



2012 Air Quality Updating and Screening Assessment for *Carlisle City Council*

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

April 2012

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Executive Summary

The Government published the revised Air Quality Strategy for England, Scotland, Wales and Northern Ireland in July 2007. At the centre of this Air Quality Strategy are the use of air quality standards, which enable air quality to be measured and assessed. These standards also provide the means to set air quality objectives and timescales. The air quality objectives had to be achieved between 2003 and 2010.

Local Authorities are required to review and assess the air quality in their areas to determine whether the air quality objectives are likely to be met. Where the likelihood of exceedences of the air quality objectives are identified, in areas of significant public exposure, a detailed assessment of that area will be required. Depending upon the findings, an Air Quality Management Area (AQMA) may need to be declared, followed by a further assessment and the formulation of an action plan to help reduce these exceedences.

This report represents the first stage of the fifth round of review and assessment of local air quality in the Carlisle district. Carlisle City Council has previously undertaken 4 rounds of review and assessment. This has concluded that overall air quality within the district is good. There are, however, small pockets within the city where the annual mean objective level for nitrogen dioxide is being exceeded due to road traffic sources. As a consequence 6 Air Quality Management Areas have been declared between 2005 and 2008.

A 'Further Assessment' undertaken by specialist consultant's AEA Technology on behalf of Carlisle City Council, in 2009, concluded that AQMA 3 should be extended. This extension now covers additional residential properties along Wigton Rd, (odd no's 1-11 and even no's. 2-24) as well as properties on Caldcotes. The need to extend the AQMA was due to exceedences of the annual mean objective level for nitrogen dioxide in this area. The order to extend the AQMA came into force on 1st July 2010 following no objections from consultees.

The purpose of this Updating and Screening Assessment is to identify any significant changes that may have occurred since the previous rounds of review and assessment were completed. This includes a detailed analysis of new monitoring data for 2011 and a breakdown of any new or changed emissions sources across the district, as well as any other local changes that might affect air quality. If significant new sources or exposure risks are identified then the City Council would need to proceed to a Detailed Assessment.

When dealing with major new development prospective developers are usually asked to demonstrate the likely impacts and mitigation measures by submitting an Air Quality Impact Assessment (AQIA). Depending on the conclusions of the impact assessment and in the event of a granted application, it may be necessary to proceed to a detailed assessment should the predicted impacts be sufficient to warrant further detailed investigation.

The three principal pollutants that are currently monitored by Carlisle City Council include; nitrogen dioxide, particulate matter (PM₁₀ and PM_{2.5}) and benzene. This

report presents both the historical and the most recent results for 2011 for comparison purposes. The latest results for PM₁₀, PM_{2.5} and Benzene show that levels remain consistently below the objective.

New monitoring data for nitrogen dioxide indicates that there are locations within all 6 of our AQMA's which remain above, or borderline of, the annual mean objective level. This Updating and Screening assessment has not identified any exceedences of the air quality objectives outside of our existing AQMA's. The 2011 data indicates that the annual mean NO₂ concentrations have decreased at the vast majority of monitoring locations across the district, compared to 2010. This supports the conclusions of Progress Report (2011) in that the unexpected increase in NO₂ levels during 2010 was due to adverse meteorological conditions.

The most significant development in the district since the previous round of review and assessment has been the completion of the Carlisle Northern Development Route (CNDR) in February 2012. The Further Assessment (2007) indicated that the opening of the CNDR will have a major impact on nitrogen dioxide levels along A7 (AQMA 1) bringing levels to below the objective level. A Further Assessment undertaken in 2009 also indicated that the CNDR will have a significant positive impact on air quality along the A595 (AQMA's 3 and 4).

At this stage it is not feasible to draw firm conclusions as to the full effects of the CNDR from traffic count or air quality monitoring data. Early indications from traffic counts and local experience suggest that the bypass is having a significant effect on congestion and traffic volume in some of the key arterial routes through the city. In particular there is a reported reduction of approximately 13% of the average daily traffic count along the A7 (AQMA1). In order to enable accurate 'before and after' comparisons to be drawn at key locations across the district it is anticipated that much of the monitoring network will remain unchanged during 2012.

Some minor changes have been made to the diffusion tube monitoring network this year to allow for a new supermarket development on Caldewgate and to begin monitoring air quality at residential properties along the route of the CNDR. Initial investigation shows that the distance of these properties to the road, the open rural environment and the free flowing nature of the traffic is unlikely to give rise to any exceedence of the objectives at any of the newly identified receptors along the CNDR route. Previous air quality impact assessment work carried out in the planning stages of the development also supports this prediction.

This report will be followed by a revised Air Quality Action Plan. The draft plan is complete and available for public consultation. Stakeholders and statutory consultees have also been sent a copy of the plan for comment. It is expected that the final version will be approved by the council in late summer 2012. The draft plan is available to view on the City Council website at:

<http://www.opinionsuite.com/cumbria/carlisle-city-council/local-environment/http-www-carlisle-gov-uk-environment-and-waste.aspx>

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1 Introduction

1.1 Description of Local Authority Area

Carlisle City Council is the most northerly of the 6 Cumbrian authorities and covers more than 400² miles.

The City of Carlisle supports the highest population concentration in Cumbria with over 70,000 people living within the urban area. The rural towns of Brampton and Longtown support the next two highest population concentrations, around 4000 and 2000 respectively.

Carlisle is remote from other centres of population being 300 miles from London, more than 120 miles from Manchester, more than 90 miles from Glasgow and Edinburgh, and 60 miles from Newcastle Upon Tyne. Consequently Carlisle is the regional, commercial, administrative and retail centre serving a catchment population of around 450,000 who live within an hours travelling time of the city.

Today's economy is characterised by food processing, agricultural support, automotive component manufactures and engineering. The dominant sectors are branch operation in warehousing, retailing, manufacturing, public administration and health services.

Carlisle is also a significant transport hub for rail services and the national road transport network.

1.2 Purpose of Report

This report fulfils the requirements of the Local Air Quality Management process as set out in Part IV of the Environment Act (1995), the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 and the relevant Policy and Technical Guidance documents. The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where exceedences are considered likely, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM in England are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Benzene	16.25 $\mu\text{g}/\text{m}^3$	Running annual mean	31.12.2003
	5.00 $\mu\text{g}/\text{m}^3$	Running 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	Running 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 (PM_{10}) (gravimetric)	50 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	40 $\mu\text{g}/\text{m}^3$	Annual mean	31.12.2004
Sulphur dioxide	350 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266 $\mu\text{g}/\text{m}^3$, not to be exceeded more than 35 times a year	15-minute mean	31.12.2005

1.4 Summary of Previous Review and Assessments

Since 1996 Carlisle City Council has been monitoring pollution levels in Carlisle and comparing them with the national air quality objectives, as part of a process known as review and assessment.

Our review and assessment work has concluded that air quality within our local authority is generally very good. For the majority of pollutants the concentrations found in Carlisle are well below the governments health based objectives and are not of any concern. However there are small pockets within the city where the annual mean objective for nitrogen dioxide is not being met due to road traffic emissions. The local authority has subsequently declared six Air Quality Management Areas within the city.

Stage 1 Report 1996 - concluded that a stage 2 assessment would be required for nitrogen dioxide and particulates

Stage 2 Report 1998 - concluded that a detailed stage 3 assessment would be required in respect to nitrogen dioxide and particulates.

Stage 3 Report 2000 - concluded that it was unlikely that an air quality objective would be exceeded.

Updating and Screening Assessment 2003 – concluded that a detailed assessment would be required for nitrogen dioxide and particulates.

Detailed Assessment 2004 – concluded that it was likely that the annual mean objective for nitrogen dioxide would be exceeded at locations alongside the A7. As a consequence Air Quality Management Area No.1 was declared in 2005

Progress Report 2005 – concluded that it was likely that the annual mean objective for nitrogen dioxide would be exceeded at locations alongside Currock Street. As a consequence Air Quality Management Area No.2 was declared in Dec 2006

Updating and Screening Assessment 2006 - concluded that a detailed assessment would be required in respect to the annual mean nitrogen dioxide at 4 locations within the City i.e. Wigton Rd, Bridge St, London Rd and Dalston Rd.

Progress Report 2007 – update on air quality issues.

Detailed Assessment 2007 – concluded that it was likely that the annual mean objective for nitrogen dioxide would be exceeded at locations alongside Wigton Rd, Bridge St, London Rd and Dalston Rd. As a consequence Air Quality Management Areas No's. 3, 4, 5 and 6 were declared in 2008.

Further Assessment Report 2007 – confirmed that AQMA boundaries for AQMA No's 1 and 2 were correct.

Progress Report 2008 – update on air quality issues

Further Assessment Report 2009 – confirmed that the boundaries AQMA's No's. 4-6 are correct. It recommends that the boundary of AQMA No.3 be extended to the bottom of Caldewgate roundabout.

Updating and Screening Assessment 2009 - concludes that that the existing boundary of AQMA No.3 on Wigton Rd will need to be extended to the Caldewgate roundabout and include properties on Caldcotes.

Progress Report 2010 – update on Air Quality issues. Confirmed that the recent extension of AQMA No.3 had taken place and gave an update on progress with action plan measures.

Progress Report 2011 – update on Air Quality issues. Confirmed no further changes required to AQMA's and gave an update on progress with action plan measures.

The following maps show all six of the AQMA's that have been declared in the district. All of the AQMA's have been declared due to exceedences of the nitrogen dioxide annual mean objective. Figure 1.1 shows all of the AQMA's on one large map and the subsequent figures show the individual AQMA's in more detail.

Figure 1.1 Map of all AQMA Boundaries

Location of Carlisle AQMAs.

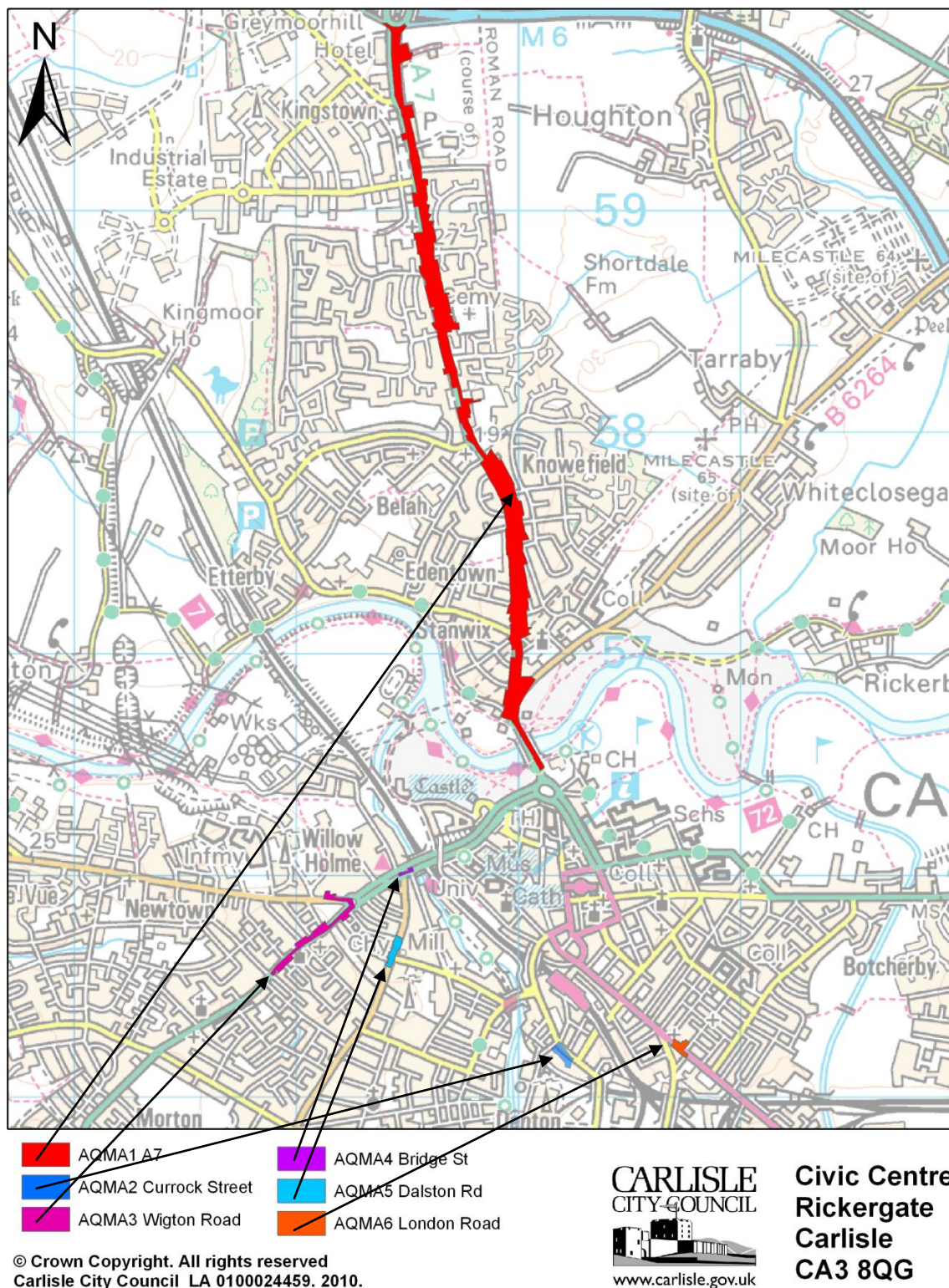
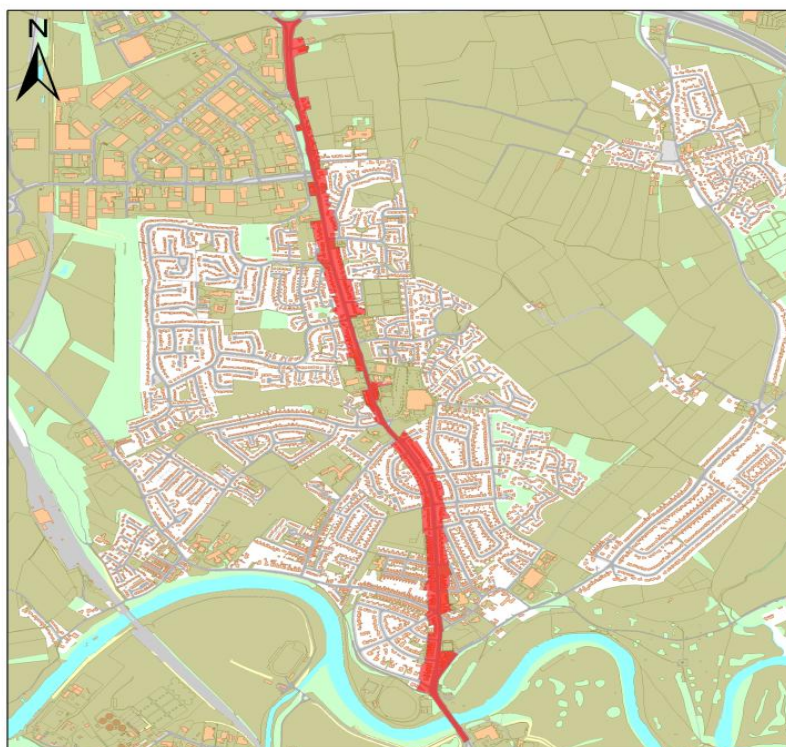


Figure 1.2 Maps of individual AQMA Boundaries

Air Quality Management Area 1 - A7

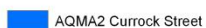


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Air Quality Management Area 2 - Currock Street.

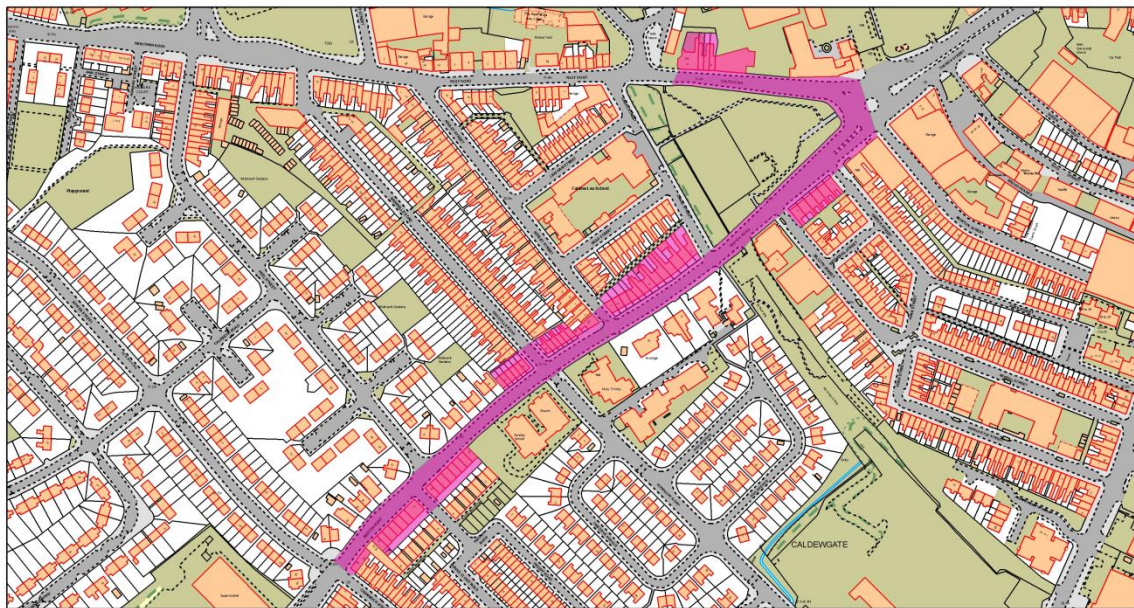


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AQMA3 Wigton Road (Extended)

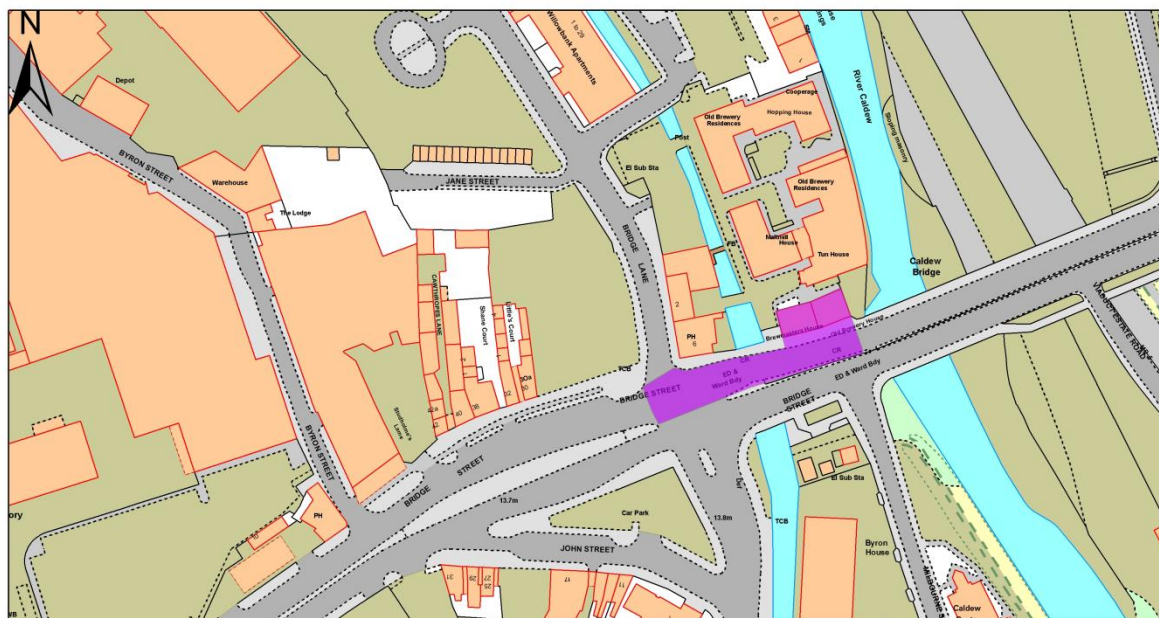


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Air Quality Management Area 4 - Bridge Street.

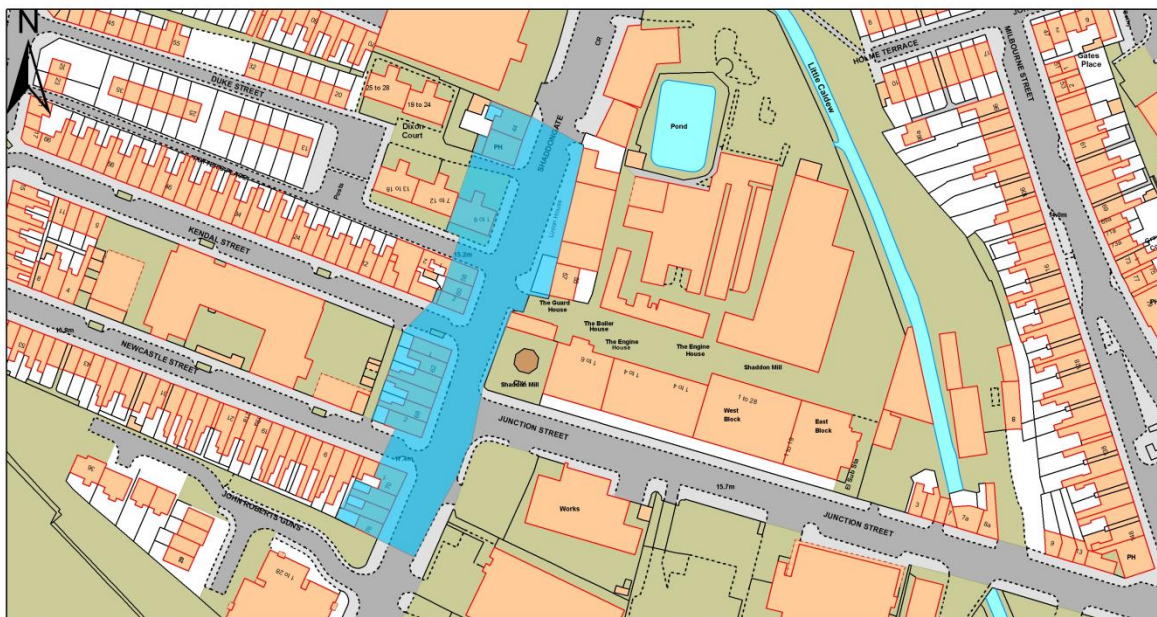


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Air Quality Management Area 5 - Dalston Road.



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Air Quality Management Area 6 - London Road.



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2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

Air quality monitoring in Carlisle City Council is driven by the local air quality management process and in particular the review and assessment of air quality. Carlisle City Council currently monitors for 3 pollutants; **nitrogen dioxide**, **particulates** and **benzene** and employs two principle methods of monitoring; diffusion tubes and continuous monitoring.

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 principle source of nitrogen dioxide within the district is road transport.

Particulates are the fraction of suspended airborne particles, these small particles can be breathed into the lungs carrying with them a range of both natural and manmade substances.

Particulate Matter 10 or PM₁₀ is the fraction of particulate matter less than 10µm (Ten micrometres) in aerodynamic diameter. This comes from a wide range of sources known as *primary* i.e. combustion processes such as vehicle exhaust emissions, *secondary* i.e. formed in the atmosphere and *course* i.e. from suspended soils, dust and construction etc). In Carlisle 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.

The PM2.5 fraction of particulate matter differs from PM10 only in respect of the size of the particles, these particles are much smaller, less than 2.5µm (2.5 micrometres) in aerodynamic diameter. Carlisle City Council began measuring PM 2.5 at the Paddy's Market monitoring station on 19th March 2009.

Benzene is a recognised genotoxic human carcinogen. The main sources of benzene in the UK are petrol engine vehicles, petrol refining and the distribution and uncontrolled emissions from petrol station forecourts without vapour recovery systems.

Whilst the local authority does not have any sources within the area which are likely to exceed the objective levels Carlisle has been monitoring benzene since April 2008. Benzene monitoring is undertaken at the Paddy's Market station using a pumped tube sampler with sorbent tubes containing Carbopack X, as part of the Non Automatic Hydrocarbon Network (NAHN).

2.1.1 Automatic Monitoring Sites

There are two continuous monitoring stations in Carlisle. These are located at Paddy's Market and Stanwix Bank.

Paddy's Market in Caldewgate has been used as a roadside monitoring site since 2005. As well as Benzene, the pollutants measured include oxides of nitrogen using a Chemiluminescent Analyser and particulate matter (PM₁₀) using a Tapered Element Oscillating Microbalance (TEOM). In April 2009 an additional TEOM to measure smaller sized particles (PM_{2.5}) was installed in Paddy's Market monitoring station by Defra. Both TEOM's have been upgraded to include a Filter Dynamics Measurement System (FDMS) to allow better equivalence to the objective level. The site is now partly funded by Defra.

Since February 2008 the site has been affiliated to the Automatic Urban and Rural Network (AURN) and the network quality assurance and control procedures are implemented.

Stanwix Bank is a site that has been in operation since the beginning of 2007 and measures nitrogen dioxide with a chemiluminescent analyser. Throughout 2011 the site was maintained and the data was managed by Casella Monitor on behalf of Carlisle City Council. Casella has a defined quality system, which forms part of the UKAS accreditation that the laboratory holds.

Contract work that was previously undertaken by Casella Monitor on behalf of Carlisle City Council was passed to Enviro Technology Services PLC in April 2012 this will not affect the monitoring data itself and the changes will be detailed in the Progress Report 2013.

Daily data from both monitoring stations is available to the public on Carlisle City Councils website.

Appendix A contains further details on our automatic monitoring including information on co-location study, quality control and quality assurance measures.

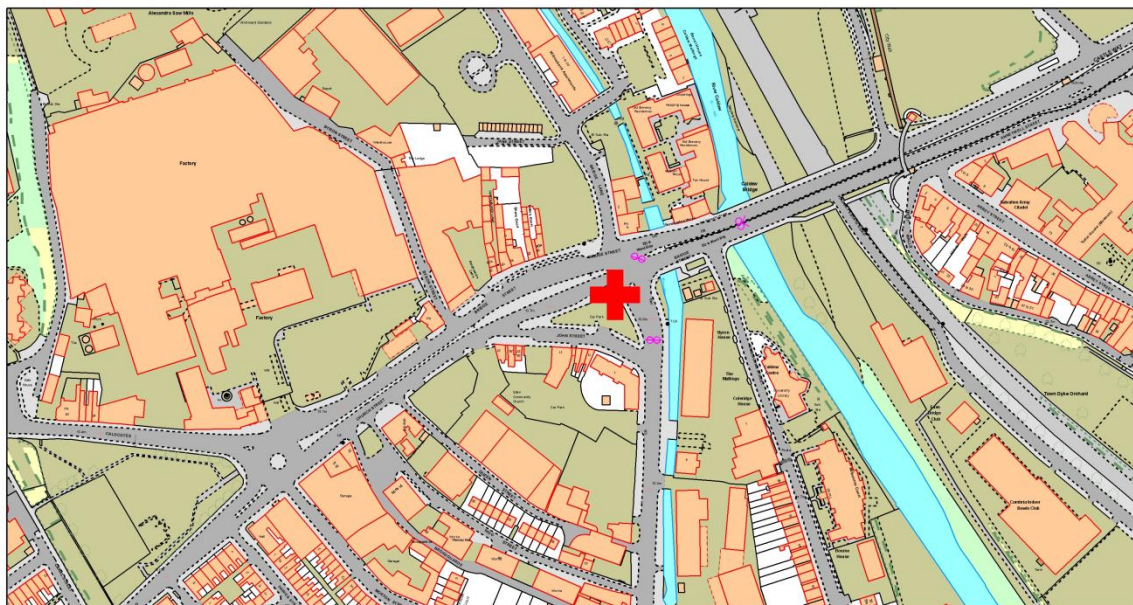
Table 2.1 gives further details of the sites and the following maps show the exact location of the automatic monitoring stations.

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQMA?	Relevant Exposure?	Distance to kerb of nearest road	Does this location represent worst-case exposure?
Paddy's Market	Road side	X 339467	Y 555974	NO ₂ , PM ₁₀ , PM _{2.5}	Chemiluminescent analyser, TEOM FDMS	N	N 42m to relevant exposure	4m	Y
Stanwix Bank	Road side	X 340018	Y 557044	NO ₂	Chemiluminescent analyser.	Y	N 15m to relevant exposure	3m	Y

Figure 2.1 Maps of Automatic Monitoring Sites

Paddys Market Automatic Monitoring Station



Scale: 1:2,500

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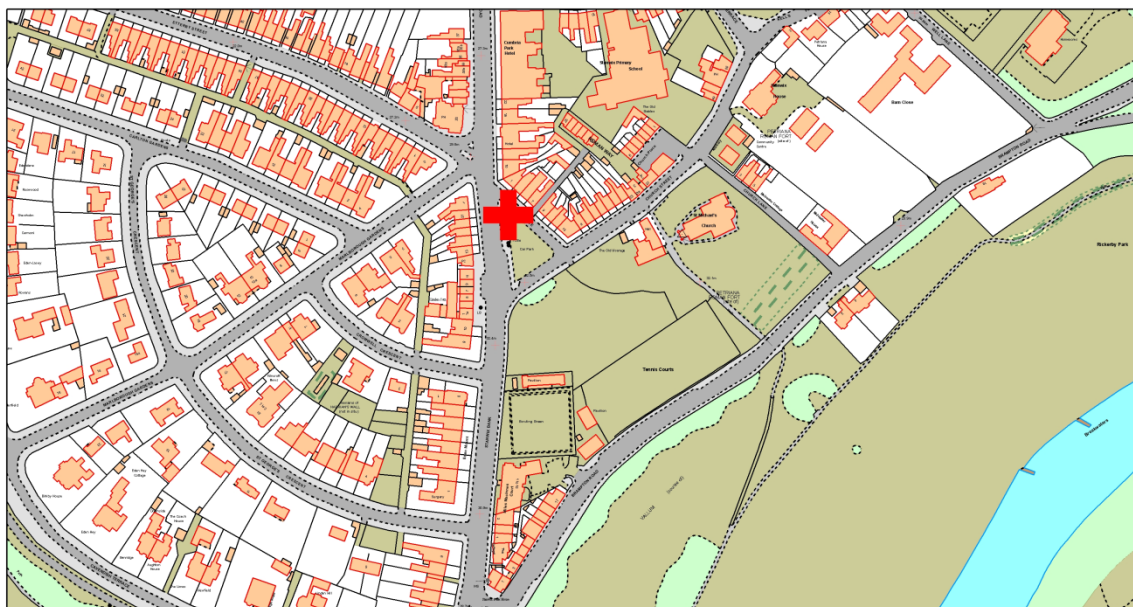


Date: 02/03/2010



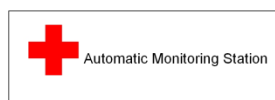
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Stanwix Bank Automatic Monitoring Station



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2.1.2 Non-Automatic Monitoring Sites

Benzene

The council operates a pumped tube benzene sampler as part of the UK Non-Automatic Hydrocarbon Network. The benzene station is located within the Paddy's Market Unit and has been in operation since April 2008. It is entirely funded by Defra.

Nitrogen Dioxide

Carlisle City Council operates an extensive network of Nitrogen Dioxide diffusion tubes across the district. Since February 2009 the council has utilised tubes prepared with 20% TEA in water, prepared and analysed by Gradko Environmental Ltd.

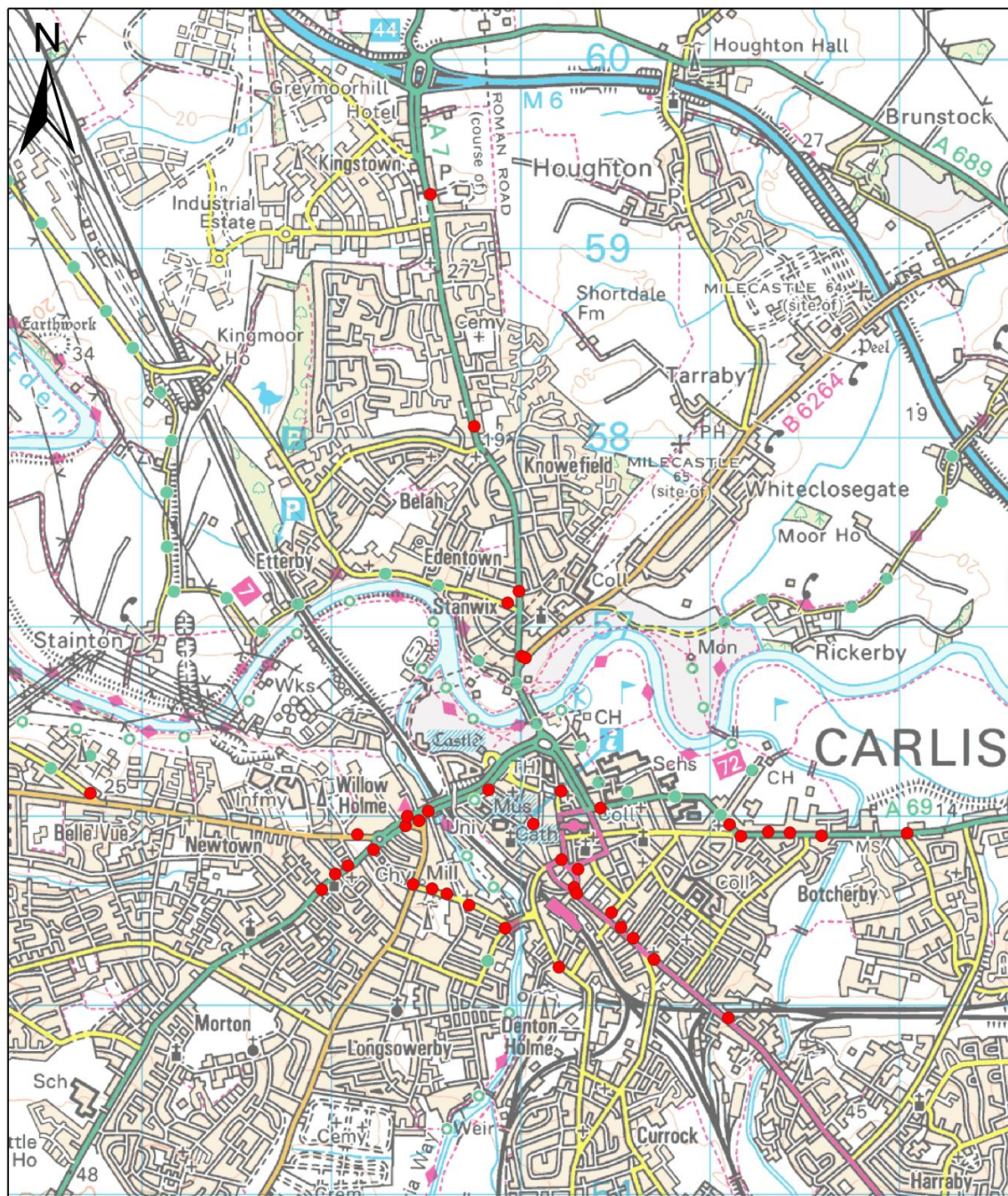
Throughout 2010 the council has obtained a full twelve months of monitoring data from most of the diffusion tube monitoring locations. Some locations have slightly fewer monthly results due to problems with individual tubes such as laboratory issues and dislodging or unauthorised removal of a tube from its mounting.

Appendix A contains further details on our NO₂ diffusion tube analysis including bias adjustment and Quality control measures.

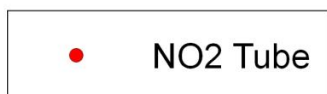
Monthly diffusion tube results can be found in appendix B. Bias adjusted annual means and other calculated data can be found in appendix C.

The locations of all the diffusion tubes are shown on the following map and further details on each location are given in table 2.2:

Figure 2.2 Map of Non-Automatic Monitoring Sites



NO2 Diffusion Tube Location Map



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Table 2.2 Details of Non-Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA ?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road	Does this location represent worst-case exposure?
A1	Roadside	339995	557188	NO ₂	Y	N	N (4.5)	1.5	Y
A10	Roadside	340008	556842	NO ₂	Y	N	N (1.5)	1.5	Y
A12	Roadside	339935	557125	NO ₂	N	N	Y	3	Y
A5	Roadside	339758	558059	NO ₂	Y	N	Y	4	Y
A7	Roadside	339526	559285	NO ₂	Y	N	N (7.5)	4	Y
A9	Roadside	340028	556833	NO ₂	Y	N	Y	1.5	Y
B12	Kerbside	339921	555406	NO ₂	N	N	N (10)	0.5	Y
B3	Roadside	339537	555613	NO ₂	N	N	Y	9	Y
B4	Roadside	339434	555638	NO ₂	Y	N	Y	3.5	Y
B5	Roadside	339613	555587	NO ₂	N	N	Y	2.5	Y
B6	Roadside	339731	555526	NO ₂	N	N	Y	2.5	Y
B7	Roadside	340205	555198	NO ₂	Y	N	Y	3	Y
C1	Roadside	340216	556131	NO ₂	N	N	Y	3	Y
C2	Urban Centre	340069	555955	NO ₂	N	N	N	N/A	N
C3	Roadside	340218	555768	NO ₂	N	N	Y	3	Y
C4	Roadside	340286	555622	NO ₂	N	N	Y	9	Y
C5	Roadside	340298	555589	NO ₂	N	N	Y	3	Y
D1	Roadside	341106	555954	NO ₂	N	N	N (8.5)	3.7	Y
D10	Roadside	342044	555907	NO ₂	N	N	Y	5	Y
D11	Roadside	340426	556040	NO ₂	N	N	Y	4.5	Y
D12	Kerbside	340307	555718	NO ₂	N	N	N	5	Y
D3	Roadside	341167	555892	NO ₂	N	N	Y	10	Y
D5	Roadside	341310	555914	NO ₂	N	N	Y	9	Y
D7	Roadside	341593	555893	NO ₂	N	N	Y	7	Y
D9	Roadside	341426	555910	NO ₂	N	N	Y	8.5	Y

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	In AQMA ?	Is monitoring collocated with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road	Does this location represent worst-case exposure?
E22	Roadside	339834	556137	NO ₂	N	N	Y	12	Y
E12	Roadside	339225	555821	NO ₂	Y	N	N (2)	2.5	Y
E15	Roadside	339091	555736	NO ₂	Y	N	Y	4.5	Y
E16	Roadside	339141	555900	NO ₂	Y	N	Y	2.5	Y
E19	Roadside	338953	555610	NO ₂	Y	N	Y	2.5	Y
E20	Roadside	339023	555692	NO ₂	Y	N	Y	5.5	Y
E4	Roadside	339396	555947	NO ₂	N	N	N(3)	3	Y
E6	Roadside	339467	555974	NO ₂	N	Y	N(42)	9	Y
E6	Roadside	339467	555974	NO ₂	N	Y	N(42)	9	Y
E6	Roadside	339467	555974	NO ₂	N	Y	N(42)	9	Y
E8	Roadside	339516	556024	NO ₂	Y	N	Y	4	Y
E9	Roadside	339405	555996	NO ₂	N	N	Y	9	Y
E21	Roadside	337730	556118	NO ₂	N	N	N (8)	3	Y
F1	Roadside	340482	555489	NO ₂	N	N	Y	3.5	Y
F10	Roadside	349597	555351	NO ₂	N	N	Y	3	Y
F5	Roadside	340534	555409	NO ₂	N	N	Y	3	Y
F7	Roadside	340708	555240	NO ₂	Y	N	Y	4.5	Y
F9	Kerbside	341099	554931	NO ₂	N	N	Y	0.5	Y
H1	Roadside	352824	561039	NO ₂	N	N	N (0.5)	2.5	Y
H3	Roadside	338052	568478	NO ₂	N	N	N (0.5)	2.5	Y
H4	Roadside	347411	556881	NO ₂	N	N	N (0.5)	2.5	Y
H5	Roadside	337643	554100	NO ₂	N	N	Y	1.5	Y
H6	Roadside	337962	553220	NO ₂	N	N	Y	4	Y
H7	Roadside	338282	553396	NO ₂	N	N	Y	6.5	Y
H8	Other	347874	561254	NO ₂	N	N	Y	2	Y

2.2 Comparison of Monitoring Results with AQ Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data

All nitrogen dioxide monitoring data shown has been ratified by the AEA group and Casella Monitor. Monitoring data was collected throughout 2011.

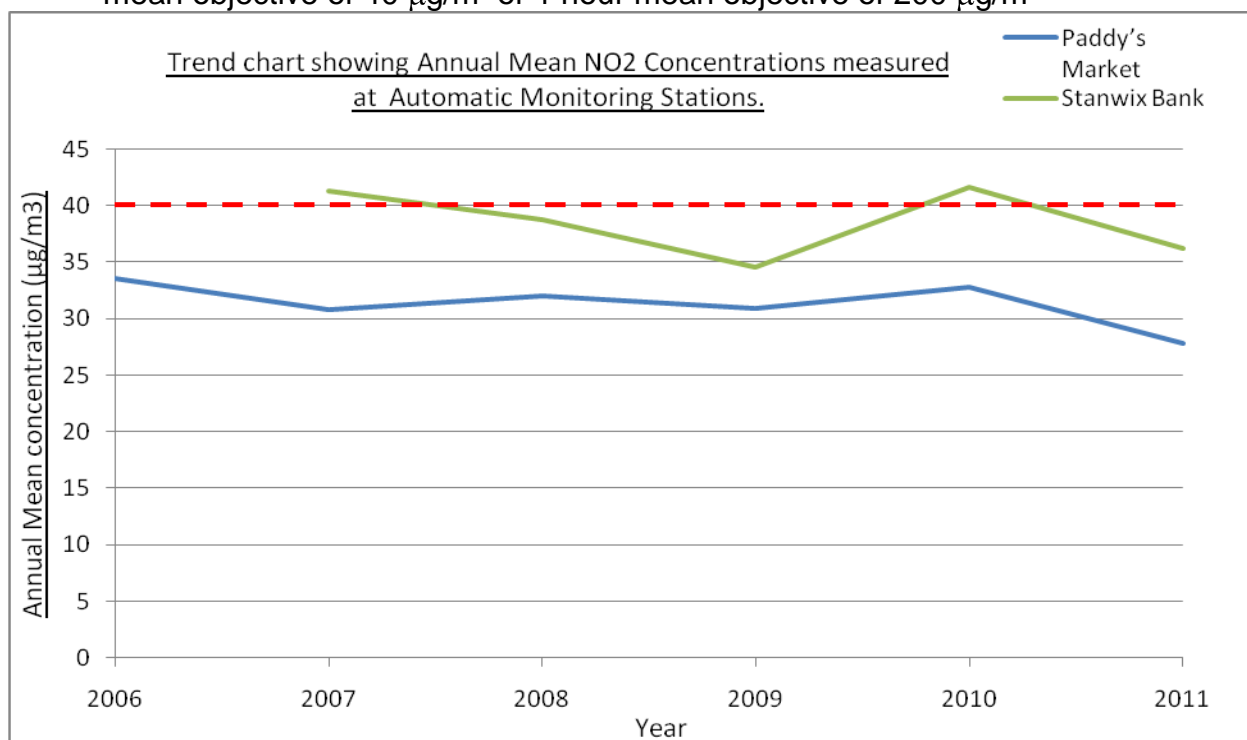
Table 2.3 Results of Automatic Monitoring of Nitrogen Dioxide: Comparison with Annual Mean Objective

Data in red indicates results that exceed the annual mean objective of 40 $\mu\text{g}/\text{m}^3$

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring	Valid Data Capture 2011	Annual Mean Concentration $\mu\text{g}/\text{m}^3$					
					2006	2007	2008	2009	2010	2011
Paddy's Market	Roadside	N	98.2	98.2	33.5	30.8	32	30.85	32.79	27.78
Stanwix Bank	Roadside	Y	98.9	98.9	-	41.3	38.8	34.6	41.6	36.2

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentrations measured at Automatic Monitoring Sites

..... The dashed red line on the following flow charts is used to indicate the annual mean objective of 40 $\mu\text{g}/\text{m}^3$ or 1 hour mean objective of 200 $\mu\text{g}/\text{m}^3$



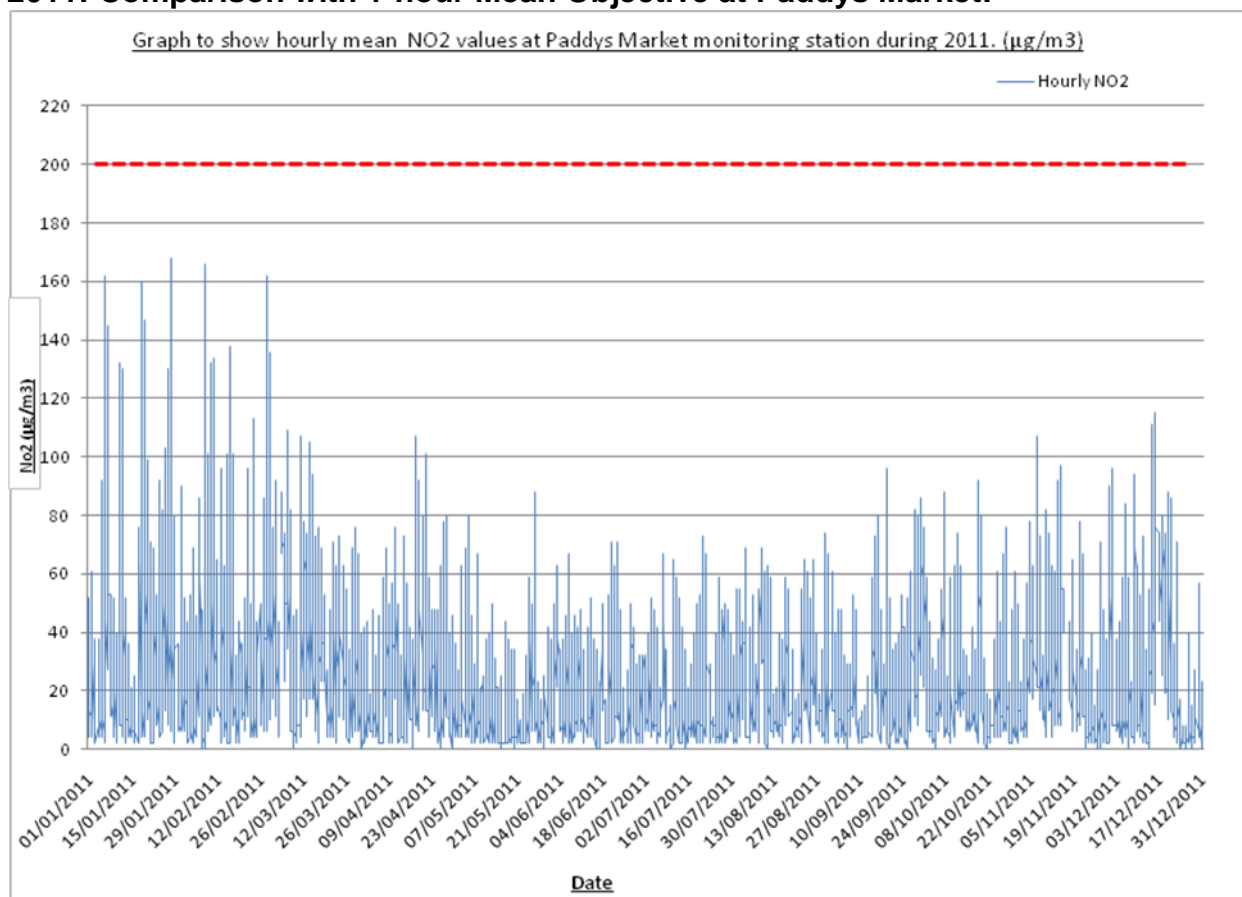
The above trend chart indicates that nitrogen dioxide levels at the Paddys Market roadside unit have remained relatively constant since 2006. During 2011 there has been a noticeable decrease in the annual mean to the lowest level since monitoring began. This appears to follow a gradual downward trend.

The Stanwix Bank unit saw a gradual reduction in nitrogen dioxide levels between 2007 and 2009. In 2010 there was a sharp increase which is believed to be due to meteorological conditions. In 2011 the annual mean has reduced and as previously predicted, the result shown is similar to that of 2009.

Table 2.4 Results of Automatic Monitoring for Nitrogen Dioxide: Comparison with 1-hour mean Objective

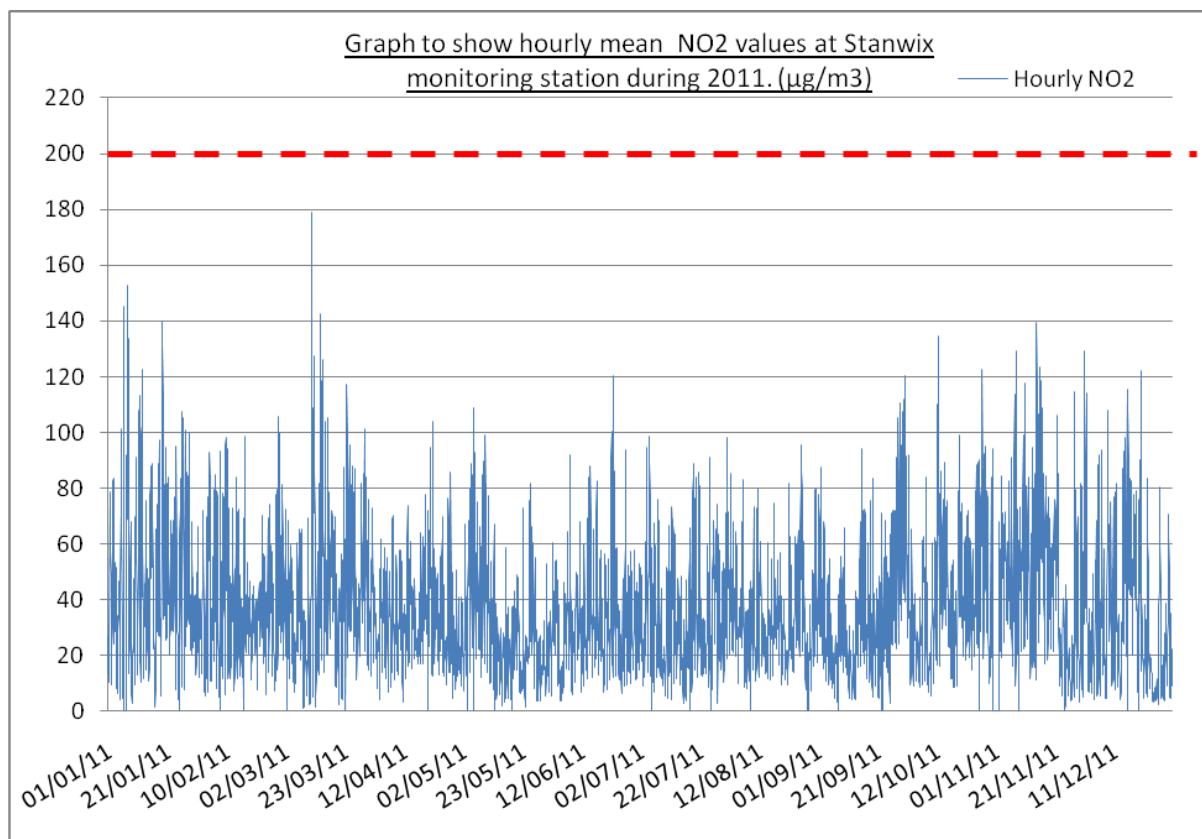
Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring	Valid Data Capture 2011	Number of Exceedences of Hourly Mean (200 $\mu\text{g}/\text{m}^3$)					
					2006	2007	2008	2009	2010	2011
Paddy's Market	Roadside	N	98.2	98.2	0	0	0	0	0	0
Stanwix Bank	Roadside	Y	98.9	98.9	0	0	0	0	0	0

Figure 2.4 Results of Hourly Automatic Monitoring for Nitrogen Dioxide during 2011: Comparison with 1-hour Mean Objective at Paddys Market:



The graph above shows that there were no recorded exceedences of the 1 hour mean objective for Nitrogen Dioxide during 2011. The highest reading at the Paddys Market site was 168 $\mu\text{g}/\text{m}^3$. This was an unusually high concentration, in relation to the next and previous days.

Figure 2.5 Results of Hourly Automatic Monitoring for Nitrogen Dioxide during 2011: Comparison with 1-hour Mean Objective at Stanwix Bank:



The data above shows that there were no recorded exceedences of the 1 hour mean objective for Nitrogen Dioxide during 2011. The highest reading at the Stanwix Bank site was 179 µg/m³ which was considerably higher than all other readings taken during the year.

The 200 µg/m³ 1 hour mean objective for Nitrogen Dioxide should not be exceeded more than 18 times per year, neither of our monitoring sites showed any exceedence of this objective.

Diffusion Tube Monitoring Data

The monitoring period for all diffusion tube locations was 12 months. All diffusion tube locations have at least 9 months of valid data collected throughout 2011. For 2011 the annual mean for each diffusion tube location has been adjusted using the national bias adjustment factor of **0.89**. (See appendix A for details)

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes in 2011

Data shown in **red** indicates a result which has exceeded the annual mean objective of $40\mu\text{g}/\text{m}^3$. Data shown is distance corrected where necessary.

Site ID	Location	Site Type	Within AQMA (Y/N)	Triplicate / Co-located Tube	Data Capture 2011 (%)	Has data been distance corrected (Y/N)	Annual mean concentration 2011 ($\mu\text{g}/\text{m}^3$)
							(Bias Adjustment factor = 0.89)
A1	45 SCOTLAND RD	Roadside	✓	N	100	Y	34.6
A10	STANWIX BANK	Roadside	✓	N	100	Y	42.9
A12	14 ETTERBY ST	Roadside	x	N	100	N	23.76
A5	37 KINGSTOWN RD	Roadside	✓	N	100	N	41.33
A7	282 KINGSTOWN RD	Roadside	✓	N	100	Y	25.4
A9	BRAMPTON RD	Roadside	✓	N	100	N	43.02
B12	DENTON ST	Kerbside	x	N	100	Y	29.5
B3	SHADDONMILL	Roadside	x	N	100	N	22.27
B4	DALSTON RD	Roadside	✓	N	92	N	50.20
B5	8 JUNCTION ST	Roadside	x	N	92	N	27.64
B6	41 CHARLOTTE ST	Roadside	x	N	100	N	33.46
B7	12 CURROCK ST	Roadside	✓	N	100	N	36.85
C1	LOWTHER ST	Roadside	x	N	92	N	34.13
C2	TOURIST INFO	Urban Centre	x	N	100	N	18.16
C3	DEVONSHIRE ST	Roadside	x	N	92	N	36.46
C4	BAR SOLO	Roadside	x	N	100	N	34.57
C5	GRIFFEN	Roadside	x	N	100	N	39.95
D1	VICTORIA PLACE	Roadside	x	N	100	Y	25.9
D10	368 WARWICK RD	Roadside	x	N	100	N	31.13
D11	CARTREF	Roadside	x	N	100	N	31.50
D12	POST OFFICE	Kerbside	x	N	92	N	41.73
D3	166 WARWICK RD	Roadside	x	N	100	N	23.67
D5	215 WARWICK RD	Roadside	x	N	100	N	22.30
D7	282 WARWICK RD	Roadside	x	N	100	N	37.32
D9	251 WARWICK RD	Roadside	x	N	100	N	27.57
E22	FINKLE ST	Roadside	x	N	100	N	38.36
E12	3 WIGTON RD	Roadside	✓	N	100	Y	39.9
E15	22 WIGTON RD	Roadside	✓	N	100	N	38.92
E16	JOVIAL SAILOR	Roadside	✓	N	92	N	35.67
E19	49 WIGTON RD	Roadside	✓	N	100	N	45.43
E20	44 WIGTON RD	Roadside	✓	N	100	N	36.53

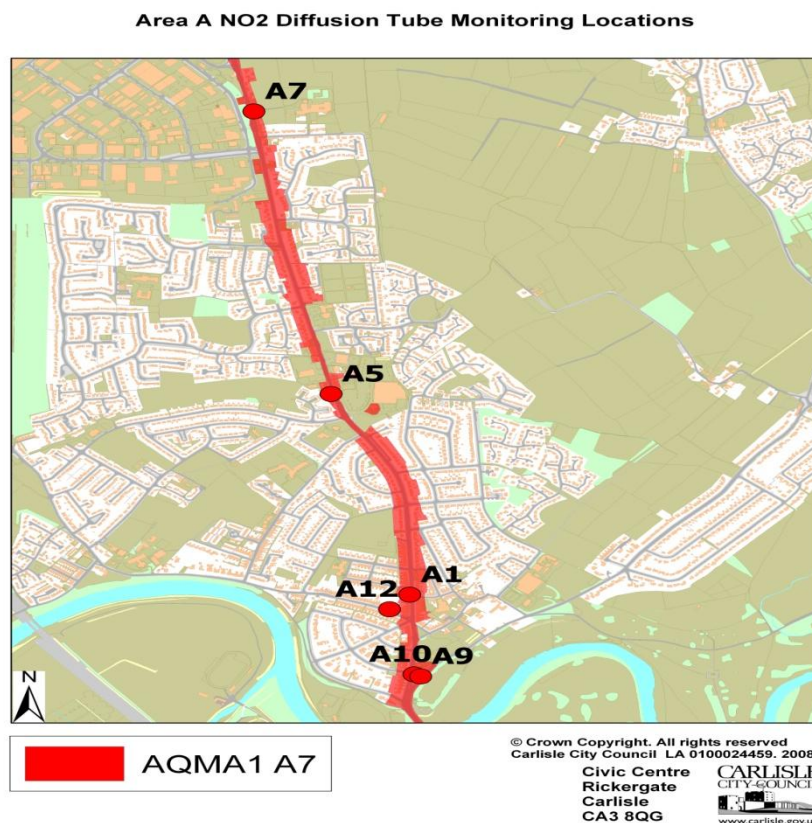
Site ID	Location	Site Type	Within AQMA ?	Triplicate / Co-located Tube	Data Capture 2011 (%)	Has data been distance corrected (Y/N)	Annual mean concentration 2011 ($\mu\text{g}/\text{m}^3$)
							(Bias Adjustment factor = 0.89)
E4	JOHN ST	Roadside	x	N	100	Y	35.2
E6	PADDYS MARKET 1	Roadside	x	Triplicate & Co-located	100	N	31.23
E6	PADDYS MARKET 2	Roadside	x	Triplicate & Co-located	100	N	31.07
E6	PADDYS MARKET 3	Roadside	x	Triplicate & Co-located	100	N	30.48
E8	BRIDGE ST	Roadside	✓	N	100	N	49.15
E9	CHURCH ST	Roadside	x	N	100	N	31.22
E21	BURGH RD	Roadside	x	N	100	Y	15.7
F1	3 TAIT ST	Roadside	x	N	100	N	30.54
F10	155 BOTCHERGATE	Roadside	x	N	100	N	32.96
F5	STANLEY HALL	Roadside	x	N	75	N	35.54
F7	24 LONDON RD	Roadside	✓	N	92	N	39.33
F9	129 LONDON RD	Kerbside	x	N	100	N	33.94
H1	BRAMPTON	Roadside	x	N	75	Y	18.3
H3	LONGTOWN	Roadside	x	N	100	Y	21.7
H4	WARWICK BRIDGE	Roadside	x	N	100	Y	29.8
H5	WIGTON RD	Roadside	x	N	100	N	21.98
H6	PETER LANE	Roadside	x	N	100	N	11.52
H7	DALSTON RD	Roadside	x	N	100	N	16.86
H8	AIRPORT	Other	x	N	100	N	9.52

The table above shows that some of the annual mean concentrations for nitrogen dioxide have exceeded the $40\mu\text{g}/\text{m}^3$ objective level for 2011. All of these locations are within areas which have already been declared as air quality management areas, except tube D3, which located on a Post Office in the city centre and is not near any residential properties.

During 2011 none of the annual means exceeded $60\mu\text{g}/\text{m}^3$. An annual mean level of $60\mu\text{g}/\text{m}^3$ is the equivalent indicator level for the likelihood of exceedence of the hourly mean objective of $200\mu\text{g}/\text{m}^3$. All of the results are below $60\mu\text{g}/\text{m}^3$ so it can therefore be concluded that there has been no indication of any exceedence of the hourly mean objective at any location. This supports the results from both automatic monitoring stations.

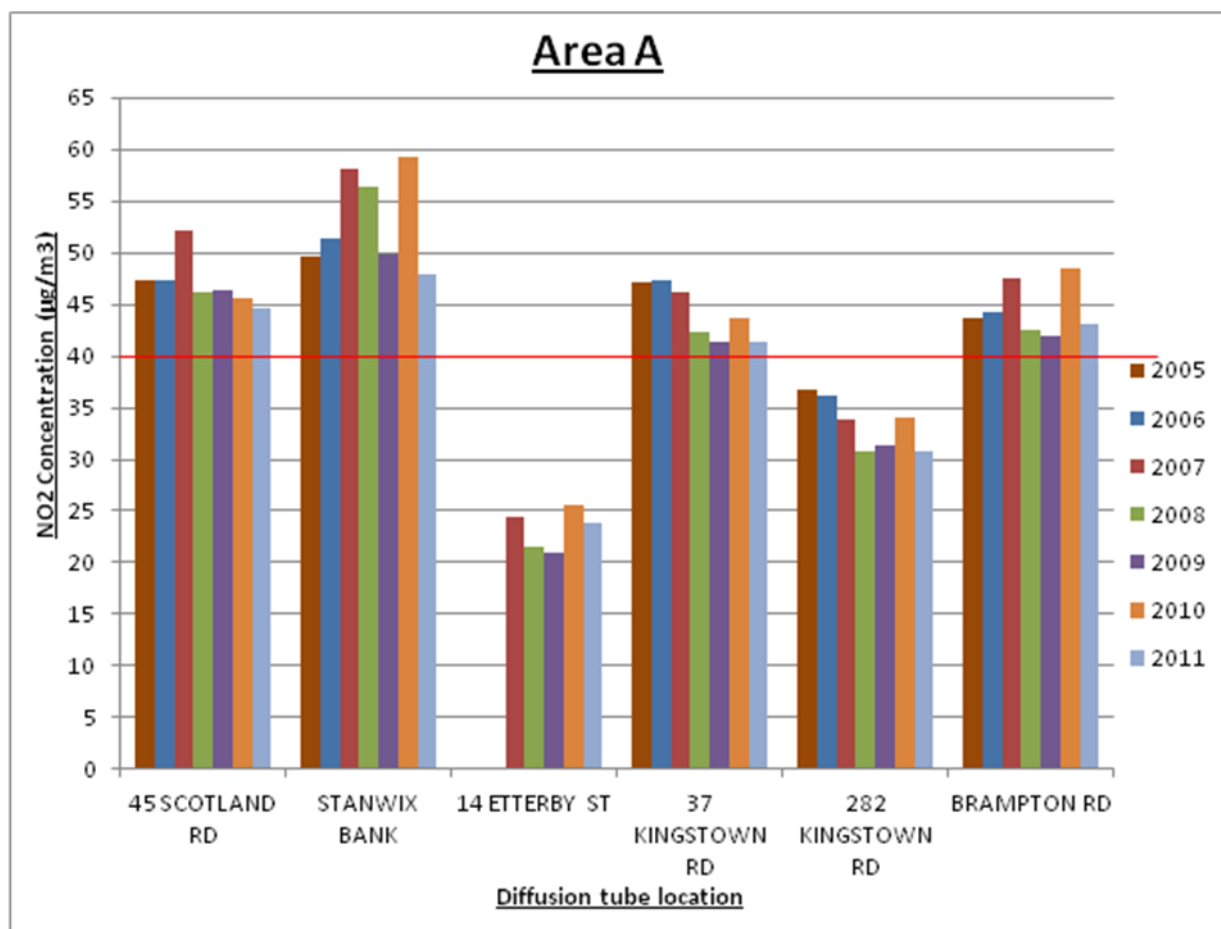
Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.

The diffusion tube locations are divided into geographical areas of the city, these areas include A, B, C, D, E, F and H. The following section looks at each area individually; it includes a map indicating the location of each tube in that area, a table showing all previous annual mean NO_2 concentrations and a trend chart displaying this data. Results in (brackets) indicate the distance corrected annual mean for the eleven locations that are not relevant to public exposure. It represents a prediction of the NO_2 concentration at the nearest receptor to the monitoring location. In these cases the associated trend charts show results from the locations themselves, not the nearest receptor, as this is a more conservative figure.

Area A – A7 Stanwix Bank, Scotland Rd and Kingstown Rd (AQMA No1)**Figure 2.6 Map of diffusion tube locations in area A.****Table 2.5a NO₂ diffusion tube results at monitoring locations in area A.**

SITE ID	LOCATION	Site Type	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS ADJUSTED FOR BIAS (µg/m ³)						
				2005	2006	2007	2008	2009	2010	2011
A1	45 SCOTLAND RD	Road side	✓	47.4	47.3	52.1	46.1 (43.4)	46.3 (35.8)	45.7 (35.6)	44.6 (34.6)
A10	STANWIX BANK	Road side	✓	49.7	51.4	58.1	56.4	49.9 (44.8)	59.2 (52.5)	48 (42.9)
A12	14 ETTERBY ST	Road side	x	-	-	24.5	21.6	21.0	25.5	23.8
A5	37 KINGSTOWN RD	Road side	✓	47.2	47.3	46.1	42.4	41.4	43.6	41.3
A7	282 KINGSTOWN RD	Road side	✓	36.7	36.2	33.8	30.7 (28.3)	31.4 (26.4)	34.1 (27.1)	30.7 (25.4)
A9	BRAMPTON RD	Road side	✓	43.7	44.2	47.5	42.6	41.9	48.5	43.0

Figure 2.7 Chart showing NO₂ diffusion tube trends at monitoring locations in area A



Results indicate that there are still locations within AQMA (No1) that remain above the NO₂ annual mean objective level. There is therefore no proposal to amend this AQMA at this stage.

Results from the diffusion tubes show that the annual mean concentrations have decreased at every location in this area from last year. Results from the continuous analyser on Stanwix bank support this overall decrease in NO₂ annual mean concentrations during 2011.

The opening of the CNDR in February 2012 is expected to bring a sustained reduction in traffic flows along this particular main route. Early signs are that traffic volumes have reduced significantly and there is an early reported reduction of approximately 13% of the average daily traffic count. These changes will be monitored and reported upon in the next Progress Report in April 2013.

Results indicate that there are no locations within this area that are likely to have exceeded the 1 hour mean objective level for nitrogen dioxide. This is also supported by results from the automatic monitoring site in this area.

Area B – Currock St, Victoria Viaduct, Charlotte St, Junction St and Dalston Rd
(Includes AQMA No.2 and No.5)

Figure 2.8 Map of diffusion tube locations in area B

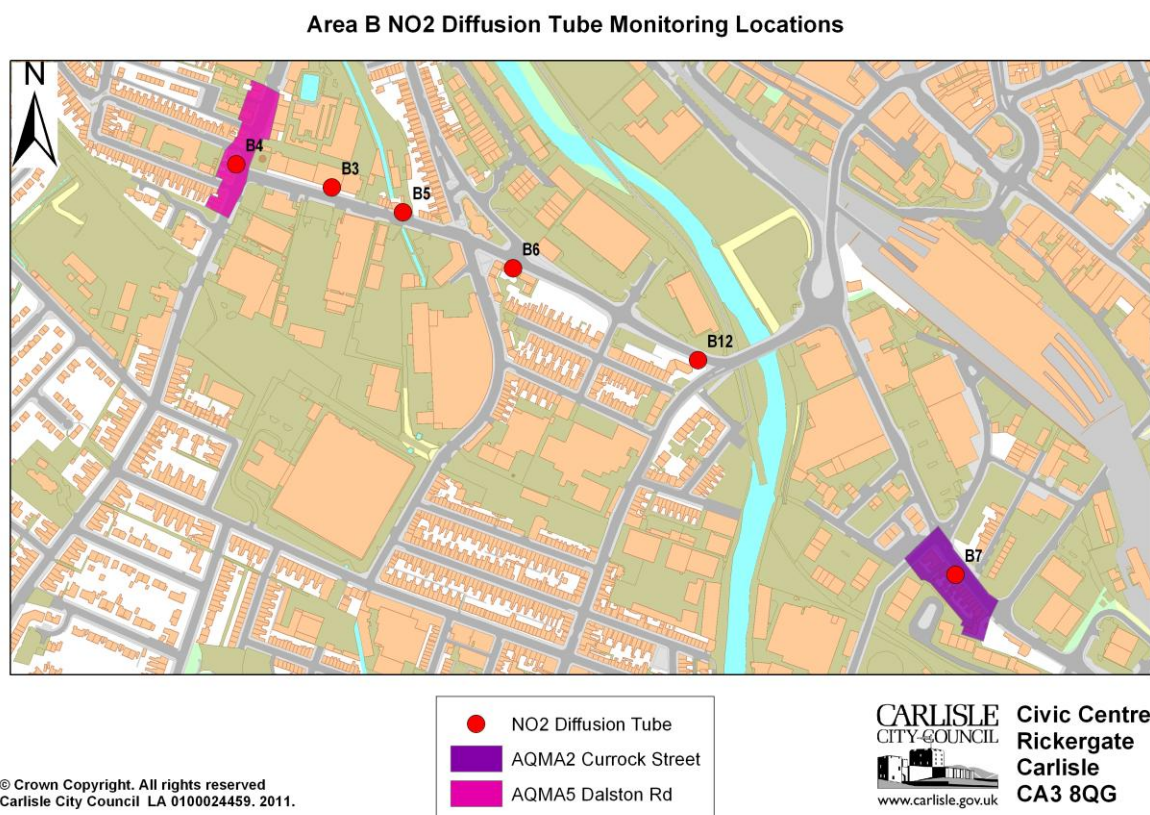
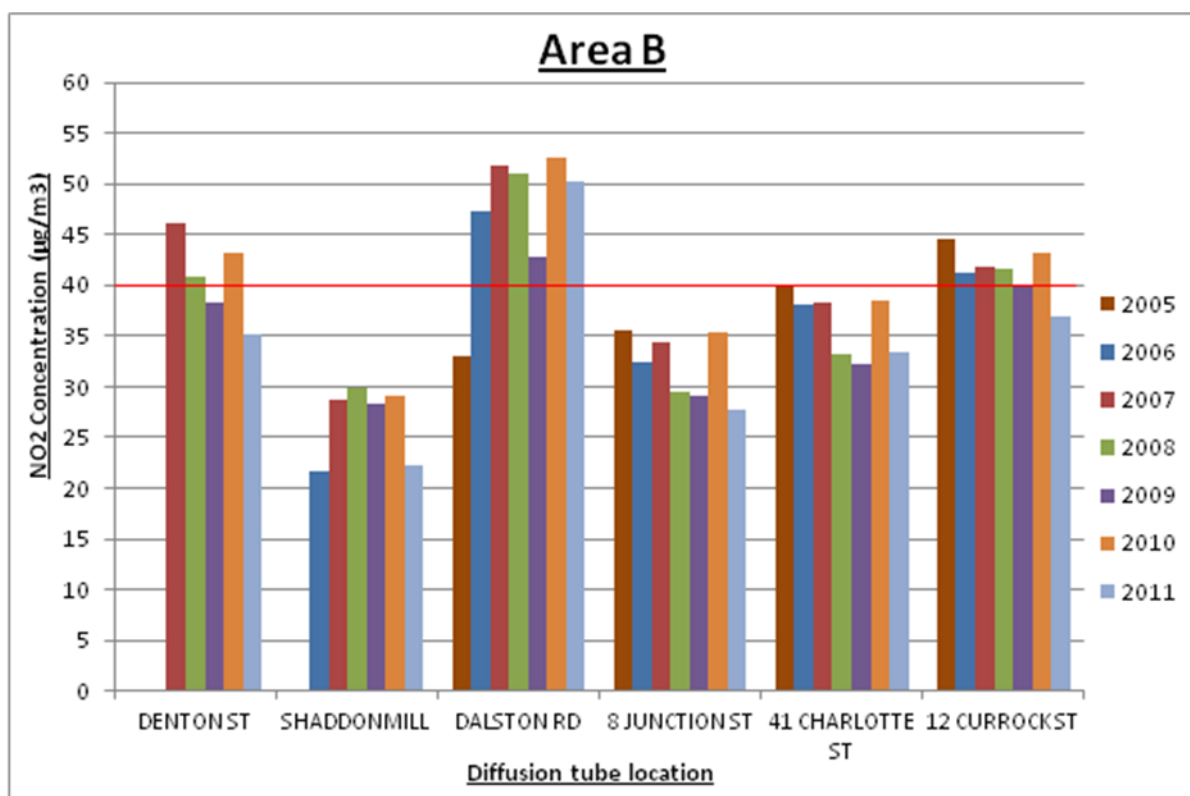


Table 2.5b NO₂ diffusion tube results at monitoring locations in area B.

SITE ID	LOCATION	Site Type	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS ADJUSTED FOR BIAS (µg/m ³)						
				2005	2006	2007	2008	2009	2010	2011
B12	DENTON ST	Kerb Side	x	-	-	46.1	40.9 (25.9)	38.3 (35.0)	43.2 (33.6)	35.2 (29.5)
B3	SHADDONMILL	Road side	x	-	21.7	28.8	29.8	28.4	29.1	22.3
B4	DALSTON RD	Road side	✓	33.0	47.2	51.7	51	42.8	52.6	50.2
B5	8 JUNCTION ST	Road side	x	35.6	32.5	34.3	29.4	29.1	35.4	27.6
B6	41 CHARLOTTE ST	Road side	x	39.8	38.1	38.3	33.2	32.3	38.6	33.5
B7	12 CURROCK ST	Road side	✓	44.6	41.2	41.9	41.6	39.8	43.3	36.9

Figure 2.9 Chart showing NO₂ diffusion tube trends at monitoring locations in area B

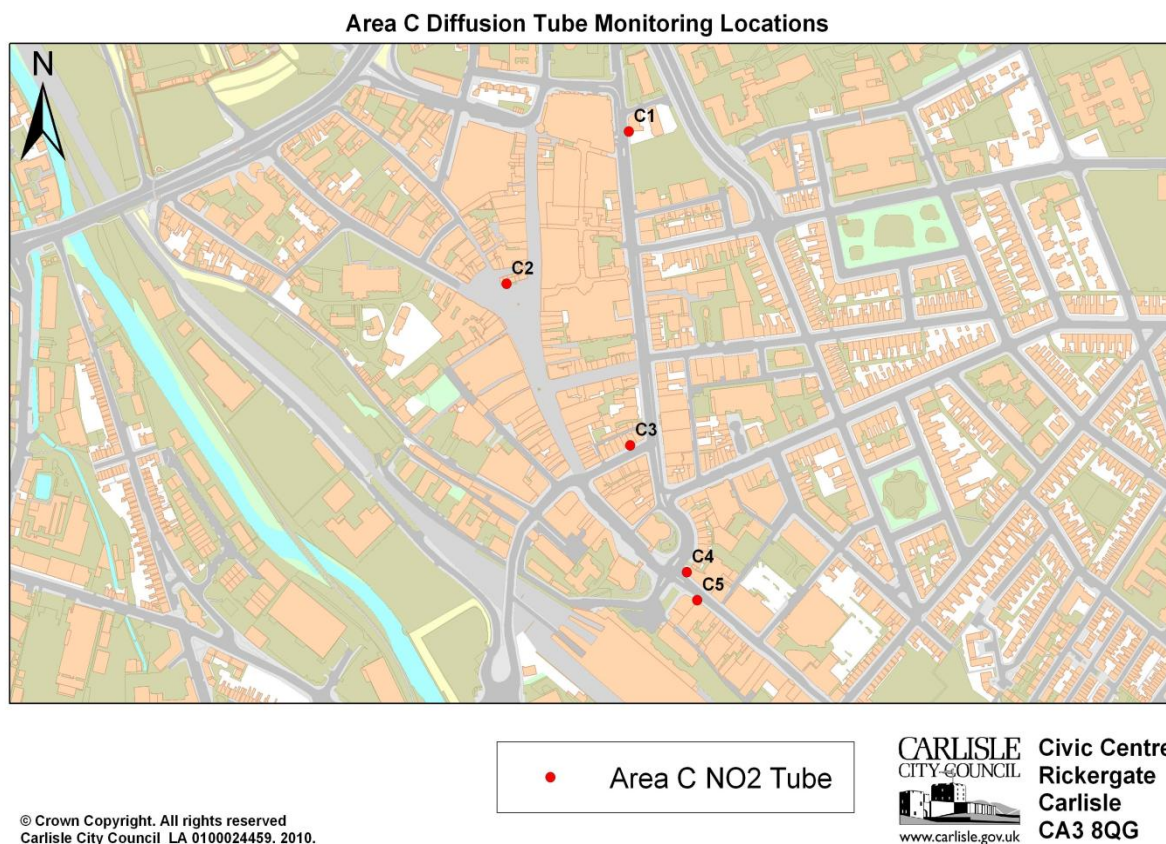


Results from these diffusion tubes show that NO₂ concentrations at all locations along this main traffic route have decreased from the previous year.

Location B7 (Currock St) (AQMA No.2) has, for the first time, dropped significantly below the objective level. 'Further Assessment' work undertaken in 2007 by AEA consultants predicted that nitrogen dioxide levels along would fall below the annual mean objective level by 2010. The unexpected increase of 2010 did not follow the downward trend of previous years. Should this level remain consistently below the objective then consideration may be made to revoke this AQMA.

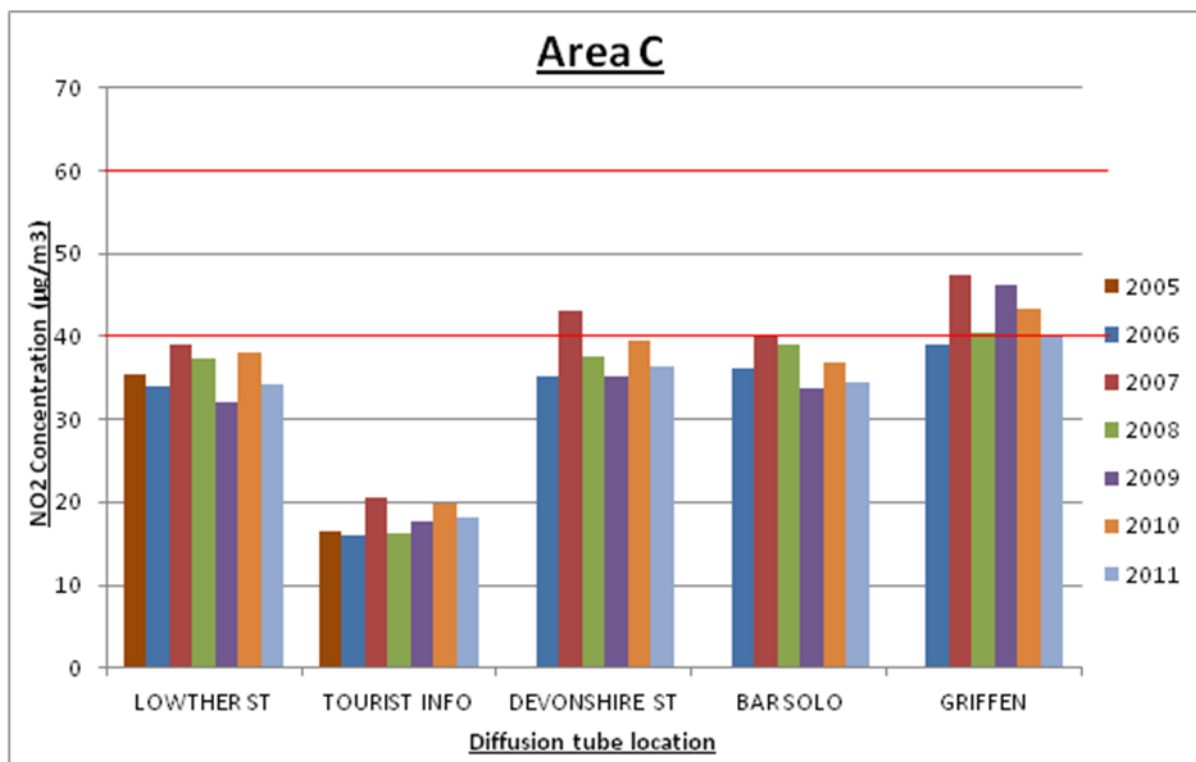
Location B4 (Dalston Road) remains above the objective and is located within AQMA 5. Carlisle City Council has worked with Cumbria County Council to develop a new revised Action Plan. This aims to reduce nitrogen dioxide levels along Dalston Rd (AQMA No5) and Currock Street (AQMA No.2). The draft Action Plan is currently at consultation and the final version will be available by September 2012.

Results indicate that there are no locations within this area that are likely to have exceeded the 1 hour mean objective level for nitrogen dioxide.

Area C – City Centre Locations**Figure 2.10 Map of diffusion tube locations in area C****Table 2.5c NO₂ diffusion tube results at monitoring locations in area C.**

SITE ID	LOCATION	Site Type	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS ADJUSTED FOR BIAS (µg/m ³)						
				2005	2006	2007	2008	2009	2010	2011
C1	LOWTHER ST	Road side	x	35.3	33.9	39.1	37.3	32.1	38.1	34.1
C2	TOURIST INFO	Urban Centre	x	16.5	15.9	20.5	16.2	17.6	19.9	18.2
C3	DEVONSHIRE ST	Road side	x	-	35.1	43.2	37.6	35.2	39.4	36.5
C4	BAR SOLO	Road side	x	-	36.2	40.2	39.1	33.8	37.0	34.6
C5	GRIFFEN	Road side	x	-	39	47.3	40.5	46.2	43.3	40.0

Figure 2.11 Chart showing NO₂ diffusion tube trends at monitoring locations in area C

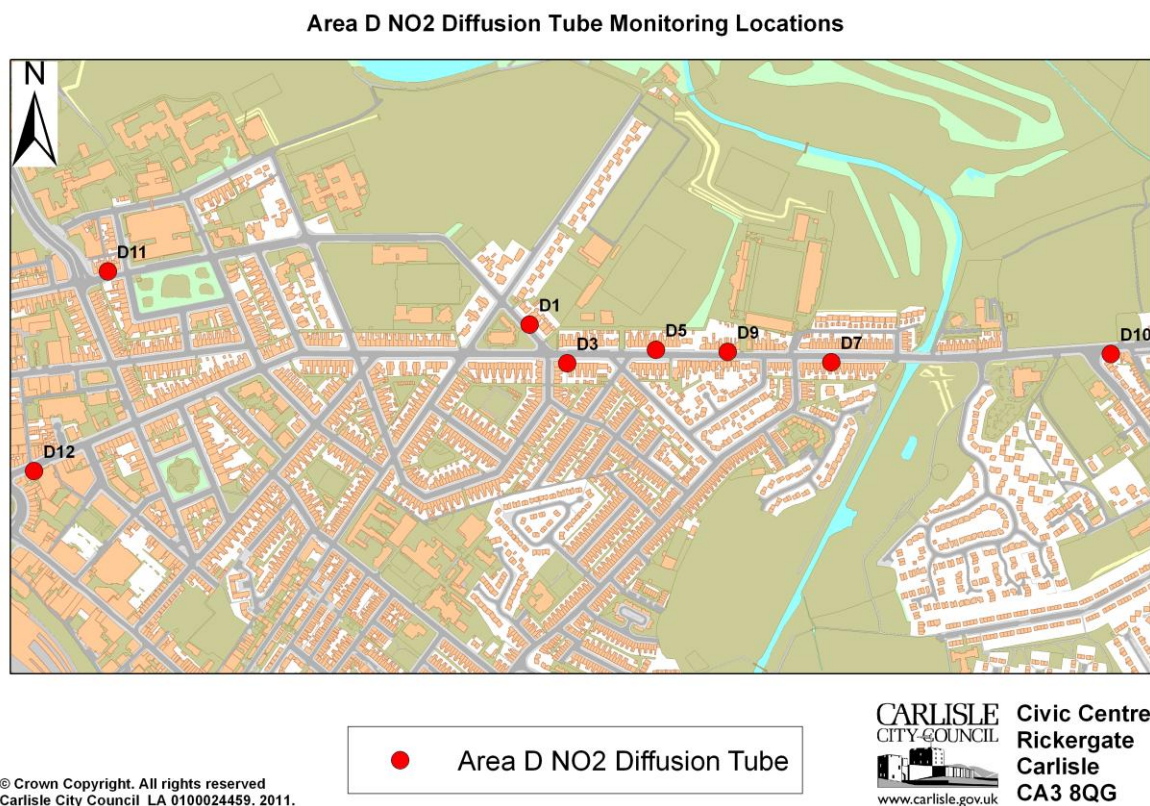


Results from these diffusion tubes show that NO₂ concentrations at all of these main city centre locations have decreased from the previous year.

Tube C1 is the only location in this area that is in a residential area, for this reason it is the only location that should be compared to the annual mean objective of 40 µg/m³. The data shows that this has not been exceeded.

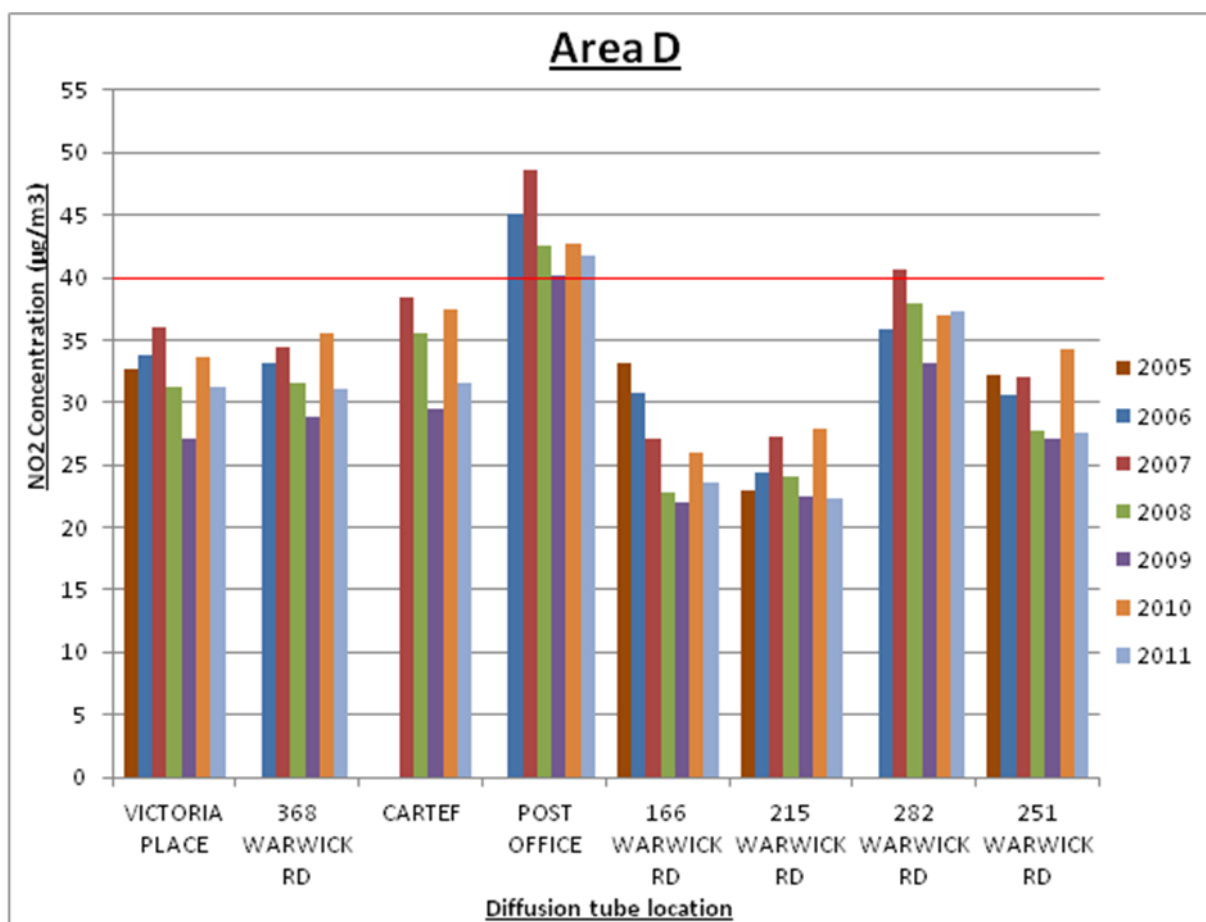
Results from locations C2 – C5 should only be compared to the 1 hour mean objective level for nitrogen dioxide which is equivalent to an annual mean of 60 µg/m³. This is due to the likelihood of people spending longer periods of time in these areas, for example, shopping, drinking and dining outdoors. This covers the main shopping and outdoor cafe areas within the centre of Carlisle which are located near busy roads. All are considerably below the hourly objective level therefore there is no need to proceed to a 'Detailed Assessment'.

Tube C2 is located in a pedestrian precinct in the heart of the city centre. The area is primarily used for shopping, this represents an urban centre location. It has consistently shown no indication of exceeding the hourly objective.

Area D A69 – Warwick Rd**Figure 2.12 Map of diffusion tube locations in area D.****Table 2.5d NO₂ diffusion tube results at monitoring locations in area D.**

SITE ID	LOCATION	Site Type	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS ADJUSTED FOR BIAS (µg/m ³)						
				2005	2006	2007	2008	2009	2010	2011
D1	VICTORIA PLACE	Road side	x	32.7	33.8	36.1	31.2 (29.5)	27.1 (23.6)	33.6 (27.7)	31.3 (25.9)
D10	368 WARWICK RD	Road side	x	-	33.2	34.5	31.6	28.9	35.5	31.1
D11	CARTEF	Road side	x	-	-	38.4	35.6	29.4	37.4	31.5
D12	POST OFFICE	Kerb Side	x	-	45.1	48.7	42.6	40.1	42.8	41.7
D3	166 WARWICK RD	Road side	x	33.2	30.8	27.1	22.8	22.0	26.0	23.7
D5	215 WARWICK RD	Road side	x	23.0	24.4	27.2	24.1	22.5	28.0	22.3
D7	282 WARWICK RD	Road side	x	-	35.8	40.7	37.9	33.1	37.1	37.3
D9	251 WARWICK RD	Road side	x	32.2	30.6	32.1	27.7	27.1	34.4	27.6

Figure 2.13 Chart showing NO₂ diffusion tube trends at monitoring locations in area D



The nitrogen dioxide levels in this area have decreased at almost all locations compared to 2010. Tube D7 has stayed almost exactly the same as the previous year, however this could have been influenced by extensive road works in the locality during May and June 2011. This location will be monitored closely in further rounds of review and assessment and any changes will be reported upon

Most locations in this area still show annual mean concentrations that are considerably below the objective level. The only tube location that shows an annual mean which is above the objective is D12 (Post Office). This is not a 'relevant location' in that it is not located near a residential property, although it's a location where people may spend an hour or more outdoors. For this reason, it should only be compared to the 1 hour mean objective level for nitrogen dioxide ($60\mu\text{g}/\text{m}^3$). This location has consistently shown no indication of exceeding the hourly objective.

Results indicate that there are no locations within this area that are at risk of exceeding the objective levels for nitrogen dioxide and there is therefore no need to proceed to a 'Detailed Assessment'.

Area E - A595 Caldewgate, Wigton Rd and Newtown Rd (includes AQMA No3 and AQMA No4)

Figure 2.14 Map of diffusion tube locations in area E.

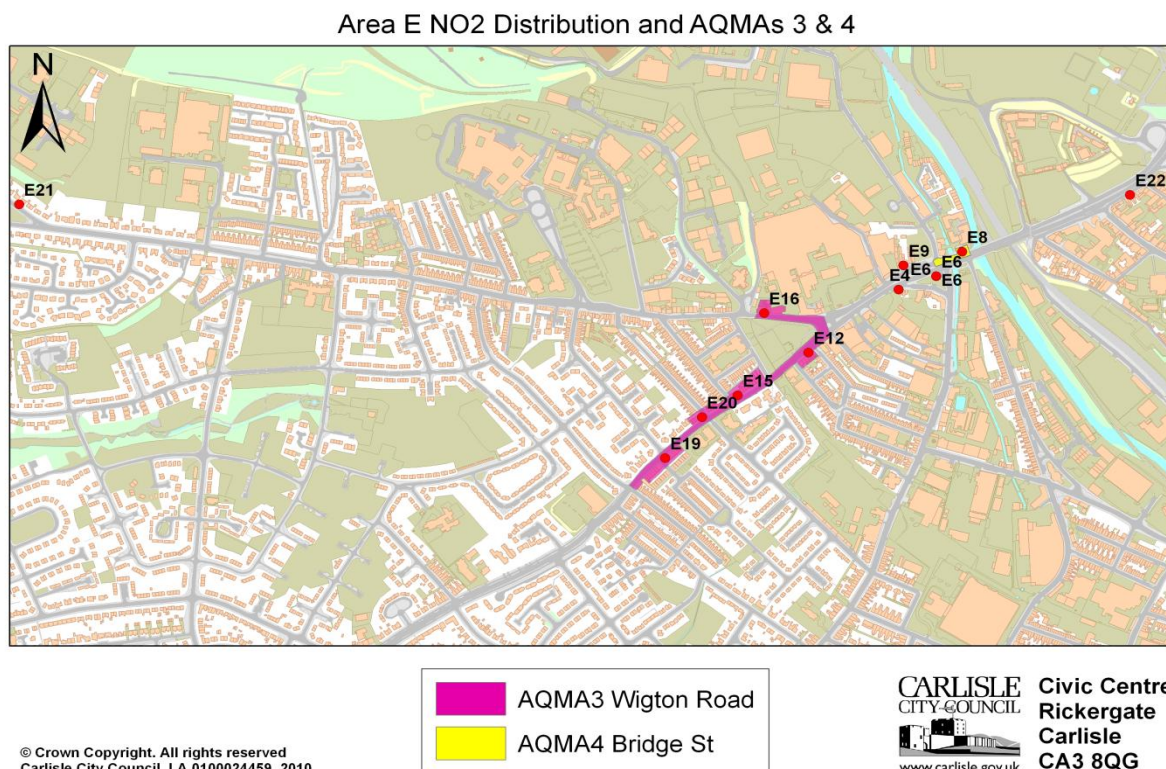
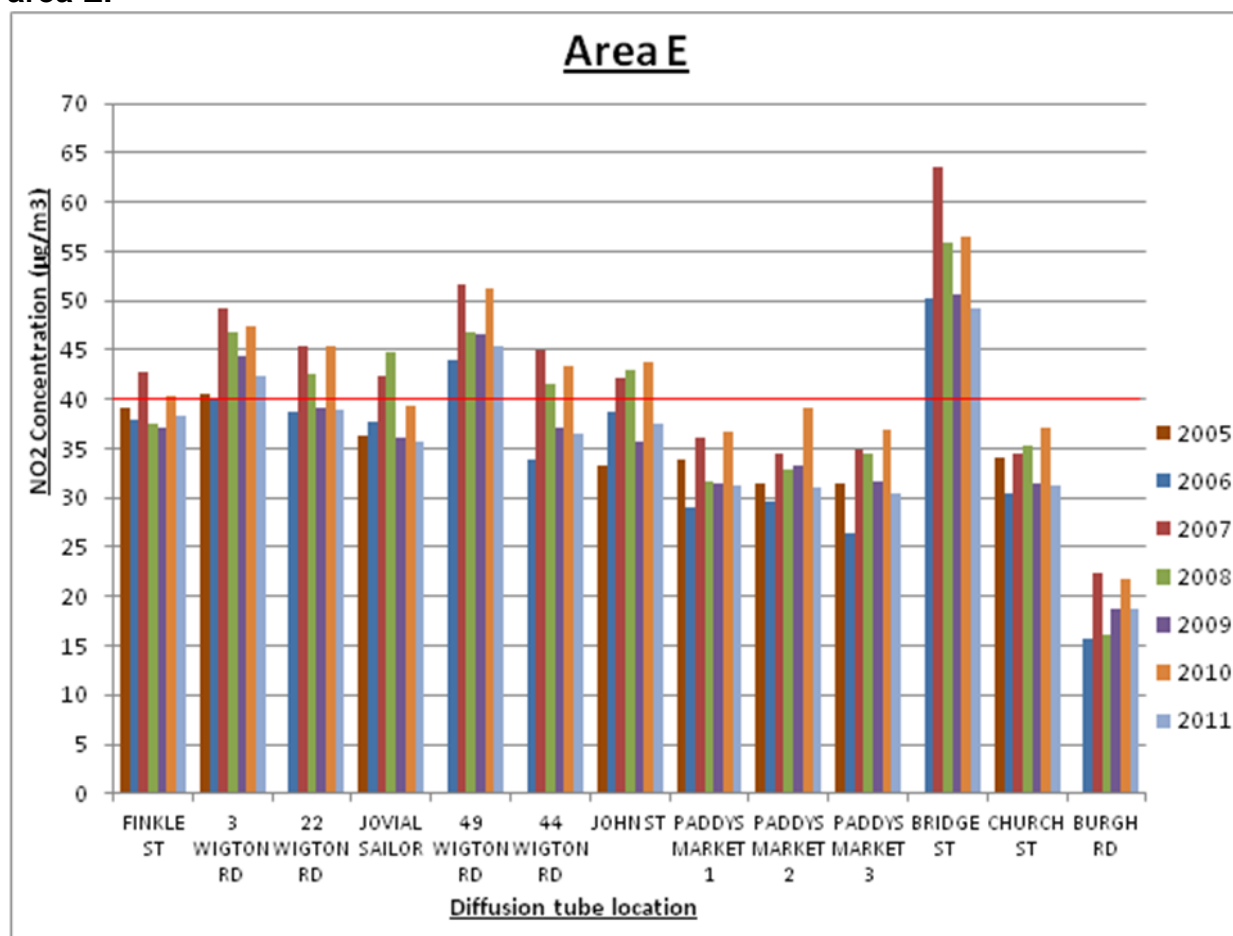


Table 2.5e NO₂ diffusion tube results at monitoring locations in area E.

SITE ID	LOCATION	Site Type	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS ADJUSTED FOR BIAS (µg/m ³)						
				2005	2006	2007	2008	2009	2010	2011
E22	FINKLE ST	Road side	x	39.1	37.9	42.7	37.6	37.1	40.4	38.4
E12	3 WIGTON RD	Road side	✓	40.5	40.1	49.3	46.9 (41.5)	44.4 (41.8)	47.4 (44.2)	42.4 (39.9)
E15	22 WIGTON RD	Road side	✓	-	38.8	45.3	42.5	39.1	45.5	38.9
E16	JOVIAL SAILOR	Road side	✓	36.3	37.8	42.3	44.7	36.0	39.3	35.7
E19	49 WIGTON RD	Road side	✓	-	43.9	51.7	46.9	46.7	51.2	45.4
E20	44 WIGTON RD	Road side	✓	-	33.8	44.9	41.6	37.1	43.4	36.5
E4	JOHN ST	Road side	x	33.3	38.8	42.2	42.9 (37.8)	35.7 (34.1)	43.7 (40.4)	37.5 (35.2)
E6	PADDYS MARKET 1	Road side	x	33.9	29	36.1	31.6	31.5	36.8	31.2
E6	PADDYS MARKET 2	Road side	x	31.4	29.6	34.4	32.8	33.3	39.2	31.1
E6	PADDYS MARKET 3	Road side	x	31.4	26.5	34.8	34.5	31.6	36.9	30.5
E8	BRIDGE ST	Road side	✓	-	50.3	63.6	55.8	50.6	56.6	49.2
E9	CHURCH ST	Road side	x	34.0	30.5	34.4	35.3	31.4	37.2	31.2
E21	BURGH RD	Road side	x	-	15.7	22.4	16.2 (15.5)	18.7 (16.1)	21.8 (17.9)	18.7 (15.7)

Figure 2.15 Chart showing NO₂ diffusion tube trends at monitoring locations in area E.



These diffusion tube results show that during 2011 NO₂ concentrations at all locations along this main traffic route have decreased from 2010. Several have also shown a reduction from previous years.

Three locations still have an annual mean above the objective level, two of these locations are within AQMA 3 and one is within AQMA 4. Both AQMA's are anticipated to show further improvement as a result of a substantial reduction in traffic flows due to the introduction of the CNDP. Early signs are that traffic volumes have reduced significantly in this area. These changes will be monitored and reported upon in the next Progress Report in April 2013.

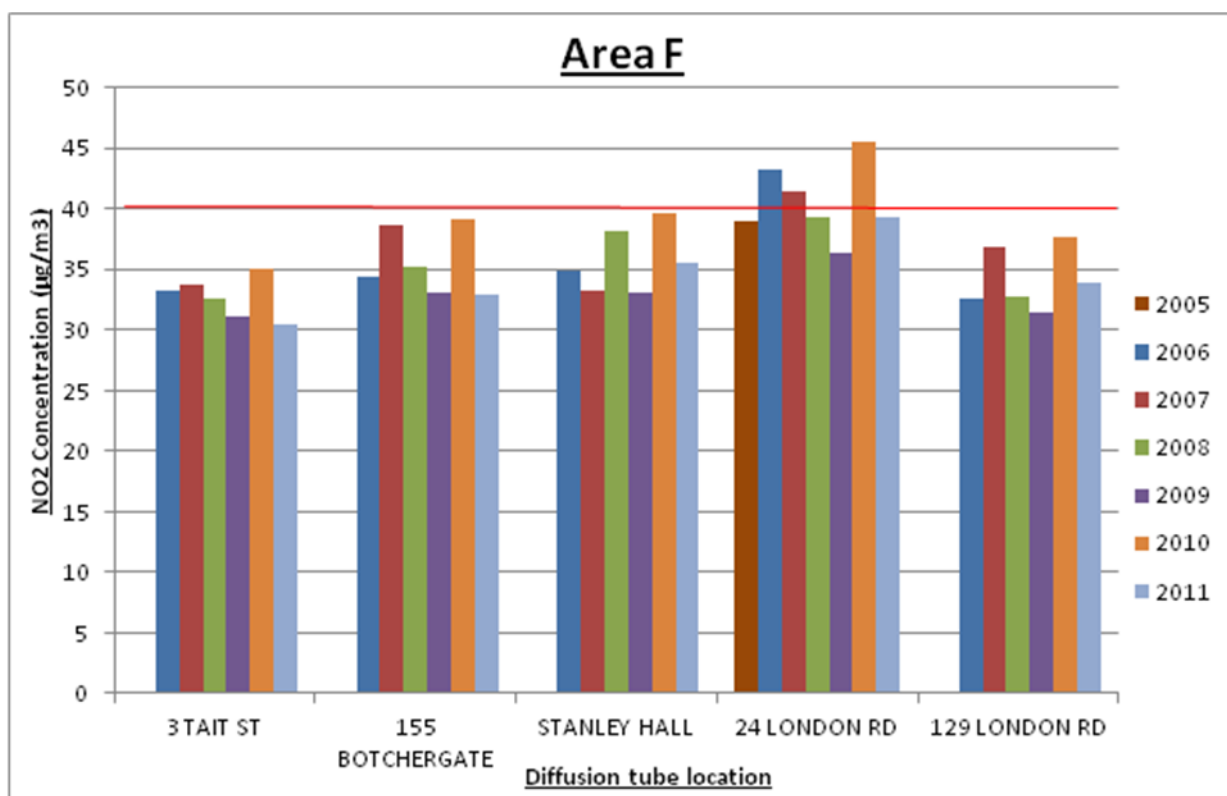
The Updating and Screening Assessment (2009) identified several 'relevant' locations immediately outside the original boundary of AQMA No3; on Wigton Rd and Caldscotes which were above the objective level in 2007/2008. These are essentially along the traffic routes leading up to the Caldewgate roundabout. 'Further Assessment' work has been undertaken which confirmed that it was necessary to extend AQMA No3 to cover these locations. DEFRA were consulted and supported the decision to extend the AQMA, figure 2.14 shows the new boundaries which have been in place since July 2010. There are currently no plans to further amend the AQMA.

Results indicate that there are no locations within area E that are at risk of exceeding the 1 hour mean objective level for nitrogen dioxide, this is also supported by results from the nearby automatic monitoring site.

Area F – A6 London Road / Botchergate (AQMA No6)**Figure 2.16 Map of diffusion tube locations in area F.****Area F NO₂ Diffusion Tube Monitoring Locations****Table 2.5f NO₂ diffusion tube results at monitoring locations in area F.**

SITE ID	LOCATION	Site Type	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS ADJUSTED FOR BIAS (µg/m ³)						
				2005	2006	2007	2008	2009	2010	2011
F1	3 TAIT ST	Road side	x	-	33.2	33.8	32.6	31.2	35.1	30.5
F10	155 BOTCHERGATE	Road side	x	-	34.4	38.7	35.2	33.0	39.1	33.0
F5	STANLEY HALL	Road side	x	-	34.9	33.2	38.1	33.0	39.7	35.5
F7	24 LONDON RD	Road side	✓	39.0	43.3	41.4	39.4	36.3	45.5	39.3
F9	129 LONDON RD	Kerb Side	x	-	32.6	36.8	32.7	31.5	37.7	33.9

Figure 2.17 Chart showing NO₂ diffusion tube trends at monitoring locations in area F.



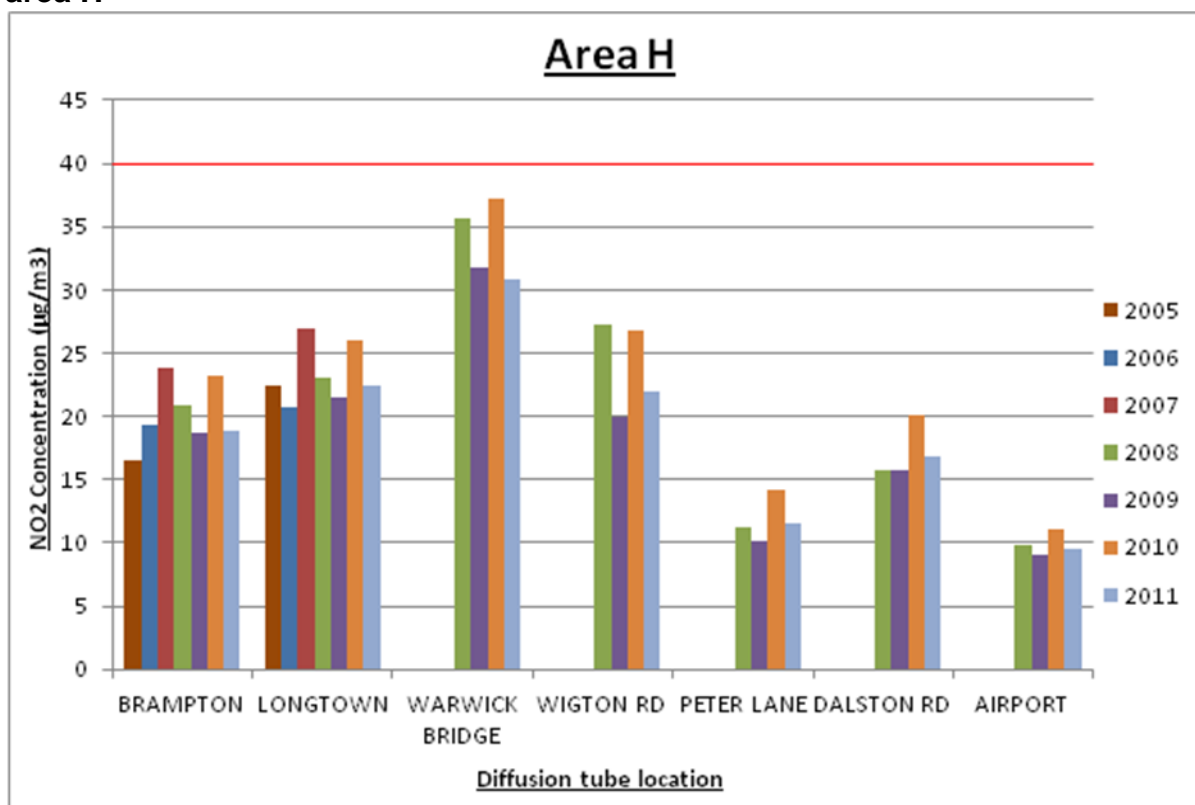
Results show that nitrogen dioxide annual mean concentrations have decreased from the previous year at every location in this area during 2011.

All locations shown in this area have remained below the objective level apart from F7 (London Road) which is located within AQMA No 6. The nitrogen dioxide levels have once again dropped slightly below the objective at this location. It is hoped that the recent completion of the Carlisle Northern Development Route will further reduce traffic volume in this area to the point where consideration could be given to revoking the AQMA at a future time.

Results indicate that there are no locations within this area that are at risk of exceeding the 1 hour mean objective level for nitrogen dioxide.

Area H – Outskirts of City, Townships and Airport**Table 2.5h NO₂ diffusion tube results at monitoring locations in area H.**

SITE ID	LOCATION	Site Type	WITHIN AQMA?	ANNUAL MEAN CONCENTRATIONS ADJUSTED FOR BIAS (µg/m ³)						
				2005	2006	2007	2008	2009	2010	2011
H1	BRAMPTON	Road side	x	16.5	19.3	23.9	20.9 (20.3)	18.7 (18.2)	23.2 (22.4)	18.8 (18.3)
H3	LONGTOWN	Road side	x	22.5	20.7	26.9	23.1 (22.4)	21.5 (20.8)	26.0 (24.9)	22.4 (21.7)
H4	WARWICK BRIDGE	Road side	x	-	-	-	35.7 (34.5)	31.8 (30.8)	37.2 (35.9)	30.9 (29.8)
H5	WIGTON RD	Road side	x	-	-	-	27.3	20.0	26.8	22.0
H6	PETER LANE	Road side	x	-	-	-	11.3	10.2	14.2	11.5
H7	DALSTON RD	Road side	x	-	-	-	15.8	15.7	20.0	16.9
H8	AIRPORT	Other	x	-	-	-	9.84	9.1	11.0	9.5

Figure 2.18 Chart showing NO₂ diffusion tube trends at monitoring locations in area H

Locations H1 & H3 are located in the two largest centres of population outside the city of Carlisle. Both are consistently showing NO₂ concentrations well below the objective level. Locations H4 – H8 are located on the outskirts of the city. Location H4 (Warwick bridge) showed the highest annual mean, however the level in 2011 was lower than in any previous year. We will continue to monitor these areas in future rounds of review and assessment.

Results from all of these sites indicate that the nitrogen dioxide levels are significantly below the objective levels for nitrogen dioxide and there is no risk of exceeding the 1 hour mean objective level for nitrogen dioxide.

Changes to the diffusion tube monitoring network

The decision has been made to move a number of diffusion tubes that have never shown any indication of exceeding the objective levels. These areas all have diffusion tubes remaining in the vicinity so as to allow accurate nitrogen dioxide monitoring to continue. The diffusion tubes will be moved to new locations on the newly opened Carlisle Northern Development Route. The locations which will be removed from the monitoring network, and therefore not reported upon in future review and assessment work, are as follows:

- Location B3 (Shaddon mill)
- Location D1 (Victoria Place)
- Location D3 (166 Warwick Road)
- Location E9 (Church Street). This has been a monitoring site since 2005. The diffusion tube was removed in March 2012 due to the commencement of building works on a new Sainsburys supermarket. The location was originally selected as it consisted of a row of shops with flats above. These have now been demolished to make way for the new store and the area is contained within barriers throughout the construction process. Figure 2.14 above shows that there is sufficient monitoring that remains in this area and the Paddys Market automatic monitoring station is located within a few metres, on the other side of the road. This will accurately monitor any changes in the air quality in this area as the new development progresses.

The new locations for the above tubes have been carefully selected to demonstrate as accurately as possible the effects of the CNDR on rural residential properties. The selected properties are four of the closest to the new road and permission has been obtained to attach a diffusion tube to the facade of these dwellings. The new locations will be as follows:

- Location G1. (Spa House) This residential property is located approximately 85 metres from a straight section of the new road. This is the closest property to the northern end of the CNDR.
- Location G2. (Knockupworth Cottage) This residential property is located 22 metres from the new road on the approach to a new roundabout to the west of the city. There is an earth embankment separating this property from the roadway.
- Location G3. (Cornhill Farm) This property is located 3 metres from an existing road (B5307) on an approach to a new roundabout connecting it to the CNDR. The property is approximately 157 metres from the junction to the new road.
- Location G4. (The Hobbit) This is the closest residential property to the road at 19 metres from the roadside, it is located at the southern end of the CNDR.

Monitoring began at these locations at the start of May 2012 in order to give the most accurate representation of the effects of the new road when it is in permanent operation, with all works complete. Chapter 3 gives further information on the introduction of the CNDR.

2.2.2 PM₁₀

The TEOM analysers at Paddys Market were upgraded using a Filter Dynamics Measurement System (FDMS) on 18th March 2009. The FDMS records gravimetric equivalent particulate data and therefore allows equivalence to the objective level. (More information on this change can be found in Appendix A.) The location of the monitoring unit is not representative of relevant public exposure.

All PM₁₀ data has been collected by Bureau Veritas and ratified by the AEA group.

The PM₁₀ objective for England is an annual mean of 40µg/m³. There is also a 50µg/m³ 24 hour mean not to be exceeded more than 35 times per year.

Table 2.6 Results of Automatic Monitoring of PM₁₀ Comparison with Annual Mean Objective

Location	Site Type	Within AQMA?	Data Capture for monitoring period (%)	Data Capture for full calendar year 2011 (%)	Gravimetric Equivalent	Annual mean concentrations (µg/m ³)					
						2006	2007	2008	2009	2010	2011
Paddy's Market	Road Side	N	93.5	93.5	Y	27.3	27.2	20.8	16.8	22.5	22.1

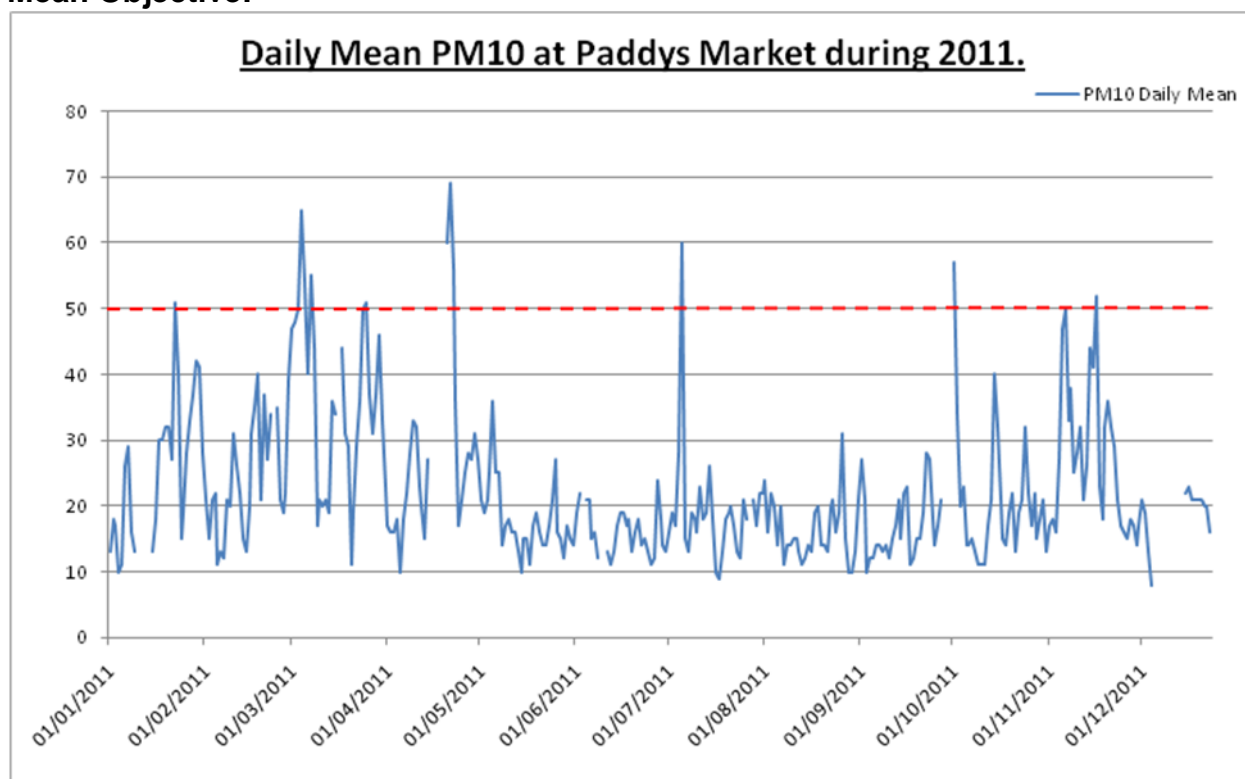
The annual mean for 2011 at Paddys Market is clearly well below the objective level of 40µg/m³. There is no indication that the national objective will be exceeded. The result for 2011 is slightly below the average concentration for the last five years.

Table 2.7 Results of Automatic Monitoring for PM₁₀: Comparison with 24-hour mean Objective

Location	Site Type	Within AQMA?	Data Capture for monitoring period (%)	Data Capture for full calendar year 2011 (%)	Gravimetric Equivalent	Number of Exceedences of daily mean objective (50 µg/m ³)					
						2006	2007	2008	2009	2010	2011
Paddy's Market	Road Side	N	93.5	93.5	Y	16	11	0	7	18	11

This data shows that during 2011 there were 11 recorded exceedences of the 50µg/m³ 24 hour mean, this is significantly less than the objective level of 35 times per year.

Figure 2.19 Results of PM₁₀ Automatic Monitoring: Comparison with 24-hour Mean Objective:



The data above shows that although the daily mean level of 50µg/m³ has been exceeded 11 times during the year, there is no exceedence of the overall 24 hour mean objective for PM₁₀.

2.2.3 Benzene

Carlisle has been monitoring benzene since April 2008 as part of the Non Automatic Hydrocarbon Network. The site is located on the roadside, 42 metres away from the nearest relevant public exposure.

The objective level for benzene is 5µg/m³ measured as a running annual mean, to be achieved by December 2010.

The benzene data shown has been ratified by AEA who have taken over management of the Non Automatic Hydrocarbons Network.

Table 2.7 Results of Benzene Monitoring: Comparison with Running Annual Mean Objective

Location	Within AQMA?	Data Capture for monitoring period (%)	Data Capture for full calendar year 2010 (%)	Running Annual mean concentrations (µg/m ³)			
				2008	2009	2010	2011
Paddy's Market	N	100	100	0.81	0.92	1.1	0.78

The data above shows that the 2011 annual mean concentration for benzene is still well below the objective level. The result is lower than any previous year of monitoring at this location. There are, therefore, no concerns of exceeding the national objective for benzene.

2.2.4 PM_{2.5}

Carlisle City Council began measuring PM 2.5 levels at the Paddy's Market site in March 2009. This is the third stage of our review and assessment work that has reported upon the results of these measurements.

All PM_{2.5} data up to 31st December 2011 has been collected by Bureau Veritas and ratified by the AEA group

Table 2.8 Results of PM_{2.5} Automatic Monitoring: Comparison with Annual Mean Objective

Location	Within AQMA?	Data Capture for monitoring period (%)	Data Capture for full calendar year 2011 (%)	Annual mean concentrations (µg/m ³)		
				2009	2010	2011
Paddy's Market	N	91.2	91.2	11.8	15.54	12.21

The PM_{2.5} objective for England is an annual mean of 25µg/m³, to be achieved by 2020. There is also an exposure reduction target of 15% (measured as a 3-year mean) between 2010 and 2020, applicable at urban background locations.

The 2011 annual mean for PM_{2.5} at Paddys Market remains significantly below the objective level. Compared to 2010 the annual mean concentration has reduced although it is still slightly higher than in 2009. We will continue to monitor PM 2.5 at this location and report the findings, as more data is collected clearer trends should become apparent.

2.2.5 Summary of Compliance with AQS Objectives

Carlisle City Council has examined the results from monitoring in the district. Concentrations outside of the AQMA's are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

Carlisle City Council operates an extensive network of nitrogen dioxide diffusion tube monitoring designed to cover the busy routes, congested roads, narrow streets, city centre locations and roads with high flows of buses and HGV's. A map of our diffusion tube locations in respect to the road network is shown in Figure 2.2.

The most significant change in the road network since the previous round of review and assessment has been the opening of the Carlisle Northern Development Route (CNDR) in February 2012. Some updated traffic count data has been supplied by Cumbria County Council to take account of the new road and give an early indication of the impacts on the rest of the road network. This data is presented in Appendix D and E.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Concentrations are often higher where traffic is slow moving with stop/start driving, and where buildings on either side of the road impede dispersion. Previous review and assessments undertaken by Carlisle City Council have considered streets with more than 5000 vehicles per day, where residential properties are located within 2m of the kerb and buildings are on both sides of the road. Where these are identified outside an AQMA, the local authority is requested to proceed to a detailed assessment.

There are very few streets within the Carlisle district where residential property is located within 2m of a kerb. There are also no new or newly identified congested streets, which match these criteria, that were not considered in the previous round of review & assessment. Those previously identified include:

Stanwix Bank
Brampton Rd
Warwick Bridge
Front St, Brampton
Denton St
Albert St, Longtown
Caldcotes,
John St
Bridge St
London Rd

Monitoring is being, or has been, undertaken at all of these locations since they were identified. In most cases the results have shown no exceedence of the nitrogen dioxide objectives. In those areas where exceedence has been found AQMA's have already been declared

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

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

There are some locations within the district where individuals may regularly spend 1 hour or more close to traffic, including streets with many shops or outdoor cafes and bars. Previous assessments undertaken by Carlisle City Council have identified several such locations including Botchergate, the Town Centre, Lowther St, Devonshire St, The Crescent and Warwick Rd. Nitrogen dioxide monitoring has subsequently been undertaken at these locations, and still continues, the results of this are given in section 2.

Monitoring to date has not found any locations which are likely to exceed the 1 hour objective level for nitrogen dioxide. There are no new or newly identified busy streets which were not considered in the last round of review and assessment where people may spend 1 hour or more. There is, therefore, no need to carry out a detailed assessment.

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

3.3 Roads with a High Flow of Buses and/or HGVs.

There are no new/newly identified roads with high flows of buses/HDV greater than 25% that have not been considered in previous review and assessment. Traffic count data for the A7 (AQMA 1) is shown in appendix D. This gives the proportion of vehicles over 6.6m that used this route, during 2011, before the CNDR was opened. The results show that between only 5 - 7% of the traffic that used this route in either direction were HGV's. This is the major arterial route in the city which links the Centre and west to the M6 junction and Kingstown industrial estate in the north of the city.

Investigation has shown that there is no relevant exposure within 10m of the CNDR along its entire length, there is therefore no need to proceed to a detailed assessment. Any collected data on the percentage of HGV's using the CNDR will be reported in future rounds of review and assessment.

Carlisle City Council confirms that there are no new/newly identified roads with high flows of buses/HDVs.

3.4 Junctions

During previous rounds of review and assessment all major junctions have been considered within the local authority area. Those assessed include the following:

Dalston Rd/Junction St
Eden Bridge Junction
Botchergate/London Rd Junction
Newtown Rd/Wigton Rd/Church St Junction
Charlotte St/Nelson Bridge Junction

James St/Currock Rd Junction
Warwick Rd/Victoria Place Junction
Victoria Place/Georgian Way Junction
Tait St/Botchergate Junction
Denton St/Victoria Viaduct
St Nicholas St/Botchergate

Monitoring is being, or has been, undertaken at all of these locations since they were identified. In most cases the results have shown no exceedence of the nitrogen dioxide objectives. In those areas where exceedence has been found AQMA's have already been declared.

As part of the CNDR there are 9 new roundabouts that link the CNDR to existing arterial routes leading in and out of the city. Since the bypass has opened traffic counts have been ongoing at three key sections of this new road, the first two months of traffic data are briefly summarised as follows:

- Parkhouse Rd-Kingmoor Hub has flows around 8,500/day
- Orton Rd-Moorhouse Rd has flows >10,000/day (average of around 10,560/day)
- A595-Orton Rd has flows around 8,000/day.

The full CNDR traffic count data can be found in appendix E.

Early traffic count data has revealed that the stretch of the CNDR between Orton Rd to Moorhouse Rd junctions has an average daily flow which is just over the 10'000 vehicles threshold level. There is, however, no relevant exposure within 10m of these roundabout junctions or indeed any of the new junctions associated with the CNDR. The nearest relevant receptor to either of these junctions is Cornhill Farm which is located approximately 157m from the Moorhouse Road Junction. This is one of our new monitoring locations and the results of which will be reported in future round of review and assessment.

Carlisle City Council confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

An air quality assessment was carried out as part of CNDR Environmental Statement Volume 1, Part 1 to support the planning application for the CNDR in February 2000. The air quality modelling assessments that were carried out followed the HA DMRB vol 11 methodology. The results of the investigations have been considered sufficient for the purpose of previous rounds of review and assessment.

The outcome of the Environmental Statement was a predicted decrease in NO_x and PM emissions on the existing road network following the introduction of the CNDR. Concentrations of NO_x and PM were also predicted for three receptors most likely to experience increase in air pollutants along the new route. All three were predicted to decrease for both pollutants because improvements in vehicle efficiencies and reduced emissions were expected to outweigh any increase at these receptors due to increased traffic flows.

It is acknowledged that the impact assessment for the bypass was produced some considerable time ago. Consideration has therefore been given to 'approach two' for assessing the potential impacts of the new road as stated in the revised technical guidance (TG(09)). As discussed in the previous section, the early traffic count data from March and April has shown that at one location along the length of the bypass traffic flow has exceeded an average of 10'000 vehicle movements per day. There is however no relevant exposure within 10m of the new road along this particular length or at any other point on the CNDR.

There is no indication at this stage that the CNDR has substantially increased traffic flow on any existing roads. There are no connecting roads in the locality of the CNDR which could potentially be impacted by increased traffic volumes that have ever revealed NO₂ annual mean concentrations of over 36 µg/m³ or 30 exceedences of the 24 hour PM₁₀ objective of 50µg/m³. Early traffic count data collected on the A7 at Stanwix Bank (AQMA 1) indicates that there has been around a 13% reduction in traffic along this main route. (See appendix D for Stanwix Bank Traffic Data) It is too early to draw any firm conclusions from the traffic count data, however as more data is collected we will be able to build a clearer picture of the actual impacts and these will be reported upon in future rounds of review and assessment.

As discussed in chapter two, changes have been made to the monitoring network to carry out NO₂ monitoring on the facade of some of the residential receptors which are situated closest to the road. Measurements taken on site have shown that the nearest two properties are 19m (Hobbit) and 22 metres (Knockupworth Cottage) from straight sections of road where the traffic is generally free flowing throughout the day. Measured concentrations at these properties, and two others, will be reported upon in future rounds of review and assessment.

Carlisle City Council has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with Significantly Changed Traffic Flows

Technical guidance advises that roads with significantly changed traffic flow are those with more than 10,000 vehicles per day which have experienced more than a 25% increase in traffic flow. There is no indication that there are any existing roads within the authority area that have experienced a 25% increase in traffic flow since the last round of review and assessment. It is expected that the opening of the CNDR will result in significant reduction in traffic flows on existing routes. Traffic count data from all routes will be assessed in more detail in future rounds of review and assessment.

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

3.7 Bus and Coach Stations

Carlisle has only one bus station within the district. Updated information provided by the bus station indicates that there are currently approximately 300 bus movements per day. This is significantly less than the 2,500 threshold, which, according to Defra guidance, may indicate a risk of an air quality objective being exceeded at adjacent relevant locations. There are no current plans for extension or relocation of the bus station.

Carlisle City Council confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

4.1 Airports

Aircraft are potentially significant sources of nitrogen oxides emissions, especially during takeoff. Guidance suggests that only nitrogen dioxide should be considered in respect to aircraft. There may be a risk of exceeding the objective levels for nitrogen dioxide where the annual throughput of passengers and tonnes of freight is more than 10 million passengers per annum (mppa), 100'000 tonnes of freight is equivalent to 1 mppa.

There is one airport within the district. Carlisle Airport is a small, privately operated site. The majority of aviation activity at the airport at present and over the last 20 years has been light flying training, aviation club activities, private aviation, air ambulance and occasional MOD training, including both fixed wing and helicopter. Essentially the airport itself has remained unchanged since previous rounds of review and assessment.

As discussed in previous rounds of review and assessment there have been various applications made to develop the airport and negotiations are ongoing. The most recent planning application will be examined by committee in June 2012. The application relates to extensive development of the airport, including the improvement of runways and buildings to include warehousing, hangers and improvements to the passenger terminal.

The developer has provided an aspirational target of 100'000 passengers per annum during future operations, should the airport be developed according to plans. They have estimated that there will be 1100 freight movements carrying a total of 3850 tonnes in the first year. Carlisle City Council has employed consultants to address the potential expansion of the airport. Their view is that the airport expansion plans are likely to result in significantly less aircraft movements than estimated by the developer.

The anticipated number of freight aircraft movements provided by the developer has an equivalent of 0.0385 mppa. Given the expected passenger throughput the indicative worst case estimate of the effective operational size of the airport is 0.1385 mppa. It can be concluded that airport sources would not have any significant local air quality impact. Any changes to the airport will be re-examined in the next stage of review and assessment.

There are residential properties within 1000 metres of the airport boundary and the NO₂ annual mean concentration has been measured since 2008 in this area. The diffusion tube, located on the airport boundary adjacent to the nearest residential properties, recorded an NO₂ annual mean of 11 µg/m³ in 2010. This was the highest level recorded since monitoring began. There is therefore no concern with the existing NO₂ levels in this area.

Carlisle City council confirms that there are no airports in the Local Authority area which have an annual throughput of passengers and tonnes of freight of 10 mppa or more.

4.2 Railways (Diesel and Steam Trains)

Carlisle has a significant railway network. Government guidance suggests that stationary locomotives, both diesel and coal fired, can give rise to high levels of sulphur dioxide close to the point of emission. Recent evidence suggests that moving diesel locomotives, in sufficient numbers, can also give rise to high NO₂ concentrations close to the track. These two potentially significant sources are considered below.

4.2.1 Stationary Trains

Whilst there are relevant locations throughout the authority which are located within 15m of a railway track there were no locations identified during the last round of review and assessment where trains remain stationary for more than 15 minutes with engines idling at those locations. This has been rechecked for the purposes of this assessment and it is still the case.

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

4.2.2 Moving Trains

Updated guidance suggests that moving diesel locomotives, in sufficient numbers (in excess of 100 trains per day), can also give rise to high nitrogen dioxide concentrations within 30m of the track where the background annual mean is 25µg/m³.

As part of a previous round of review and assessment a survey of the Newcastle/Leeds line, West Coast Mainline and West Cumbria Mainline together with the convergence of these lines adjacent to Carlisle Station indicates that there is no risk of exceeding the above criteria at any location within the district. There have been no major changes to the lines or rail traffic since this time.

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

4.3 Ports (Shipping)

There are no ports within the local authority area.

Carlisle City Council confirms that there are no ports or shipping that meet the specified criteria within the Local Authority area.

5 Industrial Sources

5.1 Industrial Installations

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

The only new permit issued for an industrial installation in the Carlisle district in the last 3 years is for a Mechanical Biological Treatment facility at Hespin Wood Resource Park. This has now become operational since the previous round of review and assessment.

Hespin Wood Resource Park is a Mechanical Biological Treatment facility for up to 75000 Tonnes of municipal waste per year. The facility is located approximately 5 miles north of Carlisle and 350 metres west of the village of Todhills. The site is surrounded on three sides by landfilling activities and on the other by the West Coast Main Line railway.

The process itself is undertaken inside a single building. This starts at the reception pit for all incoming wastes from where they are shredded and transferred by crane to a 'biodrying hall'. In this hall the wastes are dried aerobically by drawing air from the building through the stockpiled wastes for around 12 -15 days. This process reduces the waste mass by around 25% and stabilises the waste. The extracted air is then fed to a wood filled biofilter to control odours and is emitted from here to atmosphere.

The dried waste is removed by crane from the biodrying hall into a refinement area where it is segregated by size and type into different fractions. The key fraction is the Solid Recovered Fuel (SRF) which may then go through a further shredding process. Each fraction is stored pending off site recovery or disposal. Air is emitted to atmosphere from the refinement area via a bag filter to control particulate levels.

The applicants modelling of air emissions from the biofilter demonstrated that 'emissions will be insignificant in that long term releases of benzene, ammonia and hydrogen sulphide will be below 1% of the relevant long term Environmental Assessment Level (EAL) and 10% of the relevant short term EAL. The modelling also showed that odour emissions are unlikely to exceed the 1.5 OUE/m³ significance criteria'. The Environment Agency confirms that they agree with these conclusions.

The Environment Agency have set an 'Emission Limit Value (ELV) of 10 mg/m³ for particulates from the baghouse stack to ensure that the performance of this unit is optimised and meets the emission rates that the operator has proposed'. At this rate of emission they agree with the operators modelling conclusion that 'shows the emissions to be insignificant i.e. below 1% of the relevant long term EAL and 10% of the relevant short term EAL. This ELV is below the benchmark standard as the operator expects to demonstrate they can comply with this lower value through their application of Best Available Techniques (BAT)'.

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

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

There have been no substantial changes to any of the permitted industrial installations in the Carlisle area in the last 3 years.

There have been no significant changes which would create new relevant exposure in the Carlisle area.

The only permitted industrial process in neighbouring authorities which could potentially be significant is 'Innovia' at Wigton, within the district of Allerdale Borough Council. The plant is permitted by the Environment Agency to produce 17'000 tonnes of cellophane film per year and 5'000 tonnes of saleable viscose. The installation is located 7.45 Km away from the Carlisle City Council border and 7.47 Km from the nearest relevant receptor within our area. For these reasons it was not considered to have any significant impact by any previous round of assessment. The Environment Agency has also reported recent improvement, including abatement measures which have significantly reduced emissions, including Carbon Disulphide.

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

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

There have been no new or significantly changed industrial installations with no previous air quality assessment since the last round of review and assessment.

Carlisle City Council confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There is some evidence that major petrol fuel depots could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads. There is one medium sized fuel storage depot within the district. The nearest properties are approximately 200m away from the petrol storage tanks.

The storage site, formerly BP (Oil) Dalston Ltd is now known as 'Ineos LTD, Dalston Terminal.' This site was considered in the last round of review and assessment. It was revealed that this point source is well below the threshold at which exceedences of the benzene objective could occur. The site utilises a vapour recovery system to minimise any emissions. It is permitted by Carlisle City Council and visited every six months.

There is one major fuel (petrol) storage depot within the Local Authority area, but this has been considered in previous reports.

5.3 Petrol Stations

Guidance suggests that petrol stations could emit sufficient benzene to put the 2010 objective at risk of being exceeded, especially if combined with higher levels from nearby busy roads. Defra requests that local authorities identify all petrol stations with an annual throughput of more than 2000m³ of petrol (2million litres per annum), with a busy road nearby and determine whether there is relevant exposure. This includes residential property within 10m of the pumps that have not been covered by previous review & assessment reports.

All petrol stations found within the district have been considered against the above criteria in previous rounds of review & assessment and none were found to meet the trigger levels. This has been reviewed and the situation remains the same.

Carlisle City Council confirms that there are no petrol stations meeting the specified criteria.

5.4 Poultry Farms

A small number of local authorities have identified potential exceedences of the PM10 objectives associated with emissions from poultry farms defined as chickens (laying hens and broilers), turkeys, ducks and guinea fowl. Defra advises that there may be a risk of a poultry farm exceeding an objective where it houses in excess of:

- 400,000 birds if mechanically vented
- 200,000 birds if naturally vented
- 100,000 birds for any turkey farm.

There are 8 poultry farms on the integrated pollution, prevention and control register within our area , these are as follows:

- The Bow Great Orton Carlisle CA5 6EW
- Wreay Poultry Farm, Chapel Hill Rd, Wreay, CA4 0PR
- Close Gap Poultry Fm, Longtown, CA6 5NA
- Lyne Moor, Brampton Rd, Longtown CA6 5TR
- Fairholme Farm, Walby Carlisle CA6 4QL
- Mayfield, Cairnholme, Whitehead Hill, Cumwhitton, Carlisle CA8 9BZ
- Mayfield, Edenford, Randlaw Lane, Great Corby CA4 8NL
- Randlawfoot Poultry Farm, Randlaw Lane, Great Corby, Carlisle CA8 9BZ

The largest mechanically ventilated unit we have permitted, by the Environment Agency, is 392,000 broilers 8,000 below the 400,000 threshold.

We have no naturally vented farms above 200,000 and no turkey farms above 100,000 currently permitted.

Carlisle City Council confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

6.1 Biomass Combustion – Individual Installations

Biomass burning can lead to an increase in PM₁₀ emissions, due to the process of combustion. Aerosol formation from volatile materials distilled from the wood is also an issue. Compared to conventional gas-burning, biomass burning can also result in an increase in the overall NO_x emissions due to the fuel-derived portion that is not present in gas combustion. Guidance suggests that consideration needs to be given to biomass combustion installations in the range of 50kW to 20MW units.

Carlisle City Council does have a new large biomass plant since the last round of review and assessment which meets these criteria. Richard Rose Morton Academy is a school in the west of the city which was newly refurbished and extended in 2011. As part of the developments a biomass boiler was installed to provide sustainable heating to the facility. The boiler is a 550Kw unit with a 17.2m stack height and a 450mm internal flue diameter. From this information it was possible to calculate that the stack has a flow rate of 1.9035m³/s.

The worst case emission rates for the unit were obtained from the supplier and these were input into the 'EPUK Unit Conversion and Screening Tool' along with the above flow rate. This then calculated the emissions rate from the stack in (g/sec) as follows:

- NO_x emissions rate of 0.4716 g/sec.
- PM emissions rate of 0.1595 g/sec.

The annual average background concentration for the location was taken from the 2010 background maps provided by LAQM support, these are as follows:

- NO₂ annual average background 8.34992 µg/m³
- PM₁₀ annual average background 10.8998 µg/m³

The above information on the stack dimensions and background concentrations, as well as the height of the tallest building within 5 stack heights of the stack, were input into the biomass calculator (tool 6), provided by LAQM support. This calculated the following target emission levels:

- NO₂ target emission rate (annual mean) of 1.2263 g/s.
- NO₂ target emission rate (1 hour mean) of 0.8104 g/s.
- PM₁₀ target emission rate (24 hour mean) of 0.2829 g/s.

By comparing the emissions rates and target emissions rates above it becomes clear that neither the PM₁₀ or NO₂ emissions from the biomass boiler exceed the target.

In order to check the conclusions of this method the background adjusted emission rates were calculated using the procedures set out in Para 5.78, 5.81 and 5.84 of (TG(09)). These figures were then compared to threshold emission rates which were worked out using the nomograms in figure 5.19, 5.20 and 5.21 (TG(09)). The results of the calculations again showed that the source does not exceed the threshold emission rates for either PM₁₀ or NO₂ therefore it is not necessary to proceed to a detailed assessment.

Carlisle City Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

There is the potential that many small biomass combustion installations, whilst individually acceptable, could, in conjunction, lead to unacceptably high PM10 concentrations. This is of particular concern in areas where PM10 concentrations are close to or above the objectives. There is, however, only one major biomass combustion plant in the district and that has been investigated above in chapter 6.1.

Carlisle City Council currently does not have any housing estates which use biomass installations as a primary source of heat. For this part the burning of solid fuel burning in domestic properties is also considered.

Guidance provides details of the minimum number of households per 500m by 500m area required to trigger the need for a Detailed Assessment based on the worst assumption that wood is burnt in an open fireplace as a primary source of heat and based on background PM10 concentrations.

The previous round of review and assessment identified 6 villages and a small town in the district that do not have a mains gas supply and therefore use alternatives as a primary fuel source. The maximum number of dwellings in a 500x500m grid was established and the background PM10 concentrations in these areas were taken into account. The outcome was that none of the locations met the criteria for a detailed assessment. Since the previous round of review and assessment there has been little change to the housing density or background PM10 concentrations in these areas.

The previous round of review and assessment also gave detailed consideration to more densely populated areas within the city which, although on mains gas, may have properties which burn solid fuel. This mainly includes Victorian terraced properties within the city centre and other residential areas. Background concentrations were considered in these areas and it was concluded that the housing density would not be sufficient to meet the criteria. Officers regularly visit these locations and have not experienced/witnessed significant or problematic burning of solid fuel at any location. Carlisle City Council has also not substantiated any relevant complaints of smoke nuisance from domestic heating in these locations.

Carlisle City Council has assessed the biomass combustion plant, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.3 Domestic Solid-Fuel Burning (Sulphur Dioxide)

Guidance states that where the density of coal burning premises exceed 100 per 500x500m in area there may be a risk of the SO₂ air quality objective being exceeded. As discussed in the previous section there are a number of villages and a small town that do not have a mains gas supply and therefore use alternatives as a primary fuel. These areas were all examined in detail in previous rounds of review and assessment.

It was revealed by the previous investigation that only Longtown was considered a possible location where there may be a risk of exceeding the air quality objective for SO₂, because it is the only area with a housing density over 100 dwellings in any 500x500m grid. A questionnaire was sent to 350 households and as a result it was estimated that the number of houses which use coal as the predominant source of heating was significantly below the threshold for exceeding the objective. It is not considered likely that there has been a significant increase since this study was carried out.

Further frequent visits to each of these areas has not identified any significant smoke hanging during a winters evening. Carlisle City Council has also not substantiated any relevant complaints with regard to smoke nuisance from residences in these areas.

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

7 Fugitive or Uncontrolled Sources

Dust emissions from a range of fugitive and uncontrolled sources can give rise to elevated PM₁₀ concentrations.

Dust arises from the passage of vehicles over unpaved ground and from the passage of vehicles along public roads that have been affected by dust and dirt tracked out from dusty sites. It also arises from the handling of dusty materials and processes such as the cutting of concrete. There is also a possibility of wind blown dust emanating from stockpiles and dusty surfaces.

Potential sources of fugitive or uncontrolled dust within the local authority area were considered during previous rounds of review and assessment. Whilst there are a number of potential sources including quarries and concrete batching within the district it was found that there were no adjacent relevant locations. In addition these premises are permitted by Carlisle City Council and are regularly inspected. No particular dust emissions have been noted during site visits.

Since the last round of review and assessment two cement batching sites have ceased production and the others have reported significant reduction in throughput. The only brickworks that was previously operational has now closed down permanently.

Complaints received by Carlisle City Council since the last review and assessment have also been considered. Records indicate that out of the small number of complaints received, upon investigation none have been substantiated, since the last round of review and assessment.

There have been no new sources likely to emit fugitive or uncontrolled dust emissions since the last round of review and assessment.

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

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

Nitrogen Dioxide

The monitoring undertaken for the purpose of this report has not identified any potential exceedences of the nitrogen dioxide annual mean objective, at any relevant locations, outside our existing AQMA's.

The monitoring data indicates that there are still locations within all 6 of our AQMA's which remain above, or borderline of, the annual mean objective level, therefore there are no plans to revoke or amend any of them at this present time.

In 2011 the annual mean NO₂ concentrations decreased at the vast majority of monitoring locations across the district, compared to 2010. This supports the conclusions of Progress Report (2011) that the unexpected increase in NO₂ levels during 2010 was due to adverse meteorological conditions. Some locations have now also shown a further decrease on previous years.

The vast majority of the monitoring network will continue to operate unchanged during 2012. This will allow accurate 'before and after' comparisons to be drawn following the opening of the Carlisle Northern Development Route (CNDR). This action plan measure is expected to have a dramatic effect on inner city traffic congestion and should have a knock on improvement in NO₂ concentrations in key areas. There will be four diffusion tubes relocated to residential properties which are adjacent to the CNDR. This will allow us to ascertain the effects of the new road on those dwellings which are closest to it.

Monitoring from our continuous analyser unit at Paddys Market showed no exceedence of the 1 hour mean objective, or the annual mean objective, for nitrogen dioxide during 2011. The unit recorded an annual mean of 27.8µg/m³ which is the lowest since monitoring began in 2006.

Monitoring from our continuous analyser unit at Stanwix Bank showed no exceedence of the nitrogen dioxide 1 hour mean objective. The unit recorded an annual mean of 36.2µg/m³. It should be noted that the unit's location is not representative of public exposure and is within AQMA 1.

Particulate Matter (PM 10)

Monitoring from our unit at Paddys Market showed 11 exceedences of the 50µg/m³ 24 hour mean, this is below the permitted 35 exceedences given in the objective. The recorded annual mean of 22.1µg/m³ was also significantly below the objective level of 40µg/m³, during 2011.

Particulate Matter (PM 2.5)

Monitoring from our unit at Paddys Market showed no exceedence of the 25µg/m³ annual mean objective, for PM 2.5. The recorded annual mean of 12.2µg/m³ was significantly below the objective level, during 2011.

Benzene.

Monitoring from our pumped diffusion tubes unit at Paddys Market revealed a running annual mean of 0.78µg/m³ for benzene. There was therefore no exceedence of the 5µg/m³ running annual mean objective, during 2011.

No other pollutants are of concern in the district.

8.2 Conclusions from Assessment of Sources

The new local developments within the district are detailed in sections 3 -7 of this report. The air quality impacts of prospective developments have all been assessed either as part of the planning process or under the Environmental Permitting Regulations 2010. It can be concluded that there are no new major developments of any particular concern or significant changes to existing installations that have taken place since the last round of review and assessment.

There are proposed developments including an application to develop the airport within the district. Development has not been approved but this will be closely monitored and if necessary it will be given more detailed consideration in future stages of review and assessment.

There is a new supermarket that is currently being built in the Caldewgate area. Part of this development involves improvement to the existing junctions and widening of a section of existing road. The effects of this will continue to be closely monitored and reported upon in the review and assessment process.

The most significant development in the district since the previous round of review and assessment has been the opening of the Carlisle Northern Development Route (CNDR) in February 2012. The Further Assessment (2007) indicated that the opening of the CNDR will have a major impact on nitrogen dioxide levels along A7 (AQMA 1) bringing levels to below the objective level. A Further Assessment undertaken in 2009 also indicated that the CNDR will have a significant positive impact on air quality along the A595 (AQMA's 3 and 4).

At this point it is not feasible to draw conclusions from traffic count or air quality monitoring data, however, early indications in the local area show that the CNDR is having a significant effect on congestion and traffic volume on some of the key arterial routes through the city. In particular there is a reported reduction of approximately 13% of the average daily traffic count along the A7 (AQMA1). New monitoring is now underway to address any potential impacts that the new bypass may have on nearby residential properties. Initial investigation shows that the distance of these properties to the road, the open rural environment and the free flowing nature of the traffic is unlikely to give rise to any exceedence of the objectives at any of the newly identified receptors along the CNDR route. Previous air quality impact assessment work carried out in the planning stages of the development also supports this prediction.

This assessment has not identified any new developments or significantly changed existing sources that may cause any potential exceedences outside the AQMA's, therefore there is no need to proceed to further detailed assessment.

8.3 Proposed Actions

This Updating and Screening Assessment has not identified the need to proceed to a Detailed Assessment for any pollutant. It has not revealed any reason for the boundaries of any of our existing AQMA's to be amended.

The current AQMA 3 (Wigton Road) has been successfully extended and the AQMA order came into force on 1st July 2010. The data collected from within the AQMA during 2011 has shown that some locations have now dropped below the NO₂ annual mean objective. Monitoring will continue here in the same way during 2012, until sufficient data has been collected to confirm long term improvement.

Minor changes have now been made to the monitoring network (as discussed in chapter 2) to take into account a new supermarket development in the Caldewgate area and to monitor air quality at residential properties along the route of the CNDR. The rest of the monitoring programme will remain the same so that comparisons can be drawn once the CNDR has been operational for a sufficient length of time. It is hoped that this bypass will further improve air quality in several AQMA's and in future it may be possible that one or more may be revoked.

The next report to be submitted to DEFRA will be our revised Action Plan. The draft version is currently at consultation stage and it is expected that this will be adopted by the Council by September 2012. The next annual review and assessment report will be the Progress Report. This will be submitted in spring 2013 and will present all of the 2012 monitoring data as well as detail any progress with proposed or existing developments within the district. It will also provide an update on progress with regards the measures detailed within the new revised Action Plan.

9 References

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Appendices

Appendix A: QA/QC Data.

Appendix B: Monthly NO₂ diffusion tube Results 2011 – Raw Data.

Appendix C: NO₂ diffusion tube Results 2011 – Calculated data.

Appendix D: A7 (AQMA 1) Traffic Count data.

Appendix E: CNDR Traffic Count Data.

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

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.

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

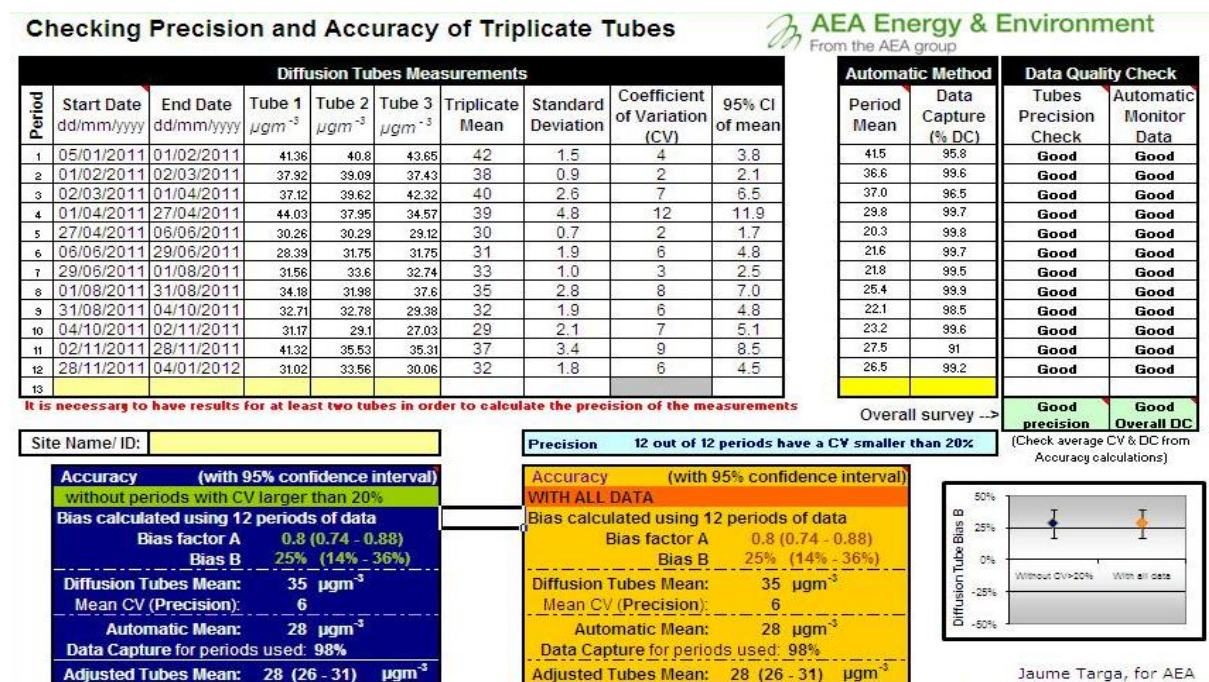
Authorities are asked to report the adjustment factor from their own collocation study, where available. The national bias adjustment factor is then determined by collating and assessing data from NO₂ collocation studies across the UK. Full details of both the national and local bias adjustment factors used to adjust data and details of data precision are provided below.

Factor from Local Co-location Study

Carlisle City Council utilises NO₂ diffusion tubes prepared with 20% TEA in water, these are prepared and analysed by Gradko Environmental Ltd.

A local bias adjustment factor of **0.8** was derived from the diffusion tubes co-located at the Paddy's Market monitoring station. This is a roadside location, not representative of public exposure, located close to two air quality management areas.

The local bias adjustment factor was calculated using the AEA Spreadsheet for checking the precision and accuracy of triplicate tubes, found on the UK Air Quality Archive website. The following screen print shows the results of the data that was input into the spreadsheet:



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%.

All of our 12 study periods shown above had a CV of below 20% (good precision) for this reason the bias adjustment factor and annual means are all based on the whole year of collected data. This is summarised as follows:

Diffusion tubes annual mean: **35 $\mu\text{g m}^{-3}$**
Automatic monitoring station mean: **28 $\mu\text{g m}^{-3}$**
Local bias adjustment factor: **0.8**

Factor from National Co-location Studies

Our local bias adjustment factor was submitted so that it could contribute to the overall national bias adjustment factor. A national bias adjustment factor of **0.89** was later calculated using the bias adjustment spreadsheet tool on the Local Authority Air Quality Support Website spreadsheet version 03/12. This calculation is based on 26 individual co-location studies including our own submitted bias adjustment factor. All of these studies were analysed by Gradko for the method 20% TEA in water during 2011.

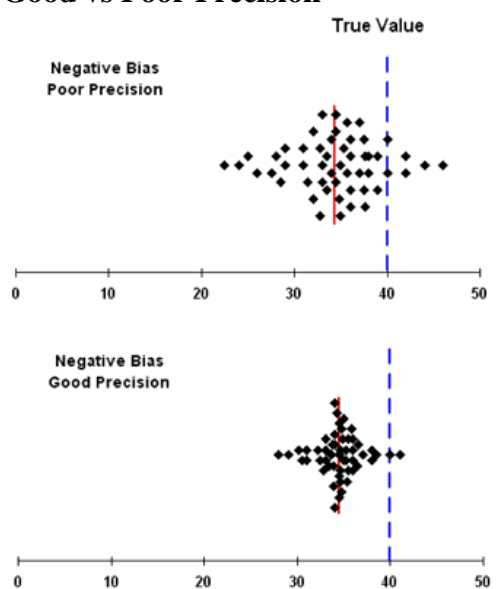
Discussion of Choice of Factor to Use

The two separately calculated bias adjustment factors are evidently rather closely matched. It was decided that the national bias adjustment factor would be the most appropriate to use as this would give the most conservative results. It was also considered that a correction factor derived from 26 co-location studies would incorporate variation from many different types of monitoring site. This would reflect the wide range of locations in which we expose our 50 diffusion tubes across the district, some of which differ considerably from our own co-location site. **The annual mean for each diffusion tube location has therefore been adjusted using the national bias adjustment factor of 0.89.**

Precision

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



The distinction between good and poor precision is an indicator of how well the same measurement can be reproduced. This precision will reflect the laboratories 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, account should be taken of the proportion of poor precision collocation results, not just the presence or absence of poor precision co-location results.

PM Monitoring Adjustment

Defra published the results of a study investigating the equivalence of various samplers and instruments for measuring PM₁₀ in comparison with the European reference method (a gravimetric technique).

The study found that the TEOM did not meet the equivalence criteria of the European reference method within the UK, even with the 1.3 correction factor (as advised in previous guidance). The outcome of the equivalence study means that TEOM analysers cannot strictly be used to measure PM₁₀ concentrations for comparison with the air quality objectives.

TEOM's are however widely used in LAQM work. Defra & the Devolved Administrations advice to local authorities using TEOM's is that it is generally not necessary to replace the instrument immediately, but when the time does come to

replace it, the selected sampler should be a reference sampler, or one that meets the equivalence criteria.

During some previous review and assessment work the data has been corrected wherever possible using the King's College London Volatile Correction Model (VCM) for PM₁₀ (rather than by the application of a 1.3 correction factor). This adjustment is not necessary for the purpose of more recent monitoring because the TEOM was upgraded to FDMS on 18th March 2009. For this reason the PM₁₀ data presented here can be used to compare with the air quality objectives.

Short-term to Long-term Data adjustment

All monitoring data was collected throughout the whole of 2011 therefore there is no requirement to make any further adjustments to the data. All of the collected data from the automatic monitoring sites has a data capture of over 90%. All of the diffusion tube monitoring locations also collected at least 9 months of valid data for the for the 12 month monitoring period.

QA/QC of automatic monitoring

Both of our automatic stations are subject to stringent QA/QC procedures.

Paddy's Market, which monitors PM₁₀, NO₂ and more recently PM_{2.5}, is part of the AURN and the network quality assurance and control procedures are implemented.

To ensure optimum data quality and capture, a three-tier system of calibration and analyser test procedures is employed in the AURN. The major components of this system are briefly described below.

- a) Daily automatic IZS checks - these allow instrumental drifts to be examined, and act as a daily check on instrument performance.
- b) Fortnightly manual calibrations - these are performed by the local site operators and are used by management unit to scale raw pollution data.
- c) 6 – monthly network inter calibrations – These exercises are performed by the QA/Qc Unit every 6 months to ensure that all measurements from all network stations are completely representative and intercomparable. The inter calibrations will also act as an independent audit of the system at the site.

Data ratification is undertaken every 3 month intervals. This involves a critical review of all information relating to the data set to verify, amend or reject the data. When the data is ratified, they represent the final data set in the review & assessment process

The NO₂ data from the Stanwix Bank monitoring unit was managed by Casella Monitor throughout 2011. Casella Monitor has a defined quality system that forms part of their UKAS accreditation that the laboratory holds.

Re-scaling of the data relies on the Local Site Operator (Carlisle City Council) providing fortnightly calibration reports as a result of using calibration sources such as gas cylinders and zero air scrubbers. This data is used to calculate the true analyser zero and response factor and is used to scale data for the following two weeks leading up to the next scheduled calibration.

QA/QC of diffusion tube monitoring**Carlisle City Council QA/QC of diffusion tube monitoring**

Carlisle City Council follows the guidance set out in the 'Diffusion Tubes for Ambient NO₂ Monitoring: Practical Guidance for Laboratories and User' which includes advice on selection of site, the location of the samplers, instructions for exposure, and collocation with automatic analysers.

Laboratory QA/QC of diffusion tube monitoring

Gradko International has a defined quality system which forms part of the UKAS accreditation that the laboratory holds. All accredited methods are fully documented. The analytical laboratory is assessed by UKAS to establish conformance of Laboratory Quality Procedures to the requirements of ISO/IEC 17025 Standard.

UKAS assessors visit on an annual basis and review all aspects of the analysis from the sample handling to analysis and reporting. As a condition of the accreditation the laboratory is required to participate in external proficiency schemes. Gradko participates in the Workplace Analysis Scheme for Proficiency (WASP) organised by the Health and Safety Laboratory. This scheme provides a regular assessment of the labs performance in that, every quarter, the laboratory receives four diffusion tubes doped with an amount of nitrite known to HSL, but not the laboratory. At least two of the tubes are usually duplicates, which enables precision, as well as accuracy, to be assessed. Any result from such a scheme that falls outside the relevant limits is immediately investigated and steps taken to rectify the situation.

Calibration

The instrument is calibrated twice daily, using a series of calibration standards to ensure a satisfactory linear response is obtained. A standard check is analysed after every fifty samples to ensure that the calibration is still valid.

Quality Control

A quality control check is run after ten samples and is assessed against warning and action limits defined in the method. Quality control solutions are prepared from standards supplied by a different vendor to that of the calibration standards. Any AQC exceeding the action limit or two consecutive warning limits is internally assessed and is reported to the client as an AQC failure.

Travel Blank

The travelling blank is analysed at the same time as the samples, any blank exceeding the currently prescribed maximum is investigated and reported to the client.

Appendix B – E

Diffusion Tube and Traffic Monitoring Data

Appendix B MONTHLY NO2 DIFUSION TUBE RESULTS 2011 - Raw Data**AREA A - A7 STANWIX BANK, SCOTLAND ROAD AND KINGSTOWN ROAD**

Site ID	OS Grid Reference		Site Name	Old Site ID	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11	Dec-11	No of months
A1	339995	557188	45 SCOTLAND RD	2	54.82	50.7	53.42	47.37	36.36	56.39	44.97	43.03	62.97	45.97	55.24	50.23	12
A10	340008	556842	STANWIX BANK	37	68.27	64.46	63.71	52.02	42.64	50.79	49.97	51.87	88.21	43.77	36.29	34.99	12
A12	339935	557125	14 ETTERBY ST	14	35.48	30	31.91	20.85	16.61	18.62	21.26	20.77	19.64	21.02	67.81	16.45	12
A5	339758	558059	37 KINGSTOWN RD	34	59.82	45.81	45.85	42.18	38.9	52.96	39.04	40.51	44.4	45.66	57.99	44.09	12
A7	339526	559285	282 KINGSTOWN RD	29	41.72	31.07	39.75	32.29	30.59	31.9	29.31	40.63	32.85	33.95	35.7	34.61	12
A9	340028	556833	BRAMPTON RD	31	67.28	44.35	54.33	53.55	40.96	51.84	50.05	46.24	46.81	38.57	42.78	43.3	12

AREA B - CURROCK ST-DENTON ST

B12	339928	555428	DENTON ST	17	45.65	38.11	45.6	45.02	31.41	40.51	32.89	32.41	35.03	39.99	54.42	33.92	12
B3	339537	555613	SHADDONMILL	12	32.44	26.99	29	28.45	17.6	21.12	24.67	21.62	21.86	10	41.31	25.25	12
B4	339434	555638	DALSTON RD	24	63.58	77.21	63.57	52.88	a	57.12	46.13	47.91	62.33	43.68	71.8	34.2	11
B5	339613	555587	8 JUNCTION ST	18	48.84	32.72	34.88	a	23.16	29.68	26.57	27.49	28.58	24.67	33.53	31.48	11
B6	339731	555526	41 CHARLOTTE ST	33	56	43.24	38.97	43.95	29.11	37.34	27.08	30.03	34.43	38.44	41.36	31.24	12
B7	340205	555198	12 CURROCK ST	25	37.22	47.72	40.94	46.18	40.27	45.51	36.55	26.88	43.09	43.08	50.47	38.99	12

AREA C - CITY CENTRE

C1	340216	556131	LOWTHER ST	19	27.08	42.41	a	40.19	32.63	39.05	31.68	41.02	42.47	38.98	46.7	39.68	11
C2	340069	555955	TOURIST INFO	11	44.73	25.67	20.73	19.05	13.21	12.08	11.65	16.17	15.48	18.54	27.03	20.47	12
C3	340218	555768	DEVONSHIRE ST	13	41.64	48.9	39.92	45.05	37.39	a	35.63	36.91	41.47	44.99	40.44	38.32	11
C4	340286	555622	BAR SOLO	38	45.59	52.57	37.88	40.21	30.96	33.21	34.69	36.84	31.09	42.55	45.85	34.65	12
C5	340298	555589	GRIFFEN	48	52.77	50.16	44.99	43.42	40.41	48.14	38.65	50.2	46.16	41.38	43.51	38.91	12

AREA D - A69 WARWICK ROAD

D1	341106	555954	VICTORIA PLACE	1	42.66	45.97	28.72	35.03	32.62	37.49	28.16	34.15	32.9	29.26	44.13	30.52	12
D10	342044	555907	368 WARWICK RD	3	45.12	41.55	38.17	35.42	24.5	28.11	28.39	31.65	35.77	33.9	41.61	35.53	12
D11	340426	556040	CARTEF	49	44.61	40.31	36.4	39.91	26.13	35.38	33.8	37.1	35.02	32.11	30.22	33.75	12
D12	340307	555718	POST OFFICE	10	a	58.81	49.32	49.27	45.53	43.54	35.73	44.83	47.95	49.72	49.11	41.91	11
D3	341167	555892	166 WARWICK RD	5	35.71	31.3	29.56	26.84	20.07	22.29	19.13	22.47	23.45	27.56	31.61	29.19	12
D5	341310	555914	215 WARWICK RD	6	31.98	28.67	27.75	29.87	21.51	25.4	23.69	22.45	18.52	21.65	23.9	25.24	12
D7	341593	555893	282 WARWICK RD	8	48.79	44.68	38.63	41.64	42.63	41.63	30.96	39.16	44.71	38.19	46.47	45.68	12
D9	341426	555910	251 WARWICK RD	7	40.48	38.64	23.22	33.86	25.15	31.18	29.05	26.77*	26.42	28.09	35.03	29.66	12

AREA E - CALDEWEGATE-WIGTON ROAD-NEWTOWN ROAD																		
E22	339834	556137	FINKLE ST	30	46.49	57.65	44.09	42.62	41.09	42.08	32.07	38.31*	37.45	43.93	49.05	37.56	12	
E12	339225	555821	3 WIGTON RD	32	59.63	47.89	47.08	51.55	39.91	51.84	45.11	23.86*	45.27	41.97	50.81	43.58	12	
E15	339091	555736	22 WIGTON RD	26	46.51	45.49	45.37	45.61	41.27	50.45	41.1	43.91	39.1	37.39	43.3	45.28	12	
E16	339141	555900	JOVIAL SAILOR	35	44.77	48.44	41.56	38.76	a	34.58	36.19	39.06	38.86	38.36	48.82	31.45	11	
E19	338953	555610	49 WIGTON RD	44	51.8	62.39	58.25	52.29	47.34	48.82	43.83	34.17	50.35	56.15	66.34	40.84	12	
E20	339023	555692	44 WIGTON RD	45	45.19	52.56	48.72	41.64	34.68	39.7	39.12	40.44	39.98	31.69	43.21	35.55	12	
E4	339396	555947	JOHN ST	36	50.91	48.52	46.52	44.19	32.87	37.81	36.23	35.76*	40.1	35.02	47.58	44.35	12	
E6	339467	555974	PADDYS MARKET 1	9	41.36	37.92	37.12	44.03	30.26	28.39	31.56	34.18	32.71	31.17	41.32	31.02	12	
E6	339467	555974	PADDYS MARKET 2	15	40.8	39.09	39.62	37.95	30.29	31.75	33.6	31.98*	32.78	29.1	35.53	33.56	12	
E6	339467	555974	PADDYS MARKET 3	16	43.65	37.43	42.32	34.57	29.12	31.75	32.74	37.6	29.38	27.03	35.31	30.06	12	
E8	339516	556024	BRIDGE ST	23	52.92	53.36	61.55	53.61	56.4	54.98	55.43	56.48	67.99	42.52	57.15	50.35	12	
E9	339405	555996	CHURCH ST	20	43.52	47.01	37.2	36.83	0.34	32.43	27.87	28.53*	34.13	33.75	41.43	51.39	12	
E21	337730	556118	BURGH RD	42	32.34	28.24	27.77	19.99	8.84	15.7	15.6	18.15	17.39	21.5	28.51	18.5	12	
AREA F - BOTCHERGATE / LONDON ROAD																		
F1	340482	555489	3 TAIT ST	39	41.16	43.97	34.6	38.68	31	34.64	34.18	13.66	35.09	34.65	33.87	36.31	12	
F10	349597	555351	155 BOTCHERGATE	43	43.6	44.22	40.74	40.01	32.08	34.49	35.84	36.92	32	33.79	38.28	32.45	12	
F5	340534	555409	STANLEY HALL	40	38.07	47.23	a	57.89	a	36.7	41.36	a	30.86	35.79	43.76	27.7	9	
F7	340708	555240	24 LONDON RD	41	47.39	53.42	48.98	44.73	40.37	a	42.97	34.52	32.45	48.58	48	44.74	11	
F9	341099	554931	129 LONDON RD	27	48.49	46.23	43.19	34.61	30.99	42.53	34.64	37.95	31.17	33.15	42.19	32.53	12	
AREA H - TOWNS																		
H1	352824	561039	BRAMPTON	21	23.52	28.63	25.11	a	a	a	16.18	20.52	18.3	18.46	22.57	17.1	9	
H3	338052	568478	LONGTOWN	22	21.51	33.03	28.16	28.18	24.3	23.61	21.74	22	21.16	29.16	28.41	20.88	12	
H4	347411	556881	WARWICK BRIDGE	50	39.35	40.81	38.12	29.76	30.5	36.25	39.39	35.66	30.76	33.5	36.42	25.47	12	
H5	337643	554100	WIGTON RD	4	36.78	31.86	28.67	22.9	18.57	20.57	19.49	19.99	22.07	20.93	30.02	24.48	12	
H6	337962	553220	PETER LANE	47	18.39	19.21	16.15	11.87	8.08	7.56	8.22	21.21	9.35	9.95	20.28	5.07	12	
H7	338282	553396	DALSTON RD	46	24.79	28.67	24.5	17.43	12.28	13.98	15.46	32.47*	14.75	19.29	26	11.21	12	
H8	347874	561254	AIRPORT	28	16.51	21.21	10.01	8.32	8.79	7.41	6.29	8.52	8.61	11.97	13.82	6.95	12	
a - Absent data.																		

Appendix C NO2 DIFUSION TUBE RESULTS 2011 - Calculated Data**AREA A - A7 STANWIX BANK, SCOTLAND ROAD AND KINGSTOWN ROAD**

Site ID	Site Name	Annual Mean (µg/m3)	Local Bias Adjustment (0.8)	National Bias Adjustment (0.89)	In relevant location? (Distance of residence from tube) (m)	Distance of tube from kerb of nearest Road. (m)	NO2 Background Concentration (µg/m3)	Predicted NO2 Concentration at receptor (µg/m3)
A1	45 SCOTLAND RD	50.12	40.10	44.61	N (4.5)	1.5	11.871018	34.6
A10	STANWIX BANK	53.92	43.13	47.99	N (1.5)	1.5	14.833824	42.9
A12	14 ETTERBY ST	26.70	21.36	23.76	Y	3	-	-
A5	37 KINGSTOWN RD	46.43	37.15	41.33	Y	4	-	-
A7	282 KINGSTOWN RD	34.53	27.62	30.73	N (7.5)	4	12.664161	25.4
A9	BRAMPTON RD	48.34	38.67	43.02	Y	1.5	-	-

AREA B - CURROCK ST-DENTON ST

B12	DENTON ST	39.58	31.66	35.23	N (10)	0.5	24.65429	29.5
B3	SHADDONMILL	25.0258	20.02	22.27	Y	9	-	-
B4	DALSTON RD	56.4009	45.12	50.20	Y	3.5	-	-
B5	8 JUNCTION ST	31.0545	24.84	27.64	Y	2.5	-	-
B6	41 CHARLOTTE ST	37.5992	30.08	33.46	Y	2.5	-	-
B7	12 CURROCK ST	41.4083	33.13	36.85	Y	3	-	-

AREA C - CITY CENTRE

C1	LOWTHER ST	38.3536	30.68	34.13	Y	3	-	-
C2	TOURIST INFO	20.4008	16.32	18.16	N		-	Not residential
C3	DEVONSHIRE ST	40.9691	32.78	36.46	N	3	-	Not residential
C4	BAR SOLO	38.8408	31.07	34.57	N	9	-	Not residential
C5	GRIFFEN	44.8917	35.91	39.95	N	3	-	Not residential

AREA D - A69 WARWICK ROAD

D1	VICTORIA PLACE	35.1342	28.11	31.27	N (8.5)	3.7	14.938412	25.9
D10	368 WARWICK RD	34.9767	27.98	31.13	Y	5	-	-
D11	CARTEF	35.395	28.32	31.50	Y	4.5	-	-
D12	POST OFFICE	46.8836	37.51	41.73	N	5	-	Not residential
D3	166 WARWICK RD	26.5983	21.28	23.67	Y	10	-	-
D5	215 WARWICK RD	25.0525	20.04	22.30	Y	9	-	-
D7	282 WARWICK RD	41.9308	33.54	37.32	Y	7	-	-
D9	251 WARWICK RD	30.98	24.78	27.57	Y	8.5	-	-

AREA E - CALDEWEGATE-WIGTON ROAD-NEWTOWN ROAD								
E22	FINKLE ST	43.0982	34.48	38.36	Y	12	-	-
E12	3 WIGTON RD	47.6945	38.16	42.45	N (2)	2.5	24.65429	39.9
E15	22 WIGTON RD	43.7317	34.99	38.92	Y	4.5	-	-
E16	JOVIAL SAILOR	40.0773	32.06	35.67	Y	2.5	-	-
E19	49 WIGTON RD	51.0475	40.84	45.43	Y	2.5	-	-
E20	44 WIGTON RD	41.04	32.83	36.53	Y	5.5	-	-
E4	JOHN ST	42.1909	33.75	37.55	N (3)	3	24.65429	35.2
E6	PADDYS MARKET 1	35.0867	28.07	31.23	N (42)	9	-	Not residential
E6	PADDYS MARKET 2	34.9155	27.93	31.07	N (42)	9	-	Not residential
E6	PADDYS MARKET 3	34.2467	27.40	30.48	N (42)	9	-	Not residential
E8	BRIDGE ST	55.2283	44.18	49.15	Y	4	-	-
E9	CHURCH ST	35.0818	28.07	31.22	Y	9	-	-
E21	BURGH RD	21.0442	16.84	18.73	N (8)	3	9.793628	15.7
AREA F - BOTCHERGATE / LONDON ROAD								
F1	3 TAIT ST	34.3175	27.45	30.54	Y	3.5	-	-
F10	155 BOTCHERGATE	37.035	29.63	32.96	Y	3	-	-
F5	STANLEY HALL	39.9289	31.94	35.54	Y	3	-	-
F7	24 LONDON RD	44.1955	35.36	39.33	Y	4.5	-	-
F9	129 LONDON RD	38.1392	30.51	33.94	Y	0.5	-	-
AREA H - TOWNS								
H1	BRAMPTON	21.1544	16.92	18.83	N (0.5)	2.5	6.489799	18.3
H3	LONGTOWN	25.1783	20.14	22.41	N (0.5)	2.5	6.071418	21.7
H4	WARWICK BRIDGE	34.6658	27.73	30.85	N (0.5)	2.5	7.549215	29.8
H5	WIGTON RD	24.6942	19.76	21.98	Y	1.5	-	-
H6	PETER LANE	12.945	10.36	11.52	Y	4	-	-
H7	DALSTON RD	18.9418	15.15	16.86	Y	6.5	-	-
H8	AIRPORT	10.7008	8.56	9.52	Y	2	-	-
Results in red indicate an exceedence of the annual mean objective of 40 µg/m3.								

Appendix D: A7 (AQMA 1) Traffic Count Data

A7 2011 North

Yearly classified during 2011 for site 101/10001

NB, A7, Eden Bridge, Carlisle, NORTHBOUND(E340061, N556549) view site location on map

Month		24hr				18hr				16hr				12hr				ATC
		ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	DAY
<u>bo</u>	Jan	20363	5.2	22165	5.9	19642	5	21490	5.8	19048	5.1	20877	5.8	16536	5.3	18044	6.2	30
<u>o</u>	Feb	21551	5.5	23017	6.5	20779	5.3	22289	6.2	20129	5.4	21614	6.3	17439	5.7	18620	6.7	27
	Mar	21845	5.4	23230	6.3	21109	5.3	22550	6.1	20474	5.4	21908	6.2	17623	5.7	18728	6.6	30
<u>bo</u>	Apr	21203	5.2	22459	6	20449	5	21736	5.8	19793	5.1	21081	5.9	16959	5.4	17992	6.2	29
<u>bo</u>	May	21847	5.3	23010	6.1	21041	5.1	22267	5.9	20327	5.2	21588	6	17410	5.5	18392	6.4	31
<u>o</u>	Jun	21744	5.6	23148	6.4	20969	5.4	22433	6.2	20275	5.5	21723	6.3	17347	5.8	18492	6.8	29
<u>o</u>	Jul	21580	5.6	22861	6.4	20786	5.4	22136	6.2	20076	5.5	21417	6.3	17111	5.8	18166	6.8	30
<u>bo</u>	Aug	20638	5.6	21869	6.5	19862	5.4	21127	6.3	19190	5.6	20450	6.4	16424	5.9	17420	6.9	31
<u>o</u>	Sep	21649	5.5	22935	6.4	20874	5.3	22221	6.2	20221	5.4	21552	6.3	17336	5.7	18354	6.7	29
<u>o</u>	Oct	21750	5.3	23061	6.2	20957	5.2	22338	6	20272	5.3	21629	6.1	17474	5.6	18516	6.5	31
	Nov	22100	5.2	23388	6	21325	5	22671	5.8	20655	5.1	21979	5.9	17808	5.4	18822	6.3	29
	Dec	20945	4.7	22499	5.3	20127	4.5	21766	5.2	19448	4.6	21050	5.3	16782	4.8	18050	5.5	31
Avg		21435	5.3	22804	6.2	20660	5.2	22085	6	19992	5.3	21406	6.1	17187	5.6	18300	6.5	357

b Bank

Holiday

w Weather

a Accident

t Time change

r Road Works

s Sporting Event

o Other

Showing only complete days. No estimated data.

This report does not contain any hidden data.

April 2012

Carlisle City Council – England

A7 2011 South

Yearly classified during 2011 for site 101/10002

SB, A7, Eden Bridge, Carlisle, SOUTHBOUND(E340078, N556555) view site location on map

Month		24hr				18hr				16hr				12hr				ATC
		ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	DAY
<u>bo</u>	Jan	21609	5.2	23158	6	20967	5	22577	5.9	20422	5.1	22022	5.9	17887	5.3	19199	6.2	20
<u>o</u>	Feb	21910	5.4	23422	6.3	21261	5.2	22828	6.1	20695	5.3	22246	6.1	18087	5.5	19369	6.5	27
	Mar	22172	5.4	23598	6.3	21531	5.2	23014	6.1	20975	5.3	22443	6.2	18252	5.5	19446	6.5	30
<u>bo</u>	Apr	21823	5.3	23304	6.1	21169	5.1	22694	5.9	20571	5.2	22083	6	17688	5.5	18930	6.4	23
<u>bo</u>	May	22391	5.3	23577	6.1	21620	5.1	22893	5.9	20922	5.2	22276	6	18034	5.4	19123	6.4	20
<u>o</u>	Jun	22270	5.5	23745	6.4	21570	5.3	23119	6.2	20945	5.4	22476	6.3	18060	5.7	19296	6.6	29
<u>o</u>	Jul	22137	5.5	23521	6.4	21430	5.4	22896	6.2	20798	5.4	22255	6.3	17867	5.7	19051	6.6	30
<u>bo</u>	Aug			22187	6.5			21554				20948				18024		3
<u>o</u>	Sep	22113	5.4	23470	6.3	21431	5.3	22853	6.1	20849	5.3	22263	6.2	18024	5.6	19162	6.6	28
<u>o</u>	Oct	21950	5.5	23239	6.4	21284	5.3	22656	6.2	20733	5.4	22099	6.3	18064	5.6	19160	6.6	6
	Nov	22511	5.1	23888	6	21832	5	23269	5.8	21237	5	22652	5.8	18567	5.2	19683	6.1	26
	Dec	21234	4.6	22819	5.3	20520	4.5	22189	5.1	19887	4.5	21516	5.2	17339	4.7	18670	5.4	31
Avg		22011	5.3	23327	6.2	21329	5.1	22712	6	20730	5.2	22107	6	17988	5.4	19093	6.4	273

bo Bank Holiday w Weather a Accident t Time change r Road Works s Sporting Event o Other

Showing only complete days. No estimated data.

This report does not contain any hidden data.



April 2012

Carlisle City Council – England

A7 2012 North


Yearly classified during 2012 for site 101/10001


NB, A7, Eden Bridge, Carlisle, NORTHBOUND(E340061, N556549) view site location on map


Month		24hr				18hr				16hr				12hr				ATC
		ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	DAY
	Jan	20435	5.1	21923	5.9	19726	4.9	21279	5.7	19129	5	20664	5.8	16598	5.3	17833	6.1	31
	Feb	19058	4.8	20281	5.5	18393	4.6	19696	5.3	17786	4.7	19075	5.4	15324	5	16331	5.8	29
	Mar	18060	4.3	19026	5	17467	4.2	18521	4.8	16878	4.3	17920	4.9	14418	4.5	15209	5.3	30
	Apr	17029	3.8	17870	4.3	16395	3.6	17268	4.1	15786	3.7	16643	4.2	13532	3.9	14217	4.5	10
	May																	0
	Jun																	0
	Jul																	0
	Aug																	0
	Sep																	0
	Oct																	0
	Nov																	0
	Dec																	0
Avg		18646	4.5	19775	5.2	17995	4.3	19191	5	17395	4.4	18576	5.1	14968	4.7	15898	5.4	100

 Bank Holiday

 Weather

 Accident

 Time change

 Road Works

 Sporting Event

 Other

86.99% (Drop of 13.01% compared to 2011 northbound flow)

Showing only complete days. No estimated data.

This report does not contain any hidden data.

April 2012

Carlisle City Council – England

A7 2012 South

Yearly classified during 2012 for site 101/10002

SB, A7, Eden Bridge, Carlisle, SOUTHBOUND(E340078, N556555) view site location on map

Month		24hr				18hr				16hr				12hr				ATC
		ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	ADT	%>6.6m	AWT	%>6.6m	DAY
	Jan	20749	5	22287	5.8	20126	4.9	21722	5.6	19602	4.9	21184	5.7	17220	5.1	18551	5.9	31
<u>o</u>	Feb	19612	4.8	20916	5.5	19020	4.7	20395	5.4	18509	4.7	19876	5.5	16187	4.9	17313	5.7	29
	Mar	18729	4.3	19768	5	18179	4.2	19296	4.8	17699	4.3	18811	4.9	15403	4.4	16316	5.1	30
<u>bo</u>	Apr	17633	3.9	18517	4.4	17053	3.7	17965	4.2	16538	3.8	17459	4.3	14332	3.9	15094	4.5	10
	May																	0
	Jun																	0
	Jul																	0
	Aug																	0
	Sep																	0
	Oct																	0
	Nov																	0
	Dec																	0
Avg		19181	4.5	20372	5.2	18595	4.4	19845	5	18087	4.4	19333	5.1	15786	4.6	16819	5.3	100

b Bank
Holiday

w Weather

a Accident

t Time change

r Road Works

s Sporting Event

o Other

87.14% (Drop of 12.86% compared to 2011 southbound flow)

Showing only complete days. No estimated data.

This report does not contain any hidden data.

Appendix E: CNDR Traffic Count Data

A595 to Orton Road (March)

Multi-Day Volume Report CNDR 000000030003: 2012-03-01 to 2012-03-31

Site Name 30003
 Site ID 000000030003
 Grid 336782553972
 Description CNDR Revenue Site 3

Setup 30003_Pvr
 Channel All directions
 Time Period 1 hour
 Class Any
 Exclude data: None

	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Average		Total
	1 Mar	2 Mar	3 Mar	4 Mar	5 Mar	6 Mar	7 Mar	8 Mar	9 Mar	10 Mar	11 Mar	12 Mar	13 Mar	14 Mar	15 Mar	16 Mar	17 Mar	18 Mar	19 Mar	20 Mar	21 Mar	22 Mar	23 Mar	24 Mar	25 Mar	26 Mar	27 Mar	28 Mar	29 Mar	30 Mar	31 Mar	Workday	7 Day	Count
00:00	26	24	47	38	11	14	24	17	27	43	28	21	28	16	15	20	34	47	16	19	16	30	20	21	32	513	37	24	15	21	34	46	43	1278
01:00	13	15	28	22	10	11	11	15	19	24	17	7	15	12	7	20	31	17	9	17	15	15	5	33	15	68	10	13	16	28	16	48	538	
02:00	13	22	15	8	3	13	11	11	14	17	10	13	7	13	14	14	22	15	10	12	16	9	15	16	23	7	10	12	10	15	18	12	13	408
03:00	20	17	20	5	27	15	21	19	21	10	7	12	16	16	18	22	23	7	6	16	12	18	17	22	17	18	17	14	20	16	14	17	16	503
04:00	38	30	25	12	37	32	32	23	27	25	15	40	27	29	30	40	30	15	39	25	24	38	36	27	18	33	31	31	33	37	31	32	29	910
05:00	105	97	69	39	131	101	106	105	105	78	41	135	125	125	100	108	67	40	129	105	104	116	94	65	26	117	110	101	132	101	67	112	95	2944
06:00	215	215	81	48	232	222	222	223	202	98	56	245	210	210	213	200	93	52	242	225	243	238	245	98	58	228	206	225	211	211	102	222	180	5569
07:00	597	573	173	57	607	612	648	619	618	174	79	643	631	624	625	588	188	86	654	593	653	605	601	194	70	581	629	540	553	543	171	608	470	14529
08:00	763	730	295	155	828	791	817	826	759	297	126	808	789	813	859	804	286	193	817	797	804	852	750	304	127	787	868	822	815	818	253	806	638	19753
09:00	528	544	354	260	510	600	500	536	513	374	314	504	527	493	526	576	439	333	510	498	482	563	558	467	238	507	548	534	586	528	400	529	477	14850
10:00	468	523	570	409	446	453	460	470	466	563	406	433	489	463	475	505	589	526	445	437	428	491	549	566	417	489	503	473	536	560	582	478	486	15190
11:00	489	553	584	563	556	475	465	493	536	608	550	493	486	495	467	572	619	693	501	483	473	512	568	654	564	478	482	467	506	555	572	503	531	16512
12:00	460	561	555	606	512	513	485	511	536	571	618	498	454	469	499	637	659	702	524	459	508	535	602	572	676	528	500	533	517	571	601	516	546	16972
13:00	531	626	598	629	579	556	504	562	644	591	631	538	480	521	575	622	642	676	537	548	529	511	589	560	622	544	568	550	549	627	555	556	573	17794
14:00	600	697	634	616	614	624	596	574	685	602	579	554	594	570	603	653	601	701	526	578	574	644	725	567	565	615	564	583	631	782	568	613	611	19019
15:00	748	788	549	604	669	724	668	698	758	564	602	639	695	653	671	784	610	638	690	688	641	758	852	598	609	662	729	688	711	866	490	713	677	21044
16:00	880	849	544	514	828	885	819	855	810	490	523	768	788	847	800	821	495	592	771	831	807	830	944	526	630	821	855	838	827	852	482	832	747	23122
17:00	852	810	496	442	769	846	843	768	844	463	392	812	832	862	807	806	452	444	791	832	881	867	840	504	455	836	877	860	872	790	465	832	724	22410
18:00	501	522	402	306	484	499	463	461	474	389	284	444	491	496	517	476	370	340	455	489	490	549	557	356	348	474	474	553	536	574	369	497	455	14143
19:00	274	309	238	167	254	270	272	285	318	238	167	247	223	259	272	275	251	226	238	294	250	277	344	225	253	281	307	315	319	387	263	283	266	8298
20:00	159	199	125	113	158	130	167	171	174	139	129	154	161	186	186	165	152	137	130	172	184	194	205	116	157	191	206	196	193	207	145	176	164	5101
21:00	135	149	90	68	119	125	128	137	134	83	77	106	141	114	144	160	94	83	123	132	127	153	133	108	84	120	142	124	143	157	93	133	119	3726
22:00	104	105	59	51	99	88	89	96	115	75	56	96	84	93	88	90	70	47	82	108	86	95	80	73	50	91	101	104	91	90	64	94	84	2620
23:00	36	49	42	49	35	36	29	40	53	38	25	31	30	38	41	50	65	28	46	51	42	45	48	54	30	50	33	35	57	75	58	43	42	1339
07-19	7417	7776	5754	5161	7402	7578	7268	7373	7643	5686	5104	7134	7256	7306	7424	7844	5950	5924	7221	7233	7270	7717	8135	5868	5321	7322	7597	7441	7639	8066	5508	7483	6935	215338
06-22	8200	8648	6288	5557	8165	8325	8057	8189	8471	6244	5533	7886	7991	8075	8239	8644	6540	6422	7954	8056	8074	8579	9062	6415	5873	8142	8458	8301	8505	9028	6111	8297	7664	238032
06-24	8340	8802	6389	5657	8299	8449	8175	8325	8639	6357	5614	8013	8105	8206	8368	8784	6675	6497	8082	8215	8202	8719	9190	6542	5953	8283	8592	8440	8653	9193	6233	8434	7791	241991
00-24	8555	9007	6593	5781	8518	8635	8380	8515	8852	6554	5732	8241	8323	8417	8552	9008	6882	6638	8291	8409	8389	8945	9377	6726	6069	8986	8865	8632	8876	9399	6425	8668	8004	248572
am Peak	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	10:00	08:00	08:00	
Peak Volume	763	730	584	563	828	791	817	826	759	608	550	808	789	813	859	804	619	693	817	797	804	852	750	654	564	787	868	822	815	818	582	806	638	
pm Peak	16:00	16:00	14:00	13:00	16:00	16:00	17:00	16:00	17:00	14:00	13:00	17:00	17:00	17:00	17:00	16:00	12:00	12:00	17:00	17:00	17:00	17:00	16:00	15:00	12:00	17:00	17:00	17:00	17:00	15:00	12:00	16:00	16:00	
Peak Volume	880	849	634	629	828	885	843	855	844	602	631	812	832	862	807	821	659	702	791	832	881	867	944	598	676	836	877	860	872	866	601	832	747	

Event key: Accider Road V Special Road C Holiday
 Weekends and defined holidays

Notes on data:

None

Data prepared by Drakewell Hosting (Powered by C2-WEB) May 10, 2012 11:52:05 AM.

April 2012

Carlisle City Council – England

A595 to Orton Rd (April)

Multi-Day Volume Report CNDR 000000030003: 2012-04-01 to 2012-04-30

Site Name 30003
Site ID 000000030003
Grid 336782553972
Description CNDR Revenue Site 3

Setup 30003_Pvr
Channel All directions
Time Period 1 hour
Class Any
Exclude data: None

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Average	Total	
	1 Apr	2 Apr	3 Apr	4 Apr	5 Apr	6 Apr	7 Apr	8 Apr	9 Apr	10 Apr	11 Apr	12 Apr	13 Apr	14 Apr	15 Apr	16 Apr	17 Apr	18 Apr	19 Apr	20 Apr	21 Apr	22 Apr	23 Apr	24 Apr	25 Apr	26 Apr	27 Apr	28 Apr	29 Apr	30 Apr	Workday	7 Day	Count
00:00	30	30	20	22	27	24	38	22	33	20	27	30	22	39	35	23	15	12	19	295	48	38	24	19	17	19	20	43	40	14	39	39	1065
01:00	19	11	10	14	16	21	16	14	19	11	10	32	23	19	30	11	9	15	13	20	37	21	15	10	12	11	15	44	28	6	14	17	532
02:00	12	11	11	14	17	15	13	14	12	6	11	13	14	14	12	8	16	10	12	21	377	18	9	11	13	7	16	21	19	12	12	26	759
03:00	14	19	19	15	22	17	12	15	18	14	15	18	20	14	6	17	21	19	20	29	25	9	9	15	15	19	20	18	9	16	18	17	499
04:00	24	44	26	24	32	24	21	14	18	35	33	38	38	19	14	42	19	15	33	24	19	10	45	27	35	28	34	25	10	31	32	28	801
05:00	40	129	107	111	113	72	55	38	64	140	119	100	113	58	54	120	117	98	145	103	83	32	132	139	127	110	131	69	38	131	120	101	2888
06:00	58	239	208	224	240	123	91	52	73	238	212	227	226	125	67	254	240	219	230	222	82	59	267	222	246	219	222	111	61	257	232	189	5314
07:00	78	582	548	588	530	119	111	76	69	489	505	475	465	158	68	635	614	635	580	622	172	90	688	628	632	658	617	189	103	642	585	452	12366
08:00	115	629	649	586	619	228	243	121	147	635	616	625	614	265	136	817	822	843	772	803	290	118	846	834	866	810	803	287	110	862	740	584	16111
09:00	249	448	513	502	535	403	384	206	280	497	492	498	559	394	258	513	531	499	521	537	388	238	551	551	548	526	519	404	225	497	519	460	13266
10:00	454	501	458	509	516	554	582	353	577	533	530	525	588	574	439	465	422	500	448	481	557	421	489	426	429	530	464	568	365	542	493	492	14800
11:00	595	547	505	498	634	675	622	509	720	525	594	540	668	579	579	498	519	486	473	518	510	509	510	470	498	530	605	575	501	527	537	542	16519
12:00	589	496	546	562	581	681	620	525	715	532	555	570	671	547	593	476	456	497	489	575	577	581	540	487	455	489	546	567	562	494	531	543	16574
13:00	586	579	542	595	721	632	581	478	690	602	648	615	705	527	630	530	599	497	519	640	572	575	525	555	554	542	657	552	493	575	593	582	17516
14:00	547	584	584	617	772	648	621	482	689	553	620	603	698	502	563	601	549	516	599	591	524	584	610	616	585	554	684	549	574	622	611	593	17841
15:00	602	591	595	636	741	581	527	423	575	574	606	646	737	503	551	636	646	642	704	846	527	520	653	690	724	704	818	571	462	660	682	637	18691
16:00	527	773	774	806	939	555	586	426	524	763	755	861	823	425	489	764	801	845	826	939	566	553	779	850	838	879	953	469	445	792	833	738	21325
17:00	358	802	771	796	861	486	467	362	400	741	776	867	788	534	431	829	852	868	842	810	460	379	822	823	867	881	833	515	327	831	824	712	20379
18:00	293	513	438	547	603	336	374	250	285	443	481	566	529	375	319	503	450	523	521	543	380	313	505	487	528	557	576	357	245	476	517	463	13316
19:00	219	275	293	313	320	214	255	204	239	260	316	355	389	256	254	274	299	299	323	371	201	240	290	309	302	296	324	261	181	263	312	289	8395
20:00	146	186	175	179	250	155	121	142	174	175	193	208	220	165	170	187	238	191	231	217	122	150	202	185	202	231	231	151	131	178	205	188	5506
21:00	86	112	104	113	169	112	102	80	99	126	123	144	146	111	109	168	148	195	138	167	141	85	109	152	137	148	161	82	97	108	141	130	3772
22:00	53	87	84	87	103	69	81	41	70	96	89	108	106	69	61	98	112	95	96	101	64	56	65	97	103	90	116	82	58	100	97	88	2537
23:00	31	29	43	47	49	56	57	27	35	40	44	49	54	61	22	219	52	31	42	96	44	62	26	32	41	49	71	67	38	29	56	53	1543
07-19	4993	7045	6923	7242	8052	5898	5718	4211	5671	6887	7178	7391	7845	5383	5056	7267	7261	7351	7294	7905	5523	4881	7518	7417	7524	7660	8075	5603	4412	7520	7465	6799	198704
06-22	5502	7857	7703	8071	9031	6502	6287	4689	6256	7686	8022	8325	8826	6040	5656	8150	8186	8255	8216	8882	6069	5415	8386	8285	8411	8554	9013	6208	4882	8326	8355	7593	221691
06-24	5586	7973	7830	8205	9183	6627	6425	4757	6361	7822	8155	8482	8986	6170	5739	8467	8350	8381	8354	9079	6177	5533	8477	8414	8555	8693	9200	6357	4978	8455	8507	7734	225771
00-24	5725	8217	8023	8405	9410	6800	6580	4874	6525	8048	8370	8713	9216	6333	5890	8688	8547	8550	8596	9571	6766	5661	8711	8635	8774	8887	9436	6577	5122	8665	8743	7962	232315
am Peak	11:00	08:00	08:00	07:00	11:00	11:00	11:00	11:00	11:00	08:00	08:00	08:00	11:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	10:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	
Peak Volume	595	629	649	588	634	675	622	509	720	635	616	625	668	579	579	817	822	843	772	803	557	509	846	834	866	810	803	575	501	862	740	584	
pm Peak	15:00	17:00	16:00	16:00	16:00	12:00	14:00	12:00	12:00	16:00	17:00	17:00	16:00	12:00	13:00	17:00	17:00	17:00	17:00	16:00	12:00	14:00	17:00	16:00	17:00	17:00	16:00	15:00	14:00	17:00	16:00	16:00	
Peak Volume	602	802	774	806	939	681	621	525	715	763	776	867	823	547	630	829	852	868	842	939	577	584	822	850	867	881	953	571	574	831	833	738	

Event key: Accident Road Works Special Road Closed Holiday
 Weekends and defined holidays

Notes on data:

	Start	End	Type	Lanes	Action	Description
	06/04/2012 00:00	06/04/2012 23:59	Holiday	-	Included	Holiday
	09/04/2012 00:00	09/04/2012 23:59	Holiday	-	Included	Holiday

Data prepared by Drakewell Hosting (Powered by C2-WEB) May 10, 2012 12:06:44 PM.

Orton Rd to Moorhouse Road (March)

Multi-Day Volume Report CNDR 000000030002: 2012-03-01 to 2012-03-31

Site Name 30002
Site ID 000000030002
Grid 336266554830
Description CNDR Revenue Site 2

Setup 30002_Pvr
Channel All directions
Time Period 1 hour
Class Any
Exclude data: None

	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Average	Total	
	1 Mar	2 Mar	3 Mar	4 Mar	5 Mar	6 Mar	7 Mar	8 Mar	9 Mar	10 Mar	11 Mar	12 Mar	13 Mar	14 Mar	15 Mar	16 Mar	17 Mar	18 Mar	19 Mar	20 Mar	21 Mar	22 Mar	23 Mar	24 Mar	25 Mar	26 Mar	27 Mar	28 Mar	29 Mar	30 Mar	31 Mar	Workday	7 Day	Count
00:00	32	35	53	52	19	25	28	31	32	43	40	20	30	37	22	34	50	52	11	32	23	30	27	37	40	13	46	30	22	40	47	28	33	1033
01:00	16	27	27	22	13	21	25	20	21	29	22	10	23	25	15	30	30	18	11	20	21	19	13	32		19	21	14	13	13	37	19	21	627
02:00	21	29	26	16	8	12	13	17	20	19	13	16	12	21	15	20	22	16	12	19	21	18	18	18	32	9	13	16	7	24	22	16	17	545
03:00	32	27	24	9	32	27	38	31	26	26	10	17	25	27	33	34	31	8	12	21	22	29	28	33	17	20	27	23	29	24	22	26	24	764
04:00	51	34	28	16	42	36	39	33	42	29	15	50	36	38	40	53	41	18	51	31	41	64	56	35	22	43	32	37	36	40	31	42	37	1160
05:00	130	113	83	34	138	128	146	132	132	79	33	149	138	141	114	136	83	33	141	132	124	139	124	84	31	152	151	146	140	137	81	136	114	3524
06:00	307	286	120	45	312	298	316	286	272	122	70	331	302	285	288	273	127	57	345	309	317	312	317	144	53	314	290	294	303	311	124	304	243	7530
07:00	797	754	250	78	800	829	818	833	777	212	96	866	821	829	814	799	240	101	875	793	811	822	749	235	86	791	858	779	798	742	230	809	624	19283
08:00	974	923	402	167	988	963	1028	1041	971	416	147	1031	1021	997	1034	1036	405	241	1062	1007	1055	1067	1001	427	142	1002	1031	1044	1076	1046	392	1018	811	25137
09:00	679	712	528	324	648	756	642	686	642	523	343	648	658	636	663	718	562	389	708	669	698	704	670	647	271	703	702	706	748	709	557	686	618	19249
10:00	597	658	748	538	597	594	552	587	621	735	571	567	595	589	600	649	756	644	613	614	584	629	692	770	543	642	643	599	689	715	731	617	630	19662
11:00	618	731	844	722	679	602	624	643	662	817	753	646	590	589	588	726	847	790	684	624	617	628	704	886	733	636	626	588	667	710	808	642	686	21382
12:00	622	778	846	815	664	645	623	666	731	858	866	605	661	637	649	849	895	828	699	609	651	690	849	824	804	677	674	704	728	767	857	686	730	22771
13:00	684	813	849	876	755	730	710	688	846	847	821	712	605	649	719	818	888	898	725	751	666	634	820	747	814	694	681	706	723	852	793	723	756	23514
14:00	789	875	841	872	727	715	737	711	847	779	824	725	721	745	760	809	855	859	693	707	707	753	893	791	744	696	664	704	779	939	816	753	772	24077
15:00	902	963	768	782	769	845	828	894	973	762	784	774	797	813	804	996	758	820	847	823	801	903	1020	798	744	823	861	826	897	1083	711	868	840	26169
16:00	1097	1125	740	595	1020	1090	1051	1099	1125	721	666	994	1063	1034	994	1127	732	701	1031	1021	1032	1062	1206	707	695	1022	1107	1106	1154	1138	697	1074	965	29952
17:00	1166	1131	668	484	1033	1156	1130	1100	1122	633	480	1076	1166	1141	1166	1075	617	470	1068	1166	1180	1230	1131	654	451	1162	1214	1237	1233	1114	635	1145	977	30289
18:00	701	708	482	324	627	654	662	660	704	475	340	624	690	704	733	725	558	396	647	719	678	769	795	490	365	691	674	709	731	754	496	695	619	19285
19:00	373	423	299	194	378	369	344	338	436	310	200	332	358	367	393	412	344	267	343	393	405	436	474	315	295	428	427	414	476	547	353	400	366	11443
20:00	220	277	186	151	207	175	209	225	247	175	134	236	227	241	240	255	237	153	202	249	249	261	274	155	188	237	295	259	286	308	186	243	223	6944
21:00	174	189	115	102	139	151	176	186	169	122	91	131	171	149	181	203	128	95	166	138	156	179	165	131	135	179	191	189	181	194	128	170	154	4804
22:00	143	127	70	67	114	124	126	118	130	99	74	114	118	153	131	134	105	70	96	141	129	148	125	87	78	115	122	159	126	134	95	128	115	3572
23:00	57	78	51	39	49	62	41	56	64	59	38	45	52	69	59	65	65	29	60	60	60	49	47	59	50	62	51	55	55	99	84	58	56	1769
07-19	9626	10171	7966	6577	9307	9579	9405	9608	10021	7778	6691	9268	9388	9363	9524	10327	8113	7137	9652	9503	9480	9891	10530	7976	6392	9539	9735	9708	10223	10569	7723	9716	9027	280770
06-22	10700	11346	8686	7069	10343	10572	10450	10643	11145	8507	7186	10298	10446	10405	10626	11470	8949	7709	10708	10592	10607	11079	11760	8721	7063	10697	10938	10864	11469	11929	8514	10833	10014	311491
06-24	10900	11551	8807	7175	10506	10758	10617	10817	11339	8665	7298	10457	10616	10627	10816	11669	9119	7808	10864	10793	10796	11276	11932	8867	7191	10874	11111	11078	11650	12162	8693	11019	10185	316832
00-24	11182	11816	9048	7324	10758	11007	10906	11081	11612	8890	7431	10719	10880	10916	11055	11976	9376	7953	11102	11048	11048	11575	12198	9106	7333	11130	11401	11344	11897	12440	8933	11286	10430	324485
am Peak	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	08:00	08:00		
Peak Volume	974	923	844	722	988	963	1028	1041	971	817	753	1031	1021	997	1034	1036	847	790	1062	1007	1055	1067	1001	886	733	1002	1031	1044	1076	1046	808	1018	811	
pm Peak	17:00	17:00	13:00	13:00	17:00	17:00	17:00	17:00	16:00	12:00	12:00	17:00	17:00	17:00	17:00	16:00	12:00	13:00	17:00	17:00	17:00	17:00	16:00	12:00	13:00	17:00	17:00	17:00	17:00	16:00	12:00	17:00	17:00	
Peak Volume	1166	1131	849	876	1033	1156	1130	1100	1125	858	866	1076	1166	1141	1166	1127	895	898	1068	1166	1180	1230	1206	824	814	1162	1214	1237	1233	1138	857	1145	977	

Event key: Accident Road Works Special Road Closed Holiday
 Weekends and defined holidays

Notes on data:

None

Data prepared by Drakewell Hosting (Powered by C2-WEB) May 10, 2012 11:51:18 AM.

April 2012

Carlisle City Council – England

Orton Road to Moorhouse Road (April)

Multi-Day Volume Report CNDR 000000030002: 2012-04-01 to 2012-04-30

Site Name 30002
Site ID 000000030002
Grid 336266554830
Description CNDR Revenue Site 2

Setup 30002_Pvr
Channel All directions
Time Period 1 hour
Class Any
Exclude data: None

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Average	Total	
	1 Apr	2 Apr	3 Apr	4 Apr	5 Apr	6 Apr	7 Apr	8 Apr	9 Apr	10 Apr	11 Apr	12 Apr	13 Apr	14 Apr	15 Apr	16 Apr	17 Apr	18 Apr	19 Apr	20 Apr	21 Apr	22 Apr	23 Apr	24 Apr	25 Apr	26 Apr	27 Apr	28 Apr	29 Apr	30 Apr	Workday	7 Day	Count
00:00	41	22	32	30	34	26	51	33	32	28	31	37	22	54	39	23	26	17	32	48	71	46	29	33	29	30	32	39	48	25	30	35	1040
01:00	31	13	11	20	14	21	16	11	17	11	16	20	16	27	33	14	13	19	11	22	32	32	14	22	21	12	22	32	32	13	16	19	588
02:00	11	10	18	13	18	23	11	17	14	11	16	18	24	21	20	14	20	17	15	13	13	15	12	13	14	12	23	26	16	18	16	16	486
03:00	11	26	28	23	29	23	19	16	17	25	21	36	31	25	12	27	26	38	34	29	20	9	17	22	29	29	28	22	8	22	27	24	702
04:00	27	52	33	33	46	33	19	11	21	42	41	47	48	19	15	61	42	25	41	42	26	15	61	39	45	43	47	32	19	45	44	37	1070
05:00	32	132	130	126	109	86	57	26	58	163	144	134	143	76	39	157	133	141	140	145	79	27	165	156	155	144	148	73	35	170	144	118	3323
06:00	52	328	296	295	319	135	113	58	95	339	294	322	312	149	64	310	307	301	300	310	165	69	349	316	330	321	322	162	73	325	316	255	7131
07:00	79	779	775	814	704	195	164	127	106	710	745	714	656	230	84	864	900	852	835	815	223	96	924	880	881	906	856	270	105	844	811	625	17133
08:00	145	907	904	844	917	328	369	154	174	865	886	908	871	392	154	1076	997	1091	1053	1114	387	134	1090	1042	1081	1040	1039	409	158	1129	993	786	21658
09:00	307	636	663	625	747	521	547	249	379	621	626	722	716	581	317	683	671	714	702	732	549	311	697	714	734	688	703	584	307	701	691	617	17747
10:00	591	673	564	619	742	784	769	421	757	706	715	704	781	766	556	585	592	609	580	701	702	613	646	577	572	657	617	757	552	640	649	649	19548
11:00	776	726	665	659	780	910	889	605	984	724	791	750	863	875	770	616	673	592	624	701	809	727	650	591	615	675	743	816	711	656	693	719	21966
12:00	860	717	685	724	809	941	920	626	949	731	805	778	872	855	786	623	595	636	694	768	857	758	685	628	639	676	757	854	774	694	716	744	22696
13:00	823	731	745	778	918	908	878	605	923	829	899	820	995	735	844	666	720	684	743	817	855	775	698	716	720	722	846	755	752	728	783	783	23628
14:00	843	727	769	796	906	906	824	619	922	756	870	828	985	683	784	772	696	700	774	830	773	789	720	779	740	721	849	823	833	720	791	787	23737
15:00	790	832	752	813	963	839	776	574	778	754	867	885	989	674	730	825	762	822	830	1057	767	741	816	898	897	820	1045	777	717	816	874	832	24606
16:00	686	1064	1023	1117	1241	776	803	592	674	1009	1045	1232	1139	590	604	1041	1090	1132	1115	1261	789	644	1049	1089	1115	1147	1278	663	559	1020	1122	991	28587
17:00	441	1181	1087	1180	1267	632	691	474	509	1109	1142	1310	1129	700	480	1175	1229	1194	1203	1227	651	454	1157	1205	1256	1209	1182	675	375	1217	1192	1012	28741
18:00	341	720	665	752	857	425	475	266	366	674	656	797	769	523	389	662	667	696	792	844	509	371	697	700	692	774	819	478	315	703	737	646	18394
19:00	276	387	410	483	480	285	376	242	278	381	447	505	527	311	257	394	417	460	433	509	305	258	369	410	384	441	471	333	222	392	440	398	11443
20:00	163	254	265	282	354	172	201	151	200	253	247	297	315	216	187	261	274	264	305	322	213	204	255	260	252	331	323	228	157	271	285	259	7477
21:00	127	168	153	177	221	138	162	107	112	173	165	209	226	138	134	187	187	171	210	229	146	140	165	164	183	214	235	150	117	157	191	176	5065
22:00	70	114	115	138	152	82	103	55	93	134	133	130	128	88	82	110	129	142	158	143	87	87	107	109	132	139	139	107	63	141	131	118	3410
23:00	47	57	53	62	77	68	76	38	42	67	60	57	79	66	32	56	58	40	56	90	58	31	40	39	53	55	92	89	36	42	61	59	1716
07-19	6682	9693	9297	9721	10851	8165	8105	5312	7521	9488	10047	10448	10765	7604	6498	9588	9592	9722	9945	10867	7871	6413	9829	9819	9942	10035	10734	7861	6158	9868	10052	9190	268441
06-22	7300	10830	10421	10958	12225	8895	8957	5870	8206	10634	11200	11781	12145	8418	7140	10740	10777	10918	11193	12237	8700	7084	10967	10969	11091	11342	12085	8734	6727	11013	11284	10278	299557
06-24	7417	11001	10589	11158	12454	9045	9136	5963	8341	10835	11393	11968	12352	8572	7254	10906	10964	11100	11407	12470	8845	7202	11114	11117	11276	11536	12316	8930	6826	11196	11477	10455	304683
00-24	7570	11256	10841	11403	12704	9257	9309	6077	8500	11115	11662	12260	12636	8794	7412	11202	11224	11357	11680	12769	9086	7346	11412	11402	11569	11806	12616	9154	6984	11489	11754	10705	311892
am Peak	11:00	08:00	08:00	08:00	08:00	11:00	11:00	11:00	11:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00
Peak Volume	776	907	904	844	917	910	889	605	984	865	886	908	871	875	770	1076	997	1091	1053	1114	809	727	1090	1042	1081	1040	1039	816	711	1129	993	786	
pm Peak	12:00	17:00	17:00	17:00	17:00	12:00	12:00	12:00	12:00	17:00	17:00	17:00	16:00	12:00	13:00	17:00	17:00	17:00	17:00	16:00	12:00	14:00	17:00	17:00	17:00	17:00	16:00	12:00	14:00	17:00	17:00	17:00	17:00
Peak Volume	860	1181	1087	1180	1267	941	920	626	949	1109	1142	1310	1139	855	844	1175	1229	1194	1203	1261	857	789	1157	1205	1256	1209	1278	854	833	1217	1192	1012	

Event key: Accident Road Works Special Road Closed Holiday
 Weekends and defined holidays

Notes on data:

	Start	End	Type	Lanes	Action	Description
	06/04/2012 00:00	06/04/2012 23:59	Holiday	-	Included	Holiday
	09/04/2012 00:00	09/04/2012 23:59	Holiday	-	Included	Holiday

Data prepared by Drakewell Hosting (Powered by C2-WEB) May 10, 2012 12:05:19 PM.

April 2012

Carlisle City Council – England

Parkhouse Rd to Kingmoor Hub (March)

Multi-Day Volume Report CNDR 000000030001: 2012-03-01 to 2012-03-31

Site Name 30001
Site ID 000000030001
Grid 338762559552
Description CNDR Revenue Site 1

Setup 30001_Pvr
Channel All directions
Time Period 1 hour
Class Any
Exclude data: None

	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Average	Total	
	1 Mar	2 Mar	3 Mar	4 Mar	5 Mar	6 Mar	7 Mar	8 Mar	9 Mar	10 Mar	11 Mar	12 Mar	13 Mar	14 Mar	15 Mar	16 Mar	17 Mar	18 Mar	19 Mar	20 Mar	21 Mar	22 Mar	23 Mar	24 Mar	25 Mar	26 Mar	27 Mar	28 Mar	29 Mar	30 Mar	31 Mar	Workday	7 Day	Count
00:00	24	28	53	43	18	29		29	28	43	25	20	34	29	26	35	46	41	10	28	22	24	28	29	33	15	31	27	20	38	44	26	30	900
01:00	25	40	28	27	12	23	8	39	30	31	13	16	27	32	29	39	29	16	12	25	26	34	21	41		14	37	31	24	28	33	26	26	790
02:00	23	26	32	16	18	18	5	21	26	18	13	17	22	35	20	31	32	14	16	23	29	25	29	32	20	18	27	19	13	24	33	22	22	695
03:00	48	38	33	10	30	37		42	43	31	15	34	32	36	41	54	35	8	25	44	42	41	42	36	20	34	33	32	37	38	28	38	34	1019
04:00	60	53	44	12	53	45		51	47	29	12	49	51	50	53	58	44	18	60	38	43	65	67	40	25	55	39	43	57	59	28	51	44	1348
05:00	103	102	83	29	114	118	128	126	113	85	26	116	118	126	91	115	88	26	104	117	125	129	99	81	30	117	132	113	122	125	90	116	99	3091
06:00	257	239	109	35	245	252	249	242	242	118	49	263	254	233	266	237	128	52	274	265	262	262	279	130	32	259	241	251	258	261	98	254	204	6342
07:00	576	551	167	67	592	564	567	595	552	182	81	625	600	592	583	576	188	88	648	607	588	607	503	159	66	538	573	571	574	535	187	579	450	13902
08:00	769	738	295	131	816	780	821	818	747	301	122	822	826	806	817	790	321	182	861	827	808	810	804	301	119	815	837	824	844	815	254	810	641	19821
09:00	586	596	423	260	506	600	509	574	550	419	267	532	529	519	574	606	433	303	548	572	553	564	552	544	210	554	595	566	593	566	399	560	500	15602
10:00	502	554	586	462	514	502	458	509	581	607	486	487	481	518	514	561	611	552	483	474	508	520	600	609	452	528	516	513	560	605	561	519	526	16414
11:00	543	583	672	591	561	492	519	538	543	656	621	558	495	534	496	630	661	648	555	549	493	495	607	688	576	531	546	495	580	604	667	541	569	17727
12:00	510	636	679	651	545	537	558	576	621	674	708	538	545	536	548	691	726	692	615	558	535	564	694	686	649	585	571	573	595	633	680	578	607	18909
13:00	599	713	704	715	632	629	541	560	726	682	683	625	542	541	586	724	771	726	629	623	561	585	724	620	637	581	564	583	579	675	658	611	633	19718
14:00	616	714	698	766	612	591	635	555	702	691	693	632	585	599	661	739	753	706	604	603	568	609	726	662	650	628	533	582	626	764	661	627	647	20164
15:00	714	805	621	672	585	659	647	689	842	624	666	603	659	666	655	816	671	712	705	665	641	688	837	674	613	656	688	637	695	889	563	696	682	21257
16:00	858	947	614	485	803	828	821	877	928	587	515	776	855	827	843	916	605	542	839	809	814	797	990	594	543	813	798	877	912	862	564	850	766	23839
17:00	962	938	535	362	812	898	855	887	883	547	347	826	916	883	908	864	569	358	818	891	855	955	897	512	334	874	968	929	948	934	536	893	765	23801
18:00	591	584	390	269	562	542	576	525	585	378	250	529	573	602	582	631	451	301	547	609	537	590	589	390	267	596	520	573	613	660	398	576	508	15810
19:00	318	355	270	156	308	310	279	281	361	251	159	277	318	330	354	343	320	201	269	332	327	323	415	254	198	368	356	335	392	454	257	334	303	9471
20:00	212	262	160	116	196	164	191	212	247	147	99	208	194	224	222	231	198	117	163	223	220	226	235	123	146	227	237	227	234	270	142	218	195	6073
21:00	149	162	100	69	139	148	151	156	143	114	67	113	150	126	141	174	117	82	149	142	130	158	159	100	98	151	158	165	177	182	124	150	134	4194
22:00	112	95	51	43	85	88	84	91	97	71	44	96	82	102	97	105	70	50	62	103	72	97	93	60	46	99	70	107	100	113	59	92	81	2544
23:00	46	68	51	32	36	34	48	50	59	44	29	42	42	52	56	51	57	22	55	44	49	38	43	48	42	52	39	42	53	71	57	48	46	1452
07-19	7826	8359	6384	5431	7540	7622	7507	7703	8260	6348	5439	7553	7606	7623	7767	8544	6760	5810	7852	7787	7461	7784	8523	6439	5116	7699	7709	7723	8119	8542	6128	7841	7295	226964
06-22	8762	9377	7023	5807	8428	8496	8377	8594	9253	6978	5813	8414	8522	8536	8750	9529	7523	6262	8707	8749	8400	8753	9611	7046	5590	8704	8701	8701	9180	9709	6749	8797	8131	253044
06-24	8920	9540	7125	5882	8549	8618	8509	8735	9409	7093	5886	8552	8646	8690	8903	9685	7650	6334	8824	8896	8521	8888	9747	7154	5678	8855	8810	8850	9333	9893	6865	8938	8259	257040
00-24	9203	9827	7398	6019	8794	8888	8692	9043	9696	7330	5990	8804	8930	8998	9163	10017	7924	6457	9051	9171	8808	9206	10033	7413	5806	9108	9109	9115	9606	10205	7121	9213	8510	264925
am Peak	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	08:00	08:00		
Peak Volume	769	738	672	591	816	780	821	818	747	656	621	822	826	806	817	790	661	648	861	827	808	810	804	688	576	815	837	824	844	815	667	810	641	
pm Peak	17:00	16:00	13:00	14:00	17:00	17:00	17:00	17:00	16:00	14:00	12:00	17:00	17:00	17:00	17:00	16:00	13:00	16:00	17:00	17:00	17:00	17:00	16:00	12:00	14:00	17:00	17:00	17:00	17:00	17:00	12:00	17:00	16:00	
Peak Volume	962	947	704	766	812	898	855	887	928	691	708	826	916	883	908	916	771	726	839	891	855	955	990	686	650	874	968	929	948	934	680	893	766	

Event key: Accident Road Works Special Road Closed Holiday
 Weekends and defined holidays

Notes on data:
None

Data prepared by Drakewell Hosting (Powered by C2-WEB) May 10, 2012 11:49:49 AM.

April 2012

Carlisle City Council – England

Parkhouse Rd to Kingmoor Hub April

Multi-Day Volume Report CNDR 000000030001: 2012-04-01 to 2012-04-30

Site Name 30001
Site ID 000000030001
Grid 338762559552
Description CNDR Revenue Site 1

Setup 30001_Pvr
Channel All directions
Time Period 1 hour
Class Any
Exclude data: None

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Average	Total	
	1 Apr	2 Apr	3 Apr	4 Apr	5 Apr	6 Apr	7 Apr	8 Apr	9 Apr	10 Apr	11 Apr	12 Apr	13 Apr	14 Apr	15 Apr	16 Apr	17 Apr	18 Apr	19 Apr	20 Apr	21 Apr	22 Apr	23 Apr	24 Apr	25 Apr	26 Apr	27 Apr	28 Apr	29 Apr	30 Apr	Workday	7 Day	Count
00:00	33	23	34	26	38	33	40	31	25	29	31	36	23	39	23	14	23	15	37	48	62	33	21	34	31	28	33	34	34	22	29	31	933
01:00	27	12	20	28	20	23	11	14	18	17	26	31	26	25	28	12	27	19	23	26	26	27	17	36	31	20	33	36	31	18	24	24	708
02:00	8	15	26	21	25	26	14	14	19	12	19	22	30	28	7	14	26	33	19	22	21	14	18	26	28	24	28	23	14	15	22	21	611
03:00	8	38	36	31	35	35	17	17	24	27	39	41	42	28	11	31	41	43	41	39	28	6	31	38	41	41	34	25	8	23	37	31	899
04:00	23	57	48	56	70	53	22	16	26	39	50	47	55	24	17	59	52	39	42	54	32	17	56	51	49	46	56	35	12	56	52	44	1259
05:00	25	116	127	128	133	87	42	18	36	120	130	118	127	82	29	123	115	115	126	111	77	20	129	132	133	110	114	79	32	129	123	101	2863
06:00	47	262	232	245	276	130	72	49	69	258	244	252	243	119	48	269	275	267	240	254	131	51	290	286	283	270	302	136	59	254	263	212	5913
07:00	65	557	542	579	501	169	128	106	89	495	516	498	460	164	67	602	618	598	589	570	159	67	670	628	612	596	579	186	93	572	566	438	12075
08:00	122	657	685	638	688	256	232	131	128	657	697	675	654	283	128	805	711	873	830	833	274	123	864	804	859	818	790	290	123	881	759	599	16509
09:00	244	537	536	551	612	407	418	193	296	489	513	570	607	434	237	522	570	551	569	563	421	253	519	558	569	576	545	433	239	536	553	489	14068
10:00	494	556	519	520	627	658	653	336	674	602	576	579	603	590	471	508	494	515	504	579	515	523	531	487	447	534	498	583	455	522	538	533	16153
11:00	622	620	572	541	642	812	737	500	889	599	603	577	706	685	600	523	548	472	522	556	606	586	558	482	521	538	474	625	601	493	556	575	17810
12:00	706	628	603	608	653	801	770	492	798	584	630	638	646	650	657	515	482	536	555	601	677	622	569	526	537	576	621	656	574	566	585	603	18477
13:00	698	598	624	644	731	781	777	469	821	680	676	675	755	608	698	553	540	567	591	686	682	665	616	542	549	598	696	602	615	592	631	636	19329
14:00	706	641	615	674	736	812	725	489	796	645	705	682	781	567	681	620	587	578	659	649	641	670	572	614	582	600	722	668	684	598	649	649	19699
15:00	673	664	609	669	750	722	681	460	676	629	691	705	800	528	618	638	612	667	694	830	600	636	656	659	657	633	938	633	626	700	703	675	20054
16:00	545	783	764	855	960	645	672	480	576	771	789	913	862	472	466	761	837	821	853	995	643	491	769	834	865	883	980	538	434	781	851	760	22038
17:00	328	903	854	904	983	507	573	371	429	850	823	947	896	570	345	899	884	941	933	953	542	340	877	918	946	913	1005	545	272	920	915	781	22171
18:00	270	576	550	611	704	333	390	218	306	512	568	627	641	383	299	558	536	549	631	690	385	259	591	547	530	625	640	389	245	533	594	516	14696
19:00	190	310	317	404	406	262	339	185	187	308	369	401	435	262	213	324	346	364	353	427	236	193	295	331	332	341	414	259	162	309	361	324	9274
20:00	127	239	235	261	323	141	171	128	158	235	234	257	279	170	140	216	241	228	273	269	179	149	210	226	185	258	276	179	136	229	247	221	6352
21:00	86	139	119	150	191	114	123	86	90	135	132	174	172	124	95	145	158	141	169	204	126	95	142	125	144	157	214	120	88	139	157	143	4097
22:00	53	83	90	103	116	56	81	32	76	105	97	110	103	66	52	91	81	90	110	118	71	52	89	83	95	118	120	83	46	113	101	90	2583
23:00	39	50	59	54	60	44	56	34	33	47	48	49	73	51	28	46	41	37	52	76	52	33	43	32	42	59	79	66	28	33	53	50	1444
07-19	5473	7720	7473	7794	8587	6903	6756	4245	6478	7513	7787	8086	8411	5934	5267	7504	7419	7668	7930	8505	6145	5235	7792	7599	7674	7890	8488	6148	4961	7694	7900	7255	213079
06-22	5923	8670	8376	8854	9783	7550	7461	4693	6982	8449	8766	9170	9540	6609	5763	8458	8439	8668	8965	9659	6817	5723	8729	8567	8618	8916	9694	6842	5406	8625	8929	8154	238715
06-24	6015	8803	8525	9011	9959	7650	7598	4759	7091	8601	8911	9329	9716	6726	5843	8595	8561	8795	9127	9853	6940	5808	8861	8682	8755	9093	9893	6991	5480	8771	9083	8294	242742
00-24	6139	9064	8816	9301	10280	7907	7744	4869	7239	8845	9206	9624	10019	6952	5958	8848	8845	9059	9415	10153	7186	5925	9133	8999	9068	9362	10191	7223	5611	9034	9369	8546	250015
am Peak	11:00	08:00	08:00	08:00	08:00	11:00	11:00	11:00	11:00	08:00	08:00	08:00	11:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00		
Peak Volume	622	657	685	638	688	812	737	500	889	657	697	675	706	685	600	805	711	873	830	833	606	586	864	804	859	818	790	625	601	881	759	599	
pm Peak	12:00	17:00	17:00	17:00	17:00	14:00	13:00	12:00	13:00	17:00	17:00	17:00	17:00	12:00	13:00	17:00	17:00	17:00	17:00	16:00	13:00	14:00	17:00	17:00	17:00	17:00	17:00	14:00	14:00	17:00	17:00		
Peak Volume	706	903	854	904	983	812	777	492	821	850	823	947	896	650	698	899	884	941	933	995	682	670	877	918	946	913	1005	668	684	920	915	781	

Event key: Accident Road Works Special Road Closed Holiday
Weekends and defined holidays

Notes on data:

Start	End	Type	Lanes	Action	Description
06/04/2012 00:00	06/04/2012 23:59	Holiday	-	Included	Holiday
09/04/2012 00:00	09/04/2012 23:59	Holiday	-	Included	Holiday

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