BALLYMENA BOROUGH COUNCIL

Environmental Health Department

LOCAL AIR QUALITY PROGRESS REPORT

October 2007

Copies of this report are available from:

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1 INTRODUCTION

1.1 Local authorities in Northern Ireland have air quality management duties which are specified in Part III of The Environment (Northern Ireland) Order 2002. The aim of these duties is to deliver the national objectives as set out in the Air Quality Strategy for England, Wales and Northern Ireland.

1.2 In 2006 Ballymena Borough Council published its Updating and Screening Assessment of Local Air Quality.

1.3 Local authorities in Northern Ireland are now required to prepare a Progress Report as specified in Environment (Northern Ireland) Order 2002 Local Air Quality Management Progress Report Guidance LAQM.PRGNI (04). Some of the aims of the Progress Report are to provide a means of communicating air quality information to elected members and the public and providing information to assist in other policy areas such as transport and land planning. The overall aim of the report is to:

- Report progress on implementing local air quality management; and
- Report progress in achieving or maintaining concentrations below the air quality objectives.

1.4 In order to achieve this Ballymena Borough Council's progress report will focus on:

- **New monitoring results** (since those reported in Updating and Screening Assessment, 2006)
- **New local developments** likely to affect air quality

2 NEW MONITORING RESULTS

2.1 Nitrogen Dioxide

2.1.1 Automatic Monitoring Results

From February 2003 the automatic monitoring of NO_2 has been undertaken at North Road, roadside location in the Borough using a chemiluminescent real time analyser.

The mean nitrogen dioxide concentration obtained from ratified data (AEA Technology) for 2006 (1/1/06-31/12-06) is shown below:

Location	**Annual Hourly Mean µgm^{-3}**	**Max Daily Mean µgm^{-3}**	**Maximum Hourly Mean µgm^{-3}**
North Road	139	76	189

The mean nitrogen dioxide concentrations for the period 1 January 2006 to 31 December 2006 at the North Road site was 36 µgm^{-3} therefore below the Annual Mean Air Quality Objective of 40 µgm^{-3}. Further no exceedences occurred of the daily or hourly means. (Air Quality Regulations (Northern Ireland) 2003)

Ratified data to date for 2007 (period 01/01/07 – 31/08/07) is also presented below for the North Road site.

Location	**Annual Hourly Mean µgm^{-3}**	**Max Daily Mean µgm^{-3}**	**Maximum Hourly Mean µgm^{-3}**
North Road	162	92	241

The mean nitrogen dioxide concentrations for the period 1 January 2007 to 31 August 2007 at the North Road site was 29 µgm^{-3} therefore below the Annual Mean Air Quality Objective of 40 µgm^{-3}. However 3 exceedences have occurred to date of the hourly mean No exceedence to date of the daily mean. (Air Quality Regulations (Northern Ireland) 2003)

QA/QC

The automatic monitoring stations are covered by a QA/QC contract with AEA Technology. The Data Quality Report by Netcen for 2006 and 2007 (to date) is shown in Appendix 1.

2.1.2 Passive Monitoring

Passive diffusion tubes are used to measure nitrogen dioxide at a number of roadside locations throughout the Borough. The tubes remain at the location for a four week exposure period and are then sent to Lambeth Scientific Services Limited, London for analysis and to calculate the average NO_2 concentration at each location.

Since 2004 tubes were placed in duplicate at the North Road automatic monitoring site.

Results

Diffusion tube results for 2006 (without bias adjustment) are listed below.

Location	**No. of Tubes Averaged**	**Average**
Leighinmohr Avenue, Ballymena	12	11
Galgorm Road, Ballymena	12	23
Main Street, Cullybackey	12	17
Cullybackey Road, Ballymena	12	20
Larne Street, Ballymena	12	20
Ballyloughan Road, Ballymena	12	10
George Street, Ballymena	12	34
Wellington Street, Ballymena	12	18
Ballymoney Street, Ballymena	12	21
Parkway, Ballymena	12	18
Lisnevenagh Road, Ballymena	12	19
Queen Street, Ballymena	12	27
North Road, Ballymena	12	19
North Road, Ballymena	12	20
Linenhall Street, Ballymena	12	35

The four sites with the highest average nitrogen dioxide concentrations are:

Location	Result
Linenhall Street, Ballymena	35
George Street, Ballymena	34
Queen Street, Ballymena	27
Galgorm Road, Ballymena	23

Bias Adjustment Factor

Duplicate diffusion tubes have been collocated at the North Road chemiluminescent NO_X monitor since 2004. A bias adjustment factor for this site for 2006 was calculated at 2.07. A bias adjustment factor of 1:33 based on 8 collocation studies using Lambeth Diffusion Tubes was obtained from Air Quality Consultants Limited website.

The various bias adjustment factors have been applied to the annual mean nitrogen dioxide concentrations at sites for those four sites with annual average highest concentrations.

Location	Annual Average	Bias Adjustment Factor (North Road) 2.07	Bias Adjustment Factor (Air Quality Consultants Ltd) 1.33
Linenhall Street, Ballymena	35	72	47
George Street, Ballymena	34	70	45
Queen Street, Ballymena	27	56	36
Galgorm Road, Ballymena	23	48	31

The diffusion tubes at each of the above sites are either on or adjacent to the facades of domestic properties (Queen Street and Galgorm), bus stop / pedestrian area (George Street) and a hostel (Linenhall Street), i.e. relevant locations. The local bias adjustment figure gives a breach of the relevant objective at each location. The

national bias adjustment figure for Lambeth diffusion tubes concludes the relevant objective for each location is being met.

2.2 Sulphur Dioxide and PM10 (Particulate Matter)

In December 2005 the existing automatic chemiluminescent analyzer within the monitoring station at Ballykeel of SO_2 was complimented with a PM_{10} real time analyser known as a TEOM.

2.2.1 PM10

The mean PM_{10} (particulate matter) concentrations obtained from ratified data for 2006 are shown below.

Location	Max Daily Mean μgm^{-3}	Maximum Hourly Mean μgm^{-3}	Annual Mean μgm^{-3}
Ballykeel	64 (GRAV EQ)	244 (GRAV EQ)	16 (GRAV EQ)

The Annual Mean for the Ballykeel site in 2006 is 16 μgm^{-3} (gravimetric concentration). This is below the annual objective of 40 μgm^{-3} (gravimetric concentration). The maximum daily mean of 50 μgm^{-3} was exceeded on three occasions, peaking at 64 μgm^{-3} (gravimetric concentration) during 2006. The maximum running 24 hour mean was 70 μgm^{-3} (gravimetric concentration).

The Ballykeel Air Quality Monitoring Station (AQMS) was relocated in August 2007, to a 'worst-case contour' within Ballykeel II. Therefore PM_{10} (particulate matter) concentrations obtained from ratified data for 2007 (to date) are shown below.

Location	Max Daily Mean μgm^{-3}	Maximum Hourly Mean μgm^{-3}	Annual Mean μgm^{-3}
Ballykeel	56 (GRAV EQ)	390 (GRAV EQ)	17 (GRAV EQ)

The Annual Mean for the Ballykeel site in 2006 is 17 μgm^{-3} (gravimetric concentration). This is below the annual objective of 40 μgm^{-3} (gravimetric concentration). The maximum daily mean of 50 μgm^{-3} was exceeded on one

occasion, at 56 µgm^{-3} (gravimetric concentration) during 2006. The maximum running 24 hour mean was 58 µgm^{-3} (gravimetric concentration).

2.2.2 SO_2

The mean sulphur dioxide concentrations obtained from ratified data for 2006 are shown below:

Location	**Annual Hourly Mean µgm^{-3}**	**Max Daily Mean µgm^{-3}**	**Maximum Hourly Mean µgm^{-3}**
Ballykeel	6	34	96

These are all below the objectives for sulphur dioxide. There were no exceedances in 2006 of the 15 minute, 1 hour or 24 hour value means.

The Ballykeel Air Quality Monitoring Station (AQMS) was relocated in August 2007, to a 'worst-case contour' within Ballykeel II. Therefore the mean sulphur dioxide concentrations obtained from ratified data for 2007 (to date) are shown below:

Location	**Annual Hourly Mean µgm^{-3}**	**Max Daily Mean µgm^{-3}**	**Maximum Hourly Mean µgm^{-3}**
Ballykeel	6	18	122

These are all below the objectives for sulphur dioxide. There were no exceedances in 2006 of the 15 minute, 1 hour or 24 hour value means.

QA/QC

The automatic monitoring station is covered by a QA/QC contract with Netcen. The Data Quality Report by Netcen for 2006 and 2007 (to date) is shown in Appendix 1.

Air Quality Management Area (AQMA)

In 2004 Ballymena Borough Council declared AQMAs in Ballykeel and Dunclug for a likely breach of the Particulate Matter (PM_{10}) objectives. The Council's Updating

and Screening Assessment (August 2006) concluded that the objective for PM_{10} was unlikely to be exceeded at any location in Ballykeel or Dunclug.

The results of the re-verification modelling went against previous modelling predictions. Detailed re-verification modelling had shown that emissions arising from domestic fuel combustion in Ballymena Borough Council are predicted to cause an exceedance of the 15-minute SO2 objective of 266umg^{-3} at relevant receptors in the Ballykeel area. The 15 minute SO2 objective had not been predicted to be exceeded at the Dunclug area. PM10 annual and daily mean objectives were **not** predicted to be exceeded at relevant receptors within the assessed areas (Ballykeel and Dunclug). Scenario work on NIHE house conversion to gas or oil has shown that the predicted SO2 exceedances at Ballykeel area will disappear if NIHE conversion was carried out.

The above monitoring data indicates no exceedence of any SO2 objective. The Ballykeel AQMS has now been relocated in the 'hotspot' were an exceedance of the 15-minute SO2 objective of 266umg^{-3} at relevant receptors in the Ballykeel II area was predicted by modelling.

3 NEW LOCAL DEVELOPMENTS

The following are new local developments since completion of the Updating and Screening Assessment (August 2006).

3.1 Part A, B and C Processes

New Part A, B or C processes within the borough are those which have previously existed, but were required to be permitted under the Pollution Prevention and Control regime for the first time, since the completion of the Updating and Screening Assessment.

3.2 New Retail Developments

There have been a number of retail developments within the Borough with the potential to increase traffic flow, particularly into the town centre.

- Debenhams, Fairhill Shopping Centre, Ballymena.
- Additional retail units at Braidwater Retail Park, Ballymena
- Tesco Superstore and Petrol Filling Station, Larne Road Link, Ballymena.
- Ballykeel Business Centre, Crebilly Road, Ballymena

In addition this department was consulted on a number of planning applications through the planning process on a number of large retail developments, including;

- Broughshane Street, Ballymena
- Woodside Industrial Estate, Woodside Road, Ballymena
- Fairhill Shopping Centre, Ballymena

3.3 New Road Schemes

Consultation exercises are completed / ongoing regarding new road schemes at the following locations;

- Ballee Road East dual carriageway – new design / road layout to include additional slip roads and underpass. Minimal impact on residential properties predicted.
- A26 dual carriageway at Frosses – an extension of dual carriageway towards Ballymoney, will bring existing residential properties closer to kerbside.
- Realignment of single carriageway on Sourhill / Tullygarley Road - will bring existing residential properties closer to kerbside.

3.4 Landfill Developments

The Council owned and managed Ballymacvea Landfill, off the A26 dual carriageway closed at the end of March 2007. A temporary waste transfer site now operates at this location. Council is currently seeking a permanent transfer facility in an alternative location. All planning applications are considered by the Environmental Health Department and, where necessary, air quality will be reviewed as part of that consultation process.

There is no licensed landfill operating within the Borough. Domestic waste collections by Council are taken outside of the Borough.

3.5 Residential Developments

In addition, there have been a number of large residential developments within the Borough with the potential to increase traffic flow, including:

- Trinity Mews, Galgorm Road, Ahoghill
- The Rosses, Tullygarley, Ballymena

In addition this department was consulted on a number of planning applications through the planning process on a number of large residential developments, including;

- Galgorm Road, Ahoghill (3 additional development sites on the boundary of the village).

- Ballymoney Road, Ballymena (2 separate large development sites)
- Lands off Main Street, Cullybackey
- Larne Road, Harryville, Ballymena (2 separate large development sites)
- Leighinmohr Avenue, Galgorm, Ballymena
- Knockan Road, Broughshane
- Sourhill Road / Dan's Road, Galgorm, Ballymena
- Galgorm Road, Ballymena
- Royal Court, Gracehill, Galgorm, Ballymena

Recently there has also been a substantial increase throughout the Borough in the sale of large detached properties as redevelopment sites for townhouses and apartments. This has the potential to substantially increase traffic flows in the Borough.

3.6 Other Developments.

The following developments have been considered at a planning consultation stage and, where necessary, air quality has been reviewed as part of that consultation process.

- Lateral extension to Craig's Quarry, Glenwherry
- Lateral extension to Ballylig Quarry, Broughshane

4 CONCLUSIONS

The main sources of pollutants in the Ballymena Borough continue to be nitrogen dioxide from road traffic and sulphur dioxide / particulate matter from domestic sources. Nitrogen dioxide, sulphur dioxide and particulate matter will continue to be monitored in key locations, with update to the department provided with reference to the objectives of relevance.

4.1 Nitrogen Dioxide

The 2006 annual average concentrations for the passive nitrogen dioxide monitoring sites at Galgorm Road and Queen Street are above the Annual Mean Air Quality Objective of 40 μgm^{-3} with the application of a **local** (2.07) bias adjustment factor. In using the **national** (1.33) bias adjustment factor all sites remain below the 40 μgm^{-3} objective. In 2005 using a local bias adjustment (1.51) Galgorm Road was under the objective at 36.7 μgm^{-3}, however Queen Street was in exceedence of the objective at 45.7 μgm^{-3}. Importantly in 2005 using a national bias adjustment no site was in exceedence of this objective.

There has been some doubt as to diffusion tube precision used during 2006. Efforts have been made to address this issue, this includes renewing our diffusion tube contract with an alternative service provider. The contract commenced 1st October 2007. It is proposed to review the matter at the earliest opportunity when sufficient diffusion tube data becomes available and provide an update within the next progress report due April 2008.

4.2 Sulphur Dioxide and Particulate Matter (PM_{10})

The mean 2006 concentrations for both SO_2 and PM_{10} are below the annual air quality objectives for both these pollutants.

The Council has relocated the Ballykeel AQMS to a best-fit location within the Ballykeel AQMA. Once sufficient monitoring data becomes available consideration

will be given to the revocation of the Dunclug AQMA and either revocation / amendment of the Ballykeel AQMA.

Progress on implementation of the existing (draft) action plan will be included in future Progress Reports

The next air quality report will be an updating and screening assessment, which is due in April 2008.

Appendix One

Produced by AEA Energy & Environment on behalf of Ballymena BC

BALLYMENA NORTH ROAD
01 January to 31 December 2006

These data have been fully ratified by AEA energy & Environment

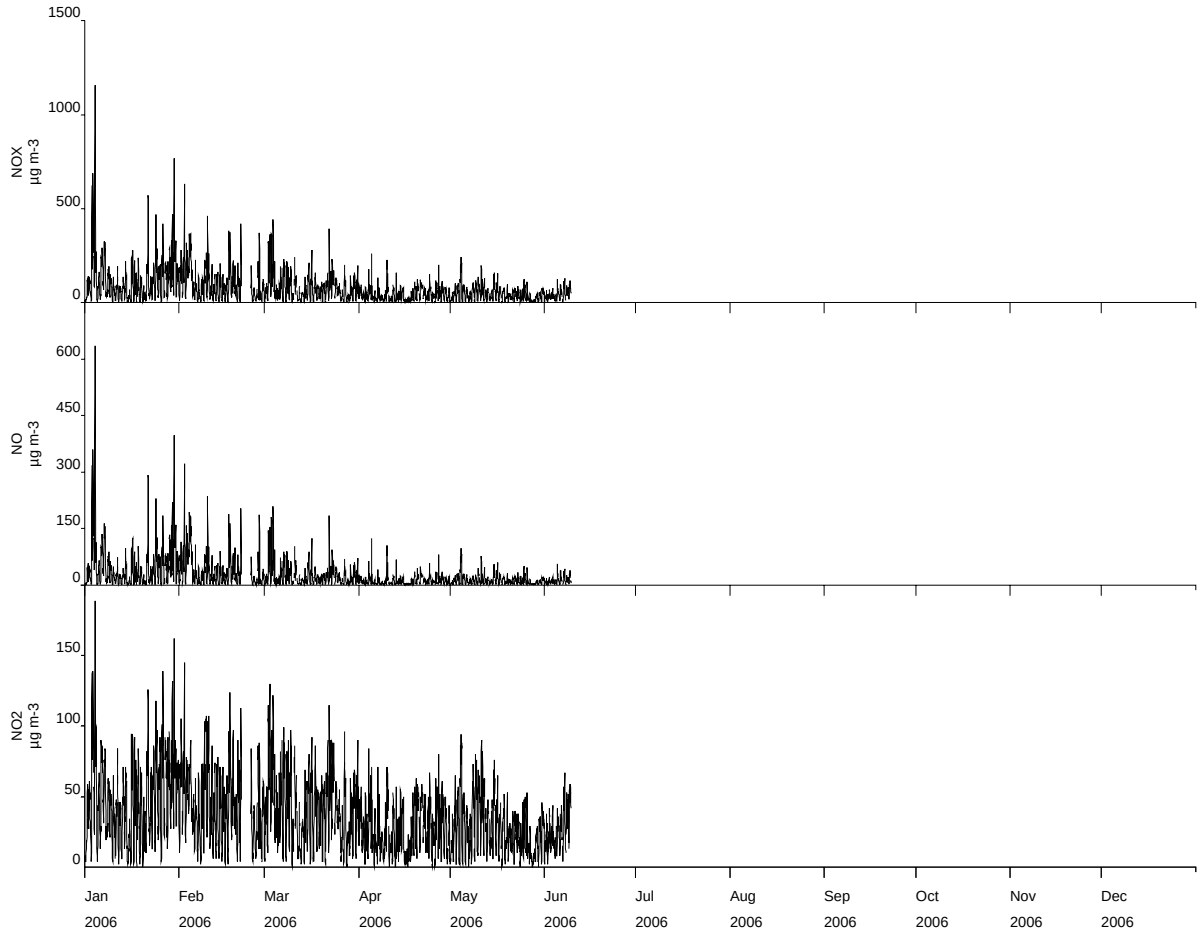
POLLUTANT	NO_X	NO	NO_2
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	3610
Maximum 15-minute mean	1291 µg m^{-3}	715 µg m^{-3}	212 µg m^{-3}
Maximum hourly mean	1159 µg m^{-3}	635 µg m^{-3}	189 µg m^{-3}
Maximum running 8-hour mean	649 µg m^{-3}	351 µg m^{-3}	121 µg m^{-3}
Maximum running 24-hour mean	398 µg m^{-3}	206 µg m^{-3}	83 µg m^{-3}
Maximum daily mean	309 µg m^{-3}	154 µg m^{-3}	76 µg m^{-3}
99.8th percentile of **hourly** means	632 µg m^{-3}	319 µg m^{-3}	139 µg m^{-3}
Average	74 µg m^{-3}	25 µg m^{-3}	36 µg m^{-3}
Data capture	41.2 %	41.2 %	41.2 %

All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0

Produced by AEA Energy & Environment on behalf of Ballmena BC

Ballymena North Road Air Monitoring
Hourly Mean Data for 01 January to 31 December 2006



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BALLYMENA NORTH ROAD
01 January to 10 August 2007

These data are provisional from 01/01/2007 and may be subject to further quality control

POLLUTANT	NO_X	NO	NO_2
Number Very High	-	-	0
Number High	-	-	0
Number Moderate	-	-	0
Number Low	-	-	3033
Maximum 15-minute mean	999 µg m^{-3}	549 µg m^{-3}	304 µg m^{-3}
Maximum hourly mean	628 µg m^{-3}	316 µg m^{-3}	241 µg m^{-3}
Maximum running 8-hour mean	355 µg m^{-3}	174 µg m^{-3}	161 µg m^{-3}
Maximum running 24-hour mean	254 µg m^{-3}	121 µg m^{-3}	107 µg m^{-3}
Maximum daily mean	215 µg m^{-3}	101 µg m^{-3}	92 µg m^{-3}
99.8th percentile of **hourly** means	531 µg m^{-3}	251 µg m^{-3}	162 µg m^{-3}
Average	61 µg m^{-3}	21 µg m^{-3}	29 µg m^{-3}
Data capture	56.9 %	56.9 %	56.9 %

All mass units are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	-	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	3	1

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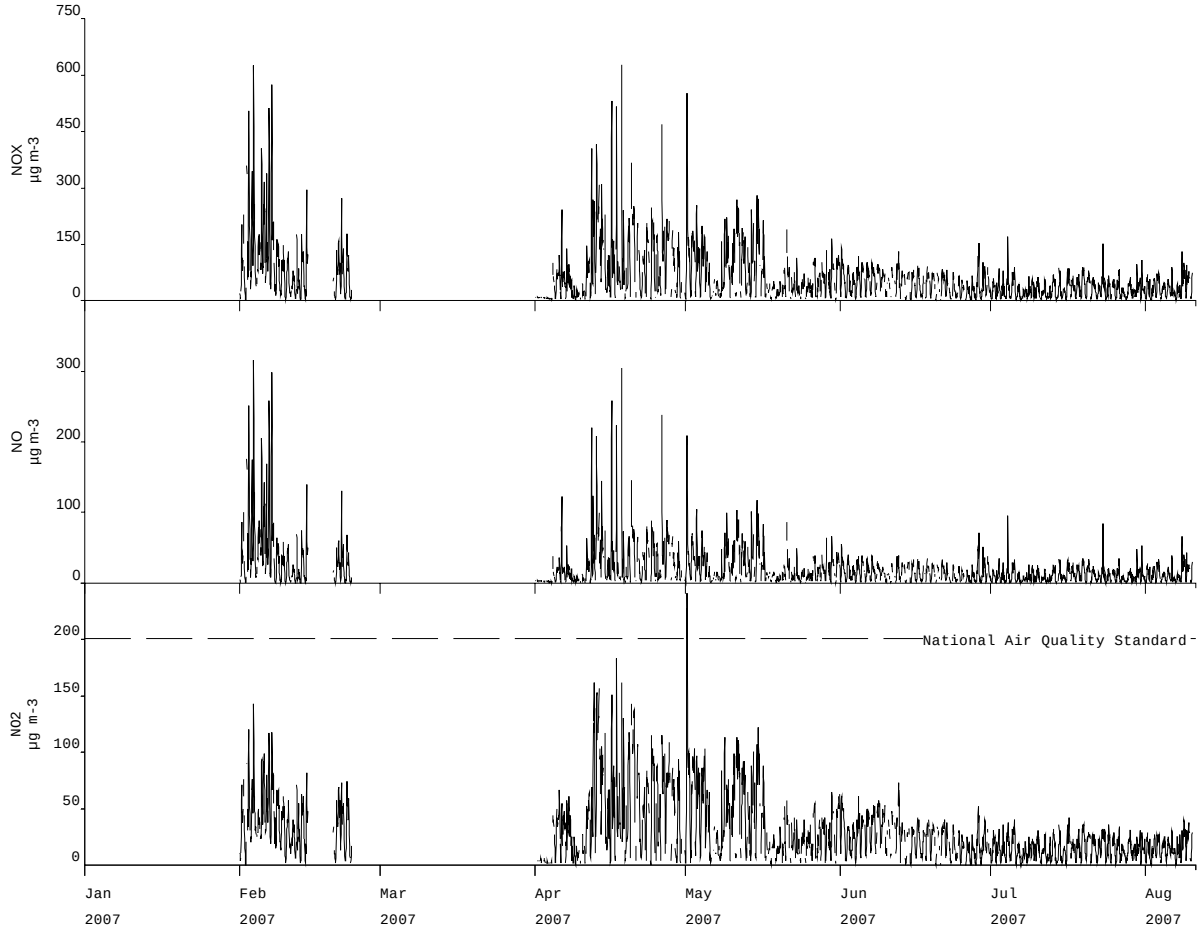
Ballymena North Road Air Monitoring
Hourly Mean Data for 01 January to 10 August 2007



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BALLYMENA BALLYKEEL
01 January to 31 December 2006

These data have been fully ratified by AEA Energy & Environment

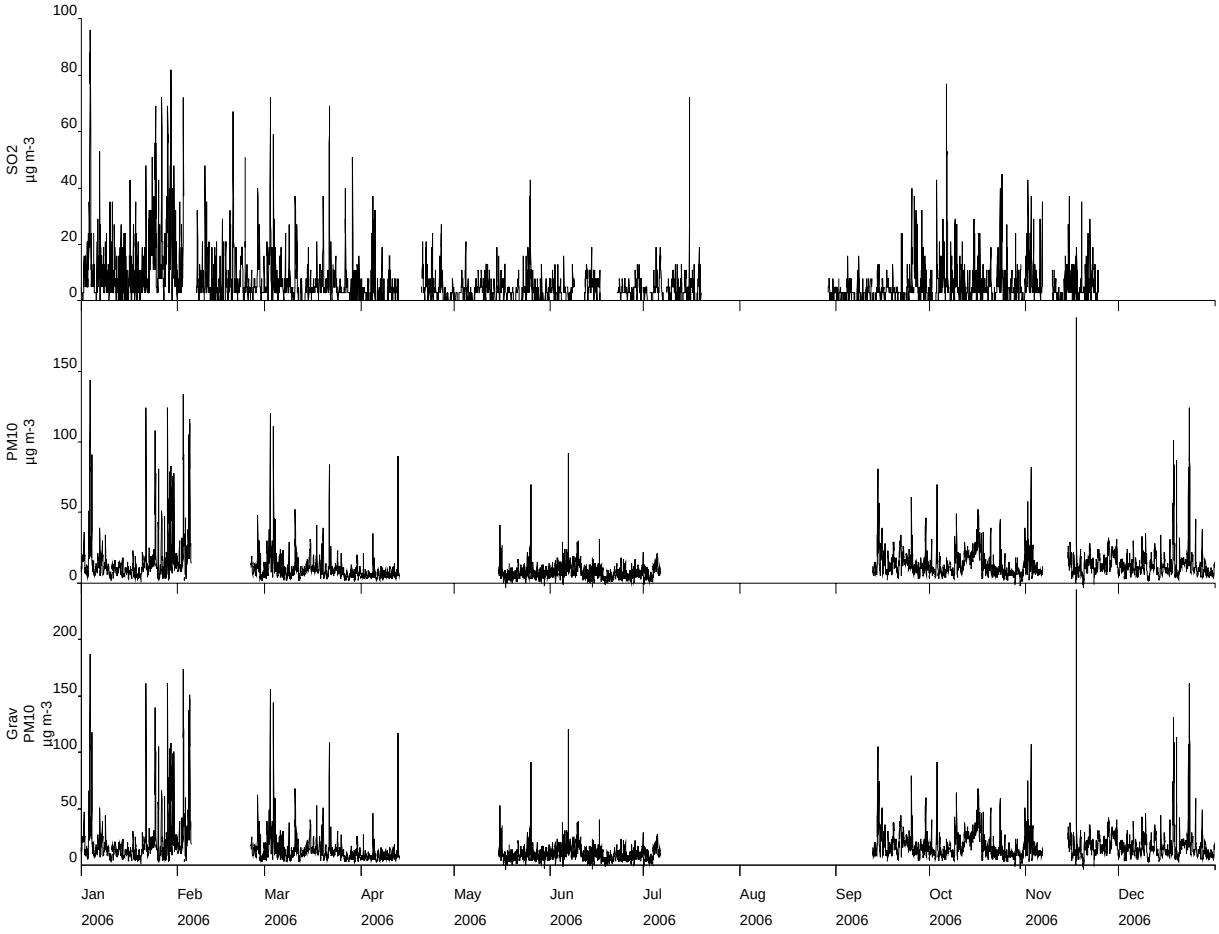
POLLUTANT	SO_2	PM_{10}+	PM_{10}*
Number Very High	0	0	-
Number High	0	0	-
Number Moderate	0	24	-
Number Low	24367	5615	-
Maximum 15-minute mean	138 µg m^{-3}	442 µg m^{-3}	575 µg m^{-3}
Maximum hourly mean	96 µg m^{-3}	188 µg m^{-3}	244 µg m^{-3}
Maximum running 8-hour mean	70 µg m^{-3}	96 µg m^{-3}	125 µg m^{-3}
Maximum running 24-hour mean	38 µg m^{-3}	54 µg m^{-3}	70 µg m^{-3}
Maximum daily mean	34 µg m^{-3}	49 µg m^{-3}	64 µg m^{-3}
90th percentile of **daily** means	11 µg m^{-3}	20 µg m^{-3}	25 µg m^{-3}
99.7th percentile of **hourly** means	64 µg m^{-3}	97 µg m^{-3}	126 µg m^{-3}
99.8th percentile of **hourly** means	69 µg m^{-3}	111 µg m^{-3}	144 µg m^{-3}
99th percentile of **daily** means	27 µg m^{-3}	43 µg m^{-3}	56 µg m^{-3}
99.9th percentile of **15 minute** means	90 µg m^{-3}	144 µg m^{-3}	187 µg m^{-3}
Average	6 µg m^{-3}	12 µg m^{-3}	16 µg m^{-3}
Data capture	70.8 %	63.9 %	63.9 %

* PM_{10} indicative gravimetric equivalent (using conversion factor of 1.3)
+ PM_{10} as measured by a TEOM (no correction applied)
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Sulphur Dioxide	15-minute mean > 266 µg m^{-3}	0	0
Sulphur Dioxide	Hourly mean > 350 µg m^{-3}	0	0
Sulphur Dioxide	Daily mean > 125 µg m^{-3}	0	0
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	3	3
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	0	-

Produced by AEA Energy & Environment on behalf of Ballymena BC

Ballymena Ballykeel Air Monitoring
Hourly Mean Data for 01 January to 31 December 2006



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BALLYMENA BALLYKEEL
01 January to 10 August 2007

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POLLUTANT	SO_2	PM_{10}+	PM_{10}*
Number Very High	0	0	-
Number High	0	0	-
Number Moderate	0	0	-
Number Low	10449	3506	-
Maximum 15-minute mean	178 µg m^{-3}	1051 µg m^{-3}	1366 µg m^{-3}
Maximum hourly mean	122 µg m^{-3}	300 µg m^{-3}	390 µg m^{-3}
Maximum running 8-hour mean	33 µg m^{-3}	87 µg m^{-3}	113 µg m^{-3}
Maximum running 24-hour mean	18 µg m^{-3}	45 µg m^{-3}	58 µg m^{-3}
Maximum daily mean	18 µg m^{-3}	43 µg m^{-3}	56 µg m^{-3}
90th percentile of **daily** means	10 µg m^{-3}	22 µg m^{-3}	2 µg m^{-3}
99.7th percentile of **hourly** means	43 µg m^{-3}	103 µg m^{-3}	134 µg m^{-3}
99.8th percentile of **hourly** means	45 µg m^{-}	116 µg m^{-}	151 µg m^{-}
99th percentile of **daily** means	16 µg m^{-}	38 µg m^{-}	50 µg m^{-}
99.9th percentile of **15 minute** means	82 µg m^{-}	194 µg m^{-}	252 µg m^{-}
Average	6 µg m^{-3}	13 µg m^{-3}	17 µg m^{-3}
Data capture	49.5 %	64.5 %	64.5 %

* PM_{10} indicative gravimetric equivalent (using conversion factor of 1.3)
+ PM_{10} as measured by a TEOM (no correction applied)
All mass units are at 20'C and 1013mb

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
Sulphur Dioxide	15-minute mean > 266 µg m^{-3}	0	0
Sulphur Dioxide	Hourly mean > 350 µg m^{-3}	0	0
Sulphur Dioxide	Daily mean > 125 µg m^{-3}	0	0
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	1	1
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	-	-

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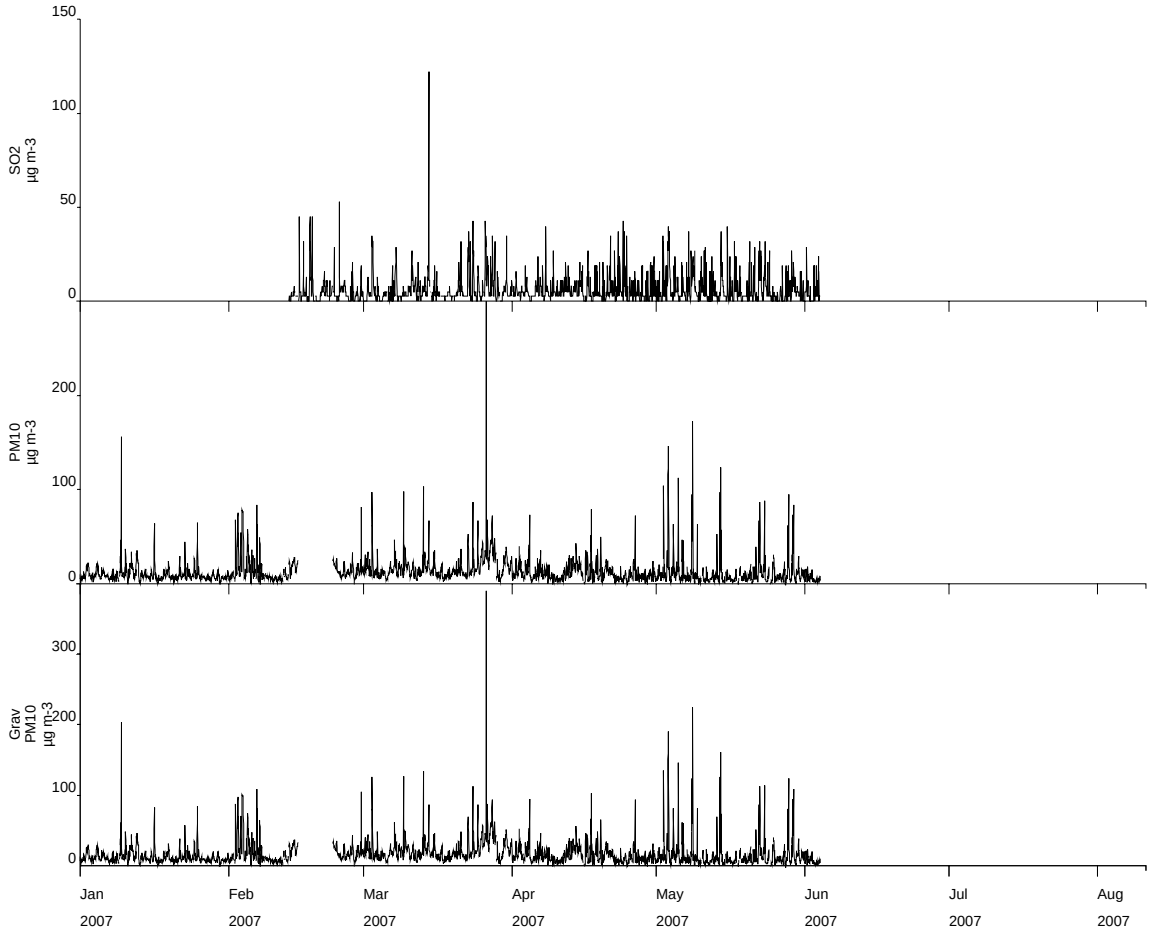
Ballymena Ballykeel Air Monitoring
Hourly Mean Data for 01 January to 10 August 2007



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