Environmental Monitoring Report

January – December 2019

Argyll & Bute COUNCIL

Environmental Monitoring in Argyll and Bute.

1. Local Air Quality

The Council has a duty to review and assess local air quality against National Air Quality Standards and report on an annual basis. The reviews have followed guidance and have initially used predictive data provided by national governments and have concluded that air quality in Argyll and Bute is generally good and should comply with the Standards. Monitoring is undertaken both as a check where local circumstances indicate that concentrations of pollutants may be close to the Standards and also to allow long term trends to be determined. The results obtained during 2019 show that no National Air Quality Standards were exceeded. Details of sites, parameters monitored and a summary of the results for each of the four areas are presented below.

1.1 Nitrogen Dioxide

1.1.1 Background

Nitrogen oxides are formed during high temperature combustion processes from the oxidation of nitrogen in the air or fuel. Nitric oxide (NO) and nitrogen dioxide (NO_2) are collectively known as NO_x. The principal source is road traffic which is responsible for approximately half the emissions in the UK. The greatest emission of NO and NO_2 emissions occur in urban areas where traffic is heaviest. Power generation and heating are other important sources.

Nitrogen oxides are released into the atmosphere mainly in the form of NO which is then readily oxidised to NO_2 by reaction with ozone. Elevated levels of NO_x occur in urban environments under stable meteorological conditions when the air mass is unable to effect dispersion.

Nitrogen dioxide has a variety of environmental and health impacts. It is a respiratory irritant, may exacerbate asthma and possibly increase susceptibility to infection. In the presence of sunlight it reacts with hydrocarbons to produce photochemical pollutants such as ozone. In addition nitrogen oxides have a lifetime of approximately 1 day with respect to conversion to nitric acid. This nitric acid is in turn removed from the atmosphere by direct deposition to the ground or transfer to cloud or rainwater thereby contributing to acid deposition.

1.1.2 Nitrogen dioxide monitoring

Argyll and Bute Council operates a network of diffusion tubes at roadside and background locations at 10 sites throughout the District. The tubes are changed monthly and allow a good indication of air quality to be obtained and also to highlight the seasonal trend of pollution emissions. It is important to note that because the operation of the tube depends on the diffusion of air the siting of the tube could have a significant effect on the results. It is sometimes necessary to hide the tubes in confined areas to protect against theft or

vandalism. The results are corrected for bias depending on laboratory and type of tube used in line with factors produced nationally.

2. Radiation

2.1. Background

The world in which we live is a naturally radioactive environment. All matter is made up of 92 elements some of which are naturally radioactive. This natural radioactivity may be found in rocks, in soil, in materials used for buildings construction, in foods and liquids that we eat and drink, and in the human body itself. Cosmic radiation, arising from the sun or other galactic bodies, also contributes to natural radiation exposure.

A number of man's activities involve the use of radioactive materials. The most important of these is the use of radioactive materials for medical applications such as the diagnosis and treatment of cancer patients. Some manufactured goods also contain small radioactive sources, e.g. smoke detectors. Energy generation - for example nuclear energy production, extraction of oil and natural gas, and burning coal - also involves the release of small amounts of radioactivity to the environment. There is also a low level of residual radioactivity in the environment from the nuclear bomb tests of the 1950s and 1960s. A severe nuclear accident, like Chernobyl, can add to this man-made radioactivity in the environment.

HM Naval Base Clyde at Faslane and Coulport is home to the United Kingdom's Nuclear Deterrent. HM Naval Base Clyde provides a base port for four nuclear powered Vanguard Class SSBN submarines and six nuclear powered Swiftsure/Astute Class SSN attack submarines.

2.2. Radiation monitoring

The Council re-established a network of three Argus gamma radiation monitors during 2008 to continuously measure background radiation dose rate. The monitors supplement those operated locally by the Ministry of Defence and RIMNET which is a UK wide Government sponsored network of 92 monitors introduced following the Chernobyl incident in 1988.

Due to the closure of its host building, the Helensburgh Argus monitor was decommissioned in November 2015. However, a network of 5 fixed monitoring points in the area has been set up to enable a baseline survey to be established. Gamma measurements are taken by a portable Mini 6-80 monitor on a monthly basis. Argus monitors record background radiation

every ten minutes and provide an automatic email alert should a pre-set threshold be exceeded.

Useful links

http://www.scottishairquality.co.uk/
http://uk-air.defra.gov.uk/
http://www.environmental-protection.org.uk/air-quality-and-climate/air-quality/
https://www.gov.uk/government/collections/radioactive-incident-monitoring

Other publications

Argyll & Bute Council 2019 Annual Air Quality Progress Report

Both available from the Council's website:
http://www.argyll-bute.gov.uk/planning-and-environment/air-pollution-and-local-air-quality

Further Information

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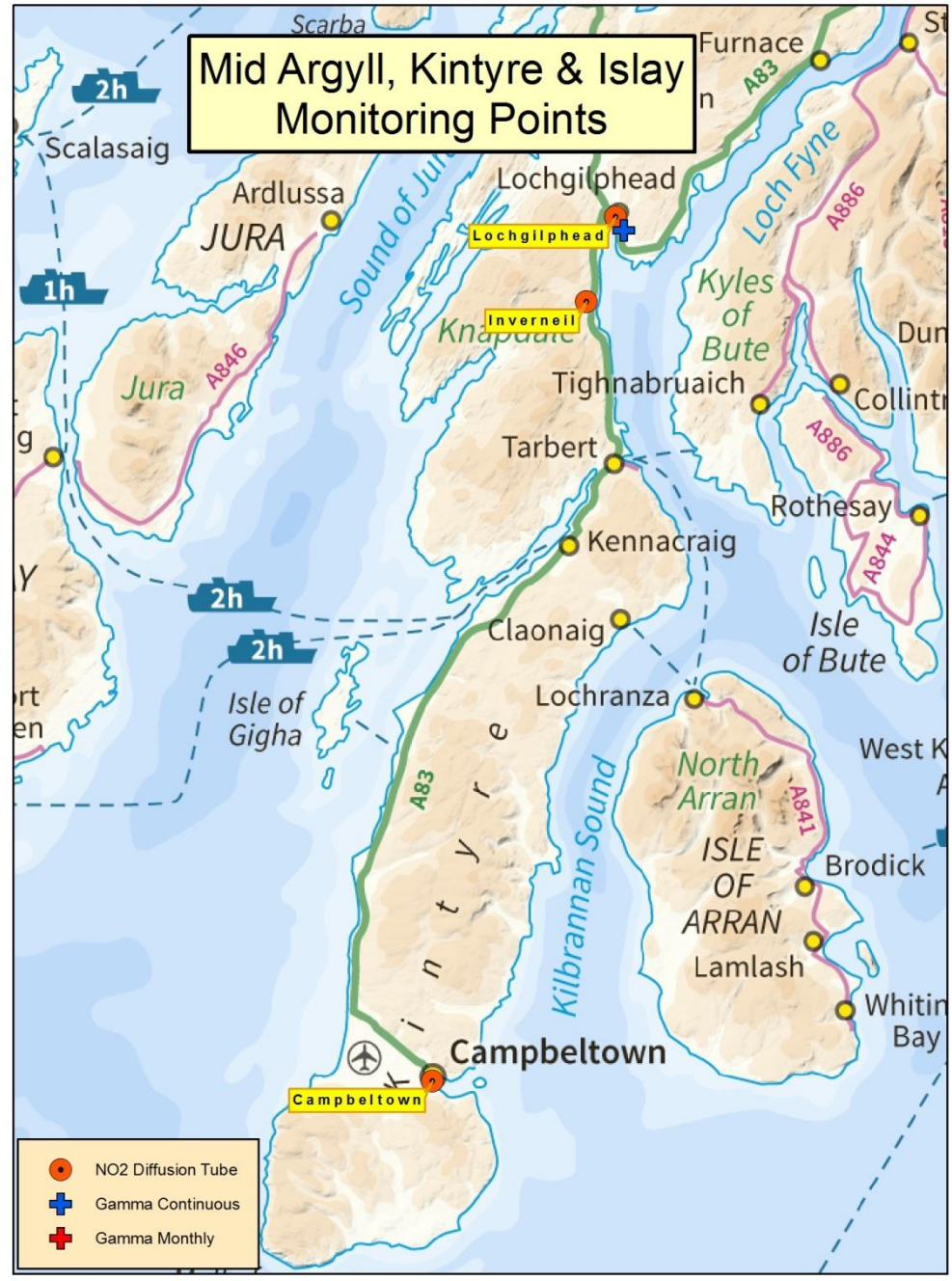
ANNEX 1 – MAPS of MONITORING LOCATIONS




Helensburgh Area
Monitoring Points
Blackhill
Kidston Park
Helensburgh
Cardross
HELENSBURGH
NO2 Diffusion Tube
Gamma Continuous
Gamma Monthly
Argyll & Bute COUNCIL
0 0.5 1 2 km
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N


Dunoon and Rosneath Peninsula
Monitoring Points
Garelochhead
Cove
Dunoon
NO2 Diffusion Tube
Gamma Continuous
Gamma Monthly
DUNOON/
DUN OBHAINN
GOUROCK
COVE
Kilcreggan
Ardentinny
Strone
Kilmun
Sandbank
Blairmore
Coulport
Ardpeaton
Argyll
Bute
COUNCIL
0 0.75 1.5 3
km
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N


Loch Long Area
Monitoring Points
Arrochar
Garelochhead
ARGYLL
FOREST PARK
NO2 Diffusion Tube
Gamma Continuous
Gamma Monthly
Argyll
Bute
COUNCIL
0 0.75 1.5 3
km
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N


Oban Town Centre
Monitoring Points
George St 3
George St 2
George St 1
NO2 Diffusion Tube
Gamma Continuous
Gamma Monthly
Argyll & Bute COUNCIL
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0
0.05
0.1
0.2
km
N

ANNEX 2 - MONITORING SITES

POLLUTANT	SITE	FREQUENCY OF READINGS	REASON
Mid Argyll, Kintyre & Islay			
Nitrogen dioxide	Colchester Sq, Lochgilphead	Monthly Diffusion Tube	Traffic
Nitrogen dioxide	Main St, Campbeltown	Monthly Diffusion Tube	Traffic
Nitrogen dioxide	Inverneil	Monthly Diffusion Tube	Rural background
Gamma radiation	Kilmory, Lochgilphead	Continuous Argus monitor	Background
Helensburgh & Lomond			
Nitrogen Dioxide	East Princes Street, Helensburgh	Monthly Diffusion Tube	Traffic
Nitrogen Dioxide	Sinclair Street Helensburgh	Monthly Diffusion Tube	Traffic
Nitrogen Dioxide	A814 Cardross	Monthly Diffusion Tube	Traffic
Gamma radiation	Arrochar foreshore	Monthly 6-80 instrument	Background/local sources
Gamma radiation	Cove foreshore	Monthly 6-80 instrument	Background/local sources
Gamma radiation	Garelochhead foreshore	Monthly 6-80 instrument	Background/local sources
Gamma radiation	Kidston Park foreshore, Helensburgh	Monthly 6-80 instrument	Background/local sources
Gamma radiation	Blackhill, Helensburgh	Monthly 6-80 instrument	Background/local sources
Bute & Cowal			
Nitrogen Dioxide	Argyll Street, Dunoon	Monthly Diffusion Tube	Traffic
Gamma radiation	Dolphin Hall, Dunoon	Continuous Argus monitor	Background/local sources
Oban, Lorn & the Isles			
Nitrogen Dioxide	George Street, Oban – 3 sites	Monthly Diffusion Tube	Traffic

ANNEX 3 – RESULTS of MONITORING 2018

Nitrogen dioxide

LOCATION	GRID REF	OBJECTIVE ANNUAL MEAN µg/m^3	MEASURED ANNUAL MEAN µg/m^3
Mid Argyll, Kintyre & Islay 2019			
Main Street, Campbeltown	**NR 719 203**	**40**	**13.5**
Colchester Square, Lochgilphead	**NR 862 879**	**40**	**15.6**
Inverneil	**NR 840 813**	**40**	**2.2**
Helensburgh & Lomond 2019			
East Princes Street, Helensburgh	**NS 299 822**	**40**	**11.8**
Sinclair Street Helensburgh	**NN 296 824**	**40**	**15.5**
Main Road, Cardross	**NS 343 777**	**40**	**13.0**
Bute & Cowal 2019			
Argyll Street, Dunoon	**NS 173 770**	**40**	**13.5**
Oban, Lorn & the Isles 2019			
George Street 1, Oban	**NM 859 299**	**40**	**21.4**
George Street 2, Oban	**NM 859 302**	**40**	**20.1**
George Street 3, Oban	**NM 859 303**	**40**	**21.9**

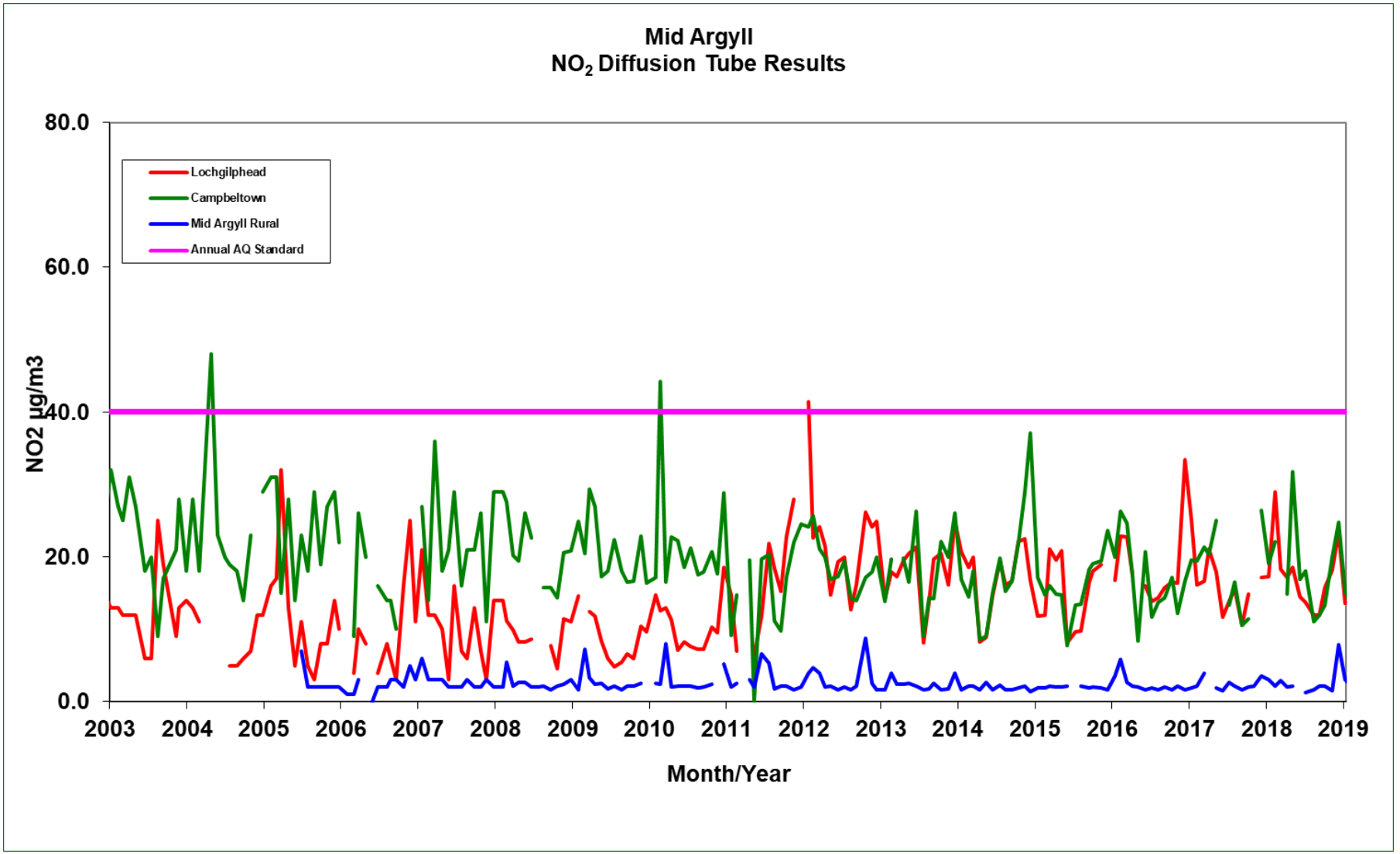
Gamma Radiation

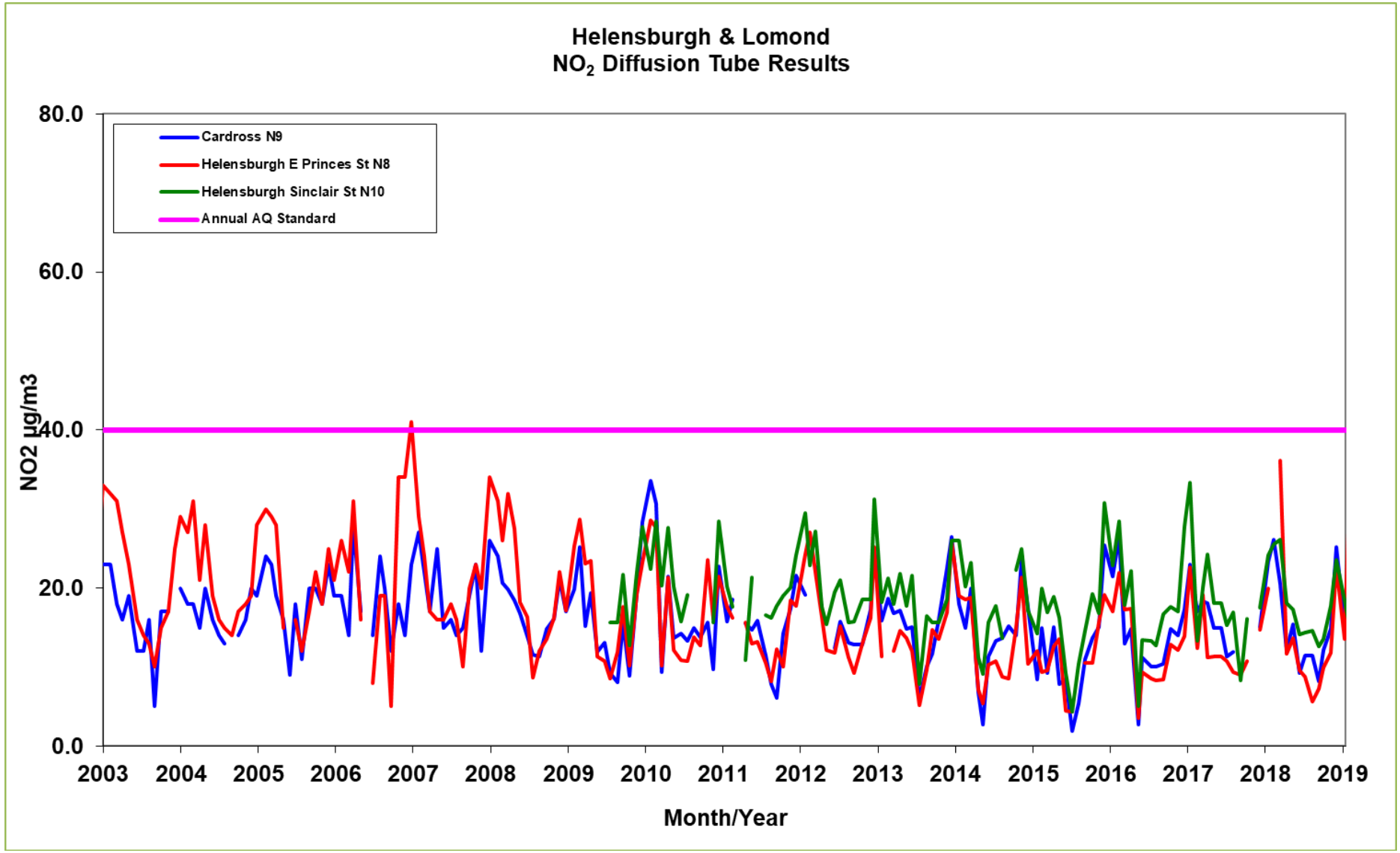
Location	Grid ref	ALERT Threshold nGy/hr	MEAN Dose rate nGy/hr	Maximum Dose rate nGy/hr
Mid Argyll, Kintyre & Islay 2019				
Kilmory, Lochgilphead (Continuous)	NR 869 868			
Kilmory, Lochgilphead (Monthly)	NR 869 866	-	80	86
Helensburgh & Lomond 2019				
Arrochar foreshore (Monthly)	NN 295 048	-	89	103
Cove foreshore (Monthly)	NS 215 835	-	91	104
Garelochhead foreshore (Monthly)	NS 235 909	-	82	95
Kidston Park foreshore, Helensburgh (Monthly)	NS 279 830	-	77	90
Blackhill, Helensburgh (Monthly)	NS 306 837	-	86	104
Bute & Cowal 2019				
Dolphin Hall, Dunoon (Continuous)	NS 174 773			

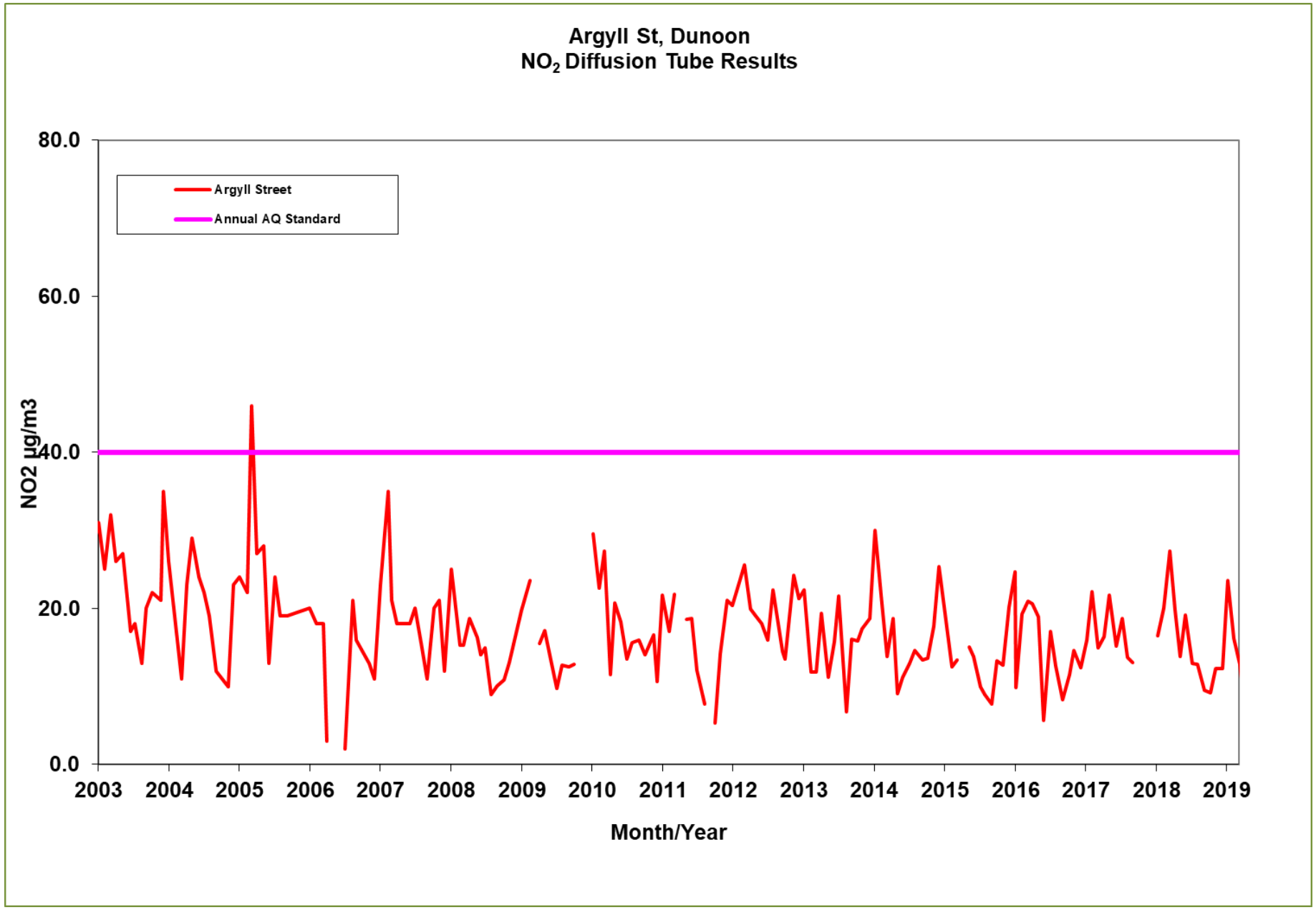
Note: Unfortunately the loss of stored data from the continuous monitors at Lochgilphead and Dunoon means that results cannot be presented for 2019.

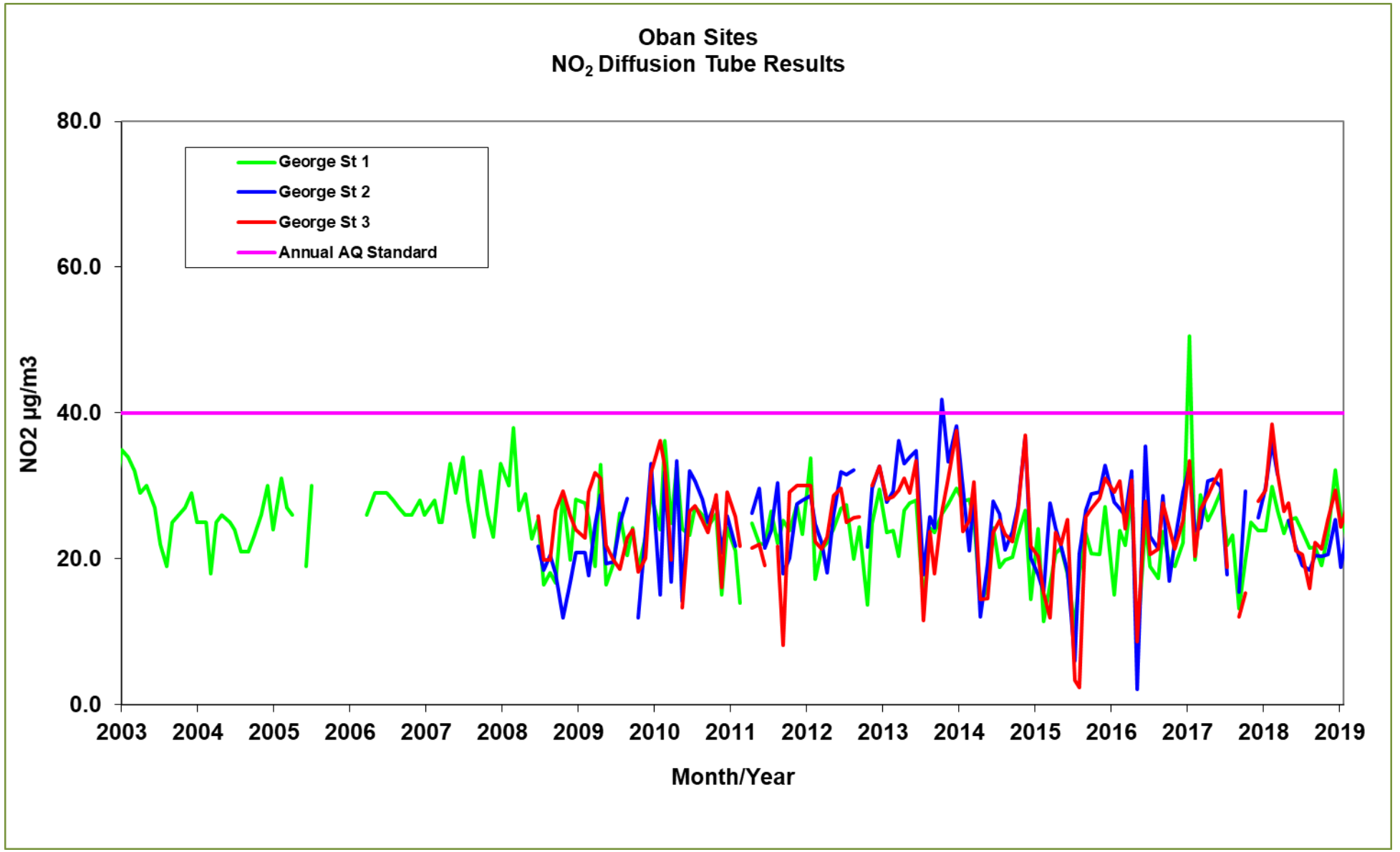
ANNEX 4 GRAPHS of MONITORING RESULTS

Nitrogen Dioxide




Helensburgh & Lomond
NO2 Diffusion Tube Results
Cardross N9
Helensburgh E Princes St N8
Helensburgh Sinclair St N10
Annual AQ Standard
80.0
60.0
40.0
20.0
0.0
NO2 µg/m3
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Month/Year


Argyll St, Dunoon
NO2 Diffusion Tube Results
Argyll Street
Annual AQ Standard
80.0
60.0
40.0
20.0
0.0
NO2 µg/m3
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Month/Year


Oban Sites
NO2 Diffusion Tube Results
George St 1
George St 2
George St 3
Annual AQ Standard
NO2 µg/m3
80.0
60.0
40.0
20.0
0.0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Month/Year

Gamma Radiation