



MALDON DISTRICT COUNCIL

2021 Air Quality Annual Status Report (ASR)

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

Date: June, 2021

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Executive Summary: Air Quality in Our Area

The 2021 Annual Status Report is designed to provide the public with information relating to local air quality in Maldon, to fulfil Maldon District 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 2020, Maldon District Council measured two exceedances of the Air Quality Objectives, both on Market Hill within the AQMA.

Air Quality in Maldon

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 pollution is generally considered to be low across the Maldon district with the exception of along Market Hill in Maldon, where significant exceedances of the nitrogen dioxide (NO₂) air quality objective have been measured.

Traffic emissions are the most significant source of air pollution in Maldon. Congestion dominates Market Hill, the town centre and bypass during the rush hour periods and the A414 is the principle route within the district.

The Council recognises the importance of working with partnering Authorities such as with Essex County Council to develop transport strategies and to make improvements to local transport infrastructure to reduce congestion.

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.

In July 2020, Maldon District Council adopted the [Maldon 2025 – 2025 Air Quality Action Plan](#). This is an ambitious action plan includes the following measures:

- Produce a transport strategy for the town of Maldon which includes feasibility studies for implementation of a bus gate and downhill only restrictions for Market Hill and 20mph speed restrictions.
- Creation of a voluntary Class D Clean Air Zone for Market Hill and Maldon High Street.
- Reduce emissions from buses on Market Hill
- Reduce emissions from taxis and private hire vehicles
- Reduce emissions from Council refuse and recycling vehicles on Market Hill
- Reduce emissions from delivery vehicles
- Public engagement efforts including promotion of sustainable travel and education about air quality

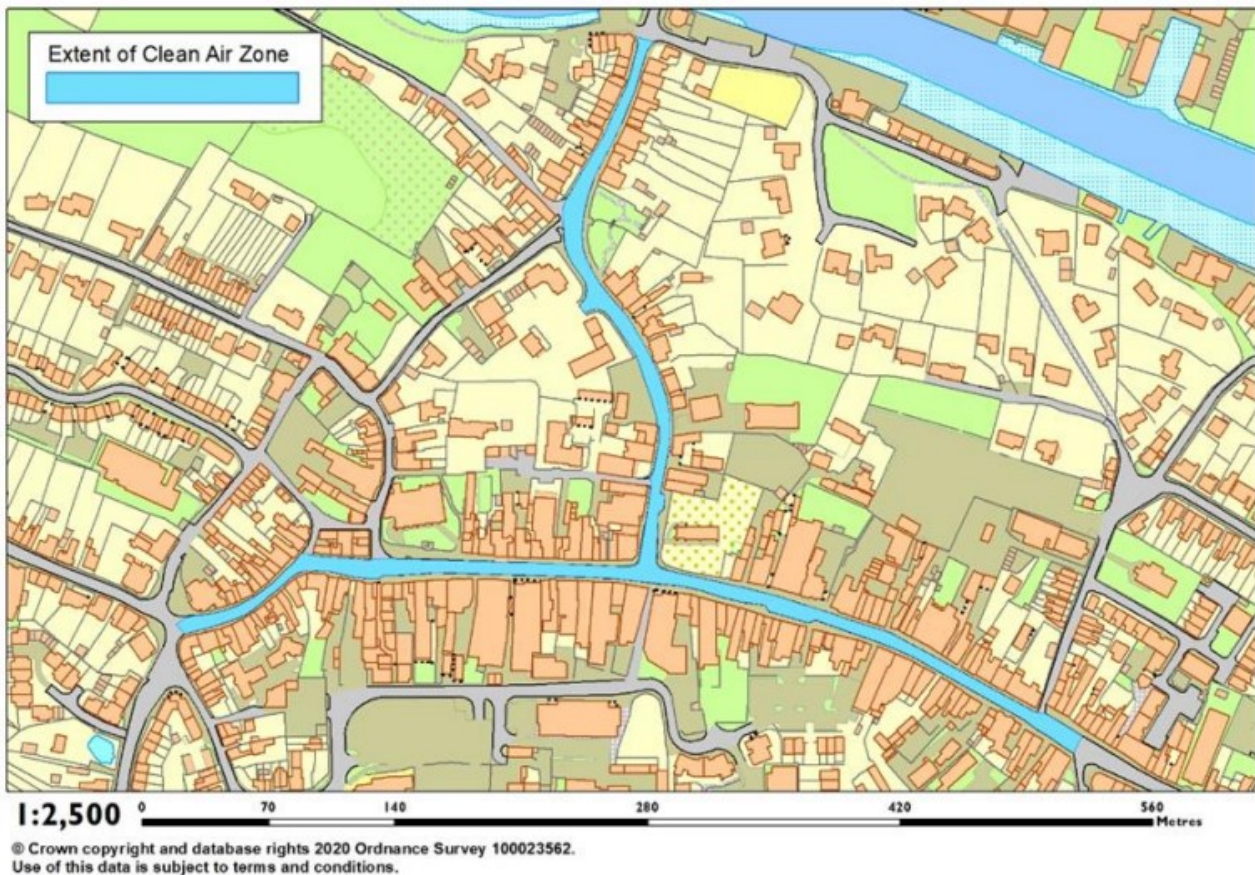
Maldon District Council anticipates that successful development of the transport strategy and implementation of the Class D CAZ will lead to compliance with the air quality objectives on Market Hill.

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

Out of these action plan measures, the proposed 20mph speed limit has been implemented as part of the continuing response to the COVID-19 pandemic and to provide a 'Safer, Greener, Healthier' environment for shoppers and other pedestrians and cyclists.

Figure i.1 - Extent of Proposed Voluntary Clean Air Zone



Conclusions and Priorities

Based upon the annual review assessment process, Maldon District Council have concluded that:

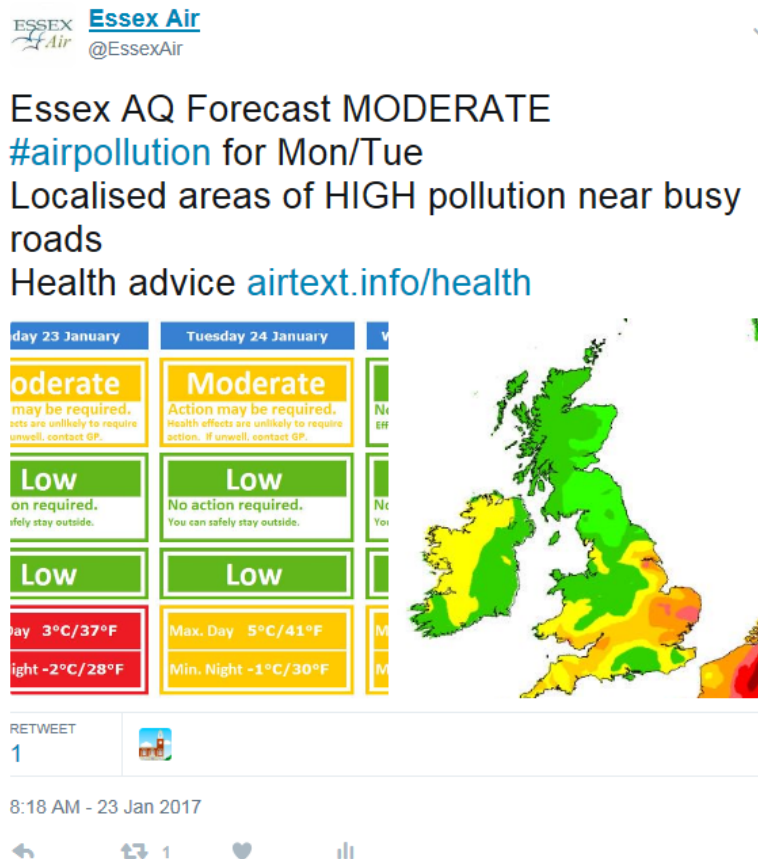
- Two air quality exceedances have been measured on Market Hill in 2020. These exceedances occurred at monitoring sites MD22 ($41.0\mu\text{g}/\text{m}^3$ at relevant exposure) and MD27 ($43.0\mu\text{g}/\text{m}^3$ at relevant exposure).
- Measured air pollution in 2020 has reduced significantly from previous years due to Covid-19 related national lockdowns and regional tiered restrictions which have reduced traffic movements
- There have been no significant planning application decisions in the last year relevant to air quality management

Maldon District Council's air quality priority for 2021 will be advancing the adopted air quality action plan measures.

Local Engagement and How to get Involved

Maldon District 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.2 - 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.3 - Essex Air Reporting Smoky Vehicle Tweets



Did you know that you can report a smoky lorry or bus to the [@DVSAgovuk gov.uk/report-smoky-v... ...](https://www.gov.uk/report-smoky-vehicles)
[#dirtydiesels](#) [#airpollution](#)

8:26 AM - 12 Apr 2017

2 Retweets 2 Likes



 2

 2



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1 Local Air Quality Management

This report provides an overview of air quality in Maldon 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 Maldon District 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..

2 Actions to Improve Air Quality

Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of the AQMA declared by Maldon District Council can be found in Table 2.1.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
MDC Air Quality Management Area Number 1 (Market Hill)	11/12/2018	NO ₂ Annual & 1 Hour Mean	The stretch of road and properties between Anchorage Hill and Bull Lane, Maldon	No	58.25	43.00	Maldon Air Quality Action Plan 2020 – 2025 June 2020	http://www.maldon.gov.uk/download/downloads/id/18206/air quality action plan 2 july 2020.pdf

Appendix D: Map of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs.

The air quality objectives pertinent to the current AQMA designation are:

- NO₂ annual mean
- NO₂ 1-Hour Mean

Progress and Impact of Measures to address Air Quality in Maldon

Maldon District Council and Essex County Council have a number of ongoing measures to improve air quality in Maldon These are detailed in Table 2.2 below.

Table 2.2 – 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	Essex Liftshare	Alternatives to private vehicle use	Car & lift sharing schemes	Unknown	Unknown	Essex County Council	Essex County Council	NO	Funded	< £10k	Implementation	Not Quantified	Number of Users	Implementation on-going	
2	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	Unknown	Unknown	County Council / District & Borough Councils	Member Organisations	NO	Funded	< £10k	Implementation	N/A	N/A	Implementation on-going	
3	Development of a Transport Strategy for Maldon	Transport Planning and Infrastructure	Other	2020	2022	Essex County Council / Maldon District Council	Essex County Council / Maldon District Council	NO	Funded	£50k - £100k	Planning	High. Compliance with the Air Quality Objective met in combination with Measure 2	Reduced traffic flow and congestion on Market Hill. Compliance with NO2 air quality objectives		The Origin and destination survey continues to be delayed due to the ongoing impacts of Covid on traffic levels. Further work with ECC required to agree a point at which traffic levels can be considered representative and robust for survey.
4	Voluntary Class D Clean Air Zone	Promoting Low Emission Transport	Low Emission Zone (LEZ)	2020	Progress dependant on funding	Maldon District Council	Maldon District Council	NO	Not Funded	£100k - £500k	Planning	High. Compliance with the Air Quality Objective met in combination with Measure 1	Compliance with NO2 air quality objectives	Defra Grant bid funding unsuccessful for 2020/2021. Report to Council required so that alternative funding through capital expenditure can be investigated	
5	Set up working group with bus	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport	2020	2020	Essex County Council / Maldon District Council /	N/A	NO	Funded	< £10k	Implementation	High	Quarterly meeting with bus operators	Initial discussions with Essex county Council	

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
	operators in Maldon					Commercial Bus Operators								and bus operators undertaken	
6	Retrofitting of buses travelling on routes along Market Hill	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2020	Progress dependant on funding	Maldon District Council / Commercial Bus Operators / DfT	DfT/Defra Joint AQ unit confirmed no plans to run another round of Clean Bus Technology Fund at present	NO	Not Funded	£500k - £1 million	Planning	High	All buses operating on Market Hill to be of a Euro VI standard or retrofitted to CVRAS standard		Retrofitting buses with Selective Catalytic Reduction Technology (SCRT) approved by Clean Vehicle Retrofit Accreditation Scheme ensures that legacy fleet vehicles comply with CAZ standards
7	Hackney Carriage & PHV Emissions Standards	Promoting Low Emission Transport	Taxi Licensing conditions	2020	2022	Maldon District Council	N/A	NO	Funded	< £10k	Planning	Medium	All newly licensed or replacement vehicles to be of a Euro VI standard or better, from 2022	New taxi licensing policy is drafted and due for consultation	Strength of original conditions amended following AQAP consultation. Preparation of new policy/conditions delayed by Covid work
8	Council Refuse & Recycling Vehicle Routing	Freight and Delivery Management	Route Management Plans/ Strategic routing strategy for HGV's	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Medium	Quarterly meeting with Head of Waste	Complete	Maldon District Council Refuse & Recycling Vehicles will not use Market Hill unless undertaking collection on Market Hill
9	MDC Team Talk	Policy Guidance and Development Control	Other policy	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	AQ highlighted in MDC team Talk	Implemented as part of Clean Air day work	MDC staff received the Clean Air Day advice going out to residents and asked to support Clean Air Day by making pledges
10	Council Vehicles Upgrade to Electric	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	2020		Maldon District Council	Maldon District Council	NO	Not Funded	£100k - £500k	Planning	Low	Compile an inventory of Council owned vehicles. +Review options to include AQ weighting	Inventory process underway	

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
													within the Council's procurement strategy		
11	Clean Air Walking & Cycling Routes	Public Information	Via leaflets	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	Provide online information to residents and visitors about walking and cycling routes away from pollution hotspots to include social distancing pavement space advice	Complete	
12	Electric Vehicle Charging Points at Supermarkets	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	2020	Maldon District Council	Supermarkets / Grant funding opportunities	NO	Not Funded	£100k - £500k	Completed	Low	Survey local supermarkets re EV charge points and proposals. Promote mapped EV charging points via social media	Complete	
13	School Travel Plans for schools in Maldon	Promoting Travel Alternatives	School Travel Plans	2020	Progress dependant on funding	Maldon District Council	Maldon District Council	NO	Not Funded	< £10k	Planning	N/A	Development and implementation of travel plans by schools		Barriers include access to funding and resources to promote modeshift STARS and support schools
14	Information on Domestic Fuel & Woodburning	Public Information	Via leaflets	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	Mail drop addresses on Market Hill advice leaflet. Promote through Council website and social media	Complete	
15	Indoor Air Quality	Public Information	Via leaflets	2020	2020	Maldon District Council	Maldon District Council	NO	Funded	< £10k	Completed	Low	Distribution of indoor air quality leaflet through website and social media	Complete	

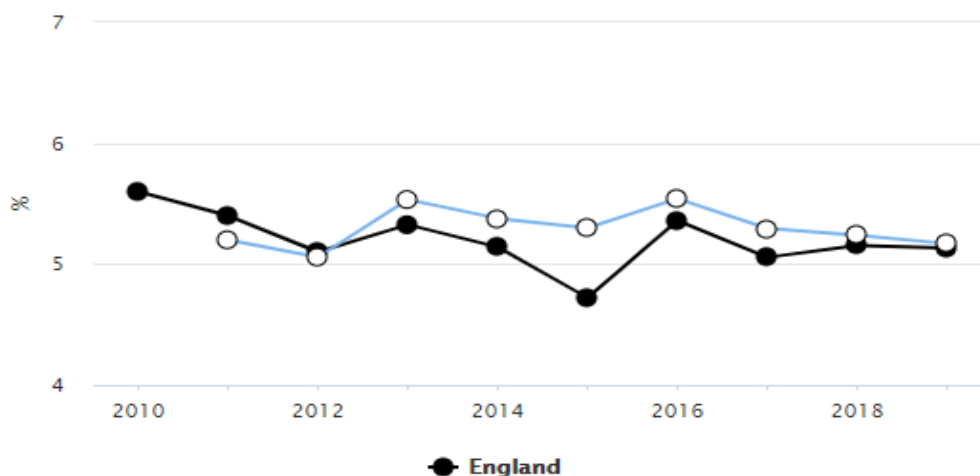
PM_{2.5} – Local Authority Approach to Reducing Emissions and/or Concentrations

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.

Maldon District Council does not monitor PM_{2.5} concentrations however notes the Defra background mapping resource which for PM_{2.5} in 2020 models a maximum annual mean concentration of 9.99µg/m³ in the Local Authority area. This is marginally lower than the World Health Organisation air quality guideline value of 10 µg/m³ for PM_{2.5}.

The Public Health Outcomes Framework indicator D01 – Fraction of mortality attributable to particulate (PM_{2.5}) air pollution which for 2019 gave a value of 5.2%. These values generally better than for other authorities within the region.

Figure 2.1 – Public Health Framework Indicator D01 Fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution



Maldon District 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}

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

This section sets out the monitoring undertaken within 2020 by Maldon District Council and how it compares with the relevant air quality objectives.

Monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed. It should be noted that within the AQMA, monitoring only commenced in 2017.

No exceedances of the nitrogen dioxide air quality objectives have been identified and the long-term trend for monitored concentrations is downwards.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Maldon District Council does not undertake automatic continuous monitoring.

3.1.2 Non-Automatic Monitoring Sites

Maldon District Council undertook non-automatic (i.e. passive) monitoring of NO₂ using 30 diffusion tubes at 26 sites during 2020. Table A.1 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

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.

Appendix A: Monitoring Results

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.

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

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m)	Distance to Kerb of Nearest Road (m)	Tube Co-located with a Continuous Analyser	Height (m)
MD1	Opposite CherryOak A414	Roadside	580645	204820	NO2		15.9	10.7	No	2.5
MD2 MD2B MD2C	A414 Spital Road/A414 Bypass	Kerbside	583952	205742	NO2		17.0	1.0	No	2.5
MD3	Heybridge Approach	Roadside	584763	208107	NO2		17.9	3.7	No	2.5
MD5	Colchester Rd/Heybridge Street Junction	Roadside	585914	208104	NO2		15.6	3.9	No	2.5
MD6	High Street (Market Hill Junction)	Urban Centre	585072	207080	NO2		0.0	2.1	No	2.5
MD7	Wantz Road/High Street	Urban Centre	585307	206943	NO2		1.9	1.6	No	2.5
MD8	Latchingdon/Burnham Road Junction	Kerbside	588575	200492	NO2		11.6	0.4	No	2.5

MD11	Latchingdon Street	Kerbside	588205	200438	NO2		0.0	1.3	No	2.5
MD12	A414 Spital Road/A414 Bypass	Kerbside	583862	205549	NO2		32.4	1.5	No	2.5
MD13	Limebrook Way/A414 Bypass	Kerbside	584165	205532	NO2		31.6	1.5	No	2.5
MD14	The Causeway	Roadside	585221	207682	NO2		0.0	9.0	No	2.5
MD16	8 Narvik Close	Roadside	584309	205776	NO2		3.0	0.5	No	2.5
MD17	2 Creasen Butt Close	Suburban	585078	207924	NO2		5.0	0.5	No	2.5
MD19	Adjacent to 16 Mill Road, Maldon	Kerbside	585565	206723	NO2		3.4	0.2	No	2.5
MD22A MD22B MD22C	10 Market Hill, Maldon	Roadside	585062	207160	NO2	MDC Air Quality Management Area Number 1	0.5	1.5	No	2.5
MD23	59-63 Market Hill, Maldon	Roadside	585055	207324	NO2	MDC Air Quality Management Area Number 1	1.5	1.3	No	2.5
MD24	32 Market Hill	Roadside	585045	207272	NO2	MDC Air Quality Management Area Number 1	0.7	1.9	No	2.5
MD25	1 Hillside, Maldon	Roadside	585016	207241	NO2	MDC Air Quality Management Area Number 1	5.0	1.4	No	2.5
MD26	18 Market Hill, Maldon	Roadside	585045	207186	NO2	MDC Air Quality Management Area Number 1	0.0	2.6	No	2.5
MD27	6 Market Hill, Maldon	Roadside	585073	207132	NO2	MDC Air Quality Management Area Number 1	0.0	2.3	No	2.5

MD28	21 Market Hill, Maldon	Roadside	585067	207116	NO2	MDC Air Quality Management Area Number 1	0.0	1.6	No	2.5
MD29	5 The Square, Heybridge	Roadside	585467	208089	NO2		4.0	1.0	No	2.5
MD30	High Street, Maldon	Roadside	584868	207042	NO2		0.0	1.0	No	2.5
MD31	Petchey Court, Fambridge Road	Roadside	584809	206962	NO2		0.0	3.0	No	2.5
MD32	Goings Wharf, Colchester Road	Roadside	585740	208010	NO2		0.0	2.5	No	2.5
MD33	High Street, Maldon	Roadside	584857	207023	NO2		0.0	1.0	No	2.5

Notes:

- (1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).
(2) N/A if not applicable.

Table A.2 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northings)	Site Type	Valid Data Capture for Monitoring Period (%)	Valid Data Capture 2020 (%)	NO ₂ Annual Mean Concentration (µg/m ³)				
						2016	2017	2018	2019	2020
MD1	580645	204820	Roadside	100	100.0	33.3	31.4	28.8	27.3	20.1
MD2, MD2B, MD2C	583952	205742	Kerbside	100	100.0	30.9	28.1	28.8	27.0	22.7
MD3	584763	208107	Roadside	100	100.0	30.8	30.2	29.2	28.4	24.1
MD5	585914	208104	Roadside	83	84.6	32.3	32.2	29.2	28.2	25.1
MD6	585072	207080	Urban Centre	100	100.0	30.1	29.7	26.9	25.9	21.3
MD7	585307	206943	Urban Centre	100	100.0	29.2	31.6	26.4	27.1	22.2
MD8	588575	200492	Kerbside	100	100.0	32.1	32.4	29.0	28.3	23.5
MD11	588205	200438	Kerbside	100	100.0	23.3	24.7	24.0	23.2	20.2
MD12	583862	205549	Kerbside	92	92.3	29.0	27.6	24.5	23.6	18.8
MD13	584165	205532	Kerbside	100	100.0	25.9	25.5	23.9	23.8	18.3

MD14	585221	207682	Roadside	92	92.3	30.7	29.4	26.6	26.1	22.8
MD16	584309	205776	Roadside	100	100.0	15.7	15.3	13.6	13.8	12.1
MD17	585078	207924	Suburban	100	100.0	18.5	20.9	15.8	17.4	14.6
MD19	585565	206723	Kerbside	100	100.0		21.6	20.7	20.7	18.9
MD22 A, MD22 B, MD22 C	585062	207160	Roadside	100	100.0		58.2	58.4	55.1	42.8
MD23	585055	207324	Roadside	83	84.6			37.1	41.1	31.4
MD24	585045	207272	Roadside	100	100.0			46.3	42.6	33.6
MD25	585016	207241	Roadside	100	100.0			30.9	27.5	23.7
MD26	585045	207186	Roadside	100	100.0			39.1	37.4	27.7
MD27	585073	207132	Roadside	100	100.0			61.8	51.9	43.0
MD28	585067	207116	Roadside	75	76.9			28.9	27.7	26.3
MD29	585467	208089	Roadside	100	100.0				28.9	24.9
MD30	584868	207042	Roadside	100	100.0				32.0	25.5
MD31	584809	206962	Roadside	100	100.0				24.5	19.4

MD32	585740	208010	Roadside	100	100.0				31.0	25.6
MD33	584857	207023	Roadside	92	92.3					28.9

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

Diffusion tube data has been bias adjusted

Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction

Notes:

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

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 – Annual Mean NO₂ Concentrations Trends in the Market Hill AQMA

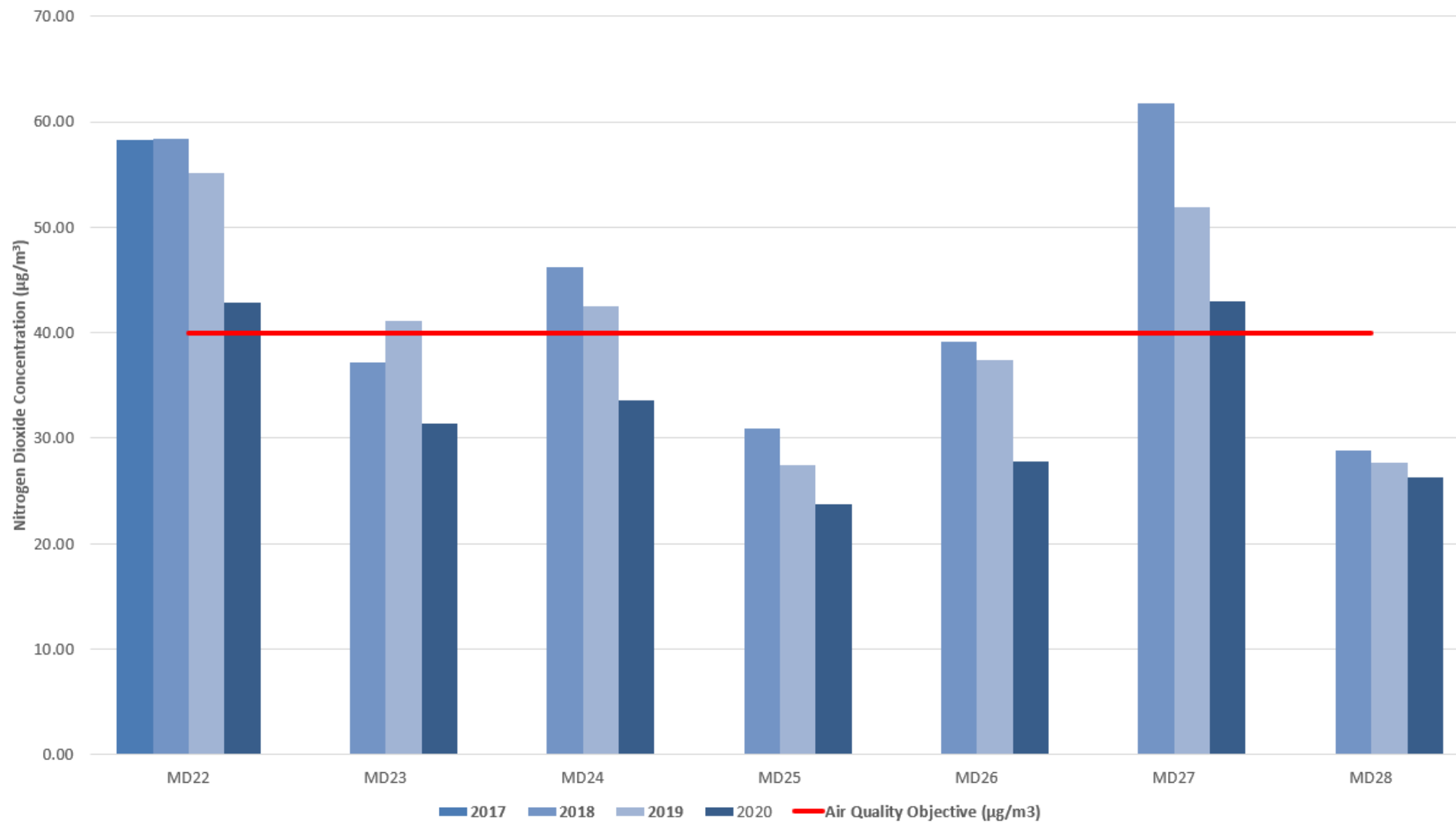
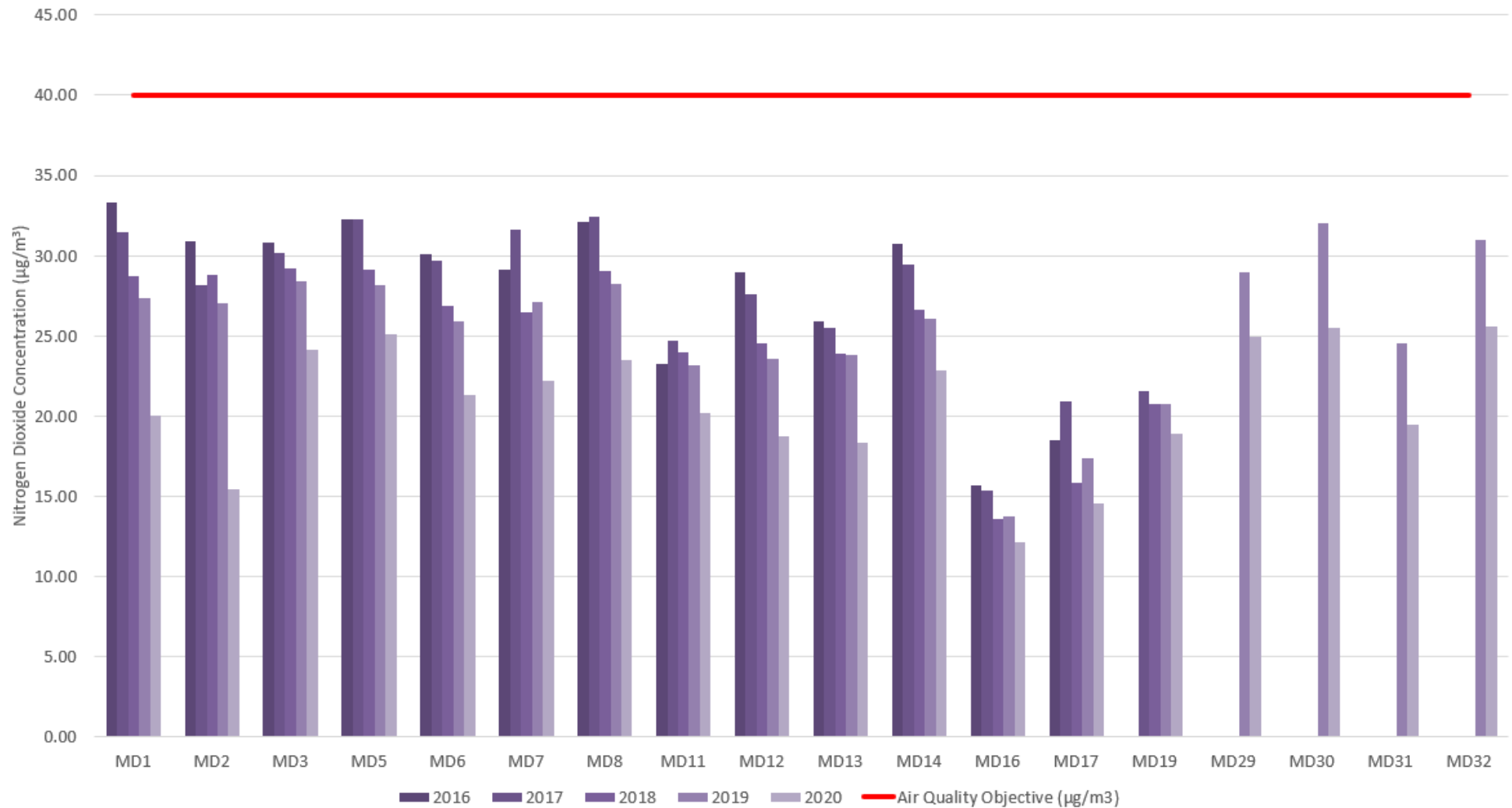


Figure A.2 – Annual Mean NO₂ Concentrations outside of the AQMA



Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO₂ 2020 Diffusion Tube Results (µg/m³)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO ₂ Mean Concentrations (µg/m ³)													Annual Mean (µg/m ³)	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.77) and Annualised	
MD1	580645	204820	30.8	25.5	23.1	22.2	22.9	20.8	21.4	30.4	30.5	23.8	35.3	26.0	26.1	20.1	
MD2	583952	205742	35.6	20.7	18.5	27.0	18.9	29.7	47.4	32.7	32.9	33.7	41.3	33.4	29.5	22.7	
MD2B	583952	205742	39.5	19.8	17.9	24.9	23.3	32.7	16.1	22.3	30.2	35.0	45.4	34.6			
MD2C	583952	205742	36.8	26.4	20.1	28.1	21.0	28.6	16.9	34.4	27.1	31.2	42.7	36.1			
MD3	584763	208107	45.3	30.2	24.9	20.8	24.6	31.0	28.2	30.9	34.8	34.3	36.9	34.2	31.3	24.1	
MD5	585914	208104	49.3	Missing	20.3	Missing	19.5	26.0	25.2	33.8	31.3	40.7	42.7	36.8	32.6	25.1	
MD6	585072	207080	41.7	31.0	26.7	21.4	18.8	20.3	22.0	23.0	33.2	28.1	36.1	29.7	27.7	21.3	
MD7	585307	206943	45.9	33.5	24.7	21.7	17.5	22.1	24.4	27.4	27.6	31.5	37.3	31.9	28.8	22.2	
MD8	588575	200492	48.6	28.8	14.5	24.8	23.7	29.4	25.9	31.9	37.5	30.1	45.1	26.2	30.5	23.5	
MD11	588205	200438	39.9	28.6	21.2	19.6	22.0	22.8	20.9	23.7	26.1	27.2	33.3	28.9	26.2	20.2	
MD12	583862	205549	33.2	21.8	19.5	Missing	17.1	23.9	18.8	24.3	26.5	25.6	32.7	24.8	24.4	18.8	
MD13	584165	205532	34.9	22.6	18.9	16.8	17.2	20.4	19.9	24.0	25.9	24.3	32.6	28.1	23.8	18.3	
MD14	585221	207682	43.4	38.6	27.6	Missing	18.1	22.9	18.6	26.9	31.5	31.5	34.2	33.0	29.7	22.8	
MD16	584309	205776	24.0	17.8	11.4	11.7	8.3	10.1	9.0	11.0	14.1	15.9	34.2	21.1	15.7	12.1	
MD17	585078	207924	34.5	20.0	16.2	12.8	9.5	14.1	13.6	12.9	18.7	21.9	30.4	22.5	18.9	14.6	
MD19	585565	206723	41.5	24.1	19.5	17.4	13.3	17.9	15.6	19.6	26.3	27.8	36.8	34.1	24.5	18.9	
MD22A	585062	207160	64.7	44.7	47.6	62.9	54.1	51.6	36.9	70.7	62.2	52.0	57.7	55.7	55.6	42.8	
MD22B	585062	207160	70.0	48.1	53.0	62.9	57.1	55.4	36.0	67.8	60.1	53.6	64.5	69.5			
MD22C	585062	207160	65.2	46.5	48.8	62.8	47.3	49.4	37.1	67.8	53.8	51.3	58.9	55.6			
MD23	585055	207324	Erroneous Data Point Removed	36.6	48.4	Missing	20.4	26.1	24.7	24.9	29.5	51.7	69.4	76.2	40.8	31.4	
MD24	585045	207272	58.5	44.6	32.6	41.3	38.7	38.4	29.4	47.5	51.2	42.9	50.3	48.5	43.7	33.6	
MD25	585016	207241	45.1	28.3	21.4	26.7	22.4	27.4	20.8	27.4	33.5	34.9	40.0	41.9	30.8	23.7	
MD26	585045	207186	43.5	33.8	30.0	38.2	35.9	36.1	23.7	46.8	40.3	29.5	36.3	38.3	36.0	27.7	
MD27	585073	207132	73.9	50.9	41.9	54.1	54.1	56.7	16.5	70.1	71.5	56.3	61.9	61.6	55.8	43.0	

MD28	585067	207116	45.0	37.8	26.2	Missing	22.4	Missing	Missing	34.7	33.4	32.9	34.1	40.4	34.1	26.3
MD29	585467	208089	47.7	69.3	26.6	20.5	17.2	27.0	16.8	27.2	30.7	32.6	39.3	33.3	32.4	24.9
MD30	584868	207042	44.4	38.4	27.9	27.5	22.0	25.9	26.1	32.7	39.8	38.4	45.1	29.0	33.1	25.5
MD31	584809	206962	40.0	26.6	23.0	18.1	15.2	18.5	15.5	21.1	28.8	27.3	38.3	30.7	25.3	19.4
MD32	585740	208010	47.7	35.5	29.7	16.1	26.1	31.9	26.8	34.2	38.6	35.6	40.1	36.9	33.3	25.6
MD33	584857	207023	53.3	41.0	34.1	Missing	25.9	30.7	27.5	38.3	42.1	37.8	44.5	38.0	37.6	28.9

All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1

No annualisation has been required

National bias adjustment factor used

Maldon District Council confirms that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System

Notes:

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 Maldon During 2020

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

Additional Air Quality Works Undertaken by Maldon District Council during 2020

Maldon District Council has not completed any additional works within the reporting year of 2020.

QA/QC of Diffusion Tube Monitoring

Diffusion Tubes QA/QC

Maldon District Council undertook monitoring at 30 nitrogen dioxide diffusion tubes at 26 sites in 2020.

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

The AIR NO₂ proficiency testing scheme found that the laboratory achieved the following percentage of results determined as satisfactory for 2020:

Table C.1 – AIR PT Results 2020

AIR PT Round	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040
Round conducted in the period	January – February 2020	April – May 2020	July – August 2020	September – October 2020
SOCOTEC	100%	No results reported	No results reported	100%

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within this 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.

As Maldon District Council do not undertake automatic air quality monitoring it is not possible to calculate a local bias adjustment. The national bias adjustment factor of 0.77 has been applied to the 2020 monitoring data. A summary of bias adjustment factors used by Maldon District Council over the past five years is presented in Table C.2. The same laboratory and preparation of diffusion tubes have been used over this time.

Table C.2 – Bias Adjustment Factor

Year	Local or National	Diffusion Tube	Version of National Spreadsheet	Adjustment Factor
2020	National	Socotec 50% TEA in Acetone	03/21	0.77
2019	National	Socotec 50% TEA in Acetone	03/20	0.75
2018	National	Socotec 50% TEA in Acetone	03/19	0.76
2017	National	ESG Didcot 50% TEA in Acetone	03/18	0.77
2016	National	ESG Didcot 50% TEA in Acetone	03/17v2	0.77

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..

One diffusion tube NO₂ monitoring location within Maldon required distance correction during 2020. The MD22 triplicate site on Market Hill measured 42.8 µg/m³ at the roadside. The predicted concentration at the receptor was 41.0 µg/m³ which is above the air quality objectives.

Table C.3 – NO₂ Fall-off Calculation

Diffusion Tube ID	Distance (m)		NO ₂ Annual Mean Concentration (µg/m ³)		
	Monitoring Site to Kerb	Receptor to Kerb	Bias Adjusted	Background	Predicted at Receptor
MD22A MD22B MD22C	1.5	2.0	42.8	13.1	41.0

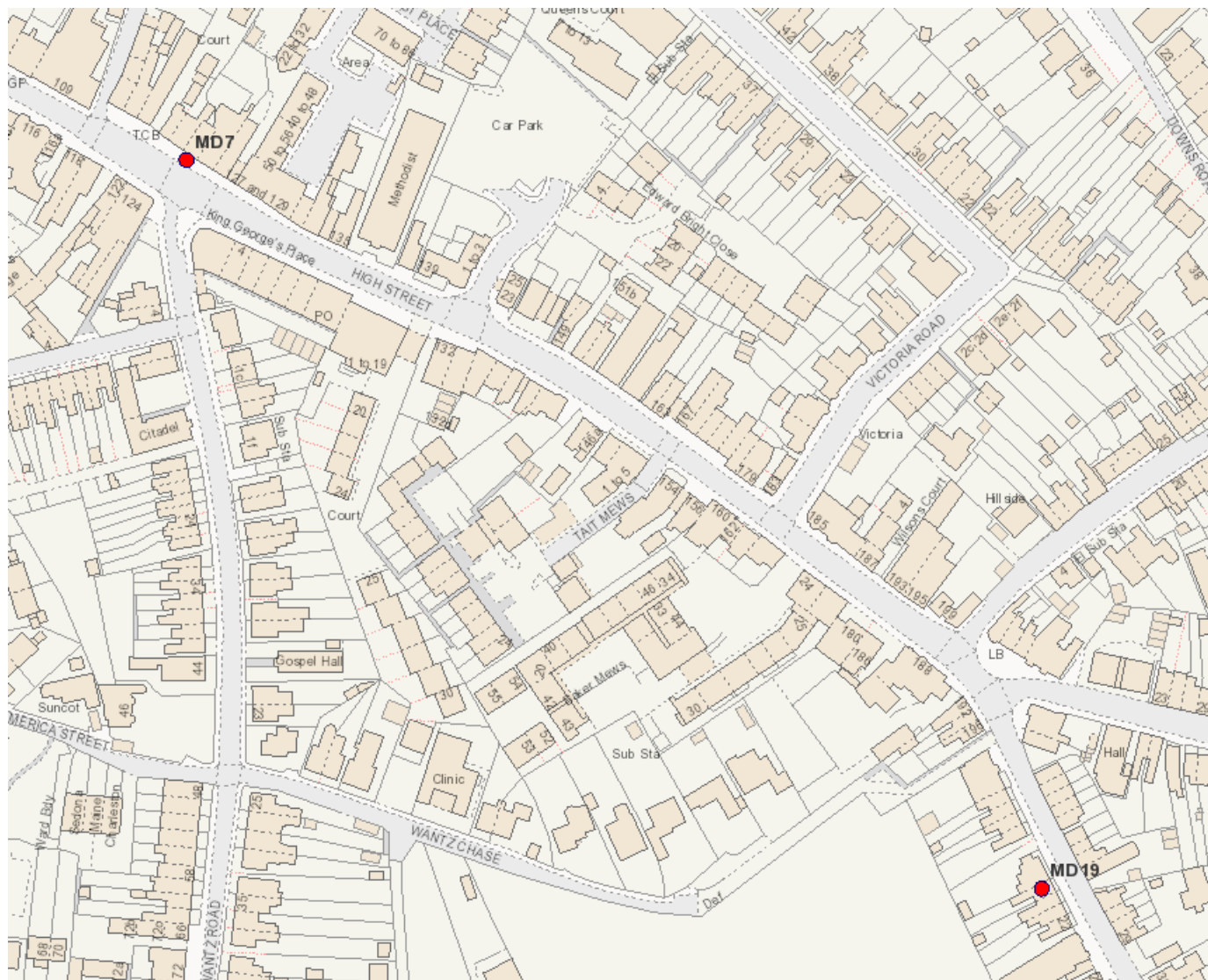
Appendix D: Map of Monitoring Locations and AQMAs

Figure D.1 – Monitoring Location Map: Market Hill AQMA



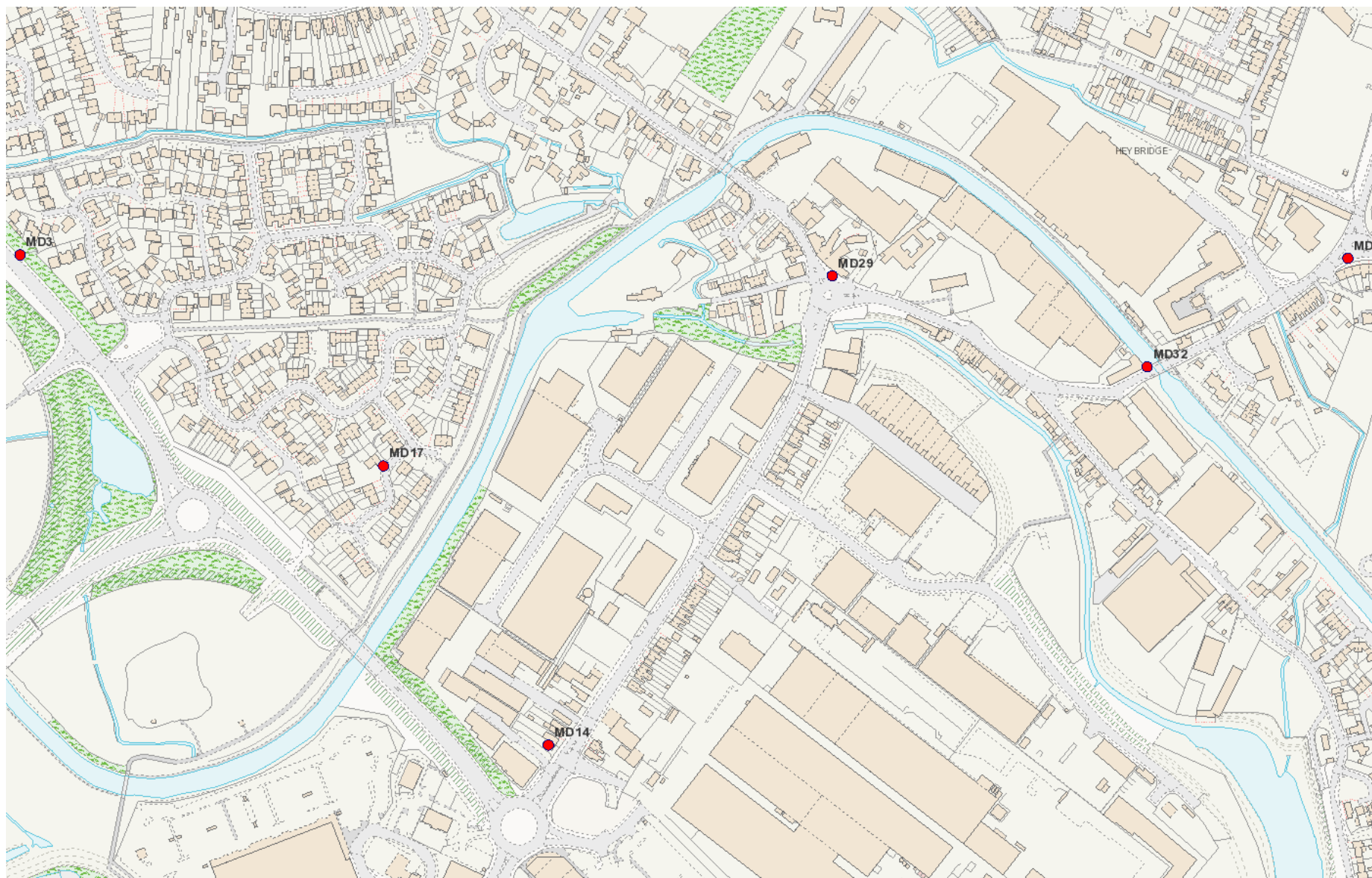
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Figure D.2 – Monitoring Location Map: East of Maldon Town Centre



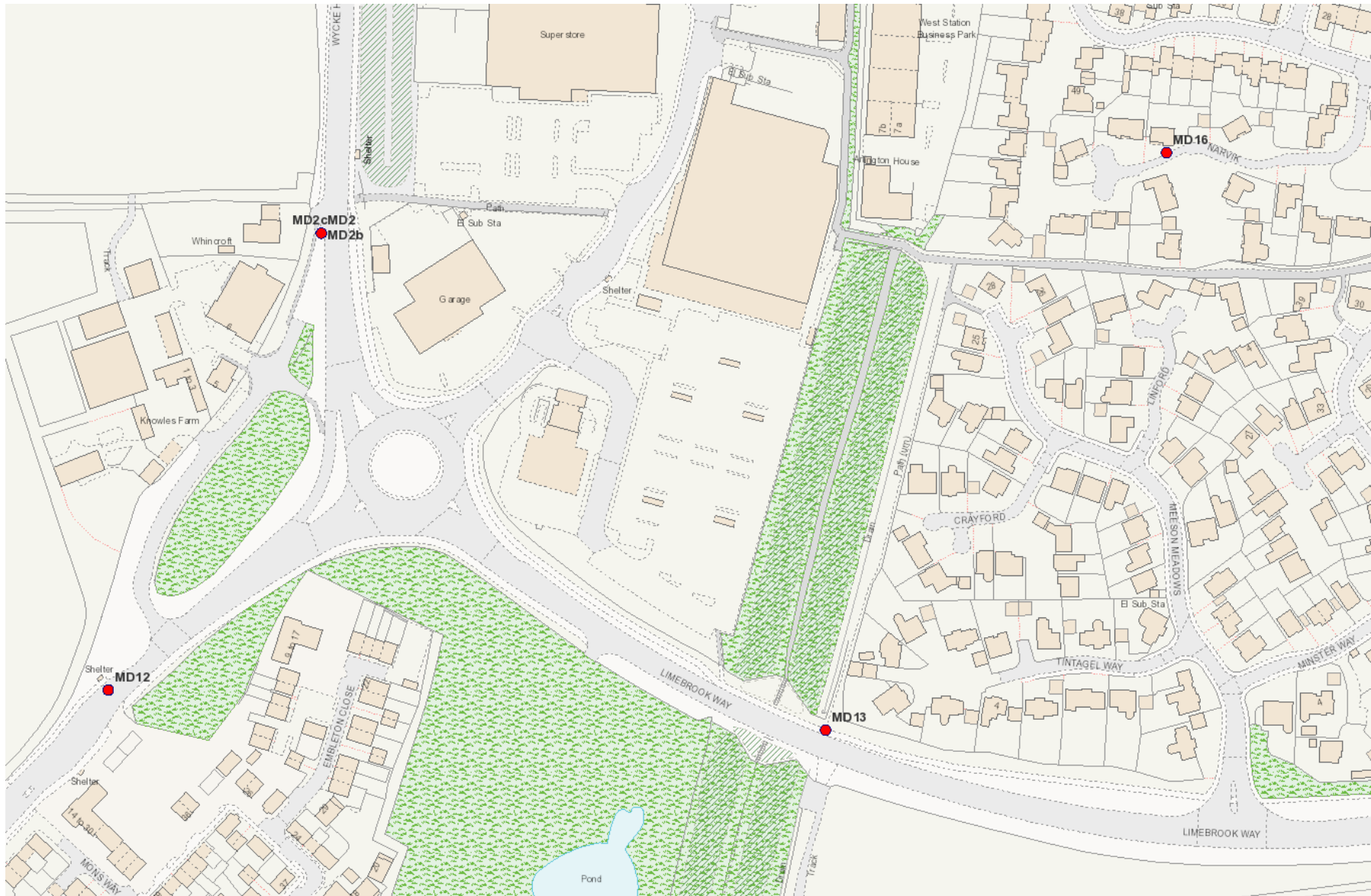
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Figure D.3 – Monitoring Location Map: Heybridge



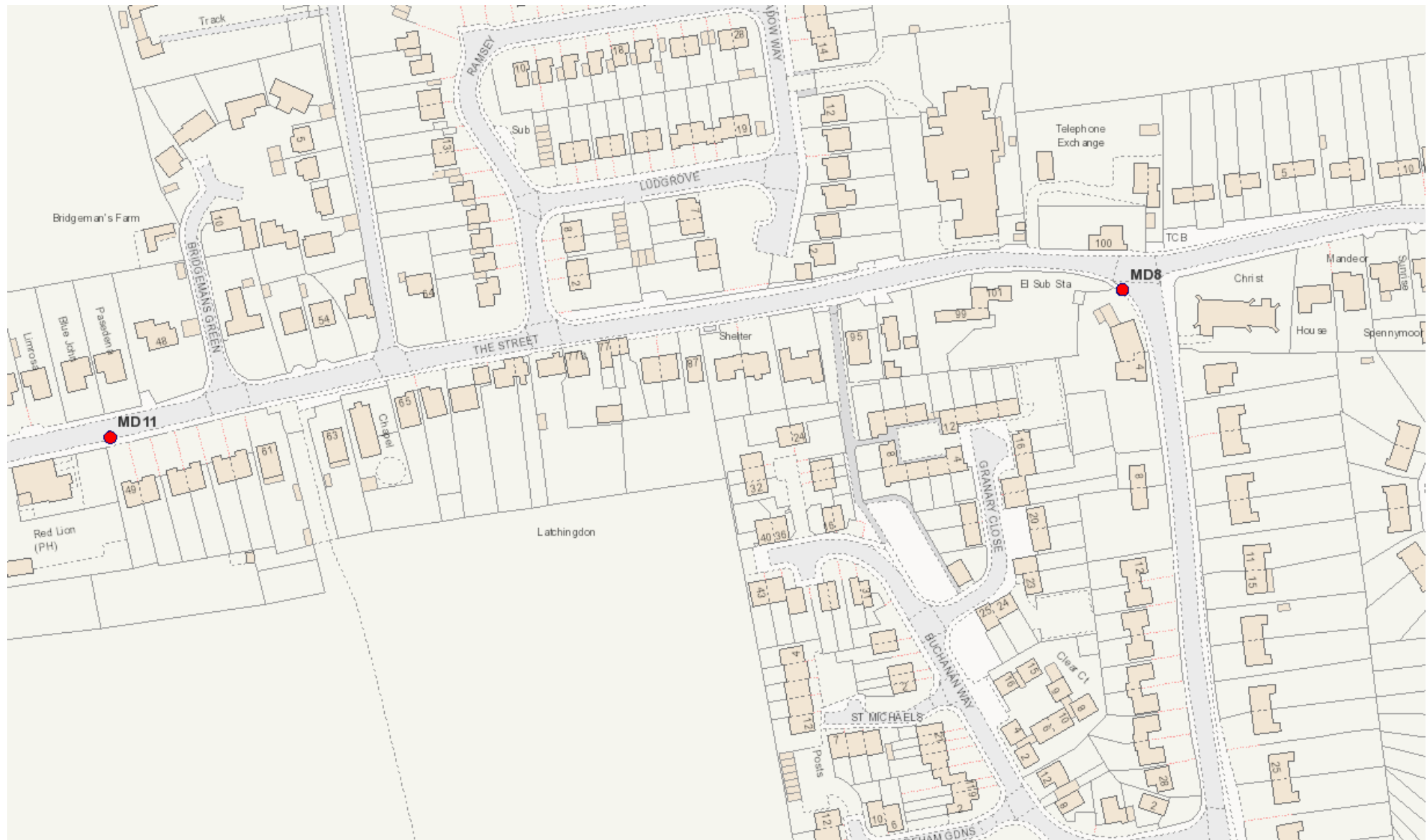
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Figure D.4 – Monitoring Location Map: A414 Wycke Hill / Limebrook Way Roundabout



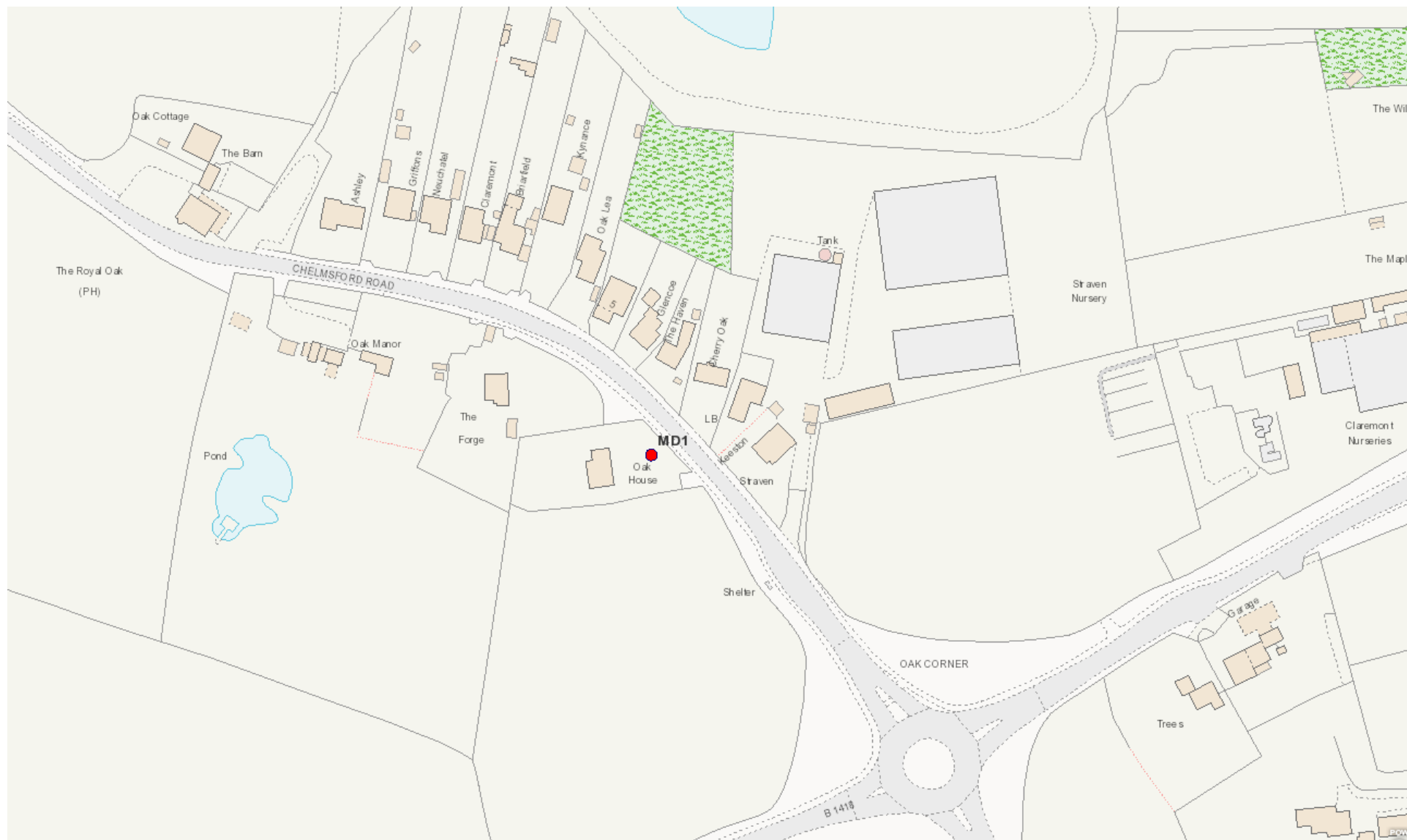
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Figure D.5 – Monitoring Location Map: Latchingdon



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Figure D.6 – Monitoring Location Map: A14 Chelmsford Road



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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 to 20µg/m³ if expressed relative to annual mean averages. During this period, changes in PM_{2.5} concentrations were less marked than those of NO₂. PM_{2.5} concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that PM_{2.5} concentrations during the initial lockdown period are of the order 2 to 5µg/m³ 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 Maldon

Reductions of NO₂ concentrations of between 20 and 40% were experienced at roadside diffusion tube monitoring sites within AQMA 1 between April and June 2020. This equates to a 20% reduction in annual mean concentration relative to 2019. The gradient of the road and street canyon in the AQMA reduces dispersion and this can be witnessed when emissions are low such as during the spring 2020 lockdown, when measured pollution was disproportionately low compared with other sites where dispersion is good.

The reduction in NO₂ experienced within 2020 will allow the Council to provide improve the evidence base in relation to the annual mean objective being achievable by the proposed measures.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Maldon

During 2020, there has been no impact on passive monitoring data capture, bias adjustment factor, adherence to changeover dates, or storage of the diffusion tubes.

The implementation of action plan measure 1: development of a transport strategy for Maldon has been delayed due to the ongoing impact of Covid-19 on traffic levels. **Small Impact**

The impacts as presented above are aligned with the criteria as defined in Table F.1, with professional judgement considered to be Small.

Table F.1 – Impact Matrix

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

Opportunities Presented by COVID-19 upon LAQM within Maldon.

Maldon District Council and Essex County Council implemented an interim 20mph speed limit on roads in the busy central shopping area of Maldon commencing from Tuesday 23 June. The new lower speed limits aim to increase pedestrian and cyclist confidence when having to avoid other people, particularly where traffic is passing. The scheme, like others being introduced across the county, is driven by immediate public health requirements such as social distancing, but in encouraging walking and cycling it will enable healthier, more sustainable ways of getting around locally.

The project is funded by part of the initial £1.9m Emergency Active Travel Fund for Essex announced by the government for such schemes and was a measured included within the Councils new Air Quality Action Plan.

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
CAZ	Clean Air Zone
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
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

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 NO₂ PT Scheme available at; <https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>
- 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>
- Maldon District Council Air Quality Action Plan available at; http://www.maldon.gov.uk/download/downloads/id/18206/air_quality_action_plan_2_july_2020.pdf
- Maldon District Council 2020 ASR available at; <https://essexair.org.uk/Reports/Maldon2020ASR.pdf>
- Public Health Outcomes Framework Indicator 3.01 available at; <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>
- 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 available at; <https://laqm.defra.gov.uk/technical-guidance/>
- 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 available at; <https://laqm.defra.gov.uk/documents/LAQM-PG16-April-16-v1.pdf>