Shetland Islands Council

Local Air Quality Management – Updating and Screening Assessment

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DOCUMENT INFORMATION AND CONTROL SHEET

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EXECUTIVE SUMMARY

This assessment has considered, in depth, the current air quality in Shetland Islands. Casella Stanger and Shetland Islands Council, in partnership, have considered the conclusions of the first round, and, in conjunction with the updated guidance, investigated the current situation in order to assess how air quality in the area is progressing towards the current NAQOs.

The assessment concludes that it is likely that all of the NAQOs will be met, even under the worst case conditions.

The tabular summary below highlights the main conclusions for each pollutant:

Pollutant	Conclusion
Carbon monoxide (CO)	No further work required
Benzene	No further work required
1,3-Butadiene	No further work required
Lead (Pb)	No further work required
Nitrogen dioxide (NO_2)	No further work required
Sulphur dioxide (SO_2)	No further work required
Fine particulates (PM_{10})	No further work required

1 INTRODUCTION

1.1 Project Background

Casella Stanger was commissioned by Shetland Islands Council to carry out an Updating and Screening Assessment (USA) of air pollution sources that may affect local air quality within the Shetland Islands area. The USA is required to be undertaken as part of the local authority's statutory duties as defined within Part IV of the Environment Act, 1995.

This report has been prepared by Casella Stanger, in partnership with Shetland Islands Council. Data collation has been co-ordinated by Shetland Islands Council, and has been sought from departments within the Local Authority, and external organisations where appropriate. The opinion of officers in the locality has been obtained throughout this assessment in order to accurately report existing conditions. The guidance contained in LAQM.TG(03) has been used to make predictions as appropriate.

1.2 Legislative Background

Part IV of the Environment Act, 1995, places a statutory duty on local authorities to periodically review and assess the air quality within their area. This involves consideration of present and likely future air quality against air quality standards and objectives. Guidelines for the 'Review and Assessment' of local air quality were published in the 1997 National Air Quality Strategy (NAQS)[1] and associated guidance and technical guidance. Standards and objectives for seven pollutants were proposed through the 1997 Strategy, which was overtaken by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)[2] in 2000, along with a further addendum in 2003[3].

The proposed air quality standards and objectives have been promulgated through the Air Quality (Scotland) Regulations 2000[4] and the Air Quality (Scotland)(Amendment) Regulations 2002[5]. .

New Technical Guidance (LAQM.TG(03))[6] and Policy Guidance (LAQM.PG(03))[7] were issued on behalf of DEFRA in January 2003. This guidance sets the framework for the requirements of review and assessment for future years, taking account of experiences from the previous rounds of review and assessment.

1.3 Scope of USA

The USA should be used to identify those matters that have changed since the last review and assessment (the First Round), and to identify those sources that may lead to air quality objectives being exceeded. A series of checklists for pollutants, and different screening tools for industrial and road traffic sources may be used in order to

[1] DoE (1997) The United Kingdom National Air Quality Strategy The Stationery Office
[2] DETR (2000) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working together for Clean Air, The Stationery Office
[3] Defra (2002) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum, The Stationery Office
[4] DETR (2000) The Air Quality (Scotland) Regulations 2000, The Stationery Office
[5] Defra (2002) The Air Quality (Scotland) Amendment Regulations 2002,The Stationery Office
[6] Defra (2003) Technical Guidance LAQM.TG(03), Part IV of the Environment Act 1995, Local Air Quality Management, The Stationery Office
[7] Defra (2003) Policy Guidance LAQM.PG(03), Part IV of the Environment Act 1995, Local Air Quality Management, The Stationery Office

determine those remaining sources that may have significant contributions to potential exceedances of the air quality objectives.

The USA should, if possible, determine what has changed since the last round of review and assessment, but where the information from the last round is not clear, or new information has become available, an additional screening of sources for significance can be carried out. In many cases it may also have been 3 years since information on sources was last collated and this could therefore be out of date.

It is important to recognise that during previous assessment, information, such as road traffic data, may only have been collated for those roads considered to be important at the time of the previous assessments, and in relation to the risk of exceedance of objectives set at the time. During previous rounds this may have concentrated on motorways, and roads with greater than 20,000 vehicles per day. However, the new technical guidance[6] indicates that in some cases, where there is relevant exposure, roads with approximately 10,000 vehicles per day may lead to exceedances of the objectives (particularly NO_2 and PM_{10}).

Therefore Casella Stanger have approached the USA as an opportunity to collate a new set of baseline information for the major sources of air pollution within the authority's boundary. This includes identifying all Part A and Part B processes, re-collecting the information on the site locations and emissions data (where available), and reviewing all traffic data available for locations within the authority's boundary.

The newly collated source data will be used to screen the relevant sources following the new technical guidance. The data will also be useful for future reviews of air quality and progress reports.

Where a risk of exceeding an air quality objective at relevant exposure locations has been identified through the USA, a detailed assessment is required (due to be reported by April 2004). The detailed assessment should identify with reasonable certainty where or not a likely exceedance will occur.

1.4 Assessment Criteria

The objectives included in the Air Quality (Scotland) Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002 have been used for the purposes of local air quality management and the process of review and assessment. These are summarised below in Table 1 for the seven pollutants of concern.

Table 1: USA Assessment Criteria

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	annual mean	31.12.10
1,3 Butadiene	2.25 μg/m^3	running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean [a]	31.12.2003
Lead	0.5 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
Particles (PM_{10}) (gravimetric)[b]	50 μg/m^3 not to be exceeded more than 35 times a year	24 hour mean	31.12.2004
	40 μg/m^3	annual mean	31.12.2004
	50 μg/m^3 not to be exceeded more than 7 times a year	24 hour mean	31.12.2010
	18 μg/m^3	annual mean	31.12.2010
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

a. The Air Quality Objective in Scotland has been defined in Regulations as the running 8-hour mean, in practice this is equivalent to the maximum daily running 8-hour mean.

b. Measured using the European gravimetric transfer sampler or equivalent.

1.5 Reporting of USA

The USA is reported in the following order so that the data used for sources can be clearly identified, and the process of deciding and justifying the need for any further detailed assessment is set out clearly.

In general, the report has been set out for sets of source type. For each source type relevant pollutants have been highlighted and screened using technical guidance (LAQM.TG(03)).

The following sections provide further details with respect to the specific aspects of the USA highlighted below:

1) Background Concentrations
2) Monitoring Data
3) Industrial Sources
- Part A Processes
- Part B Processes
- Petrol Stations
- Major Fuel Storage Depots
- Areas of Domestic Coal and Peat Burning
- Shipping
- Railways
- Other Sources

4) Road Traffic Sources
- Main Roads
- Significant Junctions
- Other roads
- Bus Stations

5) Other Considerations
6) Conclusions and Recommendations

2 LOCAL BACKGROUND CONCENTRATIONS

Background air quality data for Shetland Islands Council was obtained from NETCEN, made available through the Air Quality Information Archive located at www.airquality.co.uk which allows the user to download information files containing background concentrations for individual authorities. The background concentrations are provided for certain base years, including 2001. Background concentrations are required to be projected for relevant assessment years, which, for the purposes of the LAQM USA are the same as the date by which objectives are required to be achieved. For the projection of background concentrations to other years, the methodology described on the Dispersion Modelling Helpdesk has been used[8].

The background concentrations for the centre of Lerwick have also been factored for relevant years using the relevant tables in LAQM.TG(03) and are also shown in Table 2.

Table 2: Background[9] concentrations for the centre of Lerwick

Year	CO	Benzene	1,3-Butadiene	NO_2	SO_2	PM_{10}
	mg/m^3	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
2001	0.13	0.11	0.03	5.92	17.5	13.1
2003	0.11	0.10	0.02			
2004						12.2
2005				5.3		
2010		0.07				10.7

[8] Y.Brown (2003), Guidance Note for Use of Projection Factors for Background and Roadside pollutant concentrations. http://www.casellastanger.com/JointProjects/Detail.asp?id=88&jointprojectid=7

[9] no data was provided by www.airquality.co.uk on background lead concentrations

3 MONITORING DATA

The following sub-sections provide further updates with respect to monitoring of air pollutants carried out within the authority's area. It draws upon existing local data sets and, where necessary, national data sets, which highlight the current monitoring position within the authority's area and whether there is evidence to show (through monitoring alone) whether there is a likelihood of exceeding any of the current national air quality objectives. Monitoring data used in this assessment is included in Appendix 2.

Shetland Islands Council has not declared an Air Quality Management Area (AQMA) following the results of the first round of Review and Assessment. Therefore all monitoring refers to any ongoing monitoring programmes previously undertaken.

3.1 Carbon Monoxide (CO)

No monitoring for CO has been undertaken for this round of Review and Assessment as the previous round indicated that the NAQO would not be exceeded. There is no indication that prevailing conditions have changed sufficiently to pose a risk to the NAQO.

3.2 Benzene

Monitoring was undertaken for benzene during the first round of Review and Assessment. The monitoring illustrated that concentrations in populated areas were less than 1ppb (3.25µg/m^3). This complies with the NAQO for 2003 and the NAQO for 2010. There is no indication that prevailing conditions have changed sufficiently to pose a risk to the NAQOs, and therefore no further monitoring has been undertaken.

3.3 1,3-Butadiene

No monitoring for 1,3-butadiene has been undertaken for this round of Review and Assessment as there are no major sources of this pollutant in the Shetland Islands.

3.4 Lead

No monitoring for lead has been undertaken for this round of Review and Assessment as there are no major sources of this pollutant in the Shetland Islands.

3.5 Nitrogen Dioxide

Shetland Islands Council has used passive diffusion tubes to ascertain NO_2 concentrations throughout the area. Analysis was carried out at the NAMAS accredited laboratory at the BP Research and Engineering Centre, Sunbury (NAMAS methods MT/ICH/02 and MT/ICH/12).

<u>Bias Correction of Diffusion Tubes</u>

It is not possible to undertake a bias correction study due to the absence of an AURN site on the Shetland Islands, and the paucity of available comparison data for the analysing laboratory.

Passive Monitoring Results

Passive monitors were located in several areas as detailed in Table 5 and Appendix 2. The data covers a twelve-month period from October 2000 to September 2001.

Table 5: Passively monitored NO_2 concentrations throughout Shetland Islands ($\mu g/m^3$)

Location	Average	Standard Deviation
Sumburgh Airport	2.02	0.92
Lerwick Harbour	13.7	4.94
Fire Station, Lerwick	12.2	4.14
Greenhead	8.36	3.88
Sullom	3.40	1.89

The tubes were located in areas where elevated concentrations of NO_2 might be expected, either due to traffic or industrial emissions. The annual average data show that the concentrations are considerably lower than the NAQO.

3.6 Sulphur Dioxide

Shetland Islands Council has used passive diffusion tubes to monitor for SO_2. The tubes were sited at the same locations as NO_2 tubes, and the annual average concentrations are presented in Table 6.

Table 6: Passively monitored SO_2 concentrations throughout Shetland Islands ($\mu g/m^3$)

Location	Average	Standard Deviation
Sumburgh Airport	5.19	2.82
Lerwick Harbour	5.49	1.67
Fire Station, Lerwick	7.71	7.74
Greenhead	4.52	2.68
Sullom	6.21	6.65

The results demonstrate that over an annual period, the average concentration of SO_2 is low, and, although the data cannot be directly compared with the NAQOs, it is unlikely that any of the NAQOs will be exceeded. The average concentration for Sullom is based on eight months of data – the concentration for four months out of the twelve-month period were very high compared with the other months (13 to 152$\mu g/m^3$), and had high chloride concentrations. It was thought that these tubes had been contaminated with sea spray and that therefore, part of the SO_2 concentration could be attributable to natural sources.

3.7 Particulate matter - PM_{10}

No monitoring has been undertaken for PM_{10} as the background concentration is low (around 13 $\mu g/m^3$ (2001 data)) and there are no significant sources of PM_{10} in the Shetland Islands.

3.8 Conclusions of existing monitoring within Shetland Islands

There is sufficient evidence to indicate that all of the NAQOs will be met at the monitoring locations. The monitoring locations have been carefully selected to represent those areas with the highest potential for exceedance. Therefore, it is likely that no other area will be subject to a potential exceedance of any of the NAQOs.

4 INDUSTRIAL SOURCES

4.1 Prescribed Processes

Prescribed processes are considered to be important sources of airborne pollutants. Data were obtained from the Public Register held at the Scottish Environment Protection Agency North Region Shetland Islands office in Lerwick. Appendix 3 contains the lists of prescribed processes relevant to Shetland Islands. It was necessary to consider prescribed process sources for all of the target pollutants except CO, according to LAQM.TG(03).

Benzene

The BP Oil terminal at Sullom Voe represents the only major industrial source of benzene in the area. Further consideration of this source is made in Section 4.3 below under 'Major Fuel Depots'.

1,3-Butadiene

There are no new industrial sources of 1,3-butadiene in the area.

Lead

There are no industrial sources with substantial or increased emissions of lead to air within the area.

NO_2

The previous round of Review and Assessment highlighted that no industrial processes presented a risk to the NAQOs with respect to NO_2 emissions. There is no evidence that this situation has changed.

There are no other industrial sources with substantial or increased emissions of NO_2 to air within the area.

SO_2

The previous round of Review and Assessment highlighted that no industrial processes presented a risk to the NAQOs with respect to SO_2 emissions. There is no evidence that this situation has changed.

There are no other industrial sources with substantial or increased emissions of SO_2 within the area.

PM_{10}

There are no industrial sources with substantial or increased emissions of PM_{10}.

4.2 Petrol Stations

Latest technical guidance indicates that petrol stations may be a significant source of benzene, where residential properties occur within close proximity to the station forecourt (< 10m). Moreover, cumulative impacts of petrol stations adjacent to roads with an annual average daily traffic flow greater than 30,000 vehicles per day need to additionally be considered.

None of the petrol stations within Shetland Islands have properties located within the vicinity of the forecourt of the distance criteria highlighted. Consequently, petrol stations require no further assessment with respect to air quality impacts. SEPA have

commented with respect to petrol stations in the Shetland Islands and note that two of the premises meet all current legislative requirements with respect to regulation.

4.3 Major Fuel Storage Depots

The BP oil terminal at Sullom Voe is a major employer on the Shetland Islands and is perhaps the most significant potential source of air pollutants in the area. As such it is subject to intensive review through the prevailing prescribed process legislation.

The company routinely monitors for NO_2, SO_2 and benzene (plus H_2S and selected VOCs), both on site and off site. The results are compared with the NAQOs and presented in an annual report that is held on the public register. The report for covering monitoring in 200/2002 illustrated that all annual mean concentrations of NO_2 and benzene in the local community, were below the current NAQOs[10]. It was not possible to compare SO_2 concentrations with the NAQO due to the monitoring method used, however, it is unlikely that SO_2 will cause any exceedance of the NAQOs.

4.3 Areas of Domestic Coal and Peat Burning

Shetland Islands Council does not hold any data with respect to domestic coal or peat burning. However, given the low background concentrations of SO_2 and PM_{10} (see Table 2), alongside the relatively low density of housing means that it is unlikely that coal and peat burning for domestic purposes will present a risk to any of the relevant NAQOs. The main built-up area of Lerwick has converted to cleaner fuel types away from coal burning in recent years.

4.4 Shipping

The inter-island ferry service is a primary method of transport between the islands and, as a result, there are approximately 65,000 ferry movements within the Shetland Islands per year. Main ports include Lerwick and Scalloway, from which inter-island services and fishing activities take place. However, these ferries are not of a size similar to the cross channel ferries commonly seen in other ports, and also generally use gas oil which, according to a distributors analysis sheet, has a maximum sulphur concentration of 0.2% m/m (mass/mass).

Larger ferry operators operate out of Lerwick providing services to Aberdeen and Norway. The number of services is restricted and at most would result in 2 departures per day (730 per annum), which is below the 5,000 movements per annum criteria stipulated in LAQM.TG(03). The only data available for ferry movements from the Shetland Islands are those previously reported for 1996, and indicate that up to 3,680 movements per year. This is much higher than the current level of ferry activity and is thought to have also included movements by some smaller inter-island ferry operators.

Given the disparate nature of the ferry activities, it is unlikely that the SO_2 NAQOs will be at risk from shipping.

[10] BP Exploration Operating Company, 2003. Ambient atmospheric survey in and around the Sullom Voe terminal, Shetland.

4.6 Railways

The Shetland Islands has no rail infrastructure. Consequently, emissions from railways doe not pose a threat to air quality across the Islands.

4.7 Other Sources

Small boilers (>5MW $_{(Thermal)}$) burning coal or oil

Twenty-six boilers had been identified by a Scottish Executive publication (dated 2000)[11] as having a rating of <20MW burning coal or oil in Shetland Islands. However, it is not clear how many of these boilers have a rating >5MW. Given the low background concentration of SO_2, it is unlikely that any small boiler will pose a risk to the NAQO.

Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc.

There are eleven quarries on the Shetland Islands. Some monitoring has been undertaken in the vicinity of a large quarry at the Scord. This was based on a total deposition method and consequently, was not specific to PM_{10}. The results demonstrated that there was no significant release of particles during the monitoring period. Moreover, the maximum background levels of PM_{10} in 2004 and 2010 are 12μg/m^3 and 11μg/m^3, respectively. This means that properties located within 200m of the workings of the quarries would be potentially at risk of exceeding the NAQOs for PM_{10}. High levels of dust would be needed to approach the NAQOs – based on the proportion of 20% of dust emitted being within the PM_{10} fraction. The likelihood of this occurring is remote given that no complaints have been received with respect to the current workings of the existing quarries.

Aircraft

Aircraft movements results in emissions of NO_2. There are four regional airports on the Shetland Islands. These are Sumburgh, Scatsta, and Tingwall. The total number of passengers using these airports in 1999 was 379,194 and there were 24,521 aircraft movements. No data was available on the weight of freight moved. Consequently emissions from aircraft are not considered to present a risk to the NO_2 NAQOs.

4.8 Summary of industrial and area sources

This part of the assessment has been completed based on SEPA records, Scottish Executive publications, data from operators and local knowledge. There are industrial sources of the target pollutants but none present a risk to the NAQOs, either due to low emissions, effective control or lack of public exposure. Shetland Islands Council does not need to proceed to a Detailed Assessment for any pollutant with respect to industrial sources.

[11] Scottish Executive, 2000. Emissions of Sulphur Dioxide from Small Combustion Plants of <20MW.. Prepared by Entec.UK Limited.

5 ROAD TRAFFIC SOURCES

The first round of Review and Assessment did not identify any areas where emissions from road traffic presented a risk of exceedance of the NAQOs. However, guidance detailed in LAQM.TG(03) suggests that an assessment should be considered where the annual average daily traffic (AADT) flow exceeds 10,000 vehicles per day. According to recent traffic figures, there are five areas around Lerwick where the AADT flow exceeds 10,000 vehicles per day.

Data used in the assessment are presented in Appendix 4.

5.1 Main Roads

There are no main roads where the AADT flow exceeds 10,000 vehicles per day and where relevant exposure occurs within 10m of the kerb.

5.2 Narrow congested streets with residential properties close to the kerb

There are no narrow roads where the AADT flow exceeds 10,000 vehicles per day and where relevant exposure occurs within 5m of the kerb.

5.3 Busy streets where people may spend 1 hour or more close to traffic

There are no busy roads where the AADT flow exceeds 10,000 vehicles per day and where people may spend 1 hour or more close to traffic.

5.3 Busy roads and junctions in Shetland Islands

There are no busy roads where the AADT flow exceeds 10,000 vehicles per day and where relevant exposure occurs within 10m of the kerb.

5.4 Significant Junctions

There are no junctions where the AADT flow exceeds 10,000 vehicles per day and where relevant exposure occurs within 10m of the kerb.

5.6 Other roads

Roads with high flows of buses and/or HGVs

There are no roads with high flows of buses and/or HGVs.

New roads constructed or proposed since the first round of review and assessment

No significant new roads have been constructed in the area since the first round of review and assessment. However, the Council is proceeding with a number of significant road improvement schemes on the west-side and south mainland, which will result in smoother traffic flows on a number of road sections within the area.

Roads close to the objective during the first round of review and assessment

No roads were considered to be close to the objective during the first round of Review and Assessment.

Roads with significantly changed traffic flows

There are no other roads with significantly changed traffic flows.

5.7 Bus Stations

There are no bus stations located within 10m of relevant exposure.

5.8 Summary of Road Traffic Sources

This part of the assessment has used traffic flows obtained from Shetland Islands Council. The assessment has not identified any areas where traffic emissions present a risk of exceeding any of the NAQOs.

6 OTHER CONSIDERATIONS

Areas with Combined Impacts

There are no areas in Shetland Islands that give any cause for concern due to combined impacts.

7 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions can be drawn from this assessment:

CO

There are no major sources of CO that present a risk to the NAQO. **Based on the current information, Shetland Islands Council does not need to consider CO at the Detailed Assessment stage.**

Benzene

There are no major sources of benzene that present a risk to the NAQO. **Based on the above information, Shetland Islands Council does not need to consider benzene at the Detailed Assessment stage.**

1,3-butadiene

There are no major sources of 1,3-butadiene that present a risk to the NAQO. **Therefore Shetland Islands Council does not need to consider 1,3-butadiene at the Detailed Assessment stage.**

Lead

There are no major sources of lead that present a risk to the NAQO. **Therefore Shetland Islands Council does not need to consider lead at the Detailed Assessment stage.**

NO_2

There are sources of NO_2 namely Sullom Voe Oil Terminal and road traffic in Lerwick. However, diffusion tube monitoring for both sources has indicated that, where there is relevant exposure, the concentrations of NO_2 are significantly lower than the NAQO. **Therefore Shetland Islands Council does not need to proceed to a Detailed Assessment with respect to NO_2.**

SO_2

Although there are significant shipping movements throughout the Shetland Islands, shipping is not considered to be a risk to the NAQOs due to the type of fuel used, the disparate nature of the activities between islands, and the lack of relevant exposure. No other potential sources are considered to be a risk to the NAQOs. **Therefore Shetland Islands Council does not need to proceed to a Detailed Assessment with respect to SO_2.**

PM_{10}

There are no significant sources of PM_{10} on the Shetland Islands, as monitoring around one of the larger quarries revealed no significant deposition of particles **Therefore Shetland Islands Council does not need to proceed to a Detailed Assessment with respect to PM_{10}.**

8 REPORT STATEMENT AND DISCLAIMER

Casella Stanger completed this report on the basis of a defined programme of works and within the terms and conditions agreed with the Client. This report was compiled with all reasonable skill and care, bearing in mind the project objectives, the agreed scope of works, prevailing site conditions and degree of manpower and resources allocated to the project as agreed.

Casella Stanger cannot accept responsibility to any parties whatsoever, following issue of this report, for any matters arising which may be considered outside the agreed scope of works.

This report is issued in confidence to the Client and Casella Stanger cannot accept any responsibility to any third party to whom this report may be circulated, in part or in full, and any such parties rely on the contents of the report at their own risk. (Unless specifically assigned or transferred within the terms of the contract, Casella Stanger asserts and retains all copyright, and other Intellectual Property Rights, in and over the report and its contents).

Any questions or matters arising from this report may be addressed in the first instance to the Project Manager.

Appendix 1: Monitoring data

This appendix contains:

- monitoring data
- location maps of all monitoring sites

SO_2 ppb

Start	28-Sep-00	27-Oct-00	28-Nov-00	28-Dec-00	29-Jan-01	28-Feb-01	28-Mar-01	27-Apr-01	28-May-01	28-Jun-01	27-Jul-01	28-Aug-01	28-Sep-00
	to	to	to	to	to	to	to	to	to	to	to	to	to
Finish	27-Oct-00	28-Nov-00	28-Dec-00	29-Jan-01	28-Feb-01	28-Mar-01	27-Apr-01	28-May-01	28-Jun-01	27-Jul-01	28-Aug-01	28-Sep-01	28-Sep-01
Location No.	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12	Annual Average
SIC1	4	1	3	2	3	2	2	1	<1	1	2	1	2
SIC2	3	1	3	2	3	3	2	2	1	1	2	2	2
SIC3	1	<1	3	4	8	missing	2	2	2	1	1	9	3
SIC4	2	1	2	1	2	2	1	1	1	1	3	3	2
SIC5	2	<1	15*	5*	33*	6	57*	1	1	1	1	6	2

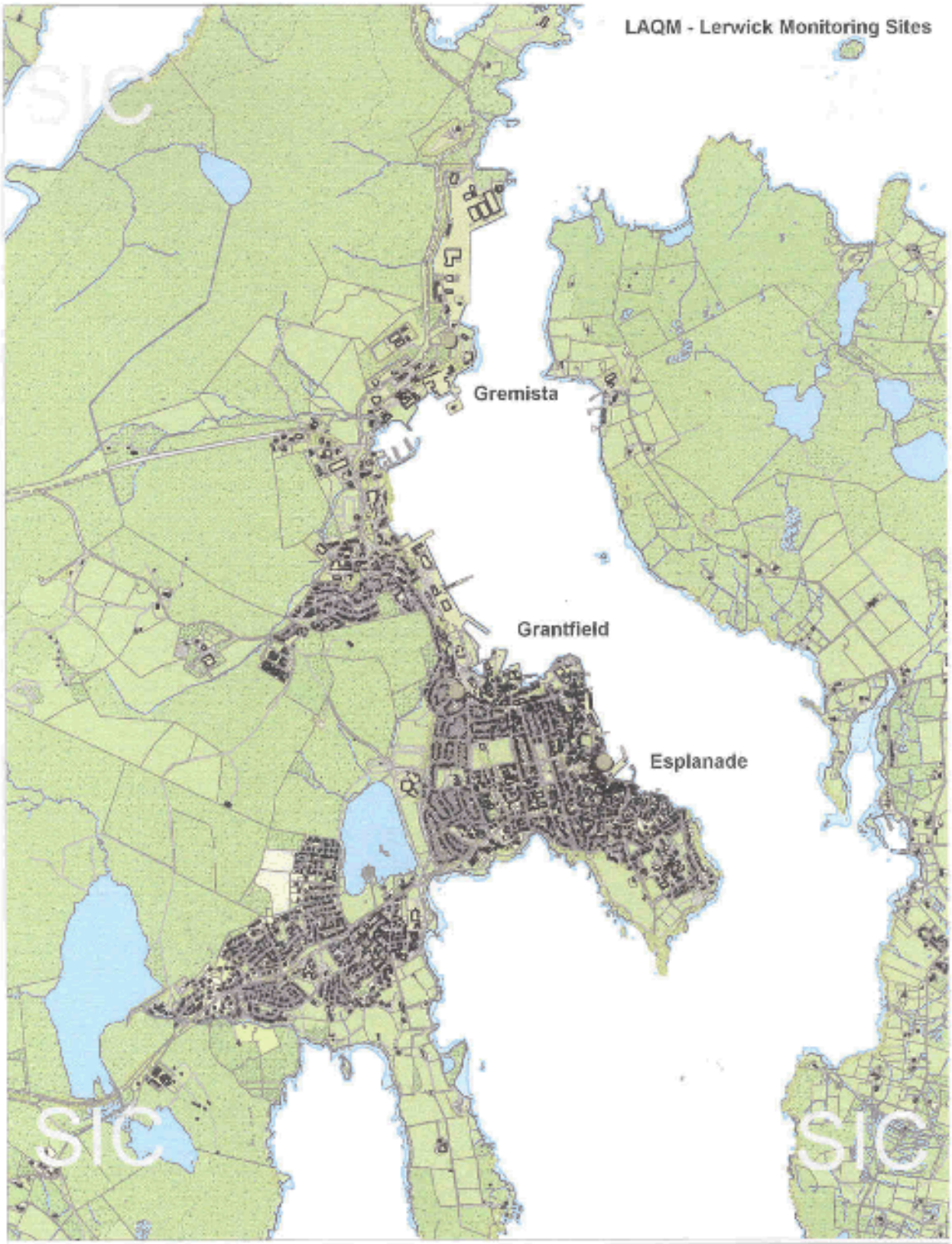
*Sample contains high levels of chloride and has probably been contaminated by "Sea spray"

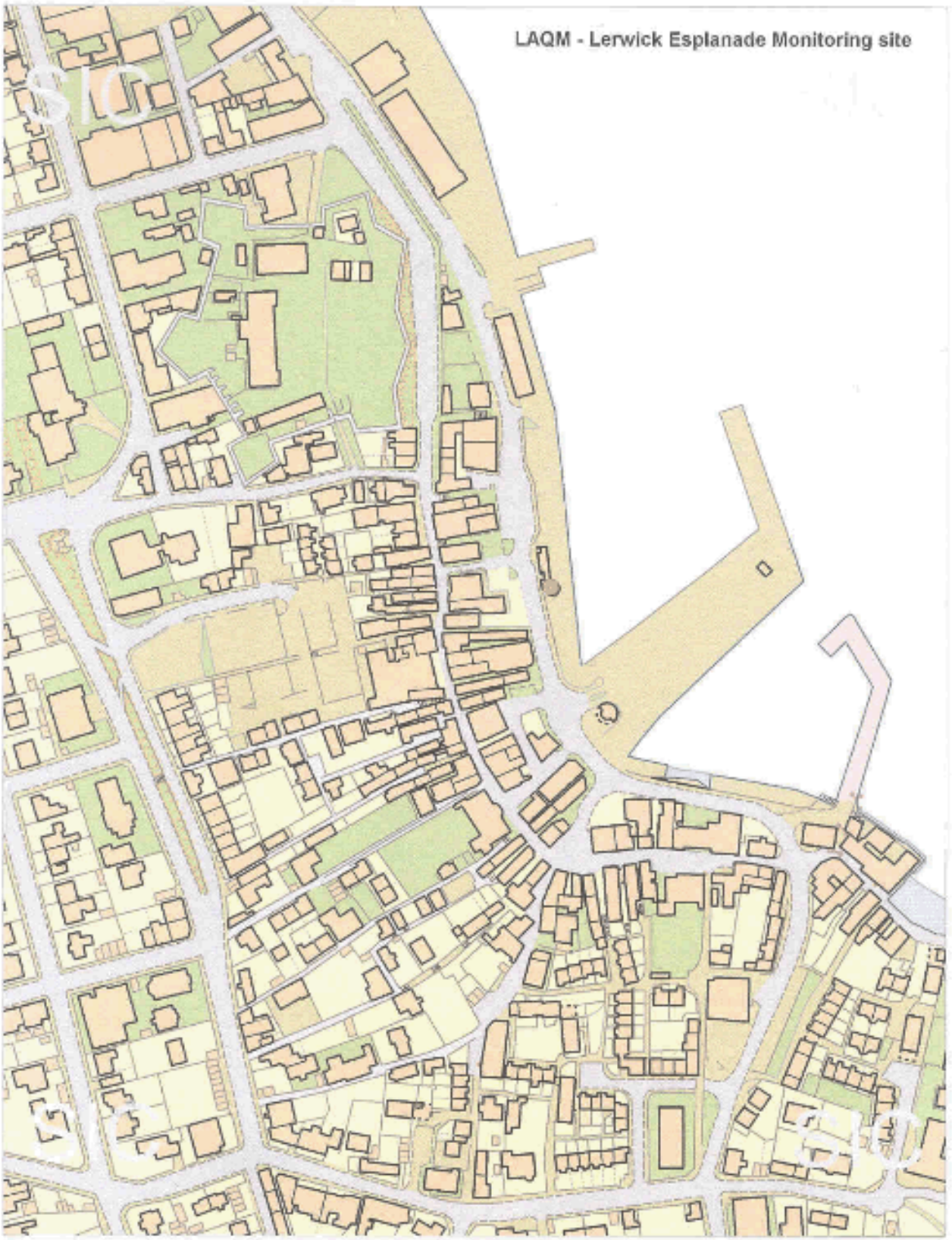
NO_2 ppb

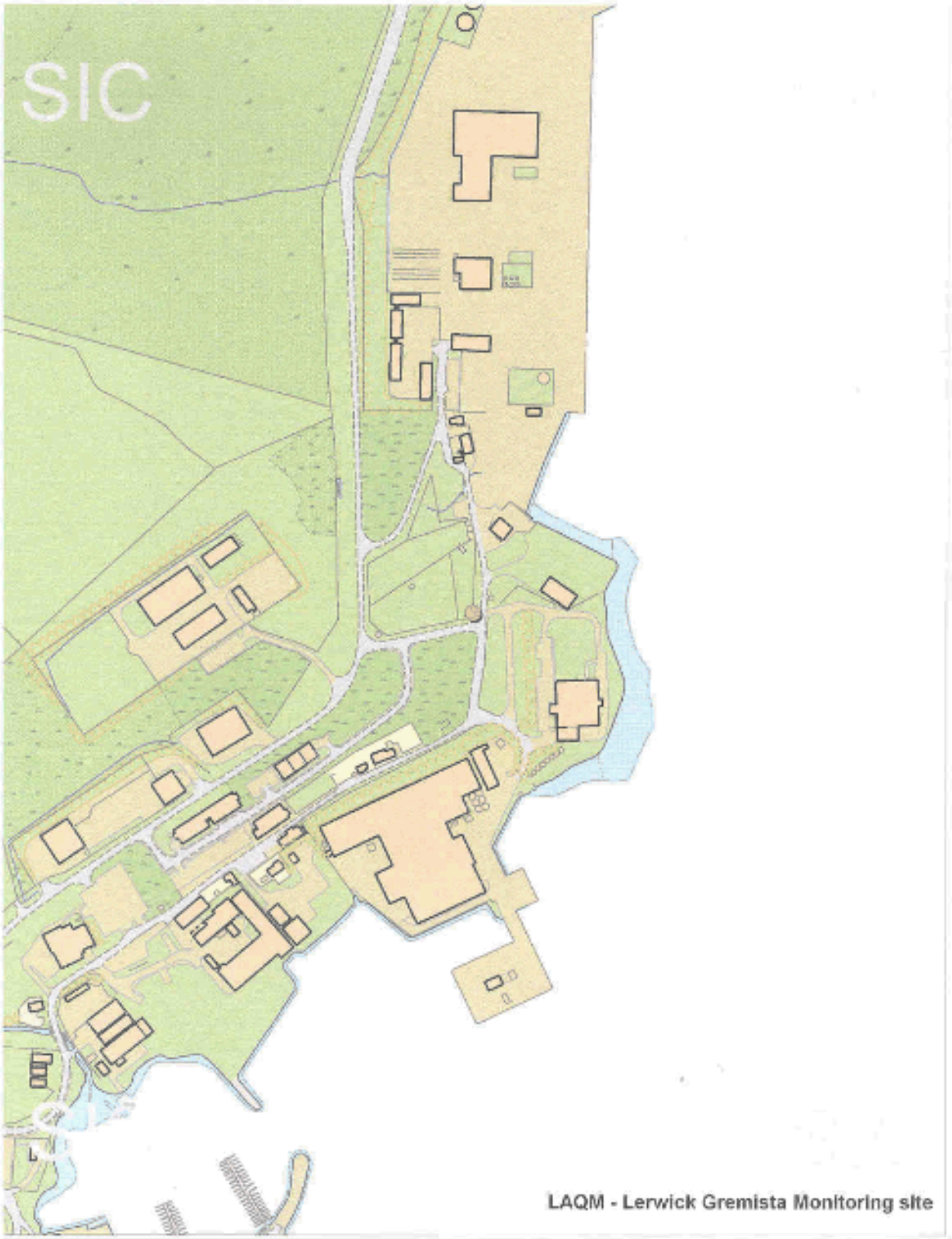
Start	28-Sep-00	27-Oct-00	28-Nov-00	28-Dec-00	29-Jan-01	28-Feb-01	28-Mar-01	27-Apr-01	28-May-01	28-Jun-01	27-Jul-01	28-Aug-01	28-Sep-00
	to	to	to	to	to	to	to	to	to	to	to	to	to
Finish	27-Oct-00	28-Nov-00	28-Dec-00	29-Jan-01	28-Feb-01	28-Mar-01	27-Apr-01	28-May-01	28-Jun-01	27-Jul-01	28-Aug-01	28-Sep-01	28-Sep-01
Location No.	Trip 1	Trip 2	Trip 3	Trip 4	Trip 5	Trip 6	Trip 7	Trip 8	Trip 9	Trip 10	Trip 11	Trip 12	Annual Average
SIC1	0	1	1	1	1	1	1	1	1	2	2	1	1
SIC2	10	11	9	7	6	7	5	3	6	6	5	12	7
SIC3	7	6	8	6	5	missing	3	5	7	5	8	11	6
SIC4	7	5	6	1	2	5	2	4	3	5	8	4	4
SIC5	3	1	2	3	0	3	2	1	1	1	2	2	2

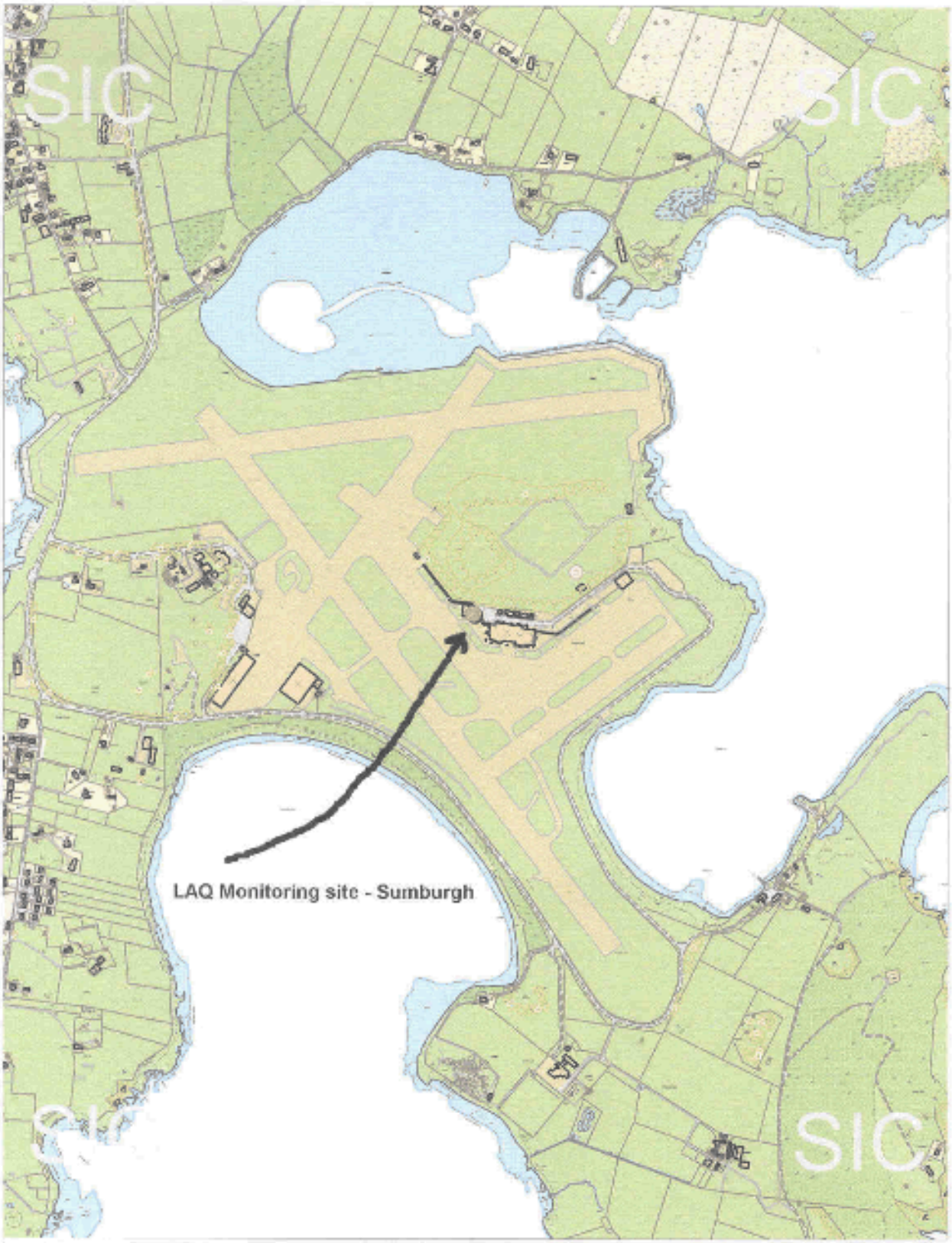
Location Key

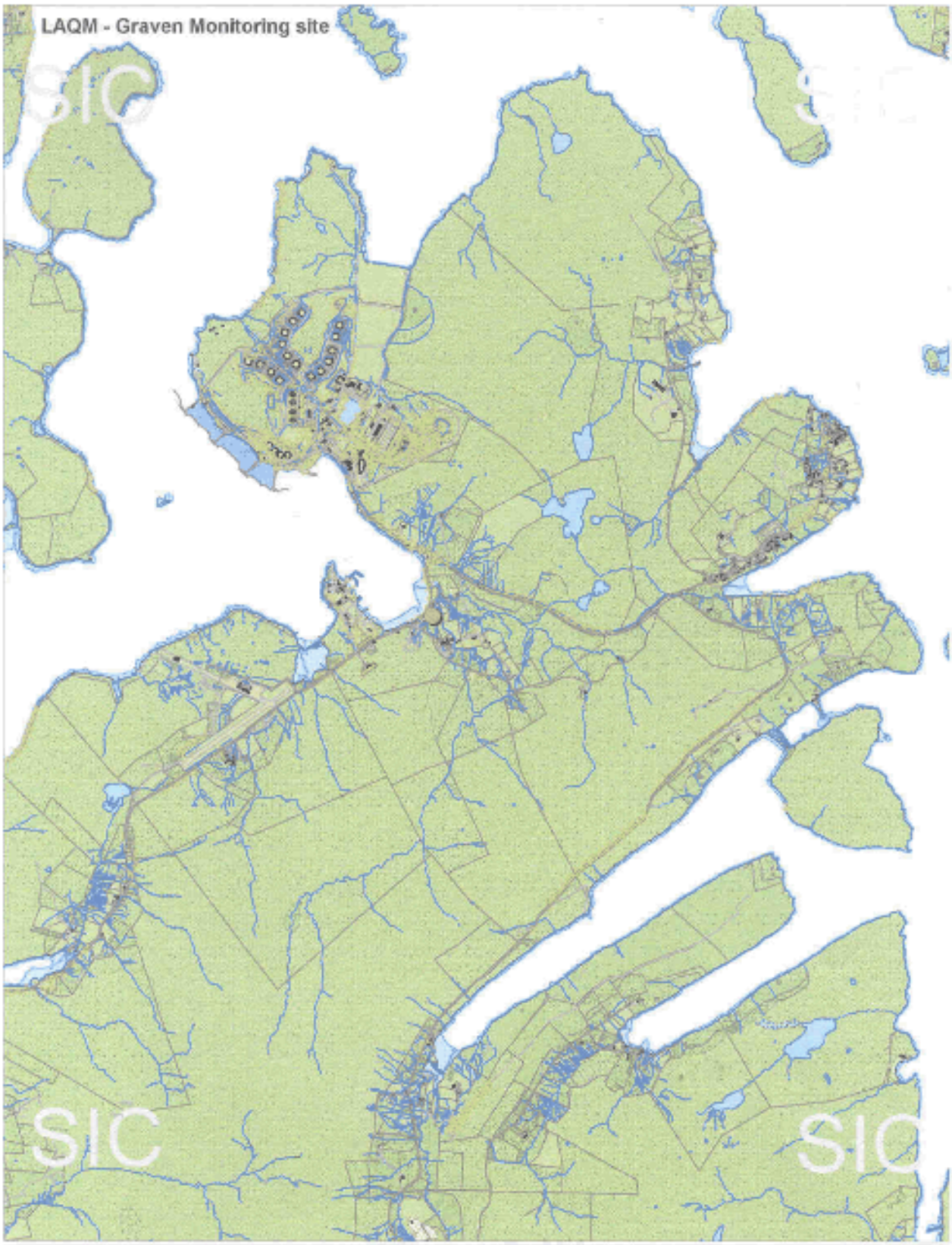
SIC1	Sumburgh Airport
SIC2	Lerwick Harbour
SIC3	Fire Station
SIC4	Greenhead
SIC5	Sullom











Appendix 2: Industry data

Part A Processes

Operator	Process Address	Process Type	Description
BP Sullom Voe	Mossbank, Shetland	Combustion	Gas Fired Power Station
BP Sullom Voe	Mossbank, Shetland	Petroleum	Oil Terminal
Scottish Hydro-Electric Plc	Lerwick, Shetland	Combustion	Oil Fired Power Station
Shetland Offshore Environmental Services	Greenhead, Lerwick	Oil Recovery	Recovery of Oil by Distillation
Shetland Islands Council	Greenhead, Lerwick	Incineration	Waste to energy Plant

Part B Processes

Operator	Process Address	Process Type	Description
Burgess & Garrick (Oil Services Ltd.)	Sellaness, Mossbank	General Incineration	Oily waste incineration
Burgess & Garrick (Oil Services Ltd.)	Vatster, Gott	General Incineration	Oily waste incineration
Lerwick Autobody Shop	Gremista Industrial Estate	Waste Oil Burner	<0.4 MW
Westside Fisherman	Vehicle Maintenance Depot, Tingwall	Waste Oil Burner	<0.4 MW
Gordon Stronach	Garthspool, Lerwick	Waste Oil Burner	<0.4 MW
Garriock Bros. Ltd.	Blackhill Ind. Est., Lerwick	Waste Oil Burner	<0.4 MW
Central Garage(Brae)Ltd	Brae	Waste Oil Burner	<0.4 MW
Messers Mills (Mills Garage)	Baltasound, Unst	Waste Oil Burner	<0.4 MW
Shalders Coaches Ltd.	Lower Scord, Scalloway	Waste Oil Burner	<0.4 MW
MMW Welding Ltd.	Gremista, Lerwick	Waste Oil Burner	<0.4 MW
Thulecraft Ltd.	Gremista Ind. Est., Lerwick	Waste Oil Burner	<0.4 MW
Alexander Sandison & Sons Ltd.	Setters Quarry, Haroldswick	Mineral Process	Crushing & Screening of rock
Alexander Sandison & Sons Ltd.	Cross Geo Quarry & Baltasound Pier, Unst	Mineral Process	Talc
Hewden Quarries Ltd.	Brindister Quarry, Gulberwick	Mineral Process	Crushing & Screening of rock
CEBO UK Ltd	OIL Base, Gremista, Lerwick	Bulk Cement Handling	
Garrick Quarries Ltd.	Vatster Quarry, Tingwall	Mineral Process	
Garrick Quarries Ltd.	Vatster Quarry, Tingwall	Cement & Lime Manufacture	
M. K. Leslie	Staney Hill Quarry, Lerwick	Mineral Process	
Shetland Islands Council	Scord Quarry, Scalloway	Mineral Process	Crushing & screening of rock
Jeniva Landfill Ltd.	Sullom Mine, Sullom	Mineral Process	
Mr H A Dickie	Gutcher Quarry, Gutcher, Yell	Mineral Process	Crushing & screening of rock
Mr H A Dickie	Gutcher Quarry, Gutcher, Yell	Cement & Lime Manufacture	
Garrick Quarries Ltd.	Vatster Quarry, Gott	Mobile Crusher	
Shetland Fish Products	Heogan, Bressay	Fish Meal and Fish Oil Processes	

Appendix 3: Traffic data

This appendix contains:

- Lerwick traffic data

Road	Location	Traffic Flow (Av. Weekday 24Hr)	Month & Year of Measurement
A969	Junction of Church Rd and Commercial St	7,788	September 1993
A969	Junction of Esplanade, North Rd & Harbour St	9,695	August 1994
A969	North Rd at Fire Station	12,629	September 1996
A970	North Lochside, north of Bruce Crescent	5,975	September 1996
A970	At South Lochside, Junction with South Rd	10,501	November 1993
A970	Holmsgarth Rd, at Shetland Hotel	11,815	July 1996
A970	Approaching North Roe	174	September 1990
A970	Approaching Sumburgh Airport	1276	June 1994
A970	Approaching Scalloway	3105	June 1992
A971	At Weisdale	1701	June 1994
A970	Approaching Lerwick (North)	5477	September 1994
A970	Approaching Lerwick (South)	4463	August 1994


04 03 5099
9 94 5477
04 03 11049
08 02 13999
7 97 9802
7 96 11815
08 02 7764
08 02 13080
6 96 2157
7 97 1122
9 91 3723
7 95 6471
11 93 9689
9 93 8053
11 93 10501
7 98 5381
Scheme
Traffic Figures - Lerwick
Title
Average weekday
24hr flow
(month & Year of count)
Shetland Islands Council
Director of Environment and Transportation
Grantfield, Lerwick, Shetland ZE1 0NT
Telephone: Lerwick (01595) 744850
Fax: Lerwick (01595) 694544
Date
25 Aug 99
Drawn
B Halcrow
Ch'k'd
Scale
1:10000
File No.
EATS
Drg. No.
Rev.