



NORTH AYRSHIRE
COUNCIL

Local Air Quality Management

Progress Report: 2008

**Incorporating Detailed Assessment
for High Street Irvine**

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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. At this time no areas of relevant public exposure in North Ayrshire had 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 LAQM Progress Report 2007 highlighted elevated levels of NO₂ in High Street, Irvine exceeding **40 µg/m³** therefore requiring progression to a Detailed Assessment. Further information regarding the Detailed Assessment is contained in *2.5 Nitrogen Dioxide*.

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 is 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

General

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).

All corrected Annual Mean results for 2007 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 are $48 \mu\text{g}/\text{m}^3$ and $44 \mu\text{g}/\text{m}^3$ respectively

Dalry

Additional site locations in Dalry have now been included in the monitoring of NO_2 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 $60 \mu\text{g}/\text{m}^3$ (3 months monitoring period).

The subsequent monitoring for this area in 2007 has shown monthly mean NO_2 levels in excess of the $40 \mu\text{g}/\text{m}^3$ annual mean limit suggesting the modelling did not accurately reflect what emissions from vehicles on a slope at traffic lights would be in reality. Further Detailed Assessment of this area will be required.

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. Despite this, monitoring has highlighted breaches recorded in High Street, Irvine and Townhead Street/New Street Dalry.
2. Passive monitoring for nitrogen dioxide will 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.

Since the updating and screening assessment carried out in 2003 there has been no evidence of any change to NO₂ production or release in North Ayrshire. Similarly, there has been no development likely to result in any increase in NO₂ levels at locations where there could be **relevant public exposure**.

Although the Air Quality Objective was met for 2005, there was an increase in recorded levels of NO₂ at all sampling points throughout the district in 2006. It appears this was a continuing trend during 2007 and 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 µg/m³.

There are still uncertainties as to why there has been a general increase in the concentration of atmospheric NO₂ throughout the whole of North Ayrshire Council, compared with previous years.

2.6 Particulate Matter PM₁₀

PM₁₀ Monitoring within North Ayrshire

No continuous PM₁₀ 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 PM₁₀.
2. Screening using the DMRB model indicates that road traffic will not cause any exceedences of the objectives for PM₁₀.
3. There is no requirement to proceed to a detailed assessment for PM₁₀.
4. The 2004 review exercise showed that the projected Annual Mean PM₁₀ Concentrations for 2004 and 2010 are 21.39 µg/m³ and 19.75 µg/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 (21.39 µg/m³) shall be well below the Air Quality Objective, for 2010 it is predicted to be 19.75 µg/m³, marginally exceeding the

much reduced Air Quality Objective $18\mu\text{g}/\text{m}^3$. 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 PM_{10} shall reduce significantly in future years. Additionally, this monitoring location is **not** in a area of **relevant public exposure**. Consequently, a detailed assessment for PM_{10} 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 Detailed Assessment – High St, Irvine

An earlier traffic management scheme adopted by the local bus service ensured a significant portion of the public transport using South High Street was re-routed along Bank Street, Irvine. In response to this, additional diffusion tubes sites were located here in 2004 to monitor the effects of this traffic (See Table 2.5.4). Results for 2007 suggest there is general improvement and annual mean levels continue to be well below permissible limits in this area.

In 2006/2007 further traffic restrictions were imposed on High Street, Irvine (North and South) by North Ayrshire Council preventing access to private vehicles. The updated traffic management measures now restrict all traffic, other than buses, taxis, delivery/service vehicles and disabled badge holders, from using the High Street and Bank Street between 07:00 - 19:00. It was anticipated that these changes would result in a reduction in NO₂ at monitoring sites.

Unfortunately, results for 2007 continue to exceed the **40 µg/m³** limit in one particular area. Figure 1.3.4 details the sampling points in High Street (South) and the Annual Mean for the relevant locations.

The sampling positions that have breached the limits are a very localised phenomenon restricted to a narrow section of pavement hemmed in by an adjacent bus shelter and the shop front facades. In view of this, initial investigations considered the possibility of secondary sources of NO₂ other than vehicles. The sampling area has two hot food takeaways, however enquiries revealed that ducts discharge to the rear of these properties. The properties are terraced and at least 3-4 storeys high, therefore it is unlikely that the flue gases would have any significant effect on the results.

The narrow pavement and adjacent bus shelters create a bottle neck causing significant numbers of people waiting for buses to gather in the immediate vicinity of the two sampling points. Consideration was given to the possibility of people smoking immediately below the sample tubes influencing higher results. There has been no final conclusion on this although significant quantities of discarded cigarette ends have been seen to litter the area.

Further investigation into the bus routes in this particular area has highlighted over subscription of routes to the two stances in this area. Further communications with North Ayrshire Council, Roads Department and SPT has revealed a long term history in this area where specific agreements were set up to address traffic congestion. These included dividing the number of routes between North and South High Street and ensuring buses did not “lay up time” at the stances, but at a designated lay-by away from this area.

The results for the whole of High Street and adjacent area, generally appear to rise and fall together, further support that emissions from vehicles is the underlying cause of the ambient pollution levels. However, they do not explain the large increases noted at the location of concern. For example the January and December 2007 for 75 High Street show levels of 99µg/m³ & 85µg/m³ respectively, however there is on comparable increase in the levels at the adjacent kerbside monitoring locations.

It appears there may have been deviations from this strategy and buses have been noted making double stops between South High Street (unauthorised) and North High Street (approved), as well as further unauthorised routes using the stance where the elevated levels of NO₂ have been recorded. These additional routes account for more than 100 extra stops a day at this location and are likely to have a significant impact on NO₂ levels.

Traffic modelling for this situation is unlikely to be effective, as it will not take into account stationary vehicles at the bus stops. This has been observed from the 2007 results obtained from the sampling points in Dalry (see 2.5 Nitrogen Dioxide).

Meetings are underway with North Ayrshire Council Roads Department, Environmental Health, Strathclyde Partnership for Transport, Stagecoach and Shuttle Buses to address the congestion issue and hopefully resolve the elevated NO₂ levels.

Anecdotal evidence suggests that the new traffic restrictions are not being fully adhered to by private vehicle owners, further contributing to vehicle emission in this area. As a result, Strathclyde Police shall be consulted on the matter with a view to raising the profile of the restrictions and increased enforcement.

4.0 Conclusions

- 4.1 All guideline limits for the National Air Quality Standards should be met for 2010.
- 4.2 NO₂ monitoring results for Townhead Street, Dalry and New Street, Dalry show consistent exceedences for the **40 µg/m³** level limit. Previous modelling of this area suggested there would be no breaches, however the modelling did not fully account for stationary traffic on an incline at traffic lights. This route is one of the main thoroughfares for traffic to and from Glasgow serving North Ayrshire. This route is also subject to proposals for a bypass which it is anticipated would reduce the elevated levels.
- 4.3 With regard to nitrogen dioxide, it is predicted that a highly localised area at the façade of 75 High Street, Irvine may continue to be subject to concentration levels in excess of the guideline limit for the annual mean (40µg/m³) national air quality standard. However, it is not known whether this level of pollution exists at the window height of the first floor dwellings and additional diffusion tube monitoring sites have been established in that area at a height of 4 metres.
- 4.4 With regard to PM₁₀, whilst the predicted estimated annual mean concentration for 2004 (21.39µg/m³) shall be well below the U.K. Air Quality Objective, for 2010 it is predicted to be 19.75µg/m³, marginally exceeding the much reduced Scottish Air Quality Objective of 18µg/m³. However the monitoring location is **not** in an area of **relevant public exposure**. Consequently a detailed assessment for particulate matter PM₁₀ remains unnecessary.
- 4.5 Passive sampling shall continue in the area to monitor ambient levels of nitrogen dioxide.
- 4.6 With the exception of Nitrogen Dioxide there is no need to proceed to a detailed assessment for any of the air pollutants.
- 4.7 In view of the inconsistencies highlighted above, there is a reluctance to declare a Local Air Quality Management Area at this time. It is proposed that additional monitoring of nitrogen dioxide by means of passive diffusion tubes be undertaken at a height of 4 metres, the height of the first floor windows of the flatted dwellings over the commercial properties. Additionally, further diffusion tubes will be sited in the area to assess the lateral extent of the exceedance area. It would be preferred to deploy a real time NO_x analyser at the site of concern. However, as stated above there is limited space and so on the grounds of pedestrian safety it is not considered prudent. Scottish Executive have granted funding to locate an NO_x analyser and PM₁₀ monitor at a site approximately 25 metres from the "hot spot". This shall provide data on the concentration of these pollutants in the immediate environment. It is hoped that this equipment shall be commissioned for the start of 2009.

Siting nitrogen dioxide diffusion tubes at 4 metres high and adding more monitoring sites in the vicinity shall provide greater confidence in the level of relevant exposure actually being caused. As the decision shall be based solely on diffusion tube monitoring. North Ayrshire Council then shall be better able to justify whether Local Air Quality Management Area status is required at this location.

With regards to Townhead Street/New Street, Darly North Ayrshire Council shall progress to a detailed assessment of NO₂. However the narrowness of the street and the level of traffic flow will limit the options for carrying out more detailed monitoring in the area. Additional diffusion tube monitoring sites have been established and as with High Street, Irvine have been fixed at the height of windows providing ventilation for dwellings (approximately 4 metres in most cases)

This report was prepared by:

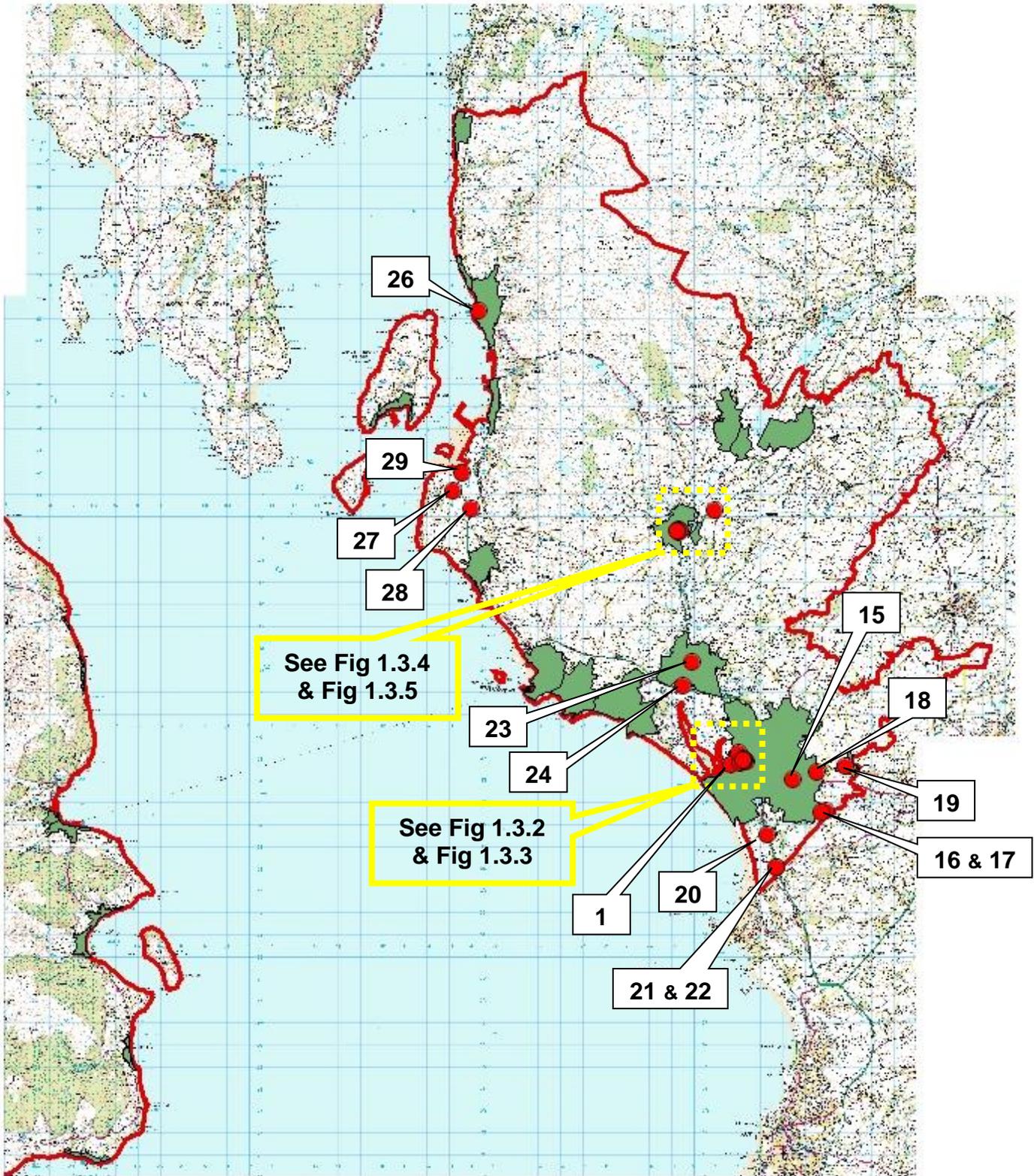
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Appendix

TABLE 1.3.1 LOCAL AIR QUALITY NO₂ MONITORING SITES

NO₂ Tube Sites			
Site Name	Eastings	Northings	Description
1. CUNNINGHAME HOUSE, IRVINE	231627	638718	1 ST FLOOR EAST WING
2. 35 EAST ROAD, IRVINE	232323	638892	LAMPOST OPP. POLICE STN GARAGE
3. IRVINE POLICE STATION	232255	638910	DRAIN PIPE POLICE STN. OPP. TOWNHOUSE
4. 74 HIGH STREET, IRVINE (Mamma's)	232195	638878	LAMPOST OUTSIDE SHOP TOWARDS KERBSIDE
5. 70 HIGH STREET, IRVINE (Somerfield)	232172	638894	LAMPOST OUTSIDE SHOP FRONT DOOR
6. 97 HIGH STREET, IRVINE (RS McColls)	232135	638907	LAMPOST ADJACENT TO SHOP FRONT
7. 79 HIGH STREET, IRVINE (No79 Doorway)	232169	638878	LAMPOST TOWARDS KERBSIDE
8. 75 HIGH STREET, IRVINE (OK Joes)	232170	638871	DRAINPIPE OUTSIDE SHOP FRONT
9. 65 HIGH STREET, IRVINE (GROUND HOG)	232182	638867	LAMPOST/TRAILER, 65 HIGH ST IRVINE
10. 34 KIRKGATE, IRVINE	232085	638774	LAMPOST HALF WAY UP HILL KIRKGATE
11. 19 BANK ST, IRVINE (Indigo Sun)	232182	638960	DRAINPIPE RIGHT HAND CORNER OF SHOP
12. 19 BANK ST, IRVINE (King World Travel)	232210	638976	DRAINPIPE LEFT HAND CORNER OF SHOP
13. 147 HIGH STREET, IRVINE	232077	638990	ON DRAINPIPE LEFT HAND SIDE OF SHOP
14. EGLINTON STREET IRVINE	231997	639252	DRAINPIPE CNR EGLINTON ST /CASTLE RD
15. GREENWOOD ACADEMY, DREGHORN	234409	637921	LAMP POLE MAIN GATE
16. MAIN STREET DRYBRIDGE	235946	636597	LAMPOST OPPOSITE OLD SCHOOL SITE
17. SHEWALTON MOSS, DRYBRIDGE	235751	636637	LAMPOST ENTRANCE TO ESTATE
18. PRIMARY SCHOOL DREGHORN	235547	638410	LAMPOST OPPOSITE PRIMARY SCHOOL
19. MAIN ROAD SPRINGSIDE	236813	638659	LAMPOST CNR STATION RD/SPRINGHILL TERR
20. AUCHENGATE (BRIDGE), IRVINE	233332	635558	PEDESTRIAN BRIDGE NORTH OF PAPER MILL
21. AUCHENGATE (HOUSE), IRVINE	233700	634078	HOUSE BEHIND AUCHENGATE SAWMILL
22. AUCHENGATE (ROAD), IRVINE	233731	634067	ROAD IN AUCHENGATE SAWMILL
23. DALRY ROAD, KILWINNING	229928	643400	LAMPOST DOWN FROM TRAFFIC LIGHTS
24. BYREHILL, KILWINNING	230943	650280	GRID REF NS 229520 642319
25. HIGHFIELD HAMLET, DALRY	220333	659322	LAMPOST AT CNR CYCLE TRACK TO GLENGARNOCK
26. MAIN STREET, LARGS	229520	642319	LAMPOST AT PEDESTRIAN CROSSING
27. GOLDENBERRY FARM ROAD	219199	651163	SOUTH OF HUNTERSTON POWER STATION
28. SEAMILL/HUNTERSTON ROAD(LAYBY)	220017	650320	LAYBY A78 SEAMILL TO HUNTERSTON
29. HUNTERSTON ROAD/CYCLE TRACT	219582	650020	JUNCT. CYCLE TRACK/HUNTERSTON PWR STN RD
30. 69 NEW STREET, DALRY			LAMPOST
31. 45 NEW STREET, DALRY			LAMPOST
32. TOWNHEAD ST, DALRY (Post Office)			ON DRAINPIPE
33. 12 GARNOCK STREET, DALRY			ON STREET SIGN
34. 44 NEW STREET, DALRY (RBS)			ON TRAFFIC LIGHT POST
35. 2 TOWNHEAD ST, DALRY (NAC Offices)			ON DRAINPIE
Mobile Air Quality Monitoring Unit (Groundhog) (CO, NO₂ & PM₁₀)			
Site Name	Description		
GROUNDHOG, 65 HIGH STREET, IRVINE.	KERBSIDE		

Fig 1.3.1 North Ayrshire: Local Air Quality Monitoring Locations

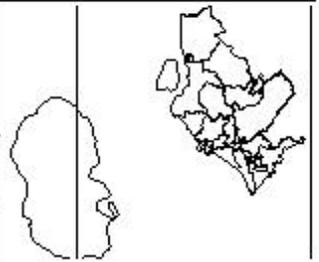


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- NAC Towns
- NAC Boundary
- NO₂ Site Locations



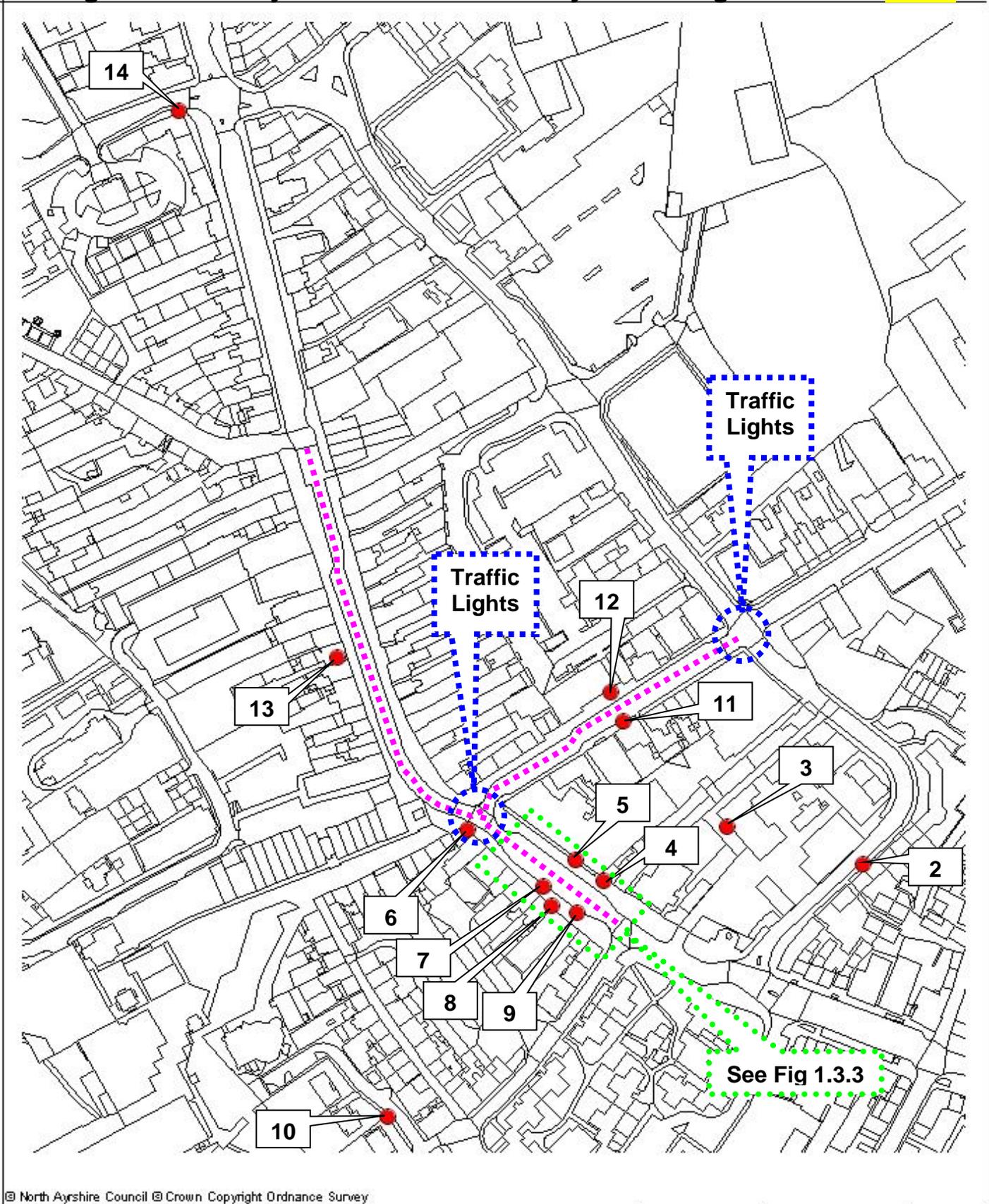
1:255,094



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

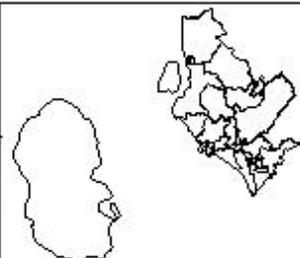


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- ⋯ Buses & Taxis only (New Traffic Management)
- NO₂ Site Locations



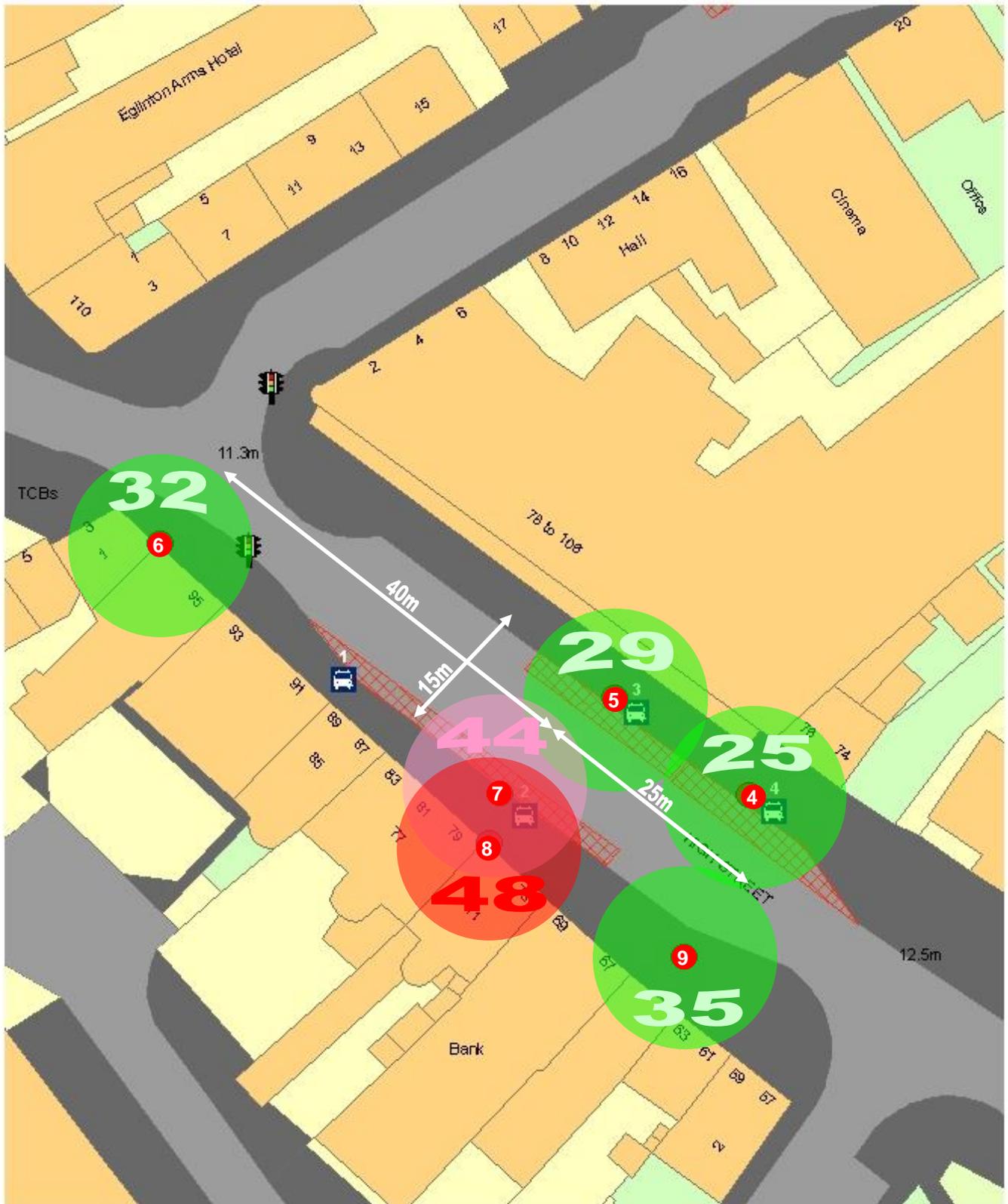
1:2,557



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Fig 1.3.3 Annual Mean ug/m³ (Bias Corrected) – High Street, Irvine



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-  nitrogen dioxide tube locations
-  Traffic Lights
-  Bus_Stops 2008
-  Bus_Bays



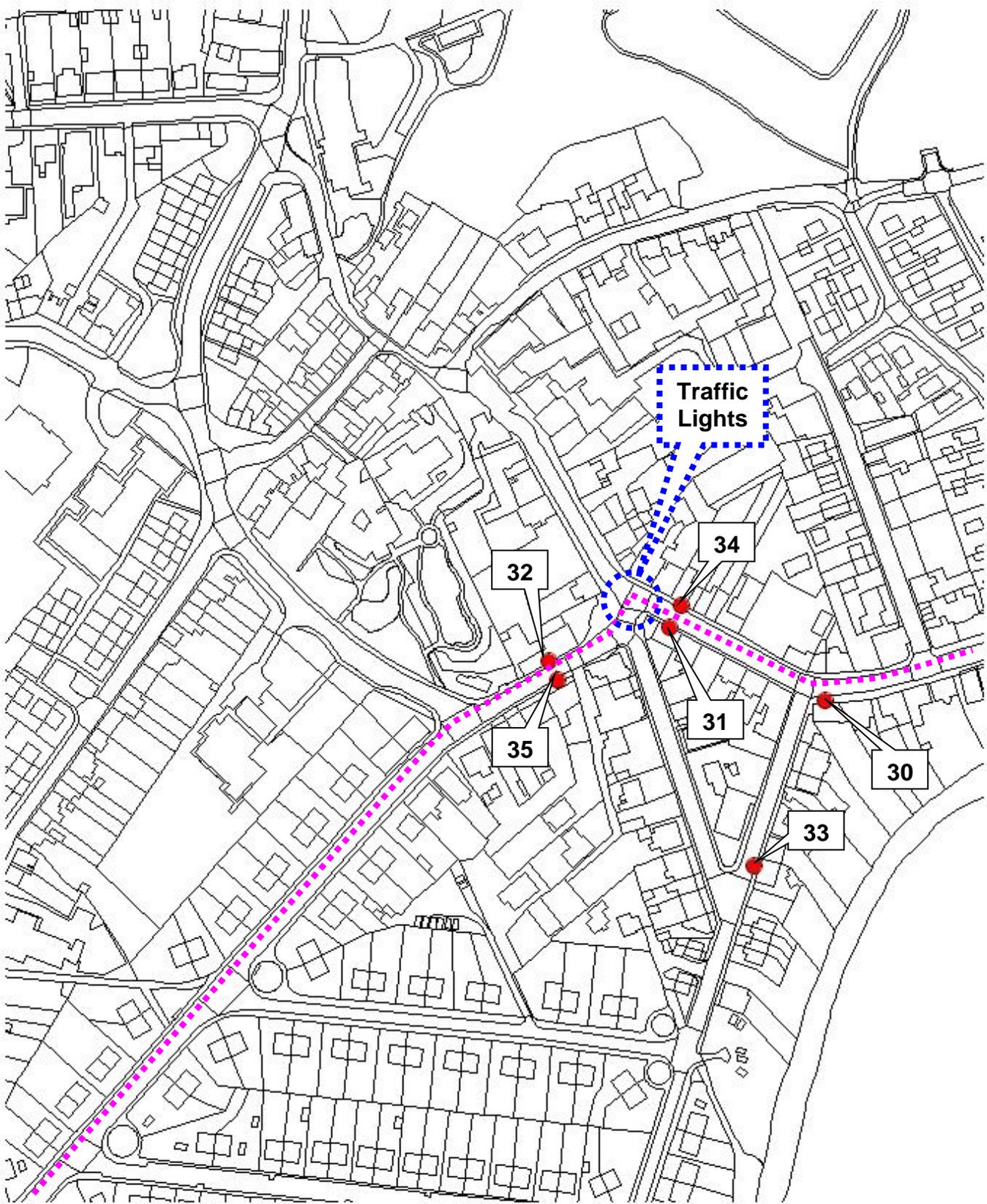
1:570



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Fig 1.3.4 North Ayrshire: Local Air Quality Monitoring Locations - Dalry



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- NO₂ Site Locations
- ⋯ Main Traffic Route



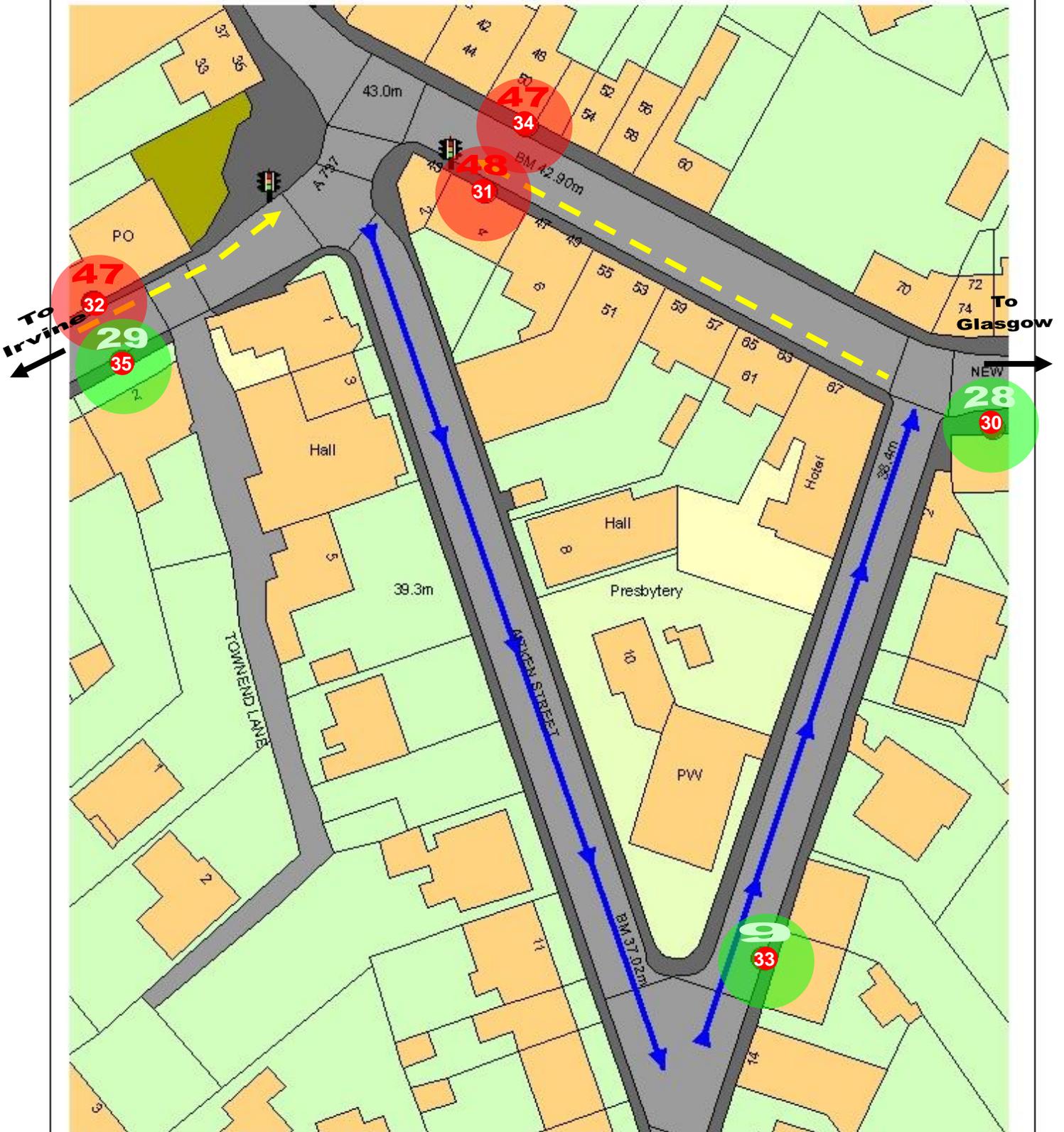
1:2,643



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Fig 1.3.5 Annual Mean ug/m³ (Bias Corrected) – Dalry



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- nitrogen dioxide tube locations
- Traffic Lights
- One Way Traffic

Queuing Traffic



1:794



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Table 2.5.1: Local Bias Corrected Nitrogen Dioxide Levels: Irvine Town Centre.1998-2007 & Projection for 2010.

Site Nos	EAST INGS	NORTH INGS	CLASS	Location	*+10.3 *+4.0 *+2.3 *+24.3 *+20.0 *+20.0 *+23.4 *+35.5 *+3.7 *-0.05											Annual Mean Object.	2010 Proj. Annual Mean (07)
					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	2007 Annual Mean			
1	231627	638718	Urban	Cunninghame House	11.0	10.6	9.4	10.1	13.7	15.7	11.9	11.8	14.0	12.0	40	10.6	
2	232323	638892	Kerbside	35 East Road, Irvine	26.1	26.3	20.8	20.1	30.0	31.4	26.2	22.9	33.2	26.0	40	22.9	
3	232255	638910	Urban	Police Station, Irvine	12.1	9.2	11.6	9.9	14.9	15.1	12.6	11.8	15.0	12.0	40	10.6	
4	232195	638878	Kerbside	74 High Street, Irvine	23.1	17.5	14.3	18.0	21.3	28.5	23.7	19.2	25.0	25.0	40	22.1	
5	232172	638894	Kerbside	70 High Street, Irvine	30.5	29.9	23.8	25.1	31.3	32.7	27.9	22.5	31.0	29.0	40	25.6	
6	232135	638907	Kerbside	97 High Street, Irvine	33.0	28.5	23.4	21.9	32.7	37.1	33.3	26.9	38.0	32.0	40	28.2	
7	232169	638878	Kerbside	79 High Street, Irvine	45.3	41.8	31.0	30.7	40.8	49.6	45.6	31.2	43.0	44.0	40	38.8	
8	232170	638871	Kerbside	75 High Street, Irvine	39.7	31.5	30.3	25.8	36.2	41.9	36.3	30.5	43.0	48.0	40	42.3	
9	232182	638867	Kerbside	65 High Street, Irvine (Ground Hog)		20.5	22.4	8.5	30.9	33.1	37.0	28.9	37.0	35.0	40	30.9	
10	232085	638774	Urban	34 Kirkgate, Irvine	10.7	8.5	9.3	8.5	13.9	15.9	11.0	11.5	14.0	11.0	40	9.7	
11	232182	638960	Kerbside	19 Bank Street, Irvine					from May 2004			22.9	22.6	28.0	24.0	40	21.2
12	232210	638976	Kerbside	19 Bank Street, Irvine					from May 2004			24.4	22.1	31.0	28.0	40	24.7
13	232077	638990	Kerbside	147 High Street, Irvine				19.1	30.2	31.5	27.8	23.3	31.0	29.0	40	25.6	
14	231997	639252	Kerbside	Eglinton Street, Irvine	20.2	19.6	17.4	17.4	23.4	25.2	21.8	19.4	26.0	22.0	40	19.4	

Calculation of Projected Nitrogen Dioxide Levels: 2010

$$\frac{\text{"year" Annual Mean} \times \text{"projected year" Correction Factor}}{\text{"year" Correction Factor}}$$

2010 Correction Factor = 0.734

2007 Correction Factor = 0.832

$$\frac{\text{2007 Annual Mean} \times 0.734}{0.832}$$

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.**

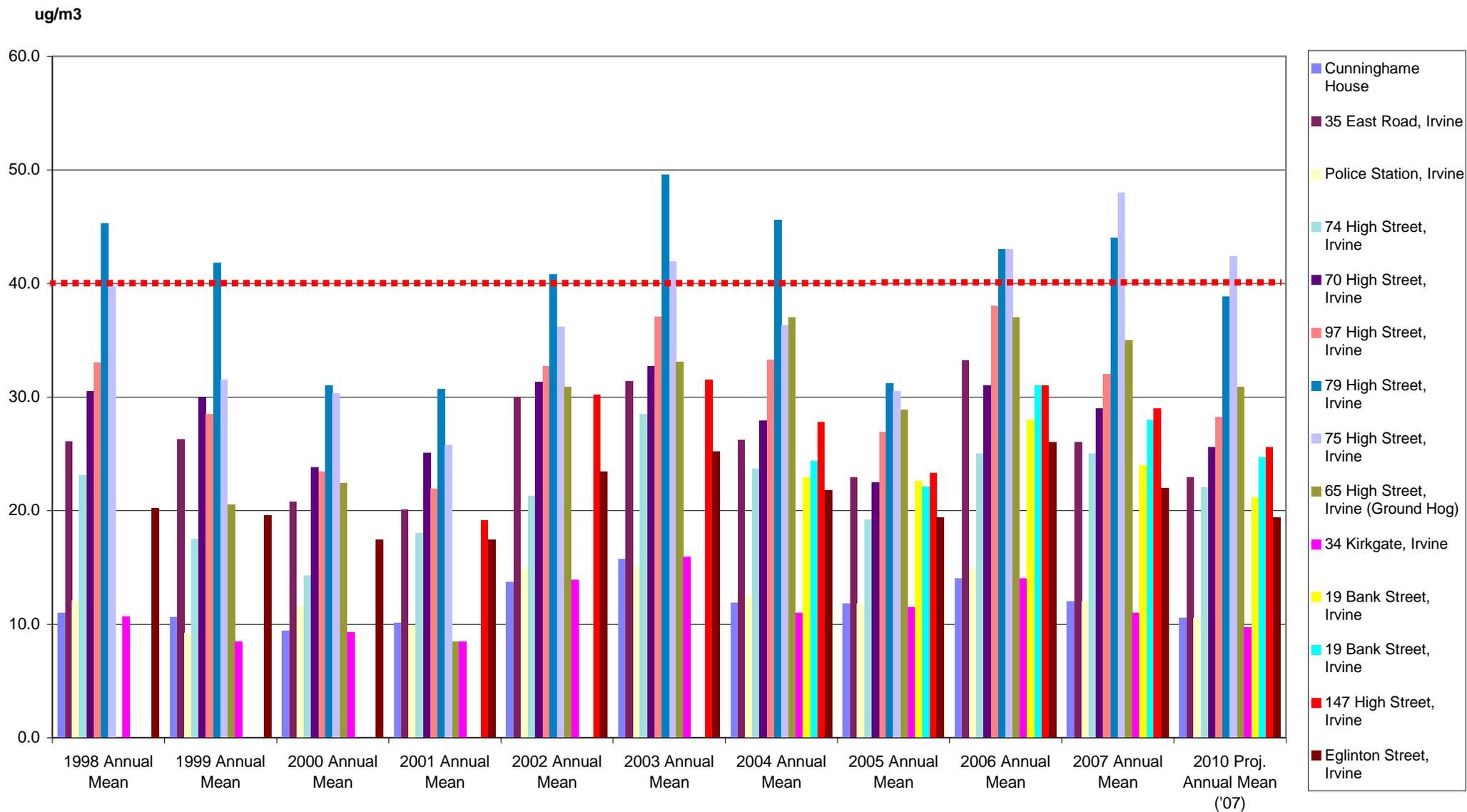


Table 2.5.2: Local Bias Corrected Nitrogen Dioxide Levels: Outlying Areas.1998-2007 & Projection for 2010.

Site Nos	EAST INGS	NORTH INGS	CLASS	Location												Annual Mean Object.	2010 Proj. Annual Mean ⁽⁰⁷⁾
					*+10.3	*+4.0	*+2.3	*+24.3	*+20.0	*+20.0	*+23.4	*+35.5	*+3.7	*-0.05			
					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	2007 Annual Mean			
15	234409	637921	Kerbside	Greenwood Academy Dreghorn		7.6	10.6	12.3	14.8	17.71	16.6	14.7	21.5	17.0	40	15.0	
16	235946	636597	SP	Main Street, Drybridge		7.2	8.6	7.5	9.6	12.10	9.8	9.3	11.3	9.0	40	7.9	
17	235751	636637	SP	Shewalton Moss, Drybridge		7.1	7.9	6.9	10.0	11.76	10.3	8.0	10.1	8.0	40	7.1	
18	235547	638410	Kerbside	Primary School, Dreghorn		12.1	16.7	11.3	15.9	18.19	14.9	15.2	18.0	13.0	40	11.5	
19	236813	638659	Kerbside	Main Street, Springside		7.9	9.1	10.3	14.5	16.83	15.8	15.5	19.2	17.0	40	15.0	
20	233332	635558	SP	Auchengate (Bridge)			13.7	10.1	13.3	15.77	14.8	13.5	15.0	14.0	40	12.4	
21	233700	634078	SP	Auchengate (House)			10.6	8.5	11.5	13.11	12.1	11.8	15.0	13.0	40	11.5	
22	233731	634067	SP	Auchengate (Road)			8.8	7.6	10.2	11.97	10.7	10.5	12.0	11.0	40	9.7	
23	229928	643400	Kerbside	Dalry Rd , Kilwinning	19.7	23.0	15.7	15.3	21.4	25.05	22.7	20.9	30.0	25.0	40	22.1	
24	229520	642319	Kerbside	Byrehill , Kilwinning			9.3	8.8	12.0	16.90	10.9	12.2	13.0	10.0	40	8.8	
25	230943	650280	Kerbside	Highfield Hamlet , Dalry		8.0	7.9	10.4	15.9	18.88	14.0	13.6	19.0	15.0	40	13.2	
26	220333	659322	Kerbside	Main Street , Largs	17.1	14.1	16.4	13.1	18.7	22.11	22.2	20.2	26.0	26.0	40	22.9	
27	219226	651212	SP	Goldenberry Farm Road			4.5	9.9	4.8	4.43	2.8	4.2	6.0	5.0	40	4.4	
28	220009	650214	SP	Seamill/ Hunterston Road (layby)			5.1	4.8	7.7	7.86	5.4	6.9	9.0	6.0	40	5.3	
29	219584	652045	SP	Hunterston Road / Cycle Track			3.6	2.8	4.7	4.77	3.3	4.2	6.0	4.0	40	3.5	

Calculation of Projected Nitrogen Dioxide Levels: 2010

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

"year" Correction Factor

2010 Correction Factor = 0.734

2007 Correction Factor = 0.832

2007 Annual Mean x 0.734

0.832

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.**

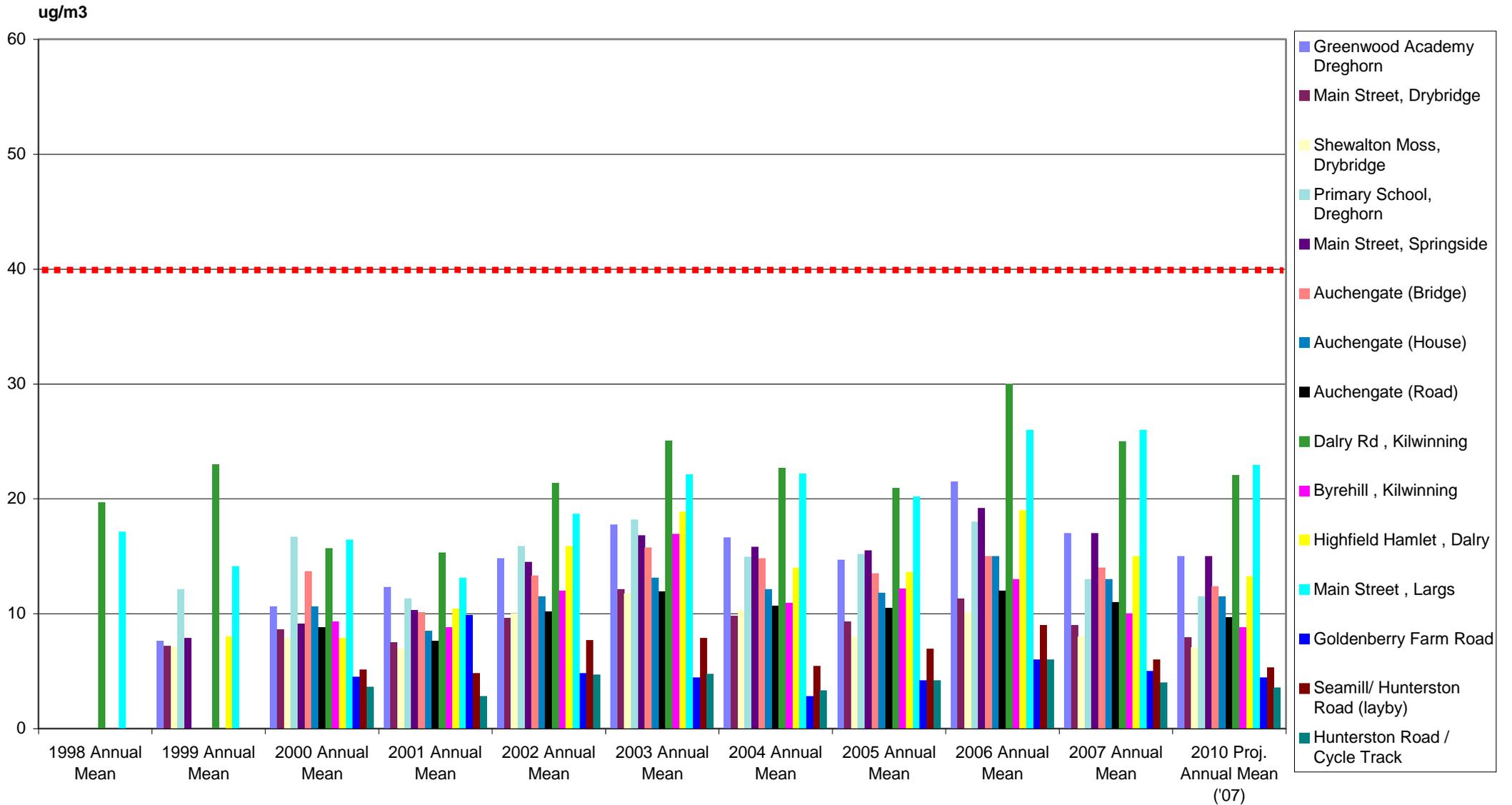


Table 2.5.3: Local Bias Corrected Nitrogen Dioxide Levels: Dalry 2007 & Projection for 2010.

Site Nos	EAST INGS	NORTH INGS	CLASS	Location	*+10.3 1998 Annual Mean	*+4.0 1999 Annual Mean	*+2.3 2000 Annual Mean	*+24.3 2001 Annual Mean	*+20.0 2002 Annual Mean	*+20.0 2003 Annual Mean	*+23.4 2004 Annual Mean	*+35.5 2005 Annual Mean	*+3.7 2006 Annual Mean	*-0.05 2007 Annual Mean	Annual Mean Object.	2010 Proj. Annual Mean ('07)
30			Kerbside	69 New St, Dalry										28.0	40	24.7
31			Kerbside	45 New St, Dalry										48.0	40	42.3
32			Kerbside	PO Townhead St, Dalry										47.0	40	41.5
33			Urban	12 Garnock St, Dalry										9.0	40	7.9
34			Kerbside	44 New St, Dalry										47.0	40	41.5
35			Kerbside	2 Townhead St, Dalry										29.0	40	25.6

Calculation of Projected Nitrogen Dioxide Levels: 2010

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

"year" Correction Factor

2010 Correction Factor = 0.734

2007 Correction Factor = 0.832

2007 Annual Mean x 0.734
0.832

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

* % deviation of NO₂ tubes

**Figure 2.5.3 Local Bias Corrected Nitrogen Dioxide Levels: Dalry
2007 & Projection for 2010.**

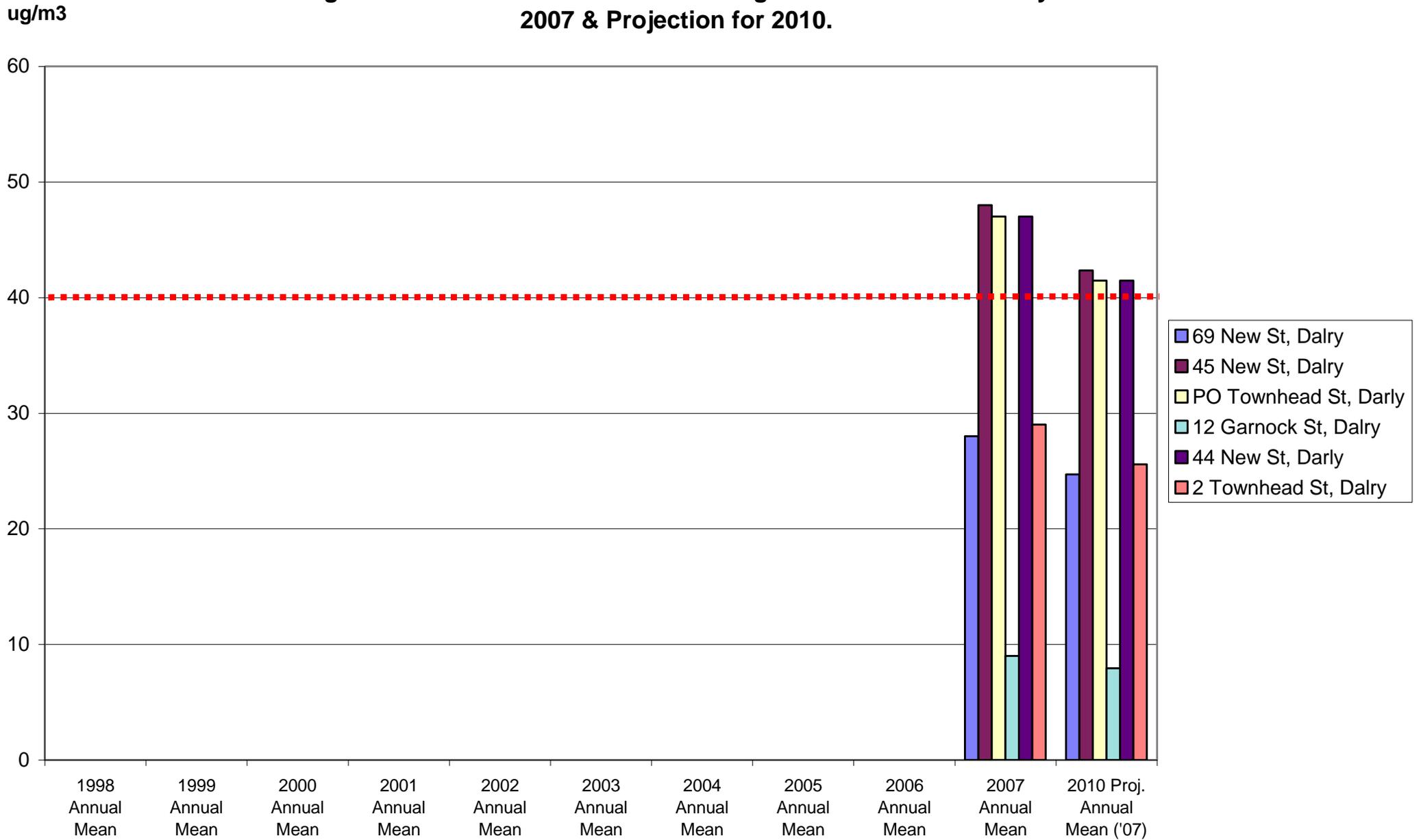


Fig 2.5.4: Nitrogen Dioxide Diffusion Tube Local Bias Correction Factors

Step 1:							Step 2:				Step 3:				Step 4:				
<p>Follow the steps below in the correct order to show the results of relevant collocation studies</p> <p>Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods</p> <p>Whenever presenting adjusted data, you should state the adjustment factor used</p> <p>This spreadsheet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.</p> <p>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</p>																<p>Spreadsheet Version Number: 03/08</p> <p>This spreadsheet will be updated in late September 2008 on the R&A website</p>			
<p>Select the Laboratory that Analyses Your Tubes from the Drop-Down List</p> <p>If a laboratory is not shown, we have no data for this laboratory.</p>				<p>Select a Preparation Method from the Drop-Down List</p> <p>If a preparation method is not shown, we have no data for this method at this laboratory.</p>				<p>Select a Year from the Drop-Down List</p> <p>If a year is not shown, we have no data²</p>				<p>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 factor³ shown in blue at the foot of the final column.</p> <p>If you have your own collocation study then see footnote⁴. If uncertain what to do then contact the Review and Assessment Helpdesk 0117 328 3668 aqm-review@uwe.ac.uk.</p>							
Analysed By ¹	Method	Year ⁵	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	2007	R	East Dunbartonshire Council	12	29	34	-13.8%	P	1.16									
Glasgow Scientific Services	20% TEA in Water	2007	R	East Dunbartonshire Council	12	38	39	-2.9%	P	1.03									
Glasgow Scientific Services	20% TEA in Water	2007	R	North Lanarkshire Council	12	20	22	-7.2%	G	1.08									
Glasgow Scientific Services	20% TEA in Water	2007	K	AEA Tech Intercomparison	12	110	103	7.3%	G	0.93									
Glasgow Scientific Services	20% TEA in Water	2007	Overall Factor ³ (4 studies)				Use		1.05										

¹ For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone; for Bureau Veritas Labs and Eurofins use Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins; 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: MattRoss-Jones@aqconsultants.co.uk

Environmental Quality Directorate
Water, Air, Soils and Flooding Division
Area 1-G(N)

T: 0131-244 7813 F: 0131-244 0211
E: andrew.taylor2@scotland.gsi.gov.uk

19 OCT 2008



John Murray
Environmental Health Officer
North Ayrshire Council
Legal & Protective Services (Env Protection)
Cunninghame House
Irvine
KA12 8EE

Your ref:
Our ref:
15 October 2008

Dear John

LOCAL AIR QUALITY MANAGEMENT: NORTH AYRSHIRE COUNCIL ANNUAL PROGRESS REPORT/DETAILED ASSESSMENT 2008

Thank you for submitting copies of the 2008 annual progress report/detailed assessment of air quality in the North Ayrshire Council area. I acknowledge receipt of the report on behalf of the Scottish Ministers as a statutory consultee in terms of paragraph 1 of Schedule 11 to the Environment Act 1995.

A discussion took place between the Scottish Government and the Scottish Environment Protection Agency (SEPA), also a statutory consultee under Schedule 11 of the 1995 Act, in order to consider your report. This has been done to maximise the expertise available and to exchange views on the information being sent to you. Following this discussion I offer the comments below on behalf of the Government.

The report contains monitoring and modelling data obtained since submission of the 2007 annual progress report, including a detailed assessment for nitrogen dioxide in Irvine. The report concludes that further investigation in Irvine and an additional detailed assessment for nitrogen dioxide in Dalry are required.

Your report was found to be thorough, containing most of the evidence specified in the guidance produced by the Government. On the basis of this evidence, the conclusions reached are accepted. However your attention is drawn to the following points.

Nitrogen dioxide

The Government agrees with the Council's decision to proceed to a detailed assessment in Dalry. The Council should provide an expected completion date for this work.

Victoria Quay, Edinburgh EH6 6QQ
www.scotland.gov.uk



We note the Council's intention to undertake additional diffusion tube monitoring for the areas of predicted exceedence at High Street, Irvine. Any available data should be submitted with the 2009 Updating and Screening Assessment, with the full assessment to follow as soon as possible. Likewise, initial data from the continuous monitor which is due to commence operation in 2009 should be submitted as soon as they are available.

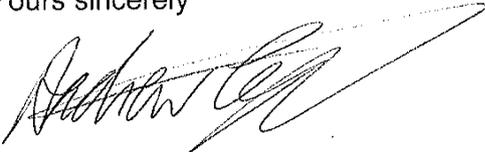
Conclusions

In addition to these comments, the Government uses an independent consultant to give a general overview of each local authority review and assessment document, to help ensure a consistency of approach. The consultant's appraisal of the report is limited to the data provided and does not take account of local knowledge. I enclose a copy this appraisal for information.

I trust you find these comments helpful. However, please do not hesitate to contact me if you wish to discuss any issues related to the report.

I would be grateful if the Council could provide a timetable for the detailed assessment in Dalry as soon as possible. I also take this opportunity to remind you that the next report due from the Council will be an Updating & Screening Assessment in April 2009.

Yours sincerely



ANDREW G TAYLOR
Air Quality Policy Officer

Ref: DA3-163 & PR3-566

Review & Assessment Appraisal Report

Report Prepared by: **North Ayrshire Council**

Date Review & Assessment Report Issued: **September 2008**

The Progress Report sets out new information on air quality obtained by North Ayrshire Council, as part of the Review & Assessment process required under the Environment Act 1995 and subsequent Regulations.

The Progress Report also provides information relating to the Detailed Assessment required for High Street, Irvine.

The Review and Assessment Progress Report covers the **minimum requirements for reporting on monitoring and new local developments.**

The Local Authority proposes to progress to a Detailed Assessment for annual mean nitrogen dioxide concentrations in Dalry.

On the basis of the information provided by the local authority, the Progress Report is **accepted.**

The information provided as a Detailed Assessment for High St, Irvine does not provide sufficient evidence to be considered as a Detailed Assessment as it is unable to conclude whether an Air Quality Management Area is necessary or not. It is accepted that the council is carrying out further monitoring, particularly at the height of first floor receptors. This monitoring data should be submitted within a future reports as soon as it becomes available. An initial comparison of the first 3 months' elevated monitoring data with the street-level data should be provided in the council's Updating and Screening Assessment in April 2009. A fuller analysis is expected to be included in the Detailed Assessment report to cover Dalry.

Ref: DA3-163 & PR3-566

Commentary

The report is well structured and provides most of the information specified in the Guidance.

The following specific item is drawn to the local authority's attention to help inform future work:

1. The council should consider setting out the report to clearly differentiate between the reporting of monitoring data and the statements regarding new or changed local developments.

This commentary is not designed to deal with every aspect of the report. It highlights a number of issues that should help the local authority in carrying out further Review & Assessment work.

Issues can be followed up through the Review and Assessment helpdesk as follows:

Help desk telephone:	0117 328 3668
Help desk email:	aqm-review@uwe.ac.uk
Web site:	www.uwe.ac.uk/aqm/review

Our Ref: CC/LALU/AQ/R&A/AllStages/
AyrN/PR08

Your Ref:

Mr John Murdoch
North Ayrshire Council
Environmental Health Department
Cunninghame House
Irvine
KA12 8EE

If telephoning ask for:
Chris Connor
16 January 2009

Dear John

**THE ENVIRONMENT ACT 1995, PART IV
LOCAL AIR QUALITY MANAGEMENT – PROGRESS REPORT 2008**

Thank you for your report, which we received on 21 November 2008. The following comments are provided by SEPA as statutory consultee in terms of paragraph 1 of Schedule 11 to the Environment Act 1995. SEPA has discussed the report with the Scottish Executive in order to share expertise and provide consistent comments.

The report presented is comprehensive and deals with the 7 AQS objective substances section by section and the inclusion of location maps was also very helpful.

The report concludes that it is unlikely that concentrations of particulates, benzene, 1,3-butadiene, carbon monoxide, lead, sulphur dioxide will exceed the relevant objectives but recent monitoring has justified the need to proceed to a detailed assessment for nitrogen dioxide at Dalry and undertake further diffusion tube monitoring at High Street, Irvine. SEPA agree with these conclusions and would like the Council to consider the following comments.

Monitoring using NO₂ diffusion tubes at Dalry has indicated exceedences of the 2005 Objective level and this would appear to be confirmed by previous modelling undertaken at this area. SEPA welcomes the Council's decision to undertake a detailed assessment but would request if there is a timescale in place or will the monitoring data be made available in this years Updating and Screening Assessment?

The Report also describes a local phenomenon on High Street, Irvine which may be a factor in recent kerbside concentration levels of NO₂. However, considering the results are unlikely to exceed the 1 hour mean limit, SEPA welcomes the Council's decision to increase the height of the diffusion tubes to 4 metres to assess relevant public exposure to determine possible exceedences of the annual mean. Furthermore, SEPA welcomes the Council's decision to install a continuous automatic monitor 25 metres from the "hot spot" and looks forward to the results of the monitoring when they become available.

I trust the above comments are of assistance. Should you wish to discuss any points raised in this response please do not hesitate to contact me at the East Kilbride office.

Yours sincerely

Chris Connor

Local Air Quality Specialist