

# Annual Progress Report (APR)



**ORKNEY**  
ISLANDS COUNCIL

2019 Air Quality Annual Progress Report (APR) for  
Orkney Islands Council

In fulfilment of Part IV of the  
Environment Act 1995

Local Air Quality Management

June 2019

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## **Executive Summary: Air Quality in Our Area**

### **Air Quality in Orkney Islands Council**

The Orkney Islands is an archipelago of over 70 islands and skerries located some seven miles north of the Scottish mainland and covering an area of just under 100,000 hectares. The county has a population in the region of 21,500 with over 80% of the population inhabiting the main island (called The Mainland). Orkney's two main towns of Kirkwall (population approximately 9,000+) 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 islands are linked to mainland Scotland via its airport situated 2 miles outside Kirkwall, and via ferry services across three routes. Other smaller air and ferry links serve the outer isles and link to 'The Mainland'.

Because of the islands predominantly rural nature and the lack of large scale industrial processes the main potential source of pollution that may impact on human health is that produced by motor vehicles with Nitrogen Dioxide the main pollutant of concern. However, traffic flows are low and reflect Orkney's small population. A network of diffusion tubes is maintained to monitor those areas deemed to be subject to higher concentrations. Recently acquired monitoring data clearly shows that Orkney is currently meeting the air quality objectives and that pollutant levels remain at consistently low levels with no significant risk of Orkney exceeding these objectives.

### **Actions to Improve Air Quality**

As indicated above air quality in Orkney is considered very good. The Council has not identified any areas where there is a risk of exceeding the air quality objectives and where consequent action is required to improve air quality.

### **Local Priorities and Challenges**

Although no specific priorities or challenges have been identified, Orkney Islands Council will continue to monitor nitrogen dioxide at existing locations unless there

becomes reason to do otherwise. These monitoring results will be discussed in the 2020 Progress Report.

### **How to Get Involved**

Copies of reports relating to air quality including monitoring results may be found at:

<http://www.orkney.gov.uk/Service-Directory/A/Air-Pollution.htm>

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## 1. Local Air Quality Management

This report provides an overview of air quality in Orkney Islands Council during 2018. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Progress Report (APR) summarises the work being undertaken by Orkney Islands Council to improve air quality and any progress that has been made.

**Table 1.1 – Summary of Air Quality Objectives in Scotland**

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m <sup>3</sup>	Annual mean	31.12.2005
Particulate Matter (PM <sub>10</sub> )	50 µg/m <sup>3</sup> , not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 µg/m <sup>3</sup>	Annual mean	31.12.2010
Particulate Matter (PM <sub>2.5</sub> )	10 µg/m <sup>3</sup>	Annual mean	31.12.2020
Sulphur dioxide (SO <sub>2</sub> )	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	3.25 µg/m <sup>3</sup>	Running annual mean	31.12.2010
1,3 Butadiene	2.25 µg/m <sup>3</sup>	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m <sup>3</sup>	Running 8-Hour mean	31.12.2003
Lead	0.25 µg/m <sup>3</sup>	Annual Mean	31.12.2008

## **2. Actions to Improve Air Quality**

### **2.1 Air Quality Management Areas**

Orkney Islands Council currently does not have any AQMAs, and from this report and previous annual reporting it is unlikely that there will be reason to declare any AQMAs in the future. Furthermore, Orkney Islands Council at present does not have an Air Quality Strategy or similar document to address air quality issues, although this is being addressed.

### **2.2 Cleaner Air for Scotland**

Cleaner Air for Scotland – The Road to a Healthier Future (CAFS) is a national cross-government strategy that sets out how the Scottish Government and its partner organisations propose to reduce air pollution further to protect human health and fulfil Scotland’s legal responsibilities as soon as possible. A series of actions across a range of policy areas are outlined, a summary of which is available at <https://www.gov.scot/Publications/2015/11/5671/17>. Progress by Orkney Islands Council against relevant actions within this strategy is demonstrated below.

#### **2.2.1 Transport – Avoiding travel – T1**

All local authorities should ensure that they have a corporate travel plan (perhaps within a carbon management plan) which is consistent with any local air quality action plan.

Orkney Islands Council does not have an AQAP although it does have a Carbon Management Plan<sup>1</sup> which has put focus on the reduction of carbon emissions from its building stock with little focus on emissions from transportation. In addition to this the Council has a Green Travel Plan<sup>2</sup> with its primary focus on the reducing the reliance on cars for commuting and to adopt greener modes of transport that would improve health and wellbeing.

As has been previously reported Orkney’s Local Transport Strategy<sup>3</sup> was published in 2007 and needs updating. At present no timetable has been set for achieving this. However, Orkney Islands Council’s Transportation section have contributed to and supported a refresh of the Regional Transport Strategy<sup>4</sup> which is currently published in draft form.



Furthermore, Orkney Islands Council are in the process of drafting a new Electric Vehicle (EV) and Ultra Low Emission Vehicle (ULEV) Strategy, which should be published in draft form in 2019. This along with other existing projects such as the Low Carbon Travel and Transport (LCTT) Project in Stromness which will provide a combination of transport decarbonising initiatives and the recently approved Draft Orkney Hydrogen Strategy will help maintain or improve air quality within the county.

**2.2.2 Climate Change – Effective co-ordination of climate change and air quality policies to deliver co-benefits – CC2**

Scottish Government expects any Scottish local authority which has or is currently developing a Sustainable Energy Action Plan to ensure that air quality considerations are covered.

Following the publication of the Orkney Sustainable Energy Strategy 2017-2025 towards the end of 2017, it was reported in the previous annual progress report that the next step will be the development of a sustainable energy action plan. It was also reported that no date had been set for this, and this is still the case. It is still expected that any future sustainable energy action plan will address air quality issues.

### **3. Air Quality Monitoring Data and Comparison with Air Quality Objectives**

#### **3.1 Summary of Monitoring Undertaken**

##### **3.1.1 Automatic Monitoring Sites**

Orkney Islands Council does not undertake automatic (continuous) monitoring for the national air quality objectives.

##### **3.1.2 Non-Automatic Monitoring Sites**

Orkney Islands Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 8 sites during 2018. Table A.1 in Appendix A shows the details of the sites.

A map showing the location of the monitoring sites are provided in Appendix D.

Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix D.

#### **3.2 Individual pollutants**

The air quality monitoring results presented in this section are, where relevant, adjusted for annualisation and bias. Further details on adjustments are provided in Appendix C.

##### **3.2.1 Nitrogen Dioxide (NO<sub>2</sub>)**

Table A.2 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of 40µg/m<sup>3</sup>.

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

As stated previously, there is no automatic monitoring data with regards to Nitrogen dioxide. The installation of an automatic monitoring station has been deemed unnecessary due to the islands rural landscape and low population levels. Therefore, all monitoring data is obtained through the placement of diffusion tubes.

Orkney Islands Council is continuously assessing its diffusion tube network with regards to the appropriateness of the localities and revised if necessary. As can be seen from the results in Table A.2 in Appendix A, in 2018 there has been no significant change in levels of NO<sub>2</sub>. Although the Figures in Appendix A show that the general trend in NO<sub>2</sub> concentrations appears to be on the rise compared to previous years reporting, it is believed that this has been influenced by the low levels of NO<sub>2</sub>

recorded in 2014 and 2015 and that over a longer time period levels of NO<sub>2</sub> continue to remain relatively steady.

However, even though it is unlikely that levels will ever exceed the NAQS objective of 40 mg/m<sup>3</sup>, it is essential that we don't become complacent with the knowledge that air quality in the county is very good and will seek to ensure that measures are taken as and when necessary to maintain NO<sub>2</sub> at these low levels, or better still reduce them.

### **3.2.2 Particulate Matter (PM<sub>10</sub>)**

Orkney Islands Council does not monitor PM<sub>10</sub>. However, previous reports have referred to the background concentration maps<sup>5</sup>. In consideration of this data it has been concluded that there is no expected exceedance of the objective (18µg/m<sup>3</sup>) in Orkney. Orkney Islands Council has no immediate plans to monitor PM<sub>10</sub> in the future.

### **3.2.3 Particulate Matter (PM<sub>2.5</sub>)**

Orkney Islands Council does not monitor PM<sub>2.5</sub> and has no plans to do so in the future

### **3.2.4 Sulphur Dioxide (SO<sub>2</sub>)**

Orkney Islands Council does not monitor SO<sub>2</sub> and has no plans to do so in the future.

### **3.2.5 Carbon Monoxide, Lead and 1,3-Butadiene**

Orkney Islands Council does not monitor Carbon Monoxide, Lead and 1,3-Butadiene and has no plans to do so in the future.

## **4. New Local Developments**

### **4.1 Road Traffic Sources**

Orkney Islands Council confirms that there are no new/newly identified:

- Narrow congested streets with residential properties close to the kerb.
- Busy streets where people may spend one hour or more close to traffic.
- Roads with a high flow of buses and/or HGVs.
- Junctions.
- Roads with significantly changed traffic flows.
- Bus or coach stations.

that require further assessment

### **4.2 Other Transport Sources**

Orkney Islands Council confirms that there are no new/newly identified:

- Airports.
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.
- Locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.
- Ports for shipping.

that require further assessment.

### **4.3 Industrial Sources**

Orkney Islands Council confirms that there are no new/newly identified:

- Industrial installations: new or proposed installations for which an air quality assessment has been carried out.
- Industrial installations: existing installations where emissions have increased substantially or new relevant exposure has been introduced.
- Industrial installations: new or significantly changed installations with no previous air quality assessment.
- Major fuel storage depots storing petrol.
- Petrol stations.
- Poultry farms

that require further assessment

#### **4.4 Commercial and Domestic Sources**

As previously reported due to Orkney's rural nature there are a number of properties in and out with the towns that use domestic solid fuels. However, the number of domestic biomass combustion installations is not known.

It has been concluded that the number of domestic biomass combustion installations is low, likely to be in low density and associated with individual developments, and therefore would not cause significant risk to PM<sub>10</sub> levels in Orkney.

Other domestic solid fuel sources are present on a greater scale; however, this is usually supplementary to rather than the primary source of heating. Considering the size of the towns and villages in Orkney they are not considered a significant risk to the NAQS objectives ever being exceeded, and therefore no further assessment is required

#### **4.5 New Developments with Fugitive or Uncontrolled Sources**

Orkney Islands Council confirms that there are no new potential sources of fugitive or uncontrolled particulate matter that require further assessment.

## **5. Conclusions and Proposed Actions**

### **5.1 Conclusions from New Monitoring Data**

The recently acquired monitoring data included in this report clearly shows that Orkney continues to meet the air quality objectives. Comparing historic data against the current data clearly 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.

### **5.2 Conclusions relating to New Local Developments**

There have been no new developments which would be considered likely to significantly affect air quality.

### **5.3 Proposed Actions**

The current monitoring regime for Nitrogen Dioxide within Orkney will continue to ensure that the high standard of air quality in the county continues.

As reported within the last progress report despite the continued low levels of pollutants and the fact that there is no significant risk of Orkney exceeding the air quality objectives it was the Authority's intention to create an air quality strategy for publication at the end of 2018. Although this timeframe has been missed it is still the intention for an Air Quality Strategy to be created and adopted to ensure that the county continues to enjoy very low levels of air pollution.

The results of the continued monitoring and other work addressing air quality will be contained in the next Annual Progress Report due in 2020.

## Appendix A: Monitoring Results

**Table A.1 – Details of Non-Automatic Monitoring Sites**

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?
KW	Kirkwall	Roadside	344812	1011017	NO <sub>2</sub>	N	0m	1m	N
SN	Stromness	Roadside	325590	1009553	NO <sub>2</sub>	N	1m	1m	N
SM	St Mary's	Roadside	347140	1001235	NO <sub>2</sub>	N	10m	1m	N
WM	Waulkmill	Rural	339525	1006985	NO <sub>2</sub>	N	N/A	1m	N
HE	Herston	Rural	341995	991999	NO <sub>2</sub>	N	10m	1m	N
MH	St Margarets Hope	Roadside	344598	993509	NO <sub>2</sub>	N	0m	3m	N
FT	Finstown	Roadside	335993	1013893	NO <sub>2</sub>	N	0m	1m	N
PD	Papdale	Other	345419	1010847	NO <sub>2</sub>	N	4m	1m	N

(1) 0 if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO<sub>2</sub> Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2018 (%) <sup>(2)</sup>	NO <sub>2</sub> Annual Mean Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>				
					2014	2015	2016	2017	2018
KW	Roadside	Diffusion Tube	100	100	11.6	13.0	15.1	14.3	14.6
SN	Roadside	Diffusion Tube	100	100	7.7	8.2	9.9	8.7	9.8
SM	Roadside	Diffusion Tube	100	100	1.7	3.5	4.3	4.4	4.1
WM	Rural	Diffusion Tube	100	100	2.1	3.1	3.0	2.6	3.3
HE	Rural	Diffusion Tube	100	100	3.0	2.8	2.6	2.6	2.3
MH	Roadside	Diffusion Tube	100	100	-	-	4.1	3.9	4.3
FT	Roadside	Diffusion Tube	100	100	-	-	8.4	7.9	9.9
PD	Other	Diffusion Tube	92	92	-	-	-	-	5.2

Notes: Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

(1) data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG(16) if valid data capture for the full calendar year is less than 75%. See Appendix C for details.



Figure A.1 - Chart showing the trend of annual NO<sub>2</sub> levels in the County's main population centres of Kirkwall and Stromness

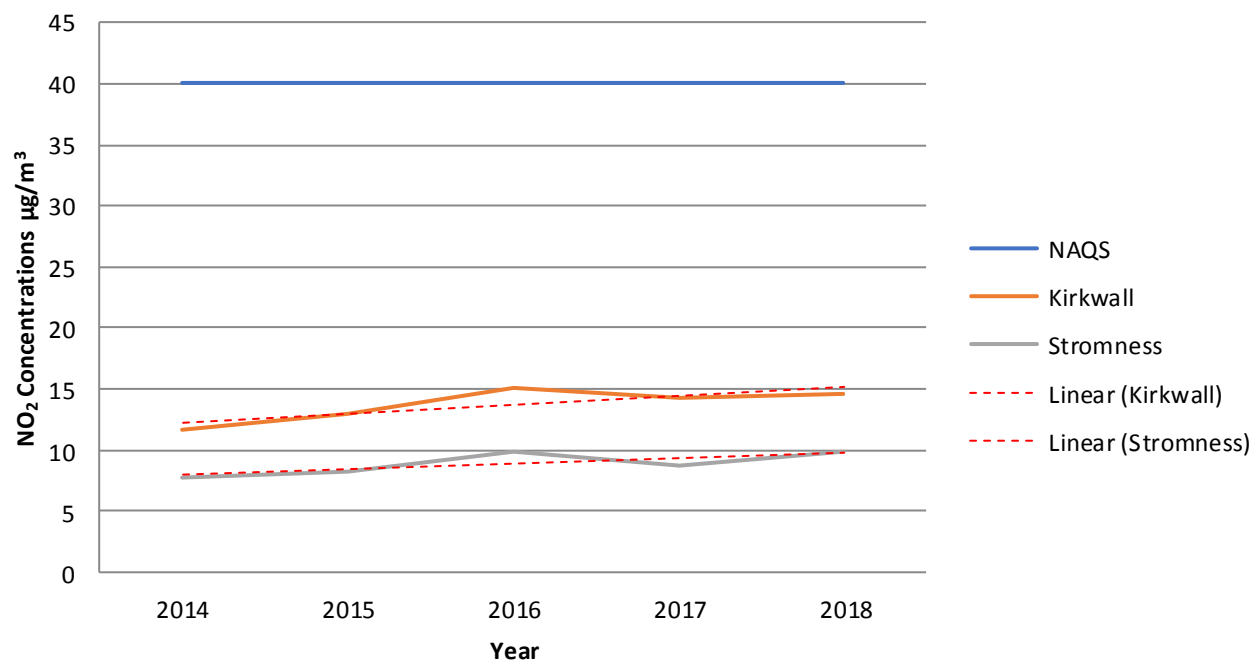
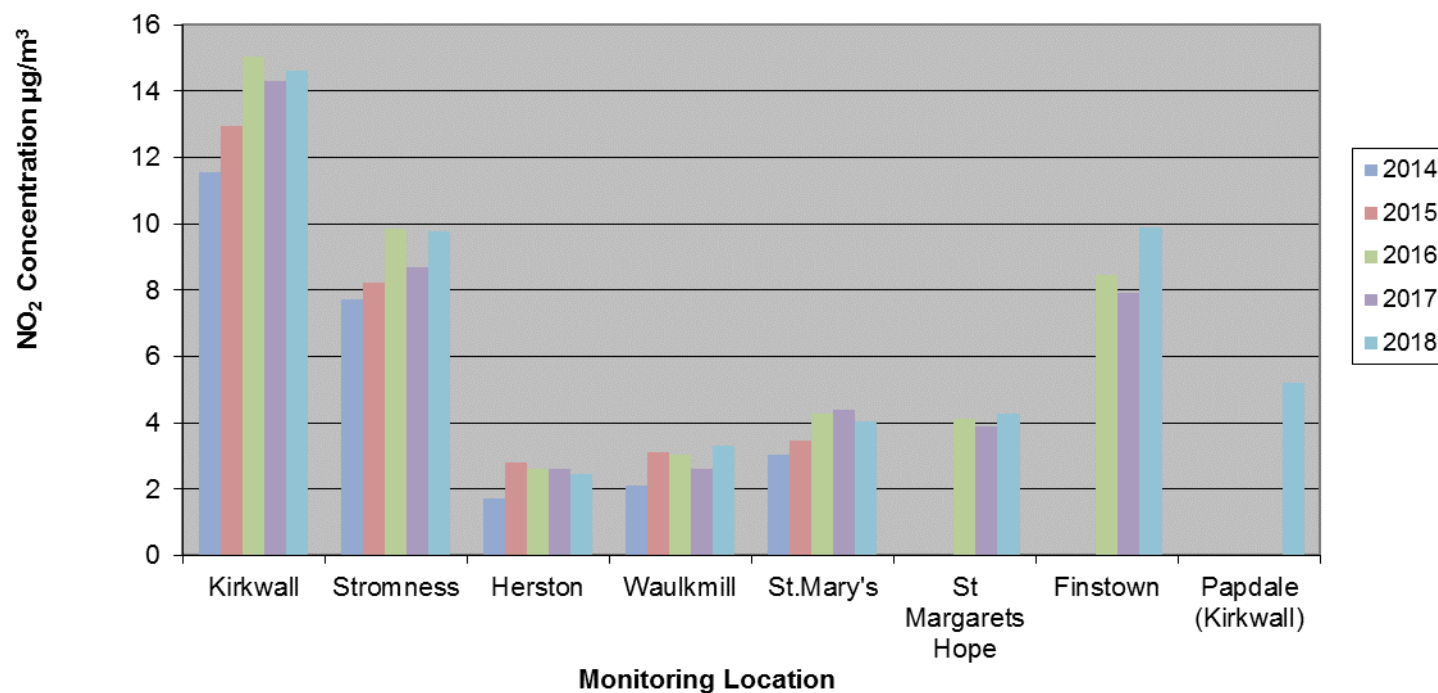


Figure A.2 - Chart Showing Average Annual NO<sub>2</sub> Concentrations for Individual Monitoring Stations



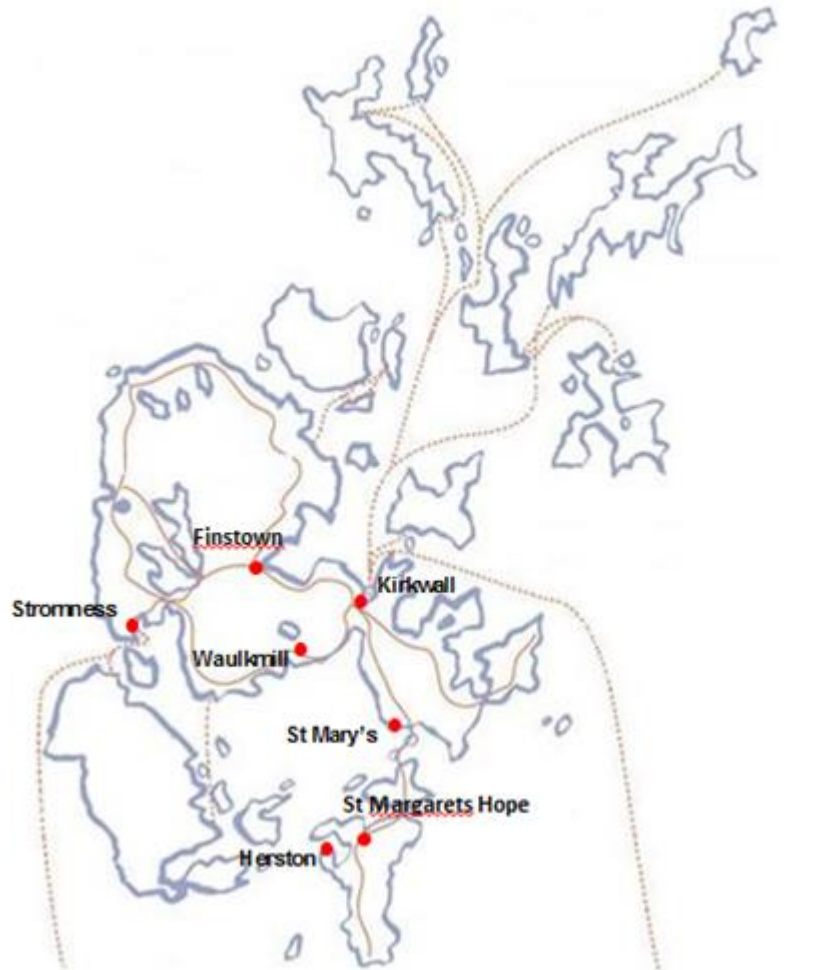
## Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results for 2018

Site ID	NO <sub>2</sub> Mean Concentrations (µg/m <sup>3</sup> )												Annual Mean	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted <sup>(1)</sup>
	KW	20.8	18.1	14.0	13.0	17.6	10.8	12.1	15.5	13.6	14.6	18.2		
SN	14.2	12.6	7.4	8.1	8.5	8.2	11.4	8.3	6.1	9.2	14.3	14.0	10.2	9.8
SM	6.3	2.3	3.3	2.1	4.9	3.7	4.7	3.4	1.9	4.2	6.6	7.3	4.2	4.1
WM	5.3	2.8	3.7	3.2	4.6	3.0	3.6	2.9	1.7	2.7	4.8	3.2	3.5	3.3
HE	4.4	2.7	1.7	2.3	3.2	1.6	2.6	2.5	<1.0	1.9	3.2	2.1	2.6	2.3
MH	5.7	3.1	4.4	5.3	5.8	3.9	5.8	4.3	2.5	4.4	4.4	3.8	4.5	4.3
FT	11.7	12.6	10.0	9.5	11.9	9.0	9.9	9.9	6.5	9.6	13.5	9.4	10.3	9.9
PD	-	9.0	5.4	4.5	5.2	3.7	4.1	4.9	4.1	5.6	6.3	6.9	5.4	5.2

(1) See Appendix C for details on bias adjustment

Appendix C: Map of diffusion tube sites.



## **Appendix D: Supporting Technical Information / Air Quality Monitoring Data QA/QC**

### **Diffusion Tube Bias Adjustment Factors**

All diffusion tubes are analysed by Edinburgh Scientific Services.

For 2018 data, a Bias Adjustment of 0.96 was used. This was taken from the National Diffusion Tube Bias Adjustment Spreadsheet (version March 2019)

### **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.

### **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 an entire year.

### **QA/QC of diffusion tube monitoring**

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

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

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