



2020 Air Quality Annual Status Report (ASR)

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

June 2020

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Report Reference number	TBC/ASR/20
Date	June 2020

Endorsement from the Director of Health & Care, Staffordshire County Council

Annual Status Report (ASR) – Air Quality

Endorsement from the Director of Health and Care, Staffordshire County Council
Staffordshire County Council (SCC) is committed to working with partners to ensure that Staffordshire will be a place where improved health and wellbeing is experienced by all. Poor air quality has a negative impact on public health, with potentially serious consequences for individuals, families and communities. Identifying problem areas and ensuring that actions are taken to improve air quality forms an important element in protecting the health and wellbeing of Staffordshire residents. Improving air quality is often a complex issue, presenting a multi-agency challenge – so it is essential that all agencies work together effectively to deliver improvements where they are needed. As Director of Health and Care across Staffordshire I endorse this Annual Status Report which sets out the position in all the Local Authorities across Staffordshire and Stoke-on-Trent

As well as the ongoing work programme to address air quality issues in Staffordshire and Stoke-on-Trent through the Defra Funded Air Quality Project.

Staffordshire County Council led the bid for the ADEPT Live Lab programme and were successful in receiving £1.97 million to deliver the SIMULATE programme with partners AMEY, Keele University, Catapult Connected Places and ADEPT Live Labs. The programme is based on challenges in two areas: urban air quality and mobility. SIMULATE is a new kind of infrastructure partnership, designed to accelerate innovative solutions in Air Quality and Intelligent Mobility within local authorities. SIMULATE is funded by the DfT and is part of the ADEPT Smart Places Research Programme. In addition, Officers from Newcastle Borough Council, Stoke City Council and Staffordshire County Council are jointly working under Ministerial Direction to improve transport related air pollution in North Staffordshire.

Dr Richard Harling
Director of Health & Care
Staffordshire County Council
26th May 2020

Executive Summary: Air Quality in Our Area

Air Quality in Tamworth Borough Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas^{1,2}.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion³.

In the Tamworth Borough Council area, the main pollutant of concern is nitrogen dioxide which is emitted as a product of combustion from heating sources and especially road vehicles. It follows that the areas of greatest interest in terms of air quality are dwellings close to busy roads or busy junctions, particularly where these are prone to congestion or where the streets are narrow and the houses are close to the carriageway and residential areas close to point sources of combustion such as chimneys serving large boiler plant.

Since 2006 monitoring undertaken by the Council had identified one particular busy junction (the Two Gates crossroads, Dosthill) was showing concentrations of nitrogen dioxide that were very close to the health based standard (called the Air Quality Objective) for nitrogen dioxide, the monitoring intensified and in 2011 it was concluded that certain properties located close to this crossroads were at risk of exceeding the annual mean air quality objective for nitrogen dioxide. In 2012 a specialist firm of air quality consultants, Ricardo-AEA undertook a detailed assessment that involved modelling the pollution concentrations. As a result the council declared an Air Quality Management Area (AQMA) at Two Gates in May 2014. An Air Quality Management Area gives the area special status where relevant professionals are required to consider a range of actions to improve air quality in the affected area (an Air Quality Action Plan).

To some extent air quality issues arising from vehicle exhausts has been reducing due to improved engine efficiency and other technical advances such as the requirement for catalytic converters. In addition, the Staffordshire County Council Highways Department, which is responsible for traffic management at this junction, made alterations to the sequence of the traffic lights at the junction. As a result there was a reduction in the nitrogen dioxide concentration which led the Council to revoke the Air Quality Management Area in March 2018, after the Council had

¹ Environmental equity, air quality, socioeconomic status and respiratory health, 2010

² Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

³ Defra. Abatement cost guidance for valuing changes in air quality, May 2013

commissioned another detailed assessment, that involved remodeling the pollution concentrations (Report ref ED62310- 26 May 2016). The modelling results indicated that there were no exceedances of the annual mean NO₂ objective occurring at any residential properties within the AQMA and recommended the revocation of the Two Gates AQMA which was completed on 23rd March 2018.

Although the busy A5 trunk road runs through the Borough and the M42 Motorway runs close to the Borough boundary, there are no sensitive receptors (dwellings) sufficiently close to these roads, so that air quality is not considered to be an issue. Although there have been no specific problem areas identified locally, nationally there is currently great interest in the extent that very small particles called PM_{2.5} impact on public health. In line with national guidance the Council is giving consideration to this pollutant and actions that can be taken to minimise its impact. Tamworth Borough Council continues to work with other partners to tackle Air Quality such as other Borough & District Councils, Staffordshire County Council, the Highways Authority, Director of Public Health and Public Health England and where appropriate will participate in projects to improve Air Quality.

The Council is also responsible for the regulation of a number of Part A2 and Part B industrial installations that are of significance in terms of air quality. Each process / installation is regulated under the Environmental Permitting (England and Wales) Regulations 2016 and are regularly inspected by the Council's Environmental Health Officers to ensure they are controlling their emissions to atmosphere in accordance with national guidance. A list of processes that currently hold an Environmental Permit issued by Tamworth Borough Council (as at April 2019) is shown at Appendix F

Actions to Improve Air Quality

As stated above, Tamworth Borough Council has been working with partner organisations to tackle air quality, particularly in and around the Air Quality Management Area. We have revoked our Air Quality Management Area as the concentrations of nitrogen dioxide have fallen below the Air Quality Objective.

Conclusions and Priorities

The key priorities for air quality in Tamworth include the continuation of the long-term air quality monitoring program which is kept under constant review to ensure that monitoring takes place in the most relevant locations and to tackle air quality issues at source wherever possible either through regulatory controls of emissions to air from certain potentially polluting industries.

Though, the Two Gates Crossroads AQMA has been revoked, officers of the Environmental Health team will continue to consider the impact of new development on existing dwellings and ensuring that no new dwellings or other sensitive developments are constructed in areas of unacceptable air quality through the Planning system. We have moved two diffusion tubes which were getting continually low readings to two other areas that we identified, could benefit from monitoring due to an increase in traffic, the two new sites are 60 High St, Dosthill and 114 Overwoods Rd. 2 Wessenden and 12 Brookside Way are longer being monitored due to consistent low readings.

New Government guidance on tackling air quality issues will see the Council forming stronger links specifically in respect of air quality with key partners such as the Staffordshire Director of Public Health and Staffordshire County Council Highways Planners.

Local Engagement and How to get Involved

Air Quality is not “someone else’s problem”. All members of the community can play a part in improving air quality. Simple steps that we can all take include making short journeys on foot or by bicycle rather than by car or using public transport. As it is often traffic congestion that exacerbates poor air quality, avoiding using vehicles at busy times can be beneficial. Car sharing for journeys to work or for the school run can reduce the number of vehicles using busy roads and junctions.

Other simple measures that can be taken include

- Purchasing low emission vehicles and or hybrid vehicles as individuals.
- Fleet vehicles and transport companies could play a major role in the use of low emission vehicles.
- Upgrading boilers to the newest and most efficient gas condensing boilers with the lowest nitrogen dioxide and carbon dioxide emissions
- Installing renewable options such as solar panels or wind turbines (in appropriate locations).

Members of the public can play their part in improving air quality in the area by obtaining further information from Tamworth Borough Council website <http://www.tamworth.gov.uk/air-quality>.

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1 Local Air Quality Management

This report provides an overview of air quality in Tamworth Borough Council during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) 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 an exceedance is considered likely the local authority must 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. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Tamworth Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

Tamworth Borough Council declared an AQMA at Two Gates in May 2014, which was revoked on 23rd March 2018 after monitoring results for the area were consistently under the air quality objective standard.

Information on Tamworth`s former AQMA can be found at : https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=271.

Appendix D: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to Tamworth Borough Council`s former AQMA.

For reference, a map of Tamworth Borough Council`s monitoring locations is available in Appendix D.

Table 2.1 – Declared Air Quality Management Areas

No Declared AQMAs

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)		Action Plan	
						At Declaration	Now 2019		Link
AQMA 1/2014	1 st May 2014, Revoked 23 rd March 2018	NO ₂ annual mean	Tamworth	Two Gates, Dosthill, Tamworth.	YES	41.6 µg/m ³	26 µg/m ³	Two Gates Air Quality Action Plan 2015 http://www.tamworth.gov.uk/sites/default/files/environment_docs/Two%20Gates%20AQAP.pdf	

Tamworth Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date

2.2 Progress and Impact of Measures to address Air Quality in Tamworth Borough Council

Defra's appraisal of last year's ASR concluded:

The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports.

1. The report provides clear and correctly labelled maps of monitoring locations.
2. Bias adjustment has been correctly carried out, and supporting evidence provided. This is good practice and encouraged for all future reports.
3. The report discusses distance correction in detail. The Council's decision not to distance-correct is appropriate and follows a conservative approach.
4. As noted in last year's appraisal, the current monitoring regime does not identify areas of exceedance and many monitored locations are well below the AQO of 40 $\mu\text{g}/\text{m}^3$. The Council may therefore wish to consider reallocating resources to other areas not yet monitored to ensure all potential pollution hotspots are identified.
5. Trends in concentrations are not discussed in detail. It would be useful to see 5-year trend graphs of concentrations at, as a minimum, a selection of monitoring locations.
6. The existing AQAP was published for the Two Gates Crossroads AQMA, which has since been revoked. The Council are however encouraged to continue implementing these measures to tackle air quality within the Borough. The Council may wish to consider publishing reduction targets and KPI's for general measures not specific to the recently-revoked AQMA.

Tamworth Borough Council has taken forward a number of direct measures during the current reporting year of 2019 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans TMBC Local Plan 2006 – 2031, Local Cycling & Walking Infrastructure Plan 2020 - 2030

Key completed measures are:

Provision, by addressing barriers and missing links, of a joined up Tamworth wide cycle and pedestrian network

£1.164m has been committed by SCC through funding awards, S106 and IT block to start work on walking and cycling schemes in Stafford, Burton upon Trent and Tamworth.

£2,062,669 has been invested in walking & cycling infrastructure in the last five years up to 2019 by the SCC as reported in the Local Cycling & Walking Infrastructure Plan 2020 – 2030 (Feb 2020)

Improved pedestrian & cycle linkages

Improvements have been delivered between Ventura Park and the Town Centre, and the Town Centre and Rail Station. Corporation Street/Church Street and St Edithas Close will form phase 3 of the Gateways Project subject to appropriate funding.

Tamworth Borough Council expects the following measures to be completed/progressed over the course of the next reporting year:

Local highway improvements and traffic management measures as required to mitigate the impact of development traffic.

Local highway improvements and traffic management measures have been secured to support a number of larger developments, including works to Coton Lane/Comberford Road junction to provide left and right turn lanes.

Local highway improvements and traffic management measures as required to mitigate the impact from development traffic

Following an assessment of the impacts of any proposed development on the Strategic Road Network where required by Highways England, capacity and safety measures at any of the following junctions:

- A5 Mile Oak
- A5 Ventura Way
- A5 Marlborough Way
- A5 Stoneydelph
- M42 Junction 10
- M42 Junction 11

Signage or junction improvements to improve access to Drayton Manor Theme Park.

Tamworth Borough Council's priorities for the coming year are a reduction in private vehicular traffic.

The principal challenges and barriers to implementation that Tamworth Borough Council anticipates facing are without an AQMA there is less government funding available for air quality projects.

Progress on the following measures working with schools has been slower than expected: as Tamworth is not given priority access to grant aided school schemes as we do not have any AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisation involved & funding source	Planning phase	Implement action Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Promotion of walking reduction in vehicle use in Tamworth	Alternatives to private vehicle use	Other Via the internet	Tamworth Borough Council	Local Plan https://www.staffordshire.gov.uk/Education/Schooltransport/Active-school-travel/Active-school-travel-team.aspx	Throughout 2019	Length of new foot paths	Reduced vehicle emissions	Ongoing	Ongoing	Nil
2	Promotion of car sharing reduction in vehicle use in Tamworth	Alternatives to private vehicle use	Other Via the internet	Tamworth Borough Council SCC	SCC, https://share-a-lift.co.uk/	Throughout 2019	Decrease in car journeys	Reduced vehicle emissions	Ongoing	Ongoing	Nil
3	Promotion of Cycling	Alternatives to private vehicle use	Other	Tamworth Borough Council SCC	Local Plan www.staffordshire.gov.uk/Transport/cycling/cyclemaps.aspx	Throughout 2019	Length of new cycle paths	Reduced vehicle emissions	Ongoing	Ongoing	Nil
4	Increase in Bus use	Alternatives to private vehicle use	Other	Tamworth Borough Council	Local Plan	Throughout 2019	Number of Bus Routes	Reduced vehicle emissions	Ongoing	Ongoing	
5	Domestic smoke control	Public Information	Via the internet	Tamworth Borough Council	Current	Throughout 2019	Reduction in breaches	Reduced emissions	ongoing	Ongoing	Nil
6	Continued Integration with planning system	Policy Guidance and Development	Air Quality Planning	SAQF including Tamworth Borough Council	Ongoing	Throughout 2019	Ongoing	Reduced emissions	Ongoing	Ongoing	Nil
7	Regulation of industrial processes	Environmental Permits	Environmental Permits	Tamworth Borough Council	Throughout 2017-18	Throughout 2019-20	Reduction in breaches	Reduced emissions	Ongoing	Ongoing	Nil

2.3 PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of PM_{2.5} (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM_{2.5} has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Particulate matter, or PM, is the term used to describe particles found in the air, including dust, dirt and liquid droplets. PM comes from both natural and man-made sources, including traffic emissions and Saharan-Sahel dust. These particles can be suspended in the air for long periods of time, and can travel across large distances.

PM less than 10 micrometres in diameter (PM₁₀) pose a health concern because they can be inhaled into and accumulate in the respiratory system. PM less than 2.5 micrometres in diameter (PM_{2.5}) are referred to as "fine" particles and are believed to pose the greatest health risks, as they can lodge deeply into the lungs and also pass into the bloodstream.

PM_{2.5} is the pollutant which has the biggest impact on public health and on which the Public Health Outcomes Framework (PHOF) indicator 3.01⁵ is based.

The Royal College of Physicians (RCP) undertook a review in February 2016⁶ where they found that long term exposure to air pollution impairs lung function growth in children, and that outdoor exposure is linked to lung cancer in adults. Within Staffordshire it is estimated that 4.8% of all deaths can be attributed to exposure to PM_{2.5}, compared to 5.1% across England (40,000 deaths annually)⁴. Overall, the estimated cost to individuals and society is more than £20 billion annually for the UK.

2.3.1 Particulate Matter (PM_{2.5}) Levels in Staffordshire and Stoke-on-Trent

A number of the Staffordshire Authorities currently monitor locally for PM₁₀. Defra's Automatic Urban and Rural Network (AURN) site, Stoke-on-Trent Centre has a dedicated PM_{2.5} monitor. Table 2.3 presents data on the local level of PM_{2.5} annual mean concentrations for the Staffordshire Authorities. Where the data is derived from PM₁₀ monitoring this has been adjusted by applying a correction factor of 0.7 to derive the PM_{2.5} component. The correction factor has been derived from the average of all ratios of PM_{2.5}/PM₁₀ for the years from 2010 to 2014 for forty sites within the Automatic Urban and Rural Network (AURN) where these substances are measured on an hourly basis and follows the guidance published in LAQM (TG16).

Table 2.3 Annual Mean PM₁₀ and PM_{2.5} results of monitoring by Staffordshire Authorities 2015 to 2019

Annual Mean PM ₁₀ and PM _{2.5} Results from monitoring Staffordshire Authorities 2015- 2019									
Authority	Site Type	Monitor Location	OS Grid Ref		Year				
					2015	2016	2017	2018	2019
Newcastle under Lyme	Roadside	Queen`s Gardens	E385057	PM ₁₀	22.9	(5)	(5)	(5)	(5)
			N346137	PM _{2.5}	16 ⁽¹⁾	(5)	(5)	(5)	(5)
Cannock Chase	Roadside	Cannock A5190	E401392 N309954	PM ₁₀	-	-	14	18	16
				PM _{2.5}	-	-	9.8	12.6	11.2
Stoke on Trent	Roadside	Basford	E386288	PM ₁₀	-	-	23	23	23
			N346802	PM _{2.5}	-	-	16 ⁽¹⁾	16 ⁽¹⁾	16 ⁽¹⁾
	Roadside	A50 Roadside Meir	E392548	PM ₁₀	20 ⁽²⁾	20 ⁽²⁾	18	19	20
			N342572	PM _{2.5}	14 ⁽²⁾	14 ⁽²⁾	13 ⁽¹⁾	13 ⁽¹⁾	14 ⁽¹⁾
	Urban Background	Stoke on Trent Central	E388351 N347895	PM _{2.5}	12	12	9	9	9
	Roadside	Middleport	E385780 N349376	MP ₁₀	22	(3)	(3)	(3)	(3)
PM _{2.5}				15 ⁽¹⁾	(3)	(3)	(3)	(3)	
East Staffordshire	Roadside	Derby Tum	E424671 N324019	PM ₁₀	23	(4)	(4)	(4)	(4)
				PM _{2.5}	16.1 ⁽¹⁾	(4)	(4)	(4)	(4)

Notes: ⁽¹⁾PM_{2.5} results are derived from PM₁₀ monitored results corrected with a 0.7 correction factor in accordance with TG16 – Annex B: Derivation of PM_{2.5} to PM₁₀ Ratio. All other results are directly monitored.

⁽²⁾ Valid data capture for 2015 was 59%. The site was commissioned on 22 May 2015.

⁽³⁾ Middleport monitor was decommissioned at the end 2015

⁽⁴⁾ East Staffordshire`s monitors were decommissioned 2016

⁽⁵⁾ Newcastle under Lyme monitors were decommissioned 2016

As can be seen from the results, concentrations of PM_{2.5} within the Staffordshire Authorities are below the 2020 EU limit value of 25µg/m³.

2.3.2 PM_{2.5} and Mortality in Staffordshire & Stoke-on-Trent

Although the levels of PM_{2.5} within the County and City of Stoke on Trent are below the 2020 EU Limit value, the impact on adult mortality directly attributable to PM_{2.5} is nonetheless still an important public health issue within Staffordshire and Stoke-on-Trent. This is revealed in data obtained from Public Health England used to inform Public Health Outcomes Framework indicator 3.01⁷, as shown in Figure 1

The percentage estimated number of deaths attributable to PM_{2.5} in adults over 30 has been translated into the estimated number of attributable deaths for each local authority area within Staffordshire, and are shown in Figure 2. The data presented to 2018 is the latest data available at time of publication of this report. Approximately 4.4% of deaths within the County can be attributed to PM_{2.5}.

Figure 1 Estimated number of deaths by local authority area attributable to PM_{2.5} within Staffordshire for adults over 30 2014 to 2018

District/County	Percentage
Newcastle-under-Lyme	4.2%
Stafford	4.2%
East Staffordshire	4.6%
South Staffordshire	4.6%
Lichfield	4.6%
Staffordshire Moorlands	3.8%
Cannock Chase	4.6%
Tamworth	5.1%
Stoke on Trent	4.4%
Staffordshire County	4.4%
England	5.2%

⁷ Public Health Outcomes Framework 2016-2019 Indicator 3.01 Fraction of mortality attributable to particulate air pollution
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/520457/At_a_glance.pdf

Figure 2 Public Health Outcomes Framework Indicator 3.01- Fraction of annual all cause adult mortality attributable to anthropogenic (human made) particulate air pollution (measured as fine particulate matter, PM_{2.5}) for Staffordshire Authorities 2014 to 2018⁸

Estimated numbers of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, PM_{2.5}*) for Staffordshire 2014 to 2018⁸

*** Fraction of annual all-cause adult mortality attributable to anthropogenic (human-made) particulate air pollution (measured as fine particulate matter, PM_{2.5}*)**

District/County	2014			2015			2016			2017			2018		
	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths	Deaths - all causes persons 30+	%*	Estimated attributable deaths
Newcastle-under-Lyme	55	4.7	60	55	4.2	50	1291	4.7	60	1197	4.2	50	1334	4.2	60
Stafford	65	4.8	60	60	4.7	60	1254	4.8	60	1267	4.3	50	1336	4.2	60
East Staffordshire	55	5.1	50	55	4.8	50	1065	5.6	60	1098	5.0	50	1093	4.6	50
South Staffordshire	55	5	50	55	4.7	60	1128	5.1	60	1239	4.5	60	1211	4.6	60
Lichfield	50	5	50	50	4.6	50	1044	5.5	60	1070	4.9	50	1087	4.6	50
Staffordshire Moorlands	45	4.5	50	45	4	40	1110	4.6	50	1127	3.9	40	1108	3.8	40
Cannock Chase	45	5.1	40	45	4.6	40	879	5.4	50	940	4.7	40	976	4.6	50
Tamworth	35	5.4	30	30	4.9	30	615	6	40	634	5.3	30	653	5.1	30
Stoke on Trent	2318	5.0	115	2479	4.9	110	2454	5.0	120	2490	4.4	110	2746	4.4	120
Staffordshire County	400	4.9	400	390	4.5	390	8386	5.2	430	8572	4.5	390	8792	4.4	390

⁸ Source Public Health England <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/3/gid/1000043/pat/6/par/E12000005/ati/102/are/E10000028/iid/30101/age/230/sex/4>

2.3.3 Actions being taken within Staffordshire to reduce PM_{2.5}

A number of the Staffordshire Authorities are currently involved in implementing measures to reduce levels of NO₂ within their areas, which are detailed elsewhere in this report. Whilst there is currently no statutory duty imposed on Local Authorities in England to reduce PM_{2.5}, a number of the measures are complementary. A mapping exercise completed by the Staffordshire Air Quality Forum members details the measures currently in place which are considered to have an impact in reducing PM_{2.5} within the County. These are produced in Table 2.4 below;

Table 2.4 Actions being taken within Staffordshire to reduce PM_{2.5}

Measures category	Measure Classification	Effect on reducing NOx and PM10 emissions (low, medium, high)	Reduces PM _{2.5} emissions	Local Authority							
				Staffordshire Moorlands DC	Newcastle under -Lyne BC	Stafford BC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC	
Traffic Management	Urban Traffic Control systems, Congestion management, traffic reduction	low	✓	UTC in Leek Town Centre	UTC in areas of Newcastle Town Centre AQMA and Kidsgrove AQMA	UTC in Stafford Town Centre	Town Centre Regeneration Programme now completed with the exception of Station Street regeneration which starts in March 2020. Many of these will then help improve traffic flow within the AQMA	LDC is liaising with Midlands Connect to increase volume of traffic using M6 Toll to reduce congestion on the A5 as well as lobbying Highways England to upgrade the A38 & A5 to expressways.		UTC in Tamworth Town Centre at Ventura Park	
	Reduction of speed limits, 20mph zones	low	✓	20mph zones near some schools in residential areas		20mph zones near some schools in residential areas	20 mph zones near some schools in residential areas		20mph zones in Trysull, Bradley, Kinver and Bilbrook		
	Road User Charging (RUC)/ Congestion charging	low	✓			x		M6 Toll	M6 Toll		
	Anti-idling enforcement	low	✓			x					
	Other		✓			x					
Promoting Travel Alternatives	Workplace Travel Planning	low	✓	www.staffordshire.gov.uk/Transport/Air-quality/Businesses.aspx www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Clean-green-and-safe.aspx							
	Encourage / Facilitate home-working	low	✓		x		x	Homeworking policy adopted	Agile working policy adopted	Homeworking policy adopted	
	School Travel Plans	low	✓	https://www.staffordshire.gov.uk/Education/Schooltransport/Active-school-travel/Active-school-travel-team.aspx Funded STPs for school expansions: 14 Newcastle Borough, 8 Staffordshire Moorlands District, 16 Stafford Borough, 9 East Staffordshire Borough, 4 Cannock Chase District, 6 Lichfield District, 3 South Staffordshire District, 19 Tamworth Borough							
	Promotion of cycling	low	✓	The Local Cycling and Walking Infrastructure Plan is currently under development by SCC www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Clean-green-and-safe.aspx				South Staffordshire Cycling Scheme	Same as other Staffs authorities		
	Promotion of walking	low	✓	The Local Cycling and Walking Infrastructure Plan is currently under development by SCC www.staffordshire.gov.uk/DoingOurBit/Get-Inspired/Clean-green-and-safe/Clean-green-and-safe.aspx				Walking for health scheme	Same as other Staffs authorities		
	Staffordshire Share a Lift Scheme		✓	The Staffordshire Lift Scheme is available at: https://share-a-lift.co.uk/				A new provider is currently being sought			
	Promote use of rail and inland waterways	medium	✓	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	North Staffordshire Community Rail Partnership operating along the North Staffordshire Line includes Blythe Bridge Rail Station. The County Council Draft Rail Strategy is available from: http://moderngov.staffordshire.gov.uk/documents/s69891/Appendix%201%20for%20Rail%20Strategy.pdf	Improvements at Burton Rail Station nearing completion	Staffordshire County Council has produced a Draft Rail Strategy, April 2016 to improve the way local rail services are managed and operated https://www.staffordshire.gov.uk/transport/transportplanning/Rail-strategy/Rail-Strategy.pdf			

Measures category	Measure Classification	Effect on reducing NOx and PM10 emissions (low, medium, high)	Reduces PM2.5 emissions	Local Authority					
				Staffordshire Moorlands DC	Newcastle under -Lyme BC	Stafford BC	East Staffs BC	Lichfield DC	South Staffs DC
Transport Planning & Infrastructure	Local Transport Plans and District Strategies	high	✓	www.staffordshire.gov.uk/Transport/transportplanning/District-integrated-transport-strategies/districtintegratedtransportstrategies.aspx					
	Public transport improvements-interchanges stations and services	low	✓	Proposed reinstatement of Leek rail connection	Kidsgrove Station interchange plans	Recent improvements completed at Stafford Rail Station	Improvements at Burton Rail Station nearing completion.	Improvements planned at Lichfield City Station as part of Friarsgate development scheme. There are also plans to improve accessibility to all users at Lichfield Trent Valley Station	Planned improvements at Tamworth station
	Public cycle hire scheme	low	✓		In House cycle to work scheme				
	Cycle network	low	✓	www.staffordshire.gov.uk/Transport/cycling/cyclemaps.aspx SCC currently looking to implement improved mapping software for future developments					
	Bus route improvements	high	✓	Potential bus stop upgraded in Cheadle Town Centre	RTPI routes 3 & 4 Newcastle Town Centre. Improved future bus services to Chatterley Valley	Improved bus priority and interchange on A518, Stafford post-SWAR	Removal of obstructions on New Street.		Improved bus infrastructure route 2 Tamworth-Perrycrofts. RTPI Tamworth Town Centre and Ventura Park. Victoria Road, Tamworth upgraded interchange.
Alternatives to private vehicle use	Bus based Park & Ride	medium	✓			X		New bus central station as part of Friarsgate development scheme	
	Car Clubs	low	✓	✓		X			
Policy Guidance and Development Control	Planning applications to require assessment of exposure / emissions for development requiring air quality impact assessment	high	✓	✓		http://www.staffordbc.gov.uk/planning/planning-policy/local-plan-2012-2031	http://www.eaststaffsbc.gov.uk/planning/planning-policy/local-plan-2012-2031	https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Planning-policy.aspx	Local & National Validation requirements 2017: http://www.tamworth.gov.uk/sites/default/files/planning_docs/National-and-Local-Validation-requirements-2017.pdf
	Air Quality Strategy			In development		2019-2021 Air Quality Strategy			

Measures category	Measure Classification	Effect on reducing NOx and PM10 emissions (low, medium, high)	Reduces PM 2.5 emissions	Local Authority							
				Staffordshire Moorlands DC	Newcastle under -Lyme BC	Stafford BC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC	
	Planning Guidance for developers		✓	In development		http://www.stafforddc.gov.uk/planning/planning-policy/supplementary-planning-policy-documents ✓	Informal guidance inplace		Sustainable Development	https://www.tamworth.gov.uk/sites/default/files/planning_docs/Tamworth_Design_SPD_July_2019_v1-0.pdf	
	Developer Contributions based on damage cost calculation		✓			x	Damage cost assessment now required for applicable applications.				
	Planning Policies		✓	• Policy T1: Development and Sustainable Transport Policy SD2: Renewable/Low-Carbon Energy		http://www.staffordbc.gov.uk/planning/planning-policy/local-plan-2012-2031	Supplementary planning document in development	https://www.lichfielddc.gov.uk/Council/Planning/The-local-plan-and-planning-policy/Planning-policy.aspx	Planning policies and guidance	https://www.tamworth.gov.uk/local-plan	
	STOR Sites (Short Term Operating Reserve) Energy Generation . Regulation via planning / permitting regime	high	✓	✓							
	Low Emissions Strategy	high	✓	In development			x				

n	Measure Classification	Effect on reducing NOx and PM10 emissions (low, medium, high)	Reduces PM 2.5 emissions	Local Authority						
				Staffordshire Moorlands DC	Newcastle under -Lyme BC	Stafford BC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Freight and Delivery Management	Freight Consolidation Centre	medium	✓			x				
	Route Management Plans/ Strategic routing strategy for HGV's	high	✓	https://www.staffordshire.gov.uk/transport/transportplanning/localtransportplan/home.aspx						
	Quiet & out of hours delivery	low	✓			✓				
	Delivery and Service plans	medium	✓			x				
	Freight Partnerships for city centre deliveries	high	✓			x				
Vehicle Fleet Efficiency	Driver training and ECO driving aids	medium	✓			✓				
	Promoting low emission public transport	high	✓			x				
	Vehicle retrofitting programmes	medium	✓			x		Retrofitting of old Council owned HGVs and Buses with pollution abatement equipment will be considered by the Council where technically and financially feasible		
	Fleet efficiency and recognition schemes	medium	✓	Staffordshire and Stoke-on-Trent Eco-Stars http://www.ecostars-uk.com/eco-stars-schemes/						

Measures category	Measure Classification	Effect on reducing NOx and PM10 emissions (low, medium, high)	Reduces PM 2.5 emissions	Local Authority							
				Staffordshire Moorlands DC	Newcastle under -Lyme BC	Stafford BC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC	
Promoting low emission transport	Low emission zone (LEZ) Clean Air Zone (CAZ)	high	✓								
	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	high	✓	In development		Waste fleet vehicles comply with Euro VI.					
	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	high	✓	In development				LDC looking to replacing old vehicles within the fleet with more modern cleaner vehicles, which comply with the prevailing EURO standard. This will be extended to all Council owned vehicles.			
	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	high	✓	In development			Procurement of EV on staff carparks				
	Priority parking for LEV's	high	✓			✓			Electric Vehicle charging spaces		
	Taxi Licensing conditions	medium	✓			✓					
	Taxi emission incentives	medium	✓			✓					
Environmental permits	Introduction/increase of environment charges through permit systems and economic instruments (Permit fees set centrally)	medium	✓			✓					
	Measures to reduce pollution through IPPC Permits going beyond BAT	medium	✓	https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211863/env-permitting-general-guidance-a.pdf (Chapter 15)							
	Large Combustion Plant Permits and National Plans going beyond BAT	high	✓								
	Other		✓								

Measures category	Measure Classification	Effect on reducing NOx and PM10 emissions (low, medium, high)	Reduces PM2.5 emissions	Local Authority						
				Staffordshire Moorlands DC	Newcastle under -Lyme BC	Stafford BC	East Staffs BC	Lichfield DC	South Staffs DC	Tamworth BC
Other measures	Smoky Diesel Hotline		✓	https://www.gov.uk/report-smoky-vehicle						
	A5 and M6 Partnership		✓			x		Strategy for the A5 2011-2026	Strategy for the A5 2011-2026	
	Domestic Smoke Control advice and Enforcement		✓	✓ -	-	https://www.staffordbc.gov.uk/environment/smoke-control.cfm	Provided via ESBC Website & other literature	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1	https://www.sstaffs.gov.uk/environment/smoke-control-areas.cfm	
	Garden Bonfires - Advice and nuisance enforcement		✓	- ✓	-	http://www.staffordbc.gov.uk/environmental-health/pollution/bonfires	Provided via ESBC Website & other literature	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1	https://www.sstaffs.gov.uk/crime-nuisances/bonfires-and-smoke.cfm	http://www.tamworth.gov.uk/air-quality
	Commercial burning advice and enforcement		✓	✓	-	http://www.staffordbc.gov.uk/environmental-health/pollution/bonfires	Provided via ESBC Website & other literature	https://www.lichfielddc.gov.uk/home-garden/bonfires-barbecues-smoke/1		http://www.tamworth.gov.uk/air-quality
	Multi agency working with Fire Service and Environment Agency for trade burning		✓	✓ -	-	✓		Information shared as appropriate		Information shared as appropriate
	Multi agency working with Staffordshire Fire Service and Local Authority Building Control regarding chimney fires and complaints about DIY domestic heating systems		✓	✓ -	-	✓		Information shared as appropriate		
	Stoke-on-Trent Low Carbon District Heat Network		✓	-	-	✓				

2.3.4 PM_{2.5} in Staffordshire & Stoke-on-Trent - Next steps

As PM_{2.5} is an issue requiring collaboration between the district, county and city authorities within Staffordshire, the following actions are proposed in addition to those outlined in the action plan. Progress on these and the action plan will be detailed in the 2020 ASR.

- ✓ To agree a target for reducing Fraction of All Cause Mortality from PM_{2.5} in each district, city and county authority by 2020
- ✓ To agree a target for reducing PM_{2.5} exposure (calculated from PM₁₀ exposure / background maps / local monitoring where available)
- ✓ To maintain compliance with the 2020 EU limit value of 25µg/m³
- ✓ To include Public Health Outcome Framework Indicator 3.01 in the Staffordshire and District Authority and City Council Joint Strategic Needs Assessment for 2019/2020 onwards and to report progress to the relevant Health and Wellbeing Boards.
- ✓ To continue to identify risks affecting PM_{2.5} which need to be addressed at a national level e.g.
- ✓ A number of authorities within Staffordshire are receiving applications for STOR (Short Term Operating Reserve) sites to supplement power to the National Electricity Grid at times of peak demand. These sites typically operate during the autumn / winter months and can be high emitters of PM.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Tamworth Borough Council does not operate any automatic (continuous) monitors.

3.1.2 Non-Automatic Monitoring Sites

Tamworth Borough Council undertook non- automatic (passive) monitoring of NO₂ at 14 sites during 2019. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure D.1 in Appendix D.

Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias⁴, “annualisation” (where the data capture falls below 75%), and distance correction⁵. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO₂)

Table A.2 in Appendix A compares the ratified and adjusted monitored NO₂ annual mean concentrations for the past 5 years with the air quality objective of 40µg/m³. Note that the concentration data presented in

Table A.2 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

There are no exceedances of the annual mean Air Quality Objective for nitrogen dioxide for 2019. There is no need, therefore, to consider declaring an AQMA in the Tamworth Borough Council area.

⁴ <https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html>

⁵ Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube collocated with a Continuous Analyser?	Height (m)
10N	47 Upper Gungate	Roadside	420040	305690	NO ₂	NO	5	2.2	NO	3
3N	34 Claremont Rd	an Backgro	420760	304560	NO ₂	NO	6	2.1	NO	3
11N	12 Brookside Way	an Backgro	423000	300970	NO ₂	NO	9	1.6	NO	3
Q2	50 Lakeland Drive	Roadside	423430	301280	NO ₂	NO	39	1.7	NO	3
Q3	14 High Broom Cou	Roadside	420350	303480	NO ₂	NO	6	1.8	NO	3
Q5	2 Wessenden	Roadside	423840	301080	NO ₂	NO	8	1.9	NO	3
Q6S	Dosthill Rd Two Gates	Roadside	421588	301526	NO ₂	NO	12	1.8	NO	3
Q6W	Watling St Two Gates Club	Roadside	421555	301065	NO ₂	NO	17	2.8	NO	3
Q6N	Tamworth Rd Two Gates	Roadside	421580	301630	NO ₂	NO	15	2.6	NO	3
Q6EX	118 Highcliffe Rd	Roadside	421600	301600	NO ₂	NO	6	15	NO	3
Q7	253 Glascote Rd	Roadside	422110	303420	NO ₂	NO	3	2	NO	3
Q8	1 Arkall Close	Roadside	421380	305450	NO ₂	NO	9	2.1	NO	3
Q9N	Opp 101 Gungate Comberford Rd	Kerbside	420823	304899	NO ₂	NO	26	1	NO	3
Q10	251 Tamworth Rd Ammington	Kerbside	420823	304899	NO ₂	NO	7	1.1	NO	3

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results 2015 - 2019

Site ID	X OS Grid Ref (Eastings)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2019 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ^{(3) (4)}				
							2015	2016	2017	2018	2019
10N	420040	305690	Roadside	Diffusion Tube	N/A	75	33.7	36	30.7	30.3	32.2
3N	420760	304560	Urban Background	Diffusion Tube	N/A	100	18.8	19	18.8	17.1	19.4
11N	423000	300970	Urban Background	Diffusion Tube	N/A	100	20.7	21	19.5	19.7	20.4
Q2	423430	301280	Roadside	Diffusion Tube	N/A	100	23.7	25	24.2	23.8	22.7
Q3	420350	303480	Roadside	Diffusion Tube	N/A	100	26.5	27	26.5	25.0	24.8
Q5	423840	301080	Roadside	Diffusion Tube	N/A	100	26.5	29	25.8	25.0	25.6
Q6S	421588	301526	Roadside	Diffusion Tube	N/A	100	36.3	39	37.3	35.5	36.9
Q6W	421555	301065	Roadside	Diffusion Tube	N/A	100	33.9	36	34.7	32.6	32
Q6N	421580	301630	Roadside	Diffusion Tube	N/A	100	31.3	33	34.5	34.1	34
Q6EX	421600	301600	Roadside	Diffusion Tube	N/A	100	41.2	37	38.5	25.6	26
Q7	422110	303420	Roadside	Diffusion Tube	N/A	100	30.9	32	32.5	31.0	29.6
Q8	421380	305450	Roadside	Diffusion Tube	N/A	100	21	22	20.7	21.0	21.2
Q9N	420823	304899	Kerbside	Diffusion Tube	N/A	100	28.7	30	29.8	27.0	29.8
Q10	420823	304899	Kerbside	Diffusion Tube	N/A	100	23.9	24	25.2	22.3	23.5

Diffusion tube data has been bias corrected

Annualisation has been conducted where data capture is <75%

Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance adjustment

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

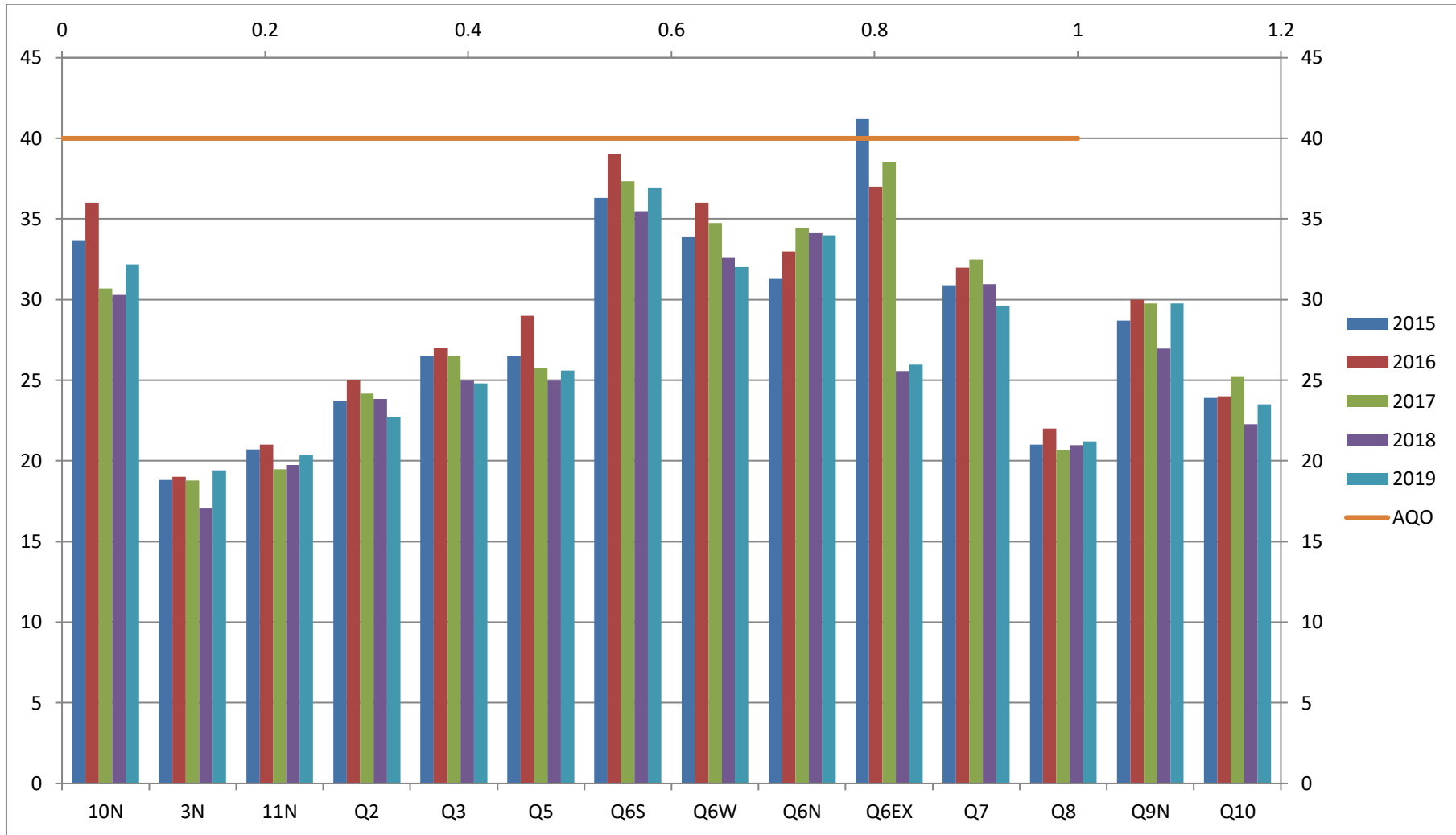
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

Figure A.1 – Trends in Annual Mean NO₂ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO₂ Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.93) and Annualised ⁽¹⁾	Distance Corrected to Nearest Exposure ⁽²⁾
10N	420040	305690	44.1	54.2	31.7	Missing	24.5	20.5	24.6	missing	28.9	missing	42.6	40.8	34.7	32.23	
3N	420760	304560	33.0	30.9	15.0	15.6	12.3	12.5	14.2	14.2	19.7	25.7	31.4	25.6	20.8	19.4	
11N	423000	300970	34.5	29.9	17.7	16.6	14.5	15.2	16.2	16.1	21.5	22.2	32.1	26.3	21.9	20.4	
Q2	423430	301280	37.1	34.5	17.1	28.6	18.5	20.4	15.3	18	22.5	23	33.3	25.1	24.5	22.7	
Q3	420350	303480	36.9	42.6	21.6	21	18	20.7	20.5	25.6	26.8	26	31	29.3	26.7	24.8	
Q5	423840	301080	42	36.8	21	24.3	19.4	20.9	21.5	22.6	28.8	27.1	41.8	24	27.5	25.6	
Q6S	421588	301526	46	46.2	30.3	29.2	32.6	34.1	34.4	32.2	46.4	41.2	59.5	44.1	39.7	36.9	
Q6W	421555	301065	47.2	43.2	24.7	39.8	29.1	32.9	31.9	28.4	37.2	33.9	31.3	33.7	34.4	32.0	
Q6N	421580	301630	45.9	49.8	31.3	27.9	22.7	31.9	28.5	33.7	38.4	40.5	44.5	43.2	36.5	34.0	
Q6EX	421600	301600	34.3	44	22.1	21.2	19.3	21.7	21.4	25.6	27.6	32.1	32	33.5	27.9	26.0	
Q7	422110	303420	42.2	39.8	28.6	28.2	20.3	20.5	28.1	29.3	33.8	35.6	40.4	35.2	31.8	29.6	
Q8	421380	305450	35.5	33.5	17.7	19.2	16.1	17.9	17.6	17.2	23.7	27	22.9	25.4	22.8	21.2	
Q9N	420823	304899	45.7	42.2	39.3	20.2	24.4	22.4	24.6	26.4	31.7	33.7	39.8	33.7	32.0	29.8	
Q10	420823	304899	39.2	36.1	18.8	18.1	14.9	19.2	17.2	21.7	24.9	25.3	36.5	31.6	25.3	23.5	

- Local bias adjustment factor used
- National bias adjustment factor used
- Annualisation has been conducted where data capture is <75%
- Where applicable, data has been distance corrected for relevant exposure in the final column

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

Diffusion tubes are used to provide a relatively simple and cost-effective method of monitoring for nitrogen dioxide at several locations where nitrogen dioxide levels are likely to be high as identified in previous reviews and assessments, due to the proximity of significant sources (normally traffic).

The tube is a small plastic device, approximately 6 centimetres long, open at one end, with a disc at the other end that reacts to nitrogen dioxide. They are located at sites, typically on lamp posts or other street furniture or on the facades of properties and exposed for a 4–5 week period, in line with the UK national survey.

The tubes contain a mesh which is doped with 20% v/v Triethanolamine (TEA) in Water and are fitted with a cap before and after exposure which is undertaken according to the nationally published monthly schedule.

QA/QC Details of the Nitrogen Dioxide Diffusion Tube Survey

The diffusion tubes are supplied and analysed by Staffordshire County Council Scientific Services, which participates in the *AIR NO₂ Proficiency Testing Scheme* for the analysis the diffusion tubes.

Air PT Scheme

The AIR NO₂ Proficiency Testing Scheme is an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL WASP PT scheme.

Staffordshire County Council Scientific Services scored 81.25% for the period covered by this report. The Air PT Scores for the relevant period is shown in Table C.1 with the Staffordshire Scientific Services results highlighted in yellow for the period covered by this report.

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, it may be conclude that the laboratory in question may have significant systematic sources of bias in their assay.

However the following explanation has been provided by Staffordshire Scientific Services.

AIR PT Scheme (LGC)

Results for each round are classified on z-scores for each tube as SATISFACTORY (≤ 2), QUESTIONABLE (between 2 and <3) and UNSATISFACTORY (>3).

- 100% satisfactory results for round 30.
- 3 out of 4 results for round 31 were satisfactory. 1 result was unsatisfactory due to an issue with the tube prior to analysis. A drop of the doping solution, which should be held between the discs in the coloured cap, was in the white cap and came out before analysis started.
- 3 out of 4 results for round 33 were satisfactory. 1 result was lower than the reference value and had a z-score greater than 3. We are currently reviewing this result as part of our ongoing investigation into the further issues we have had with the PT tubes.
- 3 out of 4 results for round 34 were satisfactory. 1 result was lower than the reference value. On receipt of this set of tubes we noticed droplets of liquid in one of the tubes and reported this, along with previous observations of round 31, to LGC (issue raised with LGC on 22nd Oct). LGC set a replacement set of tubes. The replacement set also had droplets in the tubes which was reported to LGC (on 1st Nov) who said their technical team would investigate the issue.
- 100% satisfactory results for round 36. For this round we ordered 3 sets of LGC tubes in order to investigate the issues found above. 2 sets contained tubes that again had droplets of solution on the inner surface of the tubes and in the white caps. These issues were reported to LGC on 23rd Jan and 13th Feb. The results submitted were for the tubes where there were no issues identified.

Round	z-scores	Performance
30 – Jan 2019	-1.00, -0.67, -0.62, -0.38	100% SATISFACTORY
31 – May 2019	-1.82, -1.75, -4.47, -1.49	75% SATISFACTORY 25% UNSATISFACTORY
33 – July 2019	-3.15, -0.75, 0.06, -0.07	75% SATISFACTORY 25% UNSATISFACTORY
34 – Oct 2019	-0.21, -2.58, -0.56, 0.00	75% SATISFACTORY 25% QUESTIONABLE
36 – Feb 2020	-0.97, -0.52, -0.21, -0.15	100% SATISFACTORY

After initially raising our concerns with LGC regarding round 34 on 22nd October 2019 we received a response from LGC on 25th Feb 2020.

The response from their technical team was **“The requirement is for participants to extract the innards of the Palmes tube and if quantitatively done, then good performance can be expected. This can be seen in the most recent report issued which included sample 11 (round AR036), where the satisfactory percentage was between 88.9 – 94.4%.”** The satisfactory percentage here refers to the performance of all participating laboratories.

The response we have had from LGC does not satisfactorily explain the issues we have found, so we are continuing our own investigation into the preparation and storage of the doped tubes and will update on these findings as we have them.

For the most up to date published results in the AIR PT Scheme see the Defra website:
<https://lagm.defra.gov.uk/diffusion-tubes/ga-gc-framework.html>

Field Intercomparison (NPL)

The performance results for the field intercomparison for January to December 2019 are all 'GOOD' (CoV <20).

See below for the annual summary of our results for the field intercomparison study.

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 $\mu\text{g m}^{-3}$	Tube 2 $\mu\text{g m}^{-3}$	Tube 3 $\mu\text{g m}^{-3}$	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1	09/01/2019	06/02/2019	64.0	75.4	76.7	72	7.0	10	17.4	68.0	90.4	Good	Good
2	06/02/2019	06/03/2019	88.0	96.8	97.0	94	5.1	5	12.8	84.4	94.2	Good	Good
3	06/03/2019	03/04/2019	60.3	57.6	67.3	62	5.0	8	12.4	70.0	93.4	Good	Good
4	03/04/2019	01/05/2019	61.0	53.5	61.2	59	4.4	7	10.9	57.6	96.2	Good	Good
5	01/05/2019	05/09/2019	60.8	65.7	59.0	62	3.5	6	8.6	57.7	79.2	Good	Good
6	05/06/2019	03/07/2019	76.0	83.4	78.2	79	3.8	5	9.4	64.8	84.9	Good	Good
7	03/07/2019	07/08/2019	77.3	79.2	73.8	77	2.7	4	6.8	59.5	93.9	Good	Good
8	07/08/2019	04/09/2019	71.2	86.2	86.1	81	8.6	11	21.4	58.3	82.6	Good	Good
9	04/09/2019	02/10/2019	73.3	77.7	77.3	76	2.4	3	6.0	55.2	97.4	Good	Good
10	02/10/2019	06/11/2019	79.3	78.4	78.2	79	0.6	1	1.5	63.3	97.1	Good	Good
11	06/11/2019	04/12/2019	86.4	79.5	76.2	81	5.2	6	12.9	62.9	97.5	Good	Good
12	04/12/2019	08/01/2020	80.2	80.2	78.7	80	0.9	1	2.2	61.6	97.4	Good	Good
13													

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

Site Name/ID:	Marylebone Road
Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 12 periods of data	
Bias factor A	0.85 (0.78 - 0.93)
Bias B	18% (8% - 28%)
Diffusion Tubes Mean:	75 $\mu\text{g m}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	64 $\mu\text{g m}^{-3}$
Data Capture for periods used:	92%
Adjusted Tubes Mean:	64 (59 - 70) $\mu\text{g m}^{-3}$

Precision	12 out of 12 periods have a CV smaller than 20%
Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 12 periods of data	
Bias factor A	0.85 (0.78 - 0.93)
Bias B	18% (8% - 28%)
Diffusion Tubes Mean:	75 $\mu\text{g m}^{-3}$
Mean CV (Precision):	6
Automatic Mean:	64 $\mu\text{g m}^{-3}$
Data Capture for periods used:	92%
Adjusted Tubes Mean:	64 (59 - 70) $\mu\text{g m}^{-3}$

Overall survey -->	Good precision	Good Overall DC
--------------------	----------------	-----------------

(Check average CV & DC from Accuracy calculations)

Jaume Targa, for AEA
Version 04 - February 2011

If you have any enquiries about this spreadsheet please contact the LAQM Helpdesk at:

LAQMhelpdesk@uk.bureauveritas.com

Bias factor

The bias adjustment factor spreadsheet on the Defra website was last updated in September 2019. The overall bias factor for Staffordshire Highways Laboratory for 2018 (including the Field Intercomparison result and all the co-location results from participating local authorities, total of 16 studies) was 0.88.

The bias factor for 2019 has not been published yet (as of 3rd April 2020). The bias factor from the field intercomparison results alone for 2019 is 0.85.

For the most up to date information on bias factors see the Defra website:

<https://lagm.defra.gov.uk/bias-adjustment-factors/national-bias.html>

Click on link in the 3rd paragraph down (highlighted 'here').

Table C.1: Laboratory summary performance for AIR NO₂ PT rounds AR0024, 25, 27, 28, 30, 31, 33 and 34

The following table lists those UK laboratories undertaking LAQM activities that have participated in recent AIR NO₂ PT rounds and the percentage (%) of results submitted which were subsequently determined to be **satisfactory** based upon a z-score of ± 2 as defined above.

AIR PT Round	AIR PT AR024	AIR PT AR025	AIR PT AR027	AIR PT AR028	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034
Round conducted in the period	January – February 2018	April – May 2018	July – August 2018	September – October 2018	January – February 2019	April – May 2019	July – August 2019	September – November 2019
Aberdeen Scientific Services	100 %	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Cardiff Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Edinburgh Scientific Services	100 %	100 %	100 %	100 %	100 %	NR [2]	100 %	25 %
SOCOTEC	100 % [1]	100 % [1]	100 % [1]	100 % [1]	87.5 % [1]	100 % [1]	100 % [1]	100 % [1]
Exova (formerly Clyde Analytical)	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Glasgow Scientific Services	100 %	100 %	50 %	100 %	100 %	100 %	100 %	50 %
Gradko International [1]	100 % [1]	100 %	100 %	100 %	75 %	100 %	100 %	100 %
Kent Scientific Services	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Kirklees MBC	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Lambeth Scientific Services	NR [2]	NR [2]	NR [2]	25 %	50 %	100 %	50 %	100 %
Milton Keynes Council	100 %	75 %	100 %	100 %	100 %	100 %	50 %	100 %
Northampton Borough Council	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]	NR [3]
Somerset Scientific Services	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
South Yorkshire Air Quality Samplers	100 %	100 %	100 %	100 %	100 %	100 %	100 %	75 %
Staffordshire County Council	50 %	100 %	100 %	100 %	100 %	75 %	75 %	75 %
Tayside Scientific Services (formerly Dundee CC)	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]	100 %	NR [2]
West Yorkshire Analytical Services	50 %	75 %	100 %	100 %	100 %	100 %	100 %	50 %

[1] Participant subscribed to two sets of test results (2 x 4 test samples) in each AIR PT round.

[2] NR No results reported

[3] Northampton Borough Council, Kent Scientific Services, Cardiff Scientific Services, Kirklees MBC and Exova (formerly Clyde Analytical) no longer carry out NO₂ diffusion tube monitoring and therefore did not submit results.

Bias Adjustment Factor

It is known that there are systematic differences in the performance of different laboratories and preparation methods of diffusion tubes. Table C.2 shows the studies that have been used to compare results from diffusion tubes (analysed by Staffordshire County Council Scientific Services) to results of co-located automatic chemiluminescence monitors, where data has been collected for 9 months or more.

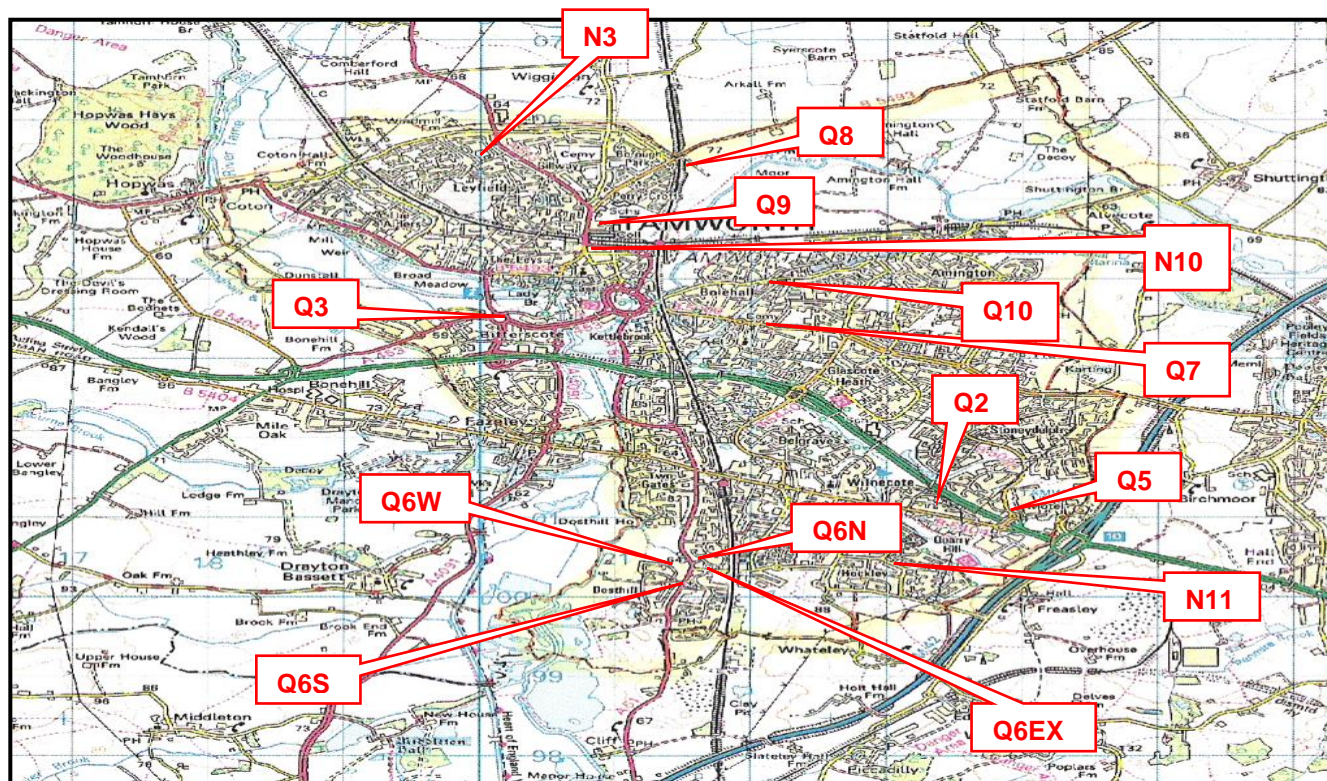
From these studies it can be seen that the bias adjustment factor (A) of 0.93 has therefore to be applied (multiplied) to the diffusion tube results for the 2019 data as shown in Table C.2.

Table C.2 Bias Adjustment Factors for Staffordshire Scientific Services 2019

National Diffusion Tube Bias Adjustment Factor Spreadsheet				Spreadsheet Version Number: 03/20						
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 spreadsheet 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 2020 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:		Step 2:	Step 3:	Step 4:						
Select the Laboratory that Analyses Your Tubes from the Drop-Down List		Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	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 ¹ shown in blue at the foot of the final column.						
If a laboratory is not chosen, we have no data for this laboratory.		If a preparation method is not chosen, we have no data for this method at this laboratory.	If a year is not chosen, we have no data.	If you have your own co-location study then see footnote ¹ . 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 ²	Year ³	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)
Staffordshire Scientific Services	20% TEA in water	2019	UB	Salford City Council	12	27	25	7.6%	G	0.93
Staffordshire Scientific Services	20% TEA in water	2019	B	Salford City Council	11	16	15	7.9%	G	0.93
Staffordshire Scientific Services	20% TEA in water	2019	R	Salford City Council	12	44	44	2.1%	G	0.98
Staffordshire Scientific Services	20% TEA in water	2019	R	Marglebone Road Intercomparison	12	75	65	14.7%	G	0.87
Staffordshire Scientific Services	20% TEA in water	2019	UB	Stoke-on-Trent City Council	12	27	24	12.2%	G	0.89
Staffordshire Scientific Services	20% TEA in water	2019	R	Stoke-on-Trent City Council	10	55	63	-12.6%	G	1.14
Staffordshire Scientific Services	20% TEA in water	2019	R	Bury Council	11	27	26	4.7%	G	0.95
Staffordshire Scientific Services	20% TEA in water	2019	KS	Manchester City Council	12	55	59	-6.3%	G	1.07
Staffordshire Scientific Services	20% TEA in water	2019	UC	Manchester City Council	12	35	36	-3.8%	G	1.04
Staffordshire Scientific Services	20% TEA in water	2019	SI	Manchester City Council	12	20	22	-9.1%	G	1.10
Staffordshire Scientific Services	20% TEA in water	2019	R	Stockport MBC	12	40	36	12.8%	G	0.89
Staffordshire Scientific Services	20% TEA in water	2019	R	Stockport MBC	11	27	23	15.0%	G	0.87
Staffordshire Scientific Services	20% TEA in water	2019	UB	Trafford	10	22	19	18.1%	G	0.85
Staffordshire Scientific Services	20% TEA in water	2019	UB	Wigan Council	11	24	18	34.1%	G	0.75
Staffordshire Scientific Services	20% TEA in water	2019	R	East Staffordshire Borough Council	11	41	36	14.1%	G	0.88
Staffordshire Scientific Services	20% TEA in water	2019		Overall Factor¹ (17 studies)					Use	0.93

Appendix D: Map(s) of Monitoring Locations and AQMAs

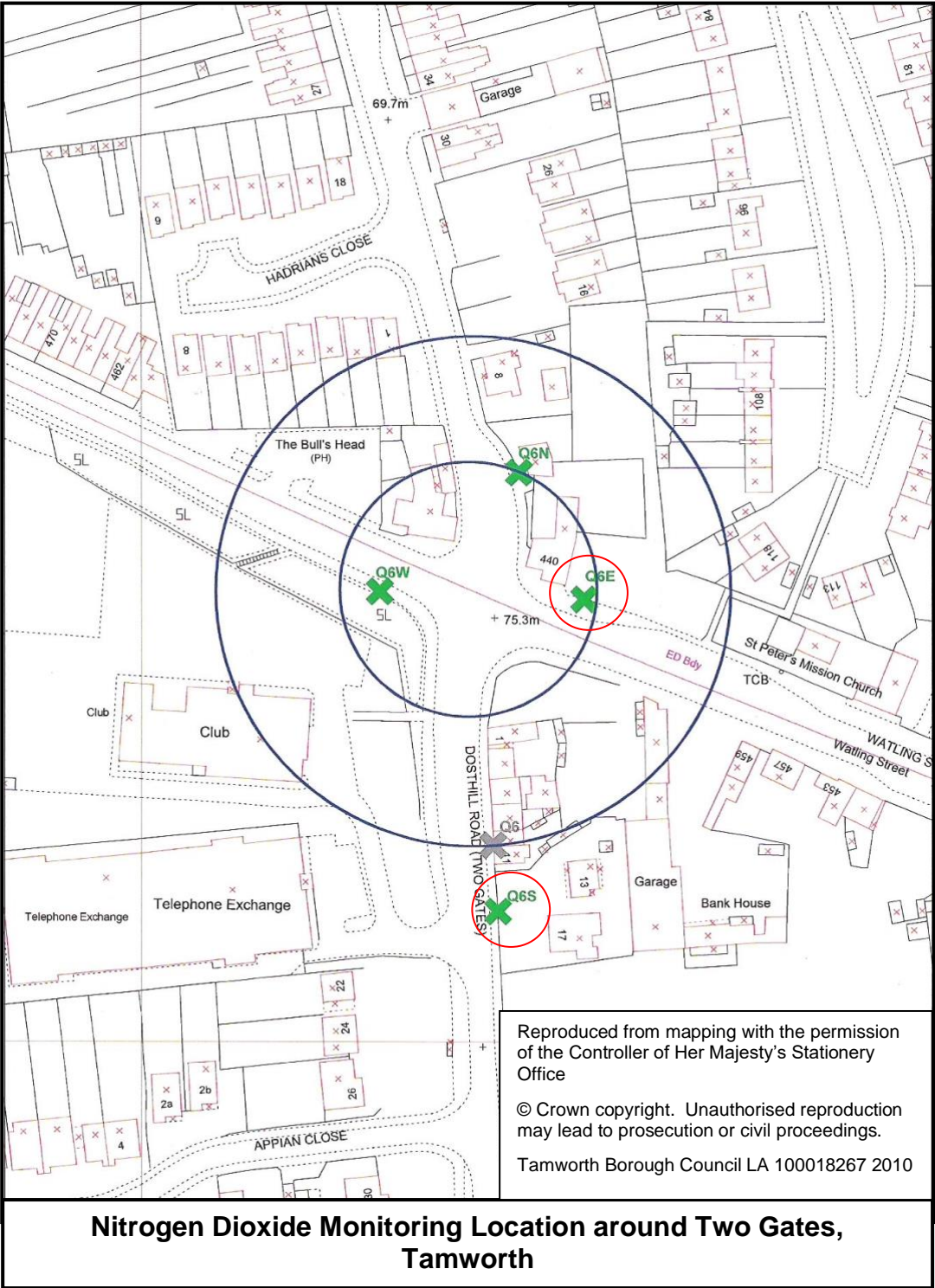
Figure D.1 Map showing location of nitrogen dioxide diffusion tubes



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NB The TAM Q6E site has been moved to 118 Highcliffe Rd and is now called TAM.6QEX
The sites around the Two Gates crossroads are shown at Figure D.2

Figure D.2 Map showing location of nitrogen dioxide diffusion tubes in the former Two Gates Air Quality Management Area



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective ⁶	
	Concentration	Measured as
Nitrogen Dioxide (NO ₂)	200 µg/m ³ not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50 µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m ³	Annual mean
Sulphur Dioxide (SO ₂)	350 µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean

⁶ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

Appendix F: Processes Regulated for Emissions to Air by Tamworth Borough Council under the Environmental Permitting (England and Wales) Regulations 2016 as at April 2019

Ref No	Operator Name	Process Address	Post Code	Process Description
Part A2				
P01	Forterra Building Products Ltd	Wilnecote Brick, Hedging Lane, Wilnecote	B77 5EU	Manufacture of heavy clay goods. (Brickworks)
Part B				
P03	Envirostrip (GB) Limited	Unit 11, 12 and 12a Hedging Lane Industrial Estate	B77 5HH	Ferrous Metal
P04	Nationwide Crash Repair Centres Ltd	109B Mariner, Lichfield Road Industrial Estate	B79 7UL	Respraying of road vehicles
P06	Leadec Ltd	Warwick House, Watling Street, Wilnecote	B77 5BH	Metal decontamination by the application of heat
P02	Breedon Southern Ltd	Mica Close, Tamworth,	B77 4DS	Concrete batching plant
P09	Apollo Chemicals Limited	Sandy Way, Amington Industrial Estate	B77 4DS	Manufacture of solvent borne adhesives and solvents
P11	Sainsbury's Supermarkets Ltd	Sainsbury's Supermarkets Ltd, Bitterscote	B78 3HD	Unloading of petrol into stationary storage tanks
P12	William Morrisons Supermarkets Ltd	William Morrison Supermarket Plc, Hilmore Way	B77 2NY	Unloading of petrol into stationary storage tanks
P13	Tamworth Service Station	Tamworth Service Station, Upper Gungate	B79 7NU	Unloading of petrol into stationary storage tanks
P14	Tesco Stores Ltd	Dosthill Service Station, High Street, Dosthill	B77 1LE	Unloading of petrol into stationary storage tanks
P15	Fuel Centre Ltd	Wilnecote Service Station, Watling Street, Wilnecote	B77 5AB	Unloading of petrol into stationary storage tanks
P22/10	Martin McColl Ltd	78 Glascote Rd, Tamworth, B77 2AF	B77 2AF	Unloading of petrol into stationary storage tanks
P20	Asda Stores Ltd	Ventura Road	B78 3HD	Unloading of petrol into stationary storage tanks
P21	Stormking Plastics Ltd	Amington Point, Sandy Way, Amington	B77 4ED	Processes for the manufacturer of fibre reinforced plastics

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

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Tel 01827 709709 or email enquiries@tamworth.gov.uk