UPDATING AND SCREENING ASSESSMENT OF AIR QUALITY IN NORTH AYRSHIRE 2006

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Executive Summary

The Environment Act 1995 makes a requirement for Local Authorities to review and assess air quality in their areas. The Air Quality Regulations 1997 provided National Air Quality objectives for 7 key pollutants, local authorities must assess whether these objectives are liable to be met. Any Local Authority, which identifies any areas where objectives are not likely to be met, must declare an Air Quality Management Area.

Following the first and second stage of review and assessment carried out in 1998 and 2000, an updating and screening assessment was undertaken in 2003 to take a more detailed look at air quality. The conclusions for North Ayrshire were as follows:

> "No areas in North Ayrshire have been identified as being at risk of exceeding the objectives for any of the 7 pollutants. There is, therefore, no reason for us to proceed with a detailed assessment for any pollutant.
>
> The current monitoring programme will continue, and a progress report will be published by April 2004."

Since then annual progress reports on local air quality indicated that:

With regard to nitrogen dioxide, it was predicted that a localised area of High Street, Irvine shall continue to be subject to concentration levels in excess of the guideline limit for the annual mean ($40\mu g/m^3$) national air quality standard at the end of 2005. However, this is **not** an area of **relevant public exposure.** Consequently, a detailed assessment for nitrogen dioxide remained unnecessary. It also is predicted that by the end of 2010 all areas will meet the guideline limit for the annual mean national air quality standard for nitrogen dioxide.

Additionally, with regard to the PM_{10}, the predicted estimated annual mean concentration for 2010 was predicted to be $19.75\mu g/m^3$, marginally exceeding the much reduced Scottish Air Quality Objective of $18\mu g/m^3$. However the monitoring location is **not** in an area of **relevant public exposure.** Consequently a detailed assessment for particulate matter PM_{10} remained unnecessary.

A traffic management plan has been implemented for Irvine Town Centre. To secure reductions in both nitrogen dioxide and PM_{10} levels in the area.

Passive sampling has continued in the area to monitor ambient levels of nitrogen dioxide. Additionally, since April 2005 the TEOM particulate monitor has been re-sited in the area, where it remained for twelve months.

This updating and screening assessment has re-examined these findings and, due to the traffic management scheme put in place by North Ayrshire, it again is considered that the Air Quality Objectives for all 7 specified pollutants shall be met, currently and in 2010.

Accordingly, there remains no need to proceed to a detailed assessment for any of the seven air pollutants.

A progress report on local air quality in North Ayrshire shall be prepared for April 2007.

Chapter 1: Introduction

1.1: Summary of National Air Quality Strategy and Local Air Quality Management (LAQM)

In order to tackle the problem of poor air quality the Environment Act 1995 put in place measures at both national and local level. However, there is a significant local dimension to air quality, with emissions varying dramatically in different areas, depending on geography, industry and traffic. Local Air Quality Management aims to ensure that solutions are tailored to local needs. The National Air Quality Strategy requires all local authorities to develop an integrated approach to local air quality management, ensuring that all air quality is considered alongside issues such as transport and land use planning. Local authorities must provide the public with information and forecasts on local air quality, consulting on any action that may be required as a result of poor air quality within their area.

Air quality assessments carried out by Local Authorities should act as benchmarks against which future progress in making improvements to air quality in their areas can be measured.

It should be stressed that, to fully appreciate the standard of local air quality, this updating and screening report should be read in conjunction the air quality reviews, assessments and progress reports already completed by North Ayrshire Council. The Executive Summary of the 2003Updating and Screening Assessment can be found in Appendix 1.

The current phased approach towards air quality is summarised in Table 1.1.

Table1. 1.1 – Summary of Phased Approach Towards Air Quality

Level of Assessment	Objective	Approach
Updating and Screening Assessment	To identify those matters that have changed since the last review and assessment, which might lead to a **risk** of an air quality objective being exceeded.	Use a checklist to identify significant changes that require further consideration. Where such changes are identified, then apply simple screening tools to decide whether there is sufficient risk of an exceedance of an objective to justify a Detailed Assessment.
Detailed Assessment	To provide an accurate assessment of the **likelihood** of an air quality objective being exceeded at locations with relevant exposure. This should be sufficiently detailed to allow the designation or amendment of any necessary AQMAs.	Use quality-assured monitoring and validated modelling methods to determine current and future pollutant concentrations in areas where there is a significant risk of exceeding an air quality objective.

The recommended timescale for submission of reviews and assessments and Progress Reports are detailed in Table 1.1.2.

Table 1.1.2 - Recommended Timescale

LAQM ACTIVITY	COMPLETION DATE	WHICH AUTHORITIES
Updating and Screening Assessment	End of April 2006	All authorities
Detailed Assessment	End of April 2007	Those authorities which have identified the need for a Detailed Assessment in their April 2006 Updating and Screening Assessment
Progress Report	End of April 2007	Those authorities which have identified **no need** for a Detailed Assessment in their April 2006 Updating and Screening Assessment
Progress Report	End of April 2008	All authorities
Updating and Screening Assessment	End of April 2009	All authorities
Detailed Assessment	End of April 2010	Those authorities which have identified the need for a Detailed Assessment in their April 2009 Updating and Screening Assessment
Progress Report	End of April 2010	Those authorities which have identified **no need** for a Detailed Assessment in their April 2009 Updating and Screening Assessment

1.2: Air Quality Objectives

Table 1.3, below shows the Air Quality Objectives required under the Air Quality Regulations 2000 and the Air Quality (Scotland) Amendment Regulations 2002.

Table 1.3: UK Air Quality Objectives

POLLUTANT	AIR QUALITY OBJECTIVE CONCENTRATION	MEASURED AS	DATE TO BE ACHIEVED BY
***BENZENE** All authorities	**16.25 μg/m^3**	Running annual mean	31.12.2003
English and Welsh Authorities only	5.00 μg/m^3	Annual mean	31.12.2010
Scottish and N Ireland Authorities only	**3.25 μg/m^3**	Running Annual Mean	31.12.2010
***1,3 BUTADIENE**	**2.25 μg/m3**	Running Annual mean	31.12.2003
CARBON MONOXIDE	**10.0 mg/m^3**	Maximum Daily Running 8-hour Mean	31.12.2003
***LEAD**	**0.5 μg/m^3** **0.25 μg/m^3**	Annual Mean Annual Mean	31.12.2004 31.12.2008
***NITROGEN DIOXIDE**	**200 μg/m^3** not to be exceeded more than 18 times per year	1 Hour Mean	31.12.2005
	40 μg/m^3	Annual Mean	31.12.2005
***PARTICLES (PM10)** All authorities	**50 μg/m^3** not to be exceeded more than 35 times a year	24 Hour Mean	31.12.2004
	40 μg/m^3	Annual Mean	31.12.2004
Scottish Authorities only	**50 μg/m^3** not to be exceeded more than 7 times a year	24 Hour Mean	31.12.2010
	18 μg/m^3	Annual Mean	31.12.2010
SULPHUR DIOXIDE	**350 μg/m^3** not to be exceeded more than 24 times a year	1 Hour Mean	31.12.2004
	125 μg/m^3 not to be exceeded more than 3 times a year	24 Hour Mean	31.12.2004
	266 μg/m^3 not to be exceeded more than 35 times a year	15 Minute Mean	31.12.2005

1.3: **North Ayrshire: The Area**

The demographics and topography of North Ayrshire was discussed fully in the First Stage Review and Assessment published in 1998 and reference should be made to that document for detailed information.

However, some updating of demographics may be appropriate. See Table 1.4.

Table 1.4 : Population of North Ayrshire

Community	2000	2007	2012	Change
Irvine/Kilwinning	57801	58217	58315	514
Three Towns	32827	32652	32493	-334
Garnock Valley	22146	22059	21949	-197
North Coast	22044	21697	21630	-414
Isle of Arran	4788	5017	5117	329
North Ayrshire	139606	139642	139504	-102

*These figures were produced by North Ayrshire Directory of Information and Research. The data was sourced from the General Register Office for Scotland

As can be seen from the above table it is anticipated that the population of North Ayrshire is expected to remain roughly the same, although the population will increase in Irvine, Kilwinning and the Isle of Arran at the expense of the other areas.

North Ayrshire: Prescribed Processes

The Integrated Pollution Prevention and Control (IPPC) processes continue to be located at five locations:

Hunterston Nuclear Power Station,
Roche Vitamins, Dalry,
Nobel Enterprises, Ardeer, Stevenston,
Caledonian Paper, Meadowhead, Irvine, and
GlaxoSmithkline, Oldhall, Irvine.

In addition to which, there are two adjacent incineration processes

North Ayrshire: Roads

Three trunk routes, A78, A737 and A738 with other "A" Class roads including A71, A736 and A760 serve North Ayrshire.

The Ardrossan, Saltcoats & Stevenston bypass was completed in December 2004. Scoping work is still underway regarding a proposed Dalry by-pass on the A737.

Future Developments and Neighbouring Sources

There are no known planned developments within North Ayrshire or neighbouring local authority areas which will have a significant effect on local air quality.

Chapter 2 – Updating and Screening Assessment for Benzene

2.1 Standard and Objective for Benzene

The Government has adopted a running annual mean of 16.25μg/m^3 as an air quality standard for benzene, to be achieved by the end of 2005. In Scotland, there is a tighter objective for an annual mean of 3.25 μg/m^3 to be achieved by the end of 2010. The focus of an authority's review and assessment for benzene should be non-occupational near ground level outdoor locations with elevated benzene concentrations in areas where a person might reasonably be expected to be exposed over a year (e.g. in the vicinity of housing schools or hospitals etc).

2.2 The National Perspective

Existing national policies are expected to deliver the prescribed air quality objective for benzene by the end of 2005. Roadside levels of benzene next to even the most busy or congested road are expected to be well below the objective by the year 2005. Only those authorities with major industrial processes which either handle, store or emit benzene, which have the potential, in conjunction with other sources to result in elevated levels of benzene in relevant location are expected to need to undertake a second or third stage review assessment. It is expected for benzene that most local authorities will not need to progress past the first stage.

2.3 Information to be considered upgrading and screening assessment

For the purposes of an updating and screening assessment for benzene the information required to be considered is: -

- Road traffic data for very busy roads and junctions in areas where the 2010 background is expected to be above 2 μg/m^3. The LAQM. TG (03) define these roads as, single carriageway roads with daily average traffic flows which exceed 80,000 vehicles per day, dual carriageway roads with daily average traffic flows which exceed 120,000 vehicles per day, motorways with daily average traffic flows which exceed 140,000 vehicles per day. It is only necessary to include very busy roads and junctions not considered in previous review and assessment reports where there had been a significant increase (>10% AADT)

- Details of any industrial sources which may have been considered in the first round of Review and assessment, but which will have to be considered again against the new objective.

- Details of any petrol stations within the District which have an annual throughput of more than 2 million litres of petrol per annum, and with a busy road nearby, a busy road can be taken to be one with more than 30,000 vehicles per day.

- Any major fuel storage depots in the area.

2.4 Background Benzene Concentrations

National figures are available which indicate estimated background benzene concentrations across the UK for 2001 and projected for 2010. The estimated background concentrations of benzene in 2010 for the North Ayrshire, expressed as a running annual mean, are all less than 0.3 μg/m^3.

2.5 Benzene Monitoring in North Ayrshire

No benzene monitoring appropriate for this review and assessment has been carried out in North Ayrshire.

2.6 SEPA Authorised Processes

The review of authorised processes identified 8 Part A processes at three locations which could be a potential significant sources of benzene.

Roche Products, Dalry
Smithkline Beecham, Irvine
Nobel's Explosives, Stevenston

These processes are authorised by the Scottish Environment Protection Agency and the initial consultation exercise with the agency identified that only two processes would emit benzene and it would only be in small quantities arising from the combustion of coal. Therefore there are no Part A processes within North Ayrshire, which are a significant source of benzene. It since has been confirmed that there are no significant increase in benzene outputs.

There are no Part B processes within North Ayrshire, which are likely to give, rise to significant quantities of benzene.

2.7 Roads in North Ayrshire

Consultation with Roads Services and Transport Scotland has shown that North Ayrshire Council has no very busy roads, the busiest section of road being the A78 Kilwinning by-pass, where the May 2006 traffic flow count was 30,065. As there is no location within North Ayrshire where the predicted background concentration of benzene is greater than $2\mu g/m^3$ (the highest predicted level being $0.219\mu g/m^3$) no further assessment of the likely effect of road traffic emissions has been undertaken.

2.8 Petrol Stations within North Ayrshire

There are two petrol stations within North Ayrshire, which have a throughput of more than two million litres of petrol per year. None, however, are located where there is a relevant exposure within 10metres of the petrol pumps.

2.9 Major Fuel Storage Depots

There are no major fuel storage depots in North Ayrshire.

2.10 Conclusions for Benzene

1. There is no significant source of benzene located either within North Ayrshire or neighbouring areas which is likely to adversely affect air quality within North Ayrshire.

2. There continues to be no need to proceed to a detailed assessment for benzene.

Chapter 3 – Updating and Screening Assessment of 1,3-Butadiene

3.1 Standard and Objective for 1,3-Butadiene

The Government has adopted a running annual mean of 2.25 $\mu g/m^3$ as an air quality standard for 1,3-Butadiene with an objective for the standard to be achieved by the end of 2005. The focus of an authority's review and assessment for 1,3-Butadiene should be non-occupational near ground level outdoor locations with elevated 1,3-Butadiene concentration where a person might reasonably be expected to be exposed over a year (e.g. in the vicinity of housing, schools or hospitals).

3.2 The National Perspective

Concentrations of 1,3-Butadiene measured at a limited number of UK national network sites, including urban locations and roadside locations were all well below the 2003 objective. Increasing numbers of vehicles are equipped with 3 way catalysts, which significantly reduce emissions of 1,3-Butadiene and improvements to fuel quality are expected to deliver the air quality objective by the end of 2003. Only those authorities with relevant locations near major industrial processes, which handle, store or emit 1,3-butadiene, are expected to proceed to a detailed assessment.

3.3 Information to be considered for an updating and screening assessment

For purposes of an updating and screening assessment for 1,3-Butadiene consideration must be given to information on new industrial sources and previous sources which have seen substantially increased emissions of 1,3-Butadiene.

The Local Air Quality Management Technical Guidance LAQM. TG (03) define a 'substantial' increase as one greater than 30%.

3.4 Background 1,3-Butadiene concentrations

National figures are available which indicate the estimated background 1,3-Butadiene concentrations across the UK for 2001 and the projected values for2003.

Estimated background 1,3-Butadiene concentrations for North Ayrshire expressed as an annual mean are all less than 0.2 $\mu g/m^3$.

3.5 1,3-Butadiene Monitoring in North Ayrshire and Neighbouring Local Authorities

No monitoring of 1,3-Butadiene has been carried out in North Ayrshire in recent years.

3.6 SEPA Authorised Processes

The review of authorised processes identified Part A processes at three sites which could be a potential significant source of 1,3-Butadiene.

Roche Products, Dalry
Smithkline Beecham, Irvine
Nobel's Explosives, Stevenston

These processes are authorised by the Scottish Environment Protection Agency and the consultation exercise with the agency at the time of the first stage review in 1998 identified that none of the above processes would emit 1,3-Butadiene to air. Since that time, none of the above possible sources have seen substantially increased emissions of 1,3-Butadiene.

There are therefore no Part A processes within North Ayrshire which are a significant source of 1,3-Butadiene.

There are no Part B processes within North Ayrshire, which are likely to give, rise to significant quantities of 1,3-Butadiene.

3.7 Conclusions for 1,3-Butadiene

1. There is no significant sources of 1,3-Butadiene located either within North Ayrshire or neighbouring areas which is likely to adversely affect air quality in North Ayrshire.

2. There continues to be no need to proceed to a detailed assessment for 1,3-Butadiene.

Chapter 4 – Updating and Screening Assessment of Carbon Monoxide

4.1 Standard and Objective for Carbon Monoxide

The Government has adopted an 8-hour running average of 10 milligrams per cubic metre (mg/m^3) as the air quality standard for carbon monoxide, with an objective for the standard to be achieved as the maximum 8 hour running average by the end of 2005. The focus of an authority's updating and screening assessment for carbon monoxide should be the following non-occupational, near ground level outdoor locations:

Background locations; roadside locations; and other areas of elevated carbon monoxide concentrations where a person might reasonably be expected to be exposed over an 8 hour period (e.g. in the vicinity of housing, schools or hospitals etc).

4.2 Information to be considered for an Updating and Screening Assessment

For the purposes of an updating and screening assessment for carbon monoxide the information required to be considered are road traffic data for very busy roads or junctions in built-up areas where the 2003 background is expected to be above $1mg/m^3$. The Local air Quality Management Technical Guidance LAQM. TG (03) define these roads as follows:

- Single carriageway roads with current or projected daily average traffic flow greater than 80,000 vehicles per day
- Dual carriageway (2 or 3-lane) roads with current or projected daily average traffic flow greater than 120,000 vehicles per day
- Motorways with current or projected daily average traffic flow greater than 140,000 vehicles per day
- Road junctions in built-up areas with the above daily average traffic flows.

LAQM. TG (03) also indicates that there are likely to be few roads meeting these criteria.

There are no roads within North Ayrshire where existing or projected traffic flows are greater than those specified above.

The busiest section of road within North Ayrshire is a length of the A78 Kilwinning by-pass where the May 2006 traffic flow count was 30,065.

4.3 Background Carbon Monoxide Concentrations

Whilst there are National figures are available which indicate the estimated background carbon monoxide concentrations across the UK for 2001 there are none for 2005 or 2010

Using the 2001 values for North Ayrshire the projected background carbon monoxide concentrations in 2003, expressed as an annual mean, are all less than $0.22\ mg/m^3$. On the basis of this figure the 2005 and 2010 background concentration of carbon monoxide is expected to be well below $1\ mg/m^3$.

4.4 Carbon Monoxide Monitoring in North Ayrshire and Neighbouring Local Authorities

Carbon monoxide monitoring has been carried out by North Ayrshire Council using an automatic analyser located in a road canyon in High Street, Irvine. This equipment is operated in partnership with Inverclyde Council, each authority siting it in their area for 12-month periods.

An automatic CO analyser operated in the Cross area of Irvine from March to December 2005. Less than 90% of the data for the calendar year was collected. However, the average for data captured is 0.223 mg/m^3, with a maximum of 0.366 mg/m^3. It is unlikely that the missing data would be elevated enough to raise concentrations to be in the region of the Air Quality Objective of 10 mg/m^3.

4.5 Roads in North Ayrshire

DMRB modelling of the busiest roads and junctions undertaken for the updating and screening process in 2003 indicated that there should be no exceedences of the air quality objective for 2005 or 2010.

4.6 SEPA Authorised Processes

Previous assessments showed that there were no processes carried on in North Ayrshire or neighbouring authority areas likely to have a significant impact on the levels of atmospheric carbon monoxide.

Consultation with the Scottish Environment Protection Agency, as part of this updating and screening assessment, indicated that there are no prescribed processes within North Ayrshire with significantly increased emissions of carbon monoxide.

4.7 Conclusions for Carbon Monoxide

1. There is no significant carbon monoxide source located either within North Ayrshire or neighbouring areas which are likely to adversely affect air quality in North Ayrshire.

2. There continues to be no need to proceed to a detailed assessment for carbon monoxide.

Chapter 5: Updating and Screening Assessment of Lead

5.1 Standard and Objective for Lead

The Government has adopted an annual mean of 0.5μg/m^3 as an air quality standard for lead. The objective is for the standard to be achieved by the end of 2005. Additionally, by 2008 a tighter annual mean standard of 0.25μg/m^3 must be met. The focus of an authority's updating and assessment for lead should be non-occupational, near ground level, outdoor locations with elevated lead concentrations in areas where a person might reasonably be expected to be exposed over a year (e.g. the vicinity of housing, schools and hospitals etc).

5.2 Information to be considered for an Updating and Screening Assessment

For the proposes of an updating and screening exercise for lead the information required for consideration is:

- Industrial sources, identified during previous rounds of review and assessment as likely to give rise to exceedances of the annual mean objective for lead,
- Any new sources of lead introduced into North Ayrshire since that time; and
- expected to be in existence and/or operation by the end of 2005; and
- for which there is a potential for exposure of individuals in relevant locations.

5.3 Background Lead Concentrations

No national maps are available which indicate estimated background lead concentrations across the UK for 2001-03. However, at the time of the first round of review and assessment figures provided by DETR estimated background concentrations of lead for North Ayrshire for 1996 as less than 0.02μg/m^3.

5.4 Lead Monitoring in the UK

Lead has been monitored in the UK by the Government's national networks since 1976. Lead is measured under five different networks throughout the UK.

Urban levels have reduced to the extent that the maximum annual average values for 2001 range from 0.016μg/m^3 to 0.419μg/m^3.

There are two lead monitoring sites in Scotland which are part of the multi-element monitoring network, Glasgow and Motherwell. Since monitoring began, lead levels at these sites have reduced dramatically and, as stated in Table 5.1 of Technical Guidance Note LAQM TG(03), the respective annual mean concentrations of lead for the year 2001was 0.025μg/m^3 in Glasgow and 0.016μg/m^3 in Motherwell.

In 1996 the maximum annual average values at these monitoring points were 0.052 μg/m^3 and 0.03μg/m^3 respectively. This indicates that over the intervening 5 years the concentration of lead in the atmosphere has halved.

5.5 Lead Monitoring in North Ayrshire

No monitoring of airborne lead has been carried out in North Ayrshire.

5.6 SEPA Authorised Processes

The review of authorised processes in accordance with the pollutant specific guidance and in consultation with SEPA identified that there are no new prescribed processes within North Ayrshire with the potential to emit significant quantities of lead.

5.7 Conclusions for Lead

1. There is no significant industrial source of lead located either, within North Ayrshire or neighbouring areas, likely to adversely affect air quality in North Ayrshire.

2. There continues to be no need to proceed to a detailed assessment for lead.

Chapter 6 - Updating and Assessment of Nitrogen Dioxide

6.1 Standard and Objective for Nitrogen Dioxide

The Government has adopted a 1-hour mean of 200μg/m^3 with no more than 18 exceedances per year as an air quality standard. This standard to be achieved by the end of 2005.

The Government has also adopted an annual average of 40μg/m^3 as an air quality standard to be achieved by the end of 2005.

6.2 Information to be considered for a Updating and Screening Assessment

For the purposes of an updating and screening assessment the following information requires to be considered: -

- Any current monitoring which North Ayrshire Council is currently undertaking within its area.
- Any narrow congested streets with residential properties close to the kerb, these would be roads, which were less than 10m wide and with a traffic flow of greater than 10,000 vehicles per day.
- Any busy junctions, where there is relevant exposure within 10m of the kerb. For the purposes of this assessment busy can be taken to mean any junction which has greater than 10,000 vehicles per day.
- Any busy streets where people may spend 1-hour or more close to traffic. Again busy can be taken to mean streets with a flow of greater than 10,000 vehicles per day.
- Any roads with a high proportion of HGV's (greater than 25%) where there is relevant exposure within 10m of the road.
- Any new roads constructed or proposed since the first round of review and assessment.
- Any roads which were close to the objective during the first round of review and Assessment
- Any roads, which have a significantly higher traffic flow i.e. a 25% increase, and which is considered to be at risk of exceeding the objective.
- Any non-enclosed bus stations within the area.
- Any new industrial sources
- Any industrial sources with substantially increased emissions, a significant increase can be taken to be one greater than 30%
- Any airport where there is a relevant exposure within 1000 metres of the airport boundary.

6.3 Nitrogen Dioxide Monitoring in North Ayrshire

In North Ayrshire passive diffusion tube monitoring of nitrogen dioxide has been undertaken regularly since 1993, after earlier involvement in the two short national surveys.

The aim of the nitrogen dioxide monitoring undertaken so far in North Ayrshire has been to measure pollutant concentrations at busy roads and junctions especially near residential areas. Monitoring has also been undertaken at sites where the continuous frontage of buildings provides a canyon effect and allows pollutant levels to accumulate.

Four of the monitoring sites in the Irvine Cross area became part of the National Nitrogen Dioxide Diffusion Tube Survey in 1998.

Summarised in tabular form and graphically, the results of monitoring in Irvine Town Centre and outlying areas are shown in Appendix 5.1 and 5.2 respectively. They show that nitrogen dioxide levels remain low at all sites except in the High Street, Irvine area, where levels had risen over recent years. This was considered to be due to the number of public service vehicles waiting in this area.

However, since a traffic management scheme was put in place by North Ayrshire Council all nitrogen dioxide concentrations have fallen to a level significantly lower than 40 $\mu g/m^3$.

6.4 Background concentrations of Nitrogen Dioxide

National figures are available which indicate the estimated background nitrogen dioxide concentrations across the UK. Estimated concentrations for North Ayrshire for 2005 are between 1.96 $\mu g/m^3$ and 11.3 $\mu g/m^3$. For 2010 levels are between 1.66 $\mu g/m^3$ and 10$\mu g/m^3$.

6.5 Roads and Junctions within North Ayrshire

After consultation with Transport Scotland and Roads section of North Ayrshire, it was possible to conclude the following: -

In North Ayrshire, there is now a narrow and congested road with a traffic flow greater than 10,000 vehicles per day with residential property close to the kerb. This was not considered in previous assessments as the traffic flow was less than 10,000 vehicles per day. Accordingly, it has now been assessed using the DMRB screening model. The results of this assessment can be seen in Appendix 2.1. The concentration of nitrogen dioxide predicted for 2010 is 13.8 $\mu g/m^3$.

Other roads/junctions, which have more than 10,000 vehicles per day, with relevant exposure near the kerb, including busy streets where people may spend 1-hour or more close to traffic were assessed using the DMRB screening model, for the updating and screening assessment process in 2003.

With the exception of the High Street, Irvine there are no roads with a high proportion of Heavy Goods Vehicles. There the majority of traffic is delivery vehicles and public service vehicles that tend to wait, sometimes for prolonged periods (over two minutes). There is limited access for private vehicles for drivers with incapacities. As a result, in 2002, over a short length of the road, the kerbside level of nitrogen dioxide marginally exceeds the annual mean objective. The concentration of nitrogen dioxide rose again in 2003 before dropping in 2004 and 2005 when the level was significantly below the Annual Mean Air Quality objective (See Table 5.1: Local Bias Corrected Nitrogen dioxide Levels 1998-2005 and Predicted Levels for 2010. This significant improvement would appear to be a consequence of a traffic management scheme instigated by North Ayrshire Council.

There are no non-enclosed bus stations within the Council area.

Since the previous updating and screening assessment the Three Towns By-pass has been completed and open to traffic since December 2004, taking through traffic away from the conurbation of Ardrossan/Saltcoats/Stevenston.

6.6 Industrial Sources of Nitrogen Dioxide

Consultation with SEPA has indicated that there are no new industrial sources of nitrogen dioxide, and no existing industrial sources with substantially increased emissions since the assessment.

6.7 Airports and Aircraft

There are no airports in North Ayrshire. The nearest airport is at Prestwick in South Ayrshire, approximately 6 Kilometres to the south.

6.8 Conclusions for Nitrogen Dioxide

1. The Annual Mean Objective for nitrogen dioxide is now being complied with throughout North Ayrshire as demonstrated by passive monitoring. However, monitoring should continue, especially in High Street, Irvine, to ensure the improvement in air quality is maintained.

2. DMRB screening shows that there are no areas within North Ayrshire, which are likely to fail the objective due to road traffic.

3. There are no significant industrial sources of nitrogen dioxide within, either North Ayrshire or neighbouring areas that would adversely affect local air quality in North Ayrshire.

4. There continues to be no need to proceed to a detailed assessment for nitrogen dioxide.

Chapter 7 –Updating and Screening Assessment for PM_{10}

7.1 Standard and Objective for PM_{10}

The Government has adopted an objective of 40 $\mu g/m^3$ as an annual mean, and 50 $\mu g/m^3$ as a fixed
24-hour mean to be exceeded no more than 35 days per year, to be achieved by the end of 2004.

The Scottish Executive, however, has also adopted the more strict objective of 18 $\mu g/m^3$ as an annual mean, and 50 $\mu g/m^3$ as a 24-hour mean (to be exceeded no more than 7 times per year), both to be achieved by the end of 2010.

7.2 Information to be considered for the Updating and Screening Assessment

For the purposes of the updating and screening assessment the following information requires to be considered: -

- Any monitoring data gathered over the previous 3 years;
- Busy roads and junctions;

  For the purposes of this assessment, "busy" can be assumed to mean:

  A) any roads or junctions with more than 5,000 vehicles per day (where the annual background in 2010 is expected to be above 15 $\mu g/m^3$), or

  B) any roads or junctions with more than 10,000 vehicles per day (where the annual background in 2010 is expected to be below 15 $\mu g/m^3$).

- Any busy junctions with relevant exposure within 10m of the kerb, for the purposes of this assessment busy can be taken to mean any junction with more than 10,000 vehicles per day.
- Any roads with a high flow of buses and /or HGVs, ("an unusually high proportion" can be taken to be greater than 20% of the annual average daily flow).
- Any new roads constructed or proposed since the last round of review and assessment.
- Any roads, which were close to the objective during the first round of review and assessment, these are only to be considered against the 2004 objective.
- Any roads with significantly changed traffic flows, this would be considered to be roads with an increase of around 25% in AADT.
- Any new industrial sources.
- Any industrial sources with substantially increased emissions, where a substantial increase can be taken to be one greater than 30%.
- Areas of domestic solid fuel burning. (For these purposes an area with significant solid fuel burning would be one with more than 50 houses using solid fuel as a primary heating source within a 500m by 500m area).
- Quarries, landfill sites, open-cast coal, handling of dusty cargoes at port.
- Any airport where there is a relevant exposure within 500metres of the airport boundary.

7.3 Background PM_{10} Concentrations

National maps are available which indicate the estimated background PM_{10} concentrations across the UK. Estimated background PM_{10} concentrations for North Ayrshire area for 2005 are between 9.59μg/m^3 and 18μg/m^3. For 2010 the levels are between 9.1μg/m^3 and 17.4 μg/m^3.

7.4 PM_{10} Monitoring within North Ayrshire

Continuous PM_{10} monitoring is carried out by North Ayrshire Council at High Street, Irvine. This site was chosen as it is on a heavily used bus route within Irvine town centre. A PM_{10} analyser operated from March to December 2005. Less than 90% data for calendar year. However, the average for data captured is 13.6 μg/m^3 (17.42 μg/m^3 Gravimetric) with a maximum of 16.8 μg/m^3 (21.84 μg/m^3 Gravimetric). No exceedence of the 1-Hour Mean Objective was recorded.

7.5 Roads and Junctions in North Ayrshire

All major roads and junction were assessed at time of previous updating in 2003. Since that time the 3-Towns By-pass has been completed taking through traffic away from the conurbation of Ardrossan/Saltcoats and Stevenston.
The 2003 Updating and Screening assessment predicted that the air quality objective would not be exceeded in the Cross area of Irvine. Qualitatively, the volume of traffic, particularly buses, has reduced and the latest prediction of the background PM_{10} concentrations for 2010 has reduced from 14 μg/m^3 to 12.5μg/m^3, the predicted level will reduce further.
Assessment using the DMRB assessment model has been carried out and this confirms the new predicted level for 2005 to be 14. 4μg/m^3 and 2010 14.1μg/m^3. See Appendix 2.2 and 2.3.

7.6 Industrial Sources within North Ayrshire

Recent correspondence with SEPA has indicated that there are no new industrial sources of PM_{10} within North Ayrshire, and none of our existing industries have had a significant increase in PM_{10} emissions.

7.7 Houses Burning Solid Fuel as their Primary Source of Heating

Monitoring across the local authority area, undertaken from 1976, identified the urban areas most at risk of elevated levels of sulphur dioxide and smoke. The Council then embarked on an extensive scheme of Smoke Control during the 1980s and early 1990s. By 1996, 27,000 houses within North Ayrshire were covered by Smoke Control Orders including Dalry, Kilbirnie, Glengarnock, Ardrossan, Saltcoats, Stevenston and Kilwinning. During this process most occupiers took the opportunity to change to natural gas or electricity as the primary source of heating. It has been estimated that only about 10% of households continued using solid fuel.

In addition, the Council embarked on a programme of renovating all local authority housing stock. This included the change to natural gas or electricity as the primary source of heating.

With regard to all major housing developments, all have natural gas or electricity as the primary source of heating.

There are, therefore, very few residential properties within North Ayrshire which have solid fuel as a primary heating source, and no areas with more than 50 houses within a 500m by 500m square which use solid fuel.

7.8 Commercial Sources of PM_{10}

All commercial sources (quarries, landfill sites and ports) were assessed for the 2003 Updating and Screening Assessment. There has been no significant change to these activities; therefore further assessment is not required at this time.

7.9 Airports and Aircraft

There are no airports in North Ayrshire. The nearest airport is at Prestwick in South Ayrshire, approximately 6 Kilometres to the south.

It is considered, therefore, that none of the above potential sources of PM_{10} is likely to cause any exceedance of the Air Quality Objective.

7.10 Conclusions for PM_{10}

1. There are no industrial sources within North Ayrshire, which are liable to cause any exceedances in 2010 objectives for PM_{10}.

2. Screening using the DMRB model indicates that road traffic will not cause any exceedances of the objectives for PM_{10}.

3. There is no requirement to proceed to a detailed assessment for PM_{10}.

Chapter 8: Updating and Screening Assessment of Sulphur Dioxide

8.1 Standard and Objective for Sulphur Dioxide

The Scottish Executive has adopted a 15 minutes mean of 266μg/m^3 as an air quality standard for sulphur dioxide. The objective for the standard is to be achieved as the 99.9th percentile (i.e. level not to be exceeded more than 35 times in a year) by the end of 2005. The focus of an authority's updating and screening assessment should be any non-occupational, near ground level, outdoor location given that exposures over 15 minutes are potentially likely in these locations.

Additional objectives have been set that are equivalent to the European Union Limit Values specified in the First Air Quality Daughter Directive. These are:

The 1-hour Mean objective of 350 μg/m^3 to be exceeded no more than 24 times in a year;

The 24-hour mean objective of 125 μg/m^3 to be exceeded no more than 3 times in a year

8.2 Information to be considered for an Updating and Screening Assessment

The local authority should identify those existing or proposed processes or activities which have the potential, singly or together, to emit significant quantities of sulphur dioxide and

- are expected to be in existence and/or operation by 2005 and
- for which there is potential for exposure of individuals in relevant locations.

For the purposes of an updating and screening assessment these can be assumed to consist of:

- All Part A industrial processes, Integrated Pollution Prevention and Control (IPPC) and Pollution Prevention and Control (PPC), with the potential to emit sulphur dioxide.
- All Part B industrial processes with the potential to emit sulphur dioxide.
- All solid fuel or fuel oil combustion system with thermal power greater than 5MW.
- Any 0.5 km x 0.5km grid-square in the authority's area where there may be more than 100 houses burning solid fuel as their primary source of heating.
- Ports with more than 5000 ship movements per year where the berths and main areas of manoeuvring are within 1km of a relevant exposure.
- Locations where diesel locomotives are likely to be stationary for periods of 15 minutes or more within 15 metres of a relevant exposure.

8.3 Rural Sulphur Dioxide Network

As part of the Rural Sulphur Dioxide Network, North Ayrshire Council are site operators for the 8-port sampler located at Camphill. This site gives weekly concentrations. The results can be used to give an indication of background sulphur dioxide levels for the area.

Reference to the background pollution level data for the year 2001 provided by Netcen, on behalf of the Scottish Executive indicates that the maximum background sulphur dioxide concentration for North Ayrshire was 8.47 μg/m^3

8.4 Sulphur Dioxide Monitoring in North Ayrshire

Monitoring for sulphur dioxide and smoke has been discontinued in North Ayrshire since 2004. Historical monitoring data is available for nearly every town in the area and there is no indication from these results that the air quality standard is likely to be breached even around local industrial sources.

8.5 Part A and Part B Authorised Processes

The review of authorised processes in accordance with the guidance identified no new Part A processes, either IPPC or PPC, that have the potential to emit significant quantities of sulphur dioxide.

All known processes, either IPPC or PPC were discussed in previous updating and screening reports

8.6 Combustion Sources greater than 5MW

All known combustion systems >5MW were discussed in previous updating and screening reports.

8.7 Houses Burning Solid Fuel as their Primary Source of Heating

Monitoring across the local authority area, undertaken from 1976, identified the urban areas most at risk of elevated levels of sulphur dioxide. The Council then embarked on an extensive scheme of Smoke Control during the 1980s and early 1990s. By 1996, 27,000 houses within North Ayrshire were covered by Smoke Control Orders including Dalry, Kilbirnie, Glengarnock, Ardrossan, Saltcoats, Stevenston and Kilwinning. During this process most occupiers took the opportunity to change to natural gas or electricity as the primary source of heating. It has been estimated that only about 10% of households continued using solid fuel.

This has been a major step forward in the reduction of pollution locally.

In addition, the Council embarked on a programme of renovating all local authority housing stock. This included the change to natural gas or electricity as the primary source of heating.

With regard to all major housing developments, all have natural gas or electricity as the primary source of heating.

8.10 Shipping

Within North Ayrshire there are two main ports, both operated by Clydeport:

- Ardrossan handles some container shipping, other cargo vessels and the Arran ferry
- Hunterston handles the importing and trans-shipment of coal by sea rail and, to a lesser extent, road/rail.

Neither has large shipping traffic approaching 5000 movements per year.

8.9 Railway locomotives

The rail link serving North Ayrshire is electrified therefore there are very few diesel-powered passenger trains each day. Goods trains on the network are diesel-powered. There are no major stockyards apart from those serving Hunterston coal terminal. These, however, are not within 15 metres of a relevant location Neither are there any stations or signal junctions where diesel locomotives are likely to be stationary for 15 minutes or more within 15 metres of a relevant exposure.

8.11 Conclusions

1. The extensive smoke control programme undertaken by Cunninghame District Council has improved sulphur dioxide levels in the area due to the shift to natural gas and electricity.

2. The extensive historical monitoring programmes for sulphur dioxide in North Ayrshire has covered every urban area and results indicate the air quality standard is being met.

3. There remains no need to progress to a detailed assessment for sulphur dioxide.

APPENDIX

APPENDIX 1 - UPDATING & SCREENING ASSESSMENT 2003

Executive Summary

The Environment Act 1995 makes a requirement for Local Authorities to review and assess air quality in their areas. The Air Quality Regulations 1997 provided National Air Quality objectives for 7 key pollutants, local authorities must assess whether these objectives are liable to be met. Any Local Authority, which identifies any areas where objectives are not likely to be met, must declare an Air Quality Management Area.

The first stage of review and assessment was carried out in 1998, the conclusions for North Ayrshire were as follows: -

1. The air quality objectives for 6 of the 7 specified parameters namely benzene, 1,3-butadiene, carbon monoxide, lead, PM_{10} and sulphur dioxide are all likely to be achieved by 2005.

2. There is insufficient information at this stage to conclude that the nitrogen dioxide standard will be achieved in the vicinity of several local industrial sources and therefore North Ayrshire will be progressing to a second stage review and assessment for nitrogen dioxide.

The second stage review and assessment was carried out in 2000, the conclusions of which were as follows:-

1. The air quality objective for nitrogen dioxide are likely to be met by the end of 2005, it will, therefore not be necessary to proceed to a stage three review and assessment.
2. It would be prudent to undertake a limited programme of diffusion tube monitoring adjacent to the A78 at Auchengate sawmill to confirm the level of nitrogen dioxide at that location.

Since the second stage review, the Air Quality (Scotland) Amendment Regulations 2002 have been enacted, these regulations have reduced the objective levels for many of the pollutants. As part of the new phased approach for review and assessment North Ayrshire Council has now carried out an updating and screening assessment to identify areas where there is a risk of exceedences of the new objectives.

No areas in North Ayrshire have been identified as being at risk of exceeding the objectives for any of the 7 pollutants. There is, therefore, no reason for us to proceed with a detailed assessment for any pollutant.

The current monitoring programme will continue, and a progress report will be published by April 2004.

APPENDIX 2.1: DMRB: Assessment of Local Air Quality

Receptor name	Dwellings: New Street, Dalry	Receptor number	2

Year	2010

Number of links	1

	Eastings	Northings
Grid Ref.	229294	649367

Background concentrations for 2010					
CO (mg/m^3)	Benzene ($\mu g/m^3$)	1,3-butadiene ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
0.129	0.0935	0.0464	5.92	4.64	10.05

Link number	Distance from link centre to receptor (m)	Traffic flow & speed	
		AADT (combined, veh/day)	Annual average speed
1	6	11495	8

Traffic composition							
Road type (A,B,C,D)	Vehicles <3.5t GVW (LDV)			Vehicles>3.5t GVW (HDV)			
	% passenger cars	% light goods vehicles	Total % LDV	% buses and coaches	% rigid HGV	% articulated HGV	Total % HDV
B			90				10

Receptor Name	Dwellings: New Street, Dalry	Receptor number	2
Assessment year	2010		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.13	0.22	0.35	mg/m^3	Annual mean*	0.35	mg/m^3
Benzene	0.09	0.19	0.28	$\mu g/m^3$	Annual mean	0.28	$\mu g/m^3$
1,3-butadiene	0.05	0.22	0.26	$\mu g/m^3$	Annual mean	0.26	$\mu g/m^3$
NO_x	5.9	32.8	38.7	$\mu g/m^3$	Not applicable		
NO_2	4.6	9.2	13.8	$\mu g/m^3$	Annual mean*	13.8	$\mu g/m^3$
PM_{10}	10.1	3.68	13.73	$\mu g/m^3$	Annual mean	13.7	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

APPENDIX 2.2: DMRB: Assessment of Local Air Quality

Receptor name	High Street, Irvine	Receptor number	3
Year	2005		
Number of links	1	Grid Ref.	Eastings 232129, Northings 638915

Background concentrations for 2005					
CO (mg/m^3)	Benzene ($\mu g/m^3$)	1,3-butadiene ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
0.129	0.0935	0.0464	7.5	5.88	11.4

Link number	Distance from link centre to receptor (m)	Traffic flow & speed	
		AADT (combined, veh/day)	Annual average speed
1	11	1071	8

Traffic composition							
Road type (A,B,C,D)	Vehicles <3.5t GVW (LDV)			Vehicles>3.5t GVW (HDV)			
	% passenger cars	% light goods vehicles	Total % LDV	% buses and coaches	% rigid HGV	% articulated HGV	Total % HDV
B			20				80

Receptor Name	High Street, Irvine	Receptor number	3
Assessment year	2005		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.13	0.03	0.16	mg/m^3	Annual mean*	0.16	mg/m^3
Benzene	0.09	0.01	0.10	$\mu g/m^3$	Annual mean	0.10	$\mu g/m^3$
1,3-butadiene	0.05	0.13	0.18	$\mu g/m^3$	Annual mean	0.18	$\mu g/m^3$
NO_x	7.5	24.8	32.3	$\mu g/m^3$	Not applicable		
NO_2	5.9	7.2	13.1	$\mu g/m^3$	Annual mean*	13.1	$\mu g/m^3$
PM_{10}	11.4	3.00	14.40	$\mu g/m^3$	Annual mean	14.4	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

APPENDIX 2.3: DMRB: Assessment of Local Air Quality

Receptor name	Dwellings: High Street, Irvine	Receptor number	1

Year	2010

Number of links	1

	Eastings	Northings
Grid Ref.	232129	638915

Background concentrations for 2010					
CO (mg/m^3)	Benzene ($\mu g/m^3$)	1,3-butadiene ($\mu g/m^3$)	NO_x ($\mu g/m^3$)	NO_2 ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
0.164	0.18	0.085	21.8	16.1	12.5

Link number	Distance from link centre to receptor (m)	Traffic flow & speed	
		AADT (combined, veh/day)	Annual average speed
1	11	1157	8

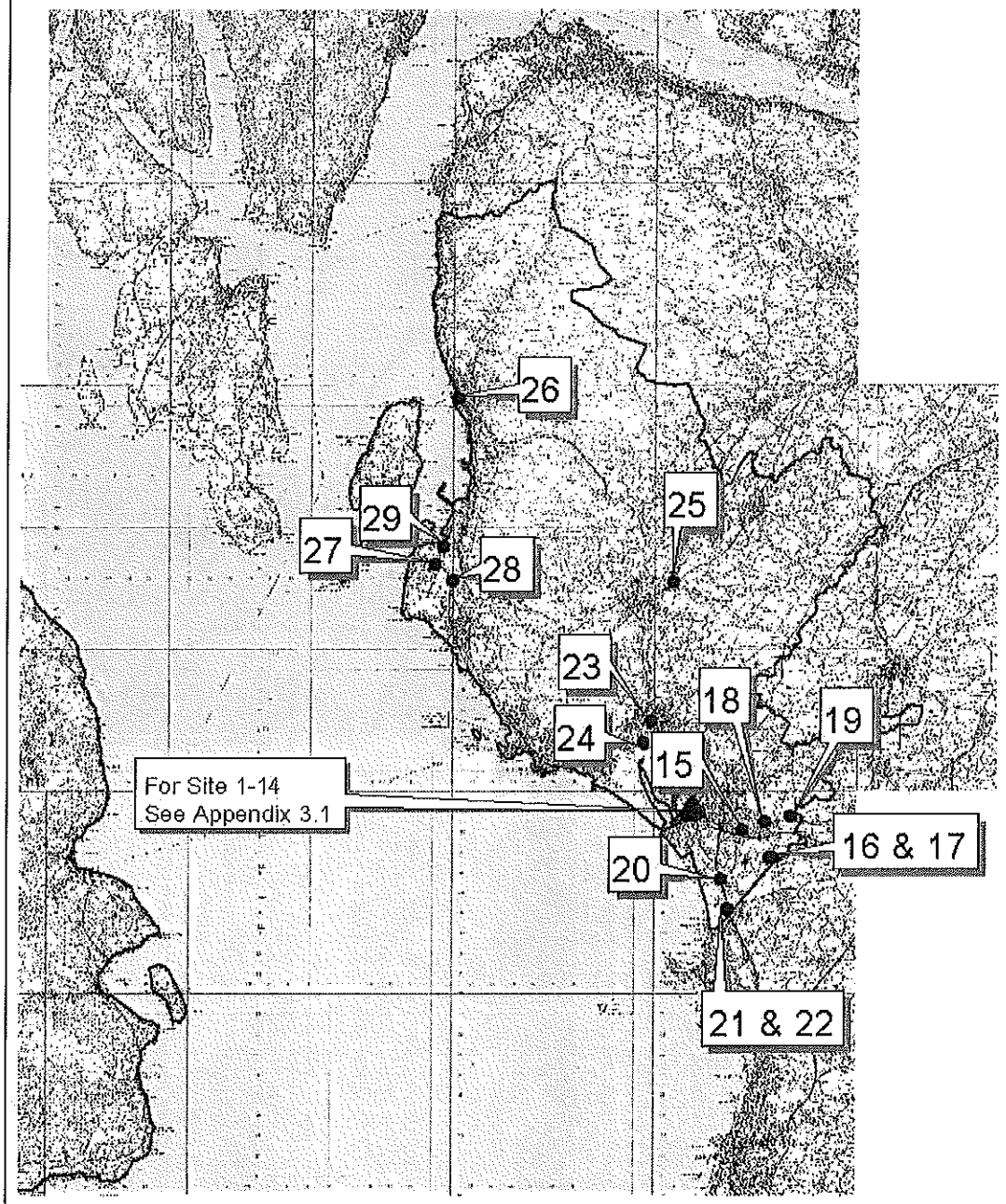
Traffic composition							
Road type (A,B,C,D)	Vehicles <3.5t GVW (LDV)			Vehicles>3.5t GVW (HDV)			
	% passenger cars	% light goods vehicles	Total % LDV	% buses and coaches	% rigid HGV	% articulated HGV	Total % HDV
B			20				80

Receptor Name	Dwellings: High Street, Irvine	Receptor number	1
Assessment year	2010		

Results

Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.16	0.02	0.19	mg/m^3	Annual mean*	0.19	mg/m^3
Benzene	0.18	0.01	0.19	$\mu g/m^3$	Annual mean	0.19	$\mu g/m^3$
1,3-butadiene	0.09	0.09	0.18	$\mu g/m^3$	Annual mean	0.18	$\mu g/m^3$
NO_x	21.8	18.4	40.2	$\mu g/m^3$	Not applicable		
NO_2	16.1	5.1	21.2	$\mu g/m^3$	Annual mean*	21.2	$\mu g/m^3$
PM_{10}	12.5	1.60	14.10	$\mu g/m^3$	Annual mean	14.1	$\mu g/m^3$
					Days >50$\mu g/m^3$	0	Days

Appendix 3.1 North Ayrshire : Local Air Quality Monitoring Locations



Groundhog

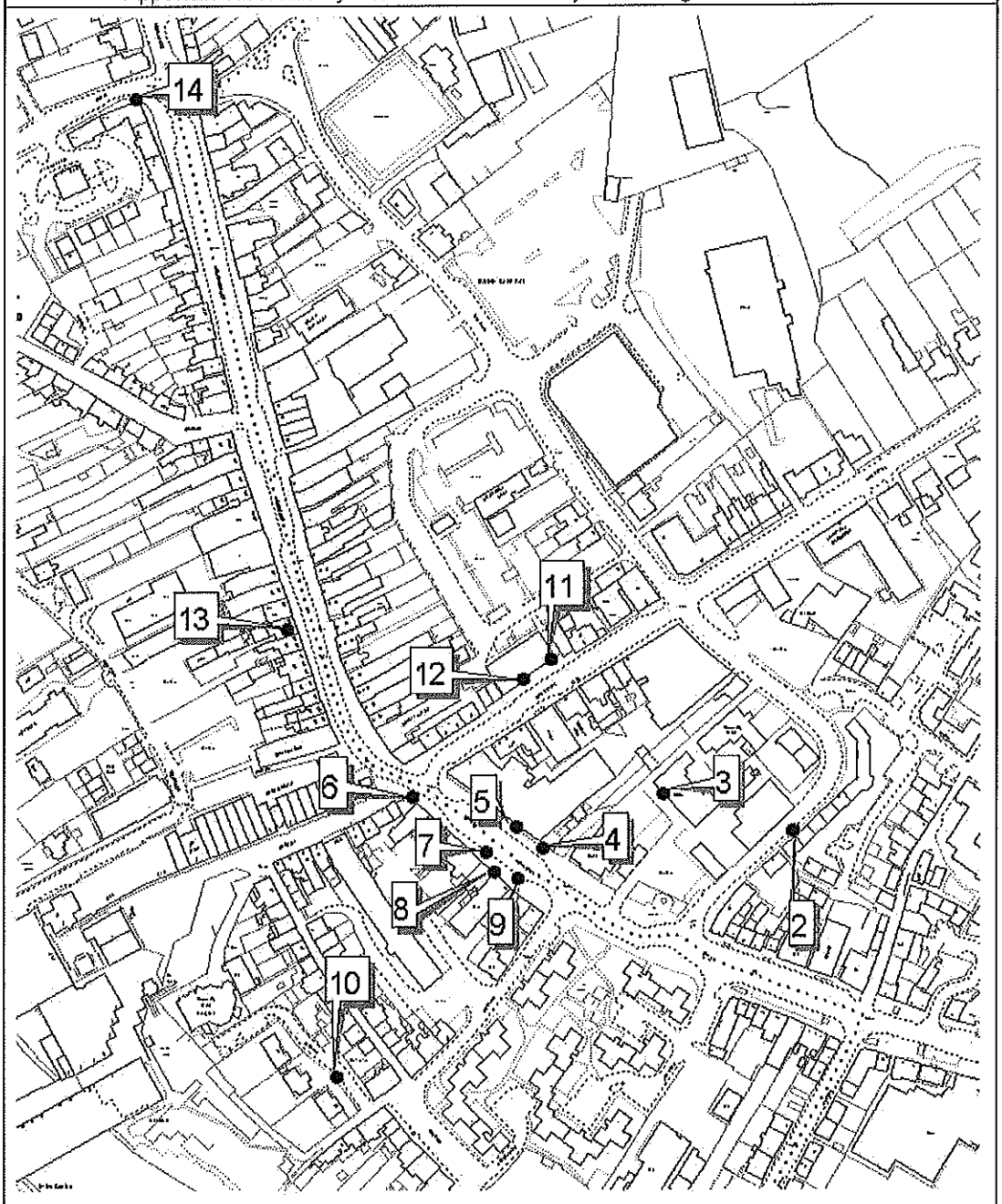
Nitrogen dioxide tube locations

NAC Boundary

N

1:250000

Appendix 3.2 North Ayrshire : Local Air Quality Monitoring Locations - Irvine Cross



● Nitrogen dioxide tube locations

N

1:2500

APPENDIX 4 - TABLE OF MONITORING SITES

NITROGEN DIOXIDE TUBE SITES	NORTH AYRSHIRE
SITE NAME	
(1) CUNNINGHAME HOUSE, IRVINE	1ST FLOOR EAST WING
(2) 35 EAST ROAD, IRVINE	LAMPPOST OPP. POLICE STN GARAGE
(3) IRVINE POLICE STATION	DRAIN PIPE POLICE STN. OPP. TOWNHOUSE
(4) 74 HIGH STREET, IRVINE	LAMPOST OUTSIDE MAMA'S CAFÉ
(5) 70 HIGH STREET, IRVINE	LAMPOST OUTSIDE KWIKSAVE
(6) 97 HIGH STREET, IRVINE	LAMPOST OUTSIDE RS.McCOLLS
(7) 79 HIGH STREET, IRVINE (LOBSTER POT)	LAMPPOST OUTSIDE LOBSTER POT
(8) 75 HIGH STREET, IRVINE (OK JOES)	DRAINPIPE OK JOE'S RESTAURANT
(9) 65 HIGH STREET, IRVINE (GROUND HOG)	LAMPPOST/ TRAILER, 65 HIGH ST IRVINE
(10) 34 KIRKGATE IRVINE	LAMPPOST HALF WAY UP HILL KIRKGATE
(11) INDIGO SUN, BANK ST, IRVINE	DRAINPIPE RIGHT HAND CORNER OF SHOP
(12) KING WORLD TRAVEL, 19 BANK ST, IRVINE	DRAINPIPE LEFT HAND CORNER OF SHOP
(13) 147 HIGH STREET, IRVINE	ON DRAINPIPE LEFT HAND SIDE OF SHOP
(14) EGLINTON STREET IRVINE	DRAINPIPE CNR EGLINTON ST /CASTLE RD
(15) GREENWOOD ACADEMY, DREGHORN	LAMP POLE MAIN GATE
(16) MAIN STREET DRYBRIDGE	LAMPPOST OPPOSITE OLD SCHOOL SITE
(17) SHEWALTON MOSS, DRYBRIDGE	LAMPPOST ENTRANCE TO ESTATE
(18) PRIMARY SCHOOL DREGHORN	LAMPPOST OPPOSITE PRIMARY SCHOOL
(19) MAIN ROAD SPRINGSIDE	LAMPOST CNR STATION RD/SPRINGHILL TERR
(20) AUCHENGATE (BRIDGE)	PEDESTRIAN BRIDGE NORTH OF PAPER MILL
(21) AUCHENGATE (HOUSE)	HOUSE BEHIND AUCHENGATE SAWMILL
(22) AUCHENGATE (ROAD)	ROAD IN AUCHENGATE SAWMILL
(23) DALRY ROAD KILWINNING	LAMPPOST DOWN FROM TRAFFIC LIGHTS
(24) BYREHILL KILWINNING	GRID REF NS 229520 642319
(25) HIGHFIELD HAMLET DALRY	LAMPPOST AT CNR CYCLE TRACK TO GLENGARNOCK
(26) LARGS MAIN STREET	LAMPPOST AT PEDESTRIAN CROSSING
(27) GOLDENBERRY FARM ROAD	SOUTH OF HUNTERSTON POWER STATION
(28) SEAMILL/HUNTERSTON ROAD(LAYBY)	LAYBY A78 SEAMILL TO HUNTERSTON
(29) HUNTERSTON ROAD/CYCLE TRACT	JUNCT. CYCLE TRACK / HUNTERSTON PWR STN ROAD
MOBILE AIR QUALITY MONITORING UNIT (GROUNDHOG) CO, NO_2 AND PM_{10}	
SITE NAME	
GROUNDHOG, 65 HIGH STREET, IRVINE.	KERBSIDE

Local Bias Corrected Nitrogen Dioxide Levels: Irvine Town Centre.1998-2005 & Projection for 2010.

					*+10.3	*+4.0	*+2.3	*+24.3	*+20.0	*+20.0	*+23.4	*+35.5		
Site Nos	EAST INGS	NORTH INGS	CLASS	Location	1998 Annual Mean	1999 Annual Mean	2000 Annual Mean	2001 Annual Mean	2002 Annual Mean	2003 Annual Mean	2004 Annual Mean	2005 Annual Mean	Annual Mean Object.	2010 Calc. Annual Mean
1	231627	638718	UB	Cunninghame House	11.0	10.6	9.4	10.1	13.7	15.7	11.9	11.8	40	9.7
2	232323	638892	K	35 East Road, Irvine	26.1	26.3	20.8	20.1	30.0	31.4	26.2	22.9	40	18.9
3	232255	638910	UB	Police Station, Irvine	12.1	9.2	11.6	9.9	14.9	15.1	12.6	11.8	40	9.7
4	232195	638878	K	74 High Street, Irvine	23.1	17.5	14.3	18.0	21.3	28.5	23.7	19.2	40	15.8
5	232172	638894	K	70 High Street, Irvine	30.5	29.9	23.8	25.1	31.3	32.7	27.9	22.5	40	18.5
6	232135	638907	K	97 High Street, Irvine	33.0	28.5	23.4	21.9	32.7	37.1	33.3	26.9	40	22.2
7	232169	638878	K	79 High Street, Irvine	**45.3**	**41.8**	31.0	30.7	**40.8**	**49.6**	**45.6**	31.2	40	25.6
8	232170	638871	K	75 High Street, Irvine	39.7	31.5	30.3	25.8	36.2	**41.9**	36.3	30.5	40	25.1
9	232182	638867	K	65 High Street, Irvine,		20.5	22.4	8.5	30.9	33.1	37.0	28.9	40	23.7
10	232085	638774	UB	34 Kirkgate, Irvine	10.7	8.5	9.3	8.5	13.9	15.9	11.0	11.5	40	9.5
11	232182	638960	K	19 Bank Street, Irvine (IS)	***from May 2004***						22.9	22.6	40	18.6
12	232210	638976	K	19 Bank Street, Irvine (KWT)	***from May 2004***						24.4	22.1	40	18.2
13	232077	638990	K	147 High Street, Irvine				19.1	30.2	31.5	27.8	23.3	40	19.2
14	231997	639252	K	Eglinton Street, Irvine (Academy Ct)	20.2	19.6	17.4	17.4	23.4	25.2	21.8	19.4	40	15.9

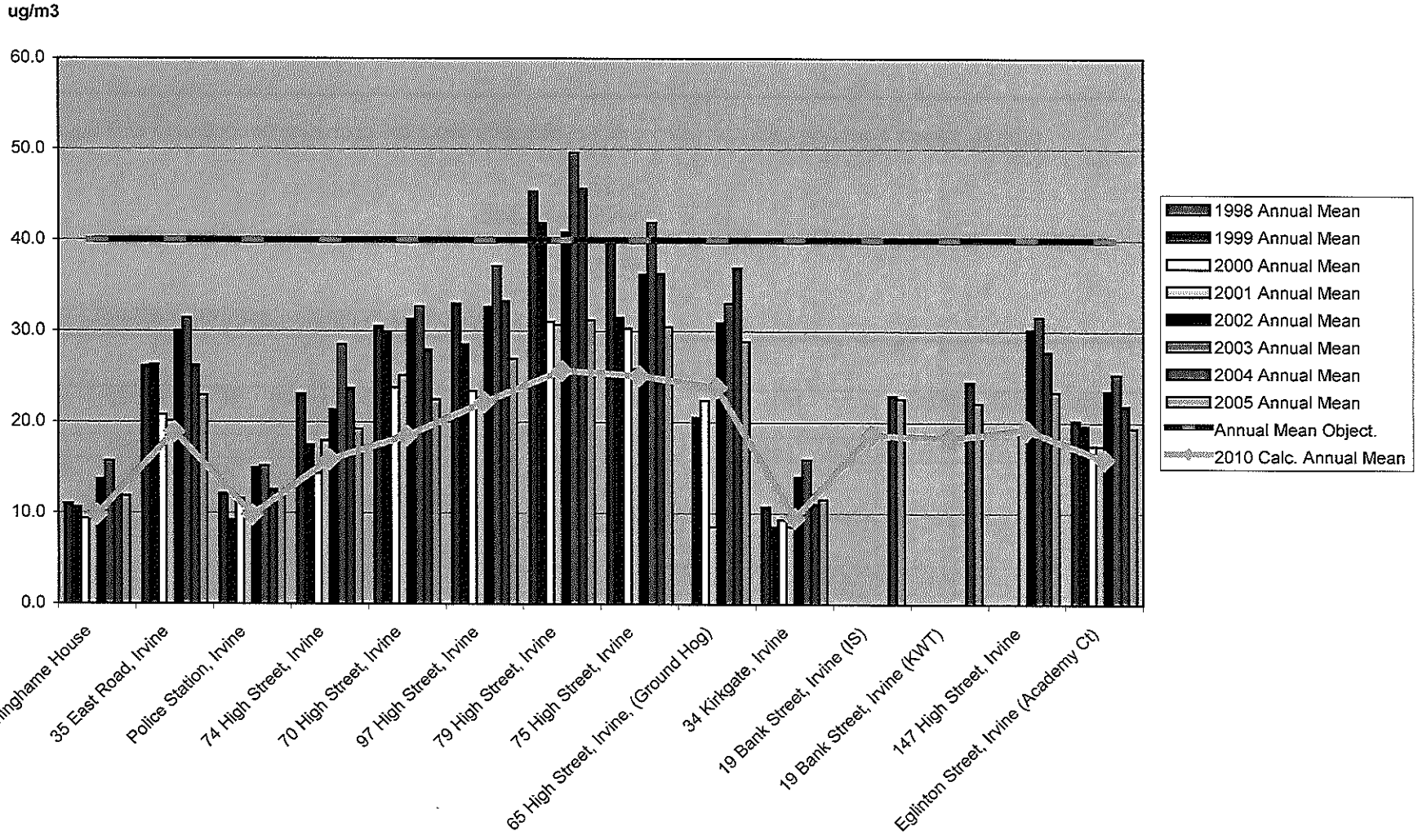
Calculation of Projected Nitrogen Dioxide Levels: 2010

2010

$$\frac{\text{2005 Annual Mean*} \; 0.734}{0.892}$$

Where the year correction factors used are those specified in Box 6.6 of Technical Guidance: LAQM. TG(03)

Local Bias Corrected Nitrogen Dioxide Levels: Irvine Town Centre. 1998-2005 & Projection For 2010.



Local Bias Corrected Nitrogen Dioxide Levels: Outlying Areas.1998-2005 & Projection for 2010.

					*+10.3	*+4.0	*+2.3	*+24.3	*+20.0	*+20.0	*+23.4	*+35.5		
Site Nos	EAST INGS	NORTH INGS	CLASS	Location	1998 Annual Mean	1999 Annual Mean	2000 Annual Mean	2001 Annual Mean	2002 Annual Mean	2003 Annual Mean	2004 Annual Mean	2005 Annual Mean	Annual Mean Object.	2010 Calc. Annual Mean
15	234409	637921	K	Greenwood Academy Dreghorn		7.6	10.6	12.3	14.8	17.71	16.6	14.7	40	12.1
16	235946	636597	SP	Main Street, Drybridge		7.2	8.6	7.5	9.6	12.10	9.8	9.3	40	7.7
17	235751	636637	SP	Shewalton Moss, Drybridge		7.1	7.9	6.9	10.0	11.76	10.3	8.0	40	6.6
18	235547	638410	K	Primary School, Dreghorn		12.1	16.7	11.3	15.9	18.19	14.9	15.2	40	12.5
19	236813	638659	K	Main Street, Springside		7.9	9.1	10.3	14.5	16.83	15.8	15.5	40	12.7
20	233332	635558	SP	Auchengate (Bridge)			13.7	10.1	13.3	15.77	14.8	13.5	40	11.1
21	233700	634078	SP	Auchengate (House)			10.6	8.5	11.5	13.11	12.1	11.8	40	9.7
22	233731	634067	SP	Auchengate (Road)			8.8	7.6	10.2	11.97	10.7	10.5	40	8.6
23	229928	643400	K	Dalry Rd , Kilwinning	19.7	23.0	15.7	15.3	21.4	25.05	22.7	20.9	40	17.2
24	229520	642319	K	Byrehill , Kilwinning			9.3	8.8	12.0	16.90	10.9	12.2	40	10.0
25	230943	650280	K	Highfield Hamlet , Dalry		8.0	7.9	10.4	15.9	18.88	14.0	13.6	40	11.2
26	220333	659322	K	Main Street , Largs	17.1	14.1	16.4	13.1	18.7	22.11	22.2	20.2	40	16.7
27	219226	651212	SP	Goldenberry Farm Road			4.5	9.9	4.8	4.43	2.8	4.2	40	3.5
28	220009	650214	SP	Seamill/ Hunterston Road (layby)			5.1	4.8	7.7	7.68	5.4	6.9	40	5.6
29	219584	652045	SP	Hunterston Road / Cycle Track			3.6	2.8	4.7	4.77	3.3	4.2	40	3.4

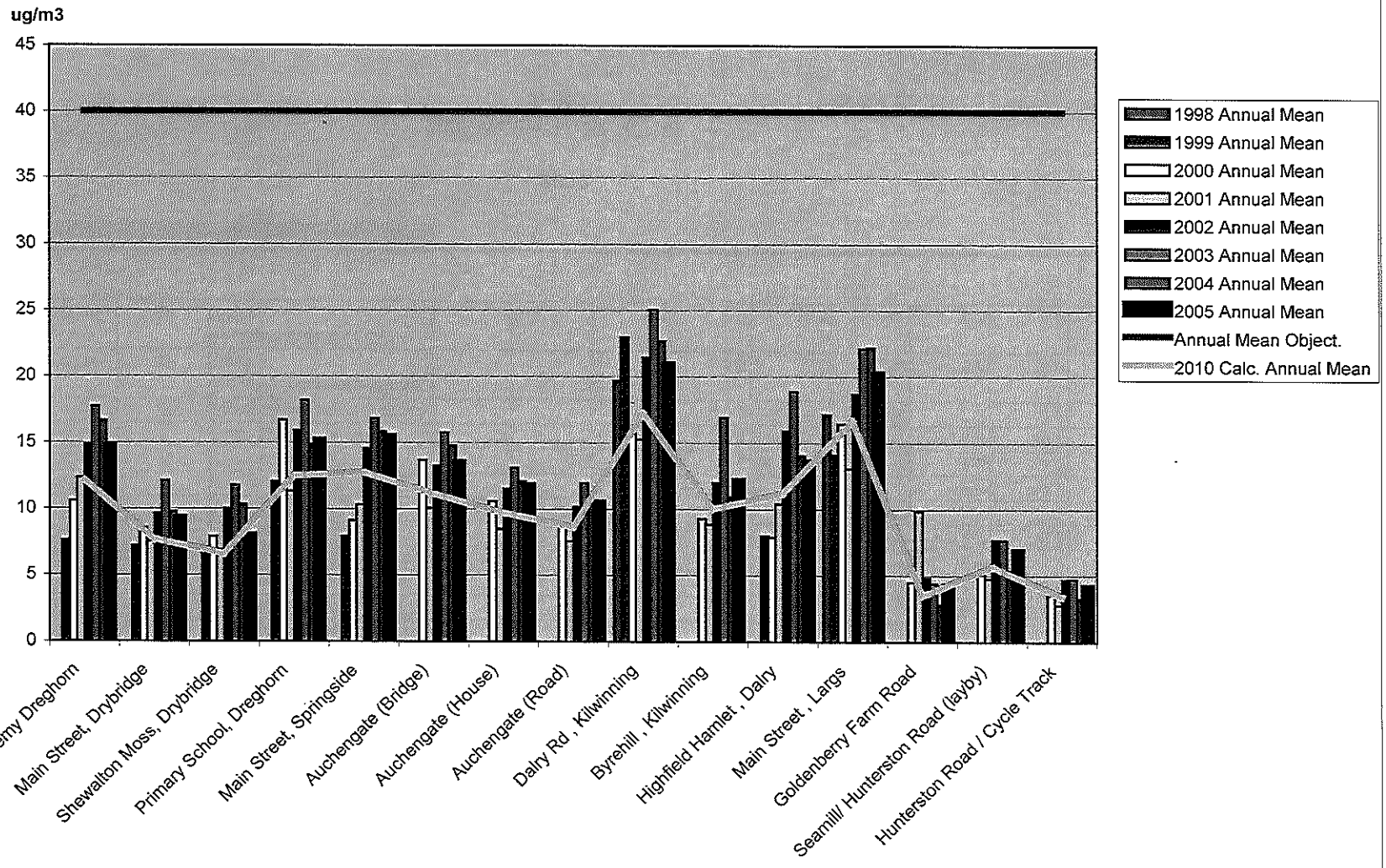
Calculation of Projected Nitrogen Dioxide Levels: 2010

2010

2005 Annual Mean* 0.734
0.892

Where the year correction factors used are those specified in Box 6.6 of Technical Guidance: LAQM. TG(03)

Figure 2.5.2: Local Bias Corrected Nitrogen Dioxide Levels: Outlying Areas. 1998-2005 & Projected Level For 2010.



Spreadsheet Version Number: 03/06

Follow the steps below **in the correct order** to show the results of **relevant** collocation studies

This spreadsheet will be updated in late September 2006 on the R&A website

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

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Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List. If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List. If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List. If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own collocation study then see footnote[4]. If uncertain what to do then contact the Review and Assessment Helpdesk 0117 328 3668 aqm-review@uwe.ac.uk.

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m3)	Automatic Monitor Mean Conc. (Cm) (µg/m3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Glasgow Scientific Services	20% TEA in Water	2005	UB	Glasgow CC	11	47	34	36.6%	P	0.73
Glasgow Scientific Services	20% TEA in Water	2005	K	Glasgow CC	12	87	64	35.5%	G	0.74
Glasgow Scientific Services	20% TEA in Water	2005		Overall Factor[3] (2 studies)				Use		0.74

[1] For Casella Stanger/Bureau Veritas use Gradko; for Staffordshire County Analyst use Staffordshire CC SS

[2] In this situation it would be reasonable to use data from the nearest year.

[3] Overall factors have been calculated using orthogonal regression to allow for uncertainty in both the automatic monitor and diffusion tube. The uncertainty of the diffusion tube has been assumed to be double that of the automatic monitor.

[4] If you have your own collocation study, please send your data to us, so that it can be included here. If this is not possible, but you wish to combine these factors with your own, select and copy the relevant data from this spreadsheet and paste them into a new one (otherwise your calculations will include hidden data). Then add your own data and calculate the bias. To obtain a new correction factor that includes your data, average the bias (B) values, expressed as a factor, i.e. -16% is -0.16. Next add 1 to this value, e.g. -0.16 + 1.00 = 0.84 in this example, then take the inverse to give the bias adjustment factor 1/0.84 = 1.19. (This will not be exactly the same as the correction factor calculated using orthogonal regression as used in this spreadsheet, but will be reasonably close).

[5] Where an annual data set falls into two years it has been ascribed to the year in which most of the data fall.

[6] Tube precision is determined as follows: G = Good precision - coefficient of variation (CV) of diffusion tube replicates is considered good when the CV of eight or more periods is less than 20%, and the average CV of all monitoring periods is less than 10%; P = Poor precision - CV of four or more periods >20% and/or average CV >10%; S = Single tube, therefore not applicable; na = not available.

APPENDIX 7: Updating and Screening Assessment Summary Checklist

Updating and Screening Assessment Summary Checklist for **Carbon Monoxide**

Item	Response
A) Monitoring data	CO analyser operated March- December 2005. Less than 90% data for calendar year. However, average for data captured is 0.223mgm^{-3}. It is unlikely that the missing data would be in the region of the Air Quality Objective of 10 mgm^{-3}.
B) Very busy roads or junctions in built-up areas	There are no very busy roads or junctions in built-up areas of North Ayrshire.

Updating and Screening Assessment Summary Checklist for **Benzene**

Item	Response
A) Monitoring data outside an AQMA	North Ayrshire Council has undertaken no monitoring of Benzene.
B) Monitoring data within an AQMA	North Ayrshire Council has not declared any AQMAs
C) Very busy roads or junctions in built up areas	There are no very busy roads or junctions in built-up areas of North Ayrshire.
D) New industrial sources.	There are no new industrial sources of benzene in North Ayrshire or surrounding areas.
E) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources in North Ayrshire or surrounding areas with an increased output of benzene.
F) Petrol stations	There are 2 petrol stations with petrol throughput in excess of 2000m^3. At neither site is there a relevant exposure within 10 metres.
G) Major fuel storage depots (petrol only)	There are no major fuel storage depots in North Ayrshire.

Updating and Screening Assessment Summary Checklist for **1,3-butadiene**

Item	Response
H) Monitoring data	North Ayrshire Council has undertaken no monitoring of 1,3-butadiene.
I) New industrial sources.	There are no new industrial sources of 1,3-butadiene in North Ayrshire or surrounding areas.
J) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources in North Ayrshire or surrounding areas with an increased output of 1,3-butadiene. There are no new relevant exposure locations.

Updating and Screening Assessment Summary Checklist for **Lead**

Item	Response
K) Monitoring data	North Ayrshire Council has undertaken no monitoring of lead.
L) New industrial sources.	There are no new industrial sources of lead in North Ayrshire or surrounding areas.
M) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources in North Ayrshire or surrounding areas with an increased output of lead. There are no new relevant exposure locations.

Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**

Item	Response
N) Monitoring data outside an AQMA	Diffusion tube monitoring of Nitrogen dioxide throughout North Ayrshire and in particular the Cross area of Irvine indicates that there are relevant exposure locations with concentration levels in excess of the Annual Mean Objective of 40 Ugm^{-3}. NO_2 analyser operated March- December 2005. Less than 90% data for calendar year. However, average for data captured is 30.2Ugm^{-3}. No exceedences of the One Hour Mean Objective was recorded
O) Monitoring data within an AQMA	North Ayrshire Council has not declared any AQMAs
P) Narrow congested streets with residential properties close to the kerb	New Street Dalry.
Q) Junctions.	Checked at time of previous Update and Screening Assessment (2003)
R) Busy streets where people may spend 1-hour or more close to traffic	Main Street, Largs. Checked at time of previous Update and Screening Assessment (2003). No exceedences likely. Monitoring indicates no exceedences of Air Quality Objectives
S) Roads with high flow of buses and/or HGVs.	The Cross area of Irvine- Low flow but high proportion HGV/PSV. Monitoring indicates no exceedences of Air Quality Objectives
T) New roads constructed or proposed since the previous round of R&A	Ardrossan/Saltcoats/Stevenston by-pass completed December 2004. This has had the effect of reducing traffic flows through this conurbation.
U) Roads with significantly changed traffic flows, or new relevant exposure	The Cross area of Irvine- Low flow but high proportion HGV/PSV. No increase in traffic flows but subject to re-routing by Traffic Management Scheme. Monitoring indicates no exceedences of Air Quality Objectives. There are no new relevant exposure locations
V) Bus Stations	There are no bus stations where the flow of vehicles exceeds 10000
W) New industrial sources.	There are no new industrial sources of nitrogen dioxide in North Ayrshire or surrounding areas.

X) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources in North Ayrshire or surrounding areas with an increased output of nitrogen dioxide. There are no new relevant exposure locations.
Y) Aircraft	There is no airport within 1000 metres of North Ayrshire.

Updating and Screening Assessment Summary Checklist for **Sulphur Dioxide**

Item	Response
Z) Monitoring data outside an AQMA	North Ayrshire Council no longer undertakes monitoring of Sulphur dioxide.
AA) Monitoring data within an AQMA	North Ayrshire Council has not declared any AQMAs.
BB) New industrial sources.	There are no new industrial sources of sulphur dioxide in North Ayrshire or surrounding areas.
CC) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources in North Ayrshire or surrounding areas with an increased output of sulphur dioxide. There are no new relevant exposure locations.
DD) Areas of domestic coal burning	Checked at time of previous Update and Screening Assessment (2003). No change. Historic monitoring data showed minimal concentrations of atmospheric sulphur dioxide.
EE) Small Boilers > 5 MW (thermal).	Checked at time of previous Update and Screening Assessment (2003). No change.
FF) Shipping	Checked at time of previous Update and Screening Assessment (2003). No change.
GG) Railway Locomotives	Checked at time of previous Update and Screening Assessment (2003). No change.

Updating and Screening Assessment Summary Checklist for PM_{10}

Item	Response
HH) Monitoring data outside an AQMA	PM_{10} analyser operated March- December 2005. Less than 90% data for calendar year. However, average for data captured is 13.6Ugm^{-3} with a maximum of 16.8 Ugm^{3}. No exceedences of the 1-Hour Mean Objective was recorded.
II) Monitoring data within an AQMA	North Ayrshire Council has not declared any AQMAs.
JJ) Busy roads and junctions in Scotland	The background concentration information indicates that there are only 3@ 1kmx1km grid squares in North Ayrshire where the background concentration level is expected to exceed 15Ugm^{-3}. These are located at the extreme south of North Ayrshire. There are no relevant locations in this area. New Street, Dalry.
KK) Junctions.	See (C above)
LL) Roads with high flow of buses and/or HGVs.	The Cross area of Irvine- Low flow but high proportion HGV/PSV. Monitoring indicates no exceedences of Air Quality Objectives
MM) New roads constructed or proposed since last round of R&A	Ardrossan/Saltcoats/Stevenston by-pass completed December 2004. This has had the effect of reducing traffic flows through this conurbation. There is no relevant exposure within 10metres.
NN) Roads with significantly changed traffic flows, or new relevant exposure.	The Cross area of Irvine- Low flow but high proportion HGV/PSV. Monitoring indicates no exceedences of Air Quality Objectives.
OO) Roads close to the objective during the second round of Review and Assessment	Checked at time of previous Update and Screening Assessment (2003). DMRB assessment at that time predicted the maximum number of days where PM_{10} level may be more than 50 Ugm^{-3} was 3.75.
PP) New industrial sources.	There are no new industrial sources of PM_{10} in North Ayrshire or surrounding areas.
QQ) Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources in North Ayrshire or surrounding areas with an increased output of PM_{10}. There are no new relevant exposure locations.
RR) Areas of domestic solid fuel burning	Checked at time of previous Update and Screening Assessment (2003). No change.
SS) Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	Checked at time of previous Update and Screening Assessment (2003). No change.
TT) Aircraft	There is no airport within 500 metres of North Ayrshire.