

**Ards Borough Council**

**Air Quality Review and Assessment**



**Updating and Screening Assessment 2006**

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## **Executive Summary**

This Updating and Screening Assessment (USA) has been undertaken in accordance with the Local Air Quality Technical Guidance LAQM TG 03 (updated 2006). It is part of a continual process of review and assessment of local air quality, and provides an opportunity to update information on the local pollution climate and to reevaluate conclusions from previous assessments.

Ards Borough Council completed the first stage review and assessment of air quality in 2000. This involved carrying out initial screening of industrial, transport and other sources of pollution which have a significant impact within the locality and the identification of pollutants of concern. The stage one review concluded that a progression to a stage two assessment was required for a number of the pollutants including carbon monoxide, sulphur dioxide, pm<sub>10</sub>, and nitrogen dioxide.

A combined stage two and three review and assessment was carried out in 2004. This assessment was to determine whether the objectives set by the government for the seven pollutants as detailed in the National Air Quality Strategy would be achieved. A detailed assessment was carried out for carbon monoxide sulphur dioxide, nitrogen dioxide and PM<sup>10</sup>. The results showed that the NAQS objectives for sulphur dioxide, carbon monoxide and nitrogen were not likely to be exceeded. However the dispersion modeling predicted exceedences of the 24 hour objective for PM<sup>10</sup> as a result of domestic coal burning and an AQMA was declared in March 2005.

Within this updating and screening assessment possible sources of pollution in Ards have been re-examined and any aspects that have changed since the first round review and assessment have been identified. New monitoring data has been used to assess compliance with the relevant national air quality objectives. The conclusions from the previous round of review and assessment continue to be valid and there is no need to proceed to a detailed assessment. However a further assessment is required within the AQMA for PM<sup>10</sup> in order to determine the location and magnitude of the exceedences. This assessment has been delayed due the problems with relocating the monitoring station to a suitable location within the AQMA. An action plan based on the results of the dispersion modelling is currently being considered. This will involve investigating measures to reduce domestic PM<sup>10</sup> emissions within the AQMA. The Council will consult with the Department, neighbouring Councils, NIHE and other such bodies or persons as are considered appropriate.

## **1. Introduction**

### **1.1 Background to Air Quality Management**

Good air quality is essential for our health, quality of life and the environment. Over the years the Government has introduced controls through legislation to improve air quality. The Environment (NI) Order 2002 requires local authorities to undertake an Air Quality Review and Assessment in their areas and to meet the air quality targets and objectives set out in the UK National Air Quality Strategy (2000). The production of an annual air quality report is now a statutory duty for all authorities. If as the result of the review process, it appears that the air quality objectives are not met, or are unlikely to be achieved in any area within the boundary of the local authority, then an Air Quality Management Area (AQMA) must be declared. Once an area has been designated a more detailed assessment of the air quality should be conducted, and an action plan produced to reduce air quality pollution levels if necessary.

The Process is set out in the Department of Environment's Local Air Quality Management Policy Guidance LAQM PGNI (03).

### **1.2 Updating and Screening Assessment**

This report builds on the earlier work and therefore must be read in acknowledgement of the previously published conclusions. This Updating and Screening Assessment (USA) must address the current and future situation with regards to all pollutants currently contained within the Air Quality Strategy. USA provides an opportunity for authorities to supplement the information already published on the local pollution climate and to reevaluate and to check any AQMA declarations.

### **1.3 Previous Review and Assessment in Ards Borough Council**

This USA report is part of a staged Review and Assessment process undertaken by all local authorities in the UK. The first round consisted of four stages which resulted in a number of authorities declaring air quality management areas (AQMA) for particular pollutants and producing action plans to address Air Quality issues. The second round consists of a series of USA reports and detailed assessments where required, to ensure that the Air Quality Management Areas (AQMA) and actions plans are kept up to date. This report describes the first USA in the second round.

**The stage one review and assessment completed in 2000 concluded that:**

1. The air quality objectives for the following pollutants were not likely to be exceeded:

Benzene, 1,2- Butadiene and Lead

2. A detailed assessment was required for the following pollutants:

Carbon Monoxide, Sulphur Dioxide, Nitrogen dioxide and  $\text{pm}^{10}$

**The stage two & three assessment completed in 2004 concluded that:**

1. The air quality objectives for the following pollutants were not likely to be exceeded:

Carbon Monoxide, Nitrogen Dioxide, and Sulphur Dioxide

2. Based on the predictions of the dispersion modeling exercise it was identified that the objective for the following pollutant would be marginally exceeded:

$\text{pm}^{10}$

This USA report simply needs to confirm that nothing significant has occurred to alter these conclusions.

#### **1.4 Designation of Air Quality Management Area**

The dispersion modeling exercise carried out as part of the stage 2 & 3 review and assessment, predicted that the national air quality objective for  $\text{PM}_{10}$  would be marginally exceed. The Council declared an air Quality Management Area for  $\text{PM}^{10}$  and produced an Air Quality Management Order in March 2005. The designated area was identified using the information obtained by the fuel use survey. Within 12 months of declaring an AQMA the Council is expected to produce an action plan in pursuit of the achievement of air quality standards and objectives in AQMAs. Action planning is the most important and significant aspect of the LAQM process, providing the practical opportunity for improving local air quality in an area where the assessment has shown that national measures will be insufficient to meet the relevant air quality objectives

Due to a number of factors including difficulties in finding a suitable location and delays by our equipment suppliers, the monitoring station has only recently moved to the new location within the AQMA, therefore monitoring data is not yet available. An Action plan is currently being considered, consultation will take place with the Department, neighbouring District Councils and other relevant authorities including NIHE, local businesses and community groups and other such bodies or persons as are considered appropriate.

## 1.5 The National Air Quality Objectives

Air quality objectives as set out in the UK National Air Quality Strategy (2000) are presented in Table 1.1 Below

**Table 1.1 – The UK Air Quality Objectives included in the Air Quality (Northern Ireland) Regulations 2003**

<b>Substance</b>	<b>Air Quality Objective</b>	<b>Date to be achieved</b>
Benzene	16.25 $\mu\text{g}/\text{m}^3$ , when expressed as a running annual mean	31 December 2003
	3.25 $\mu\text{g}/\text{m}^3$ , when expressed as a running annual mean	31 December 2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$ , when expressed as a running annual mean	31 December 2003
Carbon Monoxide	10 $\text{mg}/\text{m}^3$ , maximum daily running 8-hour mean	31 December 2003
Lead	0.5 $\mu\text{g}/\text{m}^3$ , when expressed as an annual mean	31 December 2004
	0.25 $\mu\text{g}/\text{m}^3$ , when expressed as an annual mean	31 December 2008
Nitrogen Dioxide	200 $\mu\text{g}/\text{m}^3$ (hourly mean) not to be exceeded more than 18 times per year	31 December 2005
	40 $\mu\text{g}/\text{m}^3$ (annual mean)	31 December 2005
PM <sub>10</sub>	40 $\mu\text{g}/\text{m}^3$ annual mean	31 December 2004

	50 $\mu\text{g}/\text{m}^3$ fixed 24-hour mean, to be exceeded no more than 35 days per year	31 December 2004
Sulphur Dioxide	350 $\mu\text{g}/\text{m}^3$ (1 hour mean) not to be exceeded more than 24 times a year	31 December 2004
	125 $\mu\text{g}/\text{m}^3$ (24 hour mean) not to be exceeded more than 3 times a year	31 December 2004
	266 $\mu\text{g}/\text{m}^3$ (15 minute mean) to be exceeded no more than 35 times per year	31 December 2005

Source: Local Air Quality Management Technical Guidance LAQM.TG (03)

NOTE:  $\mu\text{g}/\text{m}^3$  = micrograms per cubic metre.

## 2. Information about Ards Borough Council

Ards Borough Council is situated east of Belfast on the shores of Strangford Lough, which is designated as an area of outstanding natural beauty and special scientific interest. The Borough comprises of 140 square miles, bounded by 90 miles of coastline. Ards remains one of fastest growing borough with the population currently standing at 74,400 representing 4.4% of the total population of Northern Ireland.

The Borough is of mixed and urban rural character. The main town of Newtownards is located at the northern end of Strangford Lough and is a natural basin surrounded by hills. The prevailing wind direction is south westerly. Air pollution problems are associated with the high dependency on coal fired domestic heating combined with the geographical features of the area that may result in temperature inversions. The other main centres of population include Comber, Donaghadee and Portaferry. Neighbouring Councils include North Down Borough Council, Castlereagh Borough council and Down District Council.

Given the areas scenic beauty and historical interest tourism is a significant and growing part of the local economy, while clothing and textiles sector (traditionally a major employer in the Borough) has declined dramatically. Ards is establishing a diverse economy, particularly in the food and engineering sectors.

The Housing stock ranges from old properties in the main population centres with extensive housing development taking place on the outskirts of the towns and villages.

Figure 2.1 Map of Ards Borough Council



### **3 Possible Sources of Pollution in Ards Borough Council**

The First Stage Review and Assessment investigated the impact of the following possible sources of pollution in Ards Borough Council:-

- Industrial sources
- Traffic on major or congested roads
- Domestic coal burning

#### **3.1 Industrial Sources**

Industrial sources are currently controlled under The Industrial Pollution Control (NI) Order 1997, and are classified into either Part A, (such as reforming natural gas), Part B processes (such as quarries), or Part C (such as bulk cement and timber processes) for guidance and control. Part A and B processes fall under the jurisdiction of the Department of the Environment, whilst control of Part C processes is a duty carried out by District Councils.

Each process receives an Authorisation to emit substances to the air. Local exceedences of air quality objectives caused by a process may be grounds for the imposition of stricter conditions in an authorisation than would normally be the case. However, it will have to be clear to the authorising authority that the industry alone is responsible for the exceedences, and not a combination of other factors.

Small sources, which are exempt from the requirement to be authorised, will also be considered in the review and assessment.

In Ards Borough Council there are currently no authorisations for Part A prescribed processes.

There are currently 5 Part B Authorisations for prescribed processes.

There are currently twenty three Part C Authorisations.

Lists of Part B and C processes in Ards are given in Appendix 1.

The Stage One Review and Assessment found that there were no significant sources of industrial pollution within Ards.

### 3.2 Road Traffic

For the purposes of the first round of review and assessment process, data from the Annual Traffic Census Reports 1998 & 2002 was used to assess traffic flows within Ards Borough. It was concluded that roads did not present a significant source of pollution in Ards. However, as the review and assessment of air quality is an ongoing process, the impact of roads on nitrogen dioxide and particulate levels will be examined in this report, using updated information. The traffic flow figures for the main roads within Ards for 2004 are outlined below.

**Table 3.1 Traffic flow figures for the Main Roads servicing Ards Borough Council**

Road No	C P No	Location	24 hr AADT 2004	Predicted AADT 2006	%HGV (2004)
A2	510	Donaghadee – Millisle, at Ballyvester	5150	5356	3.5
A20	216	Upper Newtownards Road, Belfast at Quarry Corner	24270	25240	4.2
A20	509	Portaferry Road, Newtownards	11400	11628	8.1
A21	507	Bangor Road Newtownards	21080	2150	3
A21	511	Newtownards Road Comber	15160	15766	4.9
A22	217	Comber Road, Belfast, SE Of New Line	10770	10985	2.4
A22	512	Comber – Killyleagh, at Comber	8070	8392	3.3
A48	508	Donaghadee Road, Newtownards	9770	9965	9.2

Source: Annual Traffic Census Report 2004, DRD Road Service

**Note: '24 hour AADT' is the annual average daily traffic based on a 7 day week**

1. The predicted 24 hour AADT for 2005 is calculated by adding 2% annually to the existing 2004 figure
2. 'CP NO' is the reference number assigned to the individual traffic-monitoring site

### **3.3 Domestic Coal Burning**

Newtownards is a densely populated area with a high concentration of smaller sources such as domestic and commercial heating. Initial investigations as part of the stage one review and assessment concluded that the level of domestic coal burning exceeded the level recommended by the technical guidance as presenting a risk of exceeding the NAQS objectives for PM<sup>10</sup> and sulphur dioxide. As a result a detailed investigation of the impact of domestic coal burning on local air quality was required.

The stage 2 & 3 review and assessment consisted of two domestic fuel use surveys, which were undertaken by independent consultants. The data obtained from these surveys was used by BMT Cordah to undertake advanced dispersion modeling. The results showed no exceedences of the NAQS for Sulphur Dioxide, however predicted that the objective for PM<sub>10</sub> would be marginally exceeded. This resulted in an AQMA declaration for PM<sup>10</sup> March 2005.

## **4 Air Quality Monitoring**

### **4.1 Monitoring in Northern Ireland**

As a result of the air quality review and assessment process there are now a considerable number of monitoring sites established across Northern Ireland, a significant number of which are incorporated into large scale national networks such as Automatic Urban and Rural Network and Non Automatic Networks.

Methods used range from simple passive samplers to automatic analysers. Now that the majority of District Councils have completed the first round of the review and assessment process, the pollutants of concern in each District have been highlighted, and Air Quality Management Areas declared where necessary.

### **4.2 Monitoring within Ards**

Real-time automatic monitoring of Particulates and Sulphur Dioxide is currently carried out in Ards Borough Council and in the neighbouring councils, Castlereagh Borough Council, Lisburn City Council and North Down Borough Council.

Since mid-2002, an automatic monitoring station has been located at an urban background site in the Glen Estate, Newtownards, to monitor pollutants from the high density of domestic coal-burning properties in the area. PM<sub>10</sub> is monitored using an automatic TEOM sampler and sulphur dioxide is monitored using a UV fluorescence analyser. As a result of designated AQMA the automatic monitoring station was recently moved to a location within the area of predicted exceedence. The station is now located at the rear of Ards Leisure Centre, William Street, Newtownards.

The reference method for PM<sub>10</sub> is the gravimetric technique, in which the ambient concentration of PM<sub>10</sub> is calculated from the mass of particulate matter collected on a filter. The TEOM has been found to underestimate relative to this reference method. As a result data obtained from the TEOM sampler has been multiplied by a factor of 1.3 to give the gravimetric equivalent.

Since November 2000, a semi-automatic eight-port bubbler has been located in the Scrabo Estate in Newtownards, which is also an area with a high density of domestic coal burning. The 8-port bubbler apparatus is used to measure sulphur dioxide and suspended particulate matter as black smoke. The bubbler method does not allow direct comparison with the National Air Quality Objectives for Sulphur Dioxide and PM<sub>10</sub>, but it does provide a useful indicative measurement.

In Ards Borough Council monitoring of NO<sub>2</sub> by passive diffusion tubes has been undertaken regularly since 1994. Diffusion tube data cannot be compared directly with air quality limit values based on short-term averages; however, they can be used to help identify areas with high concentrations of NO<sub>2</sub>, which may require more detailed investigation. The aim of the NO<sub>2</sub> monitoring undertaken has been to measure pollutant concentrations at busy roads and junctions especially near residential areas. In 2003, as a result of the Stage 1 review it was decided to locate two additional NO<sub>2</sub> diffusion tubes to monitor kerbside levels at two road junctions. The tubes were sited using guidelines from NETCEN, but are not part of the monitoring network.

## 5 Updating and screening for Carbon monoxide

### 5.1 Standard and Objective for Carbon Monoxide

Pollutant	Objective	Date to be achieved by
Carbon Monoxide	10mg/m <sup>3</sup> maximum daily 8hr mean	31 December 2003

Carbon monoxide (CO) is a colourless and odourless gas. It is largely produced due to the incomplete combustion of fuels containing carbon. The main source of emission in the UK is road transport (67%). Annual emissions of CO have been falling steadily since the 1970's and are expected to continue to do so which is mainly due to improvements in vehicle technology and the fitting of catalytic converters.

Carbon Monoxide affects the body by restricting the uptake of oxygen by forming carboxyhaemoglobin. Exposure to high levels results in unconsciousness, with further exposure causing death.

### 5.2 Background Concentrations for Ards

National maps are available from the UK National Air Quality Information Archive which indicates the estimated background carbon monoxide concentrations across the UK. Using current information available from the Archive the estimated background annual mean concentrations are below 1mg/m<sup>3</sup>.

### 5.3 Conclusions of the Previous Review and Assessment

The stage 2 & 3 review and assessment concluded that objective for this pollutant would not be exceeded and it was therefore not necessary to proceed beyond a Stage 2/3 Review and Assessment.

There is currently no AQMA for Carbon Monoxide

### 5.4 Monitoring for Carbon Monoxide in Northern Ireland

Carbon monoxide is monitored at 39 sites throughout the UK. The results show that CO levels are currently showing declining levels. There are currently two sites in Northern Ireland (Belfast & Londonderry) which part of the UK automatic network. Results 2004 are presented below

**Table 5.1 Carbon Monoxide results for NI 2004**

Site	Annual mean ug/m <sup>3</sup>	Max 8hour mean ug/m <sup>3</sup>	No of exceedences
Belfast	0.2	2.8	0
Londonderry	0.3	1.4	0

Source: Department of Environment - Air Quality in NI 2004

### **5.5 Monitoring for Carbon Monoxide in Ards**

No Carbon monoxide monitoring has been carried out within the Ards Borough Council area or within neighbouring District Councils.

### **5.6 Very Busy Roads or Junctions In Built Up Areas**

The updating and screening checklist (LAQM.TG (03) update 2006 states that a Local Authority should :

*Identify very busy roads and junctions in areas where the current year background is expected to be above 1mg/m<sup>3</sup>.*

There are no areas where the expected background concentration will be above 1mg/m<sup>3</sup> within the District, therefore it is not necessary to proceed any further with the assessment for road traffic for Carbon monoxide.

In addition to the above guidance states that a very busy road is defined as having an annual daily traffic flow (AADT) that exceeds 80,000 vehicles a day on a single carriageway roads, 120,000 on a dual carriageway and 140,000 vehicles per day on motorways. There should also be a relevant receptor within 10m of the kerb. No roads within the district fulfil these criteria.

### **5.7 Conclusion for Carbon Monoxide**

It can be concluded that the objective of 10mg/m<sup>3</sup> as a maximum daily running 8 hour mean will not be exceeded and it will not be necessary to proceed to a Detailed Assessment for Carbon Monoxide.

## **6 Updating and screening for Benzene**

### **6.1 Standard and Objective for Benzene**

Pollutant	objective	Date to be achieved by
Benzene	16.25 ug/m <sup>3</sup> when expressed as a running annual mean	31 December 2003
Benzene	3.25 ug/m <sup>3</sup> when expressed as a running annual mean	31 December 2010

In the UK the major source of Benzene is motor vehicle emissions, accounting for 64% of the total UK annual emissions. Petrol vehicles are then main source where benzene is released either as an un-burnt constituent of the fuel or as the product of the combustion of other hydrocarbons.

Benzene is a known to be human carcinogen over long term exposure.

### **6.2 Background concentrations for Benzene**

National Maps are available from the UK National Air Quality Information Archive which indicates estimated background benzene concentrations across the UK. The estimated background concentrations of benzene for the Ards area are well below the objective.

### **6.3 Conclusions from the previous Review and Assessment**

The stage one review and assessment concluded that the objective for this pollutant would not be exceeded and it was therefore not necessary to proceed to a Stage 2/3 Review and Assessment.

There is currently no AQMA for Benzene

### **6.4 Monitoring for Benzene**

Ards Borough council does not monitor for benzene. The nearest monitoring stations are located in Belfast (Queens University, Elmwood Avenue and Upper Newtownards Road). Both sites met the Air Quality Strategy Objectives for Benzene by the due date of 31<sup>st</sup> December 2003, and continue to do so.

## **6.5 Very Busy Roads or Junctions In Built Up Areas**

The updating and screening checklist LAQM.TG (03) - update 2006 states that a Local Authority should:

*Identify 'very busy' roads and junctions in areas where the 2010 background is expected to be above 2ug/m<sup>3</sup>.*

There are no areas with the district where the expected background concentrations will be above 2ug/m<sup>3</sup>.

In addition to the above guidance states that a very busy road is defined as having an annual daily traffic flow (AADT) that exceeds 80,000 vehicles a day on a single carriageway roads, 120,000 on a dual carriageway and 140,000 vehicles per day on motorways. There should also be a relevant receptor within 10m of the kerb. No roads within the district fulfil these criteria.

## **6.6 Industrial Sources**

There are no existing, new or proposed industrial sources within Ards which are a significant source of benzene.

## **6.7 Petrol Stations**

There is a potential for benzene to be emitted from petrol stations during loading and distribution of petrol.

The updating and screening checklist (LAQM.TG (03) update 2006 states that a Local Authority should :

*Identify all petrol stations with an annual throughput of more than 2 million litres per annum and determine if there is relevant exposure within 10m of the pumps*

There are a few Petrol stations with a throughput of petrol greater than 2 million litres per annum within the Ards area. However these petrol stations have vapour recovery systems in place (stage 1 recovery), which recovers vapours displaced when filling underground tanks. In addition there would not be relevant exposure within 10m of the pumps.

## **6.8 Major Fuel storage Depots**

There are no major fuel storage depots handling petrol within the boundaries of the district.

## **6.9 Conclusion for Benzene**

The conclusion from the first round of review and assessment continues to be valid and it is unlikely that the 2010 objective will be exceeded. Therefore it will not be necessary to proceed to a detailed assessment for Benzene.

## **7 Updating and Screening for 1,3 Butadiene**

### **7.1 Standard and Objective for 1,3 Butadiene**

Pollutant	Objective	Date to be achieved by
1,3 Butadiene	2.25 ug/m <sup>3</sup> when expressed as a running annual mean	31 December 2003

In the UK the main source of 1,3 Butadiene is from vehicles with petrol engines emitting 67% of the total annual emissions and diesel a further 11%. The Compound itself is not present in fuel, but is formed as a product of the combustion of the fuel.

### **7.2 Conclusions from the Previous Review and Assessment**

The stage one review and assessment concluded that the objective for this pollutant would not be exceeded and it was therefore not necessary to proceed to a Stage 2/3 Review and Assessment.

There is currently no AQMA for 1,3-butadiene.

### **7.3 Monitoring for 1,3 Butadiene**

Ards Borough council does not monitor for 1,3-butadiene. The nearest monitoring stations are located in Belfast (Queens University, Elmwood Avenue and Upper Newtownards Road). Both sites met the Air Quality Strategy Objectives for 1,3 butadiene by the due date of 31<sup>st</sup> December 2003, and continue to do so.

The estimated background concentrations are well within the pollutant objective.

### **7.4 New industrial Sources**

There are no existing, new or proposed industrial sources within Ards which are a significant source of 1,3-butadiene.

## **7.5 Conclusion for 1,3- Butadiene**

The conclusion from the first round of review and assessment continues to be valid and therefore it will not be necessary to proceed to a detailed assessment for 1,3-butadiene.

## **8 Updating and Screening for Lead**

### **8.1 Standard and Objective for Lead**

Pollutant	Objective	Date to be achieved by
Lead	0.5 ug/m <sup>3</sup> when expressed as an annual mean	31 December 2004
Lead	0.25 ug/m <sup>3</sup> when expressed as an annual mean	31 December 2008

The majority of emissions of lead in the UK come from petrol driven vehicles (72%) where the lead is emitted as fine particles in the exhaust fumes. However leaded fuel has been banned from sale in the UK since 2000 and so emissions of lead are now restricted to a variety of industrial activities including battery manufacturing, tank lining and piping etc. Human exposure to high levels of lead has a severe adverse effect on the blood, the nervous system and the kidneys.

### **8.2 Conclusions of the Previous Review and Assessment**

The stage one review and assessment concluded that the objective for this pollutant would not be exceeded and it was therefore not necessary to proceed to a Stage 2/3 Review and Assessment.

There is currently no AQMA for Lead

### **8.3 Monitoring for Lead**

No monitoring of airborne lead has been carried out in Ards, or in neighbouring District Councils.

The estimated background concentrations for lead are well within the objective.

### **8.4 Industrial Sources**

There are no existing, new or proposed industrial sources within Ards which are a significant source of Lead.

## **8.5 Conclusion for Lead**

The conclusion from the first round of review and assessment continues to be valid and therefore it will not be necessary to proceed to a detailed assessment for Lead.

## 9 Updating and Screening for Nitrogen Dioxide

### 9.1 Standard and Objective for Nitrogen Dioxide

Pollutant	Objective	Date to be achieved by
Nitrogen Dioxide	200 $\mu\text{g}/\text{m}^3$ hourly mean not to be exceeded > 18 times per year	31 December 2005
	40 $\mu\text{g}/\text{m}^3$ annual mean	31 December 2005

Nitrogen dioxide ( $\text{NO}_2$ ) and nitric oxide ( $\text{NO}$ ) are both oxides of nitrogen and are collectively referred to as  $\text{NO}_x$ . All combustion processes produce  $\text{NO}_x$  emissions largely in the form of nitric oxide which is converted to nitrogen dioxide, mainly as a result of reactions with ozone in the atmosphere. It is Nitrogen dioxide which is of most concern, as it is a respiratory irritant.

The principal source of nitrogen dioxide is road transport, which accounted for about 49% of the total UK emissions in 2000 (LAQM.TG03). Major roads carrying large volumes of high speed traffic are major contributors, as are city centres with congested streets. Other significant sources of nitrogen oxides emissions include power stations and domestic sources.

### 9.2 Conclusions of the Previous Review and Assessment

The stage 2 & 3 Review and Assessment concluded that it was not necessary to proceed beyond this stage to investigate levels of nitrogen dioxide generated by either industrial or transport sources, as the objective was achieved.

There is currently no AQMA for Nitrogen Dioxide

### 9.3 Monitoring for Nitrogen Dioxide

Nitrogen dioxide is monitored at 6 sites by diffusion tubes throughout Newtownards. The aim of the  $\text{NO}_2$  monitoring is to measure pollutant concentrations at busy roads and junctions especially near residential areas. The tubes were sited using guidelines from NETCEN. A summary of the results is presented in table 9.1 & figure 9.1 below.

**Table 9.1 Annual Mean Nitrogen Dioxide  $\mu\text{g}/\text{m}^3$  for Ards**

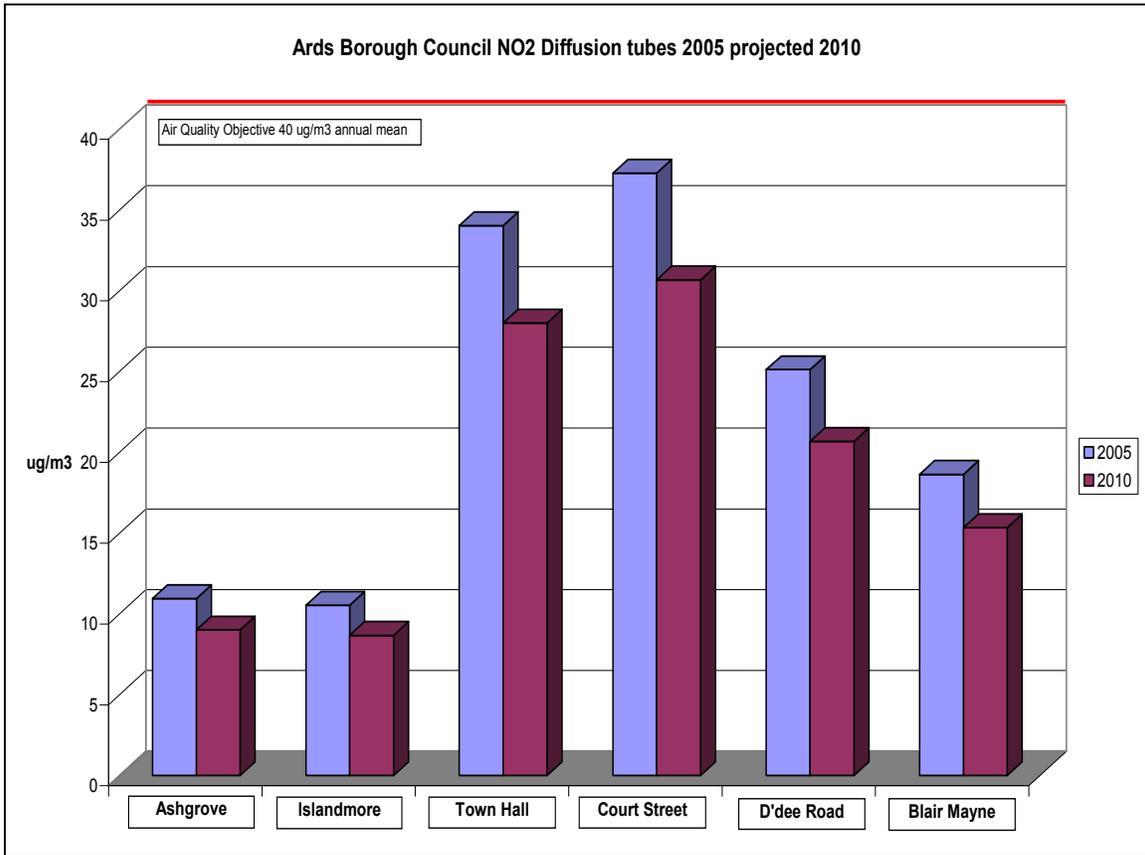
Description	Site	2001	2002	2003	2004	2005	2005 data corrected 0.81 bias adjustment applied	2005 data projected to 2010
Urban Background	Ashgrove	8.9	7.0	10.6	8.9	13.5	10.94	9.00
Urban Background	Islandmore	8.0	8.3	10.3	7.6	13	10.53	8.66
Kerbside	Town Hall	21.4	25.2	29.5	27.8	42	34.02	27.99
Kerbside	Court Street	25.2	24.9	28.2	29	46	37.26	30.66
Kerbside	Donaghadee Road			20.5	18.8	31	25.11	20.66
Kerbside	Blair Mayne			19.1	15.6	23	18.63	15.33

Note:

Kerbside location is 1.5m from the kerb of a busy road

Urban Background site is greater than 50m from a busy road

Figure 9.1:



#### 9.4 Bias Adjustment Factor for Diffusion Tubes

The technical guidance states that diffusion tube data should be appropriately bias corrected. Unfortunately Ards Borough Council does not carry out continuous monitoring for NO<sub>2</sub>, therefore can not undertake a collocation study. However NO<sub>2</sub> is monitored using the automatic chemiluminescent technique in three neighbouring councils Castlereagh Borough Council, Lisburn City Council and North Down Borough Council. This has facilitated a co-location study within each Council. The results of these studies have been used to determine a bias adjustment factor to correct the results for 2005. Results of the collocation studies can be found in appendix two and are presented in the table below.

After consulting with the other Councils within Eastern Group it was decided that the average should be taken from the local co-location studies and any other results available from authorities which use the same lab for the analysis. The studies identified in table 9.2 below use Casella for analysis of the tubes.

This is a UKAS recognised laboratory for the provision and analysis of diffusion tubes, and the analysis is performed in accordance with guidelines set out by the UK Nitrogen Dioxide Diffusion Tube Network. They also participate in the Work Place Analysis Scheme for Proficiency (WASP) for NO<sub>2</sub>.

The 2005 NO<sub>2</sub> results have been corrected by multiplying the annual mean by 0.81. Based on the corrected monitoring results for 2005 there are no locations within Ards where the NAQS objective of 40ug/m<sup>3</sup> annual mean is likely to be exceeded.

There is currently no AQMA within Ards for Nitrogen Dioxide

**Table 9.2 Results of collocation studies**

<b>Collocation Study for:</b>	<b>Bias Adjustment Factor for 2005</b>
Castlereagh Borough Council	0.82
Lisburn City Council	1.03
North Down Borough Council	0.66
UWE- overall spreadsheet factor for Casella (3 studies)	0.81
Liverpool speke (Casella 2005)	0.75
<b>Average</b>	<b>0.81</b>

### **9.5 Narrow congested streets with residential properties close to the kerb**

There are no streets within the Borough which fulfil the criteria detailed in the technical guidance.

## **9.6 Junctions**

The stage one review and assessment concluded that roads did not present a significant source of pollution in Ards. However in 2003 the nitrogen dioxide tube monitoring was extended to include two additional busy road junctions. The results from the diffusion tube can be found in appendix two. The results show that the NAQS objective has not been exceeded at the monitored locations.

DMRB modelling was also carried out as part of the stage 2/3 assessment to determine the impact of road traffic pollution. The sites modelled took into account busy road junctions within Newtownards, and identified that all junctions monitored met the air quality objectives for nitrogen dioxide.

## **9.7 Busy Streets**

*A busy street is defined in the technical guidance as having more than 10,000 vehicles per day and where members of the public may be exposed within 5m of the kerb for one hour or more.*

There are no streets within the Borough which meet the above criteria.

## **9.7 Roads with high flow of buses or HGV's**

*Roads with a high flow of buses and or HGV's are defined in the technical guidance as having greater than 25% HGV and one within 10m of relevant exposure.*

Based on the annual traffic censuses report 2004 and local knowledge there are no roads within the Borough which meet the above criteria.

## **9.8 New roads constructed or proposed since the previous round of review and assessment.**

The Following roads have been proposed since the last review and assessment:

1. A20 Newtownards Southern Relief Road  
This involves the construction of a new link road connecting the main A20 via Blaire Main Road South to the A21 Comber. Construction is expected to commence 2007.

An Environmental Impact assessment was carried out at the planning stage which adequately considered the impact on local air quality.

## 2. A20 Frederick Street Link, Newtownards

This involves creating a direct link from Nursery road, Newtownards to the Fredrick Street roundabout.

This Road is currently awaiting approval.

### **9.9 Roads with significantly change traffic flows or new relevant exposure**

*The technical guidance defines a large increase in traffic as being more than 25% since the last review and assessment.*

Based on data from the annual traffic senses 2004 report there are no roads within the borough which meet this criteria.

### **9.10 Bus stations**

*The technical guidance states that for a bus station to have a significant impact on air quality there needs to be a flow of vehicles greater than 1000 buses per day.*

There are no bus stations within the borough that would meet these criteria.

### **9.11 New Industrial Sources**

There are no new industrial sources within borough which are likely to release significant quantities of nitrogen dioxide.

### **9.12 Industrial sources with substantially increased emissions**

There are no industrial sources with substantially increased emissions within the borough.

### **9.13 Aircraft**

The Borough does not have an airport, however there is an aerodrome located on the Portaferry Road, Newtownards. This services light aircraft movement and it is not considered to have a significant impact on local air quality.

#### **9.14 Conclusion for Nitrogen Dioxide**

The conclusion from the first round of review and assessment continues to be valid, and therefore it will not be necessary to proceed to a detailed assessment for this pollutant.

## 10 Updating and Screening for Sulphur Dioxide

### 10.1 Standard and objective for sulphur dioxide

Pollutant	Objective	To be achieved by
Sulphur Dioxide	<b>1 hour mean:</b> 350 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 24 times a year	31.12.2004
	<b>24 hour mean:</b> 125 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 3 times a year	31.12.2004
	<b>15 minute mean:</b> 266 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times a year	31.12.2005

Sulphur dioxide is an acute respiratory irritant. It is generated during the combustion of fuels containing sulphur. The most significant source is fossil fuelled power stations, other major sources include industrial emissions and commercial & domestic heating.

### 10.2 Background Concentrations

National maps are available from the UK national Air Quality Information Archive which indicates the estimated background sulphur dioxide concentration across the UK. Using current information available from the archive the estimated background concentrations are below 4  $\mu\text{g}/\text{m}^3$ .

### 10.3 Conclusions from the previous review and assessment:

The first round of review and assessment concluded that the objective for this pollutant would not be exceeded and it was therefore not necessary to proceed beyond a stage 2 & 3 assessment.

There is currently no AQMA for sulphur dioxide

## 10.4 Monitoring for Sulphur Dioxide

Since mid 2002 an automatic monitoring station has been located at an urban background site to monitor sulphur dioxide using a UV Fluorescence monitor analyser. This station was recently relocated from the Glen Estate to William Street Newtownards, as a result of the stage 2 & 3 review and assessment. The data from this station is managed and ratified by NETCEN. The monitoring results are contained in appendix 2.

The results indicate that during 2005 there were no exceedences of the 15 minute mean, no exceedences of the 1 hour mean and no exceedences of the daily mean. Although the results indicate that the NAQS objective for sulphur dioxide was not exceeded unfortunately the data capture rate was intermittent due to technical difficulties with the manifold and data logger. The data capture rate for 2005 was low at 87.6% therefore the technical guidance requires the following calculations to be carried out:

- 15minute - 99.9<sup>th</sup> percentile  
 $1.8962 \times 18 \mu\text{g}/\text{m}^3$  (max daily mean)  
 $= 34 \mu\text{g}/\text{m}^3$
- 1 hour - 99.7<sup>th</sup> percentile  
 $1.3691 \times 18 \mu\text{g}/\text{m}^3$  (max daily mean)  
 $= 25 \mu\text{g}/\text{m}^3$
- 24 hour - 99<sup>th</sup> percentile  
 $1.8962 \times 18 \mu\text{g}/\text{m}^3$  (max daily mean)  
 $= 34 \mu\text{g}/\text{m}^3$

Sulphur dioxide is also monitored using an 8 port sampler which located within the Scrabo Estate, Newtownards. The data obtained can not be directly measures against the NAQS objective however it is good indicator. Data from the 8 port sampler is contained in appendix 2.

## **10.5 New industrial sources**

There are no new industrial sources within the Borough

## **10.6 Industrial sources with substantially increased emissions.**

No industrial sources were identified in the first round of review and assessment as having an effect on air quality with Ards.

## **10.7 Areas of domestic coal burning**

Newtownards is a densely populated area with a high concentration of domestic coal burning properties. During the previous round of review and assessment two domestic fuel use surveys were undertaken, this information was then used by BMT Cordah for advanced dispersion modelling. The modelling results showed no exceedences of the NAQS objective for sulphur dioxide.

There are no new areas of relevant exposure within Ards Borough Council.

## **10.8 Boilers**

There are no boiler plants greater than 5mw operating within the borough.

## **10.9 Shipping**

There are no significant shipping emissions within the borough.

## **10.10 Railway locomotives**

There are no railway run locomotives within the borough.

## **10.11 Conclusion**

The conclusion from the first round of review and assessment continues to be valid, and therefore it will not be necessary to proceed to a detailed assessment for this pollutant.

## 11 Updating and Screening for PM<sup>10</sup>

### 11.1 Standard and objective for PM<sup>10</sup>

Pollutant	Objective	To be achieved by
PM <sup>10</sup>	24 hour mean 50 $\mu\text{g}/\text{m}^3$ not be exceeded more than 35 times a year	31.12.2004
	annual mean 40 $\mu\text{g}/\text{m}^3$	31.12.2004
	*24 hour mean 50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 7 times per year	31.12.2010
	*Annual mean 20 $\mu\text{g}/\text{m}^3$	31.12.2010

\* not prescribed in regulations for the purposes of local air quality management.

Particulate matter is often associated with a range of medical conditions including effects on the respiratory and cardiovascular systems and asthma. Particulate matter in the atmosphere is composed of a wide range of material of various origins.

There are a wide range of emissions in the UK which can be divided into three main categories:

1. Primary particle emissions – which are derived directly from combustion sources including road traffic, power generation and industrial processes.
2. Secondary particles – which are formed by chemical reactions in the atmosphere.
3. Coarse particles- comprise of emissions from a wide range of sources including resuspended dusts from road traffic, construction works, and wind blown dusts & soils, and sea salt.

PM<sup>10</sup> is the description given to particles falling below 10 $\mu\text{m}$  in diameter.

## **11.2 Conclusions from previous review and assessment**

The first round review and assessment involved a detailed assessment of this pollutant. Based on the dispersion modelling carried out as part of the stage 2 & 3 assessment, an AQMA was declared in March 2005. The dispersion modelling carried out by BMT Cordah predicted that the NAQS objective (24 hour mean) would be marginally exceeded, as a result of the high level of domestic coal burning with Newtownards.

## **11.3 Monitoring outside an AQMA**

As a result of the air quality review and assessment process there has been a significant expansion of monitoring of PM<sup>10</sup>, there is currently 27 automatic monitoring stations in Northern Ireland.

Real time monitoring of PM<sup>10</sup> has been carried out in Newtownards since mid 2002. An automatic monitoring station is used to monitor emissions from the high density of coal burning properties within the area. PM<sup>10</sup> is monitored using a TEOM analyser. The results from the automatic station are presented in appendix 2.

As a result of the dispersion modelling exercise carried out as part of the stage 2/3 assessment an AQMA was declared for PM<sup>10</sup>. This modelling predicted that the NAQS objective (24 hour mean) would be exceeded within the area of Bradshaws Brae. It was therefore necessary to relocate the automatic monitoring station to a location within that area. The station is now located at William Street, Newtownards.

The 2005 monitoring results indicate that there were two exceedences of the daily mean and no exceedences of the annual mean. Therefore the NAQS for this pollutant was not exceeded. Although authorities have no obligation to review and assess against the 2010 objectives it may be useful to do so, in order to assist with long term planning and the assessment of development proposals within the local area. The results suggest that the 2010 objective will be achieved.

Since November 2000 a semi automatic 8 port sampler has been located in the Scrabo Estate in Newtownards, an area identified with a large percentage of domestic coal burning properties. The results are presented in appendix 2. Although the results can not be directly compared with the NAQS objectives it provides a good indicator.

## **11.4 Monitoring within an AQMA**

On AQMA was declared for PM<sup>10</sup> March 2005, as result of the dispersion modelling exercise carried out for the stage 2/3 review and assessment. The automatic monitoring station was recently relocated to within the AQMA; however there is no monitoring data available to date. An action plan to reduce PM<sup>10</sup> emissions within the AQMA is currently being considered.

## **11.5 Junctions**

There is currently no road side monitoring for PM<sup>10</sup> in Ards Borough Council. The stage one review and assessment concluded that roads did not present a significant source of pollution in Ards. DMRB modelling was carried out as part of the stage 2/3 assessment to determine the impact of road traffic pollution. The sites modelled took into account busy road junctions within Newtownards, and identified that all junctions monitored met the air quality objectives for PM<sup>10</sup>.

## **11.6 Roads with high flow of buses and or HGV's**

*The technical guidance identifies roads with high flow of buses or HGV's as those greater than 20% of ADDT flow.*

Based on the information from the annual traffic census report 2004 and local knowledge there are no roads within Ards that meet this criteria.

## **11.7 New roads constructed or proposed since the last round of review and assessment.**

The Following roads have been proposed sine the last review and assessment:

1. A20 Newtownards Southern Relief Road  
This involves the construction of a new link road connecting the main A20 via Blaire Main Road South to the A21 Comber. Construction is expected to commence 2007.

An Environmental Impact assessment was carried out at the planning stage which adequately considered the impact on local air quality.

2. A20 Frederick Street Link, Newtownards  
This involves creating a direct link from Nursery road, Newtownards to Frederick Street roundabout.  
This Road is currently awaiting approval.

### **11.8 Roads with significantly changed traffic flow or new relevant exposure**

*The technical guidance identifies such roads as having an increase greater than 25% in AADD traffic flow.*

Based on the data from the annual traffic census report 2004 and local knowledge there are no roads with Ards that meet this criteria.

### **11.9 Roads close to the objective during the previous review and assessment.**

The Stage 2/3 assessment concluded that roads were not a problem and therefore no roadside monitoring is carried out within Ards.

### **11.10 New industrial Sources**

There are no new industrial sources within Ards Borough Council

### **11.11 Industrial sources with substantially increased emission**

There are no industrial sources with increased emissions within Ards.

### **11.12 Areas of domestic coal burning**

Newtownards is a densely populated area with a high concentration of domestic coal burning properties. During the previous round of review and assessment two domestic fuel use surveys were undertaken, this information was then used by BMT Cordah for advanced dispersion modelling. The modelling results predicted that the NAQS 24 hour mean objective for PM<sup>10</sup> would be exceeded as a result of domestic coal burning in Newtownards.

There are no new areas of relevant exposure within Ards Borough Council.

### **11.13 Quarries, Landfill sites, opencast coal and dusty port cargoes,**

There are a number of quarries and landfill sites within the Ards Borough Council area. All of which are authorised or licensed processes, therefore the emission of dust is controlled through the conditions of their authorisation/permit or licence.

### **11.14 Aircraft**

Aircrafts are not a major source of PM<sup>10</sup> emissions, but they may make a contribution close to the source. *The technical guidance states that aircraft once they are above 200m will make a negligible contribution to ground concentrations.*

Ards Borough Council does not have an airport, however there is an aerodrome located on the Portaferry Road, Newtownards. As this services light aircraft movement it is not considered to have a significant impact on local air quality.

### **11.15 Conclusion**

The conclusion from the previous round of review and assessment continues to be valid which stated that monitoring within the AQMA should continue in order to determine the location and magnitude of the exceedences. The new monitoring data will be used to carryout a further assessment for PM<sup>10</sup> emissions within the AQMA. This assessment has been delayed due the problems with relocating the monitoring station to a suitable location within the AQMA.

Based on the results of the dispersion modelling carried out as part of the stage 2/3 assessment, an action plan to reduce PM<sup>10</sup> emissions within the AQMA is currently being considered. The Council will consult with the Department, neighbouring Councils, NIHE and other such bodies or persons as are considered appropriate. Consultation is already in place with the NIHE with regards to the fuel conversion programme for Newtownards.

## 12 Updating and Screening Assessment Conclusions

The atmospheric emission sources in Ards have been examined and those aspects that have changed since the first round review and assessment have been identified. New monitoring data has been used to assess compliance with the national air quality objectives for the seven pollutants outlined in the National Air Quality Strategy. The following conclusions have been reached:

Carbon monoxide	No detailed assessment required
Benzene	No detailed assessment required
1,3- Butadiene	No detailed assessment required
Lead	No detailed assessment required
Nitrogen	No detailed assessment required
Sulphur dioxide	No detailed assessment required
PM10	Further assessment required within AQMA

The following actions required as outlined in the previous round continue to be valid:

- To continue monitoring nitrogen dioxide in key locations
- To continue to use the 8 port sampler at the current location to monitor black smoke
- To carryout a further assessment within AQMA, in order to confirm the location and magnitude of the exceedences.
- To consult with other organisations to identify measures required to reduce PM<sup>10</sup> emissions and implement an action plan.

## **Appendix one**

## List of part B and C industrial Processes within Ards

### Part B Industrial Processes

1. Miskelly Bros Ltd, Carrickmannon Quarry, Moss Road, Ballygowan (Authorised)
2. RMC Catherwood Ltd, Carrowdore Quarry Complex, Manse Road, Carrowdore (Authorised)
3. Technical Metals Ltd, 64 South Street, Newtownards (Authorised)
4. Whitemountain Quarries Ltd, Ballystockart Quarry, Ballystockart Road, Comber (Authorised)
5. Farrans Ltd, Ballybarnes Quarry, 61 Ballybarnes Road, Newtownards (Authorised)

### Part C Industrial Processes

1. A1 Fuel Services, 181 Mill Street, Newtownards (Authorised)
2. Ballygowan Service Station, 2 Saintfield Road, Ballygowan (Authorised)
3. Centra Donaghadee, 323 Beersbridge Road, Belfast (Authorised)
4. CE Stevensons & Son, 163 Moneyreagh Road, Ballygowan (Authorised)
5. Comber Costcutter, 31-37 Mill Street, Comber (Authorised)
6. Frances Street Service Station, 110-117 Frances Street, Newtownards (Authorised)
7. Hardford Link Service Station, Hardford Link, Newtownards (Authorised)
8. Hillview Service Station, 91 High Street, Portaferry (Authorised)
9. High Trees Filling Station, 28 New Road, Donaghadee (Authorised)
10. John Hagan & Son, 125/127 Movilla Road, Newtownards (Authorised)
11. S Kelly & Son, 39 Cooks Brae, Kircubbin (Authorised)
12. Maxol/Mace, 61 Harbour Road, Portavogie (Authorised)
13. Merron Oil & Fat, 4 Craigarodden Road, Portaferry (Authorised)
14. Parkview Service Station, 57 Portaferry Road, Newtownards (Authorised)
15. Ready Mixed Concrete (Ulster) Ltd, North Road, Newtownards (Authorised)
16. Riverview Service Station, Killinchy Road, Comber (Authorised)
17. Rosevale Filling Station, 37-55 Bangor Road, Newtownards (Authorised)
18. Asda Petrol Station, Ards Shopping Centre, Newtownards (Authorised)
19. Shop 4 You, 56 Donaghadee Road, Newtownards (Authorised)
20. Spar, Carrowdore, PO Box 49, Hightown Avenue, Newtownabbey (Authorised)
21. Spar Filling Station, Donaghadee Road, Newtownards (Authorised)
22. Strickland Brothers, 2A Newtownards Road, Comber (Authorised)
23. Watson's, 2 The Square, Cloughey (Authorised)

## **Appendix two**

- Results of co-location studies and bias adjustment factors for
  - Castlereagh
  - Lisburn
  - North Down
  - Casella – Liverpool Speke
- Ards No2 diffusion tube results 2001- 2005
- Results from automatic monitoring station 2004 & 2005
- Results from 8 port sampler 2001- 2005

