

**Further Assessment of Air Quality
in Gateshead Town Centre and Portobello
Air Quality Management Areas**

April 2009

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1 Introduction

- 1.1 This is the Further Assessment of air quality in the Gateshead Town Centre Air Quality Management Area (AQMA), which was extended southwards along the A167 (Durham Road) to the junction with Dryden Road by Variation Order on 1 April 2008, and the AQMA at Portobello, Birtley also declared by Order on 1 April 2008. The AQMA's are shown in Figures 1 and 2. Both AQMA's were declared for nitrogen dioxide (NO₂), and this report provides detail of existing and predicted future NO₂ concentrations.
- 1.2 Nitrogen dioxide is mainly derived from road transport sources and other combustion sources such as the electricity supply industry. In Gateshead the nitrogen dioxide hotspots are caused by pollution from road traffic.
- 1.3 Nitrogen dioxide can irritate the lungs and lower resistance to respiratory infections. Continued or frequent exposure to concentrations that are much higher than those normally found in the ambient air may cause increased incidence of acute respiratory illness in children.

Third Round Review and Assessment

- 1.4 Local authorities commenced the third round of review and assessment of local air quality in accordance with the framework for air quality management set out in the Government's latest Air Quality Strategy (Defra July 2007) and Part IV of the Environment Act 1995 by completion of an Updating and Screening Assessment (USA) in April 2006. The USA looked at the levels of seven designated pollutants against the air quality objectives (AQO) for each pollutant laid down in the Air Quality Strategy, with the aim of identifying areas where the AQO's are unlikely to be achieved by the due dates.
- 1.5 If the USA identified any areas where there is a risk that the objectives may be exceeded, the local authority proceeded to a Detailed Assessment (DA) of the pollutant in question. The purpose of the DA is to determine whether the AQO is likely to be exceeded, and the geographical extent of that exceedence. If the outcome of the DA was that one or more of the AQO's was likely to be exceeded, then an Air Quality Management Area must be declared. Subsequent to the declaration of an AQMA, a Further Assessment must be carried out to confirm that the AQMA declaration is justified; that the appropriate area had been declared; to ascertain the contribution of various sources to the exceedence; and to calculate the magnitude of reduction in emissions required to achieve the objective. This information can then be used to inform an Air Quality Action Plan, which will identify measures to improve local air quality.

Figure 1: Gateshead Town Centre AQMA (extended)

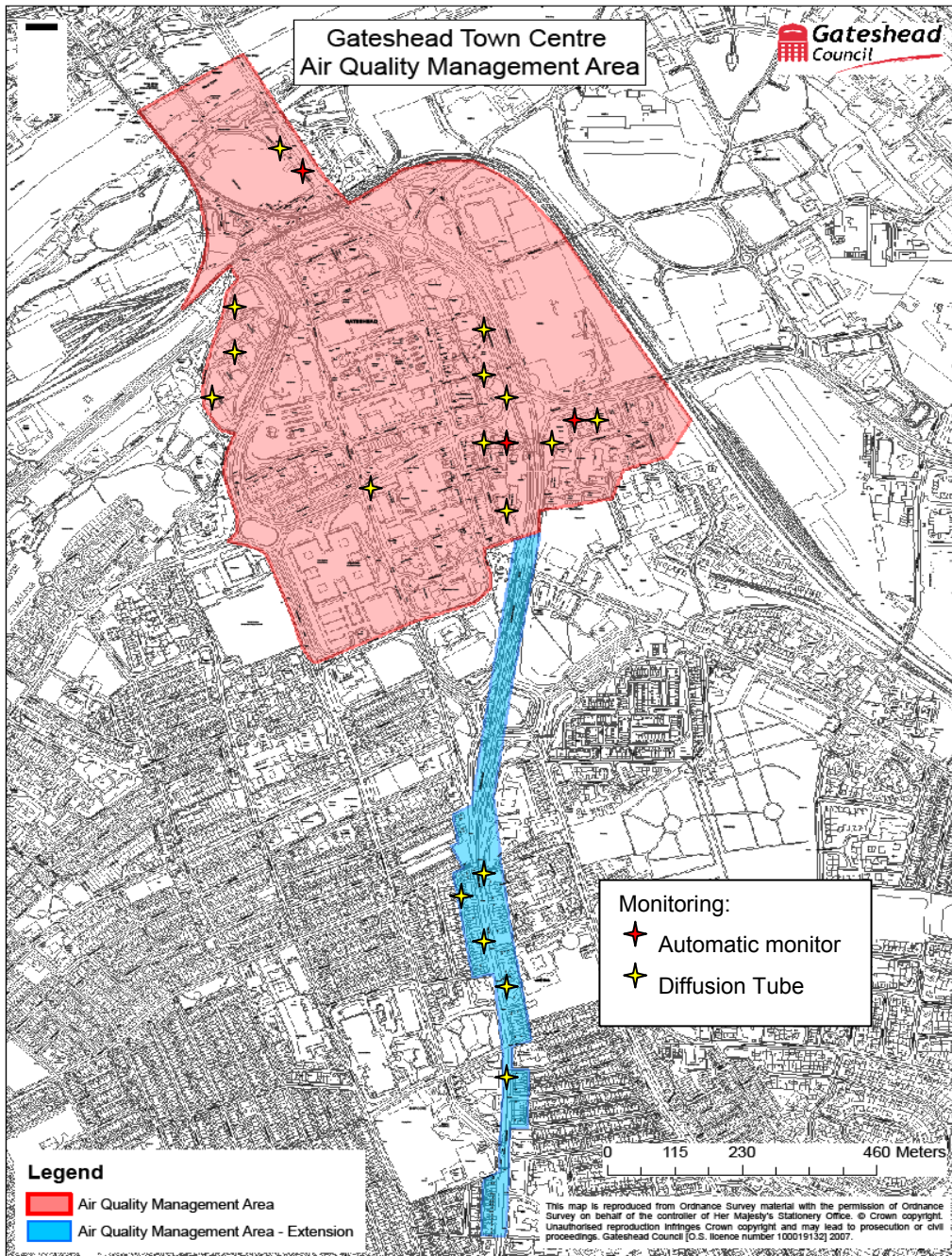
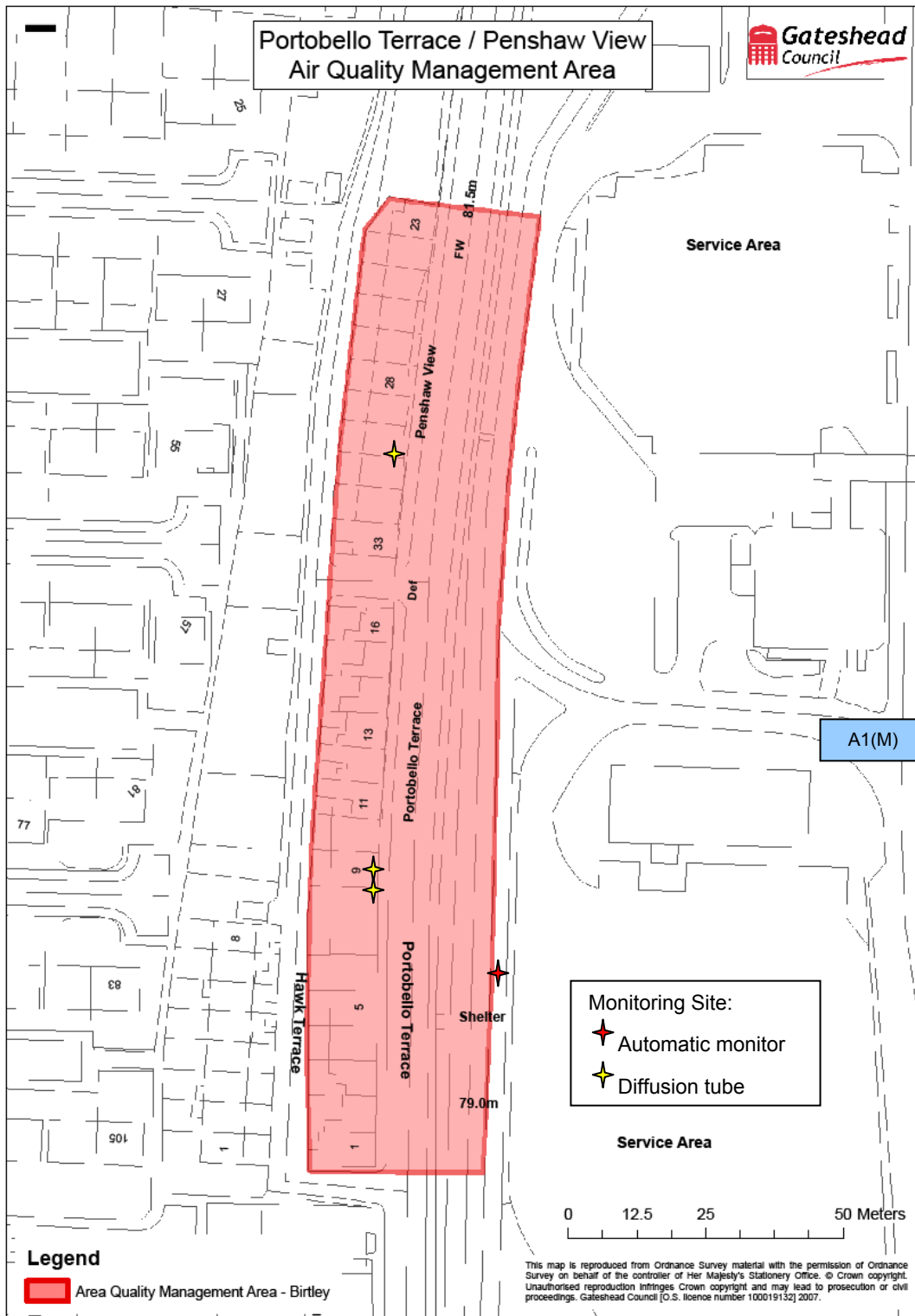


Figure 2: Portobello AQMA



The Air Quality Objectives

- 1.6 The UK Air Quality Strategy defines standards and objectives for each of a range of air pollutants. The standards are set as concentrations below which health effects are unlikely, even in sensitive population groups, or below which risks to public health would be exceedingly small, based on medical and scientific evidence. The objectives set out the dates by which the standards are to be achieved. The objectives are prescribed within The Air Quality (England) Regulations 2000, and amendments.
- 1.7 The AQO's only apply where members of the public are likely to be regularly present for the averaging time of the objectives. For annual mean objectives, relevant exposure is limited to residential properties, schools and hospitals. The 1-hour objectives may apply at outdoor locations such as shopping streets, and bus and railway stations that are not fully enclosed.

Air Quality Objectives for Nitrogen Dioxide

- 1.8 There are two AQO's for nitrogen dioxide both of which were to be achieved by 2005:
- A **1-hour mean of 200 $\mu\text{gms}/\text{m}^3$** which should not be exceeded more than 18 times a year;
 - An **annual mean of 40 $\mu\text{gms}/\text{m}^3$** .

Scope

- 1.9 This report addresses the issues for Further Assessments given in Chapter 7 of Defra's Local Air Quality Management Technical Guidance LAQM.TG(09) which states that a Further Assessment report allows authorities to:
- confirm their original assessment and thus ensure that they were right to designate the AQMA in the first place;
 - calculate more accurately what improvement in air quality, and corresponding reduction in emissions, would be needed to attain the air quality objectives within the AQMA;
 - refine their knowledge of the sources of pollution so that air quality action plans may be appropriately targeted;
 - take account of any new guidance issued by Defra or any new policy developments that may have come to light since declaration of the AQMA;
 - take account of any local developments which were not fully considered within the Detailed Assessment, for example major commercial or housing developments;
 - carry out additional monitoring to support the conclusion to declare the AQMA;
 - corroborate the assumptions on which the AQMA has been based, and check that the original designation is still valid, and does not need amending in any way; and
 - respond to any comments made by statutory consultees in respect of the Detailed Assessment.

- 1.10 Section 2 of this report looks at air quality impact assessments of proposed or new developments carried out since the Detailed Assessment was carried out. Section 3 outlines the consultation exercises carried out and provides Defra's response to the DA. Section 4 comprises a review of monitoring data collected since the DA was produced. These data are then used to determine the likelihood of exceedences of the objectives within the AQMA's. Section 5 addresses source apportionment, future year predictions and air quality improvements needed to achieve the air quality objectives.

Key Findings of the Updating and Screening Assessment and the Detailed Assessment

- 1.11 The 2006 Updating and Screening Assessment for Gateshead Council concluded that the air quality objectives for carbon monoxide, lead, benzene, 1,3-butadiene, sulphur dioxide and PM10 would all be achieved at relevant locations. However, potential exceedences of the annual mean nitrogen dioxide objective were identified at locations both within and outside of the existing Town Centre AQMA: Trinity Court and Bottle Bank within the AQMA; and the junction of the A167 Durham Road with Dryden Road in Gateshead and Station Road in Birtley, and at Portobello Terrace in Birtley outside of the existing AQMA.
- 1.12 The Detailed Assessment for Gateshead Council studied each of the areas listed above in more detail and concluded that:
- The need for the existing AQMA was confirmed;
 - There were no relevant receptors at the junction of the A167 Durham Road and Station Road in Birtley, and therefore an AQMA was not required;
 - An AQMA was required at the junction of the A167 Durham Road and Dryden Road in Gateshead; and
 - An AQMA was required at Portobello Terrace in Birtley.
- 1.13 Following the Detailed Assessment, Gateshead Council declared an AQMA for Portobello Terrace, and varied the Order for the existing AQMA to extend its boundaries south along the A167 to the Dryden Road junction. The Orders came into force on 1st April 2008.

2. Developments since Declaration of the AQMA's

New/Proposed Local Developments

- 2.1 Information on proposed developments is obtained from the Council's Planning Service, and procedures have been developed to ensure that planning applications for proposed developments that might impact on air quality are forwarded to the Council's Environmental Health service.
- 2.2 Outline planning permission has been granted for the redevelopment of Gateshead town centre. Planning proposals include commercial developments in the form of a hotel, retail units and a supermarket which will be significantly larger than the existing one with three times as many parking spaces; and residential development in the form of accommodation for 1000 students. These proposals are kept under careful review in regard to the impact of developments on air quality within the AQMA, with ongoing liaison between the Council's planners, Environmental Health Officers, consultants, and the developers.
- 2.3 In the last year air quality impact reports or scoping statements prior to full reports for three sites within the Town Centre AQMA have been submitted as pre planning application documents for comment to the Council's Air Quality Officer.
- 2.4 There are no new or proposed local developments in the Portobello area. However in 2008 a Truckstop premises which had a large lorry park and provided services and accommodation for drivers was closed down. HGV's accessed this site via the C category road which runs through the Portobello Air Quality Management Area.

Local Transport Plan and Tyne & Wear Air Quality Delivery Plan

- 2.5 Current air pollution issues in Gateshead are all related to nitrogen dioxide emissions from road traffic sources. Any measures implemented to improve air quality will thus be closely related to the local transport plan. Gateshead Council works in partnership with the other four Tyne & Wear authorities and public transport operators to produce a joint Tyne & Wear local transport plan (LTP), and transport planners and Environmental Health Officers from all five authorities have worked in close liaison to this end. Gateshead Council's Air Quality Action Plan for the Town Centre AQMA has been incorporated into the current LTP (2006-2011).
- 2.6 The Tyne and Wear Joint Air Quality Steering Group played a pivotal role in the development of the Tyne and Wear Air Quality Delivery Plan 2008, which was produced by the Tyne & Wear Local Transport Plan Core Team in response to air quality being identified as one of four shared priorities in the second round of local transport plans (LTP2). The overall scope of the plan is to outline the background to air quality problems in the region, current levels of pollution and proposed actions to improve area specific and regional Tyne and Wear air quality levels.

- 2.7 The plan presents realistic, efficient and reliable air quality solutions which need to incorporate the promotion of alternative modes of transport, management of the existing highway network, planning, emissions management, and information and education. In order to achieve these, the plan recognises the need for a clear commitment from stakeholders, along with ongoing partnership working between planning, transport and environmental health officers.
- 2.8 The Air Quality Delivery Plan focuses on the AQMA's declared by the five Tyne & Wear authorities, including the Gateshead Town Centre AQMA. The plan is to be regularly updated to include new AQMA's and reflect changes in AQMA boundaries and to take into account results of on-going air quality detailed and further assessments. Portobello is identified as a potential AQMA in the plan and will be included as an AQMA when the plan is next reviewed in July 2009.
- 2.9 The Tyne and Wear Joint Transport Steering Group approved an attached budget to the Air Quality Delivery Plan of £100,000 to be spent on the implementation of some of the plan's proposed actions. The budget is envisaged to aid the implementation of a range of air quality actions, such as the implementation of a bus quality partnership, further monitoring, and strengthening of relationships between the councils and academic institutions.
- 2.10 The Air Quality Delivery Plan can be found on the Tyne & Wear LTP website at: www.tyneandwearltp.co.uk.

'Be Air Aware' Tyne & Wear Public Awareness Campaign

- 2.11 One of the specific measures for improving air quality outlined in Gateshead's Air Quality Action Plan for the Town Centre AQMA and the LTP2 Air quality Delivery Plan, is information and education on air quality for the public. To this end, the Tyne & Wear Air Quality Steering Group and the LTP Core Team jointly submitted a bid to Defra for an air quality grant to fund an air quality awareness campaign across Tyne & Wear. Defra awarded the partners £65,000 for the first year of the campaign, and have indicated that Tyne & Wear will be eligible to bid for further funds in 2009.
- 2.12 Funding for the campaign is to be supplemented by an annual contribution by the LTP Team from the budget allocated to delivering actions from the Tyne & Wear Air Quality Delivery Plan, and an annual contribution from Newcastle City Council's Capital Programme for air quality.
- 2.13 The campaign is to be delivered over a three year period and its aim is to raise awareness of air quality issues and encourage residents and businesses to help improve air quality across the region. The project will be run along similar lines as the successful Care4Air campaign currently being run by a partnership of South Yorkshire local authorities and Travelwise, for which Sheffield CC, as lead authority, received Beacon Status.
- 2.14 A local PR/design agency has now been procured and the initial stages will be to raise awareness of the campaign, now known as 'Be Air Aware', through the use of web based information, PR, award ceremonies and marketing in the first six months. The project is managed by the LTP Core Team.

Smarter Choices

- 2.15 Smarter Choices is a project funded by the Tyne & Wear Local Transport Plan Partners for three years, from April 2008 to March 2011, and is directed by the Joint Transport Working Group who work with a range of other statutory private and voluntary partners.
- 2.16 The project aims to engage with the population across Tyne & Wear to promote behavioural change in travel towards more sustainable modes such as public transport, cycling, walking and car sharing. It focuses on the benefits of reduced road congestion, improved air quality, public health, social inclusion and the use of public transport.
- 2.17 Three key areas are to be targeted:- car drivers, to encourage them to take the first step in considering alternative travel options; households, to provide information and incentives to change their travel behaviour; and identified strategic issues in Travel Planning, and the support of existing school and workplace Travel Planning Officers in each of the Tyne & Wear local authorities.

MESSAGE Project

- 2.18 Gateshead Council, in co-operation with Newcastle University and Professor Margaret Bell from Instrumented Cities, is working on a project called Mobile Environmental Sensing System Across a Grid Environment (MESSAGE), which develops traffic sensors calculating levels of emissions. These small sensors can count traffic flows and measure road traffic pollutants and noise levels, as well as communicate with each other using ultrasound. They can also be placed on moving vehicles in order to monitor and measure a wider area and build up a database of information. The project, which is jointly funded by the Department for Transport and EPSRC (Engineering and Physical Sciences Research Council), began in October 2006 and is envisaged to last for 3 years.
- 2.19 The project is organised in a series of parallel research and development activities, such as communication and positioning and sensor technologies, which are interweaved with a series of diverse demonstration activities such as traveller behavioural responses. The MESSAGE consortium (led by Imperial College) brings together internationally leading specialist research groups in the fields of e-Science, transport, sensors, communications and positioning technologies across five universities, together with a number of major industrial partners and transport authorities.
- 2.20 Gateshead Council is in a position to update the rest of the Tyne & Wear partners on outcomes and results of the current pilot study by sharing relevant data, and is able to advise them on the potential of rolling out the project across Tyne and Wear.

UTMC Study

- 2.21 Gateshead Council has recently commissioned consultants to undertake a study exploring the feasibility and practicalities of implementing an Urban Traffic Management and Control (UTMC) system for parts of the borough, including the Town Centre Air Quality Management Area. This study is to follow on from and build upon the regional UTMC study recently completed for the Tyne & Wear TIF Board.
- 2.22 The benefits of such a UTMC system include improvement in congestion management, air quality management and traveller information, with the objective of resolving future congestion problems and thereby improving air quality.

Traffic Data

- 2.23 Traffic flow data for Tyne & Wear are reported annually by the Tyne & Wear Accident and Traffic Data Unit (TADU). The latest report (2007) provides data on road traffic accidents and traffic flows for the five year period 2003-2007. TADU is responsible for collecting traffic flow data from an extensive network of automatic traffic count sites that it manages in Tyne & Wear. It also holds a database of manual traffic counts.
- 2.24 Traffic flows within the AQMA's were obtained for the purpose of this Further Assessment from the TADU reports, including an internal report prepared for Gateshead Council for 2008. The reports show an overall decrease of 1.9% (12,198 vehicles) in combined traffic flows at the Tyne & Wear boundary cordon from 2007 to 2008. This is thought to be attributable to the current economic downturn and escalating fuel costs in 2008. Of the 15 counter locations on the Gateshead section of the cordon, 10 have recorded decreases in traffic flows, ranging from 1.3% to 12.3%.
- 2.25 For the A1 corridor south of the River Tyne there have been reductions in total combined traffic flows year on year from 2006 to 2008 with an overall decrease of 0.73% (6876 vehicles). Of the 10 counter locations in Gateshead, 7 recorded decreases in traffic flows ranging from 0.4% to 3%. For the A1(M) north of the services counter location, which is adjacent to the Portobello AQMA, a reduction of 2.3% representing 2,213 vehicles was recorded.
- 2.26 Gateshead Council uses the STM traffic model developed by Jacobs Babbie to predict traffic data for future years. The Tyne & Wear LTP2 sets out measures which are expected to restrict the growth in vehicle numbers within an "Inner Cordon" of Tyne & Wear to 5% between 2005 and 2010, which is, on average, a lower rate of growth than is assumed in the 2010 baseline case from the traffic model. However the latest traffic data from TADU shows that for the five year period from 2004 to 2008 there has been an overall increase of less than 3% for the combined flows at the Tyne & Wear boundary cordon, and less than 1% for the combined flows on the A1 South of the River Tyne corridor.
- 2.27 Given the current economic recession and associated slowing rate of increase in car ownership in the North East, together with increased fuel costs, it is expected that the current trend of levelling and reduction in traffic volumes is likely to continue at least until the end of 2010.

National Developments

- 2.28 Defra issued new guidance on Local Air Quality Management in February, and the Technical Guidance LAQM.TG(09), together with the new support tools outlined in Chapter 2 of this guidance have been used in this Further Assessment.

3 Responses to Consultation

- 3.1 Defra's formal appraisal accepted the conclusions of Gateshead Council's 2007 Detailed Assessment for Nitrogen Dioxide.
- 3.2 No responses/objections were received regarding the Detailed Assessment following a full consultation with residents of the AQMA's, other Council Services, Councillors and other relevant stakeholders.

4 Corroboration of Previous Findings

AIR QUALITY OBJECTIVES FOR NITROGEN DIOXIDE
1-hour mean of 200 µgms/m³ not be exceeded more than 18 times a year
Annual mean of 40 µgms/m³

New Monitoring

Automatic Monitoring

- 4.1 Gateshead Council measures nitrogen dioxide concentrations using real-time chemiluminescent monitors at three roadside sites within the Town Centre AQMA and one roadside site at Portobello. The monitors are located at Trinity Court, Lychgate, Bottle Bank within the Town Centre AQMA, and Portobello Terrace. Their positions are shown in Figures 1 & 2. Each monitor is operated by Council officers who have been suitably trained. Calibrations and filter changes are carried out at two-week intervals. Lychgate and Portobello also have automatic daily calibration features. All of the monitors are serviced twice a year, according to manufacturer's recommendations.
- 4.2 The Trinity Court monitoring station is close to the roundabout that acts as the main hub for traffic moving from the A184 on to the A167 Tyne Bridge approach. The monitor is approximately 10 m away from the kerbside, 15 m from the centre of the nearest road exiting the roundabout and 25 m from the central carriageway of the roundabout. The unit is also approximately 55 m from the centre of the elevated flyover (A167) that carries traffic from the A1 to the Tyne Bridge. The manifold inlet is approximately 2 m above road level and the surrounding area is generally open, although there are some low-rise council flats adjacent (6m) to the monitor.
- 4.3 The Lychgate monitoring station is located 7 m from the kerb of the A184. There are some low-rise council flats and gardens approximately 5 m south of the monitor. The manifold inlet is approximately 2 m above the road.
- 4.4 The Bottle Bank monitor is located in the regenerated Quayside area, 5m from the front of new apartments. The unit is 2.5 m from the kerb and 6 m from Bottle Bank Road, which carries traffic to the swing bridge and the wider Quayside area. The monitor is also 22 m from the road centre of the Tyne Bridge A167, which runs parallel to Bottle Bank.
- 4.5 The Portobello monitor is located opposite a row of terraced houses whose front elevations are located on a C classified road (Portobello Terrace). The monitor is in a fairly exposed setting between the C road, and the A1M trunk road, with an AADT in 2008 of 93,165, which runs parallel to the C road. It is situated within two metres of the kerb of the C road and 88 metres from the A1(M) and the motorway northbound services. The manifold inlet is approximately 2 m above the road.

- 4.6 Although all of the automatic monitors, and co-located diffusion tubes, are close to residential properties, nitrogen dioxide diffusion tubes are also located on the façades of these properties and are therefore more indicative of relevant exposure. Additionally the settings for the automatic monitors differ from the tubes on the properties in that they are more open, thereby aiding dispersion of the pollutants, whereas the tubes on the façades are sheltered by the properties which will act as a barrier to dispersion.
- 4.7 Measured nitrogen dioxide concentrations within the AQMA's during 2007 and 2008 are summarised in Table 1. No exceedences of the annual mean or 1-hour objectives have been recorded at any of the four sites. Data capture was 90% or above for all of the sites for both study years.

Table 1: NO2 Automatic Monitoring Data ($\mu\text{gms}/\text{m}^3$)

Site	Ann Mean 2007	Ann Mean 2008	Max 1-hr mean 2007	Max 1-hr mean 2008	% Data Capture 2007	% Data Capture 2008
Lychgate	32	33	162	157	99	99
Trinity	29	31	79	142	97	97
Bottle Bank	36	34	149	150	97	100
*Portobello	-	30	-	155	-	90

* 10 months data: May 2008-February 2009. No study for 2007

- 4.8 Measurement of nitrogen dioxide concentrations using a real-time chemiluminescent monitor is also carried out at one other location in Gateshead, which is outside of the Town Centre AQMA. The monitoring station is in a fairly exposed setting at the top of the A1 Dunston southbound slip road, above the A1, and the manifold inlet is approximately 2 m above the road. This site is also a co-location site with a triplicate set of nitrogen dioxide diffusion tubes, and monitoring data for 2008 has been used in the calculation of the precision of the diffusion tubes in Gateshead, so that there is a total of 5 five co-location studies used for Gateshead in the further assessment.

Diffusion Tube Monitoring

- 4.9 Monthly average nitrogen dioxide concentrations have been measured at a large number of sites during 2007 and 2008 using passive diffusion tubes. The monitoring sites are shown in Figures 1 & 2. All of the tubes are located roadside, and represent residential exposure, or are sets of triplicate tubes used at co-location sites with automatic monitors. Tables 3 & 4 set out the annual mean concentrations, and each site produced at least 9 months (most 12 months) worth of data during both study years.
- 4.10 The diffusion tubes (50% TEA in acetone) were supplied and analysed by Jesmond Dene Laboratory for the 2007 surveys. For 2008 Harwell Scientific Services laboratory was used. Both laboratories participate in the WASP QA/QC procedure. The annual mean diffusion tube results show good year-to-year consistency, which adds confidence to the results. Average concentrations of NO₂ overall were slightly lower for 2008 compared to 2007.

- 4.11 All of the monitoring data presented in this report have been adjusted to account for diffusion tube bias. For 2007 the correction factor from the R&A helpdesk website: spreadsheet version 04/08 was used for all diffusion tube monitoring data - the factor being 0.79.
- 4.12 For 2008 the bias adjustment factor was calculated using the monitoring data from Gateshead's 5 co-location studies, and the AEA DifTPAB spreadsheet. The correction factors calculated are 0.76 for the Lychgate site; 0.75 for Trinity; 0.74 for Bottle Bank, 0.83 for Portobello, and 0.77 for the A1 Dunston site. The combined factor for the 3 Town Centre AQMA sites is 0.75, and for all 5 Gateshead studies the combined factor is 0.77.
- 4.13 Annual means obtained from diffusion tube and automatic monitoring data for each of the four co-location studies within the AQMA's (three in the Town Centre AQMA and one at Portobello) are shown in Table 2. The annual means obtained from diffusion tube data have been bias adjusted using the combined correction factor (0.77) for the 5 Gateshead co-location studies.

**Table 2: NO₂ Automatic and Diffusion Tube Data at Co-location Sites
Annual Means ($\mu\text{gms}/\text{m}^3$) 2008**

Site	Tube 1	Tube 2	Tube 3	Triplicate Mean	Bias Adjusted Mean	Automatic Data Mean	Data Capture %
Lychgate	40	45	41	42	32	33	99
Trinity	41	40	39	40	31	31	97
Bottle Bank	47	46	48	47	36	34	100
Portobello	34	34	34	34	26	30	90

Town Centre AQMA

- 4.14 The three Town Centre and A1 Dunston co-location studies were all for the full 12 month period of 2008, with the exposure periods for each tube being one month and triplicate sets of diffusion tubes co-located with each of the automatic monitors. The tubes showed good precision for all sites, with poor precision being recorded for only one month at the Trinity and A1 Dunston sites, and two months at Bottle Bank. Data capture for the automatic monitors was also good, with less than 90% being recorded for one month only at Lychgate (86%), A1 Dunston (70%) and at Trinity (59% - this one being classed as Poor).
- 4.15 Table 3 sets out the annual mean diffusion tube concentrations of nitrogen dioxide in $\mu\text{gms}/\text{m}^3$ measured within the Town Centre AQMA for 2007 and 2008. The results have been bias adjusted using a factor of 0.79 for 2007. For 2008 the combined correction factor of 0.77 for the 5 Gateshead studies has been used, except for the three co-location sites, where the relevant factor calculated for each site is used. Results from the Detailed Assessment for the period April 2006 to March 2007 have also been presented for comparison

purposes, the correction factor used being 0.84 from the R&A spreadsheet version 3/07.

- 4.16 Of the 27 diffusion tube sites within the Town Centre AQMA, four recorded exceedences of the 40 $\mu\text{gms}/\text{m}^3$ annual mean objective for 2007, although one of these was one of the triplicate tubes located with the Bottle Bank automatic monitor 8 metres from the nearest receptors, where the average measurement for the 3 tubes was 38.37 $\mu\text{gms}/\text{m}^3$. For 2008 only one very slight exceedence was recorded.

Table 3: NO₂ Diffusion Tube Monitoring Data for Town Centre AQMA ($\mu\text{gms}/\text{m}^3$)

Tube No.	Location	Distance from Receptors	Mean 2006/7	Mean 2007	Mean 2008
2	Priory Court	Property Facade	35.7	32	31
42	Trinity Court	Property Facade	42.9	37	40
43	Regent Court	Property Facade	29.6	28	26
53	Hill Street (Bottle Bk)	1.5 metres	44.5	41	36
55	Trinity 1*	8 metres	37	34	32
56	Trinity 2*	8 metres	33	32	31
57	Trinity 3*	8 metres	35.5	37	30
58	Park Court	Property Facade	32	32	27
59	Pearth Ct	Property Facade	35.6	38	29
60	Lychgate Ct	Property Facade	32.6	32	29
62	St Mary's Ct	Property Facade	28	29	24
37	Lychgate 1*	6 metres	34.2	34	31
38	Lychgate 2*	6 metres	32.6	36	35
39	Lychgate 3*	6 metres	35.1	34	33
63	Bottle Bank 1*	8 metres	43	37	35
65	Bottle Bank 2*	8 metres	42	40.2	35
66	Bottle Bank 3*	8 metres	43.2	38	37
47	Durham/Dryden Rd	Property Facade	44.8	40.3	39
71	Durham Rd Lw Fell 1	Property Facade	37	35	31
72	Newsag Durham Rd	Property Facade	45.3	45	40.3
75	Durham Rd Lw Fell 2	Property Facade	29	25	24
76	Durham Rd Lw Fell 3	Property Facade	28.8	25	22
80	Durham Rd Gtshd 1	Property Facade	29.3	25	21
81	Durham Rd Gtshd 2	Property Facade	35.3	29	28
82	Durham Rd Gthsd 3	Property Facade	32.6	26	24
83	Durham Rd Gtshd 4	Property Facade	40	31	31
84	Durham Rd Gtshd 5	Property Facade	36.5	29	29

* Diffusion tubes co-located with automatic monitoring units
Exceedences shown in bold

Portobello

- 4.17 The Portobello co-location study was for the 9 month period of 1st May 2008 to 31st January 2009, with the exposure periods for each tube being one month and a triplicate set of diffusion tubes co-located with the automatic monitor. The tubes showed good precision for every month, and data capture for the automatic monitor was good for all but one month (57%) and above 90% for 6 months.

- 4.18 Table 4 sets out the annual mean diffusion tube concentrations of nitrogen dioxide in $\mu\text{gms}/\text{m}^3$ measured within the Portobello AQMA for 2007 and 2008. The results have been bias adjusted using a factor of 0.79 for 2007. For 2008 the combined correction factor of 0.77 for all 5 Gateshead co-location studies, has been used. Results from the Detailed Assessment for 2006/7 have also been presented for comparison purposes, the correction factor used being 0.84.

Table 4: NO₂ Diffusion Tube Monitoring Data for Portobello AQMA ($\mu\text{gms}/\text{m}^3$)

Tube No.	Location	Distance from Receptors	Mean 2006/7	Mean 2007	Mean 2008
10	Portobello Tce 1	Property Facade	44.5	43	38
16	Portobello Tce 2	Property Facade	43.6	39	38
68	Portobello Tce 3*	13 metres	-	-	26
69	Portobello Tce 4*	13 metres	-	-	26
70	Portobello Tce 5*	13 metres	-	-	26
74	Penshaw View	Property Facade	37.8	34	33

* Diffusion tubes co-located with automatic monitoring unit (No study for 2006/7)
Exceedences shown in bold

- 4.19 Of the six sites within the Portobello area one recorded a slight exceedence of the AQO for 2007. No exceedences were recorded for 2008.

Summary

- 4.20 The air quality objectives for nitrogen dioxide were not exceeded at any of the four automatic monitoring sites within the AQMA's during 2007 or 2008, with concentrations well below both of the objective levels. The monitors are all located within eight metres of relevant exposure in the form of residential properties.
- 4.21 The annual mean objective was also met at most of the 27 diffusion sites within the Town Centre AQMA, except for slight exceedences at four sites in 2007, and one very slight exceedence in 2008. Three of the sites are residential properties, of which two are situated in the extension of the original AQMA.
- 4.22 The annual mean objective was exceeded slightly at one of the six diffusion tube sites, which is a residential property, within the Portobello AQMA in 2007. No exceedences were recorded in 2008.
- 4.23 For almost all of the monitoring locations, the results show year on year reductions in nitrogen dioxide concentrations and the number and degree of exceedences of the annual mean objective from 2006 to 2008. This coincides with overall reductions in traffic volumes in Gateshead, and the A1(M) motorway in the vicinity of the Portobello AQMA.

5 Source Apportionment

- 5.1 Source apportionment is necessary to identify the sources contributing to the objective exceedences within an AQMA, and subsequently the reduction in pollutant emissions needed for each identified source in order to achieve the air quality objectives. This provides the information needed to identify and support proposed measures for the Action Plan.
- 5.2 Gateshead's Further Assessment of 2006 for the Town Centre AQMA gave modelled predictions of annual mean nitrogen dioxide concentrations for 2005 and apportioned source contributions to business car, commuter car, leisure car, light goods vehicle, heavy goods vehicle and bus and ambient background categories for the eleven worst case representative receptors in the town centre. Appendix 2 of the 2006 Further Assessment report explains how the data were derived, using the ADMS Urban dispersion model and the STM traffic model.
- 5.3 The relative influence of each source category varies by location, but the background concentration, which represents pollution from roads outside of the Study Area and from non-road sources, is the main component at every receptor, with an average contribution of 61% for the eleven receptors. Of the locally-generated road component, buses (12%) and leisure car trips (11%) tend to make the largest contributions, with HGV'S (8%) also important.
- 5.4 This data was subsequently used to calculate the air quality improvements necessary in order for the annual mean objective to be achieved. Focusing on the worst case receptor, the assessment found that a 2 $\mu\text{gms}/\text{m}^3$ reduction in NO₂ concentrations was required to meet the annual mean objective. This meant a reduction of 12% in locally generated NO₂ emissions due to the local background concentrations making up most of the total.
- 5.5 The data was subsequently used to inform the Action Planning process with regard to measures proposed to bring about the required air quality improvements. Gateshead Town Centre Action Plan was published in January 2008 subsequent to full internal and public consultation and appraisal by Defra. There have been no major developments or significant changes in traffic flows which may have had an impact on background nitrogen dioxide concentrations since development of the plan, in fact traffic volumes, and nitrogen dioxide concentrations, have decreased over the past year as outlined in Chapter 2. The above data is therefore still valid and the Action Plan measures are still considered relevant to deliver the air quality improvements needed.
- 5.6 As the extension of the AQMA was integrated into the original AQMA due to the obvious heavy traffic link to the town centre via the A167 Durham Road, it is considered appropriate for the existing Action Plan to be applied to the whole of the extended AQMA.

Portobello

- 5.7 The Further Assessment has shown that nitrogen dioxide concentrations at Portobello have decreased year on year since the Detailed Assessment was carried out for 2006/07, and there were no exceedences of the air quality objectives in 2008.
- 5.8 An Action Plan will not therefore be drawn up for Portobello, particularly as this trend is likely to continue in future years, due to decreasing traffic flows across Tyne & Wear, and on the A1(M) adjacent to the AQMA. Also year on year decreases in background annual mean concentrations of nitrogen dioxide are predicted by the national maps published by Defra and provided on the LAQM website. As future exceedences of the air quality objectives would not therefore be predicted, no actions or measures would be needed to meet the objectives.
- 5.9 A detailed quantification of the source contributions to nitrogen dioxide concentrations at Portobello has therefore not been carried out, although an initial separation into total and background concentrations, and predictions for background concentrations for future years have been analysed. Additionally, total count and heavy vehicle count traffic data provided for the C category road (Portobello Terrace) by TADU have been analysed.
- 5.10 The background concentration of nitrogen dioxide, which represents pollution from roads outside of the Study Area, and from non-road sources, is the main component of the total measured NO₂ concentrations. The total annual mean background concentration for the 1Km X 1Km grid square in which Portobello Terrace is located (grid reference 428254 easting, 554998 northing) is given as 25.5 µgms/m³ for 2007 and 24.6 µgms/m³ for 2008 on the national maps. This represents a 59% contribution to the total concentration in 2007, and a 66% contribution for 2008.
- 5.11 The maps predict reductions of between 0.7 and 0.9 µgms/m³ year on year until 2012, with a total reduction of 3.2 µgms/m³ by 2012. The Council has no influence over regional background levels of pollution, and little influence over local background levels, the A1(M) motorway being the main local background source.
- 5.12 Of the locally generated road component it is known that there is a high proportion of HGV's along Portobello Terrace, as this is the main access road to an industrial estate 0.5K to the north of the receptors. Traffic counts were obtained from TADU for the C category road (Potobello Terrace and Penshaw View). In October 1991 the total traffic counted for one (work)day was 6,800 vehicles with 1070 (18%) of these being heavy vehicles. The average daily flow for one week in October 2006 was 7800, although a heavy vehicle count had not been carried out. In March this year the average daily traffic counted for one week was 8500 vehicles, with HGV's accounting for 15% of the total count. Almost a third of the HGV's counted were articulated lorries.
- 5.13 The closure of a Truckstop premises 1.2K further north on the C road in late 2008 may have had the effect of reducing total traffic counts and the proportion of HGV's although there is no data for vehicle categories pre closure.

- 5.14 Buses are a minor contributor to locally generated nitrogen dioxide, with less than 200 bus journeys per day along Portobello Terrace. Congestion and road gradient are also not considered significant in terms of giving rise to excess vehicle emissions.
- 5.15 Nitrogen dioxide concentrations at Portobello have decreased year on year since 2006, despite increasing traffic volumes, including HGV's, along the C road (Portobello Terrace), suggesting that the decreasing background concentrations and traffic on the A1(M) motorway have had a more significant impact.

6 Summary

- 6.1 Nitrogen dioxide concentrations within the Gateshead Town Centre and the Portobello Air Quality Management Areas have been assessed by automatic and diffusion tube monitoring for the years 2007 and 2008. The results indicate that most locations achieved the Government's 1-hour mean and annual mean objectives for both years although there were a few slight exceedences of the annual mean objective.
- 6.2 In the Town Centre AQMA, exceedences of the annual mean objective at three residential properties were recorded in 2007, and one very slight exceedence at one of the properties again in 2008. Two of the properties are in the extension to the original AQMA, confirming the findings of the Detailed Assessment, and the designation of the extended AQMA.
- 6.3 In the Portobello AQMA two slight exceedences of the annual mean objective were recorded at residential properties in 2007. There were no exceedences in 2008. The AQMA will not however be revoked as it is recognised that pollutant concentrations can vary significantly from one year to the next, due to the influence of various factors, such as meteorological and economic factors. Cycling between declaring, revoking and declaring again, due simply to these variations is not considered to be appropriate.
- 6.4 The Air Quality Action Plan (AQAP) for the Town Centre AQMA has been incorporated into the LTP2 and will be applied to the whole of the newly designated extended area.
- 6.5 Although an AQAP will not be drafted for the Portobello AQMA, the LTP2 Air Quality Delivery Plan addresses air quality improvement measures in AQMA's across Tyne & Wear. Potential AQMA's were identified in the plan, including the Town Centre extension and Portobello, and these are to be included in the plan when it is reviewed in July this year. Additionally, Portobello will be included when any relevant air quality improvement measures in the Town Centre AQAP are implemented as and when appropriate.
- 6.6 Nitrogen dioxide concentrations across the whole of the Gateshead area have decreased year on year since the Detailed Assessment was carried out, and background concentrations are predicted to continue falling in the future. This will be partly attributable to national and international measures to reduce emissions from road transport and many other sectors. Additionally, road traffic volumes across Tyne & Wear, including the A1(M) adjacent to the Portobello AQMA, have decreased during 2008, and this situation is likely to continue into the foreseeable future due to the current economic recession, fuel costs and levelling of the rate of increase in car ownership in the North East of England.
- 6.7 It is likely that the air quality objectives for nitrogen dioxide will be achieved at all locations across Gateshead in the near future. Measurement of NO₂ concentrations using both real time automatic monitors and diffusion tubes will continue, with the focus of the Council's review and assessment efforts continuing to be on the air quality management areas.