2014 Air Quality Progress Report for Down District Council

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Executive Summary

Down District Council comprises a largely rural area of around 65,000 hectares in the south east of Northern Ireland, with a population of some 68,000. The main centres of population are located in Downpatrick, Newcastle and Ballynahinch. Agriculture and tourism form by far the most significant economic base in the area, with relatively little heavy industry

There have been no exceedences of the Air Quality Strategy objectives at relevant exposure within Down District Council area.

With respect to Nitrogen Dioxide, the 2010 Progress Report identified two exceedences of the Nitrogen Dioxide annual mean objective at diffusion tube roadside monitoring sites in Downpatrick i.e. Market Street and Church Street.

A Detailed Assessment for NO_2 was submitted by Down District Council in 2010. As a result of this in July 2010 a real time analyser was installed in Market Sreet, in the prime location in accordance with the technical guidance. Monitoring has continued at this site, the results show a slight rise each year, if this trend continues Down District Council shall consider declaring an AQMA at this junction and the immediate facinity.

Monitoring with NO_2 diffusion tubes in the surrounding area ceased at the end of 2012, data had been collected for a number of years and Market Street/Church Street continued to be the only area of concern. With the real time analyser installed in a perfect location to monitor this junction it was not deemed necessary to continue with diffusion tube monitoring as sufficient data had been obtained.

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Table of contents

Appendices

Appendix A: QA/QC Data

List of Tables

List of Figures

1 Introduction

1.1 Description of Local Authority Area

The main centres of population are located in Downpatrick, Newcastle and Ballynahinch. Agriculture and tourism form by far the most significant economic base in the area, with relatively little heavy industry. The Irish Sea and the inlet to Strangford Lough form a natural boundary for the south and east of the District. Much of this boundary has Area of Special Scientific Interest (ASSI) status. To the south of the District are the Mourne Mountains which may form the centre of Northern Ireland's first National Park. The Ards and Down Area Plan prepared under Part III of the Planning (Northern Ireland) Order 1991 will have future impacts on air quality within Down District Council. The Council has five neighbouring council areas: Ards Borough Council; Castlereagh Borough Council; Lisburn Borough Council; Banbridge District Council and Newry and Mourne District Council. . In April 2015 Down District Council and Newry and Mourne will join to form a new Council.

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 (PM10) (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

Down District Council has completed the following reviews and assessments of air quality in earlier rounds of the assessment process:

Stage 1 Report (DDC, 2000)	The first stage assessment identified all significant pollutant sources with Down District Council area. The air quality objectives were unlikely to be exceeded and no detailed assessment was necessary.
Stage 2/3 Air quality review (DDC, 2003)	The conclusions of this review stated that there was no need to progress to the third stage review and assessment and that no Air Quality Management Areas (AQMA'S) needed to be declared.
Progress report (DDC, 2005)	The progress report concluded that NO_2, SO_2 and PM_{10} were not predicted to cause exceedances of the air quality objectives at relevant receptors.
Updating and Screening Assessment (DDC, 2006)	The USA was carried out according to Local Air Quality Management Policy Guidance LAQM.TG(03). The assessment looked at seven pollutants and no detailed assessments were required. No AQMA's were required in Down District Council and there was no need for a detailed assessment in 2007.
Progress Report (EG, 2008)	Diffusion tube monitoring indicated that the annual average objective for NO_2 was being exceeded at the Irish street location in Downpatrick. Down DC Officers evaluated sites with a view to installing real time monitoring equipment. There are currently no Air Quality Management Areas (AQMA'S) within the Down District Council area. Diffusion tube measurements made in the Irish Street area during 2007 and 2008 indicated exceedances in relation to NO_2. A detailed assessment involving additional diffusion tubes was commenced in late 2008 at this Irish Street location.

Updating and Screening Assessment (DDC, 2009)	The main conclusion from the 2009 Updating and Screening Assessment (USA) was that diffusion tube measurements at Irish Street junction, Downpatrick indicated exceedances of the annual mean objective for nitrogen dioxide in both 2007 and 2008. There is relevant exposure at this location. The measurement of nitrogen dioxide at the remaining monitoring sites has shown no exceedances of air quality objectives. Down District Council then undertook a Detailed Assessment for NO_2 in the vicinity of Irish Street.
Detailed Assessment 2010	For the purposes of this Detailed Assessment additional NO_2 diffusion tubes were placed along Market Street, Irish Street, English Street and Church Street, Downpatrick. These additional tubes were installed in October 2008 and a full year of monitoring has now occurred. Following a bias adjustment of the diffusion tube results it was found that the tubes at Down 1(Irish Street location) Down 11 (Church Street) and Down 13 (Market Street) exceeded the air quality limit of 40ug/m^3 for Nitrogen Dioxide. Down District Council have committed to installing a real time analyser on Market Street junction, Downpatrick, as local authorities are advised not to rely upon diffusion tube data alone to declare an Air Quality Management Area (A1.42 LAQM Technical Guidance LAQM .TG(09)). It is expected that this equipment will be operational at the beginning of June 2010 and the results obtained over the following six month period will influence Down District Council in declaring an Air Quality Management Area (AQMA). Down District Council are still awaiting acceptance of this Detailed Assessment by DOE.
Progress report (DDC, 2010)	Diffusion tube monitoring indicated that the annual average objective for NO_2 continued to exceed the objective at the Irish street location in Downpatrick, and that the intention was to install an automatic station at this site in June 2010 at relevant exposure.
Progress report (DDC, 2011)	This reported the continued monitoring of NO_2 and the conclusions from the new data from a realtime analyser installed in Market Street

Updating and Screening Assessment (DDC, 2012)	The 2012 Updating and Screening Assessment (USA) reported results from the monitoring of NO2 in Downpatrick and Newcastle. Results remained below the objective in 2011 and reported the intention to continue monitoring in 2012.
Progress report (DDC, 2013)	This reported the continued monitoring of NO_2 and the conclusions from the realtime data and diffusion tubes and the intention to continue monitoring at the NO2 automatic site in Market Street Dowmpatrick in 2013.

2 New Monitoring Data

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

NO_2 diffusion tubes sited at the junction of Church Street, Irish Street and Market Street, had shown levels of NO2 to be above the objective. These were replaced in June 2010 with an automatic station monitoring NO_2 real time data using Chemiluminescence technique. The site is positioned to give the worst case scenario at relevant exposure. Since monitoring commenced at this site results have increased slightly each year.

See Appendix A: Details of Quality Assurance and Quality Control

Figure 2.1 Map(s) of Automatic Monitoring Sites

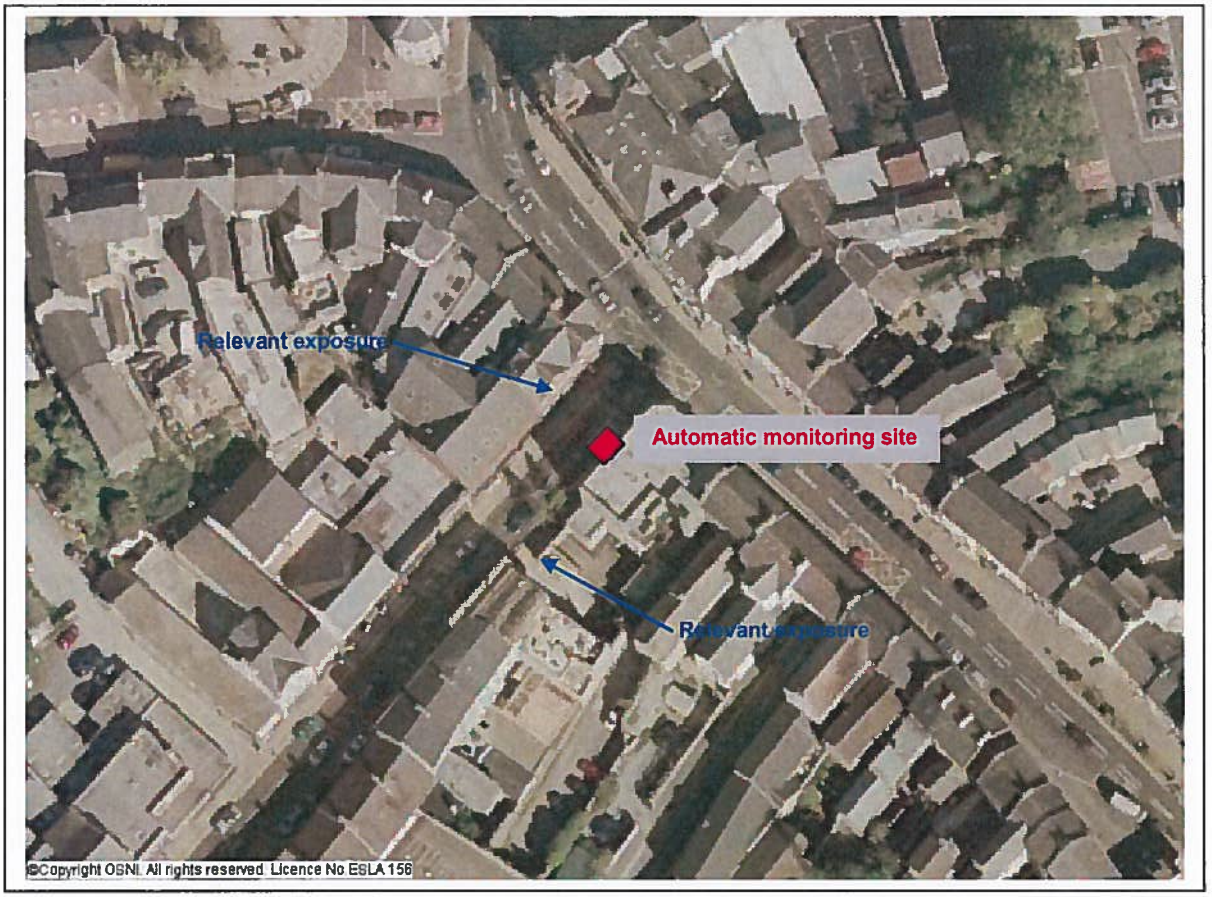


Table 2.1 Details of Automatic Monitoring Sites

Site Name	Site Type	OS Grid Ref		Pollutants Monitored	Monitoring Technique	In AQ MA ?	Relevant Exposure? (Y/N with distance (m) to relevant exposure)	Distance to kerb of nearest road (N/A if not applicable)	Does this location represent worst-case exposure?
Market Street Downpatrick	Roadside	348655	344596	NO_2	Chemiluminescence	NO	YES 10M	1.5M	YES

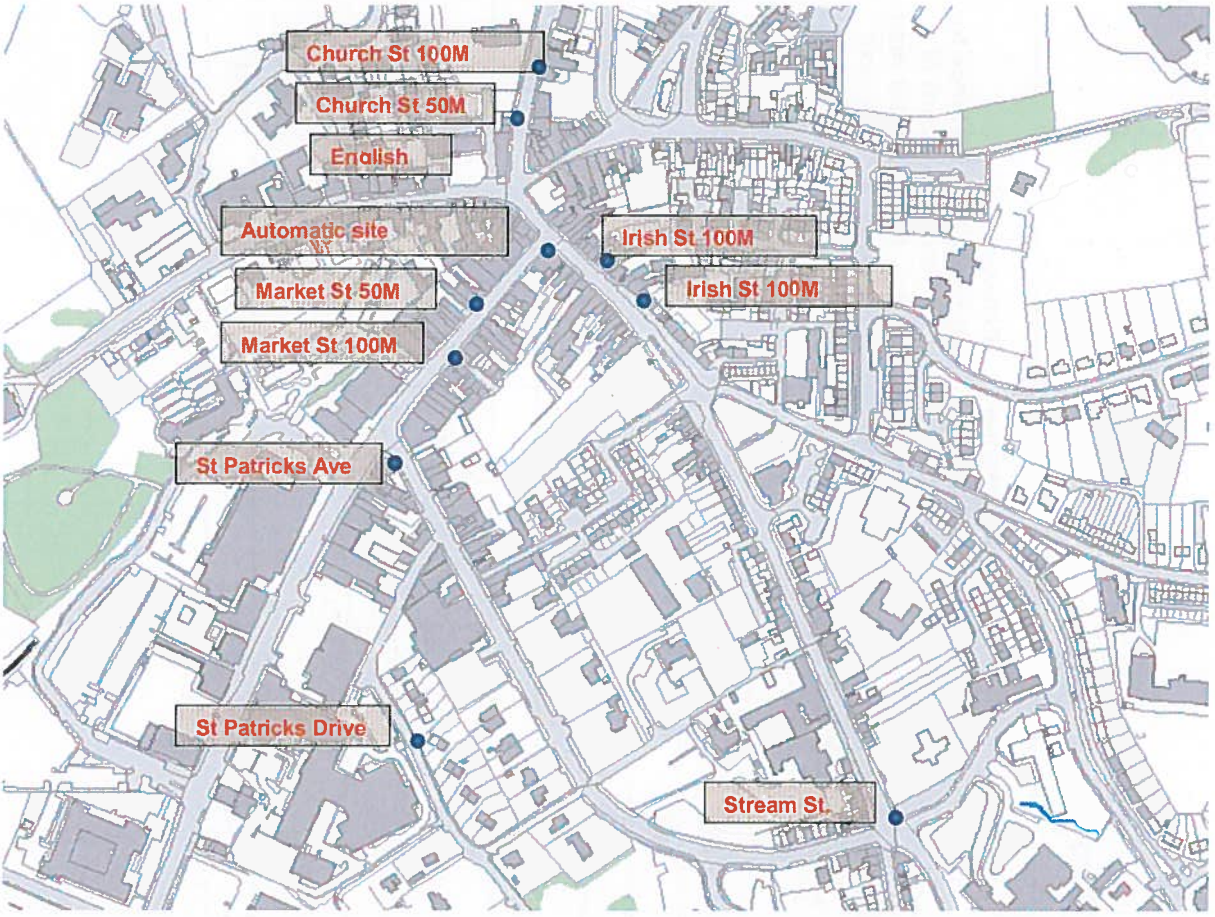
2.1.2 Non-Automatic Monitoring

Down District Council carried out monitoring of NO_2 by diffusion tubes at 11 sites until the end of 2012. Diffusion tube data cannot be compared directly with air quality limit values based on short-term averages; however, they can be used to help identify areas with high concentrations of NO_2, which require more detailed investigation. The aim of the NO_2 monitoring undertaken had been to measure pollutant concentrations at busy roads and junctions especially near residential areas. The tubes were sited in accordance with the technical guidance LAQM.TG(09)

Triplicate diffusion tubes were located at the Irish Street /Market Street / Church Street junction in Downpatrick for a number of years, the results from these exceeded the objective and therefore were removed in 2010 and an automatic site was installed in June 2010 to gain more accurate results at this location. Although relevant exposure is closest to the automatic site additional diffusion tubes were located at 50M and 100M intervals along the streets leading to this junction in October 2008 to gain further information.. The results at these sensitive locations in 2011 were below the objective and considerably lower than in previous years due to the more accurate local bias adjustment factor applied. In 2012 the Market Street 50M and Church Street 50M were the only locations with elevated levels, the sites 100M from the junction showed results considerably lower.

Monitoring with NO_2 diffusion tubes ceased at the end of 2012, data had been collected for a number of years and Market Street/Church Street continued to be the only area of concern. With the real time analyser installed in a perfect location at worst case scenario it was not deemed necessary to continue with diffusion tube monitoring as sufficient data has now been obtained.

Figure 2.2 Map(s) of Non-Automatic Monitoring Sites



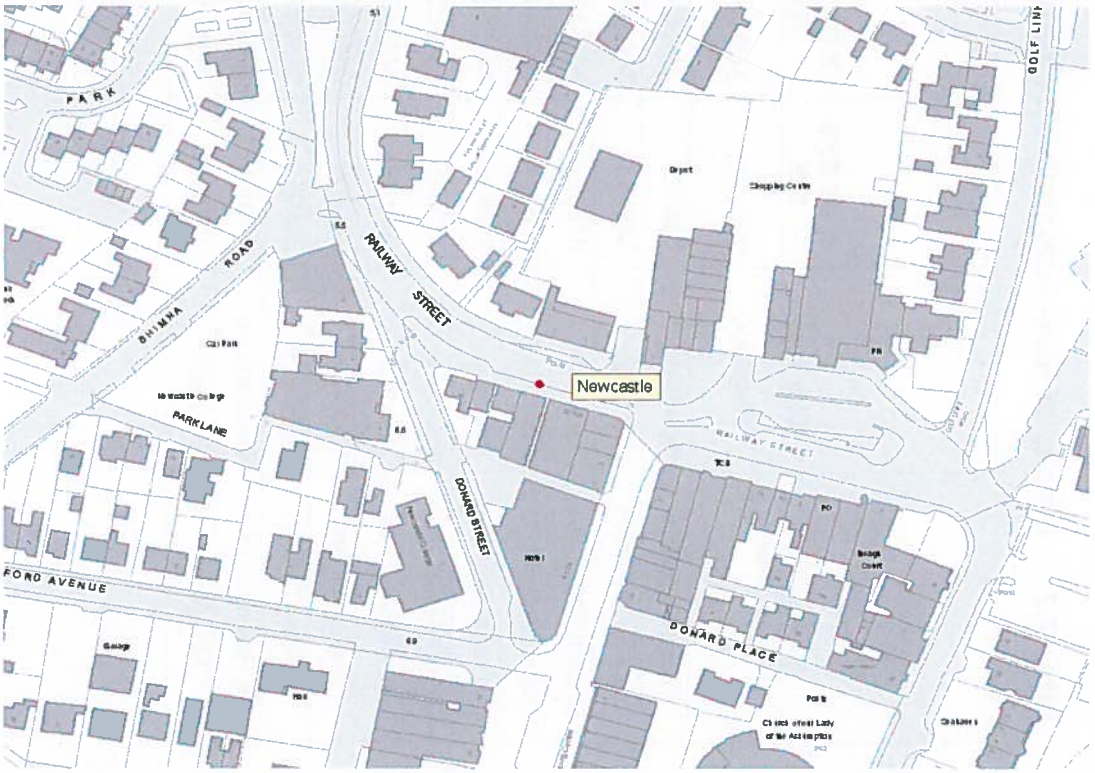


Table 2.2 Details of Non- Automatic Monitoring Sites

Site Name	Site Type	X OS Grid Ref	Y 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 *(N/A if not applicable)*	Does this location represent worst-case exposure?
Market Street Junction	Roadside	348655	344596	NO_2	N	Y	6M	1.5M	Y
Irish Street 50M	Roadside	348702	344609	NO_2	N	N	3M	1M	Y
Irish Street 100M	Roadside	348735	344566	NO_2	N	N	10M	1M	Y
Church Street 50M	Roadside	348422	344646	NO_2	N	N	12M	1M	Y
Church Street 100M	Roadside	348664	344744	NO_2	N	N	12M	1M	Y
Market Street 50M	Roadside	348686	344509	NO_2	N	N	10M	1M	Y
Market Street 100M	Roadside	348598	344531	NO_2	N	N	10M	1M	Y
St. Patricks Ave	Roadside	348542	344448	NO_2	N	N	20M	1M	Y
English Street	Roadside	348605	344664	NO_2	N	N	10M	6M	Y
Stream Street	Roadside	348915	344207	NO_2	N	N	10M	1M	Y
St Patricks Drive	Background	348605	344205	NO_2	N	N	10M	1M	N
Newcastle	Roadside	337818	331601	NO_2	N	N	15M	0.5M	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

2.2.1 Nitrogen Dioxide

In the following section results are presented for NO_2 at the automatic site and previous diffusion tube sites and compared with the objective. The Market Street and Church Street 50M sites were elevated in 2012 but the sites 100M from this junction show levels to be considerably lower.

Automatic Monitoring results

Table 2.3a presents the annual mean concentrations of NO_2 determined at the automatic site in 2013 from the hourly measurements. Results are very slightly raised each year.

Figure 2.3 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Automatic Monitoring Sites.

There has been a slight increase in levels each year at the automatic site.

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

Site ID	Site Type	Within AQMA?	Valid Data Capture for period of monitoring %[a]	Valid Data Capture 2011 % [b]	Annual Mean Concentration µg/m^3				
					2009	2010	2011	2012	2013
Market Street	Roadside	N	91.7	91.7		35.36(a)	36	38	40

[a] Only six months data was available in 2010 and therefore the annual mean has been annualised in accordance with the technical guidance.

Table 2.3b 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 %[a]	Valid Data Capture 2011 % [b]	Number of Exceedences of Hourly Mean (200 µg/m^3)				
					2009	2010	2011	2012	2013
Market Street	Roadside	N	91.7	91.7		0	0	0	1

Diffusion Tube Monitoring Data

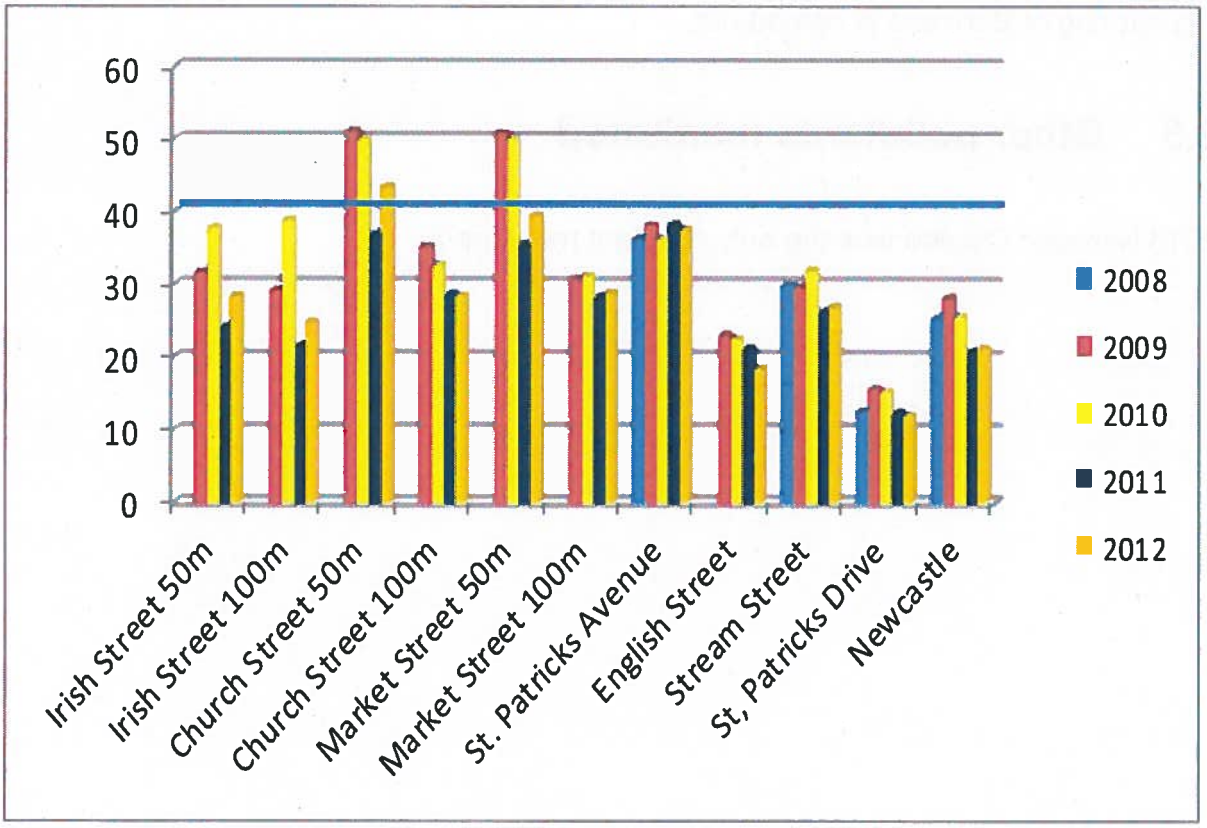
Diffusion tube monitoring ceased at the end of 2012.There had been 11 diffusion tube monitoring locations in Down District Council. Tubes were positioned in Market Street, Irish Street, English Street and Church Street all leading to the junction where the automatic site was positioned at relevant exposure. They were positioned 50 metres and 100 metres from this sensitive receptor since the end of 2008 to determine the levels of NO_2 further along these incoming roads. These tubes were not at relevant exposure (the closest being next to the automatic site),and as sufficient data has now been obtained to assist with any future action plans monitoring was ceased in 2013. Results of the NO_2 diffusion tube sites until 2012 are shown below in table 2.5
They were sited in accordance with the technical guidance.LAQM.TG(09)

Table 2.4 Results of Nitrogen Dioxide Diffusion Tubes

Site ID	Site Type	Within AQMA?	Annual Mean Concentration (µg/m^3) - Adjusted for Bias [a]				
			2008* (Bias Adjustment Factor =0.83)	2009* (Bias Adjustment Factor =0.81)	2010* (Bias Adjustment Factor =0.84)	2011 (Bias Adjustment Factor =0.72)	2012 (Bias Adjustment Factor =0.76)
Irish Street 50M	Roadside	N	N/A	32	38	24	29
Irish Street 100M	Roadside	N	N/A	29	39	22	25
Church Street 50M	Roadside	N	N/A	51	50	37	**43**
Church Street 100M	Roadside	N	N/A	35	33	29	29
Market Street 50M	Roadside	N	N/A	51	50	36	**40**
Market Street 100M	Roadside	N	N/A	31	31	28	29
St. Patricks Ave	Roadside	N	36	38	36	38	38
English Street	Roadside	N	N/A	23	23	21	18
Stream Street	Roadside	N	30	30	32	26	27
St Patricks Drive	Background	N	13	16	15	12	12
Newcastle	Roadside	N	25	28	26	21	21

Figure 2.4 Trends in Annual Mean Nitrogen Dioxide Concentration Measured at Diffusion Tube Monitoring Sites.

Levels had remained consistent at all sites, in 2011 there is a noticeable reduction this is due to a more accurate new local bias adjustment factor applied. A very slight increase in 2012 was more likely to be as a result of climatic conditions rather than changes in emissions. The sites 50M from the Church Street/ Market Street junction showed results similar to the realtime analyser and dropped considerably at 100M.



2.2.2 PM_{10}

Down District Council does not carry out monitoring for PM_{10} pollution at this time.

2.2.3 Sulphur Dioxide

Down District Council did not carry out any monitoring of SO2 in 2013

2.2.4 Benzene

No monitoring of Benzene is carried out.

2.2.5 Other pollutants monitored

In 2013 Nitrogen Dioxide was the only pollutant monitored

2.2.6 Summary of Compliance with AQS Objectives

Down District Council has examined the results from monitoring in the Council area. Concentrations are all below the objectives at relevant exposure; therefore there is no need to proceed to a Detailed Assessment.

3 New Local Developments

Down 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.

Down District Council confirms that all the following have been considered:

- **Road traffic sources**
- **Other transport sources**
- **Industrial sources**
- **Commercial and domestic sources**
- **New developments with fugitive or uncontrolled sources.**

4 Planning Applications

There have been no new planning applications approved or pending that may have an impact on air quality

5 Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

The 2013 monitored data for NO2 has been assessed and has indicated no exceedences of the national air quality objectives at relevant exposure.
There were no other exceedences identified

5.2 Conclusions relating to New Local Developments

Down District Council has found no new or significant new developments to have likely impacts on air quality.

5.3 Proposed Actions

This 2014 progress report for Down District Council has identified there is no need to proceed to a detailed assessment for any of the pollutants.
Down District Council will continue monitoring NO_2 in 2014 at the automatic site were levels remain close to the objective. This site is sited in accordance with the guidance in a prime location and at relevant exposure, however if the trend in slight increased levels Down District Council shall consider declaring the Market Street/Church Street junction and surrounding area an Air Quality Management Area.
District Council will submit an update and screening report in 2015.

6 References

TG (2003) Part IV of the Environment Act 1995. Local Air Quality Management: Technical Guidance LAQM.TG(03). Guidance prepared by the Department for Environment, Food and Rural Affairs and the Devolved Administrations, January 2003.

TG (2009) Part IV of the Environment Act 1995. Local Air Quality Management: Technical
Guidance LAQM.TG(09). Guidance prepared by the Department for Environment, Food and Rural Affairs and the Devolved Administrations, February 2009

Appendices

Appendix A: QA/QC Data

Appendix A: QA/QC Data of automatic sites

Down District Council commissioned AQDM (Air Quality Data Management) to provide the QA/QC of the automatic measurements of NO_2 their Market Street site. Local authority staff act as the local site operator and visit the site on a weekly basis carrying out any manual calibration or filter changes required. Audits of the site were carried out by NPL (National Physical Laboratory) on a six monthly basis. Supportingu were employed to service and maintain the analyser.

Produced by AQDM on behalf of Down

DOWNPATRICK ROADSIDE 2013

These data have been fully ratified by AQDM to LAQM TG(09) standards

Site Description

Outside the Ulster Bank on Market St close to the intersection with Irish St.

Air Quality Statistics

Pollutant	NO_2	NO	NO_X
Number Very High #	0	-	-
Number High #	0	-	-
Number Moderate #	1	-	-
Number Low #	8029	-	-
Maximum 15-minute mean	237 µg m^{-3}	750 µg m^{-3}	1383 µg m^{-3}
Maximum hourly mean	206 µg m^{-3}	888 µg m^{-3}	1534 µg m^{-3}
Maximum running 8-hour mean	136 µg m^{-3}	428 µg m^{-3}	772 µg m^{-3}
Maximum running 24-hour mean	94 µg m^{-3}	273 µg m^{-3}	495 µg m^{-3}
Maximum daily mean	89 µg m^{-3}	266 µg m^{-3}	484 µg m^{-3}
Average	40 µg m^{-3}	46 µg m^{-3}	109 µg m^{-3}
Data capture	91.7 %	91.7 %	91.7 %

Daily Air Quality Index (DAQI) as defined by COMEAP January 2012 and revised April 2013
Mass units for the gases are at 20'C and 1013mb
NO_X mass units are NO_X as NO_2 µg m^{-3}

Air Quality Exceedences

Pollutant	Air Quality Regulations (Northern Ireland) 2003	Max Conc	Number	Days	Allowed	Exceeded
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	40 µg m^{-3}	0	-	-	No
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	206 µg m^{-3}	1	1	18 hours	No