



# ***Carrickfergus Borough Council LAQM Progress Report 2014***

*Bureau Veritas*



*November 2014*



***Move Forward with Confidence***



## Document Control Sheet

|                |   |  |
|----------------|---|--|
| Issue/Revision | Issue 1   | Issue 2  |
| Remarks        | Draft   | Final  |
| Date           | September 2014  | November 2014  |
| Submitted to   | Claire Duddy  | Claire Duddy   |
| Prepared by    | Anna Czerska<br>(Assistant<br>Consultant)   | Anna Czerska<br>(Assistant<br>Consultant)  |
| Signature      | <i>A.C.</i>   | <i>A.C.</i>  |
| Approved by    | Jamie Clayton<br>(Senior Consultant)<br>– Project Manager                         | Jamie Clayton<br>(Senior Consultant)<br>– Project Manager                          |
| Signature      |  |  |
| Project number | 8427627   |  |
| File reference | 2953  |  |

### Disclaimer

This Report was completed by Bureau Veritas on the basis of a defined programme of work and terms and conditions agreed with the Client. Bureau Veritas' confirms that in preparing this Report it has exercised all reasonable skill and care taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

Bureau Veritas accepts no responsibility to any parties whatsoever, following the issue of the Report, for any matters arising outside the agreed scope of the works.

This Report is issued in confidence to the Client and Bureau Veritas has no responsibility to any third parties to whom this Report may be circulated, in part or in full, and any such parties rely on the contents of the report solely at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, the consultant asserts and retains all Copyright, and other Intellectual Property Rights, in and over the Report and its contents.

Any questions or matters arising from this Report should be addressed in the first instance to the report author.

|                                |   |
|--------------------------------|---|
| <b>Local Authority Officer</b> | Claire Duddy  |
| <b>Department</b>              | Environmental Services  |
| <b>Address</b>                 | Carrickfergus Museum & Civic Centre,<br>Antrim Street,<br>Carrickfergus,<br>Co. Antrim,<br>Northern Ireland<br>BT38 7DG |
| <b>Telephone</b>               | 028 9335 8000   |
| <b>e-mail</b>                  | claire.duddy@carrickfergus.org  |
|                                |   |
| <b>Report Reference</b>        | Annual Progress Report 2014   |
| <b>Date</b>                    | November 2014   |

## Executive Summary

Part III of the Environment (Northern Ireland) Order 2002 places a statutory duty on local authorities to review and assess the air quality within their area and take account of Government Guidance when undertaking such work. This Annual Progress Report is a requirement of the Fifth Round of Review and Assessment and is a requirement for all local authorities. The Report has been undertaken in accordance with the Technical Guidance LAQM.TG (09) and associated tools (2011 based).

This Annual Progress Report considers all new monitoring data and assesses the data against the Air Quality Strategy objectives. It also considers any changes that may have an impact on air quality.

Updated monitoring showed that there were no exceedences of the Air Quality Objectives at any of the monitoring locations within the Borough. The passive monitoring undertaken has shown a decrease from the 2012 concentrations.

Carrickfergus Borough Council have reviewed local developments in the Borough and have confirmed that there are none which are likely to impact upon air quality which have not previously be assessed. It has been noted that there are several proposed new roads as part of the Belfast Metropolitan Area Plan. These road schemes will be assessed in further detail in the next Updating and Screening Assessment.

Proposed actions arising from the 2014 Annual Progress Report are as follows:

- Continue NO<sub>2</sub> diffusion tube and continuous monitoring in the Borough to identify future changes in pollutant concentrations;
- Assess the air quality impact of the proposed road schemes in the next Updating and Screening Assessment; and
- Proceed to the Updating and Screening Assessment 2015.

# Table of Contents

|           |  |           |
|-----------|--|-----------|
| <b>1</b>  | <b>Introduction</b>  | <b>4</b>  |
| 1.1       | Description of Local Authority Area                          | 4         |
| 1.2       | Purpose of Progress Report                                   | 5         |
| 1.3       | Air Quality Objectives                                       | 5         |
| 1.4       | Summary of Previous Review and Assessments                   | 7         |
| <b>2</b>  | <b>New Monitoring Data</b>                                   | <b>11</b> |
| 2.1       | Summary of Monitoring Undertaken                             | 11        |
| 2.2       | Comparison of Monitoring Results with Air Quality Objectives | 18        |
| <b>3</b>  | <b>New Local Developments</b>                                | <b>23</b> |
| 3.1       | Road Traffic Sources   | 23        |
| 3.2       | Other Transport Sources                                      | 23        |
| 3.3       | Industrial Sources   | 23        |
| 3.4       | Commercial and Domestic Sources                              | 24        |
| 3.5       | New Developments with Fugitive or Uncontrolled Sources       | 24        |
| <b>4</b>  | <b>Local / Regional Air Quality Strategy</b>                 | <b>26</b> |
| <b>5</b>  | <b>Planning Applications</b>                                 | <b>27</b> |
| <b>6</b>  | <b>Air Quality Planning Policies</b>                         | <b>28</b> |
| <b>7</b>  | <b>Local Transport Plans and Strategies</b>                  | <b>29</b> |
| <b>8</b>  | <b>Climate Change Strategies</b>                             | <b>30</b> |
| <b>9</b>  | <b>Implementation of Action Plans</b>                        | <b>31</b> |
| <b>10</b> | <b>Conclusions and Proposed Actions</b>                      | <b>32</b> |
| 10.1      | Conclusions from New Monitoring Data                         | 32        |
| 10.2      | Conclusions relating to New Local Developments               | 32        |
| 10.3      | Proposed Actions   | 32        |
| <b>11</b> | <b>References</b>  | <b>33</b> |

**List of Tables**

|   |    |
|---|----|
| Table 1-1 Air Quality Objectives included in Regulations for the purpose of LAQM<br>in Northern Ireland | 6  |
| Table 1-2 Conclusions from 1st Stage of Air Quality Review and Assessment                               | 7  |
| Table 1-3 Summary of the outcomes from the previous rounds of review and assessments                    | 9  |
| Table 2-1 Details of Non- Automatic Monitoring Sites  | 16 |
| Table 2-2 Results of NO <sub>2</sub> Diffusion Tubes 2013   | 19 |
| Table 2-3 Results of NO <sub>2</sub> Diffusion Tubes (2009 to 2013)                                     | 20 |

**List of Figures**

|   |    |
|---|----|
| Figure 1-1 Carrickfergus Wards                                  | 4  |
| Figure 1-2 Carrickfergus AQMA                                   | 8  |
| Figure 1-3 Greenisland AQMA                                     | 8  |
| Figure 2-1 Map of Non-Automatic Monitoring Sites: Whole Borough | 12 |
| Figure 2-2 Map of Non-Automatic Monitoring Sites: Carrickfergus | 13 |
| Figure 2-3 Map of Non-Automatic Monitoring Sites: Greenisland   | 14 |
| Figure 2-4 Map of Non-Automatic Monitoring Sites: Whitehead     | 15 |

**Appendices**

|            |            |
|------------|------------|
| Appendix 1 | QA/QC Data |
|------------|------------|

# 1 Introduction

## 1.1 Description of Local Authority Area

The Borough of Carrickfergus is located on the Northern shore of Belfast Lough, stretching from Greenisland in the southwest to Whitehead in the east. The main settlements in the area are located along a low lying coastal strip. Further inland the ground rises to a height of 275 metres at Knockagh which forms part of the southernmost reaches of the Antrim Plateau. The Borough takes in a total area of 31.67 square miles and has a population of around 40,000.

One of the major air pollutant sources in the Borough is from road traffic, particularly along the A2 which is the main road to and from Belfast. The most significant industrial source in the area is AES Kilroot Power Station. A number of homes in the area continue to burn solid fuel although this number has declined over the years due to the arrival of Phoenix piped natural gas and subsequent Northern Ireland Housing Executive home improvement schemes.

There are currently no Air Quality Management Areas (AQMAs) in the Borough.

**Figure 1-1 Carrickfergus Wards**



## 1.2 Purpose of Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) 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 AQMA and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives.

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.

Progress Reports 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 Standards Regulations (Northern Ireland) 2010, 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,  $\text{mg}/\text{m}^3$  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 Northern Ireland**

| 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             |
|  | 3.25 $\mu\text{g}/\text{m}^3$   | 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 $\text{mg}/\text{m}^3$   | 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             |
| Particulate Matter (PM <sub>10</sub> ) (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

Monitoring of nitrogen dioxide (NO<sub>2</sub>) using diffusion tubes has been carried out in Carrickfergus since March 1997. Real time monitoring of sulphur dioxide (SO<sub>2</sub>) and PM<sub>10</sub> commenced in July 2002 at the Rosebrook Avenue site. The air quality monitoring site was however decommissioned in 2011 after results indicated that objectives for NO<sub>2</sub> and SO<sub>2</sub> were unlikely to be exceeded at this location.

The First Stage Air Quality Review and Assessment completed in February 2001 concluded that, NO<sub>2</sub> from roads and industrial sources, SO<sub>2</sub> from industrial and domestic sources and PM<sub>10</sub> from industrial and domestic sources, should be examined during the second stage review.

**Table 1-2 Conclusions from 1st Stage of Air Quality Review and Assessment**

| Pollutant        | Exceedence Road Sources | Exceedence Industrial Sources | Exceedence Domestic Sources | Progress to Second Stage Review | Progress to Third Stage Review | Progress to Fourth Stage Review |
|------------------|-------------------------|-------------------------------|-----------------------------|---------------------------------|--------------------------------|---------------------------------|
| Carbon Monoxide  | None                    | None                          | None                        | No                              | No                             | No                              |
| Benzene          | None                    | None                          | None                        | No                              | No                             | No                              |
| 1,3 Butadiene    | None                    | None                          | None                        | No                              | No                             | No                              |
| Lead             | None                    | None                          | None                        | No                              | No                             | No                              |
| Nitrogen Dioxide | Yes                     | Yes                           | None                        | Yes                             | No                             | No                              |
| Sulphur Dioxide  | None                    | Yes                           | Yes                         | Yes                             | Yes                            | No                              |
| PM <sub>10</sub> | Yes                     | None                          | Yes                         | Yes                             | Yes                            | Yes                             |

The Second Stage Assessment completed in February 2002 excluded SO<sub>2</sub> and PM<sub>10</sub> from industrial sources and NO<sub>2</sub> from industrial and road sources.

Third Stage Review and Assessment concentrated on the assessment of the remaining pollutants namely PM<sub>10</sub> from domestic sources and road sources and SO<sub>2</sub> from domestic sources. Modelling of these pollutants excluded PM<sub>10</sub> from road sources and SO<sub>2</sub> from

domestic sources, but predicted exceedances for PM<sub>10</sub> from domestic sources in both Carrickfergus town and Greenisland and resulted in the declaration of two AQMAs, as shown in Figures 1.2 and 1.3.

Figure 1-2 Carrickfergus AQMA

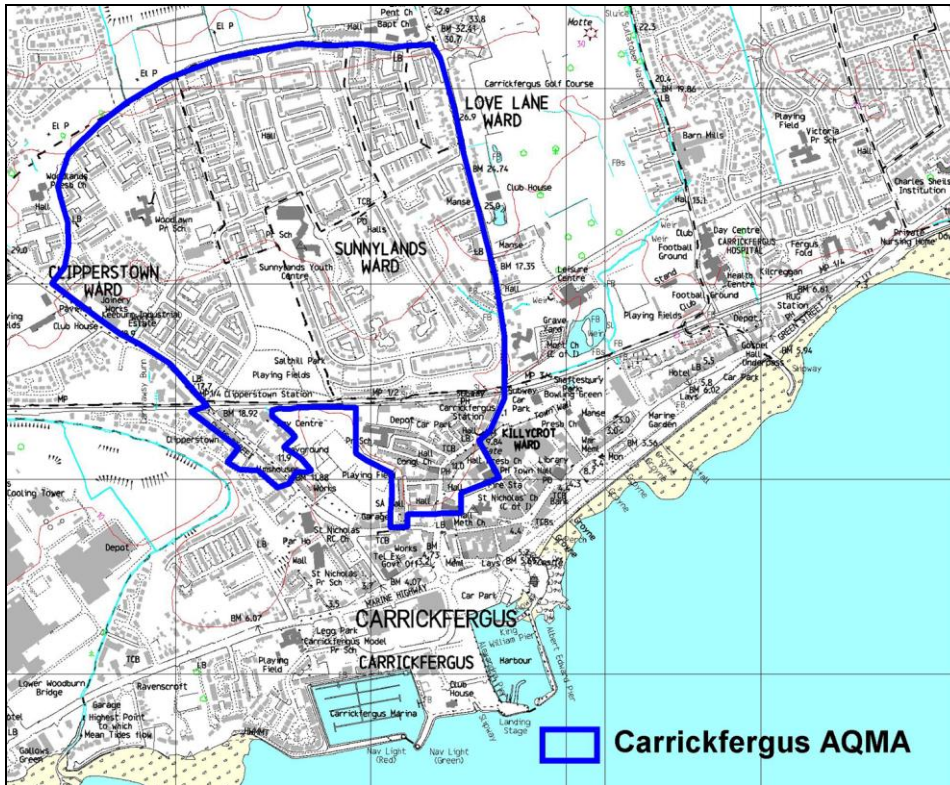
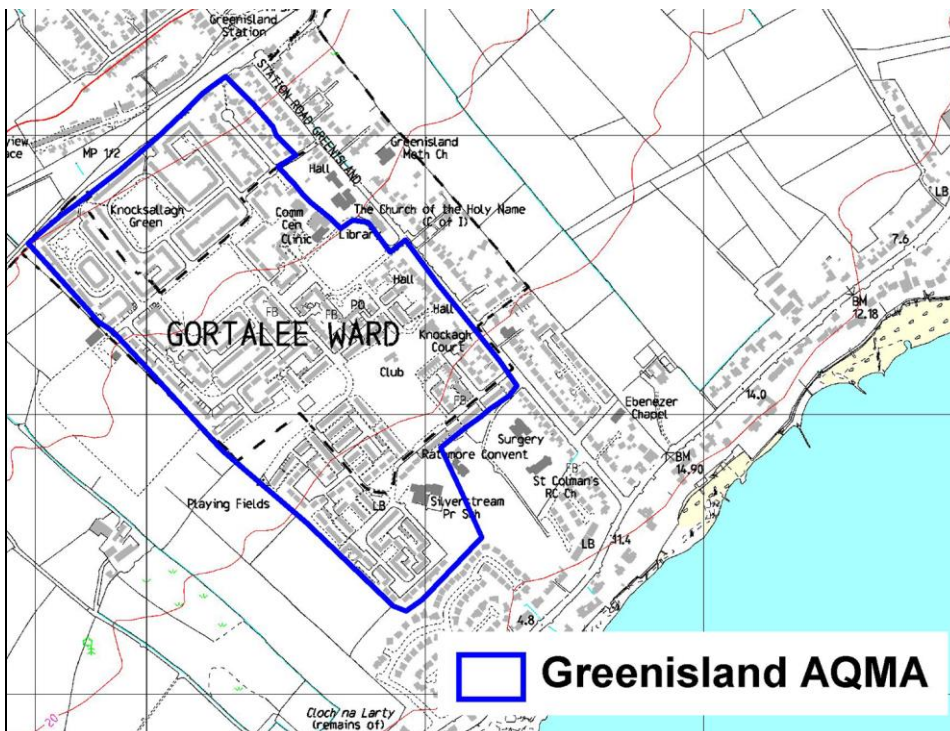


Figure 1-3 Greenisland AQMA



Fourth Stage Review and Assessment was commenced at the end of 2004 with an update of fuel use survey information within the AQMAs and was completed by the autumn of 2005.

The conclusions from the 'Air Quality Review and Assessment Stage 4 - Detailed Modelling for Domestic Fuel Combustion' indicated that PM<sub>10</sub> and SO<sub>2</sub> emissions arising from domestic fuel combustion in Carrickfergus Borough Council are not predicted to cause an exceedence of the PM<sub>10</sub> objectives at relevant receptors within the assessed areas. This has been confirmed by the monitoring data collected. Netcen who carried out the fourth stage modelling recommended,

*"Carrickfergus Borough Council may wish to consider revocation of the AQMA on the basis of these results"*

As a consequence of the Netcen recommendation and its subsequent appraisal and acceptance by U.W.E, Carrickfergus Borough Council has revoked the two AQMAs for PM<sub>10</sub> from domestic sources, in Carrickfergus town and Greenisland.

**Table 1-3 Summary of the outcomes from the previous rounds of review and assessments**

| Previous Assessment                                     | Date completed | Outcome   |
|---|----------------|---|
| 1 <sup>st</sup> Stage Air Quality Review and Assessment | Feb 2001       | NO <sub>2</sub> for roads and industrial sources, SO <sub>2</sub> for industrial and domestic sources and PM <sub>10</sub> for domestic and industrial sources to progress to 2 <sup>nd</sup> Stage of the Air Quality Review |
| 2 <sup>nd</sup> Stage Air Quality Review and Assessment | Feb 2002       | SO <sub>2</sub> and PM <sub>10</sub> from sources and NO <sub>2</sub> from industrial and road sources to be excluded from 3 <sup>rd</sup> Stage Review   |
| 3 <sup>rd</sup> Stage Review and Assessment             | June 2004      | Concentrated on PM <sub>10</sub> from domestic and road sources. Modelling predicted exceedences from PM <sub>10</sub> from domestic sources in Carrickfergus and Greenisland. Two AQMAs were declared.                       |
| 4 <sup>th</sup> Stage Review and Assessment             | July 2005      | PM <sub>10</sub> and SO <sub>2</sub> were not predicted to exceed the objectives. Both the AQMAs were revoked.  |
| LAQM Updating and Screening Assessment 2006             | Oct 2006       | No requirement to proceed to a Detailed Assessment for any of the 7 key pollutants.   |
| LAQM Progress Report 2007                               | Sept 2007      | No requirement to proceed to a Detailed Assessment for any of the 7 key pollutants.   |

|   |               |  |
|---|---------------|--|
| LAQM Updating and Screening Assessment 2009                       | April 2009    | Detailed Assessment required for NO <sub>2</sub> at Minorca Place, Carrick. PM <sub>10</sub> to be considered at the same location.  |
| LAQM Detailed Assessment for NO <sub>2</sub> and PM <sub>10</sub> | February 2011 | All AQS objectives for NO <sub>2</sub> and PM <sub>10</sub> likely to be met at relevant receptor locations. Additional NO <sub>2</sub> monitoring recommended at relevant receptor locations (building facades).  |
| LAQM Progress Report 2010   | February 2011 | No further detailed assessments required for any pollutants  |
| LAQM Progress Report 2011   | April 2011    | No further detailed assessments required for any pollutants  |
| Updating and Screening Assessment 2012                            | March 2013    | No further detailed assessments required for any pollutants.   |
| LAQM Progress Report 2013   | October 2013  | The report confirmed there were no exceedences of air quality objectives in the Borough for any of the prescribed pollutants. It was recommended to assess the air quality impact of new road schemes proposed as part of the Belfast Metropolitan Area Plan (2015) in the next Updating and Screening Assessment. |

## **2 New Monitoring Data**

### **2.1 Summary of Monitoring Undertaken**

#### **2.1.1 Automatic Monitoring Sites**

Carrickfergus Borough Council did not carry out automatic monitoring for any pollutants in 2013.

Decommissioning of the monitoring station at Rosebrook Avenue took place in 2011 after results indicated that objectives for NO<sub>2</sub> and SO<sub>2</sub> were unlikely to be exceeded at the site.

#### **2.1.2 Non-Automatic Monitoring Sites**

Carrickfergus Borough Council undertook non-automatic monitoring using diffusion tubes at twelve sites in 2013. This includes two sets of duplicates: Site 3/4 and Site 7/8. Monitoring locations remain unchanged from those reported in the previous year. The details of the NO<sub>2</sub> monitoring network are shown in Table 2-1 and Figures 2-1 through to 2-4.

The monitoring sites were chosen to represent roadside locations along the busiest roads in the Borough- namely the A2 Shore Road (AADT 27,020 vehicles per day) and B90 (15,000 vehicles per day) Upper Road -, with one Urban Background site located in Greenisland.

Monitoring sites are selected to provide data on locations that appear to be representative of likely residential exposure and, where possible, are close to the nearest receptor to the road of interest.

Figure 2-1 Map of Non-Automatic Monitoring Sites: Whole Borough

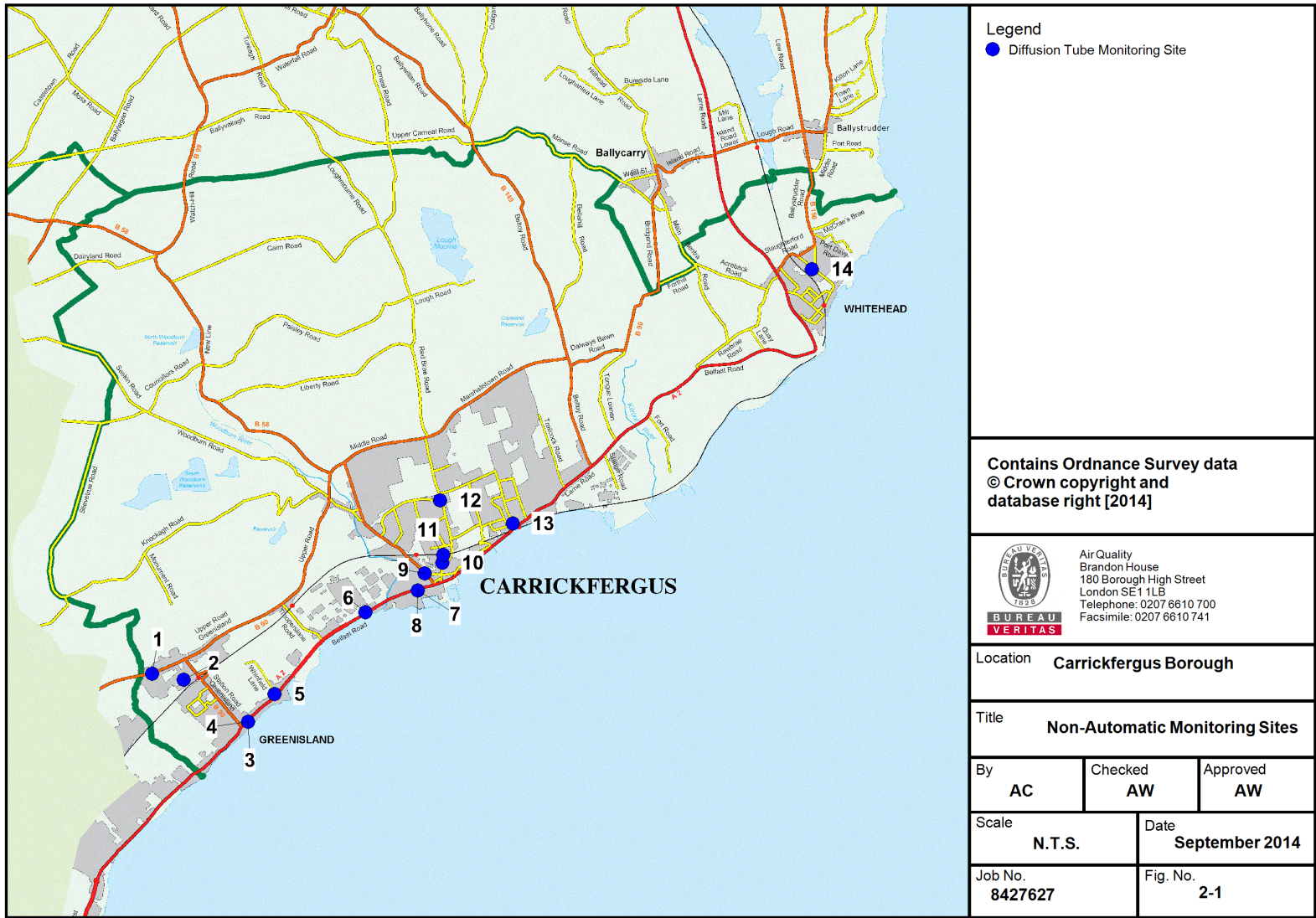
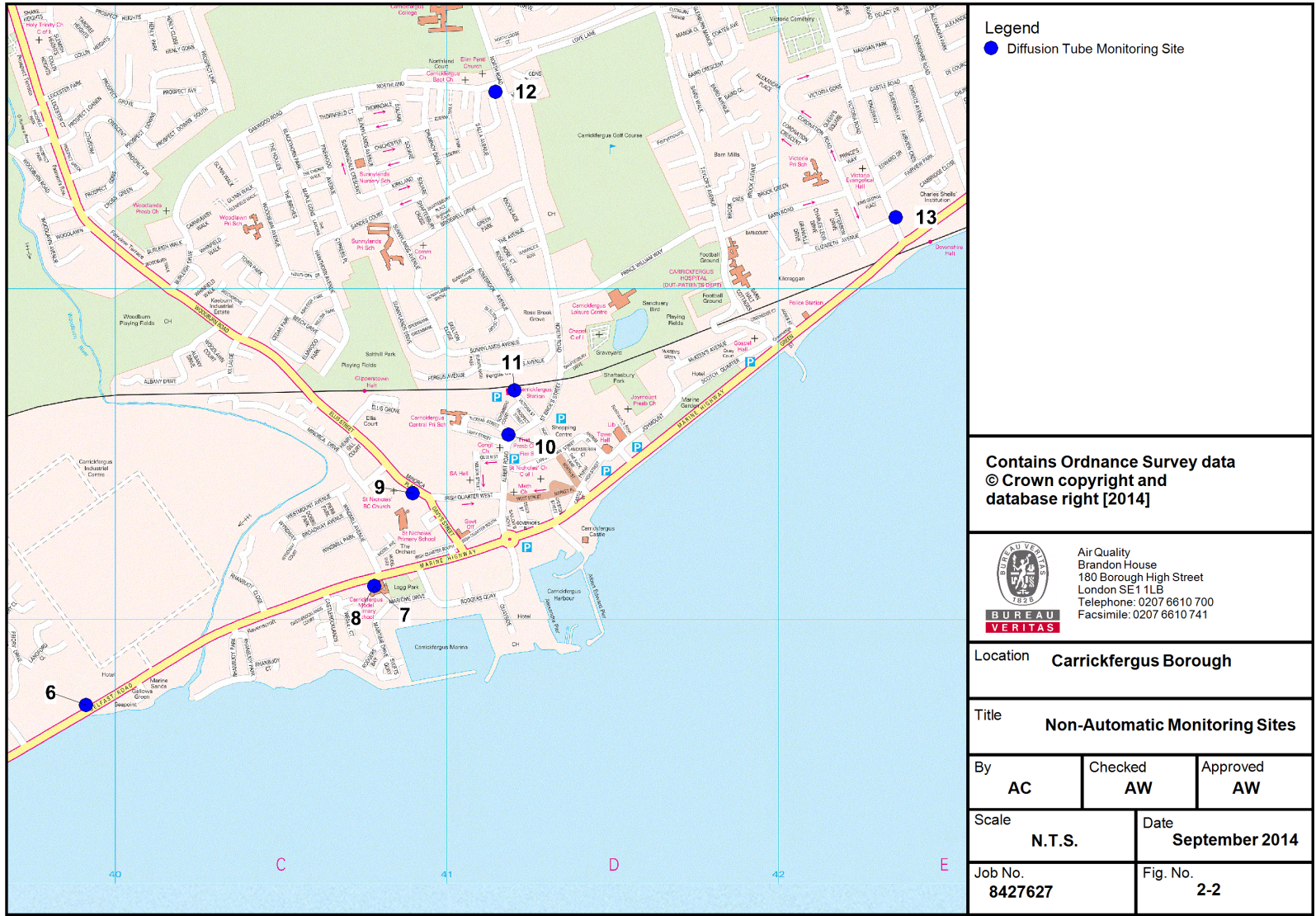


Figure 2-2 Map of Non-Automatic Monitoring Sites: Carrickfergus




|  |                      |                               |
|--|----------------------|-------------------------------|
| <p><b>Legend</b></p> <ul style="list-style-type: none"> <li>● Diffusion Tube Monitoring Site</li> </ul>  |                      |                               |
| <p>Contains Ordnance Survey data<br/>© Crown copyright and database right [2014]</p>   |                      |                               |
| <p> Air Quality<br/>Brandon House<br/>180 Borough High Street<br/>London SE1 1LB<br/>Telephone: 0207 6610 700<br/>Facsimile: 0207 6610 741</p> |                      |                               |
| <p>Location <b>Carrickfergus Borough</b></p>   |                      |                               |
| <p>Title <b>Non-Automatic Monitoring Sites</b></p>   |                      |                               |
| By<br><b>AC</b>  | Checked<br><b>AW</b> | Approved<br><b>AW</b>         |
| Scale<br><b>N.T.S.</b>   |                      | Date<br><b>September 2014</b> |
| Job No.<br><b>8427627</b>  |                      | Fig. No.<br><b>2-2</b>        |



Figure 2-3 Map of Non-Automatic Monitoring Sites: Greenisland

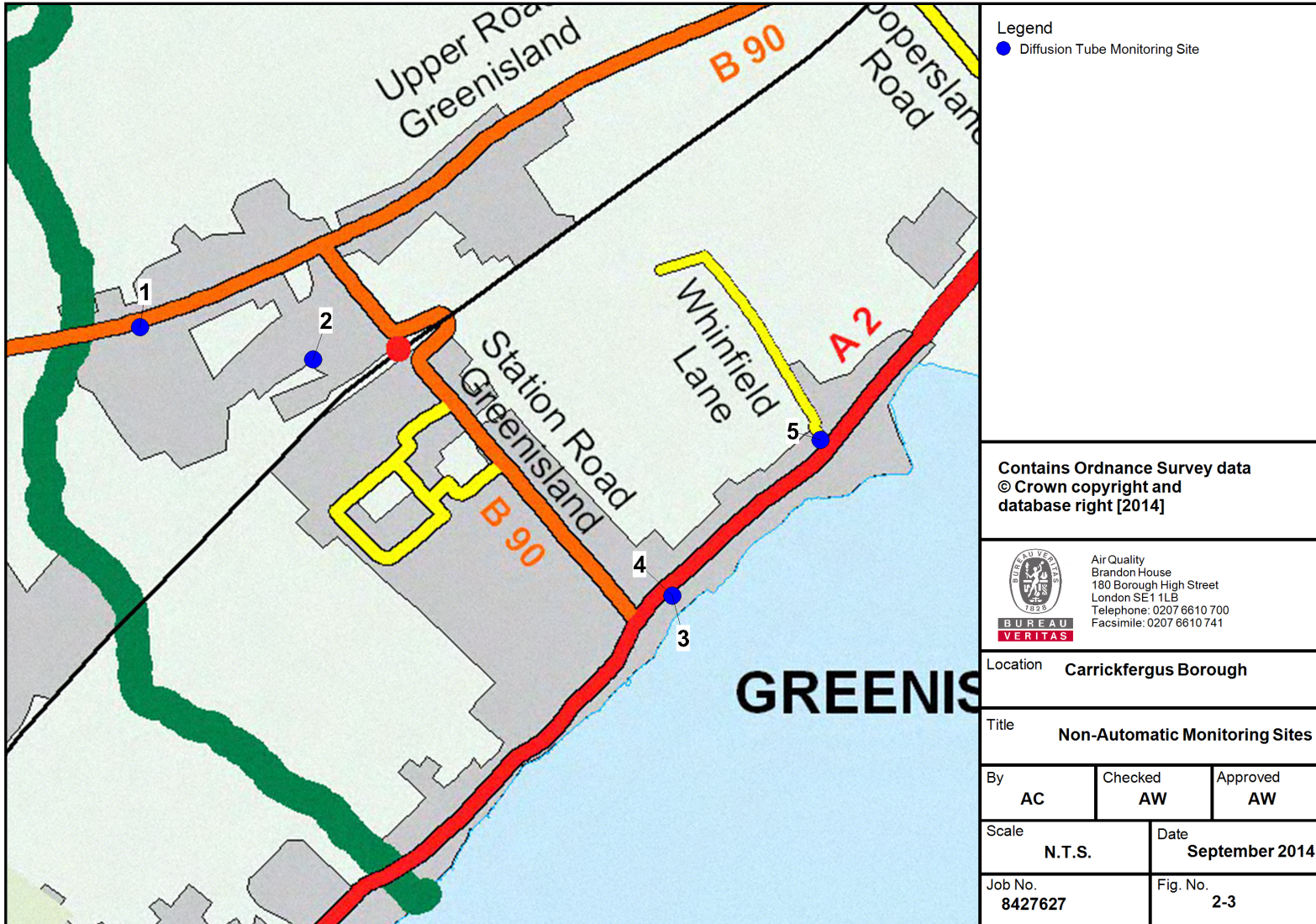
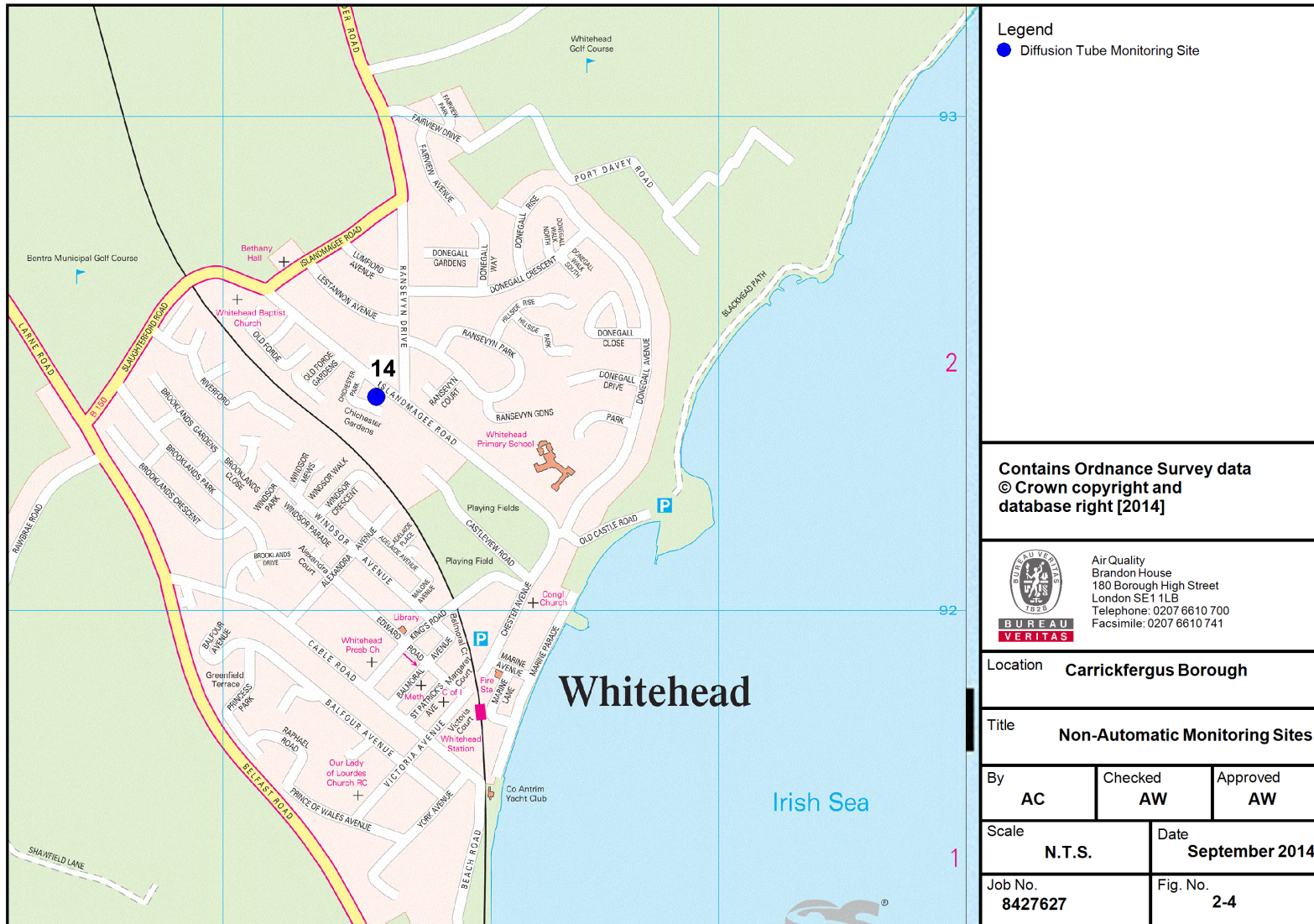


Figure 2-4 Map of Non-Automatic Monitoring Sites: Whitehead



Legend  
 ● Diffusion Tube Monitoring Site

Contains Ordnance Survey data  
 © Crown copyright and  
 database right [2014]

 Air Quality  
 Brandon House  
 180 Borough High Street  
 London SE11 1LB  
 Telephone: 0207 6610 700  
 Facsimile: 0207 6610 741

Location **Carrickfergus Borough**

Title **Non-Automatic Monitoring Sites**

|                 |                      |                       |
|-----------------|----------------------|-----------------------|
| By<br><b>AC</b> | Checked<br><b>AW</b> | Approved<br><b>AW</b> |
|-----------------|----------------------|-----------------------|

|                        |                               |
|------------------------|-------------------------------|
| Scale<br><b>N.T.S.</b> | Date<br><b>September 2014</b> |
|------------------------|-------------------------------|

|                           |                        |
|---------------------------|------------------------|
| Job No.<br><b>8427627</b> | Fig. No.<br><b>2-4</b> |
|---------------------------|------------------------|

Table 2-1 Details of Non- Automatic Monitoring Sites

| Site ID  | Site Name / Location                                  | Site Type        | OS Grid Ref (X, Y) |        | In AQMA? | Triplicate or Co-located Tube? (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (m) (N/A if not applicable) | Worst-case Location? |
|----------|---|------------------|--------------------|--------|----------|--------------------------------------|---|--|----------------------|
| Site 1   | 27 Upper Road, Greenisland                            | Roadside         | 336386             | 385717 | N        | N                                    | Y (1m)  | 1m   | Y                    |
| Site 2   | 32 Mullaghmore Park, Greenisland                      | Urban Background | 336901             | 385621 | N        | N                                    | Y (30m)   | 3m   | N                    |
| Site 3/4 | 59 Shore Road, Greenisland                            | Roadside         | 337969             | 384916 | N        | Duplicate                            | Y (1m)  | 1m   | Y                    |
| Site 5   | 186 Shore Road, Greenisland                           | Roadside         | 338411             | 385380 | N        | N                                    | Y (1m)  | 1m   | Y                    |
| Site 6   | 93 Belfast Road, Carrickfergus                        | Roadside         | 339911             | 386741 | N        | N                                    | Y (1m)  | 1m   | Y                    |
| Site 7/8 | Model PS Belfast Road, Carrickfergus                  | Roadside         | 340781             | 387100 | N        | Duplicate                            | Y (1m)  | 1m   | Y                    |
| Site 9   | Lamp Post Minorca Place/Tesco junction, Carrickfergus | Roadside         | 340897             | 387381 | N        | N                                    | Y (1m)  | 1m   | Y                    |
| Site 10  | 42 Albert Road, Carrickfergus                         | Roadside         | 341186             | 387558 | N        | N                                    | Y (1m)  | 1m   | Y                    |
| Site 11  | Railway Station, Fergus Avenue, Carrickfergus         | Roadside         | 341204             | 387692 | N        | N                                    | Y (15m)   | 15m  | Y                    |

| Site ID | Site Name / Location                             | Site Type | OS Grid Ref (X, Y) |        | In AQMA? | Triplicate or Co-located Tube? (Y/N) | Relevant Exposure? (Y/N with distance (m) to relevant exposure) | Distance to kerb of nearest road (m) (N/A if not applicable) | Worst-case Location? |
|---------|--|-----------|--------------------|--------|----------|--------------------------------------|---|--|----------------------|
| Site 12 | College North Road, Carrickfergus                | Roadside  | 341147             | 388596 | N        | N                                    | Y (1m)  | 1m   | Y                    |
| Site 13 | Victoria Road/Larne Road junction, Carrickfergus | Roadside  | 342354             | 388216 | N        | N                                    | Y (1m)  | 1m   | Y                    |
| Site 14 | Islandmagee Road, Whitehead                      | Roadside  | 347309             | 392433 | N        | N                                    | Y (1m)  | 2m   | Y                    |

## 2.2 Comparison of Monitoring Results with Air Quality Objectives

### 2.2.1 Nitrogen Dioxide (NO<sub>2</sub>)

There are two Air Quality Objectives for nitrogen dioxide, namely:

- the annual mean of 40µg/m<sup>3</sup>, and
- the 1-hour mean of 200µg/m<sup>3</sup> not to be exceeded more than 18 times a year.

#### Diffusion Tube Monitoring Data

The nitrogen dioxide diffusion tube data are summarised in Table 2-2 and Table 2-3. The full dataset (monthly mean values) are included in Appendix A.

Results for year 2013 have been bias adjusted using the national bias adjustment factor of 0.95. Data was not available for all sites in 2013 during the month of October. Despite this, data capture was above 75% at all sites except Site 1 (27 Upper Road, Greenisland). The results from Site 1 have therefore been annualised. Full details of the annualisation, bias adjustment and QA/QC procedure are provided in Appendix A.

There were no locations in Carrickfergus Borough Council where the NO<sub>2</sub> annual mean Air Quality Objective of 40µg/m<sup>3</sup> was exceeded during 2013.

Figure 2.5 show the trend in NO<sub>2</sub> concentration for the sites located in Carrickfergus Borough Council. There are no clear trends evident at the monitoring sites over 2009-2013. There has been an increase in annual mean concentration seen across the majority of the monitoring sites in 2012, followed by a decrease in 2013. There are no monitoring sites within the Borough where the annual mean objective was exceeded.

Table 2-2 Results of NO<sub>2</sub> Diffusion Tubes 2013

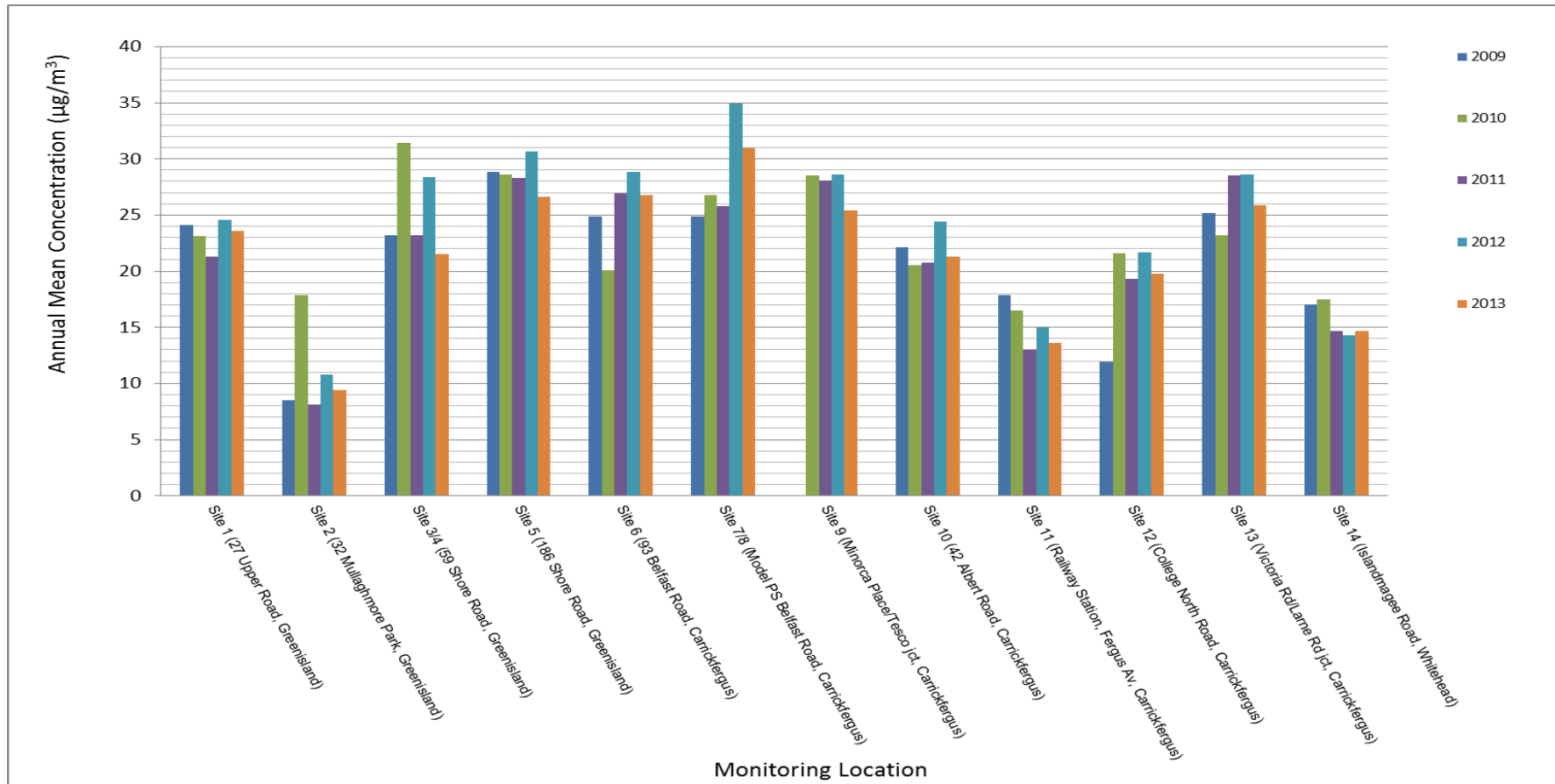
| Site ID  | Site Name/ Location                                   | Site Type        | Within AQMA? | Triplicate or Co-located Tube | Full Calendar Year Data Capture 2013 (Number of Months) | 2013 Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) - Bias Adjustment Factor = 0.95 |
|----------|---|------------------|--------------|-------------------------------|---|---|
| Site 1   | 27 Upper Road, Greenisland                            | Roadside         | N            | N                             | 8   | 23.6 <sup>a</sup>   |
| Site 2   | 32 Mullaghmore Park, Greenisland                      | Urban Background | N            | N                             | 11  | 9.4   |
| Site 3/4 | 59 Shore Road, Greenisland                            | Roadside         | N            | Duplicate                     | 11  | 21.5  |
| Site 5   | 186 Shore Road, Greenisland                           | Roadside         | N            | N                             | 10  | 26.6  |
| Site 6   | 93 Belfast Road, Carrickfergus                        | Roadside         | N            | N                             | 10  | 26.8  |
| Site 7/8 | Model PS Belfast Road, Carrickfergus                  | Roadside         | N            | Duplicate                     | 11  | 31.0  |
| Site 9   | Lamp Post Minorca Place/Tesco junction, Carrickfergus | Roadside         | N            | N                             | 10  | 25.4  |
| Site 10  | 42 Albert Road, Carrickfergus                         | Roadside         | N            | N                             | 11  | 21.3  |
| Site 11  | Railway Station, Fergus Avenue, Carrickfergus         | Roadside         | N            | N                             | 11  | 13.6  |
| Site 12  | College North Road, Carrickfergus                     | Roadside         | N            | N                             | 11  | 19.8  |
| Site 13  | Victoria Road/Larne Road junction, Carrickfergus      | Roadside         | N            | N                             | 11  | 25.9  |
| Site 14  | Islandmagee Road, Whitehead                           | Roadside         | N            | N                             | 11  | 14.7  |

<sup>a</sup> Results were annualised in accordance with the methodology laid out in TG(09) Box 3.2.

Table 2-3 Results of NO<sub>2</sub> Diffusion Tubes (2009 to 2013)

| Site ID  | Site Name/ Location                                   | Site Type        | Within AQMA? | Annual Mean Concentration (µg/m <sup>3</sup> ) - Adjusted for Bias |                                      |                                      |                                      |                                      |
|----------|---|------------------|--------------|--|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|          |   |                  |              | 2009 (Bias Adjustment Factor = 0.83)                               | 2010 (Bias Adjustment Factor = 0.83) | 2011 (Bias Adjustment Factor = 0.90) | 2012 (Bias Adjustment Factor = 0.97) | 2013 (Bias Adjustment Factor = 0.95) |
| Site 1   | 27 Upper Road, Greenisland                            | Roadside         | N            | 24.1   | 23.1                                 | 21.3                                 | 24.6                                 | 23.6                                 |
| Site 2   | 32 Mullaghmore Park, Greenisland                      | Urban Background | N            | 8.5  | 17.9                                 | 8.1                                  | 10.8                                 | 9.4                                  |
| Site 3/4 | 59 Shore Road, Greenisland                            | Roadside         | N            | 23.2   | 31.4                                 | 23.2                                 | 28.4                                 | 21.5                                 |
| Site 5   | 186 Shore Road, Greenisland                           | Roadside         | N            | 28.8   | 28.6                                 | 28.3                                 | 30.7                                 | 26.6                                 |
| Site 6   | 93 Belfast Road, Carrickfergus                        | Roadside         | N            | 24.9   | 20.1                                 | 26.9                                 | 28.8                                 | 26.8                                 |
| Site 7/8 | Model PS Belfast Road, Carrickfergus                  | Roadside         | N            | 24.9   | 26.8                                 | 25.8                                 | 34.9                                 | 31.0                                 |
| Site 9   | Lamp Post Minorca Place/Tesco junction, Carrickfergus | Roadside         | N            | -  | 28.5                                 | 28.1                                 | 28.6                                 | 25.4                                 |
| Site 10  | 42 Albert Road, Carrickfergus                         | Roadside         | N            | 22.1   | 20.5                                 | 20.8                                 | 24.4                                 | 21.3                                 |
| Site 11  | Railway Station, Fergus Avenue, Carrickfergus         | Roadside         | N            | 17.9   | 16.5                                 | 13.0                                 | 15.0                                 | 13.6                                 |
| Site 12  | College North Road, Carrickfergus                     | Roadside         | N            | 11.9   | 21.6                                 | 19.3                                 | 21.7                                 | 19.8                                 |
| Site 13  | Victoria Road/Larne Road junction, Carrickfergus      | Roadside         | N            | 25.2   | 23.2                                 | 28.5                                 | 28.6                                 | 25.9                                 |
| Site 14  | Islandmagee Road, Whitehead                           | Roadside         | N            | 17.0   | 17.5                                 | 14.7                                 | 14.3                                 | 14.7                                 |

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



The above figure shows the annual mean NO<sub>2</sub> concentrations at the diffusion tube locations from 2009 through to 2013. There has been an increase in annual mean concentration seen across the majority of the monitoring sites in 2012, followed by a decrease in 2013. There are no monitoring sites within the Borough where the annual mean objective was exceeded.



**2.2.2 PM<sub>10</sub>**

Carrickfergus Borough Council did not undertake any monitoring of PM<sub>10</sub> in 2013.

**2.2.1 Sulphur Dioxide**

Carrickfergus Borough Council did not undertake any monitoring of SO<sub>2</sub> in 2013.

**2.2.1 Benzene**

Carrickfergus Borough Council did not undertake any monitoring of benzene in 2013.

**2.2.2 Summary of Compliance with AQS Objectives**

The updated monitoring for 2013 shows that the AQS Objectives continue to be met at all monitoring locations across the Borough.

Carrickfergus Borough Council has examined the results from monitoring in the Borough. Concentrations are all below the objectives, therefore there is no need to proceed to a Detailed Assessment.

## **3 New Local Developments**

### **3.1 Road Traffic Sources**

LAQM requires local authorities to consider the following:

- Narrow congested streets with residential properties close to the kerb
- Busy streets where people may spend one hour or more close to traffic
- Roads with a high flow of buses and/or HGVs
- Junctions
- New roads constructed since the last Updating and Screening Assessment
- Roads with significantly changed traffic flows
- Bus or coach stations

Carrickfergus Borough Council confirms that there are no new/newly identified road traffic sources in the Borough.

### **3.2 Other Transport Sources**

LAQM requires local authorities to consider the following:

- Airports
- Locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with relevant exposure within 15m
- Locations with a large number of movements of diesel locomotives and long term relevant exposure within 30m
- Shipping ports

Carrickfergus Borough Council confirms that there are no new/newly identified non-road transport sources in the Borough.

### **3.3 Industrial Sources**

LAQM requires local authorities to consider the following:

- Industrial Installations: new or proposed
- Industrial installations: existing where emissions have increased substantially or relevant exposure introduced
- Major fuel storage depots

- Petrol stations
- Poultry farms

Carrickfergus Borough Council confirms that there are no new/newly identified industrial sources in the Borough

### **3.4 Commercial and Domestic Sources**

LAQM requires local authorities to consider the following:

- Biomass combustion plant – individual installations
- Areas where the combined impact of several biomass combustion sources may be relevant
- Areas where domestic solid fuel burning may be relevant

Carrickfergus Borough Council confirms that there are no new/newly identified commercial or domestic sources in the Borough.

### **3.5 New Developments with Fugitive or Uncontrolled Sources**

LAQM requires local authorities to consider the following:

- Landfill sites
- Quarries
- Unmade haulage roads on industrial sites
- Waste transfer stations
- Any other potential sources of fugitive particulate emissions

Carrickfergus Borough Council confirms that there are no new/newly identified fugitive or uncontrolled sources in the Borough.

Carrickfergus Borough 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.

Carrickfergus Borough 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 Local / Regional Air Quality Strategy**

Carrickfergus Borough Council does not have a specific local or regional air quality strategy. Regarding air pollution, Carrickfergus Borough Council acts in accordance with the Environment (Northern Ireland) Order 2002.

## 5 Planning Applications

The Belfast Metropolitan Area Plan 2015 contains a proposal for the widening of the A2 Shore Road (Marine Highway). The road is currently a four-lane highway, except for the section between the University of Ulster at Jordanstown and Island Park. The Belfast Metropolitan Transport Plan proposed that this section be widened to four lanes.

The plan also includes proposals for three road schemes in Carrickfergus:

- Carrickfergus Spine Road;
- Victoria Road, and
- Sloefield Road.

These roads will be required to support development proposals within Carrickfergus.

The A2 road widening scheme is likely to have greatest impact on air quality, works are however, not due to be completed until 2015.

Further information on these new roads will be presented in the next Updating and Screening Assessment.

## **6 Air Quality Planning Policies**

Carrickfergus Borough Council's planning policies are defined in the Belfast Metropolitan Area Plan 2015. Part 4 Volume 4 focus on planning policies related to Carrickfergus. Elements of the plan will are likely to have a positive impact on air quality although it is not specifically stated as being for the purpose of Air Quality improvement. For example, in the town centre of Carrickfergus it is planned to increase pedestrian priority areas, and expand the Park and Ride at Carrickfergus Railway station to reduce the numbers of cars in the town centre will improve Air Quality.

## 7 Local Transport Plans and Strategies

Carrickfergus does not currently have a Local Transport Plan in place. Local transport has been integrated into the afore-mentioned Belfast Metropolitan Area Plan 2015. These include the following:

- The Plan identifies an area south of Trooperslane settlement as a potential location for a Park and Ride site due to its close proximity to the railway station. It is anticipated integration with the rail network will provide a further public transport option;
- Improvement of up to 50% of rail services between Carrickfergus and Belfast;
- Introduction of an Intelligent Transport System (ITS) solutions including variable message signs in conjunction with parking provision;
- Route management system along the A2;
- Development of an integrated network of Quality Walking Routes and cycle routes, including improved links to the bus and rail station; and
- Improvements to the local bus routes and bus priority measures at key junctions.



## 8 Climate Change Strategies

Carrickfergus does not currently have a climate change strategy. The Council has developed a Sustainable Development Audit and Action Plan 'Living as if we intend to stay here' (2010) which includes air quality aims. The main aim is to '*enhance air quality*' (in the borough). Air quality is also mentioned with respect to transport stating that '*consideration could be given how energy used for staff travel can be decreased*', as improvement in air quality is expected to arise from this initiative.

## **9 Implementation of Action Plans**

The two previously declared AQMAs in Carrickfergus have been revoked; therefore no action plans are required.

## **10 Conclusions and Proposed Actions**

### **10.1 Conclusions from New Monitoring Data**

The review of 2013 monitoring data found all monitoring locations had concentrations that remained within the AQS Objective levels. The diffusion tube sites showed good data capture for 2013, with annualisation required for one site only. The annual mean concentration at most sites has shown a decrease from the 2012 data.

### **10.2 Conclusions relating to New Local Developments**

Carrickfergus Borough Council have reviewed new local developments and have found none that are likely to impact upon air quality which have not previously been assessed.

The new road schemes proposed as part of the Belfast Metropolitan Area Plan (2015) will be assessed in the next Updating and Screening Assessment.

### **10.3 Proposed Actions**

Proposed actions arising from the 2014 Annual Progress Report are as follows:

- Continue NO<sub>2</sub> diffusion tube in the Borough to identify future changes in pollutant concentrations;
- Assess the air quality impact of the proposed road schemes in the next Updating and Screening Assessment; and
- Proceed to the Updating and Screening Assessment 2015.

## 11 References

- Local Air Quality Management Technical Guidance LAQM.TG(09). February 2009. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland
- Carrickfergus Borough Council 2012 Updating and Screening Assessment
- Carrickfergus Borough Council 2013 Annual Progress Report
- DOE Northern Ireland Planning Portal – Belfast Metropolitan Area Plan (2015) Borough Proposals: Carrickfergus Transportation

# Appendices

Appendix A: Quality Assurance / Quality Control (QA/QC) Data

## Appendix A: QA:QC Data

### Diffusion Tube Bias Adjustment Factors

The diffusion tubes are supplied and analysed by Gradko utilising the 20% triethanolamine (TEA) in water preparation method. A bias adjustment of 0.95 for the year 2013 (based on 35 studies) has been derived from the national bias adjustment calculator<sup>1</sup>.

For previous data, years 2009 to 2012, the bias adjustment factors have been taken from the Council's previous LAQM annual reports. The factors used were 0.83 (2009), 0.83 (2010), 0.90 (2011) and 0.97 (2012).

### Discussion of Choice of Factor to Use

As the Council did not carry out automatic monitoring in 2013, the national bias adjustment factor was used to adjust the diffusion tube data.

### Short to Long Term Adjustment – Diffusion Tubes

Annualisation was required for one diffusion tube monitoring site only: Site 1 (27 Upper Road, Greenisland); this is shown in the table below.

| Diffusion Tube Site | Derry (Brooke Park) New Town Annualisation Factor | Belfast Centre Annualisation Factor | Average Annualisation Factor | Bias Unadjusted Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) | Bias Adjusted Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) | Bias Adjusted & Annualised Annual Mean Concentration ( $\mu\text{g}/\text{m}^3$ ) |
|---------------------|---|-------------------------------------|------------------------------|--|--|---|
| Site 1              | 1.025   | 1.003                               | 1.014                        | 24.5   | 23.3   | 23.6  |

### QA/QC of Diffusion Tube Monitoring

Gradko International Ltd is a UKAS accredited laboratory and participates in the Workplace Analysis Scheme for Proficiency (WASP) for NO<sub>2</sub> diffusion tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO<sub>2</sub> concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. In the latest available WASP results, rounds 120 through to 123 (January to December 2013) Gradko International have scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of  $< \pm 2$ . Based on 35 studies, 94% of all local Authority co-location studies in 2013 were rated as 'good' (tubes are considered to have "good"

<sup>1</sup> National Diffusion Tube Bias Adjustment Factor Spreadsheet, version 06/14 published in March 2014.

precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%).

Monthly NO<sub>2</sub> Concentrations – Diffusion Tube Sites (2013)

| Site ID | NO <sub>2</sub> Concentrations µg/m <sup>3</sup> |      |      |      |      |      |      |      |      |     |      |      | COUNT | AVERAGE |
|---------|--|------|------|------|------|------|------|------|------|-----|------|------|-------|---------|
|         | Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct | Nov  | Dec  |       |         |
| 1       | 30.8   | 28.6 |      | 22.9 | 17.4 | 22.2 |      | 21.6 | 21.5 |     | 30.8 |      | 8     | 24.5    |
| 2       | 17.9   | 11.7 | 12.3 | 10.0 | 5.5  | 7.9  | 7.2  | 7.3  | 7.4  |     | 11.0 | 10.8 | 11    | 9.9     |
| 3       | 34.0   | 29.3 | 24.9 | 20.5 | 19.3 | 19.0 | 18.3 | 20.2 | 21.0 |     | 32.2 | 23.1 | 11    | 23.8    |
| 4       | 32.7   | 29.1 | 22.4 | 13.1 | 14.4 | 19.3 | 18.0 | 20.1 | 19.7 |     | 31.7 | 16.0 | 11    | 21.5    |
| 5       | 35.1   | 34.6 | 29.7 | 21.3 | 23.9 | 32.3 |      | 21.2 | 22.3 |     | 30.6 | 29.4 | 10    | 28.0    |
| 6       | 34.6   | 29.1 | 26.5 | 24.4 | 18.5 | 25.0 |      | 25.9 | 28.1 |     | 30.6 | 39.7 | 10    | 28.2    |
| 7       | 34.4   | 38.8 | 37.1 | 31.6 | 29.7 | 34.3 | 28.4 | 26.3 | 28.0 |     | 38.0 | 19.3 | 11    | 31.5    |
| 8       | 38.0   | 41.9 | 45.0 | 30.7 | 29.1 | 38.5 | 32.2 | 29.3 |      |     | 35.4 | 18.6 | 10    | 33.9    |
| 9       | 30.7   | 31.9 | 25.2 | 22.6 | 22.6 | 26.5 |      | 22.3 | 24.5 |     | 36.1 | 25.0 | 10    | 26.7    |
| 10      | 29.1   | 28.0 | 24.9 | 20.9 | 15.5 | 18.4 | 21.4 | 18.8 | 16.9 |     | 26.8 | 25.3 | 11    | 22.4    |
| 11      | 21.0   | 19.5 | 13.3 | 12.4 | 10.6 | 9.8  | 10.4 | 10.0 | 10.1 |     | 19.3 | 21.3 | 11    | 14.3    |
| 12      | 27.0   | 27.9 | 27.8 | 18.8 | 17.9 | 21.5 | 15.1 | 19.0 | 16.7 |     | 21.3 | 15.8 | 11    | 20.8    |
| 13      | 33.5   | 29.4 | 24.8 | 22.5 | 23.0 | 22.0 | 23.1 | 30.3 | 25.2 |     | 33.6 | 32.3 | 11    | 27.2    |
| 14      | 28.9   | 24.6 | 13.8 | 13.4 | 10.8 | 12.8 | 12.5 | 10.8 | 9.7  |     | 16.1 | 16.8 | 11    | 15.5    |