



***South Kesteven District Council  
2022 Annual Status Report***

*Bureau Veritas*



*June 2023*

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SOUTH  
KESTEVEN  
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# 2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995  
Local Air Quality Management, as amended by the  
Environment Act 2021

Date: June 2023

***Move Forward with Confidence***

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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, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas<sup>1,2</sup>.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 343,000 deaths at typical ages<sup>3</sup>, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017<sup>4</sup>.

South Kesteven, located in the county of Lincolnshire, is a local government district, with four main towns within the region; Grantham, Bourne, Market Deeping and Stamford. The main source of pollution comes from vehicular emissions from established road networks, such as the A1, A52 and A1175.

The annual mean nitrogen dioxide (NO<sub>2</sub>) concentrations monitored in South Kesteven during 2022 were all below the Air Quality Strategy (AQS) objective of 40 µg/m<sup>3</sup>.

South Kesteven currently has one Air Quality Management Area (AQMA); AQMA No. 6 ([https://uk-air.defra.gov.uk/aqma/details?aqma\\_ref=1573](https://uk-air.defra.gov.uk/aqma/details?aqma_ref=1573)) which is located within Grantham. The AQMA passes through the four main roads in the town centre Manthorpe Road, Wharf Road, High Street and London Road. This AQMA was declared in 2013 as a result of exceedances of the NO<sub>2</sub> annual mean and 1-hour objectives (assessed against limits of 40 µg/m<sup>3</sup> and 200 µg/m<sup>3</sup>, respectively).

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<sup>1</sup> Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, January 2023

<sup>4</sup> Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

South Kesteven manages their local air quality via an extensive diffusion tube monitoring network comprising fifty-eight passive NO<sub>2</sub> diffusion tubes at thirty-five separate locations (including triplicate/duplicate tubes) during 2022. No automatic monitoring was carried out within South Kesteven. The diffusion tube network is used to monitor NO<sub>2</sub> concentrations across the District, used to identify new areas of concern and monitor at known hotspot areas. The majority of monitoring sites output NO<sub>2</sub> concentrations well below the objective, with the exception of one triplicate site (SK27,28,29) and two duplicate sites (SK33,34 and SK54,55) displaying increased concentrations. Concentrations at these sites are not exceeding the annual mean AQS objective but SK33 and 34 are within 10% of the air quality objective of 40µg m<sup>-3</sup>. The three sites showing elevated concentrations are within the South Kesteven District Council No 6 AQMA. Eleven diffusion tube sites reported an increase in NO<sub>2</sub> concentrations from 2021, which could be attributed to 2021 concentrations being affected by different patterns of travel after the COVID–19 pandemic. Nonetheless, this is the third year whereby all diffusion tubes have been compliant with the annual mean AQS objective for NO<sub>2</sub>. There are no passive monitoring sites where the NO<sub>2</sub> annual mean is greater than 60 µg/m<sup>3</sup>, therefore in accordance with Defra LAQM.TG(22) there are no sites likely to be at risk of exceeding the 1-hour mean AQS objective.

## Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan<sup>5</sup> sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM<sub>2.5</sub> targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce PM<sub>2.5</sub> in their areas. The Road to Zero<sup>6</sup> details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMA) are designated due to elevated concentrations heavily influenced by transport emissions.

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<sup>5</sup> Defra. Environmental Improvement Plan 2023, January 2023

<sup>6</sup> DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

## **Grantham Southern Relief Road**

This major development which affects the declared AQMA in Grantham is led by Lincolnshire County Council as the Highways Authority. Work on the final section of the relief road is ongoing, with the project completion date targeted for winter 2025. The project is expected to have a major impact on air pollution in the town centre, specifically by reducing congestion and significantly reducing the need for vehicle movements through the town centre. It is expected the project will reduce carbon emissions associated with traffic in the area, alongside reducing noise pollution and creating a safer and more accessible town centre. A number of major developments are expected to come forward in south Grantham following completion of the Southern Relief Road. These include:

- Spitalgate Heath Garden Village - Up to 3,700 properties
- Spitalgate Business Park - 110,000 sqm of office, commercial and light industrial provision
- Prince William of Gloucester Barracks site - up to 4000 properties The developments have a significant focus on minimising reliance on vehicular transport and promoting active travel modes through the layout of segregated footpaths and cycleways across the site and ensuring strong connections with neighbouring developments

The developments have a significant focus on minimising reliance on vehicular transport and promoting active travel modes through the layout of segregated footpaths and cycleways across the site and ensuring strong connections with neighbouring developments and Grantham town centre. It is also expected charging infrastructure will be provided for properties and in public car parking areas. Work will include engagement with the local highways authority to improve bus services to site and promote sustainable transport along the A52.

## **South Kesteven District Council Local Plan 2011 - 2036**

South Kesteven District Council's Local Plan 2011-2036 was formally adopted in January 2020. The plan focuses on sustainable development, protecting the natural and built environment and renewable energy generation. The plan states in "Policy SB1: Sustainable Building" that "*All new development should demonstrate how they can support low-carbon travel, to achieve this:*

- *New residential development will be expected to provide electric car charging points*
- *New commercial developments shall make provision for electric car charging points. The number of charging points required will be determined on a case by case basis"*

and provides an update to the Pollution Control Policy: EN4: Pollution Control

- Development should seek to minimise pollution and where possible contribute to the protection and improvement of the quality of air, land, and water. In achieving this:
- Development should be designed from the outset to improve air, land and water quality and promote environmental benefits.
- Development that, on its own or cumulatively, would result in significant air, light, noise, land, water or other environmental pollution or harm to amenity, health wellbeing or safety will not be permitted. New development proposals should not have an adverse impact on existing operations.
- Development 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

### **Corporate Plan 2020 – 2023**

South Kesteven's Corporate Plan 2020 – 2023 incorporates a 'Clean and Sustainable Environment' section, which includes key points to protect and improve the environment: •

- Reduce the council's carbon footprint by at least 30% by 2030 and endeavour to become net-zero carbon as soon as viable before 2050; and
- Recognise the changes in environmentally friendly modes of transport and seek to work with others to adapt required infrastructure.

### **Climate Emergency**

South Kesteven District Council declared a climate emergency in 2019 and agreed the ambition to reduce carbon emissions from council operations by at least 30%, and to net-zero carbon as soon as viable before 2050.

As part of this work, a review of the Council's fleet of around 180 vehicles towards reducing carbon emissions and improving efficiency was completed last year, signalling opportunities to transition vehicles towards those with no tailpipe emissions. The Council have, as of the start of 2023, relocated into new main office premises which are electrically heated, seeing a significant reduction on gas used to heat buildings within the AQMA.

### **Air Quality Grant**

South Kesteven in partnership with Lincolnshire County Council and other Lincolnshire councils including City of Lincoln, North Kesteven District, Boston Borough, East Lindsey



District, West Lindsey District, and South Holland District, were granted £58,180 in 2022 as part of the government annual Air Quality Grant. This grant will be put towards school education and awareness programme, a community engagement campaign and development of a dedicated Lincolnshire Clean Air Project website to raise public awareness of air quality and steps they can take to reduce pollution.

### **Grantham Transport Strategy**

The Grantham Transport Strategy was published by Lincolnshire County Council in 2022 and can be viewed here: [Grantham transport strategy – Lincolnshire County Council](#).

The strategy includes the following measures to help improve air quality:

- Signalling support to reduce congestion;
- Electric Vehicle charging; and
- Supporting the use of active travel within Grantham.

### **Conclusions and Priorities**

The passive monitoring results in 2022 report that all monitoring locations are compliant and record concentrations below the NO<sub>2</sub> annual mean AQS objective of 40µg/m<sup>3</sup>. All fifty-eight passive monitoring tubes at thirty five passive monitoring locations have reported NO<sub>2</sub> compliance for the previous 3 years, South Kesteven District Council will continue to use the passive monitoring network to monitor air quality levels, and to ensure that compliance is maintained throughout the district.

The following actions are considered to be key priorities in ensuring the air quality conditions within South Kesteven continue to comply with the AQS objectives:

- Continue passive monitoring within the AQMA to ensure the NO<sub>2</sub> concentration remains below 40 µg/m<sup>3</sup>, in particular at monitoring locations currently within 10% of the AQS objectives;
- Continue to consider amending AQMA No.6 to remove the pollution declaration of 1-hour NO<sub>2</sub> exceedances and potential revocation of the AQMA. A public consultation is planned to consider the revocation.

## Local Engagement and How to get Involved

South Kesteven District Council engage with the public via their website which contains information on how individuals can help improve the local air quality. Some of the actions individuals can do to contribute to a reduction in local air quality pollution go as follows:

### 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 your 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 re-started 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?*

*Getting from A to B in anything else but a motor vehicle in our fast-paced lives may seem unrealistic but just a few small changes could make a huge difference to reducing congestion and air pollution here in the District.*

*So why not consider cycling more with the help of our handy cycling map? It details safe routes that you and your family can enjoy.*

*Remember this form of active travel is an excellent form of sustainable travel, tackling air pollution by reducing CO<sub>2</sub> emissions from vehicles and protecting the environment. Getting on your bike also has numerous health benefits and can save you money too on your overall travel costs.*

### **Woodsure Ready to Burn Initiative**

*As the colder months draw in and wood burning stove owners start thinking about stocking up on logs, Woodsure - the UK's only wood fuel quality assurance scheme - has launched a Ready to Burn initiative to help homeowners look after their stoves and improve air quality.*

*Air quality and wood fuel has become a hot topic and stove owners are being asked to think about the impact of burning poor quality logs has on the environment. A stove is only as good as the wood it burns and so the Ready to Burn stamp of approval will reassure those who purchase logs with its logo that they are dry enough and ready to burn.*

*There are new restrictions on the sale of solid fuels, please see the following link for more information: <https://www.gov.uk/guidance/domestic-solid-fuels-rules-for-local-authorities-in-england>.*

## **Local Responsibilities and Commitment**

This ASR was prepared by Bureau Veritas on behalf of the Public Protection Service of South Kesteven Council with the support and agreement of the following officers and departments:

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Serena Brown- Sustainability and Climate Change Officer

Phil Jordan – Planning Team

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## Table of Contents

<b>Executive Summary: Air Quality in Our Area</b> .....	<b>i</b>
Air Quality in South Kesteven .....	i
Actions to Improve Air Quality .....	ii
Conclusions and Priorities .....	v
Local Engagement and How to get Involved.....	vi
Local Responsibilities and Commitment .....	vii
<b>1 Local Air Quality Management</b> .....	<b>1</b>
<b>2 Actions to Improve Air Quality</b> .....	<b>2</b>
Air Quality Management Areas .....	2
Progress and Impact of Measures to address Air Quality in South Kesteven District Council .....	4
PM <sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations .....	8
<b>3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance</b> .....	<b>9</b>
Summary of Monitoring Undertaken .....	9
3.1.1 Automatic Monitoring Sites .....	9
3.1.2 Non-Automatic Monitoring Sites .....	9
Individual Pollutants .....	9
3.1.3 Nitrogen Dioxide (NO <sub>2</sub> ) .....	9
<b>Appendix A: Monitoring Results</b> .....	<b>11</b>
<b>Appendix B: Full Monthly Diffusion Tube Results for 2022</b> .....	<b>21</b>
<b>Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC</b> <b>25</b>	
New or Changed Sources Identified Within South Kesteven District Council During 2022 .....	25
Additional Air Quality Works Undertaken by South Kesteven District Council During 2022.....	25
QA/QC of Diffusion Tube Monitoring .....	25
Diffusion Tube Annualisation .....	25
Diffusion Tube Bias Adjustment Factors .....	26
NO <sub>2</sub> Fall-off with Distance from the Road.....	26
NO <sub>2</sub> Fall-off with Distance from the Road.....	27
<b>Appendix D: Maps of Monitoring Locations and AQMAs</b> .....	<b>28</b>
<b>Appendix E: Summary of Air Quality Objectives in England</b> .....	<b>32</b>
<b>Glossary of Terms</b> .....	<b>33</b>
<b>References</b> .....	<b>34</b>

## Figures

Figure A.1 – Trends in Annual Mean NO <sub>2</sub> Concentrations in AQMA No.6 Grantham .....	17
Figure A.2 – Trends in Annual Mean NO <sub>2</sub> Concentrations in West Grantham .....	18
Figure A.3 – Trends in Annual Mean NO <sub>2</sub> Concentrations in North Grantham .....	19
Figure A.4 – Trends in Annual Mean NO <sub>2</sub> Concentrations in Stamford .....	20
Figure D.1 – Map of Non-Automatic Monitoring Sites within/near AQMA No. 6 Grantham	28
Figure D.2 – Map of Non-Automatic Monitoring Sites in North Grantham .....	29
Figure D.3 – Map of Non-Automatic Monitoring Sites in West Grantham .....	30
Figure D.4 – Map of Non-Automatic Monitoring Sites in Stamford.....	31

## Tables

Table 2.1 – Declared Air Quality Management Areas .....	3
Table 2.2 – Progress on Measures to Improve Air Quality.....	6
Table A.1 – Details of Non-Automatic Monitoring Sites .....	11
Table A.2 – Annual Mean NO <sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m <sup>3</sup> ) ....	14
Table B.1 – NO <sub>2</sub> 2022 Diffusion Tube Results (µg/m <sup>3</sup> ) .....	21
Table C.1 – Annualisation Summary (concentrations presented in µg/m <sup>3</sup> ).....	26
Table C.2 – Bias Adjustment Factor .....	26
Table E.1 – Air Quality Objectives in England .....	32

# 1 Local Air Quality Management

This report provides an overview of air quality in South Kesteven during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by South Kesteven to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

## 2 Actions to Improve Air Quality

### 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 should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

A summary of AQMAs declared by South Kesteven can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within South Kesteven.

Appendix D: Maps of Monitoring Locations and AQMAs provides maps of the AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation are as follows:

- NO<sub>2</sub> annual mean; and
- NO<sub>2</sub> 1 hour mean.



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

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
SKDC AQMA No.6	08/08/2013	NO <sub>2</sub> Annual Mean	Manthorpe Road, Wharf Road, High Street and London Road	No	58.2 µg/m <sup>3</sup>	34.4 µg/m <sup>3</sup>	3	SKDC Air Quality Action Plan 2016	SKDC AQAP
SKDC AQMA No.6	08/08/2013	NO <sub>2</sub> 1 Hour Mean	Manthorpe Road, Wharf Road, High Street and London Road	No	None predicated as annual mean is below 60 µg/m <sup>3</sup>	None predicated as annual mean is below 60 µg/m <sup>3</sup>	10	SKDC Air Quality Action Plan 2016	SKDC AQAP

South Kesteven District Council confirm the information on UK-Air regarding their AQMA(s) is up to date.

South Kesteven District Council confirm that all current AQAPs have been submitted to Defra.

## Progress and Impact of Measures to address Air Quality in South Kesteven District Council

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

- *Comments from last year's ASR have been mentioned and addressed, which is welcomed, and it is encouraged that this continues with future ASRs.*

Comments from the 2021 ASR have been addressed below.

- *The AQAP is now six years old and is therefore due for review next year.*

Due to lack of resources in 2022, the AQAP was not reviewed, when additional staffing resources are available this will be reviewed. However, a report was sent to the Environment Overview and Scrutiny Committee in November 2022 to propose that a review of AQMA No.6 is considered to remove the pollution declaration of 1-hour NO<sub>2</sub> mean exceedances, through an amendment to the AQMA order. It was recommended that public consultation is undertaken to consider this proposed amendment to the AQMA. The consultation is due to be undertaken this year and following that a further report be taken to Cabinet to approve a change if proposed.

- *All graphs are well presented and are clear to read, with the addition of the AQO allowing for visual analysis of the monitoring data. Formatting is consistent between all charts. The Council have also provided a detailed discussion of these trends.*

Graphs and discussion of trends have been provided again in this ASR.

- *The Council should consider the relocation of some monitoring sites where there has been continuously low concentrations for a number of years, for example site SK3.*

South Kesteven District Council were unable to review the diffusion tube locations in 2022 but this will be reviewed when additional staffing resource is available.

- *Overall, the report is detailed and provides a good insight into the work that South Kesteven District Council are doing within its area, and all of the measures it has put in place to improve air quality.*

South Kesteven has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Ten measures are included within Table 2.2, with the type of measure and the progress South Kesteven have made during the reporting

year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in South Kesteven District Council's 2016 Air Quality Action plan. Key completed measures are:

- Reduction in idling traffic;
- Promoting the use of cleaner or alternative fuels where possible;
- Investigate options for better travel planning amongst the council's employees; and
- Promotion of walking, cycling and public transport.

South Kesteven District Council have four remaining measures to be completed, M2, M4, M6 and M7 are on-going, whilst M1 is expected to be completed in 2025. A review of the AQAP will be undertaken when staffing resources are available.

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

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
M1	Grantham Southern Quadrant East West Relief Road	Traffic Management	Strategic highway improvements, Re- prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2016	2023	Lincolnshire County Council Highways & South Kesteven DC	Lincolnshire County Council	NO	Funded	> £10 million	Implementation	0.5 - 1µg/m <sup>3</sup>	Reduced HGV through traffic in the town centre – reduced overall traffic flows through the town.	Under construction	
M2	Improve traffic management at key junctions	Traffic Management	Strategic highway improvements, Re- prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2016	Ongoing	Lincolnshire County Council Highways	Lincolnshire County Council	NO	Funded	£100k - £500k	Implementation	1 - 2µg/m <sup>3</sup>	Reduced congestion and increased average speeds through the AQMA.	Lincolnshire County Council consulted on an Active Travel Zone for Grantham in 2021. The Proposal would see the High Street become one-way, with the creation of a 'sustainable travel corridor', while the footpath on St Peter's Hill would be extended into one lane of the road and the junction between Guildhall Street and High Street closed. Ongoing contributions from developments. SCOOT in operation at 4 key junctions in Grantham.	
M3	Improvements in Bus fleet emissions	Promoting Low Emission Transport	Other	2016	-	Lincolnshire County Council Highways & South Kesteven DC	Lincolnshire County Council	NO	Not Funded	£50k - £100k	Aborted	1 - 2µg/m <sup>3</sup>	Improved bus fleet composition but no direct traffic reduction. Bus use more attractive to potential users – increased bus use.	We currently have no plans to increase the emission standard or to change the age of vehicles operating within the passenger transport contracts. It is worth noting that not all vehicles will be operating as a contract for LCC.	
M4	Encouraging modal shift	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2016	Ongoing	Lincolnshire County Council & South Kesteven DC	Lincolnshire County Council	NO	Funded	< £10k	Implementation	0.2 - 0.5µg/m <sup>3</sup>	Reduced vehicle use and increased use of public transport.	Grantham Transport Strategy was published in 2022 following a public consultation. Full and summary versions can be seen here: <a href="#">Grantham transport strategy – Lincolnshire County Council</a> Local Cycling and Walking Infrastructure Plan development for Grantham Other smaller plans being considered in other areas of SK District. Draft LCWIP in existence.	
M5	Reduction in Idling Traffic	Public Information	Via leaflets	2016	2020	South Kesteven DC	South Kesteven DC	NO	Funded	< £10k	Completed	0 - 0.2µg/m <sup>3</sup>	Reduced idling in key areas.	Public information is provided at the Council's web site on reducing idling time in vehicles. <a href="http://www.southkesteven.gov.uk/index.aspx?articleid=8323">http://www.southkesteven.gov.uk/index.aspx?articleid=8323</a>	
M6	Provision of Cycling infrastructure	Promoting Travel Alternatives	School Travel Plans	2016	Ongoing	Lincolnshire County Council Highways	Lincolnshire County Council	NO	Funded	£50k - £100k	Implementation	0 - 0.2µg/m <sup>3</sup>	Increased number of cycle lanes makes cycling a more attractive alternative method of transport.	There is no update on the Walking and Cycling Strategy. However, with this document in place any future opportunities arising from the developments or highway improvements will be taken.	
M7	Rolling programme of replacing older more polluting vehicles with newer cleaner vehicles	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2016	Ongoing	South Kesteven DC	South Kesteven DC	NO	Funded	£10k - 50k	Implementation	0 - 0.2µg/m <sup>3</sup>	Improve average euro class of the whole council owned fleet.	The Fleet has been improved with vehicles being replaced through a rolling program. Two pool cars used by staff are fully electric Work to consider options for decarbonisation of the fleet is in progress.	
M8	Promote the use of cleaner or alternative	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2016	2020	South Kesteven DC	South Kesteven DC	NO	Funded	£10k - 50k	Completed	0 - 0.2µg/m <sup>3</sup>	Introduce new electric and hybrid	The Council is promoting the Woodsure Ready to Burn scheme for log burners to improve air quality on their website.	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
	fuels where possible												vehicles to the council fleet.	<a href="http://www.southkesteven.gov.uk/index.aspx?articleid=8323">http://www.southkesteven.gov.uk/index.aspx?articleid=8323</a>	
<b>M9</b>	Investigate options for better travel planning amongst the council's employees	Public Information	Via other mechanisms	2016	2020	South Kesteven DC	South Kesteven DC	<b>NO</b>	Not Funded	< £10k	Completed	0 - 0.2µg/m <sup>3</sup>	Reduce number of council staff driving to work.	Public information is provided at the Council's web site on driving less and cycling. <a href="http://www.southkesteven.gov.uk/index.aspx?articleid=8323">http://www.southkesteven.gov.uk/index.aspx?articleid=8323</a> The Council has implemented flexible working arrangements which enable many staff to work from home for a proportion of the working week, reducing travel to and from the offices	
<b>M10</b>	Promotion of walking, cycling and public transport	Public Information	Via the Internet	2016	2017	South Kesteven DC	South Kesteven DC	<b>NO</b>	Not Funded	< £10k	Completed	0 - 0.2µg/m <sup>3</sup>	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 cycle route maps.	Implemented. Further updates to the Air Quality page on the SKDC website have been carried out. <a href="http://www.southkesteven.gov.uk/index.aspx?articleid=8323">http://www.southkesteven.gov.uk/index.aspx?articleid=8323</a> . Continued work with Active Lincs and Love to Ride, exploration of Grantham based projects.	

## PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), 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 2022 background maps for South Kesteven District Council (2018 based) show that all background concentrations of PM<sub>2.5</sub> are far below the recommended 2022 annual mean AQS objective for PM<sub>2.5</sub> of 20µg/m<sup>3</sup>. The highest concentration is predicted to be 10.4µg/m<sup>3</sup> within the 1km x 1km grid square with the centroid grid reference of 490500, 337500. This is an area located on Cliffe Road, situated next to Gonerby Road.

The Department of Health's Public Health Outcomes Framework<sup>7</sup> has a number of public health indicators that are used focus public health action, identify areas of health inequality and concern, and monitor the differences in health impacts across regions in the UK. This framework includes an indicator "D01- Fraction of Mortality Attributable to Particulate Air Pollution" which is calculated using background annual average PM<sub>2.5</sub> concentrations, modelled at a 1km<sup>2</sup> resolution based on measured concentrations from the AURN. South Kesteven has a 5.2% fraction of mortality calculated for 2021, which is below both the average for England overall (5.5%), and the East Midlands Region (5.6%). The 2021 data is used as the 2022 dataset has not been made available at the time of writing and is available via the Fingertips Public Health Outcomes Framework website.

Within South Kesteven District Council, 42 Smoke Control Areas (SCA's) are declared. These areas are defined regions throughout Grantham and Stamford where smoke emissions from chimney's are legally prohibited. Only authorised fuels and 'exempt appliances' are not subject to these rules. More information including maps of the SCA enforcement area's within South Kesteven can be found via the following link: <http://www.southkesteven.gov.uk/index.aspx?articleid=8321>.

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<sup>7</sup> Public Health Outcomes Framework: D01- Fraction of Mortality Attributable to Particulate Air Pollution

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

This section sets out the monitoring undertaken within 2022 by South Kesteven and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

### Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

South Kesteven did not undertake any automatic (continuous) monitoring during 2022.

#### 3.1.2 Non-Automatic Monitoring Sites

South Kesteven undertook non-automatic (i.e. passive) monitoring of NO<sub>2</sub> at 35 sites during 2022 with 58 individual diffusion tubes, no new monitoring locations commenced in 2022. Table A.1 in Appendix A presents the details of the non-automatic 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.

### Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

#### 3.1.3 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 five years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented 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 2022 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.

All passive monitoring locations within South Kesteven recorded annual mean NO<sub>2</sub> concentrations below the 40µg/m<sup>3</sup> NO<sub>2</sub> AQS objective in 2022. Following bias adjustment and annualisation, where required, the maximum reported concentration in 2022 was 37.8 µg/m<sup>3</sup> at diffusion tube duplicate monitoring location SK33,34, located on A607 Manthorpe Road in Grantham AQMA No.6 which is within 10% of the AQS objective. This monitoring location reports the maximum concentration consistently between 2018 – 2022, however is showing an overall decline in NO<sub>2</sub> concentrations, continuing to comply with the NO<sub>2</sub> AQS objective from 2021 – 2022. Until concentrations of NO<sub>2</sub> within the AQMA are consistently below 10% of the AQS objective, revocation of the AQMA cannot be considered.

Figure A.1 – Figure A.3 present graphs showing the annual mean NO<sub>2</sub> concentrations from 2018 – 2022. There is a general trend of reduction in NO<sub>2</sub> concentrations over the 5-year period of monitoring results for all monitoring sites. There is a significant decrease in NO<sub>2</sub> concentrations during 2020 compared to previous years. This is largely influenced by the result of the COVID-19 pandemic, whereby the UK government advised and initiated restrictions to limit travel and encourage working from home. This resulted in significant NO<sub>2</sub> emission decreases. From 2021 – 2022, the figures show an overall increase in NO<sub>2</sub> concentrations, which is likely to be attributed to traffic volumes in 2022, more representative of pre-pandemic levels, due to 2022 not experiencing government restrictions.

All monitoring results since 2020 are below the mean NO<sub>2</sub> AQS objective of 40µg/m<sup>3</sup>. There are no passive monitoring sites where the NO<sub>2</sub> annual mean is greater than 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 AQS objective.



## Appendix A: Monitoring Results

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

Diffusion Tube ID	Site Name	Site Type	Town Location	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SK1	Scotgate	Roadside	Stamford	502659	307218	NO <sub>2</sub>	N	3.2	1.6	No	2.5
SK2	Scotgate	Roadside	Stamford	502659	307218	NO <sub>2</sub>	N	3.2	1.6	No	2.5
SK3	Essex Road	Roadside	Stamford	502717	307750	NO <sub>2</sub>	N	14.3	23.4	No	2.5
SK4	Opp Stam' Sch	Roadside	Stamford	503291	307420	NO <sub>2</sub>	N	0.0	5.7	No	2.5
SK5	East St	Roadside	Stamford	503391	307396	NO <sub>2</sub>	N	0.0	3.2	No	2.5
SK6	East St	Roadside	Stamford	503391	307396	NO <sub>2</sub>	N	0.0	3.2	No	2.5
SK7	Stam' School	Roadside	Stamford	503281	307398	NO <sub>2</sub>	N	0.0	2.5	No	2.5
SK8	London Inn	Roadside	Stamford	502910	307120	NO <sub>2</sub>	N	0.0	2.3	No	2.5
SK9	All Saints Rd	Roadside	Stamford	502873	307141	NO <sub>2</sub>	N	19.0	2.5	No	2.5
SK10	Avondale	Roadside	Stamford	502382	306890	NO <sub>2</sub>	N	4.7	1.3	No	2.5
SK11	Welwyn Close	Roadside	Grantham	490118	334165	NO <sub>2</sub>	N	5.0	2.0	No	2.5
SK12	Welwyn Close	Roadside	Grantham	490118	334165	NO <sub>2</sub>	N	5.0	2.0	No	2.5
SK13	Welwyn Close	Roadside	Grantham	490118	334165	NO <sub>2</sub>	N	5.0	2.0	No	2.5
SK14	Springfield Rd	Roadside	Grantham	490877	334642	NO <sub>2</sub>	N	24.5	2.1	No	2.5
SK15	Springfield Rd	Roadside	Grantham	490877	334642	NO <sub>2</sub>	N	24.5	2.1	No	2.5
SK16	Meres Rd	Roadside	Grantham	489263	335353	NO <sub>2</sub>	N	26.0	12.1	No	2.5
SK17	Meres Rd	Roadside	Grantham	489263	335353	NO <sub>2</sub>	N	26.0	12.1	No	2.5
SK18	Balmoral Drive	Urban Background	Grantham	489956	336574	NO <sub>2</sub>	N	32.1	0.8	No	2.5
SK19	Opp Asda	Roadside	Grantham	491067	336209	NO <sub>2</sub>	Y – No.6	2.6	5.4	No	2.5
SK20	Opp Asda	Roadside	Grantham	491067	336209	NO <sub>2</sub>	Y – No.6	2.6	5.4	No	2.5
SK21	Broad Street Scout Hut	Roadside	Grantham	491270	336256	NO <sub>2</sub>	Y – No.6	0.0	7.6	No	2.5
SK22	Brook Street	Roadside	Grantham	491260	336188	NO <sub>2</sub>	Y – No.6	0.5	6.0	No	2.5
SK23	GT. Gonerby Pond Street	Roadside	Grantham	489720	338204	NO <sub>2</sub>	N	16.0	9.5	No	2.5

Diffusion Tube ID	Site Name	Site Type	Town Location	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SK24	Gt Goverby Park	Roadside	Grantham	489870	338683	NO <sub>2</sub>	N	10.8	5.0	No	2.5
SK25	Manthorpe	Roadside	Grantham	492069	337874	NO <sub>2</sub>	N	49.6	7.6	No	2.5
SK26	Belton Lane	Roadside	Grantham	491280	336573	NO <sub>2</sub>	N	9.9	7.0	No	2.5
SK27	Jet Garage	Roadside	Grantham	491496	336354	NO <sub>2</sub>	Y – No.6	0.0	2.3	No	2.5
SK28	Jet Garage	Roadside	Grantham	491496	336354	NO <sub>2</sub>	Y – No.6	0.0	2.3	No	2.5
SK29	Jet Garage	Roadside	Grantham	491496	336354	NO <sub>2</sub>	Y – No.6	0.0	2.3	No	2.5
SK30	King's Sch	Roadside	Grantham	491472	336315	NO <sub>2</sub>	Y – No.6	2.2	2.7	No	2.5
SK31	King's Sch	Roadside	Grantham	491472	336315	NO <sub>2</sub>	Y – No.6	2.2	2.7	No	2.5
SK32	King's Sch	Roadside	Grantham	491472	336315	NO <sub>2</sub>	Y – No.6	2.2	2.7	No	2.5
SK33	Opp Jet Garage	Roadside	Grantham	491515	336389	NO <sub>2</sub>	Y – No.6	0.0	1.7	No	2.5
SK34	Opp Jet Garage	Roadside	Grantham	491515	336389	NO <sub>2</sub>	Y – No.6	0.0	1.7	No	2.5
SK35	Black Dog	Roadside	Grantham	491330	336022	NO <sub>2</sub>	Y – No.6	5.0	1.0	No	2.5
SK36	Black Dog	Roadside	Grantham	491330	336022	NO <sub>2</sub>	Y – No.6	5.0	1.0	No	2.5
SK37	High St	Roadside	Grantham	491460	335715	NO <sub>2</sub>	Y – No.6	1.2	0.8	No	2.5
SK38	High St	Roadside	Grantham	491460	335715	NO <sub>2</sub>	Y – No.6	1.2	0.8	No	2.5
SK39	High St	Roadside	Grantham	491460	335715	NO <sub>2</sub>	Y – No.6	1.2	0.8	No	2.5
SK40	Old Job Centre	Roadside	Grantham	491512	335719	NO <sub>2</sub>	Y – No.6	51.2	1.7	No	2.5
SK41	London Rd	Roadside	Grantham	491602	335485	NO <sub>2</sub>	Y – No.6	2.4	3.9	No	2.5
SK42	London Rd	Roadside	Grantham	491602	335485	NO <sub>2</sub>	Y – No.6	2.4	3.9	No	2.5
SK43	Welcome TA	Roadside	Grantham	491734	335196	NO <sub>2</sub>	N	2.0	0.5	No	2.5
SK44	Welcome TA	Roadside	Grantham	491734	335196	NO <sub>2</sub>	N	2.0	0.5	No	2.5
SK45	Sth Parade	Roadside	Grantham	491869	334960	NO <sub>2</sub>	N	0.0	3.5	No	2.5
SK46	Sth Parade	Roadside	Grantham	491869	334960	NO <sub>2</sub>	N	0.0	3.5	No	2.5
SK47	The White Lion	Roadside	Grantham	492067	334922	NO <sub>2</sub>	N	5.0	1.0	No	2.5
SK48	The White Lion	Roadside	Grantham	492067	334922	NO <sub>2</sub>	N	5.0	1.0	No	2.5
SK49	Launder Terrace	Roadside	Grantham	491427	335193	NO <sub>2</sub>	N	4.0	1.4	No	2.5
SK50	Gt Northern Court	Roadside	Grantham	491184	335575	NO <sub>2</sub>	Y – No.6	0.0	3.6	No	2.5
SK51	Gt Northern Court	Roadside	Grantham	491184	335575	NO <sub>2</sub>	Y – No.6	0.0	3.6	No	2.5
SK52	Blue Bull	Roadside	Grantham	491200	335636	NO <sub>2</sub>	Y – No.6	2.0	0.5	No	2.5
SK53	Blue Bull	Roadside	Grantham	491200	335636	NO <sub>2</sub>	Y – No.6	2.0	0.5	No	2.5

Diffusion Tube ID	Site Name	Site Type	Town Location	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SK54	Bus Station	Roadside	Grantham	491492	335505	NO <sub>2</sub>	Y – No.6	1.5	1.4	No	2.5
SK55	Bus Station	Roadside	Grantham	491492	335505	NO <sub>2</sub>	Y – No.6	1.5	1.4	No	2.5
SK56	Wharf Rd Morrisons	Roadside	Grantham	491402	335501	NO <sub>2</sub>	Y – No.6	0.8	0.9	No	2.5
SK57	Wharf Rd Morrisons	Roadside	Grantham	491402	335501	NO <sub>2</sub>	Y – No.6	0.8	0.9	No	2.5
SK58	Wharf Rd Stanford	Roadside	Stamford	503070	306957	NO <sub>2</sub>	N	3.4	1.5	No	2.5

**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 NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Town Location	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
SK1a, SK2b	502659	307218	Roadside	Stamford	100.0	100.0	30.7	28.4	21.4	24.3	24.3
SK3	502717	307750	Roadside	Stamford	100.0	100.0	13.8	13.1	9.5	11.0	8.7
SK4	503291	307420	Roadside	Stamford	100.0	100.0	29.9	30.3	21.3	24.9	26.2
SK5a, SK6b	503391	307396	Roadside	Stamford	100.0	100.0	31.1	30.1	23.5	27.0	24.6
SK7	503281	307398	Roadside	Stamford	100.0	100.0	32.7	32.8	25.5	28.0	28.3
SK8	502910	307120	Roadside	Stamford	100.0	100.0	25.7	22.5	15.8	18.4	17.3
SK9	502873	307141	Roadside	Stamford	92.3	92.3	25.0	23.9	17.9	19.2	17.5
SK10	502382	306890	Roadside	Stamford	100.0	100.0	20.2	18.3	14.7	15.1	14.5
SK11a, SK12b, SK13c	490118	334165	Roadside	Grantham	100.0	100.0	21.9	19.6	13.4	15.1	14.9
SK14a, SK15b	490877	334642	Roadside	Grantham	100.0	100.0	27.7	23.9	20.9	21.2	22.4
SK16a, SK17b	489263	335353	Roadside	Grantham	100.0	100.0	27.6	27.3	19.7	20.4	20.8
SK18	489956	336574	Urban Background	Grantham	100.0	100.0	17.0	15.3	12.2	13.1	11.5
SK19a, SK20b	491067	336209	Roadside	Grantham	100.0	100.0	30.4	27.9	18.2	25.8	25.5
SK21	491270	336256	Roadside	Grantham	100.0	100.0	27.5	25.0	18.8	22.4	20.6
SK22	491260	336188	Roadside	Grantham	100.0	100.0	30.0	27.1	20.3	23.2	24.5
SK23	489720	338204	Roadside	Grantham	100.0	100.0	20.7	18.7	14.3	16.2	15.1
SK24	489870	338683	Roadside	Grantham	100.0	100.0	21.2	19.4	15.2	15.5	15.1
SK25	492069	337874	Roadside	Grantham	82.7	82.7	19.9	17.8	13.2	15.3	14.7
SK26	491280	336573	Roadside	Grantham	100.0	100.0	24.4	22.2	15.7	21.1	19.1
SK27a, SK28b, SK29c	491496	336354	Roadside	Grantham	100.0	100.0	<b>45.3</b>	39.1	27.3	35.1	34.3
SK30a, SK31b, SK32c	491472	336315	Roadside	Grantham	100.0	100.0	31.9	28.5	22.0	24.6	24.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Town Location	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
SK33a, SK34b	491515	336389	Roadside	Grantham	100.0	100.0	45.9	40.7	31.3	36.6	37.8
SK35a, SK36b	491330	336022	Roadside	Grantham	100.0	100.0	36.0	31.8	25.3	26.8	27.4
SK37a, SK38b, SK39c	491460	335715	Roadside	Grantham	67.3	67.3	34.0	30.6	22.1	27.5	24.4
SK40	491512	335719	Roadside	Grantham	75.0	75.0	25.8	21.9	18.7	19.8	28.5
SK41a, SK42b	491602	335485	Roadside	Grantham	92.3	92.3	33.7	30.8	22.5	27.7	18.7
SK43a, SK44b	491734	335196	Roadside	Grantham	100.0	100.0	31.6	27.9	21.2	26.0	25.2
SK45a, SK46b	491869	334960	Roadside	Grantham	100.0	100.0	37.5	34.5	26.4	29.7	26.3
SK47a, SK48b	492067	334922	Roadside	Grantham	100.0	100.0	33.2	30.2	25.2	24.9	31.2
SK49	491427	335193	Roadside	Grantham	100.0	100.0	20.3	19.7	14.7	15.3	25.5
SK50a, SK51b	491184	335575	Roadside	Grantham	100.0	100.0	36.1	32.1	24.2	27.0	15.1
SK52a, SK53b	491200	335636	Roadside	Grantham	100.0	100.0	35.0	31.9	31.9	28.9	27.4
SK54a, SK55b	491492	335505	Roadside	Grantham	100.0	100.0	43.3	39.6	29.1	35.2	29.1
SK56a, SK57b	491402	335501	Roadside	Grantham	100.0	100.0	37.2	33.1	26.1	29.8	34.4
SK58	503070	306957	Roadside	Stamford	100.0	100.0	31.1	24.6	19.3	18.5	29.4

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.

Diffusion tube data has been bias adjusted.

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 correction.

#### Notes:

The annual mean concentrations are presented as  $\mu\text{g}/\text{m}^3$ .

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> 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**.

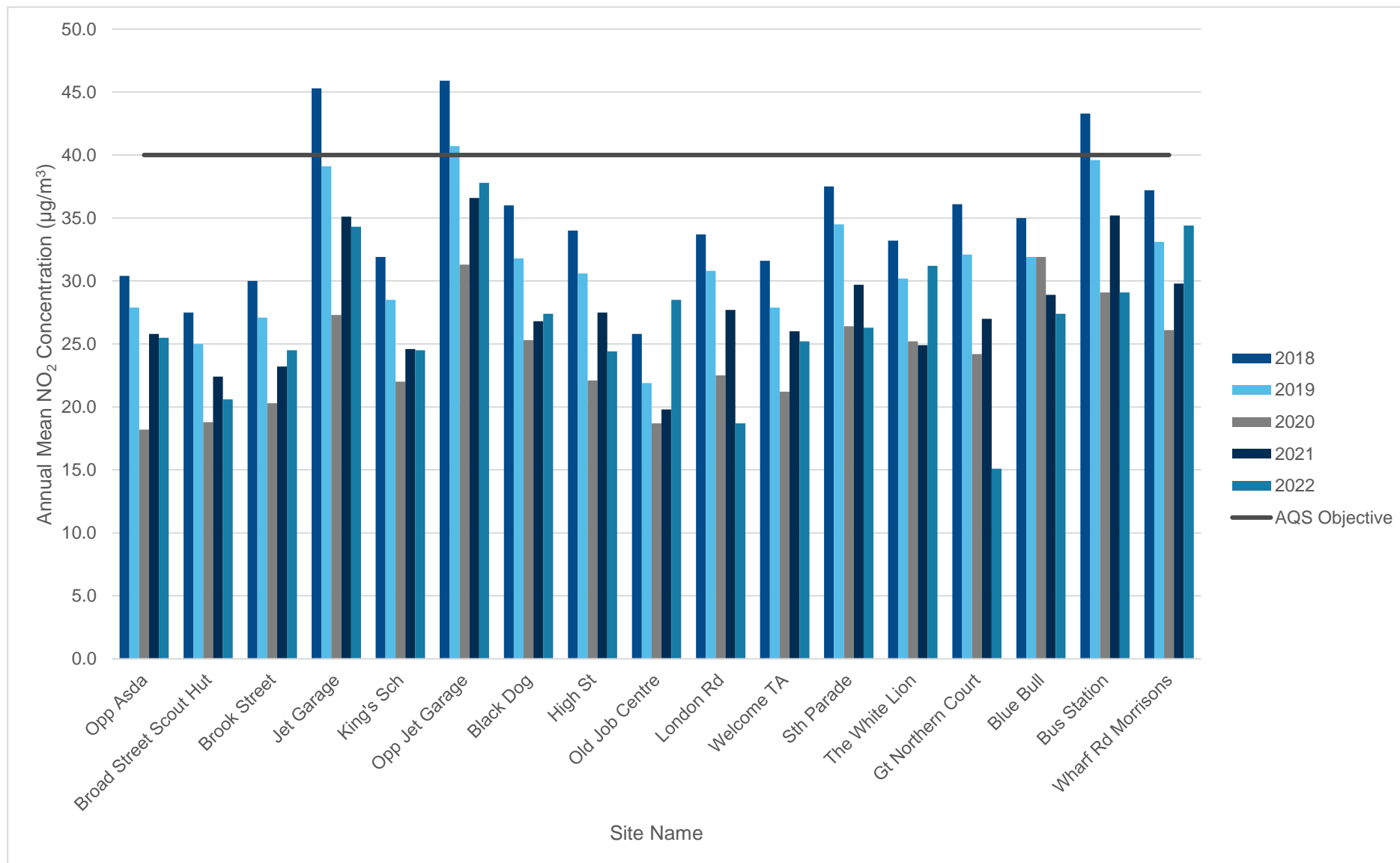
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

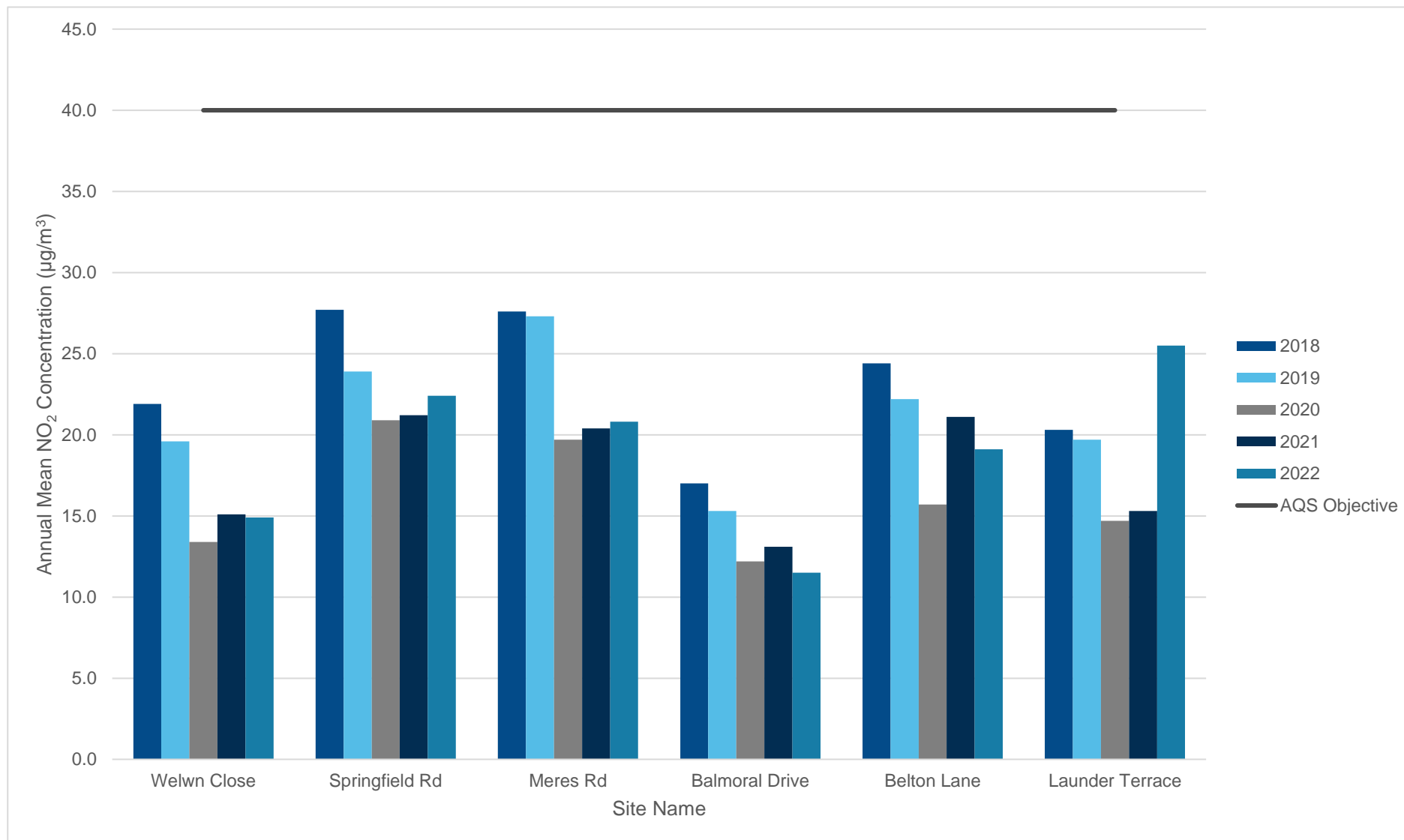
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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%).

**Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations in AQMA No.6 Grantham**

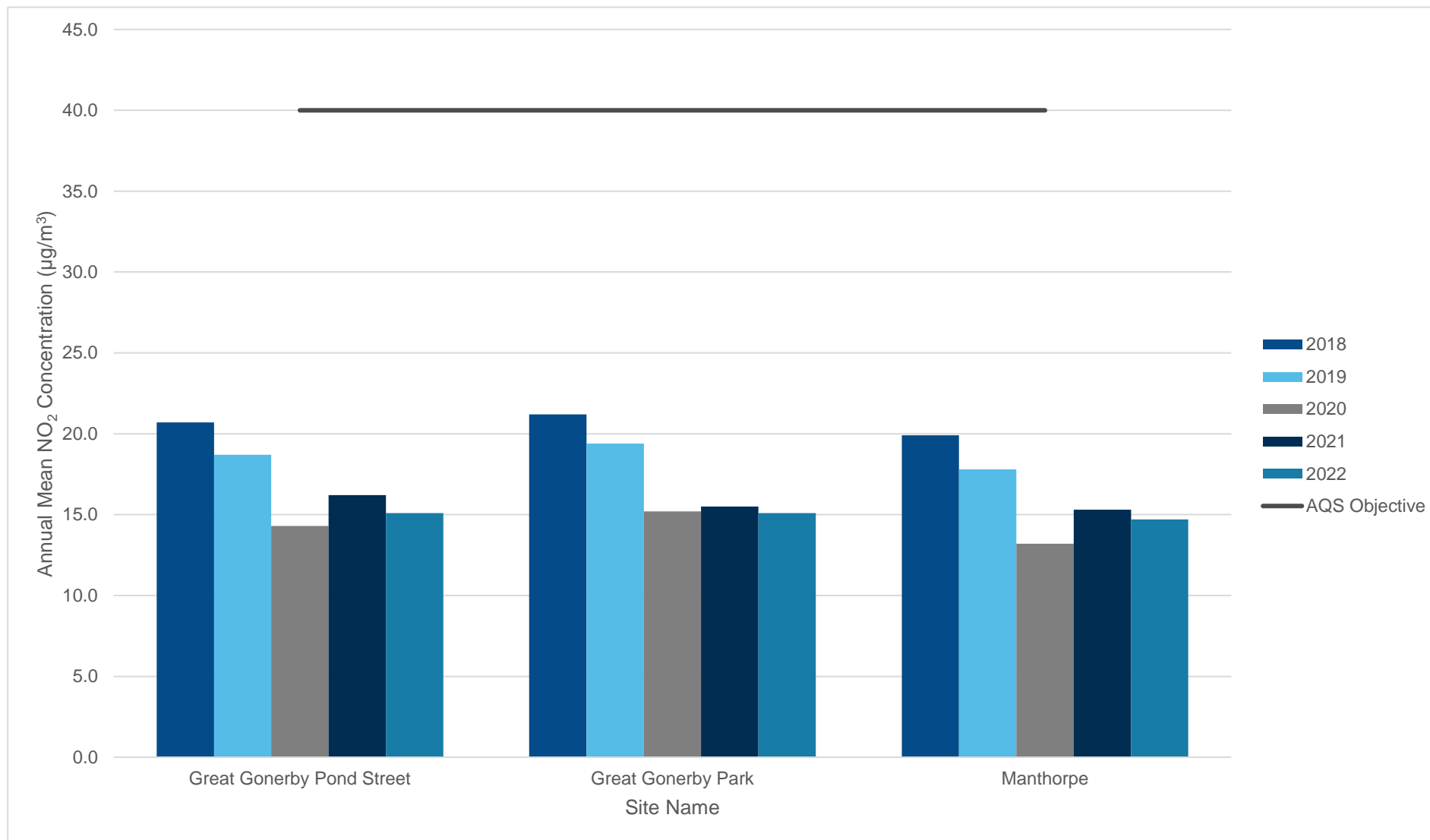


**Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations in West Grantham**

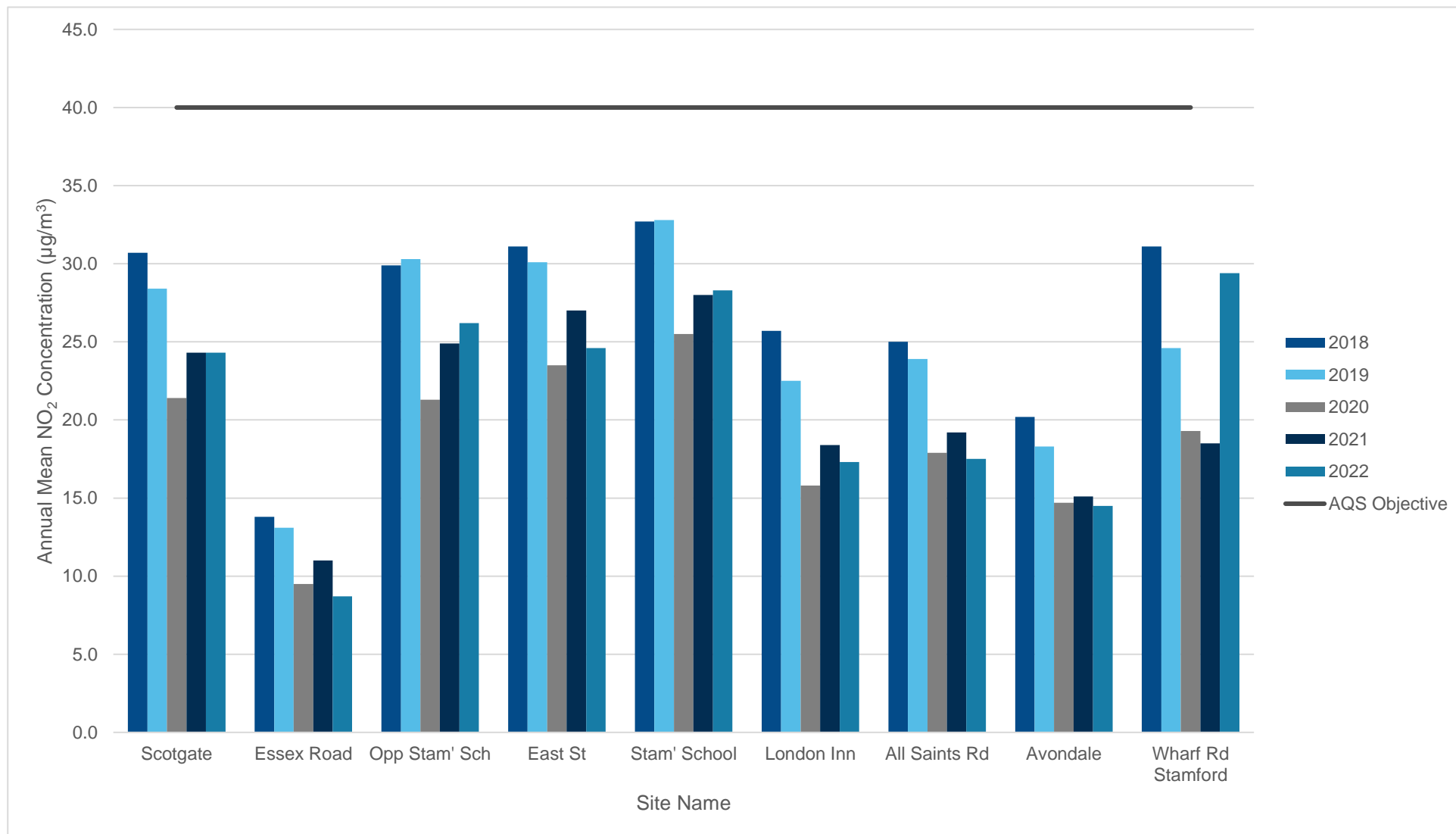




**Figure A.3 – Trends in Annual Mean NO<sub>2</sub> Concentrations in North Grantham**



**Figure A.4 – Trends in Annual Mean NO<sub>2</sub> Concentrations in Stamford**



## Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO<sub>2</sub> 2022 Diffusion Tube Results (µg/m<sup>3</sup>)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK1	502659	307218	37.4	31.4	37.1	29.9	26.7	21.6	34.5	32.3	31.5	24.4	32.6	19.4	-	-		Duplicate Site with SK1a and SK2b - Annual data provided for SK2b only
SK2	502659	307218	42.0	28.7	42.1	30.9	26.0	27.2	24.9	30.1	30.8	21.7	33.0	15.5	29.7	24.3		Duplicate Site with SK1a and SK2b - Annual data provided for SK2b only
SK3	502717	307750	22.6	13.9	7.9	8.2	6.6	7.4	7.0	7.3	8.0	11.4	19.3	8.2	10.7	8.7		
SK4	503291	307420	54.5	34.2	38.3	26.6	29.1	30.3	28.0	24.3	32.1	27.7	40.2	18.8	32.0	26.2		
SK5	503391	307396	40.6	27.4	40.1	32.6	27.1	23.5	28.6	33.6	30.9	27.9	31.8	17.9	-	-		Duplicate Site with SK5a and SK6b - Annual data provided for SK6b only
SK6	503391	307396	40.0	29.9	41.0	33.5	22.9	25.1	28.0	33.4	30.6	24.9	32.0	16.1	30.0	24.6		Duplicate Site with SK5a and SK6b - Annual data provided for SK6b only
SK7	503281	307398	46.6	38.1	45.9	35.4	29.6	33.0	31.7	35.5	33.9	29.5	34.9	20.3	34.5	28.3		
SK8	502910	307120	30.2	20.9	31.3	21.5	16.3	15.5	22.3	20.5	22.0	18.5	22.4	12.3	21.1	17.3		
SK9	502873	307141	30.8	30.6	30.0	20.1	18.2	18.5	17.8	16.8	20.6	17.5		13.2	21.3	17.5		
SK10	502382	306890	32.4	23.9	21.8	15.1	10.6	14.1	14.7	14.0	15.3	17.7	21.7	11.3	17.7	14.5		
SK11	490118	334165	33.3	20.8	25.1	16.0	11.5	16.0	15.5	15.0	17.1	16.8	24.2	10.0	-	-		Triplicate Site with SK11a, SK12b and SK13c - Annual data provided for SK13c only
SK12	490118	334165	26.9	21.0	26.0	16.3	15.8	15.6	16.2	15.1	17.1	17.5	20.8	10.6	-	-		Triplicate Site with SK11a, SK12b and SK13c - Annual data provided for SK13c only
SK13	490118	334165	30.5	22.6	21.4	14.9	14.6	14.5	15.3	16.0	17.7	12.9	22.3	11.5	18.2	14.9		Triplicate Site with SK11a, SK12b and SK13c - Annual data provided for SK13c only
SK14	490877	334642	47.6	32.6	29.7	26.3	21.1	21.9	23.9	25.3	27.9	25.9	31.0	19.4	-	-		Duplicate Site with SK14a and SK15b - Annual data provided for SK15b only
SK15	490877	334642	42.5	37.3	28.5	24.1	20.2	23.5	23.7	25.5	26.3	23.9	28.7	17.9	27.3	22.4		Duplicate Site with SK14a and SK15b - Annual data provided for SK15b only
SK16	489263	335353	36.9	32.5	21.5	16.8	26.1	33.5	26.2	22.0	21.3	30.2	25.2	13.4	-	-		Duplicate Site with SK16a and SK17b - Annual data provided for SK17b only
SK17	489263	335353	39.5	28.7	24.5	17.8	27.3	31.4	25.9	22.2	25.1	19.5	30.2	12.5	25.4	20.8		Duplicate Site with SK16a and SK17b - Annual data provided for SK17b only
SK18	489956	336574	23.0	18.2	19.4	10.5	10.3	10.1	10.4	10.4	13.7	13.5	19.8	9.6	14.1	11.5		
SK19	491067	336209	40.9	36.1	43.2	26.3	28.4	29.3	30.8	25.7	24.6	29.6	35.2	17.8	-	-		Duplicate Site with SK19a and SK20b - Annual data provided for SK20b only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK20	491067	336209	43.3	41.9	42.4	26.9	24.0	28.7	30.3	25.6	27.0	28.7	38.9	19.9	31.1	25.5		Duplicate Site with SK19a and SK20b - Annual data provided for SK20b only
SK21	491270	336256	43.6	34.6	32.1	19.4	20.9	20.2	20.5	18.6	21.7	21.1	32.9	15.2	25.1	20.6		
SK22	491260	336188	46.7	42.0	44.8	25.9	25.4	23.8	25.2	25.9	27.0	23.7	33.5	14.9	29.9	24.5		
SK23	489720	338204	29.8	26.1	21.3	15.0	14.7	13.6	14.4	14.3	18.0	15.5	26.2	12.3	18.4	15.1		
SK24	489870	338683	32.8	25.9	20.6	12.9	17.3	16.3	16.3	12.4	16.2	15.8	21.2	13.0	18.4	15.1		
SK25	492069	337874	33.6	19.1	20.5	14.8	11.0	7.8 (Found on ground)	15.3	13.9	16.3		22.1	12.8	17.9	14.7		
SK26	491280	336573	40.3	24.1	31.1	22.4	19.4	18.7	22.4	19.4	22.8	22.3	28.0	8.3	23.3	19.1		
SK27	491496	336354	61.4	38.4	54.5	41.1	32.6	36.3	39.9	40.2	45.3	38.1	43.7	22.9	-	-		Triplicate Site with SK27a, SK28b and SK29c - Annual data provided for SK29c only
SK28	491496	336354	58.7	38.3	52.4	42.4	35.8	33.9	41.8	38.3	44.2	36.8	48.3	27.0	-	-		Triplicate Site with SK27a, SK28b and SK29c - Annual data provided for SK29c only
SK29	491496	336354	60.2	40.4	60.7	43.9	37.4	36.6	40.4	38.1	42.5	38.3	52.0	21.7	41.8	34.3		Triplicate Site with SK27a, SK28b and SK29c - Annual data provided for SK29c only
SK30	491472	336315	47.4	39.0	32.5	31.8	26.4	25.5	28.9	26.0	33.1	25.7	27.5	17.4	-	-		Triplicate Site with SK30a, SK31b and SK32c - Annual data provided for SK32c only
SK31	491472	336315	45.9	36.5	31.6	31.6	27.9	28.0	28.0	23.2	31.5	25.9	29.2	18.3	-	-		Triplicate Site with SK30a, SK31b and SK32c - Annual data provided for SK32c only
SK32	491472	336315	46.6	37.2	29.2	27.9	31.2	25.7	27.9	25.7	31.0	24.2	31.3	17.9	29.9	24.5		Triplicate Site with SK30a, SK31b and SK32c - Annual data provided for SK32c only
SK33	491515	336389	69.1	60.7	45.8	42.9	43.4	43.8	46.8	37.3	46.1	43.9	40.8	25.4	-	-		Duplicate Site with SK33a and SK34b - Annual data provided for SK34b only
SK34	491515	336389	70.0	62.1	42.5	45.4	43.1	44.1	46.9	42.4	50.3	40.3	48.9	25.4	46.1	37.8		Duplicate Site with SK33a and SK34b - Annual data provided for SK34b only
SK35	491330	336022	46.1	35.7	44.9	39.9	29.1	26.4	30.8	31.9	33.5	29.3	35.6	20.3	-	-		Duplicate Site with SK35a and SK36b - Annual data provided for SK36b only
SK36	491330	336022	47.0	36.9	45.7	38.6	27.6	26.6	28.7	33.8	36.4	28.1	31.4	17.9	33.4	27.4		Duplicate Site with SK35a and SK36b - Annual data provided for SK36b only
SK37	491460	335715	43.3	44.3	46.7	35.0						28.0	29.2	19.7	-	-		Triplicate Site with SK37a, SK38b and SK39c - Annual data provided for SK39c only
SK38	491460	335715	42.4	33.3	48.8	39.2		23.5				28.9	30.0	18.9	33.4	-		Triplicate Site with SK37a, SK38b and SK39c - Annual data provided for SK39c only
SK39	491460	335715	42.9	39.4	54.7	40.7		25.9	32.0			28.9	31.2	17.3	34.8	27.7		Triplicate Site with SK37a, SK38b and SK39c - Annual data provided for SK39c only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.82)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK40	491512	335719	35.1	24.8	32.0	19.4	19.2	18.6	19.2		23.6	23.6	24.6	10.6	22.8	18.7		
SK41	491602	335485	<b>43.4</b>	37.3	34.1	29.7	30.8	24.9	31.4	35.1	34.3	21.6	31.0	17.0	-	-		Duplicate Site with SK41a and SK42b - Annual data provided for SK42b only
SK42	491602	335485	<b>48.0</b>	33.0	42.5	31.9	23.4	24.0	30.8	31.3	37.0	21.4	30.1	13.8	30.7	25.2		Duplicate Site with SK41a and SK42b - Annual data provided for SK42b only
SK43	491734	335196	<b>42.6</b>	28.5	36.8	31.5	37.9	26.2	24.5	29.3	<b>40.0</b>	38.4	<b>44.4</b>	18.9	-	-		Duplicate Site with SK43a and SK44b - Annual data provided for SK44b only
SK44	491734	335196	39.4	41.2	52.7	25.9	22.9	21.1	30.9	27.7	30.5	25.9	35.9	17.7	32.1	26.3		Duplicate Site with SK43a and SK44b - Annual data provided for SK44b only
SK45	491869	334960	<b>53.6</b>	<b>48.6</b>	<b>40.7</b>	32.4	38.4	28.6	32.6	37.3	<b>40.6</b>	26.2	<b>47.8</b>	24.8	-	-		Duplicate Site with SK45a and SK46b - Annual data provided for SK46b only
SK46	491869	334960	<u><b>65.1</b></u>	<b>44.2</b>	<b>41.7</b>	<b>40.4</b>	35.4	30.8	30.5	33.0	36.8	39.2	<b>42.4</b>	22.2	38.1	31.2		Duplicate Site with SK45a and SK46b - Annual data provided for SK46b only
SK47	492067	334922	<b>44.1</b>	35.0	39.4	24.7	29.1	29.6	29.1	27.2	25.9	32.4	37.2	16.8	-	-		Duplicate Site with SK47a and SK48b - Annual data provided for SK48b only
SK48	492067	334922	<b>45.2</b>	<b>40.6</b>	38.5	25.3	29.9	29.4	28.1	25.0	28.1	31.6	38.8		31.2	25.5		Duplicate Site with SK47a and SK48b - Annual data provided for SK48b only
SK49	491427	335193	32.9	31.2	22.1	14.2	13.9	12.0	15.4	13.8	17.2	13.9	22.4	11.4	18.4	15.1		
SK50	491184	335575	<b>48.9</b>	<b>40.6</b>	35.3	31.2		29.5	30.4	33.2	33.2	31.1	39.5	18.5	-	-		Duplicate Site with SK50a and SK51b - Annual data provided for SK51b only
SK51	491184	335575	<b>46.2</b>	<b>41.7</b>	<b>41.9</b>		30.9	29.1		32.3	29.7	31.1	34.4	22.0	33.5	27.4		Duplicate Site with SK50a and SK51b - Annual data provided for SK51b only
SK52	491200	335636	<b>49.8</b>	39.9	<b>47.7</b>	33.4	<b>43.1</b>	26.3	34.2	32.7	36.5	33.3	35.1	17.9	-	-		Duplicate Site with SK52a and SK53b - Annual data provided for SK53b only
SK53	491200	335636	<b>51.7</b>	<b>40.9</b>	<b>43.1</b>	33.6	32.6	31.1	34.3	29.7	36.9	24.6	<b>42.9</b>	19.2	35.4	29.1		Duplicate Site with SK52a and SK53b - Annual data provided for SK53b only
SK54	491492	335505	<b>55.8</b>	<b>47.2</b>	<b>54.0</b>	32.3	36.6	36.6	<b>40.9</b>	42.3	<b>42.3</b>	34.8	<b>49.6</b>	23.7	-	-		Duplicate Site with SK54a and SK55b - Annual data provided for SK55b only
SK55	491492	335505	<b>59.7</b>	<b>49.5</b>	<b>54.9</b>	<b>40.9</b>	38.2	36.7	<b>41.2</b>	39.4	<b>41.1</b>	37.3	<b>48.7</b>	22.6	<b>41.9</b>	34.4		Duplicate Site with SK54a and SK55b - Annual data provided for SK55b only
SK56	491402	335501	<b>51.7</b>	<b>42.8</b>	<b>41.6</b>	32.0	34.6	31.5	35.7	29.8	31.2	33.4	<b>41.8</b>	19.0	-	-		Duplicate Site with SK56a and SK57b - Annual data provided for SK57b only
SK57	491402	335501	<b>53.2</b>	<b>45.1</b>	<b>51.9</b>	29.3	34.0	31.1	35.1	29.8	33.8	33.8	38.5	18.6	35.8	29.4		Duplicate Site with SK56a and SK57b - Annual data provided for SK57b only
SK58	503070	306957	37.7	26.7	39.1	22.7	21.0	20.9	22.0	22.7	23.0	17.9	26.4	13.7	24.5	20.1		

All erroneous data has been removed from the NO<sub>2</sub> diffusion tube dataset presented in Table B.1.

- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- South Kesteven District Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

**Notes:**

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> 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**.

See Appendix C for details on bias adjustment and annualisation.

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

### **New or Changed Sources Identified Within South Kesteven District Council During 2022**

South Kesteven have not identified any planning applications as having the potential to impact air quality as part of Environmental Statement documents for developments in Grantham.

### **Additional Air Quality Works Undertaken by South Kesteven District Council During 2022**

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

The diffusion tubes for the year 2022 were supplied and analysed by Gradko International Ltd for the whole year. All tubes were prepared using 50% TEA v/v in acetone method. All results have been bias adjusted before being presented in Table B.1.

Gradko International Ltd are UKAS accredited laboratories and participate in the AIR-PT Scheme (a continuation of the former 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 calibre. The labs follow the procedures set out in the Harmonisation Practical Guidance. In the 2022 AIR-PT results, AIR-PT AR049 (January – February 2022) and AR050 (May – June 2022) Gradko scored 100%. The percentage score reflects the results deemed to be satisfactory based upon the z-score of < ±2. Results for July – December 2022 were not available at the time of writing.

#### **Diffusion Tube Annualisation**

Annualisation was required for monitoring locations SK37a and SK38b located on High Street, Grantham which had data capture of 58.3 and 66.7% respectively in 2022. The annualisation process in accordance with LAQM.TG.22 was undertaken utilising the

AURN sites from Nottingham Centre, Leicester University and Northampton Spring Park. The calculated annualisation factor are detailed in Table C.1 below.

**Table C.1 – Annualisation Summary (concentrations presented in  $\mu\text{g}/\text{m}^3$ )**

Site ID	Nottingham Centre	Leicester University	Northampton Spring Park	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
SK37a	0.8761	0.8688	0.8084	0.8511	35.2	29.9
SK38b	0.9178	0.9036	0.8514	0.8909	33.1	29.5

### Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 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  $\text{NO}_x/\text{NO}_2$  continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

South Kesteven have applied a national bias adjustment factor of 0.82 to the 2022 monitoring data. A summary of bias adjustment factors used by South Kesteven over the past five years is presented in Table C.2.

**Table C.2 – Bias Adjustment Factor**

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.82
2021	National	03/22	0.83
2020	National	03/21	0.84
2019	National	03/20	0.89
2018	National	03/19	0.89

### $\text{NO}_2$ Fall-off with Distance from the Road

No diffusion tube  $\text{NO}_2$  monitoring locations within South Kesteven required distance correction during 2022.



### **NO<sub>2</sub> Fall-off with Distance from the Road**

No automatic NO<sub>2</sub> monitoring locations within South Kesteven required distance correction during 2022.

## Appendix D: Maps of Monitoring Locations and AQMAs

Figure D.1 – Map of Non-Automatic Monitoring Sites within/near AQMA No. 6 Grantham

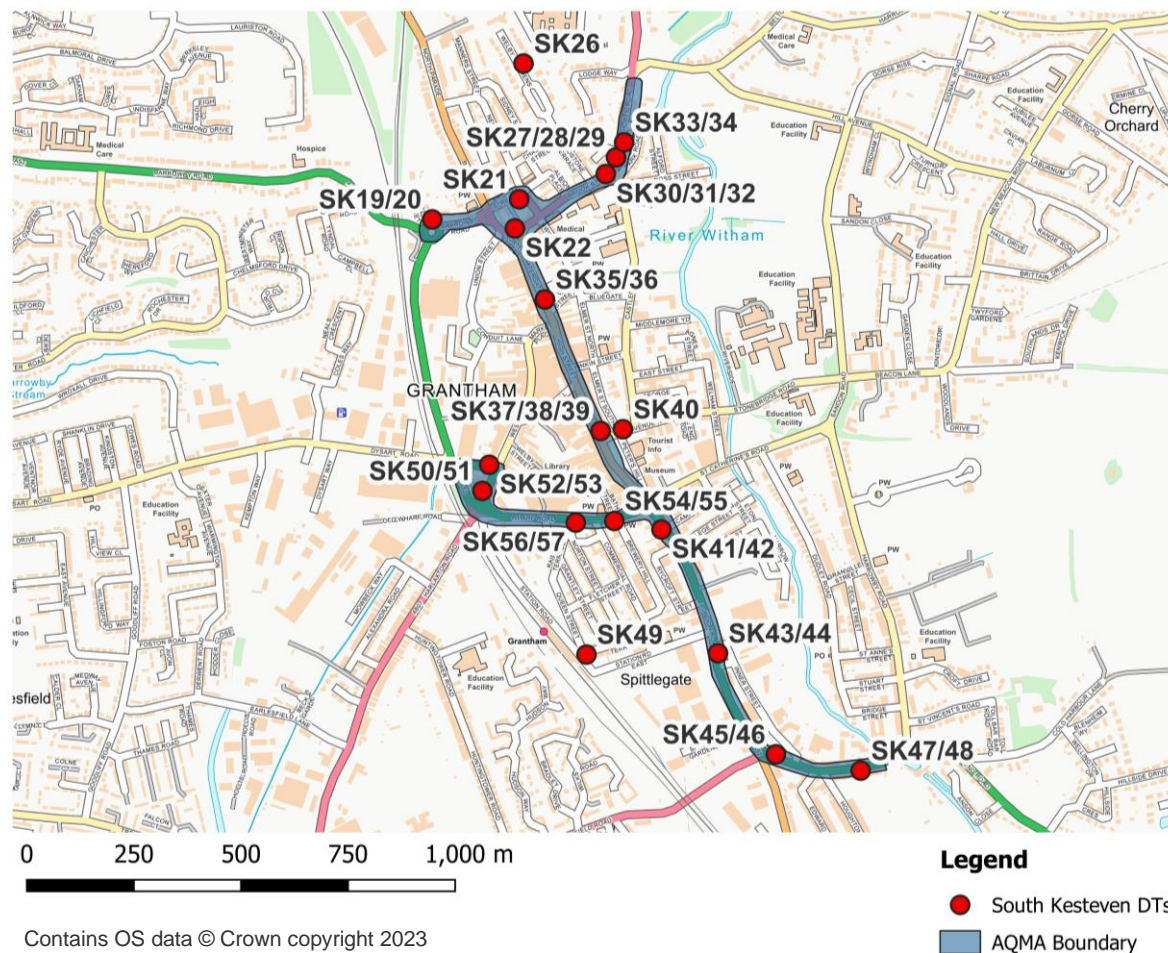


Figure D.2 – Map of Non-Automatic Monitoring Sites in North Grantham



Figure D.3 – Map of Non-Automatic Monitoring Sites in West Grantham

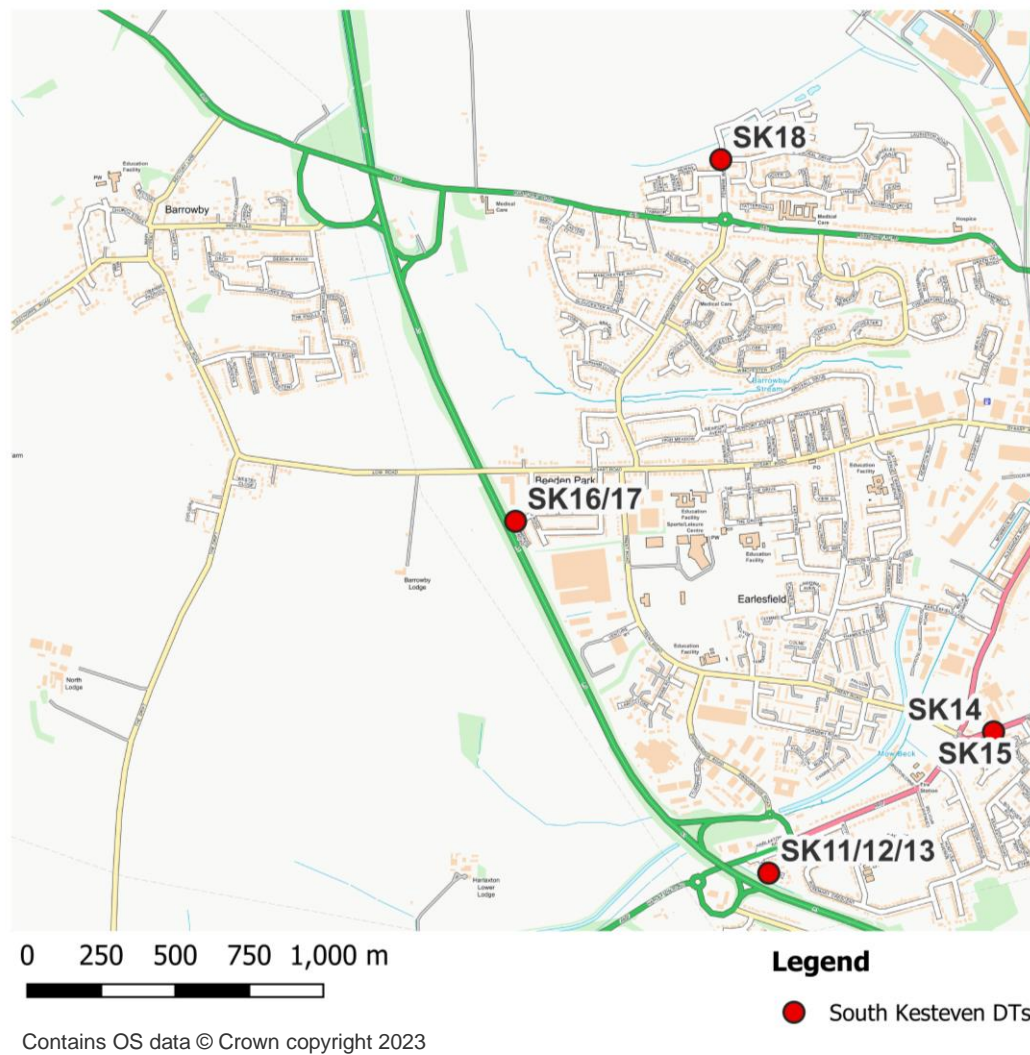
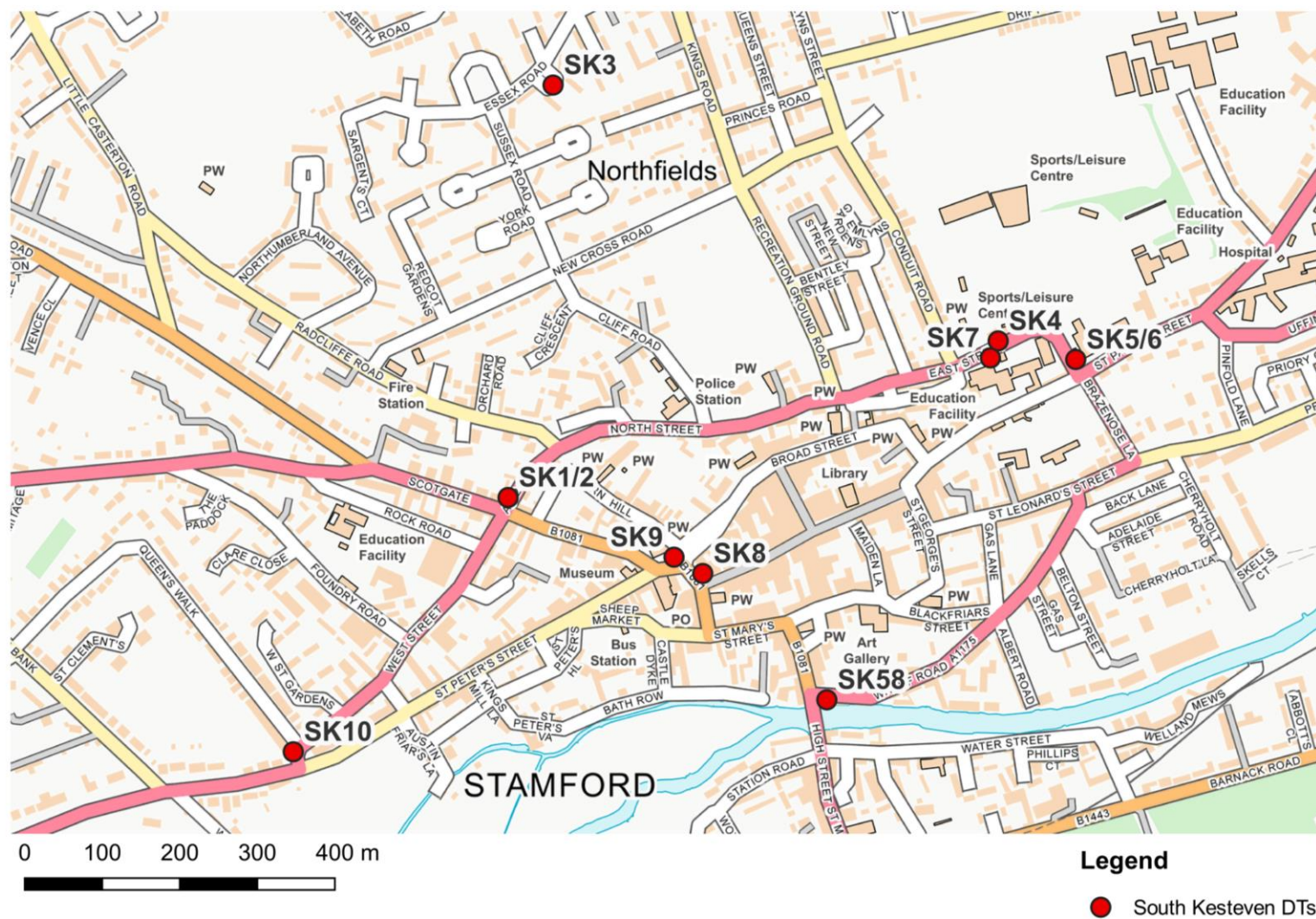




Figure D.4 – Map of Non-Automatic Monitoring Sites in Stamford



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## Appendix E: Summary of Air Quality Objectives in England

**Table E.1 – Air Quality Objectives in England<sup>8</sup>**

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO <sub>2</sub> )	40µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM <sub>10</sub> )	40µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	125µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	266µg/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
AQS	Air Quality Strategy
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm 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
WASP	Workplace Analysis Scheme for Proficiency

## References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017
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- Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018
- Defra. Environmental Improvement Plan 2023, January 2023
- DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018
- Public Health Outcomes Framework: D01- Fraction of Mortality Attributable to Particulate Air Pollution