2012 Air Quality Updating and Screening Assessment for *The Highland Council*

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

November 2012

Local Authority Officer	Nick Thornton
Department	Transport, Environment and Community Services
Address	Ross House, High Street, Dingwall
Telephone	01349 868436
e-mail	nick.thornton@highland.gov.uk
Report Reference number	THCLAQMUSA2012
Date	9th November 2012

Executive Summary

This document is a report of the findings of the 2012 updating and Screening Assessment, undertaken by the Highland Council as required by the Local Air Quality Management process.

The Assessment has considered new monitoring data, new transport, commercial, industrial and domestic sources of air pollution.

The findings of this review and assessment are that over the vast majority of The Highland Council Area the air quality meets the standard required by the UK Air Quality Objectives.

New monitoring data has identified a location in Inverness where the Air Quality Objectives for Nitrogen dioxide may not be achieved. The Highland Council will progress to a detailed assessment for Nitrogen dioxide at that location.

Table of contents

List of Tables

List of Figures

Appendices

1 Introduction

1.1 Description of Local Authority Area

The area of the Highland Council covers approximately 26,500 square kilometres, excluding inland water, around one third of the Scottish mainland. The area includes Skye and other Inner Hebridean islands. The central and western regions of the area are a combination of high mountain and moorland and deep glens bordered by a coastline of sea lochs. In the north east lies the "flow" country of Caithness. Further south on the east coast lie three estuarine systems, the Dornoch, the Cromarty and the Moray firths, which are flanked by extensive arable land. The Great Glen Fault runs approximately east – west from coast to coast between Inverness and Fort William. To the south of the Great Glen fault, lie the massive upland areas of the Monadhliath and Cairngorm mountains, including the recently formed Cairngorm National Park. To the south west the area extends to the Ardnamurchan peninsula. 15% of the land area is afforested. Over 20% of the Highlands is designated as National Scenic Area.

Inverness is the capital city of the Highlands and had an estimated population of 57,960 in 2010. The next largest settlements in the Highlands at that time were Fort William (9,820) and Nairn (population 9,200).

In 2010 the total population of the Highlands was over 221,600. The population growth rate was 6.1% in the previous 10 years. However growth in Inverness, was much higher at over 14% during the same period. The majority of the population live in the eastern coastal areas of the Highlands, in the rapidly growing city of Inverness and in the numerous smaller towns along the A9 and A96 transport corridors.

Industrial development is also concentrated in south and east, although there are some other significant industrial developments elsewhere such as the “Alcan” facility at Fort William.

Over most of the Highlands the transport network is sparse and for a large proportion of the network the usage is very light. 85% of the road network is classified as rural.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management 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.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

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 microgrammes per cubic metre $\mu g/m^3$ (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 $\mu g/m^3$	Running annual mean	31.12.2003
	3.25 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 $\mu g/m^3$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, 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 Review and Assessment of Air Quality in Highland was completed in 1998. The table below outlines the previous reports which have been published by the Highland Council as part of the Review and Assessment process.

The Local Air Quality Updating and Screening Assessment Report, 2003, identified that a Detailed Assessment would have to be carried out.

Detailed assessment was carried out for the following pollutants:

- Benzene. The screening assessment indicated that the running annual mean air quality objective for Benzene may be exceeded:
    a) in the vicinity of petrol terminals at Inverness harbour, and
    b) near the Talisman Energy UK Ltd, Nigg Oil Terminal petroleum refining process at Nigg.

- Sulphur Dioxide. The screening assessment indicated that:
    a) there was a risk that the 15 minute mean air quality objective for SO2 could be exceeded in Castletown in Caithness as a result of the density of dwellings which burn solid fuel; and
    b) a Detailed Assessment would need to be carried out in respect of the ALCAN Aluminium Smelter in Fort William as the number of stacks which emit SO2 at that site, did not lend themselves to simple screening techniques.

- Nitrogen dioxide. Both the Scottish Executive and the Scottish Environment Protection Agency voiced concern over levels of NO2 in Inverness City Centre as measured by passive diffusion tube and so a Detailed Assessment was also undertaken for Nitrogen dioxide.

The Detailed Assessment Report, published in 2005, concluded that there was little likelihood of a failure to meet the objectives for these pollutants.

The 2008 Progress Report identified that the monitoring data generated by the Automatic Monitoring station at Telford Street, Inverness suggested a likely exceedence of the PM10 annual mean objective at this location. It was concluded that a detailed assessment for PM10 would be required although later amendments to the monitoring dataset suggest that this is no longer necessary.

The Updating and Screening Assessment of 2009 identified a requirement to progress to a detailed assessment for particles (PM10) and Nitrogen dioxide with respect to a biomass installation in Halkirk, Caithness.

The 2010 Progress Report identified that the biomass installation in Halkirk had been modified in the process of gaining authorisation from SEPA and was not in fact requiring further assessment under LAQM.

The 2011 Progress report did not identify any requirement for further assessment.

Table 1.2 Review and Assessment Reports and Outcomes

Date	Report	Outcome
1998	Air Quality in the Highlands - First Stage Review and Assessment	No requirement to proceed to second stage review and assessment
2001	Addendum to Air Quality in the Highlands	
2003	Updating and Screening Assessment	Proceed to detailed assessment for: Benzene in the vicinity of fuel storage facilities at Nigg and Inverness; Sulphur dioxide in respect of areas with a high density of domestic solid fuel burning; Sulphur dioxide in the vicinity of the Alcan Site, Fort William; and Nitrogen dioxide in Inverness city centre.

Table 1.2 Review and Assessment Reports and Outcomes (continued)

2005	Progress Report	Detailed assessment not required
2005	Detailed Assessment	Concluded: That there was no likelihood of the objective for benzene not to be met in the Highland Council Area; That the air quality objective for Sulpur dioxide is being met in the Highland Council Area; That the air quality objectives for Nitrogen dioxide are being met in the Highland Council Area; and that there is no requirement to declare an Air Quality Management Area in the Highland Council Area.
2006	Updating and Screening Assessment	Detailed Assessment not required
2007	Progress Report	Detailed Assessment not required
2008	Progress Report	Likely exceedence identified at Telford Street, Inverness for PM_{10}. Detailed Assessment required. (subsequently this requirement was removed following a correction to the monitoring data)
2009	Updating and Screening Assessment	Detailed Assessment required for NO_2 and PM_{10} in Halkirk, Caithness. (subsequently this requirement was removed following a change to the emissions from a biomass process)
2010	Progress Report	Detailed Assessment not required
2011	Progress Report	Detailed assessment not required

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

There are three automatic monitoring sites in The Highland Council area. Details of the sites are summarised in table 2.1 below. The sites are operated and maintained by contractors on behalf of DEFRA and a fully ratified dataset for each site is available for download from the internet. Details of QA/QC are included in appendix A.

The Inverness site is on Telford Street, one of the busiest streets in the city. The monitoring equipment is located 4 metres from the carriageway. There is relevant exposure along the street the closest of which is around 2.5m from the carriageway. The site measures hourly Nitrogen dioxide, and daily gravimetric fine particles (PM10 and PM2.5) by Partisol.

Fort William is located in a suburban recreation area of the town. The site monitors hourly Nitrogen dioxide and Ozone.

Strath Viach is a rural site located in a remote highland glen 5km from the nearest road and monitors Ozone.

Figure 2.1 is a map of the Highland Council Area showing the location of automatic monitoring locaions

Figure 2.1 Map of Automatic Monitoring Sites

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Reference		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Inverness	Roadside	265709	845670	PM_{10} $PM_{2.5}$	Gravimetric	N	Y(2.5m)	4m	N
				NO2	Chemiluminescent				
Fort William	Suburban	210857	774431	NO2	Chemiluminescent	N	N/A	N/A	N
				Ozone					
Strath Viach	Rural	234831	875029	Ozone		N	N/A	N/A	N

2.1.2 Non-Automatic Monitoring Sites

The Highland Council monitors Nitrogen dioxide at nine sites in Inverness and Dingwall using passive diffusion tubes.

There are five sites in the city of Inverness, one of which is a colocation study at the site of the AUN station on Telford Street. The other four sites in Inverness are in the "Oldtown" area, characterised by narrow street canyons in the retail and business centre of the city.

The remaining four sites are in Dingwall, a small town of around 5000 population, the market town of the county of Ross-shire. Two of the sites are roadside and two are urban background. No data was captured at the four sites in Dingwall during 2011.

There are no changes to the detail of the sites since the last round of review and assessment. Table 2.2 contains detail of each of the sites. Diffusion tubes are supplied and analysed by Gradko International Ltd. A full description of the method employed and the QA/QC procedures is included in the appendices.

Figure 2.2 contains maps showing the location of non-automatic monitoring sites

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

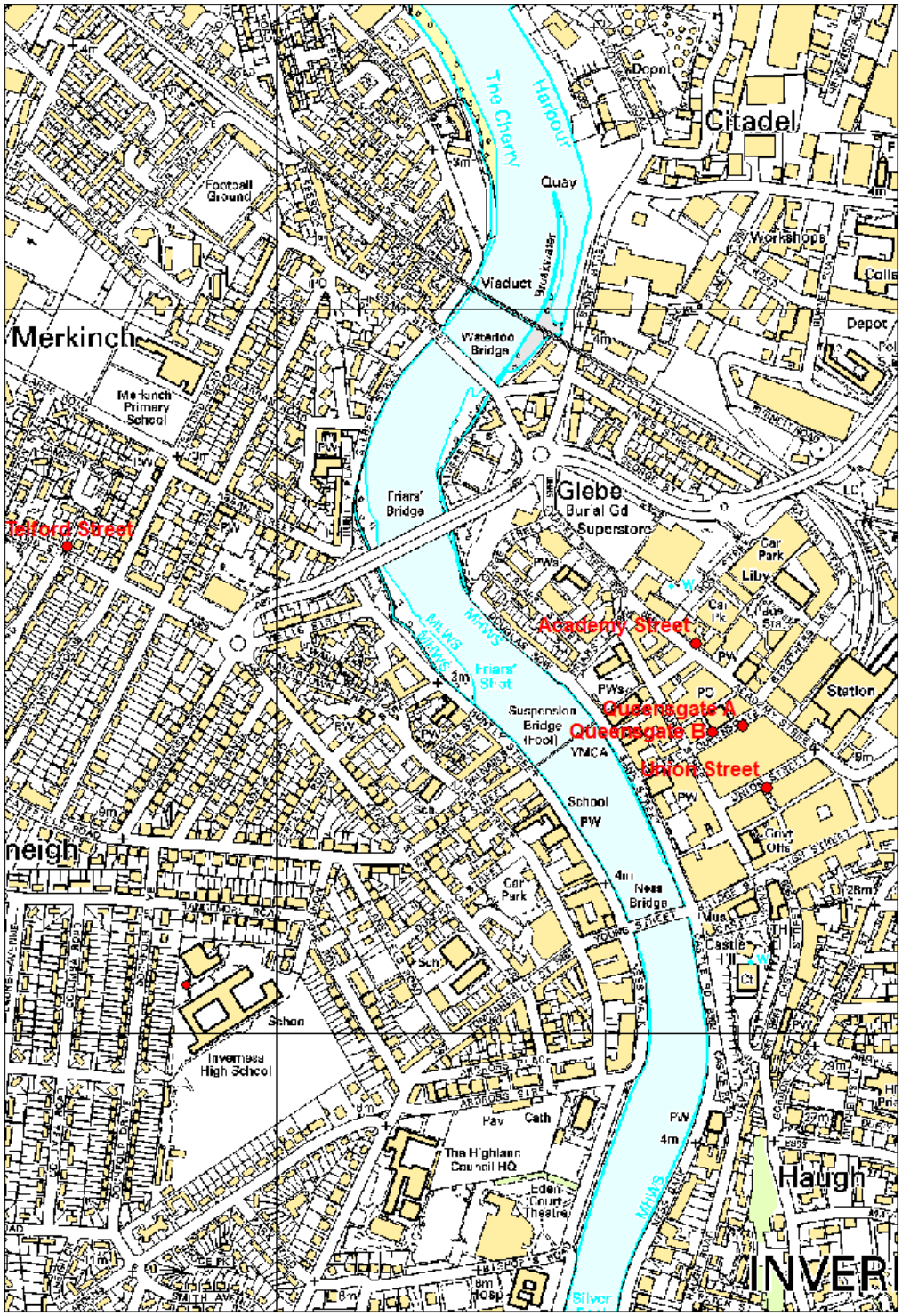


Table 2.2 Details of Non-Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Does this location represent worst-case exposure?
Telford Street, Inverness	Roadside	265710	845672	NO_2	N	Y	Y (2.5m)	4m	N
Union Street, Inverness	Roadside	266675	845339	NO_2	N	N	Y(3m) 1-hour(0.5m)	3m	Y
Academy Street, Inverness	Roadside	266577	845538	NO_2	N	N	Y(5m) 1-hour(0.5m)	5m	Y
Queensgate A, Inverness	Roadside	266599	845416	NO_2	N	N	Y(3m) 1-hour(0.5m)	3m	Y
Queensgate B, Inverness	Roadside	266642	845424	NO_2	N	N	Y(3m) 1-hour(0.5m)	3m	Y
Wyvis Terrace, Dingwall	Roadside	254430	858968	NO_2	N	N	Y(2.5m)	1m	Y
Station Road, Dingwall	Roadside	255200	858185	NO_2	N	N	Y(1m)	1m	Y
Kintail Place, Dingwall	Background	255112	859866	NO_2	N	N	Y(2.5m)	1m	N/A
Burns Crescent, Dingwall	Background	254420	859288	NO_2	N	N	Y(2.5m)	1m	N/A

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

The annual mean Nitrogen dioxide concentration exceeded 40 ugm-3 at one site in 2011. None of the sites recorded more than 18 1-hour means above 200 ugm-3, or where appropriate the 99.8th percentile of hourly means did not exceed 200ugm-3. There was insufficient data to determine the annual mean concentration at sites RC1, RC2, RC3 and RC4.

Automatic Monitoring Data

Monitoring of Nitrogen dioxide was completed throughout 2011 at Telford Street, Inverness and Fort William. The results are detailed in the tables 2.3 and 2.4 below.

The annual mean Nitrogen dioxide concentration recorded at Telford Street was 27 ugm^{-3}.

There were no hourly mean exceedences of 200ugm^{-3} in 2011. Data capture at the site was greater than 90%.

The Telford Street AUN site is 4 metres from the carriageway of the A82 (Telford Street). Relevant exposure on the street consists of domestic houses. The majority of houses along the street are at around 6 metres from the carriageway. There are, however, several houses which are 2.5 metres from the kerb. The AUN site is therefore not representative of closest relevant receptors on the street.

The procedure described in TG(09) has been followed to determine an estimate of the Nitrogen dioxide concentration at the closest receptors to Telford Street, which is 29.7 ugm^{-3}.

The Fort William site is described as “suburban”. It lies on recreational ground within the town but is removed from the town centre and any busy roads.

The annual mean recorded at the site for 2011 was 11.8 ugm^{-3}. There was significant data loss from the site during 2011 and the data capture rate was recorded as 64%. There were no exceedences of 200 ugm^{-3} as an hourly mean and the 99.8^{th} percentile of hourly means was recorded as 102 ugm^{-3}.

Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Annual Mean Concentration μg/m^3				
					2007	2008	2009	2010	2011
Telford Street	Roadside	N	97.3	97.3	22.3	20.6	20.7	24.5[4]	27
Fort William	Suburban	N	64	64	9.32[1]	10.5[2]	9.35[3]	13.4	11.8[5]

[1] only 84.88% data was captured from the Fort William Site in 2007
[2] only 88% data was captured from the Fort William Site in 2008
[3] only 87.9% data was captured from the Fort William Site in 2009
[4] only 88.8% data was captured from the Telford Street Site in 2010
[5] only 64% data was captured from the Fort William Site in 2011.

Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

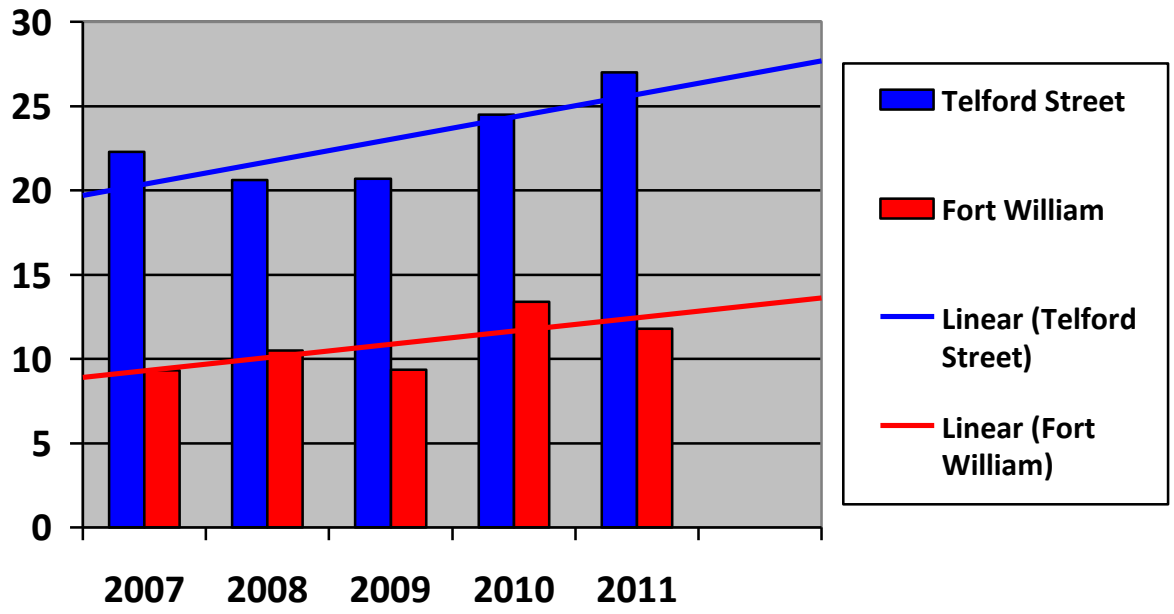
Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %	Valid Data Capture 2011 %	Number of Exceedences of Hourly Mean (200 μg/m^3)				
					2007	2008	2009	2010	2011
Telford Street	Roadside	N	99.6	99.6	0	0	0	0(118)	0
Fort William	Suburban	N	64	64	0(53)	0(59)	0(73)	0	0(102)

If the period of valid data is less than 90%, the 99.8th percentile of hourly means is displayed in brackets

Trends in Automatic Monitoring Data

Both the automatic monitoring sites have been displaying and increasing trend and the increase has been more marked at the Inverness site over the last two years. Both of these sites up until 2010 had been demonstrating a generally reducing trend.

Figure 2.3 Nitrogen Dioxide Automatic Monitoring Trends



Diffusion Tube Monitoring Data

Results of Nitrogen dioxide diffusion tube monitoring at sites within Highland are contained in Table 2.5.

Site IV4 is a collocation triplicate study at the site of the AUN (Automatic Urban Network) station on Telford Street, Inverness. The annual mean noted for the Site IV4 in table 2.5a is average of the results for the three tubes exposed at this location.

All results have been bias adjusted using a factor of 1.09 obtained from the colocation study at Telford Street, Inverness.

The annual mean Nitrogen dioxide concentration at site IV3a, which is located on Queensgate, Inverness was measured to be 48 ugm^{-3} in 2011. The site is representative of relevant exposure for the annual mean objective. Although all of the ground floor, and most of the upper storey, accommodation on the street is commercial or retail there are a number of flatted dwellings in the upper storeys. All other sites returned annual mean concentrations below the objective.

There could be relevant exposure for the 1-hour objective on Union Street, Academy Street and Queensgate, which are all busy shopping streets in the centre of Inverness. An assumption has been made that pedestrians are on the pavement approximately at a distance of 0.5 m from the kerb. The annual mean concentration has been adjusted to reflect this distance from the kerb. Technical Guidance Note LAQM.TG(09) suggests that where the annual mean recorded by a diffusion tube site is greater than 60 ugm^{-3} there is a risk that the 1 hour mean objective may not be achieved. The annual mean predicted at Academy Street, Union Street, and Queensgate B is less than 60ugm^{-3}, however at Queensgate A the predicted annual mean is 66 ugm^{-3}.

The predicted concentrations for relevant sites are displayed in Table 2.6.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2011 (comparison with Annual Mean Objective)

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = XX) 2011 ($\mu g/m^3$)
IV1	Union Street	Roadside	N	N	100	N/A	N	28.3(1.09)
IV2	Academy Street	Roadside	N	N	100	N/A	N	31.1(1.09)
IV3a	**Queensgate**	**Roadside**	**N**	**N**	**75**	**N/A**	**N**	**48.0(1.09)**
IV3b	Queensgate	Roadside	N	N	100	N/A	N	34.0(1.09)
IV4	Telford Street	Roadside	N	Y	100	N/A	Y	29.7(1.09)
RC1	Wyvis Terrace	Roadside	N	N	0	N/A	N/A	No Data
RC2	Station Road	Roadside	N	N	0	N/A	N/A	No Data
RC3	Kintail Place	Urban Background	N	N	0	N/A	N/A	No Data
RC4	Burns Crescent	Urban Background	N	N	0	N/A	N/A	No Data

Table 2.6 Results of Nitrogen Dioxide Diffusion Tubes in 2011 (comparison with 1-hour Mean Objective)

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2011 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = XX) 2011 ($\mu g/m^3$)
IV1	Union Street	Roadside	N	N	100	N/A	Y	37.2(1.09)
IV2	Academy Street	Roadside	N	N	100	N/A	Y	46.2(1.09)
IV3a	**Queensgate**	**Roadside**	**N**	**N**	**75**	**N/A**	**Y**	**66(1.09)**
IV3b	Queensgate	Roadside	N	N	100	N/A	Y	45.5(1.09)

Annual mean concentration has been corrected for distance to 0.5m from the kerb.

2.2.2 PM_{10}

PM_{10} annual mean concentrations at Telford Street continue to be significantly below the 2010 annual mean objective and are the subject of a reducing trend.

There were no exceedences of the 24 hour mean objective in 2011. Data capture at the site was less than 90%. The 98th percentile of 24 hour means was 20 ugm^{-3}.

The monitoring location at Telford Street is 4 metres from the kerb. While the majority of dwellings on the street are this distance or greater from the kerb, there are a small number of dwellings which are 2.5 metres from the kerb. However PM_{10} concentrations at the monitoring position are such that it is unlikely that concentrations, even at the closest receptors, are in excess of the objectives.

Table 2.7 Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

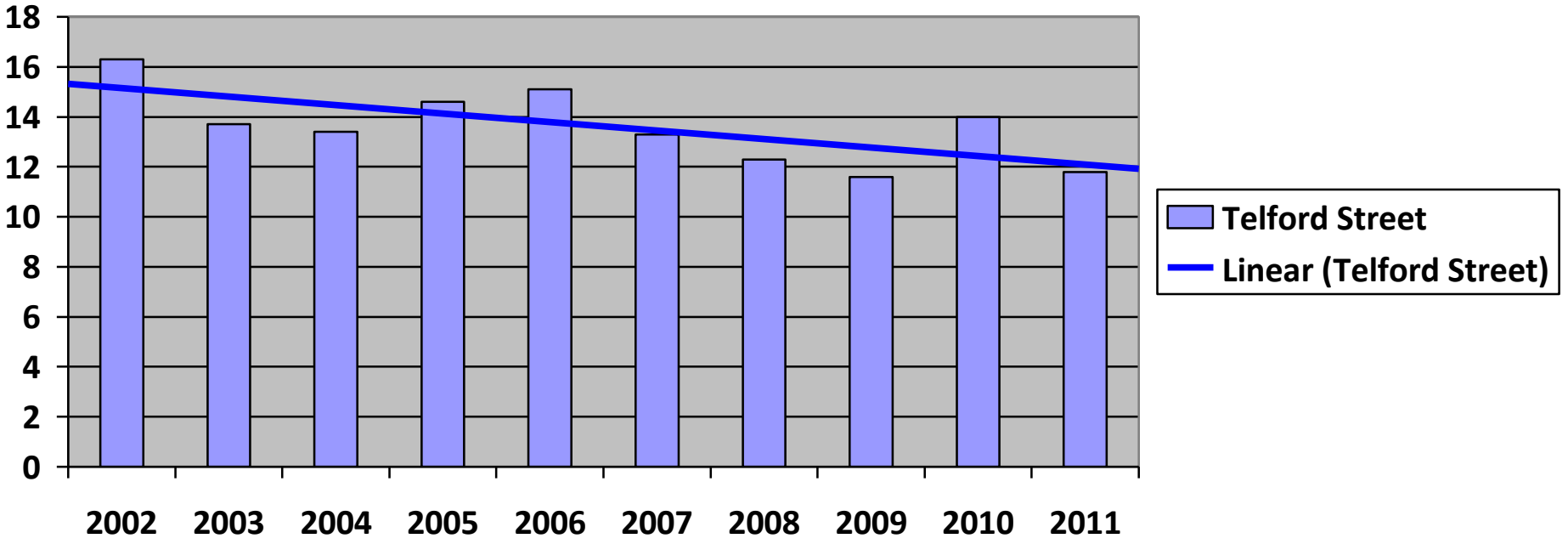
Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration μg/m^3				
						2007	2008	2009	2010	2011
Telford Street	Roadside	N	87	87	Y	13.5	12.3	11.6	14	11.8

Table 2.8 Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2011 %	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 μg/m^3)				
						2007*	2008*	2009*	2010*	2011
Telford Street	Roadside	N	87	87	Y	0	0	0	2(24.9)	0(20)

Where data capture is less than 90%, the 90th percentile of 24-hour means is included in brackets

Figure 2.4 Trends in Annual Mean PM_{10} Concentrations



2.2.3 Other pollutants monitored

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007 identified UK Air Quality Objectives for the protection of human health. Some of these objectives, including those for PM2.5 and Ozone, are not included in the regulations at present. The objectives for these two pollutants are described in table 2.6 below. The results of the automatic monitoring for these pollutants are included here for information

Table 2.9 UK Air Quality Strategy Objectives for the protection of human health, July 2007

Pollutant	Air Quality Objective		To be achieved by
	Concentration	Measured as	
Particles (PM2.5) (Gravimetric)	12 ugm^{-3} (limit)	Annual mean	2020
Ozone	100 ugm^{-3} not to be exceeded more than 10 times a year	8 hourly running mean or hourly mean	31st December 2005

In 2011the 8 hourly running mean ozone concentration was greater than 100ug m^{-3} on 7 occasions at Fort William and 14 occasions at Strath Viach. The objective was therefore achieved at Fort William but was not achieved at Strath Viach. It should be noted that there is no relevant exposure at Strath Viach.

The annual mean PM2.5 concentration at Telford Street, Inverness was 6 ugm^{-3} in 2011. This is less than the limit set by the objective to be achieved by 2020 for the pollutant in Scotland.

2.2.4 Summary of Compliance with AQS Objectives

The Highland Council has measured concentrations of Nitrogen dioxide above the annual mean objective at relevant locations, and **will need to proceed to a Detailed Assessment**, for Nitrogen dioxide at Queensgate, Inverness.

3 Road Traffic Sources

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

The Highland Council confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

The Highland Council confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

The Highland Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

The Highland Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

The Highland Council confirms that there are no new/proposed roads.

3.6 Roads with Significantly Changed Traffic Flows

The Highland Council confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

The Highland Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

The Highland Council confirms that there are no airports in the Local Authority area with a total equivalent passenger output of more than 10 million passengers per annum.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

The Highland Council confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

The Highland Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

The Highland Council confirms that there are no ports or shipping that meet the

specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

The Highland Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

The Highland Council confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

The Highland Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There are major fuel (petrol) storage depots within the Local Authority area, but these have been considered in previous reports.

5.3 Petrol Stations

The Highland Council confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

The Highland Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

The Highland Council has identified 35 individual biomass installations in addition to the 23 installations that were assessed in the 2009 Updating and Screening Assessment. None of the biomass installations assessed are likely to result in exceedences of the Air Quality Objectives.

Of the 35 installations only one was the subject of an air quality assessment. The remaining 34 installations were screened using the guidance in LAQM.TG(09).

Biomass Installations subject to Air Quality Assessment

BSW at Corpach, Fort William applied for permission to install 2 No 5MWth biomass boilers at their sawmill to provide process heat. The installation was associated with a process requiring a permit from SEPA and would be regulated by them. The applicant carried out dispersion modelling which determined an appropriate stack height and demonstrated that the air quality objectives would continue to be achieved.

Biomass installations not subject to Air Quality Assessment

34 Biomass combustion plant were assessed using the screening tools provided by the LAQM Helpdesk. The installations range in size from 50 to 5000KWth. Information was gathered on the Stack dimensions and emissions from the plant, background pollutant levels and the proximity of relevant exposure.

Screening suggested that all of these installations are unlikely to cause failures to achieve the Air Quality Objectives.

The Highland Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

There are no concentrations of biomass combustion in The Highland Council Area at a level which would require further assessment in this section.

The Highland Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.3 Domestic Solid-Fuel Burning

A detailed assessment was carried out by this authority, in 2005, with respect to Sulphur dioxide emission from domestic solid fuel combustion. Castletown in Caithness was identified as an area where the highest level of domestic solid fuel combustion occurred and was the subject of the assessment. The conclusion of the assessment was that there was not a likelihood of failure to meet the objectives.

The Highland Council has assessed areas of significant domestic solid fuel use, and concluded that it will not be necessary to proceed to a Detailed Assessment.

7 Fugitive or Uncontrolled Sources

The Highland Council confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

New monitoring data has identified a diffusion tube monitoring site where the annual mean Nitrogen dioxide concentration was in excess of the objective. The location is outside and AQMA. There are currently no AQMAs declared in Highland.

The 8-hour running mean Ozone objective was also exceeded at the Strath Viach automatic rural monitoring site. Ozone is, however, not included in the local Air Quality Management process and there is no relevant exposure at the site.

No other exceedences of the objectives were identified.

8.2 Conclusions from Assessment of Sources

The assessment of sources did not identify any sources or locations where an exceedence of the air quality objectives was likely to occur.

8.3 Proposed Actions

It will be necessary for The Highland Council to proceed to a detailed assessment of air quality in The Queensgate area of Inverness with respect to the following objectives:

- 40 ugm-3 Annual Mean Objective for Nitrogen dioxide; and
- 200 ugm-3 1-hour mean Objective for Nitrogen dioxide.

The Highland Council's next course of action will be to submit a progress report in April 2013 and progress to a detail assessment of the matters identified above.

9 References

1. DEFRA in partnership with the devolved administrations, **The Air Quality Strategy for England, Scotland, Wales and Northern Ireland**, July 2007.
2. **The Air Quality (Scotland) Regulations 2000**
3. **The Air Quality (Scotland) (Amendment) Regulations 2002**
4. DEFRA in partnership with the devolved administrations, **Local Air Quality Management Technical Guidance LAQMTG(09)**, 2009
5. The Highland Council, **Air Quality in The Highlands – First Stage Review and Assessment** 1998.
6. The Highland Council, **Addendum to Air Quality in the Highlands**, 2001.
7. The Highland Council, **Updating and Screening Assessment**, 2003
8. The Highland Council, **Progress Report**, 2005
9. The Highland Council, **Detailed Assessment Report**, 2005
10. The Highland Council, **Updating and Screening Assessment**, 2006.
11. The Highland Council, **Progress Report** 2007.
12. The Highland Council, **Progress Report** 2008.
13. The Highland Council, **Updating and screening Assessment**, 2009
14. The Highland Council, **Progress Report** 2010.
15. The Highland Council, **Progress Report** 2011
16. NETCEN, **Air Quality Monitoring: Highland**, 2005
17. **Environment Act 1995**
18. **Clean Air Act 1993**
19. http://www.airquality.co.uk/data_and_statistics_home.php
20. http://www.airquality.co.uk/laqm/laqm.php
21. AEA Energy and Environment on behalf of the Scottish Government, **Measurement and Modelling of Fine Particulate Emissions (PM10 and PM2.5) from Wood Burning Biomass Boilers**, 2008
22. AEA Technology, **QA/QC Data Ratification report for the Automatic Urban and Rural Network, October – December 2008 and Annual Review for 2008**, June 2009.
23. Gradko (International) Ltd, **Passive Diffusion Tube Monitors – Instruction manual for Exposure and Location**.
24. AEA Energy and Environment, **Technical Guidance – Screening Assessment for Biomass Boilers**, 2008
25. Air Quality Consultants, **Nitrogen dioxide Concentrations and Distance from Roads**, 2008
26. http://www.uwe.ac.uk/aqm/review/
27. AEA Energy and Environment for DEFRA and the devolved administrations, **Diffusion Tubes for Ambient NO2 Monitoring – Practical Guidance for Laboratories and Users**, 2008
28. AEA Energy and Environment on behalf of DEFRA and the devolved administrations, **WASP - Annual Performance Criteria for NO2 Diffusion Tubes used in Local Air Quality Management (LAQM), 2008 onwards, and Summary of Laboratory Performance in Rounds 105-109.**

Appendices

Appendix A: QA/QC Data

Appendix B: Data

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

Factor from Local Co-location Studies (if available)

A diffusion tube co-location study has taken place at site IV4, a roadside site on Telford Street, Inverness. The tubes are co-located with the Telford Street AUN Station. AEA's DifTPAB spreadsheet tool has been used to determine the precision and accuracy of the diffusion tube co-location study. Overall data capture of the automatic monitor data was good. Precision of both the automatic data and the diffusion tube data were identified as good. The bias factor was determined to be 1.09. There were no periods of poor precision in the survey.

Discussion of Choice of Factor to Use

The Highland Council was advised by the reviewer of the Authority's previous round review and assessment report to consider using the local bias adjustment factor for the adjustment of diffusion tubes in future reporting.

The Bias adjustment factor obtained from the local colocation study has been used in the adjustment of all diffusion data contained in this report.

PM Monitoring Adjustment

The method used for the measurement of PM10 at Telford Street, Inverness is considered to be equivalent to the reference method. No adjustment of the dataset has been necessary.

QA/QC of automatic monitoring

The AURN sites in Highland are operated for DEFRA by Bureau Veritas with QA/QC provided by AEA.

QA/QC of diffusion tube monitoring

Gradko have supplied the following QA/QC statement:

Supply and Analysis of Nitrogen Dioxide (NO_2) Diffusion Tubes

Analysis of the NO_2 diffusion tubes is carried out using ion chromatography techniques in accordance with Gradko International Ltd U.K.A.S. accredited (ISO/IEC 17025) internal laboratory procedure GLM 7, which is a recommended UV spectrophotometric method.
Reporting of the NO_2 analysis results is sent to electronically to each authority in PDF format or if requested EXEL format. The report is issued within 10 working days from receipt of the exposed diffusion tubes to the Gradko Laboratory.

Quality Assurance: The laboratory has a fully documented Quality Management System, which has been assessed and accredited by U.K.A. S. (Accreditation No. 2187). A copy of the Quality Manual Contents Index is available on request.

Quality Control Procedures: All tube components are maintained in a high state of cleanliness. New absorbent is prepared by the Laboratory and checked for levels of nitrogen dioxide.
The diffusion tubes are prepared in a dedicated clean laboratory and stored under refrigerated conditions to maintain stability. A sample of each batch of tubes prepared is checked by the analyst for blank levels. If the tubes are stored for more than one week, a further sample is taken and checked for any increases in blank levels. If the levels reach a pre-determined value, the batch of tubes is discarded
Analytical Quality Control Procedures are implemented by the use of internal standards checks using certified standards from two different sources, and the use of external proficiency schemes such as WASP Inter- Comparison Project and NETCEN which are administered by the UK Health & Safety Laboratory.

Gradko performance on the WASP Inter-comparison Project Rounds 105-109 was described as "good".

Tube Exposure Procedure

The Highland Council exposes diffusion tubes according to the method described in "Passive Diffusion Air Monitors – Instruction Manual for Exposure and Location" by Gradko International Ltd. Guidance is also found in "Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance" by AEA for DEFRA.

Appendix B: Data

Nitrogen dioxide diffusion tube raw monthly data for all sites

Month	Site										
	IV1	IV2	IV3a	IV3b	IV4a	IV4b	IV4c	RC1	RC2	RC3	RC4
JAN	30.75	30.28	42.20	35.69	36.52	32.19	31.29				
FEB	27.36	32.03	49.47	33.70	29.50	32.77	28.09				
MAR	27.23	27.15	38.52	30.72	29.34	29.42	31.59				
APR	29.48	28.26	49.26	32.19	28.98	27.40	22.01				
MAY	18.74	20.70	35.31	27.12	20.95	18.45	19.74				
JUN	32.39	34.02	47.30	41.66	22.36	20.54	19.21				
JUL	26.14	33.99	59.45	36.57	18.56	17.97	16.32				
AUG	25.61	28.96	37.88	29.39	25.10	20.88	24.86				
SEP	20.94	22.04	37.36	29.57	24.86	21.52	20.13				
OCT	32.02	22.00		30.74	29.46	22.06	25.06				
NOV	32.02	31.61		37.05	37.41	34.35	34.14				
DEC	9.24	31.90		9.98	16.92	13.40	16.36				