

2022 Air Quality Annual Status Report (ASR)

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

Date: June 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Hastings Borough Council

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, 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 2017^4 .

Air Quality in Hastings is monitored at one automatic monitoring station in Bulverhythe and 14 NO₂ diffusion tubes across the borough. Past monitoring indicates that air quality in the Borough of Hastings is generally good. In 2021, there were no recorded exceedances of the AQS objective at any monitored locations.

The 5 year trend in monitoring data is indicative of a decline in NO₂ concentrations in Hastings. At all sites, there was a marginal increase in concentrations in 2021 when compared to 2020 monitoring data. However, all sites monitored concentrations lower than 2019 (pre COVID-19 pandemic). Annual concentrations were well within the UK Air Quality Objectives at all sites.

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 2021

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 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.

Core actions in 2021 to improve air quality in the borough include the continued maintenance of the air quality monitoring programme. Hastings Borough Council has also continued to support the Sussex Air Quality Partnership through which several initiatives have been launched to improve local air quality. These include:

- Supporting the co-ordination and delivery of a high standard of 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

This ASR confirms that levels of PM₁₀ and NO₂ continue to comply with the UK Air Quality Objectives. At monitoring sites in 2021, there were increases in concentrations at all sites when compared to 2020 monitoring data, however, concentrations were below 2019 prepandemic concentrations. In 2020 the impact of the COVID-19 pandemic likely caused concentrations to be lower than might have been expected following the trends observed. All sites remain below the air quality objective.

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

Hastings Borough Council's priorities for the coming year are:

- Continue to maintain the air quality monitoring programme
- Continue to support the Sussex Air Quality Partnership

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: <u>https://sussex-air.net/</u>

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Hastings Borough

Council. This ASR has been approved by:

Ian Wheeler, Environmental Health and Licensing Manager,

Hastings Borough Council

This ASR has been sent to the Director of Public Health for information.

If you have any comments on this ASR please send them to Scott Thirkettle at:

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1 Local Air Quality Management

This report provides an overview of air quality in Hastings Borough Council during 2021. 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 Areas (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 Council 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 PM_{10} (35 exceedances of 50 µg/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: <u>https://uk-air.defra.gov.uk/aqma/list</u>.

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 Council

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

- Hastings Borough Council no longer has an air quality management area (AQMA). As such there is no formal requirement to develop and publish an air quality action plan (AQAP). However, the Council have highlighted several measures the Council are implementing to improve air quality in the borough. This is commended.
- The Council undertook automatic (continuous) monitoring of NO₂ and PM₁₀ at one site in 2019, located in Bulverhythe. The 2020 annual mean NO₂ concentration here was 10.7 µg/m³, which is well below the air quality objective. There were no instances of the 1-hour mean NO₂ objective being exceeded. The annual mean PM₁₀ concentration in 2020 was 21.3 µg/m³. There was one instance of a 24-hour mean greater than 50 µg/m³, but this is well within the allowed 35 times per year. Non-automatic (passive) monitoring of NO₂ was undertaken at 14 sites in 2020. There were no exceedances of the annual mean NO₂ objective at any of the 14 diffusion tube sites in 2020, with a maximum concentration of 26.5 µg/m³ at location number 7.
- It was noted that details in Table 2.1 could be expanded upon. However, the Council does not have a formal requirement for an AQAP and to report on their progress, and the measures included were commended.
- The Council is encouraged to consider reviewing their monitoring regime to ensure all hotspot areas are identified. In addition to this, it was suggested that the Council also include a co-location site.
- 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 completion of the final stage of the Queensway Gateway to 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. Changes in monitoring strategy will be postponed until this project is complete. Hastings Borough Council is a member of the Sussex Air Quality Partnership (Sussex Air). The purpose of the partnership is to:

- Help Local Authorities to meet their statutory obligations to assess and report on local air quality.
- Provide information to the public on air quality in their area.
- Develop and deliver projects to improve local air quality and to reduce people's exposure to poor air quality.

Hastings Borough Council has taken forward a number of measures during the current reporting year of 2021 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1.

Five measures are included within Table 2.1, with the type of measure and the progress Hastings Borough Council has made during the reporting year of 2021 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.1. Note there is no formal AQMA or air quality action plan within the borough, and therefore measures are not monitored for performance by set indicators. However, progress to date is detailed for each measure.

Hastings Borough Council's priorities for the coming year are:

- Continue to maintain the air quality monitoring programme
- Continue to support the Sussex Air Quality Partnership and associated projects.

Hasting Borough Council worked to implement these measures in partnership with the following stakeholders during 2021:

- East Sussex County Council
- Sussex Air Quality Partnership

The principal challenges and barriers to implementation that Hastings Borough Council anticipates facing relate to the delayed completion of the Queens Gate Way Project.

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	Inform and promote Clean Burn Sussex	Environmental Permit	Other	2018	-	Sussex-Air	Defra	Yes	Funded	-	Ongoing	-	-	Promoting use of smokeless fuels and reduction of solid fuels.	Timescale
2	Sussex Air Quality Alert	Health Protection	Other	2010	-	Sussex Air	Sussex-air	No	Funded	-	Ongoing	-	-	Promoting public involvement in alert system.	Funding
3	The implementation of Active Travel Initiatives to manage demand to travel by car	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2015	-	ESCC.	DFT	No	Funded	-	Ongoing	-	-	Support of this project which included walking enhancements and a school streets trial.	First phase successful, second phase on-going
4	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	-	Sussex-air	-	No	Funded	-	Ongoing	-	-	Encouraging electric vehicles including Taxi's. Support of project to improve charging infrastructure and promotion of electric vehicles	
5	Households and building trade to avoid fires and dispose of waste in the revoked AQMA	Environmental Permit	Other	2005	-	HBC Env-protection	HBC	No	Funded	-	Ongoing	-	-	Discourage burning of waste through bonfires.	

Hastings Borough Council

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 2.5 µm 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 $PM_{2.5}$. However, PM_{10} concentrations are measured at 1 location in the borough (HT1 - Hastings-Bulverhythe AQMS) which can be used to estimate $PM_{2.5}$ concentrations. $PM_{2.5}$ was estimated using the annual mean concentration of PM_{10} recorded in Hastings Borough in 2021 (calculation detailed in Section 3.1.5). An estimated $PM_{2.5}$ concentration of 12.5 µg/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 2020 is 5.8%. This information is available from the following web link:

https://fingertips.phe.org.uk/profile/public-health-outcomesframework/data#page/4/gid/1000043/pat/6/par/E12000008/ati/401/are/E07000062/iid/9386 1/age/230/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/

The mortality calculated for Hastings Borough Council is slightly lower than that calculated for South East England (6.0%) and slightly higher than for England (5.6%) as a whole.

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 address PM_{2.5} concentrations.

To address PM_{2.5} throughout Sussex, Hastings Borough Council is working in partnership with Sussex Air to improve monitoring county wide in relation to PM_{2.5}. In 2021, they completed a joint bid with Sussex Air for enhanced monitoring across their network, which was successful.

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

This section sets out the monitoring undertaken within 2021 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 2017 and 2021 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 one site during 2021. The automatic monitoring site is situated at Bulverhythe known as Hastings 1 (HT1) and forms part of the Sussex Air Quality Network. Table A.1 in Appendix A shows the details of the automatic monitoring site.

The <u>https://sussex-air.net/</u> page presents automatic monitoring results for Hastings Borough Council, with automatic monitoring results also available through the UK-Air website.

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 2021. 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 25%), 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 $40 \ \mu g/m^3$. 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). The 5 year trend in monitoring data is indicative of a decline in NO₂ concentrations in Hastings.

For diffusion tubes, the full 2021 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 200 μ g/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 ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40 μ g/m³. A decreasing trend in values can be observed from 2017. The annual mean PM₁₀ concentration (μ g/m³) did not exceed the objective value during 2021.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50 µg/m³, not to be exceeded more than 35 times per year. No exceedances were recorded during 2021. Concentrations above 50 µg/m³ were recorded only 3 times throughout the year.

3.1.5 Particular Matter (PM_{2.5})

Hastings Borough Council does not monitor PM_{2.5}. However, PM_{2.5} has been estimated using monitored PM₁₀ from the continuous monitoring station (HT1), using the method provided in Technical Guidance LAQM.TG16 (April 2021).

Eastbourne measures both PM_{10} and $PM_{2.5}$ and is the closest urban background automatic station to Hastings and therefore is used to calculate a $PM_{2.5}/PM_{10}$ ratio to estimate $PM_{2.5}$ at HT1.

The calculated $PM_{2.5}/PM_{10}$ ratio at the reference site (Eastbourne): 8.38/13.12 = 0.638

The 2021 HT1 PM₁₀ concentration recorded at HT1: $19.5 \times 0.638 = 12.5$

The 2021 estimated annual mean $PM_{2.5}$ at HT1 was 12.5 μ g/m³

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) 0 m 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

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 Church, Alma Terrace	Roadside	580037	110902	NO ₂	No	1.0	1.0	No	2.0
2	Carlise Parade	Roadside	581496	109288	NO ₂	No	5.0	1.0	No	2.5
3	Manor Road	Roadside	58223	110361	NO ₂	No	0.0	10.0	No	2.5
4	Ore Church	Roadside	583610	111325	NO ₂	No	0.0	2.0	No	2.5
5	Harley Shute Road	Roadside	578382	109601	NO ₂	No	10.0	1.0	No	2.0
6	The Boat, Bexhill Road	Roadside	576770	108101	NO ₂	No	15.0	1.5	No	2.5
7	81 Bexhill Road	Roadside	578500	10871	NO ₂	No	0.2	1.5	No	2.5
8	47 Bexhill Road	Roadside	578637	108798	NO ₂	No	1.5	2.8	No	2.0
9	71 Bexhill Road	Roadside	578532	108776	NO ₂	No	0.5	0.5	No	2.5
10	138 Bexhill Road	Roadside	578290	108819	NO ₂	No	1.5	2.0	No	2.0
11	Railway Bridge	Roadside	578447	108794	NO ₂	No	10.0	3.0	No	2.5
12	Grosvenor Gardens	Roadside	578946	108746	NO ₂	No	10.0	0.5	No	2.5
13	104 Bohemia Road	Roadside	580252	110058	NO ₂	No	0.5	1.5	No	2.0
14	116 Bohemia Road	Roadside	580246	110064	NO ₂	No	0.5	1.5	No	2.0

Table A.2 – Details of Non-Automatic Monitoring Sites

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
HT1	Roadside	577633	108726	96.8	96.8	18.0	16.4	14.9	10.7	11.0

Notes:

The annual mean concentrations are presented as μ g/m³.

Exceedances of the NO₂ annual mean objective of 40 μ g/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.

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
1	580037	110902	Roadside	100.0	100.0	22.6	21.9	21.0	14.4	18.1
2	581496	109288	Roadside	82.7	82.7	24.5	24.6	23.7	15.8	19.3
3	582223	110361	Roadside	100.0	100.0	15.5	15.3	14.4	10.0	12.5
4	583610	111325	Roadside	84.9	84.9	24.8	25.9	24.9	17.4	20.7
5	578382	109601	Roadside	100.0	100.0	28.6	27.3	24.9	20.6	23.6
6	576770	108101	Roadside	100.0	100.0	36.4	37.4	28.0	15.4	19.4
7	578500	108771	Roadside	100.0	100.0	36.5	36.0	33.7	26.5	27.4
8	578637	108798	Roadside	100.0	100.0	28.2	30.2	28.8	19.4	22.9
9	578532	108776	Roadside	100.0	100.0	35.0	36.6	33.9	23.3	26.1
10	578290	108819	Roadside	100.0	100.0	27.3	25.7	24.1	15.8	18.8
11	578447	108794	Roadside	92.3	92.3	24.3	27.7	24.0	17.4	20.4
12	578946	108746	Roadside	100.0	100.0	24.2	23.2	21.6	14.9	17.3
13	580252	110058	Roadside	92.3	92.3	36.8	35.6	33.0	21.2	25.3
14	580246	110064	Roadside	75.0	75.0	30.4	30.6	30.2	20.5	24.1

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

The annual mean concentrations are presented as μ g/m³.

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

NO₂ annual means exceeding 60 μ g/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.



Figure A.1 – Trends in Annual Mean NO₂ Concentrations

Table A 5 - 1-Hour Mean NO	Monitoring Results	Number of 1-Hour Means	$> 200 \mu a/m^3$
Table A.5 - 1-11001 Weath NO	womoning results		<i>></i> 200 μy/m ²

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
HT1	577633	108726	Roadside	96.8	96.8	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 (200 μ g/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.

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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
HT1	577633	108726	Roadside	96.3	96.3	22	22.9	21.8	21.3	19.5

Notes:

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

Exceedances of the PM₁₀ annual mean objective of 40 μ g/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.





Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
HT1	577633	108726	Roadside	96.3	96.3	4	4	4	1	3

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

Notes:

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

Exceedances of the PM₁₀ 24-hour mean objective (50 μ g/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.





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 2021 (%) ⁽²⁾	2017	2018	2019	2020	2021
HT1	577633	108726	Roadside	96.3	96.3	13.2	13.7	13.1	12.8	12.5

Notes:

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

Estimated concentrations are based on the Eastbourne PM_{2.5}/ PM₁₀ ratio (2021).

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

Appendix B: Full Monthly Diffusion Tube Results for 2021

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.84)	Comment
1	580037	110902	26.0	23.7	24.3	18.1	19.6	20.6	17.6	16.9	20.9	22.6	27.5	21.5	21.6	18.1	
2	581496	109288	24.0	26.0	23.0	Missing	Missing	24.8	22.4	17.0	25.1	20.0	24.8	22.7	23.0	19.3	
3	582223	110361	18.1	18.5	16.1	15.0	12.7	13.1	12.6	9.6	13.9	15.3	17.4	16.1	14.9	12.5	
4	583610	111325	24.4	26.5	27.5	23.1	24.8	25.1	23.0	Missing	Missing	23.8	24.2	24.6	24.7	20.7	
5	578382	109601	27.7	28.5	29.2	27.0	28.1	32.9	17.6	26.3	32.9	28.2	30.6	28.1	28.1	23.6	
6	576770	108101	27.8	24.4	22.9	20.8	20.4	22.4	21.8	17.2	23.6	23.5	28.1	23.7	23.0	19.4	
7	578500	108771	33.9	34.4	31.3	30.5	31.0	36.6	34.1	21.4	39.7	29.0	36.7	32.6	32.6	27.4	
8	578637	108798	25.7	30.9	26.6	25.3	27.0	31.4	27.4	19.8	29.4	27.3	27.3	29.9	27.3	22.9	
9	578532	108776	34.0	33.0	29.3	29.6	30.2	31.9	30.8	23.5	38.5	31.1	32.4	28.8	31.1	26.1	
10	578290	108819	23.6	25.4	23.2	19.8	20.3	23.8	21.4	16.4	24.8	20.4	27.0	22.1	22.3	18.8	
11	578447	108794	25.0	26.4	26.5	22.9	19.6	Missing	24.7	18.9	27.8	25.0	26.4	24.1	24.3	20.4	
12	578946	108746	22.5	23.7	22.5	20.1	18.4	21.2	18.6	13.3	21.5	19.5	25.1	20.6	20.6	17.3	
13	580252	110058	34.1	Missing	30.7	28.8	27.3	30.0	30.0	22.3	29.2	31.6	34.7	32.5	30.1	25.3	
14	580246	110064	32.1	29.4	Missing	27.4	27.6	30.1	26.6	23.6	29.4	31.6	Missing	Missing	28.6	24.1	

Table B.1 – NO₂ 2021 Diffusion Tube Results (µg/m³)

Notes:

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

NO2 annual means exceeding 60 µg/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 2021

Hastings Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Hastings Borough Council During 2021

Hastings Borough Council has not completed any additional works within the reporting year of 2021.

QA/QC of Diffusion Tube Monitoring

Hastings Borough Council's diffusion tubes are prepared an 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 2021 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

All diffusion tube monitoring locations within Hastings Borough Council recorded data capture of 75% therefore it was not required to annualise any monitoring data.

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

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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 0.84 to the 2021 monitoring data. Version 03/22 of the national diffusion tube bias adjustment factor spreadsheet was used. A copy of the output from the spreadsheet can be seen in Figure C. 1. A summary of bias adjustment factors used by Hastings Borough Council over the past five years is presented in Table C.1.

Figure C.1 - National Bias Adjustment Factor Calculation for HBC 2021

National Diffusion Tube	Bias Adju			neet Vers	et Version Number: 03/22					
Follow the steps below in the correct order Data only apply to tubes exposed monthly a Whenever presenting adjusted data, you sh This spreadhseet will be updated every few	This spreadsheet will be updated at the end of June 2022 MOM Industry Wabsile									
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.										ry. Original
Step 1:	Step 2:	Step 3:			S	tep 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	Wher	e there is only one study for a chosen Where there is more than one study, i	combinatio use the ove	n, you should i rall factor ³ sho	use the adjust wn in blue at t	ment fac he foot o	tor shown f the final c	with caution. olumn.
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data or this method at this laboratory.	lf a year is not shown, we have no data ²	lf you	have your own co-location study then see Helpdesk at LAQ	footnote ⁴ . If MHelpdesk@	uncertain what bureauveritas.co	to do then conta om or 0800 0327	ct the Loc 953	al Air Quality	Management
Analysed By ¹	Method To v via your zelection, chame Gill) from the pop-up list	Year Taundayaur relection, chaore (All)	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	Bias Adjustment Factor (A) (Cm/Dm)
Gradko	20% TEA in water	2021	R	Bedford Borough Council	11	34	31	7.6%	G	0.93
Gradko	20% TEA in water	2021	R	Bedford Borough Council	11	19	17	11.7%	G	0.90
Gradko	20% TEA in water	2021	R	Blackburn with Darwen Borough Council	12	27	20	32.3%	G	0.76
Gradko	20% TEA in water	2021	R	Brent Council	12	51	46	9.9%	G	0.91
Gradko	20% TEA in water	2021	R	Gateshead Council	10	23	19	23.8%	G	0.81
Gradko	20% TEA in water	2021	R	Gateshead Council	12	25	22	13.7%	G	0.88
Gradko	20% TEA in water	2021	R	Gateshead Council	11	27	25	9.8%	G	0.91
Gradko	20% TEA in water	2021	R	Gateshead Council	12	31	25	26.6%	G	0.79
Gradko	20% TEA in water	2021	R	Gateshead Council	12	32	34	-4.1%	G	1.04
Gradko	20% TEA in water	2021	KS	Marylebone Road Intercomparison	11	53	42	25.0%	G	0.80
Gradko	20% TEA in Water	2021	R	Monmouthshire County Concil	11	35	29	21.8%	G	0.82
Gradko	20% TEA in water	2021	R	Belfast City Council	12	25	20	24.3%	G	0.80
Gradko	20% TEA in water	2021	UC	Belfast City Council	12	25	20	28.5%	G	0.78
Gradko	20% TEA in water	2021	R	Belfast City Council	12	42	35	19.8%	G	0.84
Gradko	20% TEA in water	2021	R	Belfast City Council	12	38	27	39.4%	G	0.72
Gradko	20% TEA in water	2021	UB	Dudley MBC	12	20	15	36.0%	G	0.74
Gradko	20% TEA in water	2021	R	Dudley MBC	12	30	29	4.2%	G	0.96
Gradko	20% TEA in water	2021	R	Dudley MBC	12	42	40	5.5%	G	0.95
Gradko	20% TEA in Water	2021	R	Lambeth	10	91	62	46.6%	G	0.68
Gradko	20% TEA in water	2021	R	Lancaster City Council	13	38	32	18.4%	G	0.84
Gradko	20% TEA in water	2021	R	Lancaster City Council	13	28	27	4.9%	G	0.95
Gradko	20% TEA in water	2021		Overall Factor ³ (32 studies)					Jse	0.84

Monitoring Year	Local or National	lf National, Version of National Spreadsheet	Adjustment Factor
2021	National	03/22	0.84
2020	National	02/21	0.81
2019	National	03/20	0.93
2018	National	06/19	0.93
2017	National	09/18	0.89

Table C.1 – Bias Adjustment Factor

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been 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 2021.

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.

The Local Site Operations (LSO) duties are carried out by trained officers from the Council. 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. Servicing of the instrumentation, gases and associated on-site equipment and station is undertaken by Bureau Veritas UK.

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 require 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

All automatic monitoring locations within Hastings Borough Council recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.

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



Figure D.1 – Map of Automatic Monitoring Sites



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

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 (NO2)	200 μ g/m ³ not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO ₂)	40 µg/m³	Annual mean
Particulate Matter (PM ₁₀)	50 μ g/m ³ , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM ₁₀)	40 µg/m³	Annual mean
Sulphur Dioxide (SO2)	350 μ g/m ³ , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO2)	125 μ g/m ³ , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO ₂)	266 μ g/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).

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 National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO ₂	Nitrogen Dioxide
NOx	Nitrogen Oxides
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of $10\mu m$ 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.