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East Dunbartonshire Council

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BMT Cordah

Air Quality Updating and Screening Assessment 2009

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

Executive Summary

A review of pollutant monitoring data and atmospheric emissions sources within East Dunbartonshire Council area has been undertaken. The assessment compared the available monitoring data to national air quality standards in order to identify any existing exceedences of the standards.

Data was gathered from various national and local sources with regards to atmospheric emissions from: road traffic; rail; aircraft; shipping; industrial processes; intensive farming operations; domestic properties; biomass plants; and dusty processes. The screening methods outlined in the technical guidance were used to determine the likelihood that a particular source would result in an exceedence of national air quality standards.

The review of monitoring data identified exceedences of the annual mean NAQS objective for NO_2 and predicted exceedences of the 2010 annual mean NAQS objective for PM_{10} at locations of relevant exposure along Drymen Road in Bearsden. The PM_{10} monitoring data for Bishopbriggs indicate that concentrations within the AQMA have reduced such that the 2010 annual mean objective for PM_{10} is not being exceeded. NO_2 concentrations continue to exceed the annual mean NAQS objective at some locations within the AQMA.

The review of emission sources did not identify any new or significantly changed emissions within the East Dunbartonshire Council area.

East Dunbartonshire Council intend to declare an AQMA along Drymen Road in Bearsden in respect to measured and predicted exceedences of the annual mean NAQS objectives for NO_2 and PM_{10}.

It is intended that additional monitoring of NO_2 is undertaken in Milngavie at locations of relevant exposure to ensure that the annual mean objective is not exceeded.

It is intended that monitoring of PM_{10} and NO_2 continue within the Bishopbriggs AQMA and that if PM_{10} concentrations remain below the 2010 annual mean objective during 2009 then East Dunbartonshire Council will look to revoke the AQMA for PM_{10}.

The next report required for submission to the Scottish Government will be a Further Assessment and AQMA Action Plan in relation to the proposed AQMA in Bearsden. The Further Assessment will require being submitted 12 months and the Action Plan 18 months after the declaration of the AQMA. East Dunbartonshire Council will also be required to submit a Progress Report by 30th April 2010.

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1 Introduction

1.1 Description of Local Authority area

The East Dunbartonshire Council area covers approximately 200 square kilometres located to the north of Glasgow and is bordered by Glasgow City Council to the south, West Dunbartonshire Council to the west, Stirling Council to the north and North Lanarkshire Council to the east. The local authority is landlocked and contains a mixture of both urban and rural areas. A map of East Dunbartonshire is provided in Figure 1 in Appendix A.

The population of East Dunbartonshire is approximately 105,000 with the majority of residents based in the urban areas to the south, which are contiguous with Glasgow. The main urban centres are Bearsden, Bishopbriggs, Kirkintilloch, Lenzie and Milngavie. The northern part of East Dunbartonshire is largely rural with a few small population centres in Torrance, Lennoxtown, Twechar and Milton of Campsie. There are relatively low levels of industrial activity within the local authority area.

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), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

1.3 Air quality objectives

The air quality objectives applicable to LAQM in Scotland are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97), the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI 2002 No 297), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air quality objectives included in regulations for the purpose of Local Air Quality Management in Scotland.

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene			
	16.25 $\mu g/m^3$	Running annual mean	31.12.2003
	3.25 $\mu g/m^3$	Running annual mean	31.12.2010
1,3-Butadiene	2.25 $\mu g/m^3$	Running annual mean	31.12.2003
Carbon monoxide	10.0 mg/m^3	Running 8-hour mean	31.12.2003
Lead	0.5 $\mu g/m^3$	Annual mean	31.12.2004
	0.25 $\mu g/m^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu g/m^3$ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 $\mu g/m^3$	Annual mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 $\mu g/m^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu g/m^3$	Annual mean	31.12.2004
	50 $\mu g/m^3$, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	18 $\mu g/m^3$	Annual mean	31.12.2010
Sulphur dioxide	350 $\mu g/m^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu g/m^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu g/m^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of previous Review and Assessments

East Dunbartonshire Council have undertaken regular reviews of air quality; the submitted reports are listed in Table 1.2. The location of the AQMA is indicated in Figure 2 in Appendix A.

Table 1.2 Details of local air quality reviews submitted by East Dunbartonshire Council

Date submitted	Assessment / Report	Conclusions
May 2003	Updating and Screening Assessment (2003 U&SA)[1]	The risk of exceeding NO_2 and PM_{10} objectives at several busy roads and junctions was identified in Bishopbriggs, Bearsden and Milngavie.
September 2004	Detailed Assessment of NO_2 and PM_{10} (2004 DA)[2]	The assessment considered NO_2 and PM_{10} concentrations resulting from road traffic emissions along the A803 in Bishopbriggs, and the A81 and A809 in Bearsden and Milngavie. The assessment concluded that annual mean NO_2 and PM_{10} objectives would be exceeded and that an Air Quality Management Area (AQMA) should be declared in Bishopbriggs. The study also identified potential exceedences of the 2010 annual mean PM_{10} air quality objective within Bearsden and Milngavie. However, further action was deferred until the modelling results could be verified with monitored data
April 2005	Addendum to Detailed Assessment of NO_2 and PM_{10} (2004 DA- Addendum)[3]	
May 2005	Progress Report (2005 PR)[4]	No new areas were identified where exceedences of NAQS objectives were predicted The intention to declare an AQMA in Bishopbriggs was confirmed. Following the results of the DA it was noted that the Council intended to install automatic monitoring for PM_{10} and NO_2 in Bearsden
October 2005	Bishopbriggs AQMA declaration	An AQMA covering a 60m corridor along the A803 Kirkintilloch Road between Colston Road and a point 30m north of Cadder Roundabout was declared on 23rd October 2005 and implemented on 23rd December 2005.
June 2006	Updating and Screening Assessment (2006 U&SA)[5]	The risk of NO_2 and PM_{10} objectives being exceeded at Bearsden Cross was identified. Due to a low data capture rate at automatic monitoring site it was recommended that further monitoring was carried out prior to proceeding to a Detailed Assessment.
May 2007	Bishopbriggs AQMA Further Assessment (2007 FA)[6]	The Further Assessment confirmed the requirement for an AQMA, for both NO_2 and PM_{10}, in Bishopbriggs. The Further Assessment considered two proposed future road traffic emission scenarios: the implementation of a quality bus corridor on the A803; and completion of the Bishopbriggs Relief Road. The assessment concluded that both options would generally improve air quality within the AQMA but that there may be a marginal increase in pollutant concentrations at the junction between Colston Road and Kirkintilloch Road at the south of the AQMA as a result of both schemes. The assessment concluded that the completion of the Bishopbriggs Relief Road in addition to the implementation of the quality bus corridor would achieve the highest improvement in air quality within the AQMA,

[1] Air Quality Review Updating and Screening Assessment 2003, East Dunbartonshire Council, April 2003
[2] LAQM Detailed Assessment of NO_2 and PM_{10}, BMT Cordah Ltd report E_EDC_001, September 2004
[3] LAQM Detailed Assessment Addendum, BMT Cordah Ltd report, E_EDC_003 (1), April 2005
[4] LAQM Progress Report 2005 BMT Cordah Ltd report E_EDC_003 (2), May 2005
[5] LAQM Updating and Screening Assessment 2006, BMT Cordah Ltd report E_EDC_005, April 2006
[6] LAQM Bishopbriggs AQMA Further Assessment, BMT Cordah Ltd report E_EDC_004, May 2007

		although concentrations of both pollutants were still predicted to exceed the NAQS objectives in 2010.
June 2007	Progress Report (2007 PR)[7]	The report identified that measured NO_2 concentrations at four sites in Bearsden and one in Milngavie exceeded the annual mean NO_2 objective. Potential exceedences of the PM_{10} annual mean and 24 hour mean objectives were identified in Bearsden and Milngavie. It was concluded that a Detailed Assessment of NO_2 and PM_{10} was required for busy junctions in Bearsden and Milngavie.
October 2007	Bishopbriggs AQMA Further Assessment (2007 FA-Addendum)[8]	The Addendum report included additional information on source apportionment within the AQMA. It was identified that transboundary sources accounted for the greatest proportion of both PM_{10} and NO_X concentrations. The greatest contributions from local sources were from road traffic and commercial and domestic sources. It was shown that particulate emissions from tyre, break wear and re-suspension contributed significantly to road traffic emissions of PM_{10} and HGVs were the greatest contributor to road traffic emissions of NO_x.
January 2008	Bishopbriggs AQMA Draft Action Plan (2008 AP-draft)[9]	Following a series of consultations with the local community and stakeholders, including a citizens panel questionnaire, a short-life working group and 2 workshops; the Draft Action Plan was issued in conjunction with the Local Transport Strategy (LTS). A joint Strategic Environmental Assessment (SEA) was undertaken separately which assessed the wider impacts of both the LTS and AP.
April 2008	Detailed Assessment Bearsden & Milngavie (2008 DA)[10]	The assessment of NO_2 and PM_{10} concentrations in Bearsden and Milngavie concluded that there were some areas within Bearsden and Milngavie where predicted NO_2 and PM_{10} concentrations were above the respective air quality objectives; however, the locations were not classified as locations of relevant public exposure. Furthermore, there were several areas along Drymen Road at which predicted concentrations were close to, but not exceeding, the 2010 annual mean PM_{10} objective. Based on the results of the Detailed Assessment it was concluded that an AQMA in Bearsden or Milngavie was not required; however, further monitoring was recommended.
August 2008	Progress Report (2008 PR)[11]	No identified or predicted exceedences of NAQS objectives.
March 2009	Bishopbriggs AQMA Final Action Plan (2009 AP)[12]	Following consultation with SEPA, neighbouring local authorities, all Council departments and the Scottish Government the final version Action Plan was issued.

East Dunbartonshire Council plan to prepare an Air Quality Strategy for the entire Council area. To inform the strategy an emissions inventory for the Council area is currently being compiled. The inventory will allow the locations of the highest emission levels and the sources which are the highest contributors to ambient pollutant concentrations to be identified, The Strategy will help to ensure that local air quality is managed across the Council area and that measures are implemented to improve local air quality for all residents.

[7] LAQM Progress Report 2007 BMT Cordah Ltd report E_EDC_006 (1), June 2007
[8] LAQM Bishopbriggs AQMA Further Assessment Addendum, BMT Cordah Ltd report E_EDC_006 (2), May 2007
[9] Bishopbriggs AQMA Draft Action Plan, BMT Cordah Ltd report E_EDC_007, January 2008
[10] LAQM Detailed Assessment of NO_2 and PM_{10}, BMT Cordah Ltd report E_EDC_006 (4), April 2008
[11] LAQM Progress Report 2008 BMT Cordah Ltd report G_EDC_008 (1), August 2008
[12] Bishopbriggs AQMA Action Plan, BMT Cordah Ltd report G_EDC_008 (2), March 2009

2 New monitoring data

During 2008 East Dunbartonshire Council monitored both PM_{10} and NO_2 at several locations throughout the council area using both automatic and passive sampling methods.

Recorded NO_2 and PM_{10} data have been ratified for erroneous results with all negative and spurious readings removed. Measured 24-hour mean concentrations with less than 18-hours of recorded data have been omitted from any final reported results. Finally results have been corrected using where available local bias correction factors. Details of the quality control and data correction processes carried out are reported in Appendix B.

2.1 Summary of monitoring undertaken

East Dunbartonshire monitor NO_2 and PM_{10} using a variety of automatic analysers and passive diffusion tubes (PDT). The automatic monitoring sites are presented in Table 2.1a and the details of the non-automatic monitoring sites are presented in Table 2.1b.

2.1.1 Automatic monitoring sites

East Dunbartonshire Council operate three automatic NO_X analysers and four automatic PM_{10} monitors. The analysers are located at three sites:

- the junction of Drymen Road (A809) and Roman Road in Bearsden;
- the junction of Kirkintilloch Road (A807), Springfield Road and Kenmure Avenue in Bishopbriggs; and
- the Townhead junction in Kirkintilloch.

There is a NO_X and PM_{10} analyser at each monitoring location. An additional gravimetric partisol PM_{10} analyser is located at Bishopbriggs Cross.

The locations of the automatic monitoring sites are annotated in Figures 3, 4 and 5.

Table 2.1a Details of automatic monitoring sites

Site Name		**Bearsden 16**	**Bishopbriggs 14**	**Kirkintilloch 17**
Site Type		Kerbside	Roadside	Kerbside
Location		Bearsden Cross	Bishopbriggs Cross	Townhead junction, Kirkintilloch
OS Grid Ref		NS 54269 72067	NS 60995 70130	NS 65700 73500
Pollutants Monitored		NO_X, PM_{10}	NO_X, PM_{10}	NO_X, PM_{10}
In AQMA?		N	Y	N
Type of analyser		APNA 360, BAM (heated inlet)	APNA 360, BAM (heated inlet) Partisol	Thermo 42i TEOM (FDMS)
Service provider		Horiba	Horiba (NOx & BAM) AEA (Partisol)	Air monitors
Laboratory		N / A	Glasgow Scientific Services	N / A
Relevant Exposure?	*(Y/N with distance (m) to relevant exposure)*	Y < 2m	Y 5m	Y < 2m
Distance to kerb of nearest road	*(N/A if not applicable)*	1m	2m to nearest road 10m to junction with main road	1m
Worst-case Location?		Y	N	Y

2.1.2 Non-automatic monitoring

East Dunbartonshire Council maintain a network of twenty three NO_2 diffusion tube sites located across the council area. The monitoring sites represent public exposure and areas of high pollution concentrations at a variety of kerbside, roadside and urban background locations. The locations of the non-automatic monitoring sites are annotated in Figures 6, 7, 8 and 9.

Table 2.1b Details of non- automatic monitoring site

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location?
Bearsden 1	Roadside	NS 54218 72193	NO_2	N	N (< 5m)	2m	Y
Bearsden 3	Urban Background	NS 54655 70158	NO_2	N	N (< 10m)	5m	N
Bearsden 4	Urban Background	NS 53075 73382	NO_2	N	N (< 10m)	5m	N
Bearsden 7	Kerbside	NS 54269 72069	NO_2	N	Y (< 2m)	1m	Y
Bearsden 8	Kerbside	NS 54275 72047	NO_2	N	Y (< 2m)	1m	Y
Bearsden 9	Roadside	NS 54751 70621	NO_2	N	N (< 5m)	2m	Y
Bearsden 10	Roadside	NS 55394 70683	NO_2	N	N (< 5m)	2m	Y
Bearsden 13	Kerbside	NS 54809 71057	NO_2	N	Y (< 2m)	1m	Y
Bearsden 14	Kerbside	NS 54877 71000	NO_2	N	Y (< 2m)	1m	Y
Bearsden 15	Kerbside	NS 54898 71023	NO_2	N	Y (< 2m)	1m	Y
Bearsden 16	Kerbside	NS 54269 72067	NO_2	N	Y (< 2m)	1m	Y
Bearsden 16B	Kerbside	NS 54269 72067	NO_2	N	Y (< 2m)	1m	Y
Bearsden 16C	Kerbside	NS 54269 72067	NO_2	N	Y (< 2m)	1m	Y
Bishopbriggs 5	Urban Background	NS 60948 69610	NO_2	N	Y (< 2m)	5m	N
Bishopbriggs 6	Kerbside	NS 61016 70198	NO_2	Y	Y (< 2m)	1m	Y
Bishopbriggs 8	Urban Background	NS 60842 70278	NO_2	N	N (< 10m)	5m	N
Bishopbriggs 12	Kerbside	NS 60581 69527	NO_2	Y	Y (< 2m)	1m	Y
Bishopbriggs 13	Kerbside	NS 60549 69312	NO_2	Y	Y (< 2m)	1m	Y
Bishopbriggs 14	Roadside	NS 60995 70130	NO_2	Y	Y (< 5m)	2m	Y
Bishopbriggs 14B	Roadside	NS 60995 70130	NO_2	Y	N (< 5m)	2m	Y
Bishopbriggs 14C	Roadside	NS 60995 70130	NO_2	Y	N (< 5m)	2m	Y
Kirkintilloch 15	Roadside	NS 65640 73501	NO_2	N	N (< 5m)	2m	Y
Kirkintilloch 16	Roadside	NS 65695 73521	NO_2	N	N (< 5m)	2m	Y
Kirkintilloch 17	Roadside	NS 65700 73500	NO_2	N	Y (< 2m)	2m	Y
Kirkintilloch 17B	Roadside	NS 65700 73500	NO_2	N	Y (< 2m)	2m	Y
Kirkintilloch 17C	Roadside	NS 65700 73500	NO_2	N	Y (< 2m)	2m	Y
Milngavie 4	Roadside	NS 55728 74486	NO_2	N	N (< 5m)	2m	Y
Milngavie 5	Roadside	NS 55327 74137	NO_2	N	N (< 5m)	2m	Y
Milngavie 6	Roadside	NS 55288 74121	NO_2	N	N (< 5m)	2m	Y

2.2 Comparison of monitoring results with air quality objectives

Comparison of measured NO_2 and PM_{10} concentrations with relevant air quality standards are discussed in Sections 2.2.1 and 2.2.2.

2.2.1 Nitrogen dioxide

Automatic monitoring data

The annual mean and 1-hour mean NO_2 automatic monitoring data for 2008 and previous years are presented in Tables 2.2a and 2.2b respectively. Measured exceedences of NAQS objectives are highlighted in bold.

Table 2.2a Results of automatic monitoring for nitrogen dioxide: Comparison with annual mean objective

Site ID	Within AQMA?	Proportion of year with valid data 2008 %	Annual mean concentrations (µg/m³)		
			2006	2007	2008
Bearsden16	N	100	39.3	39.4	**44.1**
Bishopbriggs14	Y	89	33.6	34.1	31.5
Kirkintilloch17	N	100	/	39.2#	35.6

Analyser was installed in August 2007. The reported concentration represents a period mean adjusted estimate of the annual mean concentration

Table 2.2b Results of automatic monitoring for nitrogen dioxide: comparison with 1-hour mean objective

Site ID	Within AQMA?	Data Capture 2008 %	Number of Exceedences of hourly mean (200 µg/m³) *If the period of valid data is less than 90% of a full year, include the 99.8th %ile of hourly means in brackets.*		
			2006 (*)	2007 (*)	2008 (*)
Bearsden16	N	100	0 (131ug/m³)	0 (150ug/m³)	10 (184 ug/m³)
Bishopbriggs14	Y	89	0 (123ug/m³)	0 (145ug/m³)	1 (144 ug/m³)
Kirkintilloch17	N	100	/	0 (146ug/m³)#	0 (141ug/m³)

** 99.8th percentile of 1-hour mean concentrations*

Analyser was installed in August 2007

The data capture rate of all the NO_X analysers was good, with a data capture rate of greater than 90% achieved at both Bearsden and Kirkintilloch and 89% capture rate at Bishopbriggs.

Measured NO_2 concentrations at the Bishopbriggs Cross site during 2008 were below both the annual mean and 1-hour mean NAQS objectives for NO_2. Measured concentrations indicate that the NAQS objectives for NO_2 are being met at Bishopbriggs Cross (Bishopbriggs 14).

Similarly, measured concentrations in Kirkintilloch are also below both objective levels and indicate that the NAQS objectives for NO_2 concentrations are being met.

The measured annual mean NO_2 concentration at Bearsden Cross (Bearsden 16) in 2008 was higher than the annual mean objective level of 40ug/m³. The monitor is sited at a kerbside location on the north-east corner of the junction between Drymen Road (A809) and Roman Road. There is frequently traffic queuing at the junction and relevant public exposure within 2m of the road namely the school to the south of the junction and residential properties close to the junction along Roman Road and Drymen road. The Detailed Assessment completed in 2008 indicated that there would not be an exceedence of NAQS objectives at nearby receptors. However the modelling study used monitoring

data from 2006 and 2007 and NO_2 concentrations recorded at the Bearsden Cross during 2008 have increased. It is therefore now predicted that the annual mean NAQS objective for NO_2 is being exceeded at locations of relevant exposure.

There were no recorded exceedences of the 1-hour objective for NO_2 at any of the automatic monitoring sites.

Diffusion tube monitoring data

The NO_2 diffusion tube monitoring data for 2008 and previous years are presented in Table 2.2c. Measured concentrations above the annual mean objective level are highlighted in bold.

Table 2.2c Results of nitrogen dioxide diffusion tubes

Site ID	2008 bias adjustment factor	Within AQMA?	Data Capture 2008 %	Annual mean concentrations adjusted for bias (µg/m³)		
				2006	2007	2008
Bearsden 1	1.056	N	83	30	30	33*
Bearsden 3	1.056	N	92	21	19	17
Bearsden 4	1.056	N	92	12	11	14
Bearsden 7	1.056	N	83	36	**43**	**48**
Bearsden 8	1.056	N	92	37	38	38
Bearsden 9	1.056	N	92	31	27	29
Bearsden 10	1.056	N	92	35	34	33
Bearsden 13	1.056	N	92	38	37	39
Bearsden 14	1.056	N	92	38	39	38
Bearsden 15	1.056	N	92	38	34	**40**
Bearsden 16	1.056	N	92	38	**40**	**46**
Bearsden 16B	1.056	N	92	37	**41**	**45**
Bearsden 16C	1.056	N	92	39	39	**43**
Bishopbriggs 5	1.071	N	92	18	14	15
Bishopbriggs 6	1.071	Y	92	39	37	37
Bishopbriggs 8	1.071	N	92	18	15	17
Bishopbriggs 12	1.071	Y	92	39	34	**40**
Bishopbriggs 13	1.071	Y	92	**47**	**51**	**51**
Bishopbriggs 14	1.071	Y	92	33	30	31
Bishopbriggs 14B	1.071	Y	92	34	32	33
Bishopbriggs 14C	1.071	Y	92	34	29	32
Kirkintilloch 15	0.887	N	83	35	35	32*
Kirkintilloch 16	0.887	N	92	38	38	33
Kirkintilloch 17	0.887	N	92	/	/	36
Kirkintilloch 17B	0.887	N	92	/	/	35
Kirkintilloch 17C	0.887	N	92	/	/	34
Milngavie 4	1.056	N	92	31	26	39
Milngavie 5	1.056	N	92	28	24	26
Milngavie 6	1.056	N	92	**40**	**40**	**42**

* Less than 90% data capture

For those locations where the nearest relevant exposure is more than 2m from the diffusion tube monitoring site the measured concentrations have been adjusted to determine the likely concentration at the location of relevant exposure. The adjusted concentrations are presented in Table 2.2d. Concentrations at Bishopbriggs 14 have not been corrected as some areas of relevant exposure are closer to the main road than the monitor.

Measured annual mean concentrations at all monitoring sites were below the 60µg/m³ level provided in the technical guidance as an indication of the potential for exceedences of the 1-hour mean NAQS objective for NO_2. It is therefore unlikely that the 1-hour mean NAQS objective for NO_2 will be exceeded at any location I East Dunbartonshire.

Table 2.2d Predicted nitrogen dioxide concentrations at nearest receptors

Site ID	2008 bias adjustment factor	Within AQMA?	Data Capture 2008 %	2008 annual mean concentrations adjusted for bias ($\mu g/m^3$)	
				At monitoring location	At nearest relevant exposure
Bearsden 1	1.056	N	83	33	29
Bearsden 3	1.056	N	92	17	17
Bearsden 4	1.056	N	92	14	14
Bearsden 9	1.056	N	92	29	26
Bearsden 10	1.056	N	92	33	29
Bishopbriggs 8	1.071	N	92	17	17
Kirkintilloch 15	0.887	N	83	32	28
Kirkintilloch 16	0.887	N	92	33	29
Milngavie 4	1.056	N	92	39	33
Milngavie 5	1.056	N	92	26	23
Milngavie 6	1.056	N	92	**42**	31

With the exception of two monitoring locations, concentrations of NO_2 within Bishopbriggs have decreased. Generally concentrations of NO_2 have increased within Bearsden.

Measured NO_2 concentrations using diffusion tubes exceeded the 2005 annual mean objective at two locations in the AQMA (Bishopbriggs 12 and 13). The two diffusion tubes are at kerbside locations north of the busy junction between Colston Drive (B812) and Kirkintilloch Road (A803) where there is frequently queuing traffic.

Three diffusion tube sites in Bearsden (Bearsden 7, 15 and 16) and one diffusion tube site in Milngavie (Milngavie 6) also recorded exceedences of the annual mean NO_2 objective for 2005 during 2008.

The diffusion tube sites in Bearsden are at kerbside locations north of the Drymen Road (A809) and Roman Road junction and on the north side of Canniesburn Toll roundabout. There is relevant exposure within 2m of the kerbside at these locations.

The diffusion tube site at Milngavie 6 is a roadside location at the junction of Park Road (B8050) and Woodburn Way (B8030) where there is frequently queuing traffic. The nearest relevant exposure at this location is approximately 5m from monitoring site and therefore measured concentrations have been adjusted to account for the expected decrease in pollutant concentrations at the nearest receptor compared to those at the monitoring site. The adjusted NO_2 concentration for the nearest receptor is $31\mu g/m^3$ and therefore comfortably below the annual mean objective.

Recorded annual mean NO_2 concentrations at the Bishopbriggs 6 site located within the AQMA, at three locations in Bearsden (Bearsden 8, 13 and 14) and at one location in Milngavie (Milngavie 4) were close to the annual mean objective of $40ug/m^3$.

The diffusion tube sites in Bearsden where NO_2 concentrations were close to the objective are at kerbside locations north of the Drymen Road (A809) and Roman Road junction and on the north and east side of Canniesburn Toll roundabout. The diffusion tube sites are in the vicinity of those that exceeded but on different sides of the junction / roundabout.

The diffusion tube site at Milngavie 4 is a kerbside location at the junction of Glasgow Road (A81) and Woodburn Way/Station Road (B8030) which is a busy junction with frequently queuing traffic. The nearest relevant exposure at this location is approximately 5m from monitoring site and therefore measured concentrations have been adjusted to account for the expected decrease in pollutant concentrations at the nearest receptor compared to those at the monitoring site. The adjusted NO_2 concentration for the nearest receptor is $33\mu g/m^3$ and therefore comfortably below the annual mean objective.

2.2.2 PM_{10}

The measured annual mean and 24-hour mean PM_{10} concentrations for 2008 and previous years are presented in Tables 2.3a and 2.3b respectively. Measured and predicted exceedences of NAQS objectives are highlighted in bold.

Table 2.3a Results of PM_{10} automatic monitoring: comparison with annual mean objective

Site ID	Analyser	Within AQMA?	Data Capture 2008 %	Annual mean concentrations ($\mu g/m^3$)			
				2006	2007	2008	2010 +
Bearsden16	BAM	N	82	26.6	20.6	22.8	**21.2**
Bishopbriggs14	BAM	Y	96	22.0	21.1	17.8	16.9
Bishopbriggs14	PARTISOL	Y	97	20.1	18.5	17.7	16.8
Kirkintilloch17	TEOM (FDMS)	N	96	/	23.7#	22.0	**19.8**
+ Predicted from 2008 data using the methodology in Box 2.2 of LAQM.TG(09).							

Analyser was installed in August 2007. The reported concentration represents a period mean adjusted estimate of the annual mean concentration

Table 2.3b Results of PM_{10} automatic monitoring: comparison with 24-hour mean objective

Site ID	Analyser	Within AQMA?	Data Capture 2008 %	Number of Exceedences of 24-hourly mean (50 $\mu g/m^3$) *If data capture < 90%, include the 90th %ile of hourly means in brackets.*			
				2006	2007	2008	2010 +
Bearsden16	BAM	N	82	17	3	5	5
Bishopbriggs14	BAM	Y	96	3	6	4	<1
Bishopbriggs14	PARTISOL	Y	97	5	7	6	<1
Kirkintilloch17	TEOM (FDMS)	N	96	/	3#	6	3
+ 2010 annual mean estimated from 2008 data using the methodology in LAQM.TG(09).							

Analyser was installed in August 2007

The data capture rate of all the PM_{10} analysers was good, with greater than 90% capture at Bishopbriggs and Kirkintilloch and 82% capture at Bearsden.

There were no recorded exceedences of the 2004 annual mean or 24-hour mean NAQS objectives within East Dunbartonshire during 2008.

The PM_{10} concentrations measured during 2008 indicate that PM_{10} concentrations at the Bishopbriggs 14 monitoring site, located within the AQMA, are close to but below the 2010 objective and are predicted to be below the objective in 2010.

The monitor is located to the south east of the Bishopbriggs Cross junction, approximately 10m from Kirkintilloch Road (A803). The monitoring location does not represent the location of maximum impact within the AQMA, which occurs at the property facades along Kirkintilloch Road. However, the monitoring undertaken at the site does show a decrease in PM_{10} concentrations since 2006 which it is expected will be representative of concentrations throughout the AQMA. If concentrations of PM_{10} at the Bishopbriggs Cross monitoring site remain below the 2010 NAQS objective throughout 2009 then East Dunbartonshire Council will consider revoking the Bishopbriggs AQMA for PM_{10}.

PM_{10} concentrations measured in 2008 at Bearsden and Kirkintilloch are above the 2010 annual mean NAQS objective and are predicted to exceed the NAQS annual mean objective of 18ug/m^3 in 2010. The predicted 24-hour mean concentrations for 2010 indicate that there is potential for exceedence of the 24-hour mean NAQS objective for 2010 at Bearsden Cross. Results of the modelling in the Detailed Assessment indicated that although the 2010 annual mean NAQS objective for PM_{10} was predicted to be exceeded at several kerbside monitoring sites it was not predicted to be exceeded at

the specified receptors. However, the plotted concentrations indicate that there are sections of the school playground and some building facades at the junction of the A809 and Roman Road where the annual mean NAQS objective for PM_{10} is predicted to be exceeded.

Due to the elevated levels of NO_2 and PM_{10} measured in Bearsden, East Dunbartonshire Council will consider the declaration of an AQMA along Drymen Road (A809) in Bearsden.

The elevated levels of PM_{10} measured at Kirkintilloch are expected to decrease in 2009/2010 following the completion of the Kirkintilloch Link Road (KLR). The elevated PM_{10} concentrations are due in part to construction emissions and increased traffic congestion resulting from the road construction. It is therefore intended to continue the monitoring at the Townhead junction and review measured PM_{10} concentrations, and the requirement for an AQMA, following completion of the KLR.

2.2.3 Sulphur dioxide

East Dunbartonshire Council does not currently monitor SO_2. Historical monitoring data indicated a decline in concentrations inline with those experienced across the UK. Concentrations measured from 1992 to 2005 were significantly below objective levels for SO_2.

2.2.4 Other pollutants monitored

East Dunbartonshire Council does not undertake monitoring of any other pollutants.

2.3 Background pollutant concentrations

The UK air quality archive provides a national database of estimated background concentrations for pollutants listed in the National Air Quality Strategy. In 2008, the national predictions of background concentrations were updated using the 2006 national atmospheric emissions inventory data. The predicted changes to the national background concentrations are presented below.

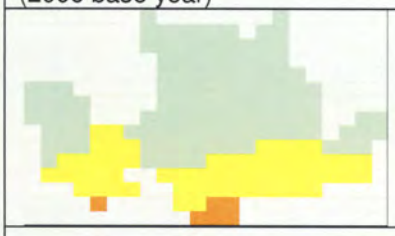
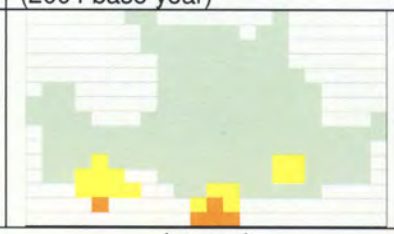
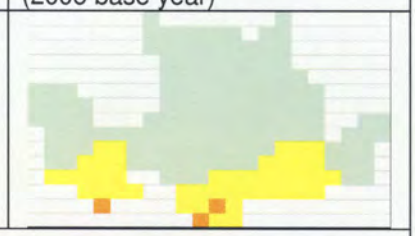
2.3.1 Nitrogen dioxide

The estimated background NO_2 concentrations for East Dunbartonshire Council are presented in Table 2.4a and 2.4b.

Table 2.4a Estimated annual mean background concentrations of NO_2 ($\mu g/m^3$)

Estimated concentration	Maximum	Mean	Minimum
2008 Annual mean concentration (2006 base year)	18.0	8.8	3.7
2010 Annual mean concentration (2004 base year)	16.3	6.7	2.5
2010 Annual mean concentration (2006 base year)	16.8	8.2	3.5
Change in predicted background concentrations (%)	2.9	22.5	37.4

Table 2.4b Predicted annual mean background concentration maps of NO_2 ($\mu g/m^3$)

2008 annual mean NO_2 concentration (2006 base year)	2010 annual mean NO_2 concentration (2004 base year)	2010 annual mean NO_2 concentration (2006 base year)
		
Legend		
0 - 10ug/m3	10 - 15ug/m3	15 - 20ug/m3

The highest estimated background NO_2 concentrations are predicted to occur in Bearsden and Bishopbriggs on the border with Glasgow City Council area. The highest estimated 2008 background concentrations of NO_2 are significantly below the annual mean NAQS objective for NO_2 of 40$\mu g/m^3$, accounting for less than 50% of the objective.

The database of background NO_2 concentrations compiled in 2006 for the East Dunbartonshire area have generally increased compared to the 2004 database.

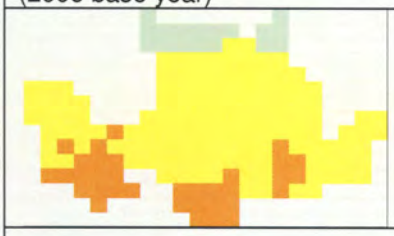
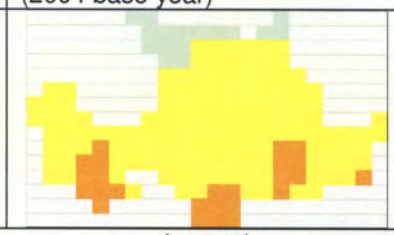
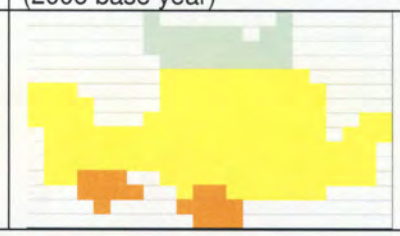
2.3.2 PM_{10}

The estimated background PM_{10} concentrations for East Dunbartonshire Council are presented in Table 2.5a and 2.5b.

Table 2.5a Estimated annual mean background concentrations of PM_{10} ($\mu g/m^3$)

Estimated concentration	Maximum	Mean	Minimum
2008 Annual mean concentration (2006 base year)	14.5	11.5	9.6
2010 Annual mean concentration (2004 base year)	14.5	11.4	9.7
2010 Annual mean concentration (2006 base year)	14.1	11.2	9.4
Change in predicted 2010 background concentrations (%)	-2.7	-1.8	-2.5

Table 2.5b Predicted annual mean background concentration maps of NO_2 ($\mu g/m^3$)

2008 annual mean PM_{10} concentration (2006 base year)	2010 annual mean PM_{10} concentration (2004 base year)	2010 annual mean PM_{10} concentration (2006 base year)
		

Legend

0 - 10ug/m3 | 10 – 12.5ug/m3 | 12.5 - 15ug/m3

The highest estimated background PM_{10} concentrations are predicted to occur in Bearsden, Milngavie, Lenzie, Kirkintilloch and Bishopbriggs.

The highest 2008 background concentrations of PM_{10} are significantly below the 2004 annual mean NAQS objective for PM_{10} of 40$\mu g/m^3$, accounting for less than 40% of the objective. However, the maximum 2010 background PM_{10} concentrations are close to the 2010 annual mean NAQS objective for PM_{10} of 18$\mu g/m^3$, accounting for more than 78% of the objective. This leaves a margin of 3- 4$\mu g/m^3$ which can be contributed from local sources before the objective is exceeded.

The database of background PM_{10} concentrations compiled in 2006 for the East Dunbartonshire area have generally decreased compared to the 2004 database.

3 Road traffic sources

Updated traffic count data for roads in East Dunbartonshire in 2008 was obtained from Transport Scotland and East Dunbartonshire Council Roads Department. The data was reviewed to identify any roads which experienced significant increases in traffic flows or new sections of road that have not previously been assessed that fit the screening criteria. Information on any new road schemes and local developments was requested from the roads department and planning departments respectively to determine if any developments were likely to result in a significantly increased traffic flow within the Council area.

For roads where there is a potential for high emissions from road traffic and relevant public exposure is identified a Design Manual for Roads and Bridges (DMRB) screening assessment of road traffic emissions is required. LAQM technical guidance provides examples of roads where there is potential for high road traffic emissions, which are determined by the traffic flow, traffic speed and traffic composition.

The traffic flow is measured as an Annual Average Daily Total (AADT) road traffic count. Relevant exposure is determined by the proximity to the road of residential properties or areas used by the general public. The DMRB assessment uses traffic flow data (traffic counts, % HGVs, traffic speed), the UK vehicle emissions database and road classification to estimate the total road traffic emissions for that road. Using the estimated emissions, the distance to the nearest receptor and background pollutant concentrations the screening tool predicts pollutant concentrations at receptor locations. These predictions can then be compared to the NAQS objectives.

The technical guidance states that only roads that have not previously been assessed and are not included in an AQMA should be considered. It is assumed that those included within an AQMA designated due to road traffic emissions or those previously assessed have either been shown to have no potential to exceed NAQS objectives or are already been considered in detail.

The road traffic data provided by Transport Scotland included three sections of road where the AADT for 2008 was greater than 10,000 vehicles per day. The traffic data provided by East Dunbartonshire Council indicated that there were an additional thirteen sections of local road where the AADT for 2008/2009 was greater than 10,000 vehicles. The available traffic data for the East Dunbartonshire area is presented in Table 3.1. The roads with traffic flows greater than 10,000 AADT area highlighted.

Table 3.1 East Dunbartonshire road traffic data for 2008 – 2009

Road section	AADT	Percentage HGVs (%)	Mean speed (m.p.h)	Percentage change in AADT 2007 - 2008
Traffic Scotland data				
B 819 @ Lenzie	5689	N / A	N / A	-17.3
B 812 @ Bishopbriggs	6463	N / A	N / A	-1.8
Lenzie Road	8857	N / A	N / A	-5.8
A809 Drymen Road, Bearsden	15167	6	N / A	-3
A81 Strathblane Road, Bearsden	6265	7	N / A	-4.9
A810 Duntocher Road, Bearsden	11034	7	N / A	-6.6
A807 Balmore Road, Bardowie	12154	8	N / A	-10.2
B8048 Waterside Road, Kirkintilloch	9771	11	N / A	-4.6
Woodhill Road, Bishopbriggs	7950	7	N / A	-4.2
East Dunbartonshire Council data				
A810 Duntocher Road, Milngavie	16022	8.5	38.8	N / A
Peel Glen Road, Milngavie	3743	9	25.9	N / A
Canniesburn Road, Bearsden	12471	9	27.2	N / A
A739 Switchback Road, Bearsden	25263	N / A	N / A	N / A
A81 Maryhill Road (Dual Carriageway)	19557	10	39.5	N / A
A879 Balmore Road, Balmore	19884	N / A	N / A	N / A

Road section	AADT	Percentage HGVs (%)	Mean speed (m.p.h)	Percentage change in AADT 2007 - 2008
B812 Colston Road, Bishopbriggs	12810	8.5	27.2	N / A
A803 Springburn Road, Bishopbriggs	N / A	N / A	N / A	N / A
Balgrayhill Road, Bearsden	12816	N / A	N / A	N / A
Northgate Road (Dual Carriageway), Bishopbriggs	5289	10.5	28.7	N / A
B765 Hillhead Road, Auchinairn	12252	7	33.8	N / A
B757 Auchinloch Road, Lenzie	13306	8.5	29.3	N / A
B819 Lindsaybeg Road, Bishopbriggs	5293	9.5	45.9	N / A
B8049 Boclair Road, Milngavie	11774	9.5	35.2	N / A
A807 Auchenhowie Road, Milngavie	12142	10	42.4	N / A
B8048 Kirkintilloch Road, Lenzie	11459	15.5	43.0	N / A
A803 Kilsyth Road (E of Arran Dr), Kirkintilloch	9661	13	33.6	N / A
Standburn Road, Auchinairn	2826	14.5	30.3	N / A
Bishopbriggs Relief Road, Auchinairn	6136	N / A	N / A	N / A
A81 Milngavie Road @ Burnbrae Hotel	21433	N / A	N / A	N / A

3.1 Narrow congested streets with residential properties close to the kerb

The technical guidance states that further investigation should be made of any narrow congested streets identified where there is relevant exposure. Narrow congested streets are defined as roads with an AADT greater than 5,000 vehicles per day where there is known congestion (slow moving traffic with frequent stopping and starting throughout much of the day and a mean traffic speed of 25kph or less) and residential properties within 2m.

The previous air quality assessments included a review of road traffic flows along narrow congested streets. The junction at Townhead, Kirkintilloch was identified as a road which was both narrow and congested with relevant exposure within 5m of the kerb. The monitoring undertaken at the junction indicates that the NO_2 concentrations are below both the annual mean and 1-hour mean NAQS objectives.

No other narrow congested streets have been identified.

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

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

The technical guidance states that a DMRB screening assessment should be undertaken for any road with an AADT greater than 10,000 vehicles per day where people may spend 1-hour or more close to traffic (within 5m of the road). Examples are likely to include town centres where shops are located close to busy roads.

Previous assessments identified Kirkintilloch Road (A803) in Bishopbriggs; Drymen Road (A809) in Bearsden and Townhead at Catherine St in Kirkintilloch as busy streets where people may spend 1-

hour or more. All three roads have been assessed previously and it was indicated that there may be exceedences of the annual mean NO_2 and 2010 PM_{10} objectives.

An AQMA has been declared along Kirkintilloch Road (A803) through Bishopbriggs and the Council continues to work towards reducing pollution levels along this stretch of road. Following on from the Detailed Assessment undertaken in 2008 and the review of monitoring data it is intended that the Council will declare an AQMA in respect to the annual mean NO_2 and PM10 NAQS objectives along Drymen Road (A809) in Bearsden therefore further work will be undertaken for this road in the form of a Further Assessment. However, no potential for exceedence of the 1-hour mean NO_2 and 24-hour mean PM_{10} NAQS objectives has been identified at these locations.

A Detailed Assessment of road traffic emissions at Townhead in Kirkintilloch was carried out in 2004. A NO_X and PM_{10} analyser was installed at the junction in 2006. The monitoring indicates that levels of NO_2 are below the annual mean and 1-hour objective but that levels of PM_{10} are predicted to exceed the 2010 annual mean objective. Currently, there are significant road works underway to construct the Kirkintilloch relief road close to the monitor location. The construction works are having a temporary negative impact upon local air quality. The completion of the Kirkintilloch relief road in 2010 is expected to reduce traffic within Kirkintilloch at Townhead and it is likely that levels of PM_{10} will reduce at areas of relevant exposure close to the junction.

There are no new roads identified where people are likely to spend more than 1 hour close to traffic.

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

3.3 Roads with a high flow of buses and/or HGVs.

The technical guidance specifies that a DMRB assessment should be undertaken for roads where the AADT is greater than 10,000 AADT, the proportion of buses and/or HGVs accounts for 20% or more of the total traffic flow and there is relevant public exposure within 10m of the road (20m for conurbations > 2 million). Examples of likely roads include access roads to industrial estates and quarries and bus only roads.

Previous reviews of roads were undertaken to determine if any matched the assessment criteria for roads with high levels of HGVs and buses. No roads have previously been assessed to have HGV and bus flows equating to 25% or greater of the total AADT.

The updated traffic count data for 2008 to 2009 was reviewed. There were no roads with an AADT of greater than 10,000 where the HGVs and buses comprised more than 25% of the total traffic flow.

East Dunbartonshire Council confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.4 Junctions and busy roads

LAQM technical guidance states that a DMRB screening assessment should be undertaken for roads and / or junctions with an AADT greater than 10,000 vehicles per day where there is relevant exposure within 10m (20m for conurbations >2 million). For local authorities in Scotland where the 2010 background concentration of PM_{10} is predicted to be greater than 15µg/m^3 all roads with an AADT of 5,000 or greater should be assessed using the DMRB screening method. The highest estimated background PM_{10} concentration in East Dunbartonshire is less than 15µg/m^3, therefore the assessment considers the higher, 10,000 AADT, flow criterion only.

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Previous LAQM assessments have considered road traffic emissions from eight busy junctions:

- Bishopbriggs Cross (A803, Kenmure Av, Springfield Rd, Crowhill Rd);
- Colston Road (A803 & B812);
- Switchback Road (A739 & Henderland Rd);
- Garscube Mill (A81& Rannoch Dr);
- Bearsden Cross (A809, Thorn Dr & A808);
- Roman Road (A81, B8049 & A808);
- Kirkintilloch Road, Lenzie (B757, Fern Av & Moncrieff Av); and
- Canniesburn Toll (A809, A81 & A73).

The Detailed Assessments and Further Assessments undertaken in Bearsden, Bishopbriggs, Kirkintilloch and Milngavie have also assessed road traffic emissions from additional roads linking to the A803, A81, A730, A807, A810 and A809.

From the available road traffic data for 2008 – 2009 six busy roads which have not previously been assessed were identified. The roads identified were:

- A879 Balmore Road;
- Balgray Road, Auchinairn;
- Northgate Road, Auchinairn;
- B765 Hillhead Road, Auchinairn;
- B757 Auchinloch Road, Lenzie; and
- B8048 Kirkintilloch Road, Lenzie.

The three roads in Auchinairn are located in the Glasgow City Council area and link to the B812 Auchinairn Road, which forms part of the boundary between Glasgow City Council and East Dunbartonshire Council areas. Emissions from road traffic on the B812 have previously been assessed with respect to air quality at properties within East Dunbartonshire and the properties within East Dunbartonshire are more than 10m from the identified roads in Auchinairn therefore no screening assessment has been undertaken for the roads in Auchinairn.

A DMRB assessment has been carried out for the three remaining roads identified. The results of the screening assessments are presented in Appendix C. Traffic volumes on Balmore road were provided by both Traffic Scotland and East Dunbartonshire Council. The greater AADT of the two surveys has therefore been used for the DMRB screening assessment.

The results indicate that the traffic emissions from the identified roads are unlikely to result in an exceedence of the NAQS objectives.

East Dunbartonshire Council has assessed newly identified sections of road and junctions meeting the criteria in Section A.4 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.5 New roads constructed or proposed since the last round of Review & Assessment

The technical guidance states that a DMRB screening assessment should be undertaken for any new roads which have been granted planning permission, for which a suitable air quality assessment was not provided. Where a suitable air quality assessment was submitted as part of the planning application this should be used in place of the DMRB screening assessment to determine the potential for exceedences of the NAQS objectives.

There are two new roads that have been previously identified in air quality reviews. One other new road was identified.

The Kirkintilloch relief road is nearing completion and will divert traffic away from Lenzie and Kirkintilloch town centres.

A planning application for permission to construct the Bisphopbriggs Relief Road was submitted as a five phase development. Two phases were completed prior to the 2003 U&SA. The remaining three phases were assessed in terms of predicted air quality impact as part of the Further Assessment. It was determined that construction of the remaining three phases of the relief road would generally decrease NO_2 and PM_{10} concentrations within the Bishopbriggs AQMA.

A new road, Marina Way, opened in July 2009. The road provides access to the Southbank / Marina area of Kirkintilloch where there are a number of developments underway, including a new civic theatre, a new office/restaurant complex and possibly future housing. There is currently no traffic count data available for the site but it is not expected to exceed 10,000 AADT and is not a narrow congested street with residential properties close to the kerb. It is therefore concluded that there is no requirement for a screening assessment of the road as therefore it does not represent the potential for exceedence of the NAQS objectives.

East Dunbartonshire Council has assessed new/newly identified junctions meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with significantly changed traffic flows

The technical guidance states that a DMRB screening assessment should be undertaken for any roads where there is a greater than 25% increase in road traffic volumes.

A review of road traffic flows on trunk roads was undertaken and data indicates that road traffic volumes between 2007 and 2008 have decreased by between -2 and -10%. The decrease in traffic flows along the trunk roads is expected to have had a beneficial impact upon measured concentrations of NO_2 and PM_{10}.

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

3.7 Bus and coach stations

The technical guidance states that a DMRB screening assessment should be undertaken for bus stations that are not enclosed where there are more than 2,500 bus movements per day and relevant exposure within 10m (20m for conurbations exceeding 2 million).

As stated in previous assessments of air quality there are no bus or coach stations located in East Dunbartonshire Council area.

East Dunbartonshire Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other transport sources

4.1 Airports

The technical guidance states that a local authority should proceed to a Detailed Assessment where there is relevant exposure within 1km of an airport boundary and the background NO_2 concentration exceeds 25 and the total annual passenger equivalent throughput for the airport exceeds ten million passengers per annum (mppa).

There are no airfields or airports located within the East Dunbartonshire Council area. The nearest commercial airports are Cumbernauld commercial airport and Glasgow International Airport, which are located 5km to the east and 15km to the west of the East Dunbartonshire Council area respectively.

Both Cumbernauld and Glasgow airports are further than 1km from any relevant public exposure within East Dunbartonshire Council area and therefore no further assessment is required.

East Dunbartonshire Council confirms that there are no airports in the Local Authority area requiring further assessment.

4.2 Railways (diesel and steam trains)

Previous air quality assessments have identified two main rail links that pass through and service the communities of East Dunbartonshire Council:

- the diesel mainline between Edinburgh and Glasgow with stations at Lenzie and Bishopbriggs; and
- the diesel/electric line from Glasgow to Milngavie passing through Westerton.

4.2.1 Stationary trains

The technical guidance states that local authorities should proceed to a Detailed Assessment where there is relevant exposure identified within 15m of locations where diesel or steam locomotives may be idling (stationary with engine running) for 15 minutes or more on more than three occasions a day.

It was identified in previous assessments that there were no sidings, stations or junctions where trains were likely to be stationary and idling for periods of 15 minutes or more.

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

4.2.2 Moving trains

The technical guidance states that local authorities should proceed to a Detailed Assessment where there is relevant exposure identified within 30m of busy sections of rail track where the annual mean background NO_2 concentration is greater than 25µg/m^3. A list of sections of rail track classed as busy is provided in the technical guidance.

The mainline between Edinburgh and Glasgow was identified in the technical guidance as a line with a heavy flow of diesel passenger trains. The line crosses the council area from the North Lanarkshire Council boundary in the east to the Glasgow City Council boundary in the south and passes through the Bishopbriggs AQMA. There are areas of Bishopbriggs, Lenzie and Kirkintilloch where there is relevant long-term public exposure within 30m of the mainline.

In 2008, the monitoring site in Bishopbriggs, which is within 30m of the rail line and 100m of the station, measured an annual mean NO_2 concentration of 31ug/m^3. However, the NO_2 background concentration taken from the background concentration maps is below 25ug/m^3 across the East Dunbartonshire Council area. It is therefore considered that the emissions from diesel trains are contributing to elevated concentrations of NO_2, in particular in Bishopbriggs, but that independently are unlikely to result in an exceedence of the NAQS objectives.

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

4.3 Ports (shipping)

The technical guidance specifies that a local authority should proceed to a Detailed Assessment for SO_2 in relation to the 15-minute objective where either

- there is relevant exposure within 250m of the ship berthing and manoeuvring areas and there are between 5,000 and 15,000 ship movements per annum; or
- there is relevant exposure within 1km of the ship berthing and manoeuvring areas and there are more than 15,000 ship movements per annum.

The review of shipping movements should be confined to large vessels such as cross-channel ferries, RoRo ships, container ships, cruise liners and large tankers.

East Dunbartonshire Council is landlocked and therefore has no major ports or harbours. The Forth and Clyde canal is used by leisure craft runs east-west through the council area, however emissions from leisure craft are unlikely to cause any exceedence of NAQS objective levels.

East Dunbartonshire Council confirms that there are no ports or harbours within the Local Authority area that meet the specified criteria.

5 Industrial sources

LAQM technical guidance requires that emissions from industrial processes are considered within the U&SA to determine if any sites or combination of sites represent a risk to human health. All significant industrial processes in Scotland are regulated by SEPA, which maintains a register of sites and require details of operations in order to consider impacts to the environment prior to issuing operating permits.

The type and quantity of atmospheric emissions from industrial processes varies significantly depending upon the installation. The majority of industrial processes operate abatement technologies and emission control procedures to limit the emission to atmosphere from the process.

The technical guidance specifically requires emissions from new industrial processes, major fuel storage depots, petrol stations and intensive poultry farming processes to be reviewed.

5.1 Industrial installations

The Scottish Environment Protection Agency (SEPA) were contacted to determine if there had been any new or significantly changed industrial processes in the area.

The register of Pollution Prevention and Control (PPC) processes includes 3 Part A PPC processes and 28 Part B processes that are operated in East Dunbartonshire Council area. The regulated processes comprise:

- 1 coating of metal and plastic facility;
- 1 coating process;
- 1 coating and printing process;
- 1 inorganic chemicals – plastics compounding facility;
- 1 melting of iron, ferrous alloys and non-ferrous alloys operation;
- 1 landfill;
- 1 waste management site;
- 6 cement, quarrying, crushing and screening processes;
- 4 dry cleaners;
- 12 petrol vapour recovery facilities;
- 1 roadstone coating process; and
- 1 vehicle re-spraying facility;

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

There is one new Part A process operating and one new application for a part B process since the last review of air quality. The two processes are:

1. a concrete facility at Balmore Road, Torrance to be operated by Aggregate Industries UK Ltd; and
2. a landfill facility at Muirhouse Quarry, Strathblane operated by Dow on Site Ltd.

All new processes identified have emissions classified as fugitive and uncontrolled and are therefore assessed in Section 7. The site at Strathblane is located within Stirling Council area but is within 1km of the East Dunbartonshire Council area.

There will also be additional emissions from increased traffic movements associated with the new processes. However, additional traffic emissions are not expected to be significant.

East Dunbartonshire Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

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

There are three operations that have ceased operation since the last review of air quality was undertaken. The three processes are:

- Two concrete batching processes in Twechar; and
- A printing facility operated in Bishopbriggs by John McGavigan Ltd.

The closure of these processes will lead to a reduction in emissions of PM_{10} in Twechar and a reduction in emissions of combustion gases and solvents in Bishopbriggs. It is also likely to result in a reduction of HGV movements around the sites. This is likely to have a beneficial impact upon local air quality.

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

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

All new processes identified have emissions classified as fugitive and uncontrolled and are therefore assessed in Section 7. There will also be additional emissions from increased traffic movements associated with the new processes. Additional traffic is likely to be HGVs.

East Dunbartonshire Council has assessed new/proposed industrial installations, and concluded that it will not be necessary to proceed to a Detailed Assessment.

5.2 Major fuel (petrol) storage depots

The technical guidance states that there is evidence that benzene emissions from major petrol fuel depots could be sufficient to exceed the 2010 objective for benzene.

A review of the major fuel depots was undertaken in previous rounds of review and assessment. No major fuel depots are located in the East Dunbartonshire Council area.

There are no major fuel (petrol) storage depots within the Local Authority area.

5.3 Petrol stations

The technical guidance states that there is a risk of the 2010 objective for benzene being exceeded where there is relevant exposure within 10m of the pumps of a large petrol station (those with an annual petrol throughput greater than 2 million litres) are located close to a very busy road (> 30,000 AADT).

East Dunbartonshire Council has previously reviewed petrol stations operated in the area. No petrol stations meeting the criteria defined above have previously been identified. There have been no new petrol stations which have commenced operation in the area since the last air quality review.

East Dunbartonshire Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry farms

It has been identified that large poultry farms emit significant quantities of dust and particulate matter such that the 2010 PM_{10} objectives are at risk of being exceeded. The technical guidance states that a Detailed Assessment should be undertaken for poultry farms where there is relevant exposure within 100m of the poultry units and where units house:

- 400,000 birds if mechanically ventilated;
- 200,000 birds if naturally ventilated; or
- 100,000 turkeys.

A review of farms regulated by SEPA under the PPC regulations was undertaken. It was confirmed that there are no farms in the area operating under the PPC regulations for intensive farming. It is therefore concluded that there are no farms which meet the criteria for poultry farms.

East Dunbartonshire Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and domestic sources

The technical guidance states that biomass boiler plants can lead to an increase in PM_{10} and NO_X emissions compared to conventional gas burning boiler plants. The technical guidance therefore requires the air quality impacts from both individual installations and the cumulative impact of biomass and domestic heating to be considered.

6.1 Biomass combustion – individual installations

The technical guidance states that all biomass plants with a thermal capacity of 50kW to 20MW should be included in the screening assessment. Biomass plants with a thermal capacity greater than 20MW will be authorised by SEPA and therefore would be included in the industrial sources section.

A review of small boiler and biomass plants operated within the East Dunbartonshire Council area was undertaken. Information on biomass boilers was sought from NHS Greater Glasgow, East Dunbartonshire Council planning department and the Scottish Biomass Support Scheme.

NHS Greater Glasgow confirmed that it does not currently operate any biomass boilers.

East Dunbartonshire Council confirmed that it does not currently operate any biomass boilers.

No biomass schemes within East Dunbartonshire were identified as receiving biomass support grants from the Scottish Government.

A review of planning applications indicated that there have been no proposals for biomass boilers within the East Dunbartonshire Council area.

As there were no individual biomass plants identified no cumulative impact assessment has been undertaken.

East Dunbartonshire Council confirms that there are no biomass combustion plants in the Local Authority area.

6.2 Domestic solid-fuel burning

East Dunbartonshire Council have previously assessed areas of domestic solid fuel burning. The majority of the urban areas within East Dunbartonshire are declared as smoke control zones and therefore it is unlikely that there will be significant burning of solid fuel in these areas. Previous assessments identified the Hillhead area of Kirkintilloch as the worst case location for domestic emissions of SO_2 and PM_{10}. It was identified that less than 25 properties in a $500m^2$ area used solid fuel as the main heating source.

There have been no significant changes to the fuel type used in domestic heating since the previous assessment was carried out and it is therefore concluded that there is no requirement to assess domestic fuel emissions further.

East Dunbartonshire Council confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or uncontrolled sources

The technical guidance states that a local authority should proceed to a Detailed Assessment for fugitive emissions where any of the criteria below apply:

- An air quality assessment for the site indicates an exceedence of the NAQS objectives;
- for the 2004 objectives – there is relevant exposure within 1km of the emission source and a PM_{10} background concentration greater than 28µg/m^3;
- for the 2004 objectives – there is relevant exposure within 400m of the emission source and a PM_{10} background concentration greater than 26µg/m^3;
- for the 2004 objectives – there is relevant exposure within 200m of the emission source for any PM_{10} background concentration;
- for the 2004 objectives – there is relevant exposure within 50m of the access road and a PM_{10} background concentration greater than 25µg/m^3;
- for the 2010 objectives – there is relevant exposure within 1km of the emission source and a PM_{10} background concentration greater than 17µg/m^3;
- for the 2010 objectives – there is relevant exposure within 400m of the emission source and a PM_{10} background concentration greater than 16µg/m^3;
- for the 2010 objectives – there is relevant exposure within 200m of the emission source for any PM_{10} background concentration; or
- for the 2010 objectives – there is relevant exposure within 50m of the access road and a PM_{10} background concentration greater than 11µg/m^3.

There are two new SEPA regulated processes where there will be uncontrolled or fugitive emissions of PM_{10}. The processes are:

- A concrete facility at Balmore Road, Torrance to be operated by Aggregate Industries UK Ltd; and
- A Landfill facility at Muirhouse Quarry, Strathblane operated by Dow on Site Ltd.

East Dunbartonshire Council planning department also confirmed that there has been an application for a 20 year extension of sand and gravel extraction to the west of Douglasmuir Quarry in Milngavie.

A screening assessment for each site was undertaken and is reported in Table 7.1.

Table 7.1 Details of new fugitive sources

Site Name	Grid reference	Background PM_{10} concentration (µg/m^3)	Distance to nearest property from active site operation (m)	Distance to nearest property from access road (m)
Balmore Road	NS 613 736	12	200m	100m
Muirhouse Quarry	NS 566 781	11	> 1000m	> 1000m
Douglasmuir Quarry	NS 527 746	13	300m	200m

Based on the distance from the various sources to the closest receptors and the prevailing background concentrations the screening assessment has indicated that there is no requirement to proceed to a Detailed Assessment for the identified fugitive sources.

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

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Several exceedences of the NO_2 annual mean objective were recorded during 2008 at sites within the Bishopbriggs AQMA and at four locations outside the AQMA. Recorded concentrations at one site within the AQMA and four sites outside the AQMA were close to the annual mean objective (>36ug/m^3). There were no measured exceedences of the 1-hour objective for NO_2.

During 2008, there were recorded exceedences of the 2010 annual mean PM_{10} NAQS objective at the monitoring sites in Bearsden and Kirkintilloch. There were no measured exceedences of the 2004 NAQS objectives or the 24-hour mean NAQS objective for 2010.

The review of monitoring data identified exceedences of the annual mean NAQS objective for NO_2 and predicted exceedences of the 2010 annual mean NAQS objective for PM_{10} at locations of relevant exposure along Drymen Road in Bearsden.

The PM_{10} monitoring data for Bishopbriggs indicate that concentrations within the existing AQMA have reduced such that the 2010 annual mean objective for PM_{10} is not being exceeded.

8.2 Conclusions from Assessment of Sources

The review of sources of atmospheric pollution within East Dunbartonshire Council area did not identify any specific sources that require further consideration.

8.3 Proposed Actions

The Updating and Screening Assessment considered new monitoring data and a review of all emissions sources in the area. It is concluded that there is no requirement to proceed to a Detailed Assessment for any pollutant at present.

East Dunbartonshire Council intend to declare an AQMA along Drymen Road (A809) in Bearsden in respect to measured and predicted exceedences of the annual mean NAQS objectives for NO_2 and PM_{10}.

It is intended that additional monitoring of NO_2 is undertaken in Milngavie at locations of relevant exposure to ensure that the annual mean objective is not exceeded.

It is intended that monitoring of PM_{10} and NO_2 continue within the Bishopbriggs AQMA and that if PM_{10} concentrations remain below the 2010 annual mean objective during 2009 then East Dunbartonshire Council will look to revoke the AQMA for PM_{10}.

The next report required for submission to the Scottish Government will be a Further Assessment and AQMA Action Plan in relation to the proposed AQMA in Bearsden. The Further Assessment will require being submitted 12 months and the Action Plan 18 months after the declaration of the AQMA. East Dunbartonshire Council will also be required to submit a Progress Report to the Scottish Government by 30th April 2010.

Appendices

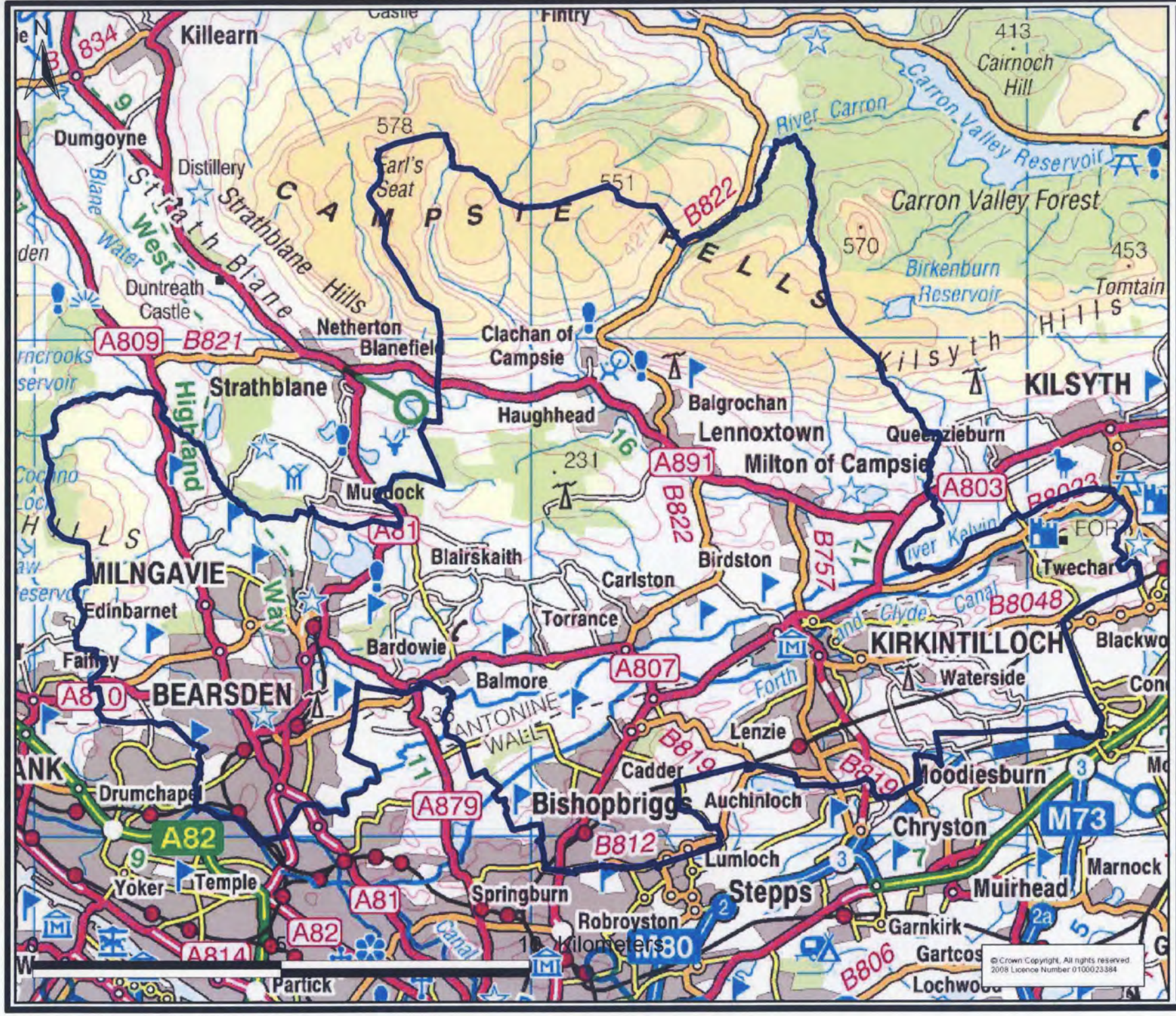
Appendix A: Figures

Appendix B: QA/QC Data

Appendix C: DMRB Calculations

Appendix A: Figures

Figure 1: East Dunbartonshire Council area
Figure 2: Bishopbriggs AQMA
Figure 3: Bearsden automatic monitor location
Figure 4: Bishopbriggs automatic monitor location
Figure 5: Kirkintilloch automatic monitor location
Figure 6: Non-automatic monitoring locations in Bearsden
Figure 7: Non-automatic monitoring locations in Bishopbriggs
Figure 8: Non-automatic monitoring locations in Kirkintilloch
Figure 9: Non-automatic monitoring locations in Milngavie



SITE LOCATION

LEGEND

East Dunbartonshire Council boundary

Client:

sustainable thriving achieving
East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 1

Figure title:
East Dunbartonshire Council area

Scale 1:100,000	Date: July 2009

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36 Washington Road, Glasgow, G3 8AZ
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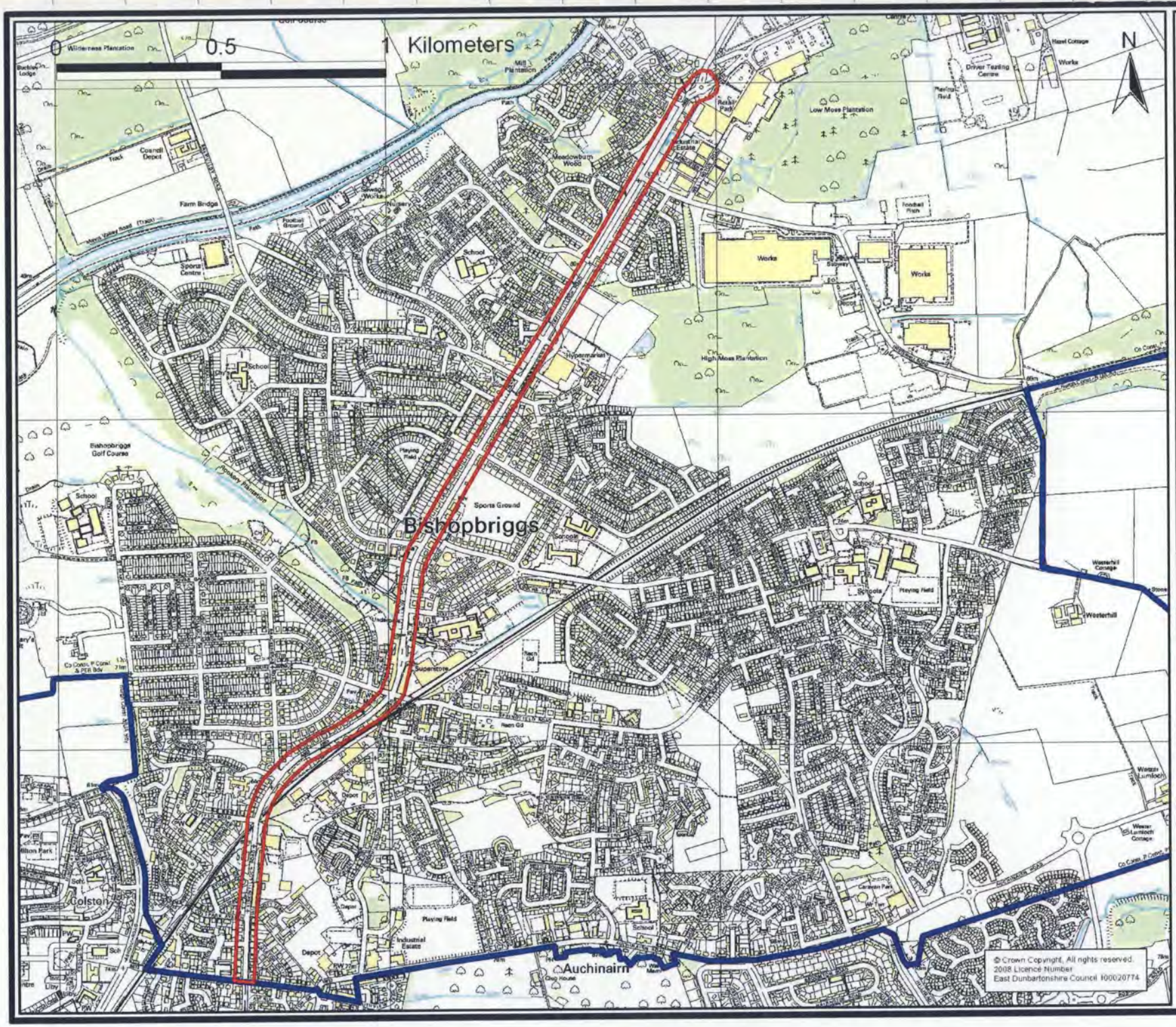

SITE LOCATION

LEGEND

- Bishopbriggs AQMA boundary
- East Dunbartonshire Council boundary

Client:

East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 2

Figure title:
Bishopbriggs AQMA

Scale 1:15,000	Date: July 2009

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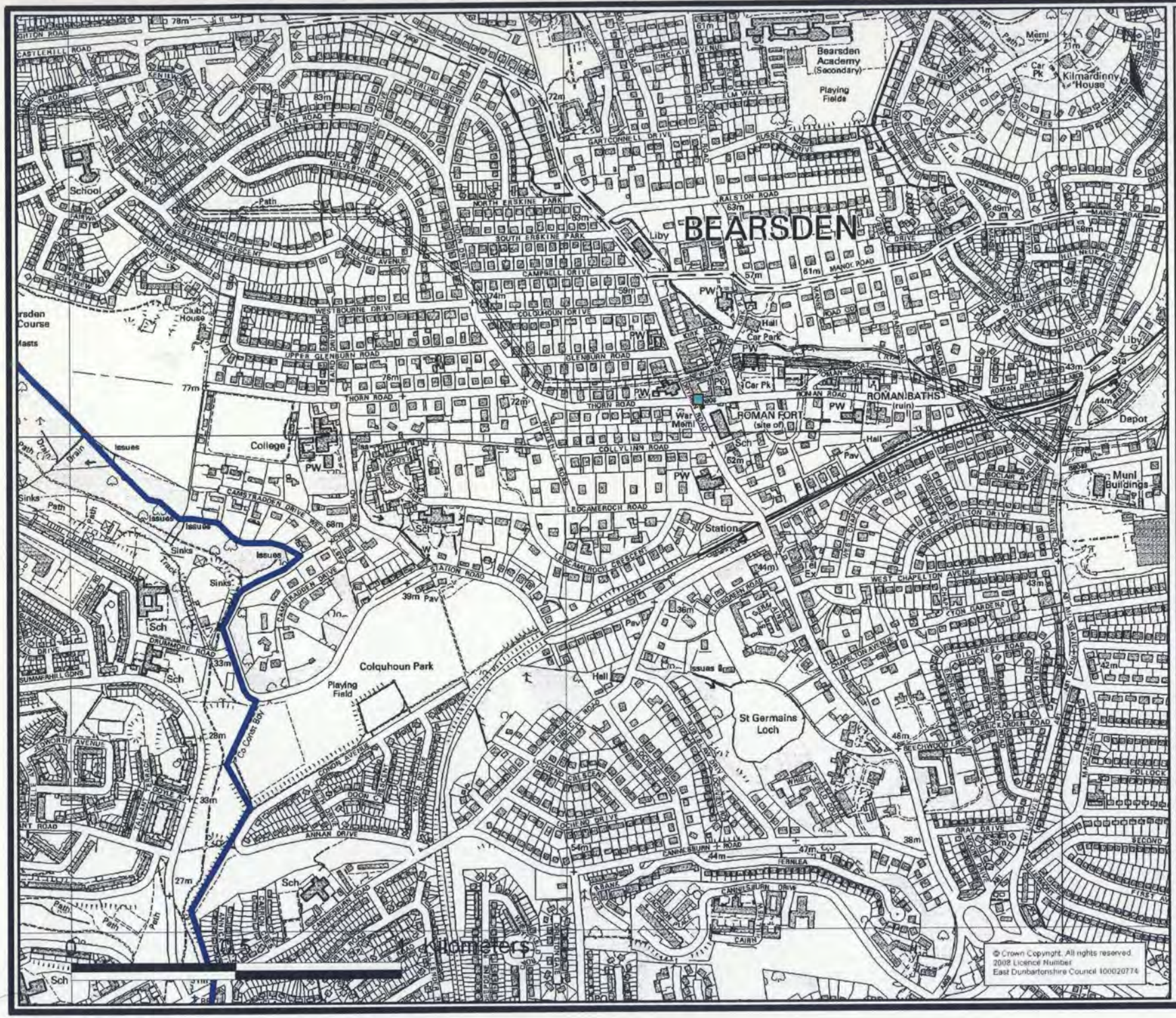

SITE LOCATION

LEGEND

- Automatic monitoring sites
- East Dunbartonshire Council boundary

Client:

East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 3

Figure title:
Bearsden automatic monitor location

Scale 1:15,000	Date: July 2009

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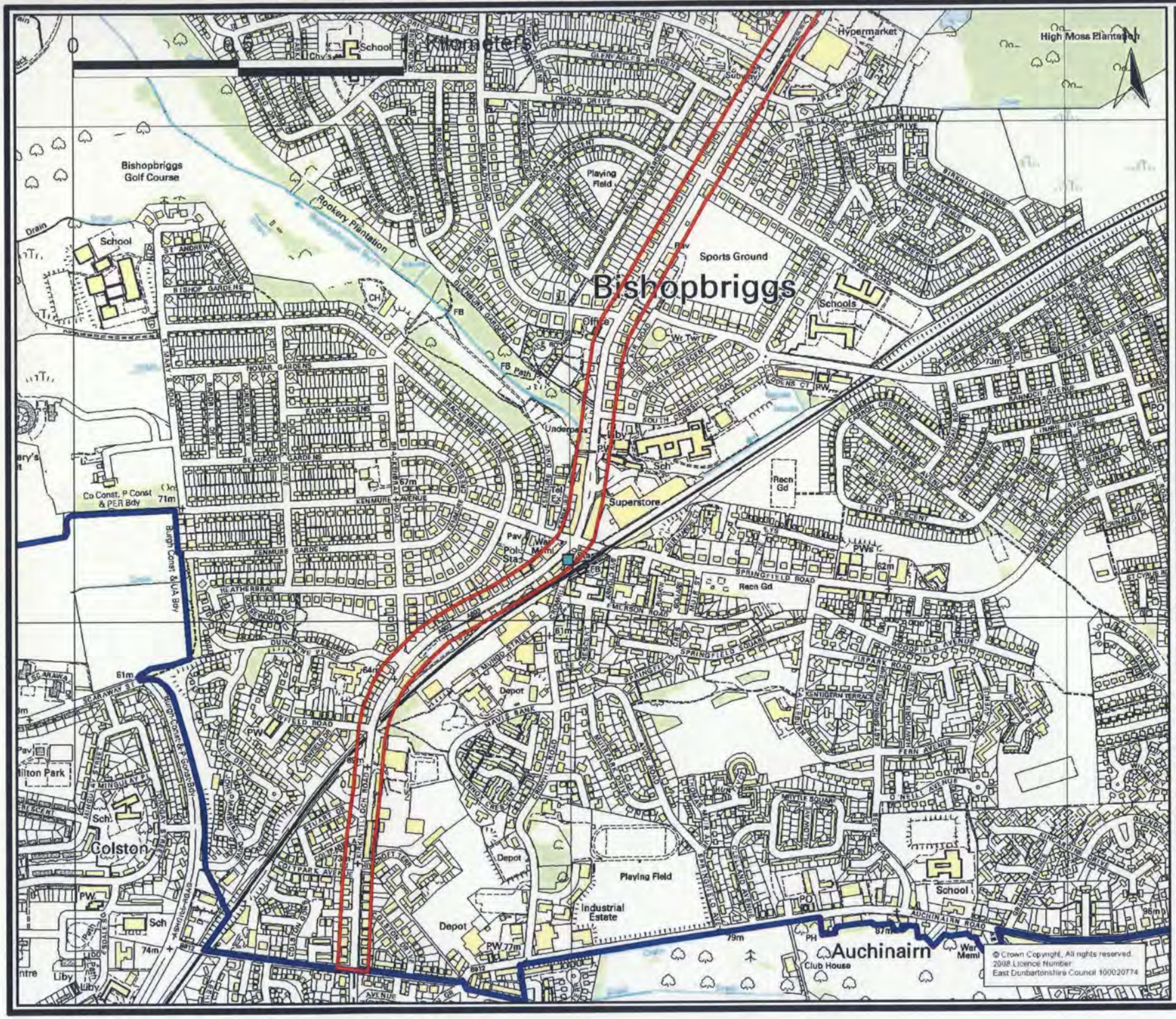

SITE LOCATION

LEGEND

- Automatic monitoring sites
- Bishopbriggs AQMA boundary
- East Dunbartonshire Council boundary

Client:

East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 4

Figure title:
Bishopbriggs automatic monitor location

Scale 1:15,000	Date: July 2009

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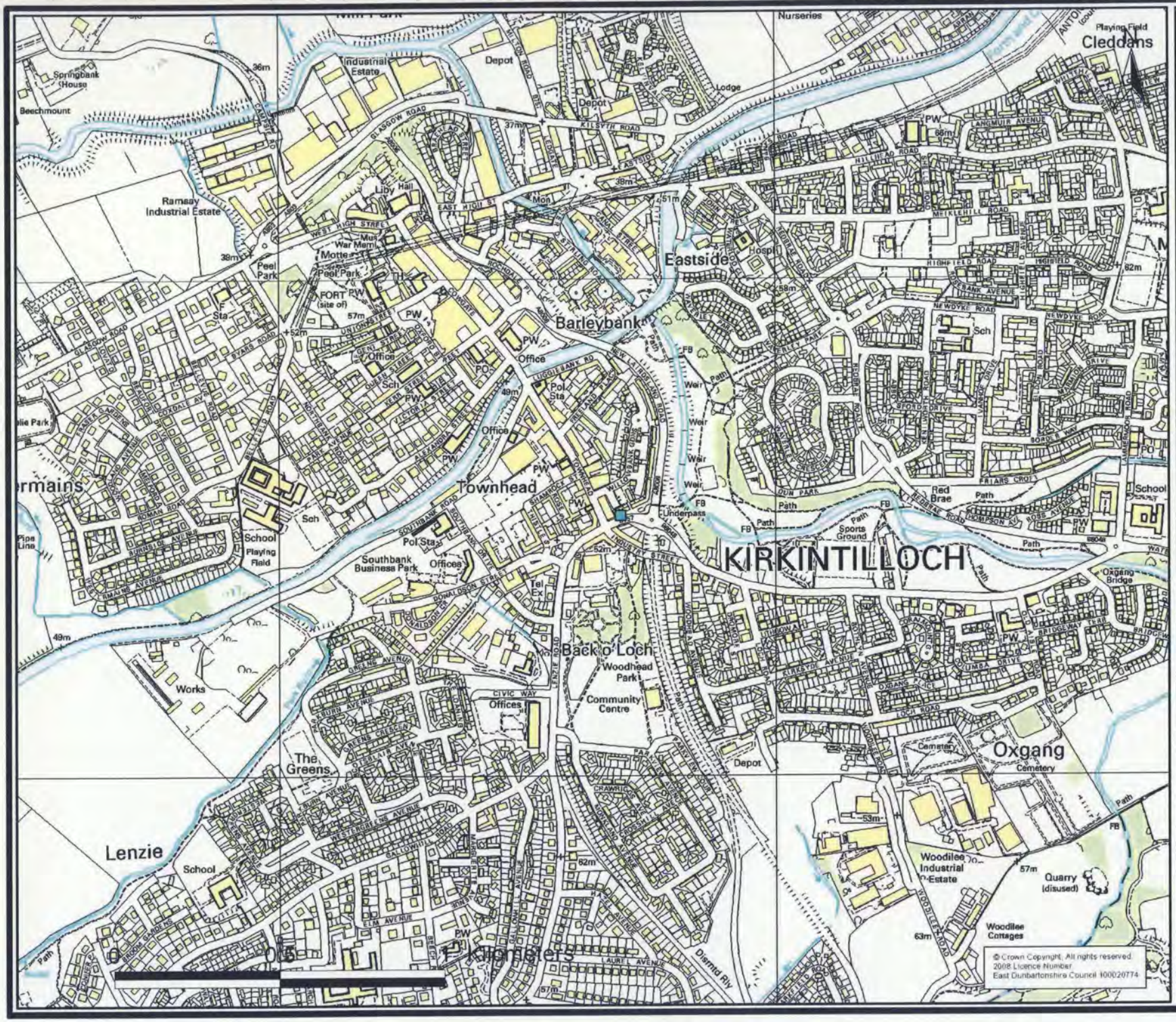

SITE LOCATION

LEGEND

Automatic monitoring sites

Client:

sustainable thriving achieving
East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 5

Figure title:
Kirkintilloch automatic monitor location

Scale 1:15,000	Date: July 2009

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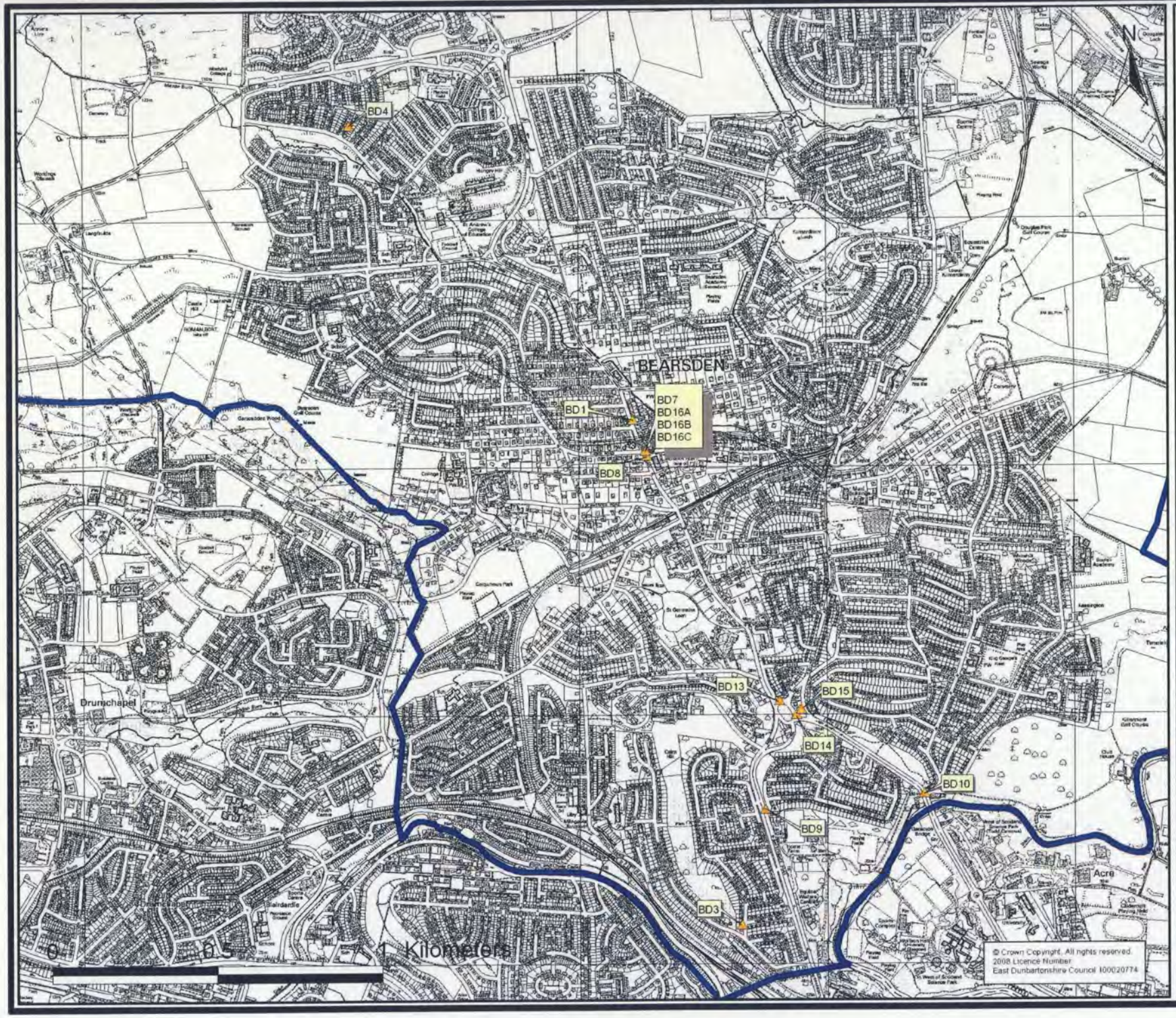

SITE LOCATION

LEGEND

- Diffusion tube monitoring locations
- Bishopbriggs AQMA boundary
- East Dunbartonshire Council boundary

Client:

East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 6

Figure title:
Non-automatic monitoring locations in Bearsden

Scale 1:20,000

Date: July 2009

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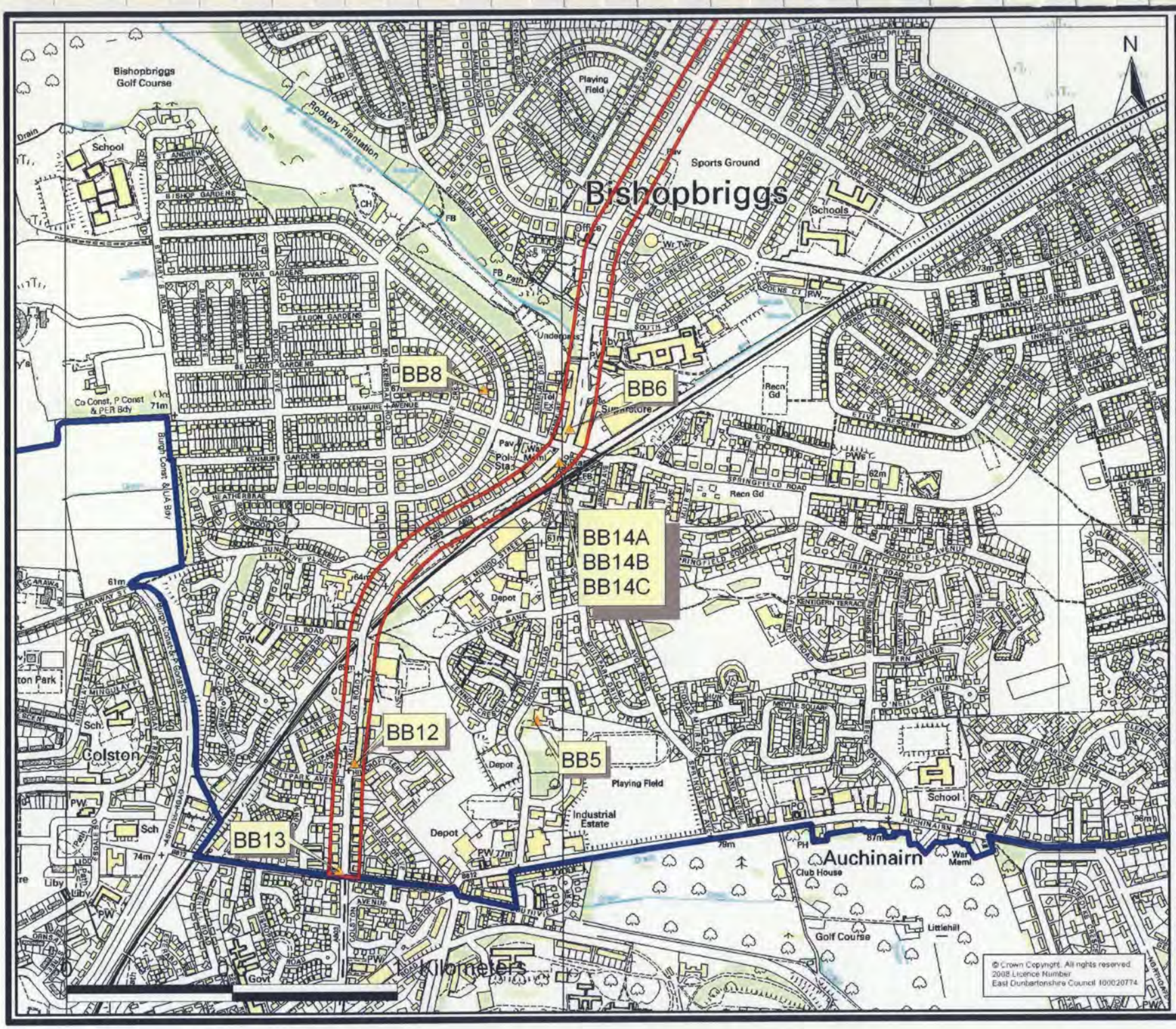

SITE LOCATION

LEGEND

- Bishopbriggs AQMA boundary
- East Dunbartonshire Council boundary

Client:

East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 7

Figure title:
Non-automatic monitoring locations in Bishopbriggs

Scale 1:15,000

Date: July 2009

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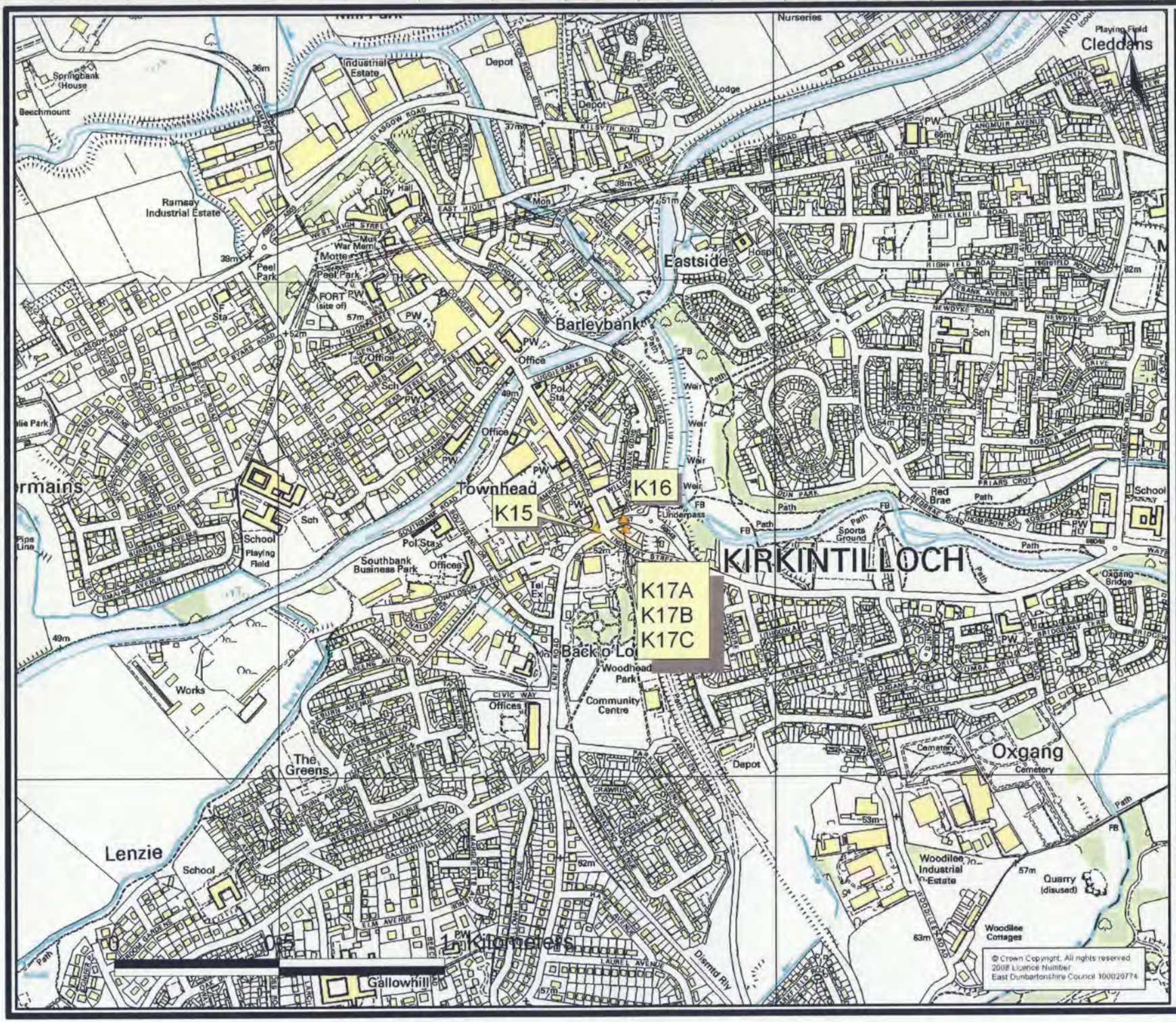

SITE LOCATION

LEGEND

Diffusion tube monitoring locations

Client:

East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 200

Figure no. 8

Figure title:
Non-automatic monitoring locations in Kirkintilloch

Scale 1:15,000	Date: July 2009

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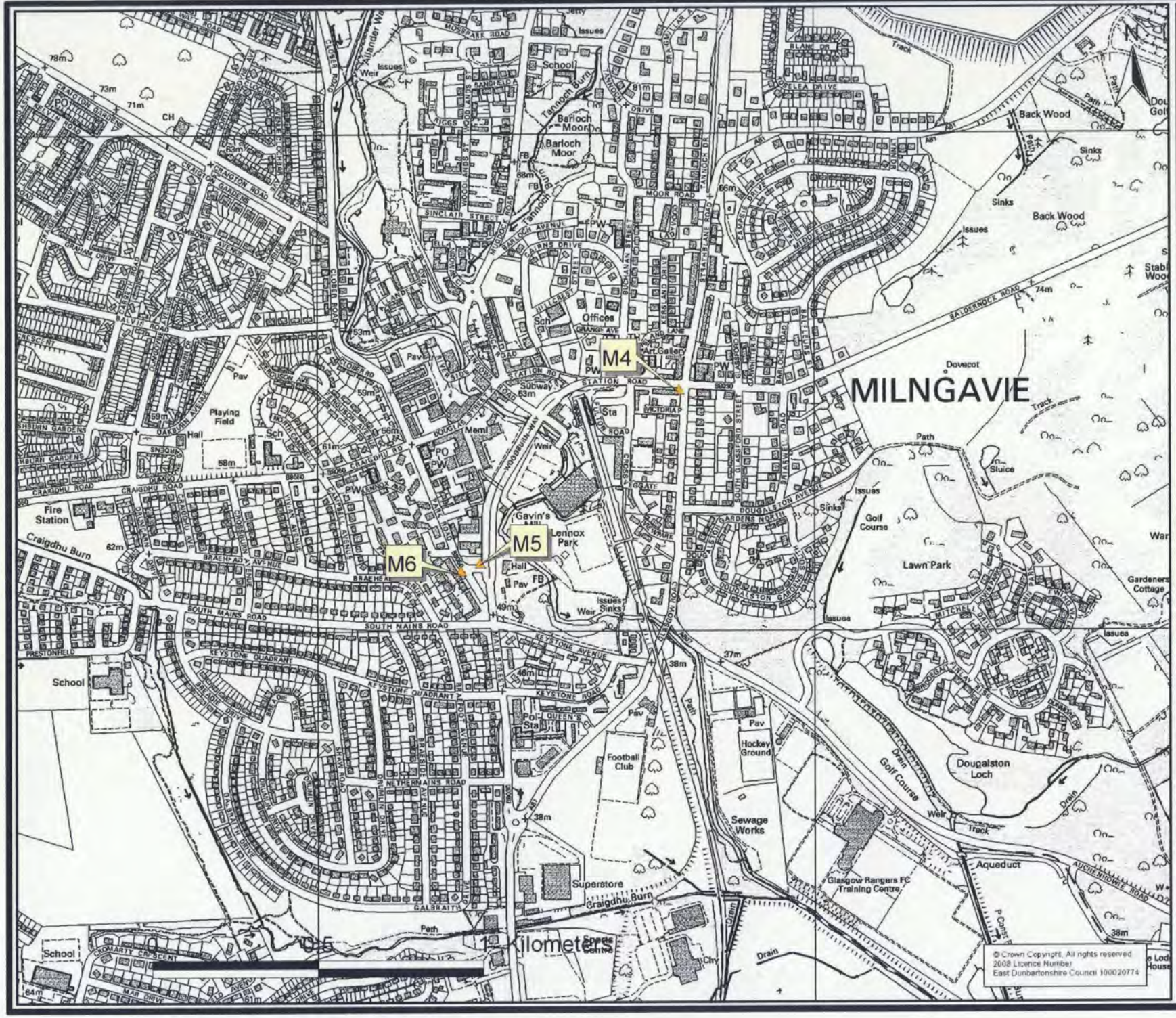

SITE LOCATION

LEGEND

- Diffusion tube monitoring locations
- Bishopbriggs AQMA boundary
- East Dunbartonshire Council boundary

Client:

East Dunbartonshire Council
www.eastdunbarton.gov.uk

Project title:
LAQM Updating and Screening Assessment 2009

Figure no. 9

Figure title:
Non-automatic monitoring locations in Milngavie

Scale 1:15,000 | Date: July 2009

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Appendix B: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The laboratory analysis of the passive diffusion tubes used by the Council is undertaken by Glasgow Scientific Services. Glasgow Scientific Services is a UKAS accredited laboratory with documented Quality Assurance/Quality Control (QA/QC) procedures for diffusion tube analysis. The laboratory prepares the diffusion tubes using the 20% triethanolamine (TEA) in water method.

Glasgow Scientific Services participates in the AEA inter-comparison scheme, with bias correction factors calculated and applied annually.

East Dunbartonshire Council has undertaken a co-location study at Bishopbriggs Cross since December 2003, a co-location study at Bearsden since November 2005 and a co-location study at Kirkintilloch since August 2007. The laboratory bias factors taken from the AEA study for Glasgow Scientific Services, the East Dunbartonshire Council monitoring sites and the overall bias factors from Glasgow Scientific Services are presented in Table B1.

Table B1 Details of the 2008 bias correction factors for NO_2 diffusion tubes

Site Name	Study duration	Tube precision	Bias correction factor
Bishopbriggs automatic analyser	10	Poor	1.071
Bearsden automatic analyser	11	Good	1.056
Kirkintilloch automatic analyser	11	Poor	0.887
Overall factor from 3 Glasgow Scientific Services co-location studies			1.00

Factor from Local Co-location Studies (if available)

The results for the three co-location studies carried out by East Dunbartonshire Council are presented in Table B2.

Table B2 Details of the 2008 co-location studies

Site Name	Annual mean NO_2 concentration automatic analyser	Annual mean NO_2 concentration Diffusion tube annual means	Bias Adjustment Factor
Bishopbriggs 14	31	29	**1.07**
Bearsden 16	45	42	**1.06**
Kirkintilloch 17	35	40	**0.89**

The co-location studies indicate that in general the diffusion tubes are under-predicting compared to the automatic analysers.

Discussion of Choice of Factor to Use

Due to delays in data ratification the only co-location factors available for Glasgow Scientific Services were those from the East Dunbartonshire Council co-location studies and the result from the AEA inter-comparison study. The concentrations measured in the AEA inter-comparison study are significantly greater than those measured in East Dunbartonshire and it was considered that this study may not reflect the surroundings of monitoring sites in East Dunbartonshire Council. The co-location results for the East Dunbartonshire studies also represent a worse case prediction for NO_2 concentrations. The bias correction factors for Bearsden and Bishopbriggs sites were very similar and it was therefore considered that these factors would be appropriate for diffusion tubes in these areas. Kirkintilloch is located at a greater distance from the Glasgow City conurbation than Bishopbriggs and Bearsden and therefore is likely to be less influenced by the transboundary emissions from the conurbation. It was considered appropriate to use the Kirkintilloch bias adjustment factor for diffusion tubes located within Kirkintilloch. The three bias correction factors calculated have therefore been used for diffusion tubes in the area surrounding each co-location study.

PM Monitoring Adjustment

East Dunbartonshire Council monitor PM_{10} using three types of analyser:

- beta-attenuation monitor (BAM);
- Tapered Element Oscillating Microbalance (TEOM) with a Filter Dynamics Measurement System (FDMS); and
- Partisol gravimetric analyser.

The beta attenuation analysers are maintained by Horiba and undergo regular calibration. The TEOM (FDMS) is maintained by Air Monitors Ltd. The gravimetric analyser was provided by Casella ETI and the filters are analysed by Glasgow Scientific Services which is a UKAS accredited laboratory.

The beta-attenuation monitors (BAMs) used by East Dunbartonshire Council have a heated inlet. The use of a heated inlet has been found to cause the evaporation of some semi-volatile particles thereby reducing the measured PM_{10} concentration. The PM_{10} air quality objectives are based on the use of the European transfer reference sampler which is a gravimetric sampler. The previous Technical Guidance[13] stated that in order to compare monitoring data from beta-attenuation analysers to the objective, the results should be factored by 1.3 to account for any potential underestimation in measured concentrations.
The (then) Scottish Executive issued further advice in 2005 on the adjustment factor based on a co-location study carried out by Edinburgh City Council which obtained a factor of 1.14 . In light of the co-location study, the advice stated that the monitoring results should be adjusted by both the 1.3 and 1.14 factors, for the annual mean objective only. In the situation where use of both factors results in measured concentrations in excess of the annual mean objective, a Detailed Assessment should be conducted. The advice also stated that where the use of the 1.3 factor results in an exceedence but the 1.14 factor does not, that the Council should conduct a local co-location study to obtain a local adjustment factor which should be used in preference.

The new Technical Guidance, TG(09), does not provide a factor for beta-attenuation monitors which have a heated inlet.

East Dunbartonshire Council currently undertake a local co-location study at Bishopbriggs Cross using a gravimetric analyser which is equivalent to the EU reference standard. The local co-location factor has therefore been used to correct results for both beta attenuation monitors operated by the Council.

The TEOM FDMS is equivalent to the European Reference Sampler and the results are therefore fully comparable to the AQS objectives, with no need for adjustment.

[13] LAQM Technical Guidance TG(03)

East Dunbartonshire Council - Scotland

Short-term to Long-term Data adjustment

East Dunbartonshire Council has not undertaken any short-term monitoring of pollutants which requires adjustment to calculate long-term mean concentrations.

QA/QC of automatic monitoring

Quality Assurance/Quality Control (QA/QC) audits are carried out by AEA Energy & Environment twice a year at all three sites.

QA/QC of diffusion tube monitoring

Method To undo your selection, choose (All) from the pop-up list	Year[5] To undo your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m3)	Automatic Monitor Mean Conc. (Cm) (µg/m3)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
20% TEA in Water	2008	R	East Dunbartonshire Council	10	29	31	-6.7%	P	**1.07**
20% TEA in Water	2008	R	East Dunbartonshire Council	11	42	45	-5.3%	G	**1.06**
20% TEA in Water	2008	R	East Dunbartonshire Council	11	40	35	12.8%	P	**0.89**
20% TEA in Water	2008	K	AEA Tech Intercomparison	12	133	116	14.9%	G	**0.87**

Appendix C: DMRB calculations

Input Data

The background pollutant concentrations used in the DMRB screening assessments are presented in Table C.1. The traffic flow data used in the DMRB screening assessments are presented in Table C.2.

Table C.1: Background pollutant concentrations used in the DMRB screening assessments

Road section	2009 Background concentration (ug/m^3)						2010 Background concentration (ug/m^3)
	benzene	1,3-butadiene	CO	NO_X	NO_2	PM_{10}	PM_{10}
A879 Balmore Road	0.32	0.08	140	12.0	9.3	11.8	11.7
B757 Auchinloch Road	0.39	0.10	160	15.6	12.8	12.4	12.2
B8048 Kirkintilloch Road	0.32	0.08	140	12.6	9.7	11.8	11.7

Using digital mapping data a review of the nearest receptors was undertaken for each road section. In each case the closest receptors were found to be between 5m and 10m from the road centreline. In order to obtain a worst case air quality prediction the nearest receptors were set at 5m from each road centreline.

Mean traffic speed data rounded down to the nearest 5kph was used in the assessment.

Where the percentage of HGV traffic was not provided for a particular road section the maximum HGV percentage for that road was used. Where there was no HGV data for that road the average HGV percentage from similar road types in the area was used.

In line with other Council road traffic predictions the traffic flows for 2010 were estimated using the National Road Traffic Forecast Lower Growth factor for total traffic of 1.18% growth per annum between 2006 and 2011.

Table C.2: Traffic flow data used in the DMRB screening assessments

Road name	Distance from link centre to receptor (m)	Traffic flow & speed			Traffic composition		
		2009 AADT (combined, veh/day)	2010 AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Total % LDV (<3.5t GVW)	Total % HDV (>3.5t GVW)
A879 Balmore Road	5m	19884	20119	55	A	90.5	9.5
B757 Auchinloch Road	5m	13306	13463	45	B	91.5	8.5
B8048 Kirkintilloch Road	5m	11459	11594	65	B	84.5	15.5

Verification

Monitoring of pollutants is not available for all locations along the assessed roads therefore no verification of the DMRB screening predictions has been undertaken.

Results

The results of the DMRB screening assessments for 2009 traffic flows are presented in Table C3 and the results for the 2010 traffic flows are presented in Table C4.

Table C.3: Predicted pollutant concentrations at nearby receptors for 2009 traffic flows

Road name	CO *	Benzene	1,3-butadiene	NO_x	NO_2 *	PM_{10}	
	Annual mean mg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Annual mean µg/m^3	Days >50 µg/m^3
A879 Balmore Road	0.22	0.41	0.21	43.06	17.76	14.61	0
B757 Auchinloch Road	0.23	0.46	0.17	35.21	18.37	14.23	0
B8048 Kirkintilloch Road	0.19	0.36	0.15	35.51	16.25	13.54	0

Table C.4: Predicted pollutant concentrations at nearby receptors for 2010 traffic flows

Road name	PM_{10}	
	Annual mean µg/m^3	Days >50µg/m^3
A879 Balmore Road	14.21	0
B757 Auchinloch Road	13.89	0
B8048 Kirkintilloch Road	13.29	0