



East Lindsey District Council
Combined Annual Status Report

Covering the monitoring period between 2016 - 2020

Bureau Veritas

March 2022



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2021 Air Quality Annual Status Report (ASR)

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

Date: March 2022

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Executive Summary: Air Quality in Our Area

Air Quality in East Lindsey

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^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

East Lindsey is predominantly rural, with three small towns: Louth, Horncastle and Skegness, the main source of pollution comes from vehicular emissions from established road networks, such that of the A16, A158, A52 and A1028.

The annual mean nitrogen dioxide (NO₂) concentrations monitored in East Lindsey during 2020 were well below the Air Quality Strategy (AQS) objective. There has been no deployment of new monitoring sites in 2020. Over the five years of monitoring data collected there has been no reported exceedance of any AQS objective within East Lindsey.

Due to the COVID – 19 pandemic the impact of laboratory closure has affected the supply and analysis of diffusion tubes. Relevant annualisation and national bias adjustment was carried out for the 2020 monitoring data were required. Besides this, there has been little impact on the Council's LAQM duties, or air quality within the District, as a result of the COVID – 19 pandemic.

Within East Lindsey there are currently no Air Quality Management Areas (AQMAs) within the Council's designation. Due to the continuous low monitored concentrations from 2016 –

¹ Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

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

³ Defra. Air quality appraisal: damage cost guidance, July 2020

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

2020, compliance to AQS and there being no sites threatening to exceed guideline concentrations the implementation of an AQMA is not needed. The diffusion tube monitoring network will be maintained within areas to ensure that pollutant concentrations remain below the relevant AQS objectives.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy⁵ sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero⁶ sets out 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 (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

With there being no designated AQMAs within the East Lindsey, an AQAP is not required. East Lindsey's air quality is consistently well below AQS guidelines and can be considered to having good general air quality.

Conclusions and Priorities

With East Lindsey being a rural district with only three main urban areas, the NO₂ concentrations are expected to be low at all monitoring sites. Assessment of concentrations will be continually monitored to identify any concentration trends.

Any new or existing developments, will be submitted through the planning process, reviewed and where there is a potential for a significant change in emissions as a result of traffic or new combustion processes, air quality assessments will be required. This will give confidence that any proposed developments are not detrimental to local air quality. In

⁵ Defra. Clean Air Strategy, 2019

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

addition, any new industrial processes will be regulated in line with The Environmental Permitting (England and Wales) Regulations 2016 (as amended).

Local Engagement and How to get Involved

The main source of air pollution within East Lindsey is from road traffic emissions. Therefore, the best way for members of the public to help improve air quality in East Lindsey is to adjust their normal travel patterns to be more sustainable.

The following are suggested alternatives to private travel that would contribute to improving the air quality within East Lindsey.

- Use and encourage public transport where available – This reduces the number of private vehicles in operation reducing pollutant concentrations through the number of vehicles and reducing congestion;
- Walk or cycle if your journey allows – From choosing to walk to cycle, the number of vehicles on your journey is reduced and also there is added benefit of keeping fit and healthy;
- Car Sharing – Where a number of individuals are making similar journey, such as travelling to work or to school, car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This can be promoted via travel plans through the workplace and within schools; and
- Alternative fuel/more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and further fuel-efficient cars available and all have different levels of benefits by reducing the amount of emissions being released.

For more information on LAQM and the work being done by DEFRA to tackle air pollution, please visit <https://uk-air.defra.gov.uk/>.

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1 Local Air Quality Management

This report provides an overview of air quality in East Lindsey during 2020. 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 East Lindsey 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

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 should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

East Lindsey currently does not have any declared AQMAs. The area of East Lindsey is largely rural, with three small towns: Louth, Skegness, and Horncastle.

There are no proposals to declare any AQMAs within East Lindsey due to the mean annual NO₂ concentrations monitored all complying and well below the relevant 40µg/m³ air quality standard (AQS) for NO₂ (Table E.1).

2.2 Progress and Impact of Measures to address Air Quality in East Lindsey

The latest DEFRA appraisal is from the 2014 Progress report and concluded that:

“ The report is well structured and covers all of the minimum requirements and some of the recommended additional items of the information specified in the Guidance.

The following specific items are drawn to the local authority’s attention to help inform future work. It is strongly recommended that the local authority note these items for future reporting purposes and amend their current report where appropriate:

- 1. The deadline for 2014 Progress Report submission was 30th April 2014. The Council is encouraged to submit future reports on time where possible.*
- 2. The sections on new developments and planning applications are very brief. Little consideration has been given to these issues in previous reports and the Council is encouraged to provide further information in the 2015 Updating and Screening Assessment ”*

The progress of East Lindsey has been limited as the latest ASR/Progress Report was last reported in 2014. Therefore, the 2020 ASR for East Lindsey reports the monitoring results carried out between 2016 – 2020. From 2014 onwards, there have been no reported measures to directly reduce NO₂ concentrations within East Lindsey. However, due to the rural nature of East Lindsey, NO₂ concentrations are relatively low from 2016 – 2020, resulting in no exceedances.

The NO₂ diffusion tube monitoring network within East Lindsey is vital into monitoring monthly NO₂ concentrations and also identifying increases in NO₂.

New and existing developments in East Lindsey are not predicted to cause significant effects to air quality.

East Lindsey District Council will continue to monitor NO₂ pollution, which is the main form of progression and measured success to address air quality.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
1	New environmental manager tasked with achieving Net Zero corporately and Promoting the Green Homes Grant Scheme	Policy Guidance and Development Control	Other policy	-	-	East Lindsey District Council	-	-	-	-	Pending	-	-	-	-
2	Bus Idling (Louth bus station 'no idling' sign to reinforce turning off engines when stationary)	Traffic Management	Anti-idling enforcement	2021	-	East Lindsey District Council	-	-	Fully Funded	-	Implemented	-	-	Implemented - Ongoing	-

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

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

East Lindsey do not monitor for PM_{2.5} or PM₁₀, therefore no numerical concentrations can be reported. However, they have incorporated a sign at Louth bus station to reinforce turning off engines when stationary which will help to aid the reduction of PM_{2.5} in this area.

To account for unmonitored PM data, [DEFRA Background Maps](#) for East Lindsey in 2018 show that all 2020 background concentrations complied with the AQS objective for PM_{2.5} of 25µg/m³. The average background concentration for East Lindsey is predicted to be 8.6µg/m³, and the maximum concentration predicted to be 10.3µg/m³ within the 1km x 1km grid square, X/Y grid reference [523500, 358500], located in Coningsby.

[The Public Health Outcomes Framework](#) data tool created by Public Health England quantifies the mortality burden of PM_{2.5} within England on a county and local authority scale. For England the 2019 fraction of mortality attributable to PM_{2.5} pollution is 5.1% and 5.3% for the East Midlands region, within East Lindsey the fraction is lower than the England and regional average with a 2019 fraction of 4.9%⁷.

⁷ [The Public Health Outcomes Framework – East Lindsey](#)

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

This section sets out the monitoring undertaken 2016 – 2020 by East Lindsey and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

East Lindsey did not undertake any automatic (continuous) monitoring at any sites between 2016 - 2020.

3.1.2 Non-Automatic Monitoring Sites

East Lindsey undertook non- automatic (i.e., passive diffusion tube) monitoring of NO₂ at 14 sites between 2017 and 2020. Two additional sites were monitored in 2016. 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: Map(s) of Monitoring Locations . 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 (NO₂)

Table A.2 in Appendix A compare the ratified and adjusted monitored NO₂ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. 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 2020 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.5 includes distance corrected values, only where relevant.

All passive monitoring locations within East Lindsey recorded annual mean NO₂ concentrations well below the 40µg/m³ NO₂ AQS objective between 2016 and 2020. Following the bias adjustment and annualisation where required, the maximum reported concentration in 2020 is 23.3µg/m³ at diffusion tube monitoring location H1, located on East Street in Horncastle. This monitoring station reports the maximum concentration consistently throughout the time period between 2016 – 2020, however is showing an overall decline in NO₂ concentrations, continuing to comply with the NO₂ AQG.

Figure A.1 presents a graph showing the annual mean NO₂ concentrations from 2016 – 2020. There is a general trend of reduction in NO₂ concentrations over the 5-year period of monitoring results for all monitoring sites. There is a significant decrease in NO₂ 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 strict lockdowns to restrict travel and encourage working from home. This resulted in significant NO₂ emission decreases. In addition, as a result of lockdown procedures, the NO₂ monitoring program was affected causing missing data from March – August 2020.

All monitoring results in all years are well below the mean NO₂ AQS objective of 40µg/m³, therefore the fall-off with distance correction is not required.

3.1.4 Particulate Matter (PM₁₀)

East Lindsey did not undertake any PM₁₀ monitoring.

3.1.5 Particulate Matter (PM_{2.5})

East Lindsey did not undertake any PM_{2.5} monitoring

3.1.6 Sulphur Dioxide (SO₂)

East Lindsey did not undertake any SO₂ monitoring.

Appendix A: Monitoring Results

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Tube Co-located with a Continuous Analyser?	Tube Height (m)
SK1	Roman Bank South	Roadside	556355	363295	NO ₂	No	2.5	2.4	No	2.5
SK2	Roman Bank South	Urban Background	556355	363295	NO ₂	No	2.5	2.4	No	2.5
SK3	Roman Bank South	Roadside	556355	363295	NO ₂	No	2.5	2.4	No	2.5
SK4	Roman Bank North	Roadside	556380	363363	NO ₂	No	1.5	3	No	2.5
SK5	Roman Bank South	Roadside	556355	363295	NO ₂	No	2.5	2.4	No	2.5
SK6	Roman Bank South	Roadside	556355	363295	NO ₂	No	2.5	2.4	No	2.5
SK7	Roman Bank South	Roadside	556355	363295	NO ₂	No	2.5	2.4	No	2.5
H1	East Street	Roadside	526075	369545	NO ₂	No	0	2.4	No	2.5
H2	A 158 / South Street	Roadside	526028	369528	NO ₂	No	1.1	3.4	No	2.5
H3	Stanhope Road	Roadside	526264	369723	NO ₂	No	1.5	2	No	2.5
H4	Bull Ring	Roadside	526007	369585	NO ₂	No	1.5	1.2	No	2.5
L1	Church St	Roadside	533225	387190	NO ₂	No	0	2.1	No	2.5
L2	Church Street	Roadside	533215	387353	NO ₂	No	0.8	0.9	No	2.5
L3	Church Street	Roadside	533215	387353	NO ₂	No	0.8	0.9	No	2.5
L4	Church Street	Roadside	533215	387353	NO ₂	No	0.8	0.9	No	2.5
L5	Priory Close	Urban Background	533459	387475	NO ₂	No	5.5	2.4	No	2.5
L6	Uppgate	Roadside	532693	387335	NO ₂	No	6	5.2	No	2.5
L7	29 Church Street	Roadside	533216	387261	NO ₂	No	0	2.1	No	2.5
L8	George Street	Urban Background	532659	387121	NO ₂	No	1.2	2.9	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 NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period 2020(%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
SK1 – 3	556355	363295	Roadside	57.6	57.6	29.7	28.2	29.4	28.7	21.5
SK4	556380	363363	Roadside	27.0	27.0	25.5	26.4	24.2	22.7	18.7
SK5 – 7	556355	363295	Roadside	0	0	21.0	-	-	-	-
H1	526075	369545	Roadside	57.6	57.6	36.7	37.0	32.3	34.3	23.3
H2	526028	369528	Roadside	57.6	57.6	29.5	29.0	26.8	25.9	20.3
H3	526264	369723	Roadside	57.6	57.6	18.6	12.6	11.7	12.5	14.0
H4	526007	369585	Roadside	57.6	57.6	29.8	26.1	26.4	25.0	12.6
L1	533225	387190	Roadside	40.2	40.2	16.9	15.9	18.0	16.1	12.8
L2 - 4	533215	387353	Roadside	57.6	57.6	26.1	23.6	24.6	23.8	16.7
L5	533459	387475	Urban Background	57.6	57.6	15.9	12.8	13.8	12.9	10.1
L6	532693	387335	Roadside	57.6	57.6	24.5	27.2	22.3	25.5	19.3
L7	533216	387261	Roadside	0	0	11.9	-	-	-	-
L8	532659	387121	Urban Background	0	0	27.0	-	-	-	-

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

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 µg/m³.

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

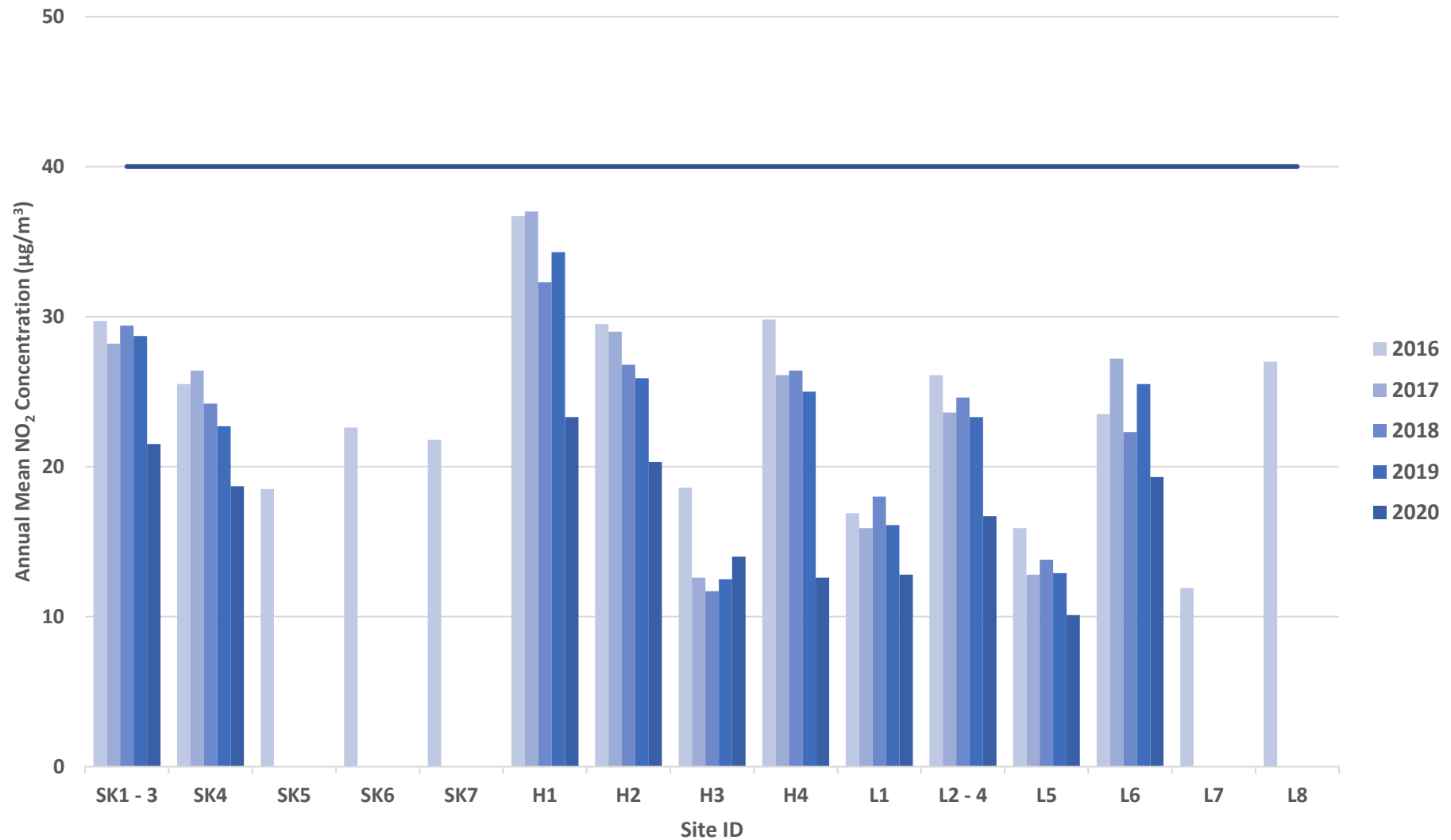
NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **bold and underlined**.

Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per [LAQM.TG16](#) 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 NO₂ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2016, 2017, 2018, 2019 and 2020

Table B.1 - NO₂ 2016 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (1.01)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK1	556355	363295	30.5	27.7	26.3	29.5	26.6	29.1	26.2	26.9	31.0	27.1	34.5	37.6	-	-	-	Triplicate Site with SK1, SK2 and SK3 - Annual data provided for SK3 only
SK2	556355	363295	26.7	28.5	28.1	30.3	30.3	28.4	26.5	26.2	31.9	27.4	34.7	38.1	-	-	-	Triplicate Site with SK1, SK2 and SK3 - Annual data provided for SK3 only
SK3	556355	363295	28.9	24.7	26.7	29.5	27.0	29.5	25.2	25.1	30.0	25.7	42.4	33.6	29.4	29.7	-	Triplicate Site with SK1, SK2 and SK3 - Annual data provided for SK3 only
SK4	556380	363363	30.9	24.5	21.5	20.9	24.8	18.2	22.6	21.3	28.3	18.4	33.1	38.4	25.2	25.5	-	
SK5	556355	363295	22.4	19.4	19.4	-	-	-	-	-	-	-	-	-	20.4	18.5	-	
SK6	556355	363295	26.9	25.7	22.0	-	-	-	-	-	-	-	-	-	24.8	22.6	-	
SK7	556355	363295	26.9	23.3	21.8	-	-	-	-	-	-	-	-	-	24.0	21.8	-	
H1	526075	369545	42.4	32.5	29.1	30.1	33.8	31.7	40.5	41.5	42.1	32.5	38.8	41.2	36.4	36.7	-	
H2	526028	369528	35.1	31.2	24.1	27.1	27.7	23.8	29.2	28.6	30.8	24.9	33.0	35.0	29.2	29.5	-	
H3	526264	369723	36.9	31.6	31.2	10.4	13.0	9.7	-	9.2	12.2	12.3	17.5	18.6	18.4	18.6	-	
H4	526007	369585	27.0	30.1	29.9	24.9	26.0	33.4	22.0	24.3	29.8	31.7	32.6	42.8	29.5	29.8	-	
L1	533225	387190	21.9	17.1	8.4	14.5	15.4	16.6	12.4	13.1	16.6	18.2	22.6	23.7	16.7	16.9	-	
L2	533215	387353	17.0	15.3	16.9	27.9	28.8	28.1	20.3	19.5	25.9	27.7	33.5	31.3	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L3	533215	387353	27.3	26.3	26.1	25.7	26.7	28.2	19.6	18.8	25.2	27.6	33.6	30.9	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L4	533215	387353	28.5	23.5	27.3	27.2	25.9	30.5	20.7	19.7	26.1	26.4	34.5	33.5	25.9	26.1	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L5	533459	387475	28.5	24.5	26.8	9.5	9.8	7.8	9.0	8.7	11.8	10.8	20.4	21.9	15.8	15.9	-	
L6	532693	387335	17.5	14.5	11.0	24.5	23.4	22.1	25.2	22.1	26.1	24.5	35.8	32.7	23.3	23.5	-	
L7	533216	387261	14.9	13.3	11.0	-	-	-	-	-	-	-	-	-	13.1	11.9	-	
L8	532659	387121	32.8	32.5	24.0	-	-	-	-	-	-	-	-	-	29.7	27.0	-	

- All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1.
- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.

East Lindsey confirm that all 2016 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

Table B.2 - NO₂ 2017 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.96)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK1	556355	363295	42.6	31.5	32.9	29.5	29.0	28.0	25.9	29.8	29.1	31.6	31.9	31.5	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK2	556355	363295	35.7	29.3	30.2	25.6	29.6	25.8	25.5	28.6	28.2	27.4	29.7	26.3	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK3	556355	363295	36.7	31.2	28.8	28.4	28.9	26.1	26.5	29.4	26.6	25.8	29.1	24.8	29.4	28.2	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK4	556380	363363	35.8	23.8	26.1	30.1	19.6	-	23.1	-	23.9	28.4	33.6	30.3	27.5	26.4	-	
H1	526075	369545	40.7	37.9	38.6	39.6	31.5	37.1	35.1	43.8	38.7	41.6	43.6	34.9	38.6	37.0	-	
H2	526028	369528	36.0	30.9	30.8	29.8	25.4	26.9	25.9	30.3	28.4	30.2	38.0	30.6	30.3	29.0	-	
H3	526264	369723	21.5	14.4	12.7	10.8	9.9	9.7	9.4	8.8	11.6	13.4	19.4	15.9	13.1	12.6	-	
H4	526007	369585	39.6	33.8	26.7	25.4	-	20.8	21.3	22.1	26.4	-	28.5	-	27.2	26.1	-	
L1	533225	387190	26.4	19.7	17.3	14.0	15.9	13.1	12.1	13.3	16.0	14.8	19.2	-	16.5	15.9	-	
L2	533215	387353	31.0	29.0	27.3	23.9	23.2	20.7	19.6	21.2	22.9	23.5	11.8	25.7	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L3	533215	387353	35.3	26.0	26.0	24.5	22.4	20.2	20.3	20.6	24.4	23.1	29.5	24.9	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L4	533215	387353	35.0	27.5	26.0	24.5	24.0	21.6	22.3	21.1	25.3	24.1	31.1	24.2	24.6	23.6	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L5	533459	387475	23.9	13.9	12.9	10.7	8.6	8.2	8.5	10.4	11.0	13.4	20.2	18.1	13.3	12.8	-	
L6	532693	387335	38.2	30.5	28.2	29.1	21.3	25.2	23.6	24.4	27.1	28.8	32.0	31.4	28.3	27.2	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.2.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

Local bias adjustment factor used.

National bias adjustment factor used.

Where applicable, data has been distance corrected for relevant exposure in the final column.

East Lindsey confirm that all 2017 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

Table B.3 - NO₂ 2018 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.89)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK1	556355	363295	40.6	35.0	37.8	33.9	34.3	28.2	37.5	33.0	32.3	37.2	35.1	31.3	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK2	556355	363295	31.8	28.5	34.5	40.4	37.7	31.5	36.0	31.1	22.7	32.4	32.3	31.4	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK3	556355	363295	31.3	31.9	35.8	37.5	35.8	29.3	28.6	33.3	27.5	31.1	31.0	28.0	33.0	29.4	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK4	556380	363363	31.9	24.5	25.1	28.0	22.7	16.3	-	28.3	-	32.5	32.9	30.1	27.2	24.2	-	
H1	526075	369545	36.1	31.5	32.8	41.9	31.4	30.8	41.1	-	41.6	37.0	36.2	38.7	36.3	32.3	-	
H2	526028	369528	32.3	30.3	28.4	31.0	27.1	24.3	28.8	33.4	29.4	32.7	33.9	30.4	30.2	26.8	-	
H3	526264	369723	18.5	-	-	12.2	11.5	10.0	10.2	11.9	6.4	15.0	18.4	17.1	13.1	11.7	-	
H4	526007	369585	-	-	-	32.1	32.7	28.4	31.7	28.3	22.6	32.4	32.8	26.0	29.7	26.4	-	
L1	533225	387190	29.3	25.3	25.0	18.3	18.7	14.3	18.5	15.2	13.9	19.1	23.4	21.3	20.2	18.0	-	
L2	533215	387353	29.9	33.3	30.1	27.6	30.3	24.9	26.6	25.4	23.2	30.9	29.2	29.0	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L3	533215	387353	27.2	29.1	28.4	27.7	31.1	25.2	24.4	24.4	24.3	28.4	30.5	29.3	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L4	533215	387353	21.4	33.3	30.8	28.0	27.8	25.3	25.3	22.7	25.1	27.1	29.2	27.8	27.6	24.6	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L5	533459	387475	32.3	20.1	16.4	13.4	8.8	7.0	8.6	11.2	12.7	16.2	20.4	19.1	15.5	13.8	-	
L6	532693	387335	-	26.5	31.8	-	24.6	16.5	27.6	25.5	28.2	31.3	31.2	31.9	27.5	24.5	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.3.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

Local bias adjustment factor used.

National bias adjustment factor used.

Where applicable, data has been distance corrected for relevant exposure in the final column.

East Lindsey confirm that all 2018 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

Table B.4 - NO₂ 2019 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.89)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK1	556355	363295	40.2	42.8	34.7	41.7	32.6	31.1	32.6	37.2	31.4	31.9	34.6	29.1	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK2	556355	363295	37.9	30.4	30.2	35.6	27.9	30.4	26.1	34.2	27.7	28.8	34.3	30.1	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK3	556355	363295	35.5	36.7	27.1	33.1	26.5	31.2	26.7	31.8	26.6	32.2	32.3	29.4	32.3	28.7	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK4	556380	363363	-	39.9	30.1	17.2	18.0	-	-	-	-	25.6	31.2	32.3	27.7	22.7	-	
H1	526075	369545	41.5	40.9	37.1	31.3	34.0	34.3	36.7	47.5	32.3	46.0	32.3	49.0	38.6	34.3	-	
H2	526028	369528	35.7	34.2	31.7	23.8	26.3	25.0	27.9	31.2	27.1	27.8	24.3	34.0	29.1	25.9	-	
H3	526264	369723	19.4	20.1	14.8	9.1	10.4	9.6	-	10.7	13.6	14.9	19.4	11.9	14.0	12.5	-	
H4	526007	369585	33.0	31.5	25.0	37.2	27.1	27.3	24.3	24.2	24.7	21.8	33.8	27.2	28.1	25.0	-	
L1	533225	387190	25.2	22.5	14.4	22.1	17.8	16.3	15.3	14.2	15.8	-	-	17.5	18.1	16.1	-	
L2	533215	387353	37.1	31.9	28.1	29.5	-	24.4	26.5	-	25.0	28.1	-	28.4	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L3	533215	387353	36.4	30.0	25.6	29.5	27.7	21.0	21.2	18.4	23.7	22.5	-	27.1	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L4	533215	387353	36.2	29.3	27.9	29.0	24.9	22.4	24.8	21.3	24.2	27.2	-	27.9	26.8	23.8	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L5	533459	387475	24.8	22.2	14.3	11.5	8.8	8.7	9.8	9.9	11.3	14.1	19.7	18.9	14.5	12.9	-	
L6	532693	387335	33.8	34.0	31.0	24.5	24.6	-	21.3	26.1	26.0	30.1	32.1	31.8	28.7	25.5	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.4.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

Local bias adjustment factor used.

National bias adjustment factor used.

Where applicable, data has been distance corrected for relevant exposure in the final column.

East Lindsey confirm that all 2019 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

See Appendix C for details on bias adjustment and annualisation.

Table B.5 - NO₂ 2020 Diffusion Tube Results (µg/m³)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
SK1	556355	363295	-	35.0	-	-	-	-	-	31.7	27.4	31.1	38.0	27.1	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK2	556355	363295	-	26.3	-	-	-	-	-	30.3	26.1	27.9	34.7	27.0	-	-	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK3	556355	363295	35.8	26.0	-	-	-	-	-	30.2	24.2	23.8	31.2	25.1	29.8	21.5	-	Triplicate Site with SK1, SK2 and SK3 – Annual data provided for SK3 only
SK4	556380	363363	33.4		-	-	-	-	-	-	-	26.2	-	26.4	28.3	18.7	-	
H1	526075	369545	39.0	33.8	-	-	-	-	-	31.0	33.8	36.4	28.9	25.0	32.4	23.3	-	
H2	526028	369528	37.4	30.0	-	-	-	-	-	23.2	24.8	25.5	30.9	27.0	28.2	20.3	-	
H3	526264	369723	17.4	10.0	-	-	-	-	-	9.0	22.2	24.1	28.3	23.0	19.4	14.0	-	
H4	526007	369585	28.3	19.8	-	-	-	-	-	24.7	11.2	11.1	15.1	14.2	17.4	12.6	-	
L1	533225	387190	-	11.8	-	-	-	-	-	13.3	13.6	14.2	27.1	-	15.9	12.8	-	
L2	533215	387353	-	22.2	-	-	-	-	-	22.1	22.9	18.7	24.6	26.2	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L3	533215	387353	27.3	18.6	-	-	-	-	-	22.2	23.0	23.4	21.2	26.0	-	-	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L4	533215	387353	28.3	21.9	-	-	-	-	-	22.7	23.4	21.2	25.9	18.2	23.1	16.7	-	Triplicate Site with L2, L3 and L4 – Annual data provided for L4 only
L5	533459	387475	20.9	11.3	-	-	-	-	-	7.3	10.3	12.8	17.5	17.6	14.0	10.1	-	
L6	532693	387335	35.5	27.2	-	-	-	-	-	21.0	23.5	27.1	30.0	24.3	26.8	19.3	-	

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.5.

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.

Local bias adjustment factor used.

National bias adjustment factor used.

Where applicable, data has been distance corrected for relevant exposure in the final column.

East Lindsey confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

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

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

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 East Lindsey During 2020

East Lindsey has not currently identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by East Lindsey During 2020

East Lindsey has implemented an anti-idling sign to reinforce turning of engines when stationary at Louth Bus station.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes for the year 2020 were supplied and analysed by Gradko International Ltd for the whole year. From March – August 2020 Gradko laboratories were closed as a result of the COVID – 19 pandemic. All tubes were prepared using the 50% TEA v/v in acetone method. All results have been bias adjusted before being presented in Table B.1 - Table B.5.

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 NO₂ tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO₂ concentrations reported are of a high calibre. The labs follow the procedures set out in the Harmonisation Practical Guidance. In the 2020 AIR-PT results, AIR-PT AR036 (January – February 2020) and AR040 (September – October 2020) Gradko scored 75%. The AIR-PT rounds AR037 (May – June 2020), AR039 (July – August 2020) were cancelled due to the COVID-19 pandemic. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$.

Diffusion Tube Annualisation

The [LAQM.TG\(16\)](#) states that annualisation is required for any site which has a data capture of less than 75%, but greater than 25%. Due to the Gradko laboratory closures during March – July 2020 all diffusion tube sites for 2020. Required annualisation. Diffusion tube sites SK1

– 3, H1 – 4 and L2 – 6 having a 57.6% data capture, L1 40.2% and SK4 27% data capture for 2020. Annualisation was completed using version 1.2 of the ‘Diffusion Tube Data Processing Tool’. Due to there being insufficient continuous background monitoring locations, the three closest locations selected to annualise the data are:

- Immingham Woodlands Avenue;
- Hull Freetown; and
- Norwich Lakenfields

These continuous background monitoring sites were applicable to use as they all had >85% data capture and therefore could be used for annualisation. Table C.2 presents the annualisation summary, taken from the ‘Diffusion Tube Data Processing Tool’.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 ASR has 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.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_x/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

East Lindsey have applied a national bias adjustment factor of 0.84 (based on 22 studies) to the 2020 monitoring data. The application of bias adjustment factor is followed in accordance with Box 7.14 [LAQM.TG\(16\)](#) and the [LAQM COVID-19 Supplementary Guidance](#). A summary of bias adjustment factors used by East Lindsey for each of the past five years of monitoring data is presented in Table C.1.

Figure C.1 - National diffusion tube bias adjustment factor spreadsheet version

09/21

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 09/21				
Follow the steps below in the correct order to show the results of relevant co-location studies							This spreadsheet will be updated at the end of March 2022				
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods							Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet				
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.							LQA Helpdesk, 10/10/2021				
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.							Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.				
Step 1:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ² 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 shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ³	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953								
Analysed By ¹	Method ² <small>To make your selection, choose (All) from the pop-up list.</small>	Year ³ <small>To make your selection, choose (All) from the pop-up list.</small>	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁴	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	50% TEA in Acetone	2020	UC	Falkirk Council	10	33	26	24.3%	G	0.80	
Gradko	50% TEA in Acetone	2020	UB	Falkirk Council	11	16	12	33.8%	G	0.75	
Gradko	50% TEA in acetone	2020	UB	Middlesbrough Council	10	18	12	46.1%	G	0.68	
Gradko	50% TEA in acetone	2020	R	Royal Borough of Windsor and Maidenhead	12	29	25	17.3%	G	0.85	
Gradko	50% TEA in acetone	2020	R	Royal Borough of Windsor and Maidenhead	12	24	22	11.7%	G	0.90	
Gradko	50% TEA in acetone	2020	SU	Redcar & Cleveland Borough Council	11	16	13	23.4%	F	0.81	
Gradko	50% TEA in acetone	2020	R	Newham	10	29	24	18.2%	G	0.85	
Gradko	50% TEA in acetone	2020	R	Sandwell MBC	12	34	27	26.3%	G	0.79	
Gradko	50% TEA in acetone	2020	B	Sandwell MBC	9	14	11	23.0%	S	0.81	
Gradko	50% TEA in acetone	2020	R	Sandwell MBC	11	25	23	9.4%	S	0.91	
Gradko	50% TEA in acetone	2020	UB	Sandwell Metropolitan Borough Council	11	21	19	9.4%	G	0.91	
Gradko	50% TEA in acetone	2020	KS	Marjebone Road Intercomparison	12	57	43	33.0%	G	0.75	
Gradko	50% TEA in acetone	2020	R	London Borough of Richmond upon Thames	12	22	20	9.4%	G	0.91	
Gradko	50% TEA in acetone	2020	B	London Borough of Richmond upon Thames	9	19	16	20.3%	G	0.83	
Gradko	50% TEA in acetone	2020	UB	Reading Borough Council	12	14	15	-7.7%	G	1.08	
Gradko	50% TEA in acetone	2020	R	Reading Borough Council	12	30	25	20.2%	G	0.83	
Gradko	50% TEA in acetone	2020	UB	Norwich City Council	10	12	10	14.4%	G	0.87	
Gradko	50% TEA in acetone	2020	SU	Reigate and Banstead BC (RGI)	10	19	14	33.3%	G	0.75	
Gradko	50% TEA in Acetone	2020	KS	Slough Borough Council	12	34	27	23.5%	G	0.81	
Gradko	50% TEA in Acetone	2020	SU	Slough Borough Council	11	21	17	29.2%	G	0.77	
Gradko	50% TEA in Acetone	2020	KS	Slough Borough Council	12	29	25	17.9%	G	0.85	
Gradko	50% TEA in acetone	2020	R	East Herts District Council	11	25	26	-4.2%	G	1.04	
Gradko	50% TEA in acetone	2020	Overall Factor² (22 studies)						Use	0.84	

Table C.1 - Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	09/21	0.84
2019	National	09/20	0.89
2018	National	06/19	0.89
2017	National	09/18	0.96
2016	National	06/17	1.01

NO₂ Fall-off with Distance from the Road

No diffusion tube NO₂ monitoring locations within East Lindsey required distance correction between 2016 – 2020.

Table C.2 - Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$) 2020

Site ID	Annualisation Factor Immingham Woodlands Avenue	Annualisation Factor Hull Freetown	Annualisation Factor Norwich Lakenfields	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
SK1	0.8812	0.8270	0.8669	-	0.8584	-	-	<i>Triplicate Site with SK1, SK2 and SK3 - Annual data provided for SK3 only</i>
SK2	0.8812	0.8270	0.8669	-	0.8584	-	-	<i>Triplicate Site with SK1, SK2 and SK3 - Annual data provided for SK3 only</i>
SK3	0.8812	0.8270	0.8669	-	0.8584	29.8	25.6	<i>Triplicate Site with SK1, SK2 and SK3 - Annual data provided for SK3 only</i>
SK4	0.8101	0.7547	0.7934	-	0.7860	28.3	22.2	
H1	0.8812	0.8270	0.8669	-	0.8584	32.4	27.8	
H2	0.8812	0.8270	0.8669	-	0.8584	28.2	24.2	
H3	0.8812	0.8270	0.8669	-	0.8584	19.4	16.7	
H4	0.8812	0.8270	0.8669	-	0.8584	17.4	14.9	
L1	0.9720	0.9090	0.9955	-	0.9589	15.9	15.3	
L2	0.8812	0.8270	0.8669	-	0.8584	-	-	<i>Triplicate Site with L2, L3 and L4 - Annual data provided for L4 only</i>
L3	0.8812	0.8270	0.8669	-	0.8584	-	-	<i>Triplicate Site with L2, L3 and L4 - Annual data provided for L4 only</i>
L4	0.8812	0.8270	0.8669	-	0.8584	23.1	19.9	<i>Triplicate Site with L2, L3 and L4 - Annual data provided for L4 only</i>
L5	0.8812	0.8270	0.8669	-	0.8584	14.0	12.0	
L6	0.8812	0.8270	0.8669	-	0.8584	26.8	23.0	

Table C.3 - Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$) 2019

Site ID	Annualisation Factor Immingham Woodlands Avenue	Annualisation Factor Hull Freetown	Annualisation Factor Norwich Lakenfields	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
SK4	0.9240	0.9231	0.9076	-	0.9182	27.7	25.5	

Table C.4 - Annualisation Summary (concentrations presented in $\mu\text{g}/\text{m}^3$) 2016

Site ID	Annualisation Factor Hull Freetown	Annualisation Factor Norwich Lakenfields	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
SK5	0.8905	0.9084	-	0.8995	-	-	<i>Triplicate Site with SK5, SK6 and SK7 - Annual data provided for SK7 only</i>
SK6	0.8905	0.9084	-	0.8995	-	-	<i>Triplicate Site with SK5, SK6 and SK7 - Annual data provided for SK7 only</i>
SK7	0.8905	0.9084	-	0.8995	24.0	21.6	<i>Triplicate Site with SK5, SK6 and SK7 - Annual data provided for SK7 only</i>
L7	0.8905	0.9084	-	0.8995	-	-	Duplicate Site with L7 and L7 – Annual data provided for L8 only
L8	0.8905	0.9084	-	0.8995	29.7	26.7	Duplicate Site with L7 and L7 – Annual data provided for L8 only

Appendix D: Map(s) of Monitoring Locations

Figure D.1 - Map of Non-Automatic Monitoring Site: Horncastle

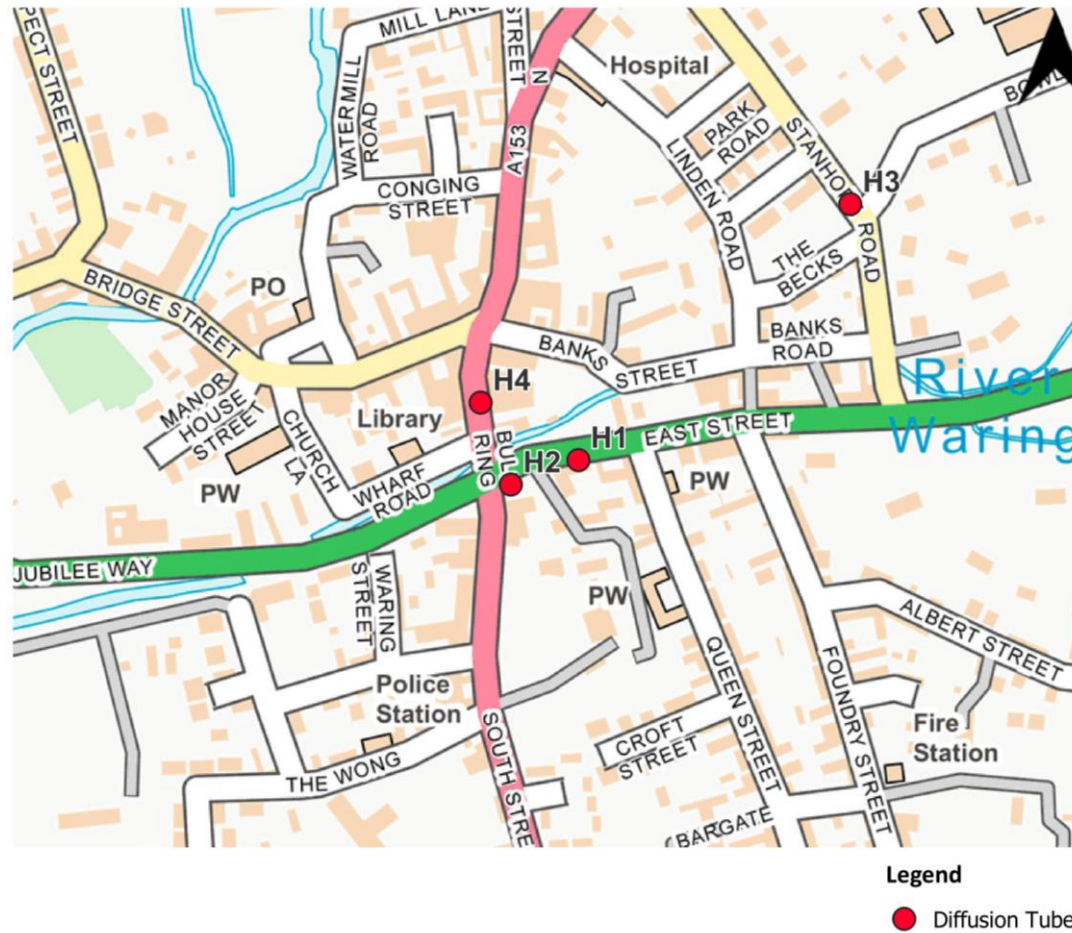


Figure D.2 - Map of Non-Automatic Monitoring Site: Louth

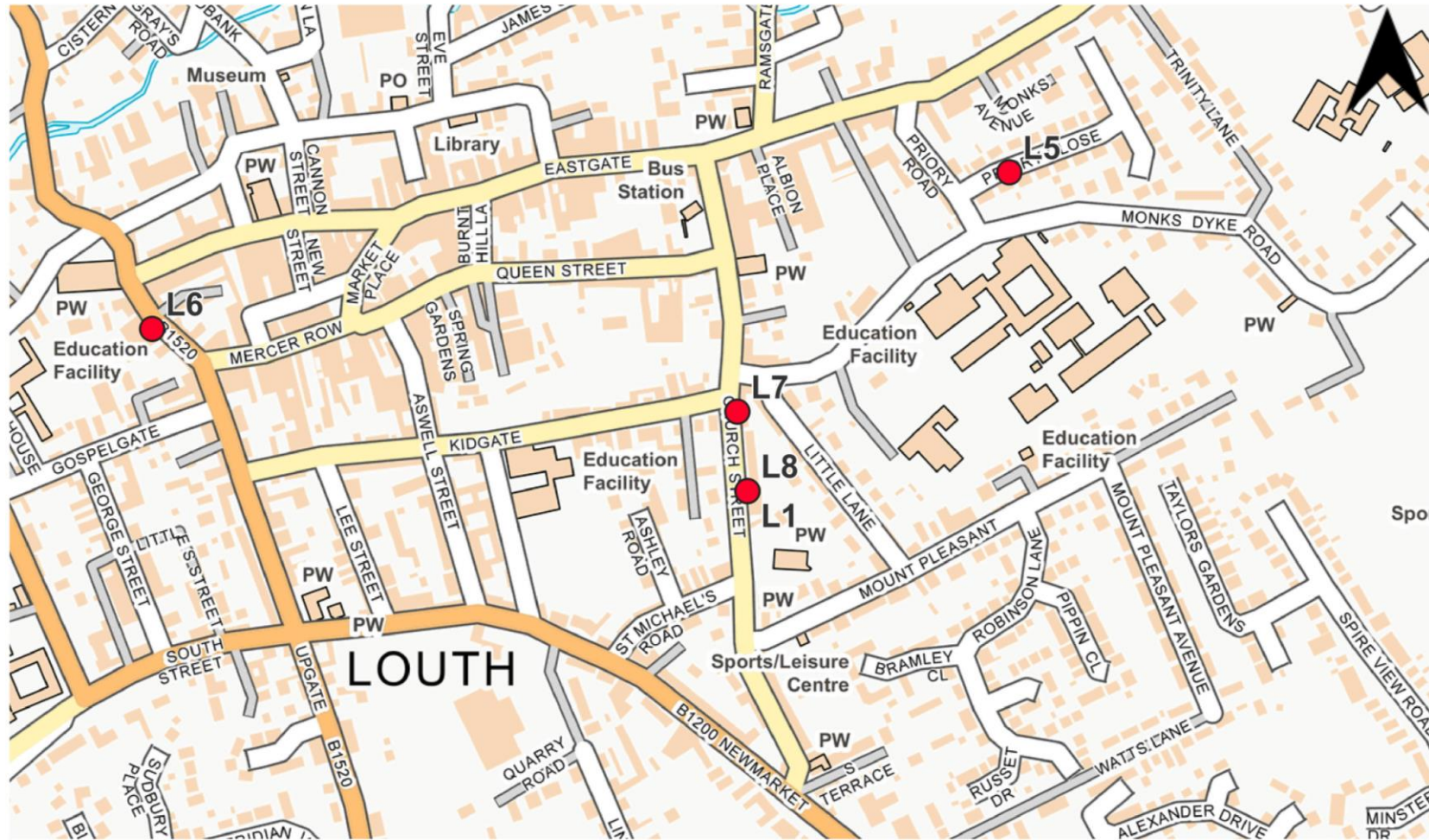


Figure D.3 - Map of Non-Automatic Monitoring Site: Skegness

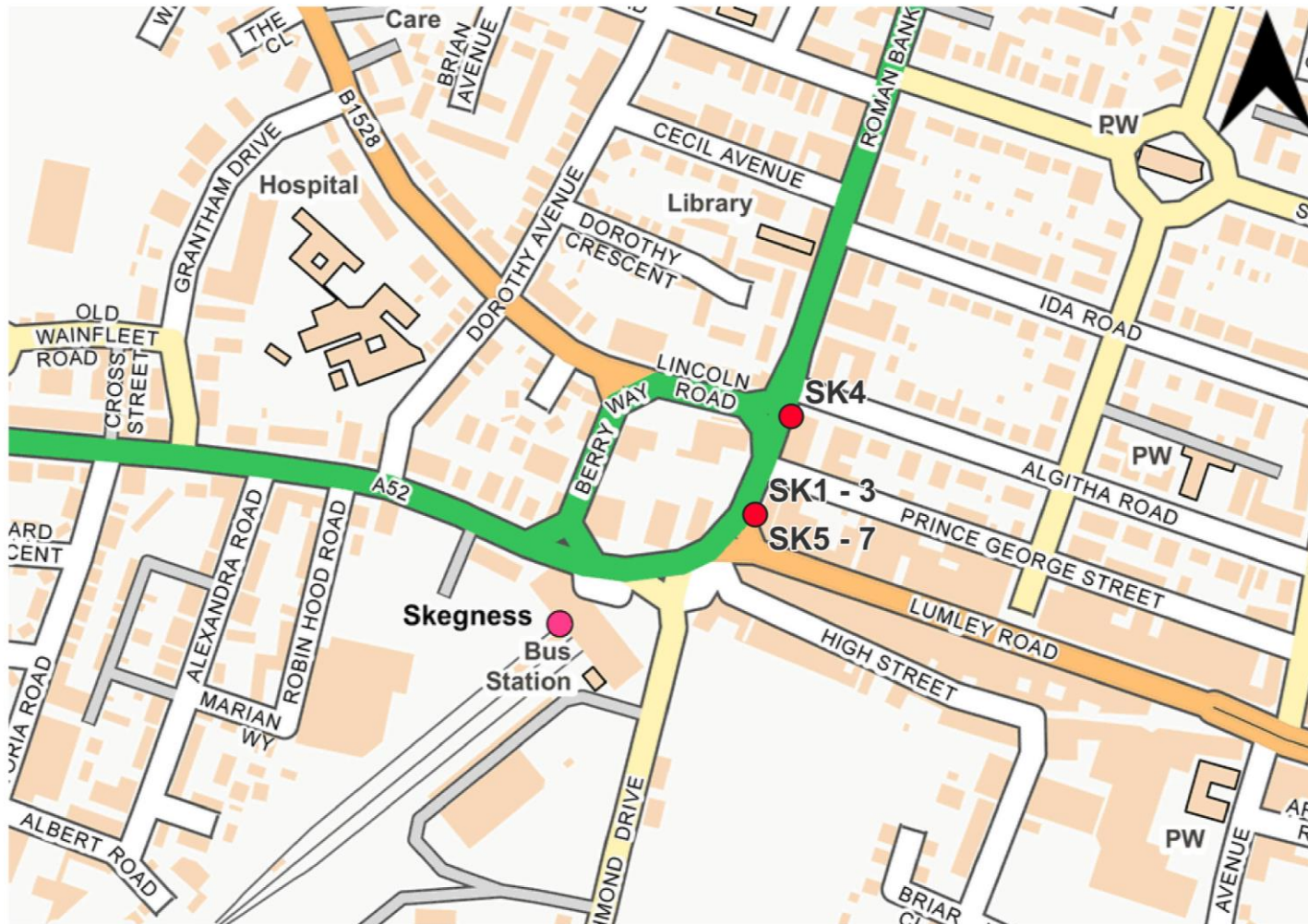
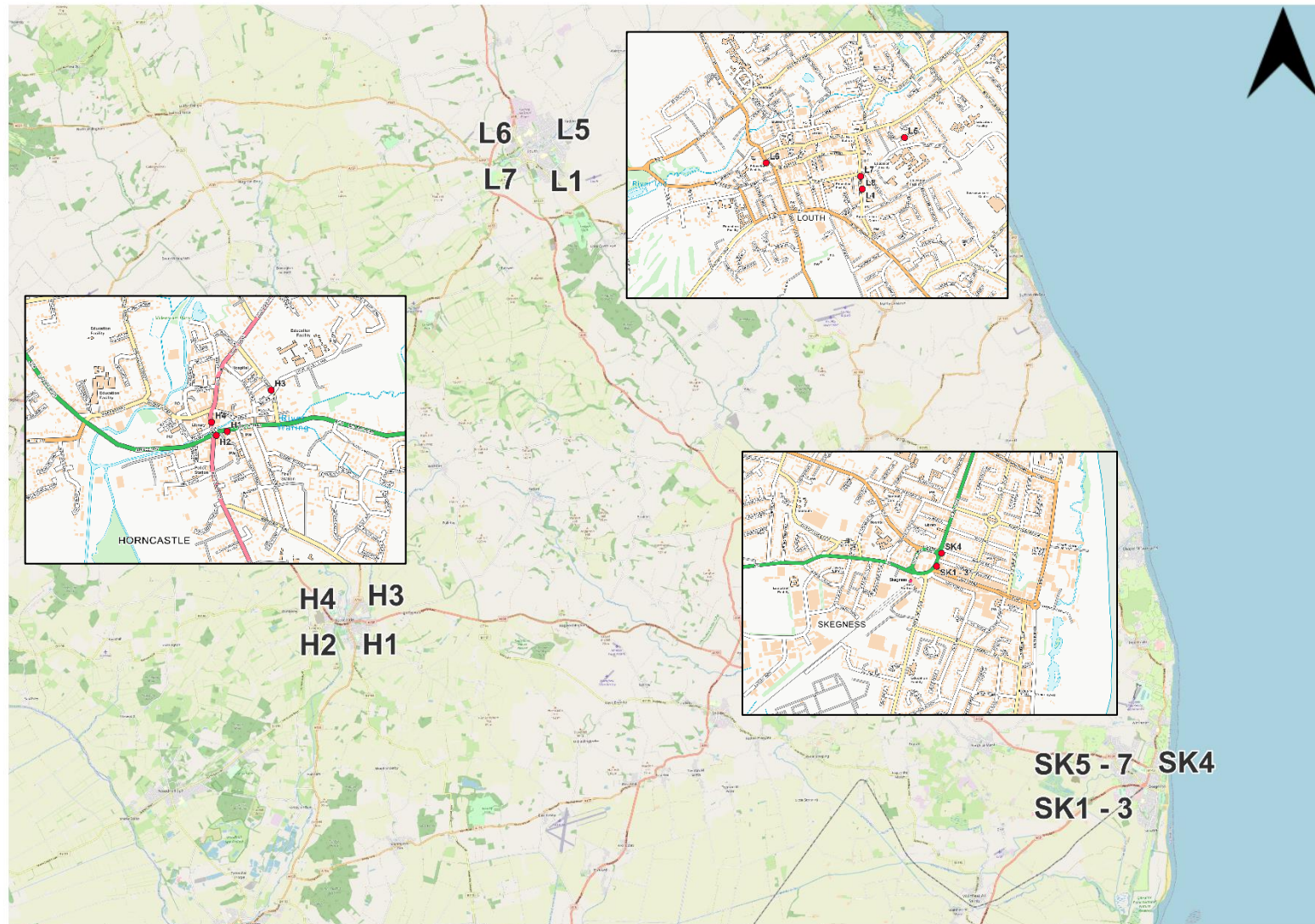


Figure D.4 - Map of Non-Automatic Monitoring Sites: Overview



Appendix E: Summary of Air Quality Objectives in England

Table E.1 - Air Quality Objectives in England

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

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional, and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO₂) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data⁸ suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e., nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)⁹ has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO₂ annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which represents an absolute

⁸ Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

⁹ Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

reduction of between 10 to 20 $\mu\text{g}/\text{m}^3$ if expressed relative to annual mean averages. During this period, changes in PM_{2.5} concentrations were less marked than those of NO₂. PM_{2.5} concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that PM_{2.5} concentrations during the initial lockdown period are of the order 2 to 5 $\mu\text{g}/\text{m}^3$ lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within East Lindsey

For 2020, the monitoring sites recorded significantly lower concentrations from previous years due to decreased car use.

Opportunities Presented by COVID-19 upon LAQM within East Lindsey

No LAQM related opportunities have arisen as a consequence of COVID-19 within East Lindsey.

Challenges and Constraints Imposed by COVID-19 upon LAQM within East Lindsey

The challenges and constraints imposed by COVID – 19 upon LAQM duties within East Lindsey are as follows.

- The COVID – 19 pandemic is accountable for the disrupted monitoring in East Lindsey's non-automatic monitoring network. Between the months of March – July 2020, the UK government administered strict lockdown rules, which led to Gradko temporarily closing down their laboratories. The closure resulted in there being no data collection between the described months. Due to significant reductions in car travel between this time, the impact can be described as 'medium'.

The impacts as presented above are aligned with the criteria as defined in **Error!**

Reference source not found. with professional judgement considered as part of their application.

Table F.1 - Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: Large
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g., 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

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	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO ₂	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance [LAQM.TG16](#). April 2021. 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.PG16](#). May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.