BMT Cordah Limited
ENVIRONMENTAL CONSULTANCY
AND INFORMATION SYSTEMS

LAQM Updating and Screening Assessment 2006

A Report for North Lanarkshire Council

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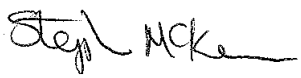

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1 INTRODUCTION

1. BMT Cordah Ltd has been commissioned by North Lanarkshire Council to undertake the Local Air Quality Management (LAQM) updating and screening assessment (U&SA) for 2006. The aim of the study is to review local air quality levels in North Lanarkshire and assess new or changed emissions sources in North Lanarkshire since the last U&SA in 2003.

2. The assessment uses updated emissions data for industrial, transport, commercial and domestic sources where available as well as updated monitoring data to identify any potential for exceedence of the air quality objectives contained within the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000 (NAQS)[1].

3. The report follows guidance set out in LAQM.TG(03) technical guidance[2], LAQM.PG(03) policy guidance[3] and subsequent guidance amendments[4].

Local Air Quality Management Framework

4. The Environment Act 1995 and subsequent regulations require local authorities to assess compliance of air quality in their area with the standards and objectives set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2000 (NAQS), transposed by the Air Quality (Scotland) Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002.

5. The LAQM framework requires that local authorities carry out regular reviews of air quality. The first round of Review and Assessment commenced in 1998 and comprised a three stage approach to the assessment of air quality.

6. The Review and Assessment process was revised in 2003 and now comprises two phases. The first phase being a U&SA which considers any changes that have occurred in pollutant emissions and sources since the last round of Review and Assessment. Where a risk of exceedence of an air quality objective at a location with relevant public exposure is identified then a Detailed Assessment is required. A Detailed Assessment will consider any risk of exceedence of an objective in greater depth in order to determine whether it is necessary to declare an Air Quality Management Area (AQMA).

7. During years when a U&SA is not being conducted, local authorities are required to submit a Progress Report detailing ongoing air quality monitoring results and providing updated information on air quality issues within the local authority area. A Progress Report includes information on new developments, policies or monitoring data relating to air quality. Air quality information and data is used to identify changes in air quality that result in a potential exceedence of the NAQS objectives.

8. The second round of Review and Assessment was completed in 2005 and this report commences the third round of Review and Assessment for air quality.

9. The NAQS details assessment criteria for eight pollutants in the form of atmospheric concentration levels for which an objective deadline is set. Of the eight pollutants identified only seven are required

[1] Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Working together for clean air, Defra, January 2000
[2] Part IV of the Environment Act 1995, Local air quality management technical guidance, LAQM.TG(03), Defra et al, January 2003.
[3] Part IV of the Environment Act 1995, Local air quality management policy guidance, LAQM.PG(03), Defra et al, January 2003.
[4] Part IV of the Environment Act 1995, Local air quality management technical guidance update, LAQM.TG(03) – update: January 2006, Defra et al, January 2006.

to be assessed and reported. The pollutants contained within the NAQS and their relevant objectives are shown in Table 1.

Table 1: Objectives included in the Air Quality regulations 2000 and (Amendment) Regulations 2002 for the purposes of Local Air Quality Management

Pollutant	Objective		Date to be Achieved By
	Concentration	Measured As	
Benzene	16.25µg/m^3 (5ppb)	Running annual mean	31 December 2003
	3.25 µg/m^3 (1ppb)	Annual mean	31 December 2010
1,3-Butadiene	2.25µg/m^3 (1ppb)	Running annual mean	31 December 2003
Carbon Monoxide	10.0/m^3 (10ppm)	Running 8 hour mean	31 December 2003
Lead	0.5µg/m^3	Annual mean	31 December 2004
	0.25µg/m^3	Annual mean	31 December 2008
Nitrogen Dioxide	200µg/m^3 (105ppb) not to be exceeded more than 18 times per year[1]	1 hour mean	31 December 2005
	40µg/m^3 (21ppb)	Annual mean	31 December 2005
Particles (PM_{10})	50µg/m^3 not to be exceeded more than 35 times per year[2]	24 hour mean	31 December 2004
	40µg/m^3	Annual mean	31 December 2004
	50µg/m^3 not to be exceeded more than 7 times per year[2]	24 hour mean	31 December 2010
	18µg/m^3	Annual mean	31 December 2010
Sulphur Dioxide	50µg/m^3 (132ppb) not to be exceeded more than 24 times a year[3]	1 hour mean	31 December 2004
	125µg/m^3 (47ppb) not to be exceeded more than 3 times a year[4]	24 hour mean	31 December 2004
	266µg/m^3 (100ppb) not to be exceeded more than 35 times a year[5]	15 minute mean	31 December 2005

[1] corresponds to the 99.79th percentile concentration of hourly mean concentrations

[2] corresponds to the 90.4th percentile concentration of 24-hour mean concentrations

[3] corresponds to the 99.7th percentile concentration of 1-hour mean concentrations

[4] corresponds to the 99th percentile concentration of 24-hour mean concentrations

[5] corresponds to the 99.9th percentile concentration of 15-minute mean concentrations

2 LOCAL PERSPECTIVE

10. North Lanarkshire is located at the heart of the central belt of Scotland and is Scotland's fourth largest populated local authority. North Lanarkshire is not self-contained, and there is substantial cross-boundary travel with neighbouring local authorities (particularly Glasgow, South Lanarkshire, Falkirk and West Lothian) for employment, education and shopping opportunities.

11. A map of the North Lanarkshire area is provided in Figure 1.

12. North Lanarkshire can be considered as three local areas.

North Area (A80 Corridor) and Kelvin Valley

13. The north covers the A80 corridor, the Kelvin Valley and Kilsyth Hills. The A80 corridor is the main route of transport between Glasgow and the north. The main centre of population in the north is Cumbernauld, whilst there are several large villages on the M80 corridor closer to the Glasgow boundary. Croy and Kilsyth lie to the north of Cumbernauld at the foot of the Kilsyth Hills.

The Rural East

14. The eastern portion of North Lanarkshire is mainly rural and is transected by the M8 motorway. There are a number of small towns and villages in this area including Caldercruix, Shotts and Harthill.

The Urban West

15. The western portion of North Lanarkshire is a more densely populated urbanised area and can be considered as two areas, north and south of the M8 motorway. To the south of the motorway are the towns of Bellshill, Motherwell and Wishaw, as well as a number of satellite villages to each town. The Ravenscraig regeneration area is situated between Motherwell and Wishaw. To the north of the motorway are the towns of Coatbridge and Airdrie. The M73 and M74 motorways form the western boundary of the western portion of North Lanarkshire.

16. North Lanarkshire has traditionally been associated with heavy industry, particularly the urbanised western area. The amount of heavy industry has however been in decline over the last two decades. The economy of North Lanarkshire is now a mixture of commerce and light industry, again focussed around the western urban area and Cumbernauld.

Topography

17. Due to its geographical position at the heart of Scotland, North Lanarkshire has a varying topography. The northern portion of North Lanarkshire is bounded by the Kilsyth Hills. The south-western portion of North Lanarkshire lies within the Clyde Valley whilst the eastern area comprises upland moorland which separates the Clyde and Forth Valleys of central Scotland.

Meteorology

18. The meteorological parameters having the greatest impact upon atmospheric pollutant dispersion and transportation are wind speed and wind direction. Temperature and rainfall also impact upon pollutant concentrations by acting as a catalyst to chemical reactions, creating convective currents or washing pollution out of the atmosphere.

19. The predominant wind directions in North Lanarkshire are south-westerly and westerly. This means that North Lanarkshire is downwind of greater Glasgow for the majority of the time. As such the western portion of North Lanarkshire will be subjected to transboundary pollutants blown from the Glasgow area.

Summary of previous assessments

20. North Lanarkshire Council undertook a U&SA of local air quality in 2003. The U&SA identified the following potential exceedences of NAQS objectives:

- NO_2 annual mean objective in Coatbridge, Chapelhall and Motherwell as a result of road traffic emissions;
- NO_2 annual mean objective as a result of industrial emissions in Motherwell;
- 2010 annual mean PM_{10} objective in Coatbridge, Chapelhall and Motherwell as a result of road traffic emissions;
- 2010 annual mean PM_{10} objective in Salsburgh and Greengairs as a result of domestic fuel burning;
- 2010 annual mean PM_{10} objective at Harthill and other locations close to dust generating processes such as opencast mines; and
- 15-minute and 1-hour SO_2 objectives at monitoring sites in Coatbridge.

21. The potential exceedences were assessed in a Detailed Assessment in 2004. The assessment identified that background PM_{10} concentrations based on Netcen mapped levels were predicted to be in the range 16-18µg/m^3. The background PM_{10} concentration therefore left little headroom before exceedences of NAQS objectives were predicted.

22. The Detailed Assessment included dispersion modelling of road traffic emissions at road junctions in Whifflett (Coatbridge), Motherwell town centre and Chapelhall. The dispersion modelling predicted exceedence of the NAQS 2010 annual mean PM_{10} objective at receptors surrounding each of the road junctions. The modelling study predicted that the concentrations would be close to the annual mean NO_2 objective at receptors surrounding the Chapelhall road junction, but predictions indicated that it would be unlikely that the objective would be exceeded at receptors surrounding the other junctions.

23. Dispersion modelling of emissions from domestic coal burning in Salsburgh was undertaken as part of the Detailed Assessment. The modelling assessment concluded that it was unlikely that there would be an exceedence of SO_2 objectives in the village but that PM_{10} levels were predicted to

exceed the 2010 annual mean objective as a result of a combination of road traffic and domestic emissions.

24. The Detailed Assessment also considered the likelihood of exceedence of NO_2 objectives in Motherwell as a result of particular industrial process emissions. The assessment examined dispersion modelling undertaken by the operator as part of a PPC submission to the Scottish Environment Protection Agency (SEPA). The modelling concluded that it was unlikely that the industrial emissions would contribute to an exceedence of NAQS objectives.

25. Following the Detailed Assessment and subsequent discussions with the Scottish Executive, North Lanarkshire Council designated AQMA surrounding the road junctions in Coatbridge, Motherwell and Chapelhall considered in the dispersion modelling study. The areas of each AQMA are presented in Figures 2, 3 and 4 respectively. The AQMA were officially declared in November 2005.

26. Since the Detailed Assessment in 2004, North Lanarkshire have continued to monitor and assess air quality levels. The 2005 Progress Report identified two further areas of potential exceedence of NAQS objectives. Monitoring data at Bank Street, a busy road junction in Coatbridge, indicated potential exceedence of the annual mean NO_2 objective, whilst monitoring data at Harthill, close to Tam's Loup quarry, indicated a potential exceedence of the 2010 annual mean PM_{10} objective. Detailed Assessments were undertaken of each location.

27. The Detailed Assessment of air quality at Bank Street included dispersion modelling of road traffic emissions. The modelling study predicted NO_2 concentrations below the NAQS objective level at the closest sensitive receptors. There was no monitoring data available, other than a single diffusion tube, with which to verify the modelling predictions, and predictions were below the diffusion tube monitored levels. An automatic monitoring station has subsequently been located at Bank Street to provide further data for this location and allow verification of modelling predictions.

28. The Detailed Assessment of PM_{10} levels at Harthill examined the monitoring data in more detail and included dispersion modelling of fugitive and point source quarry emissions, as well as emissions from road traffic on the M8 motorway. The monitoring data was analysed alongside measured wind directions and modelling predictions to ascertain the source of the measured PM_{10} levels. The analysis indicated that the contribution to measured PM_{10} levels from road traffic and the quarry was roughly similar. The study concluded that the likelihood of exceedence of the 2010 annual mean objective would depend on the nature of the PM_{10} material (e.g. course material from the quarry or more volatile secondary formed PM_{10} from road traffic emissions) and hence the adjustment factor applied to the TEOM monitored results. North Lanarkshire proposed to undertake gravimetric monitoring for direct comparison with the EU directive.

3 INVENTORY OF MONITORING

29. North Lanarkshire Council operate an extensive monitoring network of diffusion tubes and automatic analysers. An inventory of the monitoring sites in 2005 is provided in Table 2 detailing the location and reason for the monitoring site.

Table 2: Monitoring sites within the North Lanarkshire Council area

Site Ref.	Monitoring location	Monitoring method	Pollutant	Purpose
-	Merry Street, Motherwell	Automatic	NO_2, PM_{10}	Roadside within AQMA
-	Civic Centre, Motherwell	Automatic	NO_2, SO_2, PM_{10}	Roadside within AQMA
-	Main Street, Wishaw	Automatic	NO_2	Urban background
-	Salsburgh	Automatic	NO_2, SO_2, PM_{10}, CO	Urban background
-	Chapelhall	Automatic	NO_2, PM_{10}	Roadside within AQMA
-	Our Lady's High School, Motherwell	Automatic	PM_{10}	Urban background / Co-location study
-	Bron Way, Cumbernauld	Automatic	SO_2	Urban background
	Civic Centre, Motherwell (roof)	Gravimetric	Pb	Long term urban background close to former steel-works
-	Coatbridge 1, Bank Street	PDT	NO_2	Kerbside by busy road-junction
-	Coatbridge 2, Whifflet Court	PDT	NO_2	Kerbside by busy road-junction
-	Airdrie 1, Hallcraig Street	PDT	NO_2	Roadside
-	Airdrie 3, Springwells Crescent	PDT	NO_2	Roadside
-	Auchenkilns, Cumbernauld	PDT	NO_2	Roadside by A80(T)
-	Southfield Road, Cumbernauld	PDT	NO_2	Roadside
-	Lauchope Street, Chapelhall Jct	PDT	NO_2	Kerbside by busy road-junction
-	Civic Centre, Motherwell	PDT	NO_2	Roadside
-	Health Centre, Motherwell	PDT	NO_2	Urban background
-	Emily Drive, Motherwell	PDT	NO_2	Urban background
-	Kethers Lane, Motherwell	PDT	NO_2	Urban background
-	Coursington Road, Motherwell	PDT	NO_2	Urban background
-	Craigneuk Road, Carfin	PDT	NO_2	Urban background
-	Coatbridge 3, Hozier Street	PDT	NO_2	Roadside
-	Camp Street, Motherwell	PDT	NO_2	Urban background
R4	Braehead Farm (East), Bargeddie	PDT	NO_2	Roadside within 100m of M8 motorway
R9	MSA Factory, Shawhead	PDT	NO_2	Roadside within 100m of M8 motorway
R11	Orchard Farm East	PDT	NO_2	Roadside within 100m of M8 motorway
R14	Salsburgh (behind bus garage)	PDT	NO_2	Roadside within 100m of M8 motorway
R15	Salsburgh (House No 337)	PDT	NO_2	Roadside within 100m of M8 motorway
R22	Post at 46 Howburn Road	PDT	NO_2	Roadside within 100m of M8 motorway

Site Ref.	Monitoring location	Monitoring method	Pollutant	Purpose
R5	Braehead Farm (West), Bargeddie	PDT	NO_2	Roadside within 100m of M8 motorway
R27	21 New Edinburgh Road M74 Uddingston	PDT	NO_2	Roadside within 100m of M74 motorway
R28	Alpine Grove (House No 4) Uddingston	PDT	NO_2	Roadside
R29	Fallside Road, Uddingston (opposite Legget)	PDT	NO_2	Kerbside
-	Tinkers Lane, Motherwell (opposite bus station)	PDT	NO_2	Kerbside
-	Castlehill Road, Overtoun (opposite bus station)	PDT	NO_2	Kerbside
-	Mobile 1 Co-location (1)	PDT	NO_2	Industrial / co-location
-	Mobile 1 Co-location (2)	PDT	NO_2	Industrial / co-location
-	Mobile 1 Co-location (3)	PDT	NO_2	Industrial / co-location
-	Coatbridge 1, Bank Street	PDT	NO_2	Kerbside
-	Coatbridge 2, Whifflet Court	PDT	NO_2	Urban centre
-	Bank Street, Coatbridge (nearest house)	PDT	NO_2	Kerbside
-	Ravenscraig by-pass	PDT	NO_2	Urban background
R30	Dellburn Street, Motherwell	PDT	NO_2	Urban background
R31	Merry Street, Motherwell	PDT	NO_2	Kerbside
R32	Main Street, Chapelhall	PDT	NO_2	Kerbside
R33	Main Street, Chapelhall	PDT	NO_2	Kerbside
R34	Shawhead roundabout, Coatbridge	PDT	NO_2	Roadside
-	Kirkshaws Rd, Coatbridge	PDT	NO_2	Kerbside
-	Eastfield Road, Cumbernauld	PDT	NO_2	Urban background
-	Watsonville (ASDA), Motherwell	PDT	NO_2	Urban background

30. The monitoring locations are presented on Figures 5-8.

31. The majority of monitoring sites are therefore located close to busy road junctions in urban areas or at the closest receptors to motorways running through the area. Diffusion tubes were co-located with a mobile automatic monitoring station at Harthill to provide a local bias correction factor.

32. Historical monitoring locations and results are detailed in the 2005 Progress Report.

4 INVENTORY OF INDUSTRIAL ACTIVITIES

33. Industrial activity within North Lanarkshire is regulated by SEPA under the IPPC and IPC regulatory regimes. An inventory of all the regulated industrial sites is presented in Table 3.

Table 3: Regulated industrial sites within North Lanarkshire

Company	Process	Location	Date of last permit and/or variation	Atmospheric Pollutants
IPPC Processes				
Argent Energy Ltd,	Manufacture of Biodiesel fuel	Omoa Works, Newarthill, Motherwell	March 2005	NO_X, CO, PM_{10}
Corus UK Limited	Combustion	Dalzell Works, Park Street, Motherwell	December 2005	NO_X, CO, PM_{10}
Shanks Waste Services Ltd	Non hazardous landfill.	Greengairs, Airdrie	January 2004	CO, NO_x, PM_{10}, VOCs
Ibstock Scottish Brick Limited	Ceramic Production	Old Edinburgh Road, Uddingston	March 2004	NO_X, CO, PM_{10}
Highland Colour Coaters Ltd	Melting Zinc Surface Treating Metals	Blairlinn Industrial Estate Cumbernauld	July 2004	NO_X, CO, PM_{10}
William Forrest & Son (Paisley) Ltd	Animal rendering plant	Omoa Works, Newarthill, Motherwell	August 2004	NO_X, CO, PM_{10}
North Lanarkshire Council	Non hazardous landfill.	Auchinlea Landfill Site, Cleland	February 2005	PM_{10}, VOCs
Robert Wiseman Dairies	Treating and processing milk (>200 te/day)	Bellshill Industrial Estate, Bellshill	February 2005	NO_X, CO, PM_{10}
A G Barr	Storage and processing of sugar.	Mollins Road, Westfield, Cumbernauld	February 2005	NO_X, CO, PM_{10}
Davidson Brothers Limited	Animal Feed Manufacture	Gray Street Shotts	March 2005	NO_X, CO, PM_{10}
Lothian Investments Ltd	Landfill Site	Mossband Farm, Newhouse, Motherwell	November 2005	PM_{10}, VOCs
Calcarb Ltd	Production of carbon bonded carbon fibre	North Road, Bellshill	January 2006	NO_X, CO, PM_{10}, VOCs
PPC Part A Processes				
British Gas Plc	Gasification process	Glenmavis NG Facility Mollinsburn Road Airdrie	June 1998	NO_x, CO, VOCs
PPC Part B Processes				
Vallourec & Mannesmann Tubes	Automatic Pipe Coating and Marking Process	Mossend, Bellshill	2002	NO_x, CO, VOCs
CEMEX UK Materials Ltd	Batching of ready mixed concrete	Bellshill	2001	PM_{10}
CPI Mortars (North) Ltd	Bulk use of cement and mineral drying	Coatbridge	2001	PM_{10}
Tarmac Northern Ltd	Cement & aggregate mixing & concrete loading	Motherwell	1992	PM_{10}
Lafarge Aggregates Ltd	Cement batching	Kilsyth	1994	PM_{10}

Company	Process	Location	Date of last permit and/or variation	Atmospheric Pollutants
RMC Russell	Cement Batching	Twechar, Kilsyth	1992	PM_{10}
Patersons of Greenoakhill Ltd	Cement manufacture	Coatbridge	1992	PM_{10}
Stirling [Peter D Stirling Ltd]	Coal handling and loading	Mossend, Belshill	1996	PM_{10}
Bone Steel Ltd	Coating of metal	Netherton, Wishaw	2000	PM_{10}
Blue Circle Cement	Concrete batching	Uddingston	2002	PM_{10}
Powerwall Systems Ltd	Concrete Batching	Netherton, Wishaw	1998	PM_{10}
Bardon Concrete	Concrete product manufacture	Coatbridge	1992	PM_{10}
Patersons of Greenoakhill	Drilling, crushing, grading & screening,	Kilsyth	1997	PM_{10}
British Steel Engineering	Foundry	Motherwell	1998	PM_{10}
Tracey [William Tracey Ltd]	Mineral	Glenmavis	1992	PM_{10}
Gartverrie Ltd	Mineral process	Glenboig, Coatbridge	1993	PM_{10}
Tarmac Northern Ltd	Mineral quarry with coating of roadstone	Caldercruix	1992	PM_{10}
CEMEX UK Materials Ltd	Mortar Batching	Twechar, Kilsyth	1992	PM_{10}
Archibald Young Limited	Non ferrous processes, foundry operations	Motherwell	2001	PM_{10}
Gillooly [Patrick Gillooly Ltd]	Opencast coal mining	Shotts	2004	PM_{10}
GM Mining Ltd	Opencast Coal Mining	Greengairs, by Airdrie	1996	PM_{10}
Schneider Industry (UK) Ltd	Powder coating	Airdrie	1998	PM_{10}, NO_x
Riskend Quarry Co Ltd	Quarry	Kilsyth	1994	PM_{10}
Bardon Aggregates Ltd	Quarry process and coating of roadstone	Salsburgh	2000	PM_{10}
Aggregate Industries UK Ltd	Quarry processes and coating of roadstone.	Croy, nr Kilsyth	1992	PM_{10}
Boalloy Industries Ltd	Respraying of road vehicles	Bellshill	1996	VOC
Trucktech Ltd	Respraying of road vehicles	Bellshill	2001	VOC
Taggarts Motherwell	Road Vehicle Respraying	Motherwell	1996	VOC
Terex Equipment Ltd	Spray painting of heavy plant and machinery	Newhouse, Motherwell	1997	VOC

34. In addition to the processes listed above there are thirty-one petrol stations within North Lanarkshire that are currently authorised by SEPA.

35. Based on the data provided by SEPA there are no new authorised industrial processes in North Lanarkshire since the 2005 Progress Report (April 2005). Three processes have submitted applications for variations to IPPC authorisations since then, namely:

- Corus UK Limited, Motherwell;
- Lothian Investments Landfill Site, Newhouse, Motherwell; and
- Calcarb Ltd., Bellshill.

36. Each of these industrial processors are considered within this report. The locations of each of the processes are presented on Figure 9.

5 TRANSPORT NETWORK

Road Network

37. North Lanarkshire lies at the heart of the national trunk road and rail link network. The M80 / A80 via the M73 to the M74 / M6 corridor provides the main route between most of Scotland and England. Similarly the A8 / M8 corridor and M80 / M9 provide the principal routes for travel to the east and north-east and from the west of Scotland. These main arterial routes experience high traffic flows, particularly during peak periods and can lead to congestion at the interchanges with the local road networks, e.g. at Shawhead or the Raith Interchange.

38. Like North Lanarkshire itself the local road network can be considered as three distinct local areas as defined in Chapter 2. The roads discussed are presented on Figures 10-12.

A80 Corridor and Kelvin Valley

39. The main transport routes within this area are the A80(T) and A803 which connect east to west. The main north-west route connecting Cumbernauld to Airdrie intersects the A80(T) at Auchenkilns. Auchenkilns interchange has undergone major redevelopment in recent years with the roundabout replaced by a new flyover with slip roads which has alleviated congestion.

40. Problem areas in the local trunk road network are located along the A80 at Moodiesburn and Muirhead, where traffic lights interrupt the traffic flow and at the A80 and M80 convergence at Crowood Roundabout. The closest receptors are sufficiently distant from the roads at these locations to negate any potential air quality problems.

41. In Cumbernauld the local road network was laid out as part of the new town development. As such, the roads are wide and receptors are set back from the roadside. There are few air quality problems alongside the local road network in Cumbernauld. Traffic flows in the other towns and villages are not considered to be at levels that may adversely affect air quality levels.

Rural East

42. The main transport routes in the rural east area are the M8, A71, A89 and B7066 each of which are orientated east-west. Minor roads only connect north-south. Whilst traffic flows on the main roads are high the roads are free-flowing and as there are limited numbers of receptors at roadside locations it is considered unlikely that traffic flows will adversely affect air quality levels.

Urban West

43. The main local roads in the urban west (A89, A71 and A73) connect the main towns to each other and the motorway/trunk roads (M74, A8(M), M73). Unlike Cumbernauld, the towns in the urban west have older traditional designs which lead to localised congestion, particularly in town centres. North Lanarkshire's three AQMA are located in this area and relate to traffic flows on local roads.

44. Proposed developments at Ravenscraig and Gartcosh, as well as developments on the A8 corridor will have significant impacts on local traffic flows on both the trunk road and local road networks. The Scottish Executive currently has proposals in place to upgrade the A8 to motorway status between Ballieston and Newhouse. The plans will relieve the pressure on areas adjacent to the A8 such as

Shawhead, Chapelhall and links to the Ravenscraig development and should have accompanying benefits to air quality.

45. The proposed M8 Completion project has not been assessed in detail as part of this assessment, however is considered as part of North Lanarkshire's air quality Action Plan. The Action Plan is currently under preparation and is due for completion in October 2006.

46. North Lanarkshire Roads Department were consulted on whether there were any new roads or roads with significantly changed traffic flows on the local transport network. No roads were identified by the Council.

47. The Scottish Executive has provided road traffic flow data for each of the trunk roads within the North Lanarkshire area. The traffic flows are summarised in Table 4, along with the corresponding flows used in the last U&SA (2003), which were projected to 2005 levels, where considered.

Table 4: Trunk road traffic flow data, 2004 and 2005

Road	Location	Traffic Flows			
		2003 (projected to 2005)		2005	
		AADT	% HGVs	AADT	% HGVs
A80	J1-J2 Muirhead-Mollinsburn	-	-	48,431	5
A80	J2-J3 Mollinsburn – Auchenkilns	-	-	65,560	7
A80	J3-J5 Auchenkilns - Castlecary	77,300	12	61,322	7
M80	J2-J3 Steppes - Muirhead	-	-	55,397	4
M73	J1-J2 Uddingston – Bargeddie	91,500	13	71,930	7
M73	J2-J3 Bargeddie - Mollinsburn	-	-	29,575	10
A8	J8-J7 Ballieston – Shawhead	69,800	9	No Data	
A8	J7-J6 Shawhead – Newhouse	-	-	No Data	
M8	J7 – J8 Newhouse – Shotts/Harthill	63,000	9		
A725	Bellshill	50,000	7	38,260	8
A73	Airdrie - Cumbernauld	16,600	11	16,100	10

48. The measured traffic flows on each of the main trunk roads through North Lanarkshire in 2005 are each less than the assumed flows used in the 2003 assessment. The percentage of heavy goods vehicles (HGVs) of the traffic flow is also less or equivalent to the 2003 assumptions in most cases. No road traffic count data is available for road traffic levels on the stretch of the A8 between Ballieston and Newhouse in 2005.

49. Traffic flows for future years (2010) have been calculated assuming a 2% year on year growth.

Description of other transport

50. North Lanarkshire is well served by the train network. Motherwell station acts as a hub station for Lanarkshire with both local Scotrail services and inter-city trains from Glasgow to Edinburgh and/or the south. The GNER and Virgin inter-city trains are diesel, and other than at Motherwell station do not stop within North Lanarkshire.

51. The principal passenger transport services in North Lanarkshire operate in the greater Glasgow network. These train services are electrified, and as such there are no air quality concerns associated with passenger trains.

52. There are several rail freight terminals and freight routes in North Lanarkshire. Previous review and assessment reports have considered freight movements and concluded that there are no air quality problems. No significant changes to freight movements have been identified.

53. North Lanarkshire is landlocked, therefore there are no ports in the area. There is a private airfield at Cumbernauld, however it does not experience high levels of air traffic. It is anticipated that there are no air quality problems associated with shipping or air travel in North Lanarkshire.

6 CARBON MONOXIDE

54. The NAQS objective for CO is a maximum 8-hour running mean of 10mg/m^3 with an objective date of 31st December 2003.

Background concentrations

55. The predicted background CO concentration in North Lanarkshire in 2001 was 0.2-0.3 mg/m^3. Based on these levels the maximum background CO concentration in North Lanarkshire in 2005 was 0.2mg/m^3.

Monitoring data

56. North Lanarkshire Council measure CO at one automatic CO station located at Salsburgh in 2005. The maximum measured 8-hour mean concentrations measured at the station in 2005 is presented in Table 5. The maximum concentrations measured in 2003 and 2004 are provided for reference. The analyser was located at Harthill in 2003 and 2004. The measured concentrations at the closest national network monitoring site, Glasgow Centre, are also provided for reference.

Table 5: Measured CO concentrations in North Lanarkshire and at Glasgow Centre AURN site

Monitoring Station	Maximum 8-hour mean concentration (mg/m^3)		
	2003	2004	2005
Salsburgh	-	-	0.9
Harthill	0.8	0.7	-
Glasgow Centre	2.4	3.0	2.3

57. Measured CO levels in North Lanarkshire have been substantially below the NAQS objective level. Whilst the monitoring locations have been in the rural eastern portion of North Lanarkshire the measured concentrations at Glasgow Centre indicate that CO concentrations in the urbanised areas of North Lanarkshire are unlikely to exceed the NAQS objective level.

Road Traffic

58. The LAQM.TG(03) technical guidance suggests that exceedence of NAQS objectives for CO are only likely to occur close to very busy roads or junctions in urban areas where the background concentration is greater than 1mg/m^3. The background CO concentration in North Lanarkshire is predicted to be substantially below this level, therefore it is considered unlikely that there will be an exceedence of NAQS objectives as a result of emissions from road traffic.

Industrial Sources

59. Two industrial processors with emissions of CO were identified as having changes to their emissions in 2005.

60. Corus UK Ltd submitted an application to SEPA for a variation to alter their authorisation to alter the fuel use in combustion plant at the Dalzell Works from gas to heavy fuel oil. The Corus application was accompanied by dispersion modelling predictions extracted from their IPPC application. The

dispersion modelling predictions indicate that it is unlikely that there will be an exceedence of NAQS objectives for CO in the vicinity of the site.

61. Calcarb Ltd submitted an application for IPPC authorisation to SEPA in January 2006. The IPPC application included modelling predictions of CO concentrations. The dispersion modelling predicted CO concentrations greater than the NAQS objective level at off-site locations, however at the closest sensitive receptors the predicted concentrations were 50% of NAQS objective levels. It is understood that the IPPC application is still under consideration by SEPA at this stage and that ongoing changes to the plant design may reduce predicted off-site CO concentrations. Further consultation with SEPA will be required to determine the likelihood of exceedences of the NAQS objective in the vicinity of the site.

Conclusions

62. Based on monitored levels and the low predicted background concentration it is considered that CO concentrations in North Lanarkshire comply with the NAQS objective. No new or planned emission sources have been identified that will result in future exceedence of the objective at sensitive receptors.

7 BENZENE

63. The NAQS objective for benzene, contained within the air quality amendment regulations (Scotland) 2002, is detailed as a running annual mean of 3.25µg/m^3. The objective compliance deadline is 31st December 2010.

64. The second Air Quality Daughter Directive also sets a limit value for benzene of 5µg/m^3 to be achieved by the 1st January 2010, which has been transposed into UK legislation.

Background concentrations

65. The predicted background benzene concentration in North Lanarkshire in 2001 and 2003 was between 0.3-0.5µg/m^3. Based on these levels the maximum background CO concentration in North Lanarkshire in 2005 was approximately 0.4µg/m^3.

Monitoring data

66. North Lanarkshire Council do not monitor benzene concentrations. Neighbouring local authorities Glasgow City Council and Falkirk Council do however monitor benzene levels at automatic monitoring sites. It should be noted that the benzene concentrations at the Falkirk Council monitoring station in Grangemouth will be influenced by industrial emissions and as such will be higher than the concentration that would be expected in North Lanarkshire. The measured concentrations in Glasgow and Grangemouth over the last three years are presented in Table 6.

Table 6: Monitored benzene concentrations Glasgow Kerbside and Grangemouth AURN sites

Monitoring Station	Maximum 8-hour mean concentration (µg/m^3)		
	2003	2004	2005
Glasgow Kerbside	1.83	1.41	1.38
Grangemouth	1.63	1.61	1.59

67. Measured benzene concentrations in Glasgow and Grangemouth are below NAQS objective levels. Benzene concentrations in North Lanarkshire are expected to be below these levels and as such can be assumed to be below NAQS objectives levels.

Road Traffic

68. The LAQM.TG(03) technical guidance suggests that exceedence of NAQS objectives for CO are only likely to occur close to very busy roads or junctions in urban areas where the background concentration is greater than 2µg/m^3. The background benzene concentration in North Lanarkshire is predicted to be substantially below this level, therefore it is considered unlikely that there will be an exceedence of NAQS objectives as a result of emissions from road traffic.

Industrial sources

69. No new industrial sources or sources with significantly varied emissions were identified within North Lanarkshire since April 2005.

Petrol stations and fuel storage depots

70. There are currently thirty-one authorised petrol stations within North Lanarkshire. Technical guidance indicates that there is potential for exceedence of the NAQS objective for benzene within 10m of a petrol station where the petrol station has a throughput greater than 2000 m^3 per annum and is adjacent to a very busy road (>30,000 veh/day).

71. No data are available on the throughput at the authorised petrol stations, however there are three roads in North Lanarkshire within urban areas where the traffic flow is greater than 30,000 vehicles per day, in Cumbernauld, Motherwell and Coatbridge respectively. There are no petrol stations located on the stretches of road in each town where the traffic flow is close to or above 30,000 vehicles per day.

72. There are no major fuel storage depots in the North Lanarkshire area.

Conclusions

73. Monitoring data for benzene measured in local authority areas adjacent to North Lanarkshire indicate that it is unlikely that benzene concentrations in North Lanarkshire will exceed the NAQS objective in 2010. No new or planned emission sources have been identified that will result in future exceedence of the objective.

8 1,3-BUTADIENE

74. The NAQS objective for 1,3-butadiene is a running mean concentration of 2.25µg/m^3 with an objective date of 31st December 2003.

Background concentrations

75. The background 1,3-butadiene concentration in North Lanarkshire in 2001 was predicted to be <0.3µg/m^3 and <0.2µg/m^3 in 2003. Based on these levels the maximum background concentration in North Lanarkshire in 2005 was predicted to be 0.18µg/m^3.

Monitoring data

76. As with benzene, North Lanarkshire Council do not monitor 1,3-butadiene levels. The closest monitoring station is located in Glasgow. The monitored 1,3-butadiene levels at the Glasgow Kerbside AURN station are presented in Table 7.

Table 7: Monitored 1,3-butadiene concentrations at Glasgow Kerbside AURN

Monitoring Station	Maximum 8-hour mean concentration (µg/m^3)		
	2003	2004	2005
Glasgow Kerbside	0.45	0.28$^{\#}$	0.22

$^{\#}$ <75% data capture rate

77. Measured 1,3-butadiene concentrations in Glasgow are below NAQS objective levels. 1,3-butadiene concentrations in North Lanarkshire are expected to be below the levels measured in Glasgow and as such can be assumed to be below NAQS objectives levels.

Road traffic

78. Emissions of 1,3-butadiene from road traffic are unlikely to contribute to an exceedence of the NAQS objective.

Industrial sources

79. No new or significantly changed regulated industrial processes with emissions of 1,3-butadiene were identified within North Lanarkshire.

Conclusions

80. Measured 1,3-butadiene levels at the Glasgow Kerbside AURN station indicate that that 1,3-butadiene concentrations in North Lanarkshire are unlikely to exceed NAQS objective. No new or planned emission sources have been identified that will result in future exceedence of the objective.

9 LEAD

81. The NAQS objective for lead is an annual mean concentration of 0.25µg/m^3 to be achieved by 31st December 2008

Background concentrations

82. No projected background concentration data are available for lead.

Monitoring data

83. North Lanarkshire Council monitor atmospheric lead concentrations at a national network monitoring station on the roof of the Civic Centre municipal building, Motherwell. The site was located to be close to the large steel industry in Motherwell in the 1970's, however only one steel-works now remains in the area. The decline of the steel industry in the area coupled with the removal of lead from petrol mean that measured concentrations have reduced markedly in recent years.

84. Measured atmospheric lead concentrations at Motherwell Civic Centre are presented in Table 8.

Table 8: Monitored lead concentrations at Motherwell Civic Centre

Monitoring Station	Annual mean concentration (µg/m^3)		
	2003	2004	2005
Motherwell Civic Centre	0.01	0.008	0.003

85. Measured atmospheric lead concentrations are substantially below the NAQS objective level with a continued decrease in concentrations exhibited.

Road traffic

86. Lead additives in petrol were abolished in 2000. Road traffic emissions do not therefore include lead and as such will not contribute to exceedence of the NAQS objective.

Industrial sources

87. No new or significantly changed regulated industrial processes with emissions of lead were identified within North Lanarkshire.

Conclusions

88. Measured atmospheric lead concentrations at Motherwell Civic Centre indicate that lead concentrations in North Lanarkshire are unlikely to exceed the NAQS objective. No new or planned emission sources have been identified that will result in future exceedence of the objective.

10 NITROGEN DIOXIDE

89. The NAQS objectives for NO_2 are an annual mean concentration of 40µg/m^3 and an hourly mean concentration of 200µg/m^3 (not to be exceeded more than 18 times a year). The compliance date for the objectives was 31st December 2005.

90. EU limits for NO_2 equivalent to the NAQS objectives have been set with a deadline of 31st December 2010.

Background Concentrations

91. Projected background NO_2 concentrations for North Lanarkshire in 2005 range from less than 10µg/m^3 in rural areas to the north and east to 22µg/m^3 in the urban west.

Monitoring data

92. As detailed in Table 2 North Lanarkshire Council operate an extensive monitoring network for NO_2 comprising both automatic analysers and diffusions tubes.

Passive diffusion tube data

93. North Lanarkshire's network of diffusion tubes are analysed by Glasgow Scientific Services, a UKAS accredited laboratory, using 20% TEA in water.

94. During 2005, North Lanarkshire Council co-located three diffusion tubes with a chemiluminescent analyser at Salsburgh. The results of the study are presented in Table 9 to determine a bias correction factor for the diffusion tubes.

Table 9: Laboratory Bias Correction Factor for North Lanarkshire, 2005

Monitoring Station	Annual Average Diffusion Tube Concentration (µg/m^3) (Dm)				Annual Mean Automatic Concentration (µg/m^3) (Cm)	Bias correction factor (Cm/Dm)
	Tube 1	Tube 2	Tube 3	Average		
Salsburgh	19.9	18.8	18.8	19.1	14.9	0.78

95. The co-location study indicates that diffusion tubes over-estimate NO_2 concentrations by approximately 28%. A local laboratory bias correction factor of 0.78 should therefore be applied to the monitoring results.

96. Glasgow Scientific Services reported a bias correction factor of 0.74 in 2005 based on monitoring data obtained by Glasgow City Council. The calculated correction factor in Glasgow therefore provides good agreement with the calculated correction factor for Salsburgh.

97. The bias correction factor of 0.78 has been applied to the measured diffusion tube results as it presents both a worse case and was measured locally. The measured NO_2 concentrations at diffusion tube sites since the last U&SA are presented in Table 10.

Table 10: NO_2 diffusion tube monitored concentrations, 2003-2005

Site Name	Annual Mean NO_2 Concentration (µg/m^3)		
	2003	2004	2005
Coatbridge 1, Bank Street	39	37	33
Coatbridge 2, Whifflet Court	30	29	25
Airdrie 1, Hallcraig Street	24	26	21
Airdrie 3, Springwells Crescent	21	20	18
Auchenkilns, Cumbernauld	81	56	34[#]
Southfield Road, Cumbernauld	28	30	22
Lauchope Street, Chapelhall Jct	46	39	39
Civic Centre, Motherwell	40	38	31
Health Centre, Motherwell	21	21	19
Emily Drive, Motherwell	15	15	12
Kethers Lane, Motherwell	19	17	15
Coursington Road, Motherwell	14	18	12
Craigneuk Road, Carfin	18	18	15
Coatbridge 3, Hozier Street	25	26	15
Camp Street, Motherwell	21	19	18
Braehead Farm (East), Bargeddie	38	40	38
MSA Factory, Shawhead	37	37	35
Orchard Farm East	32	32	30
Salsburgh (behind bus garage)	24	21	21
Salsburgh (House No 337)	22	24	22
Post at 46 Howburn Road	19	21	17
Braehead Farm (West), Bargeddie	39	38	50
21 New Edinburgh Road M74 Uddingston	41	40	35
Alpine Grove (House No 4) Uddingston	28	26	22
Fallside Road, Uddingston (opposite Legget)	31	32	28
Tinkers Lane, Motherwell (opposite bus station)	-	29	23
Castlehill Road, Overtown (opposite bus station)	-	23	21
Bank Street, Coatbridge (nearest house)	-	45	41
Ravenscraig by-pass	-	20	17
Dellburn Street, Motherwell R30	-	25	22
Merry Street, Motherwell R31	-	40	35
Main Street, Chapelhall R32	-	32	29
Main Street, Chapelhall R33	-	35	28
Shawhead roundabout, Coatbridge R34	-	41	32
Kirkshaws Rd, Coatbridge	-	-	48[*]
Eastfield Road, Cumbernauld	-	-	32[*]
Watsonville (ASDA), Motherwell	-	-	27[*]

[#]Monitoring site relocated 2005
[*] Two months monitoring data only

98. Measured diffusion tube concentrations in 2005 were lower than in previous years with the exception of the site at Braehead Farm, Bargeddie which is adjacent to the A8/M8 motorway. In particular, the monitoring site at Auchenkilns has experienced a marked decrease in measured levels. The decrease coincides with the completion of the new interchange roadworks at the roundabout, however the tube site has also been moved further from the junction which will also have an effect on the measured levels.

99. Concentrations exceeding the NAQS objective level have been measured at Bank Street, Coatbridge and Braehead Farm, Bargeddie. An automatic analyser is now operational at Bank Street which will supplement the diffusion tube monitoring and the findings of the Detailed Assessment undertaken in 2005. Additional diffusion tube monitoring is planned for receptor sites at similar distance from the A8/M8 as at Bargeddie.

100. An NO_2 concentration close to the NAQS objective level (at 39µg/m^3) was measured at Lauchope Street, Chapelhall, within the AQMA. The measured concentration is consistent with levels measured in previous years. An automatic monitoring station was located at the road junction in 2005 with the results presented below.

101. Monitored levels close to bus depots and stations were substantially below the NAQS objective level.

102. Measured NO_2 concentrations at the remaining sites are below NAQS objective levels. Monitoring will be continued at these sites during 2006.

Automatic monitoring data

103. North Lanarkshire Council monitored NO_2 using automatic analysers at five sites during 2005 as detailed in Table 2. The measured annual average and 99.79th percentile of 1-hour mean concentrations are reported in Table 11.

Table 11: Automatic analyser measured NO_2 concentrations

Monitoring Station	Annual mean concentration (µg/m^3)	99.79th Percentile of 1-hour mean concentrations (µg/m^3)
Motherwell Civic Centre	21	102
Motherwell Cross	42	160
Chapelhall	34	116
Salsburgh	12	78
Wishaw	28	112

104. The measured annual average concentration at Motherwell Cross in 2005 exceeded the NAQS objective level. The roadside monitoring site is located within the Motherwell AQMA and was located following the Detailed Assessment in 2005. The Detailed Assessment predicted annual average NO_2 concentrations of 35µg/m^3 at the monitoring location. Annual average NO_2 concentrations have therefore been underestimated at this location and will exceed NAQS objective levels at building façades around the junction. The junction will be considered in more detail during the Further Assessment of the AQMA.

105. Measured annual average concentrations at the other monitoring sites were substantially below the NAQS objective level. The 99.79th percentiles of 1-hour mean concentrations were also substantially below the NAQS objective level at all locations.

Road traffic

106. There has been no significant change in road traffic flows since the 2003 assessment, however the projected background concentrations and vehicle emissions data have changed. The main trunk roads and congested roads considered in the 2003 assessment have therefore been reassessed.

Motorways and trunk roads

107. The closest receptors to motorways and dual carriageways in North Lanarkshire are approximately 40m from the road centre. Annual average NO_2 concentrations were predicted at 40m from the road centre of each of the motorways/dual carriageways using the DMRB model as specified in technical guidance. DMRB predictions were undertaken using the measured traffic flow data reported in Table 4. In the absence of measured data for the A8/M8 the 2003 assumed flows were used. The predicted NO_2 concentrations are reported in Table 12.

Table 12 Predicted NO_2 concentrations close to motorways/dual carriageways, 2005

Road	Location	Background Concentration (µg/m^3)	Total predicted annual average NO_2 Concentration (µg/m^3)
A80	J1-J2 Muirhead-Mollinsburn	18	23
A80	J2-J3 Mollinsburn – Auchenkilns	18	25
A80	J3-J5 Auchenkilns - Castlecary	18	25
M80	J2-J3 Steppes - Muirhead	18	25
M73	J1-J2 Uddingston – Bargeddie	22	29
M73	J2-J3 Bargeddie - Mollinsburn	18	24
A8	J8-J7 Ballieston – Shawhead	20	28
A8	J7-J6 Shawhead – Newhouse	20	28
M8	J7–J8 Newhouse – Shotts/Harthill	12	20
A725	Bellshill	18	24

108. Based on the DMRB predictions it is unlikely that there will be exceedence of the NAQS annual mean objective for NO_2 at the closest receptors to the motorway and dual carriageways in North Lanarkshire. It is considered unlikely that there would be exceedence of the hourly mean objective where annual mean concentrations were below 40µg/m^3.

109. The predicted concentrations are below measured concentrations at the closest receptors to the motorways. The DMRB predictions are typically 5-8µg/m^3 below measured levels. The predicted concentrations will remain below the objective level even allowing for the under-prediction.

Busy and congested roads

110. The 2003 assessment considered busy roads and junctions in the North Lanarkshire area. With the exception of the AQMA in Motherwell and Coatbridge, the predicted NO_2 concentrations were below NAQS objective levels. As no significant changes to traffic flows have been identified by the council, and revised estimations of background concentrations are lower than in previous assessments, then it can be assumed that annual mean NO_2 concentrations at busy roads and junctions outside the AQMA will be below the NAQS objective level.

Industrial sources

111. Two industrial processors with emissions of NO_2 were identified as having changes to their emissions in 2005.

112. The Corus UK Ltd application to SEPA to alter the fuel use in combustion plant at the Dalzell Works from gas to heavy fuel oil included dispersion modelling predictions of NO_2 concentrations. The dispersion modelling predictions indicate that it is unlikely that there will be an exceedence of NAQS objectives for NO_2 in the vicinity of the site.

113. The Calcarb Ltd application for IPPC authorisation included dispersion modelling predictions of NO_2 concentrations. The modelling predicted NO_2 concentrations substantially below the NAQS objective level (maximum predicted process contribution to annual average NO_2 concentrations of 1µg/m^3). It is unlikely therefore that there will be exceedence of NAQS objectives for NO_2 in the vicinity of the site.

Conclusions

114. Measured NO_2 concentrations in 2005 were generally lower than measured concentrations in preceding years.

115. Exceedences of the annual mean NO_2 objective were measured at a few sites which are influenced by road traffic emissions. These sites were:

- Motherwell Cross;
- Bank Street, Coatbridge;
- Bargeddie Farm, near A8.

116. In addition, measured concentrations close to the NAQS objective were measured at Chapelhall.

117. The sites at Motherwell and Chapelhall are located within AQMA and will be considered in further detail in the Further Assessment in 2006. Additional monitoring is currently being undertaken at Bank Street using an automatic analyser to verify the measured diffusion tube concentrations and dispersion modelling predictions. Further assessment of the road junction will be undertaken when sufficient monitoring data are available.

118. No new or planned emission sources have been identified that will result in future exceedence of the objective.

11 SULPHUR DIOXIDE

119. There are three NAQS objectives for SO_2:

- the 24-hour mean objective of 125µg/m^3 not to be exceeded on more than 3 occasions in a year;
- the 1-hour mean objective of 350µg/m^3 not to be exceeded on more than 24 occasions in a year; and
- the 15-minute mean objective of 266µg/m^3 not to be exceed on more than 35 occasions in a year.

120. The date of compliance with the 1-hour and 24-hour mean concentrations was 31st December 2004. The date of compliance with the 15-minute mean objective was 31st December 2005.

Background Concentrations

121. Projected background SO_2 concentrations for North Lanarkshire in 2005 range from 3-5µg/m^3.

Monitoring data

122. North Lanarkshire Council monitor SO_2 at three automatic monitoring sites at Motherwell, Salsburgh and Cumbernauld. The measured concentrations at each site are presented in Table 13.

Table 13: Automatic analyser measured SO_2 concentrations

Monitoring Site	99th percentile of 24-hour mean concentrations (µg/m^3)	99.79th percentile of 1-hour mean concentrations (µg/m^3)	99.9th percentile of 15-minute mean concentrations (µg/m^3)
Civic Centre, Motherwell	6	16	24
Salsburgh	20	44	47
Bron Way, Cumbernauld	7	18	30

123. The measured SO_2 concentrations in 2005 were substantially below NAQS objective levels.

124. The monitoring station at Salsburgh was located to monitor the effect of domestic coal burning. The measured concentrations indicate that domestic fuel burning in North Lanarkshire is unlikely to cause exceedence of NAQS objectives.

Industrial sources

125. The only proposed change to industrial SO_2 emissions in 2005 was the Corus UK Ltd application to SEPA to alter the fuel use in combustion plant at the Dalzell Works from gas to heavy fuel oil. The dispersion modelling predictions accompanying the application for variation indicate that it is unlikely that there will be an exceedence of NAQS objectives for SO_2 in the vicinity of the site.

Small boilers > 5MW(thermal)

126. The 2003 U&SA considered small boilers in the North Lanarkshire area. No coal or oil-fired boilers with a thermal output greater than 5MW were identified.

127. No new coal or oil-fired boilers with a thermal output greater than 5MW have been identified since 2003.

Domestic sources

128. Domestic coal burning was assessed in the last U&SA and it was determined that the density of coal burning houses in Salsburgh was greater than the threshold defined in technical guidance. The Detailed Assessment of SO_2 in Salsburgh predicted that it was unlikely that NAQS objectives for SO_2 would be exceeded in Salsburgh. The measured SO_2 concentrations in Salsburgh in 2005 provide good agreement with the predicted levels. It is therefore unlikely that there will be an exceedence of NAQS objectives for SO_2 in Salsburgh.

129. No new areas of domestic fuel burning exceeding the property density thresholds set in technical guidance have been identified in North Lanarkshire.

Conclusions

130. Measured SO_2 concentrations in North Lanarkshire are substantially below NAQS objective levels. No new or planned emission sources have been identified that will result in future exceedence of the objective. It is considered unlikely that there will be exceedence of NAQS objective levels in North Lanarkshire.

12 PARTICULATES

131. The NAQS objectives for PM_{10} are an annual mean concentration of 18µg/m^3 by 31st December 2010 and a 24-hour mean concentration not to exceed 50µg/m^3 on more than 7 occasions by 31st December 2010.

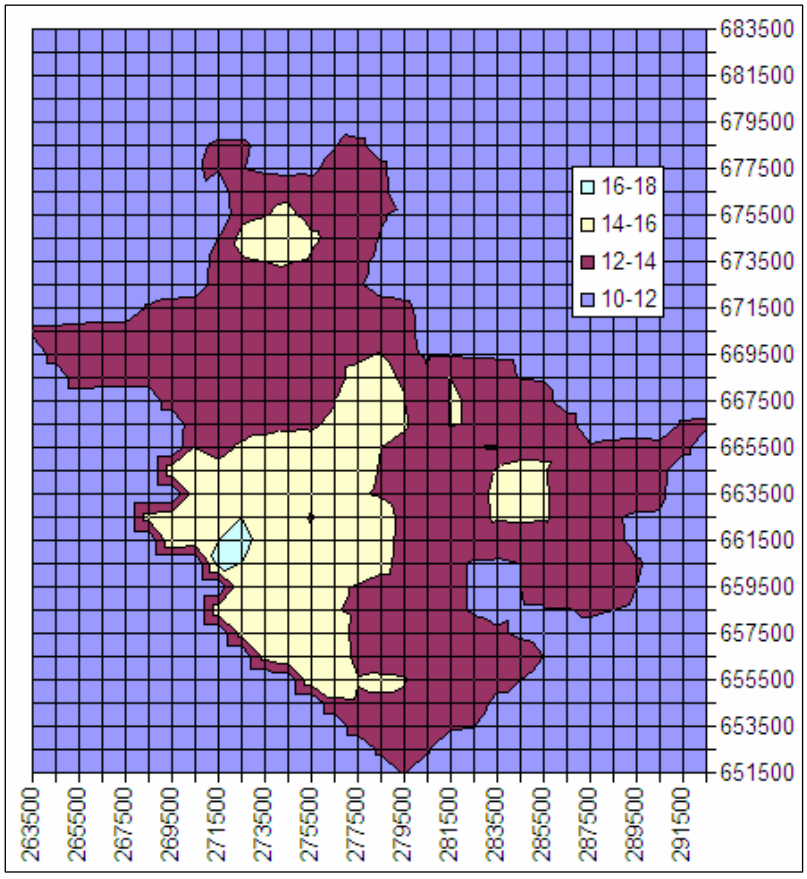
Background Concentration

132. Previous assessments of PM_{10} concentrations in North Lanarkshire have identified that the background PM_{10} concentration was elevated in comparison to the NAQS objective. The background PM_{10} concentration was predicted to be as high as 17µg/m^3 in 2010.

133. The predicted background PM_{10} concentrations have now been revised for the North Lanarkshire area. The predicted background concentrations in 2005 range from 10µg/m^3 in rural areas to 18µg/m^3 in the urban west.

134. The predicted background PM_{10} concentrations in 2010 are displayed in Chart 1. The chart shows that for a small area of North Lanarkshire, close to the motorways the background PM_{10} concentration in 2010 is predicted to be between 16-18µg/m^3. In the remainder of the urban west the background concentration is predicted to be around 16µg/m^3. Background PM_{10} concentrations in the urban west are therefore still predicted to be elevated in comparison to the 2010 annual mean objective.

Chart 1: Predicted 2010 background PM_{10} concentrations, µg/m^3



Monitoring data

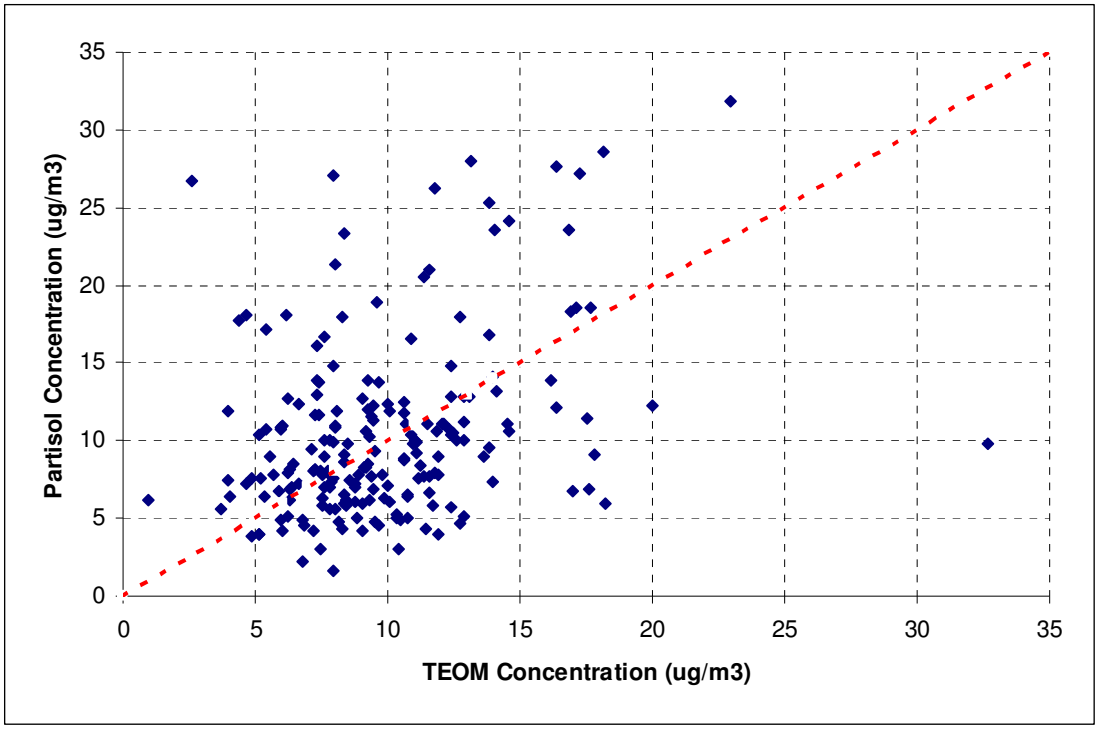
PM_{10} co-location study

135. North Lanarkshire Council monitor PM_{10} using a Tapered Element Oscillating Microbalance (TEOM). TEOM analysers have heated air inlets which can result in the evaporation of semi-volatile particulates thereby reducing the measured PM_{10} concentration. Technical guidance LAQM.TG(03) recommends that measured concentrations should be factored by 1.3 to account for any loss in the heated inlet of the analyser.

136. Recent Scottish Executive communication[5] has highlighted monitoring by Edinburgh City Council which has indicated that the 1.3 factor may overestimate the loss of semi-volatile particulates, and that an adjustment factor of 1.14 for annual mean concentrations was observed.

137. Following the declaration of AQMA in North Lanarkshire the council commissioned a background monitoring site in Motherwell to examine the accuracy of the mapped background concentration data. In 2005 a gravimetric monitor was located with the background TEOM monitor in order to compare the monitoring techniques. The results of the study (April 2005 to April 2006) are presented in Chart 2.

Chart 2: PM_{10} co-location study measurements, Partsiol vs TEOM



138. The co-location study results indicate the TEOM analyser can both over and under-estimate PM_{10} concentrations in comparison to the gravimetric technique. On average the TEOM analyser was found to underestimate concentrations by 20% in comparison to the gravimetric analyser. An adjustment factor of 1.20 was determined from the monitoring results.

[5] Local Air Quality Management: Update on Particles. Scottish Executive, April 2005

139. The AQEG report on particulate matter in the UK[6] references a UK-wide intercomparison study between TEOM analysers and gravimetric samplers. The study concluded that the ratios between methods varied from site to site and were subject to seasonal ratios. North Lanarkshire are proposing further co-location studies, particularly at roadside locations to examine the change in ratios.

140. The measured annual average PM_{10} concentration at the background site was 13µg/m^3. The mapped background concentration data indicated a background concentration between 12-14µg/m^3 at the monitoring location. The mapped and measured data therefore demonstrate good agreement.

Monitoring data within an AQMA

141. Automatic analysers were located within the AQMA at Motherwell and Chapelhall during 2005. The measured PM_{10} concentrations are reported in Table 14. The reported concentrations have been obtained using the 1.3 adjustment factor.

Table 14: Automatic analyser measured PM_{10} concentrations in AQMA

Monitoring Station	Annual mean concentration (µg/m^3)	98th Percentile of 24-hour mean concentrations (µg/m^3)	No. of measured 24-mean concentrations greater than 50µg/m^3
Motherwell Civic Centre	17.7	32	1
Motherwell Cross	23.5	44	4
Chapelhall	22.0	33	0

142. The measured concentrations at the Civic Centre during 2005 was marginally below the 2010 NAQS annual mean objective level. The measured concentrations at the Motherwell Cross and Chapehall sites exceeded the objective level. If the lower adjustment factor had been applied then the measured annual average concentrations would have been 16µg/m^3 at Motherwell Civic Centre, 20µg/m^3 at Chapelhall and 22µg/m^3 at Motherwell Cross.

143. Based on the measured data the AQMA at both Motherwell and Chapelhall remain valid, although there is potential to reduce the extent of the AQMA at Motherwell if further years of monitoring data maintain a similar trend. The measured concentrations at Motherwell Cross and Chapelhall are higher than the concentrations predicted in the Detailed Assessment. Further consideration will be given to these locations during the Further Assessment of the AQMA.

144. The measured 24-mean concentrations indicate that it is unlikely that the 2010 objective will be exceeded with less than 7 measured 24-hour mean concentrations greater than 50µg/m^3 at each site.

Monitoring data outside an AQMA

145. PM_{10} monitoring was undertaken at one site outside an AQMA in 2005, at Salsburgh. The site was located to monitor ambient PM_{10} concentrations resulting from domestic fuel burning. For operational reasons the site could not be located at the point of maximum predicted PM_{10} concentrations in the village, however the results provide a good indication of background concentrations within the village. The measured PM_{10} levels are presented in Table 15. The presented concentration has been derived using the 1.3 adjustment factor.

[6] AQEG(2005) *Particulate Matter in the UK*. Defra, London

Table 15: Automatic analyser measured PM_{10} concentrations outside AQMA

Monitoring Station	Annual mean concentration ($\mu g/m^3$)	98th Percentile of 24-hour mean concentrations ($\mu g/m^3$)	No. of measured 24-mean concentrations greater than 50$\mu g/m^3$
Salsburgh	16.5	38	1

146. The measured annual average concentration at Salsburgh is below the 2010 NAQS objective level.

Road traffic

147. There has been no significant change in road traffic flows since the 2003 assessment, however as with the assessment of NO_2 the projected PM_{10} background concentrations and vehicle emissions data have changed. The main trunk roads and congested roads considered in the 2003 assessment have therefore been reassessed.

Motorways and trunk roads

148. Annual average PM_{10} concentrations were predicted at the closest receptors (at 40m) from the road centre of each of the motorways/dual carriageways using the DMRB model as specified in technical guidance. DMRB predictions were undertaken using the measured traffic flow data reported in Table 4 projected to 2010 traffic flows. In the absence of measured data for the A8/M8 the 2003 assumed flows were used. The predicted PM_{10} concentrations are reported in Table 16.

Table 16: Predicted PM_{10} concentrations close to motorways/dual carriageways, 2010

Road	Location	Background Concentration ($\mu g/m^3$)	Total predicted annual average PM_{10} Concentration ($\mu g/m^3$)	Predicted number of exceedences of 24-hour mean objective
A80	J1-J2 Muirhead-Mollinsburn	14	15	0
A80	J2-J3 Mollinsburn – Auchenkilns	14	16	0
A80	J3-J5 Auchenkilns - Castlecary	14	16	0
M80	J2-J3 Steppes - Muirhead	14	15	0
M73	J1-J2 Uddingston – Bargeddie	15	17	1
M73	J2-J3 Bargeddie - Mollinsburn	15	16	0
A8	J8-J7 Ballieston – Shawhead	16	18	1
A8	J7-J6 Shawhead – Newhouse	15	17	1
M8	J7–J8 Newhouse – Shotts/Harthill	14	16	0
A725	Bellshill	14	15	0

149. Based on the DMRB predictions, PM_{10} concentrations at 40m from the A8 between Ballieston and Newhouse will be close to the NAQS annual mean objective. It is understood, however, that the proposed M8 completion will be operational by 2010, therefore the road network will be significantly altered. PM_{10} concentrations along the stretch of A8/M8 will be further considered.

150. The predicted PM_{10} concentrations at 40m from each of the other roads are unlikely to exceed NAQS objectives.

Busy and congested roads

151. The 2003 assessment also considered PM_{10} concentrations at busy roads and junctions in the North Lanarkshire area. The DMRB assessments predicted exceedences of the 2010 annual mean objective at each road and junction considered. The predicted PM_{10} concentrations have been recalculated using the latest background concentration data from Netcen and are presented in Table 17.

Table 17: Predicted PM_{10} concentration sat busy and congested roads

Road	Location	Background Concentration (µg/m^3)	Total predicted annual average PM_{10} Concentration (µg/m^3)	Predicted number of exceedences of 24-hour mean objective
A721	Wishaw Cross	14	16	1
A721	Motherwell Cross	15	18	1
A73	Chapelhall	14	16	0
A725	Shawhead, Coatbridge	16	19	2
A725	Whifflett, Coatbridge	15	18	1
A89	Coatbridge	15	17	1
A89	Airdrie	15	17	1
A8011	Cumbernauld	15	17	1
A73	Stand	14	16	0

152. The DMRB predictions indicate that the NAQS annual mean objective will be exceeded at Motherwell Cross, Shawhead and Whifflett. These locations are all located within the current AQMA. The predicted annual average PM_{10} concentrations at the remaining receptors are below the NAQS objective. Based on the predicted levels it is unlikely that the 24-hour mean objective will be exceeded in 2010.

Industrial sources

153. Three industrial processors with emissions of PM_{10} were identified as having changes to their emissions in 2005.

154. The Corus UK Ltd application to SEPA to alter the fuel use in combustion plant at the Dalzell Works from gas to heavy fuel oil included dispersion modelling predictions of PM_{10} concentrations. The dispersion modelling predictions indicate that it is unlikely that there will be an exceedence of NAQS objectives for PM_{10} in the vicinity of the site.

155. The Calcarb Ltd application for IPPC authorisation included dispersion modelling predictions of PM_{10} concentrations. The modelling predicted exceedences of the 2010 NAQS annual mean objective within 0.5km of the site. The modelling predictions were however based on total particulate emissions as no size specific, i.e. PM_{10}, emissions data was available. It is understood that the IPPC application is still under consideration by SEPA at this stage and that ongoing changes to the plant design may reduce predicted off-site PM_{10} concentrations. Further consultation with SEPA will be required to determine the likelihood of exceedences of the NAQS objective in the vicinity of the site.

156. Lothian Investment submitted an application to operate an inert waste landfill site on the site of an opencast mine at Newhouse, Motherwell. Emissions from the site in isolation are unlikely to result in exceedence of NAQS objectives, however the proposed site is close to other particulate generating processes, including a landfill, opencast mining, a rendering plant and a biodiesel plant. North Lanarkshire Council met with SEPA to discuss the number of particulate sources in the area in December 2005. SEPA agreed to undertake a period of gravimetric monitoring in the area and report

the results to the council. Further assessment of the area will be made following completion of monitoring by SEPA.

Domestic sources

157. Domestic coal burning was assessed in the last U&SA and it was determined that the density of coal burning houses in Salsburgh was greater than the threshold defined in technical guidance. Dispersion modelling undertaken as part of the 2004 Detailed Assessment of PM_{10} predicted annual average concentrations of 19µg/m^3 in Salsburgh. As the measured concentration is below the objective level (at 16.5µg/m^3) it is considered unlikely that NAQS objectives for PM_{10} will be exceeded in Salsburgh.

158. No new areas of domestic fuel burning exceeding the property density thresholds set in technical guidance have been identified in North Lanarkshire.

Dust generating processes

159. Assessment was made of dust generating processes in the 2003 U&SA. The assessment concluded that there was potential for exceedence of the 2010 annual mean objective for PM_{10} within 500m of the quarries and opencast sites considered.

160. The revised background concentration maps indicate that annual average PM_{10} concentrations in 2010 in these areas will be lower than previously thought. Furthermore, the 2003 assessment considered distances from the site boundary to the closest receptor, not from the source of the dust emission.

161. Assessment of the lower background PM_{10} concentration in North Lanarkshire means that the potential for exceedence of the 2010 annual mean PM_{10} objective is restricted to within 250m of dust generating sources. This conclusion is supported by the conclusions of the 2005 Detailed Assessment of air quality at Tam's Loup quarry, Harthill.

162. Of the dust generating processes considered in the 2003 assessment potential for exceedence of the 2010 annual mean objective for PM_{10} exists at Tam's Loup quarry, Harthill and Croy Quarry. Further monitoring is planned at both sites in 2006.

163. No dust complaints regarding existing quarries, landfill sites or open-cast mines have been received by the council since the last assessment in 2003.

164. A number of applications for proposed open-cast developments have been received since 2003. Applicants are required to undertake an assessment of dust and particulate material and where necessary undertake monitoring and report measured levels at the closest receptors. The results of the monitoring will be reviewed on an annual basis to identify any potential exceedence of NAQS objectives.

Conclusions

165. A revision of the national predicted background PM_{10} concentration maps indicates that background PM_{10} concentrations in North Lanarkshire are lower than previously predicted, however background PM_{10} concentrations in the urban west still constitute over 80% of the 2010 NAQS objective level.

166. Measured PM_{10} concentrations within the AQMA in Motherwell and Chapelhall indicate that the PM_{10} concentrations are substantially above the 2010 objective level and therefore the AQMA are still valid. There is however potential to reduce the extent of the AQMA in Motherwell based on monitored PM_{10} concentrations at Motherwell Civic Centre.

167. Monitored PM_{10} concentrations in Salsburgh indicate that it is unlikely that emissions from domestic fuel burning will result in an exceedence of NAQS objectives for PM_{10}.

168. Assessment of road traffic emissions indicates that there is potential for exceedence of the 2010 annual mean PM_{10} objective at roadside locations in Coatbridge. Further assessment of road traffic emissions in Coatbridge will be required as part of the Further Assessment and Action Plan in 2006.

169. Dispersion modelling undertaken to support an IPPC application for an industrial plant in Bellshill indicates potential exceedence of the 2010 annual mean objective around the plant. Discussion with SEPA will be required with regard to the potential for exceedence and abatement planned for the plant.

170. No other new or planned emission sources have been identified that will result in future exceedence of the objective.

13 CONCLUSIONS

171. Assessment was made of the seven pollutants contained in the NAQS and ambient ground level concentrations of each pollutant assessed against the relevant NAQS objectives.

172. Monitored pollutant concentrations in 2005 were generally lower than in preceding years, continuing the recent trend in falling concentrations of all pollutants.

173. Exceedences of the 2010 annual mean PM_{10} objectives were measured within the existing AQMA at Motherwell Cross and Chapelhall confirming the continued requirement of the AQMA. Monitoring data at Civic Centre, within the Motherwell AQMA, indicated that it was unlikely that the NAQS annual mean PM_{10} objective would be exceeded in 2010. If further years of monitoring data confirm this result then the extent of the Motherwell AQMA could be reduced. Annual mean NO_2 concentrations exceeding the NAQS objective were also measured in Motherwell and Chapelhall. Further consideration of the AQMAs, including NO_2 levels, should be given in the Further Assessment and Action Plan in 2006.

174. Outside the AQMA measured NO_2 concentrations exceeding the NAQS objective were measured at Bank Street and Bargeddie in Coatbridge. Additional monitoring at these locations is planned during 2006 and it is recommended that the Further Assessment and Action Plan includes the whole of Coatbridge rather than individual road junctions.

175. Assessment of new or significantly changed emissions from industrial sources identified potential exceedence of NAQS objectives surrounding an industrial site in Bellshill. It is understood, however, that the process and resulting emissions may change. Further consultation with SEPA with regard to the potential for exceedence will be required.

176. Assessment of road traffic emissions identified potential for exceedence of the 2010 NAQS objective at roadside locations in Coatbridge. The locations identified include the AQMA at Whifflett. The requirement to extend the AQMA at Whifflett will be considered in the Further Assessment of the AQMA in 2006.

177. No other new developments were identified that may result in exceedence of NAQS objectives.

178. The assessment did not identify any new areas exceeding NAQS objectives in North Lanarkshire. Measured concentrations confirmed the requirement for existing AQMA, however there may be requirement to extend or reduce the size of the respective AQMA.