



2010 Air Quality Progress Report for *East Ayrshire Council*

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

May 2010

Local Authority Officer	Sandy Loudon Environmental Health Technician East Ayrshire Council
--------------------------------	--

Department	Finance and Corporate Support
Address	Environmental Health Western Road Depot Kilmarnock KA3 1LL
Telephone	01563 554015
e-mail	sandy.loudon@east-ayrshire.gov.uk

Report Reference number	EA/01/2010
Date	April 2010

Executive Summary

East Ayrshire Council has carried out a review of air quality within East Ayrshire, which fulfils the requirements of the Local Air Quality Management process as set out in part IV of the Environment Act (1995) and the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007. The Report follows Technical Guidance LAQM.TG(09) (Reference 1), issued by the Scottish Government to assist local authorities in their Review and Assessment of air quality.

The report forms the 2010 Progress Report (PR) of the fourth round of the Review and Assessment process and includes the latest available data up to the end of 2009. It also considers the conclusions of the previous rounds of Review and Assessment and any changes that have occurred since then which would have an effect on local air quality.

The report sets out the results of air quality monitoring carried out by East Ayrshire Council and considers the potential impacts from a range of sources such as road traffic and other transport emissions, industrial processes, commercial and domestic fuel use and fugitive emission sources which may have changed since the 2009 Updating and Screening Assessment.

The Progress Report concluded that concentrations of the air quality objectives outlined in Table 1.1 are unlikely to be exceeded. On the basis of this assessment, no further action is required in respect of the pollutants:

- Carbon Monoxide
- Benzene
- 1,3-Butadiene
- Lead
- Sulphur Dioxide

Nitrogen Dioxide

A Detailed Assessment was carried out in 2008 for John Finnie Street and concluded that nitrogen dioxide levels would decrease in future years. To back up these findings, monitoring has been increased within John Finnie Street (Figure 5c) itself, and in the adjacent West George Street (Figure 5c), with the addition of extra nitrogen dioxide diffusion tubes (August 09) and the siting of automatic monitoring equipment (for nitrogen dioxide and PM₁₀) at the north end of John Finnie Street (Figure 4) in April 2010. However, levels of nitrogen dioxide were found to be just under the annual mean objective (principally from road traffic sources) at one location in East Ayrshire (Table 2.4a) where a full years monitoring was carried out. Monitoring at 62 John Finnie Street recorded NO₂ levels of 38.3 µg/m³ and this together with previous raised levels recorded in John Finnie Street (Table 2.4a) reiterates the requirement for further monitoring in John Finnie Street and the surrounding streets. Short term nitrogen dioxide monitoring (diffusion tube) from West George Street, Kilmarnock indicated levels close to the annual Air Quality Objective and short term monitoring at the new monitoring location at 95/97 John Finnie Street gave levels above the Air Quality Objective. Although results from short term monitoring must be treated with caution, with inherent inaccuracies, it emphasises the need for continued diffusion tube monitoring with the addition of more accurate automatic monitoring. It should be noted that all locations of relevant public exposure within East Ayrshire gave levels of NO₂ below the 40 µg/m³ 2005 annual mean Air Quality Objective (Table 1.1 and Table 2.4b).

Short term diffusion tube monitoring of nitrogen dioxide (Table 2.4a) at Loudoun Road, Newmilns and Earl Grey Street, Mauchline also gave raised levels at $39.8 \mu\text{g}/\text{m}^3$ and $41.3 \mu\text{g}/\text{m}^3$ respectively. Continued monitoring in both towns will therefore be continued and expanded if further monitoring shows continued raised levels.

All other monitoring locations within East Ayrshire gave annual mean levels of nitrogen dioxide well below the annual mean objective. Since all sites gave an annual mean level well below $60 \mu\text{g}/\text{m}^3$ we can conclude that no exceedences of the one hour mean are likely to occur within East Ayrshire (Section 2).

PM₁₀

PM₁₀ monitoring commenced in New Cumnock in 2009. This location was chosen due to the extensive open cast coal works in the surrounding area and the associated potentially raised background PM₁₀ levels. Results for 2009 gave levels of PM₁₀ at $12 \mu\text{g}/\text{m}^3$ well below the Annual Air Quality Objective (Table 2.5A). Similarly no exceedences of the 24 hour mean occurred. PM₁₀ monitoring commenced in John Finnie Street, Kilmarnock in April 2010 and the results will be discussed in the 2011 Progress Report.

A Detailed Assessment is therefore not required for East Ayrshire Council at this time.

An Annual Progress Report will be submitted to the Scottish Government by the end of April 2011.

Table of contents

1	Introduction	7
1.1	Description of Local Authority Area	7
1.2	Purpose of Progress Report	7
1.3	Air Quality Objectives	8
1.4	Summary of Previous Review and Assessments	10
2	New Monitoring Data	11
2.1	Summary of Monitoring Undertaken	11
2.2	Comparison of Monitoring Results with Air Quality Objectives	18
3	New Local Developments	31
3.1	Road Traffic Sources	31
3.2	Other Transport Sources	33
3.3	Industrial Sources	34
3.4	Commercial and Domestic Sources	36
3.5	New Developments with Fugitive or Uncontrolled Sources	37
4	Planning Applications	39
5	Air Quality Planning Policies	40
6	Local Transport Plans and Strategies	41
7	Climate Change Strategies	43
8	Conclusions and Proposed Actions	45
8.1	Conclusions from New Monitoring Data	45
8.2	Conclusions relating to New Local Developments	45
8.3	Other Conclusions	45
8.4	Proposed Actions	46
9	References	48

Appendices

Appendix A:	QA/QC Data: Defra and The Devolved Administrations, Spreadsheet of Bias Adjustment Factors, Version Number 03/10
Appendix B:	East Ayrshire Monthly NO ₂ Diffusion Tube Data 2009 (µg/m ³)
Appendix C:	Results of Automatic Monitoring for NO ₂ and PM ₁₀ and Certificates of Calibration
Appendix D:	Short-term to Long-term Data Adjustment
Appendix E:	Industrial Premises Regulated by SEPA under the Pollution Prevention and Control (Scotland) Regulations 2000

List of Tables

Table 1.1	Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Scotland
Table 2.1	Details of Automatic Monitoring Sites
Table 2.2	Details of Non-Automatic Monitoring Sites
Table 2.3a	Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective
Table 2.3b	Comparison with 1-Hour Mean Objective
Table 2.4a	Results of Nitrogen Dioxide Diffusion Tubes
Table 2.4b	Results of Nitrogen Dioxide Tubes – Relevant Exposure
Figure 2.4	Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites
Table 2.5a	Results of PM ₁₀ Automatic Monitoring: Comparison with Annual Mean Objective
Table 2.5b	Results of PM ₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

List of Figures

Figure 1a:	Map of East Ayrshire
Figure 1b:	Map of East Ayrshire – Towns and Villages
Figure 1c:	Map of East Ayrshire – Major Roads
Figure 2:	Map of Opencast Coal Sites around New Cumnock
Figure 3:	New Cumnock Automatic Monitoring Equipment – Location Map
Figure 4:	John Finnie Street, Kilmarnock Automatic Monitoring Equipment Location Map
Figures 5a-5l:	NO ₂ Diffusion Tube Locations

1 Introduction

1.1 Description of Local Authority Area

East Ayrshire is one of 32 unitary authority council areas in Scotland. It borders onto North Ayrshire, East Renfrewshire, South Lanarkshire, South Ayrshire and Dumfries and Galloway. With South Ayrshire and the mainland areas of North Ayrshire, it formed the former county of Ayrshire. The area was formed in 1996, from the former Kilmarnock and Loudoun, and Cumnock and Doon Valley Districts.

East Ayrshire has an area of 1,262 Km² (97% rural) and a population of 119,600 (2007), giving a population density of 95/Km². East Ayrshire has 22 localities with populations over 500. Kilmarnock is the largest town with a population of around 43,000. There are three other towns with populations over 5,000, namely Cumnock (9,400), Stewarton (6,600) and Galston (5,000).

Agriculture is the dominant land use, with pastoral farming the main type, along with small areas of arable crops grown mainly for animal feed. 22% of the land area is covered in woodland. Significant areas of land are used for open cast coal mining, stretching north and east from Dalmellington in the south west of the district, through Cumnock and New Cumnock to Muirkirk and into South Lanarkshire.

East Ayrshire, in common with the rest of Scotland, has seen the decline of traditional heavy industry and manufacturing along with the closure of deep-mine collieries. Employment is now provided by service industries, light industry, smaller-scale manufacturing, retail and the public sector, with deep mining being replaced by open-cast mining. A significant proportion of the population now work outside the district, with significant areas of new housing developments reflecting this. New housing on the north side of Kilmarnock is one example of this, with many of the new residents heading north towards Glasgow and beyond on the M77.

The main transportation route within East Ayrshire is the A77/M77, which runs from the port of Stranraer in Dumfries and Galloway, passing through South Ayrshire and East Ayrshire, before heading north to Glasgow. Although the most heavily trafficked route by far within East Ayrshire, with daily traffic flows in excess of 40,000 vehicles (Source: Transport Scotland), the road bypasses all centres of populations and built- up areas.

East Ayrshire is also served by six railway stations, with Kilmarnock being the largest, with an annual passenger usage of 440,000.

Maps of the area are included in Figure 1.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedance

of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

The Progress Report presented in this document was carried out in accordance with the recently issued technical guidance document, Local Air Quality Management Technical Guidance LAQM.TG(09) (Reference 1).

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in Scotland are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97), the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre, $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Scotland.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	3.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	18 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

LQMA Activity	Date	Outcome
First Round of Review and Assessment	1998-2001	No exceedences of air quality objectives were found or predicted.
Updating and Screening Assessment	2003	No exceedences of air quality objectives were found or predicted.
Progress Report	2004	Although some exceedences of the air quality objective for benzene were predicted for 2010 levels, this was as a result of problems associated with the analytical laboratory. No other exceedences were found or predicted.
Progress Report	2005	No exceedences of the air quality levels were found or predicted.
Updating and Screening Assessment	2006	No exceedences of the air quality levels were found or predicted. Although future levels of nitrogen dioxide and PM ₁₀ were predicted to be within future air quality objective limits, the levels found suggested more detailed monitoring was required.
Progress Report	2007	No exceedences of air quality objectives were found or predicted.
Progress Report	2008	No exceedences of air quality objectives were found or predicted for all pollutants. However, due to nitrogen dioxide levels being close to the annual mean objective within John Finnie Street, Kilmarnock, it was decided to commission a Detailed Assessment.
Detailed Assessment	2008	An atmospheric dispersion modelling of road traffic emissions was undertaken to determine nitrogen dioxide pollutant concentrations at locations of relevant public exposure, within John Finnie Street, Kilmarnock. No exceedences of both the annual mean and the 1-hour objective for nitrogen dioxide were predicted at areas of relevant public exposure. It was therefore not necessary to declare an Air Quality Management area at this time. Extra monitoring was recommended using both diffusion tubes (underway August 2009) and automatic monitoring (nearing installation).
Updating and Screening Assessment	2009	No exceedences of Air Quality Objectives were found or predicted for all pollutants at locations of relevant public exposure. Further monitoring was deemed necessary particularly in Kilmarnock, Newmilns and Mauchline as levels of NO ₂ were just below the Air Quality Objectives.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

East Ayrshire Council carried out automatic monitoring for NO₂ and PM₁₀ and non-automatic monitoring for NO₂ during 2009.

2.1.1 Automatic Monitoring Sites

Automatic Monitoring for NO₂ and PM₁₀ was carried out at one location within East Ayrshire during 2009 using an API Chemiluminescent NO/NO₂/NO_x Analyser and a Met One Instruments BETA Attenuation Mass Monitor (BAM 1020). Both monitors are fitted with web logger functionality. The station was located next to the Sports Hall, Castle, New Cumnock and is representative of residential areas within the town (Figure 3). The intention was to recommence monitoring for SO₂, CO, NO₂ and PM₁₀ at Western Road, Kilmarnock but the reliability of the equipment (which was over ten years old) was such that no meaningful results were obtained and a decision was taken to decommission this site.

New Cumnock was chosen for PM₁₀ monitoring since it lies in an area of widespread open cast coal mining (Figure 2), with associated potentially raised background levels of PM₁₀. Automatic monitoring commenced for NO₂ and PM₁₀ in John Finnie Street, Kilmarnock (Figure 4) in March 2010. John Finnie Street was chosen for NO₂ monitoring since previous monitoring using diffusion tubes has indicated that NO₂ levels are just below the National Air Quality Objective (Table 2.2 and 2.4a) and it is a heavily trafficked town centre road, with several feeder roads, several sets of traffic lights and tall buildings on either side of the road. Although earlier modelling suggested 2010 PM₁₀ levels would be under 18 µg/m³, the fact that levels of NO₂ were close to the Air Quality Objective due to high levels of road traffic (and experience suggests PM₁₀ levels would also be close to the Air Quality Objective in these circumstances), monitoring to check actual PM₁₀ levels is sensible.

Further details of the New Cumnock monitoring station are provided in Table 2.1. The location of the New Cumnock and Kilmarnock sites are shown in Figure 3 and Figure 4 respectively.

Table 2.1 *Details of Automatic Monitoring Sites*

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
New Cumnock	Urban Background	2618812	613503	NO ₂	Chemilumin escent	N	Y (<1m)	45m	N
New Cumnock	Urban Background	2618812	613503	PM ₁₀	BAM1020	N	Y (<1m)	45m	N

QA/QC of the Automatic Monitoring

The maintenance of the two monitoring sites at New Cumnock and Kilmarnock is carried out by Air Monitors. This involves two routine services per year and also provision for emergency callouts. Automatic calibration, zero and span checks are carried out daily. The automatic span check consists of a gas of known concentration being passed through the NOx analyser and the measured concentration being recorded automatically for rescaling.

Both sites are part of the Scottish Air Quality Network and are audited twice yearly by AEA Technology on behalf of the Scottish Government. AEA also carry out the data management for these two sites. Since the installation of web loggers, the data is checked daily by East Ayrshire Council Environmental Health staff to ensure that it is being recorded properly and there are no faults showing with any of the analysers, as well as checking the zero and span recordings. AEA and Air Monitors also check the data at regular intervals and e-mail or telephone Environmental Health if any problems occur. An officer from Environmental Health will attend the site to rectify any problems found, often in consultation with an engineer from Air Monitors. If the problem cannot be rectified by Environmental Health staff, Air Monitors attend the site and rectify the faults found. An officer from Environmental Health also carries out any routine filter changes, inlet cleaning etc. as recommended in the equipment instruction manual.

AEA undertake quality control of the automatic data for both the New Cumnock and Kilmarnock sites. The QA/QC procedures follow the requirements of the Local Air Quality Management Technical Guidance LAQM.TG(09) (Reference 1) and are equivalent to those used at UK National Network (AURN) monitoring sites. This gives a high degree of confidence in the data obtained for reliable concentrations at the automatic sites. Once the calibration factors have been applied AEA carry out monthly Data Validation. In essence the data is screened by visual examination, to see if they contain spurious and unusual measurements. Any suspicious data, such as large spikes or spurious high concentrations are “flagged” or marked to be investigated more fully. At six monthly intervals AEA carry out Data Ratification. This involves thorough checking of the data to ensure they are reliable and consistent. Essentially the data ratification procedure involves a critical review of all information relating to a particular data set, in order to verify, amend or reject the data. When the data has been ratified, they represent the final data set to be used in Review and Assessment Process. BAM PM₁₀ data was corrected for slope using a factor of 0.83333 to give an Indicative Gravimetric Equivalent (Reference 9). The Air Pollution Report produced by AEA on behalf of the Scottish Government can be found in Appendix C.

2.1.2 Non-Automatic Monitoring

Non-automatic monitoring of nitrogen dioxide using passive diffusion tubes was undertaken at 23 separate locations in East Ayrshire during 2009 Figures 5a-5l. The diffusion tube locations are described in Table 2.2. All diffusion tubes are located at a height of 2.95m. A lower height would be preferred but a compromise of 2.95m was necessary to minimise vandalism but still be representative of the air people breathe at street level.

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollut ants Monit ored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
1. Fowlds Street/King Street Junction, Kilmarnock	Kerbside	X242805	Y637620	NO ₂	N	N (35m)*	< 1m	Y
2. 28 John Finnie Street, Kilmarnock	Kerbside	X242701	Y638083	NO ₂	N	Y (3 – 4m)	< 1m	Y
3. 19 Lainshaw Street, Stewarton	Kerbside	X241907	Y645820	NO ₂	N	Y (2 – 3m)	< 1m	Y
4. 40 Main Street, Newmilns	Roadside	X253601	Y637310	NO ₂	N	Y (< 1m)	2 - 3m	Y
5. The Cross, Hurlford	Roadside	X245524	Y636914	NO ₂	N	N (9 – 10m)*	2 - 3m	Y
6. 8A Kilmarnock Road, Mauchline	Kerbside	X249826	Y627335	NO ₂	N	Y (2 – 3m)	< 1m	Y
7. Junction at Main Street & A70 Ochiltree	Roadside	X250712	Y621166	NO ₂	N	N (15m)*	1 - 2m	Y
8. Junction at A76 Roundabout, Auchinleck	Roadside	X254450	Y622454	NO ₂	N	N (18m)*	2 – 3m	Y
9. Townhead/Glaisnock Street Junction, Cumnock	Roadside	X256889	Y620133	NO ₂	N	N (9m)*	1 – 2m	Y
10. Air Quality Monitoring Station, Western Road, Kilmarnock	Urban Background	X241969	Y638750	NO ₂	N	N (>150m)	28m	N/A
11. 96 John Finnie Street, Kilmarnock	Roadside	X242657	Y637883	NO ₂	N	Y (3-4m)	2 - 3m	Y
12. 62 John Finnie Street, Kilmarnock	Kerbside	X242673	Y637955	NO ₂	N	Y(3 – 4m)	< 1m	Y

Site Name	Site Type	OS Grid Ref		Pollut ants Monit ored	In AQMA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Worst-case Location?
13. 22/24 Nursery Avenue, Kilmarnock	Roadside	X243458	Y637520	NO ₂	N	N(5-6m)*	2-3m	Y
14. 95/97 John Finnie Street, Kilmarnock	Roadside	X242619	Y637773	NO ₂	N	N(100m)**	3m	Y
15. 16 West George Street, Kilmarnock	Roadside	X242766	Y638160	NO ₂	N	N(35m)*	1-2m	Y
16. Bridge Street, Galston	Kerbside	X250117	Y636661	NO ₂	N	Y(<1m)	<1m	Y
17. 23/25 Loudoun Road, Newmilns	Roadside	X253204	Y637237	NO ₂	N	Y(<1m)	<1m	Y
18. 100 Main Street, Newmilns	Roadside	X253784	Y637336	NO ₂	N	Y(3-4m)	2-3m	Y
19. 57/59 Townhead Street, Cumnock	Roadside	X257059	Y620157	NO ₂	N	Y(<1m)	1-2m	Y
20. 66 Main Street, Muirkirk	Roadside	X269706	Y627355	NO ₂	N	Y(5m)	2-3m	Y
21. The Joughs, Kilmaurs	Roadside	X241043	Y641221	NO ₂	N	N(15m)*	2-3m	Y
22. The Cross, Mauchline	Roadside	X249863	Y627257	NO ₂	N	N(5-6m)*	2-3m	Y
23. 3/5 Loudoun Street, Mauchline	Roadside	X249867	Y627232	NO ₂	N	Y(<1m)	3-4m	Y
24. 5/7 Earl Grey Street, Mauchline	Roadside	X249894	Y627233	NO ₂	N	Y(<1m)	2m	Y

*Although these sites are greater than 5m from relevant exposure, they are representative of such exposure. These locations were chosen because of the suitability of mounting the NO₂ diffusion tubes at equivalent representative points to relevant exposure.

** On the recommendation of BMT Cordah, Air Quality Consultants an extra NO₂ diffusion tube was located to provide a better spread of NO₂ levels along John Finnie Street to allow better model verification if any future detailed assessments are required (Section 2.2.1 Kilmarnock).

Diffusion Tube Monitoring Procedure

The nitrogen dioxide diffusion tubes are placed at each location by East Ayrshire Council for a period of either 4 or 5 weeks, to give 12 periods within the calendar year. At the end of each monthly period the exposed tubes are replaced with new tubes and the exposed tubes are sent to the laboratory for analysis. All exposure times and dates are recorded and sent to the laboratory with the exposed tubes. East Ayrshire Council also sends one unexposed tube with each batch to check that there has been no contamination while in transit or storage. Selection of diffusion tube sites and instructions for exposing diffusing tubes was carried out using the latest guidance issued by AEA from the work completed by the Working Group on Harmonisation of Diffusion Tubes (Reference 3). The supply of the tubes and analysis is undertaken by Glasgow Scientific Services (GSS) – part of Glasgow City Council. The laboratory is UKAS accredited for the analysis and also participates in two centralised QA/QC schemes; the Workplace Analysis Scheme for Proficiency (WASP scheme)(Reference 4) and a monthly field inter-comparison exercise managed by AEA, in which diffusion tubes are co-located with an automatic analyser. The WASP scheme is an independent analytical performance testing scheme, operated by the Health and Safety laboratory (HSL). GSS scored a GOOD performance in the WASP scheme for analysis of NO₂ diffusion tubes, October 2008 – October 2009. From October 2010 the performance criteria set by HSL will be based on the Rolling Performance Index (RPI) which allows long-term trends in performance to be monitored. Performance criteria in effect will be tightened. GSS also scored a GOOD performance based on these enhanced criteria.

GSS follow the procedures set out in the Harmonisation Practical Guidance.

GSS prepares the Palmes-Type diffusion tubes using the 20% Triethanolamine (TEA) in water.

At present, East Ayrshire Council does not carry out a local co-location study. Therefore a combined bias adjustment was determined utilising the spreadsheet from the Review and assessment Helpdesk Website (Appendix A)

GSS undertakes analysis of diffusion tubes from 3 sites from East Dumbartonshire Council which runs co-location studies. GSS also participates in the AEA Technology laboratory inter-comparison study. Overall bias adjustment was therefore calculated from these four sites (as at present East Ayrshire Council has no co-location study) using orthogonal regression to allow for the uncertainty in both the automatic monitor and the diffusion tubes. The uncertainty of the diffusion tube has been assumed to be double that of the automatic monitor. The bias adjustment factor applied to the raw annual means of the diffusion tubes was therefore 1.23 for 2009 data. Precision and Bias Adjustment Data Reference 20) are shown in Appendix A.

2.2 Comparison of Monitoring Results with Air Quality Objectives

This section sets out the results of all monitoring carried out by East Ayrshire Council in 2009 and where relevant, provides results from previous years to identify any trends.

2.2.1 Nitrogen Dioxide

The results of the nitrogen dioxide monitoring at the automatic station at Castle, New Cumnock together with the results from diffusion tube monitoring from sites across East Ayrshire are presented below.

Automatic Monitoring Data

The results of automatic monitoring for nitrogen dioxide carried out in 2009 at Castle, New Cumnock are displayed in Table 2.3a and 2.3b and the full monthly dataset in Appendix C.

Table 2.3a Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)		
					2007	2008	2009
A1	New Cumnock	N		79.9	N/A	N/A	7

Table 2.3b Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Number of Exceedences of hourly mean ($200 \mu\text{g}/\text{m}^3$)		
					2007	2008	2009
A1	New Cumnock	N		79.9	N/A	N/A	0

New Cumnock

New Cumnock was chosen as an automatic monitoring site as it lies in an area of extensive open cast coal mining. Concern has been raised about the level of PM₁₀ emanating from coal extraction. Castle was chosen as an area which represents a typical residential area within the town. As can be seen from Table 2.3a and Table 2.3b annual mean levels of nitrogen dioxide are very low at 7 µg/m³ and well within the annual air quality objective. No exceedences of the hourly mean air quality objective were found. With these low recorded levels it can be predicted that no exceedences of the 2010 NO₂ Air Quality Objectives are predicted in any area within New Cumnock.

Diffusion Tube Monitoring Data

The diffusion tube method is open to a degree of uncertainty inherent in the method and as such the results of the survey should be treated with caution and used as indicators of nitrogen dioxide levels only. That said it is a useful screening method which can be used to cover multiple sites at low cost. They are also easily located, where it may not be practical to site bulky automatic monitoring equipment.

The diffusion tube monitoring data for nitrogen dioxide is presented below in Table 2.4a. and the full monthly dataset is displayed in Appendix B. Diffusion tube locations are shown in Fig. 5a-5l.

Table 2.4a Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)			
					2006	2007	2008	2009
1	Fowlds Street/King Street Junction, Kilmarnock	N		100	33	38	35	32.3
2	28 John Finnie Street, Kilmarnock	N		100	40	39	39	32.8
3	19 Lainshaw Street, Stewarton	N		100	31	33	32	31.2
4	40 Main Street, Newmilns	N		91.7	23	38	38	29.9
5	The Cross, Hurlford	N		100	29	28	28	24.6
6	8A Kilmarnock Road, Mauchline	N		100	35	34	32	30.7
7	Junction at Main Street & A70 Ochiltree	N		91.7	22	26	26	23.2
8	Junction at A76 Roundabout, Auchinleck	N		100	18	17	15	18.6
9	Townhead/Glaisnock Street Junction, Cumnock	N		91.7	21	16	16	18.5
10	Air Quality Monitoring Station, Western Road, Kilmarnock	N		N/A	16	16	14	
11	96 John Finnie Street, Kilmarnock	N		100			31	33.3
12	62 John Finnie Street, Kilmarnock	N		91.7			38	38.3
13	22/24 Nursery Avenue, Kilmarnock	N		100				23.7
14	95/97 John Finnie Street, Kilmarnock	N	100	41.7				43.7*
15	16 West George Street, Kilmarnock	N	100	41.7				39.9*
16	18 Bridge Street, Galston	N	100	41.7				24.4*

17	22/25 Loudoun Road, Newmilns	N	100	41.7				39.8*
18	100 Main Street, Newmilns	N	100	41.7				24.4*
19	57/59 Townhead Street, Cumnock	N	100	41.7				19.6*
20	66 Main Street, Muirkirk	N	100	41.7				15.1*
21	The Jongs, Kilmaurs	N	100	41.7				21.1*
22	The Cross, Mauchline	N	100	41.7				28.7*
23	3/5 Loudoun Street, Mauchline	N	100	41.7				31.2*
24	5/7 Earl Grey Street, Mauchline	N	100	41.7				41.3*

Bias adjustment factor of 1.23 was applied to all diffusion tube measurements (Appendix A).

*Short term data was annualised (Appendix D)

Short-term to Long-term Data adjustment

Where only short-term periods of monitoring data are available, the results may be adjusted to estimate an annual mean concentration using the approach set out in Technical Guidance LAQM.TG(09) Box 3.2 (Reference 1).

Adjustment to estimate annual mean (Appendix D)

The adjustment is based on the fact that patterns in pollutant concentrations usually affect a wide region. Thus if a six month average is above average at one place it will almost certainly be above average at other locations in the region. The adjustment procedure is as follows:-

1. Three nearby, urban background, long term, continuous monitoring sites within 50 miles were identified: Glasgow Anderton, Glasgow City Chambers and Coatbridge Whifflet.
2. The results of the annual mean, **Am**, for these sites in 2009 were obtained.
3. The period means, **Pm**, for 2009 were obtained for August to December (the months of the short term monitoring in East Ayrshire).
4. The Ratio, **R**, of the annual mean (**Am/Pm**) for each of the sites was then calculated.
5. The average of these ratios, **R_a**, was then calculated to give an adjustment factor.
6. The measured period mean **M** was multiplied by the adjustment factor **R_a** to give the estimate of the annual mean for 2009 (Table 2.4a).

There were no exceedences of the annual mean in 2009 at sites where monitoring was carried out for 12 months. However one of these sites was close to the 40 µg/m³ objective, 62 John Finnie Street, Kilmarnock at 38 µg/m³. Two of the new sites where short term monitoring was carried out exceeded the, 40 µg/m³ annual mean objective, 95/97, John Finnie Street, Kilmarnock and Earl Grey Street, Mauchline. Two of the new monitoring sites were also close to the 40 µg/m³ annual mean objective, 16 West George Street, Kilmarnock and Loudoun Road, Newmilns.

Kilmarnock

John Finnie Street is part of the one way system in the centre of Kilmarnock and has three lanes of traffic with parking bays on either side of the street. Most of the street has tall buildings on both sides of the road close to the kerb. Annual average daily traffic flows are in excess of 17,000 vehicles per day (Source; Traffic Section, East Ayrshire Council); there are several feeder roads and several sets of traffic lights along the street, with the resultant stationary traffic. All these factors combine to give the high levels of nitrogen dioxide.

As a result of high levels of nitrogen dioxide in John Finnie Street in 2007 a Detailed Assessment was carried out by BMT Cordah in 2008 (Reference 5). The modelling study concluded that although the annual mean NO₂ objective would be exceeded along the centre of the road, no exceedences of the annual mean were predicted at locations of relevant public exposure. Furthermore, no exceedences of the 1-hour mean objective were predicted at areas of relevant public exposure. It was therefore not considered necessary to declare an Air Quality Management Area at this time. The report also recommended that the location of the diffusion tube monitoring sites be reviewed and an additional location on the south west of John Finnie Street be considered. This has been carried out (Figure 5c), along with one tube sited on West George Street (Figure 5c). The report also recommended that an automatic monitoring unit, with triplicate diffusion tubes co-located, be installed on John Finnie Street, to provide a local bias adjustment factor for the diffusion tubes and allow full verification of any future modelling studies. This commenced in John Finnie Street in April 2010 (Figure 4).

Where monitoring was carried out for 12 months in John Finnie Street no exceedences of the annual mean were found. The new site at 95/97 John Finnie Street (south west of John Finnie Street) gave an annual mean of 43.7 µg/m³. Monitoring at this location was only carried out for 5 months at the end of 2010 and the result although annualised is open to a greater degree of uncertainty and further monitoring will be carried out at this location to check whether this level is normal or is due to the greater inaccuracies of short term monitoring. It should be noted that 95/97 John Finnie Street has no relevant exposure within 100m of the diffusion tube location, but this location gives a more complete picture of NO₂ levels along John Finnie Street.

Newmilns

The monitoring location in Main Street, Newmilns gave readings close to the 40 µg/m³ annual mean in 2009. Daily traffic flows through Newmilns are in the region of 10-11,000 (Source; Traffic Section, East Ayrshire Council), and that combined with the relatively narrow streets and high buildings on either side of the street (canyon effect), combined with pedestrian lights has resulted in levels of Nitrogen Dioxide (39 µg/m³ in 2008) close to the annual mean at this site. In consequence two additional diffusion tubes have been added, one additional tube in Main Street, Newmilns and one in Loudoun Road (Figure 5e), to ascertain the spread of nitrogen dioxide levels along the A71 running through Newmilns. Although levels of NO₂ had actually dropped at 40 Main Street, levels at Loudoun Road were close to the 40 µg/m³ annual mean. Due to the short term monitoring (latter 5 months of 2009) and the extreme weather patterns associated with December 2009 this latter result should be treated with caution.

Mauchline

The A76 Kilmarnock to Dumfries Trunk Road runs through Mauchline and daily traffic flows are in the region of 12-13,000 (Source Transport Scotland). This combined with relatively narrow streets and high buildings (canyon effect), and traffic lights at the intersection of the A76 and the B743 (Mauchline/Ayr Road) has resulted in levels of nitrogen dioxide in the Kilmarnock Road monitoring site up to 35 µg/m³ in recent years (Table 2.4a). The potential for higher levels of nitrogen dioxide was therefore a possibility and it was therefore decided to place additional tubes around Mauchline Cross (Figure 5h) covering the A76 North, A76 South (Earl Grey Street) and B743 Loudoun Street (Mauchline/Ayr Road). The trend in nitrogen dioxide levels over the last four years (Figure 2.4) is downwards at the long term monitoring site in Kilmarnock Road, Mauchline to levels in the low 30's (31.1 µg/m³ in 2009). The new monitoring site in Loudoun Street and The Cross gave lower levels at 31.2 and 28.8 µg/m³ but the site in Earl Grey Street gave levels above the 2005 annual mean Air Quality Objective at 41.3 µg/m³. It should be noted the NO₂ levels at the nearest relevant public exposure is 39.1 µg/m³ below the annual mean objective (Table 2.2 and Table 2.4b). Diffusion tube monitoring is open to a degree of uncertainty, particularly short term monitoring (in this case five months) where the uncertainty increases. The data from short term monitoring should be treated with extreme caution but the raised levels indicate the need to carry out further monitoring.

Relevant Exposure

Table 2.4b (below) illustrates NO₂ levels at locations of relevant exposure. Diffusion Tube monitoring can only give an annual mean level of NO₂, therefore objectives should only apply at locations where members of the public might be regularly exposed such as building facades of residential properties, schools, hospitals, care homes etc. Tube locations are often limited by practical implications such as a suitable mounting point (e.g. lamp post etc.) and often they are nearer the kerb than would be ideal. Table 2.4b illustrates the extrapolated NO₂ levels from the kerbside and roadside data using The NO₂ With Distance From Roads Calculator (Reference 8):-

$$C_z = ((C_y - C_b) / (-0.5476 \times \ln(D_y) + 2.7171)) \times (-0.5476 \times \ln(D_z) + 2.7171) + C_b$$

Where:

C_z is the total predicted concentration (µg/m³) at distance D_z;
 C_y is the total measured concentration (µg/m³) at distance D_y;
 C_b is the background concentration (µg/m³);
 D_y is the distance from the kerb at which concentrations were measured; and
 D_z is the distance from the kerb at which concentrations are to be predicted.
 Ln(D) is the natural log of the number D.

All extrapolated results were found to be below the annual objective of 40 µg/m³ except for 95/97 John Finnie Street, Kilmarnock. This site has no relevant exposure within 100m (but further monitoring will be carried out) however provides a more complete picture of levels in this area.

1-Hour Mean

Diffusion tubes can only be used to measure the annual mean NO₂ level. Previous research carried out on behalf of DEFRA and the Devolved Administration (Reference 6, Laxen D and Marener B (2003)) identified a relationship between the annual mean and the 1-hour objective, such that exceedences of the latter were considered unlikely where the annual mean was below 60 µg/m³. An updated analysis (Reference 7, Cook A (2008)) has been carried out taking into account new monitoring data collected over the period 2003-2007. This new analysis has identified a number of exceedences of the 1-hour mean objective where annual mean were below 60 µg/m³. The majority of these occurrences were recorded at kerbside and roadside sites, and were at sites within South-East England (and in particular within Greater London), but not

exclusively so. A large number of these exceedences were associated with a regional pollution event that occurred over several days in December 2007. If these latter exceedences are excluded the number of exceedences of the 1-hour mean where annual mean are below $60 \mu\text{g}/\text{m}^3$, is extremely limited. On the basis of this new evidence, the guidance remains unchanged and authorities may assume that exceedences of the 1-hour mean objective are only likely to occur at where annual mean concentrations are $60 \mu\text{g}/\text{m}^3$ and above. Annual mean levels of NO_2 are well below $60 \mu\text{g}/\text{m}^3$ throughout all monitoring sites within East Ayrshire and we can therefore conclude no exceedences of the one hour mean are likely at locations of relevant public exposure (any outdoor location where members of the public might reasonably be expected to spend one hour or more e.g. pavements, busy shopping streets etc.)

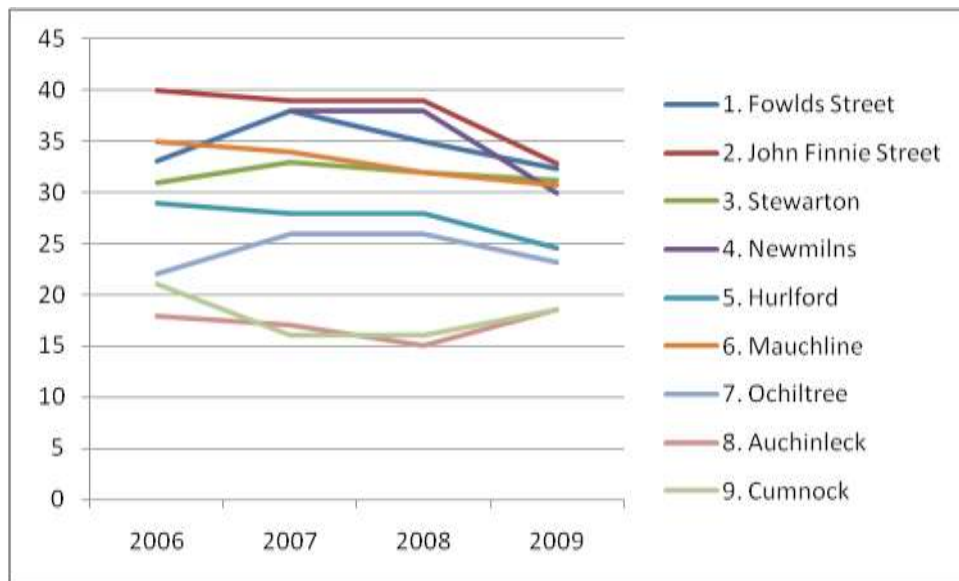
Table 2.4b Results of Nitrogen Dioxide Diffusion Tubes – Relevant Exposure

Site ID	Location	Annual mean concentrations ($\mu\text{g}/\text{m}^3$)			2009 Relevant Exposure
		2009 Kerbside/ Roadside	2009 Background	2009 Building Facade	
1	Fowlds Street/King Street Junction, Kilmarnock	32.3	13.5	26.1	N/A**
2	28 John Finnie Street, Kilmarnock	32.8	22.2	29.2	29.2
3	19 Lainshaw Street, Stewarton	31.2	6.0	24.2	24.2
4	40 Main Street, Newmilns	29.9	8.0	29.2	29.2
6	8A Kilmarnock Road, Mauchline	30.7	6.6	22.6	22.6
11	96 John Finnie Street, Kilmarnock	33.3	13.5	28.4	28.4
12	62 John Finnie Street, Kilmarnock	38.3	13.5	30.1	30.1
14	95/97 John Finnie Street, Kilmarnock	43.7*	13.5	42.4	N/A**
15	16 West George Street, Kilmarnock	39.9*	22.2	38.8	N/A**
17	22/25 Loudoun Road, Newmilns	39.8*	8.0	38.0	38.0
23	3/5 Loudoun Street, Mauchline	31.2*	6.6	30.2	30.2
24	5/7 Earl Grey Street, Mauchline	41.3*	6.6	39.1	39.1

*Annualised short term monitoring.

** No calculation was carried out for these sites since any relevant exposure is more than 35m from the monitor (Table 2.2) and the calculation would be meaningless (Reference 8).

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.



Annual mean nitrogen dioxide levels in $\mu\text{g}/\text{m}^3$ (y-axis) were plotted against the year of measurement 2006-2009 (x-axis) for the long term diffusion tube monitoring sites. Since valid data is only available for 4 years any trend analysis should be treated with caution. From the limited data available the overall trend from 9 long term monitoring sites within East Ayrshire over the last 4 years would appear to be marginally downwards.

2.2.2 PM₁₀

The results of the automatic monitoring carried out at New Cumnock are set out in table 2.5a and table 2.5b and the full monthly dataset in Appendix C. The BAM 1020 data were corrected using a gravimetric factor of 0.83333 for Indicative Gravimetric Equivalent from 17th January 2009 (Appendix C) (Reference 9).

PM Monitoring Adjustment

The UK objectives for particulate matter (and the EU limit values) are based upon measurement carried out using the European reference sampler; this is a gravimetric device, where the particle mass is collected onto a filter and subsequently weighed. This type of sampler has significant disadvantages, in that only 24-hour mean concentrations are recorded, the data cannot be disseminated to the public in real time, and the operation is labour intensive. East Ayrshire Council therefore uses Beta Attenuation Monitors (with unheated inlets) (BAM 1020) continuous analysers. Unheated BAMs tend to over-read PM₁₀ with respect to the gravimetric method since they can also read moisture as particulate matter. In 2006, the UK Government and the Devolved Administrations published a report on the outcome of detailed equivalence tests for various PM₁₀ samplers when compared with the European reference sampler. The tests carried out were based on the Guidance for the Demonstration of Equivalence of Ambient Air Monitoring Methods issued by an EC Working Group. In simple terms, the guidance sets out an approach whereby it is possible to test whether an instrument is able to comply with the Data Quality Objective for overall uncertainty as defined within the relevant Air Quality Directive – in the case of PM₁₀ this is 25%. The tests were conducted at four sites within the UK, over both summer and winter seasons. The full report can be downloaded from the web (Harrison D (2006) Reference 9).

The Met-One BAM (with unheated inlet) meets the equivalence criteria for PM₁₀ monitoring provided the results are corrected for slope. A correction for slope of 0.83333 was therefore used (Appendix C) (Reference 9).

Table 2.5a Results of PM₁₀ Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period %	Data Capture for full calendar year 2009 %	Annual mean concentrations (µg/m ³)		
					2007	2008	2009
A1	New Cumnock	N		76.4	n/a	n/a	12

Table 2.5b Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period ^a %	Data Capture 2009 %	Number of Exceedences of daily mean objective (50 µg/m ³)		
					2007	2008	2009
A1	New Cumnock	N		76.4	n/a	n/a	0

New Cumnock

New Cumnock was chosen as an automatic monitoring site as it lies in an area of extensive open cast coal mining. Concern has been raised about the level of PM₁₀ emanating from coal extraction. Castle was chosen as an area which represents a typical residential area within the town. As can be seen from Table 2.5a and Table 2.5b the measured annual mean concentration of PM₁₀ complied with the 2010 Air Quality Objective and that no exceedences of the 2010 24 hour Air Quality Objective occurred at this site. The annual mean level recorded for Castle, New Cumnock was at 12 µg/m³, well below the 18 µg/m³ 2010 annual mean Air Quality Objective. With these low recorded levels it can be predicted that no exceedences of the 2010 PM₁₀ air quality objectives are predicted in any area within New Cumnock.

Kilmarnock

PM₁₀ monitoring commenced in John Finnie Street, Kilmarnock in April 2010. This site was chosen as previous monitoring has shown NO₂ levels close to the 2005 Air Quality Objective due mainly to road traffic. Where high levels of NO₂ are due to road traffic it follows that PM₁₀ levels are also likely to be high and monitoring would be recommended. The results will be discussed in the 2011 Progress Report.

2.2.3 Sulphur Dioxide

No Sulphur Dioxide monitoring was carried out in East Ayrshire in 2009. Monitoring was discontinued in 2005 due to the very low levels recorded.

Previous monitoring of sulphur dioxide showed no exceedences of air quality objectives were found or predicted.

Previous assessment of sources of sulphur dioxide concluded that no exceedences of air quality objectives were likely due to the reduction in domestic coal usage and industrial sources.

2.2.4 Benzene

No benzene monitoring was carried out in East Ayrshire in 2008. Monitoring of Benzene was discontinued in January 2009 due to the very low levels of benzene recorded.

Previous monitoring of benzene showed no exceedences of air quality objectives were found or predicted.

Previous assessment of sources of Benzene concluded that no exceedences of air quality objectives were predicted.

2.2.5 Other pollutants monitored

No other pollutants, included in the Regulations for the purpose of Local Air Quality Management in Scotland, were monitored by East Ayrshire Council in 2009.

2.2.6. Summary of Compliance with AQS Objectives

East Ayrshire Council has examined the results from monitoring throughout East Ayrshire. Concentrations at locations of relevant public exposure are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

3.1 Road Traffic Sources

In order to provide an assessment of road traffic sources for this report, the most up to date information on traffic flows on several roads within East Ayrshire was obtained from the Traffic Section, East Ayrshire Council and Transport Scotland.

3.1.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Narrow congested streets were identified in previous rounds of Review and Assessment, including streets within Kilmarnock, Cumnock, Stewarton, the A71 which runs through Newmilns and the A76 which runs through Mauchline. These are at present subject to nitrogen dioxide monitoring. No exceedences of the Air Quality Objectives have been found at long term monitoring locations. (Table 2.4a and Table 2.4b)

East Ayrshire Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.1.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

Busy streets within East Ayrshire with significant numbers of shops were previously assessed in previous rounds of Review and Assessment.

East Ayrshire Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.1.3 Roads with a High Flow of Buses and/or HGVs.

Roads with potentially a high flow of buses and/or HGVs were assessed in previous rounds of Review and Assessment.

East Ayrshire Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.1.4 Junctions and Busy Roads

Busy roads and junctions (greater than 10,000 vehicles per day), with relevant exposure, were assessed in previous round of Review and Assessment. Where necessary, these junctions and busy roads are subject to further air quality monitoring. (Table 2.4a and 2.4b)

East Ayrshire Council confirms that there are no new/newly identified busy junctions/busy roads.

3.1.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

No new roads have been built within East Ayrshire since the last round of Review and Assessment, with either, traffic flow of greater than 10,000 vehicles a day, or, which have increased traffic flow significantly on existing roads having a NO₂ annual mean greater than 36µg/m³.

East Ayrshire Council confirms that there are no new/proposed roads.

3.1.6 Roads with Significantly Changed Traffic Flows

There are no roads within East Ayrshire, with traffic flows of greater than 10,000 which have experienced “large” increases (>25%) in traffic.

East Ayrshire Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.1.7 Bus and Coach Stations

East Ayrshire Council has two bus stations, one in Kilmarnock and one in Cumnock. Kilmarnock Bus Station has 850 bus movements per day and Cumnock has 420 bus movements per day. These numbers of movements are well below the criteria, of 2500 movements per day, required for an assessment of NO₂ and PM₁₀ to be carried out.

East Ayrshire Council confirms that there are no relevant bus stations in the Local Authority area.

3.2 Other Transport Sources

3.2.1 Airports

East Ayrshire Council confirms that there are no airports in the Local Authority area.

3.2.2 Railways (Diesel and Steam Trains)

Information on rail transport was obtained from ScotRail and Network Rail.

Stationary Trains (potential SO₂ exposure)

East Ayrshire has 6 railway stations in the towns of Kilmarnock, Kilmaurs, Stewarton, Dunlop, New Cumnock and Auchinleck, with Kilmarnock being the largest with 72 movements per day, and, an annual passenger usage of 438,000 (2006/2007). Kilmarnock is the only station with the potential for trains to be stationary for over the 15 minute criteria for further assessment. Information from ScotRail indicates that diesel locomotives have their engines shut off before being stationary for 15 minutes, and in any case, have an automatic cut-off fitted to the engine which activates on a timer after the engine is stationary for 15 minutes. There are also no more than two trains in the station at any one time, and the station has no catering facilities. There is also no residential housing or shops within 15 m of the station. It is therefore unlikely that members of the public will be exposed to 15 minute levels of SO₂ above 266 µg/m³.

East Ayrshire has several rail sidings for loading and movement of coal, including Killoch, Chalmerston and New Cumnock. There is also a railway carriage refurbishment works, Brush Barclay, located at the Caledonia Works, Kilmarnock. These utilise diesel shunters, which although may be stationary for more than 15 minutes, are located more than 15m from people with relevant exposure.

East Ayrshire Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

Moving Trains (potential NO₂ exposure)

East Ayrshire has no railway lines with a high usage of diesel locomotives. The background NO₂ mean is also less than 25 µg/m³ within all areas of East Ayrshire. No further assessment for NO₂ levels is therefore required.

East Ayrshire Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

3.2.3 Ports (Shipping)

East Ayrshire Council confirms that there are no ports or shipping within the Local Authority area.

3.3 Industrial Sources

Information on installations regulated under the Pollution Prevention and Control (Scotland) Regulations 2000 as either Part A or Part B processes was obtained from SEPA. The list of authorised processes is set out in Appendix E.

3.3.1 Industrial Installations

New or Proposed Installations for which an Air Quality Assessment has been Carried Out

Information on any new or proposed installations for which an air quality assessment has been carried out was obtained from SEPA. At the time of writing the report (May), there are two new industrial installations for which planning approval has been granted. The two premises which may have an impact on air quality are:-

Barr Ltd., Moorfield Plant have received planning consent for a roadstone coating plant at Moorfield Industrial Estate, Kilmarnock. The plant is located some 2.8km to the west of Kilmarnock and surrounded immediately by agricultural land. An air quality assessment (Reference 10) was submitted to SEPA as part of the application process for a Part B Permit (Appendix E) under the Pollution Prevention and Control (Scotland) Regulations 2000. Pollutants assessed included NO₂, PM₁₀, SO₂ and odour. Ground level pollutant concentrations were predicted to quantify maximum impact of the process at 16 identified receptors (including schools, residential properties etc.) within 5km of the proposed site. A worst case scenario was modelled, where PM fraction was considered as PM₁₀, the plant constantly at maximum operation and the modelled year (2003-2006) with maximum ground pollutant. The air quality assessment determined that although operation of the plant would have an impact on air quality, this would be minimal and there were no predicted exceedences of the relevant AQOs. Within the 5km maximum predicted ground level annual NO₂ levels are 11.84 µg/m³ with a maximum 1-hour mean of 63.05 µg/m³. Maximum predicted ground level annual PM₁₀ levels are 12.51 µg/m³ with a maximum 24-hour mean of 25.45 µg/m³. All of these levels are well below the relevant air quality objectives. Due to the downturn in the economy the plant is not yet operational.

The Egger plant at Auchinleck has obtained planning consent to provide recycling facilities to supply the existing chipboard processing. The permission is to use clean and dry recycled wood as a replacement for virgin wood. As such there would be no impact on air quality as production levels have not altered.

Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Information obtained from SEPA indicates that there are no existing installations where emissions have substantially increased.

East Ayrshire Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

New or Significantly Changed Installations with No Previous Air Quality Assessment

Information obtained from SEPA indicates that there are no new or significantly changed installations where no previous air quality assessment was carried out.

East Ayrshire Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

3.3.2 Major Fuel (Petrol) Storage Depots

Information obtained by SEPA and from Appendix E of LAQM TG(09), confirms that there are no major fuel storage depots within East Ayrshire.

There are no major fuel (petrol) storage depots within the East Ayrshire Council area.

3.3.3 Petrol Stations

East Ayrshire Council has only one petrol station which has both an annual throughput of petrol greater than 2,000 m³ and is situated adjacent to a busy road with more than 30,000 vehicles per day. Pace Petrol Station at the Bellfield Interchange, Kilmarnock sits adjacent to the intersection of the A77, A71, A76 and the A735. However, the nearest relevant exposure, a care home, is well in excess of 10m, at 180m distant, and therefore, no Detailed Assessment for benzene is required.

East Ayrshire Council confirms that there are no petrol stations meeting the specified criteria.

3.3.4 Poultry Farms

East Ayrshire Council has five poultry farms (Source; Scottish Government Rural Affairs Department) within its boundaries, two in the Mauchline area, two in the Stewarton area and one in the Muirkirk area. All five have fewer than 40,000 birds, and therefore their numbers are well under the specified criteria, for which a Detailed Assessment for PM₁₀ would be required.

East Ayrshire Council confirms that there are no poultry farms meeting the specified criteria.

3.4 Commercial and Domestic Sources

3.4.1 Biomass Combustion – Individual Installations

Information available at the time of writing indicates that there are no plants burning biomass within the specified criteria of between 50KW and 20MW units within the East Ayrshire Council Boundary.

East Ayrshire Council confirms that there are no biomass combustion plants in the Local Authority area.

3.4.2 Biomass Combustion – Combined Impacts

An assessment of domestic solid fuel burning was carried out in previous LAQM assessments (see 3.4.3 below). The assessments indicated that due to the low density of domestic solid fuel burning no exceedences were likely. As there are no new biomass installations in East Ayrshire, there is no necessity to carry out an assessment of the combined impacts of biomass combustion (on PM₁₀ levels) at this time.

East Ayrshire Council confirms that there are no biomass combustion plants in the Local Authority area.

3.4.3 Domestic Solid-Fuel Burning

As previously mentioned an assessment of domestic solid fuel burning was carried out in previous LAQM assessments. Some physical checks were undertaken in some of the former traditional mining areas to check whether any significant coal burning was still taking place (using the checklist procedure contained in LAQM.TG(03)). The results were much less than anticipated, and were substantially less than half of the suggested trigger of 100 houses per 500 by 500 metre grid squares burning solid fuel. Since this research was carried out, the number of houses burning coal has declined significantly and therefore, East Ayrshire Council confirms there are no issues with regards to sulphur dioxide due to domestic solid fuel burning. Past monitoring also confirms low levels of sulphur dioxide throughout the council area. Therefore no detailed assessment for domestic properties burning solid fuel (SO₂ concentrations) is required.

East Ayrshire Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

3.5 New Developments with Fugitive or Uncontrolled Sources including:-

Landfill Sites

Quarries

Unmade haulage roads on industrial sites

Waste transfer stations etc

Other potential sources of fugitive particulate emissions

Opencast Coal Extraction

At the time of writing, ATH Resources have submitted a planning application for a new opencast coal site at Duncanziemere, which lies to the north east of Cumnock. This new site lies to the north of, and adjacent to, the existing site at Laigh Glenmuir, and the application boundary proposed, incorporates the existing site to allow for retention of the existing overburden mound and coal preparation plant throughout the proposed operations. Coal handling processes at the mine will be subject to control under Section 3.4 Part B of Schedule 1 of the Pollution Prevention and Control (Scotland) regulations 2000. The existing mine support area and coal handling operations are subject to "Part B" regulation by SEPA and this authorisation will require to be varied should the Duncanziemere surface mine be approved. ATH have submitted an Environmental Impact Assessment incorporating an air quality assessment (Reference 11) as part of the planning application.

The recently revised technical guidance for local air quality management requires that detailed assessments should be conducted where there is any potential exposure within 200m of any source, irrespective of background. Detailed assessment of PM₁₀ exposure for receptors more than 400m from mines and quarries is unlikely to be required provided the annual mean background is <16 µg/m³, implying that the contribution from fugitive dust operations is unlikely to exceed 2 µg/m³ within 400m. The guidance also suggests that the level of complaints and dust at the site access to the public road should be taken into account. There have been no recorded complaints about dust or air pollution from the current operations at Laigh Glenmuir.

The nearest receptor High Glenmuir is 260m from the coal preparation area. The estimated background PM₁₀ for 2010 (Reference 12) is 9.8 µg/m³ and PM_{2.5} of 6 µg/m³. The process contribution at this distance was assessed at PM₁₀ 2-4 µg/m³ and PM µg/m³ 1-2 µg/m³. When added to the respective baseline gives a combined process plus background PM₁₀ of <14 µg/m³ (well below the air quality objective of 18 µg/m³) and PM_{2.5} of <8 µg/m³. The assessment for the other receptors in the vicinity of the mine workings also gave estimates of PM₁₀ at a maximum <14 µg/m³ and PM_{2.5} at a maximum of <8 µg/m³. As with the existing Laigh Glenmuir surface mine, monitoring at sensitive receptors will be carried out if SEPA or East Ayrshire Council considers there is a dust issue at nearby receptors. To date there have been no complaints about dust from local residents.

To summarise the impacts at receptors within the vicinity of coal extraction and preparation are likely to be of minor adverse significance with proper mitigation as outlined in the Air Quality Assessment (Reference 11). There are no dwellings within 1 km of the proposed development that are equally close to another surface mine site, and therefore significant adverse impacts from concurrent mining operations are therefore highly unlikely to occur.

Proposed mitigation for effective dust management requires integrated action on three aspects of control, design and engineering control, adequate process supervision and effective monitoring and review. The measures proposed are outlined in the Dust Management Plan submitted as part of the Environmental Statement (Reference 11).

The report concluded that a simple semi-quantitative assessment indicates that the worst case PM₁₀ annual mean is unlikely to exceed 14ug/m³ at the nearest receptor with ambient PM_{2.5} less than 8ug/m³. These are well within Scottish Air Quality Objectives. A monitoring programme should be conducted when excavation operations are within 400m of any sensitive receptor. Cumulative impacts from other activities are likely to be insignificant.

Other Fugitive Sources

There are no other new fugitive sources within East Ayrshire which are likely to have a detrimental impact on air quality.

There were no dust complaints from existing open cast coal sites or existing landfill sites (or other fugitive sources) during 2009.

There are no other new fugitive sources within East Ayrshire which are likely to have a detrimental impact on air quality.

There were no dust complaints from existing open cast coal sites or existing landfill sites during 2009.

East Ayrshire Council has identified the following new or previously unidentified local developments which may impact on air quality in the Local Authority area.

1. Barr Ltd., Moorfield Plant, Moorfield Industrial Estate, Kilmarnock – roadstone coating plant.
2. ATH Resources, Duncanziemere, Cumnock – new opencast coal site.

These will be taken into consideration in the next Updating and Screening Assessment, scheduled for 2012.

4 Planning Applications

One new development which has not yet been approved but could have a significant impact on air quality is the opencast coal mine at Duncanziemere, Cumnock. This site has been assessed in Section 3.5.

5 Air Quality Planning Policies

The finalised local plan currently in force within East Ayrshire unitary authority area is the East Ayrshire Local Plan (2003) (Reference 13). The only policy relating to air quality adopted within this plan is the following:-

Policy ENV20

The Council will ensure, through the introduction of appropriate conditions and Section 75 Agreements, that any new development has minimum adverse effects on the physical environment and the amenity of an area as a result of:

- (i) Air Pollution***
- (ii) Light Pollution***
- (iii) Noise Pollution***

It should be noted that the council have a more up to date local plan which is the Alteration to the East Ayrshire Local Plan, finalised draft with modifications (2009) (Reference 14). It contains the following policy:-

Policy ENV25

The Council will require all developers to ensure that their proposals have minimal adverse impact on air quality and will require air quality assessments to be undertaken in respect of any proposed developments which it considers may significantly impact on air quality. The Council will also ensure that any new development will have minimum adverse effects on the physical environment and the amenity of an area as a result of light and noise pollution. Appropriate conditions and Section 75 Agreements will be attached to individual planning consents to ensure that environmental impacts caused by air, light and noise pollution are minimised wherever possible.

At the moment, both of these local plans are used to assess planning applications. However, it is expected that the Alteration to the East Ayrshire Local Plan will be adopted in autumn 2010 and, once adopted, it will completely replace the adopted East Ayrshire Local Plan (2003).

6 Local Transport Plans and Strategies

East Ayrshire Council is in the process of publishing its second Local Transport Strategy (LTS) which sets out the Council's vision for transportation in the area. It will replace the first LTS published in 2000 and builds upon the progress to date, and outlines a vision to carry transport forward over the period 2009 to 2014, and beyond. The key issues to be addressed by the LTS include:

1. Access to education, employment and health care;
2. Access for users of all abilities;
3. Transport and access to job market areas;
4. Managing traffic levels;
5. Road safety measures; and
6. Protecting the environment.

The principle of climate change is now generally accepted. To begin to address this issue, the Scottish Government has set a target to reduce "greenhouse" gas emissions by 50% by 2030. It is therefore an underlying principle of the LTS to pursue policies and actions to enhance the environment and contribute to a reduction in emissions.

LTS Objectives

The LTS is a holistic document and includes measures to reduce emissions to the air by reducing car dependency. The LTS has established five strategic objectives to address stress points in the transport network promote integrated and sustainable transport and remove barriers to social inclusion. These objectives are intended to be consistent with the Governments national objectives for transport, SPT's Regional Transport Strategy, and support East Ayrshire's Community Plan.

Objective 1 Economic Growth

Objective 2 Accessibility and Social Inclusion

Objective 3 Environment: to improve, conserve and enhance the natural, historic and built environment, and contribute to a healthier lifestyle by facilitating the provision and use of sustainable modes of transport and reduce emissions to air by reducing car dependency, particularly in urban areas.

Objective 4 Safety and Personal Security

Objective 5 Sustainability and Integration: to encourage the integration of transport modes and promote greater use of public transport and other sustainable modes of transport.

Objective 3 and objective 5 contain measures to improve air quality by facilitating the provision and use of sustainable modes of transport and reduce emissions to air by reducing car dependency, particularly in urban areas. East Ayrshire Council is committed to promoting sustainable transport including cycling, walking, use of public transport and car sharing to minimise emissions of carbon dioxide and pollutants and therefore reduce detrimental economic, social and environmental effects. Similarly sustainable freight transport is encouraged by maximising the use of rail.

Key Action Area for Objective 3 and objective 5 include:-

Bus and rail network and service improvements
Parking management
Walking and cycling networks and facilities
Travel plans
East Ayrshire Core Paths Plan
Landscape Maintenance
Quality Bus Corridors
Use of new technology
Sustainable freight transport
Travel awareness
Interchanges
Park and Ride
Timetabling, ticketing and information

Linkage between the LTS Objectives, National and Regional Transport Objectives, Community Plan (Reference 17), and National Outcomes are summarised in Table E.1 of the LTS document (Reference 15).

The East Ayrshire Local Transport Strategy 2009-2014 is due for publication in the very near future and can be found on the East Ayrshire Council Website :
www.east-ayrshire.gov.uk.

7 Climate Change Strategies

East Ayrshire Council has policies and strategies in place which promotes sustainable development and carbon reduction.

The principle of climate change is now generally accepted. To begin to address this issue, the Scottish Government has set a target to reduce “greenhouse” gas emissions by 50% by 2030. It is an underlying principle of the LTS to pursue policies and actions to enhance the environment and contribute to a reduction in emissions (summarised in section 6).

East Ayrshire Council also has carbon management programme in place. East Ayrshire Carbon Management Programme, **Strategy and Implementation Plan (SIP), October 2007** (Reference 16).

Improving the environment is a key priority theme within the **East Ayrshire Community Plan**. Protecting the environment now and for future generations is a strategic priority. Climate change is of international, national, regional and individual concern and responsibility. As a community leader and provider, East Ayrshire Council is committed to, act, lead by example and support the increasing challenge of reducing greenhouse gases.

Participation in the Carbon Trust Local Authority Carbon Management Programme (Reference 19) has enabled the council to quantify its carbon emissions and develop a clear plan of action. The plan outlines the Council focus on four themes:

1. Reducing the environmental impact of the council's energy consumption.
2. Reducing the environmental impact of the council's vehicle fleet.
3. Reducing the environmental impact of landfill by reducing and recycling of the council's waste.
4. Reducing the environmental impact of street lighting.

An action plan has been developed ranging from short term, low cost measures to projects requiring significant investment and implementation time.

The baseline position in 2004-2005 has been used for the calculation of the council's carbon emissions. This has been calculated as 19119 tonnes of CO₂, including an allowance for 50% of the Council's electricity supply being from renewable resources. It was estimated that the Council's energy related carbon emissions could increase by 21.6% between 2004-2005 and 2009-10. However the Council's target is to reduce its combined energy related costs by 10% by 2010.

The Carbon Management Programme will be taken forward as an integral part of the Council's broader Sustainability Strategy (Reference 18), under development at the time of this report.

The Carbon Management Programme Strategy and Implementation Plan (SIP) will raise issues that when carried out will result in benefit to the Council and could be used as a springboard to influence change in the wider community. The Council recognises the need to be visionary and proactive with regard to carbon reduction.

“A commitment to lasting development will help us make the right decisions, with the knowledge that we have taken full account of the social, economic and environmental consequences.”

East Ayrshire Community Plan – Improving the Environment

East Ayrshire Council (EAC) objectives in pursuing the Local Authority Carbon Management (LACM) programme are:

- To quantify the carbon emissions associated with running the council.
- To identify and implement schemes to reduce carbon emission, by reducing energy consumption, minimising waste and lowering environmental impact of transport.
- To progress towards the integration of sustainable energy generation.

The purpose of the implementation plan is

1. To establish a baseline of the Council's carbon emissions by looking at the main energy consumers including (but not exclusively) buildings, transport, street lighting, and waste management.
2. To calculate the value of the real challenges that the Council faces and the implications if no action is taken to reduce our carbon emissions.
3. To highlight the financial and environmental benefit which can arise from resourceful ideas and the implementation of carbon reduction measures.

The implementation of the energy savings programme has been ongoing since September 2005 and the original three year programme has been extended to five years, concluding in 2010. This will correspond to the target to reduce carbon emissions by 10% over this period.

The plan encompasses actions ranging from simple short term work to longer-term projects and renewable initiatives. One of the outcomes has been confirmation that the works carried out since 2005 have resulted in significant reduction in carbon emissions. This demonstrates that if continued the Council is in a realistic position to achieve the reduction target of 10% and that investment in projects that reduce energy consumption have the additional positive effect on reducing carbon emissions.

Table 6 within the Carbon Management implementation Plan lists nominated actions and emissions reduction opportunities and Table 7 includes an implementation summary plan (Reference 16)

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

New monitoring data for NO₂ and PM₁₀, where monitoring was carried out for the full year throughout East Ayrshire, did not reveal any exceedences of the relevant Air Quality Objectives. Short term monitoring of NO₂ revealed levels around the 40 µg/m³ (Table 2.4a) and although caution should be observed when interpreting these results it confirms that there are specific locations within East Ayrshire where levels are close to the annual Air Quality Objective for NO₂. (Although it should be noted that no location of relevant public exposure exceeded the 40 µg/m³ 2005 annual mean Air Quality Objective). Further long term monitoring is therefore required particularly within John Finnie Street, Kilmarnock, A71 through Newmilns and A76 through Mauchline.

Trends (Figure 2.4) from NO₂ diffusion tube monitoring from 2006 to 2009 suggest decreasing levels of NO₂. It should be noted that trends less than five years should be treated with caution.

A Detailed Assessment is therefore not required for East Ayrshire Council at this time.

8.2 Conclusions relating to New Local Developments

All new local developments (or proposed developments) which may have a significant affect on air quality have been covered in Section 3. The two developments which may impact on air quality, the roadstone coating plant at Moorfield, Kilmarnock and the opencast coal mine at Duncanziemere, Cumnock have both been subject to air quality assessments which concluded that although both sources would have a localised impact on air quality all pollutants included in the Regulations for the purpose of Local Air quality Management in Scotland would be well within the Air quality Objectives.

8.3 Other Conclusions

Local Transport Plan

Objective 3 and Objective 5 (Reference 15) contain measures to improve air quality by facilitating the provision and use of sustainable modes of transport and reduce emissions to air by reducing car dependency, particularly in urban areas. East Ayrshire Council is committed to promoting sustainable transport including cycling, walking, use of public transport and car sharing to minimise emissions of carbon dioxide and pollutants and therefore reduce detrimental economic, social and environmental effects. Similarly sustainable freight transport is encouraged by maximising the use of rail. In conclusion these specific measures will result in a reduction in NO₂ and PM₁₀.

Updates of Planning Policy that relate to Air Quality

East Ayrshire Council are in the process of finalising a more up to date local plan which is the Alteration to the East Ayrshire Local Plan, finalised draft with modifications (2009) (Reference 14). It contains the following updated policy on air quality:-

Policy ENV25

The Council will require all developers to ensure that their proposals have minimal adverse impact on air quality and will require air quality assessments to be undertaken in respect of any proposed developments which it considers may significantly impact on air quality. The Council will also ensure that any new development will have minimum adverse effects on the physical environment and the amenity of an area as a result of light and noise pollution. Appropriate conditions and Section 75 Agreements will be attached to individual planning consents to ensure that environmental impacts caused by air, light and noise pollution are minimised wherever possible.

In conclusion this updated policy will ensure that developers will have to minimise the impact on air quality of any new development and if necessary enter into a legal agreement with East Ayrshire Council to ensure this is the case

8.4 Proposed Actions

The 2010 progress Report has not shown the need to progress with a Detailed Assessment for any pollutant which has an Air Quality Objective included in the Air Quality Regulations for the purpose of Local Air Quality.

Previous Assessments have identified John Finnie Street, Kilmarnock, due to high levels of nitrogen dioxide (Tables 2.4a and 2.4b) as an area requiring further monitoring. In this regard, extra NO₂ diffusion tubes have been placed both within John Finnie Street and on the adjoining street (West George Street) (Figure 5c). Automatic Monitoring equipment has also been commissioned at the northern end of John Finnie Street (Figure 4), to monitor for both nitrogen dioxide and PM₁₀. Three NO₂ diffusion tubes have also been co-located with the automatic monitoring equipment to give a local bias adjustment factor. 2009 monitoring data presented in the 2010 PG has reinforced the conclusion that this extra monitoring is necessary.

Nitrogen dioxide concentrations on the A71 through Newmilns (Table 2.4a) are also at levels approaching the air quality objectives and in consequence, two extra NO₂ diffusion tubes have been located to determine the extent of the problem (Figure 5e). NO₂ monitoring has been extended in Mauchline (Figure 5h) due to the high levels of traffic and narrow streets (canyon effect). Three other NO₂ diffusion tubes have been located, as previously covered in 2009 USA, in Kilmaurs, Muirkirk and Cumnock (Figures 5b, 5i and 5l respectively), to give a better spread of monitoring throughout the East Ayrshire Council area. NO₂ diffusion tubes will be located in the future in any area which air quality issues are likely to occur, such as where there are substantial changes in traffic volume and flow.

PM₁₀ monitoring has been started in New Cumnock, as previously covered, due to concerns about the potential high levels of this pollutant associated with open cast coal mines. Although levels recorded were low with an annual mean of 12 µg/m³, further monitoring will be carried out in 2010 due to continuing concerns from dust from open cast coal mines and associated works. Nitrogen dioxide will also be monitored at this location. PM₁₀ monitoring has commenced in John Finnie, Street, Kilmarnock since the high level of traffic and associated high levels of NO₂ suggest the potential for raised levels of PM₁₀.

The next course of action for East Ayrshire Council will therefore be the submission of a Progress Report by 30th April 2011.

9 References

1. Defra and The Devolved Administrations, Local Air Quality Management, Technical Guidance LAQM.TG(09), February 2009. Accessed at www.airquality.co.uk/laqm/tools.php
2. Part IV of the Environment Act 1995 Local Air Quality Management Policy Guidance PG(S)(09) February 2009. Accessed at <http://www.airquality.co.uk/laqm/tools.php>
3. Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and Users. Report to Defra and the Devolved Administrations. ED48673043 Issue 1a Feb2008. Authors Jaume Targa, Alison Lauder and The Defra Working Group on Harmonisation of Diffusion Tubes. Accessed at <http://www.laqmsupport.org.uk/no2gaqc.php>
4. The Workplace Analysis Scheme for Proficiency (WASP) – summary of laboratory performance in rounds 103-107. Accessed at <http://www.laqmsupport.org.uk/no2gaqc.php>
5. Detailed Assessment of John Finnie Street, Kilmarnock, Ayrshire. Compiled by BMT Cordah on behalf of East Ayrshire Council; Report No.: G_EAC-003/04-01-01 dated 7th October 2008.
6. Laxen D and Marner B (2003). Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites. Available at www.airquality.co.uk/archive/reports/list.php
7. Cook A (2008). Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedences of the 1-hour mean AQS Objective. Available at www.airquality.co.uk/archive/reports/list.php
8. Fall-off in nitrogen dioxide concentrations at different distances from roads. The calculator accessed at www.airquality.co.uk/archive/laqm/tools.php
9. Harrison D (2006) UK Equivalence Programme for Monitoring of Particulate Matter. Available at www.airquality.co.uk/archive/reports/list.php
10. Kilmarnock Roadstone Coating Plant Dispersion Modelling Assessment 23/01/09. Author: WYG Environment Planning Transport Limited.
11. Duncanziemere Surface Mine Environmental Statement/Air Quality. Author: RBS Group June 2009.
12. Background Pollutant Concentration Maps. Accessed at www.airquality.co.uk/archive/laqm/tools.php
13. East Ayrshire Local Plan 2003.
14. Alteration to East Ayrshire Local Plan 2009.
15. The East Ayrshire local Transport Strategy 2009 – 2014

16. East Ayrshire Council Carbon Management Programme and implementation Plan (SIP) October 2007 Strategy
17. East Ayrshire Community Plan
18. East Ayrshire Council Sustainability Strategy
19. Carbon Trust Local Authority Carbon Management Programme
20. Defra and The Devolved Administrations, Spreadsheet of Bias Adjustment factors, version 03/10. Accessed at <http://www.uwe.ac.uk/agm/review/index.html>

Appendices

Appendix A: QA:QC Data

QA/QC Data: Defra and The Devolved Administrations, Spreadsheet of Bias Adjustment Factors, Version Number 03/10. Accessed at www.uwe.ac.uk/aqm/review/index.html

Follow the steps below in the correct order to show the results of relevant co-location studies										Spreadsheet Version Number: V2.19	
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods								This spreadsheet will be updated in late September 2010 on the			
Whenever presenting adjusted data, you should state the adjustment factor used								BAA website			
This spreadsheet 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 Government 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.		If you have your own co-location 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	Year	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ²	Bias Adjustment Factor (A) (Cm/Dm)	
Glasgow Scientific Services	20% TEA in Water	2006	R	East Dunbartonshire Council	12	40	39	2.3%	G	0.96	
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	K	AEA E&E Intercomparison	12	119	111	7.1%	G	0.93	
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	36	39	-2.9%	P	1.03	
Glasgow Scientific Services	20% TEA in Water	2007	R	North Lanarkshire Council	12	26	22	-7.2%	G	1.08	
Glasgow Scientific Services	20% TEA in Water	2007	K	AEA Tech Intercomparison	12	116	103	7.3%	G	0.93	
Glasgow Scientific Services	20% TEA in Water	2008	R	East Dunbartonshire Council	16	29	31	-6.7%	P	1.07	
Glasgow Scientific Services	20% TEA in Water	2008	R	East Dunbartonshire Council	11	42	45	-5.3%	G	1.06	
Glasgow Scientific Services	20% TEA in Water	2008	R	East Dunbartonshire Council	11	40	35	12.6%	P	0.89	
Glasgow Scientific Services	20% TEA in Water	2008	K	AEA Tech Intercomparison	12	133	116	14.9%	G	0.87	
Glasgow Scientific Services	20% TEA in Water	2009	R	East Dunbartonshire Council	12	28	33	-17.7%	P	1.21	
Glasgow Scientific Services	20% TEA in Water	2009	R	East Dunbartonshire Council	12	35	40	-12.3%	G	1.14	
Glasgow Scientific Services	20% TEA in Water	2009	R	East Dunbartonshire Council	11	30	43	-29.2%	P	1.41	
Glasgow Scientific Services	20% TEA in Water	2009	K	AEA Tech Intercomparison	11	92	106	-14.5%	G	1.17	
Glasgow Scientific Services	20% TEA in Water	2006		Overall Factor ³ (3 studies)					Use	0.96	
Glasgow Scientific Services	20% TEA in Water	2007		Overall Factor ³ (4 studies)					Use	1.06	
Glasgow Scientific Services	20% TEA in Water	2008		Overall Factor ³ (4 studies)					Use	0.97	
Glasgow Scientific Services	20% TEA in Water	2009		Overall Factor ³ (4 studies)					Use	1.23	

Appendix B: Monthly NO₂ Diffusion Tube Data**East Ayrshire Monthly NO₂ Diffusion Tube Data 2009 (µg/m³)**

Site Location	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Mean	Corrected Mean (Bias Factor 1.23)
1. Fowlds Street/King Street Junction, Kilmarnock	27.4	30.9	28.3	26.8	23.1	22.6	20.2	18.1	11.7	34.4	20.4	50.7	26.27	32.3
2. 28 John Finnie Street, Kilmarnock	34.6	29.5	24.0	26.4	22.4	20.9	28.6	22.7	11.0	34.5	10.1	55	26.64	32.8
3. 19 Lainshaw Street, Stewarton	25.4	35.2	22.4	22.0	21.7	26.6	26.7	17.3	13.5	28.2	17.2	47.9	25.34	31.2
4. 40 Main Street, Newmilns	22.6	33.2	23.9	23.9	25.6	NR	21.8	16.9	16.3	26.3	16.5	40.6	24.27	29.9
5. The Cross, Hurlford	22.4	26.7	21.7	22.3	13.6	19.8	21.7	12.2	9.2	20.7	14.3	35.7	20.02	24.6
6. 8A Kilmarnock Road, Mauchline	24.0	24.9	18.3	18.7	19.6	25.9	24.0	17.2	24.3	30.4	23.3	48.5	24.93	30.7
7. Junction at Main Street & A70, Ochiltree	21.9	22.6	21.6	16.2	10.9	16.0	21.7	12.7	14.5	NR	15.7	34.0	18.89	23.2
8. Junction at A76 Roundabout, Auchinleck	15.9	16.2	16.3	12.0	12.4	10.8	16.6	10.6	15.6	19.4	7.8	27.4	15.08	18.5
9. Townhead/ Glaisnock Street Junction, Cumnock	17.4	16.6	15.0	14.9	NR	10.4	8.7	9.3	11.6	14.0	19.1	28.1	15.01	18.5
10. Air Quality Monitoring Unit, Western Road, Kilmarnock	15.4	20.2	14.3	9.2	9.7								13.36	

11. 96 John Finnie Street, Kilmarnock	26.3	33.0	25.0	22.9	24.7	13.0	25.6	21.5	22.2	27.8	30.6	52.2	27.07	33.3
12. 62 John Finnie Street Kilmarnock	33.2	33.0	26.7	27.2	26.0	NR	20.6	22.2	23.2	34.7	38.9	57.0	31.15	38.3
13. 22/24 Nursery Avenue, Kilmarnock	20.4	23.5	17.1	19.1	12.7	24.1	9.6	8.5	12.8	17.6	24.5	41.1	19.25	23.7
14. 95/97 John Finnie Street, Kilmarnock								22.7	31.3	38.0	32.9	67.7	38.52	43.7
15. 16 West George Street, Kilmarnock								28.7	30.7	36.5	23.4	56.3	35.12	39.9
16. Bridge Street, Galston								10.0	17.7	23.2	15.8	40.8	21.50	24.4
17. 22/25 Loudoun Road, Newmilns								20.3	32.7	34.2	30.9	57.1	35.04	39.8
18. 100 Main Street, Newmilns								12.2	12.7	24.9	17.1	40.4	21.46	24.4
19. 57/59 Townhead Street, Cumnock								9.7	9.5	20.5	11.8	35.0	17.3	19.6
20. 66 Main Street, Muirkirk								9.7	7.4	14.4	11.0	24.2	13.34	15.1
21. The Joughs, Kilmaurs								13.6	11.9	18.2	16.5	32.7	18.58	21.1
22. The Cross, Mauchline								17.9	17.2	30.6	20.5	40.0	25.24	28.7
23. 3/5 Loudoun Street, Mauchline								18.3	24.8	30.7	17.4	46.3	27.50	31.2
24. 5/7 Earl Gray Street, Mauchline								21.9	28.7	39.5	28.2	63.5	36.36	41.3

Appendix C: Results of Automatic Monitoring for NO₂ and PM₁₀

Produced by AEA on behalf of the Scottish Government

**EAST AYRSHIRE NEW CUMNOCK
1st January to 31st December 2009**

These data have been fully ratified by AEA

POLLUTANT	PM ₁₀ *+	NO ₂	NO _x
Number Very High	0	0	-
Number High	0	0	-
Number Moderate	0	0	-
Number Low	6565	7003	-
Maximum 15-minute mean	113 µg m ⁻³	97 µg m ⁻³	308 µg m ⁻³
Maximum hourly mean	113 µg m ⁻³	61 µg m ⁻³	170 µg m ⁻³
Maximum running 8-hour mean	72 µg m ⁻³	52 µg m ⁻³	112 µg m ⁻³
Maximum running 24-hour mean	48 µg m ⁻³	42 µg m ⁻³	76 µg m ⁻³
Maximum daily mean	48 µg m ⁻³	39 µg m ⁻³	74 µg m ⁻³
Average	12 µg m ⁻³	7 µg m ⁻³	10 µg m ⁻³
Data capture	76.4 %	79.9 %	79.9 %

* PM₁₀ Indicative Gravimetric Equivalent µg m⁻³+ PM₁₀ instruments:BAM using a gravimetric factor of 0.83333 for Indicative Gravimetric Equivalent from 17th January 009

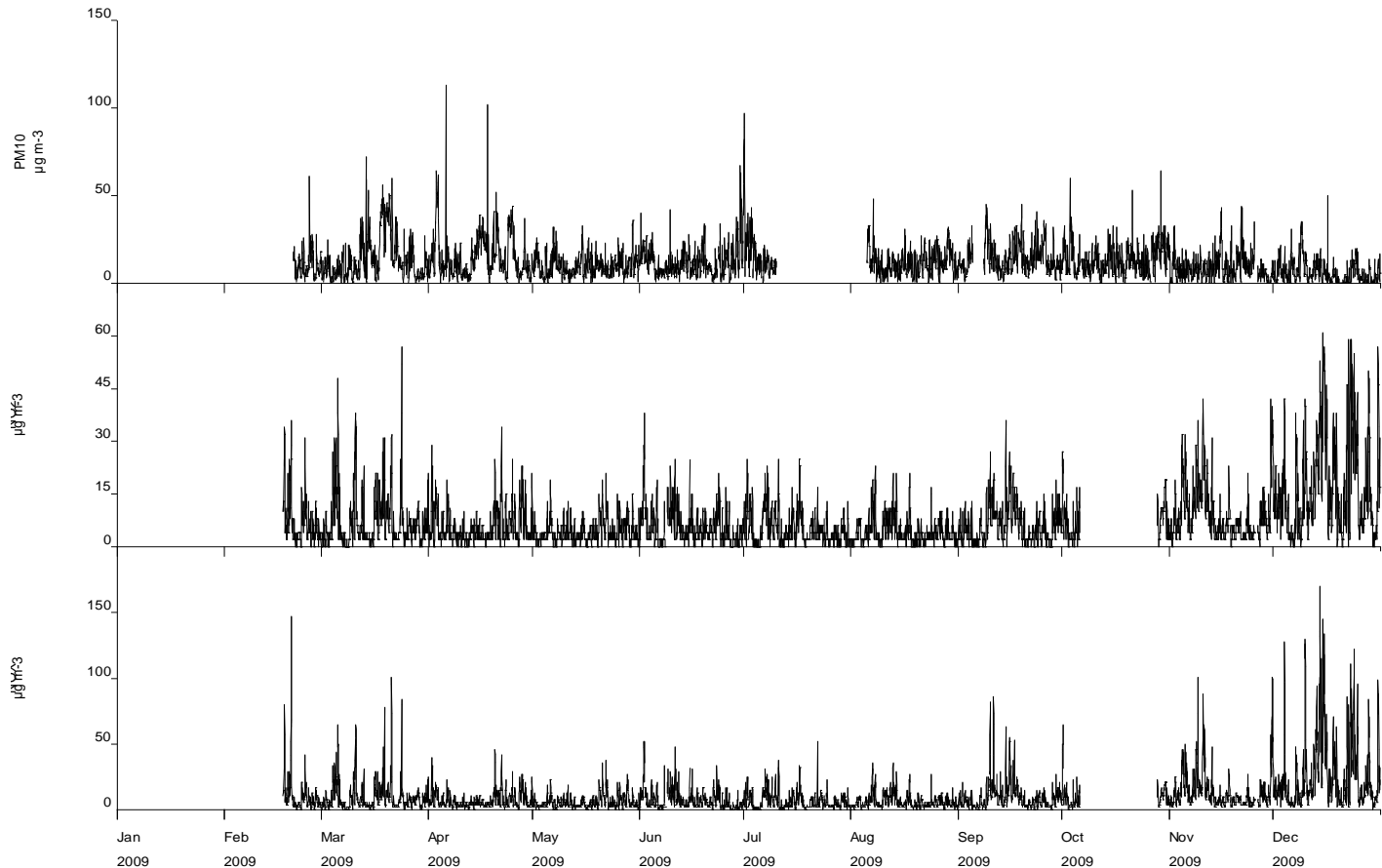
All mass units are at 20°C and 1013mb

NO_x mass units are NO_x as NO₂ µg m⁻³

Pollutant	Air Quality Regulations (2000) and Air Quality (Scotland) Amendment Regulations 2002	Exceedences	Days
PM ₁₀ Particulate Matter (Gravimetric)	Daily mean > 50 µg m ⁻³	0	0
PM ₁₀ Particulate Matter (Gravimetric)	Annual mean > 18 µg m ⁻³	0	-
Nitrogen Dioxide	Annual mean > 40 µg m ⁻³	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m ⁻³	0	0

Produced by AEA on behalf of the Scottish Government

**East Ayrshire New Cumnock Air Monitoring
Hourly Mean Data for 1st January to 31st December 2009**



Stephen Stratton
Ambient Air Quality Monitoring
AEA
Glengarnock Technology Centre
Caledonian Road
Lochshore Business Park
Glengarnock
Ayrshire
KA14 3DD

Email: Stephen.Stratton@aeat.co.uk
Tel: 0870 190 5203
Mob: 07968 707 276
Fax: 0870 190 5151

	A	B	C	D	E	F	G	H	I
1	Produced by AEA on: 25/03/2010								
2	Month	Monthly av	Maximum	Hourly dat	For >= 75°	East Ayrshire New Cumnock Nitric Oxide ppb	01/01/2009 to 31/12/2009		
3	Jan-09			0					
4	Feb-09			39.3					
5	Mar-09	2	6	100					
6	Apr-09	1	3	100					
7	May-09	1	3	100					
8	Jun-09	1	3	96.8					
9	Jul-09	1	3	99.5					
10	Aug-09	1	3	99.1					
11	Sep-09	2	8	98.9					
12	Oct-09			27.8					
13	Nov-09	2	9	96.8					
14	Dec-09	5	22	99.6					
15	Produced by AEA on: 25/03/2010								
16	Month	Monthly av	Maximum	Hourly dat	For >= 75°	East Ayrshire New Cumnock Nitrogen Dioxide ppb	01/01/2009 to 31/12/2009		
17	Jan-09			0					
18	Feb-09			39.3					
19	Mar-09	4	10	100					
20	Apr-09	3	6	100					
21	May-09	2	4	100					
22	Jun-09	3	8	96.8					
23	Jul-09	3	7	99.5					
24	Aug-09	2	5	99.1					
25	Sep-09	3	7	98.9					
26	Oct-09			27.8					
27	Nov-09	5	12	96.8					
28	Dec-09	9	20	99.6					
29	Produced by AEA on: 25/03/2010								
30	Month	Monthly av	Maximum	Hourly dat	For >= 75°	East Ayrshire New Cumnock PM10 Particulate Matter µg m-3 (20°C 1013mb)	01/01/2009 to 31/12/2009		
31	Jan-09			0					
32	Feb-09			28.1					
33	Mar-09	17	49	98					
34	Apr-09	18	58	99.4					
35	May-09	12	23	99.5					
36	Jun-09	15	40	97.1					
37	Jul-09			29.4					
38	Aug-09	14	27	81					
39	Sep-09	18	34	87.8					
40	Oct-09	16	28	97.4					
41	Nov-09	11	20	96.8					
42	Dec-09	7	28	99.7					
43									



CERTIFICATE OF CALIBRATION

Glengarnock Technology Centre, Caledonian Road, Lochshore Business Park, Glengarnock,
Ayrshire, KA14 3DD. Telephone 0870 1905269 Fax 0870 1905151



Approved Signatories:

K. Stevenson

S. Stratton ✓

Signed:

Date: 16th November 2009

Date of issue:

27th November 2009

Cert No: 2147

Page 1 of 3

Customer Name and Address:

Scottish Government
Water, Air, Soils and Flooding Division
Environmental Quality Directorate
Scottish Government
Victoria Quay
Edinburgh
EH6 6QQ

Description:

Calibration factors for East Ayrshire Council's New Cumnock
air monitoring station.

AEA Identification Number:

43060001/EAYR/B1

Site / Date Test Carried Out	Species	Analyser Serial No.	Zero Response ¹	Uncertainty (ppb)	Calibration Factor ²	Uncertainty %	Converter eff. (%) ³
New Cumnock 12 th June 2009	NOx	2361	0.93	5.5	1.68	5.0	100.4
	NO	2361	0.62	5.0	1.70	5.0	N/A

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Date of issue:

27th November 2009

Cert No: 2147

Page 2 of 3

AEA Identification Number:

43060001/EAYR/B1

Site / Date Test Carried Out	Species	Analyser Serial No.	Parameter	Specified Value	Measured Value	Deviation %
New Cumnock 12 th June 2009	BAM	17689	Main Flow	16.67	17.49	4.9

Uncertainties:

BAM PM₁₀

Main Flow

±2.2%

Date of issue:

27th November 2009

Cert No: 2147

Page 3 of 3

AEA Identification Number:

43060001/EAYR/B1

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO_x analysers only) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k₀ (where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in ppb (parts per billion) mole fractions or ppm (parts per million) mole fractions.

¹The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

²The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (ppb for NO, NO_x, SO₂, O₃ and ppm for CO. Where 1 ppm = 1000 ppb). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F (Output - Zero Response)

Where F = Calibration Factor provided on this certificate

Output = Reading on the data logging system of the analyser

Zero Response = Zero Response provided on this certificate

³Converter eff. is the measured efficiency of the NO₂ to NO converter within the oxides of nitrogen analyser under test.

⁴The measured main flow rate (where applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where applicable) is the flow rate through the bypass tubing of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are l.min⁻¹. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

FDMS analyser flow rate measurements are consistent with the TEOM's stated above. FDMS flow rates are however measured on both Base and Reference cycles. The Base cycle is the sample flow taken through the diffusion drier system minimising the effect of relative humidity, then directly onto the TEOM Microbalance for a particulate measurement. The Reference cycle, after the Drier system, is taken through a 47mm filter where it becomes a sample stream without particulate matter.

⁵The calculated k₀ value (TEOM analysers only) is the calculated k₀ spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified k₀ value.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.



CERTIFICATE OF CALIBRATION

Glengarnock Technology Centre, Caledonian Road, Lochshore Business Park, Glengarnock,
Ayrshire, KA14 3DD. Telephone 0870 1905269 Fax 0870 1905151



Approved Signatories:

K. Stevenson

S. Stratton ✓

Signed:

Date: 22nd March 2010

Date of issue:

22nd March 2010

Cert No: 2244

Page 1 of 3

Customer Name and Address:

Scottish Government
Water, Air, Soils and Flooding Division
Environmental Quality Directorate
Scottish Government
Victoria Quay
Edinburgh
EH6 6QQ

Description:

Calibration factors for East Ayrshire Council's New Cumnock
air monitoring station.

AEA Identification Number:

43060/EAYR/B2

Site / Date Test Carried Out	Species	Analyser Serial No.	Zero Response ¹	Uncertainty (ppb)	Calibration Factor ²	Uncertainty %	Converter eff. (%) ³
New Cumnock 15 th Dec 2010	NOx	2361	4.5	5.0	0.9354	5.0	97.4
	NO	2361	0.0	5.0	0.9182	5.0	N/A

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2 providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards Laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Date of issue:
 Cert No: 2244
 AEA Identification Number:

22nd March 2010
 Page 2 of 3

43060/EAYR/B2

Site / Date Test Carried Out	Species	Analyser Serial No.	Parameter	Specified Value	Measured Value	Deviation %
New Cumnock 15 th Dec 2010	BAM	17689	Main Flow	16.67	13.12	-21.3

Uncertainties:

BAM PM₁₀ Main Flow ±2.2%

Date of issue:
 Cert No: 2244
 AEA Identification Number:

22nd March 2010
 Page 3 of 3

43060/EAYR/B2

The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO_x analysers only) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k₀ (where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are given in ppb (parts per billion) mole fractions or ppm (parts per million) mole fractions.

¹The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

²The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (ppb for NO, NO_x, SO₂, O₃ and ppm for CO. Where 1 ppm = 1000 ppb). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F (Output - Zero Response)

Where F = Calibration Factor provided on this certificate
 Output = Reading on the data logging system of the analyser
 Zero Response = Zero Response provided on this certificate

³Converter eff. is the measured efficiency of the NO₂ to NO converter within the oxides of nitrogen analyser under test.

⁴The measured main flow rate (where applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where applicable) is the flow rate through the bypass tubing of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are l.min⁻¹. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

FDMS analyser flow rate measurements are consistent with the TEOM's stated above. FDMS flow rates are however measured on both Base and Reference cycles. The Base cycle is the sample flow taken through the diffusion drier system minimising the effect of relative humidity, then directly onto the TEOM Microbalance for a particulate measurement. The Reference cycle, after the Drier system, is taken through a 47mm filter where it becomes a sample stream without particulate matter.

⁵The calculated k₀ value (TEOM analysers only) is the calculated k₀ spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified k₀ value.

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

Appendix D: Short-term to Long-term Data Adjustment

	A	B	C	D	E	F	G
1	Average between two dates and times (GMT)						
2	Site name	Channel	End date	Average	Data capture	Units	
3	Glasgow Anderston	Nitrogen Dioxide	31/12/2009	36	92.3	µg m-3 (20°C 1013mb)	
4							
5							
6	Glasgow Anderston	Nitrogen Dioxide	31/12/2009	39	94.1	µg m-3 (20°C 1013mb)	
7							
8	Glasgow City Chambers	Nitrogen Dioxide	31/12/2009	46	97.2	µg m-3 (20°C 1013mb)	
9							
10							
11	Glasgow City Chambers	Nitrogen Dioxide	31/12/2009	48	94.5	µg m-3 (20°C 1013mb)	
12							
13	N Lanarkshire Coatbridge Whifflet	Nitrogen Dioxide	31/12/2009	24	92.9	µg m-3 (20°C 1013mb)	
14							
15							
16	N Lanarkshire Coatbridge Whifflet	Nitrogen Dioxide	31/12/2009	27	99.8	µg m-3 (20°C 1013mb)	
17							
18							
19							
20		NO2 Concentrations (ug/m3)		Ratios (Am/Pm)-R			
21		Jan - Dec 09 (Am)	Aug - Dec 09 (Pm)			Aug - Dec 09	
22	Glasgow Anderston	36	39			0.923	
23	Glasgow City Chambers	46	48			0.958	
24	N Lanarkshire Coatbridge Whifflet	24	27			0.889	
25					Average (Ra)	0.923	

Appendix E: Industrial Premises Regulated by SEPA under the Pollution Prevention and Control (Scotland) Regulations 2000**PART A Part A Sites**

Licence Number	Site	Council Area
PPC/W/20040	Egger	East Ayrshire
PPC/W/20055	Kilmarnock Abattoir	East Ayrshire
PPC/A/1079002	Auldhouse Burn Farm	East Ayrshire

PART B		Part B Sites
Licence Number	Site	Council Area
PPC/W/30071	Braehead Metals	East Ayrshire
PPC/W/30125	Barr Ltd (Mobile)	East Ayrshire
PPC/W/30126	BarrLtd (Mobile)	East Ayrshire
PPC/W/30141	BarrLtd (Mobile)	East Ayrshire
PPC/W/30142	Barr Ltd (Mobile) - Roadstone	East Ayrshire
PPC/W/30146	Killoch (SC) DP	East Ayrshire
PPC/W/30154	Skares OCCS	East Ayrshire
PPC/W/30158	Gasswater (SC)	East Ayrshire
PPC/B/1000016	Vesuvius UK Ltd, Newmilns	East Ayrshire
PPC/B/1003136	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003137	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003138	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003139	BarrLtd (Mobile)	East Ayrshire
PPC/B/1003189	BarrLtd (Mobile)	East Ayrshire
PPC/B/1004235	Airdsgreen (SC)	East Ayrshire
PPC/B/1004236	Chalmerston (SC)	East Ayrshire
PPC/B/1005102	BarrLtd (Mobile)	East Ayrshire
PPC/B/1009227	Lugton Limeworks, Lugton	East Ayrshire
PPC/B/1014191	Johnsons Cleaners UK Ltd	East Ayrshire
PPC/B/1015138	Eazyclean Ltd	East Ayrshire
PPC/B/1017559	Crosshouse Launderette	East Ayrshire
PPC/B/1019918	Barr Ltd (Mobile) RMC	East Ayrshire
PPC/B/1024480	Barr Limited, Moorfield Plant	East Ayrshire
PPC/B/1025233	Beez Neez, Stewarton	East Ayrshire
PPC/B/1030092	Barr Ltd (Killoch)	East Ayrshire

PVR'S

Licence Number	Site	Council Area
PPC/W/30061	Wm Morrisons, Kilmarnock	East Ayrshire
PPC/W/30100	Blair Garage, Stewarton	East Ayrshire
PPC/W/30101	Bridgend Garage, Auchinleck	East Ayrshire
PPC/W/30110	Ayr Road Garage, Dalmellington	East Ayrshire
PPC/W/30111	Central Garage, Cumnock	East Ayrshire
PPC/W/30112	JK Thomson, Cumnock	East Ayrshire
PPC/W/30114	Shell Glencairn, Kilmarnock	East Ayrshire
PPC/W/30116	Bobbin Filling Station, Galston	East Ayrshire
PPC/B/1000087	GS (Kilmarnock) Ltd	East Ayrshire
PPC/B/1000088	Pace Filling Station, Kilmarnock	East Ayrshire
PPC/B/1000090	AM Service Station, Mauchline	East Ayrshire
PPC/B/1000092	Pace Petroleum, Galston	East Ayrshire
PPC/B/1004559	Campbell Fuel Oils, Kilmarnock	East Ayrshire
PPC/B/1004561	Malthurst Ltd, Kilmarnock	East Ayrshire
PPC/B/1004562	BP Western Road, Kilmarnock	East Ayrshire
PPC/B/1004563	Asda Stores, Kilmarnock	East Ayrshire
PPC/B/1031777	Tesco Filling Station, Kilmarnock	East Ayrshire
PPC/B/1033837	Burnpark Service Station, Kilmarnock	East Ayrshire

Figure 1a: Map of East Ayrshire

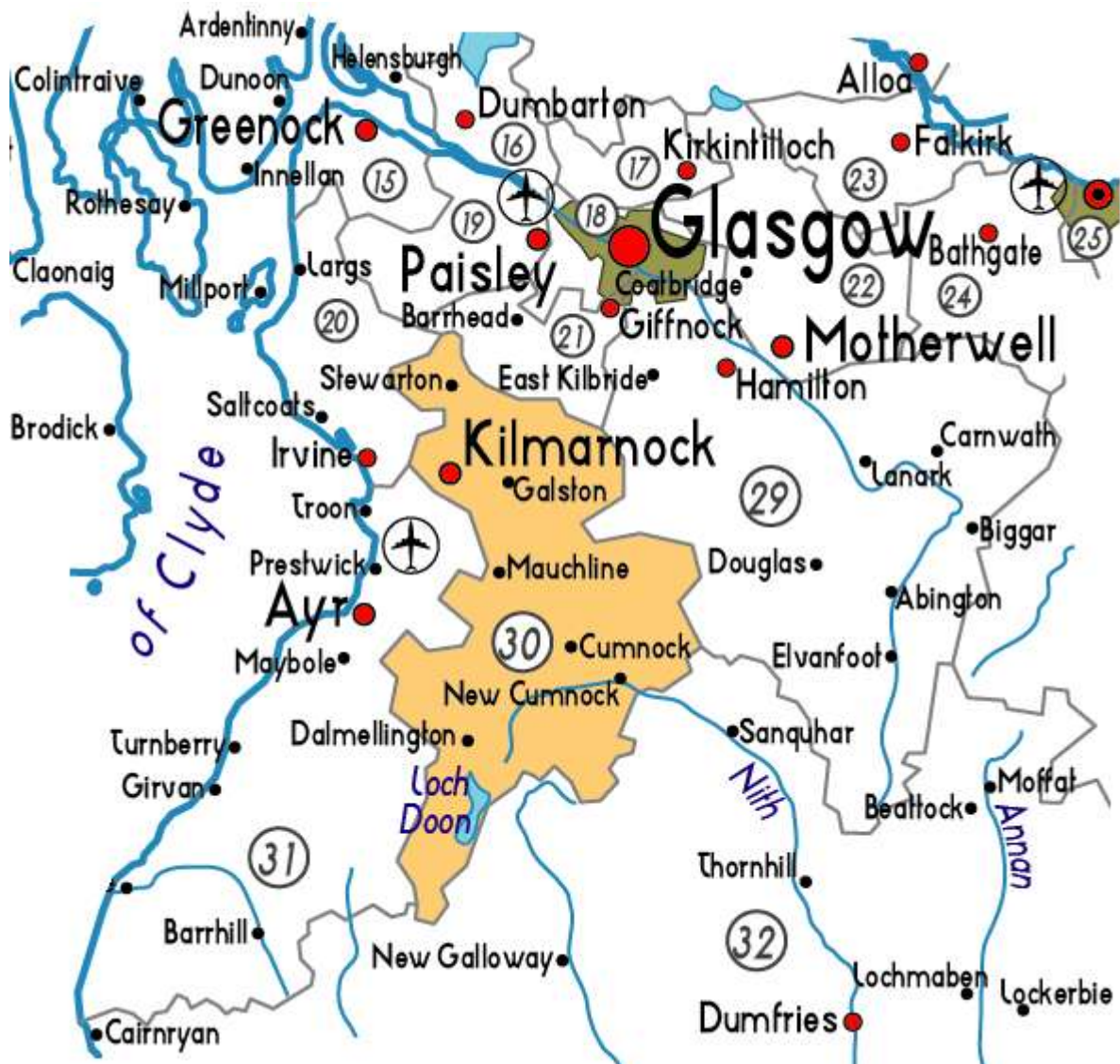


Figure 1b: Map of East Ayrshire – Towns and Villages



Figure 1c: Map of East Ayrshire – Major Roads



Figure 2: Map of Opencast Coal Sites around New Cumnock

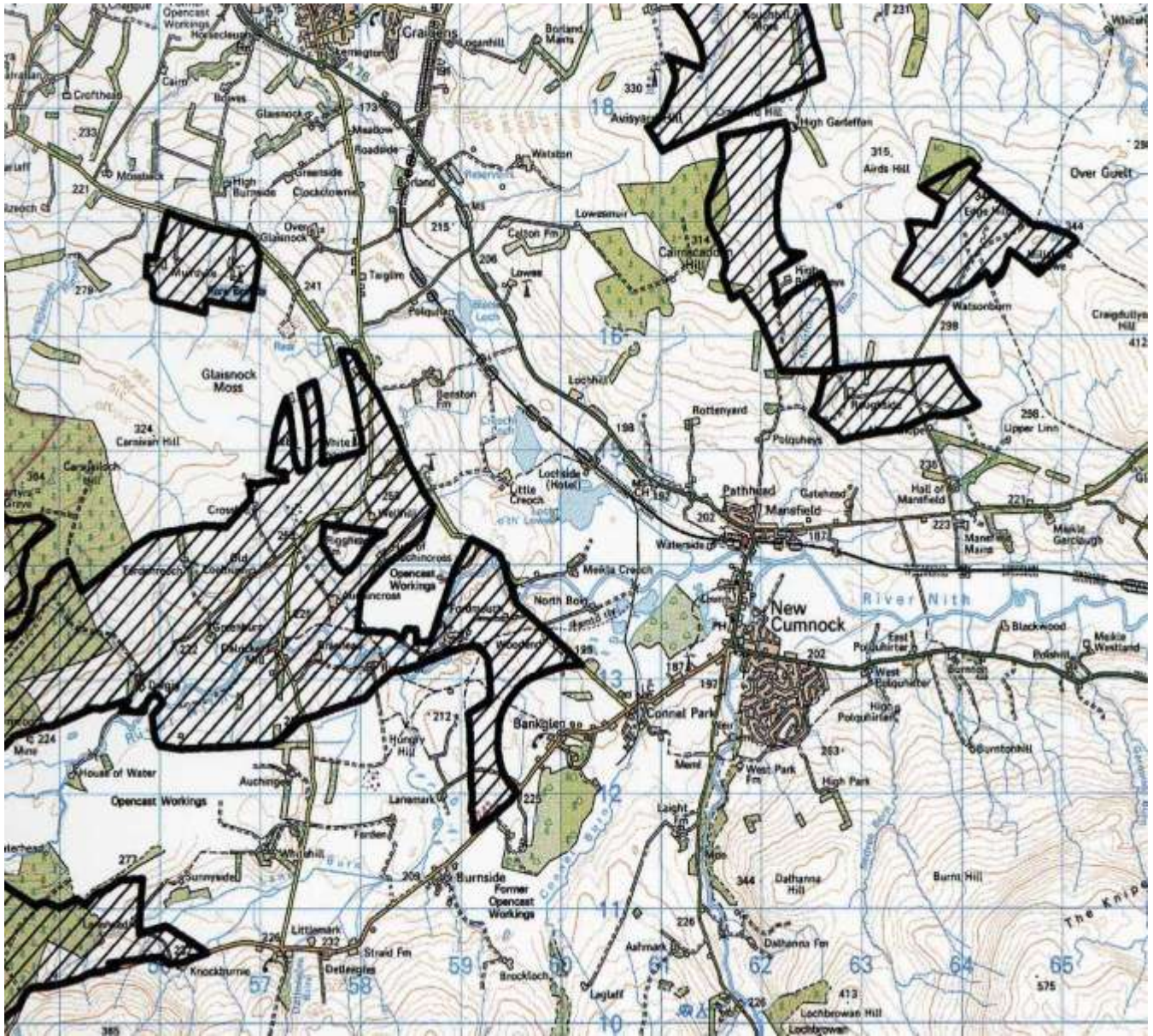


Figure 3: New Cumnock Automatic Monitoring Equipment



Figure 4: John Finnie Street, Kilmarnock – Automatic Monitoring Location



Figure 5a: Stewarton NO2 Diffusion Tube Location



Figure 5b: Kilmaurs NO2 Diffusion Tube Location



Figure 5c: John Finnie Street NO2 Diffusion Tube Location

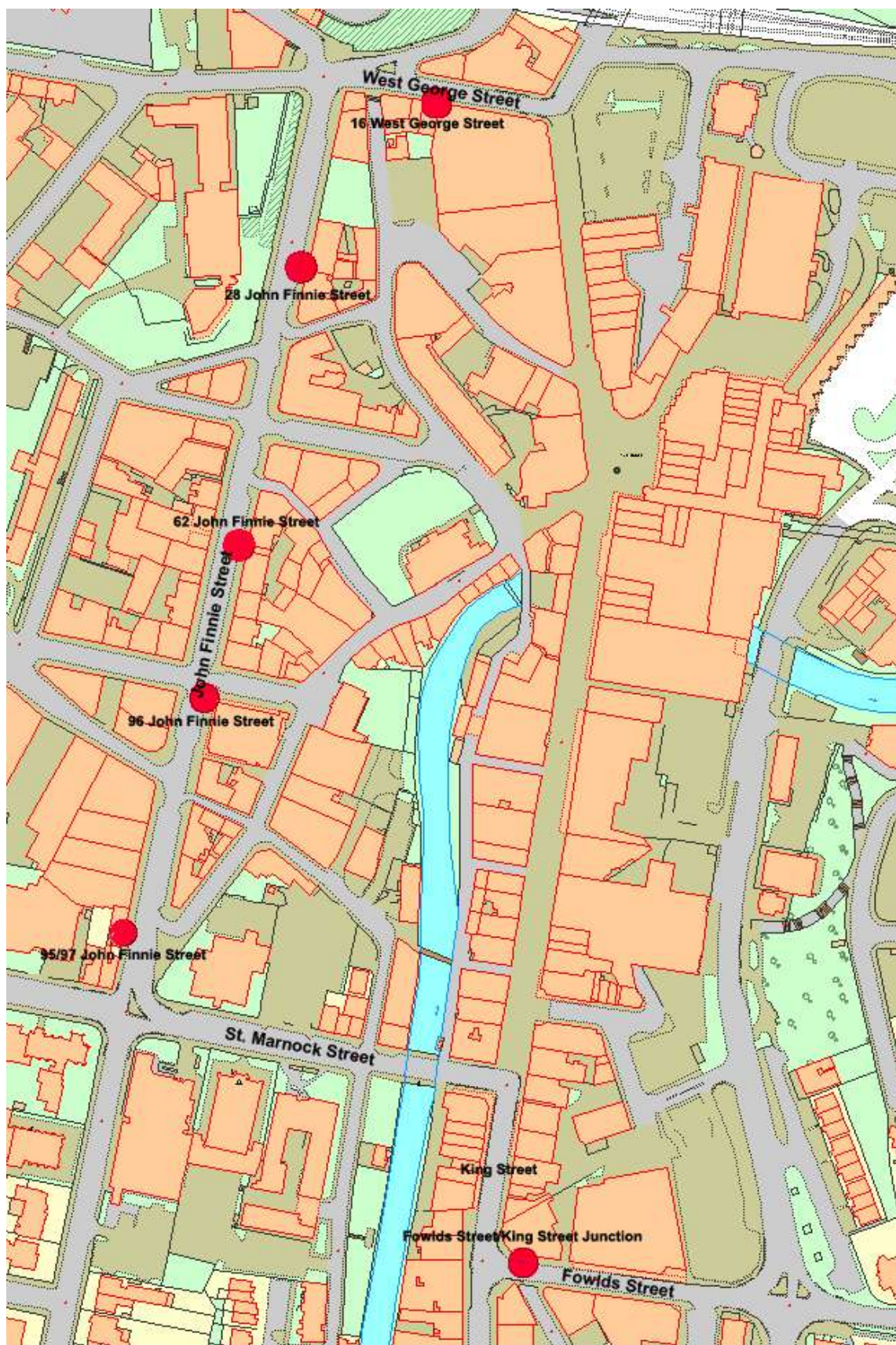
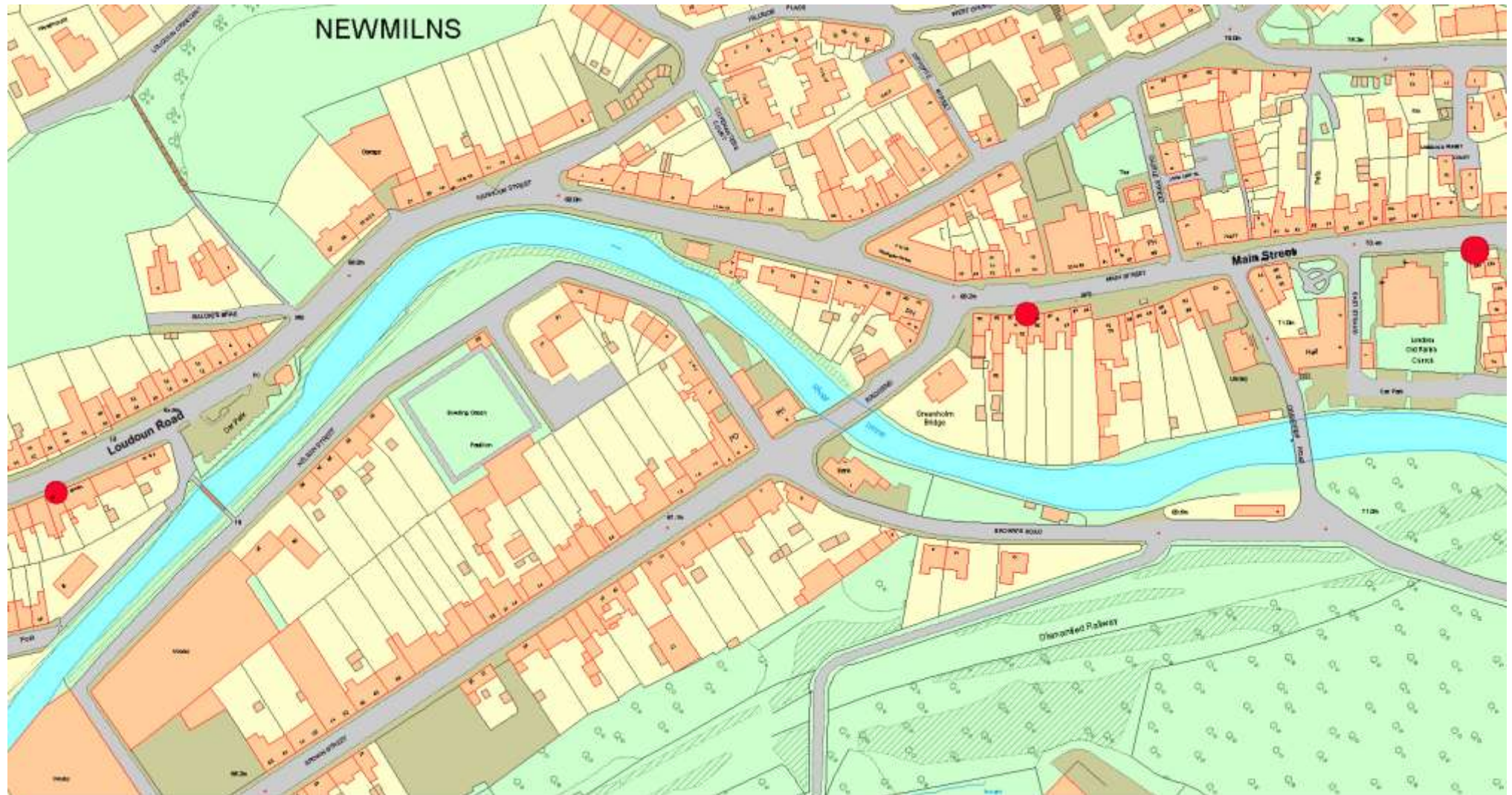


Figure 5d: Nursery Avenue NO2 Diffusion Tube Location



5e: Newmilns – NO2 Diffusion Tube Locations



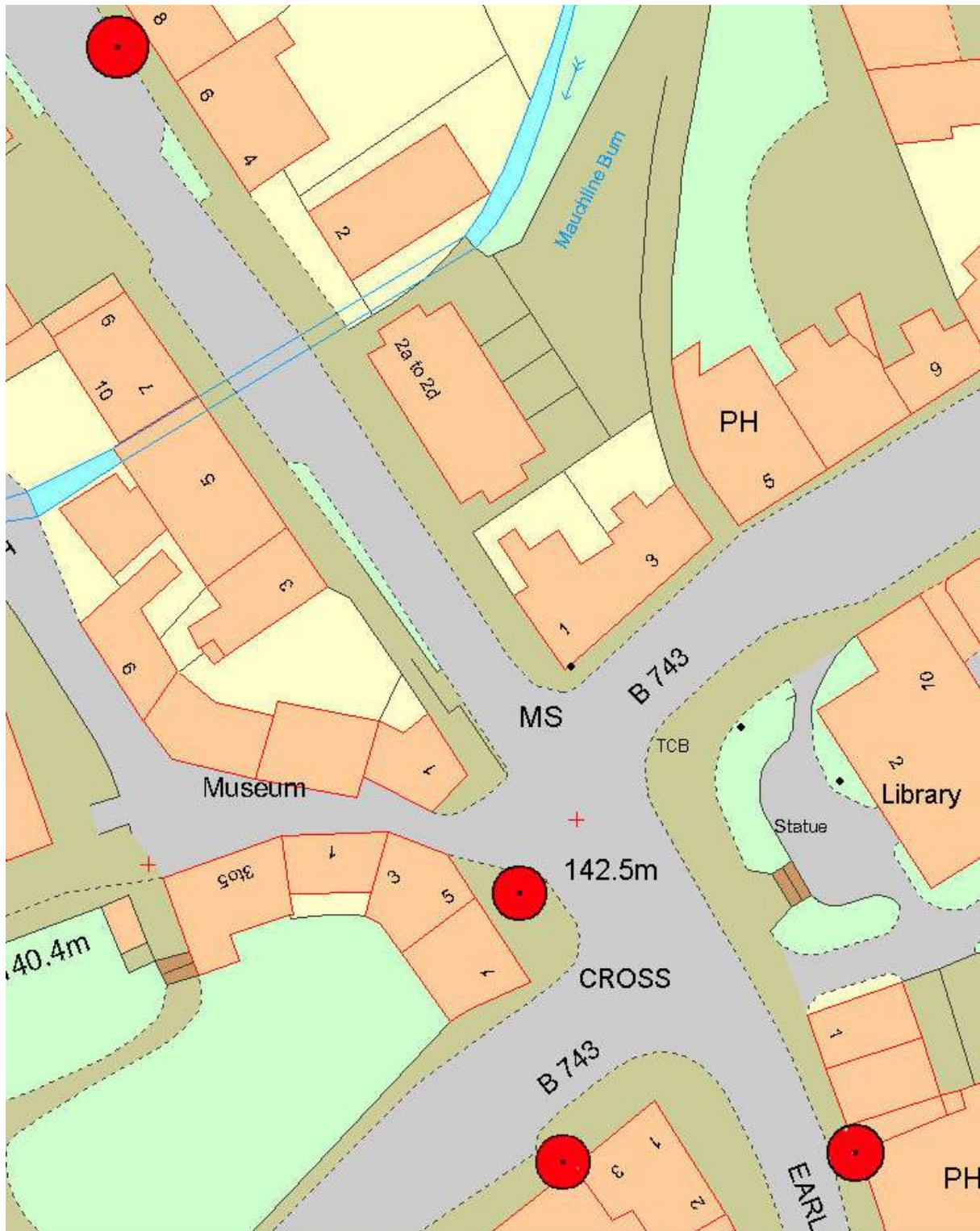
5f: Galston – NO2 Diffusion Tube Locations



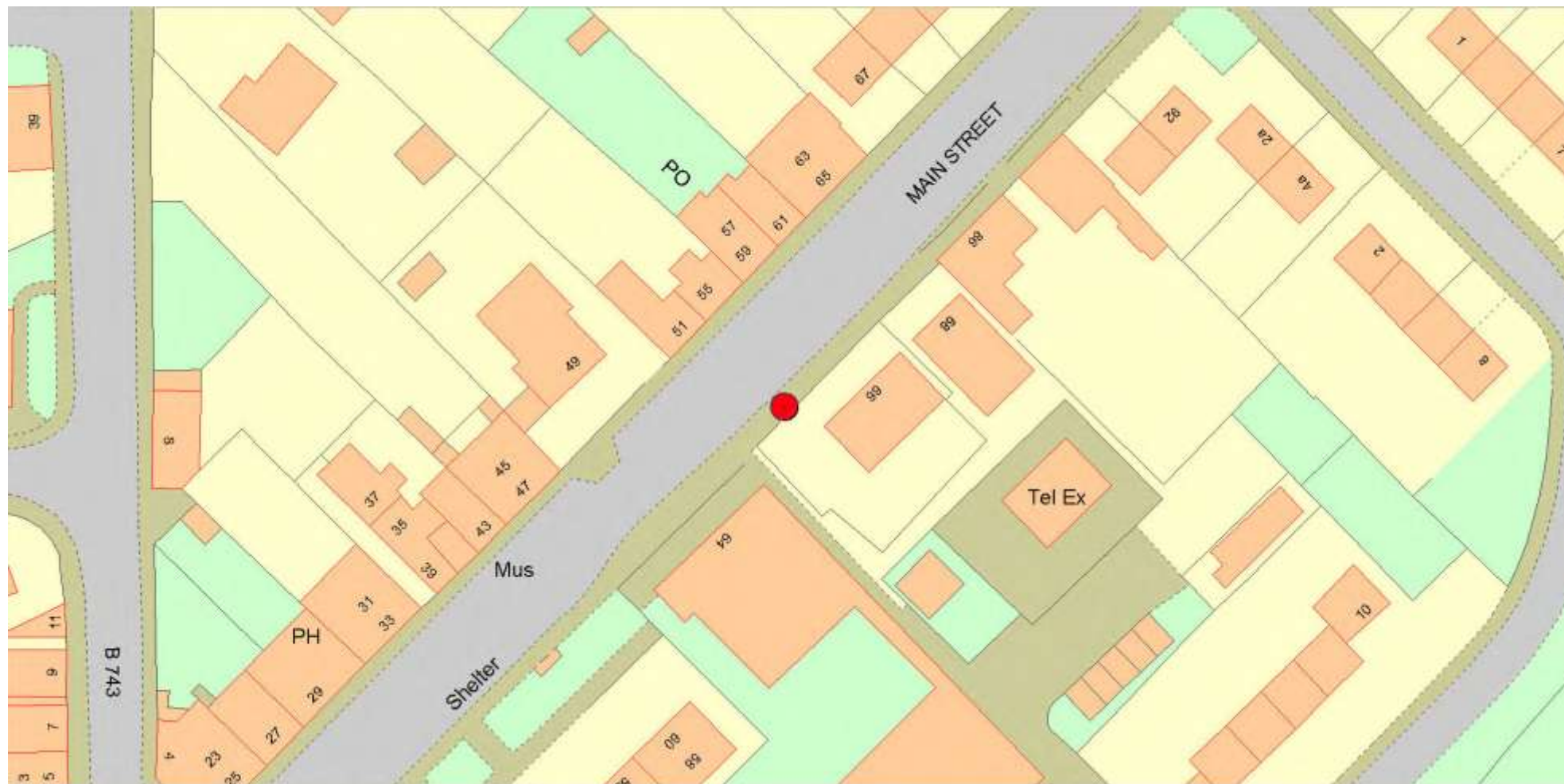
5g: Hurlford – NO2 Diffusion Tube Locations



5h: Mauchline – NO2 Diffusion Tube Locations



5i: Muirkirk – NO2 Diffusion Tube Locations



5j: Auchinleck – NO2 Diffusion Tube Locations



5k: Ochiltree – NO2 Diffusion Tube Locations



5I: Cumnock – NO2 Diffusion Tube Locations

