Local Air Quality Management Update And Screening Assessment 2005

Contents

Executive Summary

An update and screening assessment in line with the updated criteria set out in Government guidance (LAQM.TG(03)) has been undertaken for the Moyle District Council area.

The seven key pollutants specified in the UK National Air Quality Strategy and associated regulations have been reviewed and assessed according to the above guidance.

The report concludes that a detailed assessment is not required for any of the seven key pollutants considered.

1.0 Introduction

1.1 The Air Quality Issue

Although air quality has been improving in recent years in Northern Ireland, the issue continues to be important due to concern about the environment and improved scientific knowledge about pollutants and their effect on health. Councils in Northern Ireland are under a statutory obligation to assess and review air quality. This is known as local air quality management (LAQM)

1.2 Phased Approach to LAQM

Councils in Northern Ireland have already completed the first round of review and assessment of local air quality, and are now undertaking the second round. A phased approach is used to assess and review air quality. The first stage of the review and assessment process is an update and screening assessment. This identifies any changes that have occurred since the first round which may have an affect on air quality and which require a more detailed assessment. Where an update and screening assessment has identified a risk that an air quality objective will be exceeded at a location with relevant public exposure then the council is required to undertake a detailed assessment.

1.3 Legislative Background

1.3.1 The Environment (Northern Ireland) Order 2002

The Environment (Northern Ireland) Order 2002 introduced a statutory obligation on councils to carry out a review and assessment of their local air quality known as local air quality management (LAQM). The process requires the current and likely future quality of air to be assessed and compared against nationally prescribed air quality objectives. The process is set out in the Department of the Environment's Local Air Quality Management Technical Guidance LAQM. TG(03).

1.3.2 National Air Quality Strategy

The Environment Act 1995 – Part IV Section 80 required the Secretary of State to publish a strategy containing policies with respect to the assessment and management of the quality of air, i.e. a National Air Quality Strategy (NAQS). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in January 2000. The primary objective of the strategy is to ensure that everyone is able to enjoy a level of ambient air quality in public places which poses no significant risk to health and quality of life. It sets out air quality objectives for 7 pollutants, the date by which they should be achieved and the policy framework which is to be adopted to achieve the objectives. Pollutants

covered by the strategy are: benzene, 1,3 butadiene, carbon monoxide, lead, oxides of nitrogen, particulate matter (as PM_{10}) and sulphur dioxide.

1.3.3 Air Quality Regulations (Northern Ireland) 2003

In Northern Ireland the air quality objectives contained in the strategy are incorporated into the Air Quality Regulations (Northern Ireland) 2003. This provides the statutory basis for the system of LAQM.

The Air Quality Regulations specify the following objectives :

Pollutant	*Air Quality objective levels**	*Date to be achieved by*
(1)	*(2)*	*(3)*
Benzene	16.25µg/m^3 (5ppb) when expressed as a running annual mean	31 December 2003
	3.25µg/m^3 when expressed as a running annual mean	31 December 2010
1,3-butadiene	2.25µg/m^3 (1ppb) when expressed as a running annual mean	31 December 2003
Carbon monoxide	10mg/m^3 (8.6ppm) when expressed as a maximum daily running 8 hour mean	31 December 2003
Lead	0.5µg/m^3 when expressed as an annual mean	31 December 2004
	0.25mg/m3 when expressed as an annual mean	31 December 2008
Nitrogen dioxide	200µg/m^3 (105ppb) when expressed as a 1 hour mean, not to be exceeded more than 18 times a year	31 December 2005
	40µg/m^3 (21ppb) when expressed as an annual mean	31 December 2005
Sulphur dioxide	35µg/m^3 (132ppb) when expressed as a 1 hour mean, not to be exceeded more than 24 times a year	31 December 2004
	125µg/m^3 (47ppb) when expressed as a 24 hour mean, not to be exceeded more than 3 times a year	31 December 2004
	266µg/m^3 (100ppb) when expressed as a 15 minute mean, not to be exceeded more than 35 times a year	31 December 2005
Particles (PM_{10})	50µg/m^3 when expressed as a 24 hour mean, not to be exceeded more than 35 times a year	31 December 2004
	40µg/m^3 when expressed as an annual mean	31 December 2004

*µg/m^3: micrograms per cubic metre

1.4 Description of Council Area

Moyle District is situated on the north east corner of Northern Ireland, the area incorporates 42 miles of the beautiful North Antrim Coastline. The area includes the three best known features of Northern Ireland: the Giants Causeway, the Glens of Antrim and Rathlin Island. Rathlin Island is Northern Irelands only inhabited island and lies 7 miles off the coast from Ballycastle, it has a population of 110 who are mostly employed in fishing, farming and tourism. Several parts of the Moyle area have been designated 'Areas of outstanding natural beauty'.

Moyle District Council is the smallest local authority in Northern Ireland, with a low population density of 3.34 hectares per head of population compared to a Northern Ireland average of 0.9 hectares.

Moyle has a population of approximately 16,000 and covers almost 49,500 hectares. The district consists of three main settlements, Ballycastle, Bushmills, and Cushendall with approximately 46 percent of the district population living in these areas. Ballycastle is the largest settlement in the District, with 26% of the districts population living in it.

The main sources of income in the district are farming, tourism, and a small amount of light industry.

Traffic volumes in the area are low with the main route being the A2 Coast Road which runs the full length of the District following the coastline. Other A Class roads include the A43 leding from Glenarrife to Ballymena and the A44 which runs from Ballycastle to the A26 near Cloughmills.

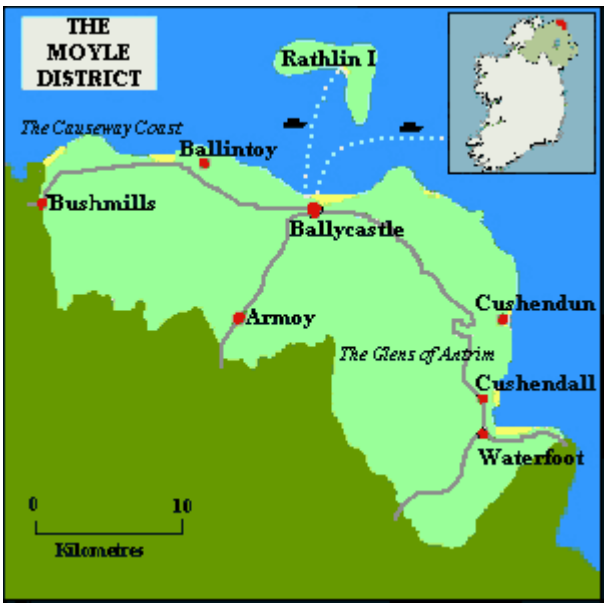


Figure 1: Map of Moyle District.

2.0 Review and Assessment for Carbon Monoxide

Carbon monoxide (CO) is a pollutant gas generated by combustion sources. The dominant source is road transport, although domestic and other combustion processes contribute. At very high concentrations (such as may occur inside a building with a faulty heating appliance), it can be a dangerous asphyxiant. Whilst outdoor concentrations do not generally reach dangerous levels, they may still have adverse health effects for vulnerable people. As CO is a component of vehicle emissions, the highest outdoor concentrations occur near busy roads.

Carbon Monoxide Objective

Pollutant	Objective	To be achieved by
Carbon Monoxide	10mg/m^3 (8.6ppm) when expressed as a maximum daily running 8 hour mean	31 December 2003

2.1 Conclusion from the first round of review and assessment

During the first round of review and assessment, a first stage review and assessment of carbon monoxide was undertaken. This concluded that there were no significant sources of CO in the Moyle District Council area and that the objective for CO was likely to be achieved at all locations within the council area.

2.2 Update Screening and assessment Checklist

2.2.1 Background concentrations

Background concentrations in the Moyle area appear to be very low. The background annual mean concentration for carbon monoxide in 2001 is less than 1mg/m^3 in all parts of the district according to data on the air quality website (www.airquality.co.uk/archive/).

2.2.2 Monitoring data

The Council does not undertake any ambient monitoring of carbon monoxide. Data available from the Environment and Heritage Service (EHS) show maximum 8-hour concentrations of between 2.7 and 5.5 mg/m^3 between 1998 – 2004, the last year for which figures are available, for Belfast Centre which is the nearest automatic monitoring site to Moyle District Council. This site has had no exceedences of the air quality objective since 1995.

2.2.3 Very Busy Roads or Junctions in Built Up Areas

The District has no roads or junctions in built up areas that would meet the criteria of 'very busy' according to the definition within LAQM.TG(03). i.e.

Single carriageways > 80,000 vehicles per day
Dual carriageways > 120,000 vehicles per day
Motorways > 140,00 vehicles per day

The highest traffic flow on any of the roads in the Council area, provided by Roads Service, measured in 2005 is 10, 232 for the Quay Road in Ballycastle.

2.2.4 Sources outside Council Area

There are no new sources of carbon monoxide in the neighbouring council areas that will give rise to levels of carbon monoxide that are likely to result in the air quality objective for carbon monoxide being exceeded in the Moyle District Council area.

2.3 Conclusion

Exceedence of the carbon monoxide objective is unlikely and there is no need to proceed to a detailed assessment for carbon monoxide.

3.0 Review and Assessment for Benzene

Benzene is a known human carcinogen (cancer causing substance), and also contributes to the formation of ground-level ozone (summer smog). The main sources of benzene emissions in the UK are petrol vehicles, petrol refining, and the fuel distribution from petrol station without vapour recovery systems. National benzene concentrations have declined in recent years, mainly due to the increasing use of three-way catalytic converters and the introduction of vapour recovery systems in petrol stations (Stage 1 and 2 control).

Since January 2000, EU legislation has reduced the maximum benzene content of petrol to1%, from a previous upper limit of 5%. The European Auto-Oil programme will further reduce emissions for cars and light-duty vehicles, and emissions of benzene from the storage and distribution of petrol (LAQM.TG (03)).

Benzene Objectives

Pollutant	Objective	To be achieved by
Benzene	16.25µg/m^3 (5ppb) when expressed as a running annual mean	31 December 2003
Benzene	3.25µg/m^3 when expressed as a running annual mean	31 December 2010

3.1 Conclusion from the first round of review and assessment

At the first round of review and assessment, a first stage review and assessment of Benzene was undertaken. This concluded that there were no significant sources of benzene in the Moyle District Council area and that as the air quality objective for benzene was likely to be achieved at all locations within the council area there was no need to undertake a detailed assessment for benzene.

3.2 Update Screening and Assessment Checklist

3.2.1 Background concentrations

Background levels of benzene in the Moyle District Council area are significantly less than 1µg/m^3 for both 2003 and 2010 in all parts of the district according to data on the air quality website (www.airquality.co.uk/archive/).

3.2.2 Monitoring Data

The Council does not undertake any ambient monitoring of benzene.

3.2.4 Very Busy Roads or Junctions in Built Up Areas

The District has no roads or junctions in built up areas that would meet the criteria of 'very busy' according to the definition within LAQM.TG(03). i.e.

Single carriageways > 80,000 vehicles per day
Dual carriageways > 120,000 vehicles per day
Motorways > 140,00 vehicles per day

The highest traffic flow on any of the roads in the Council area, provided by Roads Service, measured in 2005 is 10, 232 for the Quay Road in Ballycastle.

3.2.5 New Industrial Sources/ Industrial Sources with Substantially Increased Emissions or New Relevant Exposure

There were no industrial sources of Benzene identified during the first round of review and assessment. Currently there are no, existing or proposed, industrial sources within or located in neighbouring council areas that would impact on the achievement of the air quality objective for benzene within Moyle District Council area.

3.2.6 Petrol Stations

There are no petrol stations within the Council area that would meet the criteria specified in LAQM.TG(03).

3.2.7 Major Fuel Storage Depots (Petrol Only)

There are no major fuel storage depots within the Council area or in neighbouring council areas. TG(03) indicates that there are only two major petrol storage depots in Northern Ireland, one in Belfast and one in Londonderry. Neither of which council area are in close proximity to Moyle.

3.3 Conclusion

There is no need to proceed to a detailed assessment for benzene.

4.0 Review and Assessment for 1, 3 Butadiene

1,3-Butadiene is a suspected human carcinogen (cancer causing substance). The major source of 1,3-butadiene nationally is motor vehicle emissions, with other major sources being industrial processes (such as petrochemical and rubber processes). As with benzene, the fitting of catalytic converters to petrol vehicles reduces their emissions of 1,3-butadiene. Recently agreed reductions in vehicle emissions and improvements to fuel quality (in the framework of the Auto-Oil programme), are expected to further reduce emissions of 1,3-butadiene from vehicle exhausts (LAQM.TG03).

1,3 Butadiene Objective

Pollutant	Objective	To be achieved by
1, 3 Butadiene	2.25µg/m^3 (1ppb) when expressed as a running annual mean	31 December 2003

4.1 Conclusion from the first round of review and assessment

The first round of review and assessment indicated that there was no need to proceed to a second stage review and assessment for 1,3 butadiene.

4.2 Update Screening and assessment Checklist

4.2.1 Monitoring data

The Council does not undertake any monitoring of 1,3 Butadiene.

4.2.2 New Industrial Sources / Substantially Changed Industrial sources

The first round of review and assessment did not identify any processes within the Council area, or in such close proximity in neighbouring council areas, that would impact on the achievement of the air quality objective for 1,3 Butadiene within the Moyle District Council area. A rubber process does exist in the Ballymena Borough Council area but as established during the first round of review and assessment this does not lie in such close proximity to Moyle district as to have any affect on atmospheric levels of 1,3 Butadiene in Moyle. There are no new industrial processes, as identified in Annex 2 of LAQM.TG(03), in or within neighbouring Council areas which would affect the achievement of this air quality objective within the Moyle District Council area.

4.3 Conclusion

There is no need to proceed to a detailed assessment for 1,3 Butadiene.

5.0 Review and Assessment for Lead

Lead has been identified as causing acute and chronic damage to the nervous system, effects on the kidneys, joints and reproductive system. Historically, the major source of lead has been motor vehicle emissions, with other major sources being metal industries and power generation. The agreement reached between the European Parliament and the Environment Council on the Directive on the Quality of Petrol and Diesel Fuels has led to the ban on sales of leaded petrol in the United Kingdom with effect from 1 January 2000. Emissions of lead are now restricted to a variety of industrial activities, such as battery manufacture, pigments in paints and glazes, alloys, radiation shielding, tank lining and piping (LAQM.TG (03)).

Lead Objectives

Pollutant	Objective	To be achieved by
Lead	0.5µg/m^3 when expressed as an annual mean	31 December 2004
Lead	0.25mg/m3 when expressed as an annual mean	31 December 2008

5.1 Conclusion from first round of review and assessment

The first round review and assessment process concluded that there was no need to proceed to a second stage review and assessment for lead.

5.2 Update Screening and assessment Checklist

5.2.1 Monitoring Data

Moyle District Council does not undertake and monitoring of Lead.

5.2.2 New Industrial Sources/ Industrial Sources with Substantially Increased Emissions

The first round of review and assessment did not identify any processes within the Council area, or in such close proximity in neighbouring council areas, that would impact on the achievement of the air quality objective for lead within the Moyle District Council area. There are no new industrial processes, as identified in Annex 2 of LAQM.TG(03), in or within neighbouring Council areas which

would affect the achievement this air quality objective within the Moyle District Council area.

5.3 Conclusion

Exceedences of the objectives are unlikely and there is no requirement to proceed to a detailed assessment for lead.

6.0 Review and Assessment for Nitrogen Dioxide

Nitrogen dioxide is a respiratory irritant associated with both acute (short-term) and chronic (long-term) effects on human health, particularly in people with asthma. Nitrogen dioxide (NO_2) and nitric oxide (NO) are both oxides of nitrogen, and are collectively referred to as nitrogen oxides (NOx). All combustion processes produce NOx emissions, largely in the form of nitric oxide, which is then converted to nitrogen dioxide, mainly as a result of reaction with ozone in the atmosphere. It is nitrogen dioxide that is associated with adverse effects upon human health.

The principal source of nitrogen oxides emissions is road transport, which accounted for about 49% of total UK emissions in 2000 (LAQM.TG (03)). Major roads carrying large volumes of high-speed traffic are a predominant source, as are conurbations and city centres with congested traffic. The contribution of road transport to nitrogen oxides emissions has declined significantly in recent years as a result of various policy measures. At a national level, urban traffic nitrogen oxides emissions are estimated to fall by about 20% between 2000 and 2005, and by 46% between 2000 and 2010 (Stedman et al, 2001). Other significant sources of nitrogen oxides emissions include the electricity supply industry and other industrial and commercial sectors. Emissions from both sources have also declined dramatically, due to the fitting of low nitrogen oxides burners, and the increased use of natural gas. Industrial sources make only a very small contribution to annual mean nitrogen dioxide levels.

Nitrogen Dioxide Objectives

Pollutant	Objective	To be achieved by
Nitrogen Dioxide	200µg/m^3 (105ppb) when expressed as a 1 hour mean, not to be exceeded more than 18 times a year	31 December 2005
Nitrogen Dioxide	40µg/m^3 (21ppb) when expressed as an annual mean	31 December 2005

6.1 Conclusion from first round of review and assessment

The first round review and assessment process concluded that there was no need to proceed to a second stage assessment for nitrogen dioxide.

6.2 Update Screening and assessment Checklist

6.2.1 Background concentrations

Background levels in Moyle Council area are low. The annual mean concentration for nitrogen dioxide in 2005 did not exceed 6.42 μgm^{-3}. The highest predicted background concentration level for 2010 is 5.1 μgm^{-3}. (www.airquality.co.uk/archive)

6.2.2 Monitoring Data outside an AQMQ

Moyle District Council has undertaken a nitrogen dioxide diffusion tube survey throughout the district for a number of years. Monitoring sites are chosen to represent kerbside locations. Data collected from the analysis of the tubes has been bias adjusted using a multiplication factor appropriate to the laboratory used for the analysis. The multiplication factor was taken from www.uwe.ac.uk/aqm/review. For the year 2005 the bias adjustment factor is 1.13 (Lambeth). Correction for bias is carried out by multiplying the measured annual concentration by the adjustment factor.

All results have been well below the annual mean concentration of 40 $\mu g/m^3$. The highest level recorded in the last three years was 22.9 $\mu g/m^3$ for the main street in Bushmills. The highest level recorded in 2005 was 19.2 for the same location. Historical data is very limited. Extreme care should be exercised in drawing any conclusions regarding trends in the level of NO_2 as changes in concentrations can occur from year to year due to weather conditions. It is normal practice to only consider a trend as being significant when five years worth of data are available. However the data available does not indicate that the NO_2 annual mean objective is likely to be exceeded. (see Appendix 1)

6.2.3 Monitoring data Inside an AQMA

The Council has not declared an AQMA for NO_2 therefore this section is not applicable.

6.2.4 Narrow congested streets with residential properties within 5 metres of the kerb.

Mill Street in Cushendall and Anne Street in Ballycastle meet the descriptive criteria for a narrow congested street with residential accommodation within 5 metres of the kerb. The traffic flow on Mill Street in Cushendall was estimated by DRD Roads Service to be in the region of a maximum daily flow of 4000 vehicles, and hence this road was not considered any further. No recent traffic flow data was available for Anne Street although traffic data was available for Quay Road,

which Anne Street runs into. It is considered that the majority of the traffic on this road originates from Anne Street. The traffic flow count for Anne Street was predicted to be 10232 (the level measured on Quay Road). The average speed on Quay Road is 40 km/hour, traffic speeds are likely to be lower on Anne Street and in order to ensure that the model did not underestimate the predicted level of NO_2 an average speed of 24 km/hour was used. The Design Manual for Roads and Bridges (DMRB) was used to model NO_2 levels on Anne Street. As Anne Street meets the description of a street canyon adjustments were made to the NO_2 results in accordance with paragraph 6.30 of LAQM. TG(03). The background concentration was taken as the highest level recorded for the Moyle area at www.airquality.co.uk/archive during 2005.

Table 1: DMRB run for NO_2 adjusted for canyon effect, for Anne Street, Ballycastle.

Pollutant	Predicted Annual Mean Concentration				Air Quality Standard For Comparison		
	Background Concentration	Road Traffic component	Total	Units	Parameter	Value	units
NO_2	3.9	8.0*	11.9	µg/ m^3	Annual Mean	40	µg/m^3

*Adjusted in accordance with paragraph 6.30 of LAQM. TG(03).
(See Appendix 2 for DMRB spreadsheet)

The results indicate that exceedences of the air quality objectives for $N0_2$ are unlikely.

6.2.5 Junctions

One junction in Ballycastle (Anne Street/ Market Street and Castle Street) with a possible traffic flow in excess of 10, 000 VPD was identified however the closest receptor is more than 10 metres from the junction.

The Dunluce Road/Main Street in Bushmills was identified as another busy junction in the district which was likely to have higher traffic flows and which would have a receptors within 10 metre. As no recent traffic data was available Roads Service undertook a traffic count in July 2006. This measured an annual daily traffic flow of 7885 vehicles. This junction was not considered any further as there were less than 10,000 vehicles per day.

6.2.6 Busy streets where people spend 1 hour or more close to traffic.

There are no busy streets in the Moyle Council area where people are likely to spend one hour or more close to traffic.

6.2.7 Roads with high flow of buses and/or HGVs

There are no roads with high flows of buses and /or HGVs in the Moyle Council area.

6.2.8 New roads constructed since the last round of review and assessment

No new roads have been constructed or are proposed within the council area since the last round of review and assessment.

6.2.9 Roads with significantly changed traffic flows, or new relevant exposure

The first round of review and assessment did not identify any road which was likely to have traffic flow in excess of 10,000 VPD. However some of the data available was quite historical and the flows for 2005 were predicted on the basis of a 2.8% year on year increase. In view of this, for this screening exercise DRD Roads Service were contacted and asked to provide traffic flows for the three roads identified as likely to have the highest traffic flows during the first round of assessment.

Currently the only road in the council area with a traffic flow over 10,000 vehicles is the Quay Road in Ballycastle (10,232: Source DRD Roads Service for traffic count undertaken in 2005). An increase in traffic flow has occurred on this road, as with most in the council area. However the actual increase is difficult to quantify accurately due to the fact that the previous data on this road was obtained in 1987. On a precautionary basis it was considered that this road should be modelled using the Design Manual for Roads and Bridges, employing the more recent traffic count data.

The results from the DMRB model are shown below and indicate that the predicted level of NO_2 is well below the annual mean air quality standard for NO_2.

Table 2: Results of DMRB model run for NO_2 for Quay Road Ballycastle

Pollutant	Predicted Annual Mean Concentration				Air Quality Standard For Comparison		
	Background Concentration	Road Traffic component	Total	Units	Parameter	Value	units
NO_2	3.9	3.4	7.3	µg/ m^3	Annual Mean	40	µg/m^3

(See appendix 2 for DMRB Spreadsheet)

6.2.10 Bus Stations

A bus depot (as opposed to a bus station) is located in Ballycastle. However there are less that 150 bus movements in total per day into and out of the station and there is no relevant exposure within 10 metres of the depot.

6.2.11 Industrial Sources / Substantially increased emissions

No significant part A or B processes were identified during the first round of review and assessment. No new relevant part A or B proceses have commenced operation since the last round of review and assessment in either Moyle District Council or neighbouring council areas. Therefore there are no industrial sources with substantially increased emissions or new relevant exposure.

6.2.12 Aircraft

There are no airports in the Moyle council area or in neighbouring council areas.

6.3 Conclusion

There is no requirement to proceed to a detailed assessment for nitrogen dioxide.

7.0 Review and Assessment for Sulphur Dioxide

Sulphur dioxide is an acute respiratory irritant, hence the short averaging time for its objective. The main source of sulphur dioxide in the UK is power stations, which accounted for more than 71% of emissions in 2000. There are also significant emissions from other industrial combustion sources. Domestic sources now only account for 4% of emissions, but can be locally much more significant. Road transport currently accounts for less than 1% of emissions (LAQM.TG03).

SO_2 Objectives

Pollutant	Objective	To be achieved by
Sulphur Dioxide	35µg/m^3 (132ppb) when expressed as a 1 hour mean, not to be exceeded more than 24 times a year	31 December 2004
Sulphur Dioxide	125µg/m^3 (47ppb) when expressed as a 24 hour mean, not to be exceeded more than 3 times a year	31 December 2004
Sulphur Dioxide	266µg/m^3 (100ppb) when expressed as a 15 minute mean, not to be exceeded more than 35 times a year	31 December 2005

7.1 Conclusion from first round of review and assessment

During the first round or review and assessment all potential sources of SO_2 were screened out except an area of domestic coal burning identified in Bushmills. A fuel use survey and a detailed modelling exercise, using ADMS version 3.1 was undertaken for this criterion. This concluded that exceedences of the SO_2 objectives were unlikely.

7.2 Update Screening and assessment Checklist

7.2.1 Monitoring data outside and AQMA

A bubbler was located in Bushmills until the site was closed and an alternative location had to be found. The Council encountered difficulties in finding a new location for the bubbler and it was finally relocated in Ballycastle. However nil results were frequently recorded even when dark smoke readings indicated notable levels of smoke. Alkaline results were also recorded on several occasions. On this basis the SO_2 bubbler and smoke results are not included in this report. Use of the bubbler was discontinued in December 2005.

7.2.2 Monitoring data within an AQMA

The Council has not declared any AQMAs.

7.2.3 New Industrial sources / Industrial sources with substantially increased emissions

There are no new industrial sources of sulphur dioxide within the Moyle District Council area or close to the council border in neighbouring council areas. As no significant sources were identified during the first round of review and assessment no substantial increased emissions from industrial sources have occurred.

7.2.4 Areas of domestic Coal Burning

During the first round of review and assessment fuel use surveys were undertaken in three areas of Moyle Council: Ballycastle, Cushendall and Bushmills. A high percentage of coal burning was identified within Bushmills. A detailed modelling exercise using ADMS version 3.1 was undertaken at the second/third stage. This concluded that exceedences of the SO_2 objectives were unlikely. On the basis that this location had the highest percentage of coal burning and detailed modelling did not predict any exceedences it is considered that exceedences would be unlikely to occur in either Ballycastle or Cushendall.

However as the screening criteria for the density of coal burning in domestic areas is now reduced to number of premises exceeding 100 per 500 x 500m area it was considered that the density of domestic coal burning in some of the smaller settlements within the council area should be considered.

The two smaller settlements considered were Mosside and Armoy. Both settlements consist of a mix of private and public sector housing. The Northern Ireland Housing Executive (NIHE), provided details on the type of fuel used in their properties whilst the type of fuel used in private sector housing was estimated from a visual survey of both areas. Whilst the majority of houses in both settlements appeared to use oil heating it was assumed on a precautionary basis that at least 50% of the private sector housing used coal as their main fuel. Both settlements had large areas of open space, estimated to be 80% of the area within the 500 x 500 metre square. The analysis of fuel use is shown in table 3.

Table 3: Analysis of Fuel Use

Location	Type of housing	Total No. Houses	Oil	Coal	Other
Mosside	NIHE	53	40	12	1
	Private	90	45	45	0
	Total	143	95	57	1
Armoy	NIHE	60	28	24	8(Electric)
	Private	63	31	32	0
	Total	123	59	56	8

In both locations the number of coal burning properties is below 100 within a 500 x 500 metre square.

7.2.5 Small Boilers > 5MW

During the first round of review and assessment a second stage assessment was undertaken with respect to a boiler at the Bushmills Distillery. The second stage assessment, using nomograms contained in Guidance for estimating impacts from stationary sources (GSS), determined that the maximum ground level concentrations were well within the maximum ground level concentrations for SO_2. The 99.9^{th} percentile of the 15 minute mean was predicted to be 85.7µg/m^3. The 15 minute objective for SO2 is 266 µg/m^3.

Since the first round of assessment the boiler has been replaced increasing the thermal rating from 8.8 to 10.26 MW this is an increase of 16.6 %. However the sulphur content of the fuel used has halved reducing from 2% sulphur to 1% sulphur. It is therefore felt that the increase in capacity of the boiler is unlikely to result in a significant increase in SO_2 emissions from the boiler. It view of this it considered unnecessary to proceed to a detailed assessment for SO_2 for this boiler.

7.2.6 Shipping

There are no significant sources of shipping within the Moyle Council area or within neighbouring Council areas.

7.2.7 Railway Locomotives

As part of a working museum a coal steam train operates in the Moyle area from Easter until the end of the summer each year, the train makes 6 round trips a day (12 journeys in total). The stations (2), in the Moyle Council area, are located near the Giants Causeway and in Bushmills. On occasions the train can idle for 15 minutes at the stations. However there is no potential for regular outdoor exposure of members of the public within 15 metres of the train whilst it idles at either station.

7.3 Conclusion

During the first round of review and assessment a second stage assessment was undertaken for domestic coal burning. This round of review looked at some of the smaller settlements with respect to this criterion and concluded that there was no need to proceed to a detailed assessment. This assessment also concluded that in all other areas, exceedences of the objectives are unlikely.

8.0 Review and Assessment for Particulate Matter (PM_{10})

Particulate matter is of major health concern, as it has been linked with both increased morbidity and premature mortality. A wide range of emission sources contribute to PM_{10} concentrations in the UK. Research studies have confirmed that these sources can be divided into 3 main categories (APEG, 1999):
I) *Primary particle* emissions are derived directly from combustion sources, including road traffic, power generation, industrial processes etc. (II) *Secondary particles* are formed by chemical reactions in the atmosphere, and comprise principally of sulphates and nitrates. (III) *Coarse particles* comprise of emissions from a wide range of sources, including resuspended dusts from road traffic, construction works, mineral extraction processes, wind-blown dusts and soils, sea salt and biological particles. The expected reduction in national particle emissions in future years is different for each source type. For example, emissions from road transport will be governed by new legislation on vehicle emission standards; emissions of secondary particles will be largely governed by controls on power generation, industrial and transport SO_2 and NOx emissions, both in the UK and in Europe; emissions of coarse particles are largely uncontrolled, and in general are not expected to decline in future years (LAQM.TG (03)).

PM_{10} Objectives

Pollutant	Objective	To be achieved by
Particulate Matter	50µg/m^3 when expressed as a 24 hour mean, not to be exceeded more than 35 times a year	31 December 2004
Particulate Matter	40µg/m^3 when expressed as an annual mean	31 December 2004

8.1 Conclusion from first round of review and assessment

During the first round of review and assessment a second stage review was considered necessary and was undertaken for road traffic sources for PM_{10}. The level of PM_{10} was predicted using the DMRB model for the Quay Road in Ballycastle. This assessment concluded that an exceedence of the 2004 air quality objective was unlikely.

8.2 Update Screening and assessment Checklist

8.2.1 Monitoring Data Outside an AQMQ

Moyle District Council does not undertake any monitoring of PM_{10}. The closest automatic monitoring site within a coastal council is located at Larne Harbour (approximately 22 kilometers from Moyle). The results from the automatic monitoring station, in Larne Harbour, for 2004 are shown below. There were no exceedences of the PM_{10} objective

Monitoring Results for PM10 for Larne Harbour for 2004

Site	2004 % Data Capture	Annual Mean µg/m^3	Max Daily Mean µg/m^3	No. of Daily means > 50µg/m^3
Larne Harbour	91	20	91	8

8.2.2 Monitoring Data Within an AQMA

Moyle District Council has not declared an AQMA for PM_{10}.

8.2.3 Junctions

One junction in Ballycastle (Anne Street/ Market Street and Castle Street) with a possible traffic flow in excess of 10, 000 VPD was identified however the closest receptor is more than 10 metres from the kerb.

A second junction was identified in Bushmills (Main Street, Whitepark Road and Dunluce Road) with receptors within 10 metres of the kerb. Recent traffic data for this junction was not available for all roads leading onto this junction so DRD undertook a traffic count at the junction in July 2006. This measured an average daily traffic count of 7885 vehicles. This junction was not considered any further as daily traffic flow is below 10,000 vehicles.

8.2.4 Roads with high flows of buses and /or HGVs.

There are no roads in the Moyle Council area where the proportion of buses and or HGVs exceeds 20% of the average annual daily traffic flow.

8.2.5 New roads constructed or proposed since the last round of R&A

No new roads have been constructed in the Moyle Council area since the last round of review and assessment and no new roads are currently proposed.

8.2.6 Roads with significantly changed traffic flows, or new relevant exposure.

The first round of review and assessment did not identify any road which was likely to have traffic flow in excess of 10,000 VPD. However some of the data available was quite historical and the flows for 2005 were predicted on the basis of a 2.8% year on year increase. In view of this, for this screening exercise DRD Roads Service were contacted and asked to provide traffic flows for the three roads identified as likely to have the highest traffic flows during the first round of assessment.

Currently the only road in the council area with a traffic flow over 10,000 vehicles is the Quay Road in Ballycastle (10,232: Source DRD Roads Service for traffic count undertaken in 2005). An increase in traffic flow has therefore occurred on this road. However the actual increase is difficult to quantify accurately due to the fact that the previous data on this road was obtained in 1987. Anne Street in Ballycastle runs into Quay Road, and whilst current traffic flows were not available for this road, most traffic from this road flows onto Quay Road and therefore it is considered that the measured traffic level on Quay Road provides a good estimate of the flow of traffic on Anne Street.

On a precautionary basis it was considered that these two roads should be modelled using the Design Manual for Roads and Bridges, employing the more recent traffic count data. The background concentration was taken as the highest level recorded for the Moyle area at www.airquality.co.uk/archive during 2005.

Table 4: DMRB Run Results for PM_{10} for Quay Road, Ballycastle

Pollutant	Predicted Annual Mean Concentration				Air Quality Standard For Comparison		
	Background Concentration	Road Traffic component	Total	Units	Parameter	Value	units
PM10	11.6	1.26	12.86	µg/ m^3	Annual Mean	40	µg/m^3

No days exceeding the 50 µg/m^3 24 hour mean objective.

Table 5: DMRB Run Results for PM_{10} for Anne Street, Ballycastle

Pollutant	Predicted Annual Mean Concentration				Air Quality Standard For Comparison		
	Background Concentration	Road Traffic component	Total	Units	Parameter	Value	units
PM10	11.6	1.81	13.41	µg/ m^3	Annual Mean	40	µg/m^3

No days exceeding the 50 µg/m^3 24 hour mean objective.

8.2.7 Roads close to the objective during the second round of review and assessment.

No roads were identified as being close to exceeding the 24 hour mean or annual mean objective for PM_{10}.

8.2.8 New Industrial Sources / Industrial Sources with substantially increased emissions, or new relevant exposure.

No new industrial sources have commenced operation in the Moyle Council area since the last round of review and assessment.

There are no new or existing relevant part A or B processes in the neighbouring council areas of Ballymoney, Ballymena, Larne and Coleraine which are in such close proximity to Moyle that they would impact on the achievement of air quality objectives for PM_{10} in the District.

There are no relevant industrial sources with substantially increased emissions within the Moyle Council area.

8.2.9 Areas of Domestic Coal Burning

During the first round of review and assessment fuel use surveys were undertaken in three areas of Moyle Council: Ballycastle, Cushendall and Bushmills. A high percentage of coal burning was identified within Bushmills. A detailed modelling exercise using ADMS version 3.1 was undertaken at the second/third stage for bushmills. This concluded that exceedences of the PM_{10} objectives were unlikely. On the basis that this location had the highest percentage of coal burning and detailed modelling did not predict any exceedences it is considered that exceedences would be unlikely to occur in either Ballycastle or Cushendall. However as the screening criteria for the density of coal burning in domestic areas is now reduced to number of premises exceeding 50 per 500 x 500m area it was considered that the density of domestic coal burning in some of the smaller settlements within the council area should be considered.

The two smaller settlements considered were Mosside and Armoy. Both settlements consist of a mix of private and public sector housing. The Northern Ireland Housing Executive (NIHE), provided details on the type of fuel used in their properties whilst the type of fuel used in private sector housing was estimated from a visual survey of both areas. Whilst the majority of houses in both settlements appeared to use oil heating It was assumed on a precautionary basis that at least 50% of the private sector housing used coal as their main fuel. The analysis of fuel use is shown in table 6.

Table 6 Analysis of Fuel Use

Location	Type of housing	Total No. Houses	Oil	Coal	Other
Mosside	NIHE	53	40	12	1
	Private	90	45	45	0
	Total	143	95	57	1
Armoy	NIHE	60	28	24	8(Electric)
	Private	63	31	32	0
	Total	123	59	56	8

This information was then used to estimate the effective density of coal burning houses within Mosside and Armoy, using the guidance in box 8.8 of technical guidance LAQM.TG(03).

For the purposes of the calculation the amount of open space was estimated to be 80 % in Mosside and 85% for Armoy. Worked calculations can be found in appendix 3.

Using the nomogram in figure 8.8 of technical guidance LAQM.TG(03), and considering each of the settlements as a small village, both fell below the threshold value. Indicating that the PM_{10} objective is unlikely to be exceeded.

(note the highest annual mean backgound PM_{10} concentration recorded for the Moyle area in 2005 was 11.6 µg/m^3, although the lowest PM_{10} value on the nomogram of 16 µg/m^3 was used in the assessment)

8.2.10 Quarries/Landfill Sites/ Opencast coal/ Handling of dusty cargoes at ports etc.

The Craignagat quarry outside Ballycastle, identified during the first round of review and assessment. Closed for a period but has re-opened and has a permit permitting mobile crushing operations. The regulator, Environment and Heritage Service (EHS), has advised that some quarrying still takes place but this is on a small scale intermittent basis, as there is little rock of any quality left on the site. The mobile crusher also spends time operating off site. EHS have not received any complaints regarding dust emissions from the site. The highest background PM_{10} level for the Moyle area for 2005 was 11.6 µg/ m^3 and there are no

receptors within 200 metres of the working face of the site. In view of these factors and the small scale and intermittent nature of the operation it is considered that the operation is unlikely to give rise to emissions of PM_{10} that would breach the relevant objectives for this pollutant.

There are no active land fill sites in the Moyle Council area, the closest active site, outside Portrush, lies some 3 miles from the council boundary.

There are no opencast coal mines in the Moyle Council area.

There is a small port in Ballycastle which is used occasionally for export of building supply materials to Scotland. However due to the infrequent nature of this activity it is not considered to represent a significant source of PM_{10}.

8.2.11 Aircraft

There are no airports in the Moyle council area or in neighbouring council areas

8.3 Conclusion

As exceedences of the PM10 objectives are unlikely there is no need to proceed to a detailed assessment for PM_{10}.

9.0 Conclusions

Summary of Conclusions

Pollutant	Detailed Assessment Required
Carbon Monoxide	No
Benzene	No
1,3 Butadiene	No
Lead	No
Nitrogen Dioxide	No
Sulphur Dioxide	No
Particulate Matter	No

Overall Conclusion

There is no need to proceed to a detailed assessment for any of the 7 pollutants considered by this updating and screening exercise.

References

Part IV of the Environment Act 1995 Local Air Quality Management Guidance Technical Guidance, (LAQM.TG(03)) defra 2003. (Including 2006 updates on www.uwe.ac.uk/aqm)

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. (2000)

Air Quality Regulations (Northern Ireland) 2003

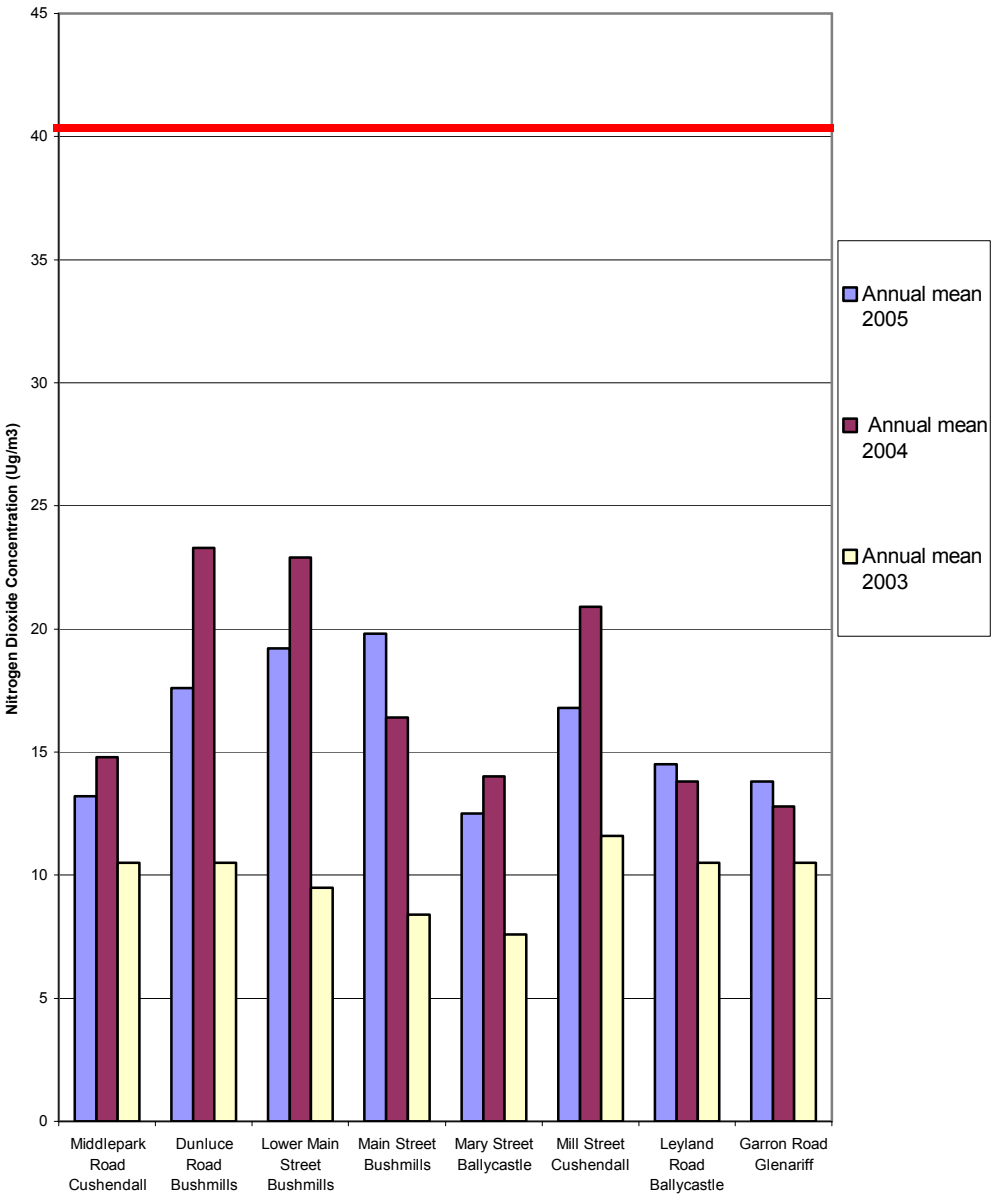
Moyle District Council Review and Assessment of Air Quality Stage 1 Report 2001

Moyle District Council Review and Assessment of Air Quality Stage 2 &3 Report 2004

South Hams District Council Updating and Screening Assessment 2003

Appendix One

Annual Mean Nitrogen Dioxide Bias Corrected Results 2003 - 2005



Appendix Two

Current receptor

Receptor Name	Anne Street Ballycastle	Receptor number	1
Assessment year	2005		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.12	0.12	mg/m^3	Annual mean*	0.12	mg/m^3
Benzene	0.00	0.13	0.13	$\mu g/m^3$	Annual mean	0.13	$\mu g/m^3$
1,3-butadiene	0.00	0.08	0.08	$\mu g/m^3$	Annual mean	0.08	$\mu g/m^3$
NO_x	0.0	11.0	11.0	$\mu g/m^3$	Not applicable		
NO_2	3.9	4.0	7.9	$\mu g/m^3$	Annual mean*	7.9	$\mu g/m^3$
PM_{10}	11.6	1.81	13.41	$\mu g/m^3$	Annual mean	13.4	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

* See Footnote 4 in DMRB Volume 11 Chapter 3

Current receptor

Receptor Name	Quay Road, Ballycastle	Receptor number	1
Assessment year	2005		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.00	0.07	0.07	mg/m^3	Annual mean*	0.07	mg/m^3
Benzene	0.00	0.08	0.08	$\mu g/m^3$	Annual mean	0.08	$\mu g/m^3$
1,3-butadiene	0.00	0.05	0.05	$\mu g/m^3$	Annual mean	0.05	$\mu g/m^3$
NO_x	0.0	8.8	8.8	$\mu g/m^3$	Not applicable		
NO_2	3.9	3.4	7.3	$\mu g/m^3$	Annual mean*	7.3	$\mu g/m^3$
PM_{10}	11.6	1.26	12.86	$\mu g/m^3$	Annual mean	12.9	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

* See Footnote 4 in DMRB Volume 11 Chapter 3

Appendix Three

Screening Assessment for Domestic Solid Fuel Burning and Exceedence of the PM10 Objectives

Formula

Deff = [ceff]/(1-L)

Where :

Ceff = Effective number of coal burning households

Deff = Density of effective coal burning houses

L = Proportion of open space

Mosside

Assuming all coal burning households (no anthricite, smokeless or wood burning)

Percentage open space (L) = 80%

Ceff = 57

Deff = [ceff]/(1-L)

Deff = [57]/(1-0.8)

Deff = 285

Armoy

Assuming all coal burning households (no anthricite, smokeless or wood burning)

Percentage open space (L) = 85%

Ceff = 56

Deff = [ceff]/(1-L)

Deff = [56]/(1-0.8)

Deff = 373