




2012 Air Quality Updating and Screening Assessment for

ARGYLL and BUTE COUNCIL

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

April 2012

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Executive Summary

The continuing work to assess local air quality within Argyll and Bute Council has established that local air quality is below national emissions prescribed levels and there is no requirement to progress to a Detailed Assessment for any pollutants and that:-

- (a) Diffusion tube results indicate that the 2004 annual mean objective for nitrogen dioxide (NO₂) continues to be met
- (b) Compliance with 2010 fine particulates (PM₁₀) 24 hour mean and annual mean objectives has been achieved
- (c) The results from the two Streetbox monitors in Port Ellen indicate that the 2003 carbon monoxide (CO) objective is being met.

A review of planning applications submitted in 2011 did not reveal any developments with the potential to significantly affect local air quality. There were no new permitted processes opened in 2011 with the capacity to affect local air quality. No new landfill sites or quarries opened with relevant public exposure to potential pollutants.

The Council considers that the monitoring programmes for PM₁₀ at Tarbert and CO at Port Ellen have reached a satisfactory conclusion and this is evidenced by the subsequent monitoring outcomes. As a result, the continuous monitors have been decommissioned.

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1 Introduction

1.1 Description of Local Authority Area

The Argyll and Bute Council area covers approximately 6900 square kilometres and borders upon Stirling, Highland, West Dunbartonshire, and Perth and Kinross Councils. Much of the land area is occupied by mountain and moorland, particularly in the north eastern portion. Off the coastline lie some 550 islands, 25 of which are inhabited. The principal islands are Bute, Islay, Mull, Luing, Jura, Coll, Lismore, Iona, Colonsay and Gigha, and the main settlements are located at Bowmore, Campbeltown, Dunoon, Lochgilphead, Oban, Rothesay, Tobermory, Tarbert, Inveraray and Helensburgh.

The combination of mountain, moorland, coastline, particularly the long indented sea lochs, as well as several large fresh water lochs, give the area a distinctive character. The designations of several National and Regional Scenic Areas and the Loch Lomond and the Trossachs National Park reflect this.

Industries

Industries tend to be related to the natural assets of the area. Forestry and agriculture are prevalent inland, whilst in coastal areas there are a large number of distilleries, fish farms, boat building and fishing businesses. Tourism makes a significant and important contribution to the Argyll and Bute economy.

Those industries that are regulated by the Scottish Environmental Protection Agency (SEPA) because of their potential to cause pollution i.e. permitted processes in terms of the Pollution Prevention & Control (Scotland) Regulations 2000, are mapped in Appendix C.

Population

The average population density of Argyll and Bute is less than 13 people per square kilometre with 75% of the population living in areas classified by the Scottish Government as either 'remote rural' or 'remote small towns' (Table 1.1.)

Table 1.1- 6 Fold Classification of Population Distribution

Scottish Government Urban-Rural classification	Population living within classification	% total population	% of total land area
1: Large urban areas	0.0	0.0	0.0
2: Other urban areas	15,994	17.2	0.1
3: Accessible small towns	0.0	0.0	0.0
4. Remote small towns	27,977	30.0	0.6
5: Accessible rural	6,856	7.6	2.8
6: Remote rural	40,523	45.2	96.5
Total	91,350	100.0	100.0

Over 47,000 people live in the six main population centres of Campbeltown, Dunoon, Helensburgh, Lochgilphead, Oban and Rothesay (Table 1.2). Around 17% of the population live on islands.

Table 1.2 Main Population Centres and their Population and Classification

Town	Population	Scottish Government Urban-Rural classification
Campbeltown	5400	Remote small town
Dunoon	9400	Remote small town
Helensburgh	15900	Other urban area
Lochgilphead/Ardrishaig	3600	Remote rural area
Oban	8050	Remote small town
Rothesay	4850	Remote small town
Total	47200	

Figure 8 in Appendix C indicates the distribution of the population in the major settlements.

Road Network and Transport

The topography of the area, together with the widely dispersed population, means that the majority of transport movements involve long road journeys. Most of the main roads follow the coastline and have to make long detours around the head of extensive sea lochs. Only the towns of Oban and Helensburgh are served by the rail network. Throughout the area heavy reliance is placed upon road transport, both by the resident population and visitors. Summertime traffic flows can be up to 30% higher than those experienced during the winter months.

Traffic monitoring locations and associated annual average daily traffic flows are presented in Figure 12 of Appendix C.

Regular car ferry services connect the larger islands and there are numerous smaller car and passenger ferries serving the smaller islands. In addition, ferry services operate between mainland settlements for commuter, freight and tourist traffic, for example Dunoon to Gourock. The main ferry terminals are located at Dunoon, Oban, Rothesay and Kennacraig.

Airports operating scheduled flights between island and mainland communities are found at Coll, Colonsay, Tiree, Campbeltown, Islay and Oban.

A map showing the location of ferry terminals and airports is included in Figure 9 of Appendix C.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy¹ for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine

whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

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)², the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297)³, and are shown in Table 1.3. 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 1.3 Air Quality Objectives included in Regulations for the purpose of LAQM 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	1-hour mean	31.12.2005

	than 18 times a year		
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2005
Particles (PM₁₀) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	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

Table 1.4 Summary of previous reports

Report	Date	Outcome
First Stage Assessment	1998	Further assessment of NO ₂ & SO ₂ required
Second Stage Assessment (USA)	2003	Detailed assessments required for PM ₁₀ and SO ₂ in relation to the combustion of solid fuel in Tarbert. Further assessment recommended for Port Ellen Maltings.
Detailed Assessment – PM ₁₀ & SO ₂ from solid fuel combustion in Tarbert	2005	Indicated compliance with PM ₁₀ & SO ₂ objectives.
Further Assessment for industrial process at Port Ellen	2005	Recommended monitoring for CO at Port Ellen
Progress Report	2005	Recommended monitoring for CO at Port Ellen
Updating & Screening assessment	2006	Continue monitoring PM ₁₀ related to solid fuel combustion at Tarbert and detailed assessment for CO at Port Ellen Maltings
Progress Report & Detailed Assessment	2007	Detailed assessment reported Port Ellen Maltings should comply with CO objective.
Progress Report	2008	Continued monitoring indicates compliance with CO & PM ₁₀ objectives
Updating & Screening assessment	2009	Continued monitoring indicates compliance with CO & PM ₁₀ objectives
Progress Report	2010	Continued monitoring indicates compliance with CO & PM ₁₀ objectives
Progress Report	2011	Continued monitoring indicates compliance with CO & PM ₁₀ objectives

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Table 2.1 provides details of automatic monitoring sites within Argyll and Bute. All three sites were originally established to support Detailed Assessments undertaken to further consider the pollutants monitored. The conclusion of the Detailed Assessments was that designation of Air Quality Management areas was not necessary although it was decided to maintain the operation of the three automatic monitoring sites. Monitoring of carbon monoxide at Port Ellen ceased in November 2011 and it is proposed to cease monitoring PM₁₀ at Tarbert in June 2012. See Section 2.2.3 for further details. Details of QA/QC procedures are included in Appendix A.

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	E OS GridRef	N OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Relevant Exposure?	Distance to kerb of nearest road	Does this location represent worst-case exposure?
Tarbert	Urban background	186553	668458	PM ₁₀	N	TEOM	Y (23m)	N/A	Y
Port Ellen – Antrim View	Urban background	135975	645880	CO	N	Streetbox	Y (12m)	N/A	Y
Port Ellen – Bay View	Urban background	136077	645870	CO	N	Streetbox	Y (22m)	N/A	Y

2.1.2 Non-Automatic Monitoring Sites

Argyll and Bute Council undertakes monitoring of nitrogen dioxide using diffusion tubes at 10 sites throughout the district, mainly on roads which are perceived to be subject to the highest concentrations due to traffic flow and possibly associated with other features such as street canyons. Details of current sites are provided in Table 2.2 and QA/QC procedures are included in Appendix A.

Table 2.2 Details of Non-Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure?	Distance to kerb of nearest	Does this location represent worst-case exposure?
George Street 1, Oban	Roadside	185921	729942	NO ₂	N	N	Y (5m)	2m	Y
George Street 2, Oban	Roadside	185870	730319	NO ₂	N	N	Y (4m)	9m	Y
George Street 3, Oban	Roadside	185880	730250	NO ₂	N	N	Y (4m)	9m	Y
Argyll Street, Dunoon	Roadside	217324	676984	NO ₂	N	N	Y (6m)	3m	Y
Main St, Campbeltown	Roadside	171918	620330	NO ₂	N	N	Y (1m)	3m	Y
Colchester Sq, Lochgilphead	Roadside	186222	687940	NO ₂	N	N	Y (10m)	2m	N
Inverneil	Rural B'ground	186048	729293	NO ₂	N	N	Y (3m)	N/A	Y
East Princes St,	Roadside	229809	682326	NO ₂	N	N	Y (12m)	2m	N

Argyll and Bute Council

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure?	Distance to kerb of nearest	Does this location represent worst-case exposure?
Helensburgh									
Main Road, Cardross	Roadside	234350	677771	NO ₂	N	N	Y (6m)	2m	Y
Sinclair Street Helensburgh	Roadside	231925	704478	NO ₂	N	N	Y (3m)	2m	Y

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Diffusion Tube Monitoring Data

The annual concentrations from diffusion tube monitoring sites (adjusted for bias) are presented in Table 2.3 and a monthly breakdown of results is included in Appendix B. The annual mean concentrations for NO₂ diffusion tubes (adjusted for bias) for the years 2007 to 2011 are presented in Table 2.4 and are shown in graphical format in Appendix B.

An examination of the results obtained from established diffusion tubes reveals a slight downward trend amongst the sites with higher concentrations and no discernible trend in relation to sites with lower concentrations. All sites are significantly below the prescribed 40µg/m³ prescribed annual mean.

Table 2.3 Results of Nitrogen Dioxide Diffusion Tubes in 2011

Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.94)
							2011 ($\mu\text{g}/\text{m}^3$)
George Street 1, Oban	Roadside	N	N	12 months	N/A	N	23.9
George Street 2, Oban	Roadside	N	N	12 months	N/A	N	24.1
George Street 3, Oban	Roadside	N	N	12 months	N/A	N	21.2
Argyll Street, Dunoon	Roadside	N	N	12 months	N/A	N	15.0
Main St, Campbeltown	Roadside	N	N	12 months	N/A	N	17.8
Colchester Sq, Lochgilphead	Roadside	N	N	12 months	N/A	N	10.1
Inverneil	Rural B'ground	N	N	12 months	N/A	N	2.5
East Princes St, Helensburgh	Roadside	N	N	12 months	N/A	N	15.6
Main Road, Cardross	Roadside	N	N	12 months	N/A	N	14.2
Sinclair Street Helensburgh	Roadside	N	N	12 months	N/A	N	19.2

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes (2007 to 2011)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) $\mu\text{g}/\text{m}^3$				
			2007* (Bias Adjustment Factor = 1.05)	2008* (Bias Adjustment Factor = 0.97)	2009* (Bias Adjustment Factor = 1.23)	2010* (Bias Adjustment Factor = 1.10)	2011 (Bias Adjustment Factor = 0.94)
George Street 1, Oban	Roadside	N	28.7	27.6	30.5	25.6	23.9
George Street 2, Oban	Roadside	N	n/a	n/a	24.9	24.7	24.1
George Street 3, Oban	Roadside	N	n/a	n/a	27.6	28.0	21.2
Argyll Street, Dunoon	Roadside	N	16.6	17.0	18.5	17.9	15.0
Main St, Campbeltown	Roadside	N	17.9	21.9	25.5	22.2	17.8
Colchester Sq, Lochgilphead	Roadside	N	11.1	9.5	11.8	9.1	10.1
Inverneil	Rural B'ground	N	3.4	2.3	3.1	3.0	2.5
East Princes St, Helensburgh	Roadside	N	24.6	19.8	24.1	19.8	15.6
Main Road, Cardross	Roadside	N	20.1	18.4	20.6	19.4	14.2
Sinclair Street Helensburgh	Roadside	N	n/a	n/a	n/a	21.7	19.2

2.2.2 PM₁₀

A TEOM PM₁₀ monitor was sited at Tarbert Academy following the conclusion of the 2003 USA⁴ to progress to a Detailed Assessment in respect of domestic solid fuel combustion. The site is surrounded by housing with many properties at the time burning solid fuel as a primary source of heating and was considered to be representative of relevant public exposure. It was reported in the 2007 Progress Report and Detailed Assessment⁵ that there would be compliance with all the 2004 and 2010 objectives. Monitoring of PM₁₀ using the TEOM has continued at the site has confirmed this position and will cease in June 2012

The Volatile Correction Model cannot be used for the TEOM monitoring data as there are no FDMS instruments with sufficient data capture within range. The results presented below have been corrected by using the equation *Reference equivalent PM₁₀ = TEOM x 1.3 – 2.2494* as directed by Defra¹⁰. Annual means and 24 hour exceedances are presented in graphical form in Appendix B and Tables 2.5 and 2.6 below

A distinct downward trend is apparent from an examination of the results of the Tarbert TEOM and is presented in Figure 5. A significant influence may be the conversion of primary heating in houses on the adjacent scheme from coal to electric power.

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

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration µg/m ³				
						2007	2008	2009	2010	2011
Tarbert	Urban background	N	N/A	99	Y	18.0	16.9	14.3	13.8	13.8

Table 2.6 Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 µg/m ³)				
						2007	2008	2009	2010	2011
Tarbert	Urban background	N	N/A	99	Y	2	0	0	0	0

2.2.3 Carbon Monoxide

The 2006 USA⁶ concluded that there was a possibility that the NAQS objective for carbon monoxide (CO) could be exceeded in the vicinity of the Maltings, Port Ellen, Islay. The process at the Maltings prepares malted barley for use at island distilleries. The malted barley is dried in kilns which are fired by medium fuel oil and the primary air to the burners is supplemented by smoke from burning peat with the intention of flavouring the product. Two kilns may be in operation at any one time. Modelling exercises undertaken following the 2003 USA suggested that the carbon monoxide produced by the burning peat could cause an exceedance of the NAQS objective at residential property close to the process.

Two Streetbox monitors were installed in 2006 at Port Ellen to provide continuous indicative monitoring of CO. These were attached to street furniture near to residential properties on Bay View and Antrim View. These sites were identified from the 2005 report⁷ which had indicated maximum concentrations of CO would be found at these locations, a conclusion supported by observation of plume grounding..

Streetbox monitors contain electrochemical cells and are regarded as suitable for use as a screening tool by LAQM.TG(09)⁸. Data is collected by the Streetbox in units of parts per million v/v and the periodic mean logged at 15 minute intervals. The data from both monitors is presented graphically in Figure 7 Appendix B.



Following the 2007 Detailed Assessment⁵ Diageo plc installed cowls on the three kiln discharge stacks in August 2007 which tripled the discharge velocity from 5.5 to 16.5 m/s. The building effects on plume behaviour were still evident and the decision was

made by the plant operator, Diageo plc, to replace the low level chimneys with 39m high stainless steel stacks. Construction was completed in summer 2010 and the dispersion of the plume has been greatly improved, successfully removing the tendency for grounding to regularly occur in the area of Bay View/Antrim View housing schemes. The photograph above shows the new stacks and much improved plume dispersion.

Unfortunately, problems with both Streetbox monitors following installation of the new stacks did not allow an assessment of CO concentrations in the latter half of 2010. However, subsequent measurements have reflected the expected significant reduction and confirm that levels are well below the national 10 mg/m^3 8 hour mean for carbon monoxide. These measurements are presented in graphical format in Appendix B. As a consequence of the successful installation of the new chimneys the monitoring exercise has been concluded and the Streetbox monitors decommissioned.

2.2.4 Summary of Compliance with AQS Objectives

Argyll and Bute Council has examined the results from monitoring NO_2 , PM_{10} and CO in its area. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment for any pollutant.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Argyll and Bute 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.

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

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

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

Argyll and Bute Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.4 Junctions

Argyll and Bute Council confirms that there are no new/newly identified busy junctions/busy roads.

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

Argyll and Bute Council confirms that there are no new roads. There are proposals for a by-pass route around Oban but these are at an early stage and will be considered in due course.

3.6 Roads with Significantly Changed Traffic Flows

Argyll and Bute Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

Argyll and Bute Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Argyll and Bute Council confirms that there are no airports in the Local Authority area with a total equivalent passenger output of 1 million passengers per annum.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

Argyll and Bute 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.

4.2.2 Moving Trains

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

4.3 Ports (Shipping)

Argyll and Bute Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

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

Argyll and Bute Council confirms that there are no new or proposed industrial installations with potential to have a significant effect on air quality for which planning approval has been granted within its area or nearby in a neighbouring authority.

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

Argyll and Bute 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.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

Argyll and Bute 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.

5.2 Major Fuel (Petrol) Storage Depots

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol Stations

Argyll and Bute Council confirms that there are no petrol stations meeting the specified criteria.

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5.4 Poultry Farms

Argyll and Bute Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Since the 2009 USA was prepared planning permission for a number of biomass boilers have been installed in district heating schemes etc. These individual installations are considered below.

Table 6.1 New biomass boilers >100kW

Site	Rating kW	Stack Height	Building Height	Effective Stack Height	Stack Diameter
Atlantis Leisure, Oban	180	11.5	4.3	11.5	0.50
Craignure PCC Unit, Mull	130	9.0	6.0	5.0	0.50
Drymsynie Hotel, Lochgoilhead	320	8.5	4.3	7.0	0.50
Hunter's Quay Holiday Park, Dunoon	320	6.5	4.3	3.7	0.50
Kilmory Council Offices, Lochgilphead	400	9.0	8.0	1.7	0.45

The large boilers listed in table 6.1 were assessed in accordance with the guidance contained in Box 5.8 LAQM.TG(09)⁸. Emission rates were estimated based on the maximum thermal capacity of the boiler and the emission factors for PM₁₀ of 66g/GJ and NO₂ of 150 g/GJ obtained from Table A2.20 in LAQM.TG(09)⁸. Background concentrations for 2010 were obtained from the Air Quality Archive¹¹. A summary of the results from each site are presented in Tables 6.2, 6.3 and 6.4

Table 6.2. Biomass boilers – assessment against 24 hour PM₁₀ objective

Site	Adjusted emission rate g/s	Threshold emission rate g/s	Progress to detailed assessment?
Atlantis Leisure, Oban	0.00050	0.00827	No
Craignure PCC Unit, Mull	0.00036	0.00269	No
Drymsynie Hotel, Lochgoilhead	0.00087	0.00393	No
Hunter's Quay Holiday Park, Dunoon	0.00088	0.00205	No
Kilmory Council Offices, Lochgilphead	0.00108	0.00130	No

Table 6.3. Biomass boilers – assessment against annual mean NO₂ objective

Site	Adjusted emission rate g/s	Threshold emission rate g/s	Progress to detailed assessment?
Atlantis Leisure, Oban	0.00074	0.02830	No
Craignure PCC Unit, Mull	0.00053	0.00796	No
Drymsynie Hotel, Lochgoilhead	0.00127	0.01148	No
Hunter's Quay Holiday Park, Dunoon	0.00131	0.00610	No
Kilmory Council Offices, Lochgilphead	0.00160	0.00378	No

Table 6.4. Biomass boilers – assessment against 24 hour NO₂ objective

Site	Adjusted emission rate g/s	Threshold emission rate g/s	Progress to detailed assessment?
Atlantis Leisure, Oban	0.00559	0.06485	No
Craignure PCC Unit, Mull	0.00404	0.03400	No
Drymsynie Hotel, Lochgoilhead	0.00983	0.05021	No
Hunter's Quay Holiday Park, Dunoon	0.00993	0.02145	No
Kilmory Council Offices, Lochgilphead	0.01232	0.01813	No

Argyll and Bute Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

Argyll and Bute Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.3 Domestic Solid-Fuel Burning

Tarbert was identified in previous reports as having the highest concentration of residential properties burning coal as a primary fuel. A Detailed Assessment¹² was undertaken and reported in 2005. The report was supplemented by further PM₁₀ monitoring and it was concluded that the designation of an Air Quality Management Area was not necessary. PM₁₀ monitoring has continued in Tarbert and the results presented in Paragraph 2.2.2.

Argyll and Bute Council has assessed areas of significant domestic solid fuel use, and concluded that it will not be necessary to proceed to a Detailed Assessment.

7 Fugitive or Uncontrolled Sources

There are numerous haul roads associated with forestry extraction or windfarm construction that are of a temporary nature and are hard surfaced with prepared aggregate but not metalled. These roads are invariably remote, inherently damp and do not threaten to cause breaches of PM₁₀ objectives. The Council does not propose to carry out individual assessments of these sources unless particular circumstances indicate that it would be appropriate.

Argyll and Bute Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area likely to threaten PM₁₀ objectives.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Indicative monitoring of PM₁₀ and carbon monoxide has continued at sites previously the subject of Detailed Assessments. There is no suggestion that any objectives have been exceeded and compliance with the PM₁₀ 2010 annual mean objective has been demonstrated in the Council's densest area of primary coal combustion.

The nitrogen dioxide diffusion tube network has continued in operation and reference to the graphs in Appendix B show that no rising trends have been revealed or that any measured concentrations are close to the annual mean objective.

8.2 Conclusions from Assessment of Sources

The Updating and Screening assessment has not identified any likely exceedences of air quality objectives relating to the sources considered by Technical Guidance LAQM.TG(09) and no areas have been identified to progress to a Detailed Assessment.

8.3 Proposed Actions

The Updating and Screening Assessment has not identified any need to proceed to a Detailed Assessment for any pollutant. The exercise to monitor carbon monoxide at Port Ellen has concluded and the monitors decommissioned. Monitoring of PM₁₀ will continue at Tarbert until June 2012 when the TEOM will be removed. It is proposed to maintain the NO₂ diffusion tube monitoring network at the sites listed in this report although individual sites will be kept under review.

The matters considered by this assessment will be updated and presented in a Progress Report in April 2013.

9 References

- (1) Defra in partnership with the devolved administrations, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, July 2007
- (2) The Air Quality (Scotland) Regulations 2000 No 97
- (3) The Air Quality (Scotland) Amendment Regulations 2002 No 297
- (4) Argyll & Bute Council, Updating & Screening Assessment of Air Quality, May 2003
- (5) Argyll and Bute Council, Local Air Quality Management Progress Report and Detailed Assessment, April 2007
- (6) Argyll and Bute Council, Updating & Screening Assessment of Air Quality, April 2006
- (7) Argyll and Bute Council, Air Quality Study of Port Ellen Maltings, Islay, October 2005
- (8) Defra in partnership with the devolved administrations, Technical Guidance LAQM.TG(09), February 2009
- (9) AEA Energy and Environment on behalf of Scottish Government, Measurement and Modelling of Fine Particulate emissions (PM_{10} and $PM_{2.5}$) from Wood Burning Biomass Boilers, September 2008
- (10) <http://uk-air.defra.gov.uk/news?view=120>
- (11) www.airquality.co.uk/archive/laqm/tools.php
- (12) Argyll and Bute Council, Detailed Assessment of Emissions from Domestic Solid Fuel Burning in Tarbert, November 2005

Appendices

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Nitrogen dioxide diffusion tubes are supplied and analysed by Glasgow Scientific Services. The preparation method used is 20% TEA in water and the 2011 bias adjustment factor of 0.94 was obtained from Spreadsheet Version 03/12. No local co-location studies were available to produce bias adjustment factors.

PM Monitoring Adjustment

The Volatile Correction Model cannot be used for the TEOM monitoring data as there are no FDMS instruments within range. The results for the annual mean have been corrected to gravimetric equivalence by applying the equation Reference equivalent $PM_{10} = TEOM \times 1.3 - 2.2494$ as directed by Defra at:

<http://uk-air.defra.gov.uk/news?view=120>.

QA/QC of automatic monitoring

PM₁₀ Monitoring

Service of TEOM

The TEOM is covered by a service and maintenance contract with Air Monitors Ltd which covers cleaning of components, calibration checks, flow and leak checks, and replacement of consumable items. The performance of the tapered element is checked against a pre-weighed filter & the result checked against the stated calibration constant. Records are kept of any service or maintenance of the analyser.

Data Handling and Validation

Raw data is downloaded at intervals not exceeding 25 days. The raw data file is opened in Excel and is visually examined for suspect data which is deleted from the data set before subsequent calculation of periodic means. Readings that are generally considered invalid are:

- Readings indicated by the analyser as invalid
- Several consecutive zero readings
- Minus concentrations

The raw data file is retained so it can re-examined at a late date if deemed necessary. The validated data file is saved in an Excel spreadsheet where it is used to calculate the 24 hour mean and to allow subsequent presentation in graphical format. All concentrations are multiplied by corrected to gravimetric equivalence by application of the Reference equivalent $PM_{10} = TEOM \times 1.3 - 2.2494$. 24 hour mean values are only calculated where data capture in the 24 hour period exceeds 75%. A separate spreadsheet is produced for each quarter starting January 1st. A fifth spreadsheet is produced as a combination of the four quarterly spreadsheets. This allows for calculation of the annual mean and presentation of graphical results.

Data ratification

Completed quarterly spreadsheets are checked periodically to ensure that the data results are reliable and consistent. This includes:

- Checking the characteristics of the plotted results to highlight any potential baseline drift or departure from the normal range of readings.
- Check any high readings against the results from other sites to help identify any possible PM_{10} episodes.
- Investigate potential local changes in the local environment that may have produced changes in PM_{10} concentrations.

Carbon monoxide monitoring

Service of Streetbox Monitors

Until decommissioning the Streetboxes were covered by a service and maintenance contract with Signal Ambitech Ltd which covered calibration checks and replacement of consumable items. Records were kept of any service or maintenance of the analyser.

Data Handling and Validation

Raw data was downloaded at intervals not exceeding 100 days. The raw data file was opened in Excel and was visually examined for suspect data which was deleted from the data set before subsequent calculation of periodic means. Readings that were generally considered invalid are:

- Readings indicated by the analyser as invalid
- Minus concentrations

The raw data file was retained so it can re-examined at a late date if deemed necessary. The validated data file was saved in an Excel spreadsheet where it was used to convert the raw data to mg/m^3 , to calculate the hourly mean and running 8 hour mean and to allow subsequent presentation in graphical format. 8 hour mean values were only calculated where data capture in the 8 hour period exceeded 75%. An annual spreadsheet was produced for each monitor starting January 1st.

Data ratification

Completed quarterly spreadsheets were checked periodically to ensure that the data results are reliable and consistent. This includes:

- Checking the characteristics of the plotted results to highlight any potential baseline drift or departure from the normal range of readings.

- Investigate any changes in the method of working at the Maltings that may have affected the magnitude of measured CO concentrations.
- Investigate other potential local changes in the local environment that may have produced changes in concentrations.

QA/QC of diffusion tube monitoring

The NO₂ diffusion tubes are supplied and analysed by Glasgow Scientific Services and prepared by using 20% TEA in water. The duration of exposure is normally the 4/5 week period suggested by the calendar provided by Defra. Glasgow Scientific Services have adopted the procedures for preparation and analysis contained in the document "Diffusion Tubes for Ambient NO₂ Monitoring:- Practical Guidance."

Section 3 of this document also provides the basis for the operation of the Council's diffusion tube network.

A bias adjustment factor was applied to the annual mean NO₂ concentrations for 2011. The factor of 0.94 was obtained from Spreadsheet Version Number 03/12 downloaded from <http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html> .

Appendix B: Monitoring Results and Graphs

Table B.1 Monthly Nitrogen Dioxide Diffusion Tube Monitoring Results

2011	George St 1 Oban	George St 2 Oban	George St 3 Oban	Lochgilphead	Campbeltown	Mid Argyll Rural	Dunoon	East Princess St Helensburgh	Sinclair St Helensburgh	Cardross
January	36.2	31.9	32.7	12.6	44.2	2.4	27.4	27.6	28.4	30.7
February	24.9	16.8	19.9	12.9	16.5	8.0	11.5	10.2	20.3	9.4
March	32.8	33.4		11.3	22.8	2.0	20.7	21.3	27.6	21.5
April	24.1	14.2	13.3	7.1	22.2	2.1	18.3	12.1	20.2	13.7
May	23.3	32.0	26.5	8.3	18.5	2.2	13.5	10.9	15.8	14.3
June	27.2	30.7	27.3	7.6	21.2	2.2	15.6	10.8	19.1	13.3
July	26.0	28.1	25.2	7.2	17.5	1.9	15.9	13.8		14.9
August	24.4	25.0	23.6	7.2	17.9	2.0	14.1	12.7	18.6	13.8
September	26.2	28.1	28.8	10.3	20.7	2.4	16.6	23.6		15.6
October	15.1	20.9	16.1	9.5	17.7		10.6	16.1	15.7	9.7
November	24.2	25.9	29.1	18.5	28.8	5.2	21.7	21.5	28.5	22.8
December	21.1	21.7	25.8	14.7	9.1	2.0	17.0	17.6	20.2	15.8

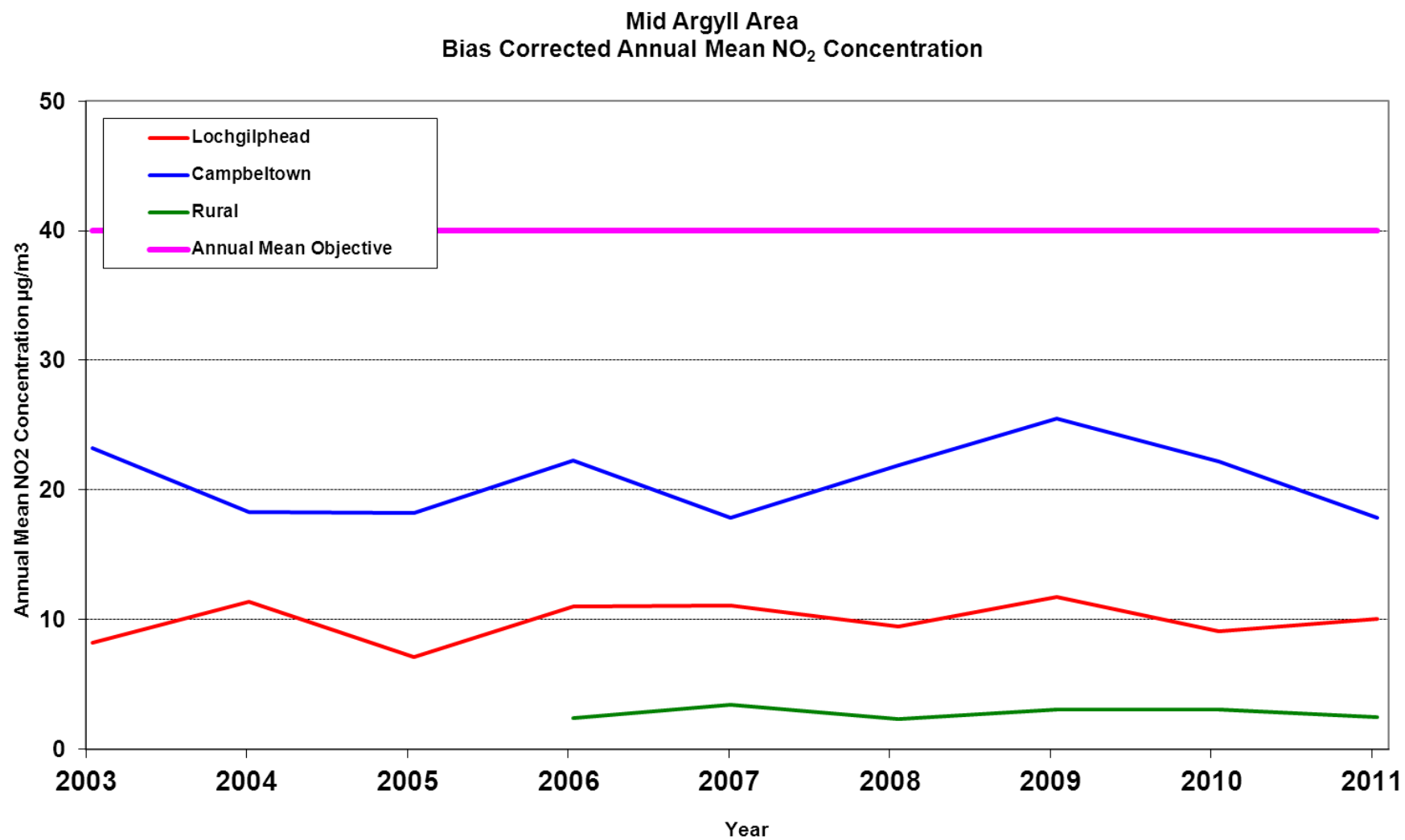
Figure 1 Graph of Annual NO₂ Trends – Mid Argyll Area

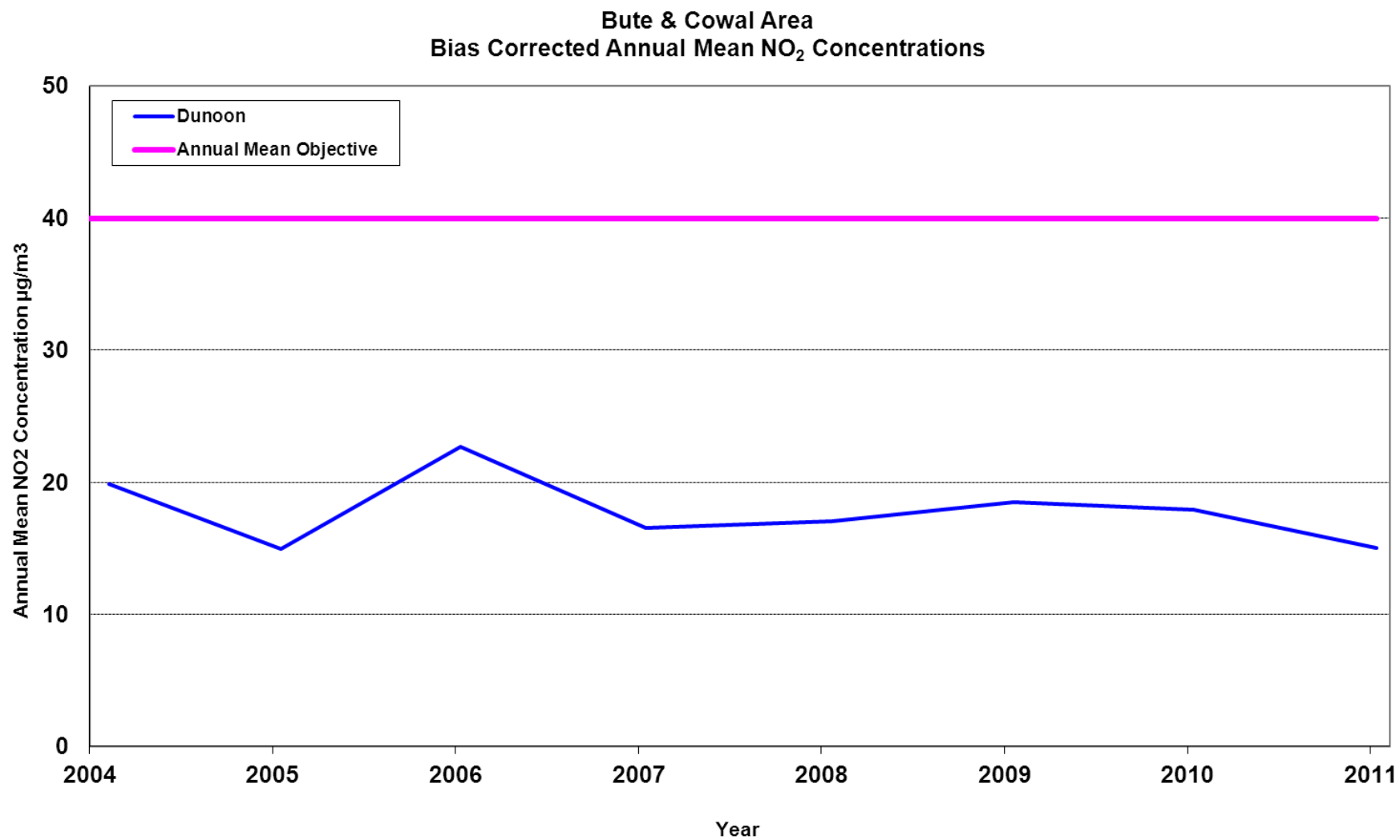
Figure 2 Graph of Annual NO₂ Trends – Bute and Cowal Area

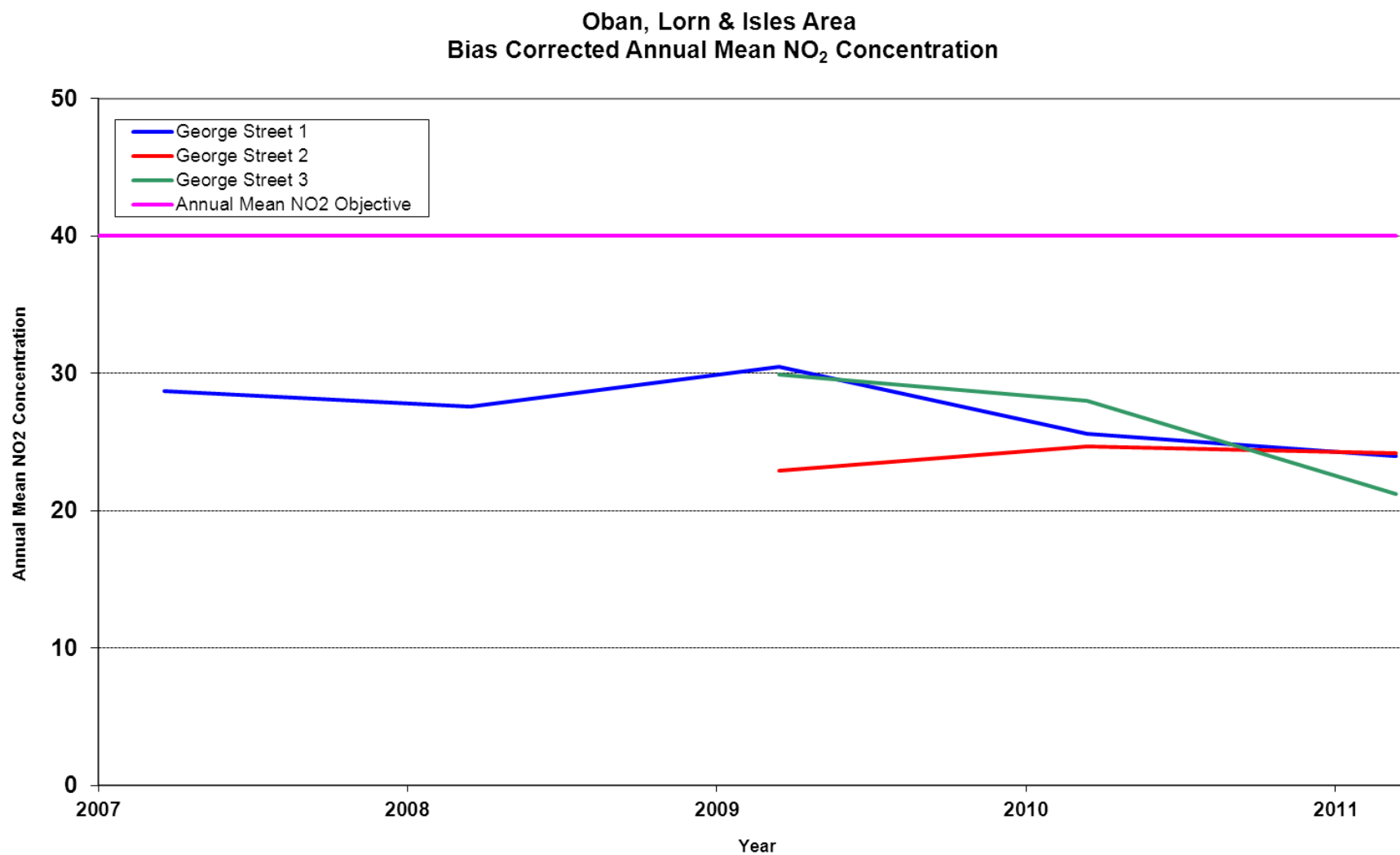
Figure 3 Graph of Annual NO₂ Trends – Oban, Lorn & Isles Area

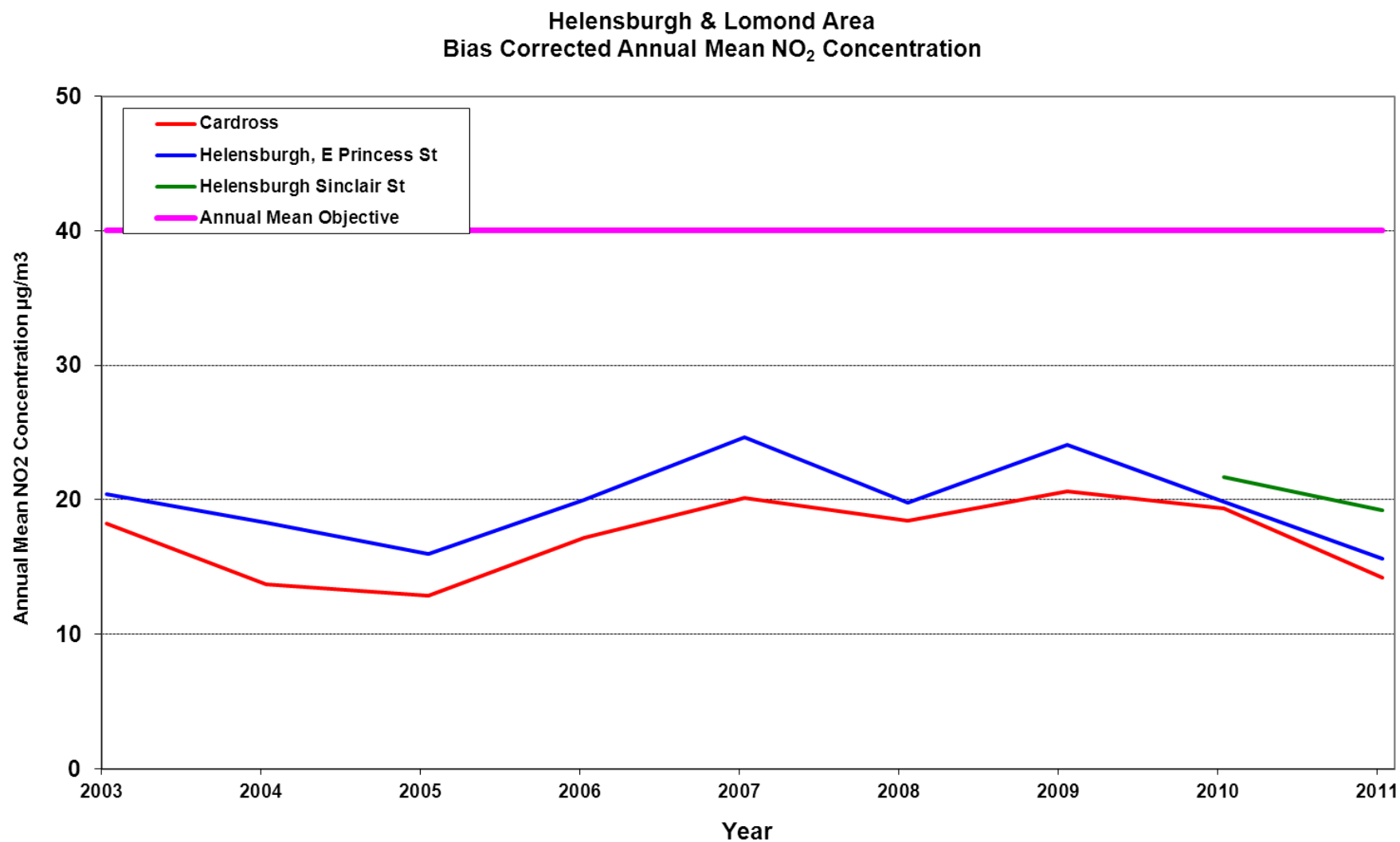
Figure 4 Graph of Annual NO₂ Trends – Helensburgh and Lomond Area

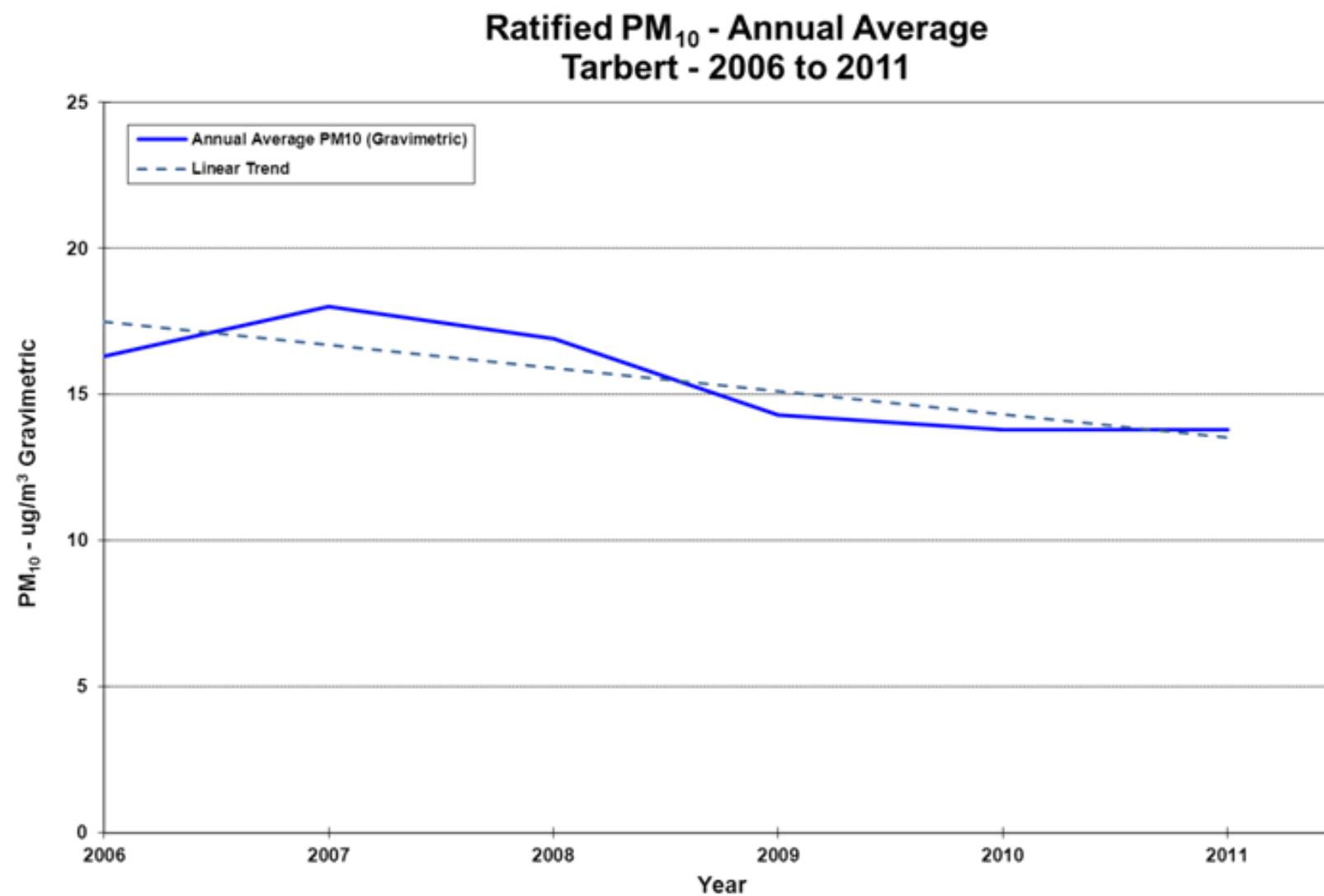
Figure 5 Trends in Annual Mean PM₁₀ Concentrations

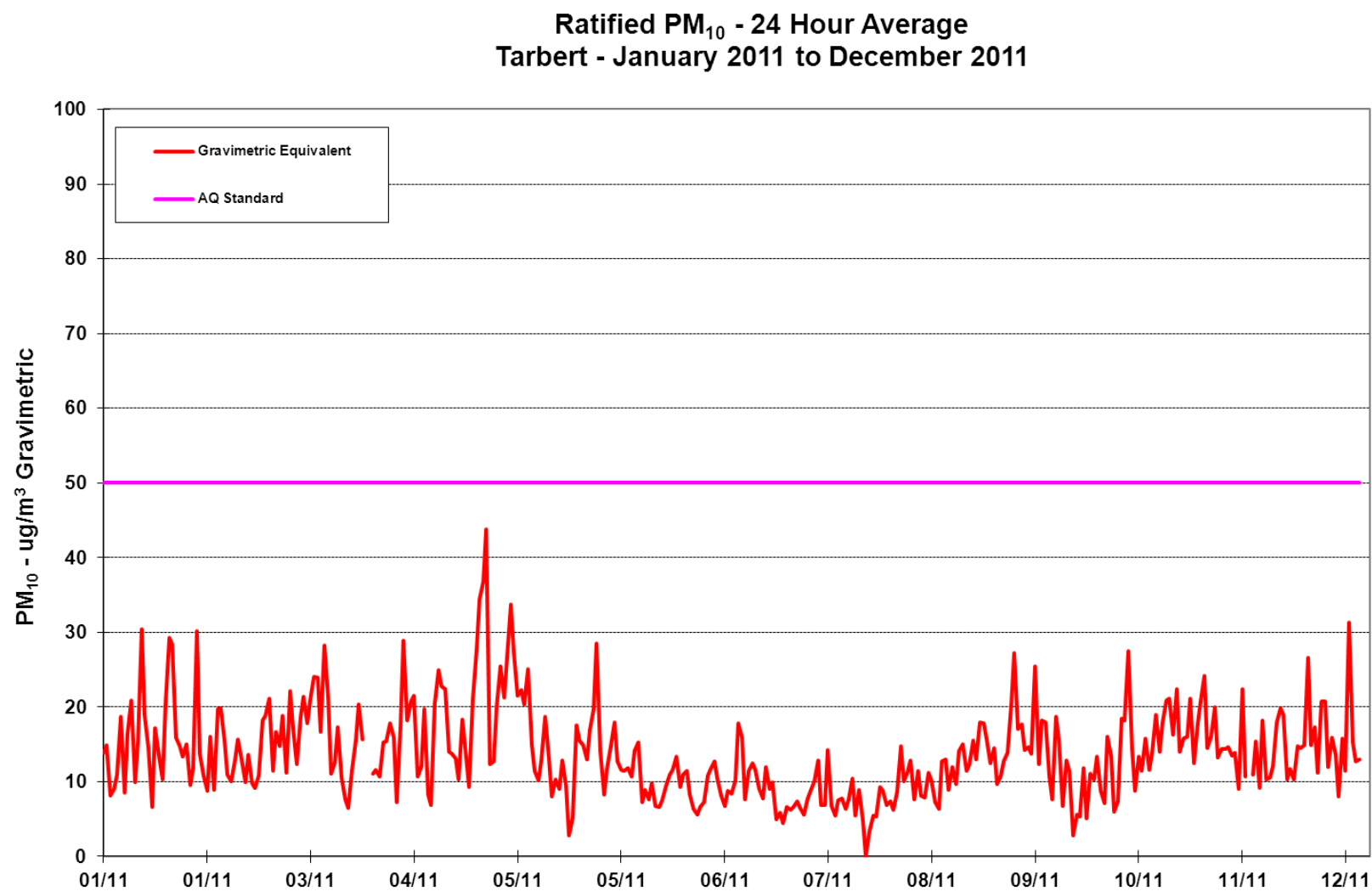
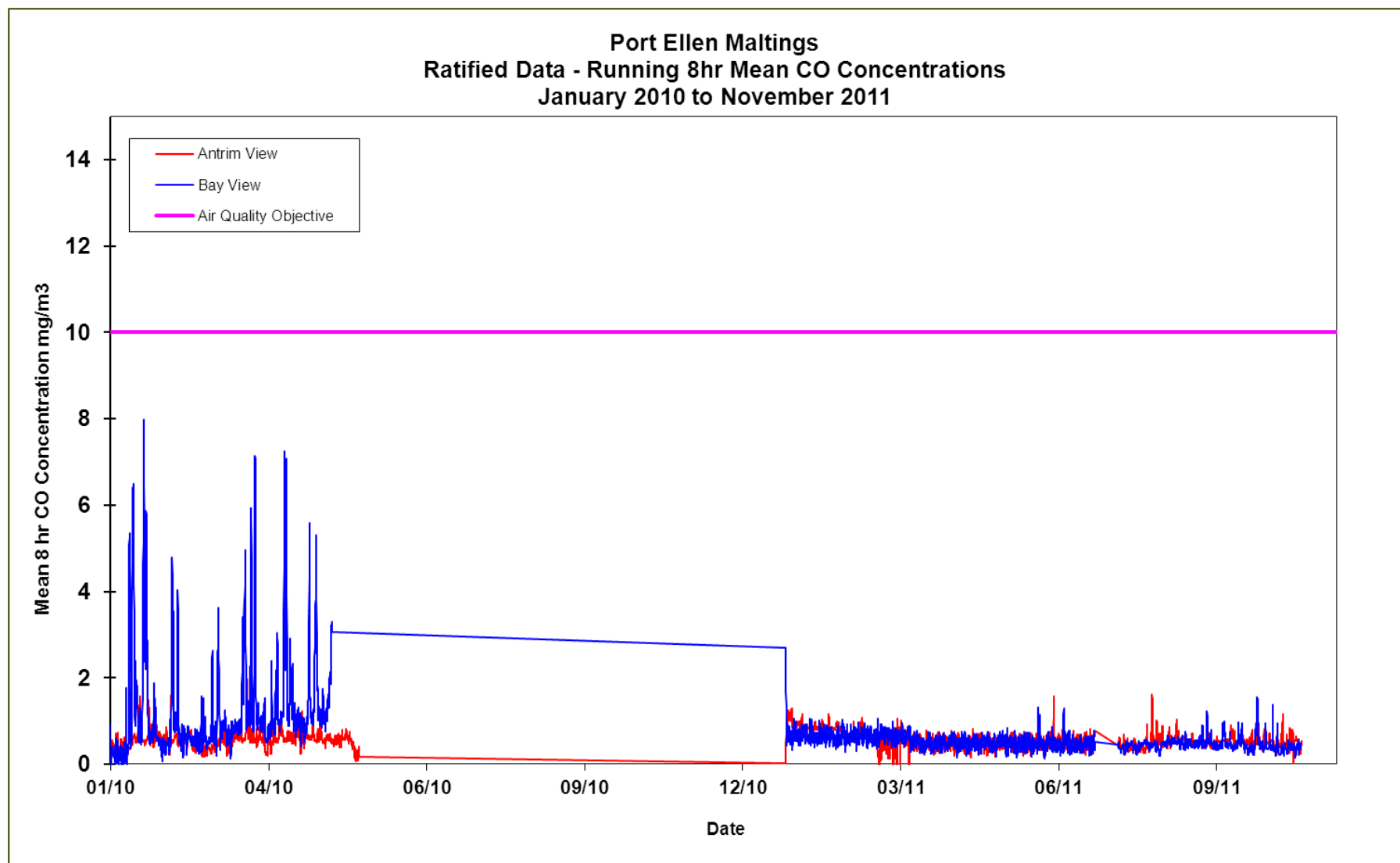
Figure 6 PM₁₀ Monitoring Results

Figure 7 Carbon Monoxide Monitoring Results

Appendix C Maps

Figure 8 Map of Major Settlements

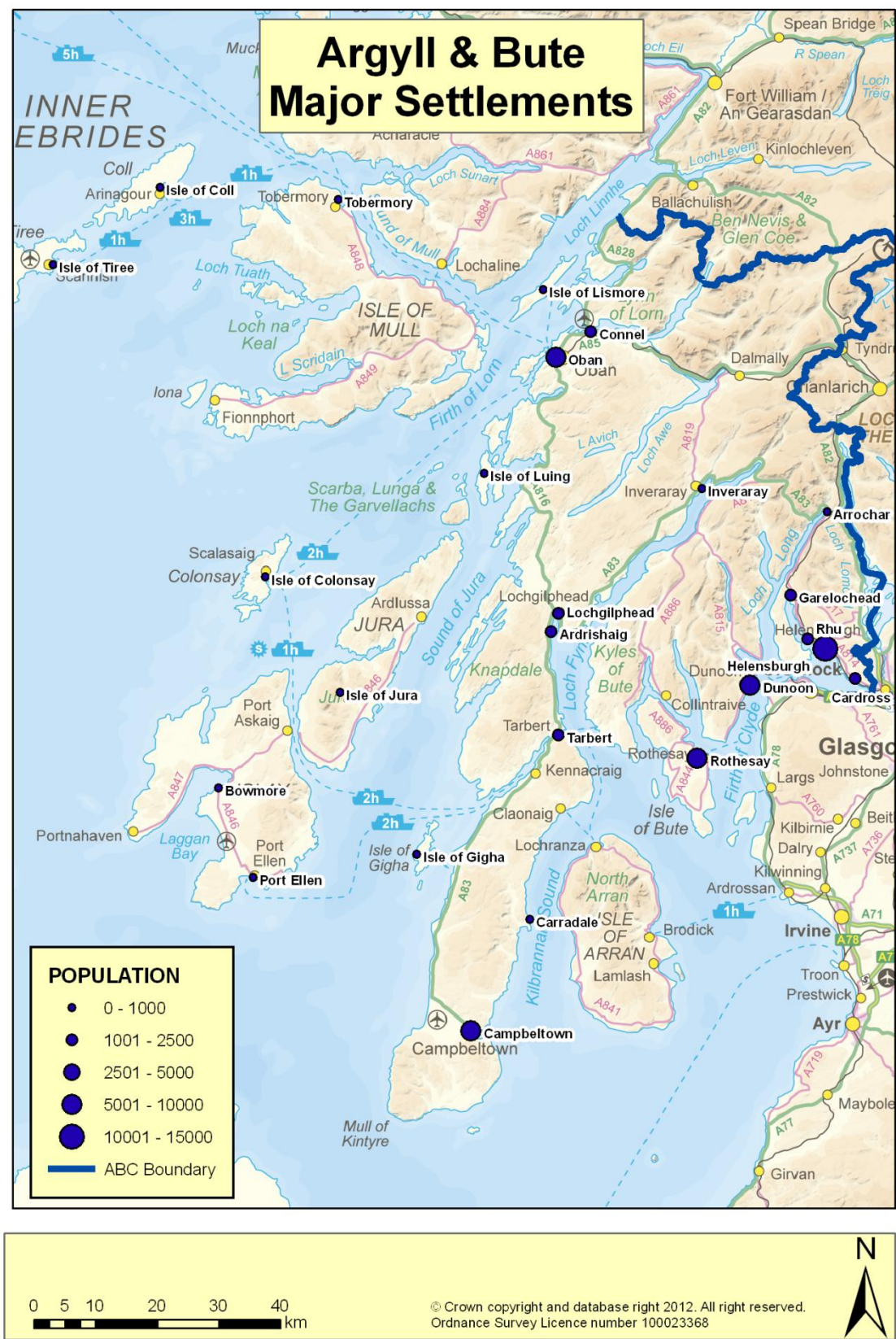


Figure 9 Map of Ports & Airports



Figure 10 Map of Monitoring Locations



Figure 11 Map of Diffusion Tube Site, Oban

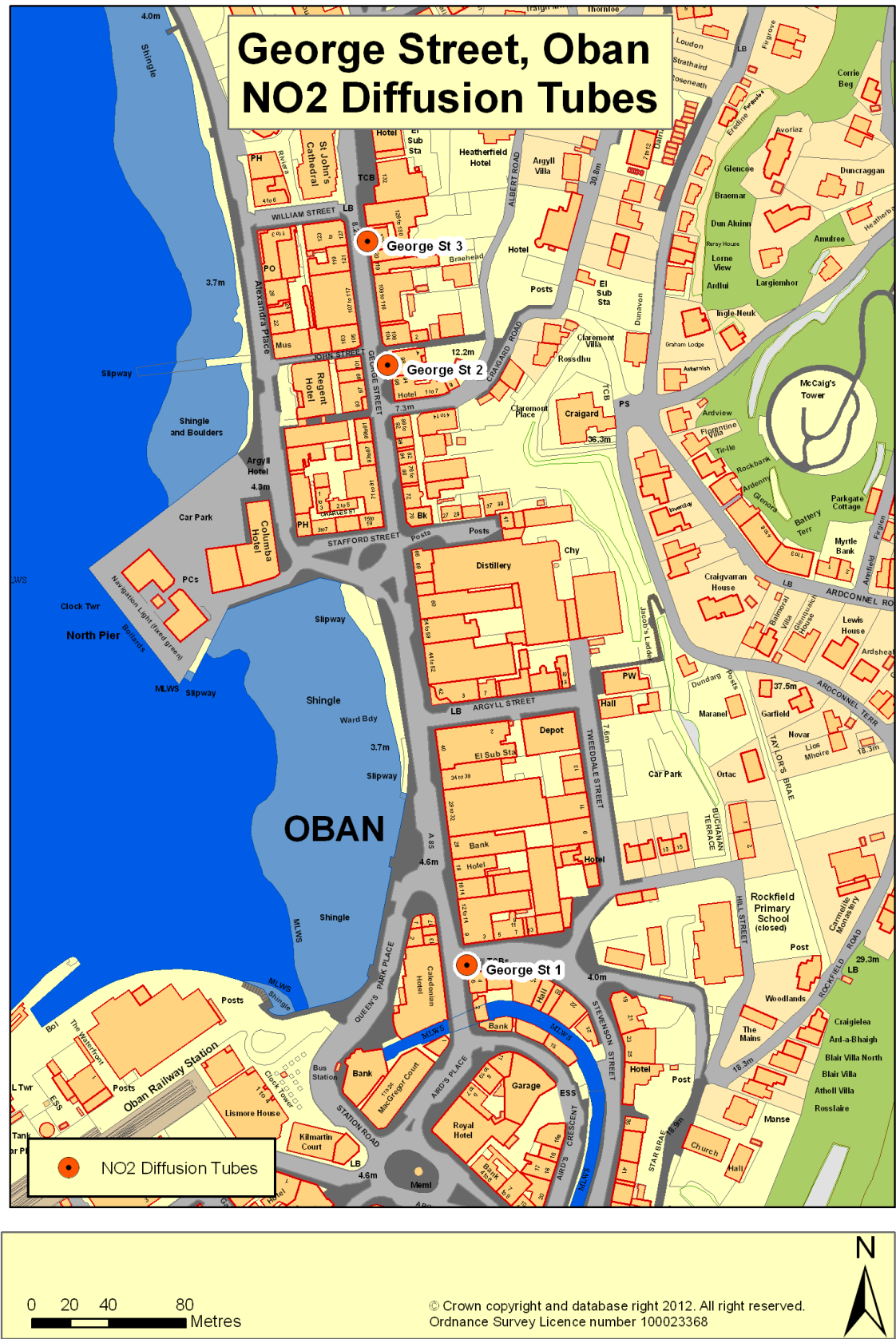


Figure 12 Traffic Flows



Figure 13 PPC Installations

