



NORTH AYRSHIRE
COUNCIL

Local Air Quality Management

Progress Report: 2007

**As amended following consultation with Scottish Government
and Scottish Environment Protection Agency**

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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 progress report should be read in conjunction with the various local air quality management reports already completed by North Ayrshire Council.

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.
Progress Report	For Authorities which have identified no need for a Detailed Assessment in the Updating and Screening Assessment	

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 May 2003	All authorities ^a
Detailed Assessment	End of April 2004	Those authorities ^a which have identified the need for a Detailed Assessment in their May 2003 Updating and Screening Assessment
Progress Report	End of April 2004	Those authorities ^a which have identified no need for a Detailed Assessment in their May 2003 Updating and Screening Assessment
Progress Report	End of April 2005	All 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

a. All local authorities except those in Northern Ireland and London local authorities that have designated AQMAs. London local authorities that have designated AQMAs will be expected to submit an Updating and Screening Assessment by the end of 2003 or earlier if possible, and to complete Detailed Assessments (where required) by the end of 2004.

1.2: Air Quality Objectives

Table 1.2.1, below shows the Air Quality Objectives required under the Air Quality Regulations 2000 and the Air Quality (Scotland) Amendment Regulations 2002.

Table 1.2.1: UK Air Quality Objectives

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

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.

1.3 Findings of Previous Reviews and Assessments

The **first stage** of review and assessment was carried out in **1998** and 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, PM₁₀ 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 carried out in **2000** concluded 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.

The enactment of the Air Quality (Scotland) Amendment Regulations 2002 reduced the Objective Levels for many of the pollutants. As part of the phased approach for review and assessment introduced by the regulations North Ayrshire Council carried out an **Updating and Screening Assessment** in 2003 and published a Progress Report in 2004 to identify whether there were areas of relevant public exposure at risk of exceedences of the new objectives.

The Updating and Screening Assessment of Air Quality in North Ayrshire Council 2006 concluded there were no areas within North Ayrshire which were likely to fail the objective due to road traffic.

No areas of relevant public exposure in North Ayrshire have been identified by these assessments as being at risk of exceeding the objectives for any of the 7 pollutants. There was, therefore, no reason to proceed with a detailed assessment for any pollutant.

The monitoring programme has continued and this is a **progress report on local air quality in North Ayrshire to date**. The locations of monitoring points are indicated in Table 1.3.1 and Figs. 1.3.1-1.3.3.

2.0 Pollutant Specific Assessments

2.1 Benzene

No recent monitoring of benzene has been undertaken. However, previous reviews have concluded that:

1. There was no significant industrial source of benzene located either within North Ayrshire or neighbouring areas which is likely to adversely affect air quality within North Ayrshire.
2. There was no need to proceed to a detailed assessment for benzene.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to benzene production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in benzene levels at locations where there could be **relevant public exposure**. Consequently, a detailed assessment for benzene remains unnecessary.

2.2 1,3-Butadiene

No monitoring of 1,3-Butadiene has been undertaken. However, previous reviews concluded that:

1. There was no significant industrial 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 was no need to proceed to a detailed assessment for 1,3-Butadiene.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to 1,3-Butadiene production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in 1,3-Butadiene levels at locations where there could be **relevant public exposure**. Consequently, a detailed assessment for 1,3-Butadiene remains unnecessary.

2.3 Carbon Monoxide

During 2004 no carbon monoxide monitoring was carried by North Ayrshire Council. An automatic analyser is operated in partnership with Inverclyde Council, each authority now siting it in their area for twelve-month periods. In 2004 this equipment was sited in Inverclyde.

Previous reviews concluded that:

1. There is no significant carbon monoxide source, industrial or road transport, located either within North Ayrshire or neighbouring areas which are likely to adversely affect air quality in North Ayrshire.
2. There is no need to proceed to a detailed assessment for carbon monoxide.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to carbon monoxide production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in carbon monoxide levels at locations where there could be **relevant public exposure**. Consequently, a detailed assessment for carbon monoxide remains unnecessary.

2.4 Lead

No monitoring of lead has been undertaken. However, previous reviews concluded that:

1. There was no significant industrial sources of lead located either within North Ayrshire or neighbouring areas which is likely to adversely affect air quality in North Ayrshire.
2. There was no need to proceed to a detailed assessment for lead.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to lead production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in lead levels at locations where there could be **relevant public exposure**. Consequently, a detailed assessment for lead remains unnecessary.

2.5 Nitrogen Dioxide

In North Ayrshire monitoring of nitrogen dioxide by passive diffusion tubes 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.

The results of monitoring since 1998 are summarised graphically in Figure 2.5.1: Irvine Town Centre and Figure 2.5.2: Outlying Areas and also in tabular form (see Table 2.5.1: Irvine Town Centre and Table 2.5.2: Outlying Areas). They show that for the existing sites nitrogen dioxide levels remain low at all sites except in Irvine Town Centre. Levels had fallen in the previous year, but have since risen in 2006 with no obvious explanation.

Additional site locations in Dalry have now been included in the monitoring of NO₂ using diffusion tubes. Sites are located on the road through the town, which serves as one of the main traffic routes between Glasgow and North Ayrshire. DMRB screening from previous reports suggested this area would not fail objectives, however for October 2006, the monthly mean concentration at 2 locations were 59 and 60 µg/m³ in the 3 months monitoring period.

An earlier traffic management scheme re-routed a portion of the public transport along Bank Street, Irvine. In response to this, additional diffusion tubes sites were located here to monitor the effects of this traffic (See Table 2.5.4). Results for 2006 show there are significant levels of NO₂, but they are all within acceptable levels with the exception of 1 result for Feb 2006 when the monthly mean concentration was 46 µg/m³.

The Irvine Town Centre area has new updated traffic management measures in place, preventing all traffic, other than buses and taxis, to use the High Street and Bank Street routes between 07:00 - 19:00. It is expected this will significantly reduce the volume of traffic and congestion with a subsequent reduction in overall levels of NO₂.

Again, as with previous reports, all the corrected Annual Mean results for 2006 meet the air quality objective with the exception of the kerbside monitoring sites at 75 High Street, Irvine and 79 High Street, Irvine. These particular sites are located adjacent to two busy bus stops. Here the bias corrected Annual Mean Concentration is 43 $\mu\text{g}/\text{m}^3$.

As shown in Figures 2.5.1 - 2.5.3 and tables 2.5.1 - 2.5.3, when the "year correction factors" are applied, all predicted Annual Mean levels for 2010 shall meet the Air Quality Objective.

Previous reviews concluded:

1. DMRB screening shows that there are no areas within North Ayrshire, which are likely to fail the objective due to Road Traffic. The annual mean nitrogen dioxide levels over a short length of High Street, Irvine, however, are marginally in excess of the annual mean objective in 2006. When the "year correction factors" are applied, as allowed in the guidance, all Annual Mean levels for 2010 meet the Air Quality Objective.
2. Passive monitoring for nitrogen dioxide should continue in High Street, Irvine to assess the effect of the **updated** traffic management scheme.
3. There are no significant industrial sources of nitrogen dioxide within North Ayrshire.
4. There is no requirement to proceed to a detailed assessment for nitrogen dioxide.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to NO_2 production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in NO_2 levels at locations where there could be **relevant public exposure**.

Although the Air Quality Objective for 2005 was met, there is now a localised kerbside area of High Street, Irvine that is currently subject to an annual mean concentration of nitrogen dioxide level in excess of 40 $\mu\text{g}/\text{m}^3$. As this location is an area with relevant public exposure North Ayrshire Council are concerned about the dramatic increase in the concentration of atmospheric NO_2 compared with previous years, with no obvious explanation. However, North Ayrshire Council remain confident that reductions in NO_2 concentrations will result from the enhanced traffic management system now in place. On the advice of the Scottish Government and the Scottish Environment Protection Agency, a detailed assessment for nitrogen dioxide will be undertaken to further investigate the conditions resulting in the exceedences. Monitoring of nitrogen dioxide will continue across North Ayrshire.

2.6 Particulate Matter PM_{10}

PM_{10} Monitoring within North Ayrshire

No continuous PM_{10} monitoring was carried out by North Ayrshire Council in 2004. The equipment is operated in partnership with Inverclyde Council, each authority now siting it in their area for twelve-month periods. In 2004 the equipment was sited in Inverclyde.

Previous reviews concluded that:

1. There are no industrial sources within North Ayrshire, which are liable to cause any exceedance in either the 2004 or 2010 objectives for PM_{10} .
2. Screening using the DMRB model indicates that road traffic will not cause any exceedences of the objectives for PM_{10} .
3. There is no requirement to proceed to a detailed assessment for PM_{10} .

4. The 2004 review exercise showed that the projected Annual Mean PM₁₀ Concentrations for 2004 and 2010 are 21.39 ug/m³ and 19.75ug/m³ respectively.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any increase in PM₁₀ production or release in North Ayrshire, as the result of either fixed sources or road traffic. Similarly, there has been no development likely to result in any increase in PM₁₀ levels at locations where there could be relevant public exposure.

Measurement of PM₁₀ undertaken in High Street, Irvine during 2003 suggested that, whilst the predicted estimated annual mean concentration for 2004 (21.39µg/m³) shall be well below the Air Quality Objective, for 2010 it is predicted to be 19.75µg/m³, marginally exceeding the much reduced Air Quality Objective 18µg/m³. However, as with nitrogen dioxide, these results were obtained when there was heavy public transport traffic in the area. Since then a traffic-management scheme has been put in place to disperse this traffic. It is anticipated, therefore, that the annual mean concentration of PM₁₀ shall reduce significantly in future years. Additionally, this monitoring location is **not** in a area of **relevant public exposure**. Consequently, a detailed assessment for PM₁₀ remains unnecessary.

2.7 Sulphur Dioxide

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.

Monitoring results obtained since 1998 for the various sites are represented graphically in Figure 2.7.1.

Previous reviews concluded that:

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 and current monitoring programmes for sulphur dioxide in North Ayrshire has covered every urban area and results indicate the air quality standard continues to be met.
3. There is no need to progress to a detailed assessment for sulphur dioxide.
4. 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.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to sulphur dioxide production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in sulphur dioxide levels at locations where there could be **relevant public exposure**. Consequently a detailed assessment for sulphur dioxide remains unnecessary.

3.0 Conclusions

- 3.1 All guideline limits for the National Air Quality Standards should be met for 2010.
- 3.2 With regard to nitrogen dioxide, it is predicted that a highly localised area of High Street, Irvine may continue to be subject to concentration levels in excess of the guideline limit for the annual mean ($40\mu\text{g}/\text{m}^3$) national air quality standard. However it is expected that a new updated traffic management scheme will see these figures fall. On the advice of the Scottish Government and the Scottish Environment Protection Agency, a detailed assessment for nitrogen dioxide will be carried out for this area. It 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.
- 3.3 With regard to PM_{10} , whilst the predicted estimated annual mean concentration for 2004 ($21.39\mu\text{g}/\text{m}^3$) shall be well below the U.K. Air Quality Objective, for 2010 it is predicted to be $19.75\mu\text{g}/\text{m}^3$, marginally exceeding the much reduced Scottish Air Quality Objective of $18\mu\text{g}/\text{m}^3$. However the monitoring location is **not** in an area of **relevant public exposure**. Consequently a detailed assessment for particulate matter PM_{10} remains unnecessary.
- 3.4 An updated and amended traffic management plan has being implemented for Irvine Town Centre. This should secure reductions in both nitrogen dioxide and PM_{10} levels in the area.
- 3.5 Passive sampling shall continue in the area to monitor ambient levels of nitrogen dioxide.
- 3.6 With the exception of Nitrogen Dioxide there is no need to proceed to a detailed assessment for any of the air pollutants.

This report was prepared by:

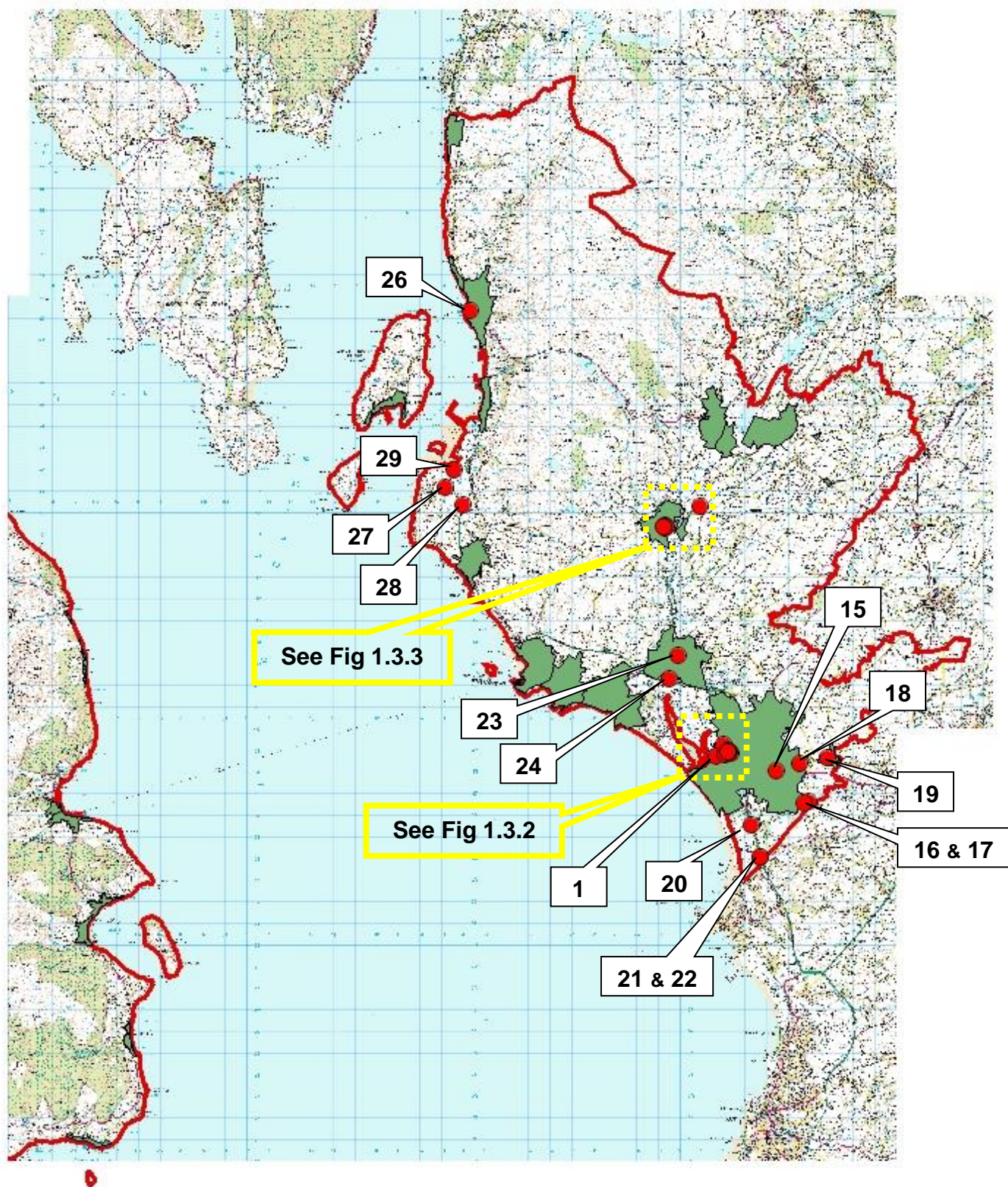
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Appendix

TABLE 1.3.1 LOCAL AIR QUALITY NO₂ MONITORING SITES

NO₂ Tube Sites	
Site Name	Description
1. CUNNINGHAME HOUSE, IRVINE	1 ST 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	LAMPPOST OUTSIDE SHOP FRONT
5. 70 HIGH STREET, IRVINE	LAMPPOST OUTSIDE SHOP FRONT
6. 97 HIGH STREET, IRVINE	LAMPPOST OUTSIDE SHOP FRONT
7. 79 HIGH STREET, IRVINE (LOBSTER POT)	LAMPPOST OUTSIDE SHOP FRONT
8. 75 HIGH STREET, IRVINE (OK JOES)	DRAINPIPE OUTSIDE SHOP FRONT
9. 65 HIGH STREET, IRVINE (GROUND HOG)	LAMPPOST/TRAILER, 65 HIGH ST IRVINE
10. 34 KIRKGATE IRVINE	LAMPPOST HALF WAY UP HILL KIRKGATE
11. 19 BANK ST, IRVINE	DRAINPIPE RIGHT HAND CORNER OF SHOP
12. 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	LAMPPOST 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
Moblie Air Quality Monitoring Unit (Groundhog) (CO, NO₂ & PM₁₀)	
Site Name	Description
GROUNDHOG, 65 HIGH STREET, IRVINE.	KERBSIDE
Additional Sites (2006)	
Site Name	Description
30. 69 NEW STREET, DALRY	LAMPPOST
31. 45 NEW STREET, DALRY	LAMPPOST
32. TOWNHEAD STREET, DALRY	ON DRAINPIPE
33. 12 GARNOCK STREET, DALRY	ON STREET SIGN
34. NEW STREET, DALRY	FUTURE SITE FOR 2007
35. TOWNHEAD STREET, DALRY	FUTURE SITE FOR 2007

Fig 1.3.1 North Ayrshire: Local Air Quality Monitoring Locations

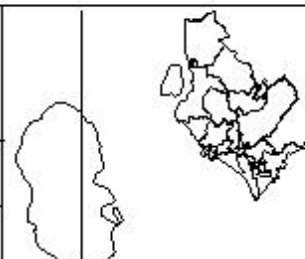


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- NAC Towns
- NAC Boundary
- NO₂ Site Locations



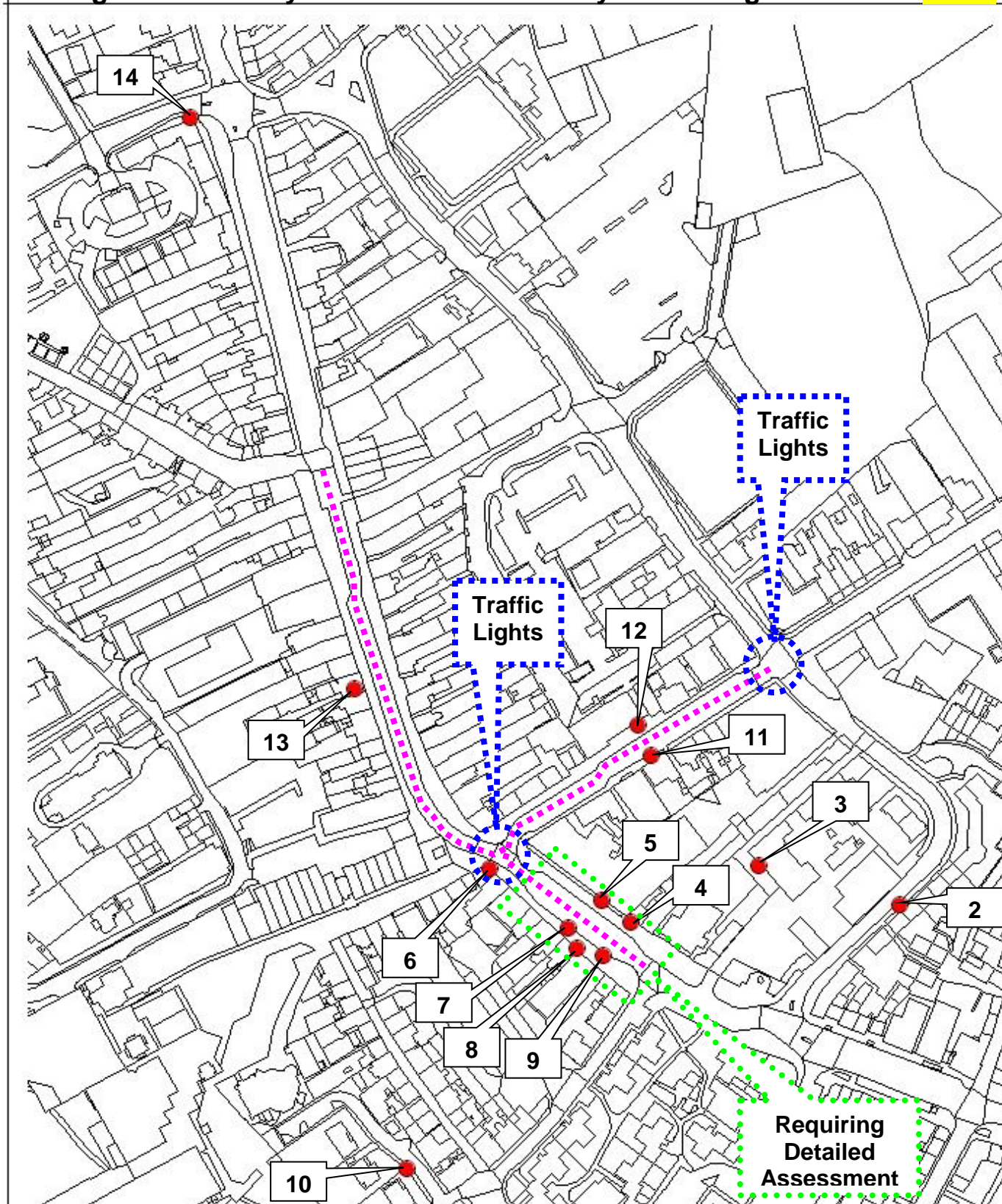
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Fig 1.3.2 North Ayrshire: Local Air Quality Monitoring Locations - Irvine



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■■■■ Buses & Taxis only (New Traffic Management)

● NO₂ Site Locations



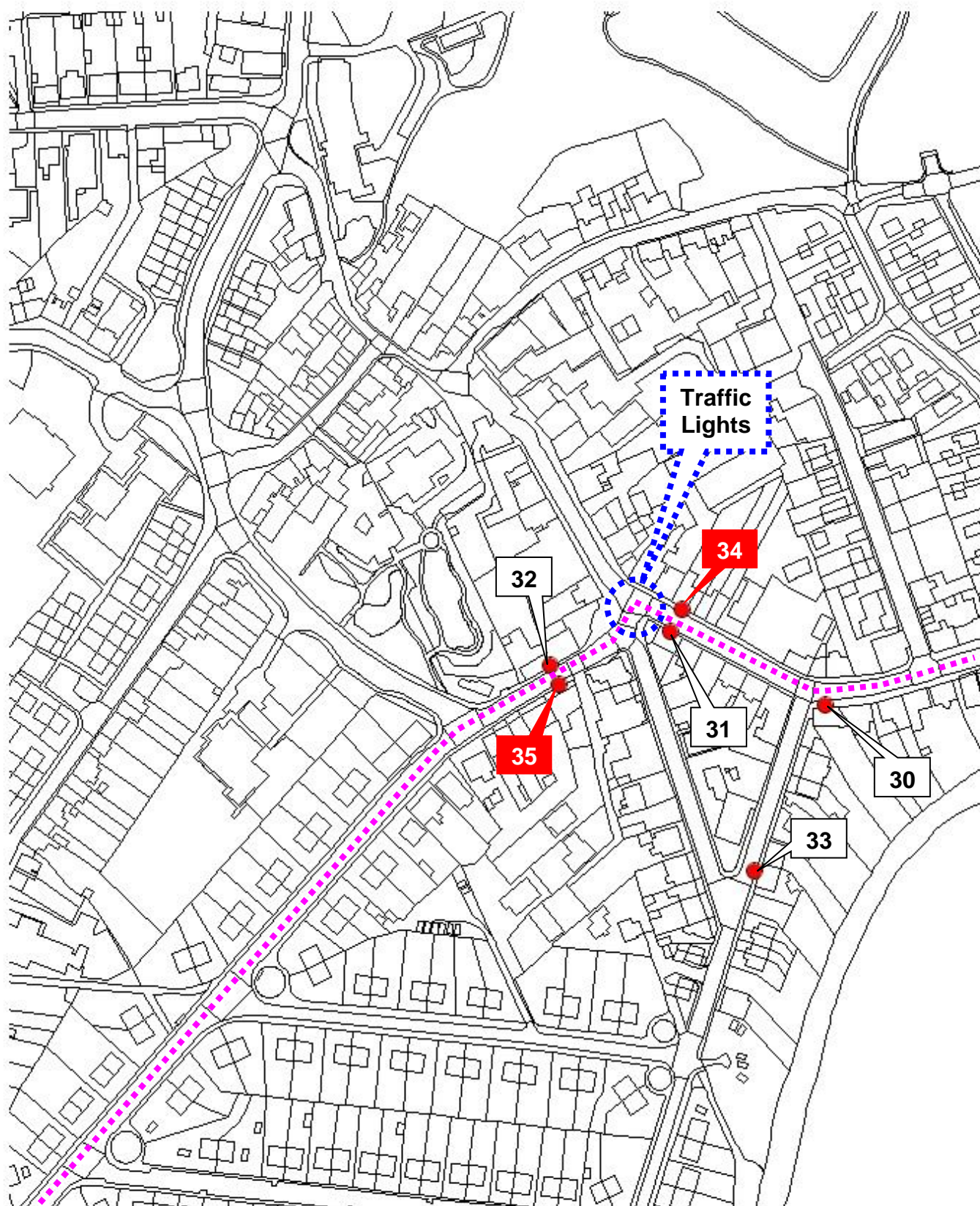
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Fig 1.3.3 North Ayrshire: Local Air Quality Monitoring Locations - Dalry



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● NO₂ Site Locations

■■■ Main Traffic Route

Future Sites for 2007

N



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Table 2.5.1: Local Bias Corrected Nitrogen Dioxide Levels: Irvine Town Centre.1998-2006 & Projection for 2010.

					*+10.3	*+4.0	*+2.3	*+24.3	*+20.0	*+20.0	*+23.4	*+35.5	*+3.7		
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	2006 Annual Mean	Annual Mean Object.	2010 Proj. Annual Mean ('06)
1	231627	638718	UB	Cunninghame House	11.0	10.6	9.4	10.1	13.7	15.7	11.9	11.8	14.0	40	11.9
2	232323	638892	K	35 East Road, Irvine	26.1	26.3	20.8	20.1	30.0	31.4	26.2	22.9	33.2	40	28.2
3	232255	638910	UB	Police Station, Irvine	12.1	9.2	11.6	9.9	14.9	15.1	12.6	11.8	15.0	40	12.8
4	232195	638878	K	74 High Street, Irvine	23.1	17.5	14.3	18.0	21.3	28.5	23.7	19.2	25.0	40	21.3
5	232172	638894	K	70 High Street, Irvine	30.5	29.9	23.8	25.1	31.3	32.7	27.9	22.5	31.0	40	26.4
6	232135	638907	K	97 High Street, Irvine	33.0	28.5	23.4	21.9	32.7	37.1	33.3	26.9	38.0	40	32.3
7	232169	638878	K	79 High Street, Irvine	45.3	41.8	31.0	30.7	40.8	49.6	45.6	31.2	43.0	40	36.6
8	232170	638871	K	75 High Street, Irvine	39.7	31.5	30.3	25.8	36.2	41.9	36.3	30.5	43.0	40	36.6
9	232182	638867	K	65 High Street, Irvine (Ground Hog)		20.5	22.4	8.5	30.9	33.1	37.0	28.9	37.0	40	31.5
10	232085	638774	UB	34 Kirkgate, Irvine	10.7	8.5	9.3	8.5	13.9	15.9	11.0	11.5	14.0	40	11.9
11	232182	638960	K	19 Bank Street, Irvine	from May 2004						22.9	22.6	28.0	40	23.8
12	232210	638976	K	19 Bank Street, Irvine	from May 2004						24.4	22.1	31.0	40	26.4
13	232077	638990	K	147 High Street, Irvine				19.1	30.2	31.5	27.8	23.3	31.0	40	26.4
14	231997	639252	K	Eglinton Street, Irvine	20.2	19.6	17.4	17.4	23.4	25.2	21.8	19.4	26.0	40	22.1

Calculation of Projected Nitrogen Dioxide Levels: 2010

"year" Annual Mean x "projected year" Correction Factor

"year" Correction Factor

2010 Correction Factor = 0.734

2006 Correction Factor = 0.863

2006 Annual Mean x 0.734

0.863

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

* % deviation of NO₂ tubes

**Figure 2.5.1: Local Bias Corrected Nitrogen Dioxide Levels: Irvine Town Centre.
1998-2006 & Projection For 2010.**

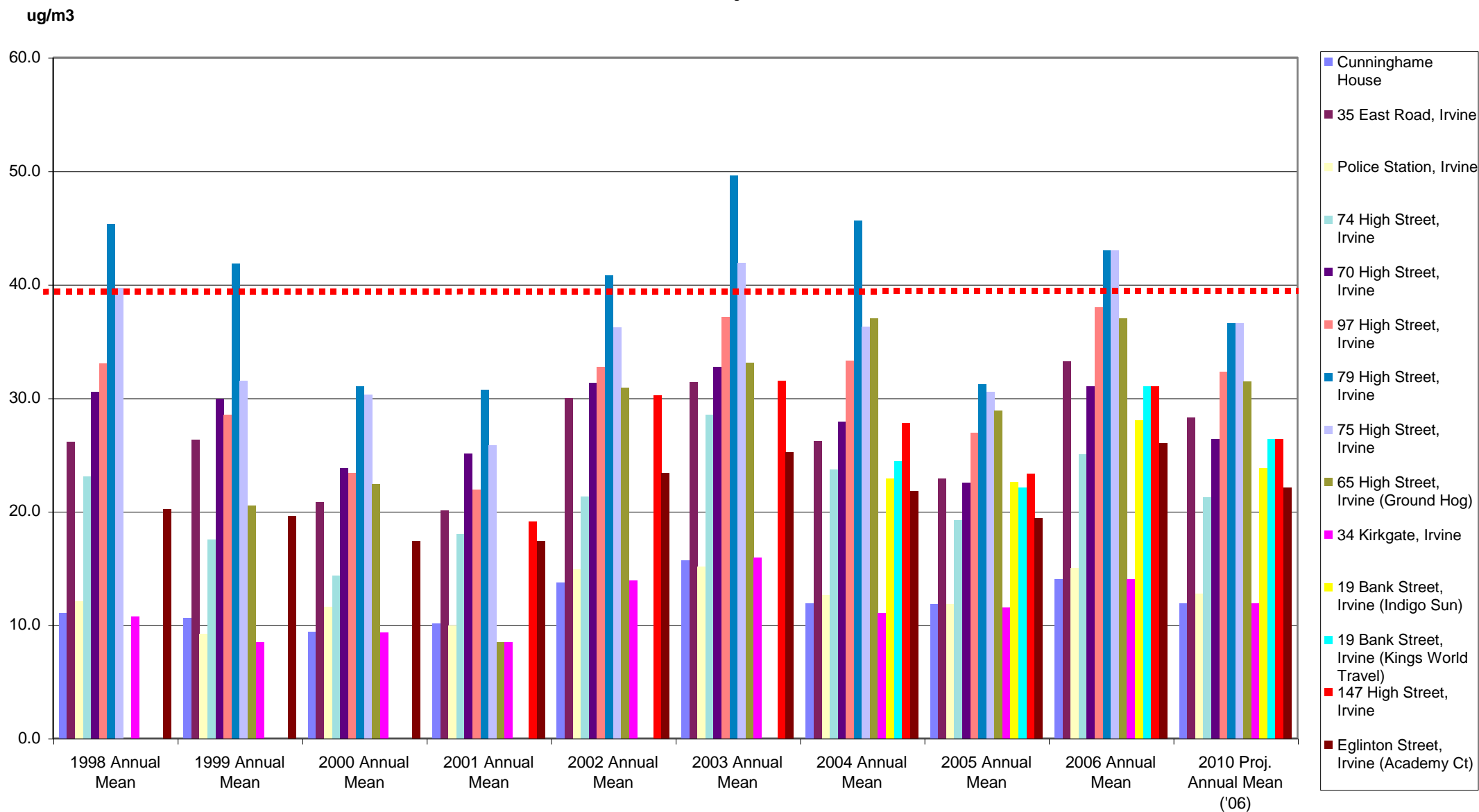


Table 2.5.2: Local Bias Corrected Nitrogen Dioxide Levels: Outlying Areas.1998-2006 & Projection for 2010.

					*+10.3	*+4.0	*+2.3	*+24.3	*+20.0	*+20.0	*+23.4	*+35.5	*+3.7		
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	2006 Annual Mean	Annual Mean Object.	2010 Proj. Annual Mean ⁽⁰⁶⁾
15	234409	637921	K	Greenwood Academy Dreghorn		7.6	10.6	12.3	14.8	17.71	16.6	14.7	21.5	40	18.3
16	235946	636597	SP	Main Street, Drybridge		7.2	8.6	7.5	9.6	12.10	9.8	9.3	11.3	40	9.6
17	235751	636637	SP	Shewalton Moss, Drybridge		7.1	7.9	6.9	10.0	11.76	10.3	8.0	10.1	40	8.6
18	235547	638410	K	Primary School, Dreghorn		12.1	16.7	11.3	15.9	18.19	14.9	15.2	18.0	40	15.3
19	236813	638659	K	Main Street, Springside		7.9	9.1	10.3	14.5	16.83	15.8	15.5	19.2	40	16.3
20	233332	635558	SP	Auchengate (Bridge)			13.7	10.1	13.3	15.77	14.8	13.5	15.0	40	12.8
21	233700	634078	SP	Auchengate (House)			10.6	8.5	11.5	13.11	12.1	11.8	15.0	40	12.8
22	233731	634067	SP	Auchengate (Road)			8.8	7.6	10.2	11.97	10.7	10.5	12.0	40	10.2
23	229928	643400	K	Dalry Rd , Kilwinning	19.7	23.0	15.7	15.3	21.4	25.05	22.7	20.9	30.0	40	25.5
24	229520	642319	K	Byrehill , Kilwinning			9.3	8.8	12.0	16.90	10.9	12.2	13.0	40	11.1
25	230943	650280	K	Highfield Hamlet , Dalry		8.0	7.9	10.4	15.9	18.88	14.0	13.6	19.0	40	16.2
26	220333	659322	K	Main Street , Largs	17.1	14.1	16.4	13.1	18.7	22.11	22.2	20.2	26.0	40	22.1
27	219226	651212	SP	Goldenberry Farm Road			4.5	9.9	4.8	4.43	2.8	4.2	6.0	40	5.1
28	220009	650214	SP	Seamill/ Hunterston Road (layby)			5.1	4.8	7.7	7.86	5.4	6.9	9.0	40	7.7
29	219584	652045	SP	Hunterston Road / Cycle Track			3.6	2.8	4.7	4.77	3.3	4.2	6.0	40	5.1

Calculation of Projected Nitrogen Dioxide Levels: 2010

"year" Annual Mean x "projected year" Correction Factor
"year" Correction Factor

2010 Correction Factor = 0.734

2006 Correction Factor = 0.863

2006 Annual Mean x 0.734
0.863

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

* % deviation of NO₂ tubes

**Figure 2.5.2: Local Bias Corrected Nitrogen Dioxide Levels: Outlying Areas.
1998-2006 & Projected Level For 2010.**

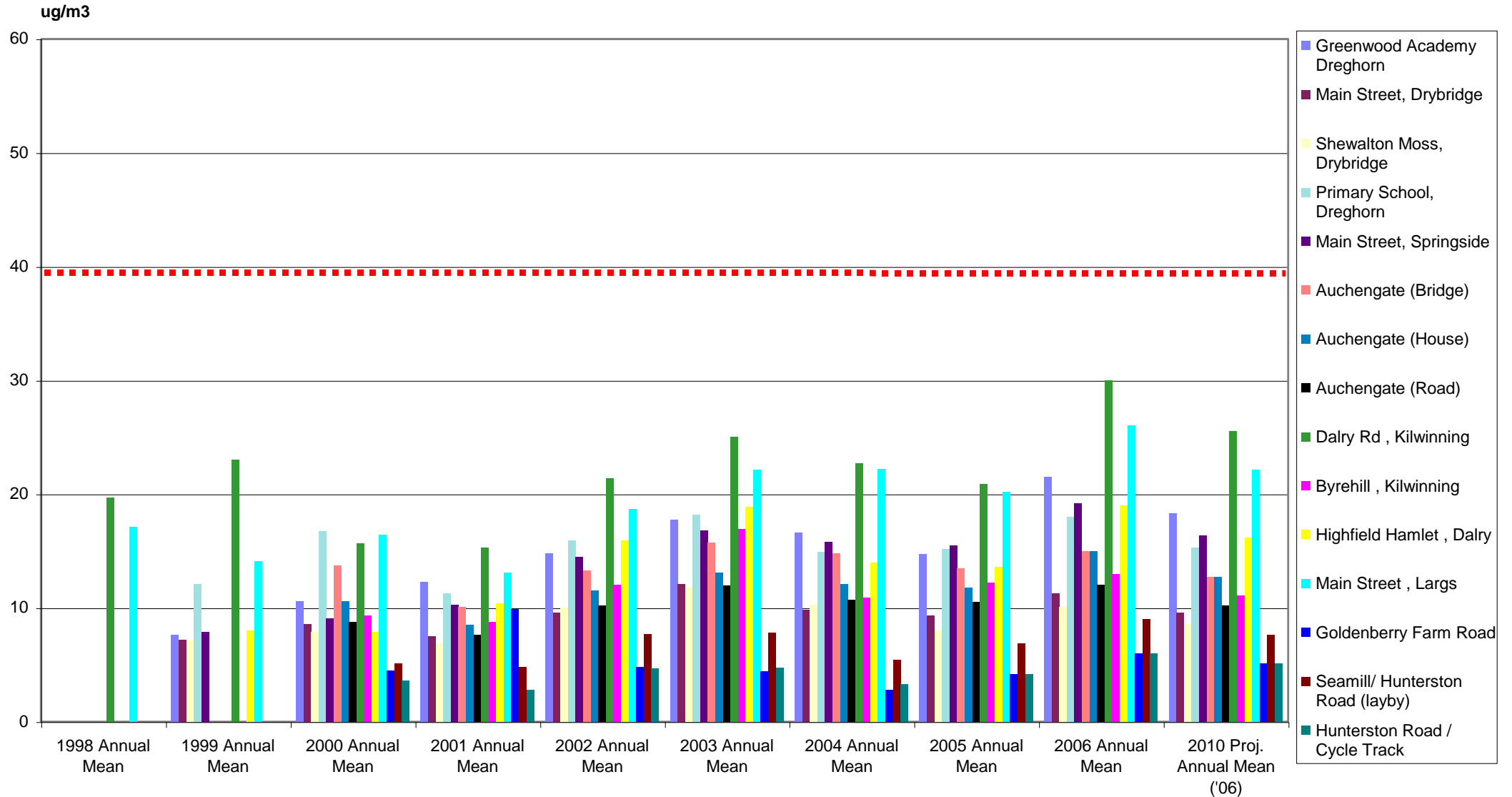


Fig 2.5.3: Nitrogen Dioxide Diffusion Tube Local Bias Correction Factors

Spreadsheet Version Number: 02/07													
Follow the steps below <u>in the correct order</u> to show the results of <u>relevant</u> collocation studies													
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.													
Published by Air Quality Consultants Ltd on behalf of Defra, the Welsh Assembly Government, the Scottish Executive and the Department of the Environment Northern Ireland													
Step 1:		Step 2:		Step 3:		Step 4:							
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List		Select a Year from the Drop-Down List		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 a laboratory is not shown, we have no data for this laboratory.		If a preparation method is not shown, we have no data for this method at this laboratory.		If a year is not shown, we have no data ²		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		2006		R	East Dunbartonshire Council	12	40	39	2.3%	G	0.98
Glasgow Scientific Services		20% TEA in Water		2006		R	East Dunbartonshire Council	12	35	33	3.5%	G	0.97
Glasgow Scientific Services		20% TEA in Water		2006			Overall Factor ³ (2 studies)					Use	0.97

¹ For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone; for Bureau Veritas Labs use Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs; 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.

[To add data download a questionnaire](#)
or contact: DeniseWelch@aqconsultants.co.uk

Table 2.5.4: Monthly NO₂ Levels - 2006

NORTH AYRSHIRE COUNCIL																		
NITROGEN DIOXIDE LEVELS 2006		Air Quality Standard: 40ug/m3 (Annual Mean)																
RESULTS IN UG/M3	EAST INGS	NORTH INGS	CLASS	Jan-06	Feb-06	Mar-06	Apr-06	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	6month Mean	Annual Mean	bias corr
Annual Mean x0.97																		
Cunninghame House, Irvine	231627	638718	UB	29	21	21	9	11	10	9	10	15	18	5	n/r	16.8	14.4	14
Greenwood Academy	234409	637921	K	31	24	24	13	n/r	19	19	n/r	24	27	16	18	22.2	21.5	21
Drybridge Main Street	235946	636597	SP	16	19	19	8	13	7	7	10	11	12	4	9	13.7	11.3	11
Shewalton Moss Estate	235751	636637	SP	16	16	11	6	10	11	8	9	10	13	3	8	11.7	10.1	10
Dreghorn Primary School	235547	638410	K	23	19	23	13	17	n/r	18	13	16	24	8	24	19.0	18.0	17
Springside Main Street	236813	638659	K	26	26	18	15	18	15	19	15	19	26	13	20	19.7	19.2	19
35 East Road Irvine	232323	638892	K	40	43	41	26	32	28	28	27	37	40	25	31	35.0	33.2	32
Irvine Police Station	232255	638910	UB	22	25	20	7	14	11	15	11	16	16	11	17	16.5	15.4	15
147 High Street, Irvine	232077	638990	K	34	39	39	27	31	31	33	26	32	35	26	33	33.5	32.2	31
74 High Street, Irvine	232195	638878	K	29	37	33	21	23	20	14	25	26	30	22	25	27.2	25.4	25
70 High Street, Irvine	232172	638894	K	39	47	48	18	29	20	29	29	30	35	n/r	n/r	33.5	32.4	31
97 High Sreet, Irvine	232135	638907	K	41	47	42	26	34	35	41	27	39	65	31	38	37.5	38.8	38
79 High Street, Irvine	232169	638878	K	52	45	40	45	44	49	49	42	45	49	30	44	45.8	44.5	43
75 High Street, Irvine	232170	638871	K	43	44	39	54	34	49	42	38	44	44	50	46	43.8	43.9	43
34 Kirkgate Irvine	232085	638774	UB	20	22	19	7	12	8	14	9	13	17	13	14	14.7	14.0	14
Eglinton Street Irvine	231997	639252	K	30	33	24	17	43	22	29	20	28	29	21	28	28.2	27.0	26
Dalry Rd , Kilwinning	229928	643400	K	36	33	37	24	29	32	32	33	31	36	22	29	31.8	31.2	30
Highfield Hamlet , Dalry	230943	650280	K	31	23	24	10	18	16	17	12	22	25	15	19	20.3	19.3	19
Main Street , Largs	220333	659322	K	25	37	38	25	30	27	21	36	25	28	14	18	30.3	27.0	26
Byrehill , Kilwinning	229520	642319	K	26	13	19	7	n/r	8	2	9	16	19	n/r	20	14.6	13.9	13
65 High Street, Irvine, (Ground Hog)	232182	638867	K	38	39	41	37	27	44	40	42	42	42	34	32	37.7	38.2	37
Auchengate (Bridge)	233332	635558	SP	20	23	21	12	15	16	8	11	20	19	5	16	17.8	15.5	15
Auchengate (House)	233700	634078	SP	20	22	19	11	14	11	16	13	15	18	8	14	16.2	15.1	15
Auchengate (Road)	233731	634067	SP	17	20	17	7	11	10	11	10	11	17	5	13	13.7	12.4	12
Goldenberry Farm Road	219199	651163	SP	10	5	9	3	6	3	4	4	8	10	n/r	3	6.0	5.9	6
Seamill/ Hunterston Road (layby)	220017	650320	SP	13	8	15	5	10	6	11	5	n/r	15	n/r	4	9.5	9.2	9
Hunterston Road/Cycle Track	219582	650020	SP	8	6	9	3	5	2	6	4	6	8	n/r	6	5.5	5.7	6
19 Bank Street Irvine	232182	638960	K	35	38	38	26	26	26	31	26	30	32	19	25	31.5	29.3	28
19 Bank Street Irvine	232210	638976	K	37	46	39	29	32	25	32	25	30	35	20	36	34.7	32.2	31
Ground Hog (see above)	232182	638867	K	38	39	41	37	27	44	40	42	42	42	34	32	37.7	38.2	37
63 High Street, Irvine	232182	638867	K	38	33	33	40	32	44	45	43	39	43	39	39	36.7	39.0	38
65 High Street, Irvine	232182	638867	K	38	43	38	40	36	42	36	39	42	40	35	35	39.5	38.7	38
69 New Street, Dalry	229364	649331	K										39	18	33			0
45 New Street, Dalry	229282	649367	K										60	35	50			0
Townhead Street, Dalry	229224	649346	K										59	36	39			0
12 Garnock Street, Dalry	229324	649243	K										17	5	13			0
Travel Blank						<0.1			<0.1			<0.1		<0.1	0.1			
Travel Blank						<0.1			<0.1			<0.1						

