

Environmental Quality

Carlisle City Council



Air Quality Progress Report

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Executive Summary

This Air Quality Progress Report has been prepared as part of Carlisle City Council's responsibilities under the Environment Act 1995.

The Report provides an update of recent air quality issues in Carlisle, focusing on the results from air quality monitoring in 2007, any recent developments or changes to industry which might have affect local air quality and the Council's progress on reducing air pollution through it's Air Quality Action Plan.

In completing this Progress Report the City Council aims to

- . Communicate the latest information on our air quality within the local authority
- . Fulfil our statutory obligations under the Environment Act 1995
- . Maximise the usefulness and interpretation of air quality monitoring data carried out by this authority
- . Provided an update on progress with the Air Quality Action Plan
- . Assist our response for requests for air quality information
- . Provide information that is relevant and useful to other policy areas within the local authority and other external agencies.

Three principal pollutants are currently monitored by Carlisle City Council; nitrogen dioxide, particulates and most recently benzene. Results from this monitoring are presented in this report. Overall air quality in our local authority is good. There are however small pockets within the city where the annual mean objective level for nitrogen dioxide is being exceeded.

Monitoring during 2007 confirms that the nitrogen dioxide annual mean objective continues to be exceeded within the 6 Air Quality Management Area's (AQMA's) declared within the city.

Diffusion tube results indicate that further exceedences in 2007 occurred immediately outside AQMA's Nos 3 and 4. Further Assessment work is already being undertaken as part of our legal responsibilities following the declaration of an AQMA to determine whether any amendments to the AQMA boundaries will be required.

A number of new planning applications have been approved since the last air quality report was completed which may have an affect on local air quality and these are listed in this report. These new developments will all be considered in the next Updating and Screening Assessment Report due April 2009.

Whilst it is still early days in it's implementation an update on the implementation of the Air Quality Action Plan (finalised in February this year) is also provided in this report. It should be noted that the plan was formulated following the declaration of AQMA's Nos. 1 (A7 Hardwicke Circus to Junction 44, M6 motorway) and Nos.2 (Currock Street) and is to be revised to take account of any further actions that may be needed following the declaration of 4 other AQMA's. within the city. 'Further Assessment' work currently being undertaken will also assist the council in deciding what further measures will be required in the Action Plan to reduce nitrogen dioxide levels within these most recently declared areas. It is however likely that the completion Carlisle Northern Development (CNDR) will also have a significant effect on reducing nitrogen dioxide levels within AQMA's Nos. 3 (Wigton Rd) and 4 (Bridge St).

1 Introduction

Welcome to Carlisle City Council's 3rd Annual Air Quality Report. The purpose of this report is to make the Council's work in air quality management more accessible and help to bring greater awareness in the community of the importance of air quality issues within the district.

This Report provides the latest information on monitoring undertaken during 2007, outlines future developments that may have an impact upon air quality and sets out the current progress being made within the City Council's Air Quality Action Plan

We hope you find this report informative, accessible & interesting. If you have any comments or air quality issues that you would like to see covered in this annual publication then please do not hesitate to contact me.

Legal Background

Local authorities have a legal duty to manage local air quality. The cornerstone of the local air quality management process is the Review & Assessment of Air Quality. This is a statutory required three yearly process where local air quality monitoring and modelling results are compared to the national Air Quality Standards & objectives shown below.

Table 1: Objectives included in the Air Quality Regulations 2000 and (Amendment) Regulations 2002 ^a for the purpose of Local Air Quality Management			
Pollutant	Air Quality Objective		Deadline
	Concentration - $\mu\text{g}/\text{m}^3$		
Benzene All authorities	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Authorities in England and Wales only	5.00 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2010
1,3 Butadiene	2.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
Carbon Monoxide	10.0 mg/m^3	Maximum daily 8-hour mean	31.12.2003
Lead	0.5 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
	0.25 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2008
Nitrogen dioxide	200 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times a year	1 hour mean	31.12.2005
	40 $\mu\text{g}/\text{m}^3$	annual mean	31.12.2005
Particles (PM₁₀) (gravimetric) * All authorities	50 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times a year 40 $\mu\text{g}/\text{m}^3$ 24 hour mean annual mean		31.12.2004 31.12.2004

*EU indicative limit for PM 10	20 µg/m ³	annual mean	01.01.2010
	50 µg/m ³	24 hour mean to be exceeded on no more than 7 days per year.	01.01.2010
Sulphur Dioxide	350 µg/m ³ not to be exceeded more than 24 times a year	1 hour mean	31.12.2004
	125 µg/m ³ not to be exceeded more than 3 times a year	24 hour mean	31.12.2004
	266 µg/m ³ not to be exceeded more than 35 times a year	15 minute mean	31.12.2005

*The provisional objectives for PM 10 set by the EU have been included in the table above, whilst this indicative limit value is not currently included in the Regulations for the purposes of LAQM and Local Authorities are under no obligation to review and assess against these objectives. It is however recommended by government that it might be helpful to do so for long term planning and the assessment of development proposals purposes. Assessment against these provisional objectives is provided in this progress report.

Where objectives are breached, or are predicted to be breached, an Air Quality Management Area must be declared. An Action Plan must then be produced siting how the authority will drive air quality towards the objectives.

All potential sources of pollutants (primarily industrial & traffic related sources) must be taken into consideration and, as shown in the table above, seven major pollutants are considered; carbon monoxide, nitrogen dioxide, sulphur dioxide, benzene, 1-3 butadiene, lead & particulates.

These pollutants are all compared to health based air quality objectives prescribed into the framework for determining the extent to which authorities should aim to improve air quality within their area. The importance of continuing to gather data to help inform the development planning process and to assess long term trends is also an important project at both the local and national level.

What Is Air Quality Like In Carlisle?

Under the Review and Assessment Process Carlisle City Council has been monitoring pollution levels in Carlisle since 1996 and comparing them with the national air quality objectives described above. For the majority of pollutants the concentrations found within the Authority are well below the government's health based objectives. However for one pollutant, known as nitrogen dioxide, the annual average concentration has been found to be currently above the health based objective level at 6 locations within the city. These are essentially adjacent to busy road junctions. Six AQMA's have subsequently been declared within the city; AQMA No 1 Stanwix Bank in December 2005, Currock Street in January 2007 and AQMA's Nos 3-6 August 2008. The maps for each of the AQMA's are shown in section 3. Detailed information about the review and assessment process and the declaration of these areas can be found on the council's website (www.carlisle.gov.uk) in the following documents:

- Local Air Quality Management, Carlisle First Stage Review and Assessment 1998
- Local Air Quality Management, Carlisle First Stage Review and Assessment 1999
- Local Air Quality Management, Carlisle First Stage Review and Assessment 2000
- Updating and Screening Assessment May 2003
- Detailed Assessment 2005 (Resulted in declaration of AQMA No1 A7)
- Updating and Screening Assessment 2006 (Resulted in declaration of AQMA No 2 Currock Street)

Progress Report 2007

Further Assessment Report 2007

Detailed Assessment Report 2007 (Resulted in the declaration of AQMA Nos 3 – 6; sections of London Rd, Dalston Rd, Castleway, and Wigton Rd)

The declaration of an AQMA meant that the Council had a duty to draw up an Air Quality Action Plan and take actions to reduce nitrogen dioxide concentrations in the city. The City Council along with its partners (in particular Cumbria County Council Highways) produced an Action Plan at the end of 2007, which addressed AQMA's Nos 1 and 2. The Action Plan was approved by the Department for Environment, Food and Rural Affairs (Defra) in February 2008. Whilst it is still early days information on the progress in it's implementation is provided in this report. It should be noted that following the declaration of AQMA's Nos 3-6, the City Council now has 18 months to revise the Action Plan to introduce any further measures that will be needed to reduce nitrogen dioxide levels within these 4 areas. Consultants have been appointed to assist in this process.

Links to other Carlisle City Council Plans and Strategies

The Air Quality Progress Report is intrinsically linked to other important areas of work including the Local Transport Plan, Development Planning, Energy Conservation, Carlisle City Council's Corporate Improvement Plan 2007-2010, Carlisle Renaissance and the Community Plan. Some of the key strategies and policies are given below.

Corporate Improvement Plan 2007 - 2010

The Corporate Improvement Plan sets out what Carlisle City Council's core values and corporate priorities are over the coming years.

The Carlisle Corporate Plan has the aim of improving all aspects of pollution control with the intention of making Carlisle the cleanest and healthiest City in Europe. The City vision statement for 2002-2012 seeks to significantly limit pollution, thus reducing damage to the environment.

One of the key priorities of the Council is a Cleaner, Greener, Safer Carlisle, promoting sustainable local communities where people want to live and work and where they feel safe. A priority which links directly to local air quality management.

Carlisle City Council- Environmental Policy

Carlisle City Council has signed up to the Nottingham declaration on Climate Change. In line with the Environmental Policy and it's commitment to the Nottingham Declaration on Climate Change, the City Council has prepared a draft Climate Change Strategy. The Strategy outlines aims and objectives for the City Council to tackle climate change through its operations, service delivery and work with partners and communities the city council serves. Measures to improve carbon emissions will also improve local air quality.

Carlisle Partnership

The Carlisle Partnership is the organisation that brings together the local council's that serve Carlisle, the Health Service, Police and other public agencies, local business and voluntary and community organisations to improve the well being of Carlisle. The Community Plan produced by

the Partnership sets out our high level aims and ambitions for the area and ensures that they are achieved by the Partnership.

Local transport Plan

The Local Transport Plan (LTP) is the statutory planning document that sets out the County Council's vision, strategy and policies for transport. It also describes the approaches and measures that will be taken to implement these policies in each district. Improving air quality is one of the key priorities of the LTP(2). A number of strategies have been developed through the LTP(2) to encourage and improve public transport, cycling and walking. These are shown in Table A at the end of this report. Good partnership working has been developed between the City Council and the County Council to ensure that there is a clear understanding of air quality issues within Carlisle.

Draft Local Development Plan and Development Control

The Carlisle District Local Plan establishes policies that guide the general location of development in the local authority and ensure that such development does not adversely affect its surroundings.

The impact of air quality on or by new development is now a material consideration and is taken account in the planning system.

Home Energy Conservation Act (HECA) 1995

Carlisle City Council has produced a HECA Strategy. This aims to improve the energy efficiency of the residential properties in our area. Improving energy efficiency reduces the need to burn fuel, thus reducing the domestic emissions of air pollutants.

Carlisle Renaissance – City Centre Development and Citywide Movement Strategy

Carlisle Renaissance is the partnership regeneration agenda for the whole of Carlisle. It is led by Carlisle City Council and is focussed on achieving the following objectives: -

- Establishing Carlisle as a learning City
- Strengthening the economy
- Maximising tourism potential
- Tackling deprivation
- Improving movement

One of the key drivers for improving movement is the need to improve air quality.

2 Air Quality Monitoring Data

Air quality monitoring in Carlisle City Council, is driven by the local air quality management process and in particular the review & assessment of air quality. At present Carlisle City Council monitors for 3 pollutants i.e. nitrogen dioxide, particulates & benzene.

Nitrogen Dioxide

Nitrogen Dioxide (NO₂) and nitric oxide (NO) are both oxides of nitrogen and are collectively referred to as nitrogen oxides (NO_x). All combustion processes produce NO_x emissions, largely in the form of NO, which is then converted to NO₂, mainly as a result of reaction with ozone in the atmosphere.

The principal source of nitrogen dioxide (NO₂) within the district of Carlisle City Council is road transport.

How is Nitrogen Dioxide Monitored

The Council has been monitoring nitrogen dioxide at sites around the district using for many years and employs two principle methods of monitoring; diffusion tubes and continuous analysers.

Diffusion Tubes



Diffusion tubes are small plastic tubes of approximately 8cm in length (see picture) that are mounted onto lampposts or sides of buildings.

There is no pump to pull the air through – instead air diffuses into the sampler over a 4/5-week exposure period, during which time the pollutant becomes slowly absorbed by the chemical present in the tube. The tubes are then collected and sent to a laboratory where they are analysed and the concentration of NO₂ in the air is determined.

The advantage of using diffusion tubes is that they are inexpensive and provide useful information of NO₂ variations across the authority area to identify hot spots and long term trends. All diffusion tube sites are subject to regular review and where sufficient data has been gathered some of the diffusion tubes are relocated to new locations of interest. Occasionally problems occur such as tubes being stolen or interfered with on a regular basis leading to the sites becoming unsuitable. As a result some diffusion tubes have been relocated to other similar sites close by.

Analysis for all NO₂ diffusion tubes used by Carlisle Council is undertaken by Bureau Veritas Labs formerly (Casella Cre Air). Their method of tube preparation is 10% TEA (triethanolamine) in water. Quality assurance/quality control methods for the tubes are explained in the Detailed Assessment Report published in 2007.

Bias Adjustment of Diffusion Tube Data

Diffusion tubes do have their limitations as they cannot provide hourly readings & have poor accuracy

As a result of the considerable difference in the performance of tubes prepared by different labs, the government recommends that a bias adjustment factor is determined and applied to the data. Technical guidance gives a method for this, which involves the collocation of these tubes with a chemiluminescent Nox analyser.

Authorities are asked to report the adjustment factor from both their own collocation study (where available), and the 'national' bias adjustment factor determined by Air Quality Consultants (AQC) who, on behalf of Defra, collate and assess data from NO₂ collocation studies across the UK. A local bias adjustment factor of 0.773 has been calculated from our own study and a national bias adjustment factor (including our own bias adjustment) has been calculated as 0.891. Full details of both the national and local bias adjustment factors used to adjust data and a comment on overall precision is provided in Appendix 1.

It is important to note that data from monitoring undertaken in 2007 has been corrected by both the national and local bias adjustment factors and results from both studies are presented in section 3 of this report. It is also important to note that national bias adjusted annual means for nitrogen dioxide levels presented in section 3 are higher than the local bias adjusted means due to the difference in the adjustment factors calculated. Most recent advice from Defra recommends that local authorities should base interpretation of their data using the combined results of a number of co-location studies i.e. the national bias adjustment factor so as to minimise the uncertainty associated with any single study. This advice has been followed.

Real Time Air Monitoring

Automatic monitoring equipment is expensive; consequently this type of monitoring can only be used at a limited number of sites. Carlisle City Council currently has two real time air quality monitoring stations.

Paddy's Market



This station opened in 2005 following the floods. It is a roadside site located adjacent to the A595 in Caldewgate. It measures both nitrogen dioxide, particulates and benzene. Since our last report the site was affiliated to the Automatic Urban and Rural Network in February this year. This means that this site will provide high quality data to the network that will be used by Defra to: -

- . determine compliance with EC Directives
- . analysis and forecasting of air pollution episode
- . examine long term trends in UK air pollution
- . input into national air quality modelling for UK studies

Carlisle will benefit from the affiliation by the following services being provided at no cost to the Council: -

- . provision of calibration gases
- . hourly polling & screening of data
- . rapid communication of any faults identified
- . ratification of pollution data sets every 3 months
- . independent QA/QC audits of analysers every 6 months
- . publication of real time provisional data and subsequent ratified data on www.airquality.co.uk & other publications such as the annual Air Quality in the UK reports

Stanwix Bank



This station opened at the beginning of 2007. It is also a roadside site located adjacent to the A7 Stanwix Bank, within AQMA No 1. It measures nitrogen dioxide.

Both stations monitor the air continuously and produce high quality data which is stored every minute to a computer.

It should be noted that since our last progress report live data from both these stations can now be viewed on the City Council's website www.carlisle.gov.uk.

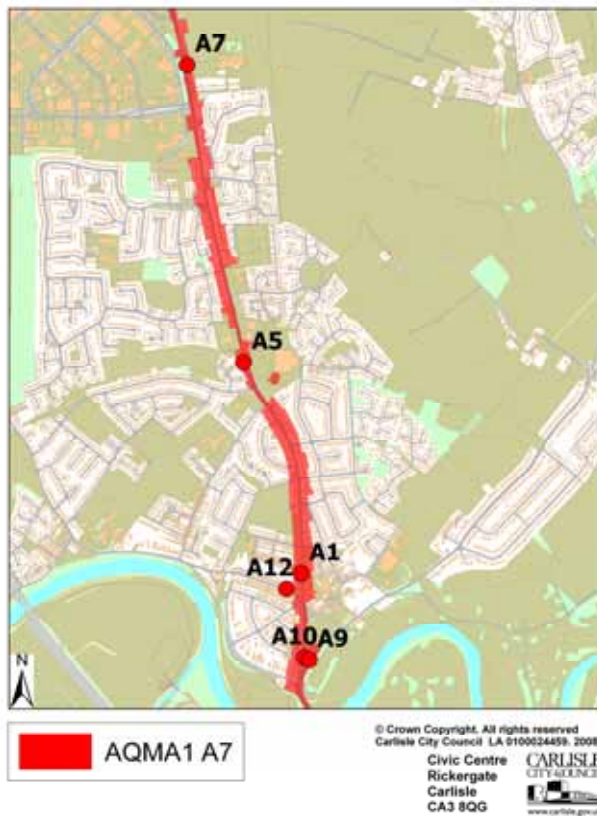
3 Nitrogen Dioxide Monitoring Results

This section provides an update on the results of nitrogen dioxide monitoring undertaken within the local authority area.

Diffusion Tube Results

Area A AQMA No 1 A7 Hardwicke Circus – Junction 44,M6 motorway

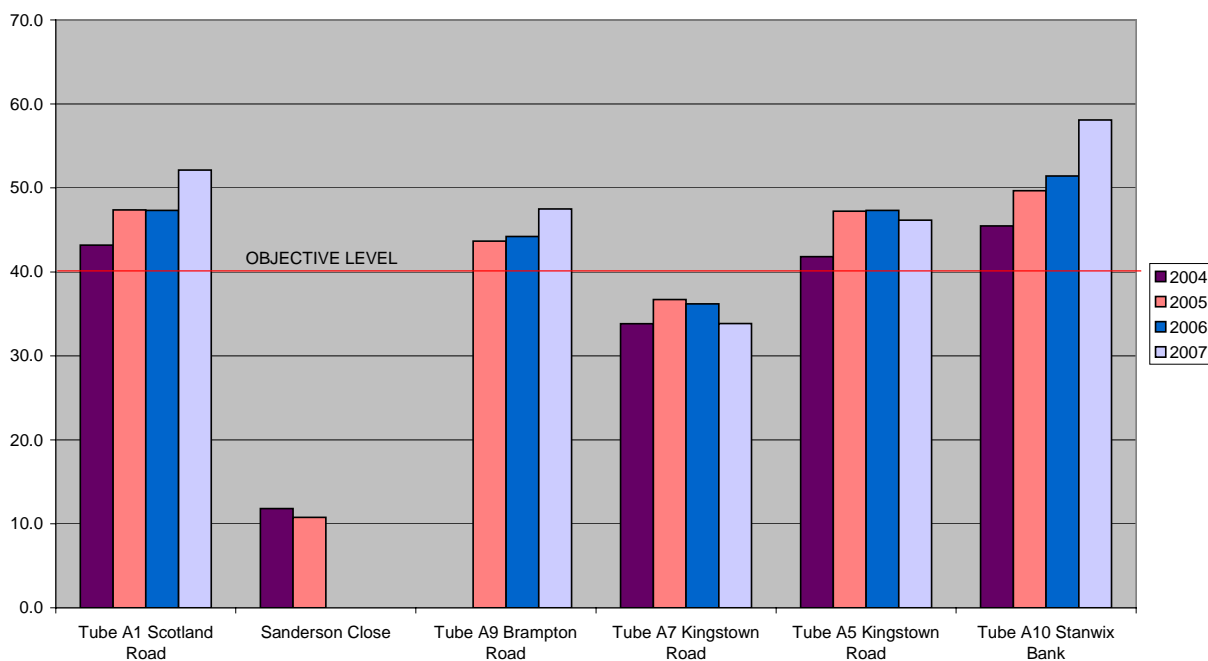
NO2 Monitoring Locations



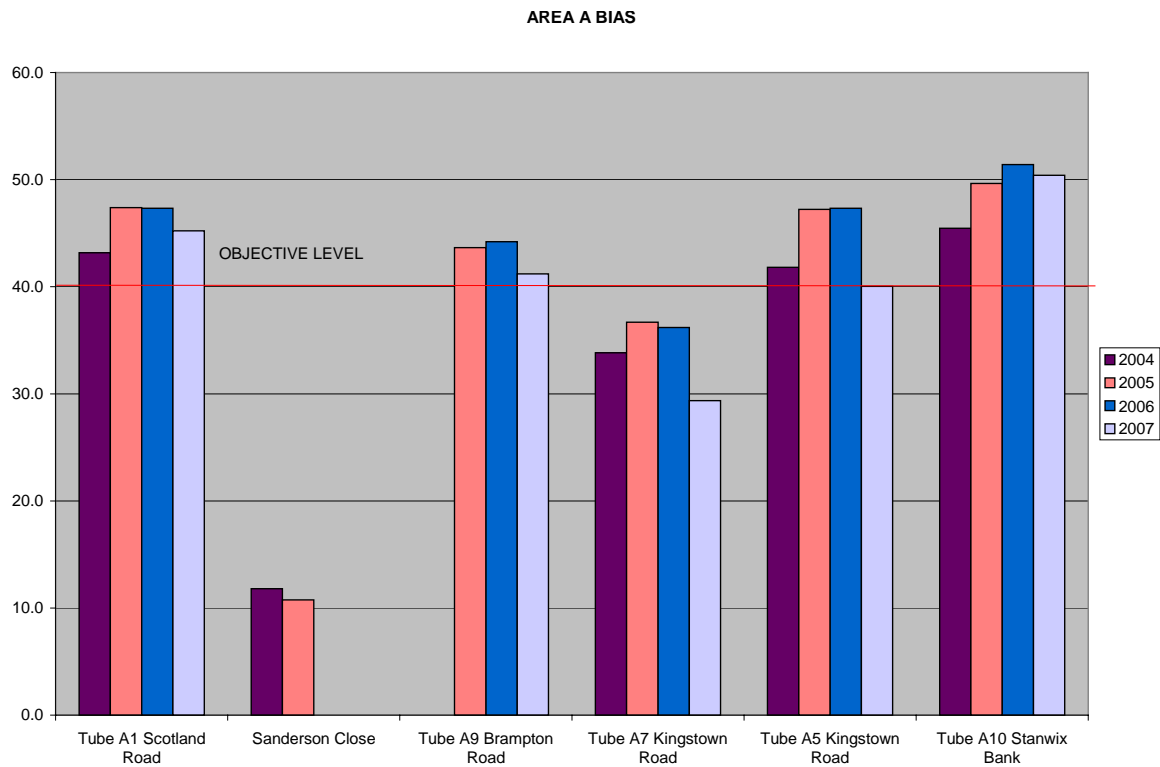
Corrected Data Using Bias Adjustment Factors

TUBE CODE	GRID REFERENCE	Location	RAW 2007 ANNUAL MEAN	CORRECTED LOCAL BIAS ADJUSTED MEAN (0.773)		CORRECTED NATIONAL BIAS ADJUSTED MEAN (0.891)	
				2007	Projected 2010	2007	Projected 2010
A1	339995 557188	Scotland Road	58.5	45.2	40.4	52.1	46.6
A10	340008 556842	Stanwix Bank	65.2	50.4	45.1	58.1	52
A12	339935 557125	Etterby Street	27.5	21.2	18.9	24.5	21.9
A5	339758 558059	Kingstown Road	51.8	40	35.8	46.1	41.2
A7	339526 559285	Kingstown Road	38	29.4	26.3	33.8	30.2
A9	340028 556833	Brampton Road	53.3	41.2	36.9	47.5	42.5

National Bias Adjusted Data



Local Bias Adjusted Data

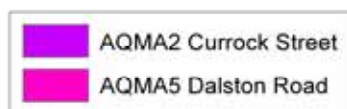
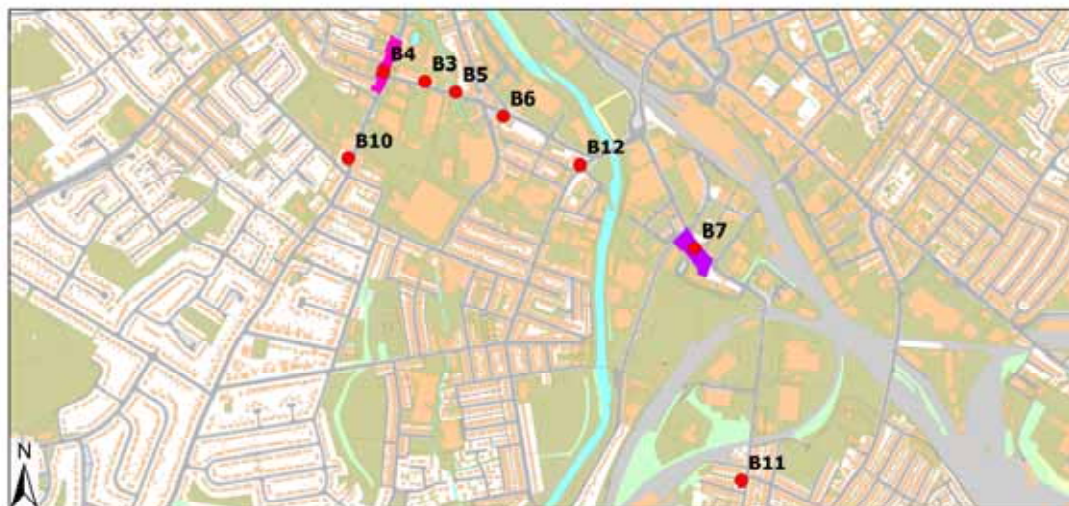


Conclusion

Results from both sets of bias adjusted data indicate that the nitrogen dioxide levels at locations alongside the A7 remain above the annual mean objective level. There is therefore no proposal to amend the boundaries of AQMA No1 at present. It is envisaged that, with the implementation of the Carlisle Northern Development Route (CNDR), nitrogen dioxide levels will fall to below the objective level by 2010.

Area B Includes Currock Street (AQMA No 2) and Dalston Road (AQMA No 5)

Monitoring Locations



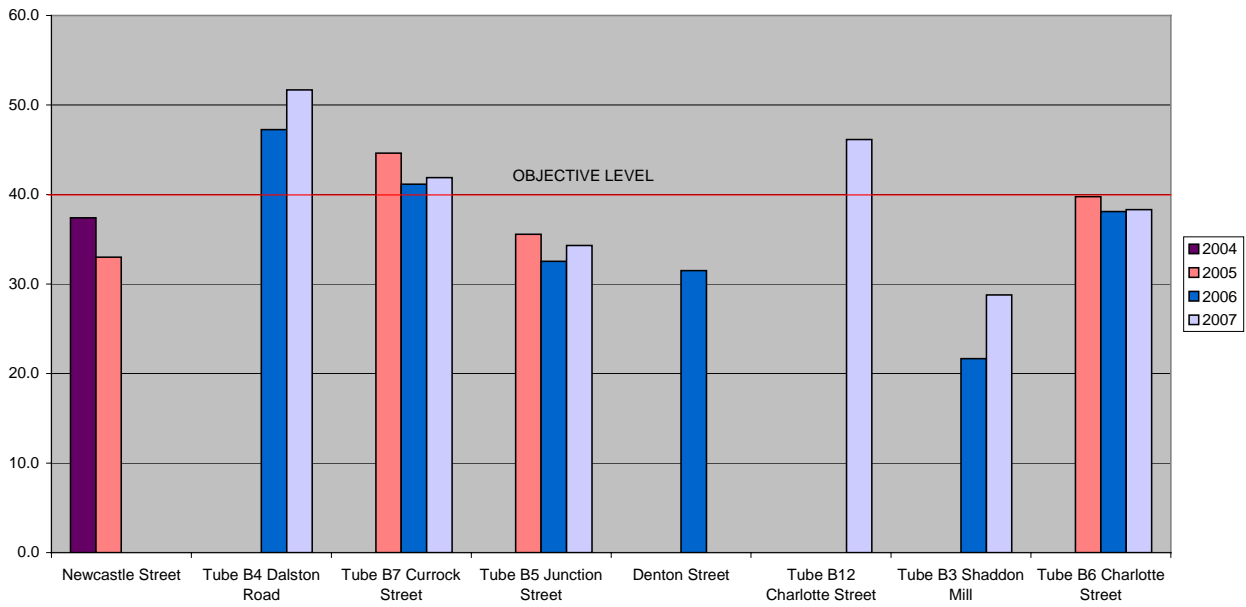
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 Carlisle
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Area B Nitrogen Dioxide Diffusion Tube Results

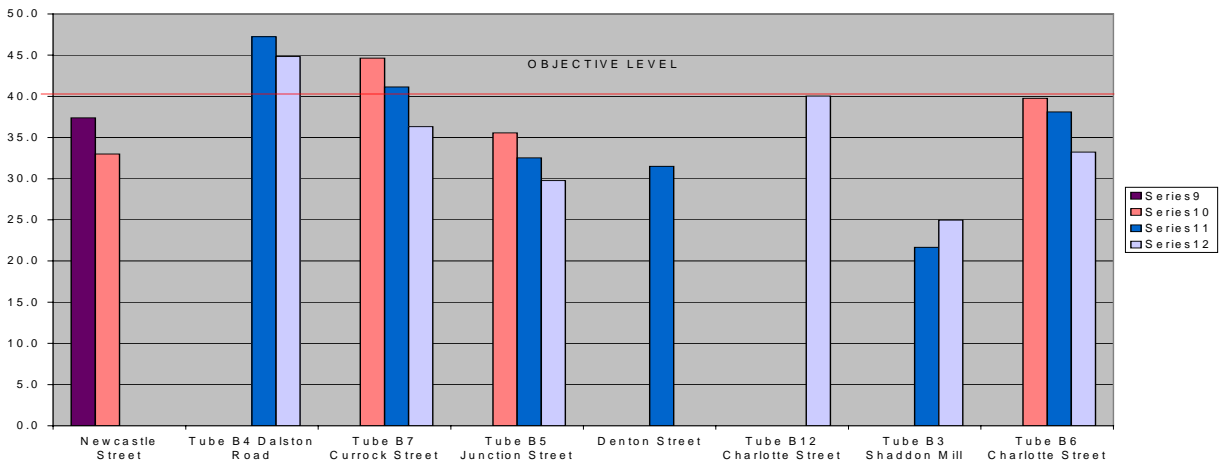
TUBE CODE	GRID REFERENCE	Location	RAW 2007 ANNUAL MEAN	CORRECTED LOCAL BIAS ADJUSTED MEAN (0.773)		CORRECTED NATIONAL BIAS ADJUSTED MEAN (0.891)	
				2007	Projected 2010	2007	Projected 2010
B10	339347 555422	Dalston Road	27	20.9	18.7	24.1	21.6
B11	340321 554621	Currock Road	23.8	19.4	17.4	21.2	18.9
B12*	339921 555406	Charlotte Street	51.7	40	35.8	46.1	41.2
B3	339537 555613	Shaddon Mill	32.3	24.9	22.3	28.8	25.2
B4	339434 555638	Dalston Road	58	44.8	40.1	51.7	46.3
B5	339613 555587	Junction Street	38.5	29.8	26.7	34.3	30.7
B6	339731 555526	Charlotte Street	43	33.2	29.7	38.3	34.3
B7	340205 555198	Currock Street	47	36.3	32.5	41.9	37.5

* Not a relevant location

Area B - National Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Results



Local Bias Adjusted Annual Mean Nitrogen Dioxide Results



Conclusion

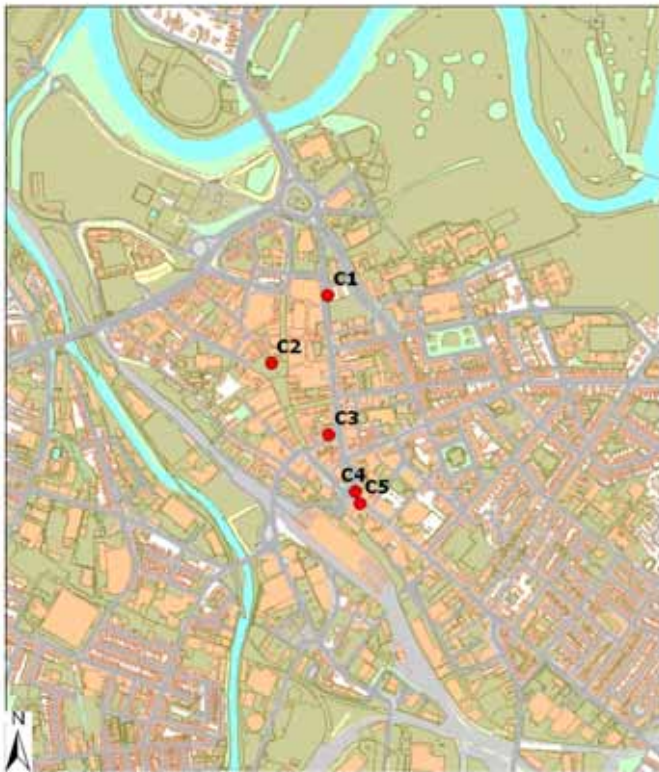
National bias adjusted data indicates that the nitrogen dioxide levels at locations alongside Currock St remain just above the annual mean objective level. Local bias adjusted data indicates that the levels are below the objective level. Whilst it appears that nitrogen dioxide levels have fallen there is no proposal at present to amend the AQMA No2 boundary. Both the national and local bias adjusted data indicates that nitrogen dioxide levels will fall below the annual mean objective level by 2010.

Results from both the local and national bias adjusted data indicate that the nitrogen dioxide levels at locations alongside Dalston Rd, within AQMA no 5, remain above the annual mean objective level. There is therefore no proposal at present to amend the AQMA No 5 boundary. Consultants have recently been appointed to undertake 'Further Assessment ' to assist the local authority in deciding what additional measures will be needed in the Air Quality Action Plan to reduce nitrogen dioxide levels at this locality. A report will be available in December 2008

Area C - City Centre Locations

These non-residential locations were chosen as they represent sites where people are present for more than 1 hour. They include streets where there are shops and outdoor cafes and are locations where the 1 hour nitrogen dioxide objective is applicable (equivalent to an annual mean of $60\mu\text{g}/\text{m}^3$).

Monitoring Locations



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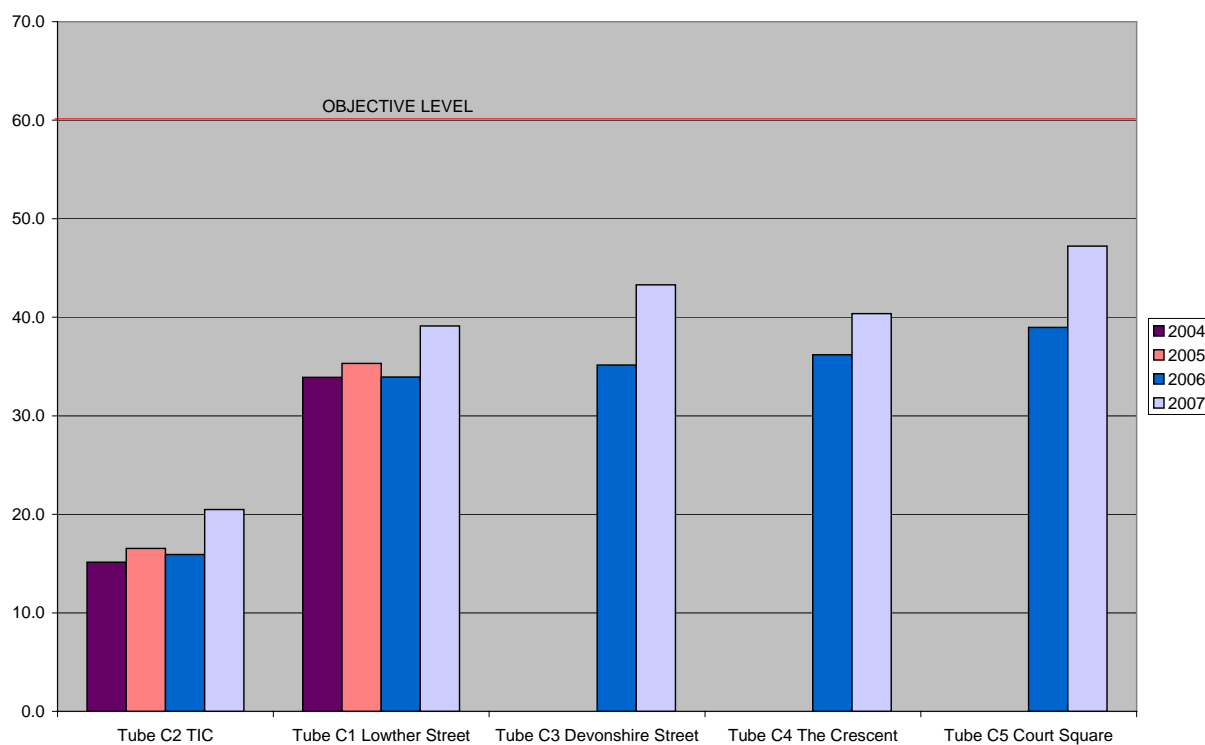
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Carlisle
CA3 8QG



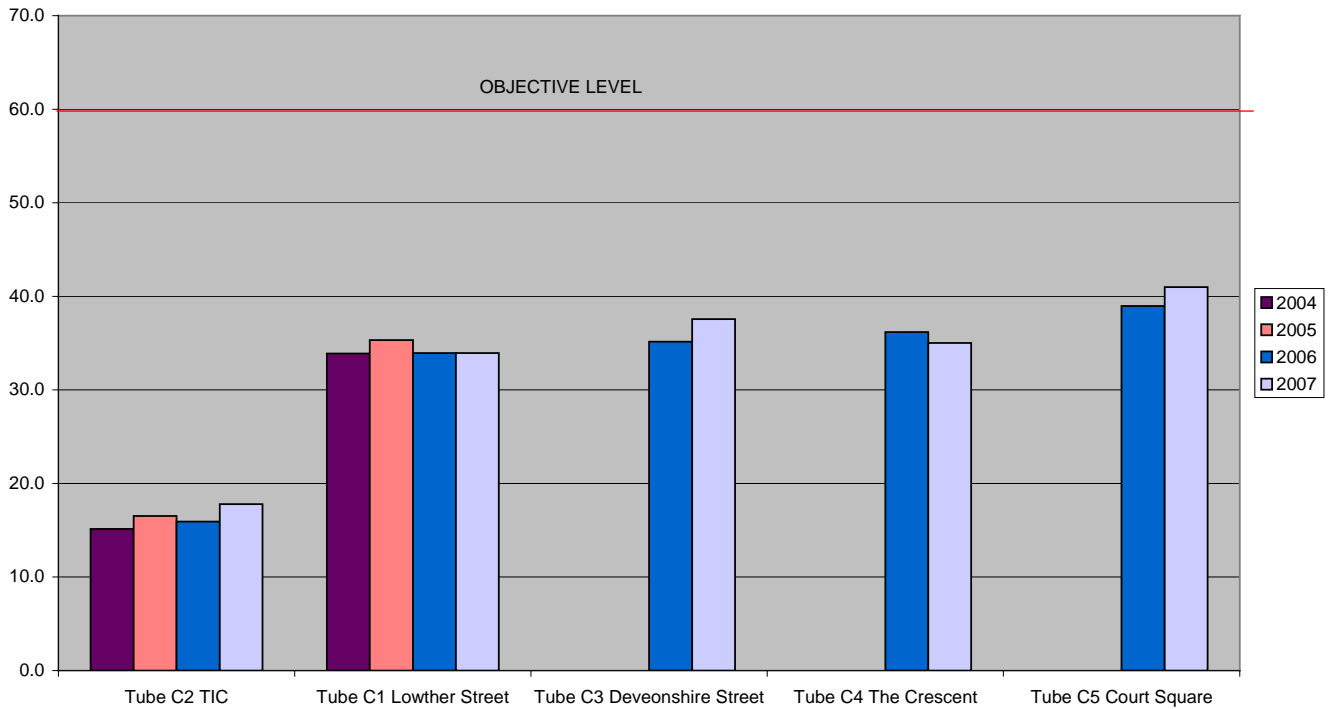
Area C – Nitrogen Dioxide Diffusion Tube Monitoring Results

TUBE CODE	GRID REFERENCE	LOCATION	RAW 2007 ANNUAL MEAN	CORRECTED LOCAL BIAS ADJUSTED MEAN (0.773)		CORRECTED NATIONAL BIAS ADJUSTED MEAN (0.891)	
				2007	Projected 2010	2007	Projected 2010
C1	340216 556131	Lowther Street	43.9	33.9	30.3	39.1	35
C2	340069 555955	TIC	23	16.8	15	20.5	18.3
C3	340218 555768	Devonshire Street	48.5	37.5	33.5	43.2	38.6
C4	340286 555622	The Crescent	45.3	35	31.3	40.2	36.1
C5	340298 555589	Court Square	53	40.9	36.6	47.2	42.2

National Bias Adjusted Annual Mean Nitrogen Dioxide Tube Results



Local Bias Adjusted Annual Mean Nitrogen Dioxide Tube Results



Conclusion

Both national and local bias adjusted monitoring data indicates that nitrogen dioxide levels at city centre locations, where people are present for 1 hour or more are already well below the objective levels.

Area D Warwick Road A69

Monitoring Locations



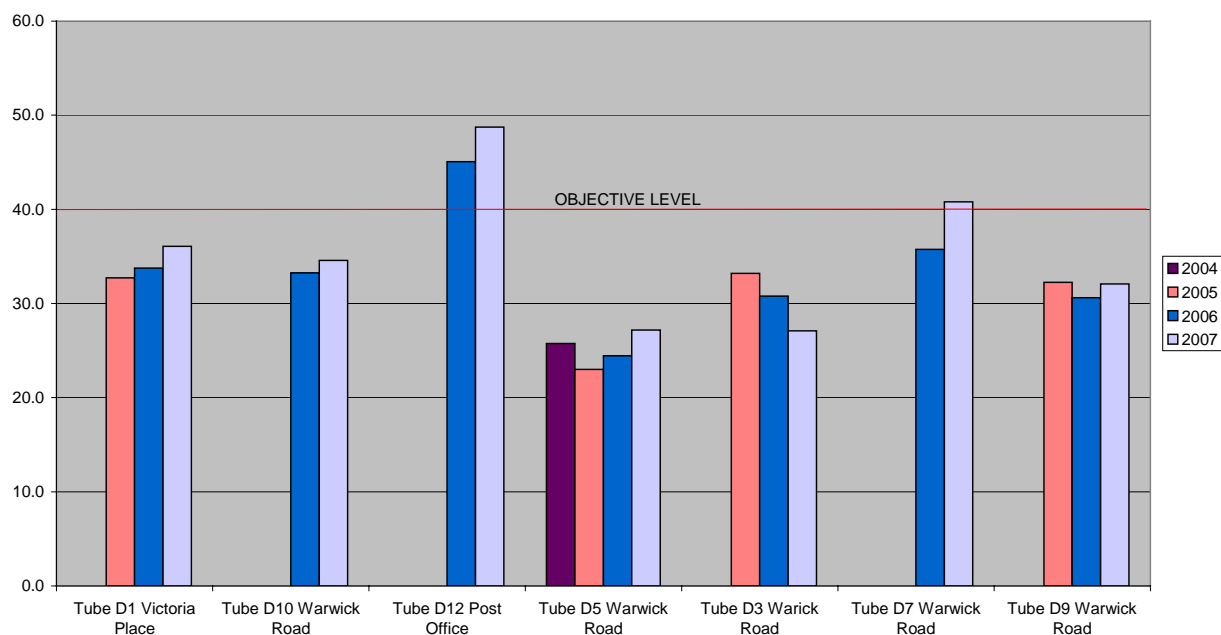
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Area D - Nitrogen Dioxide Diffusion Tube Results

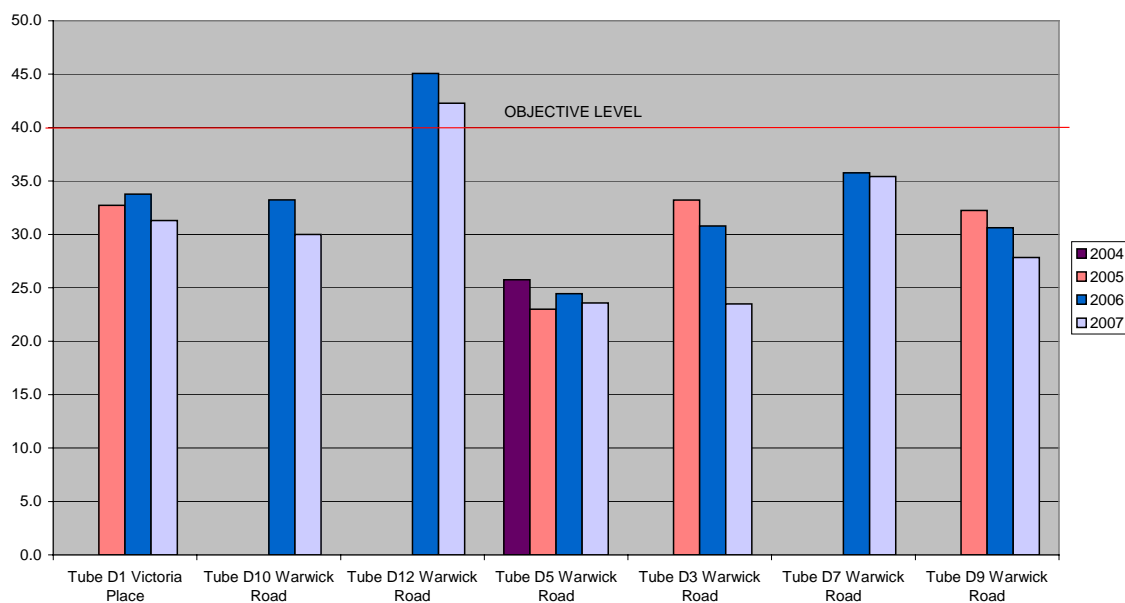
TUBE CODE	GRID REFERENCE	LOCATION	RAW 2007 ANNUAL MEAN	CORRECTED LOCAL BIAS ADJUSTED MEAN (0.773)		CORRECTED NATIONAL BIAS ADJUSTED MEAN (0.891)	
				2007	Projected 2010	2007	Projected 2010
D1	341106 555954	Victoria Place	40.5	31.3	28	36.1	32.3
D10	342044 555907	Warwick Road	38.7	29.9	26.7	34.5	30.9
D11	340426 556040	Victoria Place	43.1	33.3	29.8	38.4	34.4
D12 *	340307 555718	Warwick Road	54.7	42.3	37.8	48.7	43.6
D3	341153 555896	Warwick Road	30.4	23.5	21	27.1	24.2
D5	341310 555914	Warwick Road	30.5	23.6	21.1	27.2	23.3
D7	341593 555893	Warwick Road	45.7	35.3	31.6	40.7	36.4
D9	341426 555910	Warwick Road	36	27.8	24.9	32.1	28.7
D13	341161 555919	Warwick Road	31.7	24.5	21.9	28.2	25.2

* Not a relevant location

Area D - National Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Results



Local Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Data



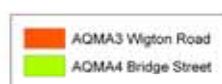
Conclusion

The national bias adjusted data indicates that there may be an exceedance of the annual mean nitrogen dioxide objective on Warwick Road. Further assessment work will be undertaken along

this route to establish whether an exceedence is likely. Both the national and bias adjusted data indicates that nitrogen dioxide levels will be below the annual mean objective level by 2010.

Area E Includes AQMA No 3 Wigton Road and AQMA No 4 Caldewgate

Monitoring Locations



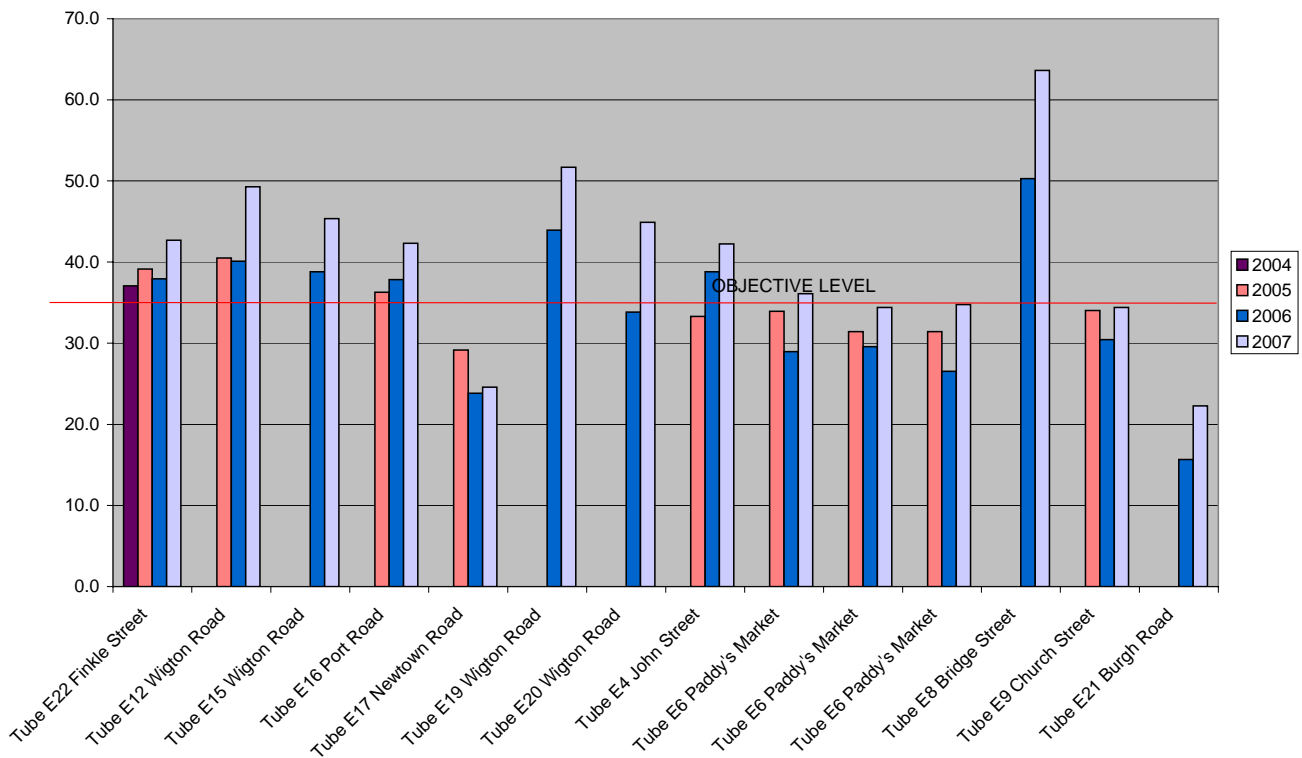
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Area E – Nitrogen Dioxide Diffusion Tube Monitoring Results

TUBE CODE	GRID REFERENCE	LOCATION	RAW 2007 ANNUAL MEAN	CORRECTED LOCAL BIAS ADJUSTED MEAN (0.773)		CORRECTED NATIONAL BIAS ADJUSTED MEAN (0.891)	
				2007	Projected 2010	2007	Projected 2010
E22	339834 556137	Finkle Street	47.9	37	33.1	42.7	38.2
E12	339225 555821	Wigton Road	55.3	42.7	38.2	49.3	44.1
E15	339091 555736	Wigton Road	50.9	39.3	35.2	45.3	40.5
E16	339141 555900	Port Road	47.5	36.7	32.8	42.3	37.8
E17	338562 5559621	Newtown Road	27.6	21.3	19.1	24.6	22
E19	338953 555610	Wigton Road	58	44.8	40.1	51.7	46.3
E20	339023 555692	Wigton Road	50.4	38.9	34.8	44.9	40.2
E4	339396 555947	John Street	47.4	36.6	32.7	42.2	37.8
E6	339467 555974	Paddy's Market	40.5	31.3	28	36.1	32.3

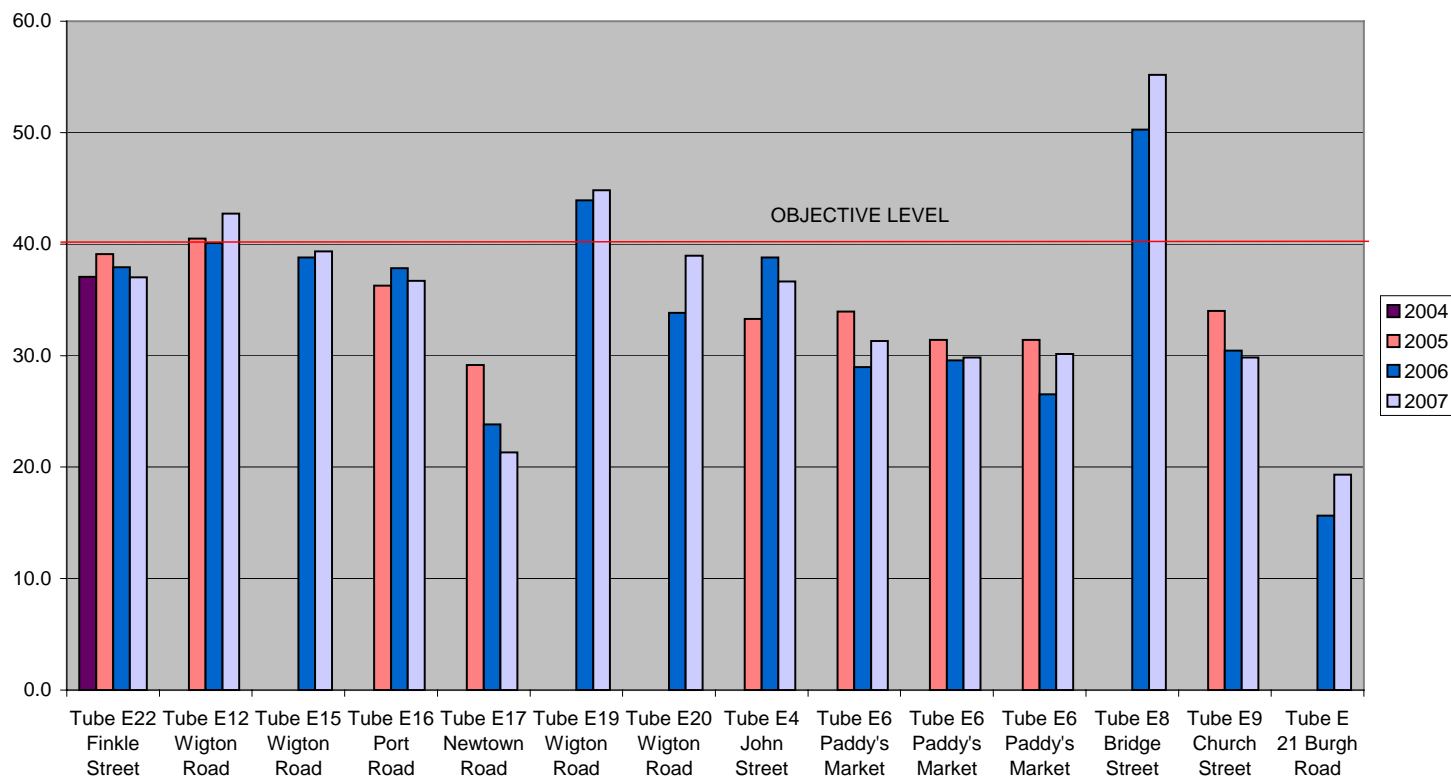
E6	339467 555974	Paddy's Market	38.6	29.8	26.7	34.4	30.8
E6	339467 555974	Paddy's Market	39	30.1	26.9	34.8	31.1
E8	339516 556024	Bridge Street	71.4	55.2	49.4	63.6	56.9
E9	339405 555996	Church Street	38.6	29.8	26.7	34.4	30.8
E21	337730 556118	Burgh Road	25.1	19.4	17.4	22.4	20

Area E - National Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Results



Area E – Local Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Results

AREA F BIAS

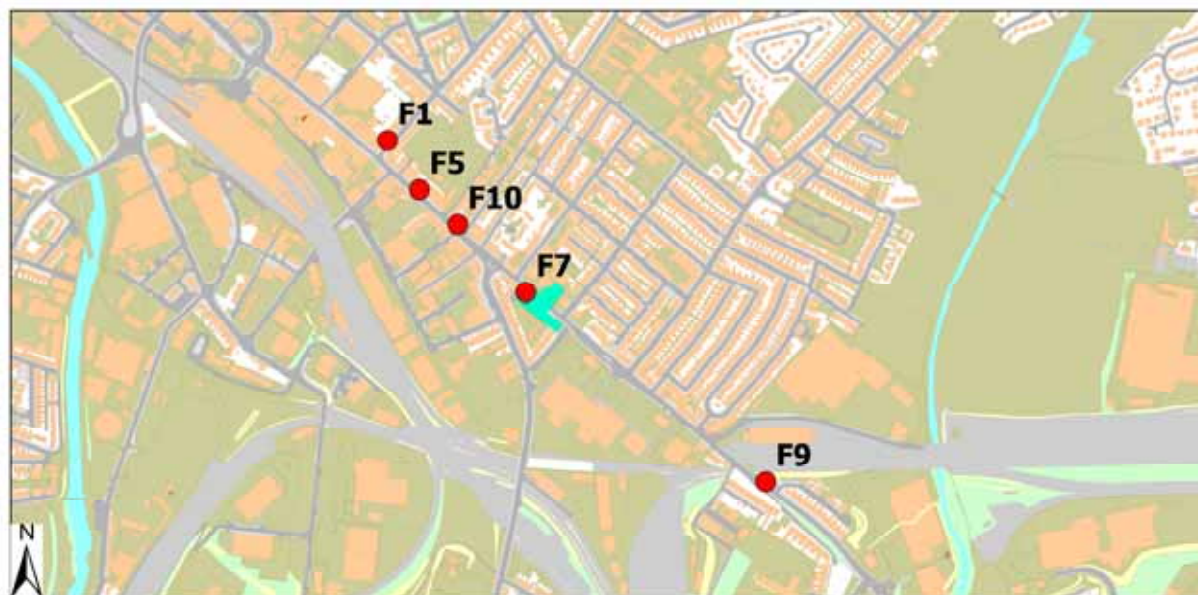


Conclusion

Both the local and bias adjusted annual mean results confirm exceedences within the AQMA's Nos 3 (Wigton Rd) and 4 (Caldewgate). Results however also indicate that there may be further exceedences outside the current boundaries of both AQMA's. 'Further Assessment' work is currently taking place as part of the Council's duties following on from the declarations of the AQMA's. One of the purposes of the Further Assessment is to confirm whether the boundary of the AQMA's is correct or requires adjustment. The work will also assist the local authority in deciding what additional measures will be needed in the Air Quality Action Plan to reduce the nitrogen dioxide along this route. It is however envisaged that the proposed CNDR will have a significant affect on reducing nitrogen dioxide levels. The Further Assessment report will be available in December 2008

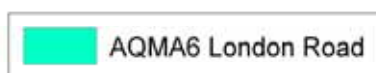
Area F Botchergate and London Road A6 (Includes AQMA No 6)

Monitoring Locations



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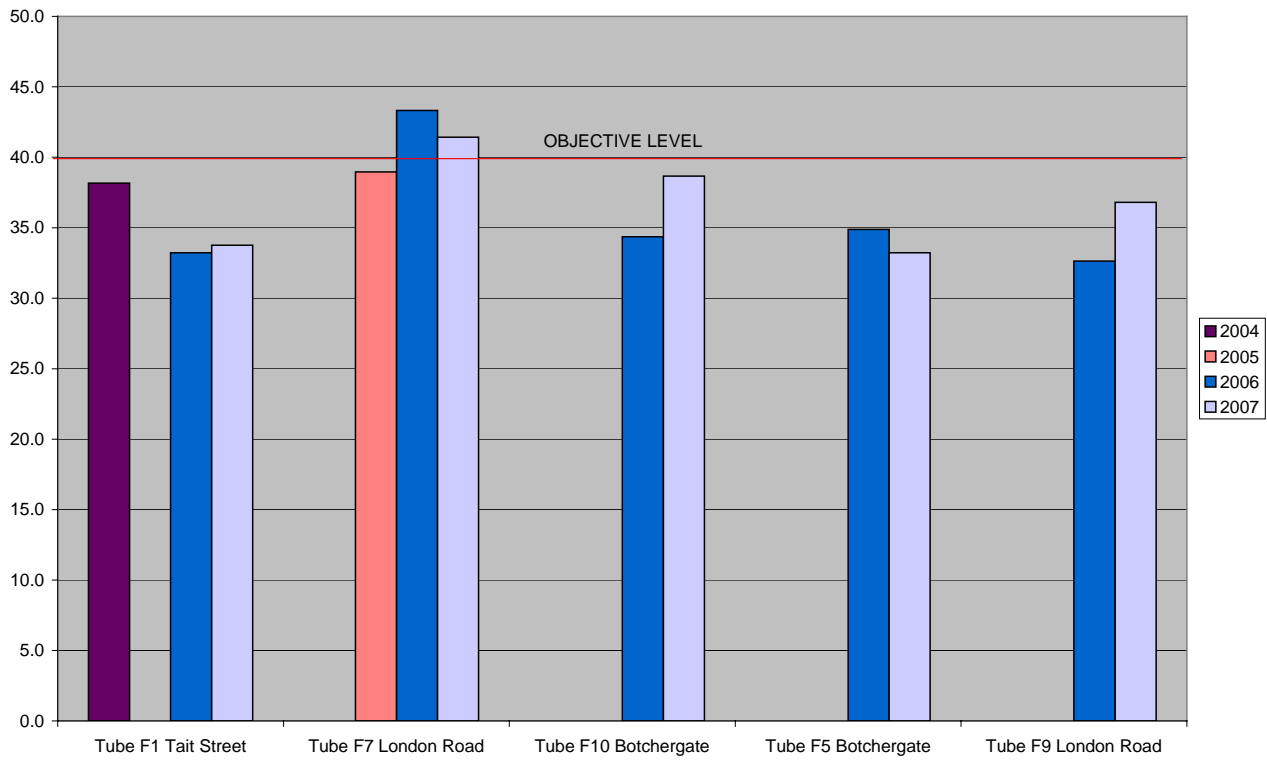
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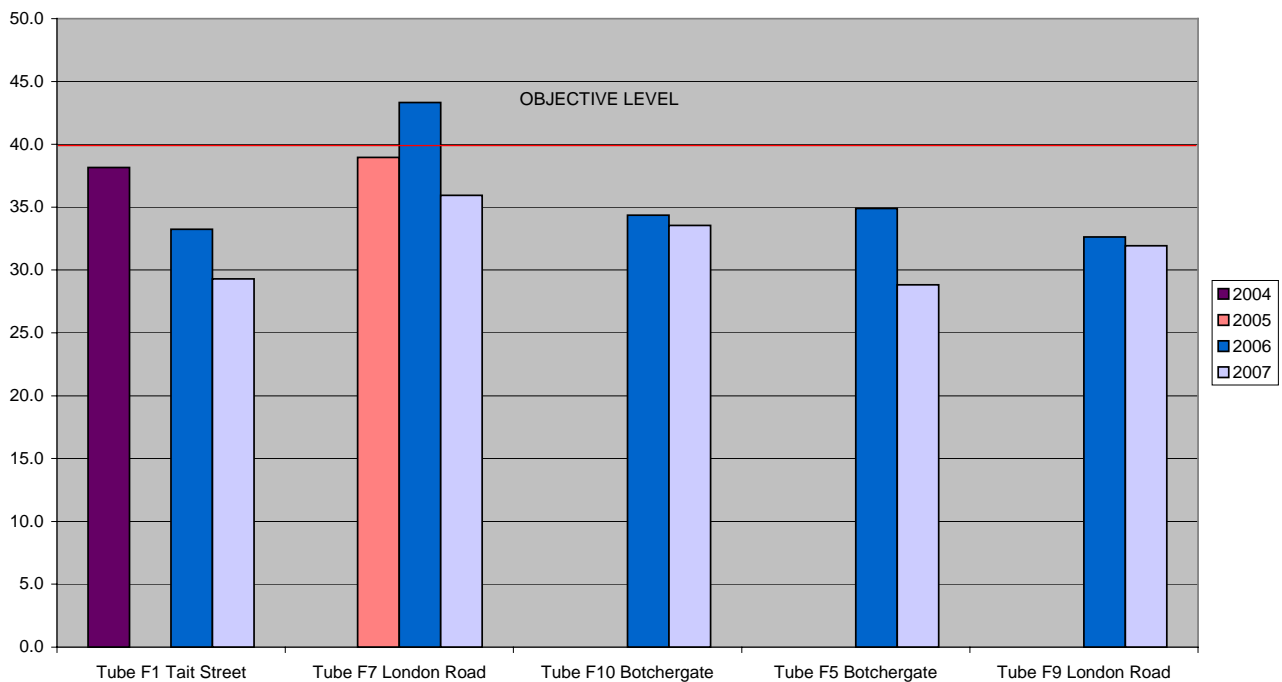
Area F- Nitrogen Dioxide Diffusion Tube Monitoring Results

TUBE CODE	GRID REFERENCE	LOCATION	RAW 2007 ANNUAL MEAN	CORRECTED LOCAL BIAS ADJUSTED MEAN (0.773)		CORRECTED NATIONAL BIAS ADJUSTED MEAN (0.891)	
				2007	Projected 2010	2007	Projected 2010
F1	340482 555489	Tait Street	37.9	29.3	26.2	33.8	30.2
F10	349597 555351	Botchergate	43.4	33.5	29.9	38.7	34.6
F5	340534 555409	Botchergate	37.3	28.8	25.7	33.2	29.7
F7	340708 555240	London Road	46.5	35.9	32.1	41.4	37
F9	341099 554931	London Road	41.3	31.9	28.5	36.8	32.9

Area F - National Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Results



Area F -Local Bias Adjusted Annual Mean Nitrogen Dioxide Results



Conclusion

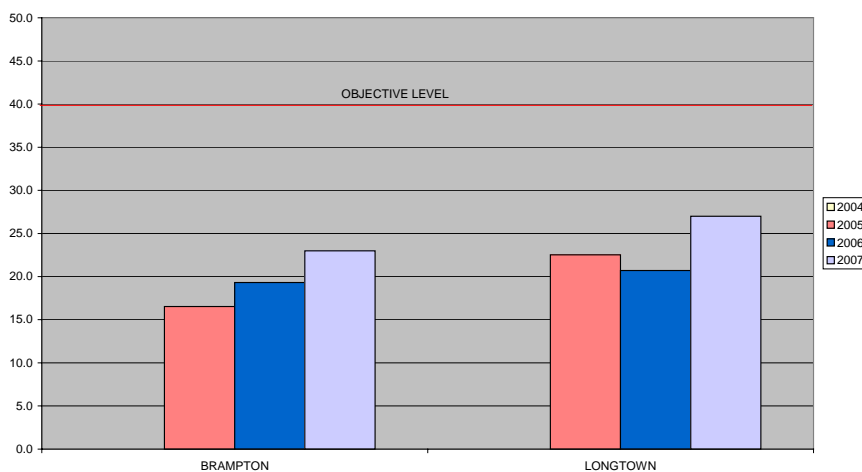
The national bias adjusted monitoring data indicates that the annual mean nitrogen dioxide levels continues to be exceeded at locations along a section of London Road. Local bias adjusted monitoring data indicates that levels have fallen to below the objective level. Whilst nitrogen dioxide levels do appear to have fallen there is no present proposals to amend the AQMA No 6. Both the national and local bias adjusted data indicates that nitrogen dioxide levels will fall below the objective level by 2010.

Area H Locations outside the city

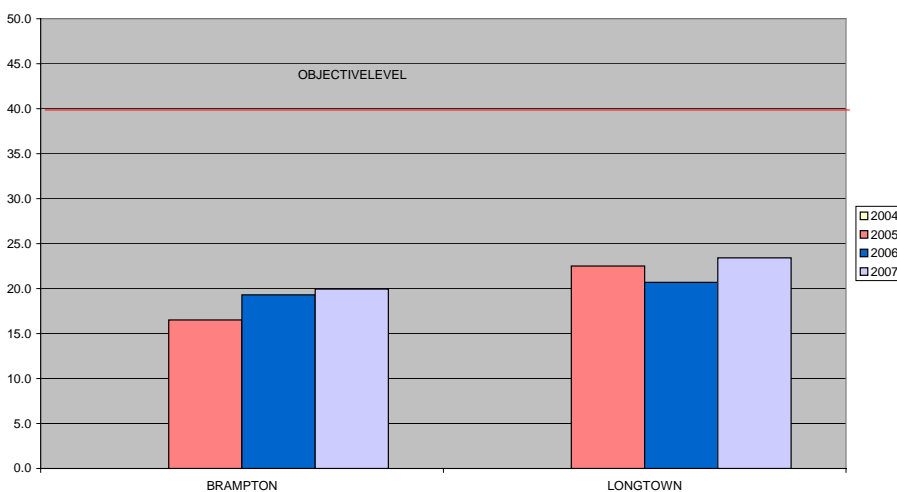
The sites in the table below are located in the next two largest centres of populations outside the city i.e. Brampton and Longtown

TUBE CODE	GRID REFERENCE	RAW 2007 ANNUAL MEAN	CORRECTED LOCAL BIAS ADJUSTED MEAN (0.773)		CORRECTED NATIONAL BIAS ADJUSTED MEAN (0.891)	
			2007	Projected 2010	2007	Projected 2010
H1 BRAMPTON	352824 561039	26.8	20.7	18.5	23.9	21.4
H3 LONGTOWN	338052 568478	30.2	23.3	20.8	26.9	24.1

National Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Results



Local Bias Adjusted Annual Mean Nitrogen Dioxide Diffusion Tube Results



Both the national and local bias adjusted annual mean data indicates that nitrogen dioxide levels in Brampton and Longtown are already well below the annual mean objective level.

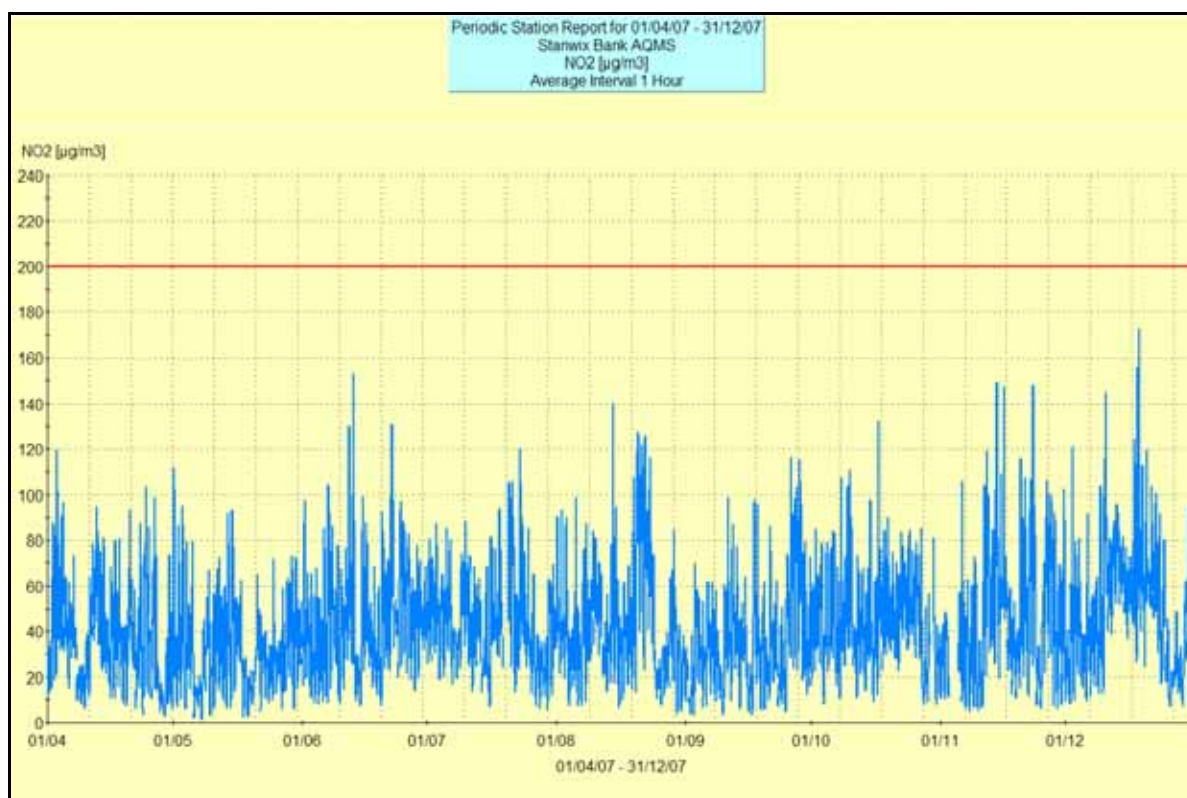
Continuous Nitrogen Dioxide Analyser Results

The following results have been obtained from our two continuous analysers located at Stanwix Bank and Paddy's Market.

Stanwix Bank - Monitoring Period 01/04/2007 - 31/12/2007

Year	No. of exceedences of hourly objective (200 µg/m ³)	Maximum hourly mean recorded	Mean Objective 40 µg/m ³	Data Capture %
2007	0	173.0	41.3	93.9 %

Graphical Report

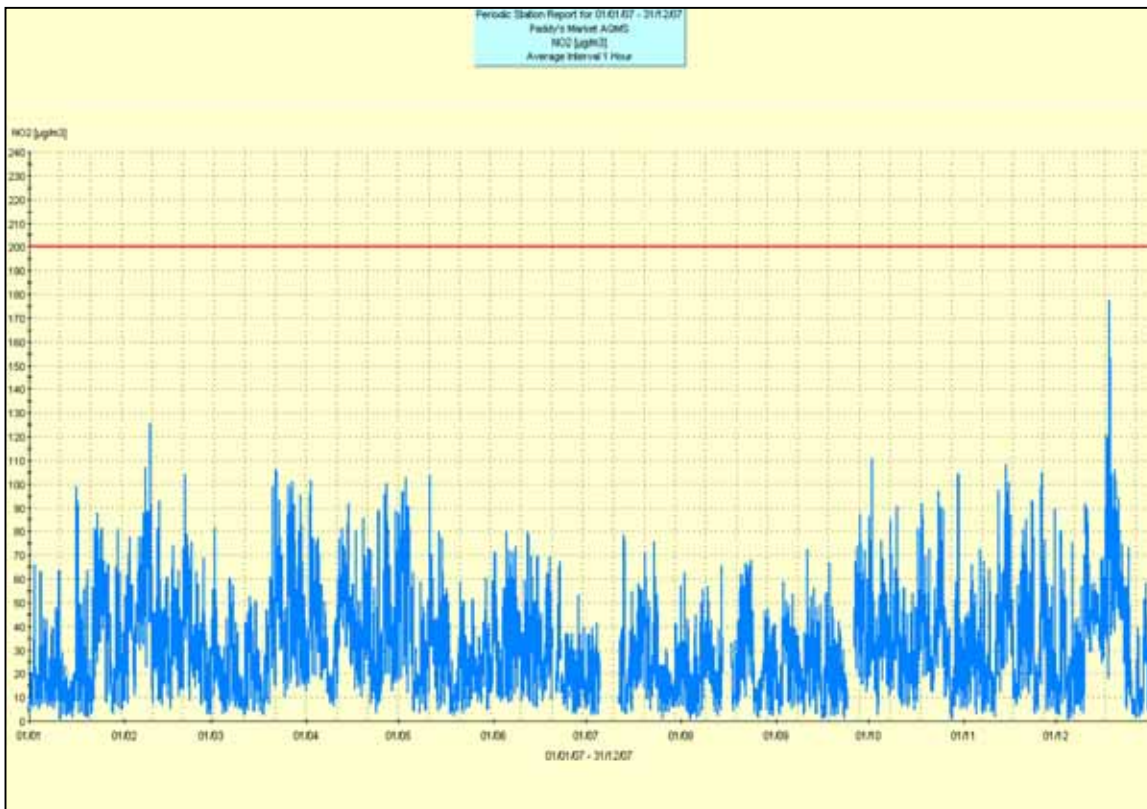


Results confirm that the annual mean objective level continues to be exceeded at Stanwix Bank. The annual mean concentration measured 41.3 µg/m³ (which was as predicted in the Further Assessment Report produced in 2007). There were no exceedences of the one-hour objective level.

Paddy's Market Monitoring Period 2006 – 2007

Year	No. of exceedences of hourly objective (200 µg/m ³)	Maximum hourly mean recorded	Mean Objective 40 µg/m ³	Data Capture %
2006	0	124.4	33.5	90.9 %
2007	0	177.4	30.8	96.1 %

Graphical Report



Particulates PM10

Particulates are the fraction of airborne particles less than $10\mu\text{g}/\text{m}^3$ in diameter. These small particles can be breathed into the deepest part of the lungs carrying with them a range of both natural and manmade substances.

PM10 comes from a wide range of sources known as primary (combustion processes such as vehicle exhausts), secondary (formed in the atmosphere) and coarse (from suspended soils, dust and construction etc).

In the Carlisle City Council are the dominating sources are likely to be: -

Local Traffic

Resuspension of road dust

Agriculture

Background PM10 carried from other parts of the UK and continental Europe


PM10 Monitoring Location

Particulate matter is monitored using a Tapered Oscillating Microbalance (TEOM). The location of the PM10 monitoring station is shown below.

Paddys Market Teom Station

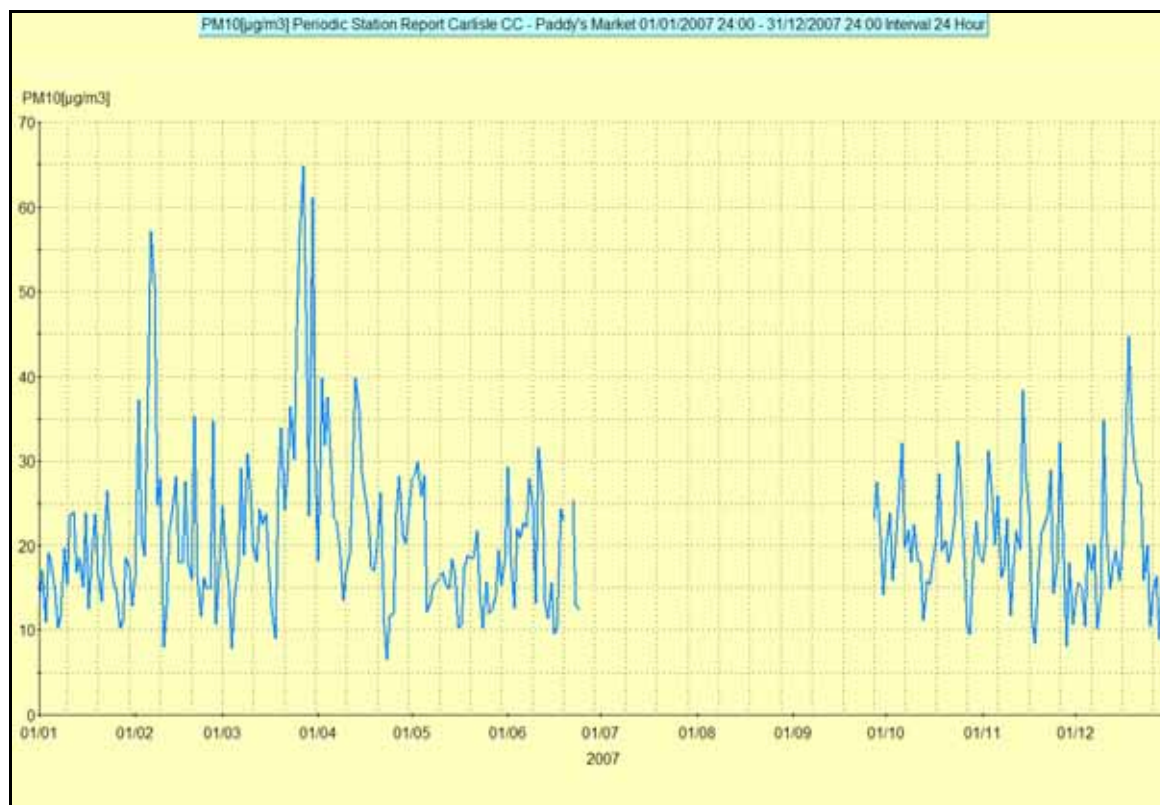


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CITY-COUNCIL

Civic Centre
Rickergate
Carlisle
CA3 8QG
www.carlisle.gov.uk

PM10 Monitoring Data

Data collected from the Teom station in 2007 is shown in below



Data from the Teom station has been corrected by a factor of 1.3 to convert the readings to gravimetric and enable comparison with the objective level. Results show that the particulate concentration is well below the objective level.

2006 – 2007 PM10 Monitoring Results Summary

	2006	2007
PM10 data capture rate	88%	74%
Annual mean PM10 concentration (gravimetric)	27.3	27.2
No of days exceeding 50 ugm (gravimetric)	16	11

Overall PM10 annual mean concentrations have remained at the same level whilst the number of 24 hour exceedances has slightly decreased. However PM10 concentrations are well below both the annual mean and 24 hour objective levels.

Benzene

Benzene is a recognised genotoxic human carcinogen. As benzene is a constituent of petrol, emissions arise from both evaporative and combustion of petrol. Benzene emissions also arise as stack emissions and, more importantly, fugitive emissions from its manufacture and use in the chemical industry. Benzene emissions have been steadily decreasing since 1990.

Previous review and assessment work undertaken within the authority has indicated that benzene concentrations are well below the objective levels. This picture is reflected nationally and there have been no AQMA's declared anywhere in the country in respect to this pollutant. Carlisle has however volunteered to undertake benzene monitoring as part of the National UK Non – Automatic Hydrocarbon Network.

Benzene Monitor



The benzene monitoring station is located within the roadside unit at Paddy's Market.

This is entirely funded by DEFRA. Results from the network are utilised by the government in demonstrating it's compliance with EEC directives. Carlisle joined the network in March and it is too early to report results. Data from our benzene monitoring will be reported in next year's Updating and Screening Assessment Report.

Monitoring of other pollutants

Carbon Monoxide

1,3-Butadiene

Lead

Sulphur Dioxide

No monitoring or modelling is carried out for these pollutants as previous review and assessment work (visit www.carlisle.gov.uk for details) and Government guidance indicates that it is unlikely that there is a breach of their objective levels within this authority.

4 New Local Developments

In addition to reporting new monitoring results and air pollution complaints, Defra guidance requires that details on new local developments that might affect local air quality are included in the Progress Report. These are considered under the following categories:-

Industrial Processes

New developments includes new A/A1, A2 or B industrial processes of types specified in Appendix E of the LAQM TG (03). It is also relevant to include any processes with substantially changed emissions, new landfill sites or quarries with relevant public exposure. It is only necessary to consider developments that have been granted planning permission.

Part A/ A1 Industrial Processes

No new Part A/A1 processes have been authorised for operation since the previous Progress Report. None of our existing Part A/A1 Processes underwent significant changes likely to increase their emissions by more than 30% since the last report. There are 16 A/A1 processes at present

Part A2 Industrial Processes

No new Part B industrial processes were authorised in Carlisle since the Progress Report. No previous existing Part B processes have undergone significant change likely to increase their emissions by more than 30% since the last report. None of the existing part B processes are likely to become Part A2.

Petrol stations fall into this category and are relevant in the context of benzene emissions. Authorities are required to identify new petrol stations where: -

- . petrol throughput is greater than 2000mgm
- . there is relevant exposure (houses within 10m of a petrol pump and
- . there is a busy road > 30000 vpd and
- . stage 2 recovery is not installed.

Carlisle City Council has no petrol stations which meet these criteria.

Other Industrial Sources

No new landfill, quarrying or mineral processes have been granted permission, started operation or significantly changed since the last report.

New Fuel Storage Depot

Carlisle City Council has one major fuel storage depot located at Dalston. This has been considered in previous reports. No new major fuel depots either in or close to Carlisle City Council have been identified since our last report.

Small Boilers

Carlisle City Council is not aware of any significant changes to > 5MW (thermal) fuel plants and processes since the last progress report.

Industrial Process Closures

There have been no industrial process closures since the last report.

New Developments – Residential, Commercial and Public

The City is undergoing an exciting and challenging period of development and renaissance following the floods of January 2005. The Council has made a Growth Point bid under the Housing Green Paper proposals. In addition the Regional Planning Guidance for the North West has identified Carlisle as a key to City development should be concentrated and identified a Regional Investment Site at Kingmoor Park. Again Government Guidance requires development to be included in a Progress Report that have been granted planning permission.

New Residential Developments

There are several new housing developments proposed for Carlisle City Council that have been granted full planning permission since the last report.: -

06/0667 – Former Cavaghan & Gray site, London Rd – 111 units

07/0845 – Former Watts Yard, London Rd - 99 units

04/0073 & 08/0431 – Former sawmill, Longtown – 78 units

08/0051 – Rome Street – 98 units

Developments which have been completed since the last Progress Report: -

Former Garlands Hospital final figure 302 units

Carleton Grange final figure 495 units

Land Allocated for Residential Development but without Permission

The following land has been set aside for residential use:-

- 1) Rome Street (2.1 hectares -)
- 2) Nelson St (2 hectares – 103 units)
- 3) Penguins (0.64hectares – 64 units)
- 4) Brisco
- 5) Adj HK Campbell School (0.9 hectares – 33 units)
- 6) Laings (1.74 hectares 90 units)
- 7) Key Safety Systems (1.32 hectares 90 units)
- 8) Hilltop (0.31 hectares – 80 units)
- 9) Harraby Green (1.05 hectares – 45 units)
- 10) St Nicholas (0.42 hectares – 50 units)
- 11) Deer Park (3.93 hectares – 60 units)
- 12) Racecourse (0.33 hectares – 60units)
- 13) Durranhill (4.8 hectares – 100 units)
- 14) Carleton Clinic (4.19 hectares – 100 units)
- 15) West of Morton Road (8.1hectres – 197 units)
- 16) East of Wigton Road (25hectres – 566 units)
- 17) Peter Lane, Dalston (47hectres – 101 units)

There have been a number of applications for residential developments for dwellings/units below 100 units. These developments by themselves are not significant but the cumulative effect may have an impact on air quality. Carlisle City Council will therefore continue to monitor along the main routes of the city. Likewise any expected or predicted future developments will be taken into account in the air quality monitoring regime.

Commercial Developments

The following commercial developments have received planning permission since the last Progress Report

07/0836 – Tynedale Agri Shop, Townfoot, Longtown – 4 workshops totalling 840 sq m plus veterinary surgery (total floor space 1000sq m)

07/0848 – Calder Foods, Burgh Road Industrial Estate – 1516sq m extension

The following commercial development has been completed since the last progress report: -

06/0258 – Units N, P and R developed total of 1152sq m, a further 5058 sq m is yet to be developed

06/0507 – Unit B Dukes Drive, Kingmoor Park North, Units B & H completed of 5940 sq m, a further 7830 sq m yet to be developed

05/0657 – 66/6, 66A, 66B Millbrook Rd, Kingstown Industrial Estate developed 3935 sq m (this involved demolition of existing building of 1751.38 sq m therefore net increase is 2183.62 sq m)

07/0015 – the Hub Development at Kingmoor Park East includes a 130 bed hotel, conference facilities etc

New Public Buildings

The following public buildings have received planning permission since the last progress report: -

07/1149 – Cumbria Constabulary, site 10 Durranshill Industrial Estate – Divisional Headquarters

07/9002/CTY – Fire Service, Eastern Way, Durranshill Industrial Estate – Community Fire Station & Divisional HQ

New Developments- Transport

New developments relating to roads or other transport are relevant to air quality as they may have an impact on ambient levels of carbon monoxide, benzene, nitrogen dioxide and particulates.

New Road Developments

Construction of the Carlisle Northern Development Route (CNDR) has been considered in previous air quality reports and work is due to start in March 2009. Further details are provided in Section 5.

No other new roads have been constructed or proposed since the previous Updating and Screening Assessment in 2006.

No roads have been identified for which updated traffic data have revealed that the annual average daily traffic flow (AADFT) is significantly higher (25% or more) than previously thought.

No roads have been identified which have an AADFT greater than 10,000 vehicles per day, but which were omitted from previous updating and screening reports.

Road Layout Changes to AADFT

There has been no significant road layout changes or road works undertaken since the last Updating and Screening Assessment (USA).

Significant Changes to AADFT

No roads have been identified with annual average daily traffic flow AADFT greater than 10,000vpd, which have experienced large increases (25%) in traffic flow since the previous USA.

Newly Identified Public Exposure to Vehicle Emissions

LA's are required to consider whether there are any of the following in their area, either new since the last report or newly identified:

Narrow congested streets meeting the following criteria

- . Residential properties are within 5m of the kerb
- . Average traffic speed and 50kmp or less
- . Carriageway is less than 10m wide and
- . AADF is greater than 10,000

Busy streets where people may spend 1 hour or more close to traffic (including streets of shops, cafes and bars) meeting the following criteria

- . Public Exposure for 1 hour or more within 5m of the kerb
- . AADT >10,000

There are no new, or newly identified streets meeting these criteria since the last report.

Other Transport Sources

As well as road vehicles, public exposure to emissions from planes, buses, trains, ships etc must also be considered.

Trains

There are no new or newly identified locations where diesel locomotives are regularly stationed for 15 minutes or more and: -

- . There is potential for public exposure within 15m of the locomotives.
- . There are more than two occasions a day when diesel locomotives are stationary with engines running for more than 15 minutes

Bus Stations

The main bus station in Carlisle has less than 1000 bus movements per day. There are no newly identified bus stations with more than 1000 bus movements per day and no bus stations where movements have increased to more than 1000 per day since the previous Updating and Screening Assessment Report.

Shipping

Carlisle City Council does not have any shipping ports.

Airport

An application to develop Carlisle Airport was submitted to the city council in October 2007. Part of the proposal included the development and expansion of commercial and passenger flights. As part of the application an air quality impact assessment was submitted. This indicated that the number of flights in terms of million passengers per annum (mppa) would be substantially below the trigger level as set out in TG (03) for being a risk of an air quality objective level being exceeded. The application has since been withdrawn although it is likely to be resubmitted in the near future.

New Commercial Development

Tesco store at the viaduct

Since the last Progress Report this application has been subject to a Public Inquiry. The local authority's decision to refuse permission was upheld. Tesco however already had permission for smaller scale store for the same site and may continue with these original plans.

New Public Developments

New public developments such as schools, hospitals, stations, major car parks require consideration as they may impact on local traffic flows. No new public developments have been granted permission since the last report.

5 Air Quality Action Plan Progress Report

Introduction

Carlisle City Council's Air Quality Action Plan was published earlier this year. The plan focuses on reducing Nox emissions primarily through measures to reduce traffic flow and vehicle emissions that are consistent with Council wide policies, particularly those in the Local Transport Plan (LTP2). Other actions focus on reducing emissions from buildings and industry as well as measures to raise public awareness of air pollution and greener travel. A copy of the full action plan is available on the city council's web site (www.carlisle.gov.uk).

Whilst it is still early days in its implementation an update on the action taken so far is provided in this report. It should be noted that the plan was formulated following the declaration of AQMA's. Nos 1 (A7 Hardwicke Circus to Junction 44, M6 motorway) and No 2 (Currock Street). Following the declaration of 4 other AQMA's in August 2008 the Action Plan will be revised to take account any further actions that will be needed in pursuit of the objective levels for nitrogen dioxide within these areas. Further Assessment work is currently being undertaken by AEA technology on behalf of the council to help inform the action planning process.

Carlisle Northern Development Route (CNDR)

The CNDR is the single major scheme in the LTP(2) and the Air Quality Action Plan. It will result in the significant reduction in road traffic along the A7 and the A595 (approximately 25%). Modelling undertaken as part of the action planning process indicates that the opening of the CNDR will result in the reduction of NO2 within AQMA Nos.1 to be below the annual mean objective level for nitrogen dioxide by 2010.

AEA Technology consultants have been appointed to undertake 'Further Assessment' work on behalf of the City Council following the declaration of the AQMA's in August this year. This work will include consideration of the effects of the CNDR on AQMA's Nos 3 (Wigton Rd) and Nos 4 (Bridge Street).

Significant progress continues to be made on the CNDR as the council's only current major transport scheme. Delivery of the scheme is vital to the economy of the area helping to tackle congestion in the city, supporting the development of the Kingmoor Park regional employment site and improving access to West Cumbria for freight traffic. The CNDR will also have an important impact on the schemes coming forward through Carlisle Renaissance. The reduction in through traffic from the city centre will allow measures to revitalise the public realm and improve access by walking, cycling and passenger transport to be implemented.

Currently negotiations are ongoing with the preferred bidder, Connect CNDR; a Balfour Beatty led consortium. These negotiations are addressing a wide range of detailed technical, financial, legal issues that will need to be fully agreed before a contract is signed. Assuming final DfT Treasury approval is granted, the council is aiming for a contract to be awarded before the end of 2008 and for works to commence on site at the earliest opportunity.

The Council's progress on each of the 41 actions is updated in the 2008 progress report is summarised in Table A below according to the recommended format set out in Defra's progress report guidance LAQM (PRG 03).

TABLE A

Action Plan Ref No	Action plan measure/ target	Original time-scale	Progress with measure	Out come to date	Comments
1	A new major road, the CNDR, will be constructed to the west of the City, which will remove approximately 25% of through traffic from the A7 (AQNA no1) and the A595	2010	On target. Preferred bidder for the project announced on 22.11.07. Negotiations are ongoing & Cumbria CC are aiming for contract to be signed by the end of 2008. In advance of contract being signed, Cumbria CC has entered into a Pre-Development Agreement with the preferred bidder to ensure a range of advance work can be progressed to reduce timescale before the start of the main works.	No outcome to date	
2	The possibility of providing a stronger route to ease congestion between the A6 & the A595 (either by a series of junction improvements or a new route entirely) will be investigated.	Unable to specify	No action to date but study due to take place during the lifetime of LTP 2.	No outcome to date	Proposal was considered by the Highways working group to be one of the top 10 measures of the Carlisle Renaissance Movement Strategy to be taken forward
3	Investigations to improve traffic flows in the city particularly at signals along the A7 & the A595.	2010	Ongoing. Signal improvements undertaken in 2007 along the A7. Real time air quality information is being shared with County Council to identify effects of traffic signalling on NO2 concentrations	Currently being assessed	
4	Within the emerging draft local plan, the City Council has set policies, which target a number of areas such as Green Travel Plans & accessibility by different modes of sustainable transport. These policies will also contribute to improving air quality.	Ongoing	The draft Local Plan has now been through a Public Inquiry & the Inspectors Report has been received. Local Plan is awaiting adoption by the City Council in July. All policies are underpinned by the concept of sustainable development & seek to reduce the need to travel & reduce the use & reliance on a private car e.g. Policy EC15 Tourism Development requires '.....access by a choice of means of transport including sustainable modes of travel such as cycling or long distance walking.....'		
5	The Environmental Quality Section will continue to work with the Planning Department with regard to new developments & ensure that air quality is taken into account in the planning	Ongoing	Environmental Quality Section is now consulted on proposed developments which may impact on air quality at an early pre planning stage. Consultations now take place with applicant prior	Air Quality Impact Assessments are now submitted as part of	

	process.		to applications being submitted.	applications for large developments	
6	A guidance document " Air Quality & Land Use" has been produced for the developers submitting planning applications on where & in what form an air quality impact assessment will be required. This has now been incorporated into the council 's planning validation process. This will be reviewed to include a suitable mitigating measures based on national best practice	2007	Completed. The Air Quality & Land Use Guidance Document is now on the City Council's web site & can therefore be viewed by developers & the public. Large developments are required to carry out an air quality assessment if they meet criteria set out in the air quality planning guidance. Criteria are essentially based on criteria used to trigger a transport assessment.	To date 8 air quality assessments have been requested	
7	Supplementary Planning Guidance will be produced on planning obligations to financial contributions from developers to movement & public realm projects set out in the Development Framework & Movement Strategy	2007	Draft SPG has been completed. The SPD sets out the City Council's approach to the use of planning obligations, as provided for under s106 of the Town & Country Planning Act 1990. The advice within the SPD will guide all those involved with the submission & determination of planning applications where obligations will be required. The SPD will include new developments which are likely to result in a significant increase in traffic volumes/demand for public transport &/or a deterioration in air quality. Financial contributions will be required to mitigate/offset such negative effects. The SPD includes guidance for commuted sums towards existing cycle routes (where development is in close proximity to) & towards Public Transport Infra structure improvements. The draft SPD will be reported to executive committees at the end of July for approval to consult on the document. Consultation period will be mid August – end Sept 08!	Draft SPD produced-consultation pending	
8	The County Council has entered a Quality Bus Partnership with Stagecoach to improve bus route infrastructure	Ongoing	<p>Significant progress is being made. A bus stop audit has recently been undertaken by Stagecoach. This work is being utilised as a basis for the general infrastructure improvements undertaken by Cumbria County Council on a route by route basis.</p> <p>Trialling of 'PIP' screens on the 67/68 services was undertaken during 2007. This measure was clearly favoured by the public to enhance service reliability.</p> <p>A report is to go to committee recommending that PIP's screens & other infrastructure improvements are provided at key stops in the city centre, on the radial routes & cross-city routes as a priority. In addition to the installation of four passenger transport information points on West Tower St, English St, the station forecourt & The Lanes Shopping Centre</p> <p>A Bus Improvement Strategy has recently been completed as part of Carlisle Renaissance Development Framework & Movement Strategy. The report provides detailed recommendations to enable public transport provision to go to the next level of offer to satisfy</p>		

			future demand generated from the Carlisle Renaissance developments & the Movement Strategy schemes such as the Carlisle Car Parking Strategy & cycling & walking routes within the city	The Bus Improvement Strategy is going through a consultation process at present	
9	Bus priority measures will take place on Scotland Rd (AQMA NO1), Wigton Rd & London Rd including traffic signal priority	2011	Still on target. Implementation will follow once the CNDR is operational	N/A	
10	Smart Card Ticketing solution will be developed on public transport services	2007/08	Still on target		
11	Roadside publicity & telemarketing will be used to encourage bus patronage	Ongoing	Annual bus patronage data obtained from Stagecoach highlights that patronage across the majority of key City Centre routes has increased during 2004-2007. From 2004/05-2005/06 there was a 0.5% increase in bus patronage, however the largest increase was observed from 2005/06-2006/07 when an increase of 7% was observed. This has reversed the declining trend that was observed from 2001-2004 & is believed to be due to the renewal of the bus fleet after the 2005 floods, marketing & fares initiatives & the introduction of the NoW Card.	2007/08 baseline on our city centre network (includes 60,61,62,67,68 69,&76) is 4.8 million passengers	
12	Development of Park & Ride will take place during the LTP(2) Plan	2009/2010	Feasibility of park & ride is being considered at the present time as part of the Car Parking Strategy & Bus Strategy & has been subject to a scrutiny review by Cumbria CC's Economy & Culture Panel.	Land has been allocated at Morton as 'park & ride' in the recently approved Local Plan	
13	A concessionary bus fare scheme has been introduced by Carlisle City Council to encourage use of public transport	Ongoing	The NoW Card is the concessionary travel scheme in Carlisle for senior citizens. Bus Pass uptake:- 2004/05 – 11,800 2007/08 – 16,500	A study of NoW Card suggests concessionary travel is the main reason that bus patronage has increased with a user survey revealing that 36% of users were using the car less as a direct result of the card.	Whether because of this or due to the current economic climate car parking usage is significantly down.
14	A Cycle Development Action Plan will be implemented through LTP(2) which will provide safer & better maintained cycle routes, more secure cycle parking, promotional programmes & improved signage	Ongoing	Improvements to existing cycle routes are in progress. Recent improvements include the Brampton Rd to Eden Bridge cycle route & sections along the River Petteril		
15	A proposed Cycling Network has been developed for the City	Ongoing	Progress is being made on the development of the cycle/pedestrian network in Carlisle. Several sections of the sustrans connect2 Kingmoor- Currock cycle route (which goes through two AQMA's) will be completed by Sept 08. Work is also taking place along the green corridors along the Petteril & Eden as part of the flood defence work undertaken by the Environment Agency. A study report on cycle & pedestrian routes commissioned by		

			<p>Carlisle Renaissance Working Group has also been undertaken. The study focuses on developing proposals that will maximise the benefit to the community by identifying measures that will link the corridor schemes to the communities each passes through, to the highway network & the city centre & to each other.</p>	The study report is currently out for consultation	
16	Cycling & Walking will be encouraged through promotional campaigns e.g. Bike week, and through regular features in Carlisle Focus Magazine & on the Council's Website	Ongoing	<p>Both the City Council's Sport's & Recreation Team & Cumbria CC Cycling for Health Officer are working with communities & businesses to encourage walking & cycling. This includes setting up refresher courses, learn to ride courses & organising events.</p> <p>Cycling & walking is regularly promoted in Staff Focus, Carlisle Focus & Your Cumbria Magazines The Sports & Physical Alliance project is due to start in September & will deliver walking & cycling initiatives in the community.</p> <p>The Sport & recreation Sections Walking Your Way to Health programme continues to thrive & new routes have been included. 20 bikes have been added to our stock from Centre Parcs & are being used, at present, by a new community cycling group in Denton Holme. The City Council is encouraging other communities to set up similar groups.</p> <p>Two bikes have been issued to Tullie House for employees to use.</p> <p>Both the City Council & County Council will be taking part in National Bike Week to encourage as many employees as possible to bike to work.</p> <p>Key officers from both Council's are to meet in order to establish a health group to promote & develop workforce health initiatives. It is hoped that the Council will adopt a Health Plan.</p> <p>Measures have been taken by Cumbria CC to improve the monitoring of cycling activity in the city. Cordons based around the key routes into the city together with appropriate recreational routes have been identified utilising new cycle counters.</p>	<p>The Cycle to Health Officer has trained up to 15 cycle leaders in Carlisle & over 150 people in the City have been involved in course/ events.</p> <p>The baseline in 2007/08 is 3,230 trips per day. LTP & Action Plan have set a target of 1% increase per annum</p>	
17	A cycling & walking guide for the City will be published by the end of 2008	2008	On target.	Cycling & Walking Guide will be available in Autumn 08	This will be made available at public buildings. Booklet will also be

					available in the Carlisle Focus magazine
18	Existing business will be encouraged to implement, monitor & review Travel Plans & promote more sustainable travel to their staff	Ongoing	Travel Plan Officer appointed by Cumbria CC. Working with larger employers within the local authority to encourage the adoption of a travel plan.	Several existing employers have taken up a travel plan including Kingmoor Business Park, University of Cumbria, Carlisle Hospitals, Cumbria CC, Capita Symonds, Carlisle College, Send The Light	
19	Travel Plans will be required to be implemented & monitored through s106 agreements through the Development Control Process for all new developments that meet the criteria for travel plan preparation	Ongoing	Cumbria County Council's Highways Development Control Officer comments on all planning applications affecting the highway. Examples of section 106 agreements include extension to Tesco, Warwick Rd subject to S106 agreement which included the provision of a free bus service & bus shelter for staff & customers; 2006- permission for outdoor education centre, subject to S106 which included a Green Travel Plan; 2007- permission for housing development within city subject to S106 which included commuted sum toward existing cycle route, the creation of a car club & a cycle to work scheme.	Monitoring system now in place to ensure all parts of S106's adhered to.	
20	Local schools will be encouraged & supported in taking up the School Travel Plans through the 'Better Ways To School Programme'	Ongoing	45 schools within the city council area have now taken up school travel plans, 28 of which are located within the city. It is envisaged that all schools within the local authority will have a school travel plan by the end of 2010	Details of modal shift?	
21	A car share scheme will be set up for the use by the public	2007	Completed. However scheme is limited to a link on the city council's web site with Car Share UK due to cost of operating City Council's own brand car share scheme (prohibitive). Car sharing is promoted on City Council's web site & also through the Carlisle Focus Magazine. Car sharing is also being considered as part of the city council's green travel plan. County Council have a staff car share scheme in operation.	Not able to monitor uptake	
22	The City Council will develop & implement a Green travel Plan for the organisation & promote the initiative to major employers	2007	Completed. A Green Travel Plan was produced & approved by Council in April 2008. The Green travel Plan is a statement of intent to be revised every 3 years & is accompanied by a separate annual action plan with further details of initiatives. Further detailed reports covering any financial & policy issues will be brought to the Executive following consultation with staff & any other necessary parties. One of the actions in the 2008/09 plan is to organise a green travel Plan event for other Carlisle employers	Green Travel Plan now approved	

			to share best practice & opportunities for partnership working.		
23	The Council will seek to improve the availability of cleaner fuels by encouraging new service stations to stock alternative cleaner fuels	Ongoing	Lack of new large fuel stations hindering progress. There may be opportunity to site in new developments	None to date	
24	The Council will develop a partnerships with business & major fleet operators to encourage the accelerated use of cleaner vehicle technologies & cleaner fuels & promote improved maintenance & considerate & economical driving	2008	No action to date		
25	The Council will introduce a policy of replacing it's vehicle fleet with greener types of vehicle	Ongoing	This is included in the 2008/09 Green Travel Plan. Policy is to be in line with the Council's Procurement Policy & the Northeast Purchasing Organisation (NEPO). Criteria to consider CO2 emissions, fuel type etc.	Now actioned in the Green Travel Plan	The refuse fleet is currently being replaced. All vehicles will meet Euro V by 2009
26	The Council will carry out campaigns to raise awareness of vehicle pollution, including discouraging drivers from allowing their engine to idle & possible voluntary vehicle emission testing	2008	Contact made with VOSA to develop emission testing pilot	Awaiting further information	
27	The City Council will consider authorising it's officers under the Road Vehicle (Construction & Use) Regulations for the purposes of issuing fixed penalty notices where motorists refuse to turn off idling engines	2008	No action to date. Waiting to see how successful schemes are in other Authorities.		
28	The City Council & The County Council will develop & implement a comprehensive Car Parking Strategy	Ongoing	A draft Carlisle Parking Strategy has recently been completed. This strategy has been developed in association with Carlisle Renaissance Development Framework & Movement Strategy objectives to ensure that car parking aids development in the city, maintaining economic vitality of the city centre & achieving aims in the city to reduce congestion, improve air quality & to promote sustainable modes of travel.	Going through committees & wider consultation	
29	The movement of goods by rail, wherever possible, will be encouraged.	Ongoing	The County Council has recently appointed a Rail Officer to promote movement of freight by rail.	The County Council are working with Direct rail Services at Carlisle to develop flows to, from & through the city.	
30	The City Council will promote the reporting of smoky vehicles through information leaflets, information in Carlisle Focus Magazine & through the City Council's website	2007/08	Information leaflets have been distributed in public buildings e.g. civic centre, libraries & community centres. Information on how to report smoky vehicles is now available on the City Council's web site.		

31	The Council will continue to provide comprehensive control over all Part A & B. Processes located within the local authority	Ongoing	Part A processes are authorised & inspected by the Environment Agency. Part A2 & B processes (88 in total) are authorised & inspected by Carlisle City Council. All processes are inspected at least annually. Inspections are risk based.	No notices issued or prosecutions necessary during 2007/08	
32	The Council will improve information & advise give to residents & companies about problems caused by bonfires, and continue enforcement action where appropriate.	Ongoing	Ongoing enforcement	62 complaints dealt with in 2007/08	
33	An extensive publicity campaign has recently taken place on green waste collection schemes provided by the Council	2007	Features on recycling initiatives regularly appear in Carlisle Focus	Recycling has increased from 34% in 2006/07 to 48% in 2007/08. The amount of residual waste going to landfill has reduced by 24% as a result of the changes in waste collection.	
34	The Council will continue to investigate complaints of black smoke & smoke control areas.	Ongoing	The City Council received & investigated 6 complaints regarding black smoke from trade/commercial premises	Warnings issued	
35	The Council will continue to ensure that only authorised fuels are used in smoke control areas.	Ongoing	There are 5 Smoke Control Areas located within the City. A map showing the areas & information on types of fuel that can be burnt are now on the Council's web site. No enforcement action was necessary during 2007.	EQS receives approximately 12 queries per year from householders who are unsure as to whether they are in a SCA & what restrictions have been imposed on type of fuel that can be burnt within the areas.	
36	An Energy Efficiency advice survey will be targeted at residential properties within/adjacent to the AQMA's . Energy savings advice & grants to be provided	Ongoing	Awaiting information from eac		
37	We will establish a method to introduce more regular publicity events & promotion of air quality & sustainable transport issues	Ongoing	Regular publishing in Staff Focus & Carlisle Focus Magazines & on council's own website will start in Sept 08 to coincide with the publication of the walking & cycling guidance.		
38	The City Council will improve access to information regarding transport options by publishing up to date bus & rail times on the Council's website	2007	Completed. Bus & rail information is now available on the City Council's web site.		
39	The City Council will publish more local air quality monitoring data on it's website	2007	Completed. Real time monitoring data from our 2 monitoring stations is now available on the Council's Web site. Review & Assessment Report's (including results of all monitoring) are also		

			available on the website		
40	The City Council will produce a teaching pack on air quality & reducing air pollution. These will be circulated to schools in the District	2007/08	Information packs completed.	Officers have given talks to 2 schools on air pollution issues.	
41	We have expanded our monitoring network to incorporate a new continuous monitoring site for nitrogen dioxide installed within AQMA (No1)	2007	New air monitoring unit has been installed at Stanwix Bank (within AQMA No1). Paddy's Market Monitoring Unit which measures nitrogen dioxide, particulates and benzene has now been incorporated into the National Automatic & Rural Network (AURN) and non-automatic hydrocarbon network. As well as providing data to the council data from this unit is also used in Government reports on the national picture	Data from both monitoring stations are now available on the City Council's web site	

Appendix 1

Diffusion Tube Precision and Accuracy

The spreadsheet of the local diffusion tube collocation results used to bias adjust the annual mean from nitrogen dioxide monitoring undertaken within Carlisle City Council is shown below.

Checking Precision and Accuracy of Triplicate Tubes

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 $\mu\text{g m}^{-3}$	Tube 2 $\mu\text{g m}^{-3}$	Tube 3 $\mu\text{g m}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Automatic Method		Data Quality Check	
										Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data Capture Check
1	4.1.07	30.1.07	33.0		30.0	32	2.1	7	19.1	25.6	99.8	Good	Good
2	30.1.07	1.3.07	47.0	48.0	45.0	47	1.5	3	3.8	36.8	100	Good	Good
3	1.3.07	3.4.07	32.0	42.0	25.0	33	8.5	26	21.2	32.8	100	Poor Precision	Good
4	3.4.07	2.5.07	39.0	40.0	27.0	35	7.2	20	18.0	38.6	99.6	Poor Precision	Good
5	2.5.07	4.6.07	27.0	31.0	28.0	29	2.1	7	5.2	29	99.9	Good	Good
6	4.6.07	3.7.07	62.0	64.0	60.0	62	2.0	3	5.0	30	93.3	Good	Good
7	3.7.07	1.8.07	24.0	20.0	37.0	27	8.9	33	22.1	30	77.8	Poor Precision	Good
8	1.8.07	5.9.07	48.0	37.0	29.0	38	9.5	25	23.7	24	91.8	Poor Precision	Good
9	5.9.07	2.10.07	41.0		43.0	42	1.4	3	12.7	26	91.4	Good	Good
10	2.10.07	31.10.07	43.0	32.0	35.0	37	5.7	16	14.1	33	100	Good	Good
11	31.10.07	31.12.07		49.0	57.0	53	5.7	11	50.8	35.6	99.7	Good	Good
12	3.12.07	3.01.08	50.0	49.0	52.0	50	1.5	3	3.8	33	99.9	Good	Good
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Site Name/ID:	paddy's market	Precision	8 out of 12 periods have a CV smaller than 20%	(Check average CV & DC from Accuracy calculations)
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Accuracy	(with 95% confidence interval)	Accuracy	Without CV>20%	With all data
Bias calculated using 8 periods of data				
Bias factor A	0.71 (0.59 - 0.89)	0.71 (0.66 - 0.94)	41%	30%
Bias B	41% (13% - 68%)	29% (7% - 51%)	27.8%	22.5%
Diffusion Tubes Mean:	44 $\mu\text{g m}^{-3}$			
Mean CV (Precision):	7	13 caution		
Automatic Mean:	31 $\mu\text{g m}^{-3}$			
Data Capture for periods used:	98%			
Adjusted Tubes Mean:	31 (26 - 33) $\mu\text{g m}^{-3}$			

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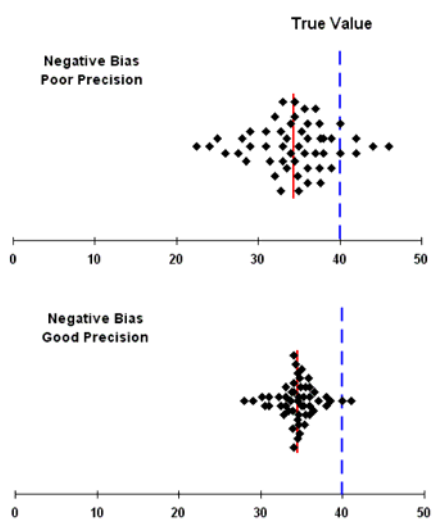
Version 03 - November 2006

The spreadsheet of diffusion tube collocation results also contains information on the precision of the diffusion tubes, in those cases where duplicate or triplicate tubes were exposed. At the request of a number of Local Authorities, the precision data for each laboratory have been brought together in a summary form. This is shown below.

Precision Vs Accuracy (Bias)

Precision should not be confused with accuracy. Diffusion tube precision can be described as the ability of a measurement to be consistently reproduced, i.e. how similar the results of duplicate or triplicate tubes are to each other. Accuracy represents the ability of the measurement to represent the 'true' value, which, in this case, is defined as the result from the automatic analyser. When averaged over a number of sets of results bias can be evident. This represents the overall tendency of the diffusion tubes to depart from the 'true' value, i.e. to systematically over-or under-read when compared against the reference method. Once identified, bias can be adjusted for to improve the accuracy of diffusion tube results. This is done using bias adjustment factors, which have been found to be specific to a laboratory and tube preparation method . Unlike bias, poor precision cannot be adjusted for. It can only be improved by careful handling of the tubes in both the laboratory and the field. The two Figures below illustrate the difference between bias and precision. Both sets of results have the same calculated negative bias, shown by the vertical red line, compared with the true value. However, those in the top part of the Figure have poor precision, whereas those in the lower part have good precision (the vertical spread is just a way of displaying the large number of individual results).

Good vs Poor Precision



Tube precision is separated into two categories Good or Poor as follows: tubes are considered to have Good precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have Poor precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%.

The distinction between Good and Poor precision is an indicator of how well the same measurement can be reproduced. This precision will reflect the laboratory's performance/consistency in preparing and analysing the tubes, as well as the subsequent handling of the tubes in the field. Any laboratory can show Poor precision for a particular period/collocation study, if this is due to poor handling of the tubes in the field. Therefore, when assessing the performance of a laboratory using the findings in the attached Figure, account should be taken of the proportion of Poor precision collocation results, not just the presence or absence of Poor precision collocation results.

The precision results in the summary above for the individual laboratories are presented for two years, 2006 and 2007, as the performance of a laboratory may change from one year to another.

Results from both the national collocation studies and our own local collocation study for Bureau Veritas Labs indicate poor tube provision

What to do with poor precision results:

Where results show Poor precision, then they should be treated with caution, and may not be suitable for their intended purpose. If a particular authority has Poor precision from most or all of its duplicate or triplicate data sets then it should look at its own tube handling procedures. If these are judged to be good then it will be appropriate to look at the precision results for its laboratory to see if this may be the explanation. The aim should be to use results from tubes that are giving Good precision, as this will improve the overall reliability of the annual mean concentrations derived from diffusion tubes.