

Denbighshire **County Council.**

Air Quality Review and **Assessment.**

Updating & Screening **Assessment.**

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EXECUTIVE SUMMARY

The UK Government published its strategic policy framework for air quality management in 1995 establishing national strategies and policies on air quality which culminated in the Environment Act, 1995. As a requirement of the Act, the Secretary of State has prepared a National Air Quality Strategy. The National Air Quality Strategy provides a framework for air quality control through air quality management and air quality standards. National air quality standards have been proposed by the Expert Panel on Air Quality Standards (EPAQS) for the UK Government.

These air quality standards and their objectives have been enacted through the Air Quality Regulations in December 1997. The Environment Act requires local authorities to undertake an air quality review. In areas where air quality objectives may not be met by the year 2005 local authorities are required to establish Air Quality Management Areas.

The first step in this process is to undertake a review of current and potential future air quality. A minimum of two air quality reviews are recommended in order to assess compliance with air quality objectives, one to assess air quality at the outset of the National Air Quality Strategy and a second to be carried out towards the end of the policy timescale (2005). The number of reviews necessary depends on the likelihood of achieving the objectives.

Denbighshire completed the Stage One Review and Assessment in November 2000 and the Stage Two Review and Assessment in May 2001. Both of these reports concluded that no exceedence of the objectives was likely.

This latest report is equivalent to an Updating and Screening Assessment as outlined in the Government's published guidance. It examines all the pollutants of concern and is part of an on going Review and Assessment procedure.

The seven pollutants (namely Carbon Monoxide, Benzene, 1.3-Butadiene, Lead, Nitrogen Dioxide, Sulphur Dioxide and Particulate Matter) were assessed in relation to the Objectives in accordance with the methods laid down in the latest Technical Guidance Document LAQM.TG(03).

The report concludes that again none of the pollutants are expected to exceed the objectives within the Denbighshire County.

1. **INTRODUCTION.**

Denbighshire County Council is undertaking a review of local air quality in order to fulfill its obligations under the Environment Act 1995 Part IV. The Act requires the Local Authority to review the sources of pollution in its own and neighbouring areas, and to assess likely future concentrations of a number of pollutants.

This document presents the results of the second round review and assessment of air quality – An Updating and Screening Assessment.

There are two main objectives of a review and assessment of air quality:

- * To identify those areas at a local level where national policies and measures appear unlikely to deliver the air quality objectives by a target date, typically 31.12.2003 - 31.12.2005
- * To ensure that air quality considerations are integrated into a local authorities decision making process.

Readers are asked to note that the Review and Assessment process is an on-going procedure and will be repeated in accordance with the guidance. The timetable is as follows:-

Progress Report/ Detailed Assessment	End of April 2004
Progress Report	End of April 2005
Updating and Screening Assessment	End of April 2006
Progress Report/ Detailed Assessment	End of April 2007
Progress Report	End of April 2008
Updating and Screening Assessment	End of April 2009
Progress Report/ Detailed Assessment	End of April 2010

The latest Technical Guidance Document LAQM.TG(03) is referred to as it was designed to 'guide local authorities through the review and assessment process'. It sets out a general approach based on a pollutant by pollutant checklists in order to identify significant changes that would require further consideration. This report is produced in the checklist format and examines all the pollutants of concern.

Table 1.1 UK Air Quality Objectives.

Pollutant	Air Quality Objective.		Date to be achieved by.
	Concentration *	Measured as	
Benzene	16.25 μgm^{-3} (5 ppb)	Running annual mean	31.12.2003
	5 μgm^{-3} (1.54ppb)	Annual average	31.12.2010
1,3,Butadiene	2.25 μgm^{-3} (1 ppb)	Running annual mean	31.12.2003
Carbon monoxide	10 mgm^{-3} (8.6 ppm)	Maximum daily running 8-hour mean	31.12.2003
Lead	0.5 μgm^{-3}	Annual mean	31.12.2004
	0.25 μgm^{-3}	Annual mean	31.12.2008
Nitrogen dioxide	200 μgm^{-3} (105 ppb) not to be exceeded more than 18 times a year.	1 hour mean	31.12.2005
	40 μgm^{-3} (21 ppb)	Annual mean	31.12.2005
Particles (PM10)	50 μgm^{-3} not to be exceeded more than 35 times a year.	24 hr mean	31.12.2004
	40 μgm^{-3} (21ppb)	Annual mean	31.12.2004
Sulphur dioxide	350 μgm^{-3} (132 ppb) not to be exceeded more than 24 times a year.	1 hour mean	31.12.2004
	125 μgm^{-3} (47 ppb) not to be exceeded more than 3 times a year.	24 hour mean	31.12.2004
	266 μgm^{-3} (100 ppb) not to be exceeded more than 35 times a year.	15 minute mean	31.12.2005

* μgm^{-3} : micrograms per cubic metre
 mgm^{-3} : milligrams per cubic metre
ppb/ppm : parts per billion/million

3. INFORMATION ABOUT DENBIGHSHIRE COUNTY COUNCIL.

- 3.1 Denbighshire County Council covers an area which runs from the North Wales coastal resorts of Rhyl and Prestatyn down through the Vale of Clwyd, south as far as Corwen and the popular tourist town of Llangollen. Along the way it takes in the historic towns of Rhuddlan, Denbigh and Ruthin, each with its own castle, and the tiny cathedral city of St. Asaph.
- 3.2 Denbighshire has a population of approximately 90,400 with an estimated summer population in excess of 150,000, and covers an area of 83,872 hectares (323 square miles).
- 3.3 Denbighshire is largely a rural county with tourism and agriculture the main industries. The expanding St Asaph Business Park, on the edge of the A55, is the home to a number of companies and organizations.
- 3.4 The A55 expressway crosses north Denbighshire giving direct links to the national and European motorway network, whilst in the south the A5 crosses the county linking through to Snowdonia on a route designed by Thomas Telford. The A494, linking Chester to Dolgellau, also runs through the county.

4. ROAD TRAFFIC AND TRANSPORT IN DENBIGHSHIRE.

4.1 Denbighshire lies astride the main east-west routes in North Wales, the A55 trunk road and North Wales Coast Main Line, both of which form part of the Trans-European Network, and the A5 trunk road. The A55 is of dual carriageway standard and connects the north of the County with the motorway network in North-West England and the main towns of North-West Wales, including the port of Holyhead. The A5 trunk road crosses the south of Denbighshire and provides connections with the A483 and M54 to the east and Anglesey and Snowdonia to the west. The road offers a lower standard of route than the A55 and is seen by the National Assembly for Wales as catering for local and sub-regional traffic, and as a tourist/leisure route. A further route crossing the County is the A494 trunk road which connects Ruthin with the southern part of Gwynedd to the west and the A55 to the east.

4.2 The County has two main line railway stations on the North Wales Coast Line at Prestatyn and Rhyl. Direct train services operate to the rest of the North Wales coast, Chester, Manchester, Birmingham, Cardiff and London. Llangollen and the Dee Valley are served by stations outside Denbighshire at Ruabon and Chirk which are situated on the Chester-Wrexham-Shrewsbury-Birmingham railway line. In addition, there is a preserved railway line, the Llangollen Railway, which operates between Llangollen and Carrog. The low frequency of service and relatively high fares currently limit its use primarily to tourists. Some use is made by local residents who are eligible for passes which reduce travel costs to levels comparable with local bus fares.

4.3 The County Council is responsible for the entire highway network other than the A5, A55 and A494 trunk roads. The trunk roads are the responsibility of the National Assembly for Wales. The total length of roads in the County is 1,475km, made up as follows:

Trunk roads	72 km
Principal classified A roads	140 km
Non principal classified B and C roads	655 km
Unclassified roads	608 km

4.4 The Council has defined a strategic highway network which includes the A5, A55 and A494 trunk roads and the following roads for which the Council is responsible:

- 1 the A525 which runs north-south through the County connecting Rhyl, with the A55, St Asaph, Denbigh, Ruthin and continues outside the County to Wrexham;
- 2 the A548 coast road which runs between Pensarn in neighbouring Conwy County Borough (where it connects with the A55), Rhyl and Prestatyn to the Denbighshire/Flintshire boundary and then to the New Dee Crossing;
- 3 the A547 which runs between Abergele in neighbouring Conwy County Borough (where it connects with the A55), Rhuddlan, Dyserth and Meliden to Prestatyn;
- 4 the A5151 which connects the A525 at Rhuddlan, with Dyserth and the A55 near Holywell in Flintshire.

- 5 the A541 which connects the A525 at Trefnant with Mold in Flintshire;
- 6 the A539 which connects Llangollen with the A483 and Wrexham.

4.5 Denbighshire does not experience serious problems of traffic congestion. The congestion that does occur is principally during the summer months. Vehicles suffer delays and queuing along the A548 coast road, on the A547 within Prestatyn, the A525 within Rhyl and the B5118 West Parade and East Parade in Rhyl. This congestion reflects the Area's attraction to day-trippers and holidaymakers. Short term delays and queuing can also be experienced in Llangollen on days of peak visitor numbers. Localized congestion occurs at other times and locations often around schools at school start and finish times.

The traffic pressures associated with seasonal visitors also give rise to on-street parking particularly in the residential streets surrounding Rhyl Town Centre.

Table 4.1. Daily Average Traffic Counts from strategic Roads within Denbighshire.

Road No.	Location	Ave Flow (24 hr.)	Predicted 2005 Flow *
A548	Wellington Road/ High St Junction, Rhyl.	13,000 (**)	13,450
A55 (T)	St. Asaph.	38533 (#)	39184
A5 (T)	East of Llangollen	5854 (#)	5953
A548	Near Rhyl Golf Course	19,640 (**)	20,320
A525	The Roe, St Asaph	12250 (#)	12457
A525	Rhyl Road, St Asaph	13,000 (**)	13,450
A543	Rhuddlan Road, Rhyl	17826 (#)	18127
A525	Vale Street, Denbigh	11719 (#)	11917
A541	Denbigh Bypass	7852 (#)	7985
A547	Nant Hall Road, Prestatyn	6,264 (**)	6,481

* Total Traffic Central Forecast. The growth factors are estimated as follows.

(**) 1996 to 2001 = 1.74%

(#) 2001 to 2005 = 1.69%

Source. Denbighshire County Council Transport and Infrastructure Department, Environmental Services Directorate.

5. CARBON MONOXIDE (CO)

Summary of the Updating and Screening checklist approach for Carbon Monoxide.

5.1 A. Monitoring data.

No local monitoring for Carbon Monoxide (CO) is carried out in Denbighshire. Data from the Local Air Quality Management website (www.airquality.co.uk/archive/laqm/tools) shows that there are no locations likely to exceed the maximum daily running 8-hour mean objective for 2003 of 10.0mgm^{-3} . The maximum 2001 annual mean background level is 0.217mgm^{-3} giving a projected 2003 annual mean of 0.179mgm^{-3} . Since the 'annual mean concentration is below 2mgm^{-3} there is little likelihood of the maximum daily running 8-hour mean concentration exceeding the objective' (LAQM.TG(03)).

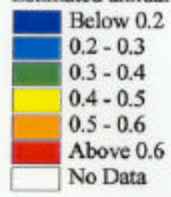
5.2 B. Very busy roads or junctions in built-up areas.

There are no areas in Denbighshire where the 2003 background level is expected to be above 1mgm^{-3} . Therefore roads and junctions in built up areas are unlikely to have a significant impact on the levels of CO in these areas.

5.3 Conclusion.

No detailed assessment of this pollutant is required.

Estimated annual mean background CO concentration, 2001 (mgm-3)



6. **BENZENE**

Summary of the Updating and Screening checklist approach for benzene.

6.1 A. Monitoring data.

No local monitoring for Benzene is carried out in Denbighshire. Data from the Local Air Quality Management website (www.airquality.co.uk/archive/laqm/tools) shows that there are no locations likely to exceed the running annual mean objectives for 2003 ($16.25\mu\text{gm}^{-3}$) or 2010 ($5\mu\text{gm}^{-3}$). The maximum 2001 annual mean is $0.246\mu\text{gm}^{-3}$ giving a projected 2003 and 2010 annual means of $0.219\mu\text{gm}^{-3}$ and $0.174\mu\text{gm}^{-3}$ respectively. The annual mean concentration has been assumed to be equivalent to the running annual mean concentration, in accordance with the Technical Guidance LAQM.TG(03).

6.2 B. Very busy roads or junctions in built up areas.

There are no locations in Denbighshire where the 2010 background level is expected to be above $2\mu\text{gm}^{-3}$. Therefore there is no likelihood that busy roads will contribute to the background levels sufficiently to cause an exceedance of the objectives.

6.3 C. Industrial sources.

There are no industrial sources within Denbighshire, or its neighbouring local authorities, that need to be considered further with regard to levels of benzene. This is in accordance with Annex 2, Appendix E of the Technical Guidance LAQM. TG(03) and liaison with the local authorities of concern.

6.4 D. Petrol stations.

The petrol stations that have a throughput of more than 2000m^3 of interest within the county of Denbighshire are:-

Safeway Petrol Station, Smithfield Road, Denbigh. LL16 3RQ
Shell Castleview, Rhyl Road, Denbigh. LL16 5SU
Shell Vale, 193 Vale Road, Rhyl. LL18 2PU
Sainsbury's Supermarkets Ltd., Rhuddlan Road, Rhyl. LL18 2LR
Marina Service Station, Wellington Road, Rhyl. LL18 1LN
Kinmel Park Service Station, A55 Expressway(Eastbound), Bodelwyddan. LL18 5XE
Kinmel Park Service Station, A55 Expressway(Westbound), Bodelwyddan. LL18 5XW
Prestatyn Service Station, Marine Road, Prestatyn. LL19 7HA
Bridge Service Station, Park Road, Ruthin. LL15 1NB

W.M Morrison Supermarkets Plc, Marsh Road, Rhyl. LL18 2DF

The distances of these petrol stations' pumps from the nearest residential properties are:-

Safeway Petrol Station	39m
Shell Castleview	43m
Shell Vale	17m
Sainsbury's Supermarkets Ltd	97m
Marina Service Station	47m
Kinmel Park Service Station (Eastbound)	240m
Kinmel Park Service Station (Westbound)	311m
Prestatyn Service Station	27m
Bridge Service Station	21m
W.M Morrison Supermarkets Plc	48m

As a result it can be assumed that the petrol stations are unlikely to have a significant influence on the concentrations of benzene. Since the petrol distribution pumps are more than 10m from locations where members of the public are regularly present and are likely to be exposed over the averaging period of the objective (LAQM.TG(03)).

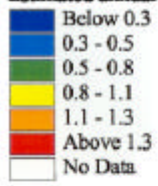
6.5 E. Major fuel storage depots (petrol only).

There are no major fuel storage depots in Denbighshire.

6.6 Conclusion.

No detailed assessment of this pollutant is required.

Estimated annual mean background Benzene concentration, 2001 ($\mu\text{g}/\text{m}^3$)



7. **1,3-BUTADIENE**

Summary of the Updating and Screening checklist approach for 1,3-butadiene.

7.1 A. Monitoring data.

No local monitoring for 1,3-butadiene is carried out in Denbighshire. Data from the Local Air Quality Management website (www.airquality.co.uk/archive/laqm/tools) shows that there are no locations likely to exceed the maximum running annual mean objective for 2003 of $2.25\mu\text{g}\text{m}^{-3}$. The maximum 2003 annual mean background level is $0.0768\mu\text{g}\text{m}^{-3}$.

7.2 B. New Industrial Sources.

Denbighshire has no new industrial processes with the potential to emit significant quantities of 1,3-butadiene in 2003 as listed in Annex 2 (Appendix E) of the LAQM.TG(03). There are also no new industrial processes in neighbouring local authorities with the potential to impact on the pollutant concentrations experienced in Denbighshire.

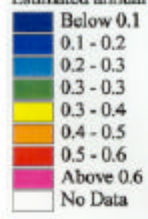
7.3 C. Existing industrial sources with significantly increased emissions.

Denbighshire has no industrial processes with the potential to emit significant quantities of 1,3-butadiene in 2003 as listed in Annex 2 (Appendix E) of the LAQM.TG(03). There are no industrial processes in neighbouring local authorities with the potential to impact on the pollutant concentrations experienced in Denbighshire.

7.4 Conclusion.

No detailed assessment of this pollutant is required.

Estimated annual mean background 1,3-butadiene concentration, 2001 ($\mu\text{g}\cdot\text{m}^{-3}$)



8. LEAD

Summary of the Updating and Screening checklist approach for lead.

8.1 A. Monitoring data.

No local monitoring for Lead is carried out in Denbighshire. The First Stage Review and Assessment showed that there were no locations within Denbighshire that exceeded the annual mean Air Quality Objective for 2004 of $0.5\mu\text{gm}^{-3}$ or the lower objective of $0.25\mu\text{gm}^{-3}$ to be achieved by the end of 2008. The study also illustrated that the background levels were negligible.

8.2 B. New industrial sources.

There are no new industrial sources of lead within Denbighshire or the neighbouring areas.

Premises covered by a Part A Authorisation from the EA within the County release a negligible amount of lead into the air – See Appendix A (<10kg from MK Electric Ltd, Glascoed Rd, St Asaph, Denbighshire, LL17 0ER – Authorisation No. AP4742).

The only Part B process that is likely to release any lead to the atmosphere is Pilkington Special Glass and the results of stack monitoring as part of the Authorisation conditions has shown that releases are below the consent limits and the nearest premises is 300m from the chimneys. So no exceedance of the objectives is likely.

8.3 C. Industrial sources with substantially increased emissions.

There are no industrial sources with substantially increased emissions of lead within Denbighshire or the neighbouring areas.

8.4 Conclusion.

No detailed assessment of this pollutant is required.

9. **NITROGEN DIOXIDE**

Summary of the Updating and Screening checklist approach for Nitrogen Dioxide.

9.1 A. Monitoring data outside an AQMA.

The Government has adopted two Air Quality Objectives for Nitrogen Dioxide (NO₂), as an annual mean of 40µgm⁻³ and a 1-hour mean concentration of 200µgm⁻³ not to be exceeded more than 18 times per year. The objectives are to be achieved by the end of 2005. The Air Quality Daughter Directive limits have also been transposed into UK legislation. They include a 1-hour limit value of 200µgm⁻³, not to be exceeded more than 18 times per year, and an annual mean limit of 40µgm⁻³, both to be achieved by the end of 2010.

Data from the Local Air Quality Management website (www.airquality.co.uk/archive/laqm/tools) shows that there are no locations likely to exceed the annual mean objectives for 2005 or 2010. The maximum 2001 background annual mean is 22µgm⁻³ giving a projected 2005 and 2010 annual means of 19.2µgm⁻³ and 15.2µgm⁻³ respectively.

Local monitoring for Nitrogen Dioxide is carried out in Denbighshire by using NO₂ diffusion tubes. There are 14 tubes located in various positions around the County. A summary of the results of the tubes can be found in Appendix B. The annual average (arithmetic average of the monthly tube results) has been bias adjusted by adding 8%. Since no co-location study has been undertaken by ourselves we have utilized studies done by others (an agreed method in these instances). Flintshire County Council has provided us with the information that it has produced (following co-location surveys at Wirral Metropolitan Council and Derby City Council). They use the same laboratory for the supply and subsequent analysis of the diffusion tubes as well as using the same exposure period (ie Casella Analytic, 10% TEA in water, 1 month).

Casella Analytic are UKAS accredited for the measurement of Nitrogen oxides (UKAS certificate number 0871 issued 13 February 2002). The lab also takes part in the WASP interlaboratory comparison scheme (the most recent classification being good) (Flintshire County Council USA, 2003).

The 'hotspots' that appear in the list have been looked at in more detail and projected forward to future years using the guidance in LAQM.TG(03). The results are shown in Appendix C. The annual averages are bias adjusted by a factor of 1.08.

These roadside site hotspots all show that there will be no exceedence of the objectives.

9.2 B. Monitoring data within an AQMA.

There is no AQMA for this pollutant in Denbighshire.

9.3 C. Narrow congested streets with residential properties close to the kerb.

These locations were not assessed during the first round of Review and Assessment.

The main streets of concern are:-

Location	Traffic Flow (vehicles per day)
Castle Street, Llangollen	9815
Park Road, Ruthin	9847
A5 Corwen	6505
Vale Street, Denbigh	11719
High Street, St Asaph	14738

Source. Denbighshire County Council Transport and Infrastructure Department, Environmental Services Directorate.

Therefore the only roads that are likely to be of concern are Vale Street in Denbigh and The High Street in St Asaph as none of the other locations have a traffic flow greater than 10,000 vehicles per day (vpd)(LAQM.TG(03)).

The data provided by the Highways department of the Council was used in the screening model prepared for the Design Manual for Roads and Bridges (DMRB) in accordance with the Technical Guidance. The DMRB Screening Model (v1.01) was obtained in Excel spreadsheet form from the internet address given in LAQM.TG(03) : www.airquality.co.uk/archive/laqm/tools.php.

See Appendix D for the data inputs and output sheets.

The Guidance states that ‘in order to avoid missing potential exceedences of the objectives in street canyons, the predicted annual mean NO₂ ‘road traffic component’ concentration, in the ‘local output’ sheet in the DMRB, should be multiplied by a factor of 2. This should then be added to the background concentration to give the total concentration.’

Therefore the output result of 5.9µgm⁻³ is multiplied by 2 and added to 9.6µgm⁻³ to give a total of 21.40µgm⁻³ for Vale Street in Denbigh. For the High Street in St Asaph 10.4µgm⁻³ is multiplied by 2 and added to 11.4µgm⁻³ to give a total of 32.2µgm⁻³. Both of which are under the objective limit and as a result no detailed assessment of this pollution source is required.

9.4 D. Junctions.

The main busy junction of concern (one with more than 10,000 vpd and where there is relevant exposure within 10m of the kerb) is the junction between the A55 and The Roe in St Asaph. There are other junctions which have a traffic flow of greater than 10,000vpd but they do not have a relevant exposure within 10m of it and so are not deemed to be of concern. There are yet others

which do have relevant exposure but have been examined with the use of NO₂ diffusion tubes in order to ascertain if an exceedence of the objectives is likely. Llangollen junction between the A5 and Castle Street has been examined with NO₂ tube number 14 and it has shown that no exceedence is likely.

The A55 junction with The Roe has been modeled using the DMRB model (See appendix E). The Llangollen junction was also modeled for comparison purposes. (See appendix F).

The results show that there are no exceedences of the objectives at either location. The Llangollen location could be regarded as a Street canyon and so as a result, in accordance with the guidance, the 'road traffic component' should be doubled and added to the background figure. This results in a calculated figure of 31.3µgm⁻³ annual mean Av for this location, compared to the NO₂ diffusion tube monitoring data figure for 2005 of 37µgm⁻³. The difference can partly be explained by the tube location being closer to the road than the actual receptor and also the slightly conservative figures given by the model.

9.5 E. Busy streets where people may spend 1-hour or more close to traffic.

These locations were not assessed during the first round of Review and Assessment but there are no further locations with a traffic flow of more than 10,000 vehicles per day where people may spend 1-hour or more close to traffic.

9.6 F. Roads with high flow of buses and/or HGVs.

These locations were not assessed during the first round of Review and Assessment but the traffic data provided by the Highways Department of the Council shows that there are no locations with a high flow of buses and/or HGVs. A high proportion is taken to be greater than 25% (LAQM.TG(03)).

9.7 G. New roads constructed or proposed since first round of review and assessment.

There have been no new roads constructed since the first round of review and assessment; however there has been a new proposal put forward. This is for a ring road to go around the town of Ruthin. There are unlikely to be any exceedence of objectives as a result of this development and it is believed that it will improve the situation within the main conurbation.

9.8 H. Roads close to the objective during the first round of review and assessment.

The A55/The Roe junction was the only road that was close to the objective in the first round and this has already been examined above.

9.9 I. Roads with significantly changed traffic flows.

There are no roads with significantly changed traffic flows within Denbighshire.

9.10 J. Bus Stations.

There are no bus stations within Denbighshire which have a bus flow of 1000 buses per day, they are all very much less.

9.11 K. New industrial sources.

There are no new industrial sources of concern within Denbighshire or the neighbouring local authorities.

9.12 L. Industrial sources with substantially increased emissions.

There are no industrial sources with substantially increased emissions within Denbighshire or the neighbouring local authorities.

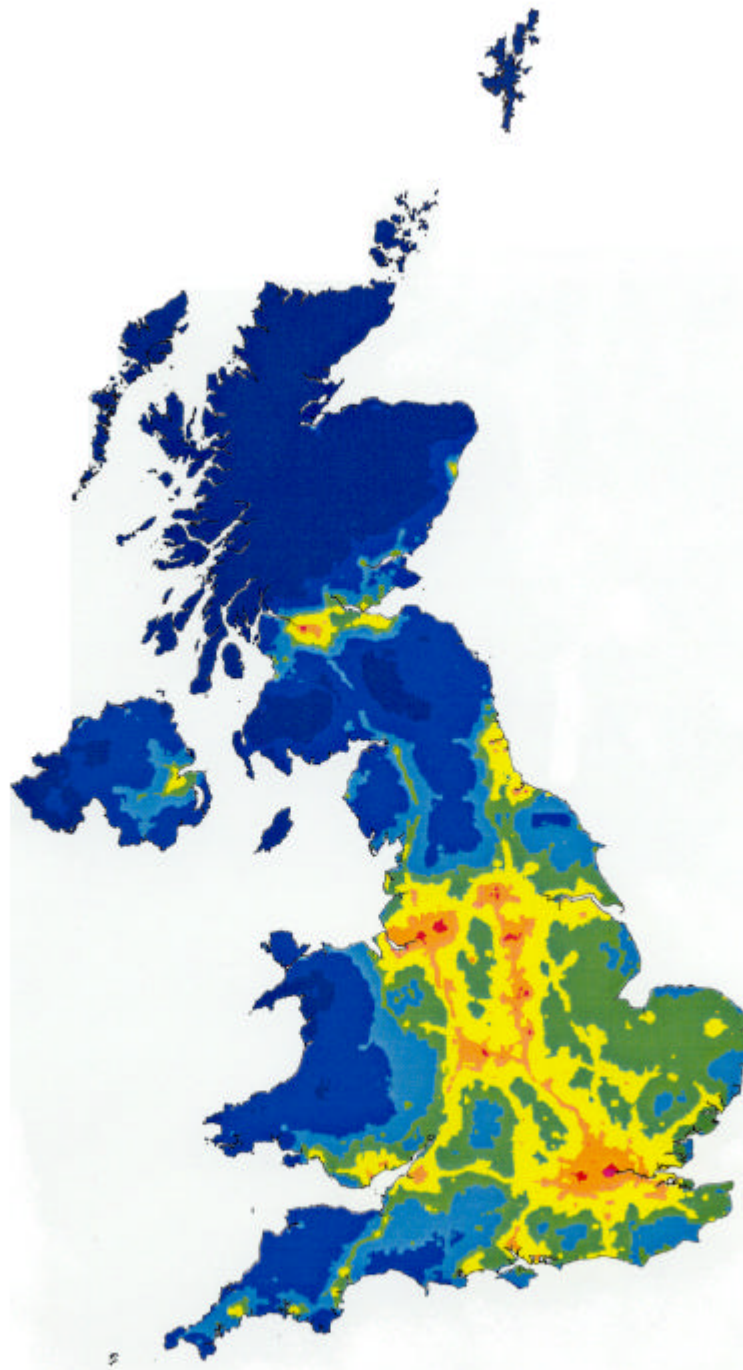
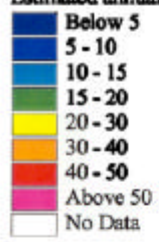
9.13 M. Aircraft.

There are no airports within Denbighshire or neighbouring Authorities that are likely to give rise to an exceedence of the objectives.

9.14 Conclusion.

No detailed assessment of this pollutant is required.

Estimated annual mean background NO₂ concentration, 2001 (ugm⁻³)



10. SULPHUR DIOXIDE

Summary of the Updating and Screening checklist approach for Sulphur Dioxide.

10.1 A. Monitoring data outside an AQMA.

The Government and the Devolved Administrations have adopted a 15-minute mean of $266\mu\text{g}\text{m}^{-3}$ as an air quality standard for sulphur dioxide, with an objective for the standard not to be exceeded more than 35 times in a year by the end of 2005. Additional objectives have also been set which are equivalent to the EU limit values specified in the First Air Quality Daughter Directive. These are for a 1-hour mean objective of $350\mu\text{g}\text{m}^{-3}$, to be exceeded no more than 24 times per year, and a 24-hour objective of $125\mu\text{g}\text{m}^{-3}$, to be exceeded no more than 3 times per year, to be achieved by the end of 2004 (LAQM.TG(03)).

No local monitoring for Sulphur Dioxide is carried out in Denbighshire. Data from the Local Air Quality Management website (www.airquality.co.uk/archive/laqm/tools) shows that there are no locations likely to exceed the annual mean objectives for 2004 and 2005. The maximum 2001 background annual mean is $8.11\mu\text{g}\text{m}^{-3}$ giving a projected 2004 and 2005 annual mean of $6.08\mu\text{g}\text{m}^{-3}$ (taken as 75% of the 2001 value in accordance with LAQM.TG(03)).

10.2 B. Monitoring data within an AQMA.

There is no AQMA for this pollutant in Denbighshire.

10.3 C. New industrial sources.

There are no new industrial sources of concern within Denbighshire or the neighbouring local authorities.

10.4 D. Industrial sources with substantially increased emissions.

There are no industrial sources with substantially increased emissions within Denbighshire or the neighbouring local authorities.

10.5 E. Areas of domestic coal burning.

Llangollen has coal burning domestic dwellings but it was established in the first round review that this source is unlikely to cause an exceedance of the objectives. In the intervening period it is likely the matter will have improved

again since more premises will have converted to using mains gas supply and there are no known increases in commercial or domestic use of coal.

10.6 F. Small boilers >5MW (Thermal).

There are no small boilers >5MW(thermal) within Denbighshire. The hospitals and schools either use smaller units or are powered by natural gas.

10.7 G. Shipping.

There are no ports within Denbighshire.

10.8 H. Railway Locomotives.

Consultation with the local operatives has established that the use of the preserved steam railway in Llangollen town has not changed since the last round of assessment. The Second Stage Review and Assessment found that the trains do cause an elevation in the background levels and that the 24hour and 15minute objectives are being theoretically and marginally breached by this activity. The following mitigating factors need to be taken into account:-

- * ADMS modelling is really aimed at modelling situations which exists 24hrs a day 365 days a year. The railway does not operate continuously. Trains run for a maximum of 241 days a year. With all three trains operating simultaneously for only about 20 days a year and two trains simultaneously for about 16 days (Llangollen Railway figures). This therefore automatically reduces the likelihood of exceedence proportionately.
- * The calculated exceedences of the objectives are marginal only. The wind direction is not constant and although the prevailing wind would have been used in the model, there are going to be instances when the problem is alleviated, as the wind will blow the pollutants away from the close properties. So the levels of pollution at the receptors will be far less than the objective levels. The closest receptors are not located 'downwind' of the prevailing wind direction.
- * It is interesting to note that the number of complaints about smoke from the railway has now decreased to virtually zero. This has coincided with the railway using Polish coal which has a very low sulphur content (about 0.3%) as opposed to the previously used British coal. Also the adoption of more efficient stoking practices has alleviated the visible smoke aspect.
- * It would be difficult to implement any further improvements on the railway without significantly disrupting the service that it provides. It is one of the main tourist attractions within the area and as such, brings in much needed revenue, whilst at the same time providing employment for local people. They have also been seen to be utilising the best practicable means approach to their operating of the attraction.

We are liaising with the helpdesk and others who have this type of tourist attraction in their authority. It is hoped that more accurate modeling and monitoring can be utilized to assess this situation in the future. Other authority's experiences will be examined in relation to this source.

There are no major rail stations in the county where diesel trains may be stationary for 15 minutes or more.

10.9 Conclusion.

No detailed assessment of this pollutant is required.

Estimated annual mean background SO₂ concentration, 2001 (ugm-3)



11. PM₁₀

Summary of the Updating and Screening checklist approach for PM₁₀.

11.1 A. Monitoring data outside an AQMA.

The Government and the Devolved Administrations have adopted two Air Quality Objectives for fine particles (PM₁₀), which are equivalent to the EU Stage 1 limit values in the first Air Quality Daughter Directive. The objectives are 40µgm⁻³ as the annual mean, and 50µgm⁻³ as the fixed 24-hour mean to be exceeded on no more than 35 days per year, to be achieved by the end of 2004. The objectives are based upon measurements carried out using the European gravimetric transfer reference sampler or equivalent (LAQM.TG(03)).

The EU has also set indicative limit values for PM₁₀ which are to be achieved by 1 January 2010. These Stage 2 limit values are considerably more stringent, and are 20µgm⁻³ as the annual mean, and 50µgm⁻³ as the 24-hour mean to be exceeded on no more than 7 days per year. The Government, the Welsh Assembly Government and the Department of the Environment in Northern Ireland introduced provisional objectives to be achieved by the end of 2010 that are broadly in line with the Stage 2 Regulation for the purpose of Local Air Quality Management at this time.

The provisional objectives are:-

- For all parts of England (except London), Wales and Northern Ireland, a 24-hour mean of 50µgm⁻³ not to be exceeded more than 7 times per year, and an annual mean of 20µgm⁻³, to be achieved by the end of 2010 (LAQM.TG(03)).

No local monitoring for PM₁₀ is carried out in Denbighshire. Data from the Local Air Quality Management website (www.airquality.co.uk/archive/laqm/tools) shows that there are no locations likely to exceed the annual mean objectives for 2004 and 2010. The maximum 2001 background annual mean is 19µgm⁻³ giving a projected 2004 and 2010 annual mean of 17.9µgm⁻³ and 16.2µgm⁻³ respectively.

11.2 B. Monitoring data within an AQMA.

There is no AQMA for this pollutant in Denbighshire.

11.3 C. Busy roads and junctions in Scotland.

Not applicable.

11.4 D. Junctions.

From the investigation undertaken in the assessment of Nitrogen Dioxide (NO₂) it is possible to say that no junctions within Denbighshire will cause an exceedence of the objectives for PM₁₀.

11.5 E. Roads with high flow of buses and/or HGVs.

There are no roads with high flow of buses and/or HGVs within Denbighshire.

11.6 F. New roads constructed or proposed since first round of review and assessment.

There have been no new roads constructed since the first round of review and assessment; however there has been a new proposal put forward. This is for a ring road to go around the town of Ruthin. There are unlikely to be any exceedence of objectives as a result of this development and it is believed that it will improve the situation within the main conurbation.

11.7 G. Roads close to the objective during the first round of review and assessment.

The A55/The Roe junction was the only road that was close to the objective in the first round and this has already been examined in the NO₂ section and is unlikely to cause an exceedence of the PM₁₀ objectives.

11.8 H. Roads with significantly changed traffic flows.

There are no roads with significantly changed traffic flows within Denbighshire.

11.9 I. New industrial sources.

There are no new industrial sources in Denbighshire or the neighbouring local authorities.

11.10 J. Industrial sources with substantially increased emissions.

There are no industrial sources with substantially increased emissions within Denbighshire. There are no sources in the neighbouring local authorities which would impact on the pollutant concentrations experienced in Denbighshire County Council.

11.11 K. Areas with domestic solid fuel burning.

Llangollen has coal burning domestic dwellings but it was established in the first round review that this source is unlikely to cause and exceedance of the objectives. In the intervening period the matter will have improved again since more premises will have converted to using mains gas supply and there are no known increases in commercial or domestic use of coal.

11.12 L. Quarries, landfill sites, opencast coal, handling of dusty cargoes at ports etc.

There are several quarries in the County that have been investigated.

Address of Quarry	Grid reference	Process	Distance to nearest receptor from closest main dust source	Complaints received
Hanson Aggregates, Denbigh Quarry, Graig Rd., Denbigh. LL16 3YE	SJ 053 668	Crushing and screening of limestone	70m	None
Tarmac Central Ltd., Burley Hill Quarry, Pant Du, Nercwys, Nr Mold.	SJ 203 597	Crushing and screening of limestone	265m	None
Hanson Aggregates, Aberduna Quarry, Maeshafn, Nr Mold. CH7 5LE	SJ206 617	Crushing and screening of limestone	270m	None
Lafarge Aggregates Ltd., Graig Quarry, Llanarmon Yn Ial, Nr Mold. CH7 4QA	SJ 207 562	Crushing and screening of limestone	200m	None

The absence of complaints and the distance from nearest receptors means that detailed assessment of PM₁₀ from this source is not deemed necessary.

There are no active landfill sites or ports in the County.

11.13 M. Aircraft.

There are no airports in the County of Denbighshire which are likely to cause concern.

11.14 Conclusion.

No detailed assessment of this pollutant is required.

Estimated annual mean background PM10 concentration, 2001 ($\mu\text{g}/\text{m}^3$, gravimetric)



12. SUMMARY

This document brings to a close Denbighshire County Council's Updating and Screening assessment of the Air Quality Review and Assessment process. We feel that there is negligible risk that any of the UK Air Quality Objectives being exceeded in Denbighshire.

Readers are asked to note that the Review and Assessment process will be repeated in accordance with the guidance. The timetable is as follows:-

Progress Report/ Detailed Assessment	End of April 2004
Progress Report	End of April 2005
Updating and Screening Assessment	End of April 2006
Progress Report/ Detailed Assessment	End of April 2007
Progress Report	End of April 2008
Updating and Screening Assessment	End of April 2009
Progress Report/ Detailed Assessment	End of April 2010

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Denbighshire County Council.

APPENDIX A

ENVIRONMENT AGENCY AUTHORISED PROCESSES

Operator Name	Site Address	Grid Reference	Authorisation ID	Type of Industry	Type of Process
MK Electric Ltd.	Glascoed Rd., St Asaph, Denbighshire. LL17 0ER	301800 ; 373800	AP4742	Chemical Industry	Inorganic Chemical Processes
Thales Optics Ltd.	Glascoed Rd., St Asaph, Denbighshire. LL17 0LL	302000 ; 374000	BC0693	Chemical Industry	Inorganic Chemical Processes
Conwy and Denbighshire NHS Trust	Ysbyty Glan Clwyd, Bodelwyddan, Rhyl, Denbighshire. LL18 5UJ	300300 ; 376000	BF4024	Nuclear	N/A

(Source : What's in Your Backyard; Environment Agency Website; environment-agency.gov.uk)

APPENDIX B

Site	Grid Ref	Site Class	Address	Nitrogen Dioxide Diffusion Tube Results in ugm/m3 (2001)												Annual Average	Avg + 8%
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	SJ 008 814	A	Wellington Road, Rhyl	52	47	43	44	31	25	34	33	37	13	24	26	34.08	36.81
2	SJ 009 814	B	Barclays Bank, Rhyl	*	*	*	*	*	*	*	*	*	*	*	*	*	*
3	SJ 016 818	C	5 St. Georges Cres., Rhyl	34	<6	44	15	14	9	17	11	<1	17	11	26	19.80	21.38
4	SJ 021 806	C	73 Bryn Coed Park, Rhyl	32	32	24	13	12	9	3	12	13	16	17	23	17.17	18.54
5	SJ 029 746	B	2 Pant Glas, St. Asaph	26	24	22	22	24	17	9	20	23	18	20	21	20.50	22.14
6	SJ 030 746	B	8 Pant Glas, St. Asaph	19	19	17	24	15	14	11	17	19	12	13	14	16.17	17.46
7	SJ 030 744	C	19 Tan y Bryn, St. Asaph	23	17	17	15	14	5	11	11	11	11	22	6	13.58	14.67
8	SJ 033 746	B	1 Plas Elwy Orchard, The Roe, St. Asaph	15	28	32	22	25	22	19	18	28	20	28	24	23.42	25.29
9	SJ 032 749	B	7 Roe Park, St. Asaph	28	29	32	28	A	21	21	23	17	29	15	12	23.18	25.04
10	SJ 033 749	B	13 Roe Park, St. Asaph	15	22	34	22	18	14	16	18	10	20	20	21	19.17	20.70
11	SJ 033 748	B	16 Roe Park, St. Asaph	26	22	34	23	22	16	16	18	9	29	13	19	20.58	22.23
12	SJ 033 749	C	24 Roe Park, St. Asaph	27	18	25	19	18	12	9	12	15	49	25	17	20.50	22.14
13	SJ 026 822	A	171 Coast Road, Rhyl	40	21	23	17	20	13	19	21	9	20	26	19	20.67	22.32
14	SJ 029 823	C	Rhyl G.C., Coast Road, Rhyl	24	<6	37	9	12	5	7	7	<1	14	15	13	14.30	15.44
New2	SJ 009 813	A	10 Kinmel Street, Rhyl	55	30	56	33	37	30	A	18	22	50	39	39	37.18	40.16
New 7	SJ 066 829	A	70 High Street, Prestatyn. (Royal B O S)														
New 11	SJ 067 826	A	200 High Street, Prestatyn (Body Matters)														
New 13	SJ 213 420	C	Bod Hefin, Westbourne Ter., Llangollen														
New 14	SJ 215 419	A	Chapel, Castle Street, Llangollen														
New 13	SJ 213 420	C	Scout Hall, West Street, Llangollen														
New 13	SJ 121 583	A	25 Park Road, Ruthin.														
New 14	SJ 119 582	A	Tawelfan, Denbigh Road, Ruthin.														

Key:-

Site Class A - Roadside (a road site where the sampler is within 1m-5m of the highway [kerb])

Site Class B - Intermediate Site (between 20m - 30m from the kerb)

Site Class C - Urban Background (locations in excess of 50m from the kerb)

Results A - Sample tube not returned by client

Results B - Sample tube damaged, unable to analyse

Results C - Sample tube contaminated, unable to analyse

Results D - Sample lost during analysis

Site	Grid Ref	Site Class	Address	Nitrogen Dioxide Diffusion Tube Results in ugm/m3 (2002)												Annual Average	Avg + 8%
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	SJ 008 814	A	Wellington Road, Rhyl	31	34	13	38	45	32	32	21	35	55	42	60	36.50	39.42
2	SJ 009 814	B	Barclays Bank, Rhyl	*	*	*	*	*	*	*	*	*	*	*	*	*	*
3	SJ 016 818	C	5 St. Georges Cres., Rhyl	22	11	18	17	16	11	9	10	16	16	21	34	16.75	18.09
4	SJ 021 806	C	73 Bryn Coed Park, Rhyl	19	16	6	17	13	12	13	10	20	20	19	25	15.83	17.10
5	SJ 029 746	B	2 Pant Glas, St. Asaph	17	9	B	23	21	15	21	20	20	23	14	31	19.45	21.01
6	SJ 030 746	B	8 Pant Glas, St. Asaph	16	16	16	20	15	26	9	17	17	20	27	29	19.00	20.52
7	SJ 030 744	C	19 Tan y Bryn, St. Asaph	*	*	*	*	*	*	*	*	*	*	*	*	*	*
8	SJ 033 746	B	1 Plas Elwy Orchard, The Roe, St. Asaph	20	22	23	24	23	20	23	20	14	25	26	30	22.50	24.30
9	SJ 032 749	B	7 Roe Park, St. Asaph	42	23	33	31	28	27	23	14	54	29	30	31	30.42	32.85
10	SJ 033 749	B	13 Roe Park, St. Asaph	31	20	5	23	23	20	16	17	29	26	31	24	22.08	23.85
11	SJ 033 748	B	16 Roe Park, St. Asaph	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	SJ 033 749	C	24 Roe Park, St. Asaph	21	16	20	17	18	15	11	14	19	20	24	54	20.75	22.41
13	SJ 026 822	A	171 Coast Road, Rhyl	27	19	21	*	*	*	*	*	*	*	*	*	22.33	24.12
14	SJ 029 823	C	Rhyl G.C., Coast Road, Rhyl	16	8	14	*	*	*	*	*	*	*	*	*	12.67	13.68
New2	SJ 009 813	A	10 Kinmel Street, Rhyl	36	11	14	45	A	42	34	25	42	28	72	47	36.00	38.88
New 7	SJ 066 829	A	70 High Street, Prestatyn. (Royal B O S)	32	21	30	29	30	26	A	25	31	30	42	41	30.64	33.09
New 11	SJ 067 826	A	200 High Street, Prestatyn (Body Matters)	27	14	23	21	19	18	19	A	35	17	21	21	21.36	23.07
New 13	SJ 213 420	C	Bod Hefin, Westbourne Ter., Llangollen				17	A	15	11	A	*	*	*	*	14.33	15.48
New 14	SJ 215 419	A	Chapel, Castle Street, Llangollen				41	38	30	36	32	41	35	40	41	37.11	40.08
New 13	SJ 213 420	C	Scout Hall, West Street, Llangollen									23	28	21	29	25.25	27.27
New 13	SJ 121 583	A	25 Park Road, Ruthin.														
New 14	SJ 119 582	A	Tawelfan, Denbigh Road, Ruthin.														

Key:-

Site Class A - Roadside (a road site where the sampler is within 1m-5m of the highway [kerb])

Site Class B - Intermediate Site (between 20m - 30m from the kerb)

Site Class C - Urban Background (locations in excess of 50m from the kerb)

Results A - Sample tube not returned by client

Results B - Sample tube damaged, unable to analyse

Results C - Sample tube contaminated, unable to analyse

Results D - Sample lost during analysis

Site	Grid Ref	Site Class	Address	Nitrogen Dioxide Diffusion Tube Results in ugm/m3 (2003)												Annual Average	Avg + 8%
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	SJ 008 814	A	Wellington Road, Rhyl	B	36	48	36	21	32	35						34.67	37.44
2	SJ 009 814	B	Barclays Bank, Rhyl	*	*	*	*	*	*	*						*	*
3	SJ 016 818	C	5 St. Georges Cres., Rhyl	14	29	16	18	7	11	8						14.71	15.89
4	SJ 021 806	C	73 Bryn Coed Park, Rhyl	17	13	24	17	4	11	25						15.86	17.13
5	SJ 029 746	B	2 Pant Glas, St. Asaph	18	25	18	18	8	15	13						16.43	17.74
6	SJ 030 746	B	8 Pant Glas, St. Asaph	6	25	17	16	5	11	10						12.86	13.89
7	SJ 030 744	C	19 Tan y Bryn, St. Asaph	*	*	*	*	*	*	*						*	*
8	SJ 033 746	B	1 Plas Elwy Orchard, The Roe, St. Asaph	14	29	23	21	4	14	14						17.00	18.36
9	SJ 032 749	B	7 Roe Park, St. Asaph	23	34	24	30	24	21	20						25.14	27.15
10	SJ 033 749	B	13 Roe Park, St. Asaph	B	23	21	45	10	19	12						21.67	23.40
11	SJ 033 748	B	16 Roe Park, St. Asaph	*	*	*	*	*	*	*						*	*
12	SJ 033 749	C	24 Roe Park, St. Asaph	10	16	5	26	12	13	13						13.57	14.66
13	SJ 026 822	A	171 Coast Road, Rhyl	*	*	*	*	*	*	*						*	*
14	SJ 029 823	C	Rhyl G.C., Coast Road, Rhyl	*	*	*	*	*	*	*						*	*
New2	SJ 009 813	A	10 Kinmel Street, Rhyl	29	46	8	47	21	29	41						31.57	34.10
New 7	SJ 066 829	A	70 High Street, Prestatyn. (Royal B O S)	11	23	31	31	17	21	23						22.43	24.22
New 11	SJ 067 826	A	200 High Street, Prestatyn (Body Matters)	B	27	B	23	10	14	16						18.00	19.44
New 13	SJ 213 420	C	Bod Hefin, Westbourne Ter., Llangollen	*	*	*	*	*	*	*						*	*
New 14	SJ 215 419	A	Chapel, Castle Street, Llangollen	9	44	51	39	24	A	33						33.33	36.00
New 13	SJ 213 420	C	Scout Hall, West Street, Llangollen	6	17	21	20	10	11	10						13.57	14.66
New 13	SJ 121 583	A	25 Park Road, Ruthin.														
New 14	SJ 119 582	A	Tawelfan, Denbigh Road, Ruthin.														

Key:-

Site Class A - Roadside (a road site where the sampler is within 1m-5m of the highway [kerb])

Site Class B - Intermediate Site (between 20m - 30m from the kerb)

Site Class C - Urban Background (locations in excess of 50m from the kerb)

Results A - Sample tube not returned by client

Results B - Sample tube damaged, unable to analyse

Results C - Sample tube contaminated, unable to analyse

Results D - Sample lost during analysis

APPENDIX C

Hotspot location	Year	Annual Average (ug/m3)	Years Forecasted Forward								Highest 2005	Highest 2010
			2003	2004	2005	2006	2007	2008	2009	2010		
Wellington Road, Rhyl	2001	37	35	34	33	32	31	29	28	27	36	30
	Correction Factor		0.941	0.915	0.892	0.863	0.832	0.799	0.765	0.734		
	2002	39	38	37	36	35	34	32	31	30		
	Correction Factor		0.971	0.944	0.920	0.890	0.858	0.824	0.789	0.757		
7 Roe Park, St. Asaph	2001	25	24	23	22	22	21	20	19	18	30	25
	2002	33	32	31	30	29	28	27	26	25		
10 Kinmel Street, Rhyl	2001	40	38	37	36	35	33	32	31	29	36	29
	2002	39	38	37	36	35	33	32	31	29		
70 High Street, Prestatyn. (Royal B O S)	2002	33.09	32	31	30	29	28	27	26	25	30	25
Chapel, Castle Street, Llangollen	2002	40.08	39	38	37	36	34	33	32	30	37	30

Source of correction factors: Box 6.6 Technical Guidance LAQM.TG(03)

APPENDIX D

Step 1	Receptor name	Vale Street, Denbigh	Receptor number	1	Step 6	CALCULATE	
Step 2	Year	2006	Step 7				STORE RESULTS FOR THIS RECEPTOR
Step 3	Number of links	1	CLEAR INPUT DATA				
Step 4	Background concentrations for 2005					RUN COMPLETE	
	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	NO ₂ (µg/m ³)		PM ₁₀ (µg/m ³)
	0.16	0.13	0.0671	12.2	9.58	16.6	
Step 5	Traffic flow & speed						
	Link number	Distance from link centre to receptor (m)	AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Traffic composition	
						Vehicles <3.5t GVW (LDV)	
						Vehicles >3.5t GVW (HDV)	
						% passenger cars	
						% light goods vehicles	
						Total % LDV	
						% buses and coaches	
						% rigid HGV	
						% articulated HGV	
						Total % HDV	
	1	6.95	11917	32.18	A	96	
	2						
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Current receptor				CLEAR RESULTS - CURRENT RECEPTOR		CLEAR RESULTS - ALL RECEPTORS	
Receptor Name	Vale Street, Denbigh	Receptor number	1				
Assessment year	2006						
Results				Contribution of each link to annual mean			
Pollutant	Annual mean			For comparison with Air Quality Standards			
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units
CO	0.16	0.11	0.26	mg/m ³	Annual mean*	0.26	mg/m ³
Benzene	0.13	0.11	0.24	µg/m ³	Annual mean	0.24	µg/m ³
1,3-butadiene	0.06	0.10	0.16	µg/m ³	Annual mean	0.16	µg/m ³
NO _x	12.2	30.3	32.5	µg/m ³	Not applicable		
NO ₂	9.6	4.9	15.5	µg/m ³	Annual mean*	15.5	µg/m ³
PM ₁₀	16.6	2.75	18.35	µg/m ³	Annual mean	18.4	µg/m ³
					Days >50 µg/m ³	0	Days
* See Section 4 in DMPE Volume 11 Chapter 3							
All receptors				Pollutant concentrations at receptor			
Receptor number	Name	Year	CO*	Benzene	1,3-butadiene	NO _x	NO ₂ *
			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
							PM ₁₀
							Days >50 µg/m ³

Step 1	Receptor name	High Street, St Asaph	Receptor number	1	Step 6	CALCULATE						
Step 2	Year	2006	Step 7				STORE RESULTS FOR THIS RECEPTOR					
Step 3	Number of links	1	CLEAR INPUT DATA									
Step 4	Background concentrations for 2005					RUN COMPLETE						
	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)						
	0.16	0.13	0.0608	14.6	11.4	15.3						
Step 5	Traffic flow & speed											
	Link number	Distance from link centre to receptor (m)	AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Traffic composition						
						Vehicles <3.5t GVW (LDV)	Vehicles >3.5t GVW (HDV)					
						% passenger cars	% light goods vehicles	Total % LDV	% buses and coaches	% rigid HGV	% articulated HGV	Total % HDV
	1	4.0	14907	31.95	A			91.6				8.4
	2											
	3											
	4											
	5											
	6											
	7											
	8											
	9											
	10											
	11											
	12											
	13											
	14											
	15											

Current receptor				CLEAR RESULTS - CURRENT RECEPTOR		CLEAR RESULTS - ALL RECEPTORS		
Receptor Name	High Street, St Asaph	Receptor number	1					
Assessment year	2006							
Results								
Pollutant	Annual mean				For comparison with Air Quality Standards			
	Background concentration	Road traffic component	Total	Units	Metric	Value	Units	
CO	0.16	0.14	0.29	mg/m ³	Annual mean*	0.29	mg/m ³	
Benzene	0.13	0.16	0.27	µg/m ³	Annual mean	0.27	µg/m ³	
1,3-butadiene	0.06	0.19	0.25	µg/m ³	Annual mean	0.25	µg/m ³	
NO _x	14.6	43.6	58.2	µg/m ³	Not applicable			
NO ₂	11.4	33.6	45.0	µg/m ³	Annual mean*	45.0	µg/m ³	
PM ₁₀	15.3	5.09	20.39	µg/m ³	Annual mean	20.4	µg/m ³	
					Days >50 µg/m ³	4	Days	
* See Section 4 in DMPE Volume 11 Chapter 3								
Contribution of each link to annual mean								
Link number	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	PM ₁₀ (µg/m ³)			
1	0.14	0.14	0.19	40.64	5.09			
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
All receptors				Pollutant concentrations at receptor				
Receptor number	Name	Year	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

APPENDIX E

DMRB: Assessment of Local Air Quality **INPUT SHEET**

Step 1	Receptor name	A66/The Roe	Receptor number	1	Step 6	CALCULATE					
Step 2	Year	2006	Step 7				STORE RESULTS FOR THIS RECEPTOR				
Step 3	Number of links	2	CLEAR INPUT DATA								
Step 4	Background concentrations for 2006										
	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)					
	0.16	0.14	0.0606	14.6	11.4	15.1					
RUN COMPLETE											
Step 5	Traffic flow & speed										
Link number	Distance from link centre to receptor (m)	Traffic flow & speed			Traffic composition						
		AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Vehicles <3.5t GVW (LDV)		Vehicles >3.5t GVW (HDV)				
					% passenger cars	% light goods vehicles	Total % LDV	% buses and coaches	% rigid HDV	% articulated HDV	Total % HDV
1	32.5	39164	96.54	A			88.6				10.4
2	43.5	12467	34.61	A			84				6
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

DMRB: Assessment of Local Air Quality **OUTPUT SHEET**

Current receptor				CLEAR RESULTS - CURRENT RECEPTOR		CLEAR RESULTS - ALL RECEPTORS							
Receptor Name	A66/The Roe	Receptor number	1										
Assessment year	2006												
Results				Contribution of each link to annual mean									
Pollutant	Annual mean			For comparison with Air Quality Standards			Link number	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	PM ₁₀ (µg/m ³)	
	Background concentration	Road traffic component	Total	Units	Metric	Value							Units
CO	0.16	0.11	0.27	mg/m ³	Annual mean*	0.27	mg/m ³	1	0.08	0.08	0.15	40.70	4.24
Benzene	0.14	0.13	0.27	µg/m ³	Annual mean	0.27	µg/m ³	2	0.03	0.04	0.06	6.88	0.88
1,3-butadiene	0.06	0.30	0.36	µg/m ³	Annual mean	0.26	µg/m ³	3					
NO _x	14.6	47.6	62.2	µg/m ³	Not applicable			4					
NO ₂	11.4	11.8	23.2	µg/m ³	Annual mean*	23.2	µg/m ³	5					
PM ₁₀	15.1	5.12	20.22	µg/m ³	Annual mean	20.2	µg/m ³	6					
					Days >50 µg/m ³	4	Days	7					
<small>* See footnote 4 in DMRB Volume 11 Chapter 3</small>													
All receptors				Pollutant concentrations at receptor									
Receptor number	Name	Year	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				

APPENDIX F

Step 1	Receptor name	Castle Street/A5 Llangollen	Receptor number	1	Step 6	CALCULATE	
Step 2	Year	2005	Step 7				STORE RESULTS FOR THIS RECEPTOR
Step 3	Number of links	2	CLEAR INPUT DATA				
Step 4	Background concentrations for 2005						
	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	
	0.15	0.12	0.0534	13.4	10.5	15.2	
RUN COMPLETE							
Step 5	Traffic flow & speed						
	Link number	Distance from link centre to receptor (m)	AADT (combined, veh/day)	Annual average speed (km/h)	Road type (A,B,C,D)	Traffic composition	
						Vehicles <3.5t GVW (LDV)	
						Vehicles >3.5t GVW (HDV)	
						% passenger cars	
						% light goods vehicles	
						Total % LDV	
						% buses and coaches	
						% rigid HDV	
						% articulated HDV	
						Total % HDV	
	1	6	9981	20	A	96.1	
	2	5.5	6183	20	A	91.3	
	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						

Current receptor				CLEAR RESULTS - CURRENT RECEPTOR		CLEAR RESULTS - ALL RECEPTORS	
Receptor Name	Castle Street/A5 Llangollen	Receptor number	1				
Assessment year	2005						
Results							
Pollutant	Annual mean				For comparison with Air Quality Standards		
	Background concentration	Road traffic contribution	Total	Units	Metric	Value	Units
CO	0.15	0.21	0.36	mg/m ³	Annual mean*	0.36	mg/m ³
Benzene	0.12	0.21	0.33	µg/m ³	Annual mean	0.33	µg/m ³
1,3-butadiene	0.05	0.23	0.28	µg/m ³	Annual mean	0.28	µg/m ³
NO _x	13.4	41.5	53.9	µg/m ³	Not applicable		
NO ₂	10.5	31.4	20.9	µg/m ³	Annual mean*	20.9	µg/m ³
PM ₁₀	15.2	5.75	20.95	µg/m ³	Annual mean	21.0	µg/m ³
					Days >50 µg/m ³	5	Days
* See Appendix 4 to SMPD Volume 11 Chapter 3							
Contribution of each link to annual mean							
Link number	CO (mg/m ³)	Benzene (µg/m ³)	1,3-butadiene (µg/m ³)	NO _x (µg/m ³)	PM ₁₀ (µg/m ³)		
1	0.13	0.13	0.12	19.95	2.58		
2	0.08	0.08	0.11	20.55	2.72		
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
All receptors							
				Pollutant concentrations at receptor			
Receptor number	Name	Year	CO*	Benzene	1,3-butadiene	NO _x	NO ₂ *
			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
							Days >50 µg/m ³

APPENDIX G

	Company:	Address:	Section / Process:	Issued:	Carbon monoxide	Benzene	1.3 butadiene	Sulphur dioxide	Nitrogen oxides	Lead	PM 10
1	White Bear Garage	Wrexham Rd., Ruthin	1.3 - Waste Oil Burner	17/05/93							
2	G & G Motors	Chapel St., Denbigh	1.3 - Waste Oil Burner	17/05/93							
3	Loggerheads Garage	Loggerheads	1.3 - Waste Oil Burner	08/12/99							
4	S. M. Autos	111, Marsh Road, Rhyl	1.3 - Waste Oil Burner	20/12/02							
5	Loggerheads Garage	Loggerheads	1.4b - Service Stations	22/12/98							
6	Safeway SS	Smithfield Road, Denbigh	1.4b - Service Stations	30/12/98							
7	Shell Castleview	Rhyl Road, Denbigh	1.4b - Service Stations	08/01/99							
8	Shell Vale	193 Vale Road, Rhyl	1.4b - Service Stations	11/01/99							
9	Sainsbury's Supermarkets	Rhuddlan Road, Rhyl	1.4b - Service Stations	12/01/99							
10	Marina Service Station	Wellington Road, Rhyl	1.4b - Service Stations	14/01/99							
11	Kimmel Park SS (E)	A55 Eastbound, Bodelwyddan	1.4b - Service Stations	21/01/99							
12	Kimmel Park SS (W)	A55 Westbound, Bodelwyddan	1.4b - Service Stations	21/01/99							
13	Dyffryn SS	Denbigh Road, Ruthin	1.4b - Service Stations	22/01/99							
14	Prestatyn SS	Marine Road, Prestatyn	1.4b - Service Stations	29/01/99							
15	Rhyl SS	154 Vale Road, Rhyl	1.4b - Service Stations	28/01/99							
16	Bridge SS	Park Road, Ruthin	1.4b - Service Stations	02/02/99							
17	Seaways SS	The Roe, St. Asaph	1.4b - Service Stations	10/03/99							
18	W.M. Morrison Supermarkets	Marsh Road, Rhyl.	1.4b - Service Stations	24/10/00							
19	Bryn Melyn Motor Services	Abbey Road, Llangollen	1.4b - Service Stations	07/12/00							
20	Central Garage	Rhyl Road, Rhuddlan	1.4b - Service Stations	21/05/02							
21	Ifor Williams Trailers	Cynwyd, Corwen	2.2 - Galvanising Steel	19/04/93							
22	Hanson Quarry Products	Graig Quarry, Denbigh	3.1 - Ready-Mix Concrete	29/04/93							
23	Hanson Quarry Products	Meliden Rd., Dyserth	3.1 - Ready-Mix Concrete	05/05/93							
24	Ruthin Pre-cast Concrete	Quarryfields, Ruthin	3.1 - Pre-cast Concrete Production	18/03/93							
25	J. Stoddard & Son.	Maes-y-Droel Quarry, Llanarmon	3.4 - Sand Drying	23/04/93							

Emissions from Part 'B' Industrial Processes.

	Company:	Address:	Section/Process	Issued	Carbon monoxide	Benzene	1,3-butadiene	Sulphur dioxide	Nitrogen oxides	Lead	PM 10
26	Robert Hunter & Co.	Lon Parcwr, Ruthin	3.4 - Roadstone Coating	15/04/92				*			*
27	Hanson Aggregates	Graig Quarry, Denbigh	3.4 - C&S Limestone	28/05/93							*
28	Tarmac Central Ltd	Burley Hill Quarry, Nercwys	3.4 - C&S Limestone, RCP	18/03/93				*			*
29	Hanson Aggregates	Aberduna Quarry, Maeshafn	3.4 - C&S Limestone, RCP	04/03/93				*			*
30	Lafarge Redland Agg. Ltd.	Graig Quarry, Llanarmon-yn-Ial	3.4 - C&S Limestone, RCP	11/06/93				*			*
31	Roadrunner Waste Ltd.	Cambrian View, Rhuallt	3.4 - Mobile C&S Plant	01/12/99							
32	Jones Bros. C1	Denbigh Rd., Ruthin	3.4 - Mobile C&S Plant	21/05/97							
33	Jones Bros. C2	Denbigh Rd., Ruthin	3.4 - Mobile C&S Plant	07/10/99							
34	Jones Bros. C3	Denbigh Rd., Ruthin	3.4 - Mobile C&S Plant	15/10/99							
35	Jones Bros. C4	Denbigh Rd., Ruthin	3.4 - Mobile C&S Plant	03/03/00							
36	Jones Bros. C5	Denbigh Rd., Ruthin	3.4 - Mobile C&S Plant	24/11/00							
37	Jones Bros. C6	Denbigh Rd., Ruthin	3.4 - Mobile C&S Plant	30/05/02							
38	Thornccliffe Building Supplies	Ally Y Graig, Dyserth	3.4 - Mobile C Plant	21/10/02							
39	Pilkington Special Glass	Glascoed Road, St. Asaph	3.5 - Specialised Glass Man.	27/10/92				*		*	
40	Smurfit Print UK	Berwyn Works, Llangollen	6.5 - Printworks	22/11/93							
41	Thales Optics	Glascoed Rd., St. Asaph	6.5 - Coating Solvent	03/12/99							
42	Gwyddelwern Sawmills Ltd	Gwyddelwern, Corwen	6.7 - Softwood Sawmilling	25/09/92							
43	BOCM Pauls	Colomendy Ind. Est., Denbigh	6.9 - Animal Feed Compounding	21/10/93							

Emissions from Part 'B' Industrial Processes.

14. List of abbreviations.

AADTF.....	Annual Average Daily Traffic Flow
AQMA.....	Air Quality Management area
DMRB	Design Manual Roads and Bridges
EA.....	Environment Agency
EPAQS.....	Expert Panel on Air Quality Standards
LAQM.....	Local Air Quality Management
NETCEN.....	National Environmental Technology Centre (available on www.aeat.co.uk/netcen/airqual/)
NO ₂	Nitrogen Dioxide
%ile.....	Percentile, the percentage of the results below a given value
PM ₁₀	Particulate matter of diameter less than 10 microns
ppb.....	parts per billion
S.....	Sulphur
SO ₂	Sulphur Dioxide
TG.....	Technical Guidance
µg/m ³ or µgm ⁻³ ..	microgrammes per cubic metre

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