2025 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June, 2025

Local Authority Officer	Tim Savage
Department	Public Health & Protection Services
Address	Duke Street, Chelmsford, Essex, CM1 1JE
Telephone	01245 606606
E-mail	tim.savage@chelmsford.gov.uk
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Written by	Tim Savage
Scientific Team Public Health & Protection Services Chelmsford City Council Duke Street Chelmsford Essex CM1 1JE	

Executive Summary: Air Quality in Our Area

The 2025 Annual Status Report (ASR) is designed to provide the public with information relating to local air quality in Chelmsford, to fulfil Chelmsford City 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 2024, Chelmsford City Council measured **no** exceedances of the Air Quality Objectives and measured particulate matter ($PM_{2.5}$) concentrations are below the Environment Act (2021) annual mean concentration target of 10µg/m³.

Air Quality in Chelmsford

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality.

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Low-income communities are also disproportionately impacted by poor air quality, exacerbating health and social inequalities.

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

Chelmsford is located in mid Essex, thirty-one miles from London and has a population of over 181,500 (2021 census), largely living in the main urban areas of Chelmsford and South Woodham Ferrers. The City of Chelmsford comprises of a number of suburban areas surrounding the main urban areas and the larger rural villages of Danbury, East and West Hanningfield, Great Leighs, Little Waltham and Little Baddow.

In Chelmsford there have been two declared Air Quality Management Areas (AQMA) due to emissions from road traffic causing exceedances of the nitrogen dioxide annual mean air quality objective.

Following a review of historical air quality monitoring data, Chelmsford City Council revoked the Army & Navy and A414 Maldon Road Air Quality Management Areas (AQMAs) in March 2024.

The 2023 Annual Status Report confirmed a long-term decline in NO_2 levels. All concentrations at relevant exposure points remained below the 10% borderline threshold for three years, and modelling of proposed developments near the Army & Navy showed no adverse impact on air quality compliance.

These findings justified the revocation. Table ES 2 below provides details of the revoked AQMAs. Appendices F and G provide the revocation orders.

Table ES 2 - Revoked AQMAs

AQMA	Description	Pollutant	Date Declared	Date Amended	Date Revoked
Chelmsford Army and Navy AQMA	Incorporating several roads leading into the Army and Navy roundabout and the Baddow Road roundabout in Chelmsford.	NO_2 Annual Mean	01/12/2005	01/10/2012	14/03/2024
A414 Maldon Road, Danbury	The designated area incorporates the stretch of road between Gay Bowers Lane and Danbury village green and adjacent properties.	NO_2 Annual Mean	08/10/2018		14/03/2024

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent years, however health risks are present despite measured levels being below the air quality objective leaves. For this reason, local action is taken to promote awareness.

Air Quality Sensor – Army & Navy

An AQS1 air quality sensor has been installed on Baddow Road in Chelmsford, within the vicinity of the Army & Navy roundabout. The aim is to measure NO_2 concentrations in this area. The proposed improvements to the Army & Navy roundabout are anticipated lead to reductions in NO_2 concentrations at local properties, which the AQS1 unit could demonstrate has occurred once the scheme is implemented.

Table ES 3 – Air Quality Sensor Monitoring

Purpose / Project	Location	Location (X, Y)	Column No.	Installation Date
Army & Navy Roundabout	Baddow Road	571259 206255	Col 19	21/01/2025

Chelmsford City Council Sustainability Initiatives

The Council's Environmental Sustainability team rolled out a number of 'green' initiatives in 2024. Two of these initiatives have directly reduced NO_2, PM_{10} and $PM_{2.5}$ from Council operations:

Hydrotreated Vegetable Oil (HVO) fuel

74 freighter vehicles have been fuelled with HVO fuel which offers significant emissions advantages over conventional diesel, particularly in reducing nitrogen dioxide (NO_2), particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$).

HVO, a renewable diesel derived from vegetable oils or animal fats, undergoes a hydrotreatment process that results in a cleaner-burning fuel. Compared to diesel, HVO can reduce NO_2 emissions by up to 30%, as its cleaner combustion produces fewer nitrogen oxides. Due to its reduced soot formation and near-zero sulphur content, HVO significantly lowers PM_{10} and $PM_{2.5}$ emissions—often by 20-50%.

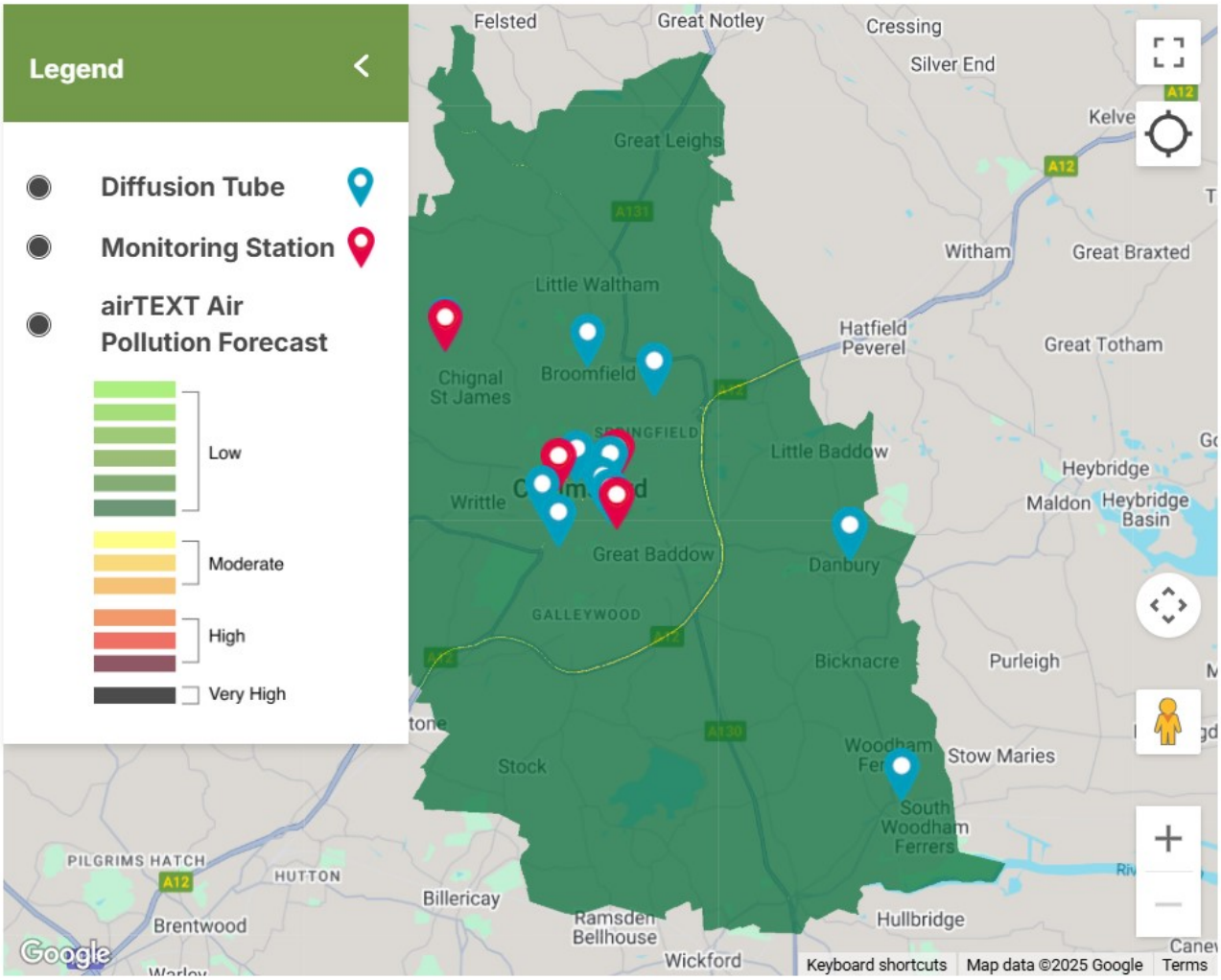
Electric Pool Cars

Between January and November 2024, 7052 miles were covered in the Councils electric pool cars, leading to a direct removal of NO_2 that would have been emitted from petrol or diesel vehicles during the traffic movements.

Local Engagement and How to get Involved

Love Your Chelmsford Air Quality Dashboard

The Love Your Chelmsford Air Quality Dashboard provides real-time and monthly data on air pollution levels across Chelmsford, using four monitoring stations and a cross-city network of diffusion tubes to measure pollutants like nitrogen dioxide (NO_2), particulate matter (PM_{10}, $PM_{2.5}$), and ozone (O_3). The dashboard, accessible at loveyourchelmsford.co.uk includes an interactive map showing air quality at specific sites, with hourly updates from automatic stations and monthly updates from diffusion tubes.



It also features airTEXT forecasts, which predict pollution levels for the area, though these may not reflect roadside conditions. Residents can use this tool to stay informed about local air quality and make decisions to reduce exposure, especially on high-pollution days. By subscribing to airTEXT alerts [via airtext.info/chelmsford](), individuals with lung or heart conditions can receive tailored notifications to adjust outdoor activities when air quality is poor, such as avoiding busy roads or limiting time outside during peak pollution hours.

Conclusions and Priorities

Chelmsford City Council have concluded that:

- There is a long term downwards trend of monitored NO_2 air pollution.
- No air quality exceedances have been identified in 2024.
- There are no new developments that will have a significant impact on air quality.
- Chelmsford City Council have an adopted an Air Quality Strategy (AQS)

Local Responsibilities and Commitment

This ASR was prepared by Public Health and Protection Services of Chelmsford City Council.

This ASR has been approved by:

Lewis Mould – Public Health and Protection Services Manager, Chelmsford City Council

This ASR has been sent to the Director of Public Health at Essex County Council.

If you have any comments on this ASR please send them to Tim Savage at:

Telephone: 01245 606606

Email: scientific.team@chelmsford.gov.uk

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in Chelmsford during 2024. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), 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 order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Chelmsford City 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

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained, and provide dates by which measures will be carried out.

Chelmsford Council does not have any declared AQMAs.

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

Defra's appraisal of last year's ASR concluded that report was well structured, detailed, and provides the information specified in the Technical Guidance.

Chelmsford City Council have a number of ongoing measures to improve air quality across Chelmsford. These are detailed in Table 2.1 below.

Table 2.1 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	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	Army & Navy Sustainable Transport Package	Transport Planning and Infrastructure	2019	2019	2029	DfT	DfT	NO	Part Funded	> £10 million	Planning			The DfT approved the Outline Business Case and agreed to contribute £68.75million of MRN funding Planning applications: Army & Navy Junction CC/CHL/108/23 Approved Sandon Park & Ride CC/CHL/109/23 Approved Chelmer Valley Park & Ride CC/CHL/110/23 Approved	
2	Assessment of Smoke Controlled Areas	Policy Guidance and Development Control	Other policy	2023	2026	Chelmsford City Council	Chelmsford City Council	NO	Not Funded	< £10k	Planning				
3	Use of Air Quality Sensor Nodes to Extend Monitoring Network	Other	Other	2023	2025	Chelmsford City Council	Chelmsford City Council	NO	Funded	£10k - 50k	Implementation			Sensor installed on Parkway near to Army & Navy Roundabout Additional sensors being considered	
4	Member of Essex Air	Policy Guidance and Development Control	N/A	N/A	N/A	N/A	N/A	NO	Funded	< £10k	Implementation				
5	Environmental Permit Inspection & Enforcement	Environmental Permits	N/A	N/A	N/A	Chelmsford City Council	Chelmsford City Council	NO	Funded	< £10k	Implementation				
6	Essex Liftshare	Alternatives to private vehicle use	N/A	N/A	N/A	Essex County Council	Essex County Council	NO	Funded	< £10k	Implementation				

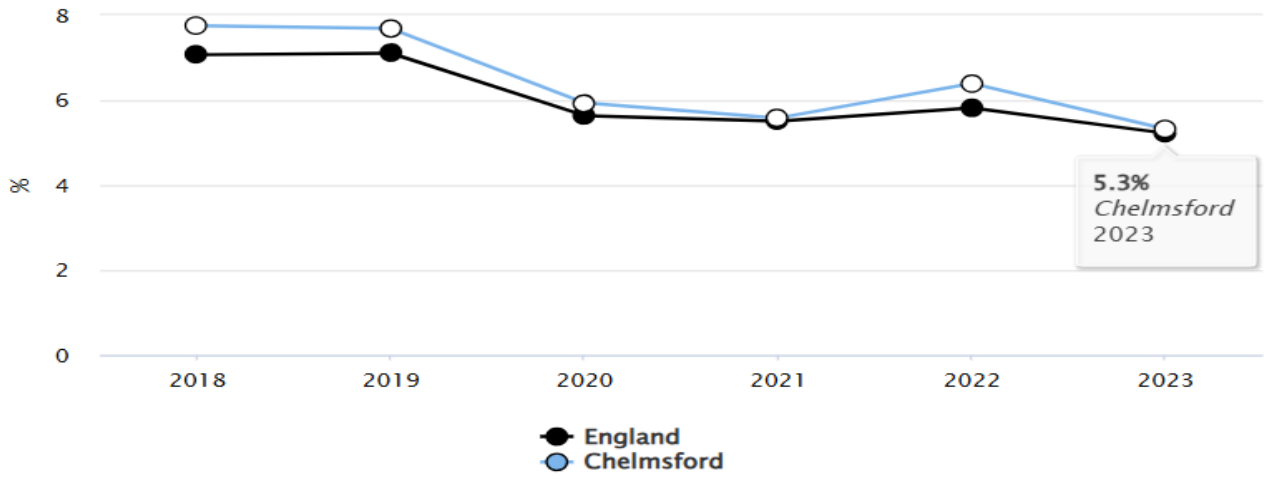
2.3 $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[1], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller than 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Chelmsford City Council monitors $PM_{2.5}$ concentrations in two locations and the highest measured annual mean concentration for 2024 was 9.5µg/m^3. The Defra background mapping resource which for $PM_{2.5}$ in 2024 models a maximum annual mean concentration of 8.9µg/m^3. Both measured concentrations and modelled background concentrations are below the Environment Act (2021) annual mean concentration target of 10µg/m³.

The Public Health Outcomes Framework indicator D01 – Fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution which for 2023 gave a value of 5.3%.

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



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

- Regular inspections of permitted industry where combustion and non-combustion processes could lead to anthropogenic emissions of PM2.5
- Chelmsford City Council has provided an information webpage regarding domestic burning https://loveyourchelmsford.co.uk/air-quality-dashboard/domestic-burning/

[1] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

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

This section sets out the monitoring undertaken within 2024 by Chelmsford City Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2020 and 2024 to allow monitoring trends to be identified and discussed.

In 2024, Chelmsford City Council measured **no** exceedances of the Air Quality Objectives.

Measured NO_2 annual mean concentrations are continuing to fall. As no measured annual mean concentrations were greater than 60µg/m^3, it is considered unlikely that there has been an exceedance of the 1-hour mean objective

No exceedances of the PM_{10} have been identified and across five years monitoring data, there is a downwards trend of measured PM_{10} pollution.

Monitored $PM_{2.5}$ is below the Environment Act (2021) annual mean concentration target of 10µg/m³.

Quality assurance and quality control information for the automatic analysers, diffusion tubes bias adjustments and other adjustments applied (e.g. annualisation and/or distance correction) are presented in Appendix C. Maps showing the location of the monitoring sites are presented in Appendix D.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Chelmsford City Council undertook automatic (continuous) monitoring with reference analysers at four sites during 2024. Table A.1 in Appendix A shows the details of the automatic monitoring sites.

3.1.2 Non-Automatic Monitoring Sites

Chelmsford City Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 19 sites during 2024. Table A.2 in Appendix A presents the details of the non-automatic sites.

3.2 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.

In 2024, Chelmsford City Council measured **no** exceedances of the NO_2 Air Quality Objectives.

3.2.1 Nitrogen Dioxide (NO_2)

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.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/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).

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. As no measured annual mean concentrations were greater than 60µg/m^3, it is unlikely that there has been an exceedance of the 1-hour mean objective.

For diffusion tubes, the full 2024 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.

Most monitoring locations identify a downwards trend of measured pollution. The exception is the NO_2 analyser at the CM2 Springfield Road automatic monitoring station which has showed 2 years of increases, breaking the downwards trend of pollution. The Council's air quality maintenance and servicing contractor is reviewing the data sets and ratification process to identify any reason for these increases however this update is not available at the time of report submission.

3.2.2 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

The results show that no exceedances of the annual mean Air Quality Objective have been measured and that there is no clear trend.

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 50µg/m^3, not to be exceeded more than 35 times per year.

In 2024, Chelmsford City Council measured **no** exceedances of the PM_{10} Air Quality Objectives.

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past five years.

Figure A.2 sets out this information in a chart.

The results are **below** the Annual Mean Concentration Target ('concentration target') - maximum concentration of 10µg/m^3 to be met across England by 2040 as set out by the Environment Act 2021.

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)
CM1	Chignal St James	Rural	566463	210830	NO_2, $PM_{2.5}$	NO	Chemiluminescent / Heated BAM	40	43	4
CM2	Springfield Road (Prison)	Roadside	571640	207179	NO_2, PM_{10}, $PM_{2.5}$	NO	Chemiluminescent / Unheated BAM / Heated BAM	29.2	2.8	2.5
CM3	Rainsford Lane (Fire Station)	Roadside	569912	206881	NO_2, PM_{10}	NO	Chemiluminescent / Unheated BAM	20	2.5	2.5
CM4	Baddow Road	Roadside	571654	205798	NO_2	NO	Chemiluminescent	12	5.1	1.5

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 – 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)
CB01	12 Van Diemans Road	Roadside	571421	205963	NO_2	No	0.0	12.0	No	2.5
CB22	95 Baddow Road	Roadside	571505	205968	NO_2	No	0.0	8.0	No	2.5
CB38	Prison AQMS	Roadside	571640	207179	NO_2	No	14.0	3.0	No	2.5
CB58	148 Baddow Road	Roadside	571476	205964	NO_2	No	0.0	12.0	No	2.5
CB62	Chignal AQMS	Rural	566463	210830	NO_2	No	40.0	43.0	No	4.0
CB65	Fire Station AQMS	Roadside	569912	206881	NO_2	No	20.0	2.5	No	2.5
CB76	5/7 Maldon Road, Danbury	Roadside	578506	205122	NO_2	No	0.0	1.0	No	2.5
CB79	10 Waterhouse Lane	Roadside	569480.455	206009.327	NO_2	No	2.0	1.0	No	2.5
CB83	134/136 Springfield Road	Roadside	571462	206999	NO_2	No	0.0	3.0	No	2.5
CB84	Baddow Road AQMS	Roadside	571653	205800	NO_2	No	12.0	5.1	No	2.5
CB87	Bus Station	Urban Centre	570444	207044	NO_2	No	4.0	3.0	No	2.5
CB89	135 Springfield Road	Roadside	571426	206979	NO_2	No	2.0	0.5	No	2.5
CB91, CB92, CB93	26 Maldon Road, Danbury	Roadside	578539	205113	NO_2	No	0.0	1.0	No	2.5
CB98	Rear of 66 Baddow Road (Dentists)	Roadside	571148	206324	NO_2	No	2.0	3.0	No	2.5
CB99	Rear of 74 Baddow Road (Aga Shop)	Roadside	571211	206274	NO_2	No	3.4	1.3	No	2.5
CB111	Wood Street adjacent to Bruce Grove	Roadside	569996.04	205198.82	NO_2	No	0.0	1.0	No	2.5
CB112	Burnham Road / Greenwood Surgery	Roadside	580275	198121	NO_2	No	10.8	1.0	No	2.5
CB113	Broomfield Road	Roadside	570669	210486	NO_2	No	0.0	1.0	No	2.5
CB117	White Hart Lane adjacent to Centenary Way	Kerbside	572642	209674	NO_2	No	N/A	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.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture for 2024 (%) (2)	2020	2021	2022	2023	2024
CM1	566463	210830	Rural	93.1	93.1	9.3	8.9	12.9	11.1	9.5
CM2	571640	207179	Roadside	97.8	97.8	31.4	28.2	28.4	33.8	37.2
CM3	569912	206881	Roadside	99.2	99.2	18.8	19.7	20.3	18.7	20.7
CM4	571654	205798	Roadside	96.5	96.5	20.7	20.1	22	18.9	17.3

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

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

☒ **Where exceedances of the NO_2 annual mean objective occur at locations not representative of relevant exposure, the fall-off with distance concentration has been calculated and reported concentration provided in brackets for 2023**

Notes:

The annual mean concentrations are presented as µg/m^3.

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

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%)	Valid Data Capture 2024 (%)	NO_2 Annual Mean Concentration (µg/m^3)				
						2020	2021	2022	2023	2024
CB01	571421	205963	Roadside	100.0	100.0	24.4	25.6	26.4	22.8	19.8
CB22	571505	205968	Roadside	36.0	32.1	23.6	26.1	24.6	23.6	23.7
CB38	571640	207179	Roadside	100.0	100.0	23.6	22.0	21.5	20.7	18.3
CB58	571476	205964	Roadside	100.0	100.0	31.3	31.7	31.0	29.9	24.7
CB62	566463	210830	Rural	92.5	92.5	9.2	9.0	9.0	7.3	6.3
CB65	569912	206881	Roadside	100.0	100.0	19.2	18.7	18.0	16.9	15.5
CB76	578506	205122	Roadside	92.5	92.5	27.6	31.5	31.0	28.0	27.0
CB79	569480.455	206009.327	Roadside	100.0	100.0	32.5	32.4	32.2	29.4	23.8
CB83	571462	206999	Roadside	88.0	66.0	30.9	31.9	30.4	30.7	26.0
CB84	571653	205800	Roadside	100.0	100.0	22.0	21.0	21.0	19.3	17.6
CB87	570444	207044	Urban Centre	84.9	84.9	30.6	30.4	32.8	30.7	30.1
CB89	571426	206979	Roadside	100.0	100.0	31.8	31.3	33.1	28.7	23.8
CB91, CB92, CB93	578539	205113	Roadside	100.0	100.0	38.3	36.8	35.9	34.5	27.2
CB98	571148	206324	Roadside	100.0	100.0	**40.2**	37.5	37.8	33.5	31.4
CB99	571211	206274	Roadside	100.0	100.0	25.9	29.2	33.1	27.1	31.2
CB111	569996.04	205198.82	Roadside	92.5	100.0	N/A	26.3	28.4	25.8	25.5
CB112	580275	198121	Roadside	90.6	92.5	N/A	25.1	23.6	21.8	22.7
CB113	570669	210486	Roadside	100.0	90.6	N/A	29.9	33.0	28.8	19.7
CB117	572642	209674	Kerbside	100.0	100.0	N/A	N/A	N/A	N/A	24.4

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

The annual mean concentrations are presented as µg/m^3.

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**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture for 2024 (%) (2)	2020	2021	2022	2023	2024
CM1	566463	210830	Rural	93.1	93.1	**0 (57.73)**	0	0	0	0
CM2	571640	207179	Roadside	97.8	97.8	**0 (74.56)**	0	0	0	0
CM3	569912	206881	Roadside	99.2	99.2	0	0	0	0	0
CM4	571654	205798	Roadside	96.5	96.5	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

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

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

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

Table A.6 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture for 2024 (%) (2)	2020	2021	2022	2023	2024
CM2	571640	207179	Roadside	98.2	98.2	21.9	24.7	19.3	20.6	17.8
CM3	569912	206881	Roadside	95.1	95.1	21.4	24	25	23.5	21.6

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture for 2024 (%) (2)	2020	2021	2022	2023	2024
CM2	571640	207179	Roadside	98.2	98.2	2	5	3	5	4
CM3	569912	206881	Roadside	95.1	95.1	2	3	3	4	2

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results ($\mu g/m^3$)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture for 2024 (%) (2)	2020	2021	2022	2023	2024
CM1	566463	210830	Rural	95.1	95.1	N/A	N/A	N/A	10.5	9.5
CM2	571640	207179	Roadside	86.5	83.6	10.2	10.9	10.5	9	9.1

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

Notes:

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

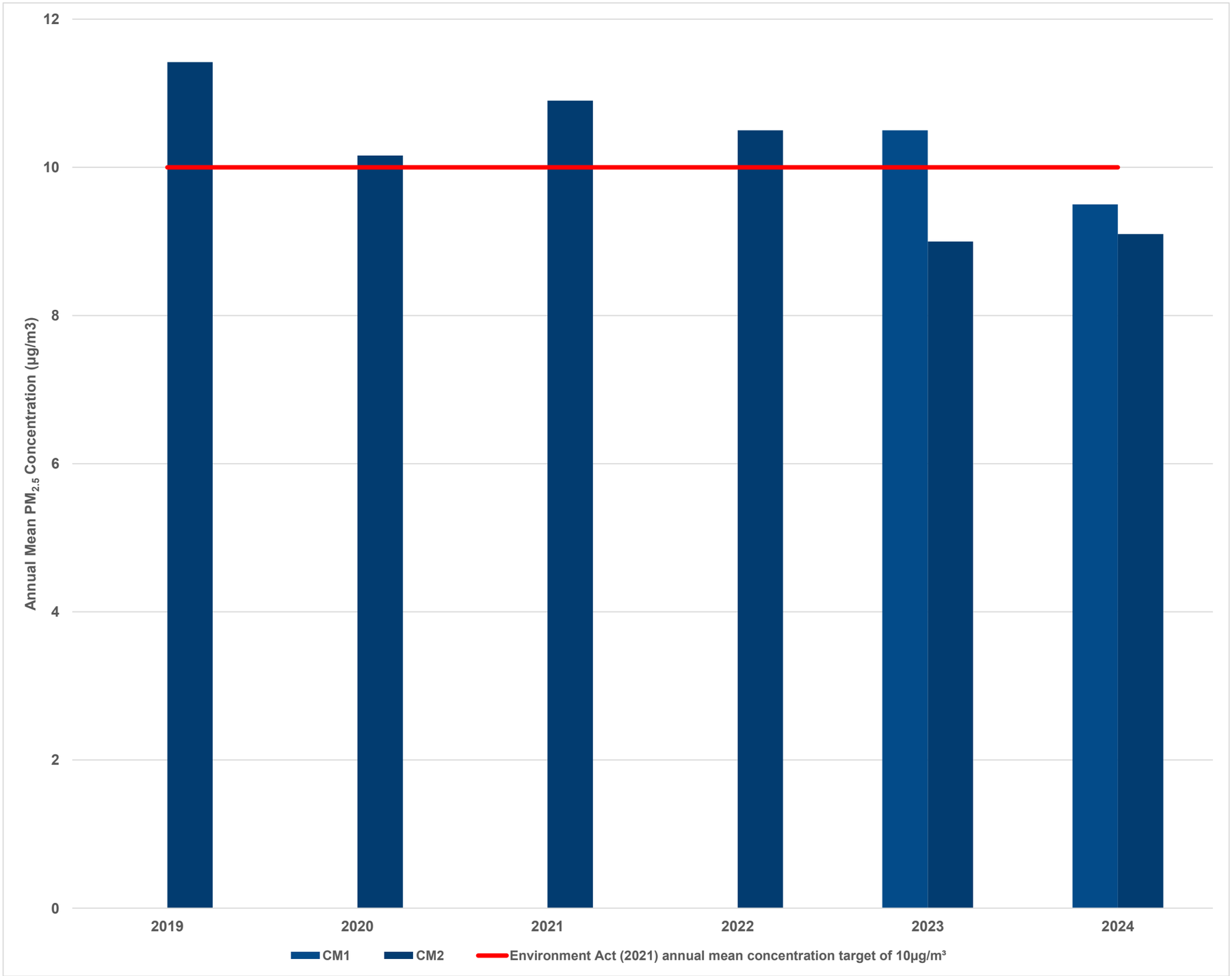
All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

Figure A.1 – Trends in Automatic Monitoring Station Annual Mean NO_2 Concentrations

Figure A.2 – Trends in Automatic Monitoring Station Annual Mean $PM_{2.5}$ Concentrations



Appendix B: Full Monthly Diffusion Tube Results for 2024

Table B.1 – NO_2 2024 Diffusion Tube Results ($\mu g/m^3$)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations ($\mu g/m^3$)													
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Raw Data	Bias Adjusted (0.78) and Annualised
CB01	571421	205963	28.6	29.4	21.5	24.3	28.9	25.3	26.5	25.9	27.8	22.1	21.0	23.6	25.4	19.8
CB22	571505	205968	Missing	Missing	27.0	Missing	Missing	24.5	24.8	23.1	Missing	Missing	Missing	Discontinued	24.9	23.7
CB38	571640	207179	27.1	21.6	23.6	21.8	19.2	18.7	18.0	21.6	23.7	27.0	34.1	25.4	23.5	18.3
CB58	571476	205964	40.8	23.4	36.2	26.4	33.5	31.9	33.0	32.3	35.4	33.5	36.9	16.9	31.7	24.7
CB62	566463	210830	Erroneous Data Removed	12.2	8.7	7.1	6.0	5.0	6.0	6.3	6.7	11.0	14.6	5.4	8.1	6.3
CB65	569912	206881	21.6	40.3	20.4	11.5	16.8	15.7	13.1	16.4	14.9	20.9	28.9	17.2	19.8	15.5
CB76	578506	205122	Erroneous Data Removed	38.5	30.7	30.6	30.3	37.5	33.3	32.9	34.8	37.0	38.5	36.3	34.6	27.0
CB79	569480	206009	34.7	23.2	26.7	27.0	29.4	24.1	26.4	27.7	36.3	39.6	44.2	26.2	30.5	23.8
CB83	571462	206999	33.0	29.8	40.1	29.7	24.1	27.7	27.7	31.8	Missing & Bracket Vandalised	Discontinued	Discontinued	Discontinued	30.5	26.0
CB84	571653	205800	30.2	24.9	17.7	19.2	21.1	20.1	17.3	16.8	21.8	24.8	32.6	24.3	22.6	17.6
CB87	570444	207044	42.2	47.9	Not Exposed	Missing	33.9	37.9	36.5	41.0	38.9	41.3	33.7	32.9	38.6	30.1
CB89	571426	206979	31.9	36.2	31.9	25.2	23.2	26.0	31.0	28.1	32.2	28.3	39.0	32.9	30.5	23.8
CB91	578539	205113	43.1	41.6	42.2	30.3	32.8	33.0	38.7	36.6	29.8	19.3	42.9	31.5	Triplicate Site with CB91, CB92 and CB93 - Annual data provided for CB93 only	
CB92	578539	205113	34.5	31.1	31.4	Missing	33.3	32.2	32.2	35.0	28.7	39.2	38.4	30.8	Triplicate Site with CB91, CB92 and CB93 - Annual data provided for CB93 only	
CB93	578539	205113	40.9	44.6	30.1	30.9	33.6	37.4	35.2	38.3	34.7	39.6	38.2	Erroneous Data Removed	34.8	27.2
CB98	571148	206324	30.8	50.0	43.8	38.0	43.6	36.3	37.7	35.8	33.6	43.6	50.9	38.4	40.2	31.4
CB99	571211	206274	42.2	47.1	44.1	37.6	37.9	37.5	39.0	31.9	36.3	44.0	47.8	34.0	40.0	31.2
CB111	569996	205199	35.2	20.4	31.9	33.3	32.7	34.9	33.5	35.5	28.4	33.8	44.7	27.4	32.6	25.5
CB112	580275	198121	31.9	30.7	35.3	22.3	28.5	26.1	25.1	31.0	26.3	35.0	Erroneous Data Removed	27.8	29.1	22.7
CB113	570669	210486	28.9	26.7	24.0	20.5	26.2	20.9	22.3	20.9	30.5	Missing	35.8	21.4	25.3	19.7
CB117	572642	209674	33.5	38.2	32.6	25.2	26.9	26.7	29.0	29.2	29.1	36.7	39.7	28.5	31.3	24.4

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22**

☒ **National bias adjustment factor used**

☒ **Chelmsford City Council confirm that all 2024 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**

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**.

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 Chelmsford During 2024

Chelmsford City Council has not identified any significant new sources relating to air quality within the reporting year of 2024.

Additional Air Quality Works Undertaken by Chelmsford City Council During 2024

Revocation of Army & Navy and A414 Maldon Road, Danbury AQMAs

The Defra Technical Guidance TG.22 identifies that there should not be any declared AQMAs for which compliance with the relevant objective has been achieved for a consecutive five-year period.

The Chelmsford City Council 2023 Annual Status Report (ASR) that was submitted to and approved by Defra concluded:

- There is a long term downwards trend of monitored NO_2 air pollution in Chelmsford
- No exceedances of the air quality objectives have been identified in 2022
- Within the last three years, all concentrations at relevant exposure have been below the borderline (10%) threshold with the air quality objectives
- Chelmsford City Council will consider revocation of the Army & Navy and Danbury Air Quality Management Areas (AQMA)

When 2023 air quality monitoring data was finalised, further analysis was undertaken:

- Further reductions in NO_2 were be measured in 2023.
- The effects of the proposed developments within the vicinity of the Army & Navy have been modelled to range from imperceptible to a small improvement and as such will have no negative impact upon the compliance with the air quality objectives
- These factors provide justification for doing revoking the AQMAs

In March 2024, the Army and Navy and A414 Maldon Road AQMAs were revoked. The revocation order can be found in Appendix F and G.

QA/QC of Diffusion Tube Monitoring

- Chelmsford City Council undertook monitoring at 19 sites in 2024.
- Chelmsford City Council adheres with the Diffusion Tube Monitoring Calendar
- The diffusion tubes were supplied by Socotec Didcot (UKAS Testing Laboratory number 1015) with a preparation method of 50% triethanolamine (TEA) in Acetone.
- The AIR NO_2 proficiency testing scheme found that for 2024, 100% of the results submitted were subsequently determined as satisfactory

Diffusion Tube Annualisation

Annualisation is required for any site with data capture less than 75% but greater than 25%. The diffusion tube processing tool is used to complete the annualisation process using background data sourced from regional AURN sites. In 2024, 2 sites required annualisation.

Table C.1 – Diffusion Tube Annualisation

Diffusion Tube ID	Annualisation Factor St Osyth	Annualisation Factor Rochester Stoke	Annualisation Factor Wicken Fen	Average Annualisation Factor	Raw Data Simple Annual Mean (µg/m³)	Annualised Data Simple Annual Mean (µg/m3)
CB22	1.1473	1.1524	1.3684	1.2227	24.9	30.4
CB83	1.0881	1.0763	1.1196	1.0947	30.5	33.4

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within this 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.TG22 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/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

In 2024, Chelmsford City Council did not undertake any triplicate co-location studies so in order to undertake bias adjustment, the national bias adjustment factor of 0.78 has been applied to the 2024 monitoring data. This ensures consistency with the other Councils in Essex. A summary of bias adjustment factors used by Chelmsford City Council over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Diffusion Tube Preparation Method	Adjustment Factor
2024	National	06/25	50% TEA in acetone	0.78
2023	National	03/24	50% TEA in acetone	0.77
2022	National	03/23	50% TEA in acetone	0.76
2021	National	03/23	50% TEA in acetone	0.78
2020	National	03/22	50% TEA in acetone	0.77

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO_2 monitoring locations within Chelmsford required distance correction during 2024.

QA/QC of Automatic Monitoring

Chelmsford City Council operates four automatic monitoring sites measuring NO_2, $PM_{2.5}$ and PM_{10}. Data from these sites is collected by a contractor.

Daily data validation checks are made to ensure the analysers are working correctly and to identify any abnormal readings that may occur. Monitoring data is forwarded to the Council.

The automatic monitoring station equipment is serviced every six months by a contractor who also carries out maintenance callouts when faults are identified.

The nitrogen dioxide analysers are calibrated monthly with a certified reference gas. Particulate monitors have their filter tapes changed every two months. All automatic monitoring sites are colocated with triplicate NO_2 diffusion tubes.

Data ratification for the analyser contains following processes;

- Applying the scaling factors derived from calibrations, maintenance visits and servicing
- Checking for equipment drift with adjustments made where detected
- Comparison with datasets from other appropriate Essex Air monitoring sites
- Checking for and deletion of erroneous data that can be linked to analyser fault or failure.

When undertaking data ratification, there are some calculations necessary for ensuring accurate and precise data:

- The Met One PM_{10} monitors are unheated and require a correction for slope by dividing the raw data by 1.2.
- The Met One $PM_{2.5}$ monitor has a smart heater and does not require correction for slope and/or intercept.
- It has not been necessary to undertake distance correction for any automatic monitoring stations.
- The automatic monitoring stations in Chelmsford recorded data capture of greater than 75% therefore it was not required to annualise any monitoring data.
- The automatic monitoring station in Chelmsford is representative of exposure. It has not been necessary to correct the automatic annual mean NO_2 concentrations for distance.

Appendix D: Maps of Monitoring Locations

Figure D.1 – Map of Diffusion Tube Monitoring Sites – Chelmsford

Figure D.2 – Map of Diffusion Tube Monitoring Sites – North Chelmsford

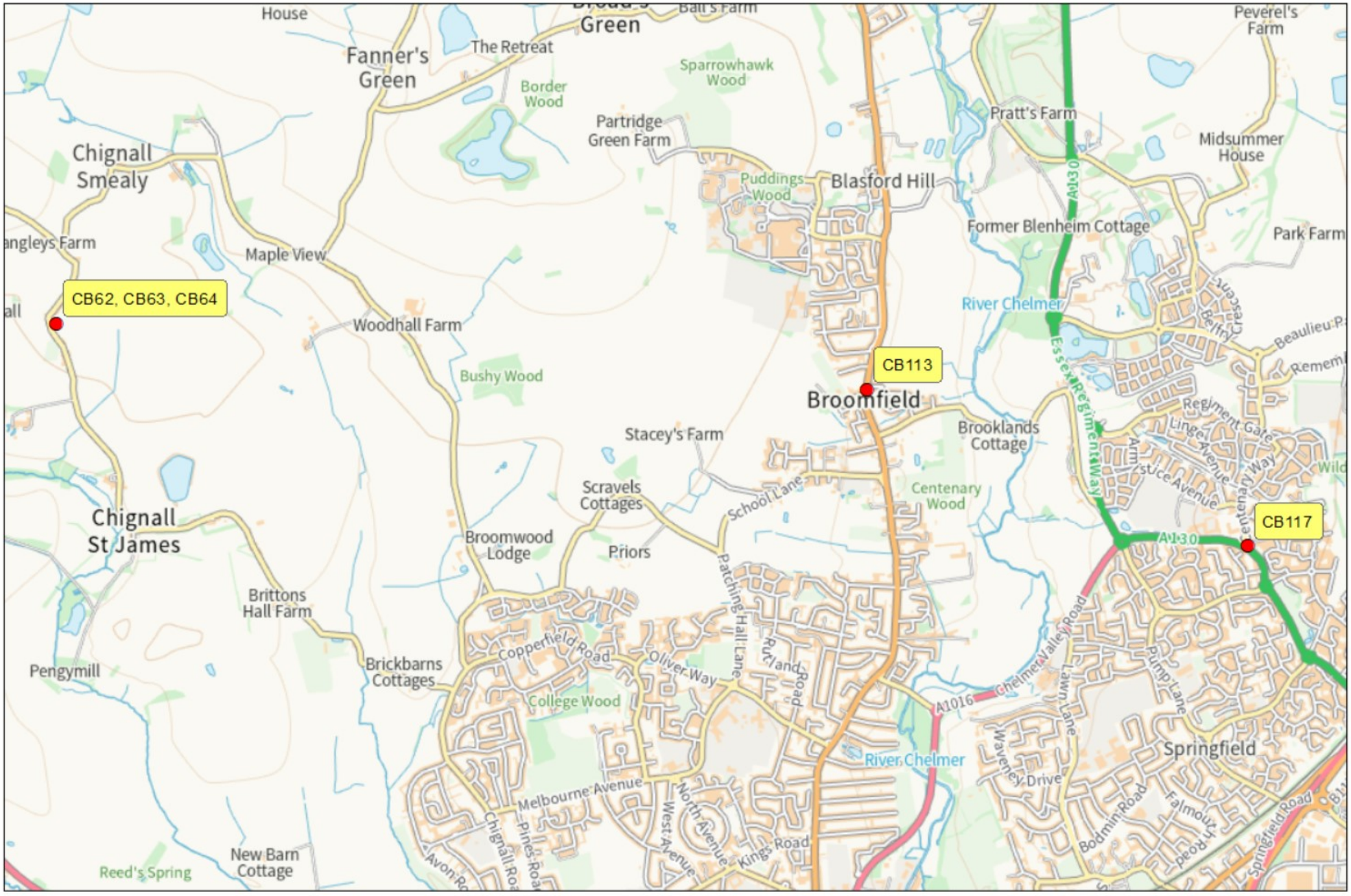


Figure D.3 – Map of Diffusion Tube Monitoring Sites – Danbury

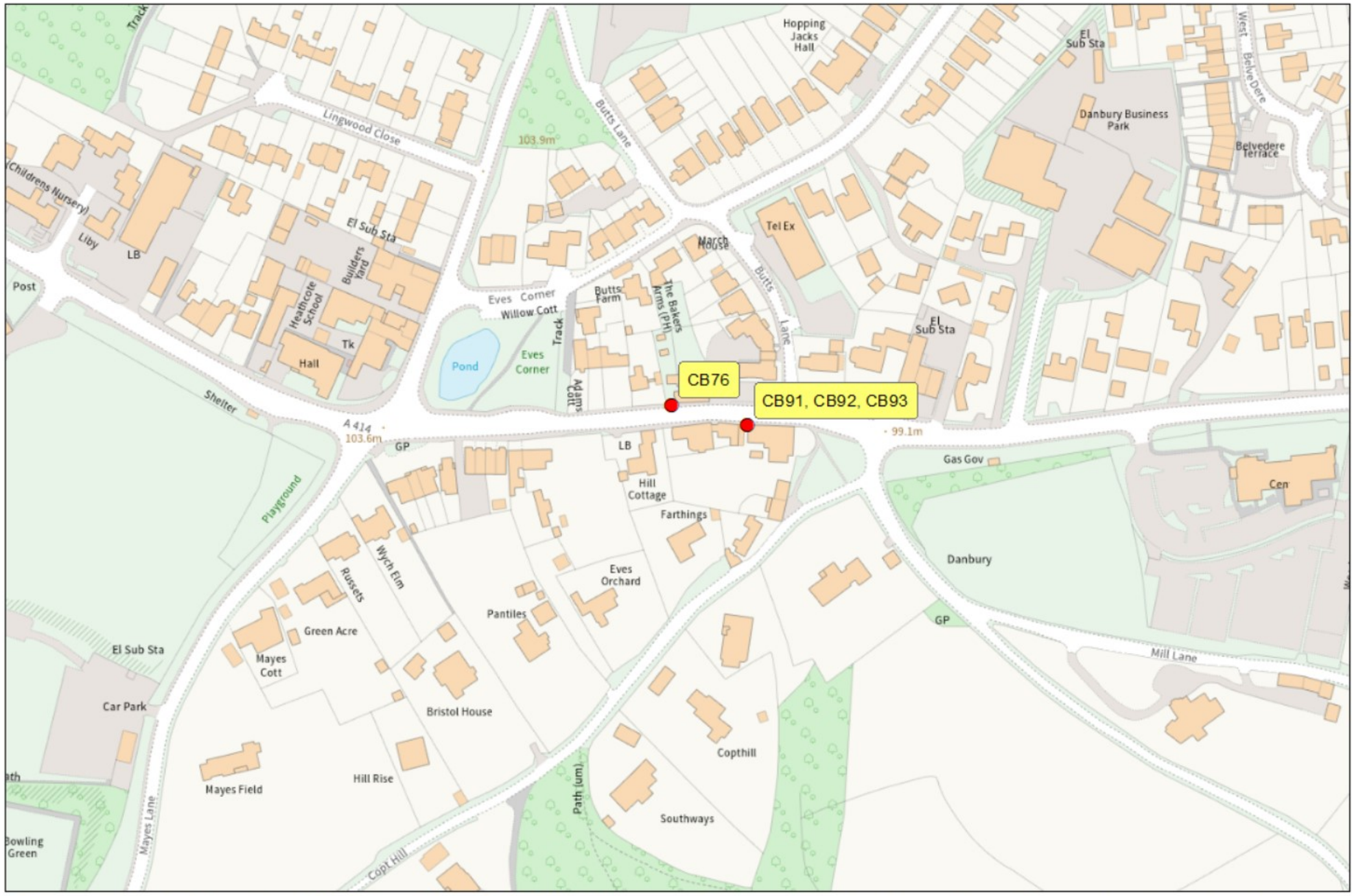


Figure D.4 – Map of Diffusion Tube Monitoring Sites – South Woodham Ferrers

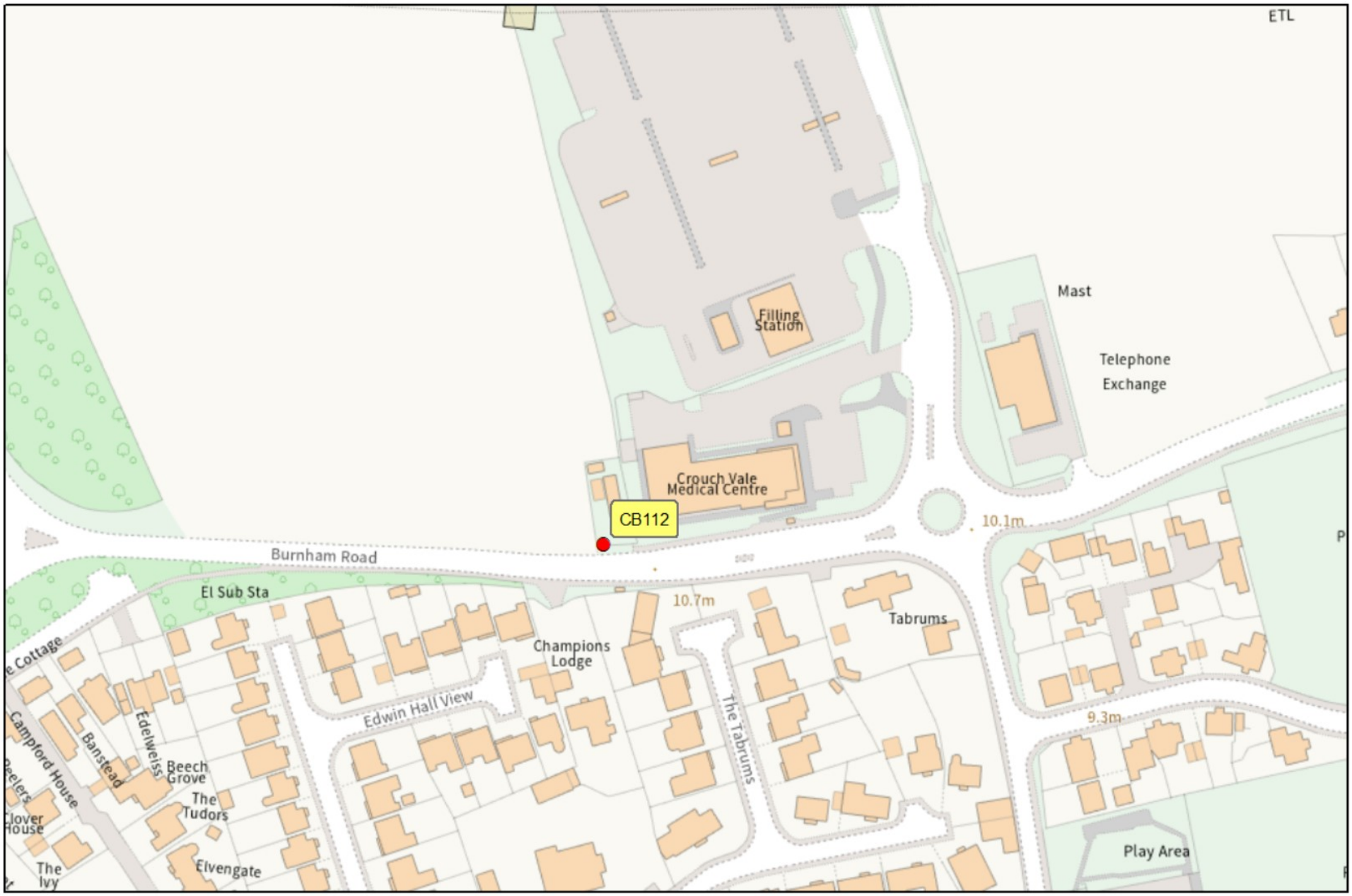


Figure D.5 – Map of Automatic Monitoring Sites

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[2]

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

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

Appendix F: Army & Navy AQMA Revocation Order

Environment Act 1995 Part IV Section 83(2)(b)

Chelmsford City Council

Air Quality Management Area Revocation Order

Chelmsford City Council in exercise of the powers conferred upon it by Section 83(2)(b) of the Environment Act 1995, hereby makes the following Order.

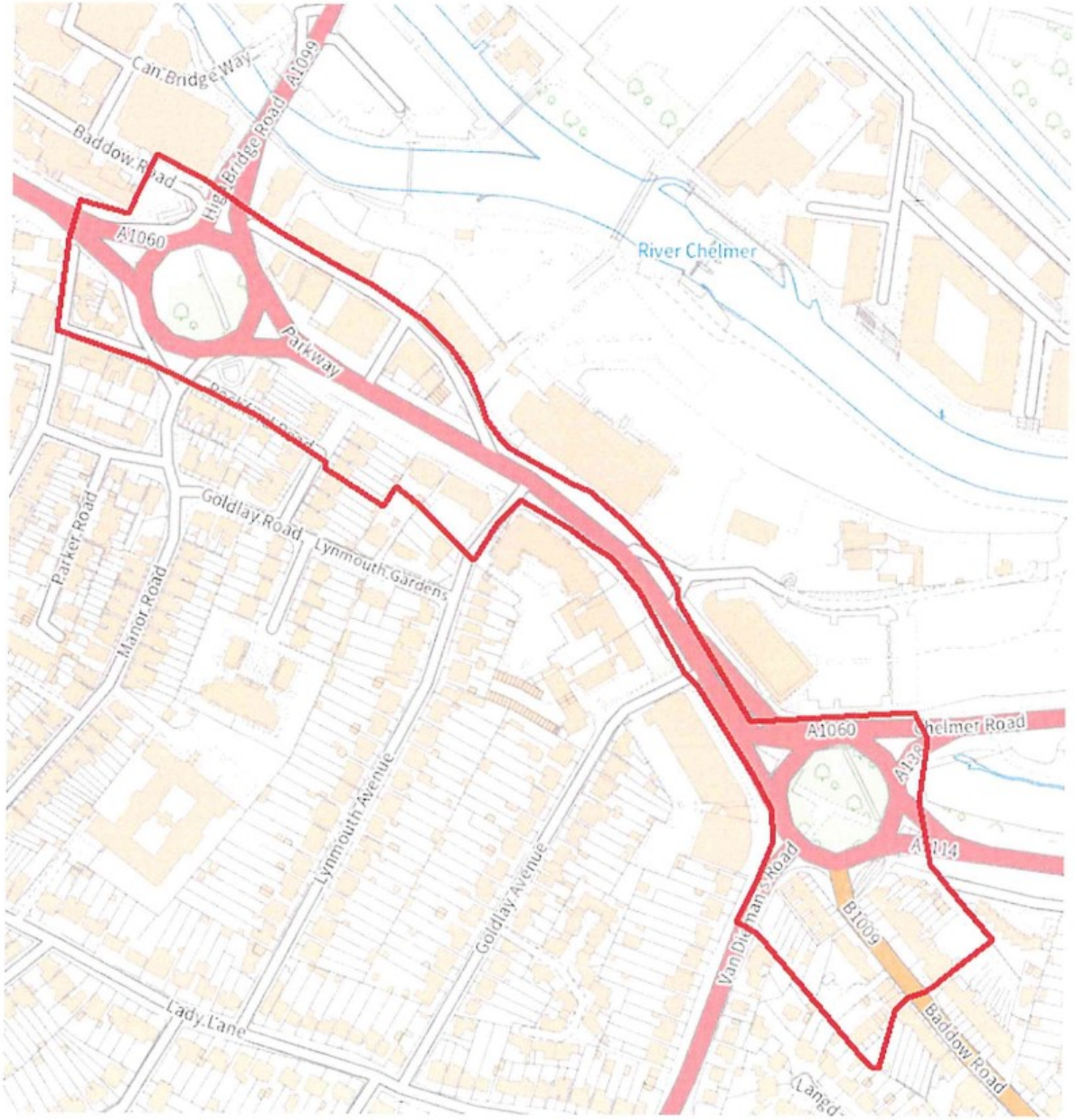
1. This Order may be cited/referred to as the Air Quality Management Area (Chelmsford City Council) Revocation Order 2024 No.1 and shall come into effect on 14th March 2024.
2. This Order revokes the Air Quality Management Area (AQMA) *the Chelmsford City Council Air Quality Management Area (Amendment) Order 2012* which was made on 1st October 2012.
3. The effect of this is to revoke as an AQMA, the area shown outlined in red on the plan in Schedule 1 which incorporates several roads leading into the Army and Navy roundabout and the Odeon roundabout.

The Common Seal of
Chelmsford City Council was
hereunto affixed in the presence of:

W. J. Butcher
(WILLIAM BUTCHER)
Authorised signatory

SEALING REGISTER
REFERENCE
34/24

Schedule 1



W. Butcher
(WILLIAM BUTCHER)

Appendix G: A414, Maldon Road, Danbury AQMA Revocation Order

Environment Act 1995 Part IV Section 83(2)(b)

Chelmsford City Council

Air Quality Management Area Revocation Order

Chelmsford City Council in exercise of the powers conferred upon it by Section 83(2)(b) of the Environment Act 1995, hereby makes the following Order.

1. This Order may be cited/referred to as the Air Quality Management Area (Chelmsford City Council) Revocation Order 2024 No. 2 and shall come into effect on 14th March 2024.
2. This Order revokes the Air Quality Management Area (AQMA) *the Chelmsford City Council A414 Maldon Road, Danbury Air Quality Management Area Order 2018* which was made on 8th October 2018.
3. The effect of this is to revoke as an AQMA, the area shown outlined in red on the plan in Schedule 1 which incorporates the stretch of road between Gay Bowers Lane and Danbury Village Green and adjacent properties.

The Common Seal of
Chelmsford City Council was
hereunto affixed in the presence of:

(WILLIAM BUTCHER)
Authorised signatory

SEALING REGISTER REFERENCE
34/24

Schedule 1

W. Butler
(WILLIAM BUTCHER)

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'
AQIA	Air Quality Impact Assessment – Reports provided in support of planning applications.
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
CVTF	Clean Vehicle Technology Fund – A DfT fund that provides grants for upgrading vehicles to reduce emissions in areas of poor air quality
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EU	European Union
Euro Standard	Euro standards define the acceptable limits for exhaust emissions of new vehicles sold in EU and EEA member states.
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SCRT	Selective Catalytic Reduction Technology – Retrofitted equipment to reduce bus emissions
Street Canyon	Road which is flanked by buildings resembling a canyon
TEA	Triethanolamine – substance used in diffusion tubes for absorbing nitrogen dioxide
UK-AIR	An information resource providing in-depth information on air quality and air pollution in the UK. A range of information is available, from the latest pollution levels, pollution forecast information, a data archive, and details of the various monitoring networks.
UKAS	United Kingdom Accreditation Service

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- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. 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/air-quality/featured/england-exc-london-policy-guidance/
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