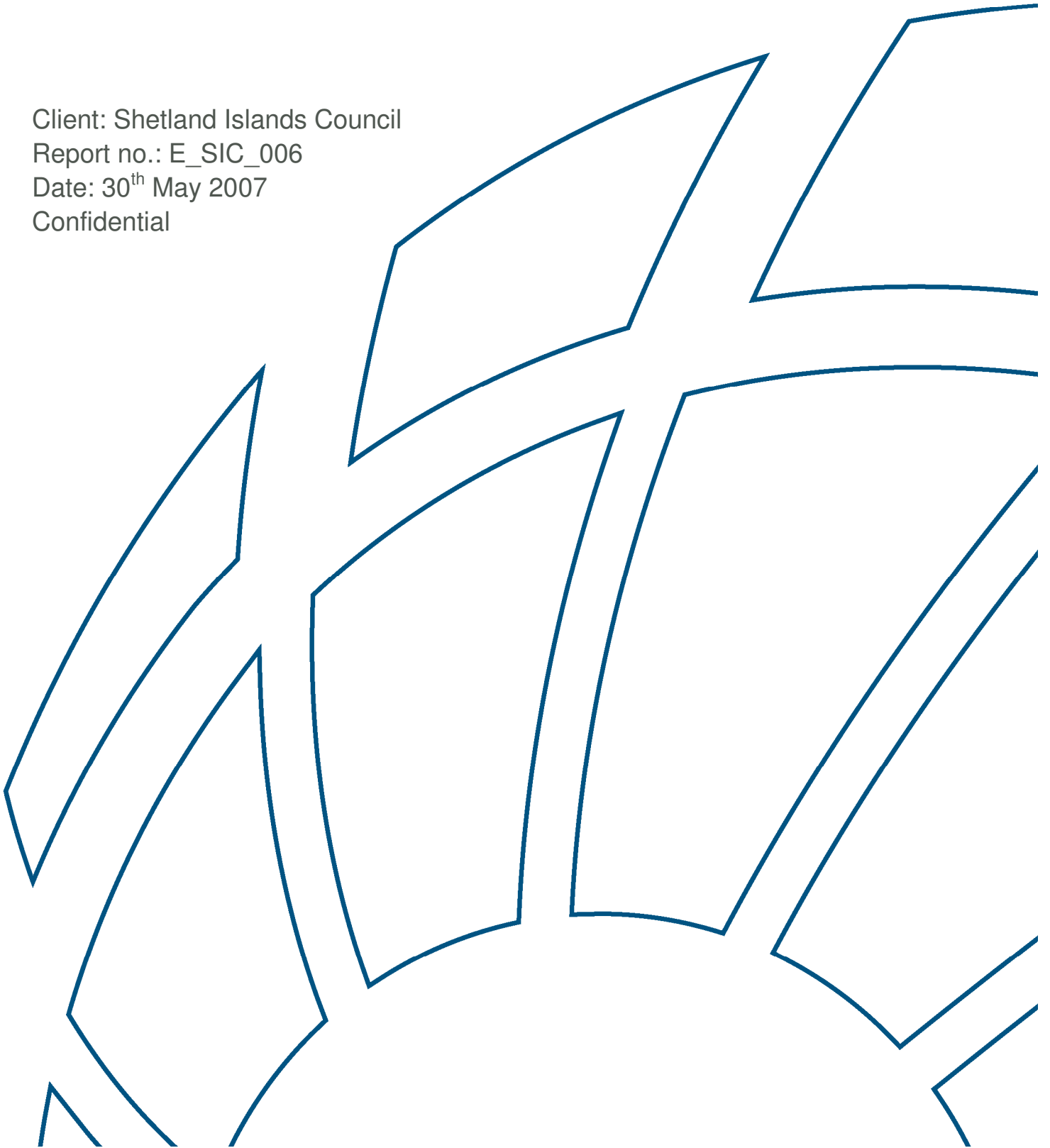


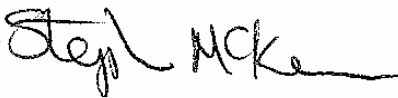


LAQM Progress Report 2007

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1 INTRODUCTION

BMT Cordah Limited has been commissioned by Shetland Islands Council (the Council) to undertake the Local Air Quality Management (LAQM) Progress Report for 2007. The aim of the report is to provide an update on local air quality including information on recent air quality monitoring, changes in local policy towards air quality and changes in local sources of atmospheric emissions.

The assessment uses current monitoring data and information on industrial, transport, commercial and domestic atmospheric emissions to identify if there is potential for exceedence of the air quality objectives for pollutants contained within the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000 (NAQS)¹.

The report follows guidance set out in LAQM.TG(03) technical guidance², LAQM.PRG(03) progress report guidance³, LAQM.PG(03) policy guidance⁴ and subsequent guidance amendments⁵.

1.1 Review and Assessment process

The Environment Act 1995 and subsequent regulations require local authorities to assess compliance of air quality in their area with the standards and objectives set out in the NAQS. For local authorities within Scotland further regulations are set out in the Air Quality (Scotland) Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002.

The LAQM framework requires that local authorities carry out regular reviews of air quality. This 'Review and Assessment' process comprises two phases. The first phase of the Review and Assessment is an Update and Screening Assessment (U&SA) which is undertaken every three years. The U&SA considers any changes that have occurred in pollutant emissions and sources since the last round of Review and Assessment that may affect air quality.

The second phase is either a Detailed Assessment or a Progress Report depending upon the outcome of the U&SA.

If the U&SA identifies a risk of exceeding an air quality objective at a location of relevant public exposure a Detailed Assessment is required. The Detailed Assessment considers the risk of

¹ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Working together for clean air, Defra, January 2000.

² Part IV of the Environment Act 1995, Local air quality management technical guidance, LAQM.TG(03), Defra et al, January 2003.

³ Part IV of the Environment Act 1995, Local air quality management progress report guidance, LAQM.PRG(03), Defra et al, January 2003

⁴ Part IV of the Environment Act 1995, Local air quality management policy guidance, LAQM.PG(03), Defra et al, January 2003.

⁵ Part IV of the Environment Act 1995, Local air quality management technical guidance update, LAQM.TG(03) – update: January 2006, Defra et al and Local air quality management policy guidance: Addendum, LAQM.PGA(05), Defra et al, January 2005

exceeding an objective to greater depth in order to determine whether it is necessary to declare an Air Quality Management Area (AQMA).

If the U&SA does not identify any risk of exceeding air quality objectives, an Progress Report is prepared annually in the intervening years between U&SAs. As mentioned above, the aim of the Progress Report is to provide an update on pollutant monitoring data, policy towards air quality and new developments which will have an impact on local air quality.

An AQMA is declared following a Detailed Assessment where it has been shown that an air quality objective has been or is predicted to be exceeded by the objective deadline.

2 NATIONAL AIR QUALITY STANDARDS AND OBJECTIVES

Assessment criteria, or objectives, in the form of atmospheric concentration levels for eight pollutants are detailed in the National Air Quality Strategy (NAQS). Of these eight pollutants, seven are assessed by local authorities. The eighth pollutant, ozone, is assessed at a national level due to its transboundary nature. The seven pollutants that are assessed and the objectives that apply in Scotland are presented in Table 1.

3 LOCAL PERSPECTIVE

The Shetland Islands are located at a latitude of approximately 60°N, around 100 miles north of the Scottish mainland. It is made up of over 100 islands, fifteen of which are inhabited, with a population of around 22,500. The largest town is Lerwick with a population of around 7,500.

The principal route on the islands is the A970 which runs between the south and north of the Shetland Mainland. Highest traffic volume is found in Lerwick, with light traffic levels experienced on the rest of road network. The main airport is at Sumburgh on the south of the Mainland, with some smaller airports on the outlying islands. There are numerous inter-island ferry services linking the various islands, with the main ports being Lerwick and Scalloway, from where inter-island ferries and fishing activity takes place. Large ferries from Scotland, Norway and the Faeroe Islands berth at Lerwick harbour. Additionally, there is a large port at the Sullom Voe oil terminal, used by numerous oil tankers.

The main industrial area on the islands is the Gremista Industrial Estate to the north of Lerwick. There is a high concentration of regulated activity in this area including a landfill site, energy recovery plant and an oil-fired power station. The Sullom Voe oil terminal handles around 25 million tonnes of oil each year and also contains a power station which supplies some of the islands electricity. Other industrial processes include quarrying, mineral processes and fish processing activities.

The most recent review and assessment report conducted by Shetland Islands Council was an Updating and Screening Assessment⁶ in 2006. The report concluded that there were no locations where the air quality objectives were likely to be exceeded. The report did, however, indicate that there was potential for the SO₂ 15-minute mean objective to be exceeded as a result of emissions from a proposed fish factory.

Table 1: NAQS air pollutant objectives

Pollutant	Air quality objective			
	Concentration	Measured as	Equivalent percentile	Date to be achieved by
Benzene	16.25 µg/m ³	running annual mean	-	31 / 12 / 2003
	3.25 µg/m ³	running annual mean	-	31 / 12 / 2010
1,3-butadiene	2.25 µg/m ³	running annual mean	-	31 / 12 / 2003
Carbon monoxide (CO)	10 mg/m ³	running 8-hour mean	-	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 (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times per year	1-hour mean	99.79 th percentile of 1-hour means	31 / 12 / 2005
	40 µg/m ³	annual mean	-	31 / 12 / 2005
Particulate (PM ₁₀)	50 µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	90.4 th percentile of 24-hour-means	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	98 th percentile of 24-hour-means	31 / 12 / 2010
	18 µg/m ³	annual mean	-	31 / 12 / 2010
Sulphur dioxide (SO ₂)	125 µg/m ³ not to be exceeded more than 3 times a year	24-hour mean	99 th percentile of 24-hour means	31 / 12 / 2004
	350 µg/m ³ not to be exceeded more than 24 times a year	1-hour mean	99.7 th percentile of 1-hour means	31 / 12 / 2004
	266 µg/m ³ not to be exceeded more than 35 times a year	15-minute mean	99.9 th percentile of 15-minute means	31 / 12 / 2005

⁶ LAQM Updating and Screening Assessment 2006. BMT Cordah Limited report E_SIC_003, March 2006.

4 MONITORING DATA

New monitoring data has been supplied by Shetland Islands Council in their role as operator of the islands' Energy Recovery Plant (ERP). NO₂ and SO₂ concentrations are measured using a network of eight passive diffusion tubes. The locations of the diffusion tubes are presented in Figure 1. The tubes are exposed for one month periods twice a year.

Table 2: NO₂ and SO₂ diffusion tube monitoring results – 2006

Location	Measured NO ₂ concentration (µg/m ³)		Measured SO ₂ concentration (µg/m ³)	
	June 2006	December 2006	June 2006	December 2006
Vatsland	2.8	1.7	0.4	2.6
Power Station	7.0	5.5	1.9	4.3
Staney Hill	1.6	1.3	0.5	4.1
Greenhead Junction	5.8	5.9	0.6	4.9
Gremista Hill	4.5	3.0	0.5	3.5
Bressay	1.5	8.0	0.7	5.3
Whalsay	1.0	1.8	0.2	3.9
Lang Kames	0.9	0.6	0.3	1.8

It is not possible to directly compare the monitoring results against the NAQS objectives, as the measured concentrations are 1-month average concentrations. This is particularly true when looking at short-term objectives such as the 15-minute and 1-hour mean objectives, since diffusion tubes cannot detect short-term fluctuations in pollutant concentrations. If monthly NO₂ concentrations throughout the year are similar to those measured in June and December, it is unlikely that there would be an exceedence of the NO₂ annual mean objective.

5 NEW LOCAL DEVELOPMENTS

In order to identify any new industrial developments, a current list of industrial processes registered with the Scottish Environment Protection Agency (SEPA) has been compared against the list of industrial processes in the Council's 2006 Updating and Screening Assessment. A number of processes have new permit numbers or new names, although the process itself has not changed. The new processes identified from comparing these lists are:

- Scottish Sea Farms Ltd, Scalloway (PPC/A/1013088); and
- Garriock Brothers Ltd, Lerwick (Mobile plants x 2, PPC/B/1008943 & PPC/B/1008944).

Scottish Sea Farms have taken over the site of Saga Seafoods Ltd at Scalloway, and undertake a similar process. A review of the site's PPC application has shown that there are no sources of atmospheric emissions on this site. The Garriock Brothers mobile plants will generate atmospheric

emissions of PM_{10} , although given the low background PM_{10} concentrations in Shetland it is unlikely that there would be a risk of exceeding the PM_{10} objectives. Any issues with the mobile plants would likely be first noted by dust complaints being received from the local population. The Council should assess air quality impacts from these sources further should any such complaints be received. The full current list of industrial processes on Shetland is presented in Table 3.

Following the Progress Report guidance, these changes will be logged and, where appropriate, considered more thoroughly during the next full round of Review and Assessment.

Two of the major sources of air pollution on Shetland, namely Lerwick Power Station and the Sullom Voe Oil Terminal, have recently submitted Pollution Prevention and Control (PPC) applications to SEPA. These applications contain assessments of the impact that emissions to air have on local air pollutant concentrations, including assessment of a number of pollutants that are assessed in the LAQM framework. The assessments were conducted by atmospheric dispersion modelling.

The assessment of atmospheric emissions from the Sullom Voe Oil Terminal concluded that there were unlikely to be any exceedences of the NAQS at locations of public exposure where the NAQS objectives apply. Some exceedences of the NO_2 1-hour mean objective were predicted at locations close to the Fortum power station within the Terminal boundary, however these were not at locations of public exposure.

The assessment of atmospheric emissions from the Lerwick Power Station predicted exceedences of the NO_2 1-hour mean objective in areas around the power station. Predicted concentrations at sensitive receptor locations are not reported, however the reported concentration contour plots show that exceedences are predicted at areas of relevant public exposure. It is noted that the power station operators plan to conduct more detailed modelling using the measured emission profile of the power station to gain a more accurate picture of NO_2 emissions and predicted ambient concentrations. It is recommended that Shetland Islands Council monitor the results of this modelling. It is also noted that the modelling did not include the effect of terrain, stating that it did not need to be considered as the local terrain gradients were less than 1 in 10. It is presumed that this assumption was based on information contained in the user guide of the dispersion model used (ADMS 3.3) which states that terrain gradients less than 1 in 10 need not be included as the effect of such terrain on pollutant dispersion would be insignificant. The omission of terrain effects may not be valid, as North Staney Hill, a residential area to the south-west of the power station, has a gradient steeper than 1 in 10. The modelling study did not predict any exceedences of other NAQS objectives, although predicted SO_2 15-minute mean concentrations were close to the objective level. More detailed modelling should also resolve whether the SO_2 objectives are likely to be exceeded.

Shetland Islands Council has indicated that the application for the proposed fish factory, identified as potentially leading to elevated SO_2 concentrations in the 2006 U&SA, has stalled and it is now unclear whether this project will proceed. It is recommended that the Council should continue to

monitor the progress of the planning application, and ensure a robust air quality impact assessment is undertaken as part of the planning process.

Table 3: SEPA registered industrial processes in Shetland

Company / Operator	Address	Permit Number
PART A PROCESSES		
Shetland Islands Council	Scord Quarry, Scalloway, Shetland	PPC/A/60035
M K Leslie Ltd	Mobile Plant, Staney Hill Quarry, North Road, Lerwick, Shetland	PPC/A/60082
Shetland Islands Council	Gremista Landfill, Gremista, Lerwick, Shetland	PPC/A/50027
Scottish Sea Farms Ltd	Sand, Bixter, Shetland	PPC/A/50034
Shetland Catch Ltd	Gremista, Lerwick	PPC/A/50035
Lerwick Fish Traders Ltd	Gremista, Lerwick	PPC/A/50036
Shetland Fish Products	Heogan, Bressay	PPC/A/50037
Shetland Islands Council	Lerwick Energy Recovery Plant, Lerwick Shetland	PPC/A/1003141
Shetland Oiltools Ltd	Mud Plant, Greenhead Base, Lerwick	PPC/A/1000167
Veolia Environmental Services	Decommissioning Transfer Station, Greenhead Base, Lerwick	PPC/A/1003203(VN01)
Scottish & Southern Energy	Lerwick Power Station	PPC/A/1008891
Scottish Sea Farms Ltd	Blacksness, Scalloway	PPC/A/1013088
BP Exploring Operating Co Ltd	Sullom Voe Terminal, Mossbank, Shetland, ZE2 9TU	PPC/A/1013533
Fortum O & M (UK) Ltd	Power Station Sullom Voe Terminal, Mossbank, Shetland ZE 29TU	PPC/A/1013522
PART B PROCESSES		
CEBO UK Ltd	Berth 3 & 4 SBS Base (Greenhead), 70 Queens Road, Aberdeen.	PPC/B/60031
H & C Dickie	Gutcher Quarry, Yell. Gerdalock, Cullivoe, Yell	PPC/B/1009718
H & C Dickie	Mobile Plant, Gerdalock, Gutcher, Yell	PPC/B/1000020
H & C Dickie	Mobile Plant, Gerdalock, Gutcher, Yell	PPC/B/1000019
Garriock Brothers Ltd	Mobile Plant, Unit 30, Gremista Industrial Estate, Lerwick	PPC/B/1003172
Garriock Brothers Ltd	Mobile Plant, Unit 30, Gremista Industrial Estate, Lerwick	PPC/B/1008945
Garriock Brothers Ltd	Mobile Plant, Unit 30, Gremista Industrial Estate, Lerwick	PPC/B/1008946
Garriock Brothers Ltd	Mobile Plant, Unit 30, Gremista Industrial Estate, Lerwick	PPC/B/1008943
Garriock Brothers Ltd	Mobile Plant, Unit 30, Gremista Industrial Estate, Lerwick	PPC/B/1008944
Hanson Aggregates	Brindister Quarry, Gulberwick	PPC/N/60069
M K Leslie	Mobile Plant, Staney Hill, North Road, Lerwick, Shetland	PPC/B/1008942
Nicolson Plant	Sullom Mine, Moorfield, Brae, Shetland ZE2 9ZS	PPC/N/60033
Sandisons Unst Ltd	Setters Quarry, Baltasound Northsude, Baltasound, Unst ZE2 9DS	PPC/B/1009711

BP Fuels Marketing Ltd	North Ness Lerwick	APC/N/220031
Nicolson Plant	Black Gaet, Scalloway, Shetland (Concrete Batching)	PPC/B/1016117

6 AIR QUALITY ACTION PLANS AND PLANNING

Under the LAQM framework, if a local authority has declared an AQMA, they must develop an Air Quality Action Plan to improve air quality within the AQMA. As Shetland Islands Council has not declared an AQMA, they have not developed an air quality action plan.

Council policy on development and land use is conducted with consideration of the Shetland Structure Plan 2001-2016⁷. The Structure Plan contains a General Development Policy, Natural and Built Environment GDS4 (P11) which states that:

“New development will conserve and, where possible, improve the quality of life and the environment by minimising water, air and land pollution...”

This policy requires the Council to assess potential impacts on local air quality that new developments might have. In order to fulfil this policy, Shetland Islands Council has developed an internal procedure whereby the Council’s planning department consults with environmental health staff when they receive an application that may have an impact on local air quality. The environmental health department can then ensure that a robust air quality assessment is carried out in the planning application where appropriate.

7 AIR QUALITY STRATEGIES

Shetlands Islands Council has recently been successful in a capital consent bid to the Scottish Executive to purchase an automatic monitoring station for SO₂ and NO₂. The Council plan to install this in a residential area close to Lerwick Power Station and passenger ferry docks. This site will provide information on ground level concentrations of SO₂ and NO₂ as a result of emissions from local sources including the power station, shipping emissions in Lerwick harbour, other industrial emissions from the Gremista industrial area and emissions from road transport. Data from the monitoring station will be particularly useful in assessing the impact of emissions from the power station, and can be used to verify the results of dispersion modelling studies.

SEPA has contacted the Council to notify them of their intention to conduct a dispersion modelling study of this area of Lerwick. While the details of this study are not fully known at this time, the study may include an assessment of the combined impact of emissions from industrial sources, shipping and roads.

⁷ The Shetland Structure Plan 2001-2016, Shetland Islands Council, Infrastructure Services, 2000.

8 CONCLUSIONS

BMT Cordah Limited has conducted a Progress Report of local air quality on behalf of Shetland Islands Council. The assessment included recent pollutant monitoring data, new local developments with an impact on air quality, how air quality issues are addressed within the planning system and what air quality strategies are being implemented by the Council.

Three new industrial developments were noted which can be assessed in more detail if required at the next U&SA. These are a fish processing factory with no atmospheric emissions and two mobile plant which will generate PM₁₀. It is considered unlikely, however, that these processes will have a significant adverse impact on local air quality.

A dispersion modelling study has been undertaken of emissions from the Lerwick Power Station as part of the sites PPC application. This study has predicted exceedences of the NO₂ 1-hour mean objective at residential locations close to the power station. The study has indicated that further modelling of this site will be undertaken using more detailed information on actual emission rates. It is recommended that the Council assess the results of this modelling to determine whether an exceedence of the NO₂ 1-hour mean objective is likely. The installation of an automatic NO₂ monitoring site close to the power station will allow the performance of the dispersion modelling to be assessed against measured concentrations.

There are no predicted exceedences of other NAQS objectives in the Shetland Islands.