Harlow Council

Working together for Harlow

2020 Air Quality Annual Status Report (ASR)

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

Date (May, 2020)

Local Authority Officer	Stuart Athol
Department	Environmental Health Services
Address	Harlow Council Civic Centre The Water Gardens Harlow CM20 1WG
Telephone	01279 446104
E-mail	stuart.athol@harlow.gov.uk
Report Reference number	HAR/ASR2020
Date	19th May 2020
Written by	Tim Savage
Scientific Team Public Health & Protection Services Chelmsford City Council Duke Street Chelmsford Essex CM1 1JE	Chelmsford City Council

Executive Summary: Air Quality in Our Area

The 2020 Annual Status Report is designed to provide the public with information relating to local air quality in Harlow, to fulfil Harlow Council's statutory duty to review and assess air quality within its area, and to determine whether or not the air quality objectives are likely to be achieved.

In 2019, Harlow Council measured **no** exceedances of the Air Quality Objectives.

Air Quality in Harlow

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with equalities issues, because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3].

Traffic emissions are the most significant source of air pollution in Harlow. The main roads in the District are the M11 and the A414. In addition, there a number of industrial processes. The majority of these are located in the two main industrial areas of the town: Templefields (to the North) and the Pinnacles (to the North West).

The Council recognises the importance of working with partnering Authorities such as with Essex County Council to make improvements to local transport infrastructure and also to fulfil its own regulatory responsibility towards industrial processes.

Air pollution is considered to be generally low in Harlow and monitoring of local Air Quality has measured no exceedances of air quality objective at relevant exposure. The trend of results across all monitored sites indicates that Air Quality is improving. A graph can be found in Appendix A that shows monitoring results from 2015 to 2019.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010
[2] Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006
[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

Actions to Improve Air Quality

Air quality in Harlow meets the Air Quality Objectives. However, significant development around the Harlow means that investment in the town's infrastructure is required to manage congestion, maintain good air quality and support future local economic growth.

Two major transport schemes are currently in progress:

M11 Junction 7a

Construction of a new motorway junction on the M11 between the existing junctions 7 and 8 has been proposed. Known as M11 Junction 7A, traffic flow will be smoothed out of Harlow onto the M11, reducing congestion on the north-south links through Harlow and the existing Junction 7. The works are programmed to take place between May 2020 until early 2022.

A414 Edinburgh Way / Cambridge Road Junction Improvement Scheme

This improvement scheme is part of a £15 million investment in the Harlow road network, to manage congestion and support future local economic growth.

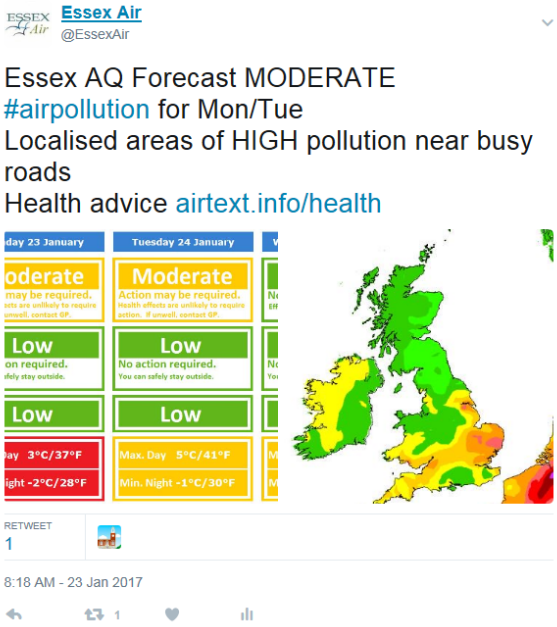
- Dual carriageway for Edinburgh Way between Cambridge Road and River Way Roundabouts.
- Upgrade of the A414 Cambridge Road Roundabout.
- Improve traffic signals at the East Road junction with Edinburgh Way, maintaining a crossing point on the A414 for pedestrians and cyclists.
- With the exception of East Road, vehicles that access premises on Edinburgh Way will be prohibited from turning right due to the new central reservation. Vehicles at the East Road junction will be able to turn in both directions at the traffic signals on completion of works.

The expected completion date for the works is June 2020 which may be extended due to restricted working during the lockdown period

Local Engagement and How to get Involved

Harlow Council is a member of the Essex Air Quality consortium. The Essex Air web site provides a daily forecast of air pollution which is based off UK-AIR data feeds. Also, the @EssexAir twitter feed provides localised weekly air pollution forecasts.

Figure i.1 Essex Air Twitter Air Quality Notifications



Links to Defra recommended actions and health advice are provided when air pollution is likely to be moderate or higher. This will enable those with heart or lung conditions, or other breathing problems to make informed judgements about their levels of activity or exposure.

The Essex Air twitter also promotes the DVSA service for reporting smoky lorries or buses. Particulate matter is usually not visible but when poorly maintained diesel engines can produce visible particles, appearing as smoke. Fine particles have an adverse effect on human health, particularly among those with respiratory and cardiovascular problem.

Figure i.2 - Essex Air Reporting Smoky Vehicle Tweets

Essex County Council has worked closely with Liftshare to develop the Essex Car Share scheme. This operates across Harlow and provides commuters with a car sharing service which could cut congestion and air pollution whilst saving money.

Table of Contents

List of Tables

List of Figures

1 Local Air Quality Management

This report provides an overview of air quality in Harlow during 2019. 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 Harlow Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.2 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Harlow Council currently does not have any Air Quality Management Areas (AQMAs).

2.2 Progress and Impact of Measures to address Air Quality in Harlow

Harlow Council and Essex County Council have a number of ongoing measures to improve air quality in Harlow. These are detailed in Table 2.1.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
1	Essex Carshare	Alternatives to private vehicle use	Car & lift sharing schemes	Essex County Council	N/A	2014	Number of Users	Not Quantified	Ongoing	N/A	
2	Travel Budi	Alternatives to private vehicle use	Car & lift sharing schemes	Harlow Council	N/A	2007	Number of Users	Not Quantified	Ongoing	N/A	
3	Member of Essex Air	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	Essex Air	N/A	N/A	N/A	Not Quantified	Ongoing	N/A	

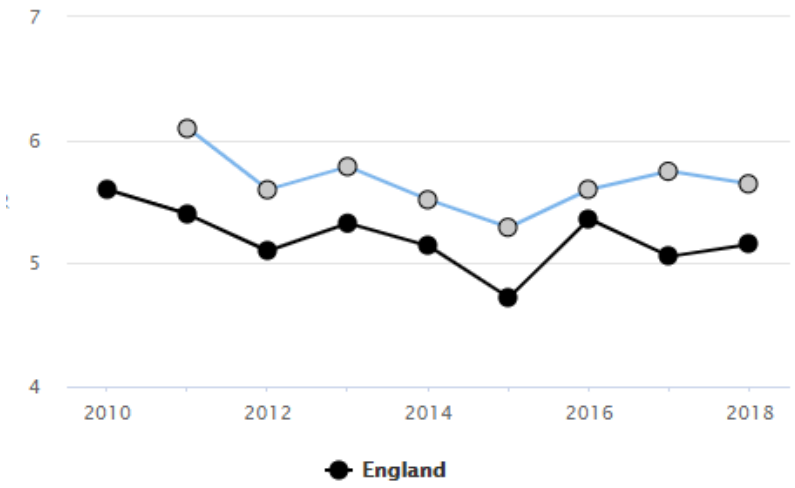
4	Environmental Permit Inspection & Enforcement	Environmental Permits	Measures to reduce pollution through IPPC Permits going beyond BAT	Harlow Council	N/A	N/A	Operator compliance with Environmental Permit	Not Quantified	Ongoing	N/A	
5	M11 J7a and associated Improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Essex County Council / South East Local Enterprise Partnership	2016	2021	Monitored Air Quality	Not Quantified	Consultation Completed / Preferred Route Approved / Works to commence May 2020	2022	
6	A414 Edinburgh Way / Cambridge Road junction improvement scheme	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Essex County Council	2016	2019	Monitored Air Quality	Not Quantified	Due to wet weather experienced during November and December 2019, as well as delays associated with cable diversions, the work programme has been revised with an expected completion date of June 2020.	2020	Road investment and congestion management programme for Harlow

2.3 $PM_{2.5}$ – 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.

Harlow Council does not monitor $PM_{2.5}$ concentrations however notes the Public Health Outcomes Framework indicator 3.01 – Fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution which for 2018 gave a value of 5.6% which has improved from 6.1% in 2011. These values are broadly similar to other authorities within the region.

Figure 2.1 - Public Health Framework Indicator 3.01 Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution



Harlow Council is taking the following measures to address $PM_{2.5}$:

- The Essex Air twitter account is encouraging the reporting of smoky vehicles through the DVSA reporting service. It is possible to report either heavy goods vehicles or public service vehicles (buses).
- Regular inspections of permitted industry where combustion and non-combustion processes could lead to anthropogenic emissions of $PM_{2.5}$
- Working with Essex County Council (highway authority) to deliver Major Transport improvement schemes to alleviate congestion. In addition to reduced exhaust emissions, these schemes will reduce non-exhaust emissions from brake and tyre wear by making traffic flows smoother.

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

3.1 Summary of Monitoring Undertaken

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

3.1.1 Automatic Monitoring Sites

Harlow Council does not undertake automatic continuous monitoring.

3.1.2 Non-Automatic Monitoring Sites

Harlow Council undertook non-automatic (passive) monitoring of NO_2 at 13 sites during 2019. Table A.1 in Appendix A provides detail of the sites.

No exceedances have been identified and the long-term trend for monitored concentrations is downwards. Figure A.1 in Appendix A identifies monitored NO_2 annual mean concentrations for 2015 to 2019.

Monitoring locations have been distance corrected for relevant exposure and the results are in Appendix B.

Details of the Quality Assurance/Quality Control (QA/QC) for the diffusion tube monitoring is included in Appendix C.

A plan showing the location of the monitoring sites is provided in Appendix D.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[4], "annualisation" (where the data capture falls below 75%), and distance correction[5]. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Error! Reference source not found.2 in Appendix A provides bias adjusted NO_2 annual mean concentrations for the past 5 years.

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B.

[4] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[5] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

Appendix A: Monitoring Results

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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
HAR8	East Park	Suburban	546942	211186	NO2	No	11	23.2	NO	2
HAR9	Gardiners	Urban Background	546888	209435	NO2	No	7.6	1.2	NO	2
HAR10	Dadds Wood	Urban Background	544434	209709	NO2	No	12.5	33.4	NO	2
HAR11	Town Centre	Kerbside	544680	210016	NO2	No	13.2	6.3	NO	2
HAR13	Guilfords	Suburban	547524	212479	NO2	No	14.2	1	NO	2
HAR15	Gilden Way	Roadside	548658	212004	NO2	No	14	1.5	NO	2
HAR16	Chalk Lane	Rural	549466	211598	NO2	No	20	0.75	NO	2
HAR17	Rivermill	Kerbside	544297	210988	NO2	No	0	4.7	NO	2
HAR18	Station Approach	Urban Background	544640	211192	NO2	No	8	0.01	NO	2
HAR19	Finchmoor	Roadside	544498.974	208325.59	NO2	No	2	1	NO	2
HAR20	Broadley Road	Roadside	543084.64	207700.97	NO2	No	13	1.5	NO	2
HAR21	Commonside Road	Roadside	546031.33	208039.17	NO2	No	8	1.5	NO	2
HAR22	Challinor	Roadside	548307.03	209702.15	NO2	No	9	0.5	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.2 – Annual Mean NO_2 Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
HAR8	546942	211186	Suburban	Diffusion Tube	92	91.67	27.55	24.95	25.24	21.91	22.58
HAR9	546888	209435	Urban Background	Diffusion Tube	100	100.00	28.68	27.93	29.99	24.24	24.54
HAR10	544434	209709	Urban Background	Diffusion Tube	100	100.00	24.83	26.19	27.50	24.58	24.43
HAR11	544680	210016	Kerbside	Diffusion Tube	100	100.00	31.04	29.75	29.82	27.52	25.11
HAR13	547524	212479	Suburban	Diffusion Tube	100	100.00	17.45	16.72	16.58	13.66	14.89
HAR15	548658	212004	Roadside	Diffusion Tube	100	100.00	21.59	25.37	26.08	23.41	22.24
HAR16	549466	211598	Rural	Diffusion Tube	100	100.00	18.09	20.36	18.89	18.65	17.31
HAR17	544297	210988	Kerbside	Diffusion Tube	100	100.00	N/A	21.91	25.99	23.90	21.94
HAR18	544640	211192	Urban Background	Diffusion Tube	100	100.00	N/A	N/A	30.77	24.42	27.48
HAR19	544499	208326	Roadside	Diffusion Tube	100	100.00	N/A	N/A	N/A	N/A	19.36
HAR20	543085	207701	Roadside	Diffusion Tube	100	100.00	N/A	N/A	N/A	N/A	18.08
HAR21	546031	208039	Roadside	Diffusion Tube	92	91.67	N/A	N/A	N/A	N/A	23.26
HAR22	548307	209702	Roadside	Diffusion Tube	100	100.00	N/A	N/A	N/A	N/A	21.52

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **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 adjustment**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

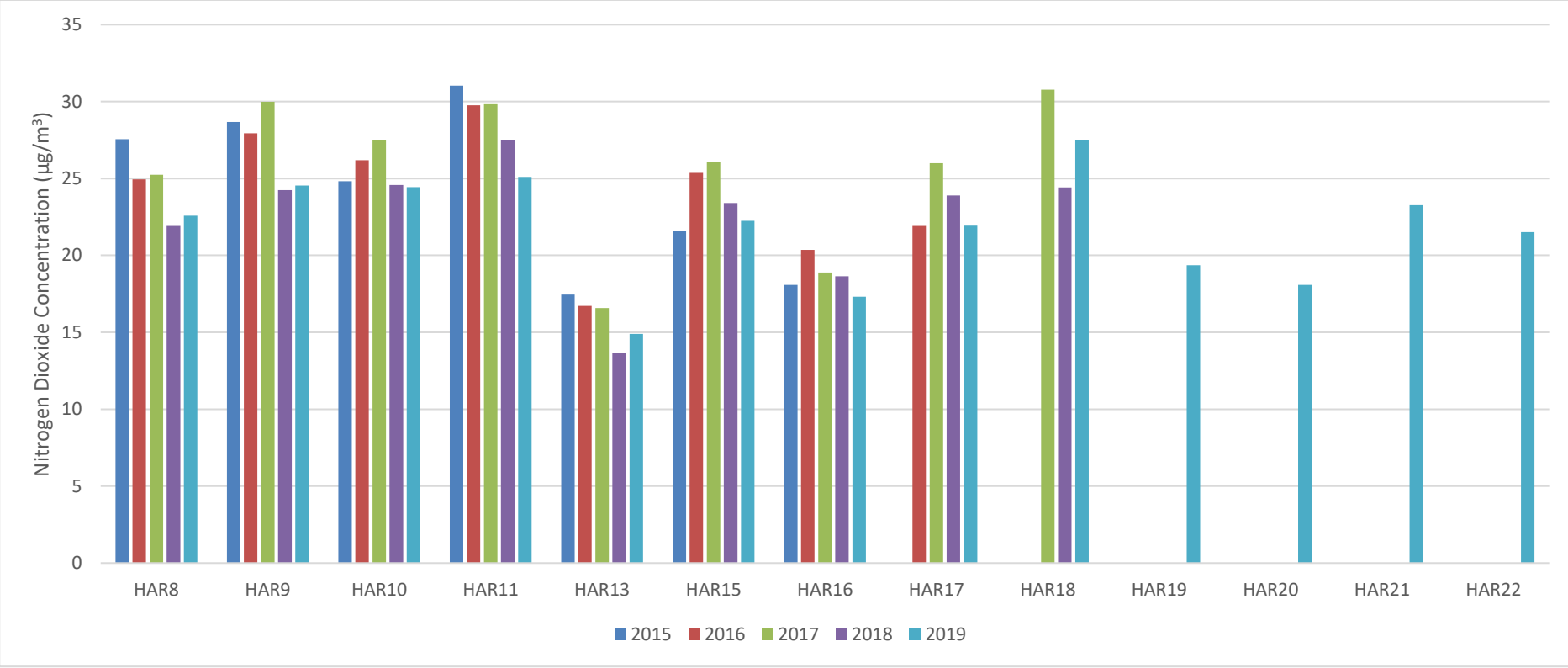
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

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

(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

Figure A.1 – Trends in Annual Mean NO2 Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (0.75) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
HAR8	546942	211186	41.9	38.5	Missing	24.5	22.8	21.4	22.7	27.2	27.3	32.5	36.2	36.1	30.1	22.58	21.64
HAR9	546888	209435	44.3	46.9	35.4	23.1	25.3	21.8	24.1	29.7	28.7	31.9	37.2	44.2	32.7	24.54	20.56
HAR10	544434	209709	45	34.4	32.2	30.7	26.8	22	25.9	26.4	30.6	32.5	43.6	40.8	32.6	24.43	22.23
HAR11	544680	210016	40.5	41.5	34	37.7	29.5	29.1	30.7	28.9	26.5	33.7	31.5	38.1	33.5	25.11	21.54
HAR13	547524	212479	26	28.8	19.1	17.6	14.1	12.9	15.7	16.8	16	20.4	22.5	28.4	19.9	14.89	14.26
HAR15	548658	212004	42	31.7	33	28.2	25.8	22.6	25.5	25.2	25.7	29.2	35.3	31.7	29.7	22.24	16.98
HAR16	549466	211598	26.6	29.8	23.9	31.3	15.7	17.1	15.7	16.9	18	23	30.7	28.2	23.1	17.31	17.30
HAR17	544297	210988	24.1	34.1	30.2	31.8	26.5	23.2	24.6	25	28.8	31.8	39.5	31.4	29.3	21.94	21.94
HAR18	544640	211192	52.5	41.4	35.6	33.8	25	27.7	26.1	33.9	32.2	39.9	48.6	43	36.6	27.48	18.47
HAR19	544499	208326	32.6	38.9	27	19.8	17.8	16.5	17.7	21.7	21.7	27.6	34.2	34.3	25.8	19.36	18.14
HAR20	543085	207701	34.4	29.7	22.2	21.4	17.9	15.7	18.7	18.7	20.6	27.1	32.8	30	24.1	18.08	15.01
HAR21	546031	208039	42.2	37.8	Missing	29.2	23.1	21.1	23.3	25.6	29.5	32.1	42.1	35.1	31.0	23.26	19.84
HAR22	548307	209702	33.2	42.2	26.9	28.7	19	18.9	20.1	24.8	26	32	32.8	39.7	28.7	21.52	20.32

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

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

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

Diffusion Tubes QA/QC

Harlow Council undertook monitoring at 13 nitrogen dioxide diffusion tubes sites in 2019.

The diffusion tubes were supplied and analysed by Socotec with a preparation method of 50% triethanolamine (TEA) in Acetone.

The AIR NO_2 proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2019:

Table C.1 – AIR PT Results 2019

AIR PT Round	AIR PT AR030	AIR PT AR031	AIR PT AR033	AIR PT AR034
Round conducted in the period	January – February 2019	April – May 2019	July – August 2019	September – October 2019
SOCOTEC	87.5%	100%	100%	100%

Diffusion tube Bias Adjustment Factors

Harlow Council uses the national bias adjustment figure for calculating diffusion tubes results.

The Diffusion Tube Bias Adjustment Factors Spreadsheet 03/20 identified that for Socotec 50% TEA in acetone diffusion tubes in 2019, a bias adjustment factor of 0.75 should be used. This was derived from orthogonal regression analysis of 24 studies.

Figure C.1 – National Bias Adjustment Factor Spreadsheet

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/20

Follow the steps below in the correct order to show the results of relevant co-location studies
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 spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2020
LAQM Helpdesk Website

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: Select the Laboratory that Analyses Your Tubes from the Drop-Down List

If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List

If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List

If a year is not shown, we have no data[2]

Step 4:

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[3] shown in blue at the foot of the final column.

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@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method	Year[2]	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
Socotec Didcot	50% TEA in acetone	2019	UB	Kingston upon Hull City Council	12	30	23	32.2%	G	**0.76**
Socotec Didcot	50% TEA in acetone	2019	O	Kingston upon Hull City Council	11	32	26	19.1%	G	**0.84**
Socotec Didcot	50% TEA in acetone	2019	R	Vale of Glamorgan	11	40	24	68.0%	G	**0.60**
Socotec Didcot	50% TEA in acetone	2019	R	Watford Borough Council	12	35	30	16.8%	S	**0.86**
Socotec Didcot	50% TEA in acetone	2019	R	Dumfries & Galloway Council	13	35	31	11.9%	G	**0.89**
Socotec Didcot	50% TEA in acetone	2019	KS	Marylebone Road Intercomparison	12	92	65	40.5%	G	**0.71**
Socotec Didcot	50% TEA in acetone	2019	UB	City of York Council	12	22	16	35.6%	G	**0.74**
Socotec Didcot	50% TEA in acetone	2019	R	City of York Council	12	33	26	26.8%	G	**0.79**
Socotec Didcot	50% TEA in acetone	2019	R	City of York Council	9	32	23	37.2%	G	**0.73**
Socotec Didcot	50% TEA in acetone	2019	R	City of York Council	11	40	28	43.4%	G	**0.70**
Socotec Didcot	50% TEA in acetone	2019	R	Ipswich Boorough council	11	34	26	34.1%	G	**0.75**
Socotec Didcot	50% TEA in acetone	2019	R	Swale BC	12	51	39	31.7%	G	**0.76**
Socotec Didcot	50% TEA in acetone	2019	R	Swale BC	12	33	27	23.9%	G	**0.81**
Socotec Didcot	50% TEA in acetone	2019	R	Swale BC	12	40	31	26.7%	G	**0.79**
Socotec Didcot	50% TEA in acetone	2019	R	Wrexham County Borough Council	10	20	16	22.2%	G	**0.82**
Socotec Didcot	50% TEA in acetone	2019	R	City of Wolverhampton Council	12	39	27	48.4%	G	**0.67**
Socotec Didcot	50% TEA in acetone	2019	R	North Herts DC	12	59	46	28.5%	G	**0.78**
Socotec Didcot	50% TEA in acetone	2019	R	Horsham District Council	12	30	24	24.5%	G	**0.80**
Socotec Didcot	50% TEA in acetone	2019	R	Horsham District Council	11	31	22	44.5%	G	**0.69**
Socotec Didcot	50% TEA in acetone	2019	R	Horsham District Council	11	32	24	34.4%	G	**0.74**
Socotec Didcot	50% TEA in acetone	2019	B	Medway Council	10	21	13	59.5%	P	**0.63**
Socotec Didcot	50% TEA in acetone	2019	R	Medway Council	12	33	24	35.1%	G	**0.74**
Socotec Didcot	50% TEA in acetone	2019	R	Waverley Borough Council	10	38	30	27.5%	G	**0.78**
Socotec Didcot	50% TEA in acetone	2019	R	Waverley Borough Council	12	35	24	44.7%	G	**0.69**
SOCOTEC Didcot	50% TEA in acetone	2019		**Overall Factor[3] (24 studies)**				**Use**		**0.75**

NO_2 Fall Off Estimation

Using the equation from the Bureau Veritas NO_2 Fall Off with Distance Calculator (version 4.2), a custom Excel spreadsheet has been developed to derive the NO_2 concentrations for multiple diffusion tubes from measured annual mean concentrations Defra 2019 NO_2 background maps.

Estimated Annual Mean at Relevant Exposure:

=IF(AC>0,(((AB-AC)/(-0.5476*LN(J)+2.7171))*(-0.5476*LN(H)+2.7171)+AC),"")

AB = Bias Adjusted Mean

AC = Annual Mean Background NO_2

J = Distance: diffusion tube to kerb of nearest road (m)

H = Distance: relevant exposure to kerb of nearest road (m)

Table C.2 – NO_2 Fall Off Calculator

Site ID	Site Name	Bias Adjusted Mean	Annual Mean Background	Distance to kerb of nearest road (m) (2)	Distance to Relevant Exposure (m) (1)	Distance Corrected to Nearest Exposure (2)
HAR8	East Park	26.93	17.00	23.20	11.00	24.81
HAR9	Gardiners	30.15	13.75	1.20	7.60	23.31
HAR10	Dadds Wood	24.90	13.29	33.40	12.50	22.36
HAR11	Town Centre	20.93	14.10	6.30	13.20	18.45
HAR13	Guilfords	17.85	12.74	1.00	14.20	15.05
HAR15	Gilden Way	23.03	11.07	1.50	14.00	16.90
HAR16	Chalk Lane	16.99	15.71	0.75	20.00	16.18
HAR17	Rivermill	19.69	14.10	4.70	0.00	19.69
HAR18	Station Approach	31.73	13.50	0.01	8.00	18.99
HAR19	Finchmoor	16.58	12.80	1.00	2.00	15.74
HAR20	Broadley Road	18.34	11.03	1.50	13.00	14.70
HAR21	Commonside Road	27.60	13.65	1.50	8.00	21.95
HAR22	Challinor	23.96	17.47	0.50	9.00	20.58

Appendix D: Map of Monitoring Locations in Harlow

Legend		
Diffusion Tube Locations		
Site ID	X OS Grid Ref	Y OS Grid Ref
HAR8	546942	211186
HAR9	546888	209435
HAR10	544434	209709
HAR11	544680	210016
HAR13	547524	212479
HAR15	548658	212004
HAR16	549466	211598
HAR17	544297	210988
HAR18	544640	211192
HAR19	544499	208326
HAR20	543085	207701
HAR21	546031	208039
HAR22	548307	209702

Appendix E: Summary of Air Quality Objectives in England

Table E.2 – Air Quality Objectives in England

Pollutant	Air Quality Objective[6]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[6] The units are in micrograms of pollutant per cubic metre of air (µg/m^3).

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air Quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
EIA	Environmental Impact Assessments
EU	European Union
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SSSI	Site of Special Scientific Interest
TEA	Triethanolamine – substance used for absorbing nitrogen dioxide in diffusion tubes
UKAS	United Kingdom Accreditation Service

References

Defra Diffusion Tube Bias Adjustment Factors Spreadsheet available at; https://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html

Defra LAQM Summary of Laboratory Performance in AIR NO_2 PT Scheme available at; https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html

Defra LAQM Policy Guidance LAQM.PG16 available at; https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf

Defra LAQM Technical Guidance LAQM.TG16 available at; http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf

Defra NO_2 Background Maps available at; https://uk-air.defra.gov.uk/data/laqm-background-home

Essex Air Quality Consortium available at; http://www.essexair.org.uk

EssexCarShare.com available at; https://liftshare.com/uk/community/essex

Essex Air Twitter Feed available at; https://twitter.com/essexair

Essex County Council: Harlow Improvement Schemes available at; http://www.essexhighways.org/highway-schemes-and-developments/major-schemes.aspx

Harlow Council 2019 Air Quality Annual Status Report available at; http://www.essexair.org.uk/Reports/Harlow_Council_2019_ASR.pdf

Proposal for new junction 7a on M11 available at; http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/major-schemes/m11-junction-7a.aspx

Public Health Outcomes Framework Indicator 3.01 available at; https://fingertips.phe.org.uk/profile/public-health-outcomes-framework