COLERAINE
BOROUGH COUNCIL

Environment (N.I.) Order 2002

Air Quality Review and Assessment

Progress Report 2004

COLERAINE BOROUGH COUNCIL

June 2005

1. INTRODUCTION.

The local air quality management (LAQM) system was introduced by the Environment (Northern Ireland) Order 2002 and subsequent Regulations. Under this legislation district councils are required to review the present quality of air and the likely future quality of air and assess whether the nationally prescribed objectives are likely to be achieved.

This Progress Report is a requirement of Government guidance issued in 2003 (LAQM. PGNI(03)) which set out the timescales for submission of the various reports on air quality. This report has been prepared in accordance with EHS guidance LAQM.PRGNI(04).

2. PURPOSE OF THE PROGRESS REPORT.

Progress Reports have been introduced into the LAQM system following a detailed evaluation of the review and assessment process. Following consultation, the Government concluded that it was too "stop-start" and that gaps of several years might occur between air quality reviews. Updating and Screening Assessments are now required at intervals of three years whilst Progress Reports are required in years when Updating and Screening Assessments or Detailed Assessments are not being carried out. The detailed timetable is at Appendix 1.

Progress Reports are designed to ensure continuity in the LAQM process and are intended to assist district councils by –

• helping to retain a profile for LAQM within the Council, including the retention of staff with knowledge of air quality issues.

• providing a means for communicating air quality information for members and the public.

• maximising the usefulness and interpretation of the monitoring effort being carried out by the District Council.

• maximising the value of the investment in monitoring equipment.

• making the next round of review and assessment that much easier, as there will be a readily available up to date source of information.

• helping District Councils respond to requests for up-to-date information on air quality.

• providing information to assist in other policy areas, such as transport and land use planning.

• providing a ready source of information on air quality for developers carrying out environmental assessments for new schemes.

• demonstrating progress with implementation of air quality Action Plans and/or air quality strategies.

• providing a timely indication of the need for further measures to improve air quality, rather than delaying until the next full round of review and assessment.

3. SUMMARY OF FINDINGS FROM PREVIOUS REVIEW AND ASSESSMENT WORK.

The cornerstone of the LAQM process is the review and assessment of air quality. This is a statutorily required process whereby local air quality monitoring and modelling results are compared to the national air quality standards and objectives (see Appendix 2). Where objectives are breached or are predicted to be breached, an Air Quality Management Area (AQMA) is declared. An Action Plan must then be produced stating how the district council will drive air quality towards the objective.

The first round of Review and Assessment (completed in 2004) concluded that:

1. **The risk of the objectives for the following pollutants being exceeded in the Coleraine Borough Council area was negligible:**

   Carbon Monoxide, Benzene, 1, 3 butadiene, Lead, Nitrogen Dioxide, PM_{10}, sulphur dioxide

The Review and Assessment report recommended the following measures:

1. That existing monitoring using NO_2 diffusion tubes be continued to monitor sensitive locations within the Borough

2. That existing monitoring for SO_2 and PM_{10} be continued in order to provide data so that modelling may be undertaken in any future rounds of assessment.

4. NEW MONITORING RESULTS.

4.1 Nitrogen Dioxide

Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides. All combustion processes produce nitrogen oxide emissions, largely in the form of nitric oxide, which is then converted to Nitrogen dioxide mainly as a result of reactions with ozone in the atmosphere. Exposure to high concentrations of nitrogen dioxide is reported to sensitise asthmatics to allergens such as irritant chemicals, house dust mites and pollen.

The principal source of nitrogen oxide emissions is road transport, which accounted for 49% of total UK emissions in 2000. The contribution of road transport to nitrogen oxide emissions has declined significantly in recent years as a result of various national policy measures, and further reductions are expected up until 2010 and beyond.

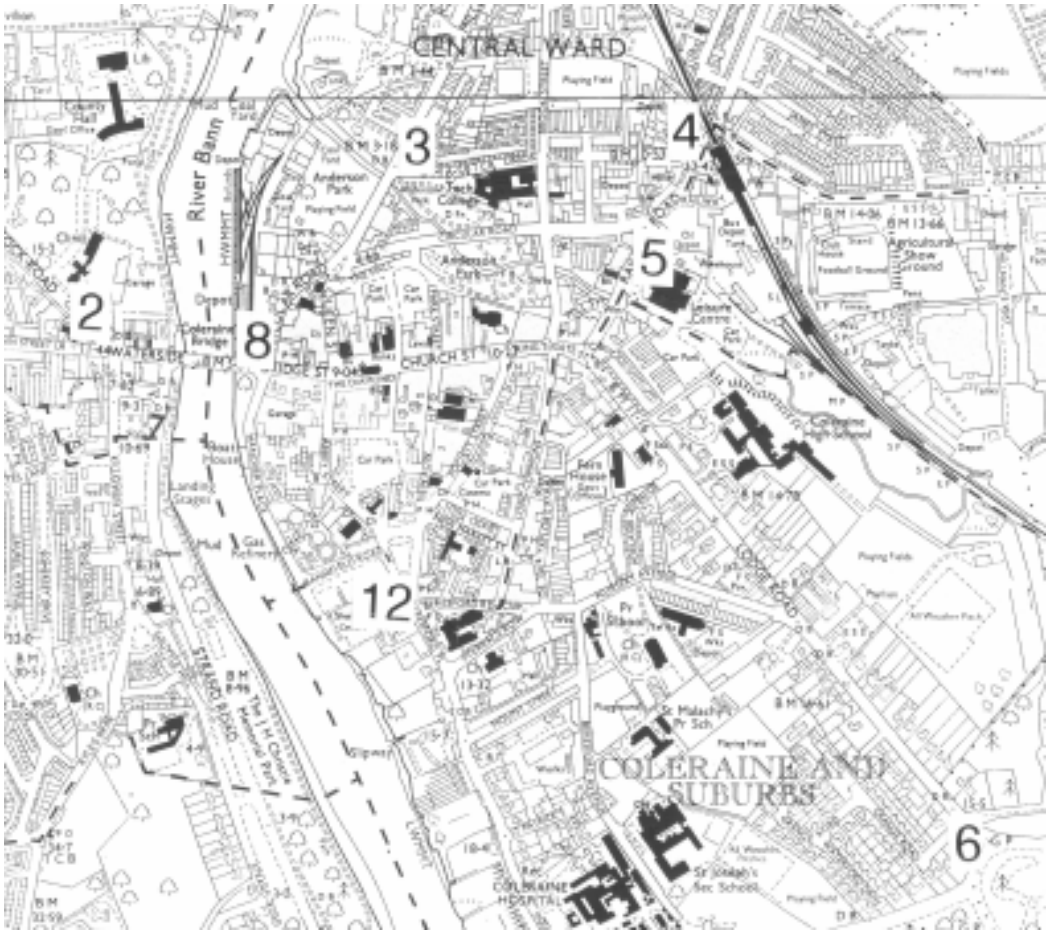
Coleraine Borough Council is currently monitoring nitrogen dioxide at 12 sites around the district using passive diffusion tubes. (Three new sites were added during 2004)

Diffusion tubes represent a simple and cost-effective method of monitoring air quality in an area, to give a good general indication of average pollution concentrations. They are particularly useful for assessment against annual mean objectives.

Monitoring sites are chosen to provide data on locations that appear to be representative of likely residential exposure and, where possible, are close to the nearest receptor to the busy road or road junction of interest. The sites are subject to periodic review.

The tubes are exposed for a month at a time before being sent for laboratory analysis. Results obtained from diffusion tubes need to be corrected for possible over or under reading. For some of the period of this report the diffusion tube analysis for Coleraine Borough Council was undertaken by Ruddock and Serrate Analyst Laboratory. It has not been possible to derive a correction factor for this laboratory and so the results provided have been unadjusted.

The monitoring sites referred to in this report are shown in the following maps. Details are also shown in Appendix 4. All maps are subject to Ordinance Survey copyright.



Map showing sites: No 2. Castle rock Road, Coleraine

No 3. Lower Union Street, Coleraine

No 4. Upper Union Street, Coleraine

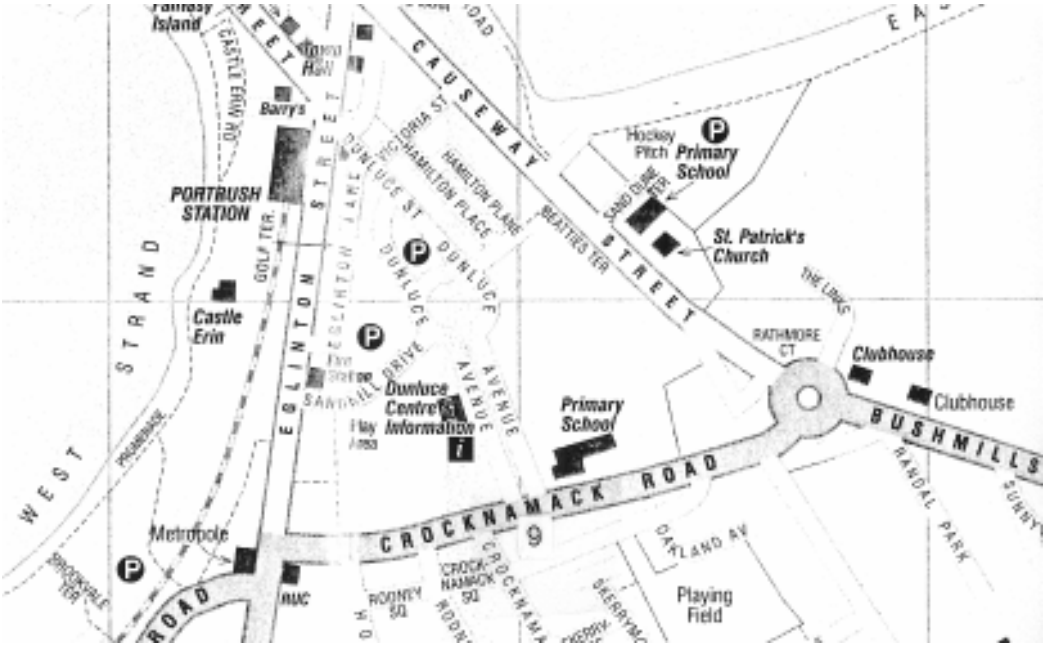
No 5. Railway Road, Coleraine

No 6. Lodge Road, Coleraine

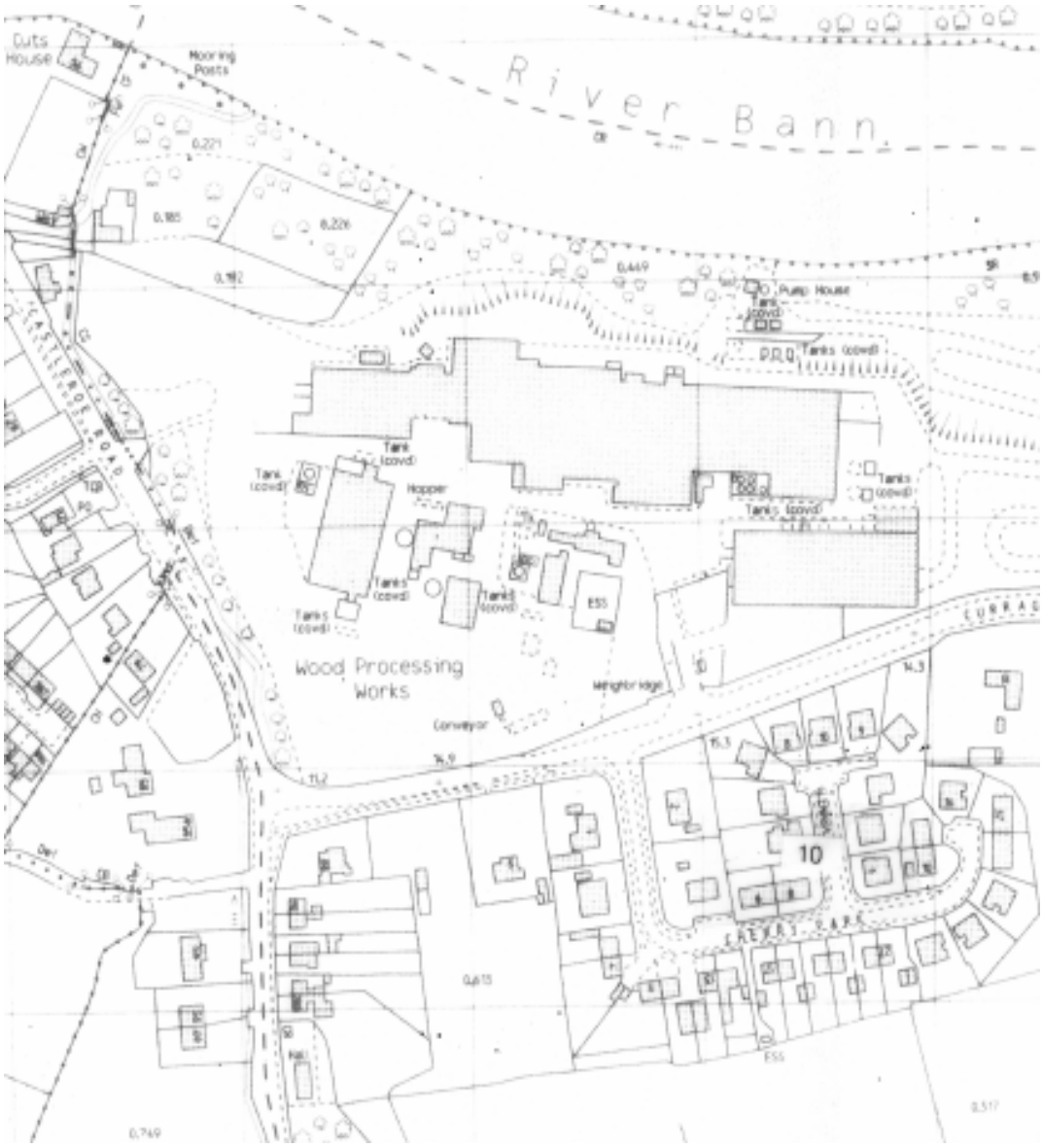
No 7. Strand Road, Coleraine

No 8. Dunes Car park, Coleraine

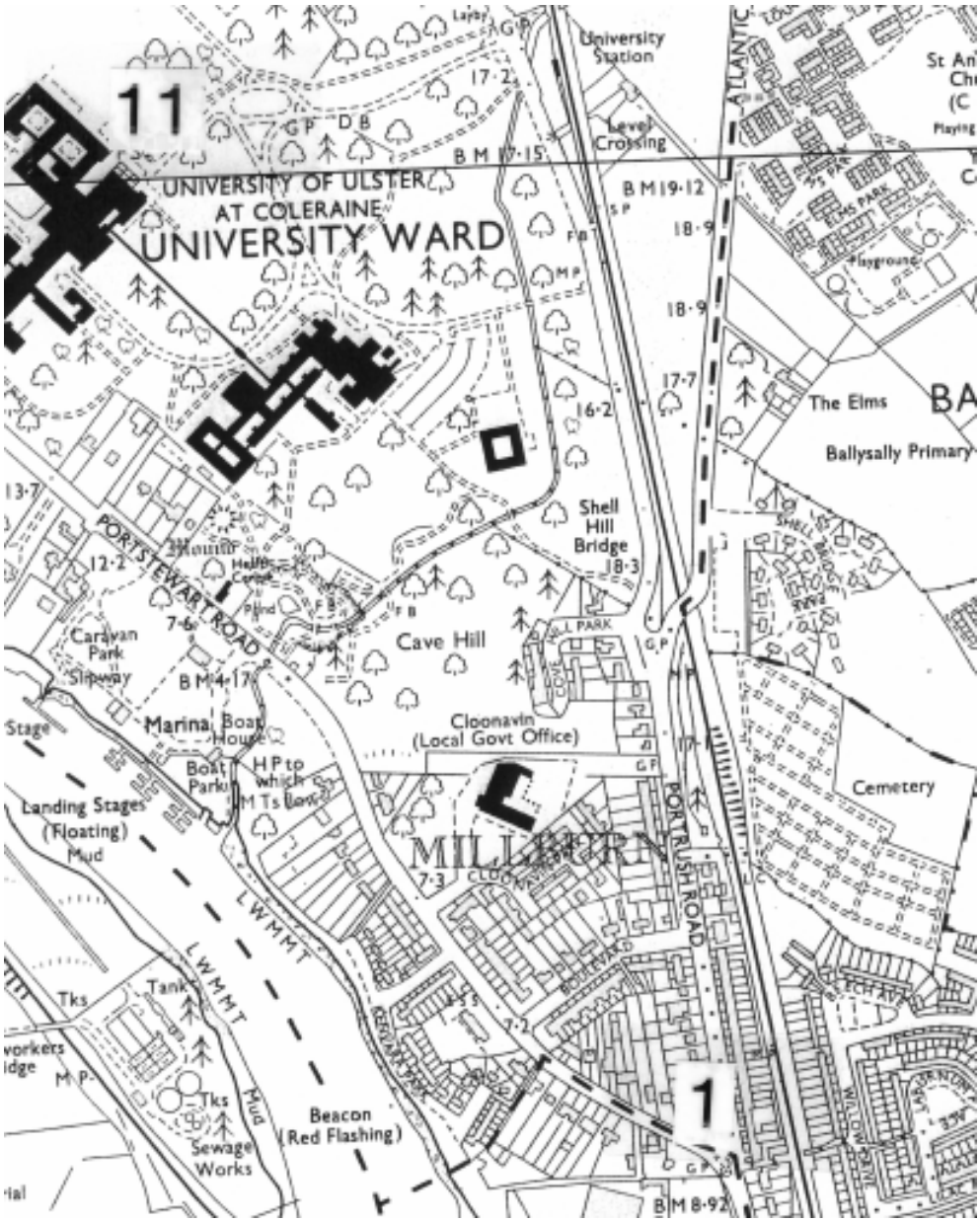
No 12. Tesco, Hanover Place, Coleraine



Map Showing sites: No 9 Crocknamack Road, Portrush



Map showing sites: No 10. Castleroe Road, Coleraine



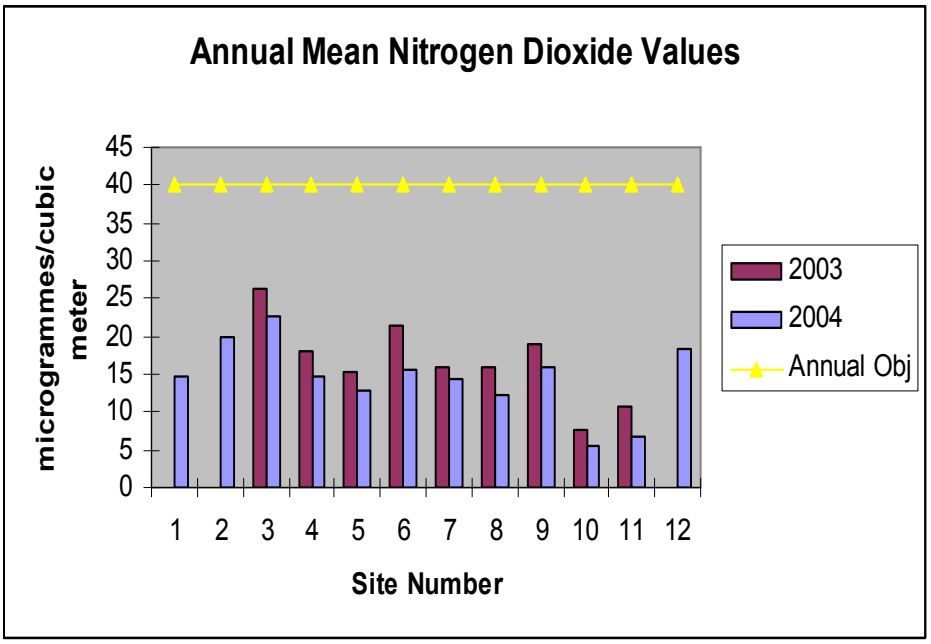
Map showing sites: No 1. Portstewart Road, Coleraine
No 11. NUU, Coleraine

4.1.1 Annual mean concentration trends

Annual mean concentrations for 2004 and, where they are available, for preceding years are shown in the table below. It should be noted that historical data is extremely limited and is insufficient to indicate any definite trends, however it can be seen that annual mean concentrations for 2004 are generally lower than for preceding years and that none exceed the national objective.

Nitrogen Dioxide Monitoring Results for 2004 (µg/m^3)

Site	2003	2004
Portstewart Rd, Coleraine	-	14.8
Castlerock Rd, Coleraine	-	19.8
Lower Union St, Coleraine	26.2	22.8
Upper Union St, Coleraine	18.2	14.7
Railway Rd, Coleraine	15.2	12.9
Lodge Rd, Coleraine	21.4	15.7
Strand Rd, Coleraine	15.8	14.3
Dunnes Carpark,	16.0	12.1
Crocknamac Rd, Portrush	19.0	15.9
Castleroe Rd, Coleraine	7.6	5.5
N.U.U, Coleraine	10.6	6.6
Tesco, Hanover Pl, Coleraine	-	18.4



4.2 Sulphur Dioxide

8-port Bubbler

The use of the 8-port bubbler apparatus to measure the concentration of sulphur dioxide in the air is estimated by passing the same measured sample of filtered air through a dilute, acidified solution of hydrogen peroxide to form sulphuric acid in solution. The solution is acidified to pH 4.5, so that strongly acidic compounds will be absorbed in preference to weakly acidic compounds (such as carbon dioxide). The amount of acid in the exposed sample is determined by titration with a standard alkaline solution. The result obtained is usually a good approximation to the concentration of sulphur dioxide.

This monitoring equipment was installed within a secure location in Harpurs Hills. Prior to its siting application was made to participate in the UK SO_2 and smoke monitoring network.

A suitable site to place the monitoring apparatus was sought which would be within the most dense coal burning area being secure and complying with the requirements of chapter 3 of document 20747054/001 AEA Technology "Smoke and Sulphur dioxide monitoring using the 8-port sampler.

Use of 8-port bubblers for monitoring sulphur dioxide concentrations
8-port bubblers continue to be used to measure concentrations of sulphur dioxide at a number of sites throughout the UK, and these data can be of use for review and assessment. The bubbler technique provides measurements of daily sulphur dioxide concentrations, which can be directly compared to the 24-hour mean objective. Where net acidity titration measurements are made the measured maximum daily mean concentration should be multiplied by 1.25 to take account of a general tendency for bubblers to under-read at high concentrations. The Government's technical guidance contained in LAQM.TG(03) advises that the adjusted daily sulphur dioxide concentration can be compared against the 24-hour mean objective. It may also be assumed that the 15-minute mean objective is likely to be exceeded if the maximum daily mean concentration is less than 80µg/m^3, and the 1-hour mean objective is unlikely to be exceeded if the maximum daily mean concentration is less than 200µg/m^3.

Fig 7. Sulphur Dioxide Bubbler Site

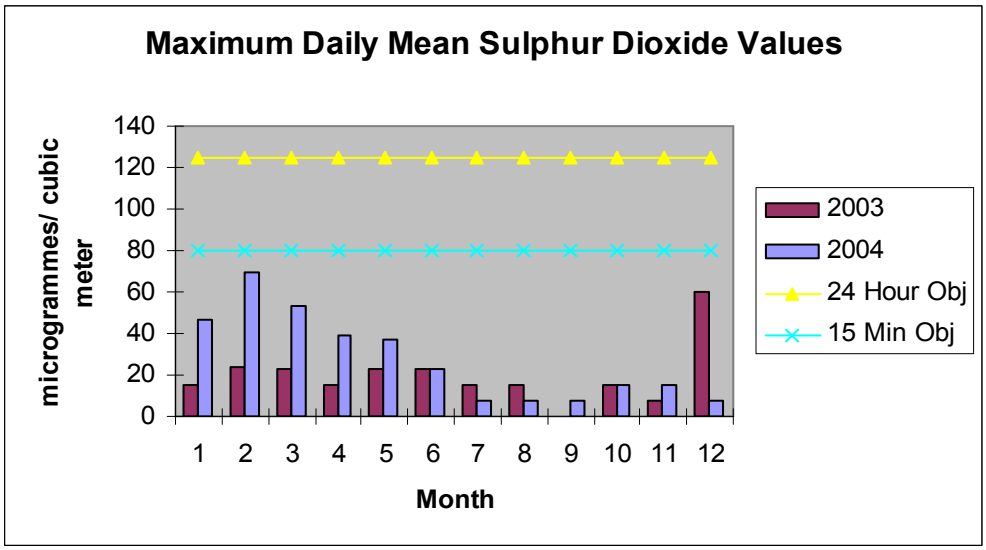
Quality Control

Before the 8-port sampler was installed the Council applied to Netcen to have the site accepted for inclusion in the UK Smoke and Sulphur Dioxide Monitoring Network. Approval for the site was granted and the site was given the site designation Coleraine 3 and the site identification code 0786003.

The equipment was installed, and is operated and maintained in accordance with the procedures set out in the UK Smoke and Sulphur Dioxide Network instruction manual.

The maximum daily mean concentrations, corrected in accordance with LAQM. TG(03) are shown in the table below:

Month	2003	2004
Jan	15	46.25
Feb	23.75	70
March	22.5	53.75
Apr	15	38.75
May	22.5	37.5
June	22.5	22.5
July	15	7.5
Aug	15	7.5
Sept		7.5
Oct	15	15
Nov	7.5	15
Dec	60	7.5



The results indicate that it was unlikely that any of the objectives for sulphur dioxide were exceeded at this site during 2004.

Particulate matter

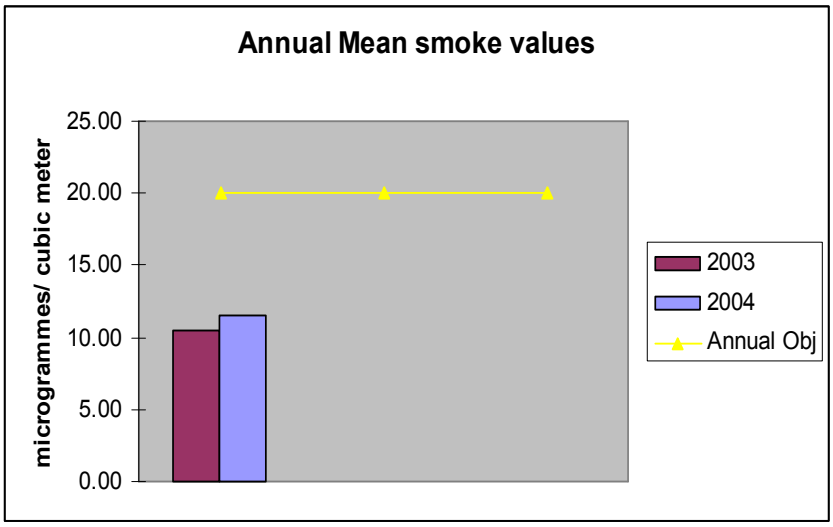
Airborne particulate matter varies widely in its physical and chemical composition, source and particle size. Particles are often classed as either primary (those emitted directly into the atmosphere) or secondary (those formed or modified in the atmosphere form condensation and growth). PM_{10} particles (the fraction of particulates in the air of very small size <10µm aerodynamic diameter) can potentially pose significant health risks as they are small enough to penetrate deep into the lungs. Large particles are not readily inhaled.

A major source of fine primary particles is combustion processes, in particular diesel combustion, where transport of hot exhaust vapour into a cooler tail pipe or stack can lead to spontaneous nucleation of "carbon" particles before emission. Secondary particles are typically formed when low volatility products are generated in the atmosphere, for example the oxidation of sulphur dioxide to sulphuric acid. The atmospheric lifetime of particulate matter is strongly related to particle size but may be as long as 10 days for particles of about 1µm in diameter.

Smoke recorded (µg/m^3)

Harpurs Hill Preschool

Month	2003	2004
Jan	13.84	9.48
Feb	17.11	10.03
March	21.52	11.13
Apr	9.60	10.63
May	5.68	10.63
June	5.30	11.07
July	5.52	10.71
Aug	9.85	10.97
Sept	11.19	11.20
Oct	8.59	13.48
Nov	9.07	15.53
Dec	9.23	13.62



4.3 Other pollutants

The UK National Air Quality Standards and Objectives also exist for the following pollutants:

- Carbon monoxide
- Benzene
- 1, 3 butadiene
- Lead

(See Appendix 1 for details of the standards)

No monitoring is carried out for these pollutants in the Borough as the first round of Review and Assessment indicates that it is highly unlikely that there is a risk of breach of these standards in this district. These pollutants will be considered again in next year's Updating and Screening Assessment.

5. NEW LOCAL DEVELOPMENTS.

5.1 New industrial processes:

No industrial processes (Part A, B or C) commenced operation or changed significantly during the period under review

5.2 New developments

a. **With a significant risk of impacting on air quality (planning approval containing air quality related conditions):**

b. **With a lower risk of impacting on air quality (planning approval not containing air quality related conditions although locations near to existing busy roads or sensitive locations):**

Location	Description	Relevant pollution	Source information	Comments
Beresford Place, Coleraine	Redevelopment of existing building to provide 21 apartments and 19 new build apartments	NO_2, PM_{10}.	Planning application: CC/2004/0019/MAST	Potential for increased traffic on Mountsandal Rd/ Beresford Place/ Beresford Rd
Cappagh Avenue, Portstewart	20 new dwellings	NO_2, PM_{10}.	Planning application: CD/2004/0107/MAST	Potential for increased traffic on Agherton Rd
Hopefield Grange, Portrush	22 new dwellings	NO_2, PM_{10}.	Planning application: CD/2004/0129/MAST	Potential for increased traffic on Hopefield Rd

Knockbracken Drive, Coleraine	62 new dwellings	NO_2, PM_{10}.	Planning application: CD/2004/0309/MAST	Potential for increased traffic on Knocklynn Rd
Hopefield development, Portrush	34 new dwellings	NO_2, PM_{10}.	Planning application: CD/2004?0366/MAST	Potential for increased traffic on Hopefield Rd
Grasmere, Coleraine	62 new dwellings	NO_2, PM_{10}.	Planning application: CD/2004/0485/MAST	Potential for increased traffic on Beechfield Park / Ashdale
West Bay, Portrush	22 new dwellings	NO_2, PM_{10}.	Planning application: CD/2004/0490/MAST	Potential for increased traffic on Portstewart Rd

6. ADDITIONAL INFORMATION.

6.1 The Environmental Health Department is consulted by the Planning Service in relation to all proposed developments within the Borough. Developments that may contribute to a reduction in air quality or where odours or noise are likely are required to undergo environmental assessment. Only where the Department is satisfied that the risk from pollution is adequately controlled and that the development will not cause air quality standards to be breached will approval of planning permission be recommended.

7. CONCLUSIONS.

Monitoring data gathered in 2004 shows that the findings of the first round of Review and Assessment continue to be valid and that the Coleraine Borough generally has good air quality. Results for all the monitored pollutants currently meet the national standards.

There has not been any change in local circumstances since the first round of Review and Assessment to indicate a possible exceedance of the air quality standards and objectives and any potential changes relate to increases in traffic as a result of increased housing and commercial development.

The next air quality report will be an updating and screening assessment which is due in April 2006.

Further information concerning this report or local air quality issues in general may be obtained from Rory Donnelly, Senior Environmental Health Officer (Health and Safety) on 028 7034 7171or e-mail rory.donnelly@colerainebc.gov.uk.

Appendix 1 Timetable for Progress Reports within Review and Assessment System

LAQM Activity	Completion Date	Which Authorities?
Progress Report	April 2005	All District Councils
Updating and screening assessment	April 2006	All District Councils
Detailed assessment	April 2007	Those District Councils which have identified the need for one in their April 2006 updating and screening assessment
Progress Report	April 2007	Those District Councils which identified that there was no need for a detailed assessment in their April 2006 updating and screening assessment
Progress Report	April 2008	All District Councils
Updating and screening assessment	April 2009	All District Councils
Detailed assessment	April 2010	Those District Councils which have identified the need for one in their April 2009 updating and screening assessment
Progress report	April 2010	Those District Councils which have identified that there was no need for a detailed assessment in their April 2009 updating and screening assessment

Appendix 2. Proposed Objectives included in the Air Quality Regulations (NI) 2003 for the purpose of Local Air Quality Management.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 μgm^{-3} 3.25 μgm^{-3}	Running annual mean Running annual mean	31.12.2003 31.12.2010
1,3 Butadiene	2.25 μgm^{-3}	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mgm^{3}	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5 μgm^{-3} 0.25 mgm3	Annual mean Annual mean	31.12.2003 31.12.2008
Nitrogen Dioxide[1]	200 μgm^{-3} no to be exceeded more than 18 times a year 40 μgm^{-3}	1 hour mean annual mean	31.12.2005 31.12.2005
Particles (PM_{10})[2] **Gravimetric**[3]	50 μgm^{-3} not to be exceeded more than 35 times a year 40 μgm^{-3}	24 hour mean annual mean	31.12.2004 31.12.2004
Sulphur Dioxide	350 μgm^{-3} not to be exceeded more than 24 times per year 125 μgm^{-3} not to be exceeded more than 3 times per year 266 μgm^{-3} not to be exceeded more than	1 hour mean 24 hour mean 15 minute mean	31.12.2004 31.12.2004 31.12.2005

	35 times per year		

Notes

1. **The objectives for nitrogen dioxide are provisional.**
2. **There are likely to be new particles objectives for 2010, not in regulation at present, expected after the review of the EU's first Air Quality Daughter Directive (2004).**
3. **Measured using the European gravimetric transfer standard or equivalent.**

Appendix 3 Nitrogen Dioxide Diffusion Tube Sites

Address	Grid Ref	Description
Portstewart Rd, Coleraine		Kerbside / Urban background
Castlerock Rd, Coleraine		Kerbside / Urban centre
Lower Union St, Coleraine	2848 4328	Kerbside / Urban centre
Upper Union St, Coleraine	2851 4328	Kerbside / Urban centre
Railway Rd, Coleraine	2852 4327	Kerbside / Urban centre
Lodge Rd, Coleraine	2858 4314	Roadside / Urban background
Strand Rd, Coleraine	2845 4325	Kerbside / Urban centre
Dunnes Carpark, Coleraine Bridge	2846 4325	Road side / Urban centre
Crocknamac Rd, Portrush	2861 4400	Kerbside / Urban background
Castleroe Rd, Coleraine	2859 4299	Urban industrial
N.U.U, Coleraine	2845 4328	Urban background
Tesco, Hanover Pl, Coleraine		Kerbside / Urban centre

Appendix 4

Nitrogen Dioxide Tube Sites

All nitrogen dioxide tubes are located on lampposts at a height of between 1.5 and 4 metres, to deter interference by the general public.

1. Portstewart Road, Coleraine

This kerbside site is located outside 1 Portstewart Road about 7 metres from the Portstewart Road and Millburn Road intersection. Millburn Road is the main road from Coleraine to Portrush. The site on Portstewart Road is located in an urban residential area on the out skirts of the town centre. Measurements began at this site in March 2004.

2. Castlerock Road, Coleraine

The site on Castlerock Road is located less than 1 metre from the kerbside and 19 metres from the busy junction of Castlerock Road and Killowen Street. It is also about 100 metres from the junction of Castlerock Road and Strand Road. Castlerock road handles a large portion of the west-east traffic into the town centre. Measurements began at this site in March 2004.

3. Lower Union Street, Coleraine

The Lower Union Street kerbside site is located 19 metres from the junction of Millburn Road and Union Street. Union Street forms part of the one way system directing traffic through the centre of the town.

4. Upper Union Street, Coleraine

This kerbside site is located outside 41 Union Street and about 26 metres from the busy junction of Union Street and Railway Road, in the town centre. The Coleraine Station railway is about 150 metres from this site.

5. Railway Road, Coleraine

This site in the town centre is located outside the Coleraine Leisure Centre. It is about 230 metres from the Coleraine Station railway and 3 metres from a bus stop.

6. Lodge Road, Coleraine

The Lodge Road site is located 4 metres from the roadside at the roundabout of the Lodge road, the Ring road and Newbridge road. Newbridge Road (A26) brings traffic from Belfast and the south east into Coleraine town. The Ring road directs traffic around the outskirts of the town.

7. Strand Road, Coleraine

This Strand road site is located less than 1 metre from the kerbside. This town centre location is 94 metres from the busy junction of Strand Road and Castlerock Road.

8. Dunnes Carpark, Coleraine

This urban centre site is located about 3 metres from Coleraine Bridge. Coleraine Bridge provides both vehicular and pedestrian access east-west across the Bann River in the town centre. The Dunnes Carpark site is about 50 metres from the main pedestrian mall and shopping precinct.

9. Crocknamack Road, Portrush

This site is located at the kerbside outside 32 Crocknamack Road. It is distanced from any major sources of nitrogen dioxide and therefore is broadly representative of urban background levels.

10. Castleroe Road, Coleraine

The Castleroe site is located outside 2 Glenara Court in the quiet residential area of Cherry Park. Cherry Park is situated approximately 3 miles from the Coleraine town centre. The Castleroe site is also located about 90 metres from Spanboard Products Ltd. As part of the process of manufacturing particleboard and related products, Spanboard combust waste wood to heat driers and thermal oil for pressing.

11. N.U.U, Coleraine

This site is located in the car park of the New University of Ulster. It is approximately 1.5 miles from the town centre and is representative of urban background levels. It is located about 600 metres from the University railway station.

12. Tesco, Hanover Place, Coleraine

This kerbside site is located in the town centre. It is situated at the junction of Beresford Road and Blindgate Street. This busy junction forms part of the one way system around the centre of Coleraine town. This junction also connects with Mountsandal Road which brings southerly traffic into the town. Measurements began at this site in March 2004.