2012 Air Quality Updating and Screening Assessment for Dumfries and Galloway Council

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

May 2013

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Report Reference Number	dgc/laqm/usa/v1
Date	24th May 2013

Summary

This report comprises Dumfries and Galloway Council's fourth updating and screening assessment (USA) of air quality within the Council's area. Any new or changed sources of potential air pollution which may give rise to a risk of an exceedence of an air quality objective have been considered. Results of NO_2 monitoring within the Council's area are also presented and evaluated in relation to the objectives.

Previous air quality assessments have concluded that concentrations of carbon monoxide, benzene,1,3-butadiene, lead, sulphur dioxide and nitrogen dioxide are all unlikely to exceed the objectives.

Recent monitoring results for NO_2 have not identified any new requirement to proceed to a detailed assessment with concentrations all below the objectives.

Previous monitoring for PM_{10} at a worst-case junction in Dumfries showed that no air quality management areas were required to be designated for PM_{10}. A detailed assessment for PM_{10} previously planned to be carried out in Cairnryan due to a perceived increase in traffic levels following the re-location of the Stena Line port from Stranraer to Old House Point, Cairnryan has been postponed pending completion of further developments at Old House Point.

To date no air quality management areas have been designated within the Council-area.

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1. Introduction

1.1 Description of Local Authority Area.

Dumfries and Galloway is located in south-west Scotland. To the north, the region shares borders with South Ayrshire, East Ayrshire and South Lanarkshire; to the east with Scottish Borders; and to the south with the county of Cumbria. Lying to the north of the Solway Firth and to the east of the Irish Sea, Dumfries and Galloway occupies a land area of approximately 6,439 km^2, making it the third largest of Scotland's 32 local authorities. Its population of approximately 147,284 is projected to fall to around 146,000 over the next 10 years. The largest town is Dumfries (31,600), followed by Stranraer (10,800) and Annan (8,300), with other settlements having populations of 4,500 or fewer. The economy of the region is based primarily on agriculture and forestry with light industry and tourism making significant contributions. Some 30% of Scotland's dairy cattle come from Dumfries and Galloway, and textiles, engineering and food processing are important industries in towns such as Dumfries, Kirkcudbright, Wigtown, Newton Stewart, New Galloway, Moffat, Lockerbie, Annan, Castle Douglas and Dalbeattie. The ferry ports at Cairnryan provide links to Belfast and Larne via Loch Ryan and the Irish Sea.

1.2 Purpose of report.

This report fulfils the requirements of the local air quality management (LAQM) process as set out in Part IV of the Environment Act 1995[i], 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 designate as an air quality management area the part or parts of its area in which it appears likely that exceedences will occur and prepare an air quality action plan setting out the measures it intends to put in place in pursuit of the objectives. The purpose of an 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 to determine whether there is a need for a detailed assessment to be carried out. The report should provide an update of any outstanding information from previous review and assessment reports.

1.3 Air quality objectives.

The air quality objectives applicable to local air quality management in Scotland are set out in the Air Quality (Scotland) Regulations 2000[ii] (Scottish Statutory Instrument No. 97) and the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish Statutory Instrument No. 297). Table 1 shows the objectives in units of microgrammes per cubic metre ($\mu g/m^3$) apart from the carbon monoxide objective which is expressed in milligrammes per cubic metre (mg/m^3) with the number of exceedences in each year that are permitted (where applicable). (The air quality objectives for other parts of the UK can be found in the Government's Air Quality Strategy for England, Scotland, Wales and Northern Ireland[iii]).

[i,ii,iii] See references on page 20

Table 1 Air quality objectives prescribed in regulations for the purpose of local air quality management in Scotland.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16·25 µg/m^3 (or less)	Running annual mean	31/12/2003
	3·25 µg/m^3 (or less)	Running annual mean	31/12/2010
1,3-butadiene	2·25 µg/m^3 (or less)	Running annual mean	31/12/2003
Carbon monoxide	10·0 mg/m^3 (or less)	Running 8-hour mean	31/12/2003
Lead	0·5 µg/m^3 (or less)	Annual mean	31/12/2004
	0·25 µg/m^3 (or less)	Annual mean	31/12/2008
Nitrogen dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31/12/2005
	40 µg/m^3 (or less)	Annual mean	31/12/2005
Particles (PM_{10})	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31/12/2010
	18 µg/m^3 (or less)	Annual mean	31/12/2010
Sulphur dioxide	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean	31/12/2004
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean	31/12/2004
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean	31/12/2005

1.4 Summary of previous review and assessments[iv]

1.4.1 The findings of the first review and assessment of air quality in Dumfries and Galloway (commenced in 1998) were that the air quality objectives were likely to be met. As a consequence no air quality management areas were declared (which is still the position to date).

1.4.2 In 2003, an updating and screening assessment was carried out, the results of which generally supported the conclusions of the first round. However, in line with the Department for Environment, Food and Rural Affairs' (DEFRA's) revised technical guidance (2003), it was found that a detailed assessment of sulphur dioxide (SO_2) levels at the ferry ports of Stranraer and Cairnryan would be required.

1.4.3 In 2004 a detailed assessment of the influence of shipping on SO_2 levels at Cairnryan was carried out, the conclusion of which was that an air quality management area was not required. With regard to the detailed assessment at Stranraer this was initially put on hold pending Stena Line's proposed re-location to Cairnryan but subsequent to DEFRA's amendment of their technical guidance (2006) which relaxed the screening criteria for SO_2 related to shipping it was found that a detailed assessment for SO_2 at Stranraer was no longer required.

1.4.4 In 2005 monitoring results detailed in a progress report indicated that there was no requirement to proceed to a detailed assessment for any of the relevant pollutants.

1.4.5 In 2006 the conclusions of an updating and screening assessment were that the relevant air quality objectives would be met and that consequently there was no requirement to undertake a detailed assessment. Three road junctions in Dumfries were however predicted to marginally exceed the 2010 annual mean PM_{10} objective.

1.4.6 Monitoring results detailed in the 2007 progress report showed that the current air quality objectives for the relevant pollutants were being met. Projected PM_{10} levels at the monitoring site at Buccleuch Street, Dumfries indicated that the 2010 annual mean PM_{10} objective would not be met but there was no relevant exposure at this roadside site. With regard to the marginal exceedences of the PM_{10} annual mean predicted at three road junctions in the 2006 updating and screening assessment, traffic flows would be checked at the relevant areas to see if they were in line with estimated levels.

1.4.7 The main findings of the 2008 progress report were that whilst the air quality objectives in force at the time were being met, PM_{10} levels at Buccleuch Street, Dumfries were again predicted to exceed the 2010 PM_{10} annual mean objective and after a re-assessment of relevant exposure it was decided that a detailed assessment for PM_{10} should be carried out to include Buccleuch St., Dumfries and the three road junctions in Dumfries which had previously been predicted to marginally exceed the 2010 PM_{10} annual mean objective.

1.4.8 A detailed assessment for PM_{10} was commenced in 2008 covering Buccleuch Street, and the junctions of Brooms Road/Annan Road, Glasgow Street/Galloway Street and Whitesands/Buccleuch Street, all in Dumfries. Concentrations of PM_{10} were modelled for 2010 using the ADMS roads dispersion model. Projections of measured PM_{10} concentrations did not identify an exceedence at the site of the Buccleuch Street PM_{10} monitor itself; however exceedences of the 2010 annual mean objective were predicted at all three junctions and exceedence of the 2010 PM_{10} 24-hour mean objective was predicted at one junction (Whitesands/Buccleuch Street). It had been intended to carry out PM_{10} monitoring at these junctions to supplement this assessment. PM_{10} monitoring at the Buccleuch St./Whitesands junction was commenced on 10/08/10.

1.4.9 In 2009 an updating and screening assessment was carried out having regard to DEFRA's further revision of their technical guidance TG(09)[v] published in February 2009. The results of monitoring together with the evaluation of new and changed sources to identify those that might give rise to a risk of an exceedence of an air quality objective did not identify any new requirement to proceed to a detailed assessment. A previous commitment to carry out a detailed assessment of PM_{10} at Cairnryan in the event that Stena Line re-located from Stranraer to Cairnryan was reiterated.

1.4.10 A progress report in 2010 found that NO_2 levels monitored during the previous year met the relevant objectives. PM_{10} monitoring at the junction of Whitesands and Buccleuch Street had commenced but no new PM_{10} data were reported as the BAM monitor had only recently been set up. No new requirement to proceed to a detailed assessment was identified as a result of monitoring or new developments.

1.4.11 A report supplementary to the PM_{10} detailed assessment carried out in 2008/09 detailed the results of PM_{10} monitoring which was carried out for six months at the junction of Buccleuch Street and Whitesands in Dumfries using a BAM monitor. The results when annualised for 2010 showed an annual mean of 15·75 $\mu g/m^3$ and no exceedences of the 24-hour mean. Originally it had been intended to monitor at all three junctions but as the modelling had indicated a higher annual mean and more exceedences of the 24-hour mean at the Buccleuch Street/Whitesands road junction than at the other two junctions (i.e. it was the worst case) it was concluded in the report that the objectives were also being met at the other two junctions and that there was no need to designate any air quality management areas.

1.4.12 The progress report submitted in November 2011 concluded that the objectives for NO_2 were being met, there was no requirement for a detailed assessment for NO_2 and that monitoring at the junction of Whitesands and Buccleuch Street, Dumfries met the objectives for PM_{10} therefore no air quality management areas were required.

2. New monitoring data

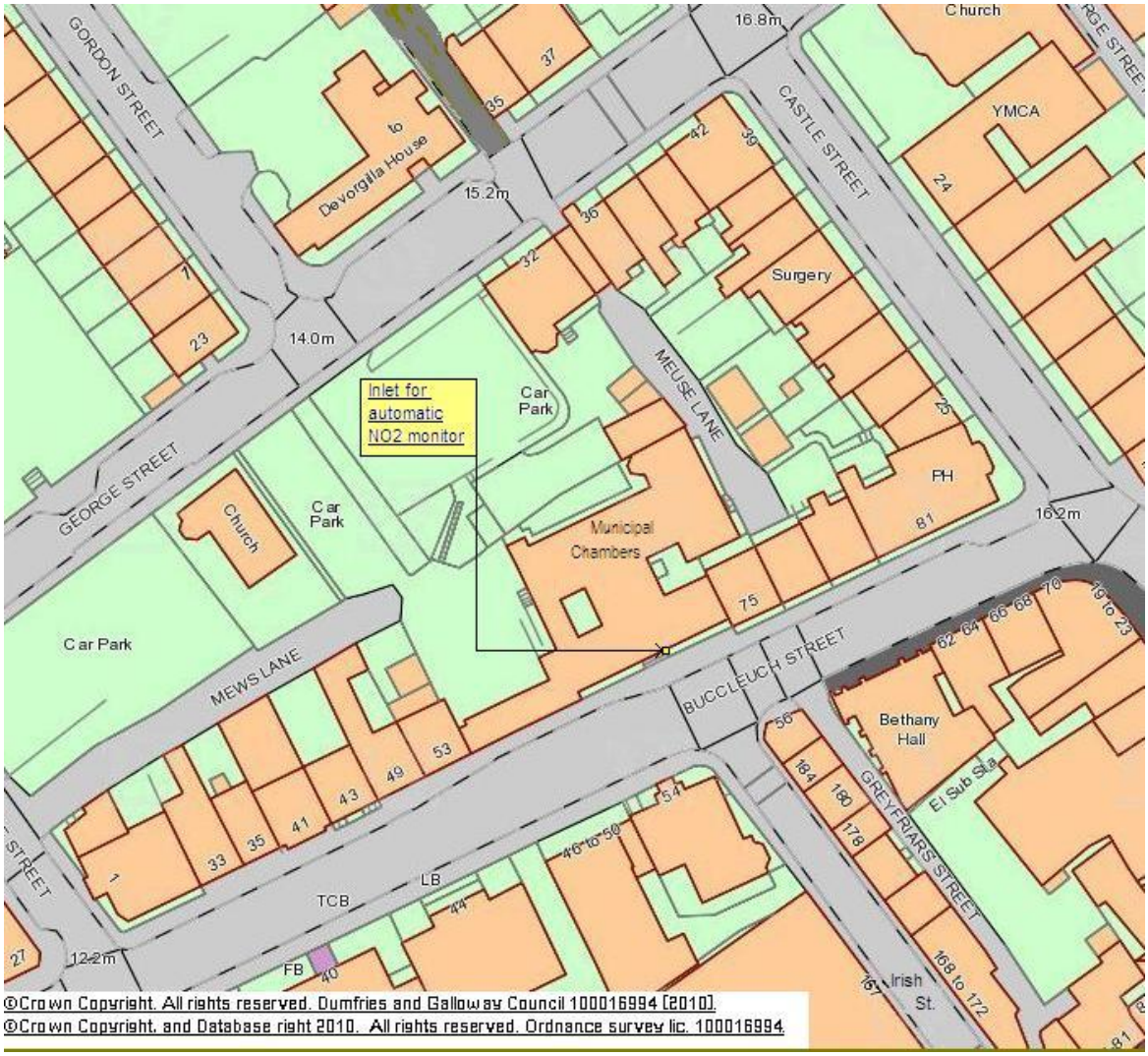
2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

2.1.1.1 Dumfries NO_2

A continuous (chemiluminescent) NO_2 monitor (API M200A) is located at the Municipal Chambers, Buccleuch Street, Dumfries and forms part of the UK Automatic Urban and Rural Air Quality Monitoring Network (AURN). Routine calibrations of the automatic monitor are carried out fortnightly by Council staff, with six-monthly audits carried out by AEA Energy and Environment. Ratification is carried out by the Quality Assurance and Control (QA/QC) Unit at AEA Energy & Environment.

Figure 1 - Map of NO_2 automatic monitoring site at Buccleuch St., Dumfries.



The air intake for the monitor is situated at a height of approximately 2·2 metres in the supporting framework of one of two decorative lamps on either side of the Municipal Chambers entrance. The air-intake tube goes through a window to the monitor which is located in the basement of the building.

2.1.1.2 Eskdalemuir NO_2

Since December 2004 a continuous NO_2 monitor has been located at the Observatory at Eskdalemuir as part of the AURN. The Observatory[vi] is currently managed by the British Geological Society and the Met Office. Ratification is carried out by the QA/QC unit at AEA.

Figure 2 - Map of NO_2 automatic monitoring site at Eskdalemuir Observatory.

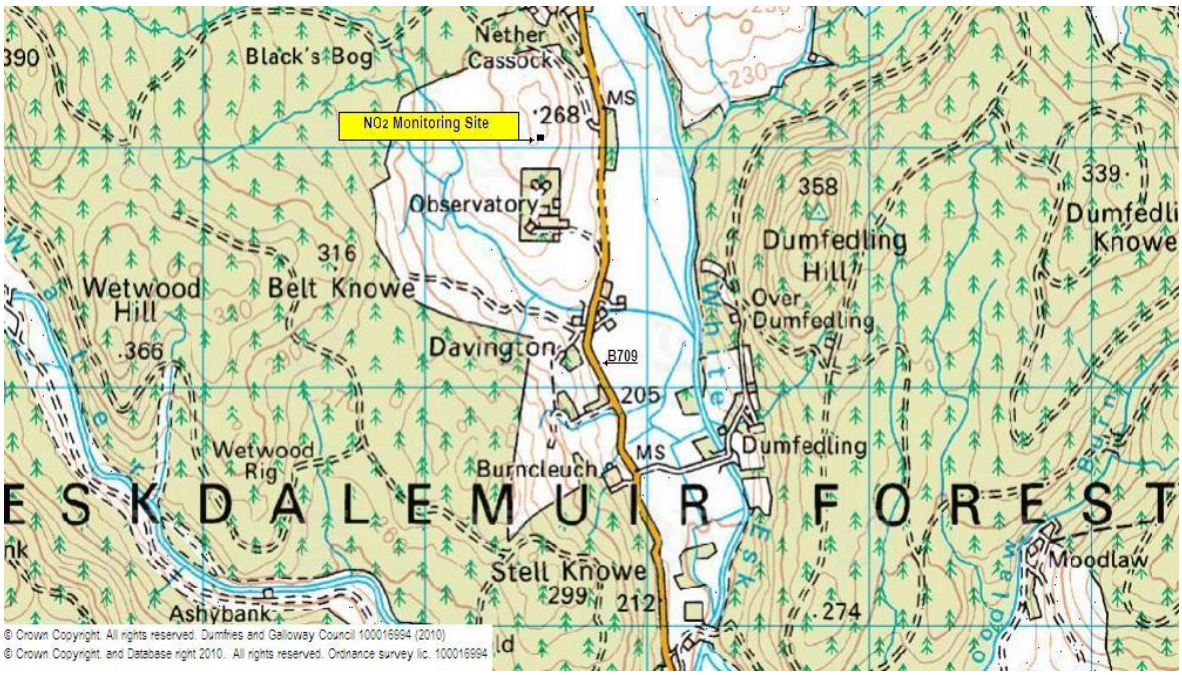


Table 2 Details of automatic monitoring sites.

Site Name	Site Type	Grid Ref.	Pollutant	Monitoring Technique	Within AQMA?	Relevant Exposure?	Distance to kerb (metres)	Worst-case Exposure?
Buccleuch Street Dumfries	Roadside	297025 576259	NO_2	Automatic	No	Yes	4·3	Yes
Eskdalemuir	Rural	323551 603022	NO_2	Automatic	No	No	n/a	n/a

2.1.2 Non-automatic monitoring.

NO_2 diffusion tubes are deployed for monthly exposure periods at the twelve sites shown in Table 3. Triplicate tubes are used at two sites namely at Buccleuch Street (East), and Buccleuch Street Bridge, with duplicate tubes at Buccleuch Street (West), while the rest of the sites have single tubes. Locations of the diffusion tubes are shown in Appendix 2 Figures 6 to 13. The tubes were prepared and analysed by Environmental Scientifics Group using 50% triethanolamine (TEA) in acetone. Environmental Scientifics Group demonstrated good performance for 2011 in the Workplace Analysis Scheme for Proficiency (WASP) (an independent analytical performance-testing scheme).
The triplicate tubes at Buccleuch St., (East) are co-located with the NO_2 automatic monitor. The local bias-adjustment factor was 0·83 (the national bias-adjustment factor for 2011 was 0·83 [v3-13] derived by amalgamation of 45 studies including Dumfries and Galloway's). Further details of the local co-location study are provided in Appendix 1.

Table 3 Details of NO_2 diffusion tube sites.
(see maps at appendix 2)

Site Name	Site Type	OS Grid Ref	Number of tubes	Within AQMA?	Relevant Exposure?	Distance to kerb of nearest road (metres)	Worst-case Location?
M74 Slip Rd. Lockerbie	Intermediate	NY133814	single	No	No (32m)	1·9	Yes
Buccleuch St. (E) Dumfries	Roadside	NX970763	triplicate (co-located with automatic monitor)	No	Yes (<1m)	4·3	Yes
Buccleuch St. (W) Dumfries	Kerbside	NX969762	duplicate	No	Yes (<1m)	1·0	No
Buccleuch St. (S) Dumfries	Kerbside	NX970762	single	No	Yes (<1m)	0·6	No
Buccleuch St. Bridge Dumfries	Roadside	NX968762	triplicate	No	Yes (<1m)	5·0	Yes
Loreburn St. Dumfries	Kerbside	NX974762	single	No	Yes (<1m)	1·0	No
St. Michael St. Dumfries	Roadside	NX975757	single	No	Yes (<1m)	3·1	No
Argyll Drive Dumfries	Background	NX994788	single	No	Yes (1m)	1·7	No
Nith Place Dumfries	Kerbside	NX973758	single	No	Yes (<1m)	0·7	Yes
Charlotte St. Stranraer	Kerbside	NX061608	single	No	Yes (<1m)	0·5	No
Port Rodie Car Park Stranraer	Other	NX063610	single	No	No (160m)	N/A	Yes
A77 Cairnryan	Roadside	NX072674	single	No	No (19m)	2·0	Yes

2.2 Comparison of monitoring results with air quality objectives.

2.2.1 Nitrogen Dioxide

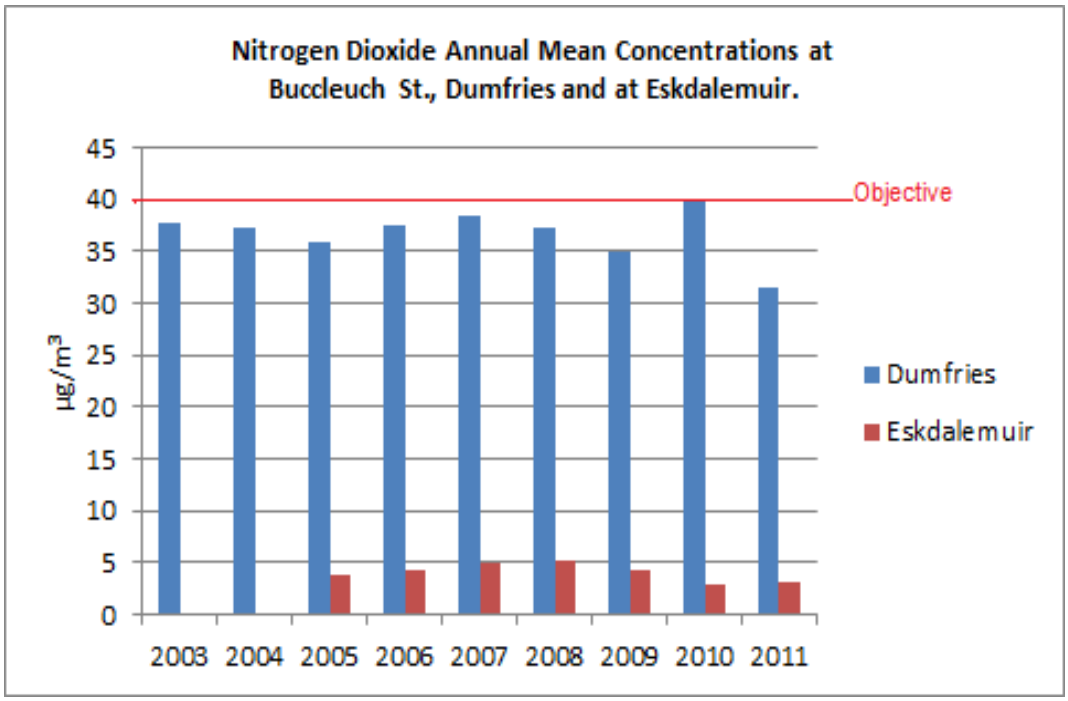
2.2.1.1 NO_2 automatic monitoring data.

All NO_2 results from automatic monitoring meet the relevant objectives.

Table 4 Results of automatic monitoring for NO_2 - comparison with annual mean objective (*40µg/m^3 or less*).

Location	Within AQMA?	Data capture for full calendar year 2011 %	Annual mean concentrations (µg/m^3)								
			2003	2004	2005	2006	2007	2008	2009	2010	2011
Buccleuch St Dumfries (Roadside site)	No	99·0%	37·6	37·3	35·9	37·5	38·3	37·3	35·0	39·9	31·5
Eskdalemuir (Rural site)	No	92·1%	n/a	n/a	3·8	4·3	5·0	5·1	4·3	3·0	3·2

Figure 3 Trends in annual mean NO_2 concentrations at automatic monitoring sites at Dumfries and at Eskdalemuir.



The above chart shows that annual mean concentrations at the roadside site at Buccleuch Street, Dumfries have stayed relatively close to but below the annual mean objective, whereas the concentrations at the rural background site at Eskdalemuir are well below the objective. The annual mean at Buccleuch Street Dumfries is the lowest recorded for several years.

Table 5 Results of automatic monitoring for nitrogen dioxide - comparison with 1-hour mean objective *(200µg/m^3 not to be exceeded more than 18 times).*

Location	Within AQMA?	Data capture for full calendar year 2011 %	Number of exceedences of hourly mean								
			2003	2004	2005	2006	2007	2008	2009	2010	2011
Buccleuch St Dumfries (Roadside site)	No	99·0%	2	0	1	0	5	4	0	3	2
Eskdalemuir (Rural site)	No	92·1%	n/a	n/a	0	0	0	0	0	0	0

2.2.1.2 NO_2 diffusion tube monitoring data.

All bias-corrected NO_2 results from diffusion tube monitoring meet the annual mean objective of 40µg/m^3 or less.

Table 6 Annual mean results of nitrogen dioxide diffusion tubes 2006 to 2011.

Location		Within AQMA?	Data capture for calendar year 2011 %	Annual mean concentrations *(microgrammes per cubic metre)*					
				2006 *(bias corrected x 0·97)*	2007 *(bias corrected x 1·01)*	2008 *(bias corrected x 0·93)*	2009 *(bias corrected x 0·83)*	2010 *(bias corrected x 0·92)*	2011 *(bias corrected x 0·83)*
M74 Slip Road	Lockerbie	No	100%	28·4	34·0	31·1	28·2	37·0	30·6
***Buccleuch St. (E)	Dumfries	No	97%	37·5	38·1	37·3	34·2	39·8	31·5
††Buccleuch St. (W)	Dumfries	No	100%	35·2	35·5	32·4	31·3	35·2	30·0
Buccleuch St. (S)	Dumfries	No	100%	35·7	32·8	32·2	32·5	36·1	34·1
†††Buccleuch St Bridge	Dumfries	No	100%	32·2	30·2	31·6	32·3	34·0	28·2
Nith Place,	Dumfries	No	100%	n/a	n/a	32·9	30·8	35·0	26·8
Loreburn St.	Dumfries	No	100%	25·7	28·2	28·4	26·0	30·8	24·5
St Michael St.	Dumfries	No	100%	25·5	25·7	24·9	24·9	28·5	23·8
Argyll Drive	Dumfries	No	100%	11·8	13·7	12·2	11·0	12·1	10·7
Charlotte St.	Stranraer	No	92%	18·4	20·1	20·3	18·7	21·8	17·7
Port Rodie Car Park	Stranraer	No	100%	16·0	18·0	15·0	17·5	18·2	16·6
A77 Cairnryan	Stranraer	No	92%	19·6	23·4	20·6	19·2	21·6	19·6

****Triplicate tubes co-located with AURN automatic monitor*
††Duplicate tubes
†††Triplicate tubes
n/a not applicable i.e. tube not deployed at site in year shown.

Figure 4 Trends in annual mean nitrogen dioxide concentrations measured at diffusion tube monitoring sites.

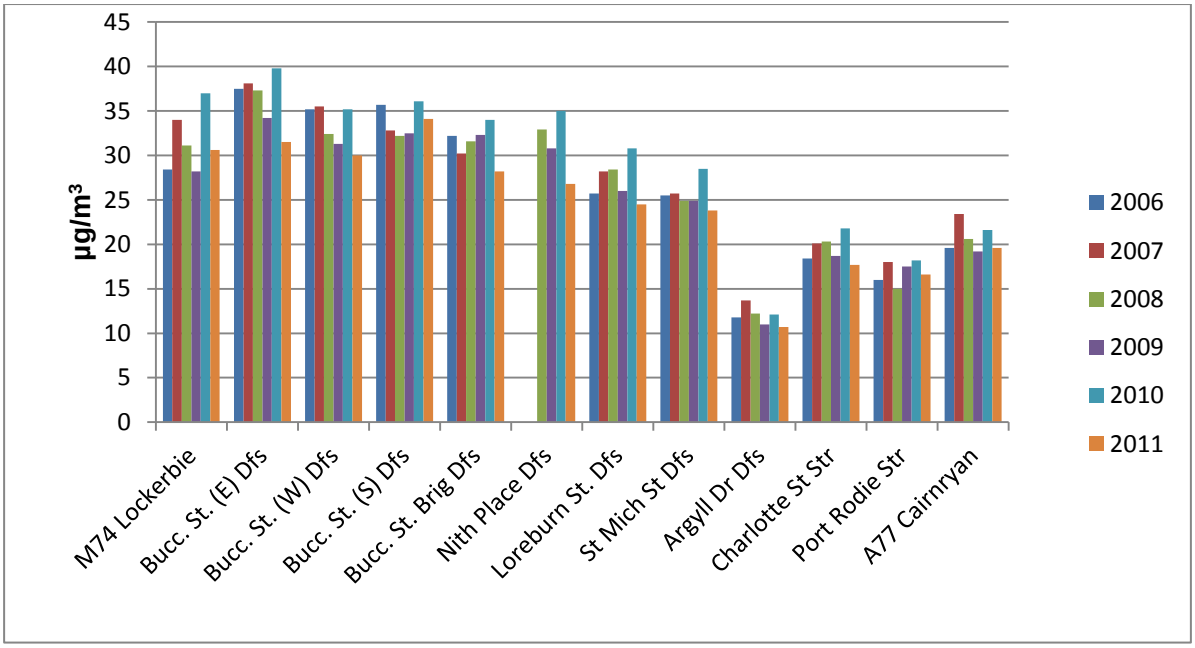
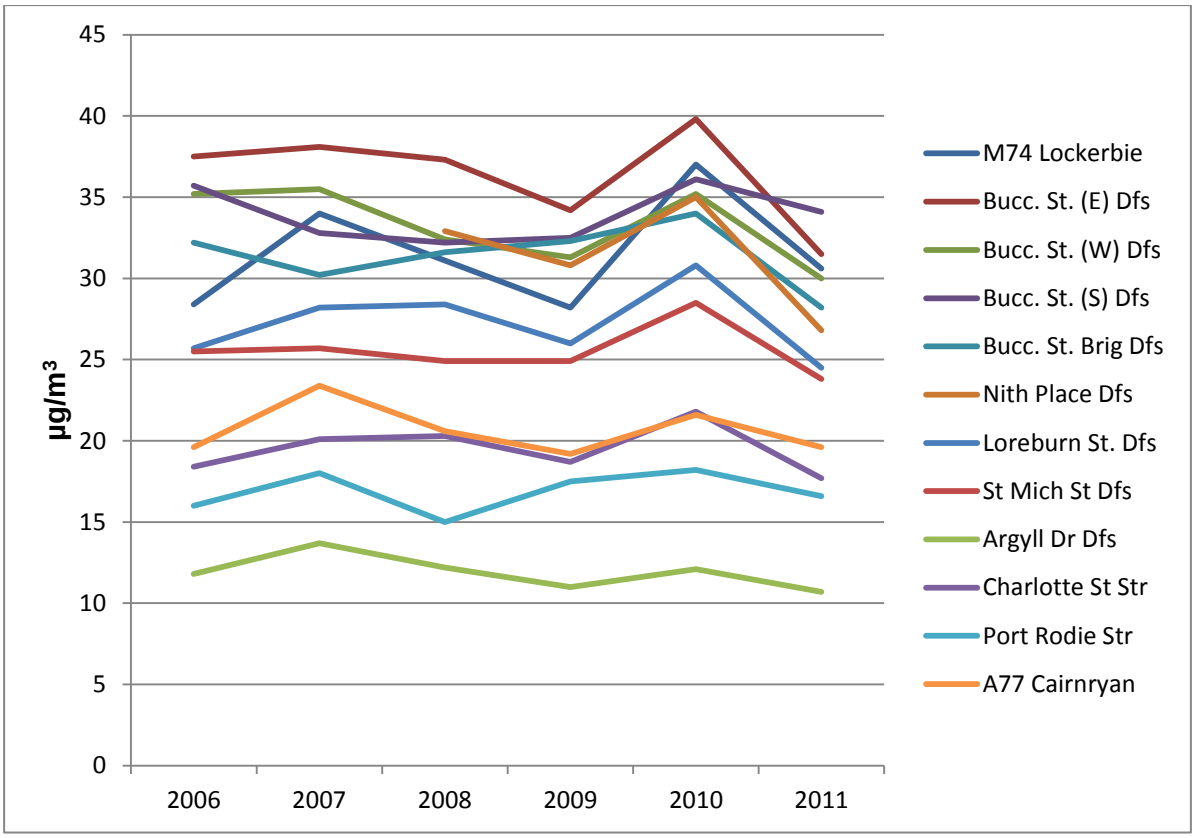


Figure 5 Graphs of annual mean nitrogen dioxide concentrations measured at diffusion tube monitoring sites.



Most sites show a reduction in NO_2 annual average levels from 2010 to 2011.

2.2.2 PM_{10}

No monitoring of PM_{10} has been carried out since February 2011 therefore there are no new PM_{10} monitoring results to report. A supplement[vii] to a detailed assessment[viii] for PM_{10} detailing the results of monitoring for PM_{10} at a worst-case junction in Dumfries showed that no air quality management areas were required to be designated for PM_{10}. A detailed assessment for PM_{10} previously planned to be carried out in Cairnryan due to a perceived increase in traffic levels following the re-location of the Stena Line port from Stranraer to Old House Point, Cairnryan has been postponed pending completion of further developments at Old House Point.

Dumfries and Galloway Council has examined the results from monitoring in the Council-area. Concentrations are all below the objectives, therefore there is no need to proceed to a detailed assessment.

3 Road traffic sources

3.1 Narrow congested streets with residential properties close to the kerb.

The criteria for assessing narrow congested streets are set out in section A1 of Box 5.3 of TG(09)[v].

Dumfries and Galloway 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 one hour or more close to traffic.

The criteria for assessing busy streets are set out in section A2 of Box 5.3 of TG(09).

Dumfries and Galloway Council confirms that there are no new/newly identified busy streets where people may spend one hour or more close to traffic.

3.3 Roads with a high flow of buses and/or heavy goods vehicles.

The criteria for assessing roads with high flows of buses and/or heavy goods vehicles are set out in section A3 of Box 5.3 of TG(09).

Dumfries and Galloway Council confirms that there are no new/newly identified roads with high flows of buses/heavy goods vehicles.

3.4 Junctions

The criteria for assessing junctions are set out in section A4 of Box 5.3 of TG(09).

Dumfries and Galloway Council confirms that there are no relevant new/newly identified busy junctions/busy roads.

3.5 New roads constructed or proposed since the last round of review and assessment.

The criteria for assessing new roads are set out in section A5 of Box 5.3 of TG(09

Dumfries and Galloway Council confirms that there are no relevant new/proposed roads.

3.6 Roads with significantly changed traffic flows.

The criteria for assessing roads with significantly changed traffic flows are set out in section A6 of Box 5.3 of TG(09).

Dumfries and Galloway Council confirms that there are no relevant new/newly identified roads with significantly changed traffic flows.

3.7 Bus and coach stations.

The criteria for assessing bus and coach stations are set out in section A7 of Box 5.3 of TG(09).

Dumfries and Galloway Council confirms that there are no relevant bus stations in the Council-area.

4 Other transport sources

4.1 Airports

The criteria for assessing airports are set out in section B1 of Box 5.4 of TG(09).

Dumfries and Galloway Council confirms that there are no airports in the Council-area.

4.2 Railways (Diesel and Steam Trains)

4.2.1 Stationary Trains

The criteria for assessing stationary locomotives are set out in section B2 of Box 5.4 of TG(09).

Dumfries and Galloway 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 15 metres.

4.2.2 Moving Trains

The criteria for assessing moving diesel locomotives are set out in section B2 of Box 5.4 of TG(09).

Dumfries and Galloway Council confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term exposure within 30 metres that meet the relevant criteria.

4.3 Ports (Shipping)

The criteria for assessing ports (shipping) are set out in section B3 of Box 5.4 of TG(09). The new Stena Line port at Old House Point, Cairnryan does not meet the criteria which would require a detailed assessment for sulphur dioxide to be carried out. The P&O port in Cairnryan situated approximately 2·5 kilometres south of the Stena Line port was the subject of a detailed assessment for sulphur dioxide in 2004[iv], the conclusions of which were that an air quality management area was not required. A detailed assessment for PM_{10} which was planned to be carried out in the village of Cairnryan due to the perceived increase in traffic levels due to the new port has been postponed pending completion of further developments at the new port.

Dumfries and Galloway Council confirms that there are no ports or shipping which have not previously been assessed in detail that meet the criteria which would require a detailed assessment for sulphur dioxide to be undertaken.

5. Industrial sources

5.1 Industrial installations

The criteria for assessing industrial installations are set out in section C1 of Box 5.5 of TG(09).

5.1.1 New or proposed installations for which an air quality assessment has been carried out.

Dumfries and Galloway Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within the Council-area or nearby in neighbouring local-authority-areas, so far as is known.

5.1.2 Existing installations where emissions have increased substantially or where new relevant exposure has been introduced.

Dumfries and Galloway Council confirms that there are no existing installations where emissions have increased substantially or where new relevant exposure has been introduced within the Council-area or nearby in neighbouring local-authority-areas, so far as is known.

5.1.3 New or significantly changed installations with no previous air quality assessment.

Dumfries and Galloway Council confirms that there are no new, proposed or significantly changed industrial installations for which planning approval has been granted within the Council-area or nearby in neighbouring local-authority-areas, so far as is known.

5.2 Major Fuel (Petrol) Storage Depots

The criteria for assessing major fuel (petrol) storage depots are set out in section C2 of Box 5.5 of TG(09).

There are no major fuel (petrol) storage depots within the Council-area.

5.3 Petrol Stations

The criteria for assessing petrol stations are set out in section C3 of Box 5.5 of TG(09)

Dumfries and Galloway Council confirms that there are no petrol stations within the Council-area meeting the specified criteria.

5.4 Poultry Farms

The criteria for assessing poultry farms are set out in section C4 of Box 5.5 of TG(09). No farms exceeding the relevant criteria (farms with mechanically-ventilated units housing in excess of 400,000 birds, farms with naturally-ventilated units housing in excess of 200,000 birds or turkey units with more than 100,000 birds) have been identified within the council-area.

Dumfries and Galloway Council confirms that there are no poultry farms meeting the relevant criteria.

6 Commercial and domestic sources

6.1 Biomass Combustion - Individual Installations

The criteria for assessing biomass combustion (individual installations) are set out in section D1a of Box 5.8 of TG(09). Biomass boilers are being or have been installed at several local hospitals, schools and other premises. Assessments have been carried out but no requirement to proceed to a detailed assessment has been identified.

Dumfries and Galloway Council has assessed individual biomass combustion plants and concluded that it will not be necessary to proceed to a detailed assessment.

6.2 Biomass Combustion - combined impacts

The criteria for assessing biomass combustion (combined impacts) are set out in section D1b of Box 5.8 of TG(09). The estimated average PM_{10} background concentration in the Council-area for 2012 is 9·3 µg/m^3 (range 8·5 – 14·1 µg/m^3). As previously reported by AQC Air Quality Consultants (in the 2009 updating and screening assessment) “using the nomograms and assuming a worst-case background of 14 µg/m^3 in a large town, emissions of at least 1800 kg PM_{10} per year would be required in a square 500m by 500m in order for this type of emission source to be likely to lead to exceedence of the annual average mean objective for PM_{10} in Scotland. This is equivalent to a minimum of 70 households within a 500m by 500m grid square all using wood burned in fireplaces as their primary fuel. Alternatively, there would need to be a minimum of 17,500m^2 of commercial floorspace (approximately equivalent to 3 large supermarkets) heated by biomass boilers within a 500m by 500m grid square using wood as their primary fuel. Using this fact, and local knowledge of the district, it is considered highly unlikely that there are any areas of biomass combustion exceeding these criteria.” It is noted however that wood-burning stoves are becoming increasingly popular and the situation will be kept under review.

Dumfries and Galloway Council has assessed the combined impact of biomass combustion plants and concluded that it will not be necessary to proceed to a detailed assessment.

6.3 Domestic solid-fuel burning

The criteria for assessing domestic solid-fuel burning (SO_2 emissions) are set out in section D2 of Box 5.8 of TG(09). Domestic solid fuel burning has been considered in previous updating and screening assessments and has not been considered to be significant; this is still the case.

Dumfries and Galloway Council confirms that there are no areas of significant domestic fuel use in the Council-area.

7. Fugitive or uncontrolled sources

The criteria for assessing fugitive or uncontrolled sources are set out in section E1 of Box 5.10 of TG(09). An Environmental Statement[ix] for a review of mineral permissions and application to extend the time for operating Coatesgate Quarry Moffat was compiled by Wardell Armstrong who concluded that the impact of dust on properties located in proximity to the site would be insignificant and that the PM_{10} objectives would not be exceeded. An Environmental Statement[x] for an eastern extension to Glenmuckloch Surface Coal Mine compiled by Wardell Armstrong whose assessment included the cumulative impacts concluded that the proposed extension would not cause the PM_{10} objectives to be exceeded. These assessments are considered sufficient for review and assessment purposes.

With reference to the specified criteria Dumfries and Galloway Council confirms that no potential sources of fugitive particulate matter emissions have been identified within the Council-area.

8. Conclusions and proposed actions

8.1 Conclusions from new monitoring data

Results of monitoring for NO_2 are all below the objectives therefore no requirement to proceed to a detailed assessment for NO_2 has been identified. (A supplement[vii] to a detailed assessment[viii] at a worst-case junction in Dumfries showed that no air quality management areas were required to be designated for PM_{10}.)

8.2 Conclusions from assessment of sources

The likely impacts on air quality of road traffic, industrial, commercial, domestic and fugitive or uncontrolled sources of pollution have been assessed but no potential exceedences of the objectives have been identified.

8.3 Proposed actions

No new requirement to proceed to a new detailed assessment has been identified for any pollutant. A detailed assessment for PM_{10} previously planned to be carried out in Cairnryan due to a perceived increase in traffic levels following the re-location of the Stena Line port from Stranraer to Old House Point, Cairnryan has been postponed pending completion of further developments at Old House Point.

9. References

i. The Environment Act 1995 (UK Parliament Public General Acts).
http://www.opsi.gov.uk/acts/acts1995/Ukpga_19950025_en_1

ii. The Air Quality (Scotland) Regulations 2000 Scottish Statutory Instrument (SSI) Number 97.
The Air Quality (Scotland) Amendment Regulations 2002 SSI Number 297
http://www.opsi.gov.uk/legislation/scotland/ssi2000/20000097.htm
http://www.opsi.gov.uk/legislation/scotland/ssi2002/ssi_20020297_en.pdf

iii. The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1&2) (July 2007).
http://archive.defra.gov.uk/environment/quality/air/airquality/strategy/documents/air-qualitystrategy-vol1.pdf

iv. Previously published LAQM reports for Dumfries and Galloway Council are available at
http://www.dumgal.gov.uk/index.aspx?articleid=1733

v. Local Air Quality Management Technical Guidance LAQM.TG (09): DEFRA February 2009
http://www.defra.gov.uk/publications/files/pb13081-tech-guidance-laqm-tg-09-090218.pdf

vi. Eskdalemuir Observatory.
http://www.geomag.bgs.ac.uk/operations/eskdale.html

vii. Supplement to Detailed Assessment for PM_{10} – 2011, Dumfries & Galloway.

viii. Detailed Assessment 2009 Dumfries & Galloway Council – AQC – Air Quality Consultants.

ix. Coatesgate Quarry Environmental Statement (Air Quality) Wardell Armstrong 2011.

x. Glenmuckloch Surface Mine, Proposed East Extension Wardell Armstrong 2010.

Appendix 1 Details of NO_2 co-location study

Table 7 Details of co-location study at Buccleuch St., Dumfries 2011.

Date	Monthly average (continuous monitor)	Ratified/ provisional data	Data capture %	Average diffusion Tube	Ratio:- continuous/ diffusion tube result
January	49·28	Ratified	99·70	57·67	0·85
February	36·81	Ratified	99·26	46·97	0·78
March	40·77	Ratified	98·66	47·73	0·85
April	34·37	Ratified	99·55	41·70	0·82
May	26·69	Ratified	97·62	31·37	0·85
June	29·13	Ratified	99·71	35·33	0·82
July	25·74	Ratified	99·27	29·90	0·86
August	24·43	Ratified	95·96	28·67	0·85
September	22·00	Ratified	99·54	27·57	0·80
October	26·88	Ratified	99·42	33·83	0·79
November	31·02	Ratified	99·43	38·50	0·81
December	32·03	Ratified	99·75	35·93	0·89
Average	31·60			37·93	

Bias-adjustment factor = continuous mean/diffusion tube mean = 31·60/37·93 = 0·83
Diffusion tube bias = (diffusion tube mean minus continuous mean) divided by continuous mean = (37·93 - 31·60)/31·60 = 0·20 i.e. tubes over-read by approximately 20%.

Table 8 Diffusion tube annual averages 2011.

Location of diffusion tube(s)		A Annual average $\mu g/m^3$	B Annual average *(bias-corrected with local bias-adjustment factor x 0·83)*	C Annual average using AEA Energy and Environment spreadsheet
M74 Slip Road	Lockerbie	36·9	30·6	31
***Buccleuch St. (E)	Dumfries	37·9	31·5	32
††Buccleuch St. (W)	Dumfries	36·2	30·0	30
Buccleuch St. (S)	Dumfries	41·1	34·1	34
†††Buccleuch St Bridge	Dumfries	34·0	28·2	28
Nith Place	Dumfries	32·2	26·8	27
Loreburn St.	Dumfries	29·5	24·5	24
St Michael St.	Dumfries	28·6	23·8	24
Argyll Drive	Dumfries	12·9	10·7	11
Charlotte St.	Stranraer	21·3	17·7	18
Port Rodie Car Park	Stranraer	19·9	16·6	17
A77 Cairnryan	Stranraer	23·6	19·6	20

($\mu g/m^3$ = *micrammes per cubic metre)*
****Triplicate tubes co-located with AURN automatic monitor*
††Duplicate tubes
†††Triplicate tubes

Table 9 Monthly diffusion tube results for 2011.

Site	Monthly diffusion tube results (micrograms per cubic metre)													
	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	Average	Adjusted Average. (x0·83)
M74 Slip Road, Lockerbie	52·7	45·1	41·1	34·0	29·5	32·2	30·7	31·1	29·8	38·2	36·4	41·8	36·9	30·6
***Buccleuch St. (East), Dumfries	56·2	46·5	47·8	41·4	30·4	34·7	29·5	30·0	26·3	33·5	37·3	38·4	37·9	31·5
	61·5	48·7	50·2	42·0	33·5	36·8	30·9	26·4	28·1	34·1	38·5	36·8		
	55·4	45·7	45·2	V	30·2	34·5	29·3	29·6	28·3	33·9	39·7	32·6		
††Buccleuch St. (West), Dumfries	48·3	49·2	47·9	31·3	29·5	33·0	28·4	29·3	29·9	36·0	39·0	38·0	36·2	30·0
	51·1	47·0	42·4	29·6	26·1	30·9	26·0	28·6	29·1	36·3	41·6	39·2		
Buccleuch St. (South), Dumfries	54·4	56·7	50·6	36·0	34·8	37·5	29·3	32·4	31·6	41·9	48·7	39·4	41·1	34·1
†††Buccleuch St. Bridge, Dumfries	51·2	52·2	45·8	30·2	27·9	29·2	22·0	24·0	28·4	32·7	43·5	23·7	34·0	28·2
	50·5	51·8	42·1	31·6	30·4	25·3	21·0	22·9	29·7	36·3	47·8	30·9		
	47·1	50·2	32·6	29·7	26·5	23·3	19·5	23·0	27·5	37·3	44·5	31·1		
Nith Place, Dumfries	29·4	47·6	41·4	33·1	26·3	30·7	25·6	27·1	24·8	31·0	40·4	29·5	32·2	26·8
Loreburn St. Dumfries	43·3	41·0	33·5	28·0	21·8	25·0	24·4	23·3	19·3	27·4	37·2	29·7	29·5	24·5
St Michael St. Dumfries	46·6	41·9	35·4	25·9	21·0	22·2	20·5	20·0	19·5	25·6	34·4	30·5	28·6	23·8
Argyll Drive, Dumfries	24·6	21·6	15·3	8·4	7·2	7·6	5·1	6·3	14·3	10·2	17·2	16·4	12·9	10·7
Charlotte St. Stranraer	33·6	35·6	18·8	20·5	17·9	16·7	13·7	14·7	V	20·4	27·4	15·0	21·3	17·7
Port Rodie Car Park, Stranraer	28·7	36·3	21·4	25·9	12·8	16·3	8·9	12·5	13·8	19·7	30·9	12·1	19·9	16·6
A77 Cairnryan, Stranraer	24·5	V	26·5	17·8	25·7	22·9	21·3	20·8	23·1	24·2	26·7	26·2	23·6	19·6

****Triplicate tubes (co-located with automatic monitor)*
††Duplicate tubes
†††Triplicate tubes
V - Tube(s) vandalised (or otherwise removed or sample tubes contaminated or result[s] rejected).

Appendix 2 Maps of non-automatic monitoring sites.

Figure 6 Map of diffusion tube site at M74 Lockerbie.

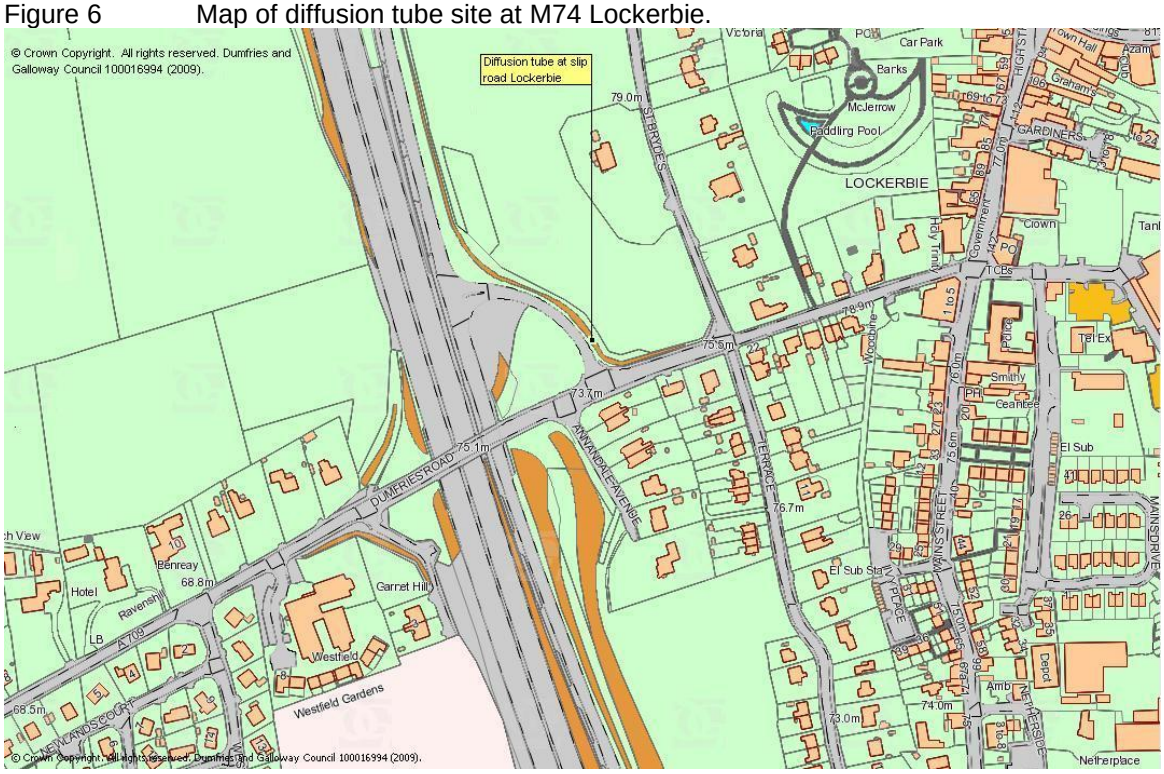
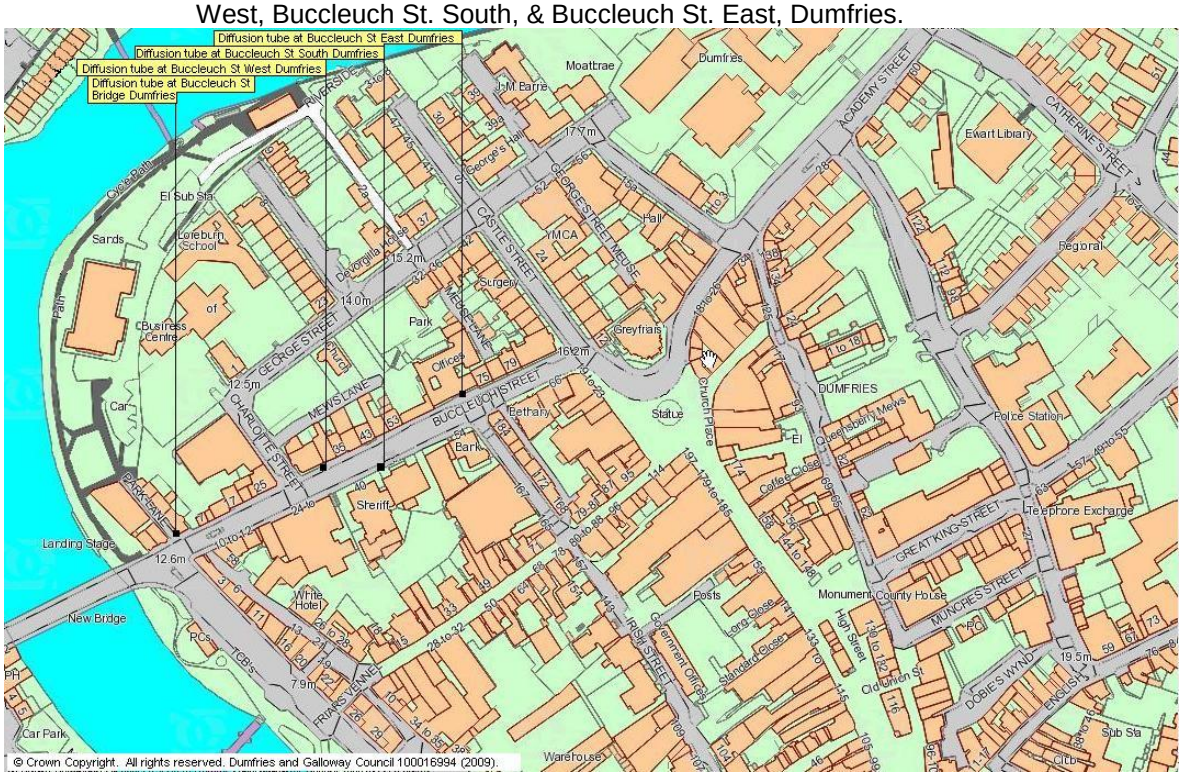


Figure 7 Map of diffusion tube sites at (from left to right) Buccleuch St. Bridge, Buccleuch St. West, Buccleuch St. South, & Buccleuch St. East, Dumfries.



Appendix 2 Maps of non-automatic monitoring sites (continued).

Figure 8 Map of diffusion tube site at Loreburn St., Dumfries.

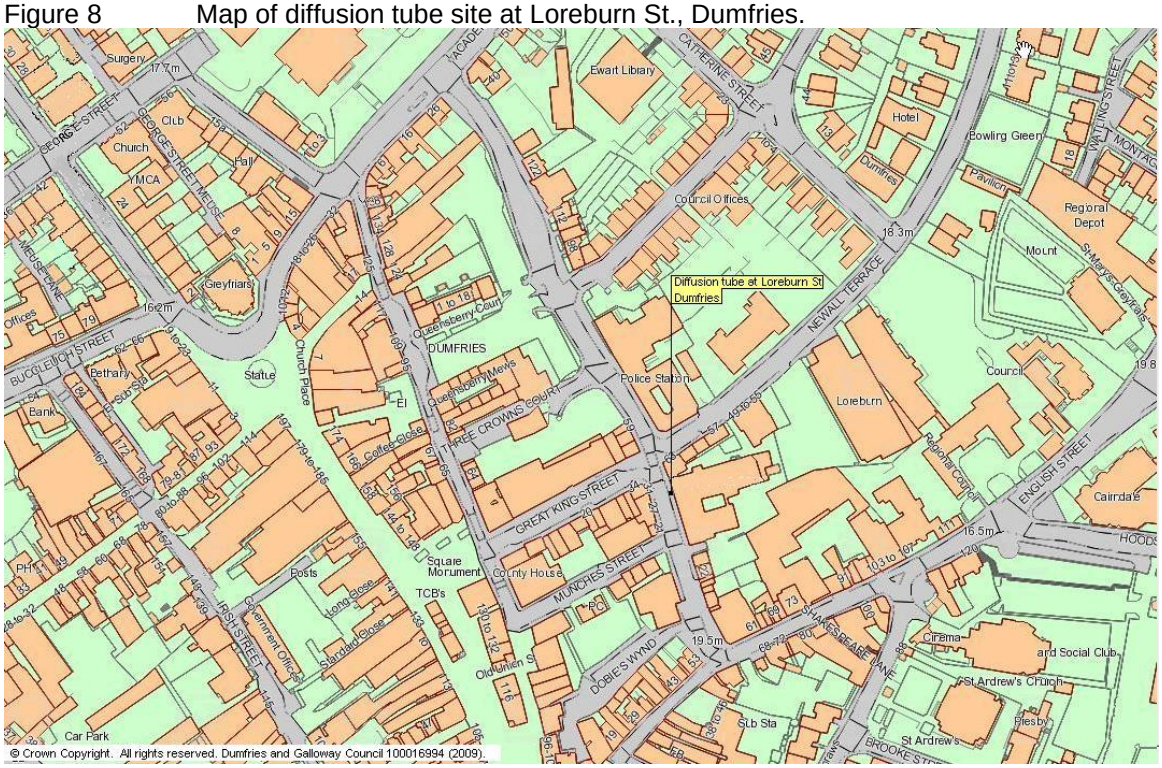
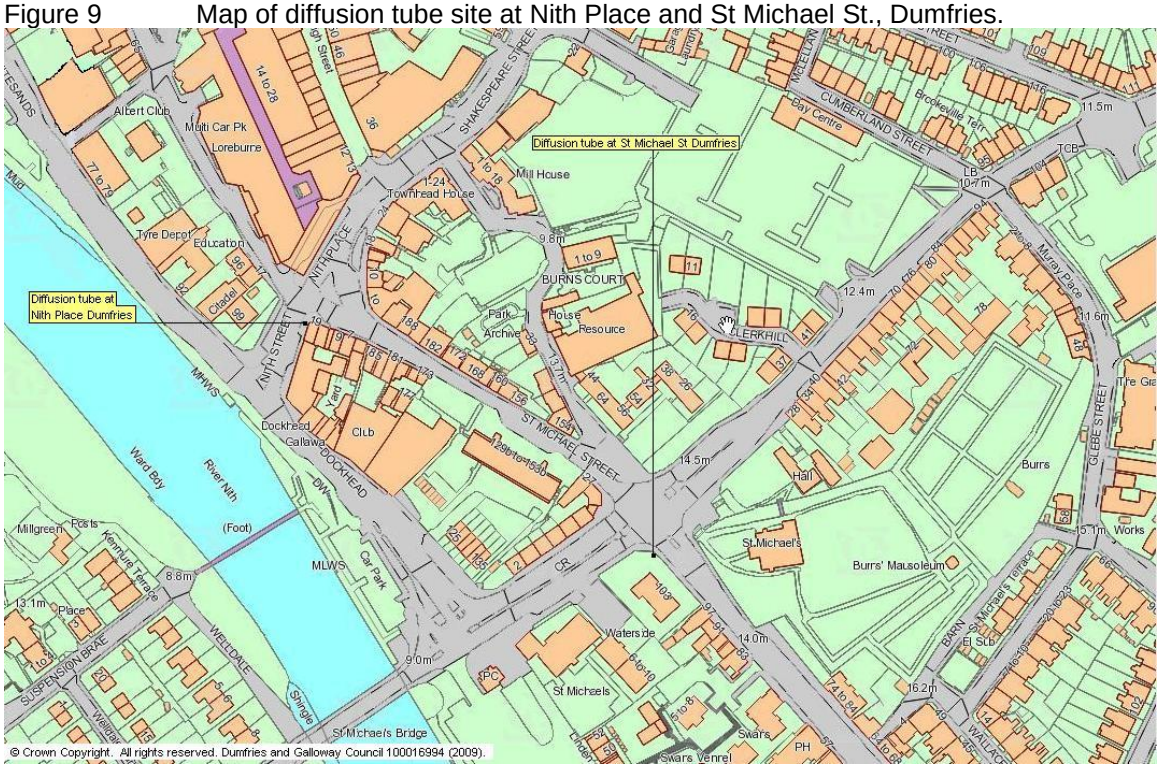


Figure 9 Map of diffusion tube site at Nith Place and St Michael St., Dumfries.



Appendix 2 Maps of non-automatic monitoring sites (continued).

Figure 10 Map of diffusion tube site at Argyll Drive, Heathhall Dumfries.

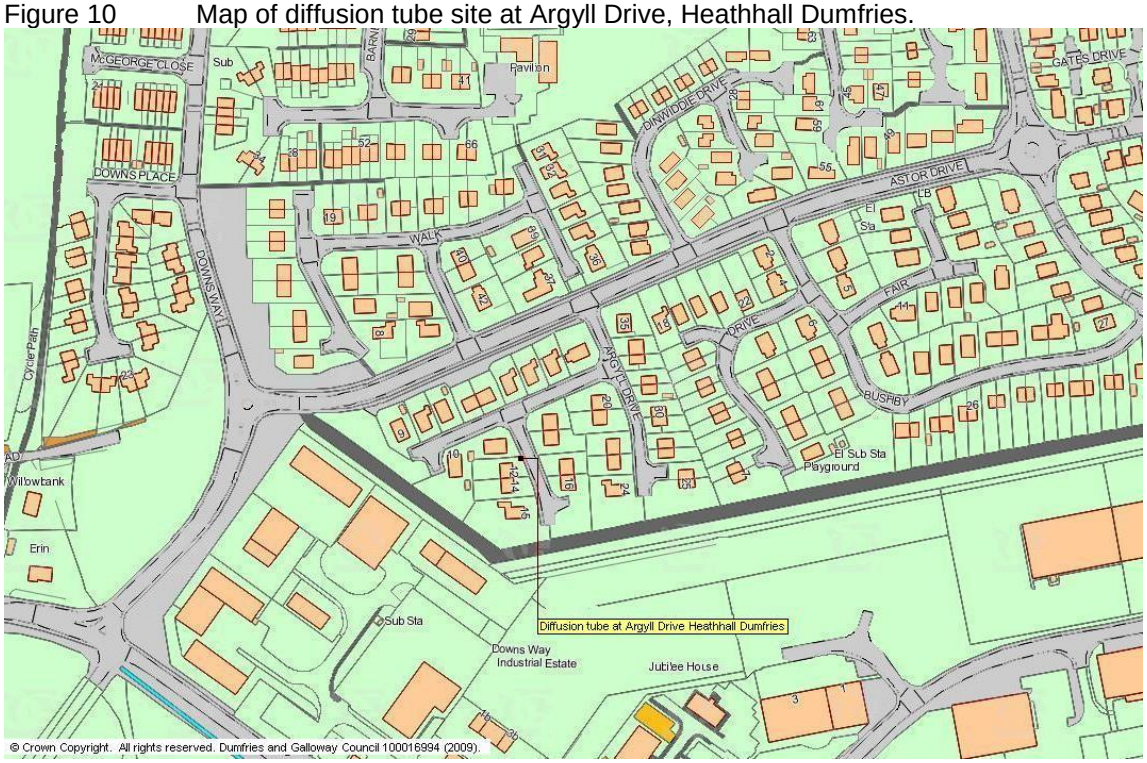
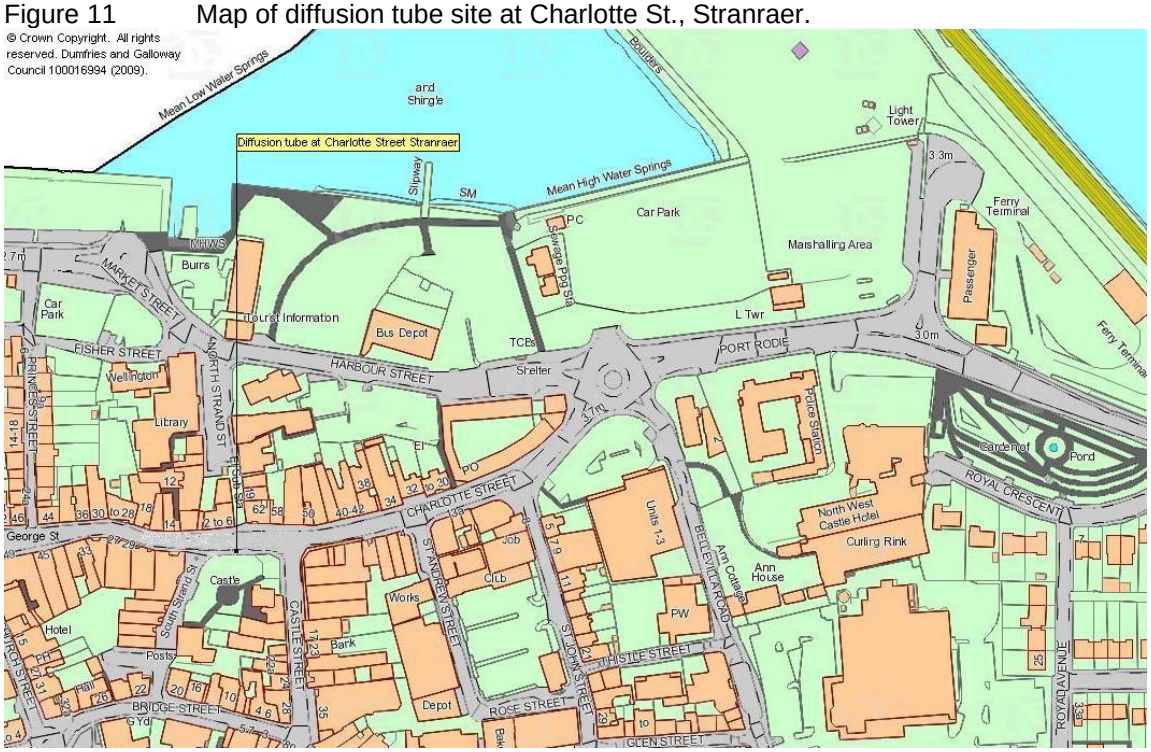


Figure 11 Map of diffusion tube site at Charlotte St., Stranraer.



Appendix 2 Maps of non-automatic monitoring sites (continued).

Figure 12 Map of diffusion tube site at Port Rodie Car Park Stranraer.

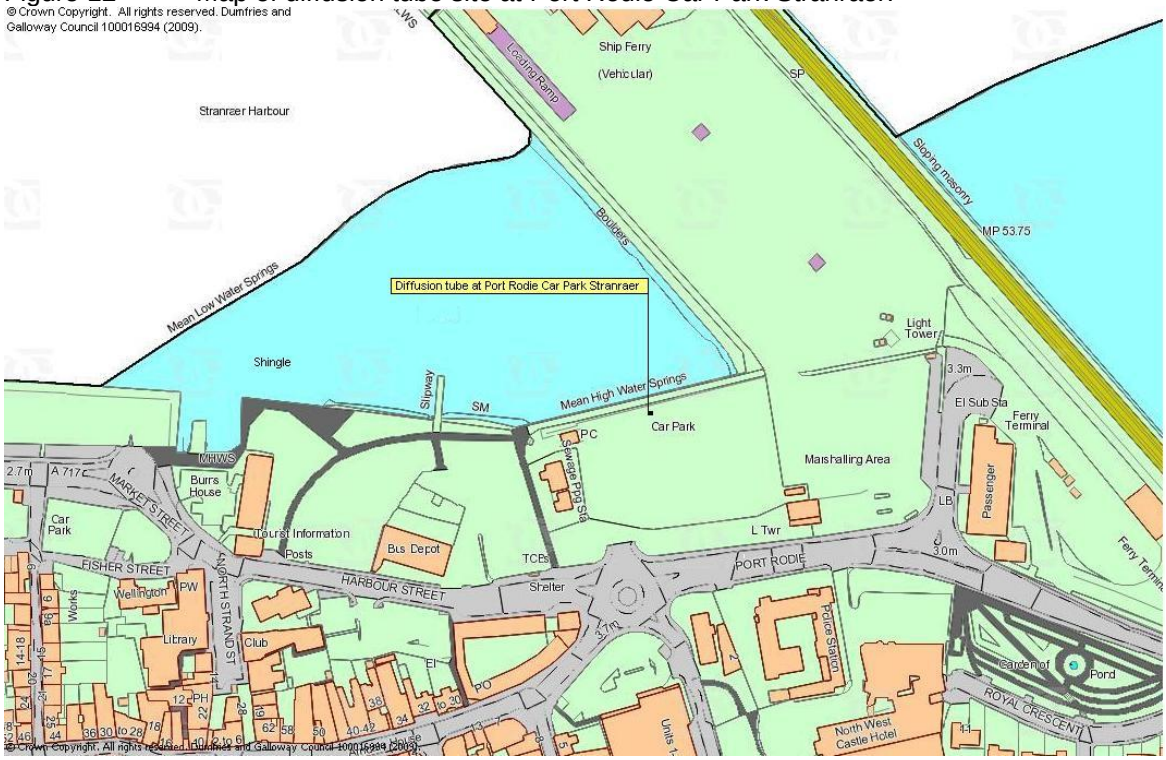


Figure 13 Map of diffusion tube site at A77 Cairnryan.