ORKNEY
ISLANDS COUNCIL

2014 Air Quality Progress Report for Orkney Islands Council

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

May 2014

Local Authority Officer	Nick Blowfield
Department	Environmental Health
Address	Council Offices School Place Kirkwall Orkney KW15 1NY
Telephone	01856 874516
e-mail	env-health@orkney.gov.uk
Report Reference number	OIC/006
Date	May 2014

Executive Summary

The 2014 Progress Report has concluded that there is no need to proceed to a detailed assessment for any pollutant.

Recently acquired monitoring data clearly shows that Orkney is currently meeting the 2010 air quality objectives. Pollutant levels have remained at a consistently low level and there is no significant risk of Orkney exceeding the air quality objectives.

There continues to be a lack of large scale industrial processes, and as things stand it is highly unlikely that there is a risk of exceeding the air quality objectives.

The current monitoring regime for NO_2 within Orkney will continue to ensure that the high standard of air quality in the county continues. Benzene monitoring was resumed as indicated in the last report with results below the limit of detection.

There have been no significant changes that would indicate an increase in the risk of SO_2, to further substantiate this, monitoring commenced in January 2014. Full details of the monitoring will be discussed in next year's report however preliminary results show ambient levels of SO_2 to be negligible and way below the air quality objectives.

The next course of action for Orkney Island Council will be to submit an Update Screening and Assessment in 2015.

Table of Contents

List of Tables

List of Figures

Appendices

Appendix 1 QA/QC Data and 2013 Monitoring Results

1 Introduction

1.1 Description of Local Authority Area

The Orkney Islands are situated situated some seven miles north of the Scottish mainland and covering an area of just under 100,000 hectares. (59°N, 3°W). There are approximately 70 islands and 20 skerries in the island group. The county has a resident population of 21,349 in 2011 of which 17,162 inhabit the main island (called The Mainland). Orkney's two main towns of Kirkwall (population approximately 7,500) and Stromness (population approximately 2,200) are situated on The Mainland.
The main traffic routes in Orkney are a series of 'A' roads that link the west mainland to the east, through Kirkwall and southwards across the barriers to South Ronaldsay. The highest volume of traffic can be found within Kirkwall, with very light levels of traffic found across the mainland and the Outer Isles. The main airport is situated at Grimsetter, 2 miles outside Kirkwall. There are smaller airports across the Outer Isles providing links to Orkney mainland. Large ferry services link Orkney to the Scottish mainland and Shetland with other numerous smaller inter-island links throughout Orkney. Other shipping activity is present within Orkney water's and tends to be concentrated around Scapa Flow.

The county is overwhelmingly rural in character and there are few significant industrial processes in Orkney. The main industrial process comes from the oil activities at Flotta. There are other smaller industrial processes i.e. fish processing and quarrying.

The last update and screening assessment in 2012 concluded that there were no locations in Orkney where the air quality objectives were likely to be exceeded.

1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy 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.

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 LAQM 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 exceedence 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.

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 micrograms per cubic metre µg/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 LAQM in Scotland

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 µg/m^3	Running annual mean	31.12.2003
	3.25 µg/m^3	Running annual mean	31.12.2011
1,3-Butadiene	2.25 µg/m^3	Running annual mean	31.12.2003
Carbon monoxide	10 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.50 µg/m^3	Annual mean	31.12.2004
	0.25 µg/m^3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2011
	18 µg/m^3	Annual mean	31.12.2011
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/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

The First stage review and assessment for Orkney Islands Council was published in December 1998 and revised in May 1999. This concluded that because Orkney is predominantly a rural island community with few significant industrial processes in the islands, and road traffic volumes are low. The risk of the air quality objectives for benzene, 1,3 butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide and particulates being exceeded are considered negligible. It also concluded that there was not a requirement for a second stage review.

Further Updating and Screening Assessment of local air quality were published in October 2003 and April 2009 respectively. These reports concluded that air quality was currently meeting the national objectives and that it was not necessary to undertake a Detailed Assessment or to declare an Air Quality Management Area (AQMA).

The latest update and screening assessment was published in April 2012 and again it was concluded that there was no need to proceed to a detailed assessment for any pollutant and that the levels of pollutants monitored are way below the NAQS objectives.

The Council has also published Progress Reports on Air Quality, in the intervening years with the most recent in June 2013. These reports have confirmed that a Detailed Assessment for air quality within Orkney is not required for any pollutants, and further concluded that levels of pollutants in Orkney are way below the NAQS objectives and Orkney is not at risk of exceeding these objectives.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are no automatic monitoring sites in Orkney

2.1.2 Non-Automatic Monitoring Sites

New data for 2013 has been gathered by Orkney Islands Council via a network of five diffusion tubes for Nitrogen Dioxide (NO_2) concentrations. The tubes are exposed on a monthly basis throughout the year and sent for analysis at Edinburgh Scientific Services. The locations of the tubes are presented in Figure 2.2.

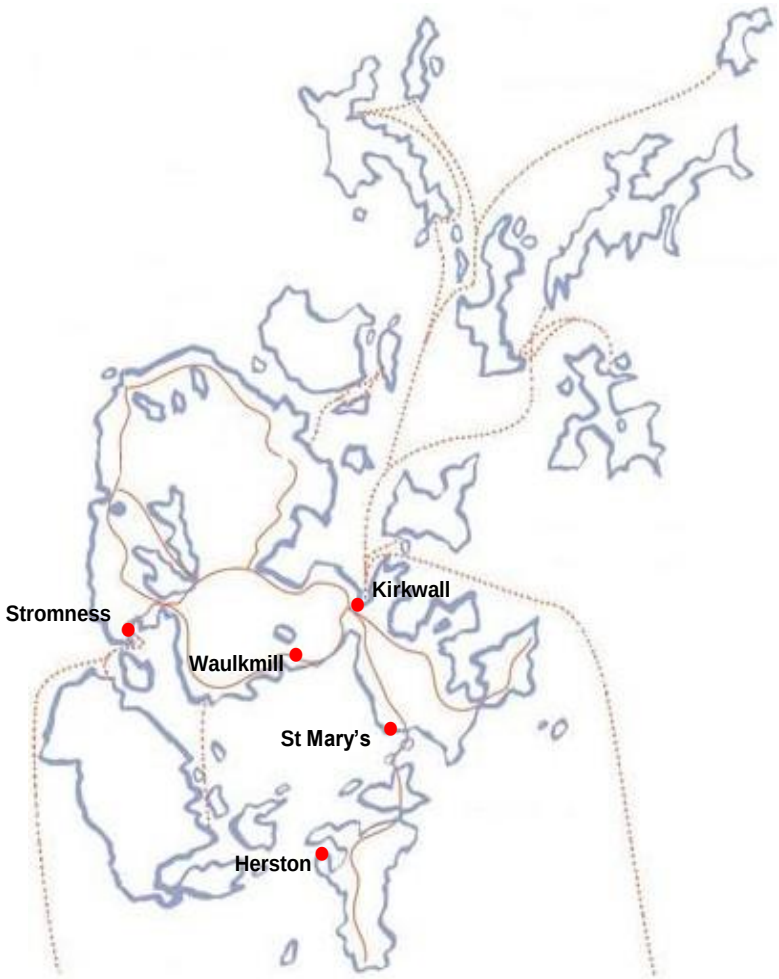


Figure 2.2 Map(s) of Non-Automatic Monitoring Sites

Table 2.2 Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Site Height (m)	Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
KW	Kirkwall	Roadside	344812	1011017	2.8	NO_2	N	N	Y (1m)	1m	Y
SN	Stromness	Roadside	325590	1009553	2.8	NO_2	N	N	Y (1m)	1m	Y
SM	St Mary's	Roadside	347140	1001235	2.3	NO_2 , Benzene	N	N	Y (2m)	1m	Y
WM	Waulkmill	Rural	339525	1006985	1.4	NO_2, Benzene	N	N	N	1.5m	Y
HE	Herston	Rural	341995	991999	2.6	NO_2, Benzene	N	N	Y (10m)	2m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide (NO_2)

As stated previously, there is no automatic monitoring data with regards to Nitrogen dioxide, as it has been deemed unnecessary due to the islands rural landscape and low population. Therefore all monitoring data is obtained through the placement of diffusion tubes. As diffusion tubes cannot detect short term fluctuations in pollutant concentrations, it is not possible to compare the monitoring results against all NAQS objectives for NO_2. As can be seen from the data below, this is justified due to the County's very low NO_2 levels.

Diffusion Tube Monitoring Data

The annual mean concentrations for NO_2 are shown in Table 2.5. The full data set of results for 2013 can be seen in Appendix A

As can be seen from the results in Table 2.6 below, in 2013 there has been no significant change in levels of NO_2, with all monitoring locations showing a reduction in levels since the previous year. Kirkwall experiences the highest levels of NO_2 which is understandable considering it is Orkney's largest town with over 40% of the population and has the highest traffic flows. The levels in Kirkwall are currently at 38% of the objective.

Figure 2.4 below displays the trends of NO_2 concentrations within Orkney over the last 5 years. It is unlikely that levels will ever exceed the NAQS objective of 40 mg/m^3.

Table 2.5 Results of NO_2 Diffusion Tubes 2013

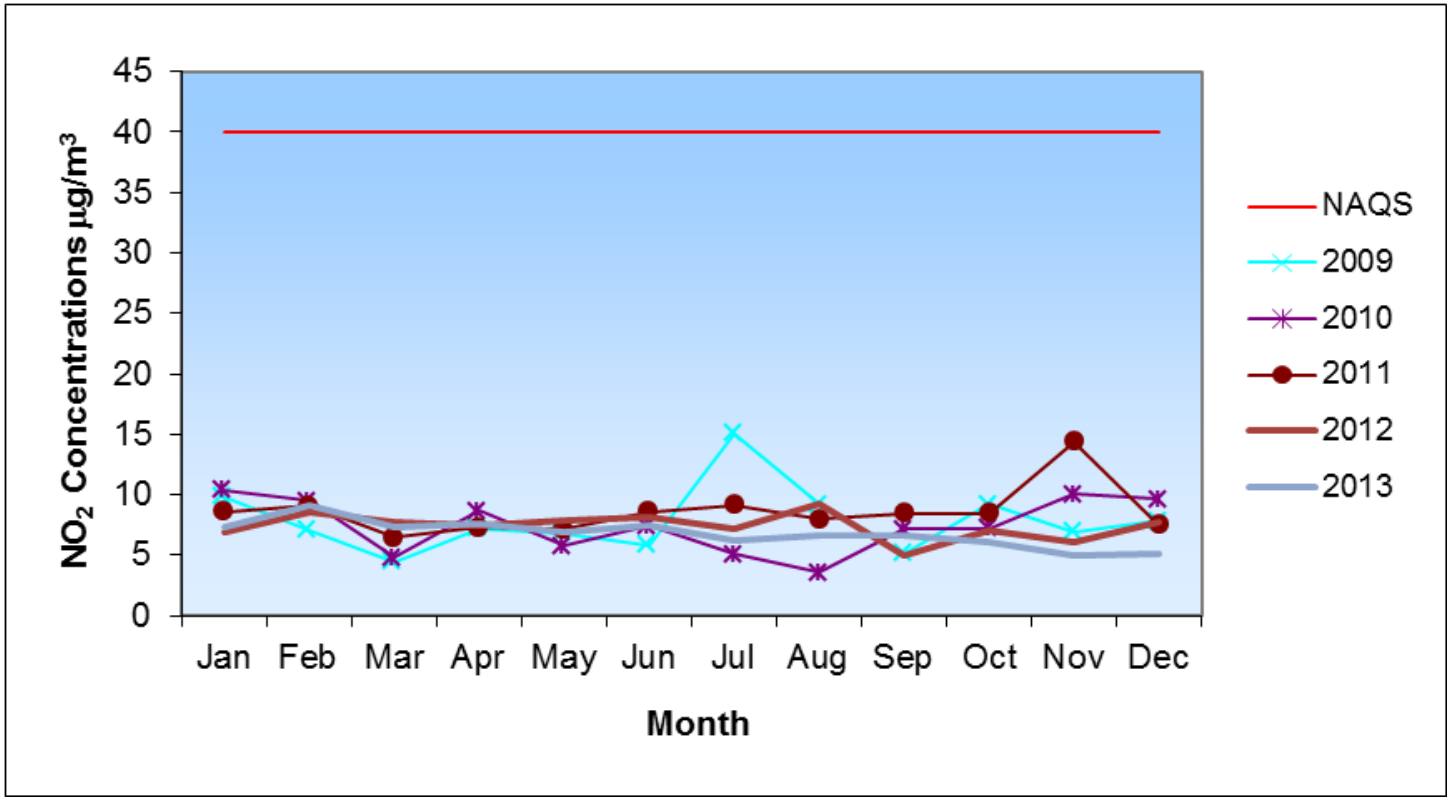
Site ID	Location	Site Type	Within AQMA?	Triplicate or Co-located Tube	Full Calendar Year Data Capture 2013 (Number of Months or %) [a]	2013 Annual Mean Concentration (µg/m^3) - Bias Adjustment factor = 0.79 [b]
KW	Kirkwall	Roadside	N	N	12	15.2
SN	Stromness	Roadside	N	N	12	9.6
SM	St Mary's	Roadside	N	N	12	3.7
WM	Waulkmill	Rural	N	N	10	2.3
HE	Herston	Rural	N	N	12	2.1

Table 2.6 Results of NO_2 Diffusion Tubes (2009 to 2013)

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2009 (Bias Adjustment Factor = 0.93)	2010 (Bias Adjustment Factor = 0.95)	2011 (Bias Adjustment Factor = 1.02)	2012 (Bias Adjustment Factor = 0.84)	2013 (Bias Adjustment Factor = 0.79)
KW	Kirkwall	N	14.0	18.9	18.4	17.3	15.2
SN	Stromness	N	10.3	10.6	12.6	9.9	9.6
SM	St Mary's	N	6.8	5.0	4.6	4.1	3.7
WM	Waulkmill	N	4.8	4.0	3.8	3.3	2.3
HE	Herston	N	2.6	2.8	3.1	2.7	2.1

The QA/QC for the diffusion tubes are detailed in Appendix A

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



2.2.2 Particulate Matter (PM_{10})

Orkney Islands Council does not undertake monitoring for PM_{10}. In previous reports background concentration maps were used and predicted that PM_{10} pollution levels in Orkney will not exceed 15µg/m^3. Current background maps show Orkney to have PM_{10} levels of approximately 9-10 µg/m^3. Taking these facts into consideration it is concluded that there is no expected exceedance of the 2010 objective (18µg/m^3) in Orkney.

2.2.3 Sulphur Dioxide (SO_2)

There is no new monitoring data for SO_2 in Orkney.

The last time data was collected was in 2005 when real time data for SO_2 was collected to measure ambient levels of SO_2 in Kirkwall, with the assistance of SEPA.

The resulting report from SEPA concluded that the 'ambient air levels of SO_2 in Kirkwall never exceeded the limits set out by the air quality objectives'.

Since these findings were published by SEPA and reported on in the Orkney Islands Council 2005 Progress Report and commented on in subsequent reports, there have been no significant changes within Kirkwall Orkney that would influence ambient SO_2 concentrations in the town.

However, as reported in the 2013 Progress Report monitoring of SO_2 in collaboration with SEPA has commenced in order to substantiate that SO_2 levels are still unlikely to exceed the air quality objectives. The monitoring had been due to start in the Autumn of 2013, however delays have meant that monitoring commenced in late January 2014. It is intended for the monitoring to continue for 12 months. Preliminary results have shown mean ambient air levels of SO_2 are 0.5 µg/m^3 with a peak of 6.5 µg/m^3 recorded. A full report on the 12 months of monitoring will be reported on in the Update and Screening Assessment due in 2015.

These preliminary results indicate that there has been no significant change in SO_2 levels within Orkney since the last report in 2005 and are unlikely to ever exceed the air quality objectives set out by NAQS.

2.2.4 Benzene

Monitoring of Benzene during 2013 has shown there have been no significant changes in the levels of benzene recorded. The results cover January to October 2013. There are no results for November to December due to technical issues. Over 80% of the recorded values for the period were below the Limit of Detection (LOD) of 0.2ppb (0.65 µg/m^3). . The full data set of results for 2013 can be seen in Appendix A. Benzene levels in Orkney are well within the NAQS objectives.

It can therefore be concluded that benzene levels within Orkney are not likely to exceed the NAQS air quality objectives.

2.2.5 Other Pollutants Monitored

Orkney Islands Council does not monitor any other pollutants

2.2.6 Summary of Compliance with AQS Objectives

Orkney Islands Council has examined the results from monitoring in the County. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

Orkney Islands Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

Orkney Islands Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Local / Regional Air Quality Strategy

Orkney Islands Council does not have a Local Air Quality Strategy in place. This is because Orkney Islands Council has not had to declare an AQMA and is unlikely to in the future. Results also indicate that levels are considerably lower than the levels set out in the AQS objectives.

5 Planning Applications

There has been no planning applications approved or in the process of being assessed that are deemed to have a possible impact on air quality in Orkney.

6 Air Quality Planning Policies

The Orkney Local Development Plan (OLDP) 2014 was formerly adopted on the 7 April 2014.

This has replaced the Orkney Islands Council Local Plan 2004 which addressed the requirements of air quality through its policies LP/DC1 – Criteria for Development and LP/DC6 – Development Impact Assessments

The new OLDP has not changed how air quality is addressed in Orkney through the planning process with both Policy SD1 - 'Criteria for all new development' and Policy SD2 - 'Transport and Travel' providing scope for air quality impacts to be assessed.

Further policies SD5 – 'Low and Zero Carbon Technologies in Buildings' and SD6 – Renewable and Low Carbon Energy Developments', although they do not directly address air quality, they are aimed at contributing to the reduction of CO_2 emissions and ultimately aiding Scottish Government to achieve their targets.

7 Local Transport Plans and Strategies

Orkney Islands Council most recent local transport strategy was for 2007 - 2010

The Local Transport Strategy is a framework for how the Council intends to deliver on its own and national objectives at a local level and has been under review. The review of this document has been placed on hold, based on developments at a national level, with no time frame for its replacement having been set.

However, Orkney Islands Council is currently producing *'Orkney's Electric Vehicle Infrastructure Strategy'*. This will aim to encourage the mass adoption of electric vehicles in the county. The strategy outlines the key hub areas for infrastructure and it's financing, with the ultimate goal of the strategy to reduce CO_2 emissions.

8 Climate Change Strategies

Orkney Islands Council does not currently have a Climate Change Strategy and at present there is no programme in place to develop one.

9 Conclusions and Proposed Actions

9.1 Conclusions from New Monitoring Data

The recently acquired monitoring data that has been included in this report clearly shows that Orkney is currently meeting the 2010 air quality objectives. Comparing historic data against the current data shows that pollutant levels have remained at a consistently low level and that there is no significant risk of Orkney exceeding the air quality objectives.

It is therefore concluded that there is no need to proceed to a Detailed Assessment for any pollutant.

9.2 Other Conclusions

Orkney is already at the forefront of the renewable energy industry, with local planning policy supporting such development. In addition to this Orkney has seen a recent growth in electric car use, and Orkney Islands Council is responding to this with the development of 'Orkney's Electric Vehicle Infrastructure Strategy' to encourage and increase this already growing usage. Although long term the aim is to contribute to lowering CO_2 levels, an increase in electric vehicles will contribute to the lowering of NO_2 and particulate matter within the local authority area, thus further contributing to achieving compliance with the NAQS objectives.

9.3 Proposed Actions

The Progress Report has concluded that there is no need to proceed to a detailed assessment for any pollutant.

The current monitoring regime for NO_2 within Orkney will continue to ensure that the high standard of air quality in the county continues. Despite being concluded that there are no newly identified local developments which may have an impact on air quality within the Local Authority area. Monitoring locations will be continually

reviewed and if necessary new ones identified to ensure best representation within the county.

As stated in the report the monitoring of SO_2 has not been carried out in the County since 2005. Although there has been no significant changes that would indicate an increase in the risk of SO_2, monitoring commenced in Kirkwall in January 2014. The preliminary results indicate that there is no significant change to levels of SO_2 in Orkney and that levels within the county are meeting the NAQS objectives. The full results of the monitoring are to be reported on in the next report in 2015.

The next course of action for Orkney Island Council will be to submit the 2015 update Screening and Assessment report.

10 References

DEFRA Local Air Quality Management Technical Guidance LAQM.TG (09) 2009

Orkney Islands Council Update and Screening Assessment Report 2012

Orkney Islands Council Progress Report 2013

Orkney Local Development Plan 2014

Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data and 2013 Monitoring Results

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

All diffusion tubes are analysed by Edinburgh Scientific Services.

A Bias Adjustment of 0.79 was used. This was taken from the National Diffusion Tube Bias Adjustment Spreadsheet (version March 2014)

Factor from Local Co-location Studies

There has been no co-location studies conducted in Orkney.

Discussion of Choice of Factor to Use

The national bias adjustment factor was used as there have been no local bias adjustment factors calculated through a co-location study.

PM Monitoring Adjustment

There has been no recent PM monitoring within Orkney

Short-term to Long-term Data adjustment

No adjustment is required for short term monitoring as all monitoring data is conducted on a monthly basis over the entire year.

QA/QC of automatic monitoring

There are no automatic monitoring sights in Orkney

QA/QC of diffusion tube monitoring

Bias and Precision taken from data supplied on R & A website.

Nitrogen Dioxide Results

Concentrations expressed in micrograms per cubic metre (ug/m^3)

2013													
Site / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average (with bias adjustment)
1 Kirkwall	19.8	24.8	23.2	23.6	18.9	18.4	15.6	17.8	18.9	18.6	16.8	13.9	15.2
2 Stromness	18.1	13.8	12.7	14.5	11.1	10.8	11.5	10.1	13.0	10.8	8.5	10.2	9.6
3 Herston	1.9	2.6	4.1	2.5	2.6	3.0	3.0	4.1	2.8	1.8	1.4	2.7	2.1
4 Waulkmill	3.0	<1.0		3.0	4.4	<1.0	3.5	5.2	3.2	3.3	2.0	2.1	2.3
5 St.Mary's	3.9	5.0	6.6	4.4	7.0	5.3	5.7	4.8	3.8	3.7	2.8	3.6	3.7

													Annual Average
Monthly Averages	9.3	11.6	9.3	9.6	8.8	9.4	7.9	8.4	8.3	7.6	6.3	6.5	8.6
Bias Adjustment (0.79 for Edinburgh Scientific Services)	7.4	9.1	7.4	7.6	7.0	7.4	6.2	6.6	6.6	6.0	5.0	5.1	6.8

Benzene Results

Concentrations expressed in micrograms per cubic metre (ppb)

2013												
Site / Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1 Herston	<0.2	3.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		
2 Waulkmill	<0.2	3.8	<0.2	<0.2	<0.2	<0.2	1.1	<0.2	<0.2	<0.2		
3 St.Mary's	0.4	0.3	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		