



2021 Air Quality Annual Status Report (ASR)

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

Date: 1st June 2021

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Executive Summary: Air Quality in Our Area

Air Quality in Hastings Borough

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.

Air quality in Hastings is monitored through an automatic (continuous) air quality monitoring station (AQMS) in Bulverhythe, along with a network of 14 NO₂ diffusion tubes deployed in strategic locations across the borough. Local monitoring shows that air quality in Hastings is generally good and there were no monitored locations where pollution levels exceeded the UK Air Quality Objectives in 2020. Furthermore, there were no locations where pollutant concentrations were approaching the UK Air Quality Objective for annual mean NO₂ (i.e. within 10%).

The monitoring data for 2020 are indicative of the continued decline in NO₂ concentrations in Hastings when compared to the 2019 monitoring data. Levels of PM₁₀ monitored via the Bulverhythe AQMS continued to remain well below the UK Air Quality Objectives.

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

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.

Hastings Borough Council, together with the Sussex Air Quality Partnership has been involved in supporting several initiatives during 2020 to improve local air quality. These include:

- Supporting the co-ordination and delivery of a high standard air quality evidence base in Sussex
- Providing information and advice to the public
- Supporting the co-ordination and delivery of strategic work and projects to improve air quality in Sussex

Conclusions and Priorities

The 2021 ASR has confirmed that levels of PM10 and NO2 continue to comply with the UK Air Quality Objectives. NO2 concentrations in 2020 have decreased, when compared to 2019 concentrations. Hastings Borough Council's priorities for the coming year are:

- Continue to monitor air quality locally
- Continue to work with the Sussex Air Quality Partnership

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

- Continued promotion of sustainable transport options

Local Engagement and How to get Involved

Road vehicles are a major source of many pollutants in urban areas. They produce over 50 percent of the emissions of Nitrogen Oxides (NOx) in the UK.

Before using your car, ask yourself:

- Do I really need to make this journey?
- Could I walk or cycle instead of taking the car?
- Could I take a bus, or train or carpool?
- Are the levels of air pollution already too high today?

If you must drive:

- Drive smoothly. You'll save fuel, and your engine will also pollute less;
- Don't rev your engine unnecessarily;
- Maintain your car. Keep the engine properly tuned and the tyres at the right pressure; and
- Turn off the engine when your car is stationary.

At home:

- Buy water-based or low-solvent paints, varnishes, glues and wood preservatives.
- Avoid burning solid fuels, if possible.
- Avoid lighting bonfires, but if you must, don't light them when pollution levels are high or while the weather is still and cold.
- Only burn dry material and never burn household waste, especially plastic, rubber, foam or paint.

Levels of pollution can be quite high on bonfire night and other events/festivals with bonfires, and sensitive people, including people with respiratory conditions, may notice some effects. However, exposure can be considerably reduced by remaining indoors and keeping windows closed. Further information on how you can improve air quality is provided by Sussex Air:

<http://www.sussex-air.net/ImprovingAQ/Default.aspx>

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1 Local Air Quality Management

This report provides an overview of air quality in Hastings Borough Council 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 Hastings Borough Council 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 Area (revoked)

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.

Hastings Borough currently does not have any declared AQMAs. The Bulverhythe AQMA, which was declared in 2003 due to exceedances of the 24-hour mean Air Quality Objective for PM₁₀ (35 exceedances of 50µg/m³ per annum), was revoked in April 2017.

Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at: <https://uk-air.defra.gov.uk/aqma/list>

Air Quality Strategy

Despite having no active AQMAs within the borough, Hastings Borough Council developed an Air Quality Strategy in 2019, which sets out a number of actions that Hastings Borough Council and their partners can undertake in order to further reduce pollution levels in Hastings. This Air Quality Strategy can be found online on the Hastings Borough Council website at: www.hastings.gov.uk/environmentalhealth/pollution/air/air_management/.

Progress and Impact of Measures to address Air Quality in Hastings Borough

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

- The Council have developed a set of measures to improve air quality in their area, which is commended. Progress on these actions has been discussed, and it is expected that the Council develop and update these actions as necessary and in the event that new sources of pollution are identified. The inclusion of this discussion demonstrates the Council's active engagement to improving air quality and is a sign of good practice.

- The Council undertook automatic monitoring of NO₂ and PM₁₀ at one site in 2019. The annual and short-term objectives for both NO₂ and PM₁₀ were met at this site. Non-automatic monitoring was undertaken at 14 sites in 2019. There were no recorded exceedances of the annual mean objectives for NO₂ at any monitoring location. In addition to this there are no longer any recorded annual mean concentrations within 10% of the AQO.
- On the basis of the evidence provided by the local authority the conclusions reached are accepted for all sources and pollutants. The next step for Hastings Borough Council is to submit an Annual Status Report in 2021.

Hastings Borough Council is awaiting the Queensway Gateway new road to fully open before undertaking a review of the current monitoring strategy. The redistribution of traffic caused by this road may change the local pattern of air quality.

Hastings Borough Council is a member of the Sussex Air Quality Partnership (Sussex Air), which produced an air quality strategic plan 2010 to 2015. Hastings Borough Council contributed to the development of this strategy, which aims to provide a consistent approach to air quality across a number of district councils.

This plan has 5 key objectives:

1. Provide advice and support and improve the expertise and knowledge base
2. Project development and implementation
3. Partnership working
4. Develop cross cutting work on health improvement, climate change, environment, and transport
5. Communicate air quality issues and initiatives in Sussex

Hastings Borough Council has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

The measures are included within Table 2.1, with the type of measure and the progress Hastings Borough Council have made during the reporting year of 2020 presented.

The principal challenges and barriers to implementation that Hastings Borough Council anticipates facing are from the recovery of businesses and people after the COVID-19 pandemic.

Opportunities through the Governments levelling up agenda will be reviewed to link into bids and funding opportunities for sustainable transport, public health and air quality initiatives. We will look to work with partners across Sussex in the public and private sector such as East Sussex County Council and Bus operators to develop any appropriate bids.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	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	The implementation of Active Travel initiatives to manage demand to travel by car.	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2015		ESCC/HBC					On going				
2	Promote use of electric vehicles and charging network	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015		HBC/Sussex-air					On going				
3	Taxi Licence Policy	Promoting Low Emission Transport	Taxi Licensing conditions	2016		HBC taxi licencing					On going				
4	Encourage domestic solid fuel burning to use smokeless fuels and exempt appliances	Environmental Permits	Other	2013		Env. Protection Team duties relating to Statutory Nuisance and the Clean Air Act					On going				
5	Inform and promote clean fuel burning project:	Environmental Permits	Other	2019		HBC/Sussex-air					On going				
6	Households and building trade to avoid fires and dispose of waste in the revoked AQMA	Environmental Permits	Other	2005		Env. protection					On going				

Measure No.	Measure	Category	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
7	Anti-idling signage	Traffic Management	Anti-idling enforcement	2017		HBC					On going				
8	airAlert	Health protection	Other	2010	ongoing	HBC/Sussex-air	Sussex-air	-		-	On going				

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

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

Hastings Borough Council does not monitor for PM_{2.5}. It does, however, monitor PM₁₀ concentrations at 1 location in the borough (HT1 - Hastings-Bulverhythe AQMS) which can be used to estimate PM_{2.5} concentrations. An estimated PM_{2.5} calculation was undertaken (see Section 3.1.5) and using the annual mean concentration of PM₁₀ recorded in Hastings Borough in 2020 at 21.3µg/m³ an estimated PM_{2.5} concentration of 12.8µg/m³ was calculated.

Work carried out by Public Health England as part of the Public Health Outcomes Framework (PHOF) shows that the mortality associated with particulate air pollution within Hastings Borough Council for the year 2019 is 5.0%. This information is available from the following web link:

<https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000043/pat/6/par/E12000008/ati/101/are/E07000062/iid/90366/age/1/sex/1>

The mortality calculated for Hastings Borough Council is slightly lower than that calculated for South East England (5.2 %) and for England (5.1%) as a whole.

Hastings Borough Council is developing processes to determine how it will approach measures to address PM_{2.5} in partnership with Sussex Air and the ESCC Public Health team. Hastings Borough Council continues to work with Sussex Air and the ESCC Public Health team to address PM_{2.5}. A number of the existing measures in Table 2.2 directly addresses PM_{2.5} concentrations. For reference, there is no smoke control area in place within the Borough.

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

This section sets out the monitoring undertaken within 2020 by Hastings Borough Council 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

Hastings Borough Council undertook automatic (continuous) monitoring at 1 site during 2020. The automatic monitoring site is situated at Bulverhythe known as Hastings 1 (HT1) and is part of the Sussex Air Quality Network. Table A.1 in Appendix A shows the details of the automatic monitoring site.

The Sussex Air Quality Partnership (Sussex-Air) hosts live air quality data from the HT1 site via www.sussex-air.net. This website presents automatic and non-automatic monitoring results for Hastings Borough Council.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Hastings Borough Council undertook non-automatic (i.e. passive) monitoring of NO₂ at 14 sites during 2020. Table A.2 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 33%), and distance correction. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO₂)

Table A.3 and Table A.4 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.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO₂ hourly mean concentrations for the past five years with the air quality objective of 200µg/m³, not to be exceeded more than 18 times per year.

No exceedances of the annual or 1-hour mean air quality objectives were measured in Hastings Borough.

3.1.4 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40µg/m³. The PM₁₀ was provisional at time of publishing the ASR.

Table A.7 in Appendix A compares the continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

No exceedances of air quality objectives were measured for PM₁₀ during 2020.

3.1.5 Particulate Matter (PM_{2.5})

PM_{2.5} is not monitored in Hastings Borough. An estimate of PM_{2.5} using the monitored PM₁₀ at the automatic station (HT1) and following Technical Guidance LAQM.TG16 (April 2021) is provided below.

Eastbourne (Holly Place) measures both PM₁₀ and PM_{2.5} and is the closest urban background automatic station to Hastings and therefore is used to calculate a PM_{2.5}/PM₁₀ ratio to estimate PM_{2.5} at HT1.

- The calculated PM_{2.5}/PM₁₀ ratio at the reference site (Eastbourne): $8.68/14.47 = 0.599$
- The 2020 HT1 PM₁₀ concentration recorded at HT1: $21.3 \times 0.599 = 12.8$
- The 2020 estimated annual mean PM_{2.5} at HT1 was 12.8µg/m

Appendix A presents the estimated PM_{2.5} annual mean concentrations for the past five years.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
HT1	Hastings-Bulverhythe	Roadside	577633	108726	NO ₂ //PM ₁₀	No	Chemiluminescent/TEOM	5	3	1.7

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 – 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)
1	St Luke's / Alma Terrace	Roadside	580037	110902	NO ₂	No	1	1	No	2
2	Carlisle Parade	Roadside	581496	109288	NO ₂	No	5	1	No	2.5
3	Manor Road	Roadside	582223	110361	NO ₂	No	0	10	No	2.5
4	Ore Chur/Old London Rd	Roadside	583610	111325	NO ₂	No	0	2	No	2.5
5	Harley Shute	Roadside	578382	109601	NO ₂	No	10	1	No	2
6	Bexhill Road 'Boat'	Roadside	576770	108101	NO ₂	No	15	1.5	No	2.5
7	81 Bexhill Road	Roadside	578500	108771	NO ₂	No	0.2	1.5	No	2.5
8	45 Bexhill Road	Roadside	578637	108798	NO ₂	No	1.5	2.8	No	2
9	71 Bexhill Road	Roadside	578532	108776	NO ₂	No	0.5	0.45	No	2.5
10	138 Bexhill Rd	Roadside	578290	108819	NO ₂	No	1.5	2	No	2
11	Railway Bridge Bexhill Rd	Roadside	578447	108794	NO ₂	No	10	3	No	2.5

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)
12	West Marina Gardens	Roadside	578946	108746	NO ₂	No	10	0.5	No	2.5
13	104 Bohemia Rd	Roadside	580252	110058	NO ₂	No	0.5	1.5	No	2
14	116 Bohemia Rd	Roadside	580246	110064	NO ₂	No	0.5	1.5	No	2

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.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
HT1	577633	108726	Roadside	91.1	91.1	18.4	18.0	16.4	14.9	10.7

Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16

Reported concentrations are those at the location of the monitoring site (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**.

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%).

Table A.4 – 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 (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
1	580037	110902	Roadside	84.6	84.6	21.1	22.6	21.9	21	14.4
2	581496	109288	Roadside	61.5	61.5	21.5	24.5	24.6	23.7	15.8
3	582223	110361	Roadside	69.2	69.2	17.6	15.5	15.3	14.4	10.0
4	583610	111325	Roadside	84.6	84.6	24.9	24.8	25.9	24.9	17.4
5	578382	109601	Roadside	84.6	84.6	19.5	28.6	27.3	24.9	20.6
6	576770	108101	Roadside	84.6	84.6	22.7	36.4	37.4	28	15.4
7	578500	108771	Roadside	59.6	59.6	35.4	36.5	36.0	33.7	26.5
8	578637	108798	Roadside	84.6	84.6	26.2	28.2	30.2	28.8	19.4
9	578532	108776	Roadside	84.6	84.6	34.2	35.0	36.6	33.9	23.3
10	578290	108819	Roadside	84.6	84.6	25.3	27.3	25.7	24.1	15.8
11	578447	108794	Roadside	76.9	76.9	18.7	24.3	27.7	24	17.4
12	578946	108746	Roadside	84.6	84.6	15.9	24.2	23.2	21.6	14.9
13	580252	110058	Roadside	84.6	84.6	31.7	36.8	35.6	33	21.2
14	580246	110064	Roadside	84.6	84.6	26.5	30.4	30.6	30.2	20.5

- ☒ Annualisation has been conducted where data capture is <75% and >33% 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 $\mu\text{g}/\text{m}^3$.

Exceedances of the NO_2 annual mean objective of $40\mu\text{g}/\text{m}^3$ are shown in **bold**.

NO_2 annual means exceeding $60\mu\text{g}/\text{m}^3$, indicating a potential exceedance of the NO_2 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

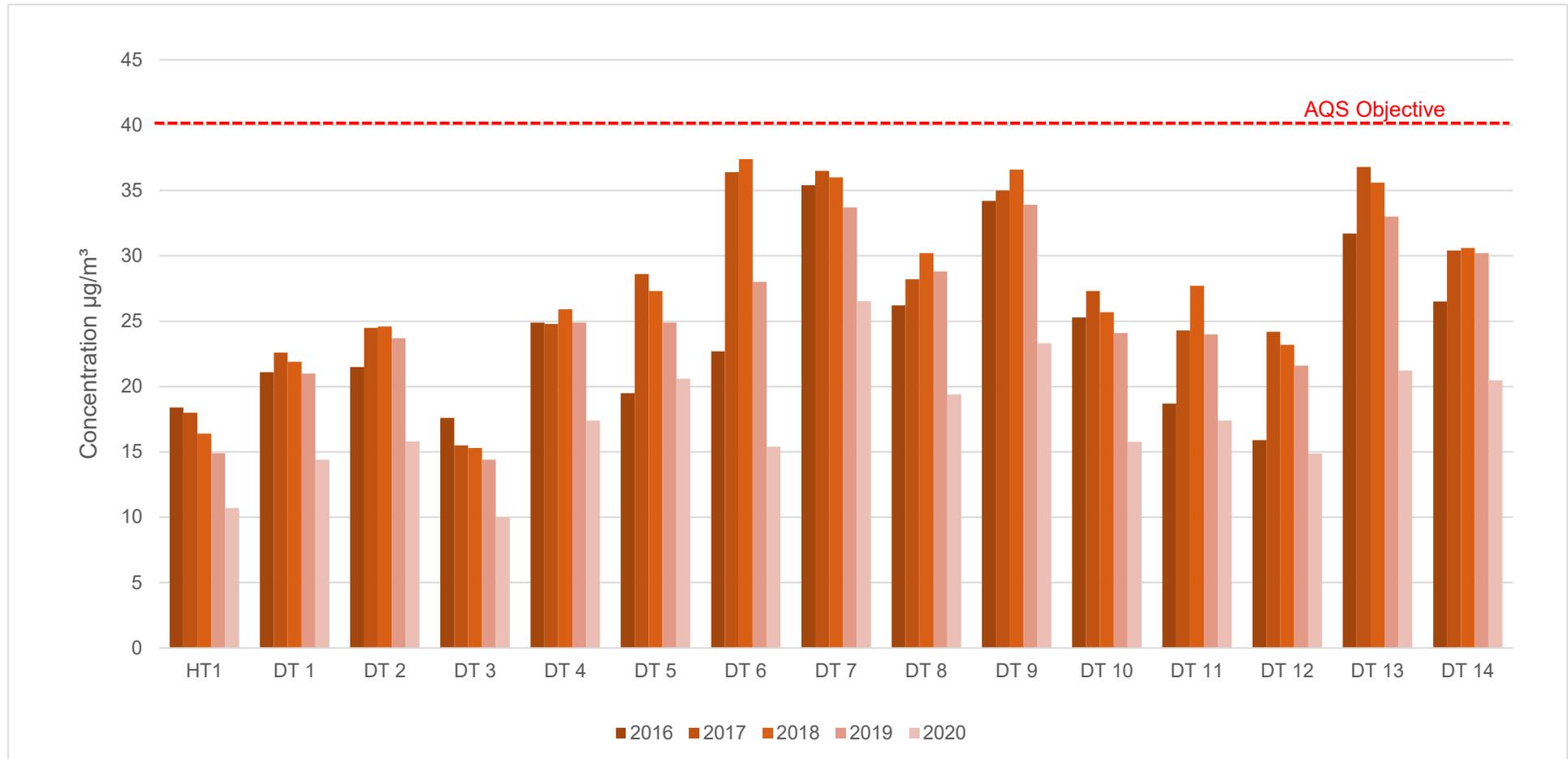


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
HT1	577633	108726	Roadside	91.1	91.1	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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.2 – NO₂ 1-Hour Means in 2020.

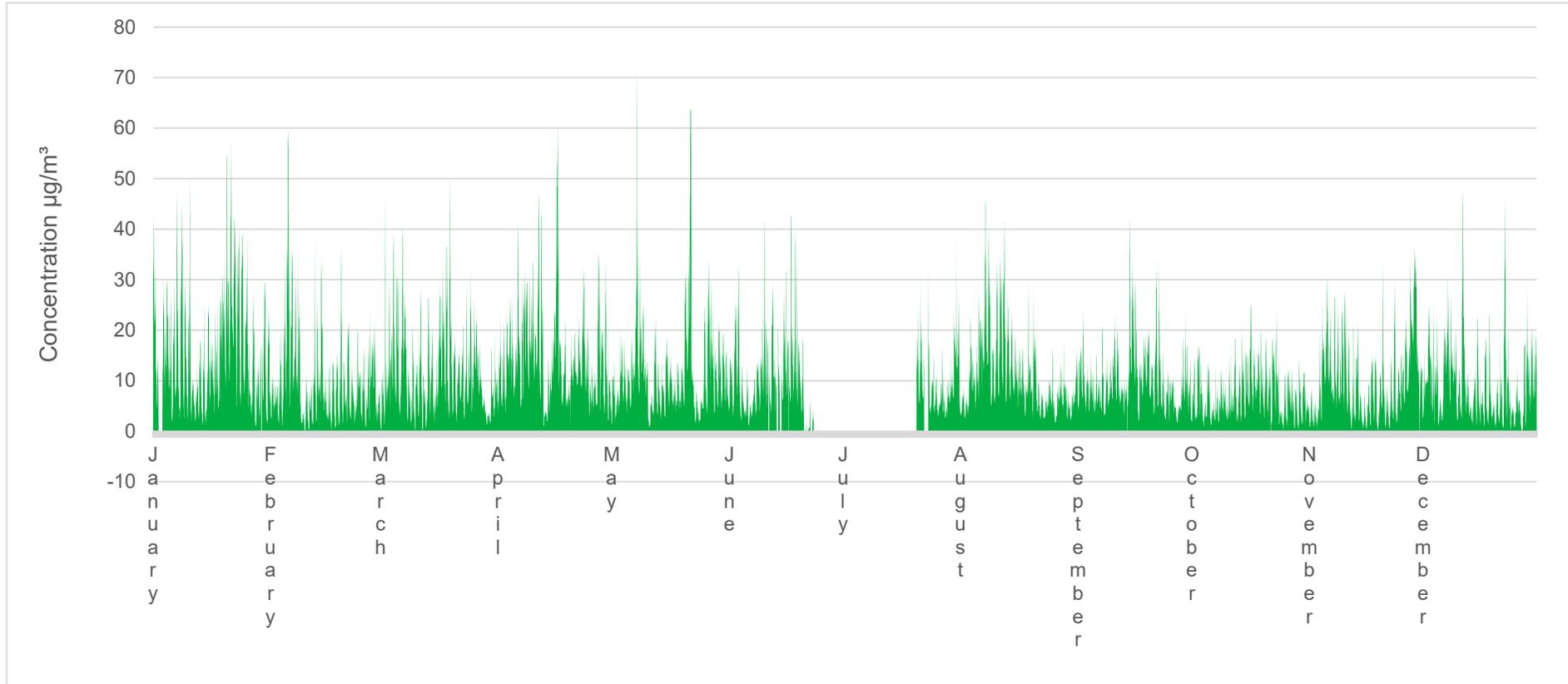


Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
HT1	577633	108726	Roadside	76.6	76.6	19.3	22	22.9	21.8	21.3 ⁽³⁾

Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16.

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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.

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

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

(3) PM₁₀ results not ratified at date of ASR publication.

Figure A.3 – Trends in Annual Mean PM₁₀ Concentrations.

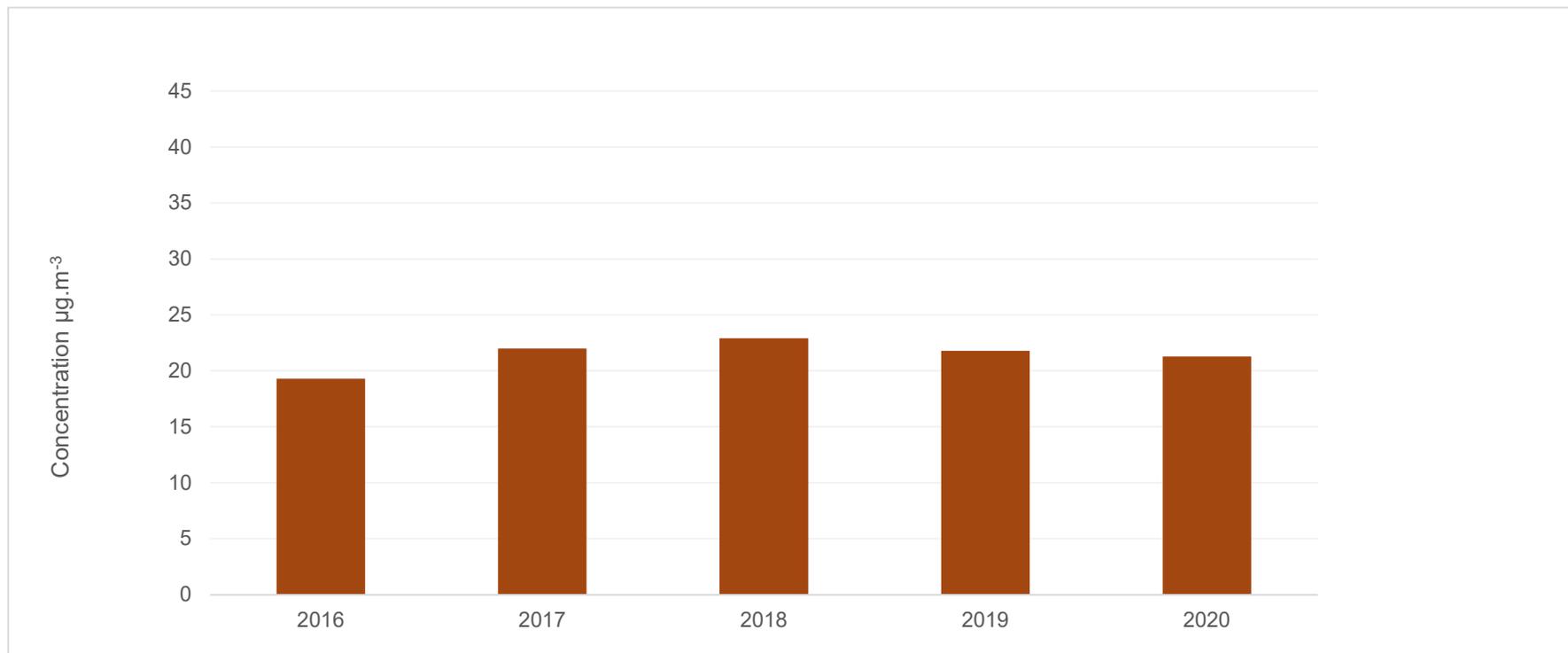


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
HT1	577633	108726	Roadside	73.3	73.3	3	4	4	4	1 (33.3)

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(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.4 – Trends in Number of 24-Hour Mean PM₁₀ Results > 50µg/m³

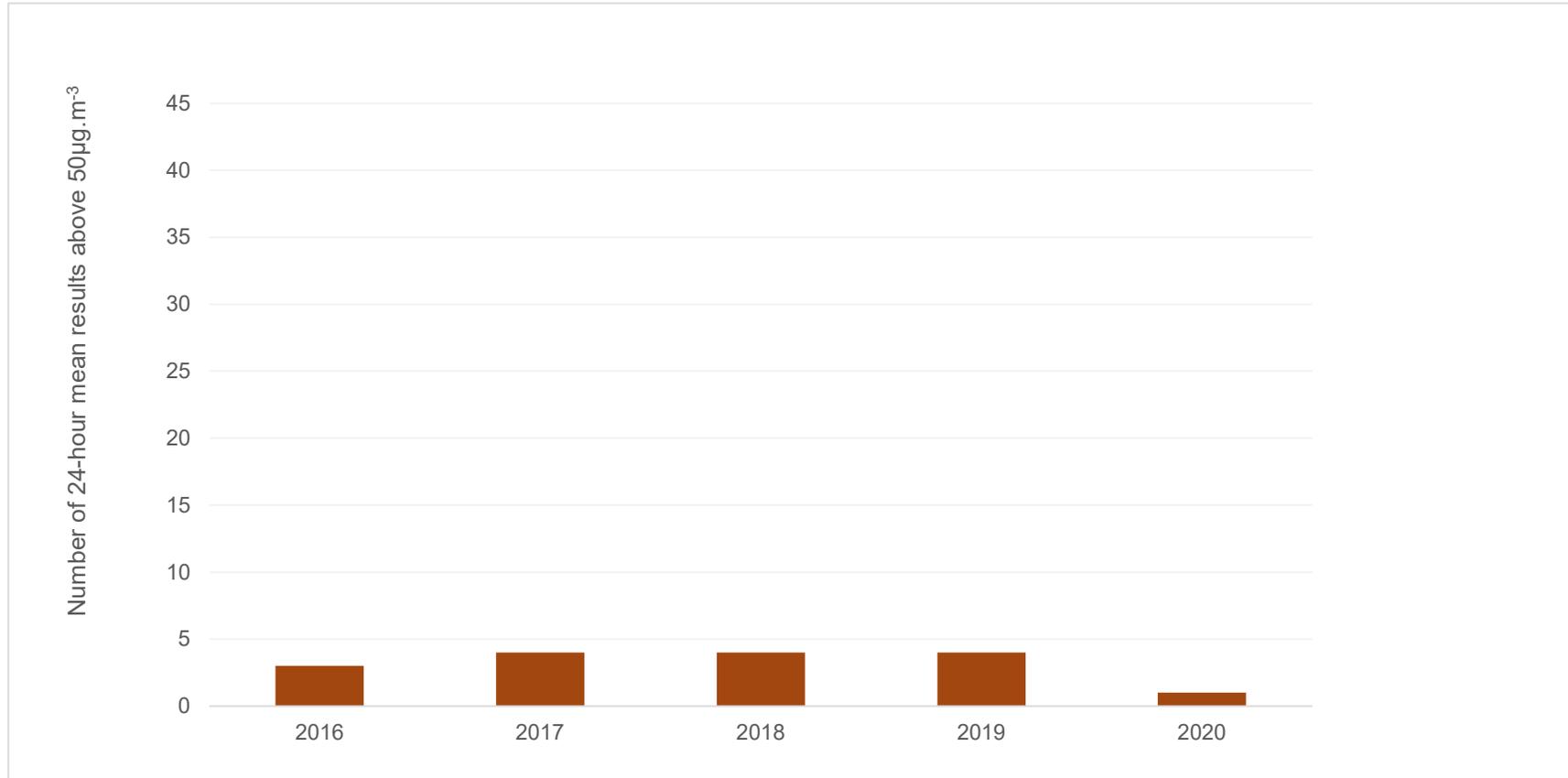


Table A.8 – Estimated Annual Mean PM_{2.5} (µg/m³)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2020 (%) ⁽²⁾	2016	2017	2018	2019	2020
HT1	577633	108726	Roadside	76.6	76.6	11.6	13.2	13.7	13.1	12.8

Notes:

The estimated annual mean concentrations are presented as µg/m³.

Estimated concentrations are based on the Eastbourne PM_{2.5}/ PM₁₀ ratio (2020).

(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%).

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – 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 (0.81)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
1	580037	110902	26.1	15.1	-	-	13.0	14.9	16.0	16.2	19.6	18.1	27.1	11.7	17.8	14.4	-	March April data not avail. due to COVID-19 lockdown restrictions in April 2020.
2	581496	109288			-	-	17.6	17.7	15.0	20.4	20.1	17.4		11.9	17.2	15.8	-	
3	582223	110361	16.6	12.0	-	-	11.2			11.6	13.6	11.7	18.0	8.0	12.9	10.0	-	
4	583610	111325	28.6	19.9	-	-	19.6	18.6	18.9	24.2	23.7	20.0	29.5	11.6	21.5	17.4	-	
5	578382	109601	29.8	20.1	-	-	23.1	27.7	23.9	33.1	28.6	23.4	31.1	13.4	25.4	20.6	-	
6	576770	108101	26.3	15.7	-	-	15.9	16.9	18.1	20.5	20.4	21.4	23.6	11.3	19.0	15.4	-	
7	578500	108771	38.0	24.1	-	-	24.9			40.2	34.7	29.9	41.3		33.3	26.5	-	
8	578637	108798	29.3	21.5	-	-	21.4	24.1	23.1	31.8	26.4	19.3	31.8	10.6	23.9	19.4	-	
9	578532	108776	36.4	23.9	-	-	26.6	28.6	29.0	37.5	32.0	26.3	36.7	10.9	28.8	23.3	-	
10	578290	108819	23.4	17.3	-	-	18.3	19.7	18.2	23.8	22.2	19.4	22.0	10.5	19.5	15.8	-	
11	578447	108794	32.6		-	-	18.4	16.4	17.3	21.1	22.3	23.0	29.9	12.2	21.5	17.4	-	
12	578946	108746	25.3	16.6	-	-	17.8	14.8	15.8	18.6	19.9	17.5	27.2	10.2	18.4	14.9	-	
13	580252	110058	37.2	22.3	-	-	22.8	23.6	23.1	30.0	29.3	23.1	35.3	15.5	26.2	21.2	-	
14	580246	110064	36.5	22.6	-	-	19.6	22.3	23.0	27.7	27.9	23.8	34.0	15.2	25.3	20.5	-	

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 >33% 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.

Hastings Borough Council 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 Hastings Borough Council During 2020

Hastings Borough Council has not identified any new sources relating to air quality within the reporting year of 2020.

Additional Air Quality Works Undertaken by Hastings Borough Council During 2020

Hastings Borough Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

Diffusion tubes may systematically under or over-read NO₂ concentrations when compared to the reference chemiluminescence analyser. This is described as bias and can be corrected to improve the accuracy of the diffusion tube results, using a suitable bias adjustment factor.

Hastings Borough Council's diffusion tubes are prepared and analysed by Gradko International Ltd using the 20% TEA in water method. This laboratory takes part in the QA/QC Field Intercomparison, operated on behalf of Defra. Gradko International Ltd are a UKAS accredited laboratory.

Monitoring was completed in adherence with the 2020 Diffusion Tube Monitoring Calendar. Due to the first 2020 COVID-19 lockdown, diffusion tubes were not collected or deployed in April, as a result there are no measurements for the periods of March and April 2020.

Diffusion Tube Annualisation

Annualisation was required for three (3) non-automatic monitoring sites, the sites requiring annualisation are clearly provided in Table C.2. Annualisation was required for these sites as data capture less than 75% but greater than 33%.

Measurements for the period March and April 2020 were not undertaken due to COVID-19 restrictions during April 2020, hence the retrieval and deployment of NO₂ diffusion tubes did not take place.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2021 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.TG16 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.

Hastings Borough Council have applied a National bias adjustment factor of 0.81 to the 2020 monitoring data. A summary of bias adjustment factors used by Hastings Borough Council over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	03/21	0.81
2019	National	03/20	0.93
2018	National	06/19	0.93
2017	National	09/18	0.89
2016	National	06/17	0.88

NO₂ Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at

the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within Hastings Borough Council required distance correction during 2020.

QA/QC of Automatic Monitoring

The automatic monitoring site at Bulverhythe (HT1) is part of the Sussex Air Quality Network; hence the standards of QA/QC are similar to those of the government's Automatic Urban and Rural Network (AURN) sites. Monthly local site operator calibrations and filter change data are sent to the Environmental Research Group (ERG) at Kings College, London on a fortnightly basis.

The ERG collect data from the instruments on a daily basis, verifying the data against other monitoring stations in the south-east and ratifying it using the calibration information supplied. The Local Site Operations (LSO) duties are carried out by trained officers from the Council. Servicing of the instrumentation, gases and associated on-site equipment and station is undertaken each 6 months by the Equipment Support Unit (ESU).

Data is provisional, but checked daily for anomalies or issues by ERG, who undertake 6 monthly reviews and annual ratification of all data. Data presented in the 2020 ASR is ratified for NO₂, however PM₁₀ data was provisional at time of publishing.

Air Quality data is live and uploaded to the Sussex-Air website (www.sussex-air.net).

PM₁₀ and PM_{2.5} Monitoring Adjustment

The type of PM₁₀ monitor(s) utilised within Hastings Borough Council do not required the application of a correction factor. PM₁₀ data on Sussex-air is presented in both reference (Volatile Corrected (VCM)) and non-reference equivalent on the website.

Automatic Monitoring Annualisation

The automatic NO₂ and PM₁₀ recorded data capture was greater than 75% therefore it was not required to annualise any monitoring data.

NO₂ Fall-off with Distance from the Road.

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure should be estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No automatic NO₂ monitoring locations within Hastings Borough Council required distance correction during 2020.

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

Site ID	Annualisation Factor Brighton Preston Park	Annualisation Factor Canterbury			Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
2	1.1392	1.1341	-	-	1.1367	17.2	19.5	Two relevant SE urban background sites selected. No other SE sites had sufficient data capture rates in 2020.
3	0.9366	0.9811	-	-	0.9588	12.9	12.3	
7	0.9740	0.9929	-	-	0.9835	33.3	32.7	

Appendix D: Map of Monitoring Locations.

Figure D.1 – Map of Automatic (HT1) and Non-Automatic Monitoring Sites

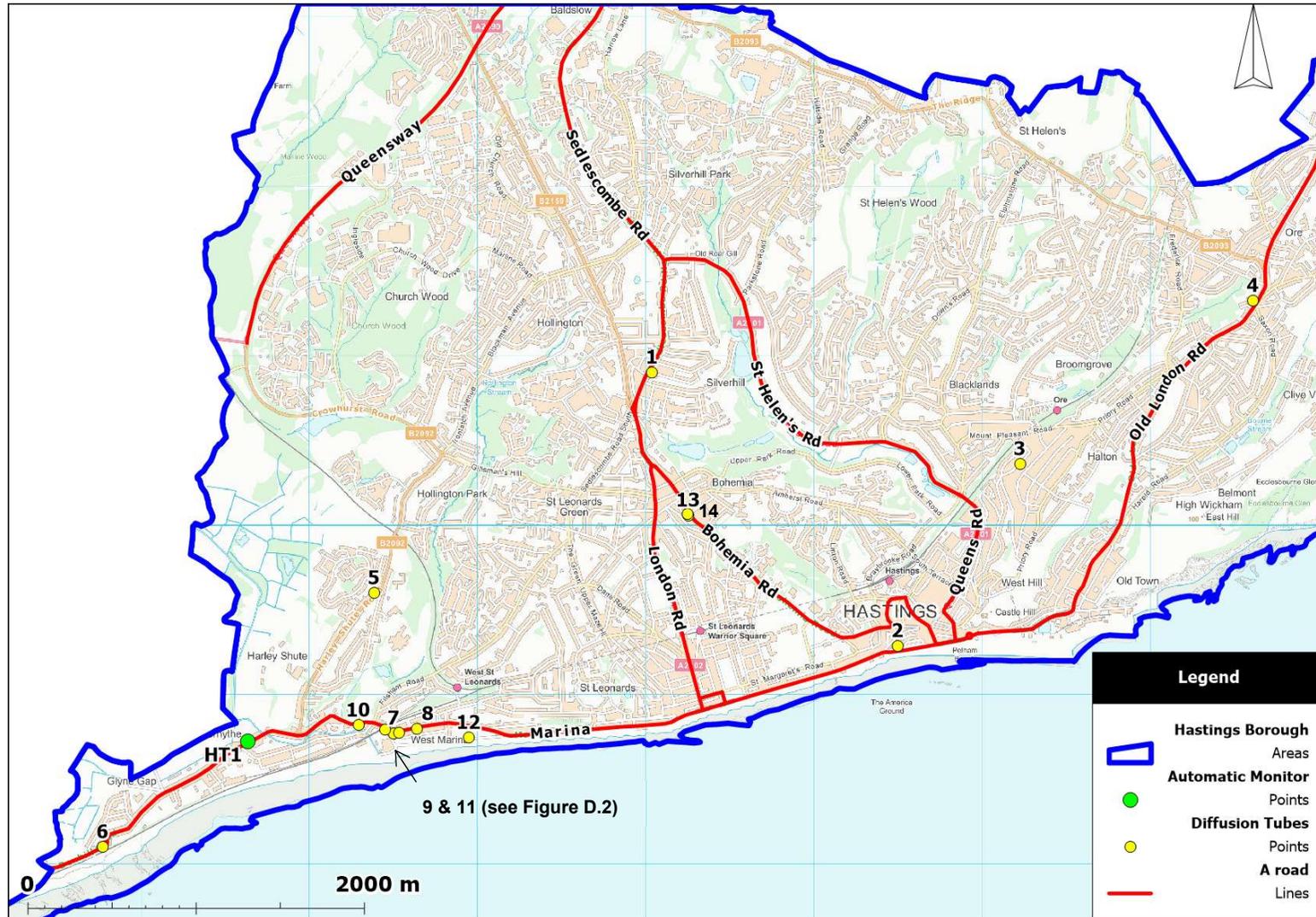
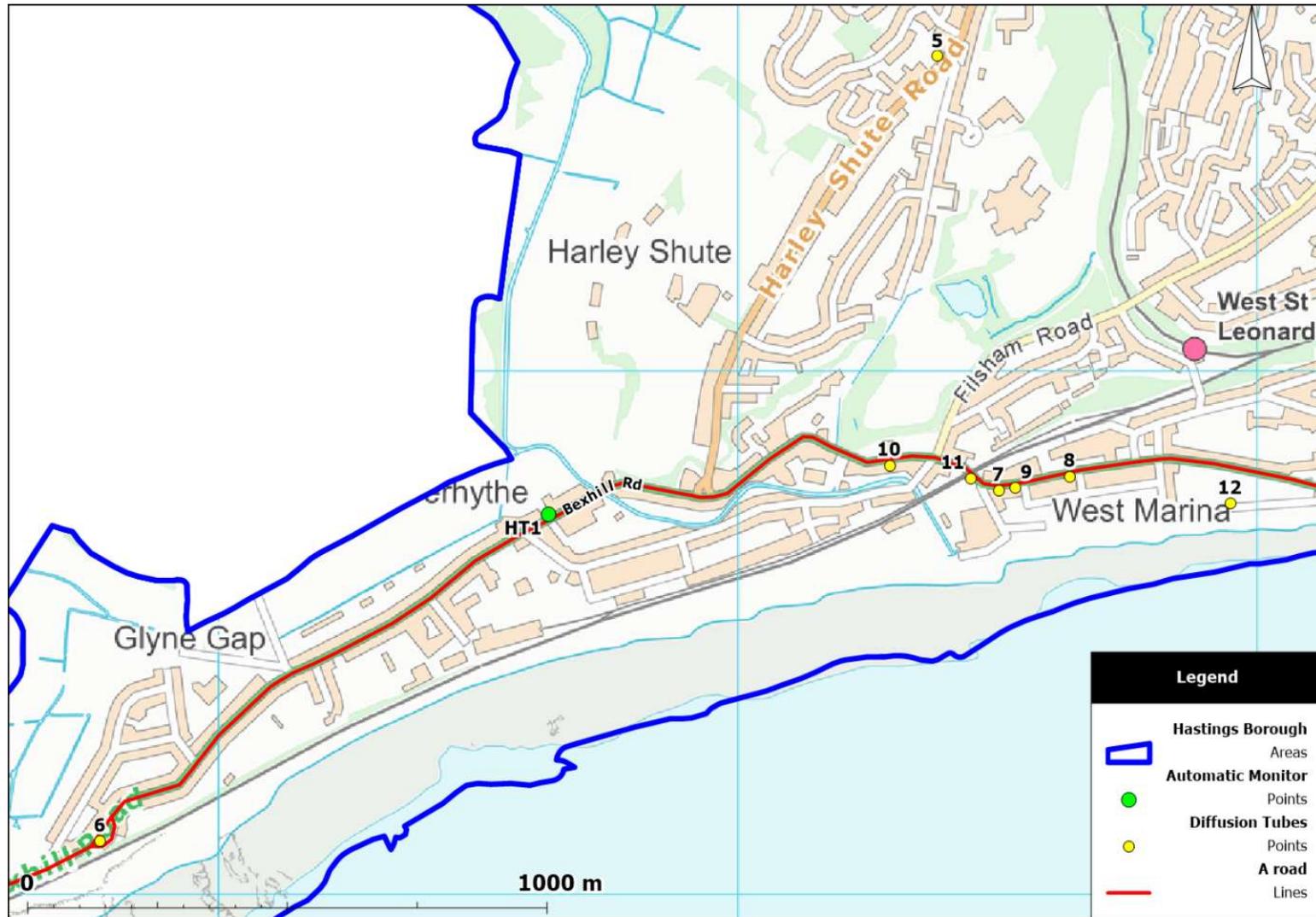


Figure D.2 –Monitoring locations along Bexhill Road & Harley Shute Road in Hastings.



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

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

⁷ The units are in microgrammes of pollutant per cubic metre of air (µg/m³).

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

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.

represents an absolute reduction of between $10\mu\text{g}/\text{m}^3$ to $20\mu\text{g}/\text{m}^3$ if expressed relative to annual mean averages. During this period, changes in $\text{PM}_{2.5}$ concentrations were less marked than those of NO_2 . $\text{PM}_{2.5}$ 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 $\text{PM}_{2.5}$ concentrations during the initial lockdown period are of the order $2.0\mu\text{g}/\text{m}^3$ 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 Hastings Borough

Localised Sussex research into “Changes in ambient air quality and atmospheric composition and reactivity in the South East of the UK as a result of the COVID-19 lockdown”¹⁰ was undertaken by University of Brighton and Phlorum Consultants. This research included analysis of measured pollution at stations across the South East including Hastings. Data from the research paper identified significant changes in local concentrations of pollutants in roadside concentrations during the March 2020 lockdown. The research used a technique to de-weather the data, which showed:

- The equivalent mean reduction in NO_2 concentrations prior to de-weather analysis was $11.7\mu\text{g}/\text{m}^3$, which corresponds to a reduction of ~38% relative to the 2015 - 2019 period mean for March to May, inclusive.
- Concentrations of ozone also appeared to increase over this period.
- Thirteen stations monitoring PM_{10} concentrations in the AURN and Sussex-Air Network (including Hastings) showed de-weathered PM_{10} concentrations increased during the lockdown period, most notably during April.

The results presented in the paper have shown that there was a clear decline in average ambient NO_2 during the UK lockdown period, effective from 24th March 2020, owing to a reduction in vehicle traffic by as much as 70%. However, there was also a concomitant increase in average ambient O_3 concentrations (most noticeably under urban, hydrocarbon

¹⁰ Science of the Total Environment - Changes in ambient air quality and atmospheric composition and reactivity in the South East of the UK as a result of the COVID-19 lockdown. Published 24 September 2020

limited ozone production conditions), and the overall abundance of total O_x species did not change significantly at chosen study locations as a result of the UK lockdown. It has also been shown that there were clearly defined peaks in PM₁₀ and PM_{2.5} concentrations with respect to the 2020 average, which corresponded with the timing of regional pollution episodes. As a result, there is limited evidence of a decline in particulate matter concentrations which can be attributed to lockdown restrictions.

There were no significant impacts as a consequence of COVID-19 upon air quality within Hastings Borough. The only impact of the March lockdown was to miss the April 2020 passive diffusion tube exchange, causing 2 months of missed data. (Ref Table F1 – Impact Matrix: This had an Impact Rating of **Small**).

Opportunities Presented by COVID-19 upon LAQM within Hastings Borough

No LAQM related opportunities have arisen as a consequence of COVID-19 within Hastings Borough.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Hastings Borough

During 2020, access to a number of diffusion tube monitoring sites was restricted due to their locations on residential buildings. Therefore, it was not possible to maintain diffusion tube exposure periods for March to April in line with the national monitoring calendar for a number of sites. This has affected data capture within 2020, although a 75% rate was still achieved (**Impact Rating Small**)

As a result, no significant challenges or constraints relating to LAQM have arisen during 2020 as a consequence of COVID-19 within Hastings Borough.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: High
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
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm 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.