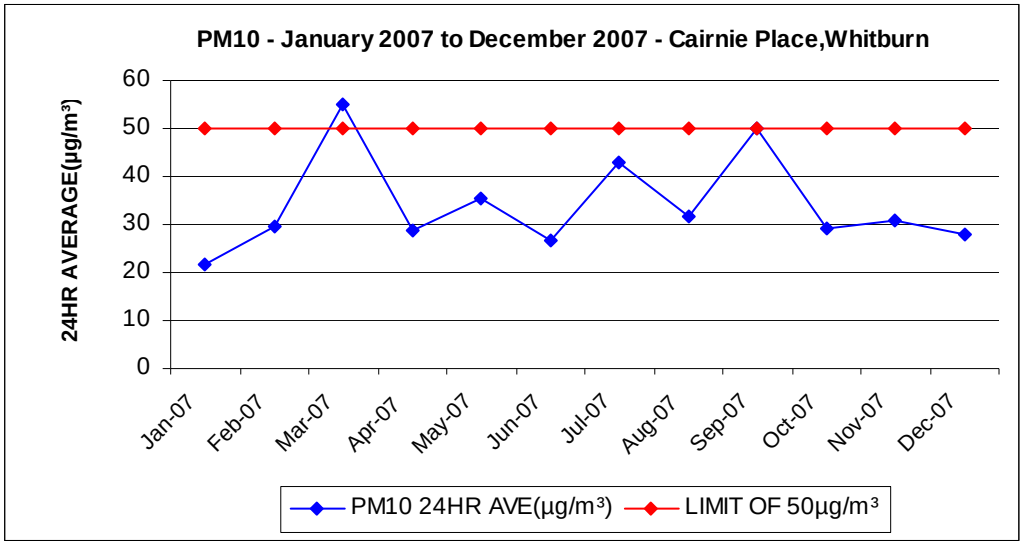


Figure 8.1 above shows that there were two exceedences on 27th March 2007 and 13th September 2007 of the 24-hour objective for 2010. This objective has been achieved. Graphs of the monthly 24-hour results can be seen in Appendix 3 pages 43-48.

8.5. PM_{10} Results: High Street, Linlithgow

8.5.1. Monthly & Annual Average

Table 8.2 – Monthly and annual averages for PM10 – January 2007 to December 2007

MONTHLY AVERAGE	PM_{10}(µg/m³)
January 2007	13.9
February 2007	18.9
March 2007	25.8
April 2007	20.3
May 2007	14.3
June 2007	17.1
July 2007	14
August 2007	18.7
September 2007	18.1
October 2007	21.6
November 2007	18.6
December 2007	19.5
Annual Average(1.3)	**18.4µg/m³**
Annual Average(1.14)	**16.1µg/m³**

Table 8.2 shows an annual average of 18.4µg/m³ when multiplied by the 1.3 default factor and a period mean of 16.1µg/m³ when multiplied by the 1.14 default factor. The PM_{10} 2010 objective of 18µg/m³ is therefore borderline at present due to an increase in PM_{10} at the end of March 2007.

8.5.2. 24 Hour Averages

Figure 8.2 – High St, Linlithgow - Highest monthly 24hr average – 2007

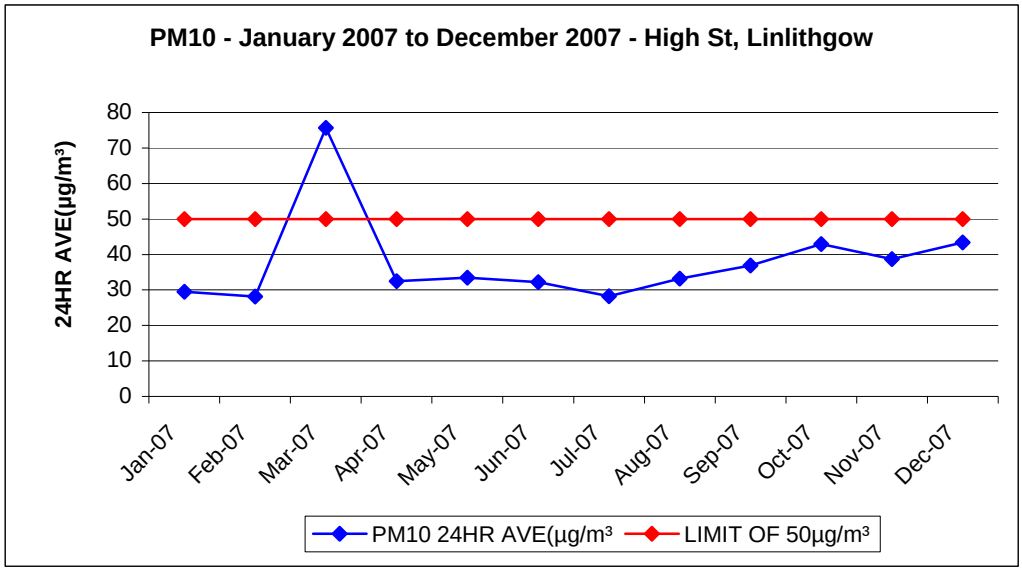


Figure 8.2 shows that there was an exceedence on 27th March 2007. Further exceedences occurred on 25th March, 26th March, 28th March and 30th March of the 24-hour objective for 2010(see figure 11.15 in Appendix 3 on page 50).

This resulted in five exceedences during 2007.The 2010 objective has been achieved. Graphs of the monthly 24-hour results can be seen in Appendix 3 on pages 49-54.

Further monitoring of PM_{10} will continue at Linlithgow High St.

8.6. Conclusion for PM_{10}

The real – time monitoring data results for PM_{10} at Cairnie Place, Whitburn, and High Street, Linlithgow indicate that in West Lothian the standards for PM_{10} are being achieved at these locations. However, at Linlithgow this is very marginal.

Linlithgow High Street had an annual average of 18.4µg/m³ (when applied by 1.3 factor and an average of 16.1µg/m³ when applied by 1.14 factor). There were five exceedences of the 24-hr objective of 50µg/m³ for High St, Linlithgow. As highlighted in the previous report the exceedences which occurred at the end of March 2007 (25-28th and 30th March) were a national event as exceedences also occurred at Dundee and Cupar, Fife. SEPA and the Scottish Executive have advised that these exceedences will not be discounted as local authorities are required to monitor all PM_{10} irrespective of where it comes from. These exceedences are therefore included, but are not solely due to local air quality. The 24-hr objective for PM_{10} at Linlithgow High St has still been achieved as local authorities are permitted seven exceedences.

Cairnie Place, Whitburn had an annual average of 14µg/m³ (when applied by 1.3 factor and an average of 13µg/m³ when applied by 1.14 factor). There were two exceedences of the 24-hr objective in the last 12 months.

It is concluded that there is no need to proceed to a detailed assessment for PM_{10} at present but real-time monitoring will continue at Cairnie Place, Whitburn and High St, Linlithgow. The TEOM PM10 monitor at High Street, Linlithgow is to be upgraded to FDMS to remove the need to use the varying default correction factors which currently result in figures straddling the annual average objective figure of 18µg/m³.

9. PROGRESS REPORT FOR SULPHUR DIOXIDE

9.1. Introduction

9.1.1. Real-time monitoring

Monitoring for Sulphur dioxide has continued using the real-time analyser located in the Groundhog at Cairnie Place, Whitburn.

9.1.2. 8-port Bubbler Monitoring

Two 8-port bubblers were used for measuring daily levels of Sulphur dioxide during 2007. The 8-port bubblers were located at Atlas Cottages, Armadale and Netherton Place, Whitburn.

There is no longer a national air-quality network for Sulphur dioxide and West Lothian Council has taken the decision to cease monitoring of Sulphur dioxide with the 8-port bubblers due to consistent low levels. The two bubblers were removed at the beginning of January 2008 and results for 2007 can be viewed on page 24

9.2. Standard and Objective for Sulphur dioxide

The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-

- 1-hr mean of 350µg/m³ not to be exceeded more than 24 times a year
- 24-hr mean of 125µg/m³ not to be exceeded more than 3 times a year
- 15-minute mean of 266µg/m³ not to be exceeded more than 15 times a year

9.3. Monitoring Data Results

9.3.1. Real-time monitoring

Figures 9.1 to 9.3 show the monthly maximum reading for the 15-min mean, 1-hr mean and 24-hr mean for Sulphur dioxide from January 2007 to December 2007 for the Groundhog at Cairnie Place, Whitburn.

Figure 9.1 – Cairnie Place – January 2007 to December 2007 – 15min mean monthly max

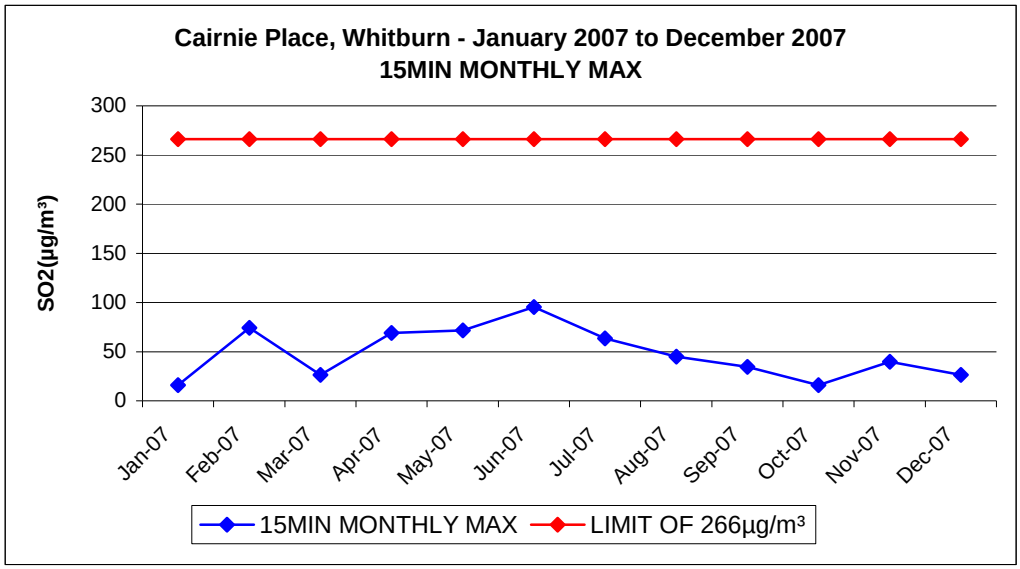


Figure 9.2 – Cairnie Place – January 2007 to December 2007 – 1hr mean monthly max

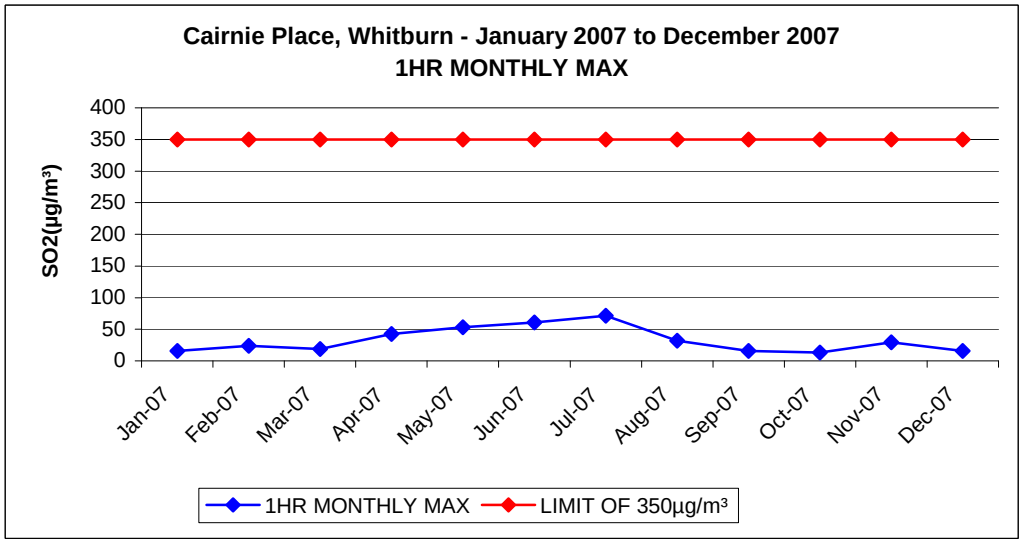
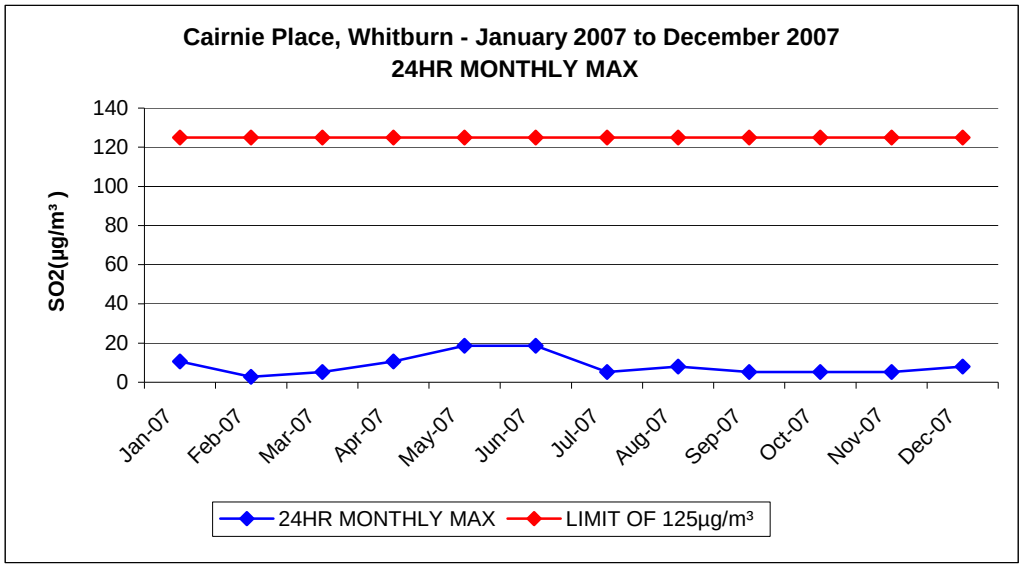


Figure 9.3 – Cairnie Place – January 2007 to December 2007 – 24hr mean monthly max



It can be seen from the graphs (figs 9.1 to 9.3) that from January 2007 to December 2007 there have been no exceedences for any of the three objectives for Sulphur dioxide.

9.3.2. 8-port Bubbler Sulphur dioxide Results

Figures 9.4 & 9.5 show the monthly maximum daily 24-hour levels for the two 8-port bubblers. The results shown are from January 2007 to December 2007.

Figure 9.4 – Atlas Cottages, Armadale – monthly maximum 24-hr level

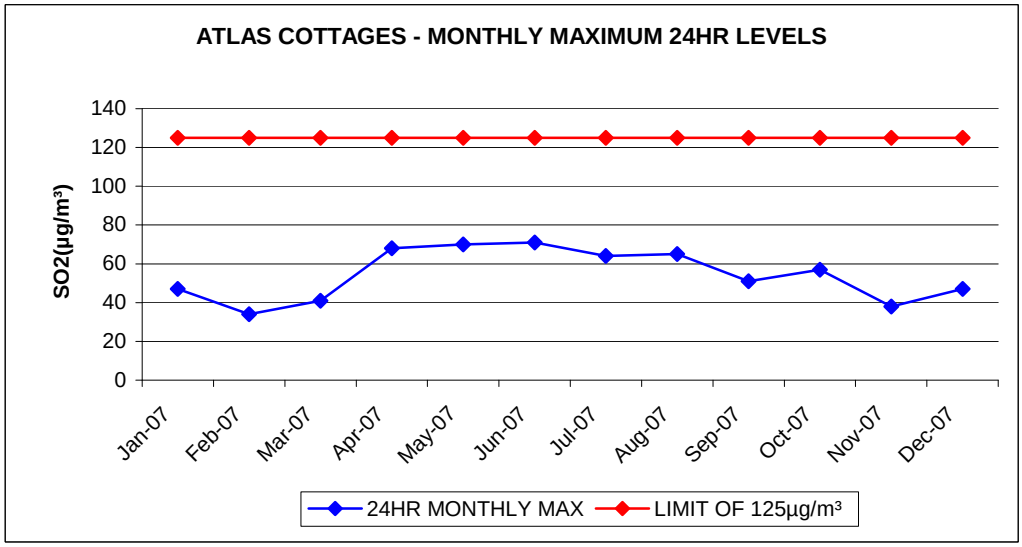
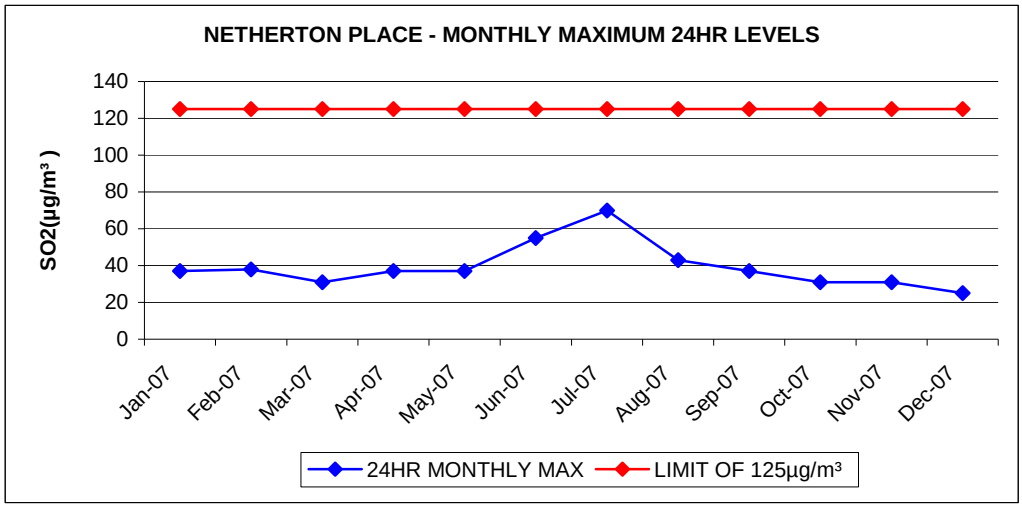


Figure 9.5 - Netherton Place, Whitburn - monthly maximum 24-hr level



Figures 9.4 & 9.5 above indicate that there have been no exceedences of the 24-hr objective for both the sites at Atlas Cottages, Armadale and Netherton Place, Whitburn.

West Lothian has now ceased monitoring of Sulphur dioxide with the two 8-port bubblers.

9.4. Conclusion for Sulphur dioxide

The real-time monitoring data for Sulphur dioxide indicates that levels of this pollutant in West Lothian are very low. There have been no exceedences of the 15min, 1hr or 24hr objective.

Neither the 8-port bubbler located at Atlas Cottages, Armadale next to Caradale Brickworks nor that located at Netherton Place, Whitburn had any exceedences in the last 12 months.

There is no need for West Lothian Council to proceed to a detailed assessment this year for Sulphur dioxide.

10. CONCLUSIONS AND RECOMMENDATIONS

10.1. Benzene

10.1.1. Conclusion for Benzene

There are no significant industrial sources of benzene located either within West Lothian or neighbouring areas which are likely to adversely affect air quality.

10.1.2. Recommendation for Benzene

Monitoring of Benzene has now ceased in West Lothian and there is no need to proceed to a detailed assessment.

10.2. 1,3 – Butadiene

10.2.1. Conclusions for 1,3 – Butadiene

There are no significant industrial sources of 1,3 – Butadiene located either within West Lothian or neighbouring areas which are likely to adversely affect air quality.

10.2.2. Recommendation for 1,3 – Butadiene

There is no need to monitor for this pollutant and no need to proceed to a detailed assessment.

10.3. Carbon monoxide

10.3.1. Conclusions for Carbon monoxide

There are no significant industrial sources of Carbon monoxide located either within West Lothian or neighbouring areas which are likely to adversely affect air quality.

Real-time monitoring during 2007 has indicated that the air quality standard and objective of 10mg/m^3 is currently being achieved.

10.3.2. Recommendation for Carbon monoxide

There is no requirement to proceed to a detailed assessment and real-time monitoring of Carbon monoxide will continue at Cairnie Place, Whitburn.

10.4. Lead

10.4.1. Conclusions for Lead

There are no new industrial sources of lead in West Lothian and no new sources with substantially increased emissions of lead.

There is no requirement to proceed to a detailed assessment.

10.4.2. Recommendation for Lead

No monitoring of Lead will be carried out in West Lothian.

10.5. Nitrogen dioxide

10.5.1. Conclusions for Nitrogen dioxide

Real-time monitoring of Nitrogen dioxide during 2007 has indicated that there has been no exceedence of the 1-hr mean of 200µg/m³ at Cairnie Place, Whitburn or High St, Linlithgow. The annual mean of 40µg/m³ is also being achieved at both sites.

Diffusion tube monitoring has indicated the need for increased monitoring in Broxburn. A real-time analyser will be installed by the end of March 2008.

There is no requirement to proceed to a detailed assessment.

10.5.2. Recommendation for Nitrogen dioxide

Real-time monitoring for Nitrogen dioxide will continue at Cairnie Place, Whitburn and High St, Linlithgow.

Real-time monitoring will be introduced in Broxburn.

The diffusion tube network will be maintained and adapted to the increasing traffic flows in West Lothian.

10.6. PM_{10}

10.6.1. Conclusions for PM_{10}

The real – time monitoring data results for PM_{10} at Cairnie Place, Whitburn and High Street, Linlithgow indicate that in West Lothian the standards for PM_{10} are being achieved at Cairnie Place, Whitburn and at High St, Linlithgow for the annual average. However, Linlithgow High Street is very marginal.

Linlithgow High Street had an annual average of 18.4µg/m³ (when applied by 1.3 factor and an average of 16.1µg/m³ when applied by 1.14 factor). This is just on the 18µg/m³ 2010 objective. In addition, there were five exceedences of the 24-hr objective of 50µg/m³.

Cairnie Place, Whitburn had an annual average of 14µg/m³ (when applied by 1.3 factor and an average of 13µg/m³ when applied by 1.14 factor). There were no exceedences of the 24-hr objective in the last 12 months.

It is concluded that there is no need to proceed to a detailed assessment for PM_{10} at present but real-time monitoring will continue at Cairnie Place, Whitburn and High St, Linlithgow.

10.6.2. Recommendation for PM_{10}

Real-time monitoring of PM_{10} will continue at High St, Linlithgow and Cairnie Place, Whitburn during 2007.

An additional Scottish Executive funded Romon300 Roadside (to measure Nitrogen dioxide and PM_{10}) is to be situated in Broxburn town centre. The TEOM PM10 monitor at High Street, Linlithgow is to be upgraded to FDMS to remove the need to use the varying correction factors which currently result in figures bordering the annual average objective figure of 18µg/m³.

10.7. Sulphur dioxide

10.7.1. Conclusions for Sulphur dioxide

There are no new industrial sources of Sulphur dioxide in West Lothian and no industrial sources with substantially increased emissions of Sulphur dioxide.

The real-time analyser results at Cairnie Place have indicated that there has not been any exceedence of the 1-hr mean of 350µg/m^3, the 24-hr mean of 125µg/m^3, or the 15-minute mean of 266µg/m^3.

No exceedences occurred in the last twelve months with the 8-port bubblers located at Atlas Cottages, Armadale and Netherton Place, Whitburn.

There is no need to proceed to a detailed assessment.

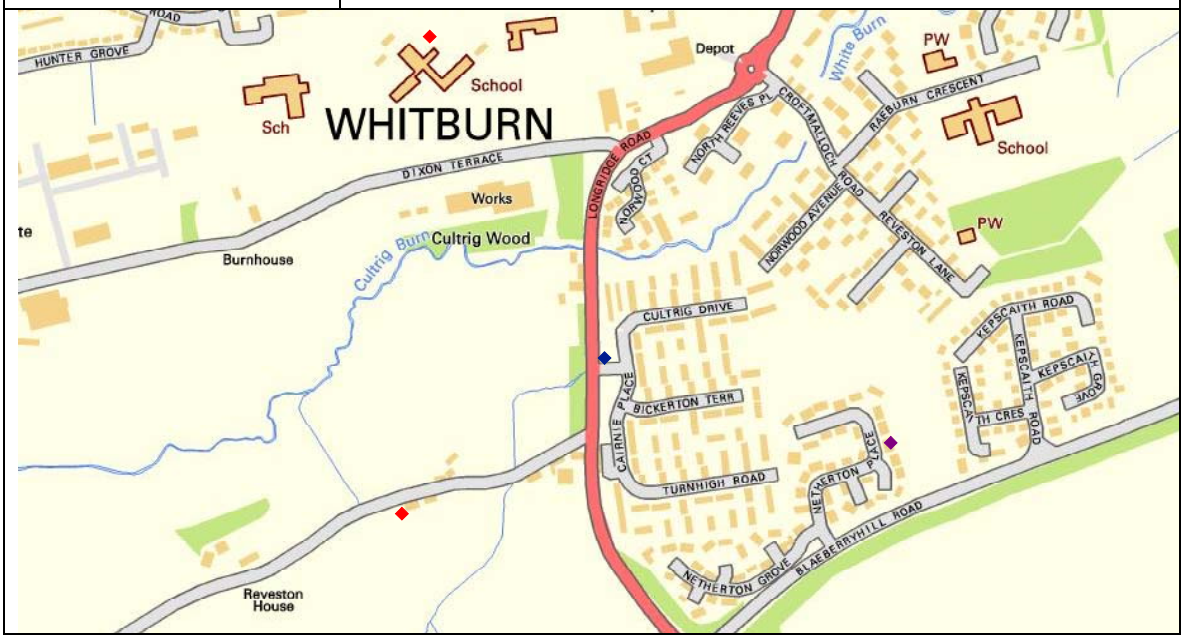
10.7.2. Recommendation for Sulphur dioxide

Real-time monitoring of Sulphur dioxide will continue at Cairnie Place, Whitburn during 2008.

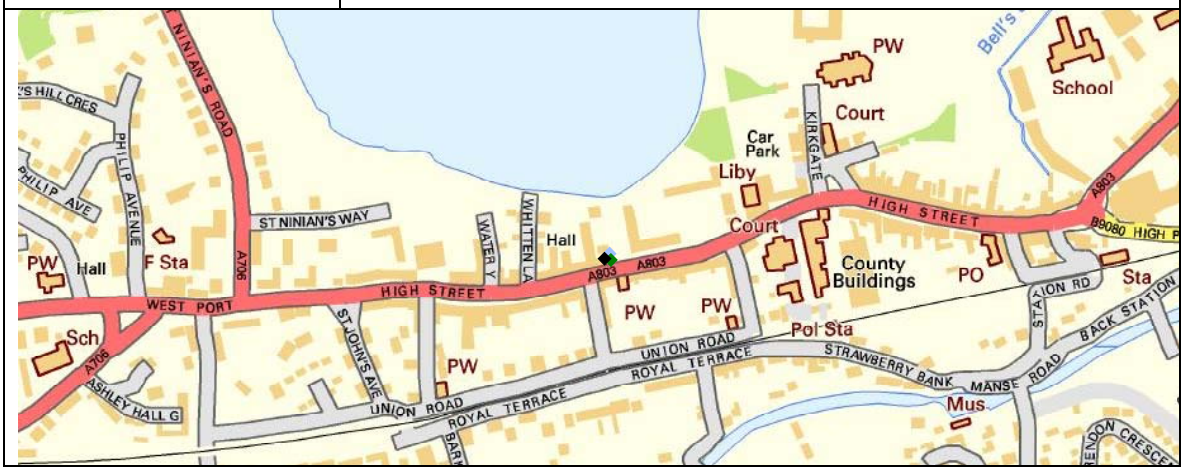
The two 8-port bubblers located at Atlas Cottages, Armadale and Netherton Place, Whitburn have now been removed.

APPENDIX 1: DETAILS OF REAL-TIME MONITORING STATIONS

Groundhog Cairnie Place, Whitburn, West Lothian, EH47 Grid reference: NS 944 641 Pollutants monitored: NOX;SO2;CO;PM_{10}	



Romon 300	
High Street, Linlithgow, West Lothian, EH49	
Grid reference: NS 1000 771	
Pollutants monitored: PM10 NOx	



APPENDIX 2

Real-time monitoring results: Cairnie Place, Whitburn

Nitrogen dioxide -1 hour averages

Figure 10.1 – Cairnie Place, Whitburn – January 2007 – 1hr average

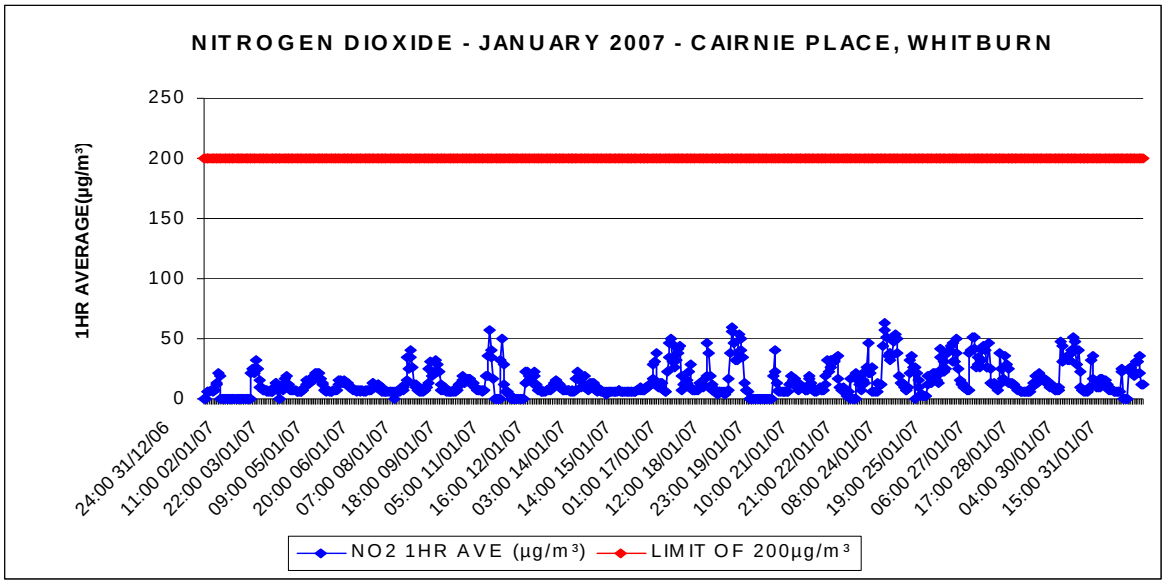


Figure 10.2 – Cairnie Place, Whitburn – February 2008 – 1hr average

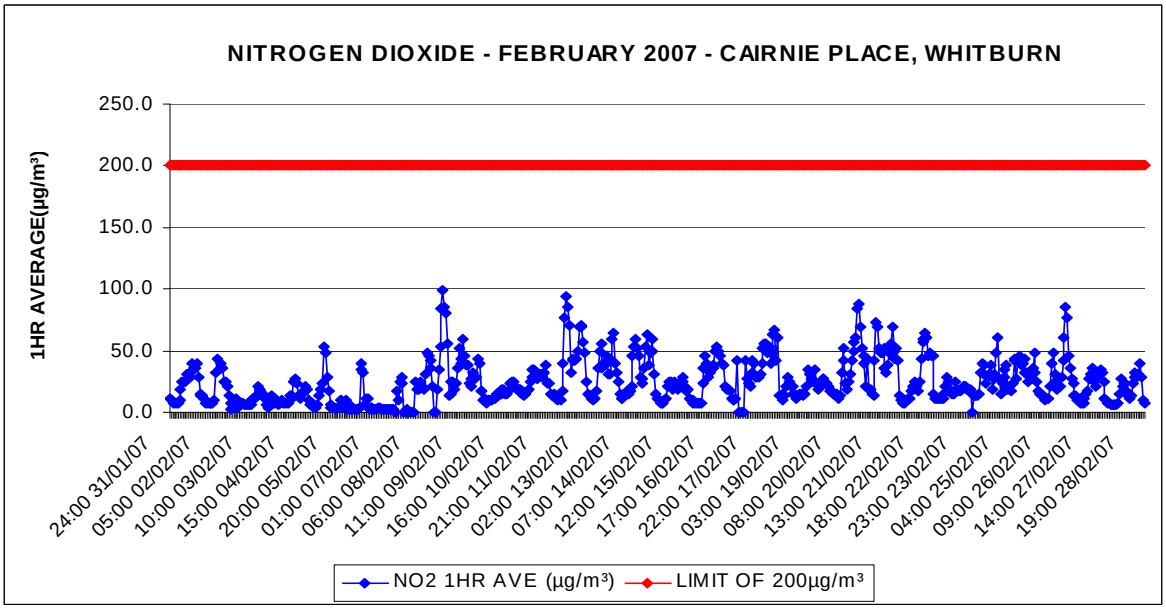


Figure 10.3 – Cairnie Place, Whitburn – March 2008 – 1hr average

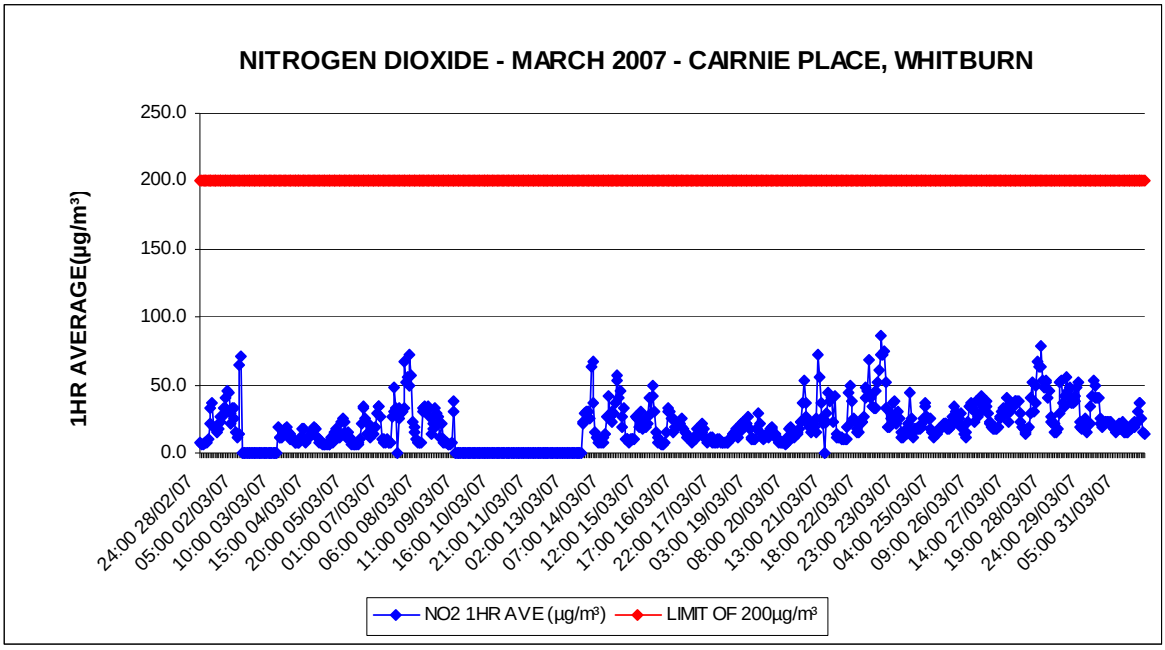


Figure 10.4 – Cairnie Place, Whitburn – April 2008 – 1hr average

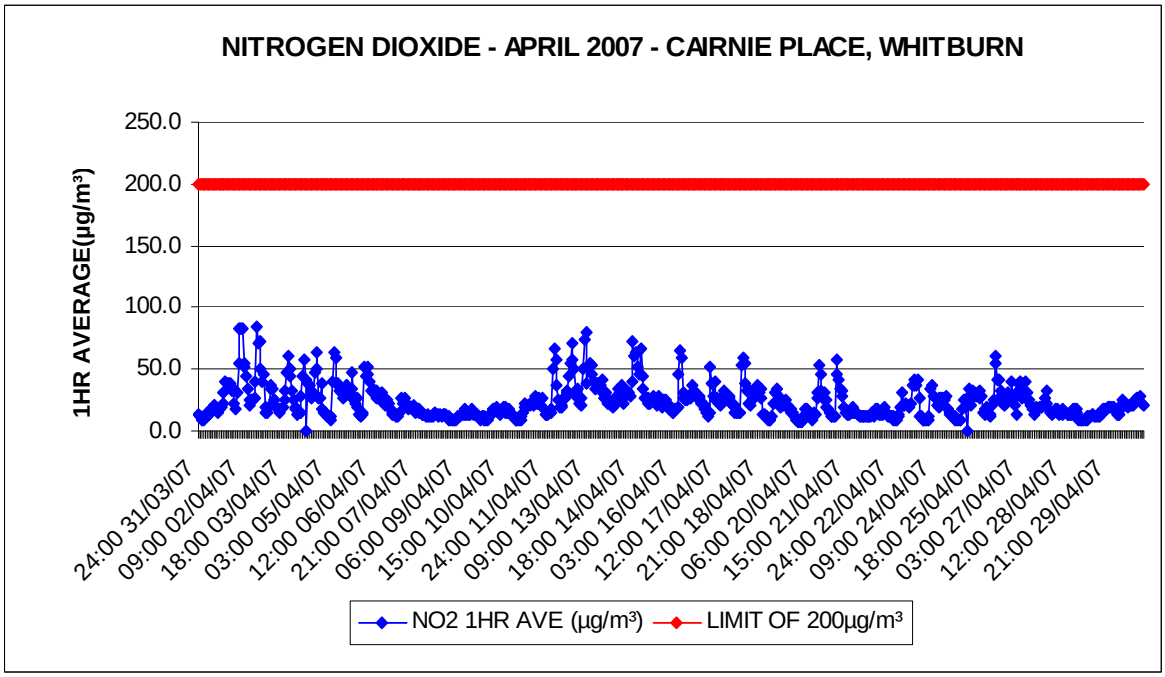


Figure 10.5 – Cairnie Place, Whitburn – May 2007 – 1hr average

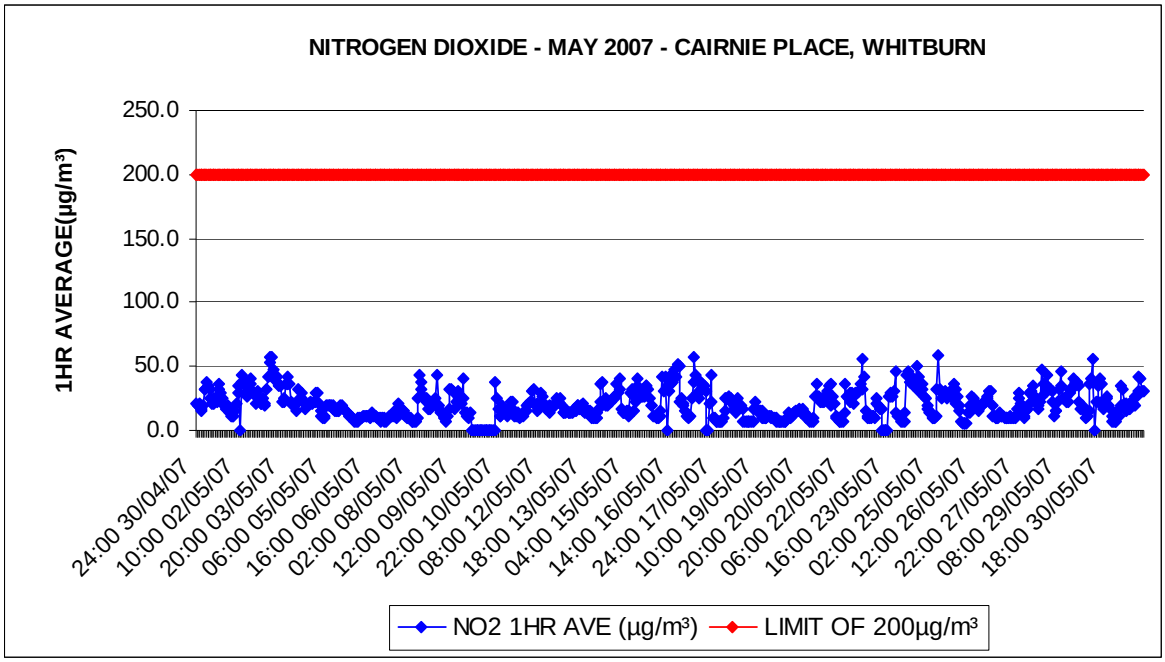


Figure 10.6 – Cairnie Place, Whitburn – June 2007 – 1hr average

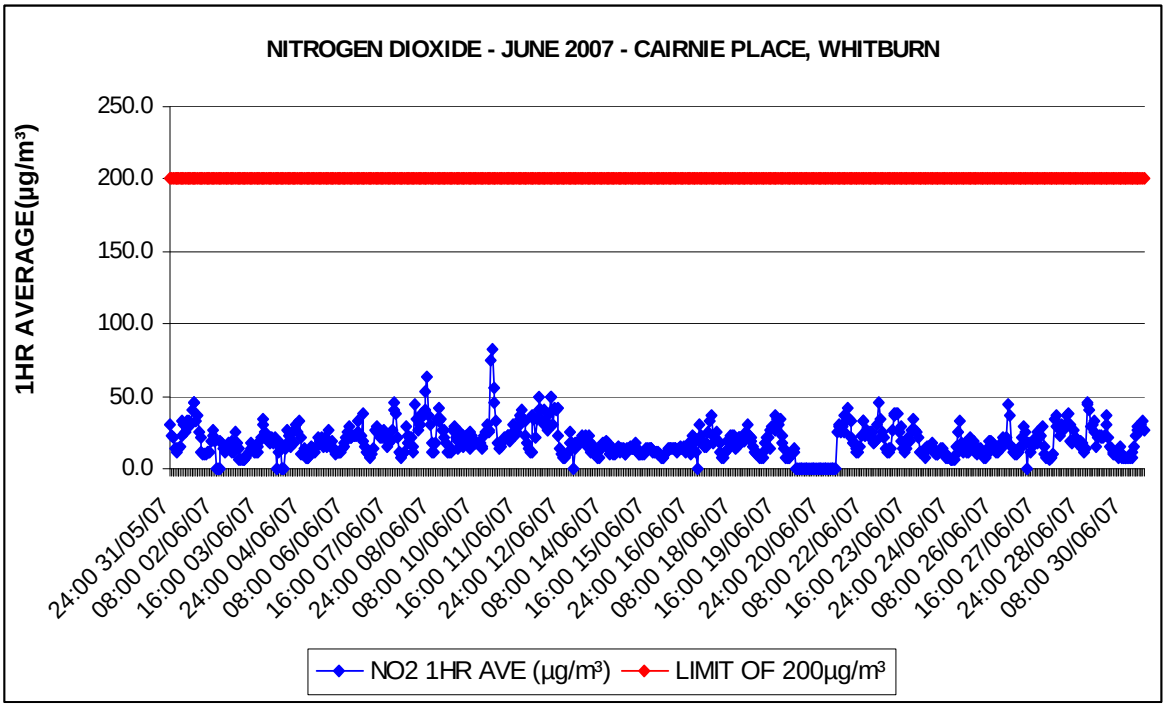


Figure 10.7 – Cairnie Place, Whitburn – July 2007 – 1hr average

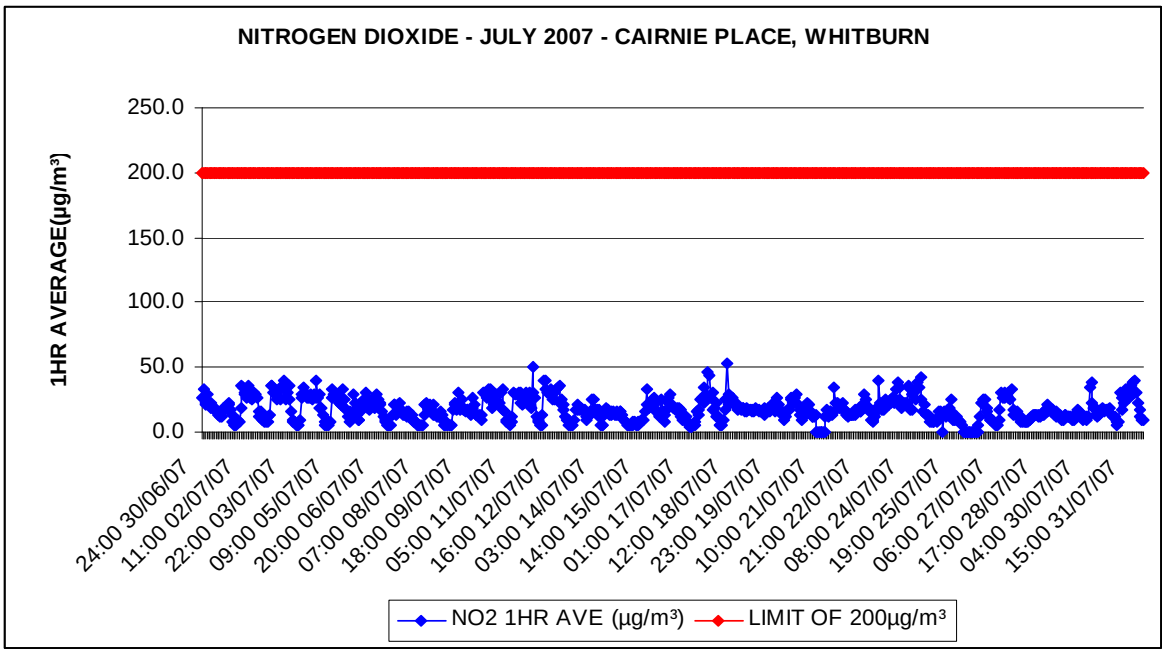


Figure 10.8 – Cairnie Place, Whitburn – August 2007 – 1hr average

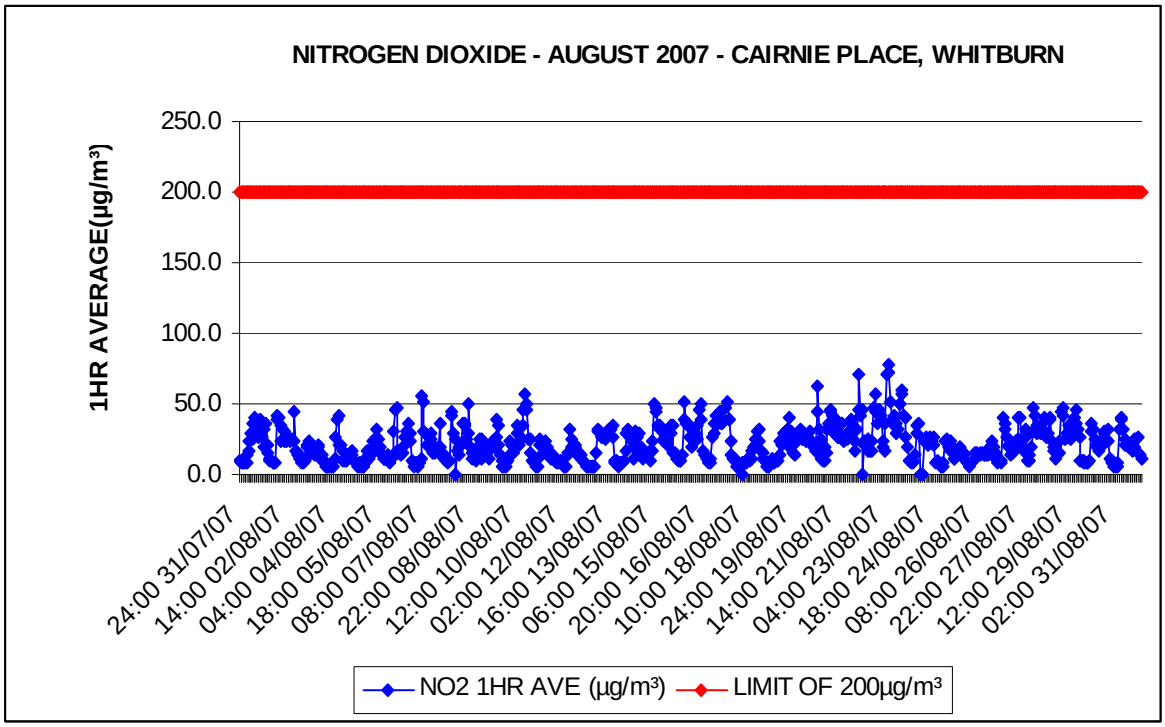


Figure 10.9 – Cairnie Place, Whitburn – September 2007 – 1hr average

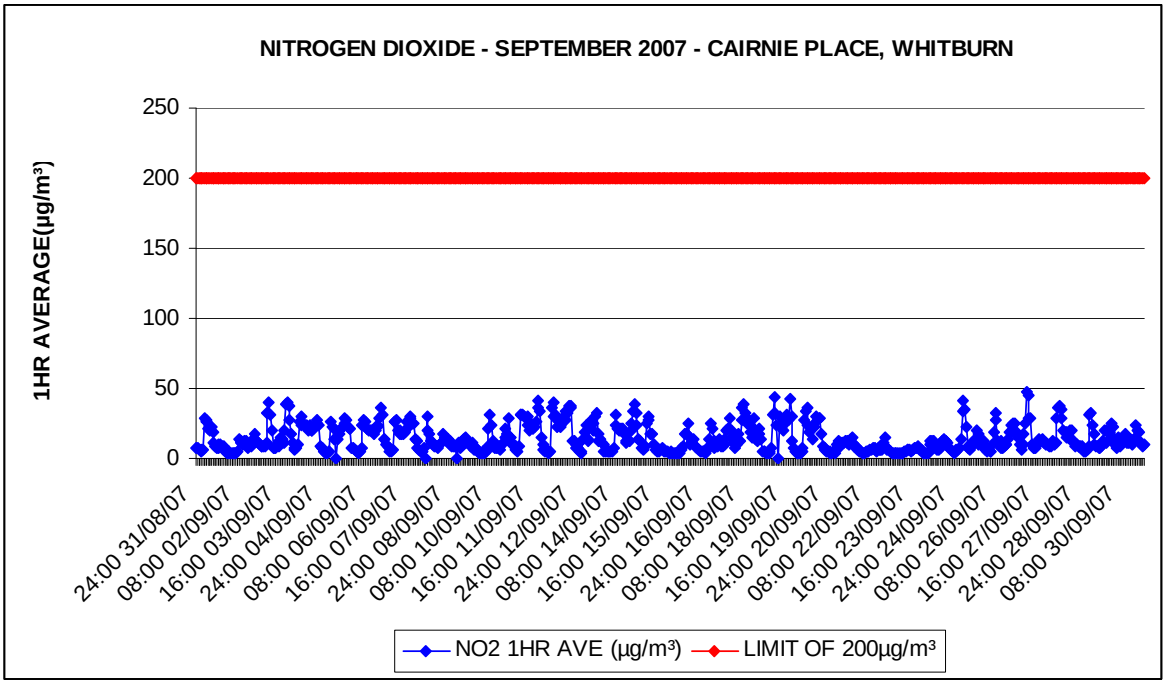


Figure 10.10 – Cairnie Place, Whitburn – October 2007 – 1hr average

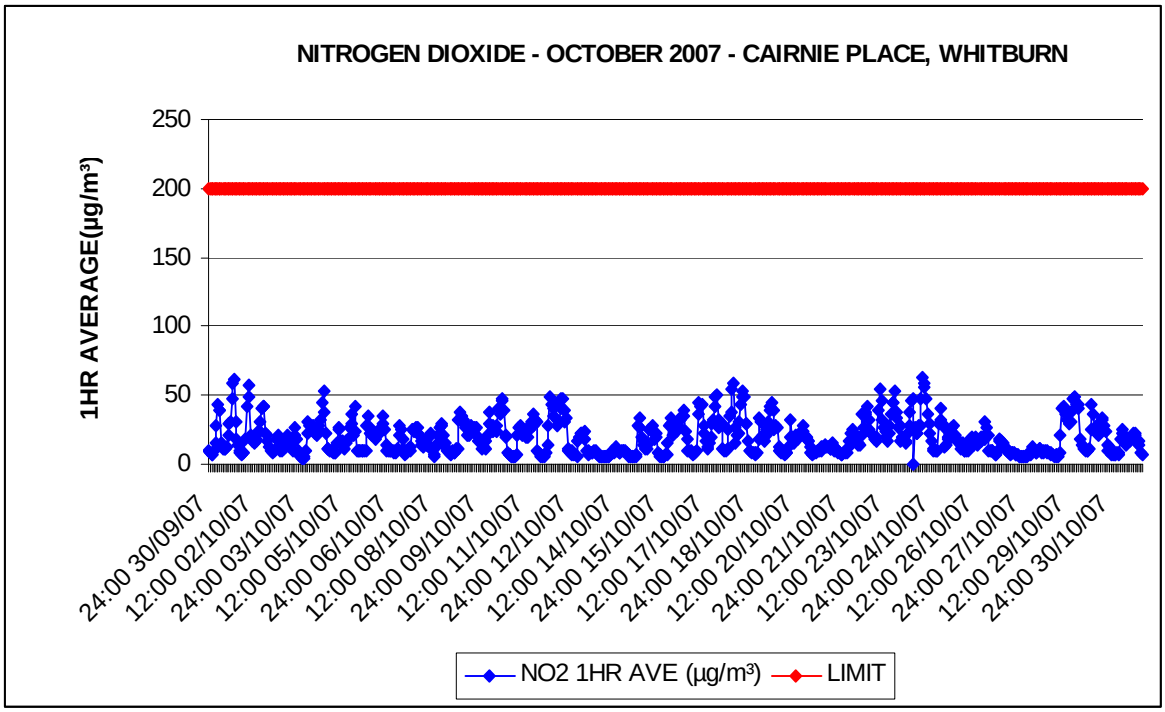


Figure 10.11 – Cairnie Place, Whitburn – November 2007 – 1hr average

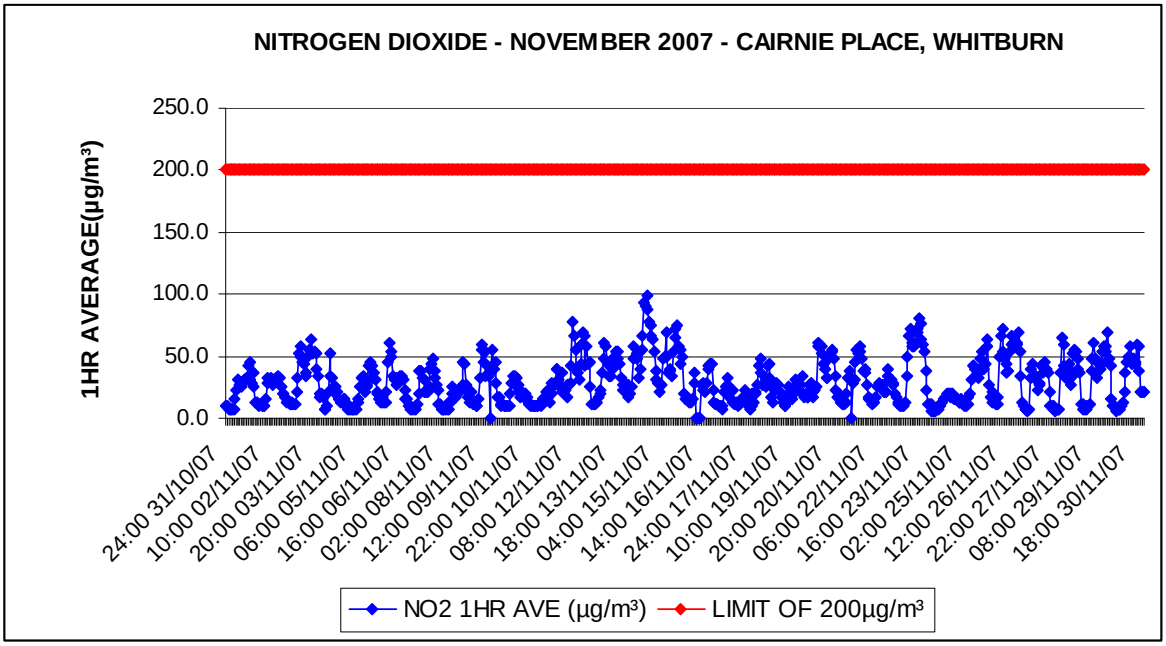
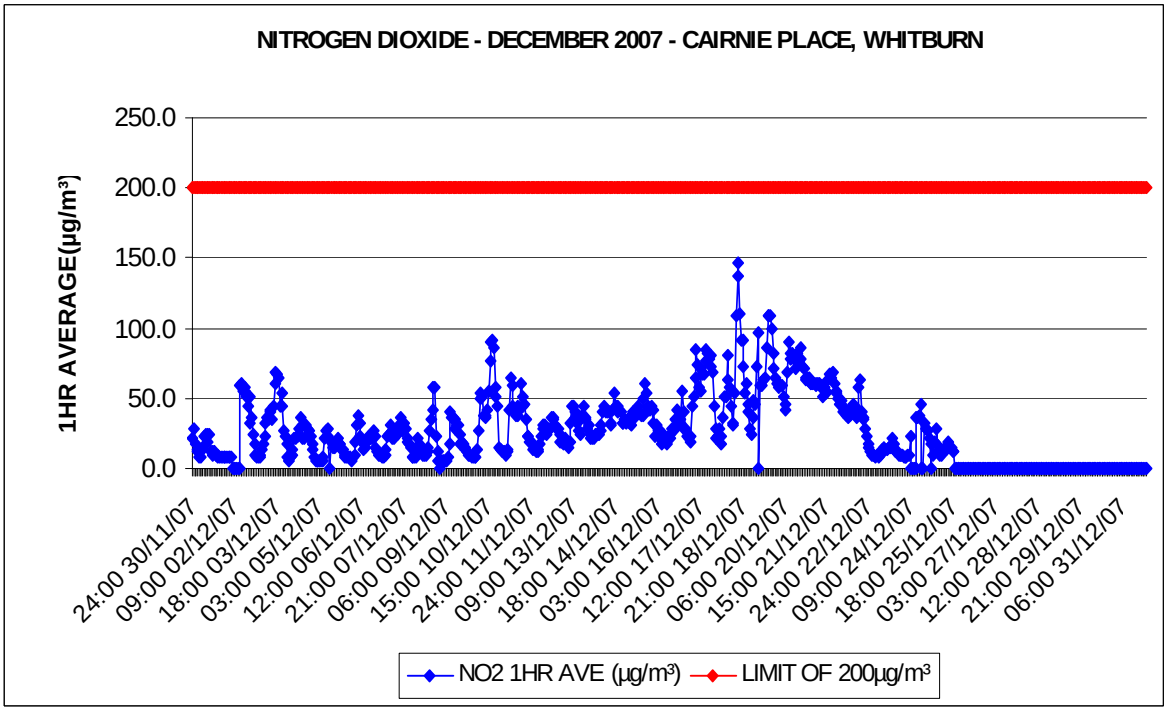


Figure 10.12 – Cairnie Place, Whitburn – December 2007 – 1hr average



Real-time monitoring results – High St, Linlithgow

Nitrogen dioxide – 1hr average

Figure 10.13 – High St, Linlithgow – January 2007 – 1hr average

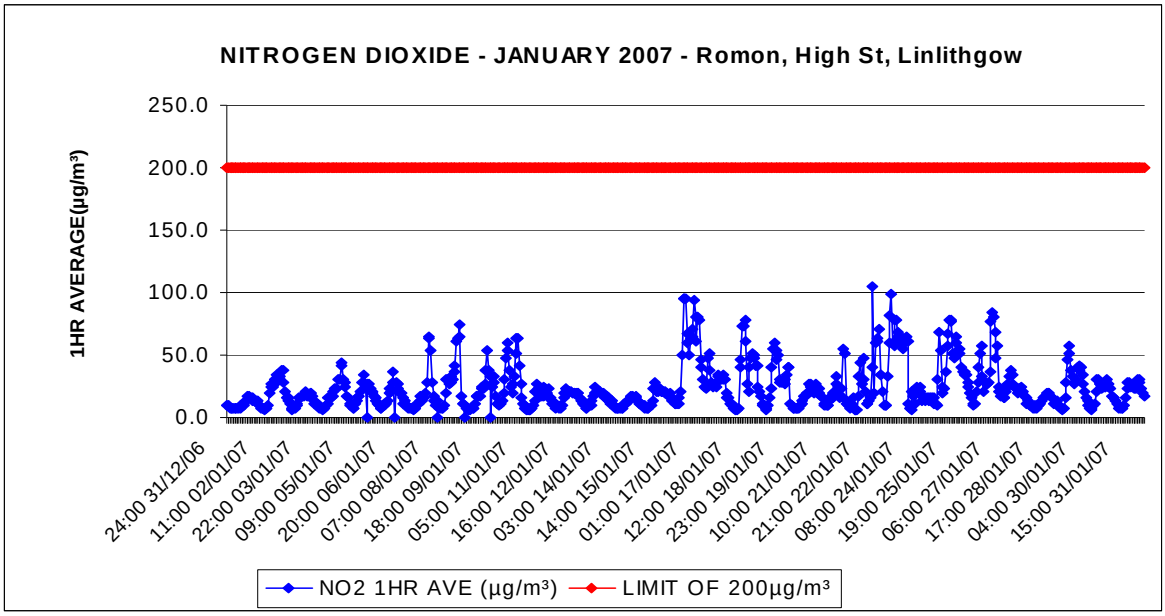


Figure 10.14 – High St, Linlithgow – February 2007 – 1hr average

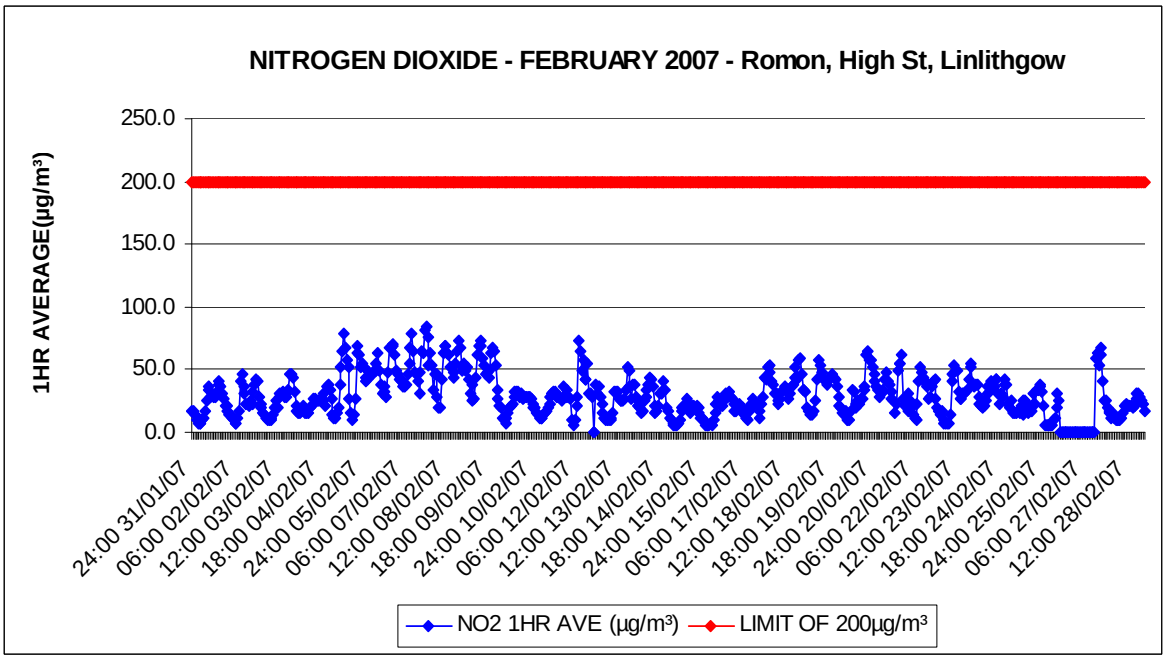


Figure 10.15 – High St, Linlithgow – March 2007 – 1hr average

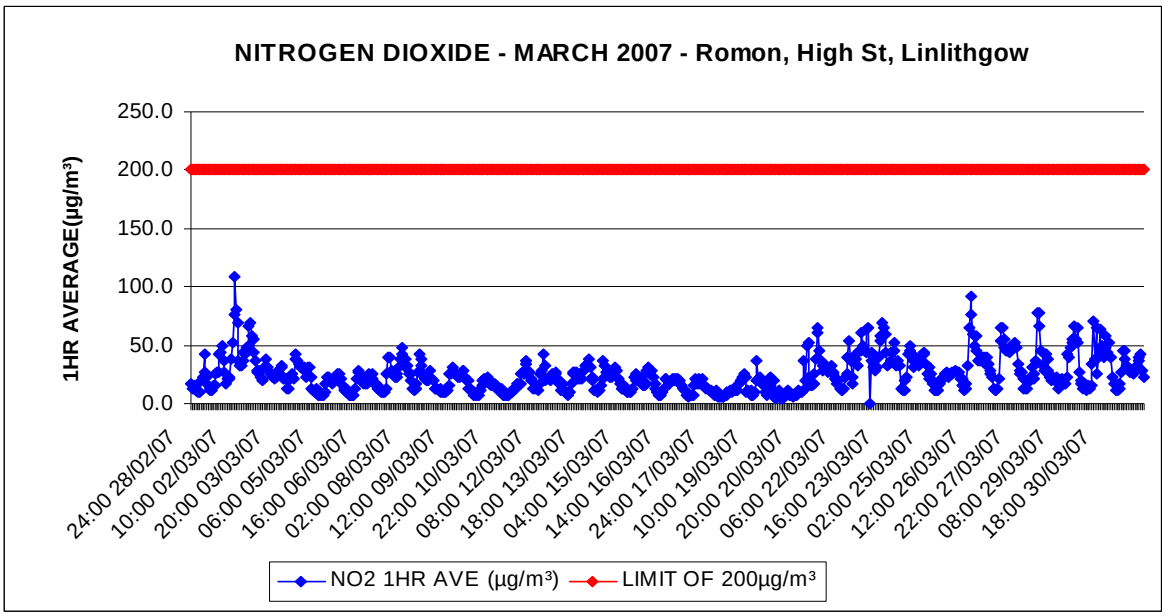


Figure 10.16 – High St, Linlithgow – April 2007 – 1hr average

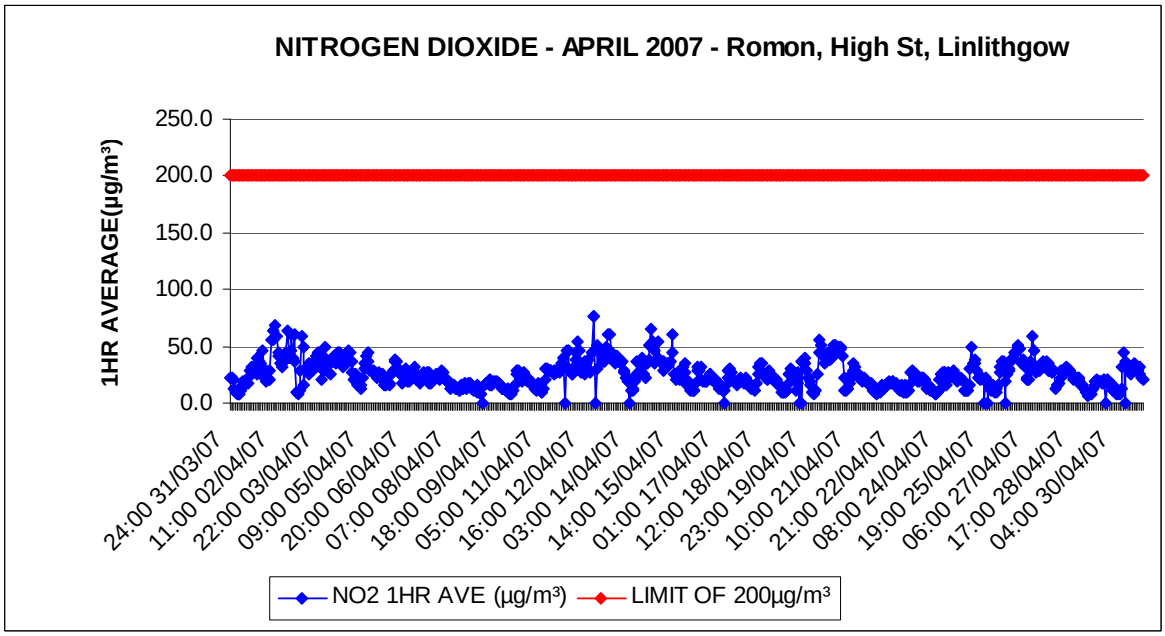


Figure 10.17 – High St, Linlithgow – May 2007 – 1hr average

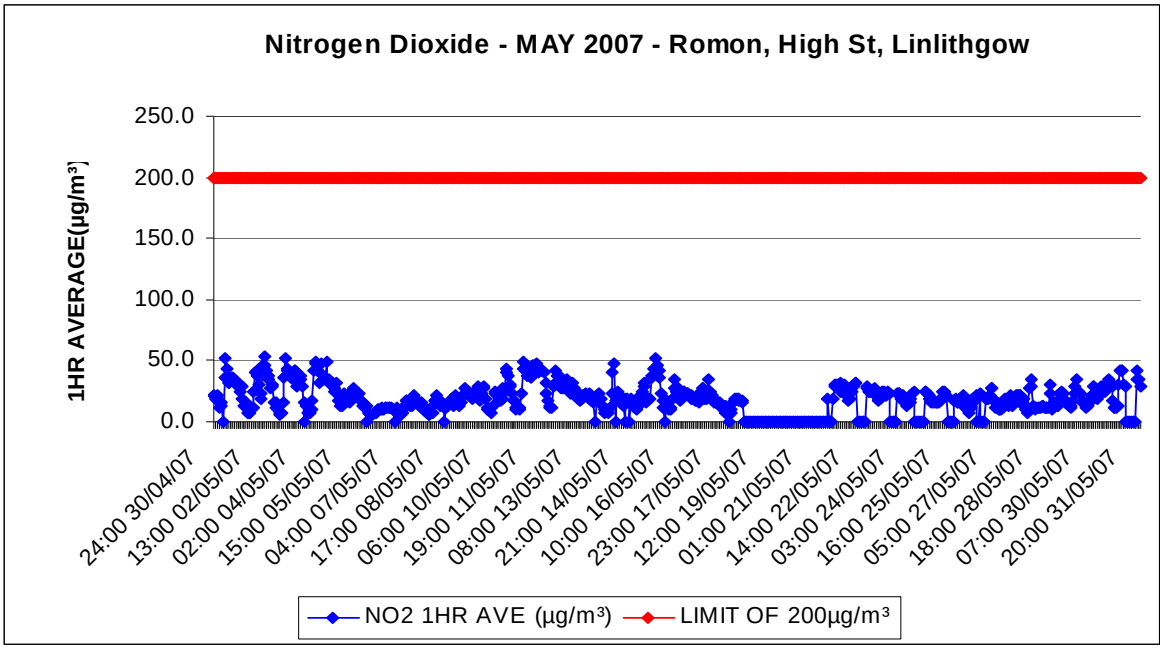


Figure 10.18 – High St, Linlithgow – June 2007 – 1hr average

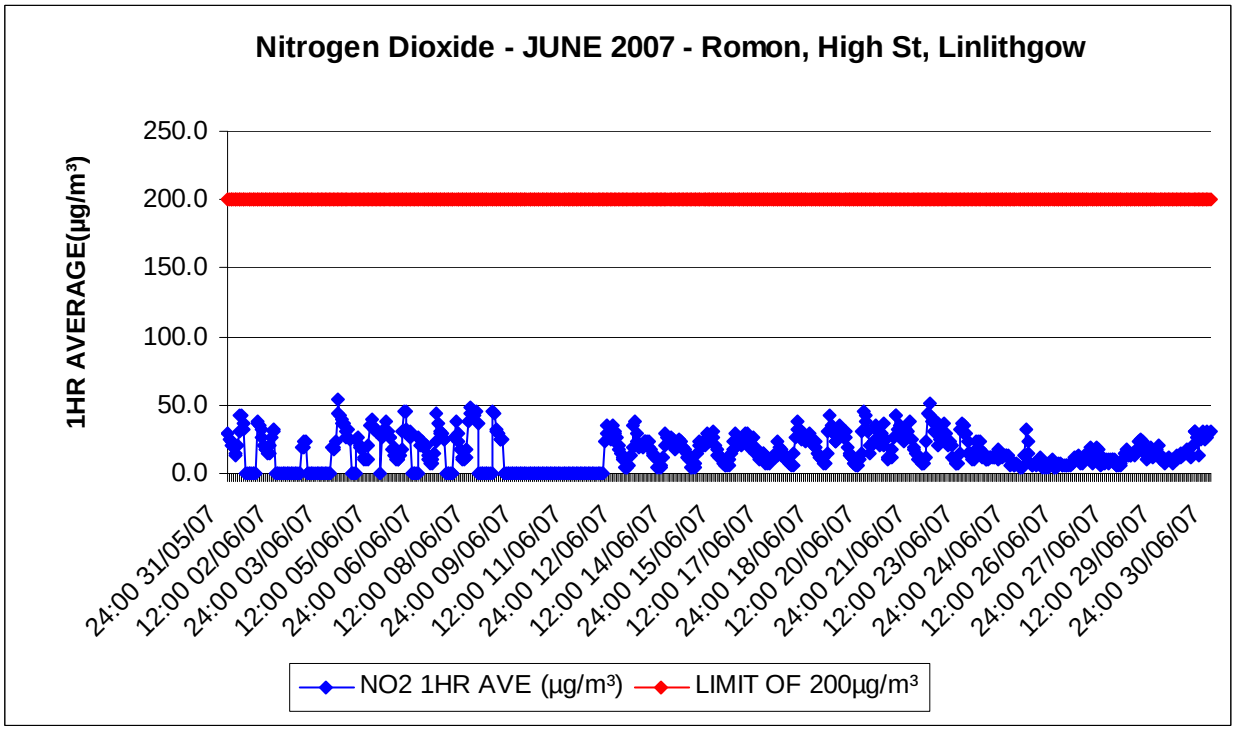


Figure 10.19 – High St, Linlithgow – July 2007 – 1hr average

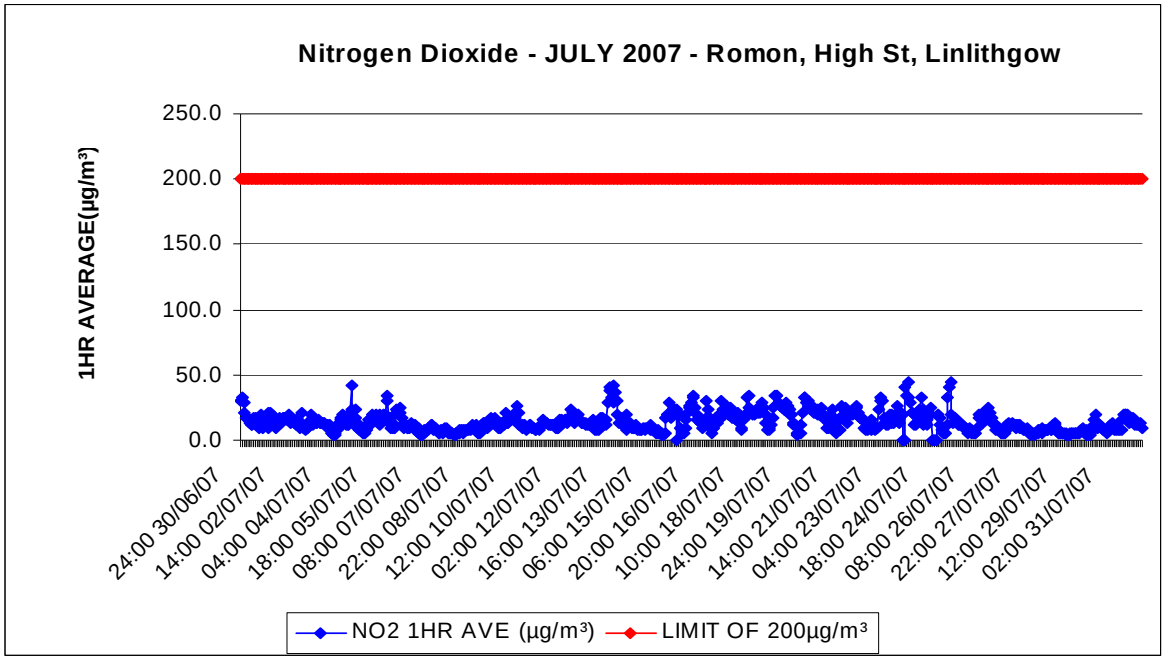


Figure 10.20 – High St, Linlithgow – August 2007 – 1hr average

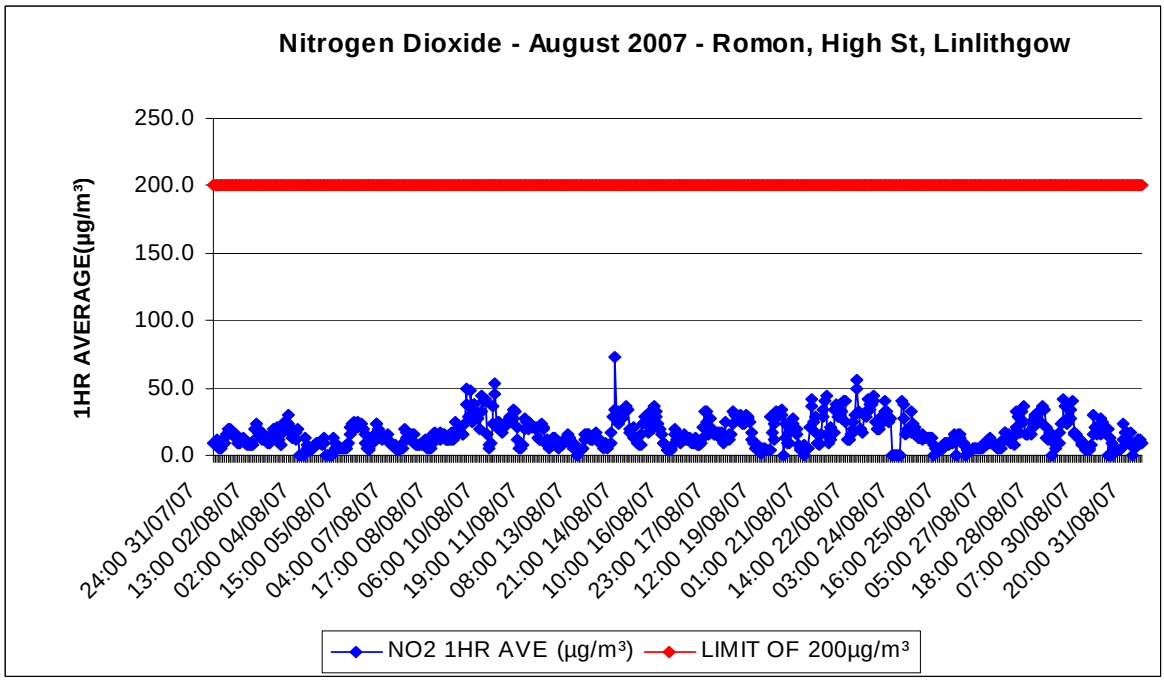


Figure 10.11 – High St, Linlithgow – September 2007 – 1hr average

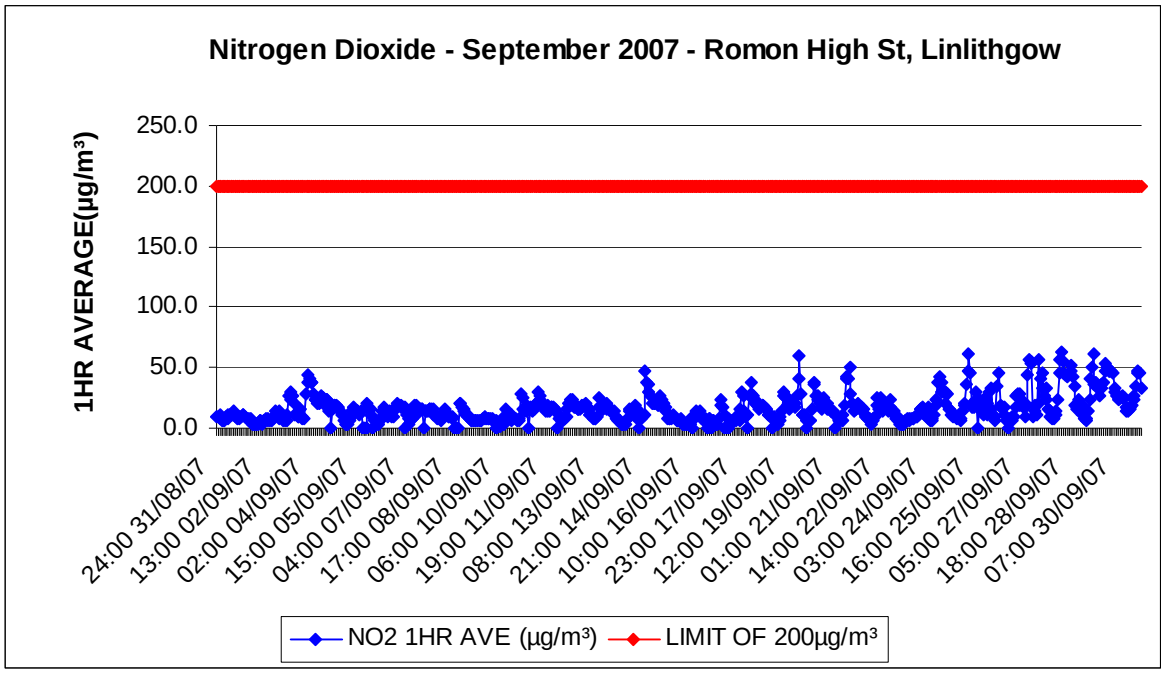


Figure 10.12 – High St, Linlithgow – October 2007 – 1hr average

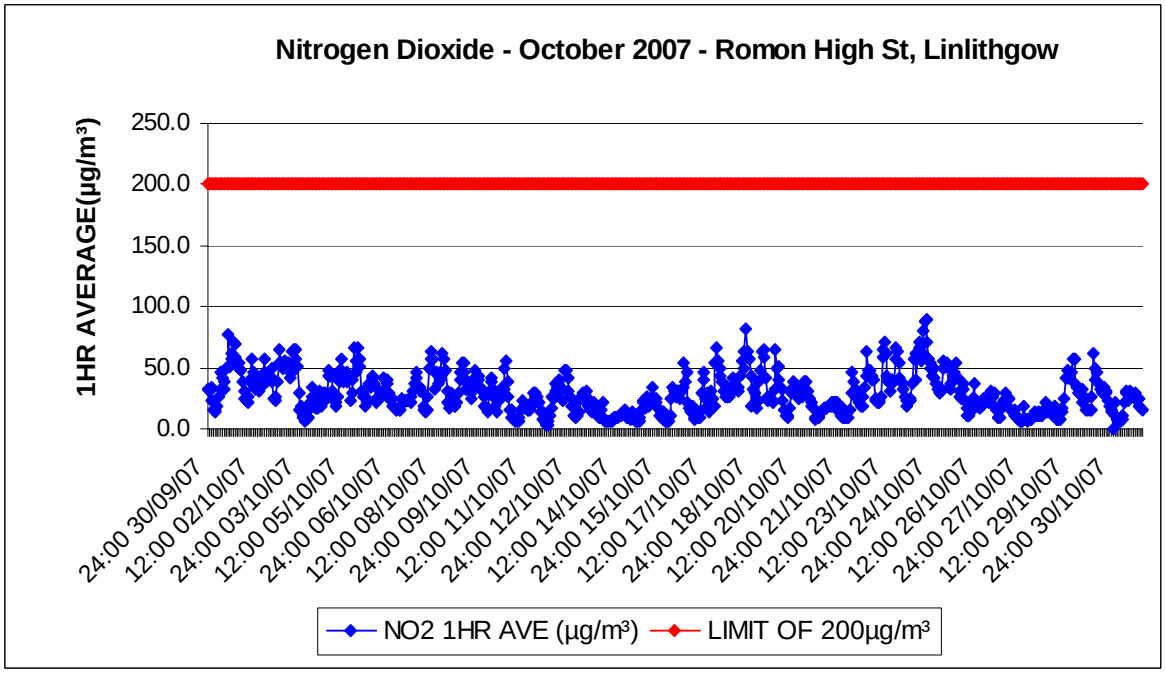


Figure 10.13 – High St, Linlithgow – November 2007 – 1hr average

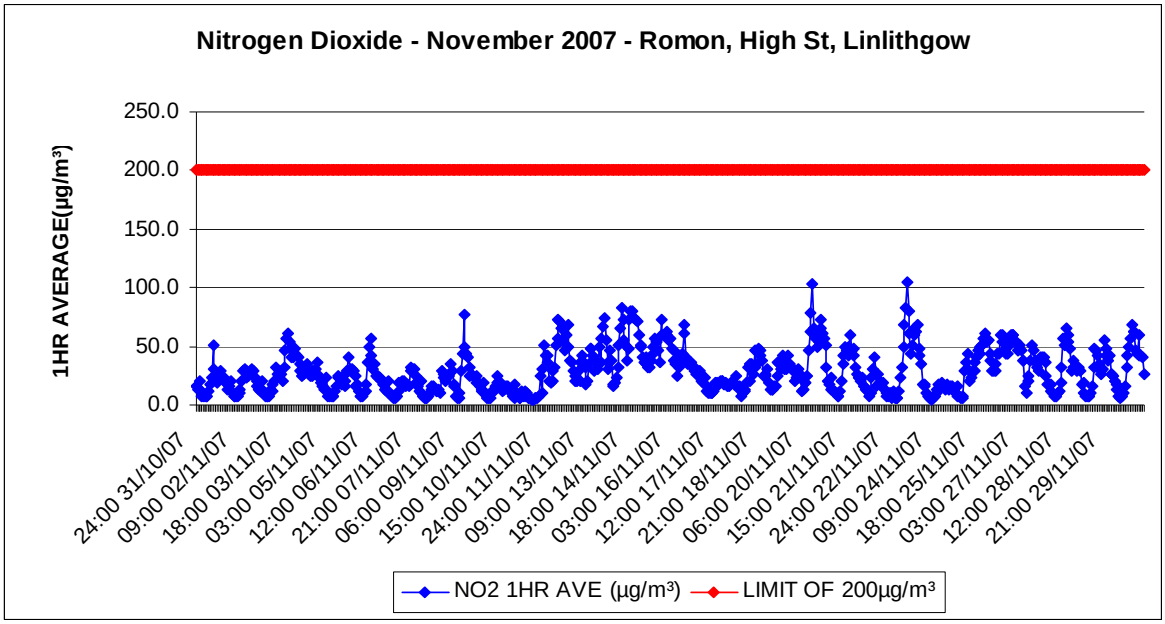
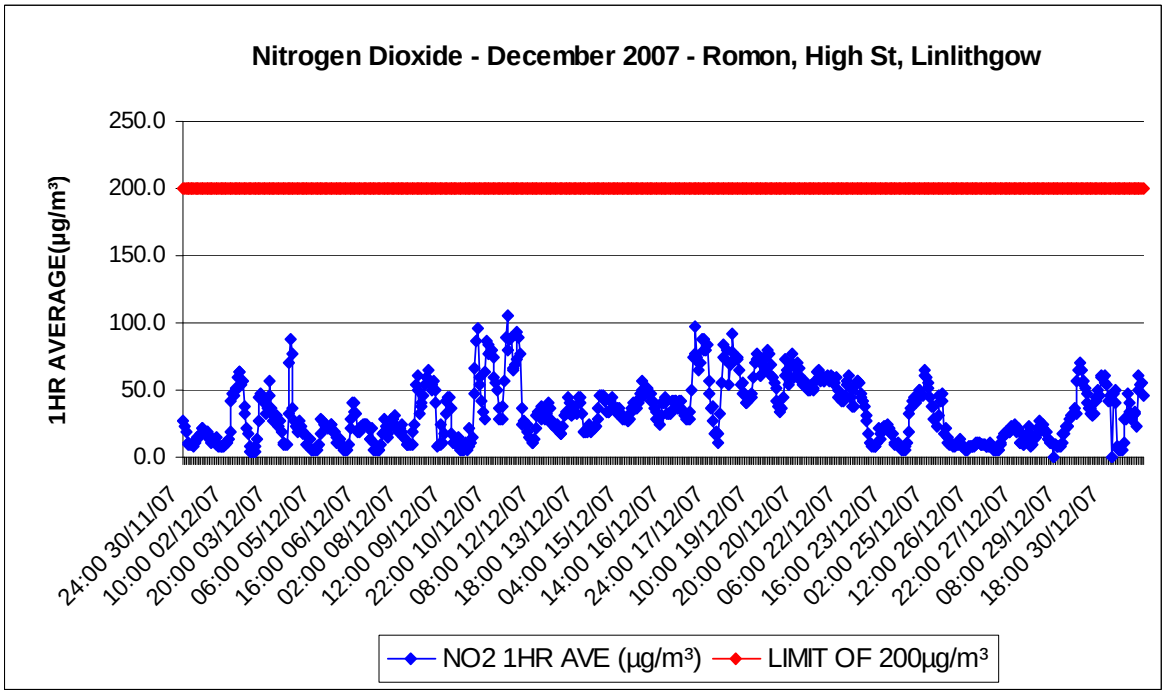


Figure 10.14 – High St, Linlithgow – December 2007 – 1hr average



APPENDIX 3

PM_{10} Results: Cairnie Place, Whitburn

24 Hour Averages

Figure 11.1 – Cairnie Place, Whitburn – January 2007 – 24hr average

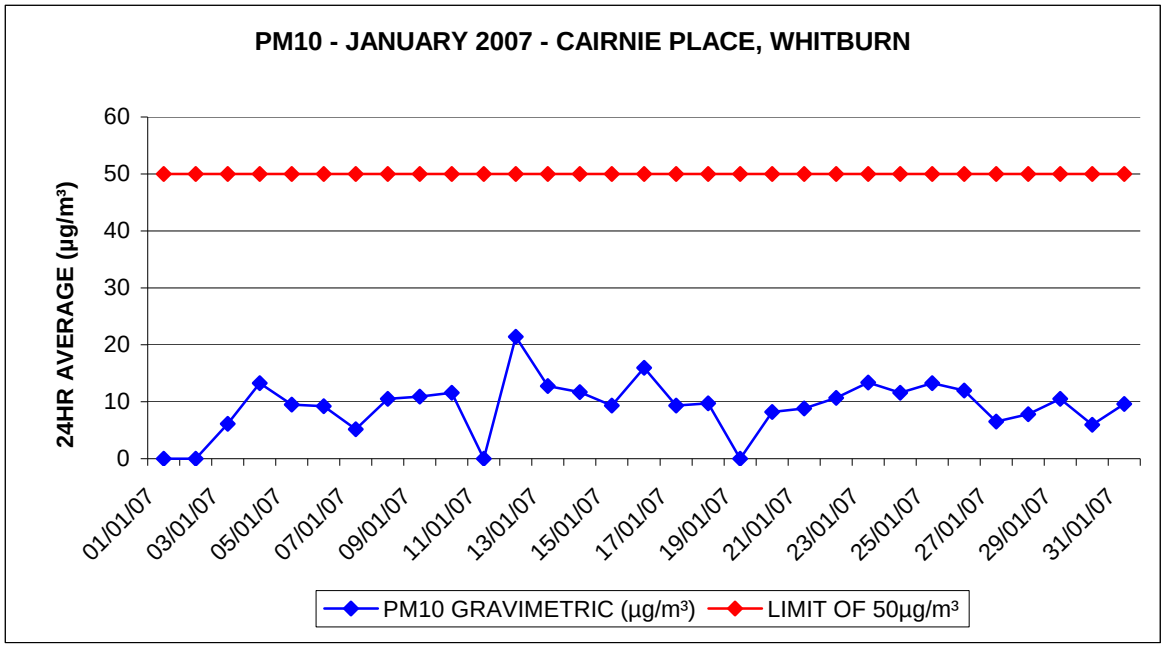


Figure 11.2 – Cairnie Place, Whitburn – February 2007 – 24hr average

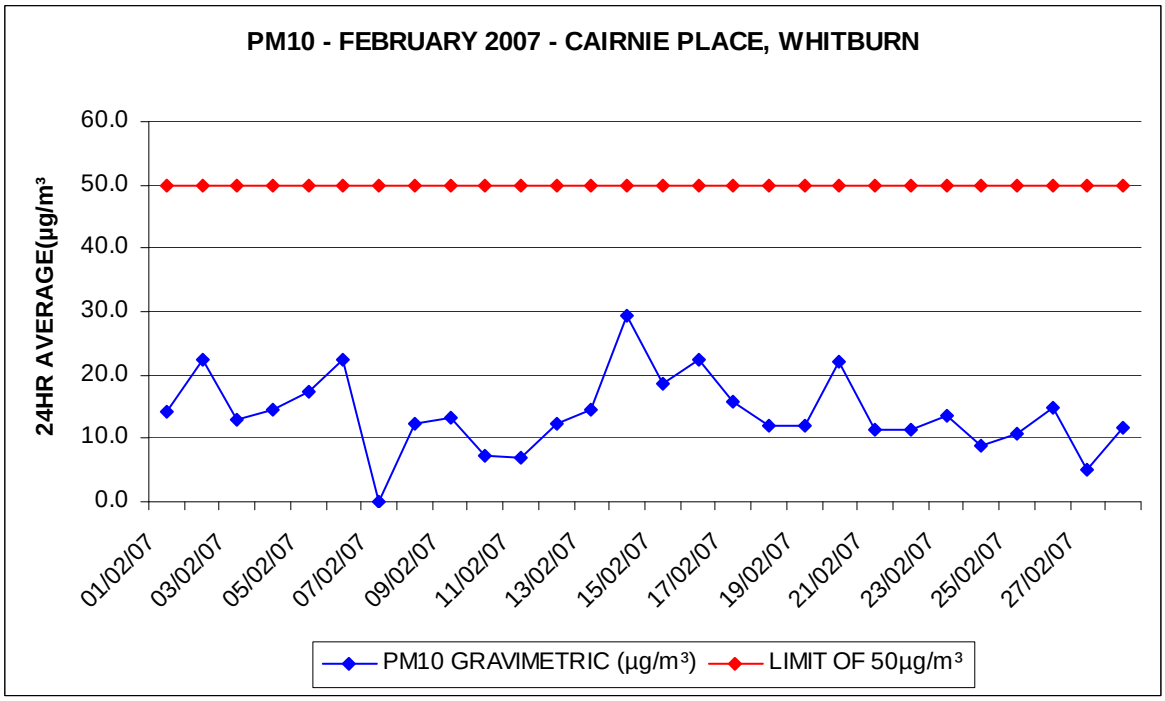


Figure 11.3 – Cairnie Place, Whitburn – March 2007 – 24hr average

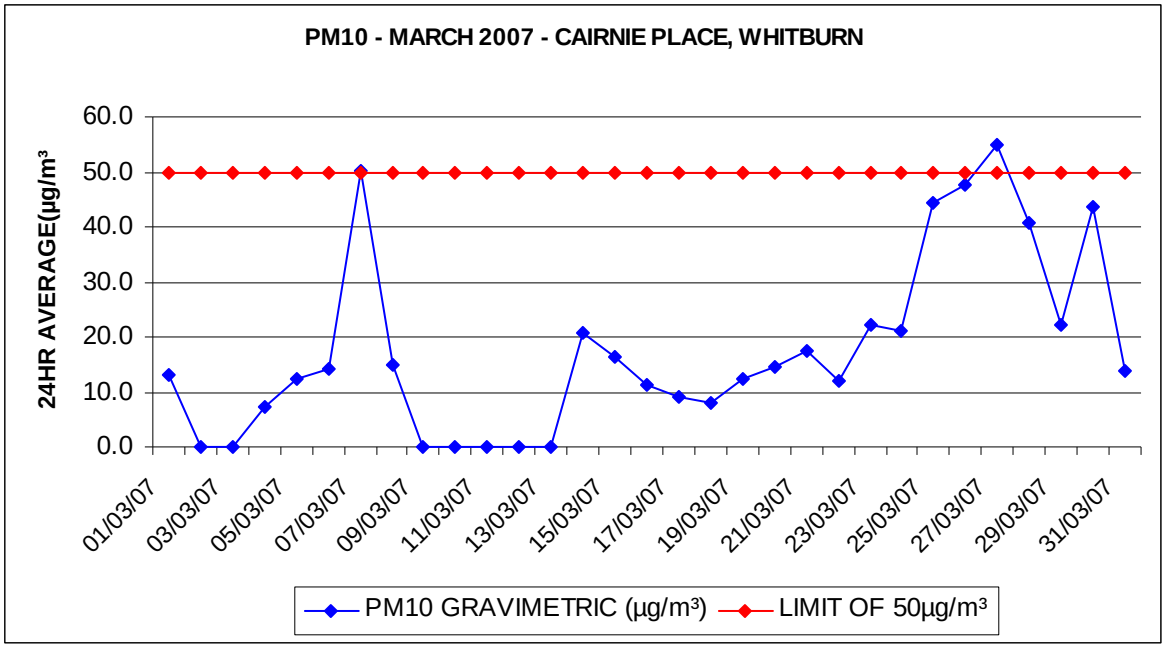


Figure 11.4 – Cairnie Place, Whitburn – April 2007 – 24hr average

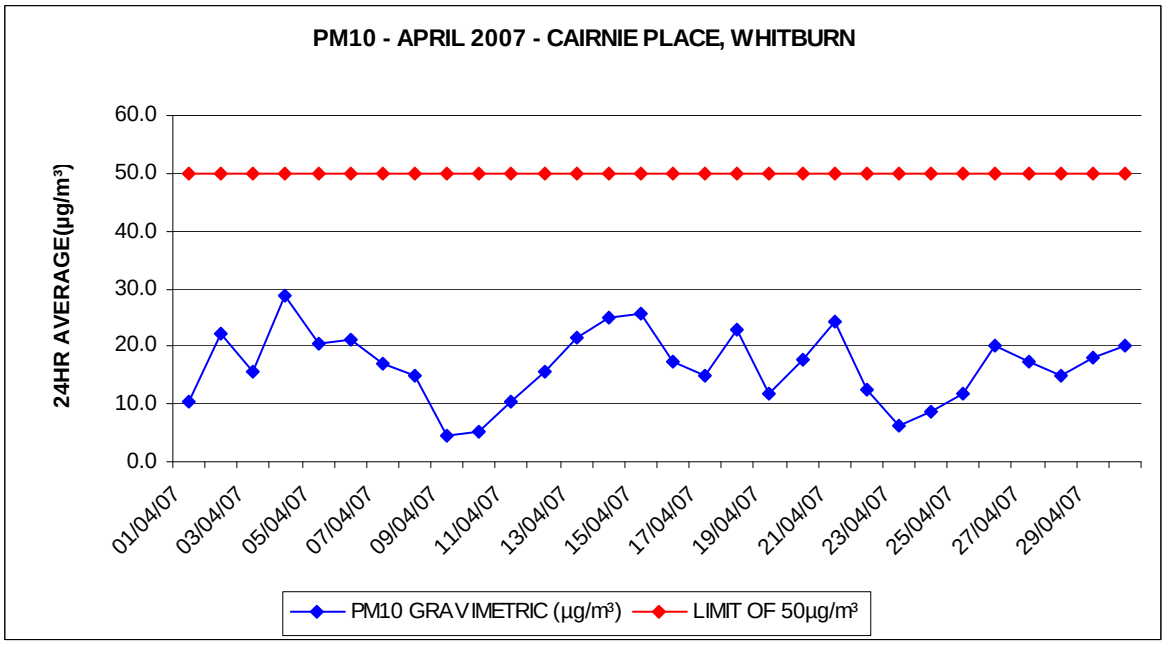


Figure 11.5– Cairnie Place, Whitburn – May 2007 – 24hr average

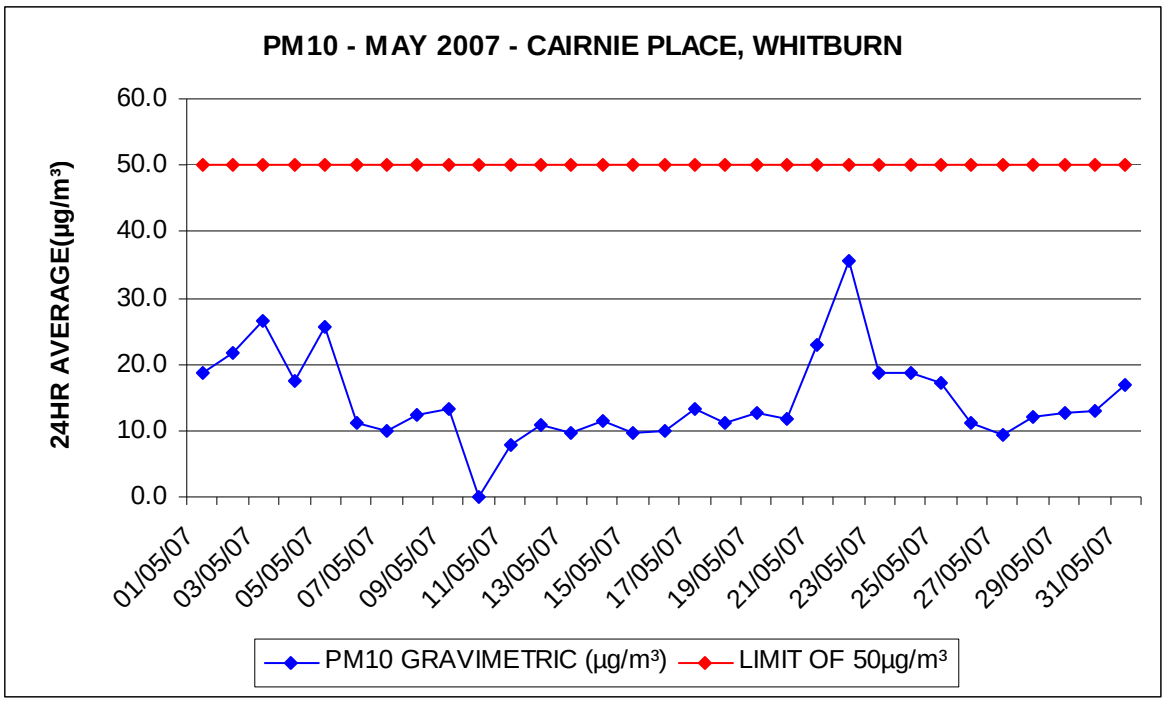


Figure 11.6 Cairnie Place, Whitburn – June 2007 – 24hr average

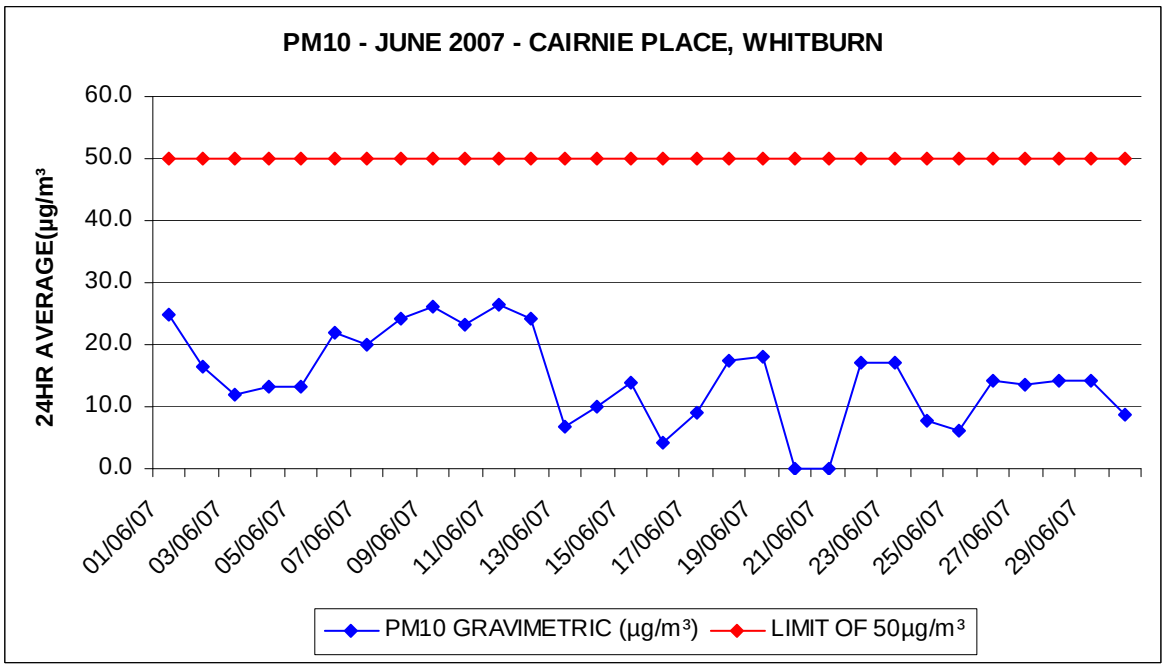


Figure 11.7– Cairnie Place, Whitburn – July 2007 – 24hr average

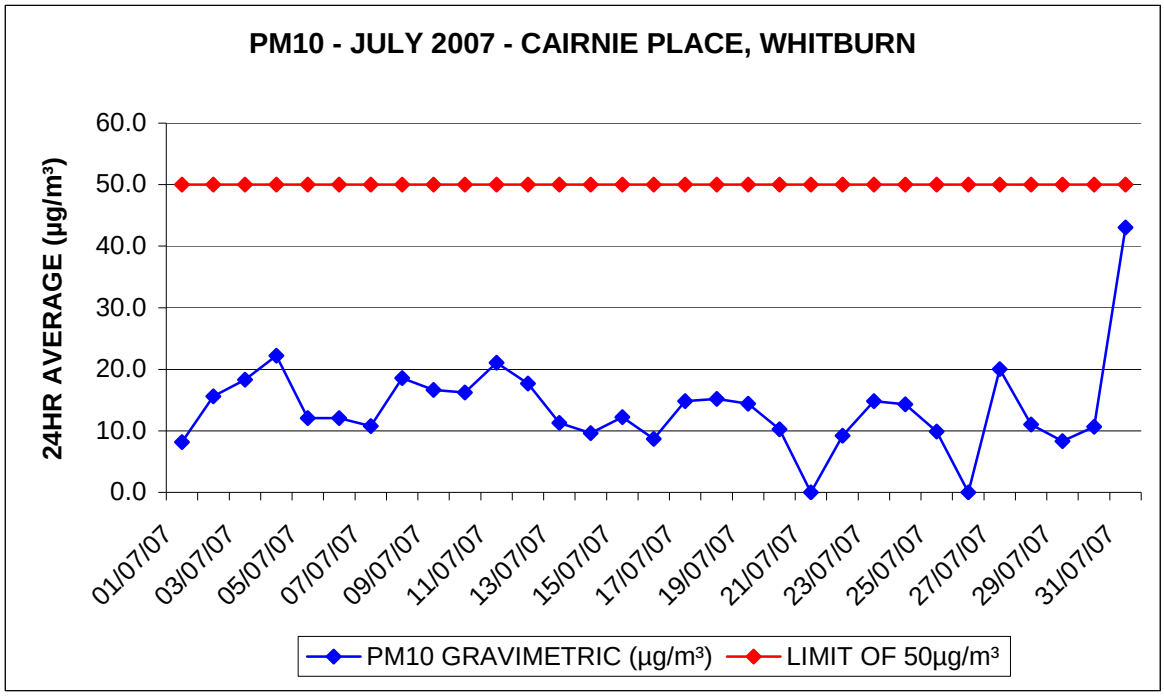


Figure 11.8 Cairnie Place, Whitburn – August 2007 – 24hr average

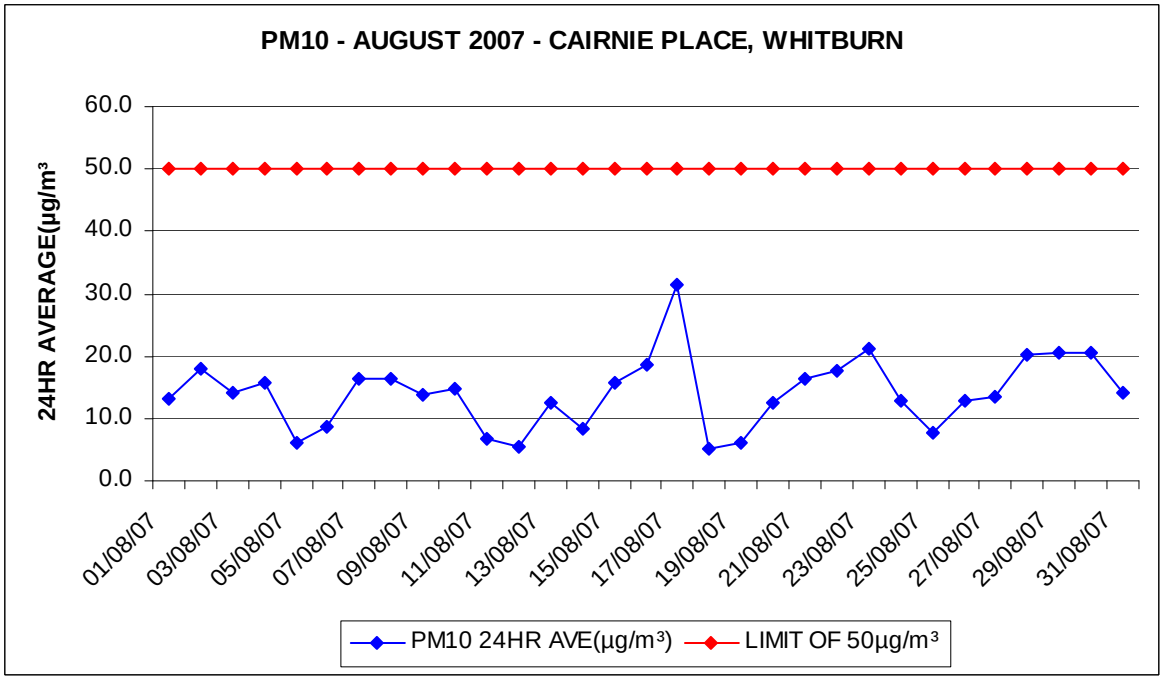


Figure 11.9 – Cairnie Place, Whitburn – September 2007 – 24hr average

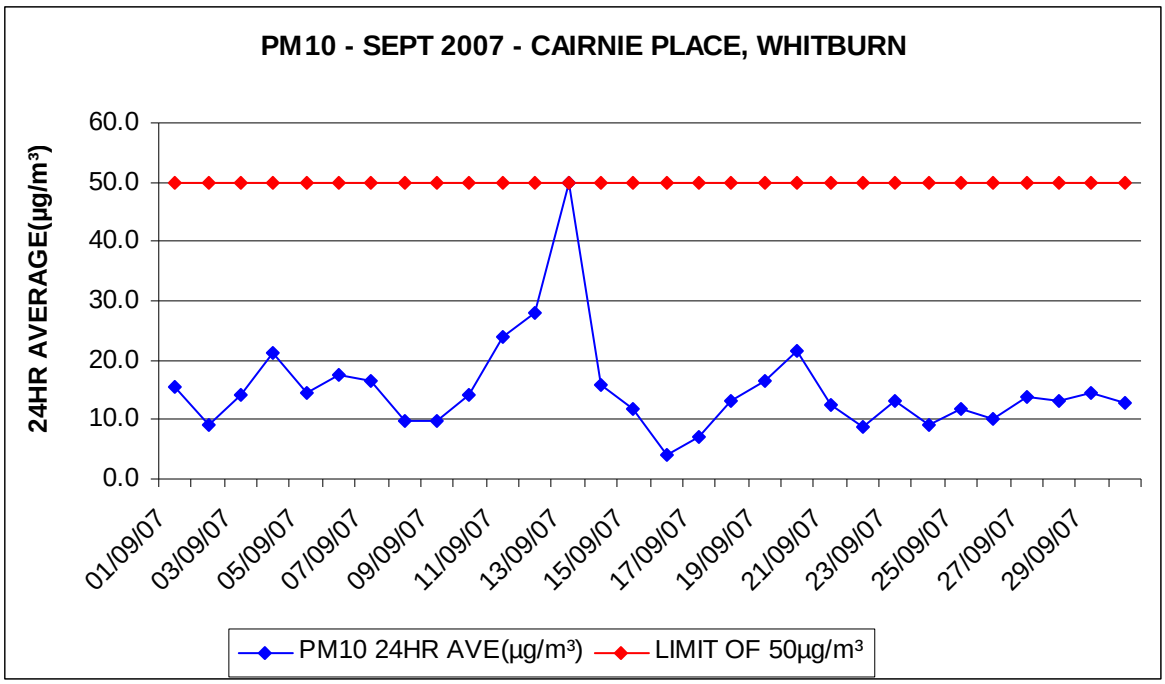


Figure 11.10 – Cairnie Place, Whitburn – October 2007 – 24hr average

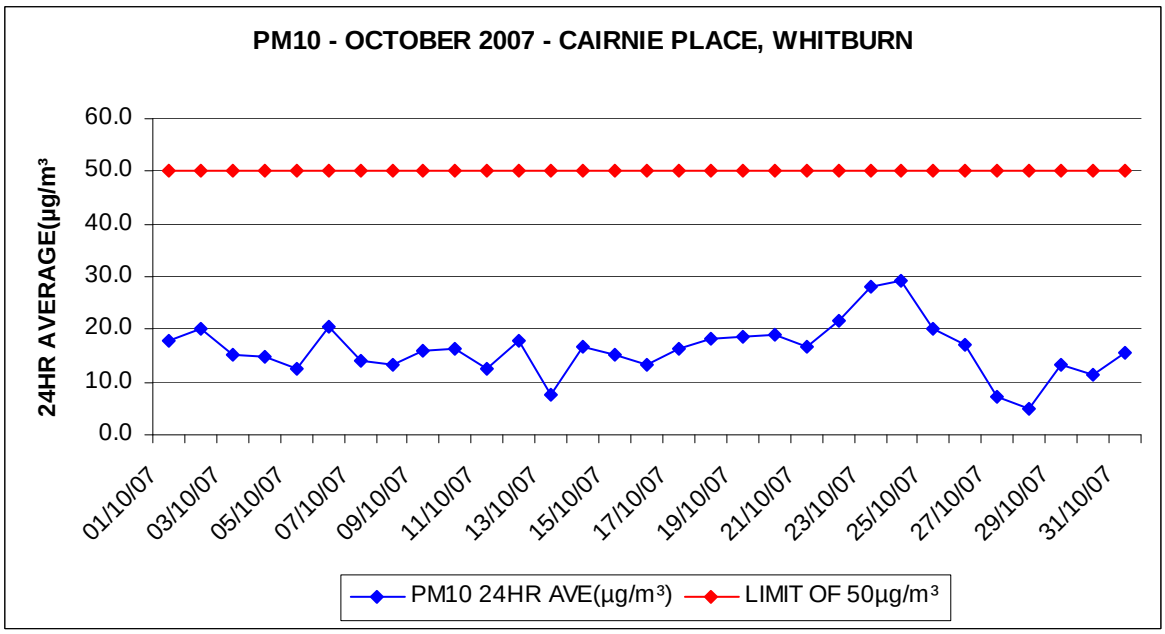


Figure 11.11 – Cairnie Place, Whitburn – November 2007 – 24hr average

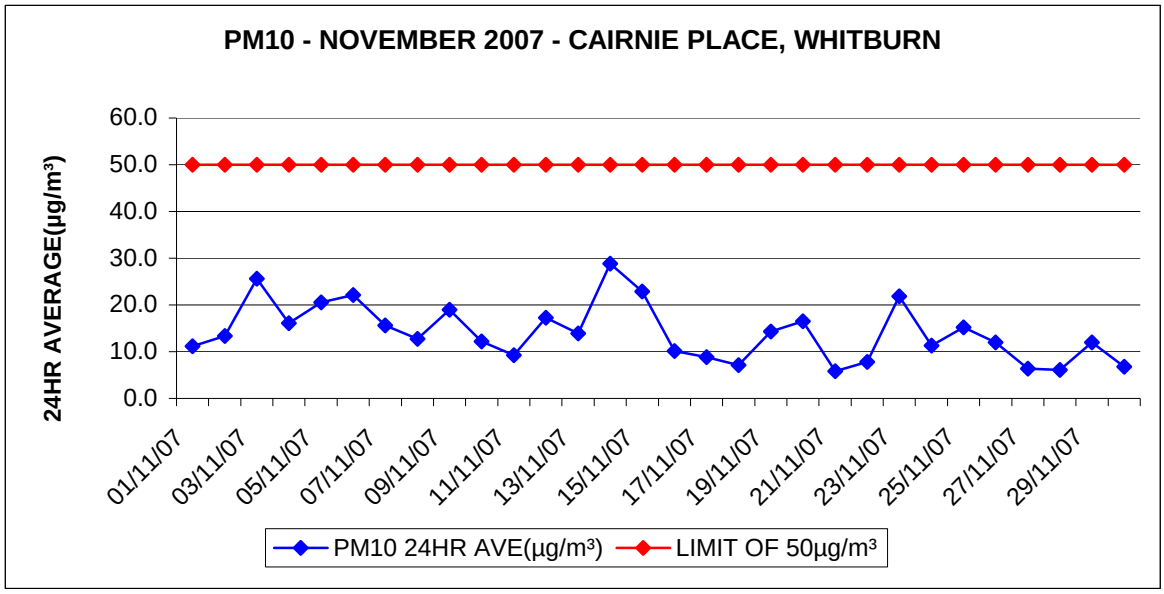
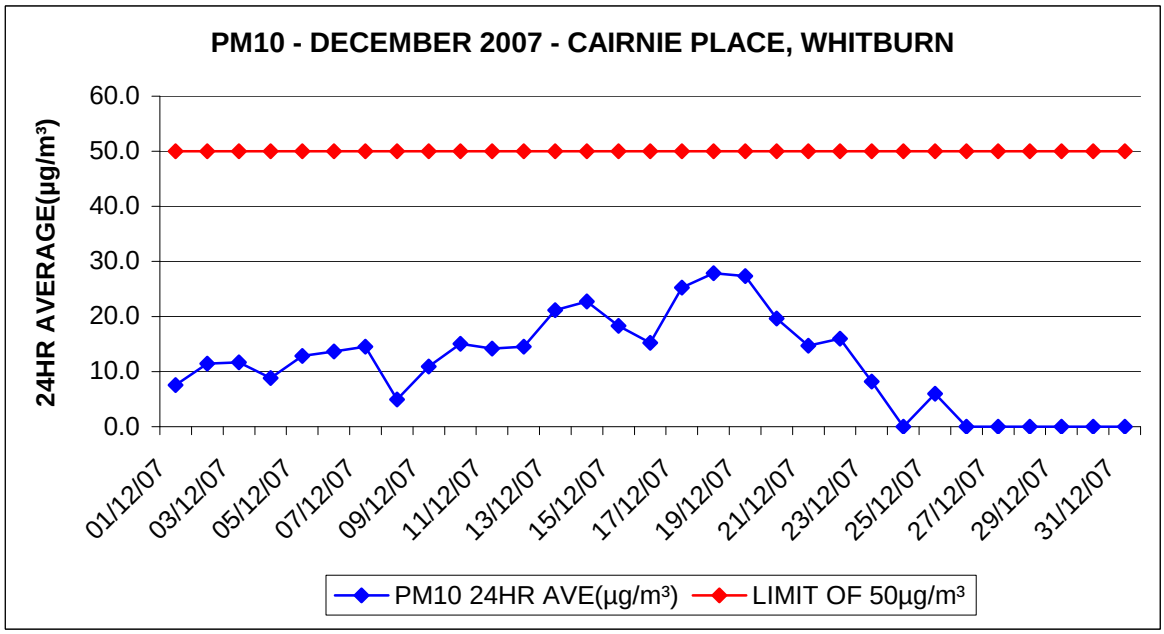


Figure 11.12 – Cairnie Place, Whitburn – December 2007 – 24hr average



PM_{10} Results: Linlithgow High St

24 Hour Averages

Figure 11.13 – Linlithgow High St – January 2007 – 24hr average

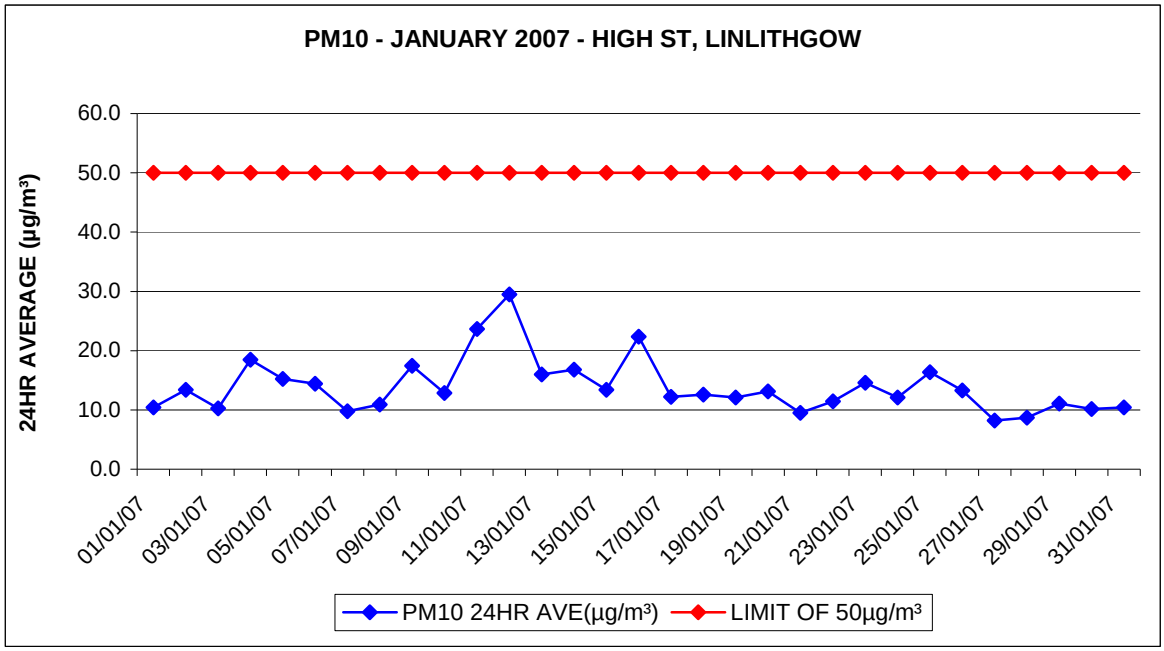


Figure 11.14 – Linlithgow High St – February 2007 – 24hr average

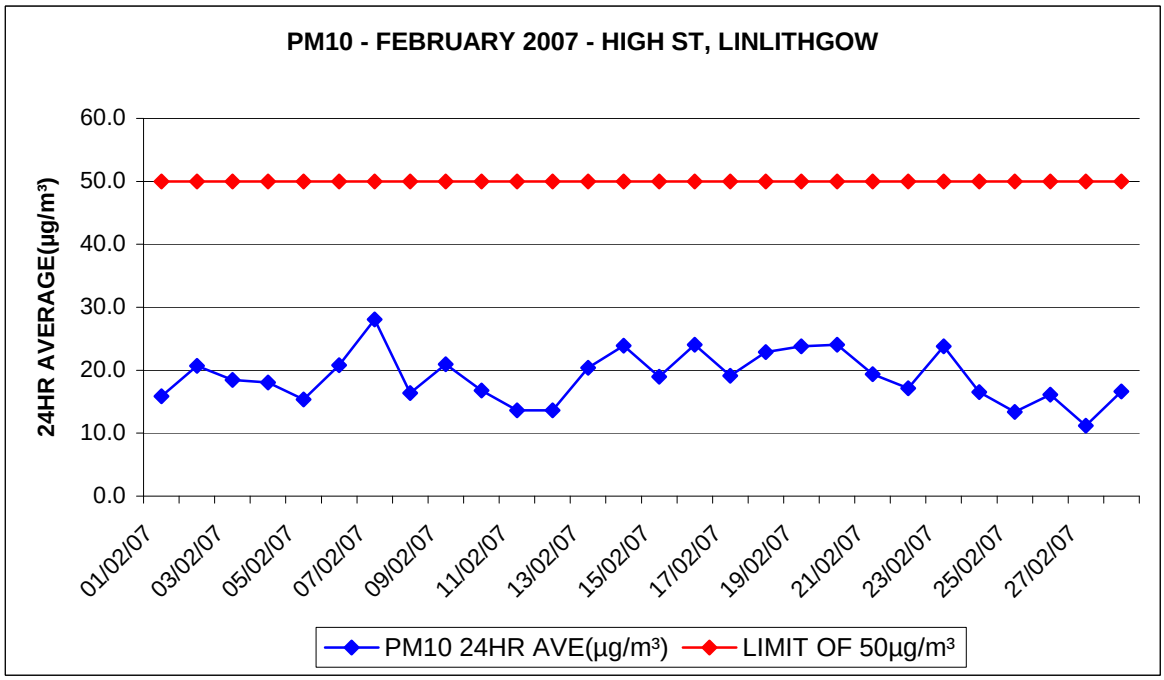


Figure 11.15 – Linlithgow High St – March 2007 – 24hr average

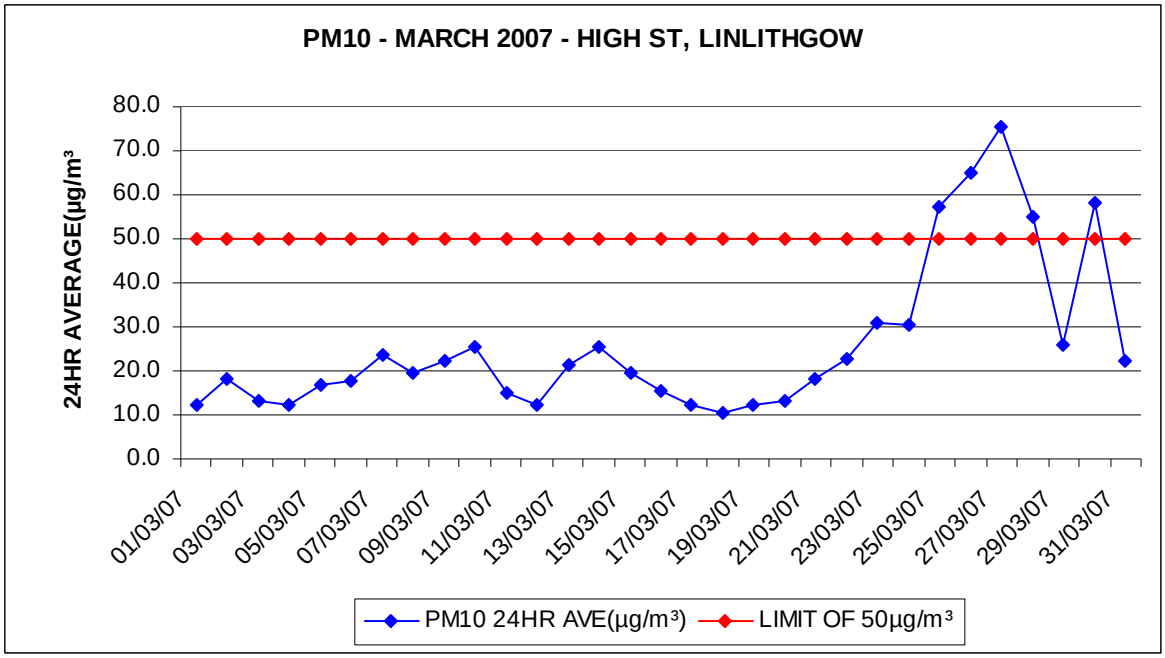


Figure 11.16 – Linlithgow High St – April 2007 – 24hr average

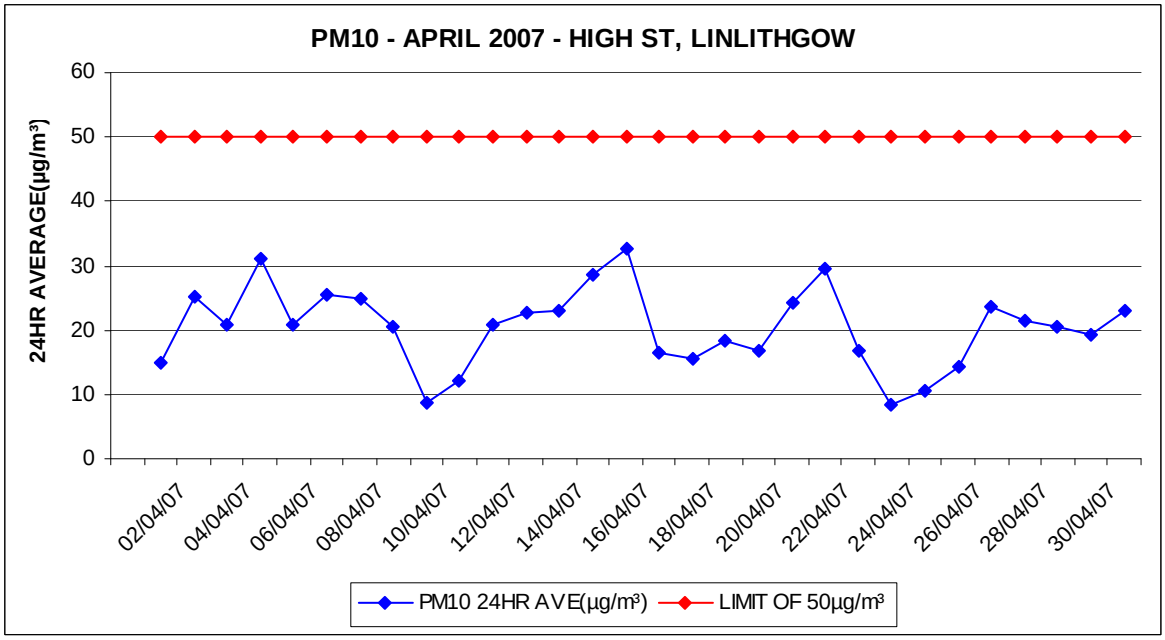


Figure 11.17 – Linlithgow High St – May 2007 – 24hr average

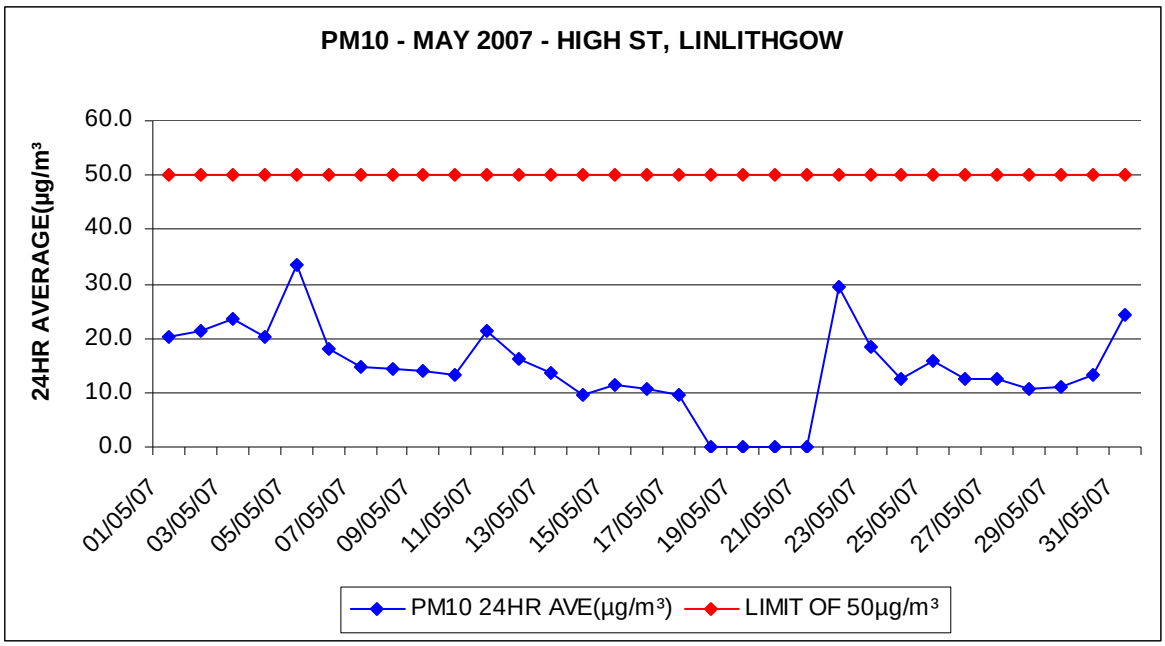


Figure 11.18 – Linlithgow High St – June 2007 – 24hr average

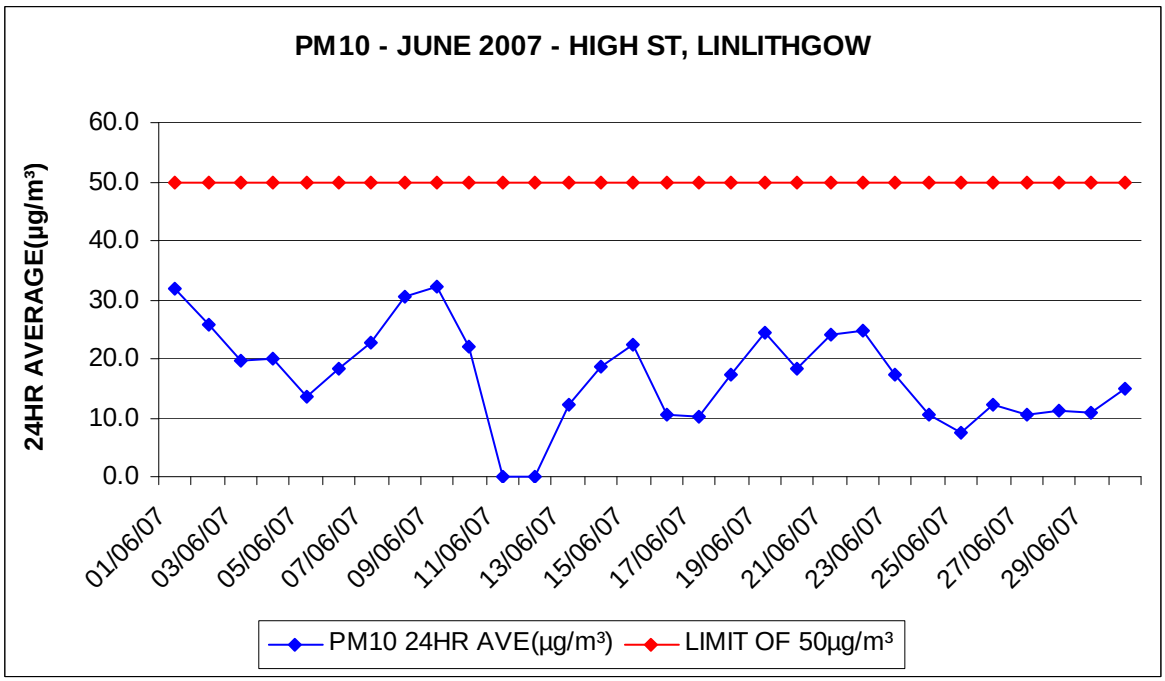


Figure 11.19 – Linlithgow High St – July 2007 – 24hr average

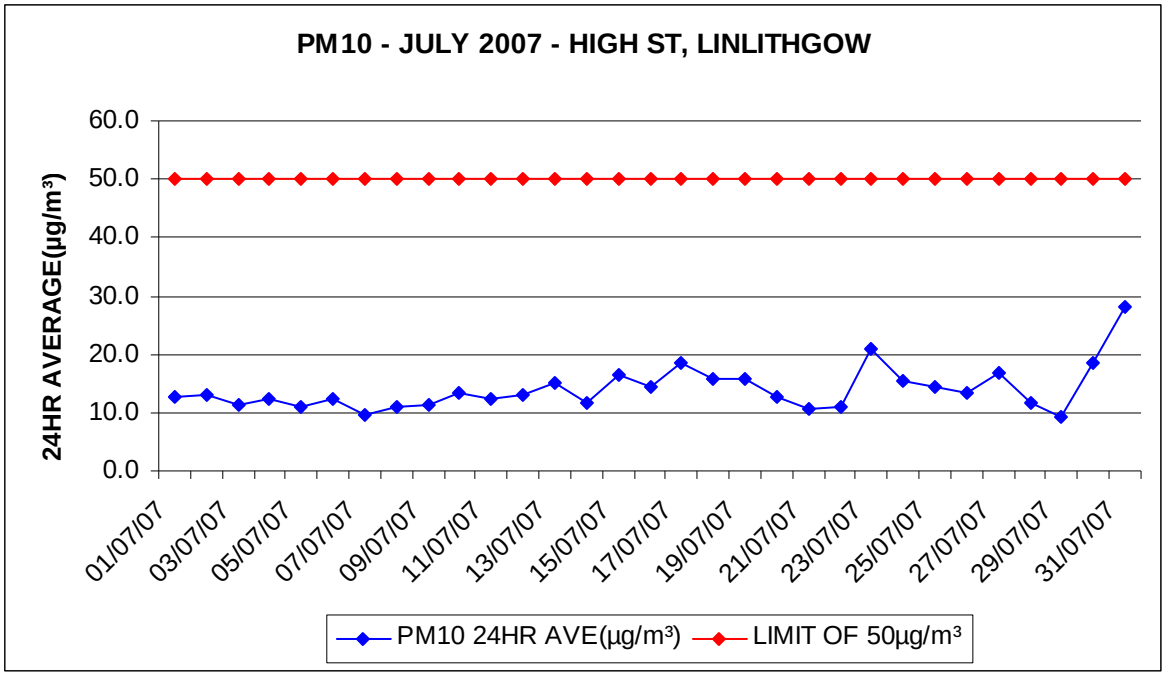


Figure 11.20 – Linlithgow High St – August 2007 – 24hr average

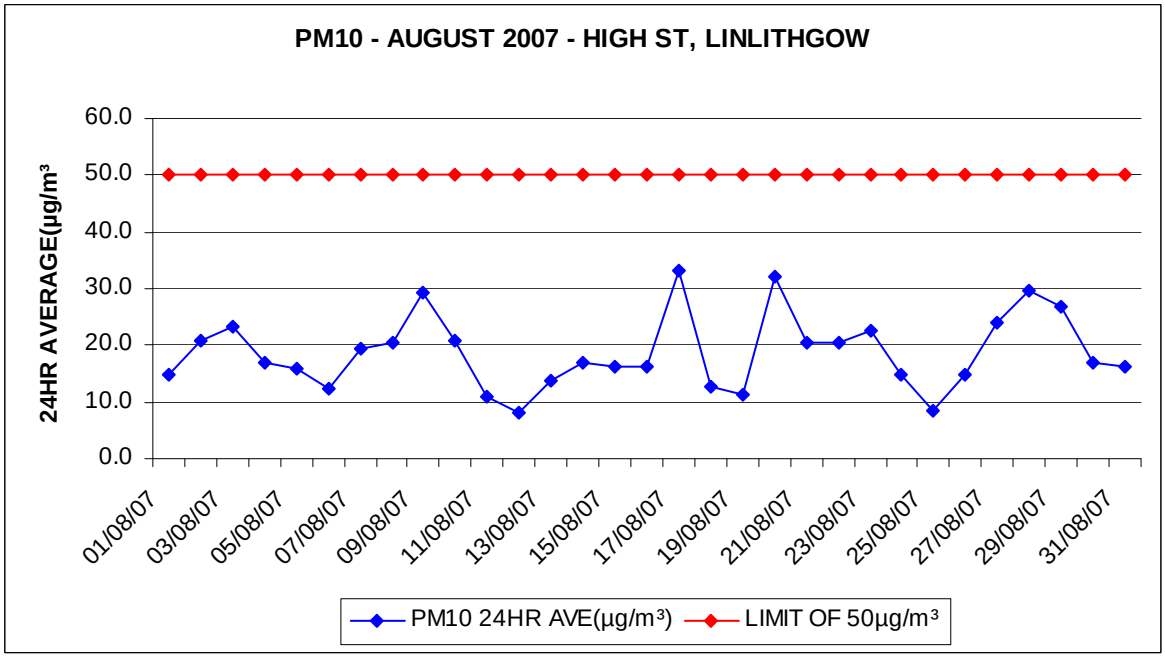


Figure 11.21 – Linlithgow High St – September 2007 – 24hr average

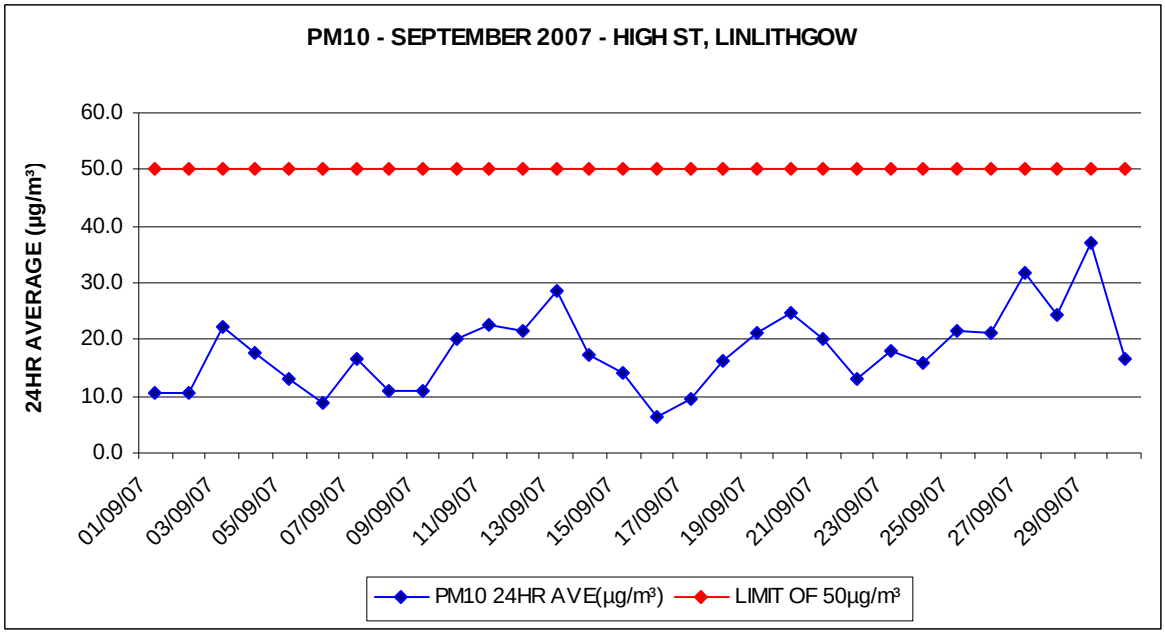


Figure 11.22 – Linlithgow High St – October 2007 – 24hr average

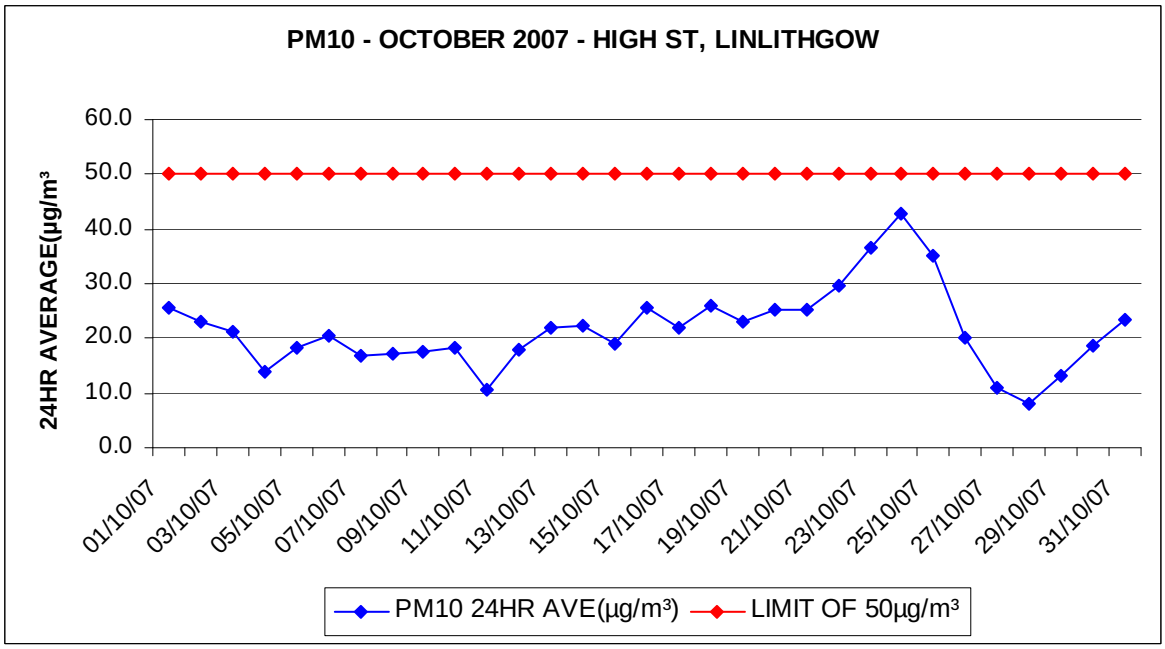


Figure 11.23 – Linlithgow High St – November 2007 – 24hr average

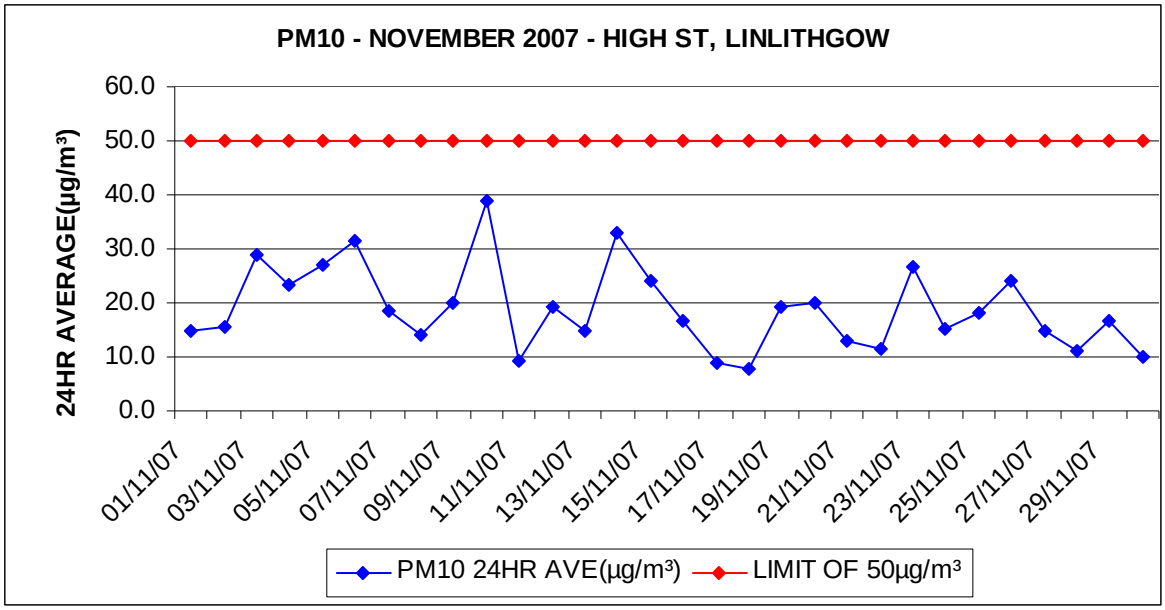
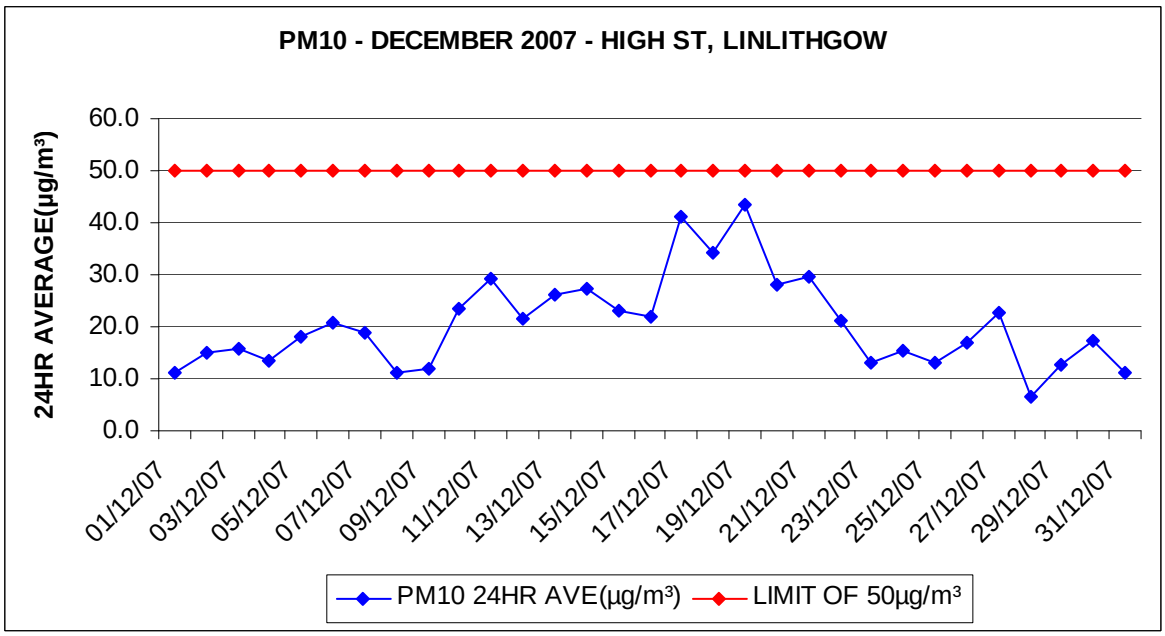


Figure 11.24 – Linlithgow High St – December 2007 – 24hr average



APPENDIX 4: DIFFUSION TUBE LOCATIONS IN WEST LOTHIAN

Additional diffusion tube sites have been added in West Lothian since the end of January 2008. There are now a total of ten sites in West Lothian. The new and existing locations are shown by a green diamond on the map below.

The new sites are as follows:

- WL 12,13&14: High St, Linlithgow(co-located with real-time analyser)
- WL 15&17: Armadale Cross
- WL 21&23: King St, Bathgate
- WL 22&24: Orchardfield Terrace, Wilkieston