Detailed Assessment Report by Belfast City Council for revocation of the M1 / Westlink Air Quality Management Area for exceedences of Particulate Matter (PM$_{10}$) 24 hour mean and annual mean objectives.

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

August 2014
<table>
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<tr>
<th><strong>Contact</strong></th>
<th>Air Quality Officer</th>
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<tbody>
<tr>
<td><strong>Department</strong></td>
<td>Health and Environmental Services</td>
</tr>
</tbody>
</table>
| **Address**   | The Cecil Ward Building  
4-10 Linenhall Street  
Belfast  
BT2 8BP |
| **Telephone** | 028 9032 0202 |
Introduction.

Part III of the Environment (Northern Ireland) Order 2002 places a statutory duty upon Northern Ireland district councils to periodically review and assess air quality within their districts in order to identify geographic locations where health-based air quality objectives are not being achieved, or are unlikely to be achieved within relevant time periods. Reviews and assessments are undertaken at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present.

Where air pollution levels exceed or are predicted to exceed the relevant objectives taking due account of relevant exposure considerations, an Air Quality Management Area (AQMA) will be declared. The district council is required subsequently to develop an Air Quality Action Plan in collaboration with competent partner authorities in pursuit of the objective. The Action Plan includes actions that the district council and partner organisations intend to implement in order to improve air quality and protect public health.

In 2002, Belfast City Council completed its initial review and assessment of air quality for the city and, as a result, the M1 Motorway and A12 Westlink road corridor was designated as an Air Quality Management Area for monitored and modelled exceedences of the 24 hour and annual mean objectives for particulate matter (PM$_{10}$). The Air Quality Management Area is defined specifically as encompassing the M1 Motorway and A12 Westlink corridor from the Belfast City boundary at Sir Thomas and Lady Dixon Park to the end of the A12 Westlink at the junction with Great George’s Street and York Street including Stockmans Lane and Kennedy Way. It is delineated as follows by the dense blue line;
The council, with a range of competent partner authorities including the Department of the Environment, Department for Regional Development, and Translink subsequently developed an Air Quality Action Plan for the M1 / Westlink area. The Action Plan which was published in 2006, was designed to deliver the air quality objectives for particulate matter as soon as practicable.

**Context.**
The M1 Motorway and A12 Westlink form a strategic traffic corridor, which functions as the main access route to the south and west of Northern Ireland and to the Republic of Ireland. In addition, it provides access to the largest commercial area in Northern Ireland, Belfast, as well as the major commercial and passenger Port of Belfast and George Best Belfast City Airport. Accordingly, annual average daily traffic movements along this corridor regularly exceed 85,000 vehicles with a heavy goods vehicle component of around 5%.
Air quality actions applied in the M1 / Westlink Air Quality Management Area.

A source apportionment study for the M1 / Westlink corridor identified the principal source of particulate emissions in this location to be road transport sources (54%). Accordingly, the Action Plan consisted principally of actions designed to cut road congestion and vehicles emissions within the Air Quality Management Area and its environs. These actions included measures to increase levels of walking and cycling and the uptake of public transport as well as a range of highway engineering and traffic management initiatives.

Specific examples included significant strategic highway network capacity enhancements to the M1 Motorway and A12 Westlink to include re-engineering of the Broadway and Grosvenor Road roundabouts to incorporate under and over passes, the introduction of an advanced traffic control strategy for this transport corridor and lane revisions to the Stockmans Lane roundabout. The engineering revisions to the key congestion points along the transport corridor are depicted in the following aerial images:
Broadway Roundabout – conversion to over and under pass and roundabout lane enhancement.

Stockmans Lane roundabout – lane revisions.
The Air Quality Action Plan concluded in 2010 and has resulted in significant and sustained reductions in ambient particulate matter concentrations within the M1 / Westlink Air Quality Management Area. For this reason, Belfast City Council considers that it is appropriate to revoke the M1 / Westlink Air Quality Management Area for exceedences of both the 24 hour mean and annual mean objectives for particulate matter (PM$_{10}$). This decision to revoke has been considered ‘sensible’ by appraisers of the BCC Air Quality Progress Report 2014.

**Monitoring for ambient particulate matter along the M1 and Westlink Corridor.**

In order to determine accurately particulate matter concentrations along the M1 and Westlink corridor, the council has established two real time ambient particulate matter monitors. Belfast Westlink site is located by residential properties at Roden Street adjacent to the country bound lane of the Westlink, while Stockmans Lane site is adjacent to residential properties on Stockmans Lane close to the roundabout.

Belfast Westlink site is equipped with a Met One Instruments Beta Attenuation particulate matter monitor fitted with an unheated PM$_{10}$ inlet head. In terms of United Kingdom equivalence testing for this type of instrument, government guidance indicates that the BAM meets the equivalence criteria with a correction for slope, i.e. measured concentrations should be divided by a factor of 1.21. This site was established in 2010.
The Stockmans Lane site is equipped with a Thermo Instruments Tapered Element Oscillating Microbalance (TEOM) Model 1400b and Filter Dynamics Measurement System (FDMS) that has been determined also to meet equivalence criteria. This site was established in 2006.

In order to ensure that the data emanating from the analysers is both accurate and precise, National Physical Laboratory (NPL) are contracted to provide quality assurance and quality control services for both monitoring sites. Instruments are comprehensively tested on a 6-monthly basis.

In addition, Enviro Technology Services Plc. are contracted to provide service and maintenance support for our analysers. Finally, data collection and data scaling for the analysers is provided by Ricardo-AEA.

Data from our particulate matter analysers is routinely provided to the Department of the Environment for Northern Ireland and it is available to the public via the Northern Ireland Air website via the following web link - www.airqualityni.co.uk. It should be noted that all particulate matter monitoring data presented on the Northern Ireland Air website is corrected to the equivalence standard. Accordingly, we have employed this corrected data throughout the revocation report for consistency.

**Ambient particulate matter monitoring data.**
Recent historical particulate matter monitoring data for both monitoring sites is summarised as follows:

Annual mean 40 µg/m³ objective (µg/m³ Reference Equivalent). Exceedences are highlighted in bolded red.

<table>
<thead>
<tr>
<th>Site</th>
<th>2006</th>
<th>2007</th>
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<tr>
<td>Roden Street</td>
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<td>-</td>
<td>23</td>
<td>23</td>
<td>26</td>
<td>23</td>
</tr>
<tr>
<td>Stockmans Lane</td>
<td>42</td>
<td>43</td>
<td>36</td>
<td>22</td>
<td>26</td>
<td>24</td>
<td>24</td>
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Number of exceedences of the 50 µg/m\(^3\) 24 hour mean objective per annum – 35 exceedences permitted per annum (µg/m\(^3\) Reference Equivalent). Exceedences are highlighted in bolded red.

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<tr>
<th>Location</th>
<th>2006</th>
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<tr>
<td>Roden Street</td>
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<td>-</td>
<td>10</td>
<td>11</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>Stockmans Lane</td>
<td><strong>49</strong></td>
<td><strong>105</strong></td>
<td>14</td>
<td>1</td>
<td>18</td>
<td>6</td>
<td>2</td>
<td>12</td>
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By considering the preceding monitoring data, it can be seen that there have been no exceedences of the annual mean objective at Belfast Westlink monitoring site since its introduction in 2010. Indeed, monitored ambient particulate matter concentrations have remained consistently and substantially below the annual mean objective of 40µg/m\(^3\). Provisional monitoring data to date for the 2014 pollution year continues to suggest compliance with the annual mean objective.

Referring to the Stockmans Lane particulate matter annual mean monitoring data, it can be seen that the annual mean objective was exceeded during both 2006 and 2007. However, since 2008, there have been no exceedences of the annual mean objective and 2014 provisional monitoring data to date continues to suggest compliance.

In terms of the 24 hour mean objective, it should be noted that the standard allows for 35 exceedences of the 24 hour mean standard per annum before the objective is deemed to be exceeded. On this basis, there have been no recorded exceedences of the 24 hour mean objective at Belfast Westlink site since it was established. The objective was exceeded at the Stockmans Lane monitoring site during 2006 and 2007 but since then, it has been achieved at this location.

In order to provide further evidence of declining ambient particulate matter across Belfast City Council district, we have investigated underlying trends at the Belfast Centre AURN site. This site is classified as an Urban Centre site and, as such, its monitoring data is representative of an urban location representative of typical population exposure in towns or city centres, pedestrian precincts and shopping areas. Accordingly, although the site cannot be regarded as a background site, it is nonetheless in excess of 300m from any major road and a considerably greater distance from any significant emission sources of particulate matter. Monitoring of particulate matter has been undertaken at the Belfast Centre site since 1992. The following graph summarises trends in annual mean particulate matter monitoring.
at the Belfast Centre site since 2000. The annual mean objective of 40 µg/m³ is highlighted on the graph in red. A linear regression analysis has been completed for the annual mean values; the downward trend in annual mean values is highlighted on the graph by the green trendline.

**Conclusion**

Based on the monitoring data trends and having regard to Defra’s guidance on the need to avoid cycling between declaring, revoking and declaring again, Belfast City Council is reasonably certain that any future exceedences are unlikely. It is assumed that the pollutant emissions for the original AQMA declaration have considerably changed as a result of significant strategic highway network enhancements to the area.

Belfast City Council considers that it is appropriate to revoke the M1 / Westlink Air Quality Management Area for exceedences of both the 24 hour mean and annual mean objectives for particulate matter (PM₁₀).