

# SOUTH KESTEVEN DISTRICT COUNCIL

2019 Air Quality Annual Status Report (ASR)

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

June 2019

Local Authority Officer	Peter Rogers
Department	Environmental Protection
Address	Council Offices St Peter's Hill Grantham Lincolnshire NG31 6PZ
Telephone	01476 406080
E-mail	p.rogers@southkesteven.gov.uk
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# Executive Summary: Air Quality in Our Area Air Quality in South Kesteven

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<sup>1,2</sup>.

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion<sup>3</sup>.

There is currently one Air Quality Management Area (AQMA) designated within South Kesteven; AQMA No.6 within Grantham that spans the main vehicular route through the town centre. The current AQMA has been declared due to exceedances of the NO<sub>2</sub> annual mean and 1-hour objectives.

During 2018, South Kesteven monitored NO<sub>2</sub> using fifty eight passive NO<sub>2</sub> diffusion tubes at thirty five separate locations with no automatic monitoring completed. The NO<sub>2</sub> diffusion tube network is in place to monitor NO<sub>2</sub> concentrations across the District, monitoring at known hotspot areas and also being used to identify any new hotspot areas.

Following the application of bias adjustment and distance correction to the raw data, two sites exceeded the NO<sub>2</sub> annual mean objective in 2018. The sites where exceedances were experienced are within the current AQMA that is located within Grantham, and there were no exceedances reported outside of the existing AQMA.

In comparison to the concentration in 2017, all of the sites experienced a decrease in concentration in 2018 except Sites SK08, SK25 and SK52/53. In 2018, the maximum increase in annual mean NO<sub>2</sub> concentration was recorded at SK52/53 located near at the junction of A52 Dysart Road and A52 Westgate, where the annual mean NO<sub>2</sub> concentration increased from  $29.5\mu g/m^3$  to  $35.0\mu g/m^3$ .

<sup>&</sup>lt;sup>1</sup> Environmental equity, air quality, socioeconomic status and respiratory health, 2010

<sup>&</sup>lt;sup>2</sup> Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>&</sup>lt;sup>3</sup> Defra. Abatement cost guidance for valuing changes in air quality, May 2013

There were no sites where the NO<sub>2</sub> annual mean is greater than  $60\mu g/m^3$ , therefore in accordance with Defra LAQM.TG(16) there are no sites likely to be at risk of exceeding the 1-hour mean objective. The current AQMA has been designated for exceedances of both the annual mean and 1-hour NO<sub>2</sub> objectives. Within the past five years there has not been an annual mean concentration above  $60\mu g/m^3$ , therefore it is likely that the 1-hour mean objective has not been exceeded in the last five years.

### **Actions to Improve Air Quality**

Throughout 2018, the measures outlined in the 2016 AQAP have progressed towards the goal of reducing pollutant concentrations within the District and the revocation of the No.6 AQMA in Grantham, they include:

- The continual construction of the Grantham Southern Relief Road. Phase one is complete, Phase 2 of the works expected to commence Summer 2019 following the scheme's legal orders being approved by Central Government. Phase 3 archaeological site works are now complete.
- The Council has made a number of changes to its pool car fleet:
  - Two new electric vehicles have been included within the fleet, the new Renault Zoe cars have dedicated parking and charging points; and
  - An increase in the proportion of fleet vehicles which meet at least a Euro
     6 standard, this has increased within 2018 from 24% to 67%.
- The Council is also working with energy suppliers to install a number of electric vehicle charging points to public car parks within Grantham, Stamford, Bourne and Market Deeping.

A new Local Plan (2011-2036) is currently progressing through its last stage of consultation. This consultation represented the last formal opportunity to make comments on the Local Plan before the Council submits the document to the Secretary of State for independent examination. The Local Plan will be adopted in 2019. This plan will replace the existing development plan, where air quality is identified as a planning restraint for any new development that is planned within the District. The new plan proposes to focus on several policies including; sustainable development, protecting the natural and built environment and renewable energy generation. It is stated within the existing Local Plan that *'Air Quality will be considered when assessing* 

development proposals, particularly in or near the designated AQMA and where significant doubt arises as to the air quality impact then a cautious approach will be applied'.

This statement is embedded within the planning policy EN3:

#### EN3: Pollution Control

Development that, on its own or cumulatively, would result in significant air, light, noise or other environmental pollution or harm to amenity, health or safety will only be permitted if the potential adverse effects can be mitigated to an acceptable level by other environmental controls, or by measures included in the proposals.

Where applicable mitigation should be provided in accordance with measures from the Council's Air Quality Action Plan (AQAP). This may be achieved by the imposition of planning conditions or through a planning obligation.

New developments should not exacerbate air quality in the existing Air Quality Management Area (AQMA).

### **Conclusions and Priorities**

Following completion of the 2019 ASR, it has been concluded that the current AQMA that is designated within Grantham should remain, this is due to monitored exceedances of the NO<sub>2</sub> annual mean at a number of diffusion tube monitoring sites located within the AQMA. There were no annual mean concentrations monitored above 60µg/m<sup>3</sup> therefore in accordance with Defra LAQM.TG(16) there are no sites likely to be at risk of exceeding the 1-hour mean objective. The AQMA has been designated for both the annual mean and 1-hour NO<sub>2</sub> objectives.

The priorities for the local authority in addressing air quality for the coming year are:

- Continue the monitoring within the AQMA to ensure the air quality will not worsen
- Consider revoking the AQMA for exceedances of 1-hour mean
- Continue to progress the measures outline within the AQAP with an overall aim of reducing the NO<sub>2</sub> concentrations within the AQMA to a point where the AQMA can be revoked.

### Local Engagement and How to get Involved

At an individual level there are a number of ways the public are able to get involved and help improve air quality at a local level. The air quality section of the South Kesteven website provides information on a number of individual actions that can be taken to reduce pollutant concentrations across the District. These include:

#### **Reducing Idling Engines**

Running your engine unnecessarily while stationary:

- Pollutes your local environment and turning off and restarting an engine causes less pollution than keeping the engine running.
- Effects health for all you could help to reduce heart disease, asthma and lung cancer associated with polluted air simply by turning off.
- Costs you money it wastes fuel and money whilst increasing wear and tear on you engine and adding to repair bills. You could save £53 a year by not idling.
- Is illegal for unnecessarily leaving your car idling you could be fined.

So what can you do:

- You can do your bit by switching off the engine if it looks like you could be waiting for more than a minute. Modern cars use virtually no extra fuel when they're restarted without pressing the accelerator so you won't waste lots of fuel switching the engine back on.
- Also avoid idling whilst waiting in car parks, petrol stations, layby's and set down and pick up points.
- Be smart, stop/start.

Cutting down on these emissions can lead to better air quality and help reduce overall impacts on health. Switching the engine off while your vehicle is stationary reduces emissions and will have a positive environmental effect.

#### Drive Less and Get Cycling

Why not use your car less in South Kesteven and enjoy the health and wellbeing of cycling?

Cycling is an excellent form of sustainable travel, it tackles air pollution by reducing CO<sub>2</sub> and NO<sub>2</sub> emissions from vehicles and protecting the environment. Getting on your bike also has numerous health benefits and can save you money on your travel costs. The South Kesteven District Council cycle to work scheme has benefitted 18 members of staff since it was introduced as part of the 2016 AQAP.

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# 1 Local Air Quality Management

This report provides an overview of air quality in South Kesteven during 2018. 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 South Kesteven District 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.

A summary of AQMAs declared by South Kesteven District Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at <a href="https://uk-air.defra.gov.uk/aqma/local-authorities?la\_id=242">https://uk-air.defra.gov.uk/aqma/local-authorities?la\_id=242</a>. Alternatively, see Appendix D: Maps of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

ΔΟΜΑ	Date of	Pollutants and Air	City/	One Line	Is air quality in the AQMA Dne Line influenced		Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan			
Name	Declaration	Quality Objectives	Town	Descriptio n	by roads controlled by Highways England?	At Declara	ration Now		Now		Date of Publication	Link		
SKDC AQMA No 6	08/08/2013	NO2 Annual Mean	Granth am	Manthorpe Road, Wharf Road, High Street and London Road	NO	58.2	µg/ m³	45.9	µg/ m³	SKDC Air Quality Action Plan 2016	2016	http://www.s outhkesteve n.gov.uk/CHt tpHandler.as hx?id=17687 &p=0		
SKDC AQMA No 6	08/08/2013	NO₂ 1 Hour Mean	Granth am	Manthorpe Road, Wharf Road, High Street and London Road	NO	None predicted as annual means below 60µg/m <sup>3.</sup>	µg/ m³	None predicted as annual means below 60µg/m <sup>3.</sup>	µg/ m³	SKDC Air Quality Action Plan 2016	2016	http://www.s outhkesteve n.gov.uk/CHt tpHandler.as hx?id=17687 &p=0		

#### Table 2.1 – Declared Air Quality Management Areas

South Kesteven District 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 South Kesteven District Council

Defra's appraisal of last year's ASR concluded

- Results continue to indicate that there is no exceedance of the hourly mean NO<sub>2</sub> objective in the AQMA, and there have been no such indications for the last five years. The Local Authority should therefore consider revoking the AQMA for hourly mean NO<sub>2</sub>.
- The Local Authority should therefore continue to develop and implement measures which target improvement in the AQAP and pollution hotspots.

The monitoring results in 2018 suggest there are no exceedances of the hourly mean NO<sub>2</sub> objective in the AQMA. Therefore, the Council will consider revoking the AQMA for exceedances of the hourly mean NO<sub>2</sub> objective in the AQMA.

With regards to the measures for improving the air quality within the AQMA, the Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of the AQMA.

South Kesteven have taken forward a number of direct measures during the current reporting year of 2018 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 Plan 2016. Key progressed measures are:

- The continual construction of the Grantham Southern Relief Road. Phase one is complete, Phase 2 of the works expected to commence Summer 2019 following the scheme's legal orders being approved by Central Government. Phase 3 archaeological site works are now complete.
- All the Council's vehicles are above euro 4 standard, 97% of the South Kesteven fleet now meets Euro V or VI standards with the council intending to replace the remaining Euro IV vehicles in 2019.
- The Council pool car fleet has become "greener" with the introduction of two new electric vehicles. The new Renault Zoe cars have dedicated parking and charging points. The council is working with energy supplier to bring electric

vehicle charge points its public car parks in Grantham, Stamford, Bourne and Market Deeping.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
M1	Grantham Southern Quadrant East West Relief Road	Traffic Managem ent	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Lincolnshire County Council Highways & South Kesteven District Council	2016	2016 + 3-5 years	Reduced HGV through traffic in the town centre – reduced overall traffic flows through the town	0.5 - 1µg/m³	Work commenced on site at end of 2015.	Phase 1 completed. Phase 2 of the works expected to commence Summer 2019 following the scheme's legal orders being approved by Central Government. Phase 3 archaeological site works are now complete.	Legal Orders for Phases Two and Three were officially approved by the Secretary of State in March 2019.
M2	Improve traffic managem ent at key junctions	Traffic Managem ent	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Lincolnshire County Council Highways	2016	2016 + 3-5 years	Reduced congestion and increased average speeds through the AQMA	1 - 2µg/m³	Partially implemented	On going	Funding contributions from appropriate developments SCOOT in operation at 4 key junctions
МЗ	Improvem ents in Bus fleet emissions	Promoting Low Emission Transport	Other	Lincolnshire County Council Highways & South Kesteven DC	2016	2016 + 3-5 years	Improved bus fleet composition but no direct traffic reduction. Bus use more attractive to	1 - 2µg/m3	Partially implemented	On going	Lincolnshire County Council currently have no plans to upgrade the vehicles operating within the passenger transport contracts.

### Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
							potential users – increased bus use				
M4	Encouragi ng modal shift	Promoting Travel Alternativ es	Intensive active travel campaign & infrastructure	Lincolnshire County Council and South Kesteven DC	2016	2016 + 6+ years	Reduced vehicle use and increased use of public transport	0.2 - 0.5µg/m3	Design and feasibility stage and some already built	On going	Lincolnshire County Council has funded a Sustrans officer to work along the Poacher Line - the Community Rail Partnership which runs through Grantham. LCC and SKDC have supported Virgin Trains in developing a travel plan for Grantham Station.
M5	Reduction in Idling Traffic	Public Informatio n	Via leaflets	South Kesteven DC	2016	Ongoing	Reduced idling in key areas	0 - 0.2µg/m3	Partially implemented	Ongoing	Over 3,000 leaflets have been distributed to schools in Grantham to encourage parents to reduce idling engines. Taxi licensing applications and renewals now include anti idling information
M6	Provision of Cycling infrastruct ure	Promoting Travel Alternativ es	School Travel Plans	Lincolnshire County Council Highways	2016	2016 + 6+ years	Increased number of cycle lanes makes cycling a more attractive alternative method of transport	0.2 - 0.5µg/m3	Design and feasibility stage and some already built	On going	Considering using the East Midland Air Quality Developers guide within Lincolnshire which encourages improved cycling infrastructure in new developments
M7	Rolling programm e of replacing older more polluting vehicles with	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	South Kesteven DC	2016	2016 + 6+ years	Improve average euro class of the whole council owned fleet	0.2 - 0.5µg/m³	On going	On going	All the council's vehicles are above euro 4 standard and 97% of Council fleet now meet euro 5 or 6 standard

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
	newer cleaner vehicles										
M8	Promote the use of cleaner or alternative fuels where possible	Promoting Low Emission Transport	Low Emission Zone (LEZ)	South Kesteven DC	2016	On going	Introduce new electric and hybrid vehicles to the council fleet	0.2 - 0.5µg/m³	Partially implemented	On going	Options considered during vehicle procurement. South Kesteven DC have two electric cars
M9	Investigat e options for better travel planning amongst the councils employee s	Public Informatio n	Via other mechanisms	South Kesteven DC	2016	On going	Reduce number of council staff driving to work	0.2 - 0.5µg/m <sup>3</sup>	Partially implemented	On going	The Council are implementing internal measures to reduce the need for staff to work from the Council's offices, reducing the number of staff driving to work, particularly to the Grantham office
M10	Promotion of walking, cycling and public transport	Public Informatio n	Via the Internet	South Kesteven DC	2016	2017	Increased public awareness of air quality issues and ultimate shift to less polluting forms of transport. Increased uptake of bicycle use and walking. Removal of existing road traffic from the road network and minimisation of that introduced by new schemes. Provision of	0.2 - 0.5µg/m³	Implemented	Implemented	-

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
							cycle route maps.				

### 2.3 PM<sub>2.5</sub> – 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<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

The current Defra 2018 background maps for South Kesteven District Council (2017 based<sup>4</sup>) show that all background concentrations of  $PM_{2.5}$  are well below the 2020 annual mean objective for  $PM_{2.5}$ . The highest concentration is predicted to be 10.7µg/m<sup>3</sup> within the 1 x 1km grid square with the centroid grid reference of 490500, 337500 to the North West of Grantham near the Cliffe Road and B1174.

The Public Health Outcomes Framework data tool<sup>5</sup> compiled by Public Heath England quantifies the mortality burden of  $PM_{2.5}$  within England on a county and local authority scale. The 2017 fraction of mortality attributable to  $PM_{2.5}$  pollution across England is 5.1%, and in contrast the fraction within South Kesteven is slightly lower than the National average at 5.0%.

The air quality actions South Kesteven have implemented, and continue to work to implement have invariably also included benefits for the reduction of PM<sub>2.5</sub> pollution. Although not specifically designed for the reduction of PM<sub>2.5</sub>, improvements in NO<sub>2</sub> concentrations will lead to a net reduction of PM<sub>2.5</sub> concentrations from combustion based sources where both pollutants arise. This is apparent for the measures that are aimed at reducing car usage and promoting other forms of transport. In addition LAQM.TG(16) Table A.1 Action toolbox presents a list of measures that can be implemented to help reduce concentrations of PM<sub>2.5</sub>.

<sup>&</sup>lt;sup>4</sup> Defra Background Mapping data for local authorities (2017-based), available online at <u>https://uk-air.defra.gov.uk/data/lagm-background-maps?year=2015</u>

<sup>&</sup>lt;sup>5</sup> Public Health Outcomes Framework, Public Health England. data tool available online at <u>https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/0/gid/1000043/pat/6/par/E12000009/ati/102/are/E06000028</u>

# 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

This section sets out what monitoring has taken place and how it compares with objectives.

South Kesteven did not carry out any automatic monitoring during 2018.

#### 3.1.2 Non-Automatic Monitoring Sites

South Kesteven District Council undertook non- automatic (passive) monitoring of NO<sub>2</sub> at 35 sites during 2018. Table A.1 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided 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 bias, "annualisation" and distance correction. Further details on adjustments are provided in Appendix C.

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

Table A.2 in Appendix A compares the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past 5 years with the air quality objective of  $40\mu g/m^3$ .

For diffusion tubes, the full 2018 dataset of monthly mean values is provided in Appendix B.

Following the application of bias adjustment and distance correction to the raw data, two sites exceeded the NO<sub>2</sub> annual mean objective in 2018. The sites where exceedances were experienced are within the current AQMA that is located within Grantham, there were no exceedances reported outside of the existing AQMA.

There were no sites where the NO<sub>2</sub> annual mean is greater than  $60\mu g/m^3$ , therefore in accordance with Defra LAQM.TG(16) there are no sites likely to be at risk of exceeding the 1-hour mean objective. The current AQMA has been designated for exceedances of both the annual mean and 1-hour NO<sub>2</sub> objectives. Within the past five years there has not been an annual mean concentration above  $60\mu g/m^3$ , therefore it is likely that the 1-hour mean objective has not been exceeded in the last five years.

#### **Diffusion Tubes within Stamford**

The annual mean concentration results for the diffusion tubes within Stamford are presented in Figure A.1.

There were nine established monitoring sites within Stamford during 2018, the annual mean concentrations at all of the sites were below the annual mean objective concentration of  $40\mu g/m^3$ . In comparison to concentrations in 2017, all of the sites experienced a decrease in concentration within 2018 except one site; SK08 at London Inn, which experienced an increase of  $0.7\mu g/m^3$ . The highest annual mean concentration at any monitoring location within Stamford was  $32.7\mu g/m^3$  (SK7), which was also the case in 2017. The diffusion tube installed in 2017 at Wharf Road, Stamford (SK58) was in response to a change in traffic flow resulting in queuing traffic. The data capture for SK58 was only 25%, and this was an insufficient data capture to calculate the annual mean concentration, therefore, the 2017 result for this location was not included in Figure A.1.

#### **Diffusion Tubes within Grantham**

The annual mean concentration results for the diffusion tubes within Grantham are presented in Figure A.2 and Figure A.3.

There were twenty six monitoring sites within Grantham during 2018, sixteen of which are located within the designated AQMA. There were no exceedances of the annual mean objective at any of the tubes outside of the AQMA within 2018. The highest concentration recorded outside of the AQMA was 27.7µg/m<sup>3</sup>, recorded at SK14/15, which is located on Springfield Road.

Across the twenty six established monitoring locations in Grantham, in comparison to 2017, the annual mean concentrations at all the monitoring sites decreased in 2018 except Sites SK25 and SK52/53, which experienced an increase of 0.7  $\mu$ g/m<sup>3</sup> and

 $5.5\mu$ g/m<sup>3</sup> between 2017 and 2018, however, the annual mean concentrations at these two sites are below 10% of the annual mean NO<sub>2</sub> AQS objective in 2018.

For the sixteen monitoring locations that are located within the current AQMA, two sites located at a relevant exposure were recorded as in exceedance of the AQS objective. For the sites not already located at a relevant exposure, two sites were above 10% of the annual mean AQS objective (one of them were above the annual mean objective) before distance correction was applied. Following the application of the distance correction methodology, the annual mean concentrations at the relevant exposure closest to the monitoring sites were below the AQS objective.

Due to the continued exceedances of the NO<sub>2</sub> annual mean objective recorded within the designated AQMA in Grantham, the AQMA is to remain in force. As annual mean concentrations at the monitoring sites continue to remain below  $60\mu g/m^3$ , the AQMA designation in relation to the 1-hour NO<sub>2</sub> mean objective will be reviewed.

# **Appendix A: Monitoring Results**

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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
SK1/2	Scotgate	Roadside	502659	307218	NO <sub>2</sub>	NO	3.2	1.6	NO	2.5
SK3	Essex Road	Roadside	502717	307750	NO <sub>2</sub>	NO	14.3	23.4	NO	2.5
SK4	Opp Stam' Sch	Roadside	503291	307420	NO <sub>2</sub>	NO	0	5.7	NO	2.5
SK5/6	East St	Roadside	503391	307396	NO <sub>2</sub>	NO	0	3.2	NO	2.5
SK7	Stam' School	Roadside	503281	307398	NO <sub>2</sub>	NO	0	2.5	NO	2.5
SK8	London Inn	Roadside	502910	307120	NO <sub>2</sub>	NO	0	2.3	NO	2.5
SK9	All Saints Rd	Roadside	502873	307141	NO <sub>2</sub>	NO	19	2.5	NO	2.5
SK10	Avondale	Roadside	502382	306890	NO <sub>2</sub>	NO	4.7	1.3	NO	2.5
SK11/12/13	Welwyn Close	Roadside	490118	334165	NO <sub>2</sub>	NO	5	2	NO	2.5
SK14/15	Springfield Rd	Roadside	490877	334642	NO <sub>2</sub>	NO	24.5	2.1	NO	2.5
SK16/17	Meres Rd	Roadside	489263	335353	NO <sub>2</sub>	NO	26	12.1	NO	2.5
SK18	Balmoral Drive	Urban Background	489956	336574	NO <sub>2</sub>	NO	32.1	0.8	NO	2.5
SK19/20	Opp Asda	Roadside	491067	336209	NO <sub>2</sub>	YES	2.6	5.4	NO	2.5
SK21	Prem Court	Roadside	491270	336256	NO <sub>2</sub>	YES	0	7.6	NO	2.5
SK22	Prem Court	Roadside	491260	336188	NO <sub>2</sub>	YES	0.5	6	NO	2.5
SK23	Pond St opp shop	Roadside	489720	338204	NO <sub>2</sub>	NO	16	9.5	NO	2.5
SK24	Gt Goverby	Roadside	489870	338683	NO <sub>2</sub>	NO	10.8	5	NO	2.5

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube collocated with a Continuous Analyser?	Height (m)
SK25	Manthorpe	Roadside	492069	337874	NO <sub>2</sub>	NO	49.6	7.6	NO	2.5
SK26	Belton Lane	Roadside	491280	336573	NO <sub>2</sub>	NO	9.9	7	NO	2.5
SK27/28/29	Jet Garage	Roadside	491496	336354	NO <sub>2</sub>	YES	0	2.3	NO	2.5
SK30/31/32	King's Sch	Roadside	491472	336315	NO <sub>2</sub>	YES	2.2	2.7	NO	2.5
SK33/34	Opp Jet Garage	Roadside	491515	336389	NO <sub>2</sub>	YES	0	1.7	NO	2.5
SK35/36	Black Dog	Roadside	491330	336022	NO <sub>2</sub>	YES	5	1	NO	2.5
SK37/38/39	High St	Roadside	491460	335715	NO <sub>2</sub>	YES	1.2	0.8	NO	2.5
SK40	Old Job Centre	Roadside	491512	335719	NO <sub>2</sub>	NO	51.2	1.7	NO	2.5
SK41/42	London Rd	Roadside	491602	335485	NO <sub>2</sub>	YES	2.4	3.9	NO	2.5
SK43/44	Taste of China/Welcome TA	Roadside	491734	335196	NO <sub>2</sub>	YES	2	0.5	NO	2.5
SK45/46	Sth Parade	Roadside	491869	334960	NO <sub>2</sub>	YES	0	3.5	NO	2.5
SK47/48	The White Lion	Roadside	492067	334922	NO <sub>2</sub>	YES	5	1	NO	2.5
SK49	Launder Terrace	Roadside	491427	335193	NO <sub>2</sub>	NO	4	1.4	NO	2.5
SK50/51	Gt Northern Court	Roadside	491184	335575	NO <sub>2</sub>	YES	0	3.6	NO	2.5
SK52/53	Blue Bull	Roadside	491200	335636	NO <sub>2</sub>	YES	2	0.5	NO	2.5
SK54/55	Bus Stn	Roadside	491492	335505	NO <sub>2</sub>	YES	1.5	1.4	NO	2.5
SK56/57	Wharf Road, Grantham	Roadside	491402	335501	NO <sub>2</sub>	YES	0.8	0.9	NO	2.5
SK58	Wharf Road, Stamford	Roadside	503070	306957	NO2	NO	3.4	1.5	NO	2.5

#### Notes:

(1) Om if the monitoring site is at a location of exposure (e.g. installed on/adjacent to the façade of a residential property).

(2) N/A if not applicable.

#### Table A.2 – Annual Mean NO2 Monitoring Results

	Valid Da Capture Site ID Site Name Site Type Monitoring Monitori		Valid Data Capture for	Valid Data	N	NO <sub>2</sub> Annual Mean Concentration (µg/m³) <sup>(3)</sup>						
Site ID	Site Name	Site Type	Туре	Period (%)	2018 (%) <sup>(2)</sup>	2014	2015	2016	2017	2018		
SK1/2	Scotgate	Roadside	Diffusion Tube	100.0	100.0	31.4	35.7	36.7	32.7	30.7		
SK3	Essex Road	Roadside	Diffusion Tube	100.0	100.0	15.0	15.1	16.3	16.0	13.8		
SK4	Opp Stam' Sch	Roadside	Diffusion Tube	91.7	91.7	38.3	35.9	36.6	33.4	29.9		
SK5/6	East St	Roadside	Diffusion Tube	100.0	100.0	34.9	34.1	37.8	32.8	31.1		
SK7	Stam' School	Roadside	Diffusion Tube	100.0	100.0	38.5	34.1	38.8	38.8	32.7		
SK8	London Inn	Roadside	Diffusion Tube	100.0	100.0	26.5	25.9	27.8	25.0	25.7		
SK9	All Saints Rd	Roadside	Diffusion Tube	100.0	100.0	28.5	27.7	26.4	26.7	25.0		
SK10	Avondale	Roadside	Diffusion Tube	91.7	91.7	19.1	15.3	19.9	22.0	20.2		
SK11/12/13	Welwyn Close	Roadside	Diffusion Tube	97.2	97.2			23.7	24.4	21.9		
SK14/15	Springfield Rd	Roadside	Diffusion Tube	91.7	91.7	25.0	24.1	26.9	29.2	27.7		
SK16/17	Meres Rd	Roadside	Diffusion Tube	100.0	100.0	25.8	34.6	31.6	36.0	27.6		
SK18	Balmoral Drive	Urban Background	Diffusion Tube	100.0	100.0	16.4	16.2	18.2	21.2	17.0		
SK19/20	Opp Asda	Roadside	Diffusion Tube	100.0	100.0	30.6	29.9	31.3	31.7	30.4		
SK21	Prem Court	Roadside	Diffusion Tube	100.0	100.0	27.0	26.2	27.7	28.1	27.5		
SK22	Prem Court	Roadside	Diffusion Tube	100.0	100.0	24.9	27.0	29.6	30.7	30.0		
SK23	Pond St opp shop	Roadside	Diffusion Tube	100.0	100.0	17.4	18.2	20.7	21.1	20.7		
SK24	Gt Goverby	Roadside	Diffusion Tube	91.7	91.7	21.5	18.8	19.6	23.4	21.2		
SK25	Manthorpe	Roadside	Diffusion Tube	100.0	100.0	20.7	19.4	21.2	19.2	19.9		
SK26	Belton Lane	Roadside	Diffusion Tube	100.0	100.0	24.3	24.1	24.6	24.8	24.4		
SK27/28/29	Jet Garage	Roadside	Diffusion Tube	100.0	100.0	46.5	43.4	45.8	48.2	45.3		

Site ID	Sito Namo	Site Type	Monitoring	Valid Data Capture for Monitoring	Valid Data	N	NO <sub>2</sub> Annual Mean Concentration (μg/m³) <sup>(3)</sup>						
Sile ID	Site Name	Site Type	Туре	Period (%)	2018 (%) <sup>(2)</sup>	2014	2015	2016	2017	2018			
SK30/31/32	King's Sch	Roadside	Diffusion Tube	94.4	94.4	34.5	33.7	32.6	32.9	31.9			
SK33/34	Opp Jet Garage	Roadside	Diffusion Tube	100.0	100.0	45.1	50.3	49.6	48.9	45.9			
SK35/36	Black Dog	Roadside	Diffusion Tube	95.8	95.8	36.6	36.4	40.1	36.6	36.0			
SK37/38/39	High St	Roadside	Diffusion Tube	94.4	94.4	37.3	35.8	39.9	34.3	34.0			
SK40	Old Job Centre	Roadside	Diffusion Tube	100.0	100.0	26.6	25.4	28.1	31.9	25.8			
SK41/42	London Rd	Roadside	Diffusion Tube	100.0	100.0	38.2	36.3	37.5	41.6	33.7			
SK43/44	Taste of China/Welcom e TA	Roadside	Diffusion Tube	100.0	100.0	31.3	30.7	32.5	32.0	31.6			
SK45/46	Sth Parade	Roadside	Diffusion Tube	100.0	100.0	39.6	37.4	40.4	37.9	37.5			
SK47/48	The White Lion	Roadside	Diffusion Tube	91.7	91.7	35.3	35.6	42.9	37.9	33.2			
SK49	Launder Terrace	Roadside	Diffusion Tube	100.0	100.0	20.7	20.9	23.1	25.9	20.3			
SK50/51	Gt Northern Court	Roadside	Diffusion Tube	100.0	100.0	32.1	33.5	34.2	37.3	36.1			
SK52/53	Blue Bull	Roadside	Diffusion Tube	100.0	100.0	34.6	36.2	40.5	29.5	35.0			
SK54/55	Bus Stn	Roadside	Diffusion Tube	100.0	100.0	45.5	45.4	48.9	44.5	43.3			
SK56/57	Wharf Road, Grantham	Roadside	Diffusion Tube	100.0	100.0	37.9	37.7	39.0	37.1	37.2			
SK58	Wharf Road, Stamford	Roadside	Diffusion Tube	100.0	100.0	-	-	-	33.1 <sup>(4)</sup>	31.1			

☑ Diffusion tube data has been bias corrected

 $\Box$  Annualisation has been conducted where data capture is <75%

#### Notes:

Exceedances of the NO<sub>2</sub> annual mean objective of  $40\mu g/m^3$  are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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) Average concentration calculated based on three months data.



#### Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Stamford Diffusion Tubes



#### Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Grantham Diffusion Tubes outside AQMA



Figure A.3 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Grantham Diffusion Tubes within AQMA



# **Appendix B: Full Monthly Diffusion Tube Results for 2018**

#### Table B.1 – NO<sub>2</sub> Monthly Diffusion Tube Results - 2018

		NO₂ Mean Concentrations (μg/m³)													
														Annual Mea	n
Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.92) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
SK1	33.3	32.5	41.9	36.2	36.0	28.4	35.9	28.7	27.0	32.4	37.7	31.2	33.4	20.7	
SK2	32.4	36.8	41.5	37.5	32.9	28.1	35.6	29.7	25.0	33.2	37.0	30.5	33.4	30.7	-
SK3	21.3	18.1	17.6	13.7	9.7	6.6	9.4	11.3	12.8	16.2	23.8	19.0	15.0	13.8	-
SK4	44.9	32.1	-	32.9	26.1	22.6	28.8	29.0	34.3	32.7	39.4	35.3	32.6	29.9	-
SK5	32.0	33.3	43.0	34.9	34.7	34.8	32.0	28.2	27.7	31.6	36.9	31.8	33.4	31.1	-
SK6	35.0	39.0	39.7	35.0	38.0	32.6	29.1	28.5	29.2	34.2	36.1	34.8	34.3	51.1	-
SK7	41.9	36.7	44.6	35.2	33.5	27.1	37.4	31.8	31.2	32.3	36.4	38.9	35.6	32.7	-
SK8	28.2	31.4	33.5	28.7	26.6	24.7	29.4	23.6	22.3	27.9	31.2	28.1	28.0	25.7	-
SK9	28.7	26.9	37.6	29.4	21.7	18.3	26.1	25.5	24.5	23.0	31.0	33.0	27.1	25.0	-
SK10	-	24.3	27.0	19.7	19.9	15.8	21.1	21.0	21.1	21.6	25.0	25.0	22.0	20.2	-
SK11	27.4	24.1	28.9	-	17.6	15.2	21.8	22.4	24.4	25.8	27.0	28.9	24.0	22.0	-
SK12	27.4	24.8	26.6	22.5	18.9	14.9	21.3	23.4	22.4	26.5	27.2	27.6	23.6	21.7	-
SK13	29.2	24.7	29.3	20.4	18.8	13.9	20.7	23.4	23.9	27.7	26.0	27.8	23.8	21.9	-
SK14	31.2	29.7	31.3	32.4	25.7	24.1	27.5	24.8	28.2	-	30.4	29.9	28.7	27.7	
SK15	43.4	29.6	36.4	31.2	29.4	20.3	34.2	22.1	-	35.9	35.0	30.2	31.6	21.1	-
SK16	27.9	28.4	31.6	35.9	20.3	20.4	27.6	40.9	37.9	32.1	29.7	30.5	30.3	27.6	-

		NO₂ Mean Concentrations (μg/m³)													
														Annual Mea	n
Site ID	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Νον	Dec	Raw Data	Bias Adjusted (0.92) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
SK17	32.0	27.2	32.6	28.6	20.5	20.0	30.7	36.2	36.5	33.0	28.5	31.6	29.8		-
SK18	21.2	21.2	21.7	22.7	14.4	9.1	15.3	15.2	13.3	20.5	26.3	20.8	18.5	17.0	-
SK19	39.4	34.4	40.8	38.5	24.0	20.9	34.7	30.7	28.4	30.5	41.9	32.9	33.1	20.4	-
SK20	36.3	33.5	38.6	37.4	24.6	22.4	33.2	30.8	31.7	31.1	42.5	33.1	32.9	30.4	-
SK21	33.9	29.7	35.8	37.6	21.5	17.5	25.2	25.2	29.7	29.0	39.8	33.9	29.9	27.5	-
SK22	33.3	29.9	39.1	39.5	26.9	25.5	27.9	28.8	33.5	31.9	42.6	32.9	32.7	30.0	-
SK23	25.3	24.5	26.2	20.6	20.5	15.5	18.8	19.5	20.7	24.8	27.6	26.7	22.6	20.7	-
SK24	29.3	25.0	29.2	22.2	20.2	13.0	19.3	21.3	20.6	24.8	-	28.1	23.0	21.2	-
SK25	27.5	24.4	24.8	18.9	17.5	14.1	20.0	18.4	19.6	24.9	23.3	26.2	21.6	19.9	-
SK26	27.5	29.0	33.1	24.8	24.5	16.4	24.5	23.2	27.3	29.2	30.6	28.8	26.6	24.4	-
SK27	47.8	50.4	50.5	42.8	51.4	44.8	53.1	42.7	40.2	50.0	49.1	48.9	47.6		
SK28	47.5	76.7	55.4	48.0	50.4	44.8	54.2	43.5	38.4	49.7	61.1	46.8	51.4	45.3	-
SK29	47.5	47.1	60.1	45.8	48.8	44.4	52.6	44.1	39.0	51.1	56.8	45.4	48.6		
SK30	36.3	35.6	39.5	32.3	35.6	26.0	35.7	36.0	36.6	41.0	33.4	38.2	35.5		
SK31	33.7	33.2	40.0	32.4	32.9	31.4	35.7	32.3	32.2	39.9	31.6	37.6	34.4	31.9	-
SK32	34.2	34.6	39.1	-	36.2	30.2	31.4	35.0	34.0	-	32.1	34.6	34.1		
SK33	48.6	46.1	50.8	44.1	49.0	42.3	55.0	53.1	53.6	52.1	47.5	53.8	49.7	45.0	
SK34	52.7	46.7	55.4	45.4	48.7	37.7	55.0	51.7	54.0	55.2	48.1	51.6	50.2	40.9	-
SK35	41.1	39.5	48.7	23.3	-	34.8	38.7	32.8	32.6	46.0	44.0	42.5	38.5	26.0	
SK36	44.6	41.8	47.8	37.0	40.7	33.4	39.5	36.7	34.2	36.8	40.8	42.9	39.7	30.0	-

		NO <sub>2</sub> Mean Concentrations (μg/m <sup>3</sup> )													
														Annual Mea	n
Site ID	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Νον	Dec	Raw Data	Bias Adjusted (0.92) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>
SK37	35.8	40.9	46.8	35.4	42.0	36.1	35.3	32.2	29.6	35.7	-	38.0	37.1		
SK38	34.5	42.5	44.4	38.4	40.4	34.9	36.4	30.2	26.9	39.0	-	37.5	36.8	34.0	-
SK39	37.8	41.1	42.8	36.2	42.3	33.1	33.9	30.2	29.0	38.7	42.9	34.6	36.9		
SK40	34.5	30.5	34.0	20.9	25.2	21.9	26.5	24.1	28.1	27.9	29.8	33.0	28.0	25.8	-
SK41	38.9	39.6	47.7	36.2	45.2	41.2	40.8	18.3	6.7	41.9	41.0	37.9	36.3	22.7	
SK42	43.3	41.1	39.2	35.4	38.3	33.7	39.5	18.0	31.3	40.3	42.3	41.1	37.0	33.7	-
SK43	35.7	37.0	38.6	32.0	34.1	26.6	33.7	29.0	24.6	33.3	41.7	38.0	33.7	21.6	_
SK44	39.2	36.2	37.8	34.0	35.9	27.6	33.0	30.3	26.6	35.4	45.0	37.9	34.9	51.0	-
SK45	48.4	42.3	38.2	38.9	36.4	36.2	42.5	33.1	36.1	38.1	41.9	40.9	39.4	27.5	_
SK46	45.5	46.7	46.1	39.8	41.6	38.0	39.7	33.4	36.8	46.9	44.5	47.4	42.2	37.5	-
SK47	44.7	39.5	41.5	36.3	28.7	26.6	35.3	37.3	33.3	34.1	41.0	36.6	36.2	22.2	
SK48	44.1	38.8	40.2	30.1	26.7	27.0	35.8	-	-	33.3	45.8	38.0	36.0	33.2	-
SK49	29.0	26.9	26.5	19.9	16.3	12.5	18.9	20.5	20.2	24.4	21.9	28.2	22.1	20.3	-
SK50	39.0	37.2	44.7	37.8	37.0	31.5	40.9	38.9	36.2	38.4	42.7	47.2	39.3	26.1	_
SK51	43.0	39.3	45.1	33.6	37.3	30.2	39.9	40.7	35.2	38.6	47.1	40.2	39.2	30.1	-
SK52	45.4	43.1	48.7	39.2	29.3	30.9	37.2	38.6	35.5	39.2	48.4	41.6	39.8	25.0	
SK53	46.2	43.3	39.0	35.4	35.8	29.4	38.5	32.3	13.2	37.5	44.8	40.2	36.3	55.0	-
SK54	53.8	49.0	58.2	42.3	42.6	45.7	48.9	47.4	39.8	45.3	49.4	45.4	47.3	12.2	20 6
SK55	58.7	47.9	52.6	47.2	45.0	44.4	51.2	48.5	35.9	45.9	44.6	39.9	46.8	43.3	38.6
SK56	50.0	45.4	44.8	36.6	32.7	32.0	41.2	40.5	34.2	37.6	43.3	40.0	39.9	37.2	34.2

							NO <sub>2</sub> Mea	an Conce	ntrations	s (µg/m³)						
													Annual Mean			
Site ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.92) and Annualised <sup>(1)</sup>	Distance Corrected to Nearest Exposure <sup>(2)</sup>	
SK57	49.3	42.7	48.8	37.8	37.6	32.0	44.3	41.8	33.0	37.4	44.6	42.1	40.9			
SK58	38.4	35.4	37.6	42.0	27.7	32.3	30.0	30.7	28.1	35.0	32.3	36.5	33.8	31.1	-	

□ 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

#### Notes:

Exceedances of the NO<sub>2</sub> annual mean objective of  $40\mu g/m^3$  are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 Tube Bias Adjustment Factors**

The diffusion tube data has been corrected using a bias adjustment factor, which is an estimate of the difference between the diffusion tube concentration and continuous monitoring, the latter assumed to be a more accurate method of monitoring. The Defra LAQM.TG(16) provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

With regard to the application of a bias adjustment factor for diffusion tubes, Defra LAQM.TG(16) and the LAQM Helpdesk<sup>6</sup> recommend the use of a local bias adjustment factor where available and relevant to diffusion tube sites.

South Kesteven District Council does not operate any continuous monitors within the District and therefore a co-location study is not available to derive a local bias factor, thus the national bias adjustment factor spreadsheet<sup>7</sup> has been used.

Diffusion tube data for South Kesteven District Council is supplied and analysed by Gradko International Ltd. The tubes were prepared using the 50% TEA in acetone preparation method. The national bias adjustment factor for Gradko 50% TEA in acetone is 0.92 for the year 2018 (based on 8 studies, version 03/19) as derived from the national bias adjustment factor spreadsheet as shown in Figure C.1.

<sup>&</sup>lt;sup>6</sup> Laqm.defra.gov.uk
7 National Diffusion Tube Bias Adjustment Factor Spreadsheet version 03/18 available at https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

National Diffusion Tube	Bias Adjus	tment Fa	acto	or Spreadsheet			Spreadsh	neet Vers	sion Numbe	er: 03/19	
Follow the steps below in the correct order to show the results of <u>relevant</u> co-location studies T 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 spreadheet 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 2019 LAOM Helpdesk Website		
The LAQM Helpdesk is operated on behalf of Defra a and the National Physical Laboratory.	nd the Devolved Administ	trations by Burea	u Verita:	s, in conjunction with contract partners AECOM	Spreadshe compiled b	et maintained by y Air Quality Cor	/ the National P nsultants Ltd.	hysical La	aboratory. C	riginal	
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	lect a Year         Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there i only one study, use the overall factor <sup>2</sup> shown in blue at the foot of the final column.								
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not hown, we have no data for this method at this laboratory.	If a year is not shown, we have no data	lf you	u have your own co-location study then see footn LAQMHelp	ote <sup>4</sup> . If uncert desk@uk.bur	ain what to do ther eauveritas.com or (	contact the Local	Air Quality	Managemen	Helpdesk at	
Analysed By <sup>1</sup>	Method To undo your selection, hoose (All) from the pop-up list	Year <sup>5</sup> To undo your selection, choose (All)	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m <sup>3</sup> )	Automatic Monitor Mean Conc. (Cm) (µg/m <sup>3</sup> )	Bias (B)	Tube Precision <sup>6</sup>	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	50% TEA in acetone	2018	R	RBWM	12	39	36	7.8%	G	0.93	
Gradko	50% TEA in acetone	2018	R	RBWM	12	35	34	2.2%	G	0.98	
Gradko	50% TEA in acetone	2018	2018 SU Redcar and Cleveland Borough Council 9 18 10							0.55	
Gradko	50% TEA in acetone	2018	R	West Berkshire	10	40	37	10.5%	G	0.91	
Gradko	50% TEA in acetone	2018	KS	Marylebone Road Intercomparison	11	91	85	6.5%	G	0.94	
Gradko	50% TEA in acetone	2018	UB         Peeding Borough Council         12         20         26         -22.6%         G         1.29								
Gradko	50% TEA in acetone	2018	2018 Overall Factor' [8 studies] Use 0.92								

#### Figure C.1 – National Bias Adjustment Factor

#### **QA/QC of Diffusion Tube Monitoring**

The diffusion tubes for the year 2018 were supplied and analysed by Gradko International Ltd, the tubes were prepared using the 50% TEA in acetone preparation method. All results have been bias adjusted where required before being presented in Table A.1.

Gradko is a UKAS accredited laboratory and participates in the new AIR-PT Scheme (a continuation of the Workplace Analysis Scheme for Proficiency (WASP)) for NO<sub>2</sub> tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO<sub>2</sub> concentrations reported are of a high caliber. The lab follows the procedures set out in the Harmonisation Practical Guidance In the latest available AIR-PT results, AIR-PT AR 0024 (January to February 2018), AIR-PT AR025 (April to May 2018), AIR-PT AR027 (July to August 2018), AIR-PT AR028 (September to October 2018) and AIR-PT AR030 (January to February 2019). Gradko has scored 100% on all results in 2018. The percentage score reflects the results deemed to be satisfactory based upon the z-score of <  $\pm 2$ .

#### Short-term to Long-term Data Adjustment

For the 2018 diffusion tubes, annualisation was not required at any of the monitoring sites as data capture was above 75%.

Distance correction has been completed for locations SK54/55 and SK56/57 where the sites are either exceeding or are close to exceeding (within 10% of the objective) the annual mean NO<sub>2</sub> AQS objective. Distance correction is applied to the monitored

annual mean concentration to estimate the NO<sub>2</sub> concentration at the closest relevant receptor location. This has been completed due to the location of the diffusion tubes not being at a location of relevant exposure; the sites that are not distance corrected are found to already be located at a sensitive receptor. The concentrations that have been calculated following this procedure can be seen in brackets within Table C.1 and within the NO<sub>2</sub> fall off with distance calculator shown in Figure C.2.

# Table C.1 – Distance Correction Required for SK54/55 and SK56/57 with Annual Mean NO<sub>2</sub> Concentrations Exceeding or within 10% of the NO<sub>2</sub> AQS Objective

Site ID	Location	2018 Bias Adjusted Annual Mean Concentration (µg/m³)
SK54/55	Bus Station – within AQMA	43.3(38.6)
SK56/57	Wharf Road, Grantham – within AQMA	37.2(34.2)

Note: Values in brackets represent concentration once distance corrected to closest relevant exposure

#### Figure C.2 – Distance Correction Calculations for SK54/55 and SK56/57

BUREAU VERITAS	Ē	inter data int	to the pink ce	ells		
	Distar	nce (m)	NO <sub>2</sub> Annua	Mean Concentr	ration (µg/m³)	
Site Name/ID	Monitoring Site to Kerb	Receptor to Kerb	Background	Monitored at Site	Predicted at Receptor	Comment
SK54/55	1.4	2.9	13.7	43.3	38.6	Predicted concentration at Receptor within 10% the AQS objective.
SK56/57	0.9	1.7	13.7	37.2	34.2	

# **Appendix D: Maps of Monitoring Locations and AQMAs**

#### Figure D.1 – – NO<sub>2</sub> Diffusion Tube Locations: Grantham





#### Figure D.2 – NO<sub>2</sub> Diffusion Tube Locations: Stamford



#### Figure D.3 – NO<sub>2</sub> Diffusion Tube Locations: Grantham North

# Appendix E: Summary of Air Quality Objectives in England

#### Table E.1– Air Quality Objectives in England

Pollutant	Air Quality Objective <sup>8</sup>	
Fonutant	Concentration	Measured as
Nitrogen Dioxide	200 µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
(NO2)	40 μg/m <sup>3</sup>	Annual mean
Particulate Matter	50 μg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
(FIVI10)	40 μg/m <sup>3</sup>	Annual mean
	350 µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	125 µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

 $<sup>^{8}</sup>$  The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

# **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 <sub>2</sub>	Nitrogen Dioxide
NOx	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide
South Kesteven DC	South Kesteven Distric Council

### References

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- Local Development Framework for South Kesteven: Core Strategy, July 2010
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