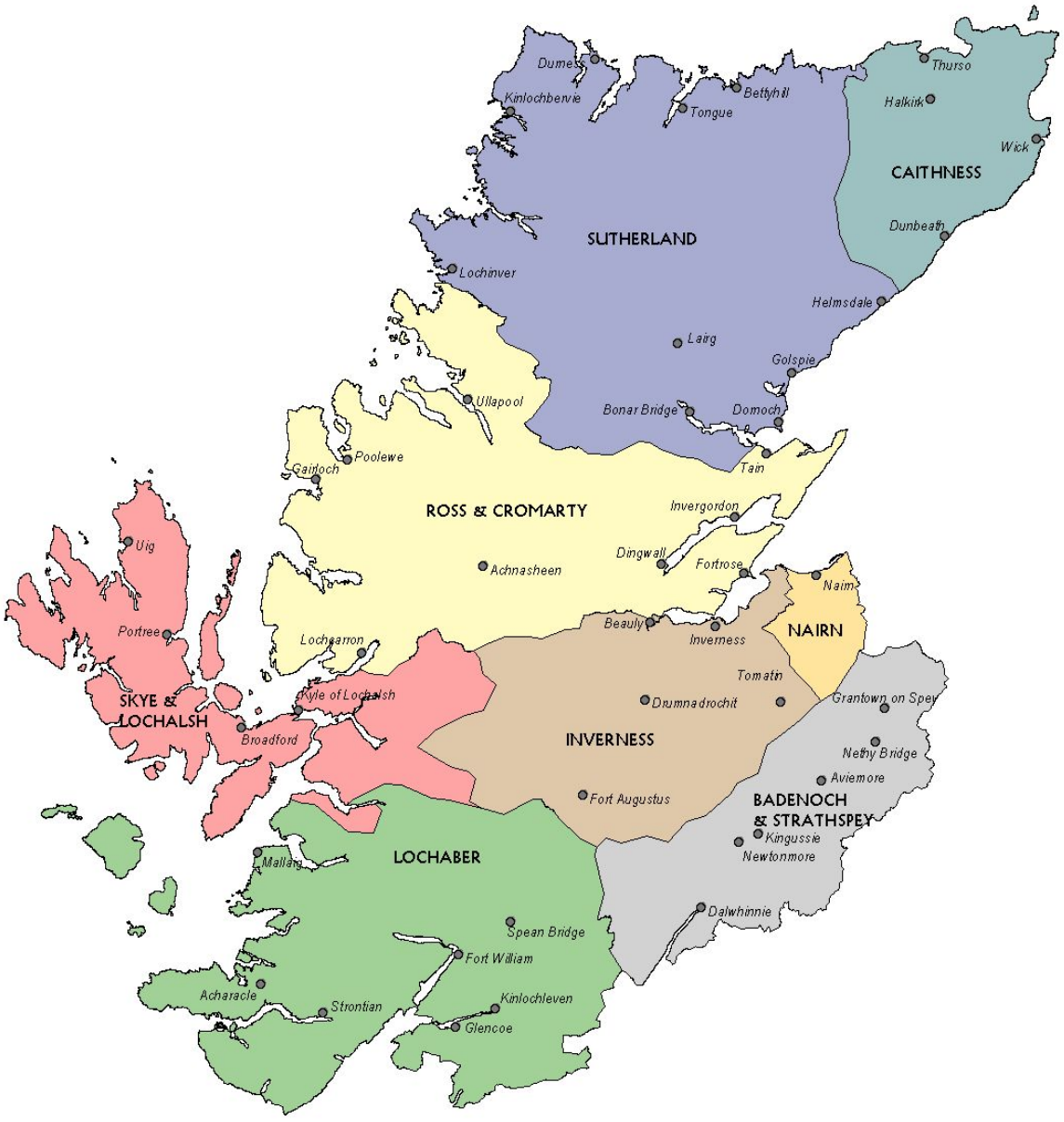
Updating and Screening Assessment of Air Quality

Highland Council 2006

The Highland Council Administrative Areas



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1 Executive Summary

Part IV of the Environment Act 1995 introduced Local Air Quality Management, whereby local authorities have a statutory duty to carry out reviews and assessments of local air quality from time to time. Local Air Quality Management has an important role in helping to deliver the air quality objectives which are set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (January 2000) and the Air Quality (Scotland) Regulations 2000 (as amended).

The Highland Council is required to undertake a review and assessment of local air quality by the end of April 2006. The purpose of this report is to update the findings of previous reports and to assess whether any of the Air Quality Objectives are at risk of being exceeded in Highland in the coming years up to 2010.

There are seven pollutants which each local authority must assess. The assessment is carried out having regard to the directions in the Local Air Quality Management Technical Guidance LAQM. TG(03), which is referred to throughout this report.

Where an updating and screening assessment identifies a risk that an air quality objective will be exceeded at a location with relevant exposure, the local authority will be required to undertake a Detailed Assessment following the directions in LAQM. TG(03). The aim of a Detailed Assessment is to identify with reasonable certainty whether or not an Air Quality Objective will be exceeded.

The main findings of this Review and Assessment are that in the Highland Council area:-

- the Air Quality Objectives for all pollutants have been met; and
- the Air Quality Objectives are not at risk of being exceeded in the coming years up to 2010.

2 Introduction

2.1 Introduction

This report presents the findings of Highland Council's second Updating and Screening Assessment (USA) of air quality. The report builds upon the first round of review and assessment that was completed in 1998 and the first Updating and Screening Assessment that was completed in 2003.

In 2005 Detailed Assessments were carried out for two pollutants. These assessments were for Sulphur dioxide from industrial emissions in Fort William and from solid fuel burning in Castletown and for Nitrogen dioxide from vehicle emissions in Inverness.

This report describes:

- The statutory background and the legislative framework within which local authorities must work;
- The new principles behind reviews and assessments of air quality up to 2010 and the recommended steps that local authorities should take;
- The link between air quality and health;
- Air quality objectives and standards;
- Review and assessment of Carbon monoxide, Benzene, 1,3-butadiene, Lead, Nitrogen dioxide, Sulphur dioxide and PM10

2.2 Statutory Background

In March 1997 the Government published the National Air Quality Strategy under Part IV of the Environment Act 1995. The Strategy introduced a system for local air quality management and included objectives for certain air pollutants. The first review and assessment of air quality was carried out in 1998.

In January 2000 a revised strategy, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, was launched - replacing the 1997 document. In this Strategy objectives for the eight main health-threatening pollutants, namely ozone, Carbon monoxide, benzene, 1,3-butadiene, lead, nitrogen dioxide, sulphur dioxide and PM10, were set and, apart from ozone, were given legal effect through the Air Quality (Scotland) Regulations 2000 (as amended).

An addendum to the Strategy set additional objectives for particles and new objectives for benzene, Carbon monoxide and for polyaromatic hydrocarbons, which were not previously included. With the exception of polyaromatic hydrocarbons, these have also been given legal effect via the Air Quality (Scotland) Amendment Regulations 2002.

2.3 Principles of Review and Assessment of Air Quality

The Air Quality Strategy establishes the framework for air quality improvements in the UK. Measures agreed at the national and international level are the foundations on which the strategy is based. The strategy recognises that despite national and international measures, and industrial

regulation, areas of poor air quality will remain, and that these will best be dealt with using local measures implemented through the Local Air Quality Management (LAQM) regime. Limit Values for the protection of vegetation and ecosystems are, however, treated as national objectives and are not included within regulations for the purposes of LAQM.

The role of the local authority review and assessment process is to identify those outside areas where it is considered likely that the Air Quality Objectives will be exceeded, and where members of the public are regularly present. Experience in other parts of the UK has shown that such areas may range from single residential properties to whole town centres. Where local exceedences have been identified, either as a result of an activity carried on within the council area, or as a result of activities carried on within the neighbouring councils, the local authority must make plans to tackle the pollution.

The Scottish Executive also recognises that policies to improve air quality may have added benefits, for example, policies designed to reduce the impact that transport has on air quality by tackling congestion should also reduce Carbon dioxide emissions, thereby contributing to the achievement of the UK and Scottish Climate Change Programmes. It is recognised that the outcome of these policies will be difficult to achieve and delivery would only be expected in the long term.

2.4 Local Authorities' Functions and Duties

Local authorities have a major part to play in delivering cleaner air. They have a long history of local environmental control. For air quality, this started with the early nuisance legislation, then control of smoke from domestic sources under the Clean Air Acts of the 1950s and 1960s. More recently local authorities have started to consider air quality when they fulfil

their strategic planning and transport roles. Managing ambient air quality is therefore a natural progression for local authorities.

Local Air Quality Management requires local authorities to periodically review and assess the current and future quality of air in their areas.

The timetable for the process is presented below:

Figure 1 Timetable for Local Authority Air Quality Reports

LAQM Activity	Completion Date	Which Authorities?
Updating and screening assessment	May 2003	All authorities
Detailed assessment	April 2004	Those authorities which have identified the need for one in their May 2003 USA
Progress report	April 2004	Those authorities which identified that there was no need for a detailed assessment in their May 2003 USA.
Progress report	April 2005	All authorities
Updating screening and assessment	April 2006	All authorities
Detailed assessment	April 2007	Those authorities which have identified the need for one in their April 2006 USA.
Progress report	April 2007	Those authorities which identified that there was no need for a detailed assessment in their April 2006 USA.
Progress report	April 2008	All authorities
Updating screening and assessment	April 2009	All authorities
Detailed assessment	April 2010	Those authorities which have identified the need for one in their April 2009 USA.
Progress report	April 2010	Those authorities which identified that there was no need for a detailed assessment in their April 2009 USA.

In order to assist local authorities in the performance of their duties the Scottish Executive has produced a guidance note, Technical Guidance TG(03) which updates and replaces previous versions. In addition, the Executive has produced Policy Guidance that sets out how local authorities should handle the LAQM process.

Updated guidance has been prepared to cover the following issues:

- Background pollution maps and future year calculation tools
- Emissions of sulphur dioxide from steam locomotives

- Emissions of sulphur dioxide from shipping
- Emissions of PM10 from poultry farms
- Data ratification procedures
- NOx:NO2 relationships

This guidance is available at http://www.uwe.ac.uk/aqm/review/guidance_05.html.

2.5 Air Quality, Health and the Environment

The main reason for tackling poor air quality is the link to quality of life and the need to minimise the risk to human health. There is now a better understanding of the short-term and the long-term health effects of air pollution, largely due to the work undertaken by the Committee on the Medical Effects of Air Pollutants.

Short-term increases in particles, sulphur dioxide and nitrogen dioxide are associated with increased deaths brought forward and increased respiratory or cardiovascular hospital admissions amongst the elderly and those who are already ill. These pollutants can also worsen the symptoms of those with asthma. The Committee on the Medical Effects of Pollution has recently reported that long-term exposure to particles is associated with reduced life expectancy.

Carbon monoxide can increase symptoms in those with heart disease, and lead can have adverse effects on the blood, the nervous system and the kidneys, and can also affect brain development in children. Benzene and 1,3-butadiene are both carcinogenic.

In addition, nitrogen oxides, sulphur dioxide and ozone can damage crops, vegetation and ecosystems, as well as materials and buildings, often at concentrations below those known to have a direct impact upon human health.

2.6 Monitoring

There are over 1500 sites across the UK at which local authorities monitor air quality as part of national automatic or non-automatic networks. These sites produce hourly, daily, weekly or monthly statistics. The data generated can be accessed via the UK National Air Quality Information Archive. In addition, maps of estimated ambient air pollution have been provided to assist local authorities in carrying out their review and assessments.

Most local authorities will also carry out limited monitoring for the purposes of air quality review and assessment, outwith the national network scheme. The results of monitoring carried out within Highland Council are included within Section 4 - Monitoring.

2.7 Air Quality Objectives and Standards

The Air Quality Strategy sets air quality standards that are based on the medical evidence of the effects of particular pollutants on health. They represent minimum or no significant risk levels, founded on the advice of the Expert Panel on Air Quality Standards. These standards do not take account of cost benefit assessment or on technical feasibility.

Air quality objectives included within the Strategy are however based upon an analysis of costs and benefits, along with the feasibility of moving towards the recommended standards. These air quality objectives, set out in the Air Quality (Scotland) Regulations 2002 (as amended), provide the statutory basis for the system of LAQM, and are listed below. Ozone, polycyclic aromatic hydrocarbons, and the objectives for protecting vegetation and ecosystems are not included in the Regulations for purposes of LAQM at the present time.

Figure 2 Air Quality Objectives

Air Quality Objective			
Pollutant	**Concentration**	**Measured as**	**Date to be achieved by**
Carbon monoxide	10.0 mg/m3	Running 8-hour mean	31.12.2003
Benzene	16.25 µg/m3	Running annual mean	31.12.2003
	3.25 µg/m3	Running annual mean	31.12.2010
1,3-butadiene	2.25 µg/m3	Running annual mean	31.12.2003
Lead	0.5 µg/m3	Annual mean	31.12.2004
	0.25 µg/m3	Annual mean	31.12.2008
Nitrogen dioxide	200 µg/m3 not to be exceeded more than 18 times a year	1 hour mean	31 12.2005
	40 µg/m3	Annual mean	31.12.2005
Particles (PM_{10} as gravimetric)	50 µg/m3 not to be exceeded more than 35 times a year	24 hour mean	31.12.2004
	40 µg/m3	Annual mean	31.12.2004
	50 µg/m3 not to be exceeded more than 7 times a year	24 hour mean	31.12.2010
	18 µg/m3	Annual mean	31.12.2010
Sulphur dioxide	350 µg/m3 not to be exceeded more than 24 times a year	1 hour mean	31.12.2004

Air Quality Objective			
Pollutant	**Concentration**	**Measured as**	**Date to be achieved by**
	125 µg/m3 not to be exceeded more than 3 times a year	24 hour mean	31.12.2004
	266 µg/m3 not to be exceeded more than 35 times a year	15 minute mean	31.12.2005

The Department of the Environment, Transport and the Regions Air Quality Strategy for England, Scotland, Wales and Northern Ireland establishes the framework for air quality improvements.

2.8 Local Air Quality Management

Measures agreed at a national and international level are the foundations on which the strategy is based. It is recognised, however, that despite these measures, areas of poor air quality will remain, and that these will best be dealt with using local measures implemented through the Local Air Quality Management Regime.

The role of the Local Authority review and assessment process is to identify these areas, where it is considered that the Air Quality Objectives may be exceeded. The experience gained from such reviews carried out throughout the UK has shown that such areas may range from single residential properties to whole town centres. Where it is likely that the Air Quality Objectives will not be met in the area of a Local Authority, that Authority must designate an air quality management area (AQMA).

2.9 Review and Assessment

Local Air Quality management requires the local authority to review and assess the air quality in the area of the authority at prescribed intervals.

The first Review and Assessment of Air Quality in Highland was completed in 1998. This exercise was to be followed by updating and screening assessments (USA) in 2003, 2006 and 2009. Detailed assessments are to be carried out as determined by the review and assessment process. Where detailed assessments are not required the local authority will also be required to submit annual progress reports.

2.10 The Review and Assessment process in Highland to date

The Highland Council published A Local Air Quality Updating and Screening Assessment in June 2003. This report identified that a Detailed Assessment would have to be carried out for:

Benzene. The screening assessment indicated that the running annual mean air quality objective for Benzene may be exceeded:

- in the vicinity of petrol terminals at Inverness harbour, and
- near the Talisman Energy UK Ltd, Nigg Oil Terminal petroleum refining process at Nigg.

Sulphur Dioxide. The screening assessment indicated that:-

- 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
- 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 Nitrogen dioxide in Inverness City Centre as measured by passive diffusion tube and so a Detailed Assessment was also undertaken for Nitrogen dioxide.

The Highland Council proceeded with a detailed assessment during 2004-2005.

A Local Air Quality Progress Report was published in June 2005.

2.11 Detailed Assessment – October 2005

A Local Air Quality Detailed Assessment Report was published in October 2005. This document detailed the findings of the Detailed Assessment for Benzene in the vicinity of the Inverness Fuel Terminal and at Nigg, for Sulphur dioxide at Castletown and in respect of the Alcan Aluminium Smelter at Fort William, and for Nitrogen dioxide in Inverness City Centre. The report concluded that:

- The assessment clearly indicated that the objectives for Benzene are likely to be met at the two locations assessed.
- The assessment indicated that the objective for Nitrogen dioxide is likely to be met across Inverness city centre.
- The air quality objectives for Sulphur dioxide are likely to be met in Castletown and it was concluded that the same outcome would be evident in other similar communities throughout the Highlands.
- The air quality objectives for Sulphur dioxide are likely to be met at Fort William
- There is no requirement for the local authority to declare an AQMA in respect of any of these pollutants in these areas.

2.12 Updating and Screening Assessment 2006

In 2006 The Department for the Environment Food and Rural Affairs has issued further guidance to assist Local Authorities with the review and assessment process. The guidance is in the form of *FAQs* and *Checklists for Updating and Screening Assessments 2006* and will be used in conjunction with the existing Technical Guidance LAQM. TG(03).

This Updating and Screening Assessment will cover:

- New monitoring data;
- New or significantly changed transport sources
- New or significantly changed industrial sources
- New areas of relevant exposure
- Any other local changes that might affect air quality

2.13 Reference Publications

Full details of the Air Quality Strategy and the role of Local Air Quality Management can be found in the following publications:

1. Department of the Environment, Transport and the Regions, the Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Working Together for Cleaner Air, January 2000

   http://www.defra.gov.uk/environment/airquality/strategy/index.htm

2. Department for the Environment, Food and Rural Affairs, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland: Addendum, February 2003
3.

   http://www.scotland.gov.uk/Topics/Environment/Pollution/16215/6145

4. Department for the Environment, Food and Rural Affairs, Part IV of the Environment Act 1995, Local Air Quality Management, Technical Guidance LAQM. TG(03), February 2003

   http://www.scotland.gov.uk/Topics/Environment/Pollution/16215/6148

5. Scottish Executive, Part IV of the Environment Act 1995, Local Air Quality Management, Revised Policy Guidance, February 2003

   http://www.scotland.gov.uk/Topics/Environment/Pollution/16215/6151

2.14 Consultations

The Updating and Screening Assessment has been forwarded to the following organisations:

List of Consultees
The Scottish Executive, Air Quality Team, 1-H North Victoria Quay, Edinburgh, EH6 6QQ
The Scottish Environment Protection Agency, Graesser House, Fodderty Way, Dingwall Business Park, Dingwall IV15 9XB
The Moray Council, Council Offices, High Street, Elgin IV30 1BX

List of Consultees
Aberdeenshire Council, Woodhill House, Westburn Road, Aberdeen AB16 5GB
Perth and Kinross Council, Council Buildings, 2 High Street Perth PH1 5PH
Argyll & Bute Council Headquarters, Kilmory, Lochgilphead PA31 8RT
The Cairngorms National Park Authority, 14 The Square, Grantown-on-Spey, Moray, PH26 3HG
Talisman Energy UK Ltd, Nigg Oil Terminal, Tain, Ross-Shire IV19 1QF
BP Oil (UK) Ltd, Inverness Terminal, Cromwell Road, Inverness IV1 1SX
ALCAN Smelting & Power UK, Lochaber Smelter, Fort William PH33 6TH

2.15 Contacts for further information

Requests for further copies of this report or enquiries about it can be directed to:-

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3 The Highland Council Area

3.1 Geography

The area of the Highland Council covers approximately 25,500 square kilometres, around one third of the Scottish mainland and also includes Skye and other inner Hebridean islands. This diverse area, stretching from coast to coast, encompasses not only the mountains, glens and lochs for which the Highlands are renowned but also extensive lowlands. The west coast is mountainous with numerous deeply indented 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 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 Ardnamurachan peninsula.

3.2 Settlements

A large proportion of the 213,000 population are settled in the eastern coastal fringe however there are numerous towns, villages, scattered rural communities and inhabited islands. The Highland Capital is the City of Inverness which in 2001 had a population of just over 50,000 and is one of the fastest growing cities in Europe.

3.3 Industrial processes

The Scottish Environment Protection Agency (SEPA) has regulatory responsibility for certain prescribed processes and for landfill sites in Scotland. In order to assist authorities in the compilation of data related to these processes, SEPA have committed to provide information on any changes that may affect emissions from existing processes, and any new processes that have been, or will be, authorised.

Since 2003, there have been no developments which would compromise the air quality objectives.

4 Monitoring

4.1 Monitoring in Highland Council Area

This section details the monitoring which is undertaken in Inverness and Dingwall.

4.2 Automatic Monitoring Station – Telford Street, Inverness

Site Address: Telford Street IV3 5LE **OS Grid Reference**: NH 657 456
Site Type: Roadside **Start Date**:17/07/01

The site is adjacent to a pathway connecting Telford Street (A862) and Cameron Square Inverness. It is 4 metres from the A862. It is a predominantly residential area with a retail business park 250 metres away.

Nitrogen dioxide, carbon monoxide and particulate matter have been monitored at this site since July 2001. Nitrogen dioxide and carbon monoxide are monitored continuously whereas PM10 is measured gravimetrically by a Partisol, with filters being changed daily.

The results for the four complete years, 2002 to 2005 are shown in Figure 3 to Figure 5. All data has been ratified.

Figure 3 Nitrogen dioxide levels monitored at Telford Street, Inverness

Nitrogen Dioxide	**2002**	**2003**	**2004**	**2005**	**Air Quality Objective**
% Data Captured	97.8	98.3	98.1	97.1	
Annual mean μg/m3	21.85	23.1	22.6	21	The air quality objective annual mean to be achieved by 31.12.2005 is 40μg/m3
Maximum hourly mean μg/m3	117	130	157	130	The air quality objective hourly mean to be achieved by 31.12.2005 is that an hourly mean of 200 μg/m3 is not to be exceeded more than 18 times a year

Figure 4 PM10 levels monitored at Telford Street, Inverness

Particulate matter (PM_{10})	**2002**	**2003**	**2004**	**2005**	**Air quality Objective**
% Data Captured	65.8	93.4	95.3	94	
Annual mean µg/m3 Gravimetric	17.3	17.3	15	**16.7**	
Projected annual mean µg/m^3 Gravimetric 2010	16.3	15.9	14.5	16.1	**18 µg/m^3** to be achieved by 31.12.2010
Maximum 24 hour mean µg/m^3 Gravimetric	51	68	54	85	
Number of Exceedences (>50 µg/m^3)	1 on 31/12/02	10 between 07/01/03 and 21/04/03	1 on 10/11/04	2 on 23/12/05 and 24/12/05	The air quality objective to be achieved by 31.12.2010 is **50 µg/m^3 is not to be exceeded more than 7 times a year**

There is no obvious reason for the ten exceedences of the 50 µg/m^3 limit in the spring of 2003.

Figure 5 Carbon monoxide levels monitored at Telford Street, Inverness

Carbon monoxide	**2002**	**2003**	**2004**	**2005**	**Air quality Objective**
% Data Captured	65.8	93.5	95.3	97	-
Annual mean mg/m^3	0.43	0.45	0.43	0.52	
Maximum hourly mean mg/m^3	4.1	3.9	3.8	3.9	
Number of running 8-hour means exceeding 10mg/m^3	0	0	0	0	The air quality objective is that **the running 8-hour mean must not exceed 10 mg/m^3**

4.3 Nitrogen dioxide diffusion tubes

The locations of the diffusion tubes are listed in Figure 6 Locations of NO_2 diffusion tubes in Inverness and Dingwall. They are also shown on the maps in Annex1 and Annex 2.

Figure 6 Locations of NO_2 diffusion tubes in Inverness and Dingwall

Site Reference	Town	Street	Site Category	Easting	Northing
IV1	Inverness	Union Street	Kerbside *	266663	845346
IV2 A	Inverness	Academy Street	Roadside	266519	845528
IV2 B	Inverness	Academy Street	Roadside	266570	845530
IV2 C	Inverness	Academy Street	Roadside	266570	845530
IV2 D	Inverness	Academy Street	Roadside	266570	845530
IV3 A	Inverness	Queensgate	Kerbside	266631	845420
IV3 B	Inverness	Queensgate	Roadside	266010	845410
IV3 C	Inverness	Queensgate	Roadside	266620	845410
IV4 A	Inverness	Telford Street	Roadside	265707	845664
IV4 B	Inverness	Telford Street	Roadside	265707	845664
IV4 C	Inverness	Telford Street	Roadside	265707	845664
IV5	Inverness	Kenneth Street	Kerbside	266009	845549
RC1	Dingwall	Wyvis Terrace	Roadside	254430	858968
RC2	Dingwall	Station Road	Roadside	255200	858185
RC3	Dingwall	Kintail Place	Background	255109	859854
RC4	Dingwall	Burns Crescent	Background	254419	859287

Nitrogen dioxide diffusion tubes using the 20% TEA in water method are supplied and analysed by Gradko International. The laboratory is UKAS accredited for the analysis of NO2 diffusion tubes.

In 2005 a co-location study at Telford Street, Inverness was undertaken and the bias correction factor of 0.88 has been calculated using the netcen spreadsheet at :- http://www.airquality.co.uk/archive/laqm/tools/netcen_DifTPAB_v02.xls.

This bias correction factor was used for diffusion tube locations in Inverness. Locations with less than 9 months data have been adjusted in column 5 according to the technique describe in Box 6.5 of Local Air Quality Management, Technical Guidance LAQM. TG(03), February 2003.

The results of the passive diffusion tube analysis for 2005 are shown for Inverness in.Figure 7 Annual Mean NO2 Concentrations for 2005 in Inverness.

Figure 7 Annual Mean NO2 Concentrations for 2005 in Inverness

Location	Number of months for which data obtained in 2005	Annual Mean NO2 concentration (µg/m3) Raw data	Annual Mean NO2 concentration (µg/m3) Bias corrected (0.88)	Annual Mean NO2 concentration (µg/m3) Corrected for < 9 months data
IV1	8	38.6	34	34.4
IV2A	11	37	33	Not applicable
IV2B	12	24.6	22	Not applicable
IV2C	5	21.7	19	29.9
IV2D	4	20.6	18	28.3
IV3A	10	42.4	37	Not applicable
IV3B	9	31.1	27	Not applicable
IV3C	5	37.4	33	35.6
IV5	11	23.1	20	Not applicable

The results of the passive diffusion tube analysis for 2005 are shown for Dingwall in Figure 8.

The diffusion tube locations in Dingwall were bias corrected using the factor 0.99 which was derived from the spreadsheet at http://www.uwe.ac.uk/aqm/review/diffusiontube100505.xls

Figure 8 Annual Mean NO2 Concentrations for 2005 in Dingwall

Location	Number of months for which data obtained in 2005	Annual Mean NO2 concentration (µg/m3) Raw data	Annual Mean NO2 concentration (µg/m3) Bias corrected (0.99)	Annual Mean NO2 concentration (µg/m3) Corrected for < 9 months data
RCD1	11	21.3	21	Not applicable
RCD2	12	35.7	35	Not applicable
RCD3	12	8	8	Not applicable
RCD4	12	9.8	10	Not applicable

5 Updating and Screening Assessment for Carbon monoxide

5.1 Air Quality Objective for Carbon monoxide

- 10 mg/m^3 as a running 8-hour mean concentration, by 31 December 2003.

5.2 The national perspective

Studies at a national level, and the first and second round of review and assessment, suggest that there is little likelihood of the objective for carbon monoxide being exceeded. However, all local authorities are required to consider local circumstances by carrying out an updating and screening assessment.

5.3 Checklist for Carbon monoxide

The impact of the pollutant in the Highland Council area has been assessed having regard to the Air Quality Objectives and to the Upgrading and Screening Assessment checklist in the January 2006 update to Local Air Quality Management Technical Guidance LAQM. TG(03).

Figure 9 Checklist for Carbon monoxide

Updating and Screening Assessment Summary Checklist for **Carbon monoxide**	
Checklist Item from TG(03)	**Response**
A. Monitoring data	Carbon monoxide is monitored at one location within the Highlands. The site is on Telford Street in Inverness and is part of the Automatic Urban and Rural Network (AURN). The site achieved 97% data capture. The most up to date ratified data for the 2005 monitoring year returned a maximum 8-hour running mean of 2.4mg/m^3 The maximum 8-hour running mean did not exceed the 10 mg/m^3 criterion. **Further detailed assessment not required.**
B. Very busy roads or junctions in built-up areas	In 2005 the greatest background concentration of CO in Highland is calculated as 0.13 mg/m^3 (year adjustment to 2001 data). There are no roads or junctions in the Highland Council area that meet the "very busy roads or junctions" criteria. **Further detailed assessment not required.**

5.4 Conclusion

Having considered the information obtained in relation to monitoring and road traffic, with regard to the Checklist and information contained within in Technical Guidance TG(03), **there is no requirement for Highland Council to progress to a Detailed Assessment for Carbon monoxide.**

6 Updating and Screening Assessment for Benzene

6.1 Air Quality Objective for Benzene

- 16.25 µg/m3 as a running annual mean, by 31 December 2003.
- 3.25 µg/m3 as a running annual mean, by 31 December 2010.

6.2 The national perspective

Forecasts based upon national mapping, and the first two rounds of review and assessment, suggest that the policy measures currently in place would achieve the 2003 objective at all urban background and roadside/kerbside locations. Local authorities with locations of relevant public exposure in close proximity to major industrial processes that store, handle or emit benzene, may need to progress to a detailed assessment. The information collated during the first round of review and assessment has indicated that there is the possibility that the 2010 objectives will be exceeded at some busy roadside locations in close proximity to industrial sites (petrochemical processes) where additional measures at a local level may be required to achieve the objectives.

6.3 Checklist for Benzene

The impact of the pollutant in the Highland Council area has been assessed having regard to the Air Quality Objectives and to the Upgrading and Screening Assessment checklist in the January 2006 update to Local Air Quality Management Technical Guidance LAQM. TG(03).

Figure 10 Checklist for Benzene

Updating and Screening Assessment Summary Checklist for **Benzene**	
Checklist Item from TG(03)	**Response**
A. Monitoring data outside an AQMA	Monitoring by passive diffusion tube was previously undertaken at Lotland Street, Inverness and at Nigg, Easter Ross. This was discontinued in 2005 as the data indicated clearly that the objective for benzene would be met. **Further detailed assessment not required.**
B. Monitoring data within an AQMA	There are no Air Quality Management Areas within the Highland Council area. **Further detailed assessment not required.**

Updating and Screening Assessment Summary Checklist for **Benzene**	
Checklist Item from TG(03)	**Response**
C. Very busy roads or junctions in built up areas	There are no roads or junctions in the Highland Council area that meet the "very busy roads or junctions" criteria. In 2010 the highest background concentration of benzene in Highland is calculated as 0.0.25 μg/m3 . This is below the specified background criterion of 2 μg/m3 **Further detailed assessment not required.**
D. New industrial sources.	There are no new industrial sources (such as petrochemical works) or sources for which planning permission has been granted locally or in neighbouring authorities, close to the Highland Council boundary. **Further detailed assessment not required.**
E. Industrial sources with substantially increased emissions, or new relevant exposure	There are no industrial sources with substantially increased emissions, or new sites of relevant exposure. **Further detailed assessment not required.**
F. Petrol stations	Of the new petrol stations that have been built since the 2003 Updating and Screening Assessment none have relevant exposure within 10 m of the petrol pumps. **Further detailed assessment not required.**
G. Major fuel storage depots (petrol only)	There are no major fuel storage depots handling petrol that have not been covered by previous review and assessment reports. **Further detailed assessment not required.**

6.4 Conclusion

Having considered the information obtained in relation to monitoring, road traffic, industrial sources, petrol stations and major fuel storage depots, with regard to the Checklist and information contained within Technical Guidance TG(03) as amended, **there is no requirement for Highland Council to progress to a Detailed Assessment for Benzene.**

7 Updating and Screening Assessment for 1,3-butadiene

7.1 Air Quality Objective for 1,3-butadiene

- 2.25 µg/m3 as a running annual mean, by 31 December 2003.

7.2 The national perspective

Studies at a national level, and the first two rounds of review and assessment, suggest that there was little likelihood of the objective being exceeded by 2003, and only local authorities with relevant locations in the vicinity of major industrial processes which handle, store, or emit 1,3-butadiene are expected to progress beyond the updating and screening assessment.

7.3 Checklist for 1,3-butadiene

The impact of the pollutant in the Highland Council area has been assessed having regard to the Air Quality Objectives and to the Upgrading and Screening Assessment checklist in the January 2006 update to Local Air Quality Management Technical Guidance LAQM. TG(03).

Figure 11 Checklist for 1,3-butadiene

Updating and Screening Assessment Summary Checklist for **1,3-butadiene**	
Checklist Item from TG(03)	**Response**
A. Monitoring data	No monitoring is undertaken locally.
B. New industrial sources.	There are no new industrial sources likely to give rise to exceedences of the running annual mean objective for 1,3-butadiene. There are no such industrial sources in neighbouring authorities close to the Highland Council boundary. **Further detailed assessment not required.**
C. Industrial sources with substantially increased emissions, or new relevant exposure	There are no such industrial sources in Highland Council or in neighbouring authorities close to the Highland Council boundary. **Further detailed assessment not required.**

7.4 Conclusion

The information obtained in relation to monitoring and industrial sources, considered with regard to the Checklist and information contained within Technical Guidance TG(03) as amended, indicates that **there is no requirement for Highland Council to progress to a Detailed Assessment for 1,3-butadiene.**

8 Updating and Screening Assessment for Lead

8.1 Air Quality Objectives for Lead

- 0.5 µg/m3 as an annual mean, by 31 December 2004.
- 0.25 µg/m3 as an annual mean, by 31 December 2008.

8.2 Checklist for Lead

The impact of the pollutant in the Highland Council area has been assessed having regard to the Air Quality Objectives and to the Upgrading and Screening Assessment checklist in the January 2006 update to Local Air Quality Management Technical Guidance LAQM. TG(03).

Figure 12 Checklist for Lead

Updating and Screening Assessment Summary Checklist for **Lead**	
Checklist Item from TG(03)	**Response**
Monitoring data	No monitoring for lead is undertaken locally.
New industrial sources.	There are no new industrial sources likely to give rise to exceedences of the annual mean objective for lead. There are no such industrial sources in neighbouring authorities close to the Highland Council boundary. **Further detailed assessment not required.**
Industrial sources with substantially increased emissions, or new relevant exposure	There are no such industrial sources in neighbouring authorities close to the Highland Council boundary. **Further detailed assessment not required.**

8.3 Conclusion

The information obtained in relation to monitoring and industrial sources, considered with regard to the Checklist and information contained within Technical Guidance TG(03) as amended, indicates that **there is no requirement for Highland Council to progress to a Detailed Assessment for lead.**

9 Updating and Screening Assessment for Nitrogen dioxide

9.1 Air Quality Objectives for Nitrogen dioxide

- 200 µg/m3 as a 1-hour mean, not to be exceeded more than 18 times a year, by 31 December 2005.
- 40 µg/m3 as an annual mean, by 31 December 2005.
-

9.2 The national perspective

National studies have indicated that the annual mean objective is likely to be achieved at all urban background locations outside of London by 2005 and that the objective may be exceeded more widely at roadside sites throughout the UK in close proximity to busy road links. Local review and assessment has identified exceedences within major conurbations, smaller town centres with congested traffic, and alongside dual carriageways and motorways in more rural areas. Exceedences have also been predicted in the vicinity of major airports.

9.3 Checklist for Nitrogen dioxide

The impact of the pollutant in the Highland Council area has been assessed having regard to the Air Quality Objectives and to the Upgrading and Screening Assessment checklist in the January 2006 update to Local Air Quality Management Technical Guidance LAQM. TG(03).

Figure 13 Checklist for Nitrogen dioxide

Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**	
Checklist Item from TG(03)	**Response**
A. Monitoring data outside an AQMA	Continuous monitoring and passive diffusive tube sampling, is reported in Section 4 - Monitoring. In 2005 no annual mean concentrations were greater than 40 µg/m^3 In 2005 no hourly concentrations exceeded 200 µg/m^3 **Further detailed assessment not required.**
B. Monitoring data within an AQMA	There are no Air Quality Management Areas within the Highland Council area.
C. Narrow congested streets with residential properties close to the kerb	Narrow congested streets with residential properties close to the kerb in Inverness were considered in the 2003 USA. **Further detailed assessment not required.**

Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**	
Checklist Item from TG(03)	**Response**
D. Junctions.	Busy junctions were assessed against the 2005 and 2010 objectives in the 2003 USA. **Further detailed assessment not required.**
E. Busy streets where people may spend 1-hour or more close to traffic	These types of locations were assessed in the 2003 USA. No new locations have been identified. **Further detailed assessment not required.**
F. Roads with high flow of buses and/or HGVs.	These types of locations were assessed in the 2003 USA. No new locations have been identified. **Further detailed assessment not required.**
G. New roads constructed or proposed since the previous round of R&A	A new road has been provided between A96 Trunk road and Inverness Airport with associated spur roads to the existing road network.. Traffic counts on the adjacent network and forecasts indicate daily traffic flows in the order of 3,000. This falls below the screening threshold of 10,000 vehicles per day. **Further detailed assessment not required.**
H. Roads with significantly changed traffic flows, or new relevant exposure	There are no roads with more than 10,000 vehicles per day which have encountered an increase of 25% in traffic flow since 2003. The roads which were assessed in 2003 did not generate annual mean NO_2 levels in excess of 36 $\mu g/m^3$ as predicted in 2001, 2005 and 2010. **Further detailed assessment not required.**
I. Bus Stations	No bus stations have bus movements in excess of 1000 movements per day. **Further detailed assessment not required.**
J. New industrial sources.	No new industrial sources have been identified within the Highland Council area or in neighbouring local authorities. **Further detailed assessment not required.**
K. Industrial sources with substantially increased emissions, or new relevant exposure	Arjo Wiggins Carbonless Paper Ltd was assessed during the 2003 USA. It closed at the end of 2005. **Further detailed assessment not required.**

Updating and Screening Assessment Summary Checklist for **Nitrogen Dioxide**	
Checklist Item from TG(03)	**Response**
L. Aircraft	Inverness Airport was considered in the 2003 USA. With a projected total passenger equivalent of 0.73 million passengers per annum in 2010, the throughput falls well below the screening threshold of 5 million passengers per annum. **Further detailed assessment not required.**

9.4 Conclusion

The information obtained in relation to monitoring, road traffic, industrial and other sources, considered with regard to the Checklist and information contained within Technical Guidance TG(03), indicates that **there is no requirement for Highland Council to progress to a Detailed Assessment for Nitrogen dioxide.**

10 Updating and Screening Assessment for Sulphur dioxide

10.1 Air Quality Objectives for Sulphur dioxide

- 350 µg/m3 as a 1-hour mean, not to be exceeded more than 24 times a year, by 31 December 2004.
- 125 µg/m3 as a 24-hour mean, not to be exceeded more than 3 times a year, by 31 December 2004.
- 266 µg/m3 as a 15-minute mean, not to be exceeded more than 35 times a year, by 31 December 2005.

10.2 The national perspective

Both national and local studies indicate that exceedences of the objectives (principally the 15-minute mean) may occur in the vicinity of small combustion plant (less than 20 MW) which burn coal or oil, in areas where solid fuels are the predominant form of domestic heating, and in the vicinity of major ports.

10.3 Checklist for Sulphur dioxide

The impact of the pollutant in the Highland Council area has been assessed having regard to the Air Quality Objectives and to the Upgrading and Screening Assessment checklist in the January 2006 update to Local Air Quality Management Technical Guidance LAQM. TG(03).

Figure 14 Checklist for Sulphur dioxide

Updating and Screening Assessment Summary Checklist for **Sulphur dioxide**	
Checklist Item from TG(03)	**Response**
A. Monitoring data outside an AQMA	No monitoring for SO_2 is currently being undertaken.
B. Monitoring data within an AQMA	There are no Air Quality Management Areas within the Highland Council area.
C. New industrial sources.	No new industrial sources have been identified within the Highland Council area or in neighbouring local authorities. **Further detailed assessment not required.**

Updating and Screening Assessment Summary Checklist for **Sulphur dioxide**	
Checklist Item from TG(03)	**Response**
D. Industrial sources with substantially increased emissions, or new relevant exposure	Arjo Wiggins Carbonless Paper Ltd was assessed during the 2003 USA. It closed at the end or 2005. A Local Air Quality Detailed Assessment Report was published in October 2005. This document reported the findings of the continuous monitoring for Sulphur dioxide near the Alcan Aluminium Smelter at Fort William. The report concluded that the air quality objectives for Sulphur dioxide are likely to be met at Fort William. ALCAN propose to change the fuel oil serving the two holding furnaces. The lower sulphur content of the fuel should result in a reduction of 7.1 tonne SO_2 /annum from 7.5 t SO_2/annum to 0.4t SO_2/annum. Thus there will be a substantial reduction in SO_2 emissions. **Further detailed assessment not required.**
E. Areas of domestic coal burning	(The screening threshold in the guidance is any area of about 500 x 500 m where there may be more than 100 houses burning solid fuel as their primary source of heating. In the case of Castletown, there were 273 such dwellings in a 500 X 500 m area) A Local Air Quality Detailed Assessment Report was published in October 2005. This document detailed the findings of continuous monitoring for Sulphur dioxide at Castletown in Caithness. The Detailed Assessment report showed that air quality objectives for Sulphur dioxide are likely to be met in Castletown. It was concluded that the same outcome would be evident in other similar communities throughout the Highlands. **Further detailed assessment not required.**
F. Small Boilers > 5 MW (thermal).	The new regulations limiting the sulphur content of fuel oil to less than 1% from 1 January 2003, mean that boilers using fuel oil are unlikely to be significant on their own. Particular attention should be paid to the combined impact of several sources, including those outside the local authority area. No locations have been identified which were not covered by previous reviews and assessments or where there is new relevant exposure. Hunters of Brora, which was identified in the ENTEC study as having a significant boiler > 5 MW is no longer in operation. **Further detailed assessment not required.**

Updating and Screening Assessment Summary Checklist for **Sulphur dioxide**	
Checklist Item from TG(03)	**Response**
G. Shipping	No locations have been identified which were not covered by previous reviews and assessments or where there is new relevant exposure. **Further detailed assessment not required.**
H. Railway Locomotives	Both steam and diesel trains were covered in the 2003 USA. No relevant outdoor locations where exposure might occur for more than 15 minutes were identified. In December 2005, 14 additional rail services were introduced in the Highlands by First ScotRail Under the Invernet services, there are an additional 11 commuter rail services to and from Inverness from Lairg, Sutherland, via Tain and Invergordon in Ross-shire and two additional services from Kingussie, Strathspey, to Inverness. These additional trains should not result in the screening objective being exceeded. **Further detailed assessment not required.**

10.4 Conclusion

The information obtained by the Detailed Assessment and in relation to monitoring, small boilers, industrial, domestic and other sources, considered with regard to the Checklist and information contained within Technical Guidance TG(03), indicates that **there is no requirement for Highland Council to progress to a Detailed Assessment for Sulphur dioxide.**

11 Updating and Screening Assessment for PM_{10}

11.1 Air Quality Objectives for PM_{10}

- 50 µg/m3 as a 24-hour mean not to be exceeded more than 35 times a year, by 31 December 2004.
- 40 µg/m3 as an annual mean, by 31 December 2004. 50 µg/m3 as a 24-hour mean not to be exceeded more than 7 times a year, by 31 December 2010.
- 18 µg/m3 as an annual mean, by 31 December 2010.

11.2 The national perspective

National monitoring sites show that particle concentrations are generally well below the 2004 annual mean objective. An analysis of PM10 projections indicates that exceedences may occur at urban background sites in central London; areas adjacent to busy roads, particularly within major urban areas; areas which have significant emissions from the domestic burning of solid fuels; and areas in the vicinity of industrial plant, or which have significant uncontrolled or fugitive emissions (for example, quarrying, materials handling facilities etc.). A similar analysis for the 2010 objectives suggests that, dependent upon meteorological conditions, exceedences of the annual mean objectives at background locations are only likely to occur in south east England, but that exceedences may occur at some busy roadside sites throughout the UK.

11.3 Checklist for PM10

The impact of the pollutant in the Highland Council area has been assessed having regard to the Air Quality Objectives and to the Upgrading and Screening Assessment checklist in the January 2006 update to Local Air Quality Management Technical Guidance LAQM. TG(03).

Figure 15 Checklist for PM_{10}

Updating and Screening Assessment Summary Checklist for **PM_{10}**	
Checklist Item from TG(03)	**Response**
A. Monitoring data outside an AQMA	Continuous monitoring is reported in Section 4 - Monitoring. For 2004 objectives: · there are less than 35 predicted 24-hour exceedences of 50 mg/m^3 For 2010 objectives: None of the predicted annual means in 2010 greater than 18 mg/m^3. **Further detailed assessment not required.**
B. Monitoring data within an AQMA	There are no Air Quality Management Areas within the Highland Council area.

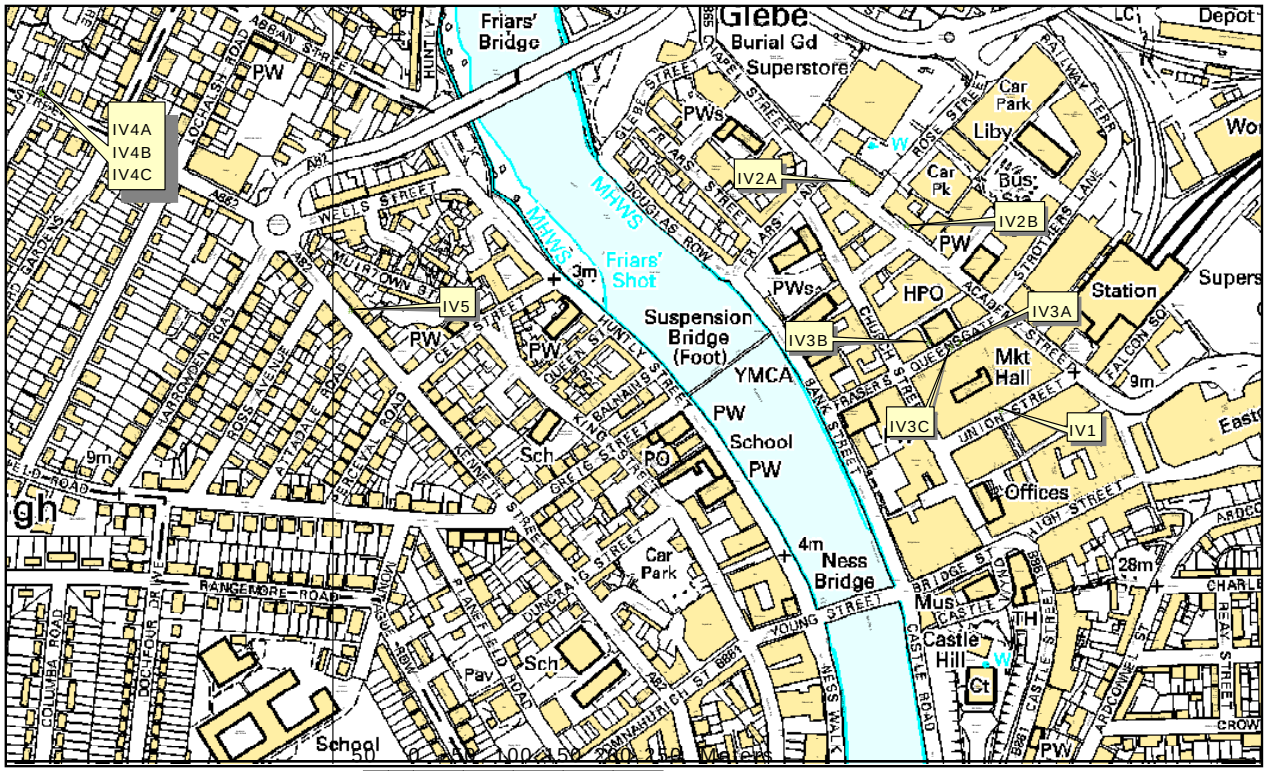
Updating and Screening Assessment Summary Checklist for **PM_{10}**	
Checklist Item from TG(03)	**Response**
C. Busy roads and junctions in Scotland	There are no busy roads or junctions which were not considered in the 2003 review and assessment reports, where there has been a significant increase (>10% AADT) in traffic flows, or where there is new relevant exposure. **Further detailed assessment not required.**
D. Junctions.	Covered in C above. **Further detailed assessment not required.**
E. Roads with high flow of buses and/or HGVs.	Street locations where there is an unusually high proportion of buses and/or HGVs were assessed in the 2003 USA. No new locations have been identified. **Further detailed assessment not required.**
F. New roads constructed or proposed since last round of R&A	A new road has been provided between A96 Trunk road and Inverness Airport with associated spur roads to the existing road network.. Traffic counts on the adjacent network and forecasts indicate daily traffic flows in the order of 3,000. This falls below the screening threshold of 10,000 vehicles per day. **Further detailed assessment not required.**
G. Roads with significantly changed traffic flows, or new relevant exposure.	There are no roads with more than 10,000 vehicles per day which have encountered an increase of 25% in traffic flow since 2003. Of the roads which were assessed in 2003 by DMRB screening the highest output was two 24-hour concentrations above 50 mg/m^3 in the year 2004. (A road 'at risk' of exceeding the objectives can be taken to be one previously identified with more than thirty 24-hour concentrations above 50 mg/m^3 at a relevant location) **Further detailed assessment not required.**

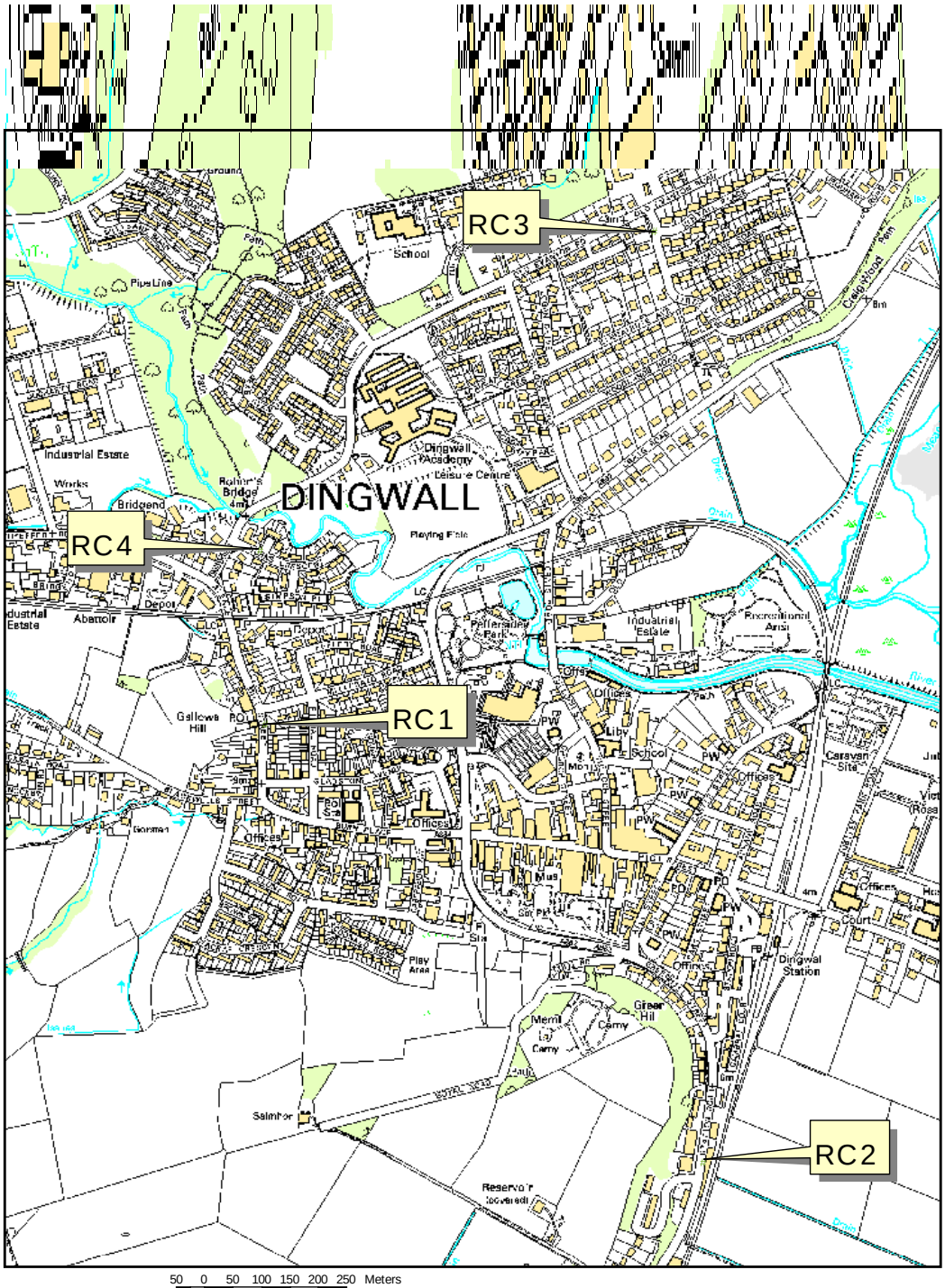
Updating and Screening Assessment Summary Checklist for **PM_{10}**	
Checklist Item from TG(03)	**Response**
H. Roads close to the objective during the second round of Review and Assessment	In 2003 no roads were identified where there were between 25 and 35 days exceedence of the 24 hour objective at relevant locations. The maximum exceedences of the 2004 objective was two. Having regard to the spreadsheet with updated background levels, the highest predicted annual mean concentration in 2010 in Highland was10.5µg/m^3 i.e. less than the screening threshold of 16 µg/m^3. **Further detailed assessment not required.**
I. New industrial sources.	There are no new industrial sources likely to give rise to exceedences of the annual mean objective for PM_{10}. There are no such industrial sources in neighbouring authorities close to the Highland Council boundary. **Further detailed assessment not required**
J. Industrial sources with substantially increased emissions, or new relevant exposure	There are no such industrial sources in neighbouring authorities close to the Highland Council boundary. **Further detailed assessment not required.**
K. Areas of domestic solid fuel burning	The 2003 USA focussed on locations where the density of houses burning solid fuel exceeded 50 in an area of 500 x 500 m. No new locations need to be screened. **Further detailed assessment not required.**
L. Quarries / landfill sites / opencast coal / handling of dusty cargoes at ports etc.	No new sites of relevance have been identified. **Further detailed assessment not required.**
M. Aircraft	Inverness airport was considered in the 2003 USA. With a projected total passenger equivalent of 0.73 million passengers per annum in 2010, the throughput falls well below the screening threshold of 5 million passengers per annum. **Further detailed assessment not required.**

11.4 Conclusion

The information obtained in relation to monitoring, road traffic, industrial and other sources, considered with regard to the checklist and information contained within Technical Guidance TG(03), indicates that **there is no requirement for Highland Council to progress to a further Detailed Assessment for PM10 as the 2004 NAQS standards for 2004 are met.**

➢ Annex 1 – Diffusion Tube locations – Inverness





The Highland Council
Comhairle na Gaidhealtachd

Diffusion Tube Monitoring Locations

Dingwall

SUPPLIED BY THE HIGHLAND COUNCIL

16th June 2005

N

Scale **1:8500**

The Highland Council
Updating and Screening Assessment of Air Quality - 2006