2011 Air Quality Progress Report for Armagh City and District Council

In fulfillment of the Environment (Northern Ireland) Order 2002 - Local Air Quality Management

May 2011

Local Authority Officer	Christopher Coyle

Department	Environmental Health
Address	The Palace Demesne, Friary Road, Armagh, Co Armagh
Telephone	07917 133627
e-mail	c.coyle@sgehc.com

Report Reference number	ArmaghPR2011
Date	May 2011

Executive Summary

Monitoring at 16 locations (This was reduced to 12 sites in September 2010 in order to facilitate triplicate monitoring at sites were a detailed assessment was required) within Armagh City and District Council's area has demonstrated that there are 3 sites where NO_2 levels exceed the objective limit of 40ug/m^3. Based on the results for 2010, the council **will not** be revoking the current AQMA but will be submitting a detailed assessment of NO_2 pollution at Terrace in Armagh due to exceedences of the objective limit at these sites during 2009. Triplicate diffusion tube monitoring was completed at Greenpark Terrace as part of the detailed assessment for this site. The DA will be uploaded to the report submission website in June 2010.
A detailed assessment for Dawson Street in Armagh was abandoned in early 2010 as the road layout was changed to a one way system which significantly reduced road traffic pollution levels.

No other pollutants were assessed to have an impact on air quality within the district at this time and therefore no AQMA's or detailed assessments are required for any other pollutants.

Armagh City and District Council has not seen any significant changes from any pollution sources since the last round of review and assessment and no other sources of pollution have been identified. Therefore the likely impact from such sources is negligible.

The next course of action to be taken by the council is to complete and submit a detailed assessment of NO_2 at Greenpark Terrace. This will run concurrently with the Draft Action Plan for the current AQMA and a USA in 2012.

Table of contents

Appendices

List of Tables

1 Introduction

1.1 Description of Local Authority Area

Armagh City and District is located in the geographical heartland of Northern Ireland, a beautiful rural, historic area served by the main motorway network in Northern Ireland, with major road links to the business capitals of Belfast and Dublin. Armagh City and District does not have a high level of heavy industry. The majority of the local work force is employed in the delivery of services such as local government, education authority, health and social services, retail and agriculture. Although there are a number of quarries providing graded stone & gravel as well as road-stone coating. The greatest contribution to air quality pollution in the district is from road traffic. Particularly in the city centre where the road network is quickly reaching it's maximum capacity due to the increase in car ownership. Given the size of the rural hinterland surrounding the city of Armagh, public transport resources are stretched and the reliance on the motor car is greatly exacerbated. Armagh City is regarded as a route hub to the border with the Republic Of Ireland and is main through-route between mid-Ulster and the south east of Northern Ireland and hence has a traffic flow higher than that which could be created by local traffic alone. Particulate Matter (PM_{10}) and NO_2 would be considered as the pollutants most at risk of breaching the objective limits in Armagh as a result of road traffic. Armagh City and District Council has already declared an AQMA in January 2009 for NO_2 on Railway Street, Lonsdale Road, Mall West and Barrack Street.

Domestic fuel usage throughout the District has historically been based on solid fuel but, as with the province generally, the use of coal is declining.

1.2 Purpose of Progress Report

Progress Reports are required in the intervening years between the three-yearly Updating and Screening Assessment reports. Their purpose is to maintain continuity in the Local Air Quality Management process.

They are not intended to be as detailed as Updating and Screening Assessment Reports, or to require as much effort. However, if the Progress Report identifies the risk of exceedence of an Air Quality Objective, the Local Authority (LA) should undertake a Detailed Assessment immediately, and not wait until the next round of Review and Assessment.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in Northern Ireland** are set out in the Air Quality Regulations (Northern Ireland) 2003, Statutory Rules of Northern Ireland 2003, no. 342, and are shown in Table 1.1. This table shows the objectives in units of micrograms per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of Local Air Quality Management in Northern Ireland.

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

1.4 Summary of Previous Review and Assessments

Report Type	Date	Exceedences	Detailed Assessment Required	AQMA's Declared
Initial Review and Assessment	Jan 2001	None	No	None
Progress Report	April 2005	None	No	None
Updating & Screening Assessment	April 2006	None	No	None
Progress Report	April 2007	None	No	None
Detailed Assessment for NO_2	Nov 2007	None	No	None
Progress Report	April 2008	NO_2	No	Yes
Updating & Screening Assessment	April 2009	NO_2	No	In the previous year
Progress Report	May 2010	NO_2	Yes	None

Figure 1.1 Map of AQMA Boundaries (if applicable)

See Appendix C

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

Armagh has one automatic monitoring station located in the district. This is at Lonsdale Road in Armagh City and monitors PM_{10} and NO_2 emissions. (This site is also a co-location site for NO_2 diffusion tubes). In September 2010 the PM10 analyser was upgraded to FDMS standard.

Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location ?
Lonsdale Road	Roadside	H 876 458	PM_{10} & NO_2	Y	Y (20m)	3m	Y

Figure 2.1 Map(s) of Automatic Monitoring Sites (if applicable)

See Appendix C

2.1.2 Non-Automatic Monitoring

During 2010 Armagh City and District Council carried out monitoring of NO_2 with diffusion tubes at 16 sites within the city. (This was reduced to 12 sites in September 2010 in order to facilitate triplicate monitoring at sites were a detailed assessment was required). The NO_2 diffusion tubes were prepared and analysed by Harwell Scientifics Limited. The tubes are prepared by coating the grids in a 50% v/v solution of the absorbent, triethanolamine (TEA) in Acetone. Analysis is carried out using a colorimetric technique.

One site at Lonsdale Road is co-located with an automatic NO_2 analyser. Details of the monitoring sites are given in Table 2.2.

Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref	Pollutants Monitored	In AQMA ?	Relevant Exposure? *(Y/N with distance (m) to relevant exposure)*	Distance to kerb of nearest road *(N/A if not applicable)*	Worst-case Location ?
Lonsdale Road (x3)	Roadside	H 876 458	NO_2	Y	Y (20m)	3m	Y
Mallview Terrace (x3)	Roadside	H 879 452	NO_2	Y	Y(<1m)	4m	Y
25 Railway St*	Roadside	H 875 458	NO_2	Y	Y(<1m)	2.5m	Y
1 Barrack St	Roadside	H 879 450	NO_2	Y	Y(<1m)	2m	Y
11 Desert Lane	Urban Background	H 865 457	NO_2	N	Y(10)	2m	Y
19 Folly Lane	Urban Background	H 882 458	NO_2	N	Y(<1m)	1.5m	Y
1 Green Park Terrace	Roadside	H 873 447	NO_2	N	Y(<1m)	2.5m	N
19 Portadown Road*	Roadside	H 887 459	NO_2	N	Y(20)	2m	Y
80 Railway Street	Roadside	H 875 459	NO2	Y	Y(20)	2m	Y
20 Victoria St	Roadside	H 881 452	NO2	N	Y(<1m)	4.5m	Y
3 Barrack Hill	Roadside	H 881 451	NO2	N	Y(<1m)	2m	Y
44 Barrack Hill*	Roadside	H 884 452	NO2	N	Y(<1m)	2m	Y
Drumadd House	Roadside	H 886 452	NO2	N	Y(<1m)	2m	Y
10 Orangefield*	Roadside	H 888 451	NO2	N	Y(<1m)	4m	Y
Cathedral Terrace	Roadside	H 873 456	NO2	N	Y(<1m)	3m	Y
Dawson Street	Roadside	H 874 454	NO2	N	Y(<1m)	1m	Y

* Denotes that monitoring was discontinued at this site in September 2010.

The bias factor used to adjust the diffusion tube results was taken from the UWE Review and Assessment Website. The bias factor used to adjust the diffusion tubes is 0.78

The details of Harwell Scientifics WASP results are provided in Appendix B.

See Appendix C for Map(s) of Non-Automatic Monitoring Sites (if applicable)

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

Automatic Monitoring Data – Nitrogen Dioxide (NO_2)

The NO_2 monitoring site is located at Lonsdale Road in Armagh City. The site is on a main road which passes through the centre of Armagh. The inlet of the NO_2 monitor is located approx 3m from the kerbside. The nearest relevant exposure is approx 15-20 metres from the sampling site. The data capture for this site was 87.4% for 2010 and the NO_2 annual average is 26 µg m^{-3}.

POLLUTANT	NO	NO_2	NO_X
Number Very High	-	0	-
Number High	-	0	-
Number Moderate	-	0	-
Number Low	-	7656	-
Maximum 15-minute mean	1165 µg m^{-3}	118 µg m^{-3}	1883 µg m^{-3}
Maximum hourly mean	1013 µg m^{-3}	111 µg m^{-3}	1639 µg m^{-3}
Maximum running 8-hour mean	544 µg m^{-3}	81 µg m^{-3}	906 µg m^{-3}
Maximum running 24-hour mean	291 µg m^{-3}	61 µg m^{-3}	495 µg m^{-3}
Maximum daily mean	287 µg m^{-3}	61 µg m^{-3}	495 µg m^{-3}
99.8th percentile of hourly means	-	**92 µg m^{-3}**	-
Average	45 µg m^{-3}	**26 µg m^{-3}**	94 µg m^{-3}
Data capture	87.4 %	87.4 %	87.4 %

Nitrogen Dioxide Diffusion Tube Monitoring Data

Table 2.3 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Location	Within AQMA?	Data Capture for monitoring period[a] %	Data Capture for full calendar year 2009[b] %	Annual mean concentrations (µg/m^3)		
					2008 [c, d]	2009 [c,d]	2010 [c]
Lonsdale Road (x3)	Armagh City	Y	100	100	26	32	32
Mallview Terrace (x3)	Armagh City	Y	92	92	35	**43**	**42**
25 Railway St	Armagh City	Y	100	100	31	32	30*
1 Barrack St	Armagh City	Y	100	100	29*	38	36
11 Desert Lane	Armagh City	N	100	100	9	14	14
19 Folly Lane	Armagh City	N	100	100	12	14	15
1 Green Park Terrace	Armagh City	N	100	100	25	**52**	**54**

19 Portadown Road	Armagh City	N	100	100	25	29	28*
80 Railway Street	Armagh City	Y	100	100	N/A	**48**	**46**
20 Victoria St	Armagh City	N	100	100	N/A	28	32
3 Barrack Hill	Armagh City	N	100	100	N/A	32	32
44 Barrack Hill	Armagh City	N	100	100	N/A	25	23*
Drumadd House	Armagh City	N	100	100	N/A	24	24
10 Orangefield	Armagh City	N	100	100	N/A	16	15*
Cathedral Terrace	Armagh City	N	100	100	N/A	21	23
Dawson Street	Armagh City	N	100	100	N/A	**52**	34

* Denotes that monitoring was discontinued at this site in September 2010

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)

[c] Means should be “annualised” as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.

[d] Annual mean concentrations for previous years are optional.

*The tube positioned at 1 Barrack Street was formerly used at Bridge House until it was moved to Barrack Street in January 2009.

2.2.2 PM_{10}

The PM_{10} monitoring site is located at Lonsdale Road in Armagh City. The site is on a main road which passes through the centre of Armagh. The inlet of the PM_{10} monitor is located approx 3m from the kerbside. The nearest relevant exposure is approx 15-20 metres from the sampling site. The PM_{10} unit was upgraded to an FDMS inlet in September 2010.

Table 2.4a Results of PM_{10} Automatic Monitoring: Comparison with Annual Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture for full calendar year 2010 [b] %	Annual mean concentrations (μg/m^3)		
					2008 [c, d]	2009 [c,d]	2010 [c]
Lonsdale Road	Lonsdale Road	Y	92	92	**26**	**27**	**32**

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] Means should be "annualised" as in Box 3.2 of TG(09), if monitoring was not carried out for the full year.
[d] Annual mean concentrations for previous years are optional.

Table 2.4b Results of PM_{10} Automatic Monitoring: Comparison with 24-hour Mean Objective

Site ID	Location	Within AQMA?	Data Capture for monitoring period [a] %	Data Capture 2010 [b] %	Number of Exceedences of daily mean objective (50 μg/m^3) If data capture < 90%, include the 90th percentile of daily means in brackets.		
					2008 [c]	2009 [c]	2010 [c]
Lonsdale Road	Lonsdale Road	Y	92	92	10	17	49

[a] i.e. data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.
[b] i.e. data capture for the full calendar year (e.g. if monitoring was carried out for six months the maximum data capture for the full calendar year would be 50%.)
[c] Numbers of exceedences for previous years are optional.

Produced by AEA on behalf of Armagh City and District Council

ARMAGH ROADSIDE
01 January to 31 December 2010

These data have been fully ratified by AEA

Please Note: DoE NI have requested that the pre-FDMS data to remain provisional i.e. 1 January to 2 September 2010 as this site is exceeding the Directive with TEOM*1.3. However, the data should be okay upon correction using Volatile Correction Model when data are available. Note: FDMS installed on 3 September however, a fault occurred with the instrument resulting in loss of data from 3 to 30 September 2010. This data is also to remain provisional until the VCM correction is applied.

POLLUTANT	PM_{10}*+	NO	NO_2	NO_X
Number Very High	38	-	0	-
Number High	142	-	0	-
Number Moderate	453	-	0	-
Number Low	7406	-	7656	-
Maximum 15-minute mean	871 µg m^{-3}	1165 µg m^{-3}	118 µg m^{-3}	1883 µg m^{-3}
Maximum hourly mean	360 µg m^{-3}	1013 µg m^{-3}	111 µg m^{-3}	1639 µg m^{-3}
Maximum running 8-hour mean	232 µg m^{-3}	544 µg m^{-3}	81 µg m^{-3}	906 µg m^{-3}
Maximum running 24-hour mean	152 µg m^{-3}	291 µg m^{-3}	61 µg m^{-3}	495 µg m^{-3}
Maximum daily mean	143 µg m^{-3}	287 µg m^{-3}	61 µg m^{-3}	495 µg m^{-3}
99.8th percentile of hourly means	-	-	92 µg m^{-3}	-
Average	32 µg m^{-3}	45 µg m^{-3}	26 µg m^{-3}	94 µg m^{-3}
Data capture	91.6 %	87.4 %	87.4 %	87.4 %

* PM_{10} Indicative Gravimetric Equivalent µgm^{-3}
+ PM_{10} instruments:
FDMS using a gravimetric factor of 1 from 3 September 2010
TEOM using a factor of 1.3 for Indicative Gravimetric Equivalent from 1 January to 2 September 2010
All gaseous pollutant mass units are at 20'C and 1013mb. Particulate matter concentrations are reported at ambient temperature and pressure.
NO_X mass units are NO_X as NO_2 µgm^{-3}

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Exceedences	Days
PM_{10} Particulate Matter (Gravimetric)	Daily mean > 50 µg m^{-3}	49	49
PM_{10} Particulate Matter (Gravimetric)	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	-	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	0

Note: For a strict comparison against the objectives there must be a data capture of >90% throughout the calendar year

2.2.3 Sulphur Dioxide

N/A

2.2.4 Benzene

N/A

2.2.5 Other pollutants monitored

N/A

2.2.6 Summary of Compliance with AQS Objectives

Armagh City and District Council has measured concentrations of **NO_2** above the annual mean objective at relevant locations outside of the AQMA , and **is in the process of submitting a Detailed Assessment**, for Greenpark Terrace in Armagh City.

3 New Local Developments

3.1 Road Traffic Sources

3.2 Other Transport Sources

3.3 Industrial Sources

3.4 Commercial and Domestic Sources

3.5 New Developments with Fugitive or Uncontrolled Sources

Armagh City and District Council confirms that there are no new or newly identified local developments which may have an impact on air quality within the Local Authority area.

4 Local / Regional Air Quality Strategy

The Armagh City and District Council Local Air Quality Management Strategy 2006 – 2010 was launched in tandem with the 4 neighbouring councils (Banbridge, Craigavon, Dungannon & South Tyrone and Newry) in Southern Group in March 2006. It was issued for public consultation and Armagh City and District Council consulted the community, statutory consultees and key organisations that have an interest in local air quality affecting the District.

Since the launch of the Strategy the key responsibility of the Southern Group Local Air Quality Manager along with the corresponding council officers has been to implement the objectives outlined in Section 4 of the strategy document. The objectives served to act as a guide for the councils on how to minimise the impact of pollution on air quality from a variety of sources and details actions on how best to achieve these objectives.

The strategy highlights the lead role being played in the delivery of each objective and the relevant partners required to work together in order to achieve successful delivery of each objective aim and the respective cost of doing so.

The Council has found it difficult to implement the strategy due to budgetary constraints both within Council and with the strategic partner organisations, particularly since the beginning of the international economic downturn in late 2007. Other constraints include a lack of power or authority by the Council and its neighbouring LA's to encourage the uptake of the objectives contained within the strategy. However, the Council has had some success in delivering several actions. These are listed below;

To Promote and Maximise the use of public transport, car-sharing, walking and cycling as a means to get to School

- Launch of Walk to School Competition May 2006
- News article on Walk to School completed by Brian Black for UTV news November 2006
- Walk to School Competition and Presentation with Guest Speaker Brian Black (UTV environment correspondent) November 2006.
- Walk to School Competition photos and press release sent to main newspaper in each district.
- Schools Air Quality Conference programmed for April 2008 had to be cancelled due to low response from schools. New air quality conference scheduled for 24th September 2008. Broader in perspective but schools will still take part in some role.
- Walk to school, Cycle to School and use of public transport to school High visibility campaign launched to raise awareness at school level.

To Promote and Maximise the use of public transport, car-sharing, walking and cycling as a means to get to Work

- Questionnaire sent in payslip to all Council Staff about travel to work preferences. Questionnaire reported to council and agreement reached upon implementation of CarShare Scheme for council staff.
- Southern Group CarShare Scheme rolled out and promoted to each council within Southern Group during 2007.
- Launch of Southern Group CarShare Scheme promotional drive. Newly joined members entered into draw for 2 mountain bikes. Both bikes won by staff from Newry and Mourne District Council. Pictures and editorial of bike winners published in Newry newspapers.

To** a**ctively target the population in general with relevant air quality messages and information.

- Completed under the STAQ campaign also. STAQ is being promoted by the Local Air Quality Management Officer as a project of high visibility with posters and banners, media and press releases throughout the entire southern group area with the aim of bringing the air quality agenda to everyone. It will be mostly demonstrated in areas where there is a higher risk of exceedences of the objective limits in the air quality legislation and guidance (LAQM TG03).

The Southern Group Local Air Quality Strategy is available upon request from the Council.

The Strategy will be reviewed at the end of 2010.

5 Planning Applications

N/A

6 Air Quality Planning Policies

N/A

7 Local Transport Plans and Strategies

N/A

8 Local Transport Plans and Strategies

Regional Transportation Strategy

The Regional Transportation Strategy (RTS) for Northern Ireland 2002- 2012 identifies strategic transportation investment priorities and considers potential funding sources and affordability of planned initiatives. The RTS focuses on three geographic areas and one overlying Network. These are as follows:

- Belfast Metropolitan Area (BMA), containing the continuous area comprising Belfast City Council and the built-up areas within the Council areas of Carrickfergus, Castlereagh, Lisburn, Newtownabbey and North Down;
-
- Other Urban Areas (OUAs): collectively those towns described as main or local hubs in the RDS (including Dungannon) and other towns outside the BMA with a population greater than 5,000);

- Rural Area – the remainder of Northern Ireland; and

- Regional Strategic Transport Network (RSTN) comprising the complete rail network and all motorway and trunk road links (including the Key Transport Corridors and Link Corridors).

The RTS is a “daughter document” of the Regional Development Strategy (RDS), which sets out the spatial development framework for Northern Ireland up to 2025. Implementation of the Strategy will be through three Transport Plans covering the Regional Strategic Transport Network (RSTN), the Belfast Metropolitan Area (BMA), and the Sub-Regional Transport Plan (SRTP). Transport studies undertaken to support the RSTN Transport Plan will take due account of current and future cross-border inter-urban transport demands and the roles of the gateway cities and towns, including Armagh.

3.4 Regional Strategic Transport Network Transport Plan

The Regional Strategic Transport Network (RSTN) Transport Plan prepared by the Department for Regional Development (DRD) covers the complete rail network, five Key Transport Corridors (KTCs), four Link Corridors, the Belfast Metropolitan Transport Corridors and the remaining trunk network across Northern Ireland. The Plan is based on the guidance set out in the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS), as described in Sections 3.2 and 3.3 of the RSTN Transport Plan.

The RSTN Transport Plan consists of proposals for transport schemes and measures for the maintenance, management and development of the RSTN until 2015. The RSTN Transport Plan also includes a number of measures for rail, bus, roads, walking and cycling.

3.5 Sub-Regional Transport Plan 2015

The Sub-Regional Transport Plan (SRTP) was prepared by the Department for Regional Development (DRD) and completed in 2007. The SRTP is based upon the guidance provided by the Regional Development Strategy (RDS) and the Regional Transportation Strategy (RTS). Proposed public transport measures for Armagh (within category of Other Urban Areas (OUA)) contained within the SRTP are as follows:

· Improved walk/cycle

· Improved local bus services

· Bus stop Improvement Strategy

· Bus based Park and Ride

· Increased parking at bus/rail station

· Taxi rank

· Transport Programme for People with Disabilities

Spatial Development Strategy for Northern Ireland

The Spatial Development Strategy (SDS) guides the physical development of the Region to 2025. The SDS will contribute to meeting a number of key regional challenges emerging from the significant local, national and international forces, which will drive change over the next 25 years, including:

Transport:

- Promote a change in travel culture and particularly manage the effects of a possible 100% growth in the number of vehicles by 2025;
- Contribute to the creation of a modern, sustainable, safe transportation system for the Region, meeting the travel needs of all groups in society;
- Accommodate the growing volume of freight moving to and from the regional gateways; and
- Strengthen the regional gateways to handle the increasing flow of people and goods in and out of the Region.

Environment:

- Accommodate future development growth while protecting and caring for the environment;
- Reduce the consumption of resources;
- Continue to maintain or, where needed, to improve the quality of air, water and land resources within the Region;
- Seek to maintain local landscape character and to conserve cultural assets; and
- Take particular care to sustain and, where required, to enhance the biodiversity of the Region, its natural habitats, high quality landscapes and built heritage.

Developing a Regional Transportation System

Creating an upgraded and integrated transport system, built around the Regional Strategic Transport Network of the key transport corridors with their main public transport services providing the framework for future development is recognised as one of the key assets to accommodate growth. Strategic planning guidelines relating to the development of a Regional Transport System (RTS) are as follows:

- **SPG-TRAN 1:** To develop a Regional Strategic Transport Network (RSTN), based on Key Transport Corridors (KTCs), to enhance accessibility to regional facilities and services. Two major roads within the District are identified in the RDS as part of the Key Transport Corridors in Northern Ireland: -
- A4 Dungannon - Fivemiletown Road: The South Western Corridor; and
- A5 Aughnacloy - Omagh Road: The Western Corridor.
- In addition, the A29 Cookstown to Moy Road is identified as part of one of three additional Link Corridors in the RTS.

- **SPG-TRAN 2:** To extend travel choice for all sections of the community by enhancing public transport. Including the strengthening of the regional bus network (including the promotion of public transport routes and Park and Ride schemes) and the regional rail system;

- **SPG-TRAN 3:** To integrate land use and transportation to provide a much better range of travel choices for all, and reduce the demand for travel; and

- **SPG-TRAN 4:** To change the regional travel culture and contribute to healthier lifestyles, such as giving greater priority to encouraging more walking and cycling.

9 Climate Change Strategies

N/A

10 Implementation of Action Plans

Armagh City and District Council is currently in the process of completing an Action Plan for the AQMA currently in operation in Armagh City. The due date for completion of the Action Plan is June 2011. Following consultation, the Action Plan will commence during 2011. A review of the objectives will be completed through a stakeholders meeting in early 2012, where progress on each objective will be re-assessed.

11 Conclusions and Proposed Actions

11.1 Conclusions from New Monitoring Data

Monitoring at 16 locations (This was reduced to 12 sites in September 2010 in order to facilitate triplicate monitoring at sites were a detailed assessment was required) within Armagh City and District Council's area has demonstrated that there are 3 sites where NO_2 levels exceed the objective limit of 40ug/m^3. Based on the results for 2010, the council **will not** be revoking the current AQMA but will be submitting a detailed assessment of NO_2 pollution at Terrace in Armagh due to exceedences of the objective limit at these sites during 2009. Triplicate diffusion tube monitoring was completed at Greenpark Terrace as part of the detailed assessment for this site. The DA will be uploaded to the report submission website in June 2010.
A detailed assessment for Dawson Street in Armagh was abandoned in early 2010 as the road layout was changed to a one way system which significantly reduced road traffic pollution levels.

No other pollutants were assessed to have an impact on air quality within the district at this time and therefore no AQMA's or detailed assessments are required for any other pollutants.

Armagh City and District Council has not seen any significant changes from any pollution sources since the last round of review and assessment and no other sources of pollution have been identified. Therefore the likely impact from such sources is negligible.

The next course of action to be taken by the council is to complete and submit a detailed assessment of NO_2 at Greenpark Terrace. This will run concurrently with the Draft Action Plan for the current AQMA and a USA in 2012.

12 References

Local Air Quality Management Technical Guidance – LAQM.TG(09)

Appendices

Appendix A: QA/QC Data

Appendix B: Harwell Scientifics WASP Data

Appendix C: Diffusion Tube Site Maps

Appendix D: Diffusion Tube Monitoring Data 2010

Appendix E: Armagh AQMA Action Plan: Actions Tables

Appendix A: QA:QC Data

Diffusion Tube Bias Adjustment Factors

The NO_2 diffusion tubes were prepared and analysed by Harwell Scientifics. This laboratory takes part in the NO_2 Network QA/QC Field Intercomparison survey. Harwell Scientifics tubes are prepared by coating the grids in a 50% v/v solution of the absorbent, triethanolamine (TEA) in Acetone. Analysis is carried out using a colorimetric technique. Armagh City and District Council obtained the appropriate bias factor from the UWE Review and Assessment Website. A factor of 0.81 was taken from the drop down menus available on the excel spreadsheet matrix.

Factor from Local Co-location Studies (if available)

Armagh City and District Council did not use a bias factor from a local co-location site during 2010 as the NO_2 analyser at Lonsdale Road was not in use due to technical problems during part of 2010.

PM Monitoring Adjustment

All data sets for PM10 monitoring during 2010 were provided by AEA Netcen with the 1.3 adjustment already calculated. The site was upgraded to FDMS in September 2010.

QA/QC of diffusion tube monitoring

Please See Appendix B for Harwell Scientifics WASP Data.

Appendix B – Harwell Scientifics WASP Data

Current best 4 from 5 current Z-score average:	0.19

Year	WASP Round	Period	Samples Dispatched	Results Deadline	HSL Calculations (Pre-Sendout) Sample A Calculated Spiked Value	HSL Calculations (Pre-Sendout) Sample A Measured Value	Harwell Analysis Tubes A Result Tube 1	Result Tube 2	Average	Standard Deviation	RSD	Z-Score
2011	115	Sept-Dec										
	114	Jul-Aug										
	113	Apr-Jun										
	112	Jan-Mar	17/01/2011	04/03/2011								
2010	111	Sept-Dec			1.84	1.85	1.821	1.821	1.821	0.000	0	0.1
	110	Jul-Aug			0.99	1	0.972	0.987	0.980	0.011	1.1	0
	109	Apr-Jun			1.03	1.06	1.053	1.053	1.053	0.000	0	0.3
	108	Jan-Mar			1.92	1.91	1.921	1.896	1.910	0.018	0.9%	-0.1
2009	107	Oct-Dec			2.03	2.04	1.905	1.914	1.910	0.007	0.4%	-0.8
	106*	Jul-Sept			1.84	1.84	1.880	1.439	1.660	0.312	18.8%	-1.3
	106*	Jul-Sept			1.84	1.84	1.880	1.880	1.880	0.000	0.0%	
	105	Apr-Jun			1.68	1.69	1.795	1.784	1.790	0.008	0.4%	0.8
	104	Jan-Feb			2.02	2.01	2.017	2.047	2.032	0.022	1.1%	0.0
2008	103	Sept-Dec			1.22	1.22	1.242	1.234	1.238	0.006	0.5%	0.1
	102	Jun-Aug			1.37	1.38	1.470	1.472	1.471	0.043	2.9%	0.5
	101	Apr-Jun			0.92	0.94	0.974	0.991	0.983	0.013	1.3%	0.5
	100	Jan-Mar			1.36	1.37	1.395	1.384	1.390	0.008	0.6%	0.2
2007	99	Oct-Nov			2.15	2.16	2.242	2.235	2.239	0.005	0.2%	0.3
	98	Jul-Sept			1.83	1.85	1.877	1.854	1.866	0.013	0.7%	0.2
	97	Apr-Jun			0.89	0.87	0.920	0.918	0.919	0.002	0.2%	0.2

HSL Calculations (Pre-Sendout)		Harwell Analysis					
Sample B		Tubes B					
Calculated Spiked Value	Measured Value	Result Tube 1	Result Tube 2	Average	Standard Deviation	RSD	Z-Score
1.54	1.57	1.512	1.482	1.497	0.022	1.5	-0.4
2.37	2.47	2.367	2.394	2.381	0.020	0.8	0.1
1.27	1.27	1.265	1.268	1.267	0.003	0.2	0
1.47	1.47	1.409	1.422	1.420	0.009	0.6%	-0.5
2.20	2.20	2.049	2.046	2.048	0.003	0.1%	-0.9
1.42	1.44	1.880	1.429	1.655	0.319	19.3%	2.1
1.42	1.44	1.439	1.429	1.434	0.007	0.5%	
0.96	0.96	1.031	1.035	1.033	0.003	0.3%	0.9
1.22	1.19	1.269	1.230	1.252	0.024	1.9%	0.2
0.94	0.95	0.957	0.951	0.954	0.005	0.5%	0.1
2.28	2.3	2.435	2.386	2.411	0.035	1.5%	0.4
1.86	1.93	1.947	1.958	1.953	0.008	0.4%	0.4
1.47	1.45	1.511	1.516	1.514	0.004	0.3%	0.2
0.84	0.84	0.906	0.901	0.904	0.004	0.4%	0.6
1.19	1.2	1.229	1.223	1.226	0.005	0.4%	0.2
1.58	1.59	1.619	1.640	1.630	0.015	0.9%	0.2

Appendix C – Diffusion Tube Site Maps

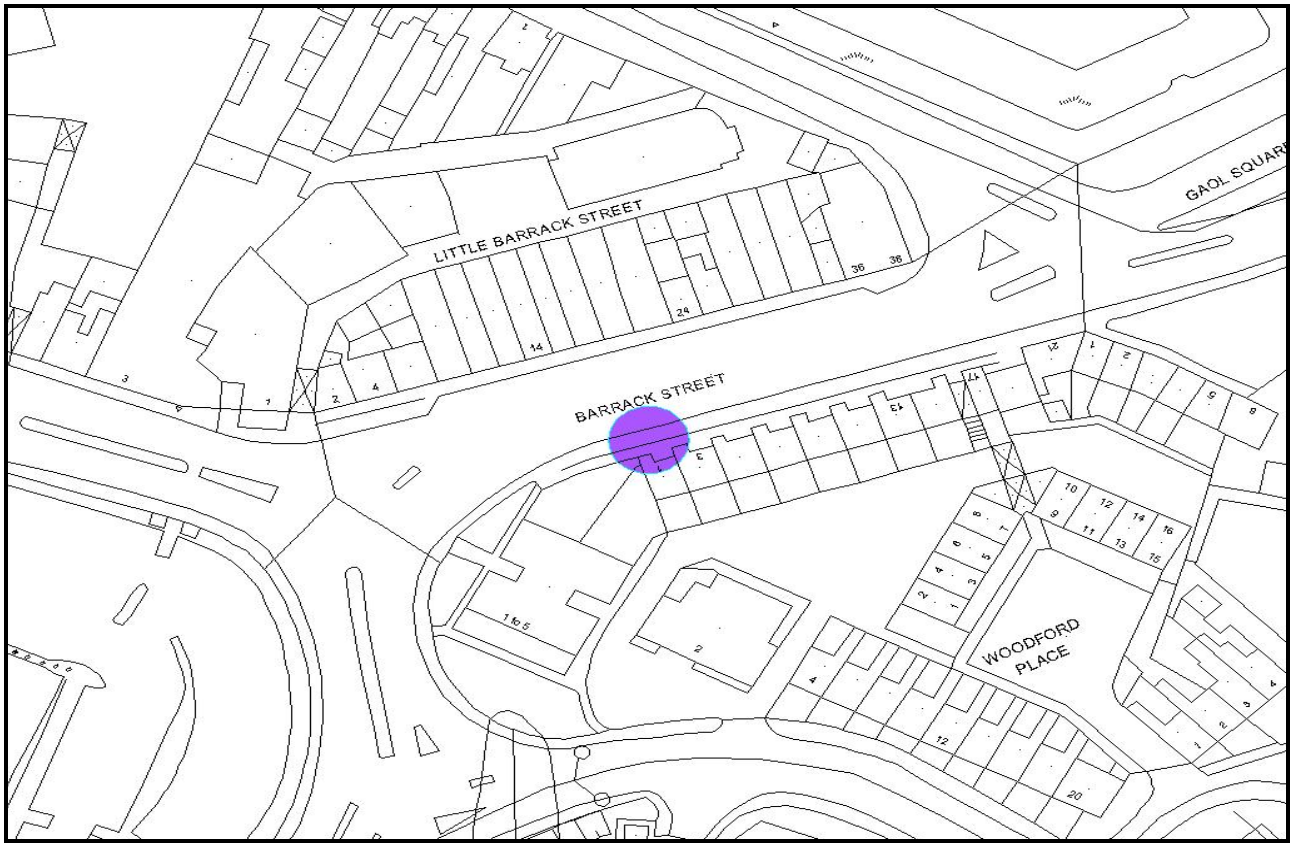
Title : Diffusion Tube Locations

Scale : Not to Scale

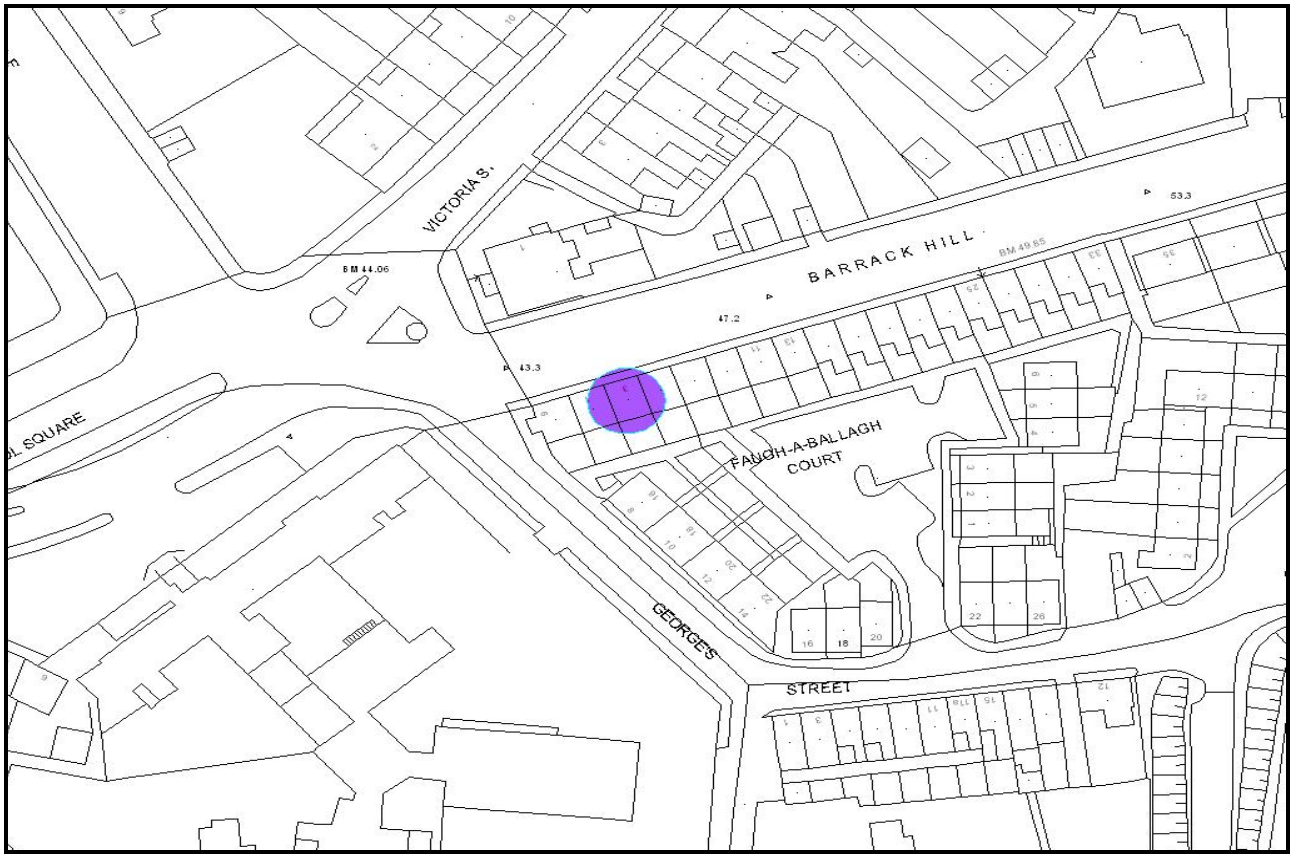
29/04/2009

Armagh City and District Council...

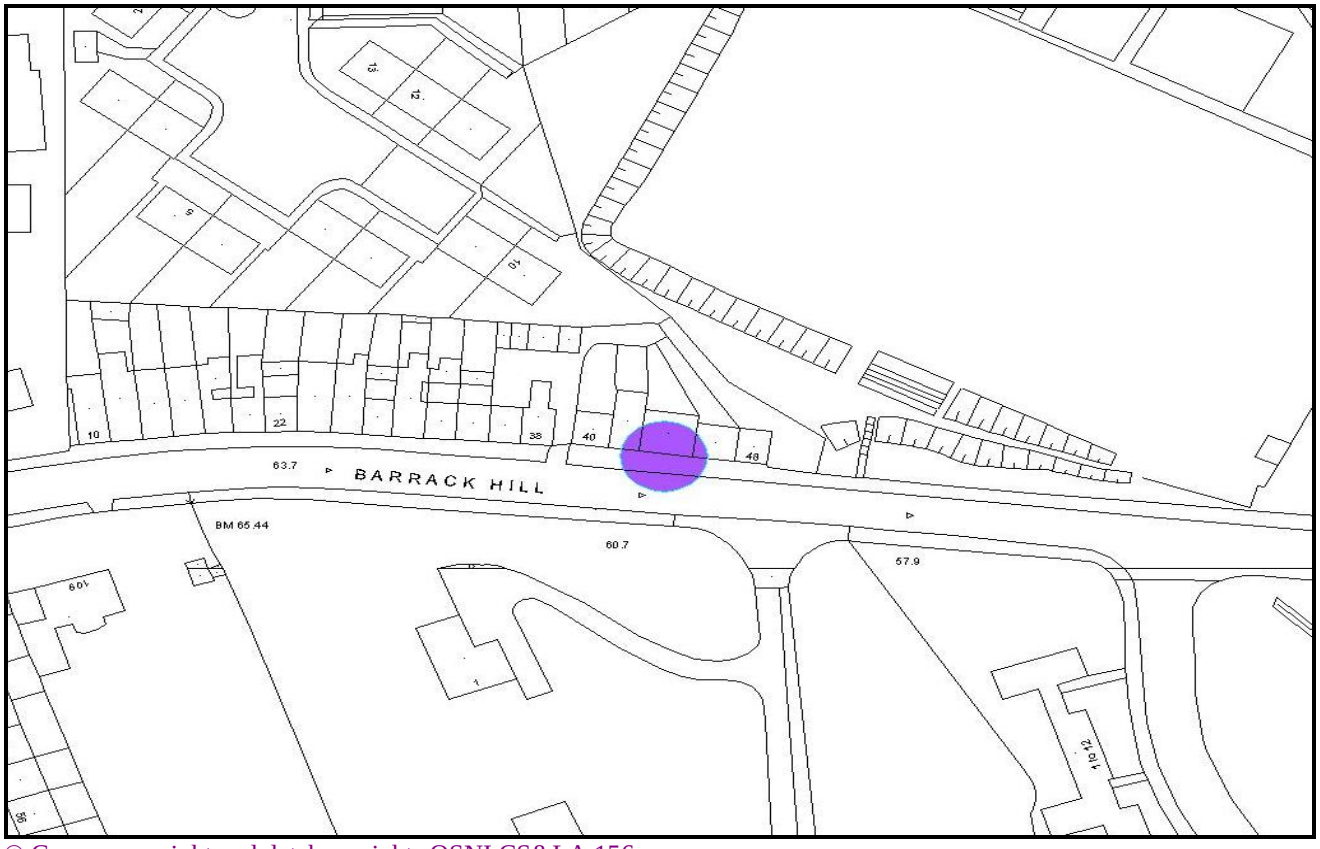
1 Barrack Street



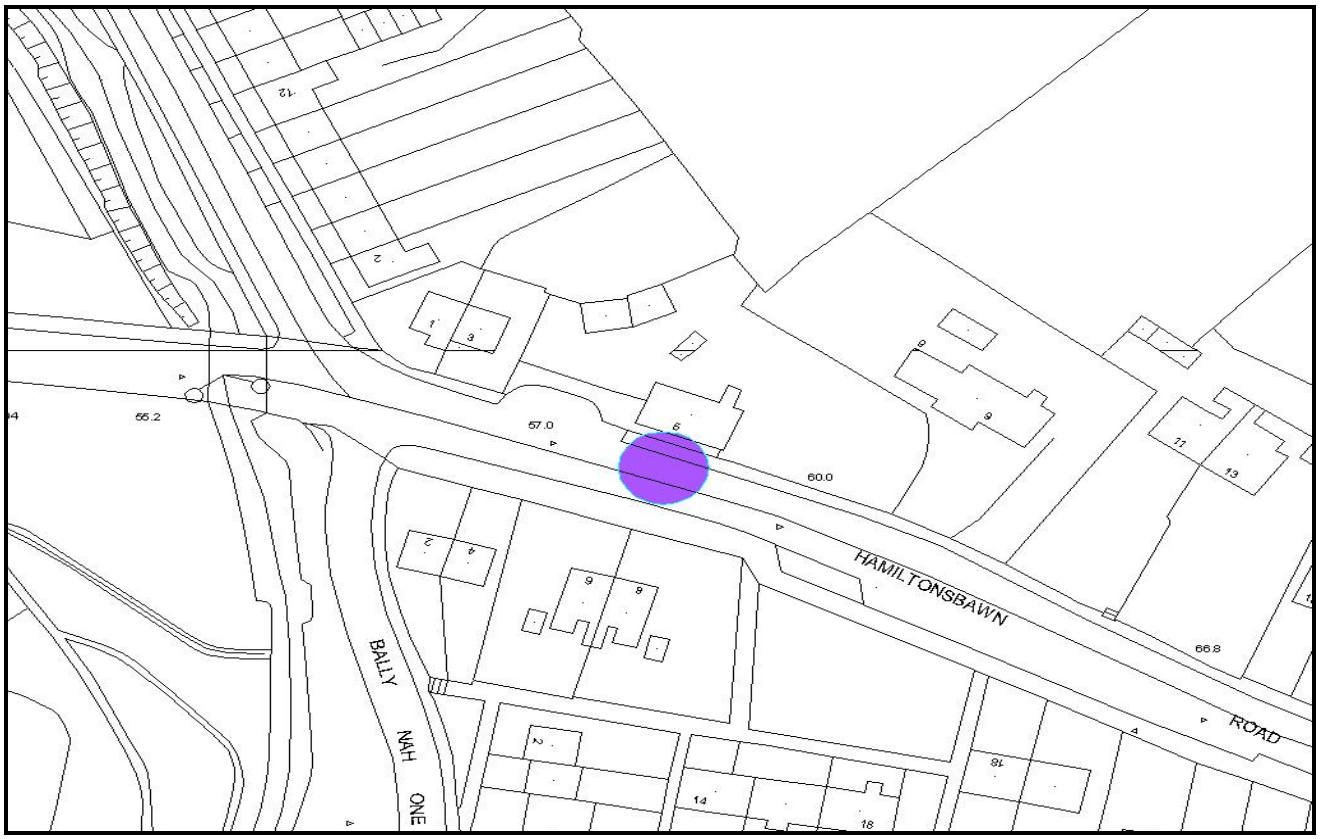
3 Barrack Hill



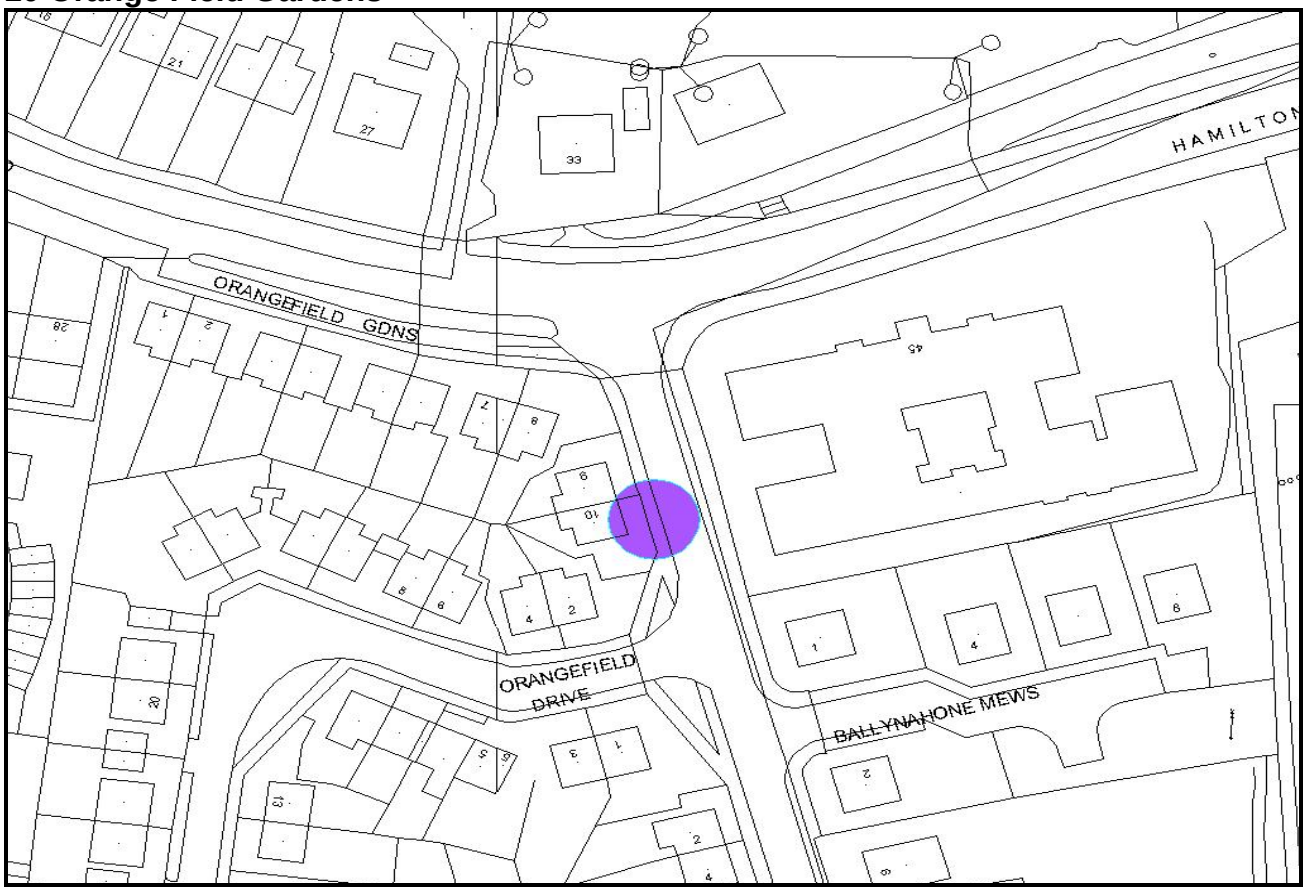
44 Barrack Hill



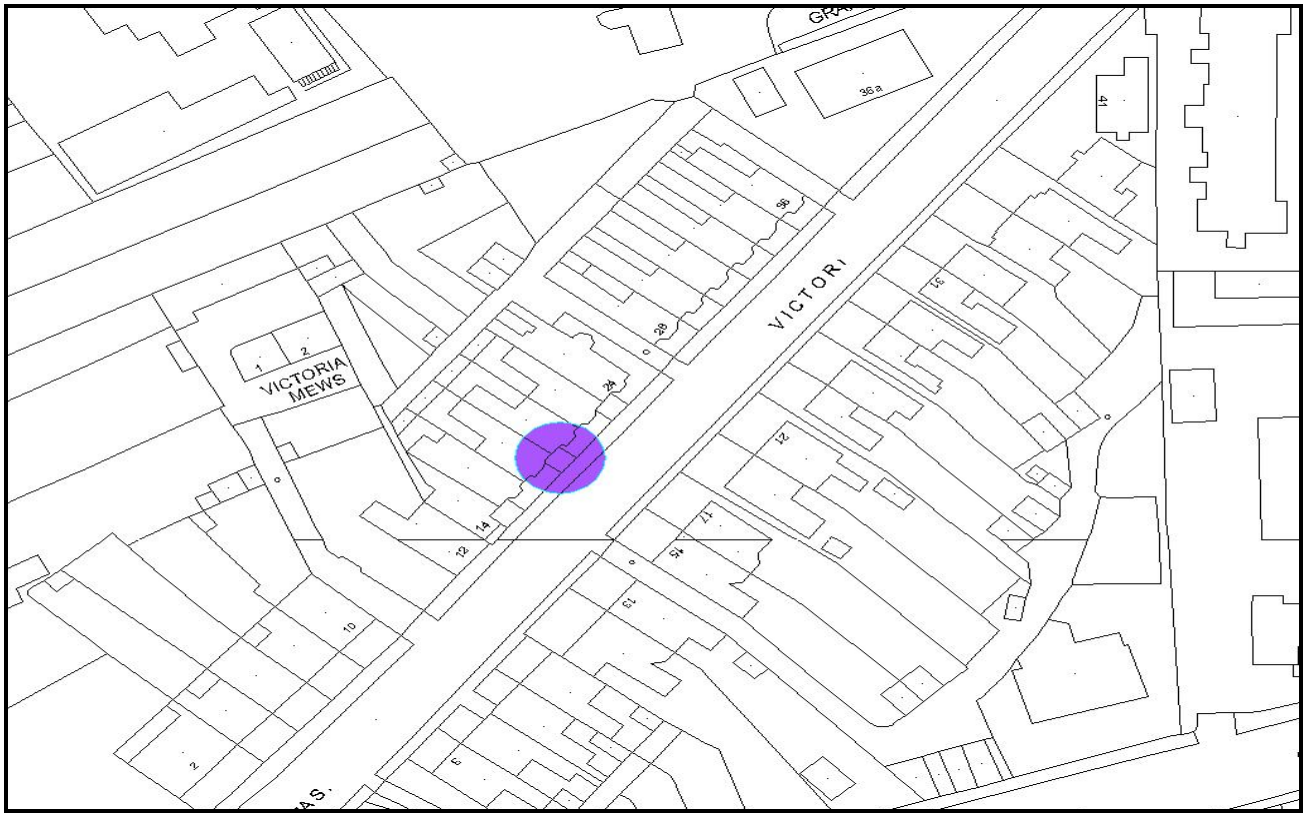
Drumadd House



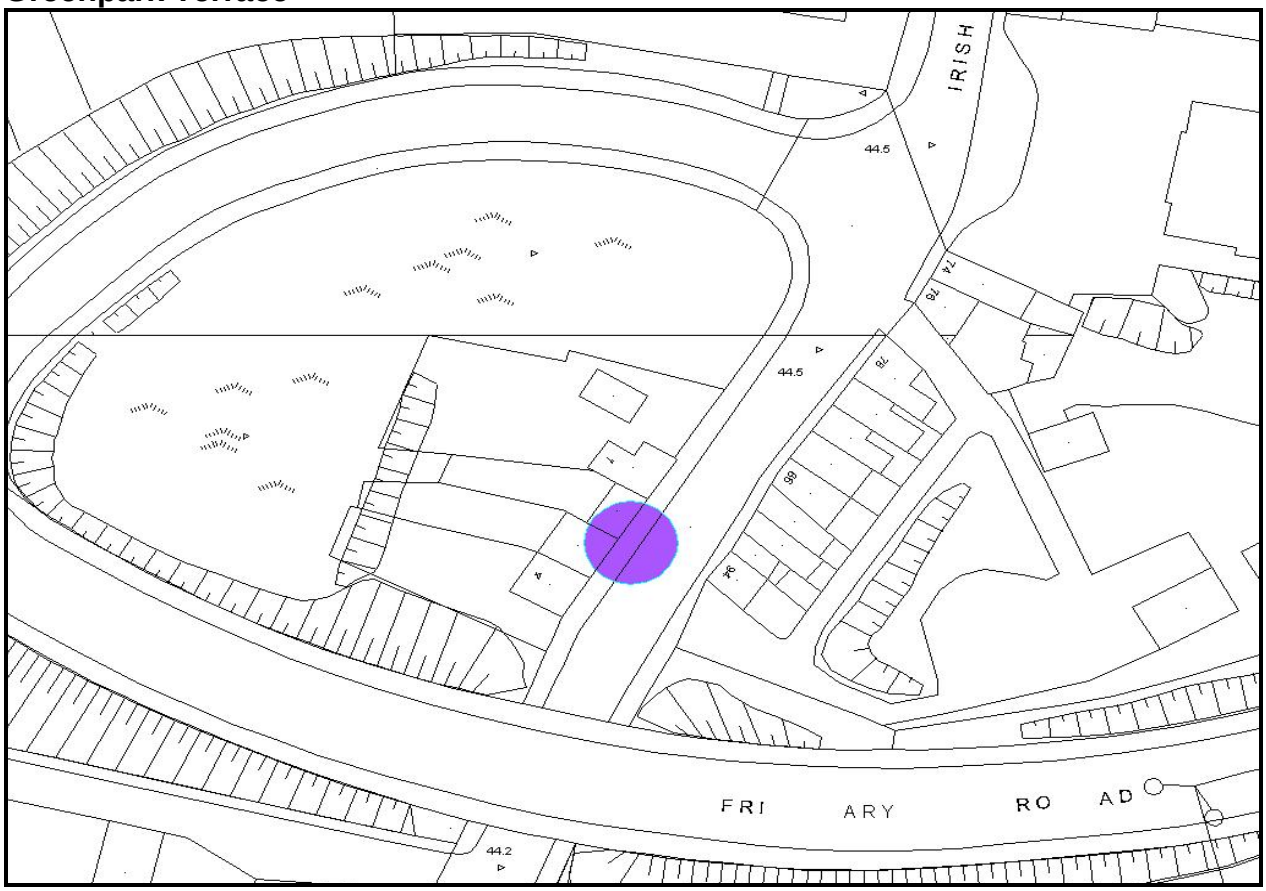
10 Orange Field Gardens



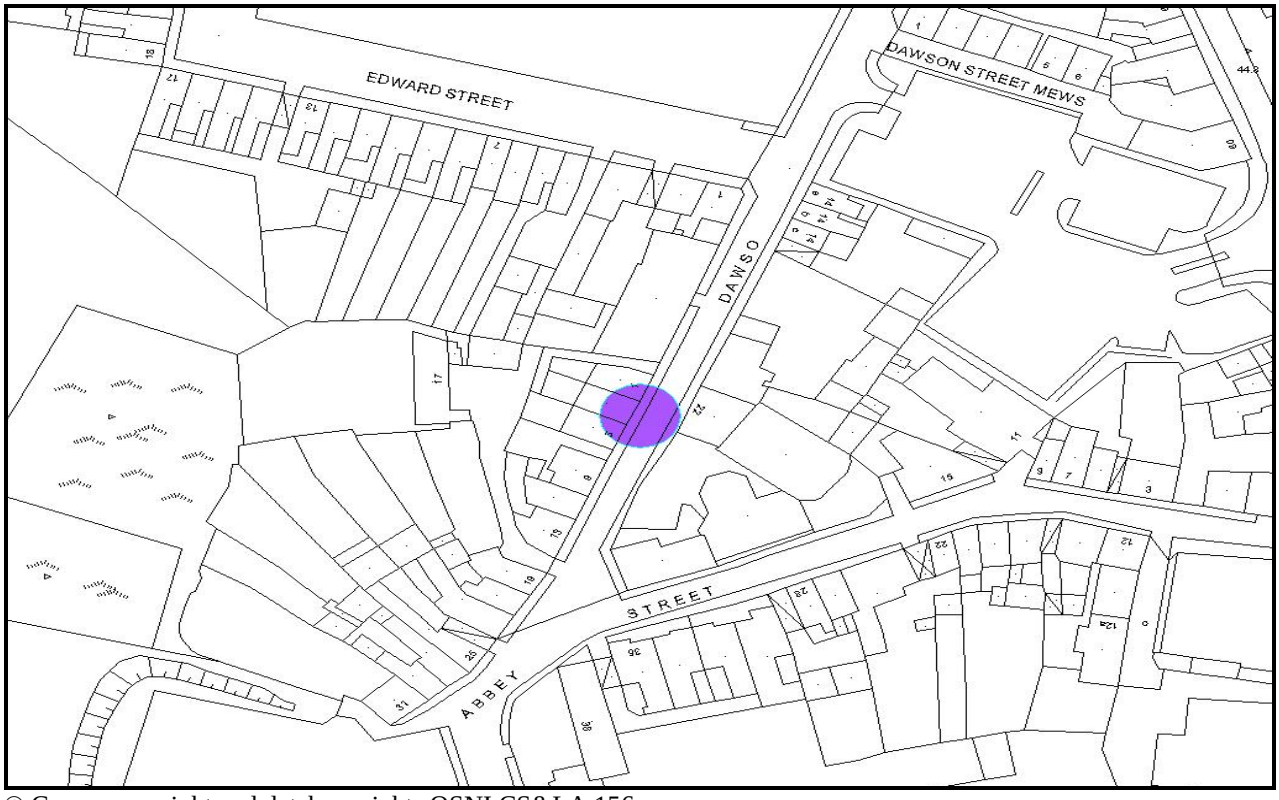
Victoria Street



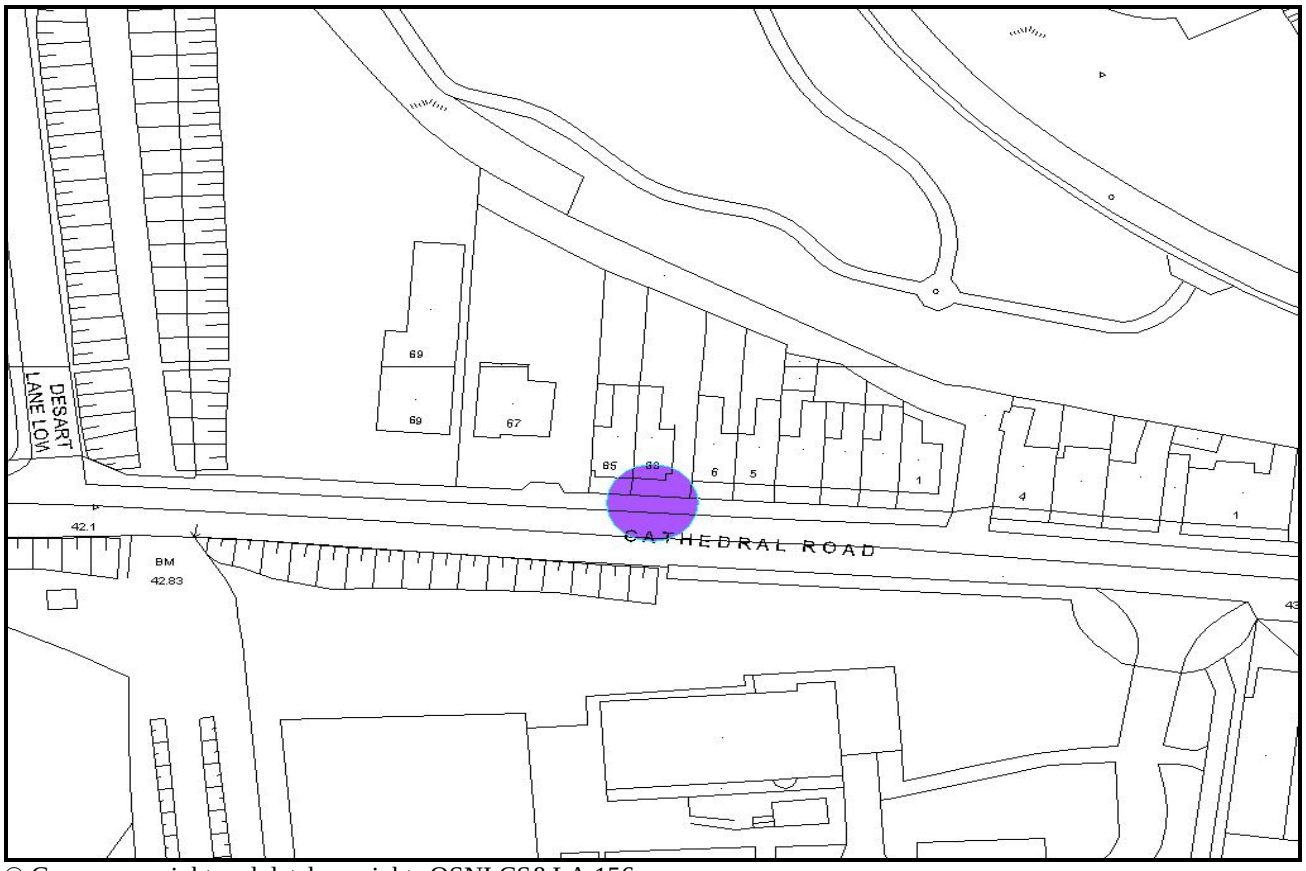
Greenpark Terrace



Dawson Street



Cathedral Road



Appendix D

Diffusion Tube Monitoring Data 2010

NO2 DIFFUSION TUBE RESULTS 2010 (ug/m3)

	25 Railway St	1 Barrack St	11 Desart Lane	19 Folly Lane	80 Railway St	7 Mallview Terrace	1 Greenpark Terr	19 Portadown Rd	Lonsdale Rd	20 Victoria Street	3 Barrack Hill
JANUARY	45	53	21	25	48	50	76	40	42	38	42
FEBRUARY	55	57	30	32	83	70	95	59	58	55	58
MARCH	44	48	19	22	65	58	72	43	44	42	45
APRIL	39	48	13	16	63	61	78	39	43	45	41
MAY	32	42	9	13	48	45	61	36	31	35	31
JUNE	32	38	8	10	41	41	54	17	23	29	25
JULY	27	28	7	10	46	38	54	25	25	29	27
AUGUST	33	32	9	13	52	48	61	31	32	34	33
SEPTEMBER	-	51	15	15	61	56	60	-	36	32	36
OCTOBER	-	45	18	18	62	55	63	-	41	40	42
NOVEMBER	-	60	31	28	68	64	82	-	60	56	52
DECEMBER	-	55	30	31	73	67	80	-	58	59	58
AVERAGE	38	46	18	19	59	54	70	36	41	41	41
Bias Ave	30	36	14	15	46	42	54	28	32	32	32

Bias Factor **0.78**

	44 Barrack Hill	Drumadd House	10 Orangefield	Cathedral Terr	Dawson St
JANUARY	29	40	19	27	55
FEBRUARY	47	48	35	52	92
MARCH	34	32	23	33	69
APRIL	35	28	21	30	71
MAY	26	24	14	5	22
JUNE	22	20	12	23	20
JULY	23	16	10	20	17
AUGUST	23	21	N/A	23	23
SEPTEMBER	-	27	-	27	26
OCTOBER	-	30	-	29	33
NOVEMBER	-	36	-	46	46
DECEMBER	-	51	-	38	46
AVERAGE	30	31	19	29	43
Bias Ave	23	24	15	23	34

Appendix E

Armagh Action Plan: Action Tables

Action Plan Proposals for Armagh City and District Council

To successfully develop and deliver an Action Plan it is essential that all relevant authorities as defined in the Air Quality Regulations (Northern Ireland) 2003 work in partnership with the Council to ensure that the required reduction in Nitrogen Dioxide is achieved. In particular, as the major source of pollution in this AQMA is transport-related those relevant authorities with responsibilities for transport have a very important role.

The Action Plan proposals are outlined in the following pages, including the impact and timescales for the proposals. In order to inform the action planning process an assessment of the cost and benefit of each proposal has been undertaken. The following table gives an indication of the scoring used. A simple multiplication of the cost and the beneficial impact gives an indication as to the cost effective score of the proposals.

Table 4.1 - Scoring used to assess and prioritise proposals

Costs		**Beneficial Impact on Air Quality**		**Timescale***	
Score	£				Years
7	<100k	10	Highest	Short (S)	1 – 2
6	100 – 500k	↓		↓	↓
5	500k – 1 million				
4	1 – 10 million			Medium (M)	3 – 5
3	10 – 50 million			↓	↓
2	50 – 100 million				
1	>100 million	1	Lowest	Long (L)	6+

*measures implemented already are denoted as " I ", otherwise denoted as ongoing - "O"

4.1 Specific Measures to Be Implemented within the AQMA

To ensure that the AQS objectives will be achieved within the AQMA, the following measures will be/are proposed to be implemented

ACTION	Lead Authority	Impact	Time scale	Status	Impact	Cost	Cost Effective score	Indicator	To be achieved
1. Investigate the efficiency of the traffic lights at the junctions of Barrack Street, Mall West and Newry Road and improve the timings of the lights to aid traffic flow.	DRD Roads Service (NI)	Less congestion and faster speeds at junctions leading to an overall reduction in NO_2 levels.	S	O	2	7	14	Roads Service to report back to AQMA Stakeholder Committee on possible efficiency measures. If implemented, changes will be assessed in the short term based on average queue lengths and number of journeys. Long Term reduction of NO2 in annual monitoring results	August 2012 On-Going
2. Investigate the efficiency of the roundabout at the junction of Mall West, Lonsdale Road, and to assess if other traffic control measures may be better suited to ease congestion	DRD Roads Service (NI)	Reduction in the overall level of traffic pollution on Mall West, Lonsdale Road and Railway Street. Co-ordinate efficient traffic flow in conjunction with lights at Barrack Street and Newry Road.	S	O	5	7	35	Roads Service to report back to AQMA Stakeholder Committee on possible efficiency measures. . If implemented, changes will be assessed in the short term based on average queue lengths and number of journeys. Long Term reduction of NO2 in annual monitoring results	August 2012 On-Going
3. To use vehicles, fuel and technology which optimize the balance of efficient operations, output emissions and environmental impact, with regulatory compliance as a minimum standard.	Translink	Reduction in the overall level of traffic pollution in the AQMA and reduction in the numbers of highly polluting vehicles on the roads	S	O	2	7	14	To achieve an average road fleet age of 8 years and a retirement age of 12 years for coaches and 18 years for buses by 2013	2013

ACTION	Lead Authority	Impact	Time scale	Status	Impact	Cost	Cost Effective score	Indicator	To be achieved
4 Air Pollution Monitoring.	Armagh City and District Council	Identification of long term trends in pollution and focus on areas of poor air quality	M	O	5	7	35	Long Term reduction of NO2 in annual monitoring results	On-Going
5. Investigate the feasibility of removing a number of the parking spaces on Mall West.	DRD Roads Service (NI)	Reduces pressure on vehicles using Mall West. Optimises traffic speeds and eradicates congestion on Mall West in both directions.	M	O	2	7	14	Number of Car Parking spaces reduced Long term reduction of NO2 in annual monitoring results	May 2012 On-Going
6. Investigate the feasibility of introducing a 'Pay & Display' system on Mall West	DRD Roads Service	Increased efficiency in traffic flow through the AQMA and town centre. Reduces congestion and encourages use of larger off-street car parks.	S	O	5	7	35	DRD to report back to AQMA stakeholder committee on possible measures	May 2012
7. Complete a traffic assessment of Armagh City Centre and carry out DMRB assessment of AQMA Junctions	Armagh City and District Council	Identification of long term trends in pollution and assesses requirement for improvements to road network	L	C	9	3	27	Long Term reduction of NO2 in annual monitoring results Reduced Traffic Flows (AADT) through Armagh City centre	April 2011

ACTION	Lead Authority	Impact	Time scale	Status	Impact	Cost	Cost Effective score	Indicator	To be achieved
8. Investigate the possibility of designating a number of free parking spaces on Mall West for electric/hybrid vehicles only.	DRD Roads Service	Promotes the use of more environmentally friendly vehicles and the follow on reduction in road traffic pollution in the AQMA and Town Centre.	S	O	1	7	7	DRD to report back to AQMA stakeholder committee on possible measures Long term reduction of NO2 in annual monitoring results	May 2012 On-Going
9. To investigate the possibility of creating a Low Emissions Zone within Armagh City Centre	Armagh City and District Council & DRD Roads Service (NI)	Allow access for vehicles that meet the latest euro emissions standards to designated area within city.	M/L	O	1	7	7	DRD to report back to AQMA stakeholder committee on possible measures	May 2012
10. Investigate the possibility of Introducing a 'Park and Ride' scheme for shoppers and employees on the outskirts of Armagh	DRD Roads Service (NI) & Translink	Increases options for access to city centre and may reduce traffic congestion in Armagh overall. Helps to promote the benefits of public transport.	M	O	2	6	12	Percentage of parking spaces within Park and Ride facility being used on a daily basis Long term reduction of NO2 in annual monitoring results	On-Going On-Going

ACTION	Lead Authority	Impact	Time scale	Status	Impact	Cost	Cost Effective score	Indicator	To be achieved
11. Ensure potential air quality issues are assessed with new developments before problems arise through consultation with the Northern Ireland Planning Service	Armagh City and District Council	Reduces the possibility of further AQMA declarations and limits the degradation of air quality in future years.	L	O	2	7	14	Long term reduction of NO2 in annual monitoring results Number of consultations on planning application by Armagh City and District Council	On-Going On-Going
12. Air quality assessment of vehicle emissions	Armagh City and District Council	Reduction in the numbers of highly polluting vehicles on the roads	S	I	2	7	14	Annual initiative to check emissions and promote efficient driving Long Term reduction of NO2 in annual monitoring results	On-Going
13. Encourage the use of Staff Bicycles for short journeys within Armagh City	Armagh City and District Council	Reduction in pollution from Council vehicles	S	I	2	7	14	Increased use of existing bikes owned by council for short journeys in city. Long term reduction of NO2 in annual monitoring results	On-Going On-Going

ACTION	Lead Authority	Impact	Time scale	Status	Impact	Cost	Cost Effective score	Indicator	To be achieved
14. Investigate the use of alternative fuels where possible.	Armagh City and District Council	Reduction in pollution from Council vehicles	S	O	2	7	14	Report to be produced by Council on the viability of using alterative fuels for Council vehicles Long term reduction of NO2 in annual monitoring results	May 2012 On-Going
15. Vehicle upgrading/renewal programme to comply with EURO 5 emission standards	Armagh City and District Council	Reduction in pollution / noise from Council vehicles and increased fuel efficiency	S	O	2	7	14	Two new Bin Lorries purchased to replace two older models being removed from service Long term reduction of NO2 in annual monitoring results	December 2011 On-Going
16. Develop better travel planning amongst Council employees	Travelwise NI	Reduction in vehicle pollution from Council staff travelling to and from work.	S	O	2	7	14	Travel plan produced and implemented by Council	May 2012
17. Facilitate the development of Travel Plans for local schools and colleges	Travelwise NI	Reduction in pollution from vehicles used for school run	S	O	2	7	14	Number of ravel plans produced and implemented by Schools and Colleges through Travelwise NI	On-Going

ACTION	Lead Authority	Impact	Time scale	Status	Impact	Cost	Cost Effective score	Indicator	To be achieved
18. Sustainable Development.	Armagh City and District Council	General environmental impact. Inform policy makers. Increased awareness of sustainable development issues among a variety of stakeholders	M	O	5	7	35	Long Term reduction of NO2 in annual monitoring results	On-Going
19. Industrial Pollution Control	Armagh City and District Council	Reduced ambient pollution in local atmosphere	S	O	3	7	21	Long term reduction of NO2 in annual monitoring results Percentage of PPC programme completed by Armagh City and District Council	On-Going
20. Nuisance policy for dealing with burning of commercial and domestic waste	Armagh City and District Council	Reduced pollution from uncontrolled burning of commercial and domestic waste	S	O	1	7	7	Long Term reduction of NO2 in annual monitoring results	On-Going
21. Air Quality Awareness Promotion Campaign	Armagh City and District Council	Increase public awareness of Air Quality Management Area and general air pollution issues	S	O	2	7	14	Production of visual, verbal and written materials for dissemination to general public and/or highlighting air quality issues through various media	Annually as funding permits

5 Consultation

It is important for the success of the Action Plan to seek involvement from all local stakeholders including local residents, community groups and local businesses in order to share knowledge about the issues and hopefully gain support for the final measures proposed.

To date a number of meetings have been held with the Strategic Partners and other agencies in developing this action plan. Please see **Appendix 2** for details of these meetings

The following is a list of statutory and non-statutory consultees to which the draft Plan will be sent:

- The Secretary of State
- Department of the Environment / The Northern Ireland Environment Agency
- Department for Regional Development
- Southern Health and Social Care Trust
- Armagh City and District Council Councillors and Officers
- Neighbouring local authorities
- Local residents within and bordering the AQMA (Updating letter sent)
- Relevant local businesses, community groups and forums
- Other relevant local stakeholders

All comments from both statutory and non-statutory consultees received on the draft Action Plan will be considered and incorporated where appropriate into the final Action Plan. The Plan will now be presented to Armagh City and District Council for endorsement and subsequently placed on the Northern Ireland Air Quality website at http://www.airqualityni.co.uk/reports.