2015 Updating and Screening Assessment for East Staffordshire Borough Council

In fulfillment of Part IV of the
Environment Act 1995
Local Air Quality Management

12th May 2015

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Executive Summary

This Updating and Screening Assessment considers the most up to date monitoring data from 2014 with respect to Nitrogen Dioxide (NO_2), particulates (PM_{10}). Sulphur Dioxide (SO_2) and benzene are also referred to, but have long been ruled out as a concern within the Borough.

Data from 47 NO_2 diffusion tubes within the Borough and 1 automatic monitoring station located at Derby Turn in the centre of ESBC's primary Air Quality Management Area (AQMA) is reported here for both NO_2 and PM_{10}.

With respect to the 47 diffusion tubes, 10 exceedences of the NO_2 annual Objective of 40 µg/m^3 were found during 2014. The highest concentrations were found at the Derby Turn junction in the centre of the AQMA and at some sites along Derby Street, Wellington Street and the Borough Road / Derby Street / Byrkley Street / Waterloo Street gyratory. For a sixth consecutive year there were no exceedences anywhere along the Horninglow Road or Derby Road sections of the larger AQMA and in the case of the smaller AQMA in Stapenhill, NO_2 levels have been fluctuating just above or below the annual NO_2 Objective for the past few years. All diffusion tube sites outside of the AQMAs recorded NO_2 levels comfortably below the annual mean Objective of 40 µg/m^3 during 2014. An assessment of temporal trends dating back to 2006 has shown a marked decline overall in NO_2 levels across the Borough, although the rate of decline has slowed in the past couple of years. None of the tube locations have recorded NO_2 levels in excess of 60 µg/m^3, therefore hourly exceedences are considered unlikely. Meanwhile, NO_2 concentrations from the automatic monitoring station were 36.0 µg/m^3 in 2014. Automatic data for NO_2 levels for 2011 to 2013 were also below the NO_2 Objective, but trend analysis found no clear upward or downward trend. There have been no exceedences of the 1-hour mean NO_2 Objective of 200 µg/m^3 at all during the past 5 years.

No changes to the existing NO_2 diffusion tube monitoring network are warranted at this stage, therefore ESBC proposes to keep the vast majority of diffusion tubes, even those in stretches of the AQMA that are complying with NO_2 Objectives. ESBC is not proposing to revoke the Derby Road and Horninglow Road stretches of the AQMA at this stage as it feels it should err on the side of caution in light of a number

of development proposals for the periphery of Burton Town that individually may not adversely impact upon air quality but may do from a cumulative effect in the future. ESBC is also considering the option of installing further tubes to the network outside of the existing AQMAs in order to try and capture any potential NO_2 creep early hence future risks of exceedences should they arise?

PM_{10} monitoring at the automatic monitoring station shows no PM_{10} Objective exceedences, but trend analysis showed a gradual increase in annual concentrations in recent years, which will be monitored closely moving forward.

Traffic data for 2014, did not highlight any existing roads or junctions where traffic flows have changed significantly to warrant further consideration, nor did it show a disproportionately large volume of HGV's or buses. Also there have been no newly identified roads that have not already been considered adequately in previous rounds of Review and Assessment. A number of planning applications have also been considered to assess whether potential changes to traffic flow could adversely affect current air quality or have the potential to in the future. This exercise ruled out any requirement for a Detailed Assessment, but proposals to reconfigure the A50 trunk road by Uttoxeter through 2 phases may affect future NO_2 levels at a couple of sensitive receptors. However, at present there is some uncertainty over this, particularly as the design of the second phase has not yet been confirmed. ESBC has however started to monitor NO_2 levels through diffusion tubes in this area, which began early in 2015 and will be reported in more detail in future annual reports.

ESBC also considered other transport sources in this Updating & Screening Assessment. ESBC continues to have no applicable airports or ports within the Borough, so consideration in the Review and Assessment was not required. There are also no relevant areas of exposure in relation to stationary or moving trains.

No industrial sources previously considered have increased their emissions significantly enough to warrant further consideration within this Updating and Screening Assessment. Three new industrial installations made either a planning or a permit application during 2014, but further considerations referred to in this report have ruled out the likelihood of Objective exeedences and on these grounds a Detailed Assessment is unnecessary.

With regards to other potential sources of emissions to air, there have either been no changes to those previously studied in earlier rounds of Review and Assessment or the change that has occurred has been negligible or is well managed, for example in relation to poultry farms, biomass combustion (and combined biomass combustion) and fugitive sources such as quarries and constructions sites. ESBC continues to have no large fuel storage depots or relevant large service stations within the Borough.

This Updating and Screening Assessment confirms that there is no requirement to progress to a Detailed Assessment for any of the Air Quality Objectives.

However it is important to note that moving forward, ESBC has now commenced the review of its Air Quality Action Plan, which originally dates back to 2009. ESBC will be working closely with Staffordshire County Council in prioritising measures within a new Integrated Transport Strategy completed by the County Council in 2014 as well as implementing a number of other new measures such as the Eco-stars Recognition Scheme which is also in the early stages of implementation. ESBC is aiming to complete the review of the Air Quality Action Plan document by the autumn of 2015.

Table of contents

Appendices

List of Tables

List of Figures

1 Introduction

1.1 Description of Local Authority Area

The Borough of East Staffordshire occupies a strategic position on the edge of the West Midlands and shares borders with South Derbyshire and Derbyshire Dales in the East Midlands.

The Borough covers an area of approximately 150 square miles with an estimated population of 113,583 according to 2011 Census Data. This represents a 9.5% increase on the 2001 Census figure and is also above the national and regional growth figures. East Staffordshire is located in the eastern part of the County and is predominantly rural. The two main towns are Burton upon Trent and Uttoxeter. Almost three quarters (73%) of the population of the Borough reside in Burton upon Trent and Uttoxeter. However, these two towns form just 12% of the total land area of the Borough.

Burton upon Trent is the principal town where the bulk of employment for the Borough is provided and is a sub-regional centre serving the needs of its hinterland. Meanwhile, Uttoxeter is a small traditional market town with a sphere of influence extending into Derbyshire Dales and Staffordshire Moorlands.

East Staffordshire has thrived from a long legacy of manufacturing particularly in Burton upon Trent that includes the presence of companies such as Molson Coors Brewing Company (UK) Limited, Kerry Foods, JCB and Pirelli. Approximately 65 industrial processes exist that are subject to regulation under the Environmental Permitting Regulations 2010 (as amended), which cover a wide range of activities. However, over the last decade the Borough has faced a substantial period of change, driven by industrial re-structuring, globalisation and the growth of a service led economy.

There are no motorways in the Borough although there are two major trunk routes, namely:

• A38 between Birmingham and Derby
• A50 linking the M1 near Nottingham and the M6 at Stoke on Trent

The main commuter routes into Burton from Leicestershire, Warwickshire, Derbyshire and other parts of Staffordshire include;

• A511 linking the A50 to the north and the M1 near Coalville, Leciestershire
• A444 traversing the M42 and Nuneaton in North Warwickshire

A map showing the extent of the East Staffordshire Borough is shown in Figure 1.1 below.

Figure 1.1: Map of East Staffordshire Borough.

1.2 Purpose of Report

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

The objective of this Updating and Screening Assessment is to identify any matters that have changed which may lead to risk of an air quality objective being exceeded. A checklist approach and screening tools are used to identify significant new sources or changes and whether there is a need for a Detailed Assessment. The USA report should provide an update of any outstanding information requested previously in Review and Assessment reports.

1.3 Air Quality Objectives

The air quality objectives applicable to LAQM **in England** are set out in the Air Quality (England) Regulations 2000 (SI 928), The Air Quality (England) (Amendment) Regulations 2002 (SI 3043), and are shown in Table 1.1. This table shows the objectives in units of microgrammes per cubic metre $\mu g/m^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedences in each year that are permitted (where applicable).

Table 1.1 Air Quality Objectives included in Regulations for the purpose of LAQM in England

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

1.4.1 Air Quality Action Plan and Further Assessment

During the 3rd round of review and assessment, East Staffordshire Borough Council (ESBC) passed an Order for the declaration of two AQMAs for Nitrogen Dioxide (NO_2) from road traffic at the end of February 2007. The declarations came into effect within 3 months of the Order being made. In pursuit of improving air quality within the AQMAs, an Air Quality Action Plan (AQAP) was produced in 2009.

Prior to the Action Plan, a Further Assessment was completed at the end of February 2008. Detailed modelling justified the Authority's decision in declaring the two AQMA's with regard to the annual NO_2 Objective. It also highlighted two other locations where the A38 trunk road traverses Dallow Street / Belvedere Road and Shobnall Road where NO_2 Objectives could potentially have been exceeded. During 2008, NO_2 diffusion tubes were placed in these locations to monitor air quality on a long-term basis and are still in use now, although no exceedences of the Objectives have so far been recorded. The 2010 annual average modelled concentrations also highlighted predicted exceedences of the EU Limit Value at receptors along Wellington Street, Derby Street and Waterloo Street. Source apportionment of NO_2 concentrations were modelled at receptors for both traffic and industrial related sources. Vehicle sources accounted for over 90% of NO_2 concentrations at receptors, confirming that the focus of the Action Plan should be based on the road traffic sector.

The heart of the Action Plan was the Burton Urban Area Transport Management Study (BUATMS) that was originally established in 2001 by Staffordshire Highways Authority, as part of the Local Transport Plan (LTP) for Staffordshire. Burton upon Trent was identified as one of the key strategic centres in the LTP, and as a result BUATMS was established to address traffic issues related to the town specifically. Since 2012, ESBC has been in a transition period during which a new Integrated District Transport Strategy was being formulated in tandem to the Local Plan. During this period funding for transport schemes across the whole County was considerably reduced. Highway / junction improvements therefore focussed on making best use of the existing highway network through maintaining its condition. Bus services were also maintained throughout 2013. However, the success of the enhanced bus passenger information (displaying timetabled departure times) that was implemented in 2011 as part of the former Burton Urban Area Transport BUATMS was evaluated during 2013. Interviews with 357 local residents concluded that the majority of respondents found the scheme to be extremely useful, but sustainable travel could be improved further by upgrading to real time bus passenger information (RTPI). Furthermore, many bus stops in the Borough now comply with disability discrimination legislation and discretionary travel allowance provides free 24/7 bus transport to any citizen of pensionable age or with a disability, plus their carer, and under 20s can travel anywhere in Staffordshire for just £1 per journey.

The Integrated Transport Strategy was updated in April 2014. Development of the Local Plan commenced in 2007, with the production of the Core Strategy, in line with the former Regional Spatial Strategy. Building on this work, a new Local Plan has been prepared with a vision to 2031. In July 2012, ESBC published a preferred consultation document and a further Pre-Submission consultation stage was completed by November 2013. ESBC has updated the Strategic Housing Market Area (SHMA) assessment, which has identified an 11,648 housing need within the Borough from 2012 to 2031; 4,790 dwellings are proposed on Greenfield sites and 1,683 on Brownfield sites within Burton upon Trent. Meanwhile, the proposed allocation for the Borough's second town, Uttoxeter, stands at 407 on Brownfield and 1,150 on Greenfield sites. Also, the Employment Land Review was updated in August 2013, which identified the need for 40 hectares of employment land. This includes approximately 20 hectares of employment land that has been proposed in Burton upon Trent, all of which would be allocated to Lawns Farm (i.e. land between the B5017 and Branston Road at Tatenhill Lock), that will also include residential development. Approximately 10 hectares is proposed for land west of Uttoxeter adjacent to the A50 trunk road and a further 10 hectares at Derby Road in Uttoxeter. The aim is to provide a variety of employment uses, in particular B1 (i.e. business, offices and light industry) and B8 (i.e. warehousing and storage / distribution) which are considered necessary to support a growing population.

A Transport Study previously undertaken by Atkins Consultants during 2007 and 2009, as part of the Core Strategy at that time, was revisited during 2013 to help support the evidence base for the emerging Local Plan. The revised Transport Study used the SATURN traffic model to determine the most sustainable locations in transport terms for new housing and employment growth in Burton upon Trent and enabled a better understanding of potential highway capacity impacts. This in turn has informed the updated Integrated Transport Strategy. The study further helped to address transport problems that may have been created by a higher quantity of housing and employment under the 2009 option. It is considered that flows generally on the local network across Burton upon Trent are lower with the revised option due to changes in distribution and lower levels of proposed housing and employment. However a handful of specific locations were identified where traffic impacts are likely to be greater, these are;-

- Derby Road (north of Hawkins Lane)
- Horninglow Street during the PM peak
- Bitham Lane in Stretton during the AM peak

Furthermore a few other locations have been identified where further investigations may be necessary with respect to potential mitigation; these are;-

- B5018 Branston Road corridor including Wellington Road / Main Street junction
- Shobnall Road (B5017) corridor
- St Peters Bridge / A444 Stanton Road and Main Street
- Wellington Street / Derby Street / Derby Road corridor
- A5111 Burton Bridge and Horninglow Street
- A511 Tutbury Road / Horninglow Road corridor and local roads including Bitham Lane and Rolleston Road
- Union Street

The updated Integrated Transport Strategy is also consistent with the Strategic Economic Plan. A significant level of transport funding has been transferred to the Local Growth Fund (LGF) created through Local Enterprise Partnerships (LEPs) as transport has been recognised as key to local economic development. European funds may also become available for transport through Growth Deals. Allocation of the LGF and European funds will be determined through Strategic Economic Plans produced by the LEPs for the period 2015/16 to 2020/21. Allocations will be determined by the strength of the Strategic Economic Plan in terms of identifying effective and expedient delivery of transport schemes that offer value for money. It is expected LEP Growth Deals will be announced in July 2014. LEPs have been required to work with the County Transport Planners in identifying priorities for transport spending for inclusion in the Economic Plan. The Integrated Transport Strategy has therefore helped to inform this work.

Delivery of the Integrated Transport Strategy will take place through a combination of countywide initiatives, connectivity proposals in the Borough, schemes under the Divisional Highway Programme and Local Transport Packages for Burton upon Trent and Uttoxeter.

The Burton upon Trent Local Transport Package will focus on mitigating the potential impact of traffic generated from housing and employment growth in the Pre-submission document (see Appendix 2). It will also tackle any residual issues that are likely to remain on the highway network as identified in the revised Transport Study and Transport Assessments produced by developers. Highway measures will then be supplemented with a number of sustainable travel initiatives. The key measures proposed in the Burton upon Trent Local Transport Package are;-

- A38 Trunk road corridor has been selected as a trial location for a Smarter Running Scheme including the installation of vehicle detection and information on speeds and congestion problems. In addition A38 capacity improvements have been proposed by developers in the form of a new signalised junction at Barton Turn and signalisation and widening of the Branston Interchange. Land south of Branston will be accessed via a left in and left out access off the A38 southbound carriageway south of Branston interchange.
- Walton-on-Trent bypass – As part of the Drakelow Village development in South Derbyshire District a new bridge crossing over the River Trent will be provided by developers through a S.106 agreement to improve highway capacity on the A38 trunk road and in turn into Burton town.
- Branston Locks Access Road – A new road will be provided by the developers of Branston Locks creating access to Branston Road and Shobnall Road and the provision of a new bus service along the route. It is considered the route will potentially ease traffic flows on some local roads such as Wellington Road and Parkway.
- A5189 St Peters Bridge and A444 – Capacity issues on St Peters Bridge and on the A444 will be relieved through an additional westbound lane over the bridge and improvements to the Stapenhill Road junction. It is expected the scheme will reduce journeys times by 12% and therefore will benefit the smaller AQMA in Stapenhill.

- Considerations for further improvements to traffic flows, junction improvements, upgrades to Urban Traffic Control systems and sustainable transport measures along the B5018 Branston Road corridor, B5017 Shobnall Road Corridor, A511 Tutbury Road corridor, A511 Burton Town Centre Corridor and the A5121 Derby Road corridor.
- Town Centre Traffic Management – Traffic conditions along Orchard Street / Union Street and Guild Street corridor will be reviewed with a view to improving capacity should resources permit. New Street is Burton's bus interchange and there are proposals to review traffic management and potentially remove through traffic to improve bus flow and encourage greater bus use and pedestrian safety.
- Bus Provision – Bus improvements will focus on providing RTPI to improve service information and journey time reliability as part of a wider scheme to improve connectivity in the Borough. The frequency of existing services is likely to be increased and changes will be made to the bus network to ensure connectivity to the new major development sites at Branston Locks, Beamhill, Land south of Branston and Drakelow Village.
- Sustainable Travel Promotion – All new developments that are deemed to generate significant levels of traffic are now required to produce a Travel Plan. This is likely to continue as stated in the new Local Plan. Businesses in Burton upon Trent will also be encouraged to develop Workplace Travel Plans to promote initiatives such as car sharing, personalised journey planning, teleworking and flexible working hours. Local community events promoting walking and cycling are also likely to take place and schools in the town will be encouraged to have Travel Plans in place during the Local Plan period.

In addition to the schemes outlined above, a package of measures has also been proposed for Uttoxeter town to improve highway capacity, bus services, cycling routes etc. However, to date Uttoxeter has not been subjected to any air quality issues and no AQMAs are in force here.

ESBC has now commenced work on reviewing the Action Plan and is assisting Staffordshire County Council in prioritising and improving quantification of the benefits of the proposed measures in the updated Integrated Transport Strategy.

Another scheme that will feed into the revised AQAP is the Staffordshire Eco-stars. During 2014, ESBC collaborated with 7 of the other Staffordshire Local Authorities to form a consortium. The Staffordshire Consortium then made an air quality bid for funding an Eco-stars project. This application was successful and the Consortium was awarded £80,000 to fund a 2 year project. The Eco-stars scheme is a programme which actively engages with operators of commercial vehicles (i.e. hauliers) at a local level with the specific aim of encouraging and helping them to reduce the negative impact of their activities on air quality and the wider the environment. At the core of the Eco-stars scheme is a fuel management and operational efficiency support programme, designed to help hauliers reduce fuel consumption, thereby reducing vehicle carbon, NO_2 and particulate emissions. It also has the added benefit of providing the tools and ongoing support for hauliers to reduce operating costs, thereby making the scheme economically attractive. Moving forward, each Authority in the Consortium will now identify key hauliers in their area. A specialist third party consultancy (Transport & Travel Research Ltd or TTR) who have a wealth of experience of engagement with and working alongside commercial vehicle operators delivering Eco-stars in other areas will then deliver the scheme. TTR's role will be to evaluate current practices of each member (i.e. haulier), identify what environmental controls are already in existence and then benchmark this against existing best practice and devise an action plan with potential improvements to make cost savings, reduction in emissions etc that will undergo a cost benefit analysis. It will also include follow up assessments to monitor and measure progress over time. ESBC will also look at their own waste fleet as a potential member of the Eco-stars scheme. It is envisaged the scheme will officially be launched during the summer of 2015.

Other measures that will be looked at within the revised AQAP are supplementary planning guidance for developments within the Borough and possible Section 106 agreements to fund AQAP measures, feasibility of Low Emission Strategy measures, review of the council's Travel Plan, closer working with public health and more engagement with communities in promoting alternative transport modes (e.g. schools).

ESBC aims to complete and adopt the revised AQAP by the autumn of 2015. It is envisaged the AQMA boundaries will remain the same as in the previous AQAP. Maps showing the location of the two AQMA"s are shown in Figures 1.2 and 1.3 respectively.

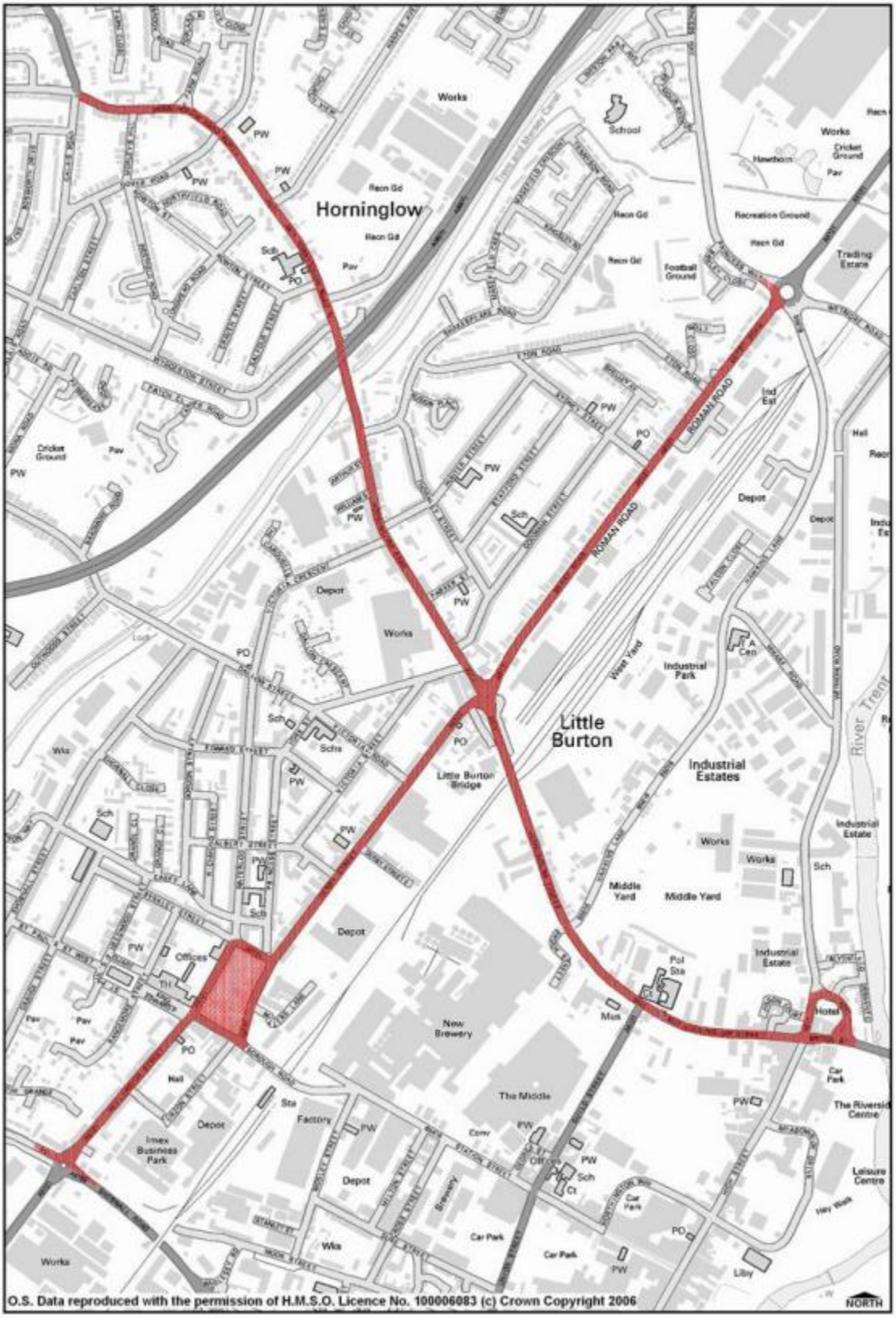

Figure 1.2: AQMA 1. Burton-upon-Trent- Derby Rd, Derby St, part of Princess Way roundabout, Horninglow St, Horninglow Rd, Bridge St, Wellington St, part of Borough Road, part of Wellington St roundabout, part of Waterloo St and part of Byrkley St.

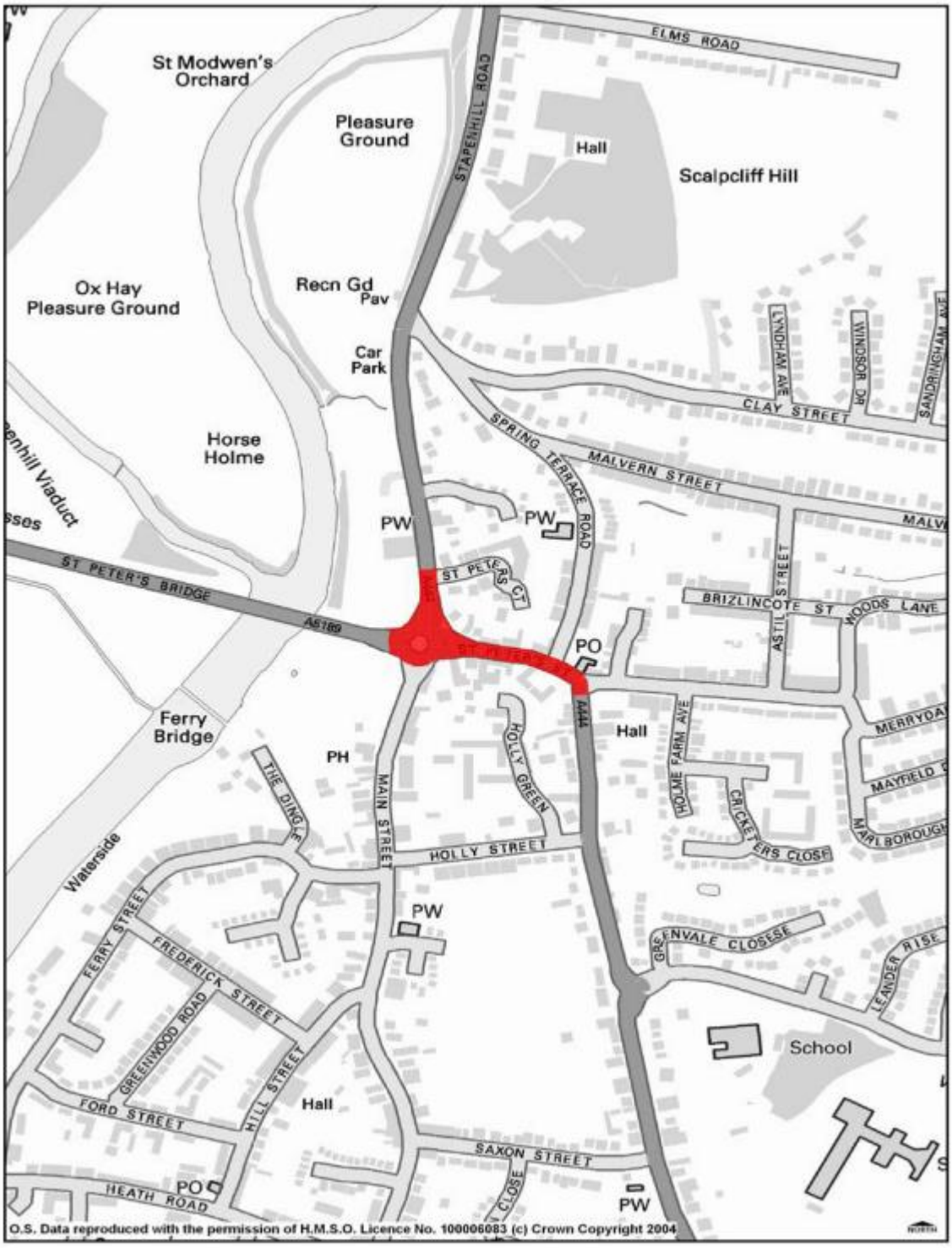

Figure 1.3: AQMA 2 – St Peters Bridge roundabout, Stapenhill, Burton-upon-Trent – St Peters Bridge roundabout and part of St Peters St.

1.4.2 Updating & Screening Assessment 2012

Completion of the 2012 USA marked the beginning of the 5th round of review & assessment.

This USA considered the most up to date monitoring data for the 2011 calendar year. It confirmed that the AQMA's were still warranted, although the downward trend in NO_2 levels continued, with 17 locations exceeding the annual NO_2 Objective in 2011 compared with 21 in 2010. Also, for a third consecutive year no NO_2 exceedences were recorded along the Derby Road and Horninglow Road sections of the AQMA. Even some sites within the smaller St Peters Bridge AQMA started to fall below the Objective for the first time. Outside of the AQMA's, all air quality Objectives were predicted to be achieved.

The USA also assessed road traffic sources, in which there were no new road / junction sources within the Borough previously not considered and DMRB screening, demonstrated that roads with significantly changed traffic flows, were not at risk of Objective exceedences for either NO_2 or PM_{10}. All other transport sources were deemed to be meeting all air quality Objectives.

The 2012 USA also provided a final update on PM_{10} emissions from Molson Coors (Shobnall Maltings) which was subject to a number of studies spanning 6 years. Molson Coors carried out their own on site particulate monitoring throughout 2011, near to sensitive receptors (i.e. Bass Cottages). The overall measured annual mean concentration was 26.9 µg/m^3 relative to the annual mean Objective of 40µg/m^3. The 24-hour mean Objective of 50µg/m^3 was exceeded on just 11 days, relative to the permitted number of exceedences of 35 days annually. The final report also indicated that previous dispersion modelling results may have been overestimates of the PM_{10} concentrations in the area around Bass Cottages. It was therefore concluded that no further modelling or monitoring was necessary with respect to this source.

Any increase in emissions from other industrial sources previously considered were found to be negligible, therefore further considerations were unnecessary. Several other industrial installations had made either a planning or a permit application, but their accompanying air quality assessments ruled out the likelihood of Objective exceedences. Biomass combustion, poultry farms, fuel storage depots and fugitive

sources such as waste transfer sites and quarries were also considered in the 2012 USA, but no concerns were raised.

1.4.3 Progress Report 2013

During 2013, ESBC produced an annual Progress Report outlining updating monitoring data, discussion of new developments and progress in implementing AQAP measures.

NO_2 diffusion tube data showed exceedences at 13 locations during 2012, 9 of which were at roadside locations in terms of the annual Objective of 40 µg/m^3. The highest concentrations were found at the Derby Turn junction in the centre of the AQMA and at isolated spots along Derby Street, Wellington Street and the Borough Road / Derby Street / Byrkley Street / Waterloo Street gyratory. For a fourth consecutive year there were no exceedences anywhere along the Horninglow Road or Derby Road sections of the larger AQMA and in the case of the smaller AQMA in Stapenhill, there were no exceedences for a second consecutive year. Hourly exceedences were considered unlikely as all monitoring sites recorded levels below 60 µg/m^3 and no exceedences were recorded at sites outside of the AQMA's.

In terms of automatic monitoring data, no exceedences were recorded for either NO_2 or PM_{10} during 2012.

The 2013 Progress Report discussed new developments that could impact on road traffic emissions, industrial emissions, domestic / commercial emissions and fugitive/uncontrolled emissions. Any impacts were deemed to be negligible overall.

The 2013 Progress Report also provided an update on the implementation of AQAP measures up to that moment in time.

1.4.4 Progress Report 2014

During 2014, ESBC produced a second Progress Report as part of the Fifth Round of Review & Assessment. This document provided updated information on automatic and non-automatic monitoring data for 2013, a discussion of new developments and progress with the AQAP.

Monitoring data from 49 NO_2 diffusion tubes within the Borough, highlighted 9 exceedences of the annual NO_2 Objective of 40 µg/m^3 during 2013, of which, 6 occurred at roadside locations. The highest concentrations were recorded within the primary AQMA at the Derby Turn junction and some sites along Derby Street and Wellington Street. For the fifth consecutive year no exceedences were recorded anywhere along the Derby Road and Horninglow Road sections of the AQMA. No exceedences of PM_{10} occurred during 2013 and sites outside of the AQMAs all recorded NO_2 levels below the annual Objective. An assessment of temporal trends highlighted that NO_2 levels both from diffusion tube data and from the automatic montoring station continued to decline gradually. PM_{10} on the other hand was found to be following a slow increase from 2009, but levels overall were still well below Objectives.

In the 2014 Progress Report, ESBC reported on new developments that could impact on road traffic emissions, industrial emissions, domestic / commercial emissions and fugitive/uncontrolled emissions. ESBC found none of the aforementioned emission sources were at risk of adversely affecting air quality. In light of this and the fact monitoring data found no exceedences outside of the existing AQMA's, ESBC concluded that a Detailed Assessment would not be necessary, but an Updating & Screening Assessment would be completed by the end of April 2015, marking the start of a sixth round of Review & Assessment.

An update on AQAP measures, the Local Transport Plan (LTP3) and an Integrated Transport Strategy specific for the Borough were also provided, but these were discussed in more detail with further updates to the present day in Section 1.4.1 (i.e. pages 5-13).

2 New Monitoring Data

This Updating & Screening Assessment requires ESBC to report on the monitoring that was undertaken during the 2014 calendar year. During 2014, ESBC monitored the following;-

- NO_2 by diffusion tubes and an automatic chemiluminescent analyser
- PM_{10} through a Beta Attenuation Monitor (BAM)

Diffusion tubes provide a good spatial resolution, they are cheaper and simple to use and they can identify hotspots of high NO_2 concentrations. However they do not offer the same degree of accuracy as automatic monitoring data. The chemiluminescent monitor located within the Borough's automatic monitoring station, provides more accurate data. A good monitoring program incorporates the use of both methods of monitoring, with the more accurate automatic data being used to validate the diffusion tube data, through co-located tubes at the monitoring station.

2.1 Summary of Monitoring Undertaken

2.1.1 Automatic Monitoring Sites

During 2014, ESBC operated one automatic monitoring station which is located at Derby Turn. This station comprises a Nitrogen Oxides (NOx) chemiluminescent analyser and a Beta Attenuation Monitor (Met-One BAM with an unheated inlet) for PM_{10}. The station is located approximately 3m from the kerb of the Derby Turn junction, which takes a central position in the larger of the two AQMAs (see Figure 2.1). Details of site characteristics of the automatic monitoring station are provided in Table 2.1.

Figure 2.1: Location of Derby Turn monitoring station.

Table 2.1 Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Reference	Y OS Grid Reference	Inlet Height (m)	Pollutants Monitored	In AQMA?	Monitoring Technique	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	**Distance to Kerb of Nearest Road (m)** (N/A if not applicable)	**Does this Location Represent Worst-Case Exposure?**
CM1	Derby Turn	Roadside	424671	324011	2.0	NO_2 & PM_{10}	Yes	NO_2 via chemiluninescence PM_{10} via Met-One BAM (with unheated inlet)	No (21m)	3m	Yes

Data collected from the monitoring station is in a raw format and no adjustments are made at this stage to correct for any errors. ESBC renewed its Data Management contract for a third year in March 2014 with Envitech Europe Limited, which is a subsidiary of the larger parent organisation, Envitech Limited based in Israel. Envitech Europe Limited has extended its market in the UK in the past few years and collaborates with another company Air Quality Data Management (AQDM). Prior to 2012, ESBC had a data management contract with Casella Measurement that extended back to 2006.

Correction of the data is applied in two stages. The first stage is known as rescaling, where the raw data is scaled into concentrations using the latest calibrations. Also at this stage, any abnormalities are identified and a maintenance engineer is called out to the station to rectify such problems. The second stage is a data validation and ratification stage to check for any obvious errors or spikes in the data. This form of data management not only improves the reliability in the data, but also ensures that any problems that arise with the analysers are identified and corrected promptly, with minimal data loss.

During 2014, ESBC had a maintenance & service contract with ESU1 Limited, which was renewed in July 2014 for a second consecutive year. Prior to July 2013, ESBC had service and maintenance contracts with Enviro-Technology Limited from 2012-2013 and Casella Measurement prior to 2012. ESU1 Limited is a relatively new engineering company with staff who have worked with some of the biggest names in the industry from auditing and data ratification (e.g. AEAT) to service/repairs, product design and installation (e.g. Casella). ESU1 Limited provides a 24 hour response service to any breakdowns or serious faults and can even attend over the weekend. In addition to this, an ESBC Pollution Officer visited the Derby Turn station at least monthly, where manual calibrations of the chemiluminescent analyser were undertaken and the gaseous filter was replaced. Meanwhile, the BAM Tape was replaced approximately every 3 months.

Unlike TEOM monitors, the Met-One BAM analyser meets equivalence tests (i.e. it is equivalent to gravimetric methods) as long as adjustments are applied to correct for slope, which is explained in more detail in Appendix 1(a).

2.1.1 Non-Automatic Monitoring Sites

During 2014, ESBC used 47 NO_2 diffusion tubes located at roadside, kerbside and background sites, as detailed in Table 2.2.

The diffusion tubes were supplied and analysed by Staffordshire Scientific Services. They were prepared by pipetting a 20% solution of TEA in deionised water, where the solution is pipetted onto grids already placed in the end cap (see Appendix 1(b) for more specific details).

Staffordshire Scientific Services take part in the AIR/WASP NO_2 Proficiency Testing Scheme. AIR is an independent analytical proficiency-testing (PT) scheme that is operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme that started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and the HSL WASP PT scheme. AIR supplies a number of test samples on a quarterly basis designed to test the proficiency of laboratories supplying and undertaking analysis of NO_2 diffusion tubes. AIR NO_2 PT is central to the UK NO_2 diffusion tube network's QA/QC.

The AIR PT scheme uses artificially spiked Palmes type diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis and continues with the same format used in the preceding WASP PT scheme. Laboratory performance is based on a Z_{score} performance indicator. During the last WASP Round 124 (January – March 2014) Staffordshire Scientific Services scored a satisfactory Z_{score} of 100%. With the new AIR PT Scheme, Staffordshire Scientific Services scored a satisfactory Z_{score} of 100% during rounds AR001 (April – May 2014) and AR004 (October – November 2014) but an unsatisfactory result of 25% during the AR003 (July – August 2014) round, indicating systematic bias. Further details of the methodology are provided in Appendix 1(c). Appendix 1 (c) also provides more details on diffusion tube precision which for Staffordshire Scientific Services has been consistently good for the past 6 years indicating good practice in handling the tubes in the field by ESBC and in the laboratory.

Diffusion tubes regularly exhibit bias (i.e. they under or over-read) compared to the reference chemiluminescence analyser (at the automatic monitoring station). It is therefore necessary to correct for such bias, when tube results are used for Review and Assessment purposes. This is done using either a locally derived bias adjustment factor or a national factor, in line with the technical guidance.

ESBC took part in both a local bias adjustment exercise and a national exercise. In terms of the national exercise, ESBC completed a questionnaire with co-located diffusion tube data and automatic monitoring station data and submitted this to the National Physical Laboratory (NPL) for the end of February 2015 for inclusion in the National Bias Adjustment Database (http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html) by the end of March 2015. For the purpose of this Updating & Screening Assessment, ESBC considered the criteria set out in Box 3.3 of TG(09) in deciding which bias factor to use. For more information about how each bias factor was calculated and justification for choice of factor, see Appendix 1(d) and 1(e).

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Table 2.2: Details of Non- Automatic Monitoring Sites

Site ID	Site Name	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
			X	Y						
DT1 & DT2	Trent Bridge (Duplicates)	Roadside	425362	323339	NO_2	Y	N	Y (<0.5m)	2.1m	Y
DT3 & DT4	St Peters Bridge (Duplicates	Roadside	425362	322028	NO_2	Y	N	Y (6.5m)	3.0m	Y
DT5	Horninglow Croft	Roadside	424367	324781	NO_2	N	N	Y (2.2m)	1.6m	Y
DT6, DT7 & DT8	Monitoring Station – Derby Turn (Triplicates)	Roadside	424671	324019	NO_2	Y	**Y**	N (8.2m)	5m	Y
DT9 & DT10	Wellington Street (Duplicates)	Kerbside	423952	323281	NO_2	Y	N	Y (1.7m)	0.5m	Y
DT11	Horninglow Street	Roadside	424796	323624	NO_2	Y	N	Y (2m)	2.7m	Y
DT12	Derby Turn	Roadside	424632	324043	NO_2	Y	N	Y (<0.5m)	3.6m	Y
DT13	Derby Turn	Kerbside	424636	324037	NO_2	Y	N	Y (3.2m)	<0.5m	Y
DT14	Brookside - Winshill	Urban Background	425742	324155	NO_2	N	N	N (N/A)	N/A	N/A
DT15 & DT16	A38 Slip Road (Duplicates)	Roadside	421135	319527	NO_2	N	N	N (18.5m)	3.5m	Y

Site ID	Site Name	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
			X	Y						
DT17	Horninglow Road – appr. Shakespeare Rd Junc.	Roadside	424416	324483	NO_2	Y	N	Y (2.8m)	1.8m	Y
DT18	Horninglow Rd – opp. Morris Homes	Roadside	424537	324228	NO_2	Y	N	Y (1m)	4.5m	Y
DT19	Derby St – near to Derby Turn	Roadside	424581	323963	NO_2	Y	N	Y (0.5m)	1.8m	Y
DT20	Horninglow Road North – appr. Junc. Morleys Hill	Roadside	423990	325224	NO_2	Y	N	Y (3.1m)	1.2m	Y
DT21	Derby St / Byrkley St Junction	Roadside	424212	323473	NO_2	Y	N	Y (3.8m)	1.7m	Y
DT22	A444 – Stapenhill appr. Violet Way	Roadside	425706	321902	NO_2	Y	N	Y (3.2m)	1.5m	Y
DT23	Princess Way Roundabout	Roadside	425235	324854	NO_2	Y	N	N (10.3m)	1.8m	Y
DT24	Derby Road appr. Princess Way Roundabout	Roadside	425161	324737	NO_2	Y	N	Y (5.7m)	4m	Y
DT25	Derby Rd / Eton Rd Junc.	Roadside	425107	324668	NO_2	Y	N	Y (2.9m)	2.4m	Y

Site ID	Site Name	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
			X	Y						
DT26	Derby Road – appr. Derby Turn	Roadside	424708	324140	NO_2	Y	N	Y (6.0m)	3.2m	Y
DT27	Derby St – appr. Derby Turn	Roadside	424547	323940	NO_2	Y	N	Y (3.4m)	2m	Y
DT28	Derby St – Maltings Court	Roadside	424351	323660	NO_2	Y	N	Y (2.8m)	2.3m	Y
DT29	Derby St appr. Little Burton West	Roadside	424453	323794	NO_2	Y	N	N (7m)	3m	Y
DT30	Waterloo St / Byrkley St Corner	Roadside	424453	323483	NO_2	Y	N	Y (0.5m)	4.1m	Y
DT31	Derby St / Borough Rd Junc.	Kerbside	424149	323344	NO_2	Y	N	Y (2.9m)	<0.5m	Y
DT32	Wellington St - Crossing	Kerbside	423993	323308	NO_2	Y	N	Y (2m)	<0.5m	Y
DT33	Wellington St Roundabout	Roadside	423812	323077	NO_2	Y	N	N (12.9m)	2.5m	Y
DT34	Wellington St – appr. Roundabout	Roadside	423807	323115	NO_2	Y	N	Y (<0.5m)	1.9m	Y
DT35	Wellington St / Shobnall Rd Roundabout	Roadside	423784	323099	NO_2	Y	N	N (8.7m)	2.8m	Y

Site ID	Site Name	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	Relevant Exposure? (Y/N with distance (m) from monitoring site to relevant exposure)	Distance to Kerb of Nearest Road (m) (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
			X	Y						
DT36	Rolleston Rd – near. Junc. Horninglow Rd	Roadside	424113	325209	NO_2	N	N	Y (6m)	1.4m	Y
DT37	Horninglow St / Guild St Corner	Roadside	424984	323388	NO_2	Y	N	Y (1.3m)	1.5m	Y
DT38	Horninglow St – near. Junc. Wetmore Rd	Roadside	425270	323346	NO_2	Y	N	Y (0.6m)	3.5m	Y
DT39	Horninglow St – near Junc. High St	Roadside	425257	323327	NO_2	Y	N	Y(<0.5m)	2.7m	Y
DT40	Bridge St – near Old Bridge	Roadside	425345	323321	NO_2	Y	N	Y (0.5m)	2.6m	Y
DT41	Anglesey Rd / Evershed Way Corner	Roadside	424096	322774	NO_2	N	N	N (2.2m)	1.9m	Y
DT42	Orchard Street – Caxton Court	Roadside	424559	322376	NO_2	N	N	N (6m)	2.7m	Y
DT43	Branston Rd / St Peters Bridge Roundabout	Roadside	424648	322300	NO_2	N	N	N (9.1m)	3.2m	Y
DT44	Grange St / Shobnall Rd Junc.	Roadside	423611	323176	NO_2	N	N	N (7.6m)	2.9m	Y

Site ID	Site Name	Site Type	OS Grid Reference		Pollutants Monitored	In AQMA?	Is Monitoring Co-located with a Continuous Analyser (Y/N)	**Relevant Exposure?** (Y/N with distance (m) from monitoring site to relevant exposure)	**Distance to Kerb of Nearest Road (m)** (N/A if not applicable)	Does this Location Represent Worst-Case Exposure?
			X	Y						
DT45	Shobnall Rd – near Marstons	Roadside	423264	323358	NO_2	N	N	Y (3.8m)	1.5m	Y
DT46	Forest Rd – Fred Brewer Way	Roadside	422129	323906	NO_2	N	N	Y (2.1m)	1.0m	Y
DT47	Hawkins Lane – opp. Pipe Centre	Roadside	424969	323802	NO_2	N	N	Y (1.7m)	1.5m	Y

2.2 Comparison of Monitoring Results with Air Quality Objectives

Each year, Local Authorities are required to report any new monitoring data to assess whether any NO_2, PM_{10}, SO_2, benzene (C_6H_6) or any other relevant pollutant Objectives are likely to be exceeded. For NO_2, it is the annual Objective of 40 µg/m^3 and the 1-hour Objective of 200 µg/m^3, which must not be exceeded more than 18 times in any 12 month calendar year that is considered. For PM_{10}, the number of exceedences of the 24-hour Objective of 50 µg/m^3 and the annual Objective of 40 µg/m^3 needs to be assessed. If any of these Objectives are found to be exceeded then that local authority would need to consider declaring an AQMA, subject to a Further Assessment. If a local authority has an existing AQMA for NO_2 or PM_{10}, and all Objectives have consistently been achieved then that local authority should investigate further, with a view to determining whether to revoke part or all of an AQMA. Should any of the annual mean NO_2 concentrations measured using diffusion tubes in an AQMA be greater than 60 µg/m^3, then the Local Authority can assume an exceedence of the 1-hour mean Objective. The Authority would therefore need to amend their AQMA order and Action Plan to cover the 1-hour Objective.

2.2.1 Nitrogen Dioxide (NO_2)

Automatic Monitoring Data

Annual average concentrations of NO_2 from the Derby Turn automatic monitoring station are shown in Table 2.3a for 2014 and are compared with data for the previous four years to assess any trends with respect to the annual Objective of 40µg/m^3. Meanwhile, Table 2.3b shows the number of 1-hour exceedences, with respect to the 1-hour Objective of 200µg/m^3. Again, comparisons are made with the previous four years.

Table 2.3a: Results of Automatic Monitoring for NO_2: Comparison with Annual Mean Objective.

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2014 %	Annual Mean Concentration (µg/m^3)				
					2010	2011	2012	2013	2014
CM1 – Derby Turn	Roadside	Y	94.9	94.9	**41.7**	38.9	32.2	29.0	36.0

Note: Exceedences of the NO_2 annual mean Objective of 40µg/m^3 are highlighted in bold.

Table 2.3b: Results of Automatic Monitoring for NO_2: Comparison with 1-hour Mean Objective.

Site ID	Site Type	Within AQMA?	Valid Data Capture for Monitoring Period %	Valid Data Capture 2014 %	Number of Hourly Means > 200µg/m^3				
					2010	2011	2012	2013	2014
CM1 – Derby Turn	Roadside	Y	94.9	94.9	0	0	0	0	0

Table 2.3a shows a decline in NO_2 levels at the Derby Turn monitoring from 41.7 µg/m^3 during 2010 to 29.0 µg/m^3 during 2013; but a subsequent increase to 36.0 µg/m^3 during 2014. Some caution needs to be exercised with the 2013 figure, as the annual mean is based on just 62.2% data capture, despite annualisation. That said, a general slow downward trend in NO_2 levels can still be assumed. This is highlighted further in Figure 2.2 below.

The other requirement of this Updating & Screening Assessment concerning NO_2 automatic data is to report on the number of exceedences of the 1-hour mean Objective of 200 µg/m^3. The 1-hour mean Objective should not be breached more than 18 times in any calendar year. These are shown in Table 2.3b, which clearly demonstrates no exceedences of the 1-hour mean Objective over the past five years**.**

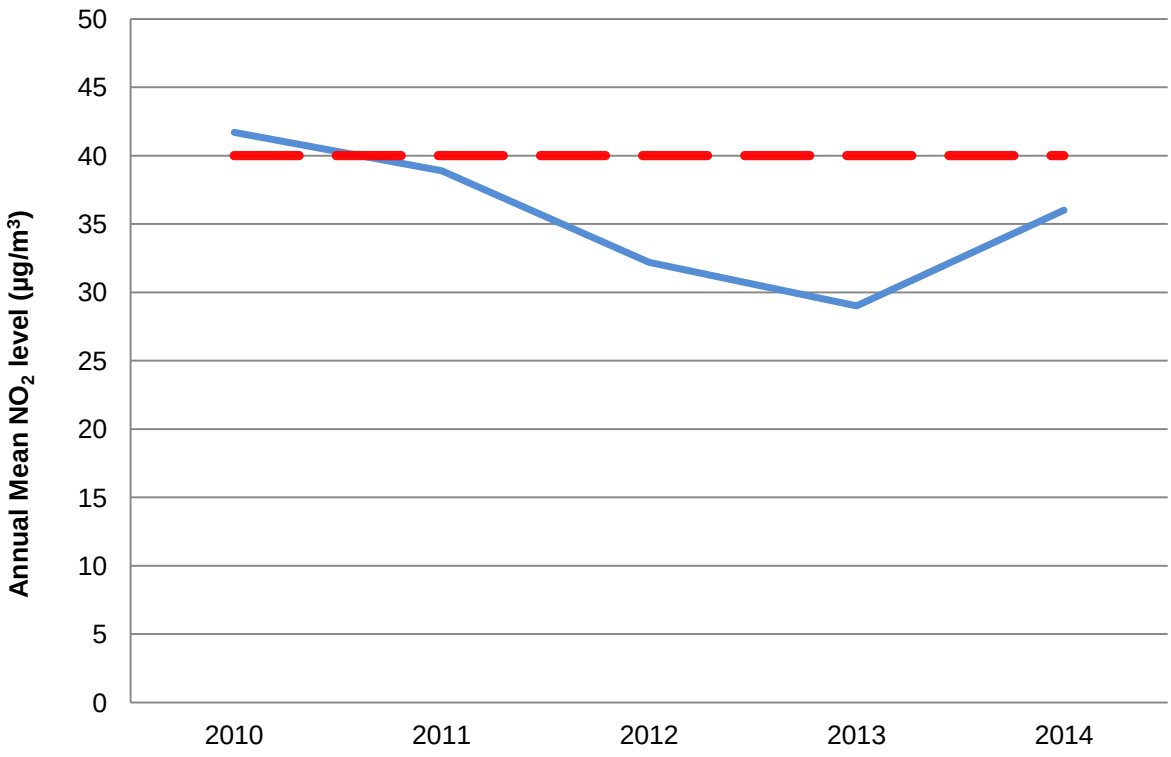

Figure 2.2: Trends in Annual Mean NO_2 Concentrations Measured at the Derby Turn Automatic Monitoring Station.

Diffusion Tube Monitoring Data

Annual average NO_2 concentrations for each diffusion tube located in and around Burton upon Trent throughout 2014 are shown in Table 2.4. Results for 2014 are compared with 2010-2013 data to assess for temporal trends. Annual means in excess of the 40µg/m^3 Objective are highlighted in bold and diffusion tube locations within the AQMA are highlighted in red.

ESBC considered it would be more prudent to err on the side of caution and follow the more conservative approach by using the national bias factor of 0.83 (see Table 2.4) as this gave higher NO_2 results than the local bias adjustment factor of 0.75 (see Appendix 1(d).

TG(09) recommends that for diffusion tubes with data capture below 75%, the data should be annualised; using a simple calculation as set out in Box 3.2 of the Guidance. TG(09) recommends that Local Authorities identify two to four nearby long-term continuous monitoring sites, that ideally form part of the national network (i.e. AURN), are background sites and wherever possible lie within a 50 mile radius of the diffusion tube location. In the case of ESBC there are not enough continuous monitors that form part of the national network and which are within a 50 mile radius of any of the diffusion tubes. TG(09) does offer an alternative to using continuous monitoring data when there are not enough appropriate sites to adjust the data. TG(09) states that other nearby diffusion tube results can be used to adjust short-term diffusion tube data, but to allow for the greater uncertainty in the results, it is recommended that four or more diffusion tube sites are used. In the case of ESBC, results for diffusion tubes below 75% were adjusted using other diffusion tubes sites with >90% data capture. Diffusion tube sites that were annualised are indicated in Table 2.4. The methodology for this procedure is set out in Appendix 1(f).

Measurements of pollutant concentrations are not always possible at the desired location or receptor for a range of practical reasons, for example continuous monitoring equipment requires space, security and electricity and diffusion tubes require a suitable surface to be attached to. TG(09) therefore recommends that adjustments are made to diffusion tube data, where a relevant receptor is located

some distance away from the diffusion tubes. An air quality tool is available to local authorities to estimate concentrations at the façade of a relevant receptor, either using Box 2.3 of TG(09) or the electronic version available to download from the air quality tools page of the Defra website (http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html). Excluding background locations, ESBC has a number of diffusion tubes that due to practical reasons are not located at the facades of receptors; therefore the electronic version of this tool was used to estimate the fall off of NO_2 concentrations with distance from the kerb. Further details on this procedure are shown in Appendix 1(g) and are supplemented with an example calculation for one of the diffusion tubes that were distance corrected. Tubes where distance corrections have been applied are indicated in Table 2.4. For a monthly breakdown of NO_2 concentrations during 2014, including annual NO_2 results applying both the local and national bias factors, see Appendix 1(h).

Table 2.4: Results of Nitrogen Dioxide Diffusion Tubes in 2014

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.83) 2014 (µg/m^3)
DT1 & DT2	Trent Bridge (Duplicates)	Roadside	Y	N	92%	N	N	33.7
DT3 & DT4	St Peters Bridge (Duplicates	Roadside	Y	N	92%	N	Y	37.2
DT5	Horninglow Croft	Roadside	N	N	92%	N	Y	31.6
DT6, DT7 & DT8	**Monitoring Station – Derby Turn**	**Roadside**	**Y**	**Y (Triplicate & Collocated)**	**100%**	**N**	**N**	**41.4**
DT9 & DT10	Wellington Street (Duplicates)	Kerbside	Y	N	100%	N	Y	36.8
DT11	Horninglow Street	Roadside	Y	N	83%	Y	Y	35.6
DT12	**Derby Turn**	**Roadside**	**Y**	**N**	**100%**	**N**	**N**	**44.2**
DT13	**Derby Turn**	**Kerbside**	**Y**	**N**	**100%**	**N**	**N**	**48.5**
DT14	Brookside - Winshill	Urban Background	N	N	100%	N	N	14.8
DT15 & DT16	A38 Slip Road (Duplicates)	Roadside	N	N	100%	N	Y	29.3
DT17	Horninglow Road – appr. Shakespeare Rd Junc.	Roadside	Y	N	92%	N	Y	34.4
DT18	Horninglow Rd – opp. Morris Homes	Roadside	Y	N	92%	N	Y	31.5
DT19	**Derby St – near to Derby Turn**	**Roadside**	**Y**	**N**	**83%**	**Y**	**Y**	**44.0**

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.83) 2014 (µg/m^3)
DT20	Horninglow Road North – appr. Junc. Morleys Hill	Roadside	Y	N	100%	N	Y	26.7
DT21	**Derby St / Byrkley St Junction**	**Roadside**	**Y**	**N**	**100%**	**N**	**Y**	**42.9**
DT22	A444 – Stapenhill appr. Violet Way	Roadside	Y	N	100%	N	Y	36.5
DT23	Princess Way Roundabout	Roadside	Y	N	100%	N	Y	28.9
DT24	Derby Road appr. Princess Way Roundabout	Roadside	Y	N	100%	N	Y	31.8
DT25	Derby Rd / Eton Rd Junc.	Roadside	Y	N	100%	N	Y	32.2
DT26	Derby Road – appr. Derby Turn	Roadside	Y	N	100%	N	Y	33.7
DT27	Derby St – appr. Derby Turn	Roadside	Y	N	100%	N	Y	37.7
DT28	Derby St – Maltings Court	Roadside	Y	N	92%	N	Y	37.0
DT29	Derby St appr. Little Burton West	Roadside	Y	N	100%	N	Y	33.3
DT30	Waterloo St / Byrkley St Corner	Roadside	Y	N	100%	N	Y	38.4
DT31	**Derby St / Borough Rd Junc.**	**Kerbside**	**Y**	**N**	**83%**	**N**	**Y**	**45.0**
DT32	**Wellington St - Crossing**	**Kerbside**	**Y**	**N**	**75%**	**Y**	**Y**	**44.3**

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.83) 2014 (µg/m^3)
DT33	Wellington St Roundabout	Roadside	Y	N	100%	N	Y	36.3
DT34	**Wellington St – appr. Roundabout**	**Roadside**	**Y**	**N**	**100%**	**N**	**N**	**41.7**
DT35	Wellington St / Shobnall Rd Roundabout	Roadside	Y	N	92%	N	Y	35.8
DT36	Rolleston Rd – near. Junc. Horninglow Rd	Roadside	N	N	75%	Y	Y	28.7
DT37	**Horninglow St / Guild St Corner**	**Roadside**	**Y**	**N**	**100%**	**N**	**Y**	**41.1**
DT38	Horninglow St – near. Junc. Wetmore Rd	Roadside	Y	N	83%	N	Y	36.0
DT39	**Horninglow St – near Junc. High St**	**Roadside**	**Y**	**N**	**100%**	**N**	**N**	**42.4**
DT40	Bridge St – near Old Bridge	Roadside	Y	N	75%	Y	Y	33.6
DT41	Anglesey Rd / Evershed Way Corner	Roadside	N	N	100%	N	Y	33.1
DT42	Orchard Street – Caxton Court	Roadside	N	N	50%	Y	Y	31.0
DT43	Branston Rd / St Peters Bridge Roundabout	Roadside	N	N	92%	N	Y	30.4

Site ID	Location	Site Type	Within AQMA?	Triplicate or Collocated Tube	Data Capture 2014 (Number of Months or %)	Data with less than 9 months has been annualised (Y/N)	Confirm if data has been distance corrected (Y/N)	Annual mean concentration (Bias Adjustment factor = 0.83) 2014 (µg/m^3)
DT44	Grange St / Shobnall Rd Junc.	Roadside	N	N	66.7%	Y	Y	27.7
DT45	Shobnall Rd – near Marstons	Roadside	N	N	66.7%	Y	Y	31.0
DT46	Forest Rd – Fred Brewer Way	Roadside	N	N	100%	N	Y	25.2
DT47	Hawkins Lane – opp. Pipe Centre	Roadside	N	N	75%	Y	Y	32.5

Note:

Monitoring locations within the AQMA's are highlighted in red.

Exceedence of the NO_2 annual mean AQS objective of 40µg/m^3 are in bold.

Table 2.4 shows there were 10 exceedences of the annual NO_2 Objective during 2014, 7 of these were at roadside locations. The highest NO_2 levels were recorded on the approach to Derby Turn and actually at the junction itself with concentrations of 44.2 µg/m^3, 48.5 µg/m^3 and 44.0µg/m^3 respectively at tube locations DT12, DT13 and DT19. The triplicate tubes located at the automatic monitoring station on Derby Turn also exceeded the annual NO_2 Objective with a concentration of 41.4 µg/m3, which is 5.4 µg/m^3 above the annual average NO_2 level recorded by the automatic continuous analyser (see previous Table 2.3a). Exceedences were also recorded at locations within the Derby Street / Byrkley Street / Borough Road gyratory, with concentrations of 42.9 µg/m^3 and 45.0 µg/m^3 respectively at tube locations DT21 and DT31. During 2014, concentrations ranged between 35.8 µg/m^3 (DT35) and 44.3 µg/m^3 (DT32) along the Wellington Road section of the AQMA; 33.3 µg/m^3 (DT29) to 44.0 µg/m^3 (DT19) along the Derby Street section and 33.6 µg/m^3 (DT40) to 42.4 µg/m^3 (DT39) along the Horninglow Street section. No exceedences were recorded anywhere along the Horninglow Road or Derby Road sections of the AQMA during 2014. Along Horninglow Road, concentrations ranged between 26.7 µg/m^3 (DT20) and 34.4 µg/m^3 (DT17). The Derby Road section recorded levels ranging between 28.9 µg/m^3 (DT23) and 33.7 µg/m^3 (DT26). Furthermore, diffusion tubes within the smaller AQMA around St Peters Bridge roundabout in Stapenhill recorded levels just below the 40 µg/m^3 NO_2 Objective, with concentrations of 37.2 µg/m^3 and 36.5 µg/m^3 respectively at site DT3/4 and DT22. Outside of the AQMAs, no exceedences were recorded. The highest NO_2 level outside of the AQMAs during 2014 was recorded on the Anglesey Road / Evershed Way junction (DT41) with a concentration of 33.1 µg/m^3. Meanwhile, diffusion tubes along the A5121 corridor that links the two AQMAs recorded NO_2 levels ranging between 25.2 µg/m^3 (DT46) and 33.1 µg/m^3 (DT41). None of the tube locations recorded concentrations greater than 60µg/m^3; therefore exceedences of the hourly NO_2 Objective of 200 µg/m^3 are considered very unlikely.

It is also prudent to assess the long term trend in NO_2 concentrations, which in order to be reliable should extend back at least 5 years. NO_2 diffusion tube data is shown in Table 2.5 from 2010 – 2014 to assess temporal trends in NO_2 levels within the Borough.

Table 2.5 Results of Nitrogen Dioxide Diffusion Tubes (2010 to 2014)

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m³				
			2010* (Bias Adjustment Factor = 0.85)	2011* (Bias Adjustment Factor = 0.88)	2012* (Bias Adjustment Factor = 0.86)	2013* (Bias Adjustment Factor = 0.87)	2014 (Bias Adjustment Factor = 0.83)
DT1 & DT2	Roadside	Y	**40.0**	35.1	37.6	30.3	33.7
DT3 & DT4	Roadside	Y	**41.0**	37.6	38.8	**40**	37.2
DT5	Roadside	N	32.3	34.8	33.2	22.8	31.6
DT6, DT7 & DT8	**Roadside**	**Y**	**46.2**	**46.2**	**43.6**	38.9	**41.4**
DT9 & DT10	Kerbside	Y	**46.9**	**46.9**	38.4	35	36.8
DT11	Roadside	Y	**41.0**	**41.5**	39.8	35.1	35.6
DT12	**Roadside**	**Y**	**47.8**	**47.9**	**45.4**	39.0	**44.2**
DT13	**Kerbside**	**Y**	**57.2**	**53.8**	**46.8**	**44.0**	**48.5**
DT14	Urban Background	N	17.7	17.5	15.9	16.9	14.8
DT15 & DT16	Roadside	N	28.9	27.0	29.0	28.4	29.3
DT17	Roadside	Y	36.5	35.8	37.3	34.7	34.4
DT18	Roadside	Y	35.3	32.1	34.0	28.6	31.5
DT19	**Roadside**	**Y**	**51.6**	**48.5**	**46.9**	**44.7**	**44.0**
DT20	Roadside	Y	27.5	24.6	25.6	25.3	26.7
DT21	**Roadside**	**Y**	**46.0**	**44.2**	**47.4**	**43.9**	**42.9**
DT22	Roadside	Y	39.0	37.7	35.7	35.8	36.5
DT23	Roadside	Y	30.3	29.8	30.7	27.6	28.9
DT24	Roadside	Y	35.7	34.1	36.0	29.9	31.8
DT25	Roadside	Y	34.9	34.3	32.5	30.7	32.2
DT26	Roadside	Y	35.2	35.0	35.7	32.1	33.7
DT27	Roadside	Y	**41.5**	**41.8**	**43.0**	**40.5**	37.7
DT28	Roadside	Y	**40.9**	**40.4**	**41.6**	**40.1**	37.0

Site ID	Site Type	Within AQMA?	Annual mean concentration (adjusted for bias) µg/m^3				
			2010* (Bias Adjustment Factor = 0.85)	2011* (Bias Adjustment Factor = 0.88)	2012* (Bias Adjustment Factor = 0.86)	2013* (Bias Adjustment Factor = 0.87)	2014 (Bias Adjustment Factor = 0.83)
DT29	Roadside	Y	36.9	35.0	36.0	38.9	33.3
DT30	Roadside	Y	**41.0**	**43.6**	**42.4**	39.0	38.4
DT31	**Kerbside**	**Y**	**53.1**	**43.5**	**45.6**	**44.0**	**45.0**
DT32	**Kerbside**	**Y**	**45.0**	**49.3**	**46.9**	**44.7**	**44.3**
DT33	Roadside	Y	35.9	35.6	32.5	31.4	36.3
DT34	**Roadside**	**Y**	**41.3**	**45.4**	**43.8**	39.4	**41.7**
DT35	Roadside	Y	37.4	**45.5**	34.1	32.9	35.8
DT36	Roadside	N	37.3	37.3	37.5	29.3	28.7
DT37	**Roadside**	**Y**	**45.3**	**46.4**	**45.6**	38.7	**41.1**
DT38	Roadside	Y	**44.2**	**43.2**	39.7	31.7	36.0
DT39	**Roadside**	**Y**	**48.0**	**47.6**	**46.4**	**41.2**	**42.4**
DT40	Roadside	Y	**40.2**	38.5	39.7	31.6	33.6
DT41	Roadside	N	35.2	38.6	35.7	35.8	33.1
DT42	Roadside	N	33.8	30.4	33.7	35.4	31.0
DT43	Roadside	N	32.3	30.5	34.1	34.4	30.4
DT44	Roadside	N	n/a	33.4	31.2	30.9	27.7
DT45	Roadside	N	29.3	29.2	30.6	27.6	31.0
DT46	Roadside	N	27.2	26.3	26.2	24.4	25.2
DT47	Roadside	N	32.0	36.1	36.0	31.4	32.5
		Overall Average	38.7	38.1	37.4	34.3	35.1
		Rolling 5 Year Average	36.7				

Note:

Monitoring locations within the AQMA's are highlighted in red.

Exceedence of the NO_2 annual mean AQS objective of 40µg/m^3 are in bold.

Table 2.5 shows that despite fluctuations in overall NO_2 concentrations for all sites, there has been a general downward trend in the total number of NO_2 exceedences with 19 exceedences during 2010, 17 during 2011, 13 during 2012, 9 exceedences during 2013 and a slight increase to 10 exceedences during 2014. It is also worth noting that in 2010 the highest overall NO_2 concentration was 53.1 µg/m^3 at tube location DT31 but by 2014 the highest overall NO_2 concentration was 48.5 µg/m^3. This finding is supported by the overall NO_2 average of all diffusion tube sites which has declined from a maximum of 38.7 µg/m^3 during 2010 to 35.1 µg/m^3 during 2014, despite a slight increase from the overall average of 34.3 µg/m^3 during 2013. However, 60 µg/m^3 has never been exceeded at any roadside sites; therefore we can be confident that NO_2 levels are clear of any breach of the hourly NO_2 Objective of 200 µg/m^3.

It is also worth making an assessment of spatial trends in NO_2 levels over time in order to monitor any improvements or degradation in air quality across specific geographical areas. Figures 2.3 to 2.9 show spatial trends in NO_2 levels from 2006 to 2014 for specific sections of the AQMAs as well as sites outside of the AQMAs.

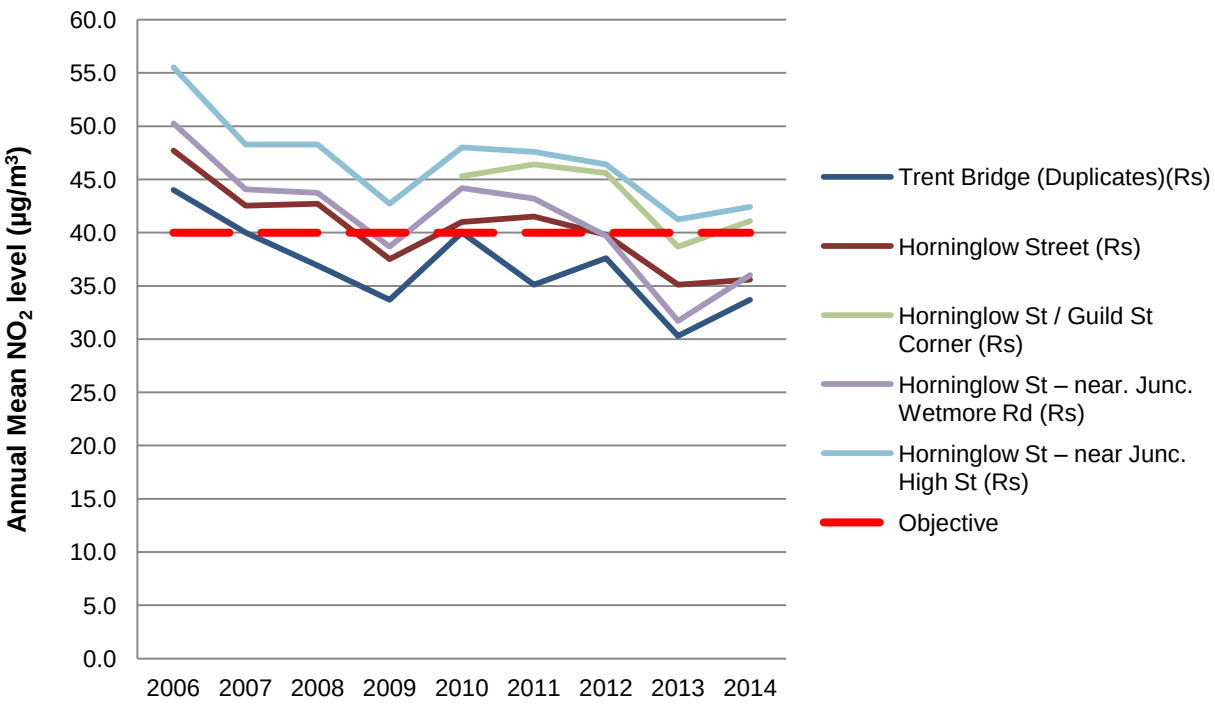

Figure 2.3: Trends in Annual Mean NO_2 Concentrations Measured at Diffusion Tube sites along the Horninglow Street section of the AQMA.

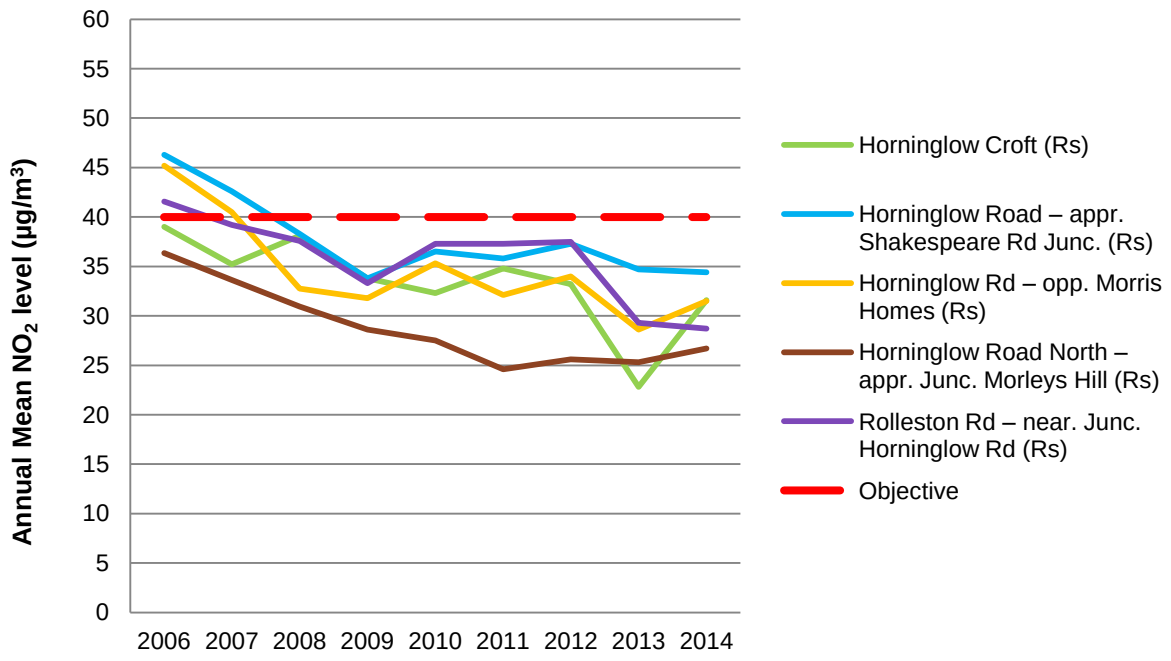

Figure 2.4: Trends in Annual Mean NO_2 Concentrations Measured at Diffusion Tube sites along the Horninglow Road section of the AQMA.

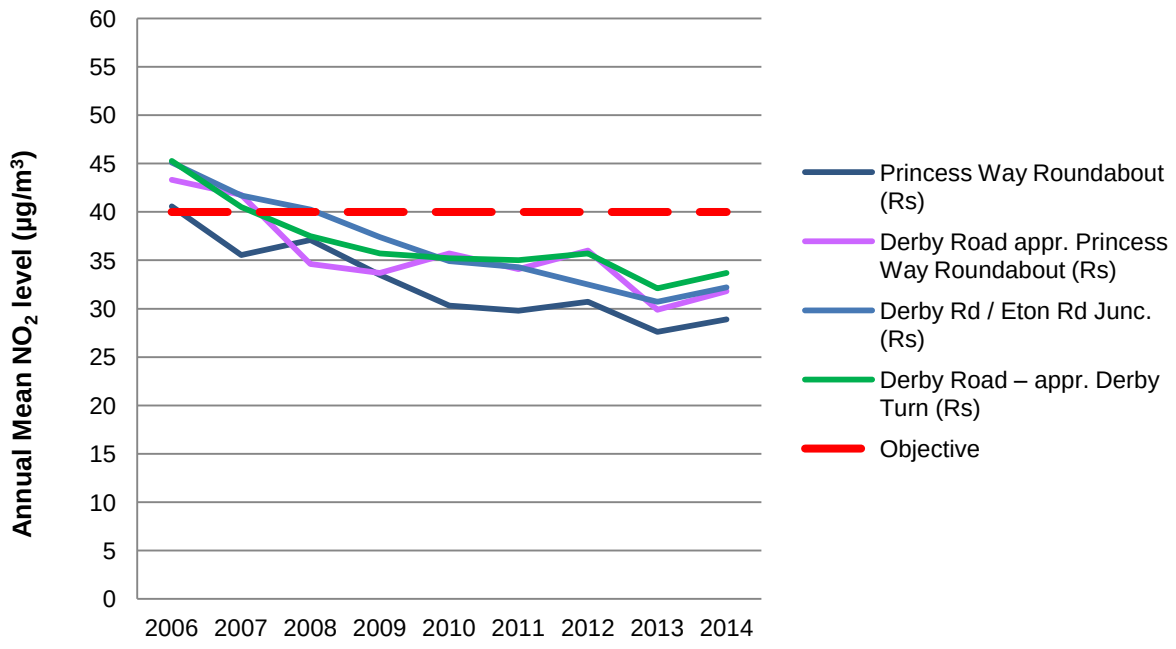

Figure 2.5: Trends in Annual Mean NO_2 Concentrations Measured at Diffusion Tube sites along the Derby Road section of the AQMA.

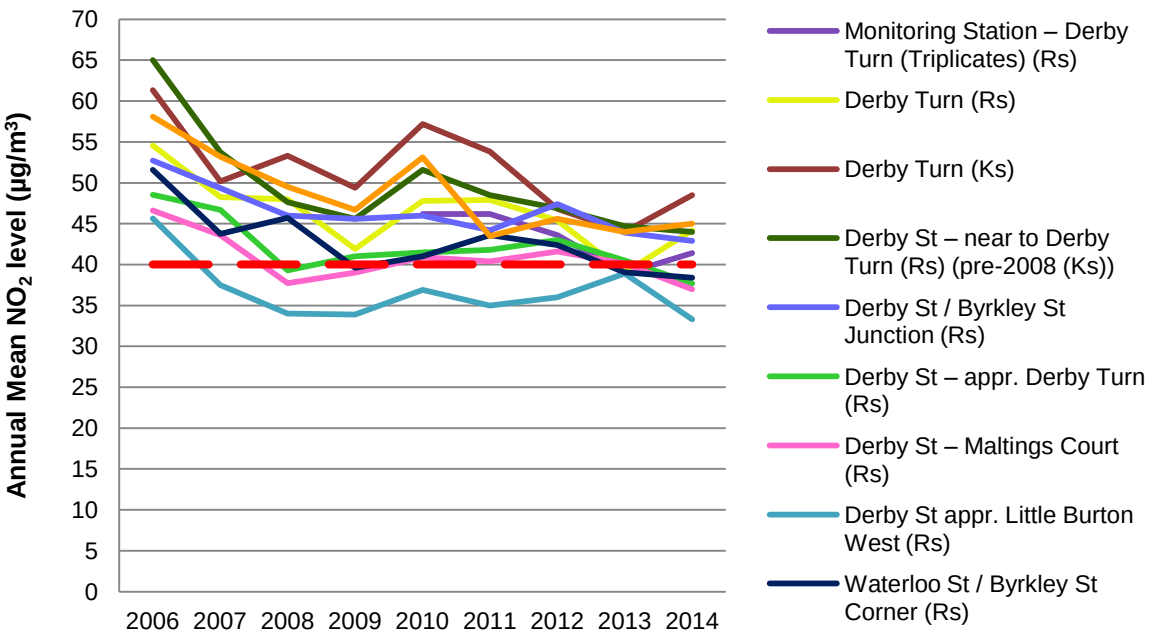

Figure 2.6: Trends in Annual Mean NO_2 Concentrations Measured at Diffusion Tube sites along the Derby Street, including Derby Turn and the Borough Road / Derby Street / Byrkley Street / Waterloo Street gyratory section of the AQMA.

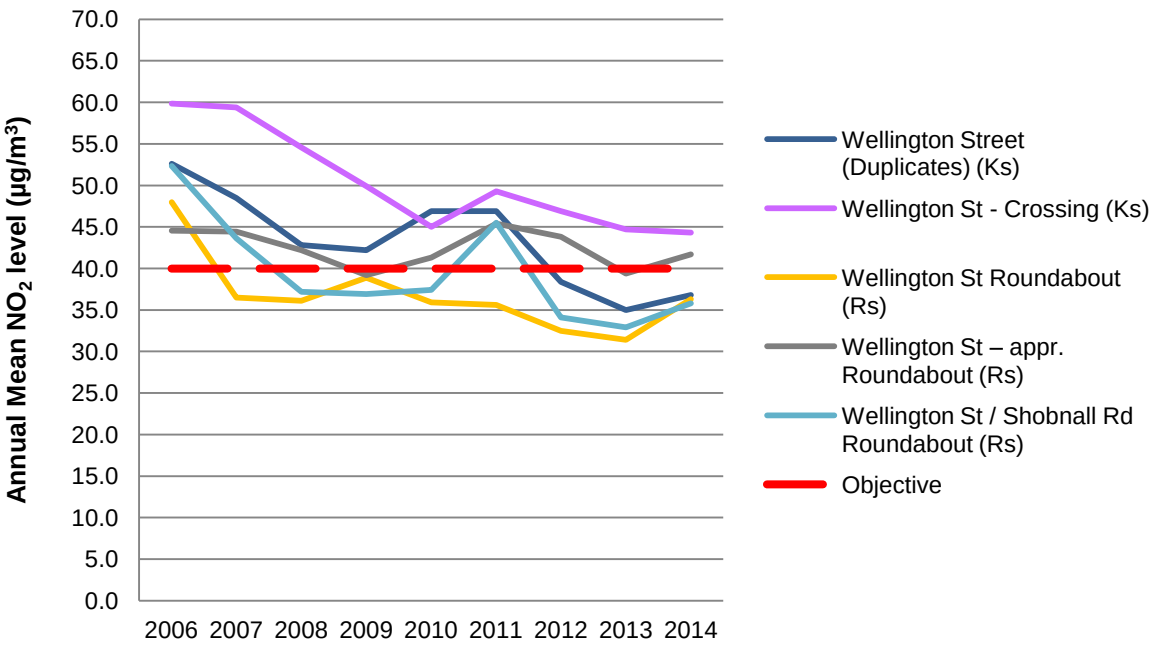

Figure 2.7: Trends in Annual Mean NO_2 Concentrations Measured at Diffusion Tube sites along the Wellington Street section of the AQMA.

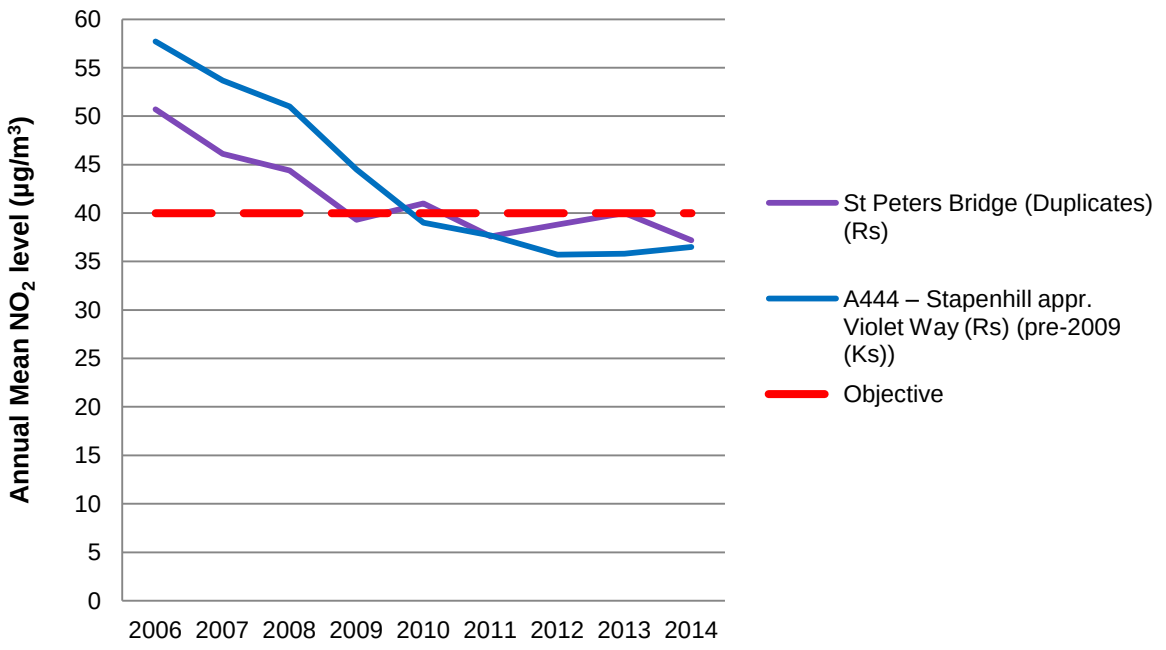

Figure 2.8: Trends in Annual Mean NO_2 Concentrations Measured at Diffusion Tube sites along the small St Peters Bridge Roundabout AQMA.

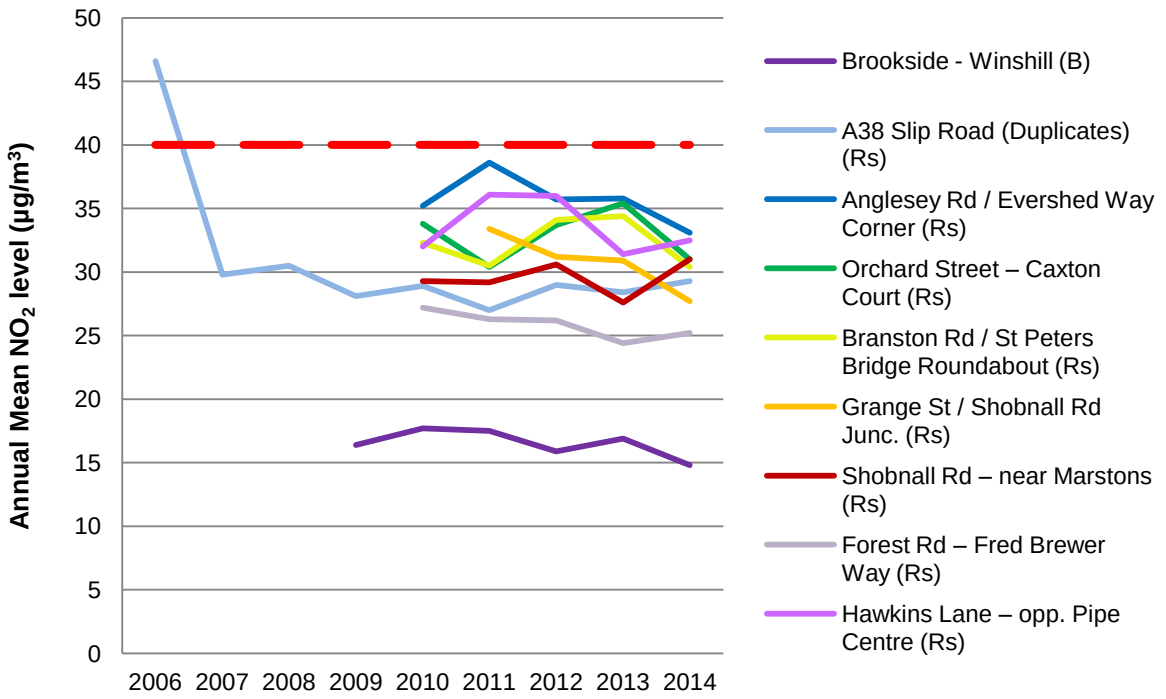

Figure 2.9: Trends in Annual Mean NO_2 Concentrations Measured at Diffusion Tube sites outside of the AQMA's.

Figures 2.3 to 2.9 clearly show an overall downward trend in NO_2 levels at sites within the AQMA's over the past 9 years. Spatially, the highest NO_2 levels have historically been recorded at sites along the Wellington Street, Derby Street including Derby Turn and the Borough Road / Derby Street / Byrkley Street / Waterloo Street gyratory sections of the primary AQMA. With respect to Wellington Street (Figure 2.7), 2 out of 6 sites breached the annual mean NO_2 Objective during 2013 and 2014, while 6 out of 10 sites breached the NO_2 Objective along the Derby Street and Borough Road / Derby Street / Byrkley Street / Waterloo Street gyratory section (Figure 2.6). Meanwhile, diffusion tube sites along the Horninglow Street section of the AQMA have also shown a gradual decline over the past 9 years, whereby all monitoring sites along this stretch recorded NO_2 levels in excess of the annual Objective during 2006, but by 2014 just 2 sites were hovering around the 40 µg/m^3 annual NO_2 Objective (Figure 2.3). With respect to the Horninglow Road (Figure 2.4) and Derby Road (Figure 2.5) sections of the AQMA, NO_2 levels have consistently fallen below the annual NO_2 Objective for the past 6 years and continue to decline slowly. However, ESBC considers it prudent to continue monitoring, as some of the diffusion tube sites have recorded levels around 34 µg/m^3 during 2014. Ideally these would need to decline by at least a further 3 µg/m^3 in order to be absolutely confident of revoking these two sections of the AQMA, taking into consideration uncertainties in data accuracy, which are often inherent with diffusion tube monitoring. Further monitoring is also required in the smaller AQMA around St Peters Bridge (Figure 2.8), where NO_2 levels have been hovering above and below the 40 µg/m^3 Objective by approximately 1 or 2 µg/m^3 for the past 5 years. Figure 2.9 shows NO_2 levels over the past 9 years for all remaining NO_2 diffusion tube sites located outside of the AQMA's. NO_2 levels have consistently remained below the 40 µg/m^3 post 2006 for all sites outside of the AQMA's.

2.2.2 PM_{10}

Annual average concentrations of PM_{10} from the Derby Turn monitoring station are shown in Table 2.6a for 2014 and are compared with data for 2010-2013 to assess for any temporal trends with respect to the annual Objective of 40 µg/m^3. With respect to the BAM particulate monitor at the Derby Turn station, the results were corrected for slope as per TG(09) to meet the equivalence criteria for gravimetric methods for PM_{10} monitoring. More details on this procedure are provided in Appendix (a).

A further requirement with respect to PM_{10} monitoring is to assess whether more than 35 exceedences of the 24 hour Objective of 50µg/m^3 have occurred in the most recent calendar year. Results of the number of 24 hour exceedences of PM_{10} are shown in Table 2.6b. Data is displayed for 2014 and comparisons are made with 2010-2013 data.

Table 2.6a: Results of Automatic Monitoring of PM_{10}: Comparison with Annual Mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2014 %	Confirm Gravimetric Equivalent (Y or NA)	Annual Mean Concentration µg/m³				
						2010	2011	2012	2013	2014
CM1 – Derby Turn	Roadside	Y	64.8%	64.8%	Y	23.7	26.9	25.4	*29.0	*31.0

Note:

* Annual Mean annualised in accordance with Box 3.2 of TG(09), due to less than 75% data capture

Table 2.6b: Results of Automatic Monitoring for PM_{10}: Comparison with 24-hour mean Objective

Site ID	Site Type	Within AQMA?	Valid Data Capture for monitoring Period %	Valid Data Capture 2014 %	Confirm Gravimetric Equivalent	Number of Exceedences of 24-Hour Mean (50 µg/m³)				
						2010	2011	2012	2013	2014
CM1 – Derby Turn	Roadside	Y	64.8%	64.8%	Y	2	12	4	13	10

In contrast to NO_2 levels that have seen an overall decline in recent years, Table 2.6b demonstrates that PM_{10} levels have started to show a gradual creep from 23.7 µg/m^3 during 2010 to 31.0 µg/m^3 during 2014. This is highlighted further in Figure 2.10 below. ESBC does not consider this gradual PM_{10} creep to be alarming as levels are 9 µg/m^3 below the annual Objective, but it is prudent to monitor this closely in the long term. With respect to the 24-hour mean Objective, the number of exceedence days has fluctuated over the past 5 years with no clear trend. During 2014, the 24-hour mean Objective was breached on 10 days compared with 13 days during 2013, 4 during 2012, 12 during 2011 and just 2 in 2010 (Table 2.6b).

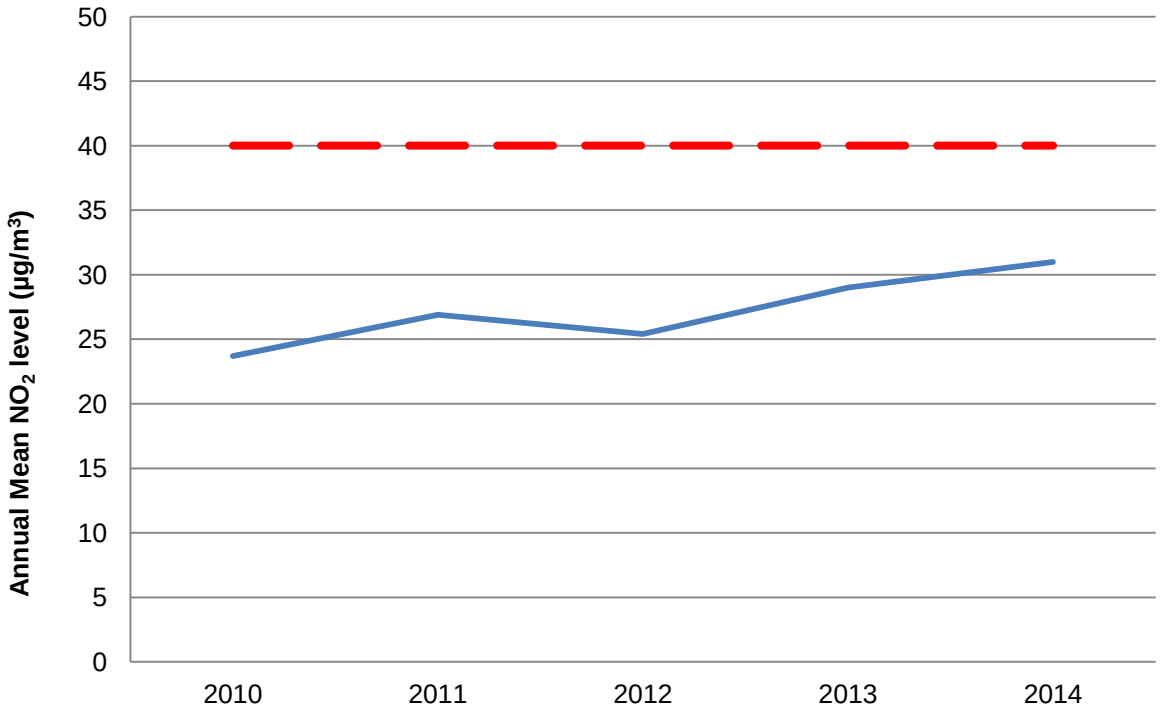

Figure 2.10: Trends in Annual Mean PM_{10} Concentrations Measured at the Derby Turn Automatic Monitoring Station.

2.2.3 Sulphur Dioxide (SO_2)

During previous rounds of Review and Assessments, ESBC considered a range of sources in order to find out if any of the SO_2 Objectives were likely to be breached. No breaches were identified, therefore at ESBC does not monitor for this pollutant.

2.2.1 Benzene

This Authority does not currently monitor for benzene within the Borough. Previous rounds of Review and Assessment highlighted that there are no relevant locations within the Borough where Objectives are likely to be breached, therefore monitoring is not considered necessary.

2.2.5 Other pollutants monitored

At present ESBC does not monitor for any other pollutants. Only NO_2 and PM_{10} are monitored at the current time.

2.2.2 Summary of Compliance with AQS Objectives

ESBC has examined the results from monitoring in the Borough. Concentrations outside of the AQMA are all below the objectives at relevant locations, therefore there is no need to proceed to a Detailed Assessment.

3 Road Traffic Sources

Local Authorities are required to focus their attention on the likely impacts of road traffic sources on relevant receptors close to busy roads. This is particularly the case along congested roads and near to junctions where emissions will be higher, together with built up areas where the road can have a canyon effect, where buildings either side restrict dispersion and dilution of pollutants. Attention is required with regards to NO_2 in all cases and PM_{10} in some. This Updating and Screening Assessment report considers locations that have not been assessed in earlier rounds of Review and Assessment, locations where significant changes in traffic flows have occurred, locations where new developments may have impacted upon traffic conditions and locations where a new exposure has been introduced to areas of poor air quality that have not been assessed previously.

To assess the road traffic sources for the latest round of the Review and Assessment, the latest road traffic data was downloaded from the Department for Transport (DfT), supplemented with some data from the Highway Data Team at Staffordshire County Council and traffic data supplied in Transport Assessments for local developments. This helps identify any new or changed road sources.

Using the checklist approach from TG (09) the following categories were considered to determine if more detailed assessment was required in relevance to the appropriate pollutants.

In some instances screening modelling may be required using the latest version of the DMRB (Design Manual for Roads & Bridges). This model is described in more detail in Appendix B, but considers factors such as the distance of a receptor from a road, the daily traffic flow along the road, the proportion of HGVs and the general background concentration of the pollutant under consideration.

3.1 Narrow Congested Streets with Residential Properties Close to the Kerb

Concentrations of NO_2 tend to be higher where traffic is slow moving, with stop/start driving and along canyon like streets with buildings either side that reduce dispersion. TG(09) requires Local Authorities to identify narrow congested streets with annual average daily traffic flows (AADF) of around 5,000 vehicles per day or more.

A congested street is defined as one with slow moving traffic that is frequently stopping and starting due to pedestrian crossings, parked vehicles throughout much of the day and not just peak rush hours. The average speed down such streets is likely to be less than 25 kph (15 mph).

A narrow street is defined as one with residential properties within 2m of the kerb and buildings on both sides (the buildings on the opposite side of the road may be further from the road than 2m). Also the buildings height tends to be greater than the width of the road.

Using knowledge of the Borough and up-to-date traffic data downloaded from the DfT and observed in Transport Assessments for developments, the street that matches the criteria outlined above most closely is Wellington Street. However, this street has already been considered in previous Review and Assessment work and it forms part of the larger AQMA where an Action Plan has been in place since 2009 and we currently monitor. To the best of ESBC's knowledge, there are no other streets where the above criteria apply.

ESBC confirms that there are no new/newly identified congested streets with a flow above 5,000 vehicles per day and residential properties close to the kerb, that have not been adequately considered in previous rounds of Review and Assessment.

3.2 Busy Streets Where People May Spend 1-hour or More Close to Traffic

TG(09) recognises that there are some street locations where individuals may regularly spend 1-hour or more, for example, streets with many shops or outdoor cafes and bars. Local Authorities are required to identify all busy streets (i.e. those with an annual average daily traffic flow (AADF) of >10,000) where individuals may be exposed within 5 metres of the kerb for 1-hour or more, that are new, or have not previously been assessed. Using detailed information on traffic flows, Local Authorities are then required to run the most up to date version of DMRB for NO_2 to predict concentrations. The DMRB screening model does not calculate 1-hour concentrations; therefore TG(09) states that if the annual mean does not exceed 60µg/m^3 then there should be fewer than 18 1-hour exceedences of the 200µg/m^3 Objective.

Traffic data from DfT and Staffordshire County Council has shown there are no street locations that haven't already been adequately assessed previously in terms of daily traffic flows greater than 10,000 AADF where people may spend 1 hour or more close to traffic. Furthermore there are no new street locations where the aforementioned criteria apply.

ESBC confirms that there are no new/newly identified busy streets where people may spend 1 hour or more close to traffic.

3.3 Roads with a High Flow of Buses and/or HGVs.

TG(09) requires roads with high flows of buses and heavy goods vehicles (HGVs) to be assessed in relation to both NO_2 and PM_{10}.

Even roads where traffic flows are not necessarily high (i.e. fewer than 20,000 AADF) but there is a disproportionately high volume of buses and/or HGVs, further considerations may be required through DMRB modelling. Exposure is considered relevant when people spend more than 1-hour and are within 10m of the road in question.

For this round of the assessment consideration was given to roads with greater than 20% of buses and HGVs that were not previously considered or may have changed in the 3 years since the previous Updating and Screening Assessment in 2012.

After reviewing the most recent traffic data downloaded from DfT there are still no roads with sufficiently high buses and HGVs to require a Detailed Assessment for NO_2 or PM_{10}. The two main trunk roads of the A50 at Uttoxeter and the A38 around Burton upon Trent hold the greatest percentage of buses / HGV's of 16% and 12% respectively. All other roads have a lower percentage of buses & HGVs.

ESBC confirms that there are no new/newly identified roads with high flows of buses/HGVs.

3.4 Junctions

Junctions are considered in relation to both NO_2 and PM_{10} and are significant due to the combined effect of traffic from more than one road and stop start driving.

The Updating and Screening Assessment is required to consider “busy” junctions where combined traffic levels are greater than 10,000 AADF with relevant receptors within 10 metres of the kerb. A number of junctions were considered through DMRB modelling in previous Updating & Screening Assessments within the AQMA, Uttoxeter, and junctions just outside the AQMAs and at locations along a corridor that connects the two AQMAs. Apart from key junctions within the AQMAs, all other junctions previously considered were found not to be at risk of exceeding Objectives for NO_2 or PM_{10}. This was further highlighted by diffusion tube data, which to this day are still not exceeding the annual NO_2 Objective.

For this Updating & Screening Assessment, ESBC has looked at available data outside of the main towns of Burton upon Trent and Uttoxeter that previously have not been considered (i.e. outlying villages such as Yoxall and Barton under Needwood) and has found that the combined traffic levels at key junctions does not exceed an AADF of 10,000. Nor have any new exposures been introduced to busy junctions. ESBC therefore concluded that further screening modelling through DMRB was not necessary.

ESBC confirms that there are no new/newly identified busy junctions/busy roads.

3.5 New Roads Constructed or Proposed Since the Last Round of Review and Assessment

TG(09) states that Local Authorities must review any new roads constructed or proposed since the last round of Review and Assessment in order to assess for any likely exceedences of the NO_2 and PM_{10} Objectives. It requires information to be gathered from air quality assessments carried out prior to construction or planning permission being granted. Where no air quality assessment has been completed then new roads with greater than 10,000 vehicles per day should be subject to DMRB modelling to predict NO_2 and PM_{10} concentrations.

Although not a completely new road, the A50 trunk road around Uttoxeter has been proposed to be restructured as part of the A50 Growth Corridor Project. The A50 Growth Corridor project is a multi-million pound Government investment aimed at reducing congestion, addressing safety concerns, supporting local businesses and ultimately creating more jobs and opportunities for Staffordshire people.

The A50 is a trunk road managed by Highways England (formerly known as the Highways Agency). Proposals to improve the A50 around Uttoxeter were announced by the Government as part of the National Infrastructure Plan and the Autumn Statement in December 2013. Highways England has appointed Staffordshire County Council to be their ‘delivery partner’ for the projects.

The A50 Growth Corridor investment works will be implemented through two separate projects. Project A, the first project, will deliver a grade-separated junction on the A50 to the West of Uttoxeter, providing improved access to a new housing and employment site to the south of the A50 and the existing and new JCB factories to the north of the A50. The form of Project B is still to be confirmed, but will likely involve the reconfiguration of the existing Dove Way bridge over the A50 to the East of Uttoxeter, by converting it to a grade-separated junction. This second project may also involve closing the two ‘at grade’ roundabouts on the A50 in the Uttoxeter area.

The proposals for Project A were approved at the end of 2014. As part of a wider Environmental Impact Assessment (EIA), URS Infrastructure & Environment UK Limited assessed the potential air quality impact of Project A (Reference: 47069770, May 2014). Using the most up to date version of ADMS Roads, URS quantified the

change in pollutant concentrations at representative existing air quality sensitive receptors in the vicinity of the Project A site. This was based on predicted emissions data from the change in traffic flow as a result of Project A. Predictions were made for annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations for baseline and operational scenarios in 2015. PM_{10} and $PM_{2.5}$ were predicted to be well below Objectives at all receptors.

Baseline NO_2 diffusion tube monitoring was carried out by URS between February and May 2014 to inform the dispersion modelling exercise. This exercise indicated that annual mean concentrations of NO_2 were likely to marginally exceed the annual NO_2 Objective at a couple of locations immediately adjacent to the A50 trunk road, near to its junction with the B5030 in the future. The exercise also recognised that annual mean concentrations of NO_2 fall rapidly with distance from the A50, so that concentrations are below the national air quality Objective for that pollutant at 40 metres back. Due to the uncertainty with the predicted NO_2 concentrations at sensitive receptors, ESBC has started to monitor NO_2 levels in the vicinity of receptors where the annual NO_2 Objective could be at risk of exceeding in the future. Monitoring through diffusion tubes began in January 2015. ESBC had previously monitored NO_2 levels in this area, but the diffusion tubes were removed in 2006 due to consistent compliance. Also to date, traffic flows have not increased significantly (i.e. by more than 25%) to trigger further screening modelling (see Section 3.6).

It is also important to note that Project B (second phase) has not yet been confirmed, which could alter the air quality situation further. In light of this, ESBC will be working closely with Staffordshire County Council and Highways England to try and ensure sensitive receptors will not be unduly affected by the road schemes. This will be supplemented with diffusion tube monitoring that will be reported in future reports.

ESBC has assessed new/proposed roads meeting the criteria in Section A.5 of Box 5.3 in TG(09), and concluded that it will not be necessary to proceed to a Detailed Assessment.

3.6 Roads with Significantly Changed Traffic Flows

The guidance highlights the need to consider both NO_2 and PM_{10} for roads where traffic flows have changed significantly since the previous Updating and Screening Assessment in 2012.

A significant change is defined as any roads with more than 10,000 vehicles per day (AADF) that have experienced a “large” increase in traffic flow greater than 25% since the previous round of Review and Assessment.

If large increases in traffic are highlighted and have previously been identified as being at risk of exceeding Objectives then screening modelling using DMRB is required to determine whether potential Objective exceedences could occur and therefore require more detailed assessment. At risk of exceeding Objectives is described as roads where the previous predicted NO_2 concentrations were above 36µgm^3.

All available data was downloaded from DfT for 2013 for roads over 10,000 AADF within the Borough. Growth factors produced from Tempro were applied to the 2013 DfT AADF traffic data to estimate AADF in 2014. For the two main trunk roads of the A38 and A50 a growth factor of +1.0054 was applied, while for other A-roads a growth factor of +1.0046 was applied. By doing this, it was found that all roads with an AADF of 10,000 did not exceed the trigger level of 25% increase. The highest increase in traffic levels was 9% on the A52 (Mayfield) and on a stretch of the A50 trunk road between the A522 and A518 where the increase in traffic levels was 7%. In light of the above, it is deemed that further screening modelling is not necessary.

A number of planning applications have also been considered in this section, where air quality assessments were completed as part of a planning application. These assessments were requested predominately due to concerns of potential increased traffic flows on nearby roads, potential impact on the AQMAs, or due to the introduction of new receptors near to existing roads where the annual mean NO_2 Objective are close to or are currently being exceeded.

The 2011 Progress Report reported on an application to develop a Tesco foodstore, with customer car park, petrol filling station, service yard and Combined Heat and Power Plant (CHP). The development was proposed for a vacant brown field site previously used by Alumasc Grundy, located just to the west of Hawkins Lane. Planning consent was given to the development in April 2011, subject to conditions. However in June 2014, the application was resubmitted due to a reduced overall footprint such that the gross building area would now be 10,570 m^2 and whole site would be 42,500 m^2. This was supplemented with a new air quality assessment undertaken by Mouchel (Reference: 1059730-001). Using ADMS Roads, NO_2 and particulates were modelled for a baseline year of 2012, opening year of 2019 and future year of 2024. This exercise highlighted that four locations that are already exceeding the annual NO_2 Objective within the AQMA would also exceed in the 2019 opening year and by 2024 two of these four locations would still be exceeding the NO_2 annual Objective. No exceedences were found outside of the existing AQMA during any of the modelled years, and no exceedences of particulates were found anywhere within or outside of the AQMAs. These predictions were however based on worst case scenarios and do not reflect any potential benefits from the proposed Travel Plan for the development. This is likely to include a car sharing scheme for staff, greater provision of cycle parking, promotion of walking buddy and Bicycle Use Group (BUG) schemes, promotion of home shopping and procurement of cleaner delivery vehicles amongst a number of other schemes.

Also in June 2014, an application to develop approximately 23.3 hectares of green field land off Craythorne Road, Stretton to accommodate up to 425 residential dwellings was submitted. Wardell Armstrong undertook an air quality assessment (Reference: 001) to assess both the impacts during construction and operational phase of the development. Using the most up to date version of DMRB, screening modelling was undertaken to assess potential air quality impacts of the operational phase of the development at six representative existing sensitive receptors for a projected opening year of 2026. Both NO_2 and PM_{10} were considered in the assessment. All predicted NO_2 and PM_{10} concentrations were predicted to be well below Objectives / Limit Values in both the baseline year of 2012 and the future opening year of 2026. In 2026, for NO_2, four of the six existing sensitive receptor locations were predicted to experience an imperceptible increase in NO_2 concentrations as a result of the proposed development (i.e. increase of less than 0.4

µg/m^3). Two of the six existing sensitive receptors were predicted to experience a small change (i.e. 0.4 – 2 µg/m^3). Overall the predicted generated traffic from the development was predicted to have a negligible impact in the locality. No further considerations were necessary.

There have also been four applications during 2014, where residential receptors were proposed to be introduced in areas of existing poor air quality on Derby Road, Horninglow Street, Waterloo Street and Borough Road. All four applications involved the conversion of retail units or offices to residential flats, where mechanical ventilation will now be fitted to draw in air from the rear of the properties where the NO_2 Objectives are not being breached.

ESBC confirms that there are no new/newly identified roads with significantly changed traffic flows.

3.7 Bus and Coach Stations

TG(09) states that NO_2 concentrations can sometimes be elevated close to bus stations or sections of bus stations that are not enclosed and where there are relevant exposures nearby. Relevant exposure is judged mainly with regard to the 1-hour NO_2 Objective (i.e. those parts of the bus station that are not enclosed or nearby shopping areas where members of the public may reasonably spend 1 hour or more). Attention also needs to be paid with regard to the NO_2 annual mean, if there are residential properties close by too. Local Authorities are required to determine whether the number of bus movements to and from bus stations exceeds 2,500 movements per day and whether there are relevant exposures within 10m of any part of the bus station where buses are present. Should this be the case, Local Authorities are then required to use the DMRB screening model to determine whether NO_2 Objectives are likely to be exceeded.

Within the Borough, there are two main bus stations, one on New Street in Burton upon Trent and the other just off Bradley Street (B5028) in Uttoxeter. The most up to

date data was gathered from Staffordshire County Council on the numbers of bus movements for both locations (i.e. 2013). Although there are residential properties within 10m of the Uttoxeter bus station together with the likelihood of people spending 1 hour or more in the vicinity, the number of bus movements to and from the station was under 200, which is well below the 2,500 movement threshold. New Street is located in a shopping area with no residential properties, where people could reasonably spend 1 hour or more. The number of bus movements here was 538 movements in both directions which again are below the 2,500 threshold. No further considerations are therefore required.

ESBC confirms that there are no relevant bus stations in the Local Authority area.

4 Other Transport Sources

The Updating and Screening Assessment also requires consideration of non-road related transport sources including airports; railways, particularly stations and depots, but also alongside some busy lines with a large number of diesel locomotives; and ports due to shipping emissions.

4.1 Airports

Aircraft are widely known to be potentially significant sources of NO_2 emissions, particularly during takeoff. Local Authorities that have airports in their area are therefore required to assess NO_2 concentrations at relevant exposures located within 1000m of the airport boundary. ESBC only has 1 aerodrome within its area and therefore no further consideration is required.

ESBC confirms that there are no airports within its area and a Detailed Assessment is therefore not required.

4.2 Railways (Diesel and Steam Trains)

Stationary diesel and coal-fired locomotives can give rise to high levels of sulphur dioxide (SO_2) close to the point of emissions. A requirement of the Updating and Screening Assessment is to consider locations where diesel or steam locomotives are regularly stationary for 15 minutes or more and where individuals may be regularly exposed within 15m of these locomotives. NO_2 concentrations tend to be elevated alongside railway lines with a large number of diesel locomotive movements and emissions can be equivalent to those from a busy road. There is therefore a new requirement that applies to some Local Authorities to assess railway lines in their district with a high usage of diesel locomotives and whether there are relevant exposures nearby. Supplementary guidance to TG(09) on assessing emissions from railway locomotives outline which railway lines should be considered. However,

TG(09) states that these lines only need to be considered where the background NO_2 concentration is above 25 µg/m^3.

4.2.1 Stationary Trains

ESBC confirms that there are no locations where diesel or steam trains are regularly stationary for periods of 15 minutes or more, with potential for relevant exposure within 15m.

4.2.2 Moving Trains

ESBC confirms that there are no locations with a large number of movements of diesel locomotives, and potential long-term relevant exposure within 30m.

4.3 Ports (Shipping)

TG(09) states that Local Authorities with shipping / ports must assess potential exposures to SO_2 as large ships generally burn oils with high sulphur content in their main engines. If there are sufficient movements in a port they can give rise to a sufficient number of 15-minute periods above 266 µg/m^3 to exceed the 15-minute Objective. Since ESBC is an inland Local Authority, this requirement does not apply.

ESBC confirms that there are no ports or shipping that meets the specified criteria within our area.

5 Industrial Sources

5.1 Industrial Installations

Whilst industrial sources are unlikely to make significant local contributions to annual mean concentrations, they could be significant with regards to the short -term Objectives and consideration should be given to combined impacts. TG(09) utilises a checklist approach divided into four sections;-

1. Industrial installations either regulated by the Environment Agency (i.e. A1 processes) or Local Authorities (i.e. A2 and Part B processes).
2. Major fuel (petrol) storage depots
3. Petrol filling stations
4. Poultry farms

In order to help Local Authorities to identify potential significant sources, nomograms have been developed for a number of pollutants. TG(09) states that all of the pollutants under the Regulations should be considered but those most at risk of requiring further work are SO_2, NO_2, PM_{10} and benzene. TG(09) also recommends Local Authorities also consider sources in neighbouring Authorities.

5.1.1 New or Proposed Installations for which an Air Quality Assessment has been Carried Out

TG(09) requires Local Authorities to obtain details of any air quality assessments, where relevant, that have been carried out for new or proposed industrial installations.

ESBC confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.1.2 Existing Installations where Emissions have Increased Substantially or New Relevant Exposure has been Introduced

Another requirement for Updating and Screening Assessments is to determine whether any of the sources identified during previous rounds of Review and Assessment have experienced a substantial increase in emissions or received new relevant exposure in their vicinity. A substantial increase is taken to be one greater than 30%. Should any industrial installation be found to have increased emissions of more than 30% then information would need to be gathered on the total annual emission of the pollutant in question as well as the height of the emission, which should then be used through the relevant nomogram to see if relevant thresholds are likely to be exceeded.

All industrial point sources previously assessed were reconsidered, along with any existing processes that have become regulated in the last 3 years, to identify any significant emissions. None of the Part B processes regulated by this Authority have been identified as having increased emissions.

For the A1 installations, information from the Environment Agency's ("What's in your backyard?") pollution inventory for all their regulated processes was used. None of these were identified as having substantial increases in emissions since the Updating and Screening Assessment in 2012.

ESBC confirms that there are no industrial installations with substantially increased emissions or new relevant exposure in their vicinity within its area or nearby in a neighbouring Authority.

5.1.3 New or Significantly Changed Installations with No Previous Air Quality Assessment

This section looks at any new or significantly changed installations with no previous history of air quality assessments. In the absence of previous air quality assessments, Local Authorities are required to determine whether the installation in question is likely to give rise to significant pollutant emissions, and if so, gather detailed information on the emission characteristics of that source to determine if thresholds are exceeded in the relevant nomogram.

During 2014, ESBC received an application to undertake a prescribed coating activity for powder coating of metal components from Pym & Wildsmith (Metal Finishers) Limited, Bramshall Industrial Estate, Bramshall, Uttoxeter, Staffordshire, ST14 8TD Powder coating is the main regulated activity. In addition, there are a number of other activities undertaken on site, including surface cleaning of metal, coating of metal or plastic using organic solvents, coating using metal in molten form, a decontamination of metals process to clean jigs used in the powder coating and organic solvent coating processes. These activities themselves are below the thresholds for regulation. An Environmental Permit was issued in March 2015. The main emissions are combustion gases from the powder coating ovens / heaters and particulates associated with the jig furnaces, shot blasting arrestment and the metal coating booth. Given the type of activity and the scale of the processes undertaken means that compliance can be demonstrated via other means to emissions monitoring through robust management practices and process control (i.e. temperature controls etc). No further considerations are required at this stage.

Also, in the last 12 months, Environmental Permits to operate Small Waste Oil Burners (SWOBs) have been issued for 2 premises;-

1. Filmers Garage Limited , Unit 13, Falcon Close, Burton upon Trent, Staffordshire, DE14 1SG
2. T.L Darby Limited, Unit 5, Centrum East Retail Park, Eighth Avenue, Burton upon Trent, Staffordshire, DE14 2WG

Both premises are small garages / car repair workshops where waste hydrocarbon based oils arising from the draining of engines, gearboxes and other lubrication systems at the premises is burned within a heating appliance with a net rated thermal input of less than 3 MW. Such waste oil burners tend to only be used during some

cold days during the winter months to provide heating to staff within the workshop. In terms of emissions of key pollutants the risk is considered very low from these premises.

ESBC confirms that there are no new or proposed industrial installations for which planning approval has been granted within its area or nearby in a neighbouring authority.

5.2 Major Fuel (Petrol) Storage Depots

There is some evidence to suggest that major petrol fuel depots can emit sufficient levels of benzene to put the 2010 annual Objective at risk of being exceeded, particularly if combined with higher levels from nearby busy roads.

ESBC can confirm there are no major fuel (petrol) storage depots within the Borough.

5.3 Petrol Stations

There is also evidence to suggest that petrol stations with an annual throughput of more than 2,000m^3 of petrol that are close to busy roads with more than 30,000 vehicles per day and a sensitive receptor within 10m of the pumps are at risk of exceeding the annual 2010 benzene Objective. This includes any residential accommodation above the petrol station. TG(09) states that if all three of the criteria outlined above are met then exceedences are likely and a Detailed Assessment would need to be carried out. This Updating and Screening Assessment has considered all 15 petrol service stations within the Borough that are permitted under the Environmental Permitting (England and Wales) Regulations 2010 (as amended). TG(09) states that petrol stations with Stage II Vapour recovery controls (i.e. control of displaced petrol vapours at the pumps when filling vehicle tanks) do not need to be considered. Six petrol stations have continued to operate Stage II Vapour Recovery

controls that have been in place since 1st January 2010, in addition to controls of displaced vapours from storage tanks on the forecourt (i.e. Stage I Vapour Recovery). Out of the remaining 9 Petrol stations that operate Stage 1 vapour recovery controls alone, none meet all three criteria of throughputs greater than 2,000m^3, location close to roads in excess of 30,000 vehicles per day and relevant receptors within 10m of the pumps.

ESBC confirms that there are no petrol stations meeting the specified criteria**.**

5.4 Poultry Farms

A further requirement for Updating and Screening Assessment's is the consideration of poultry farms (defined as chickens (laying hens and broilers), turkeys, ducks and guinea fowl) with regards to PM_{10} emissions. Local Authorities are required to establish whether they have any relevant exposures within 100m of poultry farms with greater than 400,000 birds if mechanically ventilated, 200,000 birds if naturally ventilated and 100,000 birds for any turkey units. If any of the above criteria are met the Local Authority must proceed to a Detailed Assessment.

This Authority has three poultry farms where birds are mechanically ventilated, but the numbers of birds are well below the 400,000 threshold. ESBC received an application in March 2014 to increase the number of birds at one of the poultry farms, but not to the extent that it would exceed the thresholds stated above. No further considerations are therefore required at this stage.

ESBC confirms that there are no poultry farms meeting the specified criteria.

6 Commercial and Domestic Sources

Another requirement for Updating and Screening Assessments is the consideration of emissions from biomass burning from both the domestic and commercial sectors, including the service sectors (for example commercial offices, education, government, health, hotels, sport and leisure, retail and warehousing). Attention is also required with regards to solid fuel-burning from domestic sources.

It is widely recognised that biomass burning together with some combined heat and power systems (CHP) can lead to an increase in particulate emissions during combustion. Aerosol formation from volatile materials distilled from the wood is also considered to be a potential issue. However, in contrast to gas-burning, biomass burning can also result in an increase in the overall NO_X emissions due to the fuel-derived portion not present in gas combustion.

6.1 Biomass Combustion – Individual Installations

Local Authorities are required to identify individual plant burning biomass in 50 KW to 2MW units using information under the Clean Air Act 1993 together with any recent planning consultations that have included biomass boilers. Biomass combustion needs to be considered in relation to both NO_2 and PM_{10}. TG(09) also suggests looking at previous Review and Assessment work on boilers >5 MW for SO_2 which could help in making any assessment. Once individual plant has been identified, further information on stack heights, diameters, dimensions of buildings within 5 times the stack height, maximum emission rates (g/sec) etc, needs to be gathered. This information would then be used to calculate an effective stack height, which together with a calculation of background emission rates can then be modelled using the nomograms set out in TG(09), to determine whether further assessments are required. Should the source exceed the threshold in the relevant nomogram a Detailed Assessment would be required.

Section 3.6 reported on an air quality assessment undertaken to assess the impacts of a proposal for a Tesco foodstore, with customer car park, petrol filling station, and service yard off Hawkins Lane. One other element to this application was the

proposal for a CHP plant which was also modelled as part of the air quality impact assessment. The plant is expected to provide an electricity output of 228 kW. The CHP plant will be fuelled by natural gas, and the main emissions modelled were NO_x to estimate local air quality impacts on NO_2 concentrations. The modelling exercise found that CHP emissions at relevant public exposure locations in close proximity to the store would be well within NO_2 Objectives / limits.

ESBC also received one other application for a small domestic biomass combustion plant, but the impact of this installation was found to be minimal. Furthermore, there are no other biomass plants within the vicinity of this installation.

ESBC has assessed biomass combustion plants, and concluded that it will not be necessary to proceed to a Detailed Assessment.

6.2 Biomass Combustion – Combined Impacts

It is now widely recognised that many small biomass combustion plants (including domestic solid-fuel burning), are individually acceptable but when combined, could lead to unacceptably high PM_{10} concentrations, particularly in areas where PM_{10} concentrations are close to or above the Objectives. The significance of domestic solid-fuel burning is thought to be relatively small but may become more significant in the future. TG(09) sets out a series of checklists, which includes identifying areas in $500m^2 \times 500m^2$ squares with the highest densities of houses and service sector biomass combustion appliances and the type of appliance used which then through a series of calculations is used to estimate an emission density for the square to determine if it exceeds the threshold in the nomogram. If the relevant threshold is exceeded then it would be necessary for the Local Authority to proceed to a Detailed Assessment. A significant proportion of Burton upon Trent is designated as a Smoke Control Area and since it is likely that the vast majority of people without central heating will be using gas or an alternative fuel, there is not the required density of solid fuel burning to justify a Detailed Assessment. An emissions inventory carried out in 1996 indicated that following the designation of the Area, there was a shift

towards households using predominantly electricity together with some gas rather than solid fuel. This further indicates that only a small proportion of households not using central heating will be using solid fuel.

There are however, a number of predominantly rural wards within the Borough where the burning of solid fuel was still fairly commonplace until recently. One such area is the village of Rocester, with approximately 700 households. Most of the village did not have access to a gas supply and solid fuel consumption remained relatively high. A Detailed Assessment was therefore undertaken during the second round of Review and Assessment in 2004 for both SO_2 and PM_{10}. Since 2004, a significant number of properties have now converted to natural gas or electricity as their fuel source; therefore no further consideration is needed in this regard.

There are no other significant densities of commercial biomass combustion that would require further investigation at this current time.

ESBC confirms that there are no locations within the borough where the combined effect of biomass burning is considered significant enough to proceed to a Detailed Assessment.

6.3 Domestic Solid-Fuel Burning

TG(09) recommends that solid fuel burning can be a significant source of SO_2, particularly on a local scale.

Rocester historically had a large density of solid fuel burning until recently. As a significant number now use electricity or natural gas as their fuel source, no further consideration is needed with respect to SO_2 emissions.

ESBC confirms that there are no areas of significant domestic fuel use in the Local Authority area.

7 Fugitive or Uncontrolled Sources

Dust emissions from uncontrolled and fugitive sources can give rise to elevated PM_{10} concentrations. Sources include quarrying and mineral extraction sites, landfill sites, coal and material stockyards, waste management sites and major construction sites.

Emissions are not well quantified from these sites; therefore predicting PM_{10} levels with any degree of accuracy is a difficult task. The first step in identifying any potential exceedences, is to determine whether there have been any air quality assessments carried out for the particular source in question. If so, the Local Authority would need to determine whether it is of adequate quality for Review and Assessment purposes. In the absence of an existing assessment, Local Authorities need to establish whether there is relevant public exposure near to the source of the dust emissions. On site sources may be haul roads, crushers, skips, stockpiles etc. Off-site sources may also be important, for instance access routes to the site where dust and dirt can be tracked out by vehicles leaving the site, deposited on the public highway and then picked up by passing traffic.

TG(09) states that if the relevant exposure is away from off-site roads used as access routes to the site, then 'near' should be defined with regards to the local background PM_{10} concentrations. For 2004 Objectives 'near' is within 1000 metres for a background >28 µg/m^3; 400 metres for a background >26 µg/m^3 and 200 metres for any background. Furthermore if the relevant exposure is within 50 metres of an off-site road used to access the site and there are visible deposits on the road, then these sections of road which may extend up to 1000 metres are regarded as 'near' providing the background is >25 µg/m^3 for the 2004 Objectives.

Local Authorities are further required to assess whether there are dust concerns associated with the individual facilities / sites through visual inspections and any history of dust complaints. Should all criteria be met, then it would be necessary to proceed to a Detailed Assessment.

There are a number of quarries located within the East Staffordshire Borough. These sites have continued to operate since the last round of review and assessment but without creating problems. Although there are receptors within 1000 metres of some

of the sites, there have been no significant dust emissions nor has there been any dust complaints. No further consideration is therefore required. A further large quarry on Yelsway Lane, Cauldon operated by Lafarge Cement UK PLC has been considered previously in relation to its potential trans-boundary impact on air quality from particulates. The “What’s in my backyard” section of the Environment Agency’s website highlights that emissions in 2012 (‘the latest available’) were significantly lower than previous years. Furthermore, the 2009 Updating & Screening Assessment highlighted that significant investment had been spent on dust abatement, plus there have been no complaints in relation to dust. No further considerations are required.

ESBC also regulates 10 activities where concrete batching, roadstone coating, manufacture of concrete blocks, roof tiles and other products and 2 mobile crushing activities etc take place. All of these activities are regulated through Part B Permits to operate under the Environmental Permitting Regulations 2010 (as amended). Again these activities have operated without creating dust problems so no further consideration is required. Furthermore, these processes have now been downgraded to reduced fee activities as the environmental impact potential is fairly low.

TG(09) recognises that waste management sites and landfill sites also have the potential for significant fugitive dust emissions. There are a number of such sites located within the East Staffordshire Borough, some of which are located near to sensitive receptors. However, these activities are generally small-scale and there have been no concerns over visible dust emissions. Also there are no recent dust complaints from these premises. No further considerations are required.

Major construction sites also have the potential for significant dust emissions. ESBC’s Pollution Team is consulted for planning applications. A number of larger developments are listed below that will involve long-term work where dust emissions could arise. These are;-

- Burton Rugby Club & Former Blockbuster Video Store off Orchard Street, Burton upon Trent.
- Mixed use development on land adjacent Pirelli Tyres Limited, Derby Road, Burton upon Trent.
- Land west of Uttoxeter (Hazellwalls Farm).
- A50 alterations (Project A) already referred to in Section 3.5

- Land south of Branston running parallel with the A38 Trunk road and at Branston Gateway that will be phased.
- Land off Craythorne Road, Stretton to accommodate 425 residential properties
- Tesco Foodstore development off Hawkins Lane already referred to in Section 3.6 for air quality impacts during the operational phase from traffic and Section 6.1 with respect to a proposed CHP.

All of the developments listed above produced air quality assessments where dust emissions were adequately assessed and robust dust mitigation plans covering each stage of the development from demolition, earthworks / excavation, trackout and loading / unloading etc have been produced or requested using the latest guidance such as 'Guidance on the assessment of dust from demolition and construction' produced by the Institute of Air Quality Management 2014. ESBC is confident dust emissions will be adequately controlled and therefore no further consideration is required at this stage.

Overall there is no requirement to proceed to a Detailed Assessment with respect to fugitive / uncontrolled sources of particulates.

ESBC confirms that there are no potential sources of fugitive particulate matter emissions in the Local Authority area.

8 Conclusions and Proposed Actions

8.1 Conclusions from New Monitoring Data

NO_2 – During 2014, ESBC monitored NO_2 levels using 47 diffusion tubes and an automatic chemiluminescent analyser at Derby Turn station. For a fourth consecutive year, NO_2 levels were below the annual mean Objective at the automatic monitoring station, whereby concentrations were 36.0 µg/m^3 in 2014 compared with 29.0 µg/m^3 during 2013, 32.2 µg/m^3 during 2012, 38.9 µg/m^3 during 2011 and 41.7 µg/m^3 during 2010. There have been no exceedences of the 1-hour mean NO_2 Objective of 200 µg/m^3 at all during the past 5 years.

NO_2 diffusion tube data for 2014 showed 10 exceedences, 7 of which were at roadside locations in terms of the annual Objective of 40 µg/m^3. The highest concentrations were found at the Derby Turn junction in the centre of the AQMA and at some sites along Derby Street, Wellington Street and the Borough Road / Derby Street / Byrkley Street / Waterloo Street gyratory. For a sixth consecutive year there were no exceedences anywhere along the Horninglow Road or Derby Road sections of the larger AQMA and in the case of the smaller AQMA in Stapenhill, NO_2 levels have fluctuated just above or below the annual NO_2 Objective for the past few years.

None of the tube locations recorded NO_2 levels in excess of 60 µg/m^3, therefore hourly exceedences are considered unlikely.

Upon inspection of temporal trends, it is clear that there has been a general decline in NO_2 levels over the past 9 years. The highest NO_2 concentration was 48.5 µg/m^3 recorded at the Derby Turn junction during 2014. However, prior to 2013 the highest overall concentration was in excess of 50 µg/m^3 recorded at multiple locations.

All diffusion tube sites outside of the AQMAs recorded NO_2 levels comfortably below the annual mean Objective of 40 µg/m^3.

PM_{10}- PM_{10} levels were also monitored at Derby Turn through a BAM monitor for the fifth full year during 2014. All PM_{10} Objectives have been complied with since 2009, but have shown a gradual increase from 23.7 µg/m^3 in 2010 to 31.0 µg/m^3 in 2014 .

In light of the above a Detailed Assessment will not be required.

8.2 Conclusions from Assessment of Sources

Transport- there have been no newly identified roads that have not already been considered in previous rounds of Review and Assessment. A number of planning applications have also been considered where potential changes to traffic flow may have affected air quality, although the requirement for a Detailed Assessment was ruled out.

Traffic data for 2014, did not highlight any roads and junctions with significantly changed traffic flows nor did it show a disproportionately large volume of HGV's or buses. Further investigations were therefore deemed unnecessary.

Other transport- there are no applicable airports or ports within the Borough, so consideration in the Updating and Screening Assessment was not required. There are also no relevant areas of exposure in relation to stationary or moving trains.

Industrial- no industrial sources have been identified through the Updating and Screening Assessment that require Detailed Assessment. There were no existing sites with significantly increased emissions and three "new" Part B regulated activity that were issued Environmental Permits under the Environmental Permitting Regulations 2010 (as amended) were also considered, but identified as not requiring further consideration.

Fuel Storage Depots and large service stations- there are no fuel storage depots in the Borough and any petrol service stations do not have the relevant exposure to require consideration.

Poultry Farms- the existing poultry farms in the borough are not large enough to require consideration in the Updating and Screening Assessment, despite an application to extend operations for one of them.

Biomass combustion from individual and combined sources- an application for one CHP Plant running off natural gas and one small domestic biomass plant were received during 2014. Neither was found to impact adversely upon air quality. Combined effects of biomass burning (solid fuel) was considered previously for a local village, although there are no other combined sources that required consideration within this Updating and Screening Assessment.

Fugitive sources

There are no new or significantly changed fugitive sources since the previous Updating and Screening Assessment.

8.3 Proposed Actions

This Updating and Screening Assessment has identified no need to proceed to a Detailed Assessment for any pollutant.

The Updating and Screening Assessment has not identified the need for additional monitoring or changes to the existing monitoring regime at this stage. Monitoring data gathered from ESBC's network of NO_2 diffusion tubes, plus automatic NO_2 and PM_{10} data from the Derby Turn Station have shown a clear improvement in the general air quality of the Borough. For six consecutive years the Horninglow Road and Derby Road sections have recorded NO_2 levels consistently below the annual mean Objective of 40 µg/m^3. Road traffic levels and composition have not changed significantly and all planning applications and their respective air quality assessments individually have not identified thus far any adverse impacts on future air quality that would warrant any major concerns. However, due to economic growth and subsequent cumulative impacts of large development sites planned for the periphery of Burton upon Trent, ESBC considers it prudent to retain the AQMAs as this stage and not revoke any section of them. Monitoring of NO_2 levels within the AQMAs and along connecting routes will therefore continue. ESBC will also consider additional

diffusion tubes outside of the AQMA's to monitor more closely any creep that may occur due to the combined effect of developments or changes to the road network in the Borough. One such area is the A50 by Uttoxeter due to reconfiguration proposals, where monitoring has already begun (as of January 2015) and further tubes may also be added in the near future. Other potential locations are the A511 Tutbury Road, Harehedge Lane, Rolleston Road and Bitham Lane in Stretton. Furthermore, as part of a local community project in the outlying village of Barton under Needwood, ESBC were asked if they could monitor NO_2 levels along the main street through the village to assess any potential impacts of school traffic. This monitoring exercise also began in January 2015, where new diffusion tubes were installed. The results of these will be reported on in future annual reports.

ESBC found no exceedences of PM_{10}, but this Authority will continue to monitor particularly in light of a gradual increase in recent years and the latest health evidence of fine particulates on health outcomes, even below Objectives / limit values.

ESBC will continue to regulate all of its existing Part B Environmental Permits and review the area from time to time to identify any potential processes that may need to be regulated.

ESBC has now commenced a review of the Air Quality Action Plan with the aim of completing it by the autumn of 2015. One of the measures within the new Action Plan is the Eco-Stars Recognition Scheme for hauliers operating within or travelling through the Borough, which is already underway. The Action Plan will also include a number of other measures that will focus on NO_2 and particulates even though particulates have to date met Objectives.

9 References

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Appendices

Appendix 1: Quality Assurance (QA) & Quality Control (QC) of Data

Appendix 2: DMRB Calculations

Appendix 1: Quality Assurance (QA) & Quality Control (QC) of Data

(a) PM Monitoring Adjustment

TG(09) states that the Met-One BAM (with unheated inlet) meets the equivalence criteria for PM_{10} monitoring so long as the results are corrected for slope. Data from the Derby Turn Met-One BAM from 2009 to 2015 were corrected for slope, whereby the measured PM_{10} concentrations were divided by a factor of 1.21. For example, if the reported PM_{10} mass concentration were 30 µg/m^3, the corrected PM_{10} mass would be 30/1.21 = 24.8 µg/m^3.

(b) Diffusion Tube Preparation Method

Throughout 2014, NO_2 diffusion tubes were supplied and analysed by Staffordshire Scientific Services. They were prepared by pipetting a 20% solution of TEA in deionised water, where the solution is pipetted onto grids already placed in the end cap. During previous years (i.e. until 2009) the diffusion tubes were prepared by pipetting a 50% v/v solution of triethanolamine (TEA) in deionised water onto the grids.

(c) QA/QC of diffusion tube monitoring

As already stated this Authority uses tubes prepared by pipetting a 20% solution of TEA in deionised water, where the solution is pipetted onto grids already placed in the end cap. Staffordshire Scientific Services who provide the tubes also takes part in the AIR/WASP NO_2 Proficiency Testing Scheme. AIR PT is a new scheme that started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and the HSL WASP PT scheme. The AIR PT scheme uses laboratory spiked Palmes type diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis and continues the format used in the previous WASP PT scheme. Every quarter, roughly January, April, July and October each year, each laboratory receives four diffusion tubes doped with an amount of nitrite, known to LGC Standards, but not the participants. At least two of the tubes are usually duplicates, which enables precision, as well as accuracy, to be assessed. The masses of nitrite on the spiked tubes are altered each quarter to reflect the

typical analytical range encountered in actual NO_2 ambient monitoring in the UK. LGC Standards assign a performance score to each laboratory's result, based on how far their results deviate from the assigned values for each test samples. The assigned values are best estimates of the levels of nitrite doped onto the test sample tubes and are calculated from the median of participant results, after the removal of test results that are inappropriate for statistical evaluation, e.g. miscalculations, transpositions and other gross errors. At the completion of the round, laboratories receive a report detailing how they have performed and how their results relate to those of their peers. The performance indicator is based on a Z_{score} which can be interpreted as;-

- z score $< \pm 2$ – satisfactory laboratory result
- z score $\geq \pm 2$ and $< \pm 3$ – questionable (warning) laboratory result
- z score $\geq \pm 3$ – unsatisfactory laboratory result

From this, the percentage of results that recorded a satisfactory laboratory result is then reported out of a total of 100%. Participation in a single round of an external proficiency-testing scheme represents a "snap-shot" in time of a laboratory's analytical quality. It is more informative therefore to consider performance over a number of rounds. Over a rolling five round AIR PT window, one would expect that 95% of laboratory results should be $\leq \pm 2$. If this percentage is substantially lower than 95% for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have significant systematic sources of bias in their assay. Staffordshire Scientific Services scored an unsatisfactory performance of 25% during the AR003 (July – August 2014) round, but all other rounds during 2014 were satisfactory, therefore ESBC can assume overall Staffordshire Scientific Services perform well, which is further supported by good performance during previous years.

Diffusion tube performance is also assessed by their precision which is defined as a measure of how well the same result can be consistently reproduced, i.e. how similar the results of duplicate or triplicate tubes are to each other. Unlike bias, poor precision cannot be adjusted for. It can only be improved by careful handling of the tubes in both the laboratory and the field. For the purposes of Local Air Quality Management, tube precision is separated into two categories, "Good" or "Poor", as follows: tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have "poor" precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%. Results that show "poor" precision, should be treated with caution, and may not be suitable for their intended purpose. If a particular Local Authority has "Poor" precision from most or all of its duplicate or triplicate data sets then it should look at its own tube handling procedures. If these are judged to be good then it will be appropriate to look at the precision results for its laboratory to see if this may be the explanation. A summary of precision results for Staffordshire Scientific Services against some other laboratories was downloaded from http://laqm.defra.gov.uk/diffusion-tubes/precision.html and is shown overleaf. This exercise has shown consistently good tube precision for diffusion tubes supplied by Staffordshire Scientific Services for the past 6 years indicating good practice in handling the tubes in the both the field and in the laboratory.

Bristol Scientific Services,	
2008	G
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Lancashire CC	
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Lambeth Scientific Services	
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Exova	
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Staffordshire Scientific Services	
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West Yorkshire Analytical Services	
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Walsall MBC	
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Cardiff Scientific	
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Kent Scientific	
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Aberdeen CC	
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Kirklees County Scientific Services	
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Milton Keynes Council	
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Glasgow Scientific Services, 20% TEA in Water	
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Edinburgh Scientific Services	
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(d) Bias Adjustment Factors from Local / National Co-location Studies

Accuracy represents the ability of the measurement to represent the 'true' value, which, in this case, is defined as the result from the automatic analyser. When averaged over a number of sets of results bias can be evident. As mentioned in Section 2.1.2, ESBC takes part in the national bias adjustment exercise, where co-location and automatic data was submitted to the National Physical Laboratory (NPL) for upload on the national bias spreadsheet which was downloaded from the Defra website (http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html) and completed by the end of February 2015. For 2014, an overall bias adjustment factor of 0.83 was derived from the collation of diffusion tube results for all participants that use Staffordshire Scientific Services. ESBC also took part in the local bias adjustment exercise to calculate the accuracy and precision of diffusion tubes that were compared with automatic data at Derby Turn. Calculations were made using the spreadsheet available for download from the Defra website (http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html). From this a bias adjustment factor of 0.75 was derived. Results of both the national and local bias adjustment exercises are shown overleaf;-

National Bias Adjustment Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet

Spreadsheet Version Number: 03/15

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies

Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods

Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet

This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2015

LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down

If a year is not shown, we have no data[2]

Step 4: **Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.**

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method To make your selection, choose [All] from the pop-up list	Year[5] To make your selection, choose [All]	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
Staffordshire Scientific Services	20% TEA in water	2014	KS	Manchester City Council	10	76	68	12.0%	G	**0.89**
Staffordshire Scientific Services	20% TEA in water	2014	KS	Marylebone Road Intercomparison	12	106	80	32.0%	G	**0.76**
Staffordshire Scientific Services	20% TEA in water	2014	O	South Staffordshire District Council	10	37	42	-12.1%	G	**1.14**
Staffordshire Scientific Services	20% TEA in water	2014	R	Stoke-on-Trent City Council	10	59	47	25.1%	G	**0.80**
Staffordshire Scientific Services	20% TEA in water	2014	UC	Stoke-on-Trent City Council	10	31	27	16.9%	G	**0.86**
Staffordshire Scientific Services	20% TEA in water	2014	R	Trafford Council	12	38	32	21.0%	S	**0.83**
Staffordshire Scientific Services	20% TEA in water	2014	UB	Trafford Council	9	28	22	30.5%	S	**0.77**
Staffordshire Scientific Services	20% TEA in water	2014	R	Stockport MBC	12	34	27	26.3%	G	**0.79**
Staffordshire Scientific Services	20% TEA in water	2014	UB	Tameside MBC	12	21	17	25.7%	G	**0.80**
Staffordshire Scientific Services	20% TEA in water	2014	UI	Salford City Council	12	34	29	19.3%	G	**0.84**
Staffordshire Scientific Services	20% TEA in water	2014	R	Salford City Council	12	58	60	-2.9%	G	**1.03**
Staffordshire Scientific Services	20% TEA in water	2014		**Overall Factor[3] (15 studies)**				**Use**		**0.83**

Local Bias Adjustment Spreadsheet

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	08/01/2014	10/02/2014	51.6	52.5	50.9	52	0.8	2	2.0	28.1	99.9	Good	Good
2	10/02/2014	04/03/2014	58.1	54.3	57.8	57	2.1	4	5.2	36.4	73.9	Good	r Data Capture
3	04/03/2014	03/04/2014	49.3	42.8	44.0	45	3.5	8	8.6	43.7	98.2	Good	Good
4	03/04/2014	01/05/2014	43.7	54.6	49.4	49	5.5	11	13.5	43.5	99.3	Good	Good
5	01/05/2014	29/05/2014	42.7	44.7	47.2	45	2.3	5	5.6	44	90	Good	Good
6	29/05/2014	02/07/2014	38.8	45.8	43.7	43	3.6	8	8.9	39	83.2	Good	Good
7	02/07/2014	30/07/2014	47.8	46.3	44.6	46	1.6	3	4.0	34	94.6	Good	Good
8	30/07/2014	27/08/2014	48.3	44.3	43.7	45	2.5	6	6.2	30	99.9	Good	Good
9	27/08/2014	01/10/2014	53.8	52.5	52.1	53	0.9	2	2.2	34	98.2	Good	Good
10	01/10/2014	30/10/2014	52.0	53.5	53.0	53	0.8	1	1.9	38	99.9	Good	Good
11	30/10/2014	01/12/2014	53.8	55.0	56.2	55	1.2	2	3.0	33.6	95.7	Good	Good
12	01/12/2014	07/01/2015	54.0	55.2	56.8	55	1.4	3	3.5	37.7	97.1	Good	Good
13													
											Overall survey -->	Good	Good

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

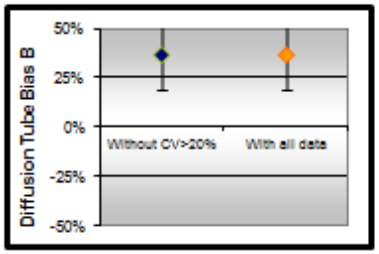
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:	Derby Turn (Burton)

Precision 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)	
without periods with CV larger than 20%	
Bias calculated using 11 periods of data	
Bias factor A	0.75 (0.66 - 0.87)
Bias B	33% (15% - 51%)
Diffusion Tubes Mean:	49 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	37 μgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	37 (32 - 43) μgm^{-3}

Accuracy (with 95% confidence interval)	
WITH ALL DATA	
Bias calculated using 11 periods of data	
Bias factor A	0.75 (0.66 - 0.87)
Bias B	33% (15% - 51%)
Diffusion Tubes Mean:	49 μgm^{-3}
Mean CV (Precision):	5
Automatic Mean:	37 μgm^{-3}
Data Capture for periods used:	96%
Adjusted Tubes Mean:	37 (32 - 43) μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

(e) Discussion of Choice of Factor to Use

Local Authorities using diffusion tubes as part of their Review and Assessment are required to report both the locally derived bias adjustment factor and the bias adjustment factor from the national database. However, the decision on which factor to use will depend on a number of factors, for example;-

- Tube exposure time (1 week, 2 weeks, 1 month)
- Length of the monitoring study
- QA/QC of the chemiluminescence analyser
- QA/QC of diffusion tubes
- Siting of co-located tubes
- Siting of other tubes in the survey

Although, ESBC had good data capture, precision and accuracy from the both the automatic NO_2 data and co-located tubes, it has taken the decision to take a more conservative approach by using the national bias factor of 0.83 instead of the locally derived bias factor of 0.75, as the national bias factor produces higher NO_2 concentrations.

(f) Short-term to Long-term Data adjustment

As explained in the main body of this Report (Section 2.2.1) adjustments need to be made to short-term monitoring results (i.e. if data capture is below 75%). Long term monitoring sites therefore need to be used to correct for short term monitoring results. In the absence of relevant automatic monitoring sites that form part of the national network and which are within a 50 mile radius, diffusion tube sites with >90% data capture were chosen to correct other diffusion tube data in agreement with Box 3.2 in TG(09).

Box 3.2 of TG(09) sets out a calculation method for correcting short-term monitoring data whereby for each case, annual means for the calendar year and period means for the period of interest were gathered for 5 other diffusion tube sites. To ensure results were as accurate as possible, similar diffusion tube sites or nearby tubes

were chosen to correct those with less than 75% data capture. Ratios between the two means were then calculated followed by an overall average. For each diffusion tube site below 75%, the measured period mean is then multiplied by this overall ratio. Calculations for each site that has been annualised is set out below;-

DT 11: Horninglow St (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Horninglow Croft (Rs)	34.1	34.6	0.986791401
Derby Turn (Rs)	44.2	45.1	0.9804733
Horninglow Road – appr. Shakespeare Rd Junc. (Rs)	38.0	38.2	0.996245059
Horninglow St / Guild St Corner (Rs)	43.6	43.7	0.996077687
Horninglow St – near Junc. High St (Rs)	43.4	44.6	0.973540542
			0.986625598

DT 19: Derby St – near to Derby Turn (Rs) (pre-2008 (Ks))

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Derby Turn (Rs)	44.2	45.2	0.979572461
Horninglow Road – appr. Shakespeare Rd Junc. (Rs)	38.0	39.5	0.963432503
Derby St – appr. Derby Turn (Rs)	41.4	42.0	0.986346017
Derby Road – appr. Derby Turn (Rs)	37.1	38.9	0.953065995
Horninglow St / Guild St Corner (Rs)	43.6	44.8	0.973175104
			0.971118416

DT 32: Wellington St – crossing (Ks)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Derby Turn (Ks)	48.5	48.3	1.004489874
Waterloo St / Byrkley St Corner (Rs)	38.8	37.1	1.044037267
Wellington St Roundabout (Rs)	40.2	39.5	1.019046506
Wellington St – appr. Roundabout (Rs)	41.7	40.0	1.041599447
Wellington St / Shobnall Rd Roundabout (Rs)	45.6	44.0	1.03812732
			1.029460083

DT 36: Rolleston Rd – near. Junc. Horninglow Rd (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Horninglow Croft (Rs)	34.1	33.4	1.023384702
Derby Turn (Rs)	44.2	43.8	1.009415106
Horninglow Road – appr. Shakespeare Rd Junc. (Rs)	38.0	37.8	1.006363387
Horninglow St / Guild St Corner (Rs)	43.6	42.1	1.035174227
Horninglow St – near Junc. High St (Rs)	43.4	43.0	1.008515424
			1.016570569

DT 38: Horninglow St – near. Junc. Wetmore Rd (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Horninglow Croft (Rs)	34.1	33.2	1.029611835
Derby Turn (Rs)	44.2	43.9	1.006957562
Horninglow Road – appr. Shakespeare Rd Junc. (Rs)	38.0	36.7	1.036555553
Horninglow St / Guild St Corner (Rs)	43.6	43.3	1.005813211
Horninglow St – near Junc. High St (Rs)	43.4	41.6	1.04428695
			1.024645022

DT 40: Bridge St – near Old Bridge (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Horninglow Croft (Rs)	34.1	32.5	1.051848407
Derby Turn (Rs)	44.2	43.1	1.026256684
Horninglow Road – appr. Shakespeare Rd Junc. (Rs)	38.0	36.5	1.041824899
Horninglow St / Guild St Corner (Rs)	43.6	42.8	1.017337928
Horninglow St – near Junc. High St (Rs)	43.4	41.4	1.048263193
			1.037106222

DT42: Orchard Street - Caxton Court (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Derby St- Lidl (Rs)	49.2	50.1	0.981767956
Wellington St – appr. Roundabout (Rs)	41.7	41.7	0.998343274
Horninglow St / Guild St Corner (Rs)	43.6	44.2	0.984677924
Branston Rd / St Peters Bridge (Rs)	36.2	37.7	0.959529242
Forest Rd - Fred Brewer Way (Rs)	27.9	29.1	0.959343795
			0.976732438

DT44: Grange St / Shobnall Rd Junc. (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Wellington St – appr. Roundabout (Rs)	41.7	41.5	1.003330003
Horninglow St / Guild St Corner (Rs)	43.6	41.9	1.039531237
Anglesey Rd / Evershed Way Corner (Rs)	36.0	35.9	1.004339022
Branston Rd / St Peters Bridge (Rs)	36.2	35.9	1.008838384
Forest Rd - Fred Brewer Way (Rs)	27.9	27.9	1.00031362
			1.011270453

DT45: Shobnall Rd – near Marstons (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Wellington St – appr. Roundabout (Rs)	41.7	40.7	1.022974196
Horninglow St / Guild St Corner (Rs)	43.6	41.8	1.041335979
Anglesey Rd / Evershed Way Corner (Rs)	36.0	36.2	0.99389313
Branston Rd / St Peters Bridge (Rs)	36.2	37.1	0.974439758
Forest Rd - Fred Brewer Way (Rs)	27.9	27.3	1.023419006
			1.011212414

DT 47: Hawkins Lane – opp. Pipe Centre (Rs)

Long Term Site	Annual Mean 2014 (AM)	Period Mean 2014 (PM)	Ratio (AM/PM)
Horninglow Croft (Rs)	34.1	35.3	0.967194812
Derby Turn (Rs)	44.2	43.9	1.007718967
Horninglow Road – appr. Shakespeare Rd Junc. (Rs)	38.0	39.5	0.962308573
Horninglow St / Guild St Corner (Rs)	43.6	44.8	0.973315475
Horninglow St – near Junc. High St (Rs)	43.4	43.4	1.000797194
			0.982267004

(g) Correction for distance of NO_2 levels from diffusion tubes

As explained in Section 2.2.1, measurements of NO_2 concentrations are not always possible at the desired location or receptor for a range of practical reasons, for example access, safety and diffusion tubes require a suitable surface to be attached to. TG(09) therefore recommends that adjustments are made to diffusion tube data, where a relevant receptor is located some distance away from the diffusion tubes. ESBC used the electronic tool available to download from the air quality tools page of the Defra website (http://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html). The main inputs in the tool are the NO_2 concentration of the diffusion tube in question before distance correction, background NO_2 levels in that 1km x 1km grid square, distance of receptor from the kerb and distance of the monitoring position from the kerb. Calculations for diffusion tube DT20: Horninglow Road North – approaching Morleys Hill (Rs) are shown below as an example. This shows that with the extra distance from the diffusion tube monitoring position to the nearest receptor, NO_2 levels drop by 4.3 µg/m^3 from 31.0 µg/m^3 to 26.7 µg/m^3. This is also represented graphically to show the expected overall reduction in NO_2 levels with distance from the kerb at this location.

Distance Correction tool example for DT20: Horninglow Road North – approaching Morleys Hill (Rs)

This calculator allows you to predict the annual mean NO_2 concentration for a location ("receptor") that is close to a monitoring site, but nearer or further the kerb than the monitor. The next sheet shows your results on a graph.

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Enter data into the yellow cells

Step 1	How far from the KERB was your measurement made (in metres)?	(Note 1)	1.2	metres
Step 2	How far from the KERB is your receptor (in metres)?	(Note 1)	4.3	metres
Step 3	What is the local annual mean background NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	14.766723	$\mu g/m^3$
Step 4	What is your measured annual mean NO_2 concentration (in $\mu g/m^3$)?	(Note 2)	31	$\mu g/m^3$
Result	The predicted annual mean NO_2 concentration (in $\mu g/m^3$) at your receptor	(Note 3)	26.7	$\mu g/m^3$

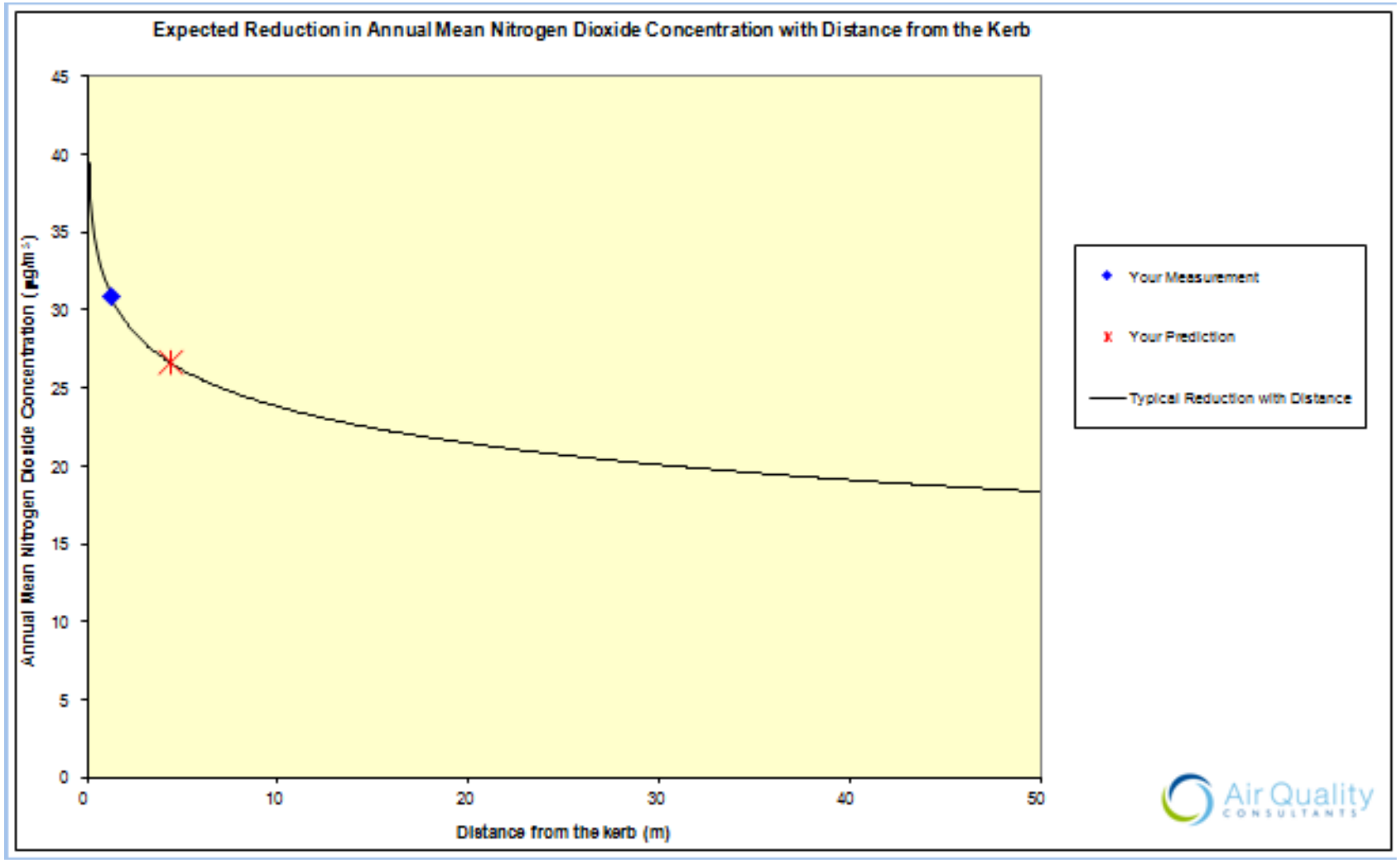
Note 1: In some cases the term "kerb" may be taken to be the edge of the trafficked road - see the FAQ at http://laqm2.defra.gov.uk/FAQs/Monitoring/Location/index.htm for further details. Distances should be measured horizontally from the kerb and assumes that the monitor and receptor have similar elevations. Each distance should be greater than 0.1m and less than 50m (In practice, using a value of 0.1m when the monitor is closer to the kerb than this is likely to be reasonable). The receptor is the location for which you wish to make your prediction. The monitor can either be closer to the kerb than the receptor, or further from the kerb than the receptor. The closer the monitor and the receptor are to each other, the more reliable the prediction will be. When your receptor is further from the kerb than your monitor, it is recommended that the receptor and monitor should be within 20m of each other. When your receptor is closer to the kerb than your monitor, it is recommended that the receptor and monitor should be within 10m of each other.

Note 2: The measurement and the background must be for the same year. The background concentration could come from the national maps published at www.airquality.co.uk, or alternatively from a nearby monitor in a background location.

Note 3: The calculator follows the procedure set out in Box 2.3 of LAQM TG(09). The results will have a greater uncertainty than the measured data. More confidence can be placed in results where the distance between the monitor and the receptor is small than where it is large.

Issue 4: 25/01/11. Created by Dr Ben Marner; Approved by Prof Duncan Laxen. Contact: benmarner@aqconsultants.co.uk

Graphical representation of fall off NO_2 levels with diatance from the kerb for DT20: Horninglow Road North – approaching Morleys Hill (Rs)



(h) Monthly NO_2 Diffusion Tube Data for 2014

Tube No	Location address	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14		Annual Average	Bias Corrected (Local bias adjustment)	Corrected (National bias adjustment	Correction for Short term monitoring (National bias)	Corrected for Distance (National bias)
1	Trent Bridge (Rr)	39.1	38.9	41.5	35.6	38.7	37.4	42.3	33.5	43.3	41.7	52.7	45.9		40.9	30.7	33.9	33.9	33.9
2	Trent Bridge (Rr)	35.9	41.0	41.8	40.1	37.1	36.9	41.6	37.1	44.1	40.5	48.5	Missing		40.4	30.3	33.5	33.5	33.5
3	St Peters Bridge (Rr)	53.2	56.5	Missing	59.4	48.6	54.0	54.6	49.3	66.4	53.8	42.7	55.9		54.0	40.5	44.9	44.9	36.3
4	St Peters Bridge (Rr)	48.9	73.9	47.6	50.5	56.6	55.4	57.1	56.0	66.0	61.6	52.5	60.5		57.2	42.9	47.5	47.5	38.1
5	Horninglow Croft (Rr)	47.5	51.3	39.1	38.2	35.9	34.9	33.8	32.1	43.9	49.0	Missing	46.7		41.1	30.8	34.1	34.1	31.6
6	Monitoring Station Derby Turn (Rr)	51.6	58.1	49.3	43.7	42.7	38.8	47.8	48.3	53.8	52.0	53.8	54.0		49.5	37.1	41.1	41.1	41.1
7	Monitoring Station Derby Turn (Rr)	52.5	54.3	42.8	54.6	44.7	45.8	46.3	44.3	52.5	53.5	55.0	55.2		50.1	37.6	41.6	41.6	41.6
8	Monitoring Station Derby Turn (Rr)	50.9	57.8	44.0	49.4	47.2	43.7	44.6	43.7	52.1	53.0	56.2	56.8		50.0	37.5	41.5	41.5	41.5
9	Wellington St (Kr)	44.0	52.9	50.5	49.7	46.8	48.6	52.0	43.8	56.2	52.7	71.3	58.9		52.3	39.2	43.4	43.4	36.8
10	Wellington St (Kr)	43.0	52.6	51.3	51.4	52.4	46.0	51.6	44.5	60.8	57.0	57.8	56.6		52.1	39.1	43.2	43.2	36.7
11	Horninglow St (Rr)	46.0	45.6	Invalid	Invalid	47.2	45.2	39.8	36.3	51.4	47.6	52.1	42.6		45.4	34.0	37.7	37.2	35.6
12	Derby Turn (Rr)	49.2	64.2	47.2	48.8	49.9	43.5	52.0	51.0	54.8	55.5	61.7	61.9		53.3	40.0	44.2	44.2	44.2
13	Derby Turn (Kr)	52.3	62.7	61.1	54.3	52.7	51.9	61.0	47.2	67.0	58.3	65.1	67.4		58.4	43.8	48.5	48.5	48.5
14	Winshill - Brookside (B)	17.3	21.2	20.4	14.4	12.9	11.0	12.1	13.6	19.3	19.5	27.0	25.4		17.8	13.4	14.8	14.8	14.8
15	A38 Lichfield Rd Slip Rd (Rr)	54.0	59.2	51.4	47.6	44.7	44.2	40.3	30.6	56.6	55.2	66.4	44.0		49.5	37.1	41.1	41.1	28.9
16	A38 Lichfield Rd Slip Rd (Rr)	58.7	56.9	56.3	54.1	46.8	45.4	35.8	39.8	55.4	57.6	66.6	45.4		51.6	38.7	42.8	42.8	29.7
17	Horninglow Road – appr. Shakespeare Rd Junc. (Rr)	54.4	51.4	47.4	42.7	46.0	46.5	29.5	34.0	56.9	49.3	Invalid	46.0		45.8	34.4	38.0	38.0	34.4
18	Horninglow Rd – app. Marris Homes (Rr)	46.8	44.9	40.9	36.1	34.5	25.8	29.3	Missing	36.9	43.0	47.6	39.8		38.7	29.0	32.1	32.1	31.5
19	Derby St – near to Derby Turn (Rr) (pre-2008 (Kr))	55.5	58.9	52.7	61.3	56.9	Missing	Missing	45.3	74.7	62.3	38.6	53.7		56.0	42.0	46.5	45.1	44.0
20	Horninglow Road North – appr. Junc. Morleys Hill (Rr)	33.0	35.0	40.6	33.1	28.8	26.9	31.8	26.9	40.5	36.4	77.2	37.8		37.3	28.0	31.0	31.0	26.7
21	Derby St / Byrkley St Junction (Rr)	54.7	66.3	62.9	64.7	63.9	57.5	44.6	47.7	71.3	63.4	54.2	59.6		59.2	44.4	49.2	49.2	42.9
22	A444 – Stapenhill appr. Violet Way (Rr) (pre-2009 (Kr))	42.9	53.4	42.2	47.8	50.0	43.4	49.6	41.7	62.3	49.0	56.0	53.4		49.3	37.0	40.9	40.9	36.5
23	Princess Way Roundabout (Rr)	44.0	47.5	42.6	38.9	41.6	34.3	39.2	30.2	51.1	48.7	52.5	45.9		43.0	32.3	35.7	35.7	28.9
24	Derby Road appr. Princess Way Roundabout (Rr)	45.7	48.4	44.2	36.9	42.7	35.7	30.7	32.0	48.7	48.1	49.4	53.2		43.0	32.2	35.7	35.7	31.8
25	Derby Rd / Eton Rd Junc. (Rr)	43.7	48.4	44.3	39.7	39.6	35.8	32.8	30.9	47.8	44.1	54.3	46.0		42.3	31.7	35.1	35.1	32.2
26	Derby Road – appr. Derby Turn (Rr)	48.6	58.0	46.7	40.9	43.2	32.8	34.6	36.1	45.4	53.7	48.7	47.7		44.7	33.5	37.1	37.1	33.7
27	Derby St – appr. Derby Turn (Rr)	44.7	55.1	49.5	47.5	44.1	45.2	47.3	44.1	53.2	55.7	56.9	54.9		49.9	37.4	41.4	41.4	37.7
28	Derby St – Maltings Court (Rr)	45.8	52.7	47.5	45.8	46.2	41.3	42.5	46.9	54.8	Missing	49.9	53.8		47.9	35.9	39.8	39.8	37.0
29	Derby St appr. Little Burton West (Rr)	43.3	49.5	47.1	43.7	38.4	39.5	39.6	31.0	57.2	41.9	53.8	46.9		44.3	33.2	36.8	36.8	33.3
30	Waterloo St / Byrkley St Corner (Rr)	52.6	52.5	47.0	45.9	42.2	40.1	36.7	35.1	52.4	52.8	54.1	48.9		46.7	35.0	38.8	38.8	38.4
31	Derby St / Borough Rd Junc. (Kr)	54.1	54.6	52.3	58.2	50.9	Missing	Invalid	52.6	58.3	57.4	51.8	60.9		55.1	41.3	45.7	45.7	45.0
32	Wellington St - Crossing (Kr)	Missing	68.8	64.3	67.2	64.7	61.3	63.1	54.9	Missing	Missing	63.7	66.8		63.9	47.9	53.0	54.6	44.3
33	Wellington St Roundabout (Rr)	50.3	51.1	50.1	43.2	41.0	36.6	44.4	43.5	50.7	52.5	68.1	49.9		48.5	36.3	40.2	40.2	31.1
34	Wellington St – appr. Roundabout (Rr)	50.8	52.5	47.9	48.8	57.5	42.5	43.9	37.5	60.6	57.3	53.0	50.3		50.2	37.7	41.7	41.7	41.7
35	Wellington St / Shobnall Rd Roundabout (Rr)	59.3	62.0	43.7	51.2	52.4	48.2	Missing	47.2	60.3	61.5	55.8	63.2		55.0	41.2	45.6	45.6	35.8
36	Rolleston Rd – near. Junc. Horninglow Rd (Rr)	Missing	Missing	44.0	38.8	38.7	31.1	26.3	Missing	43.0	48.1	55.3	48.5		41.5	31.2	34.5	35.0	28.7
37	Horninglow St / Guild St Corner (Rr)	57.6	72.1	48.8	54.1	46.5	43.4	47.1	43.8	46.7	61.3	50.9	57.5		52.5	39.4	43.6	43.6	41.1
38	Horninglow St – near. Junc. Wetmore Rd (Rr)	44.8	39.0	43.2	49.2	41.4	46.5	45.9	36.3	Missing	Missing	44.6	41.7		43.3	32.4	35.9	36.8	36.0
39	Horninglow St – near Junc. High St (Rr)	53.3	63.2	44.2	46.2	49.0	40.5	50.5	44.4	74.4	52.4	57.8	51.8		52.3	39.2	43.4	43.4	42.4
40	Bridge St – near Old Bridge (Rr)	42.9	49.0	40.3	38.5	38.6	32.0	35.3	30.9	Missing	Missing	51.3	Missing		39.9	29.9	33.1	34.3	33.6
41	Anglesey Rd / Evershed Way Corner (Rr)	46.0	42.3	45.2	38.2	39.5	39.0	42.1	34.6	47.5	48.7	49.4	48.3		43.4	32.6	36.0	36.0	33.1
42	Orchard Street – Caxton Court (Rr)	Missing	40.9	41.0	Missing	Missing	Missing	Missing	35.3	50.8	Missing	42.7	53.2		44.0	33.0	36.5	35.7	31.0
43	Branston Rd / St Peters Bridge Roundabout (Rr)	33.8	44.3	49.6	39.9	43.5	42.2	46.1	37.2	50.4	46.8	Missing	45.6		43.6	32.7	36.2	36.2	30.4
44	Grange St / Shobnall Rd Junc. (Rr)	45.1	Invalid	Missing	Missing	39.0	26.1	28.9	33.4	45.4	44.4	Missing	45.6		38.5	28.9	31.9	32.3	27.7
45	Shobnall Rd – near Marstons (Rr)	Missing	Missing	43.9	40.4	Missing	34.5	38.7	39.4	52.1	50.3	40.9	44.7		42.8	32.1	35.5	35.9	31.0
46	Forest Rd – Fred Brewer Way (Rr)	39.1	37.0	33.9	28.3	31.7	28.5	26.8	26.5	37.6	38.8	35.0	40.3		33.6	25.2	27.9	27.9	25.2
47	Hawkins Lane – app. Pipe Centre (Rr)	45.9	47.4	41.1	37.4	Missing	31.4	Missing	36.1	42.0	44.7	Missing	48.7		41.6	31.2	34.6	33.9	32.5

Appendix B: DMRB Calculations

Following a review of all available traffic data for the Borough from 2014, it was found that there were no roads with a significant increase in traffic level of 25%, disproportionately high level of buses/HGVs or busy junctions with a combined AADF of 10,000 that have previously not been adequately assessed. Nor has there been any new roads constructed since the last round of review & assessment. In light of this, ESBC did not consider it necessary to run the DMRB modelling.