

2023 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 2023

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## Executive Summary: Air Quality in Our Area

### Air Quality in Epsom and Ewell

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<sup>1,2</sup>.

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages<sup>3</sup>, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017<sup>4</sup>.

In common with much of the region, the principal pollutant of concern in Epsom and Ewell has been nitrogen dioxide arising from road transport. The other potentially relevant pollutants contained within the national air quality strategy were screened out in previous rounds. In response to a local hotspot in Ewell High Street, the Council declared an Air Quality Management Area (AQMA) in 2007 and modified the boundary in 2011. Details on the Ewell High Street AQMA can be found here [https://uk-air.defra.gov.uk/aqma/details?aqma\\_ref=508](https://uk-air.defra.gov.uk/aqma/details?aqma_ref=508). An action plan to begin to take measures to improve air quality and reduce exposure was subsequently developed, consulted on and delivered to the extent that was possible. It is recognised that work to improve air quality depends on close cooperation with other Epsom & Ewell Borough Council (EEBC), departments such as planning and partner agencies. In particular the two tier working arrangements in this area require the local highways authority, Surrey County Council to

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<sup>1</sup> Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

<sup>2</sup> Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, July 2021

<sup>4</sup> Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

be involved with air quality matters. This is achieved through the Surrey Air Alliance – a collaborative group of all councils in Surrey.

During 2022 the Surrey Air Alliance has been working with the Surrey Heartlands Children and Young People's Asthma Team on their project to develop an Asthma care bundle. As part of this work the Air Alliance drew up a prioritised list of schools based on modelled pollution concentrations so that the Asthma team could identify the initial schools to support. The group has been briefed on the pollution warning services available in Surrey including Surrey Air Alert. The Air Alliance also fed information into the Asthma Toolkit the group were producing, [www.healthysurrey.org.uk/children-and-families/asthma-toolkit/parent-and-carer](http://www.healthysurrey.org.uk/children-and-families/asthma-toolkit/parent-and-carer) and provided information on indoor and outdoor air quality issues.

The group also attended a number of meetings to help support the production of an Air Quality Pack for healthcare professionals, with the aim of ensuring air quality information is easily accessible and available, what messaging about poor air quality means for patients, and what actions they can take.

Within the Borough, a gradual improvement in air quality has been noted for over a decade which has been aided by no new major transport or industrial related sources of emissions, nor has there been any new AQMA declarations in the past year. 2022 was the second year in which levels within the existing AQMA were below the national objective and should this continue, the Council will be in a position to revoke the AQMA in subsequent years.

### **Actions to Improve Air Quality**

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan<sup>5</sup> sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM<sub>2.5</sub> targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and

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<sup>5</sup> Defra. Environmental Improvement Plan 2023, January 2023

reduce PM<sub>2.5</sub> in their areas. The Road to Zero<sup>6</sup> details 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.

Air Quality is featured within the Council's Climate Change Action Plan. This includes the introduction of the 'Don't be Idle' campaign in order to monitor and reduce idling within key areas of concern in the borough. This is primarily an educational and awareness initiative but the Council has issued 2 fixed penalty notices where requests to switch off engines have been ignored. Collaboration with external partners including Surrey Climate Change Officer groups helps to provide information for opportunities/funding relating to improving air quality. The Council's ambitious target to achieve net zero status by 2035 includes a range of sustainable principles from which further work is being developed in relation to improving air quality and combatting climate change.

The Council is in the process of adopting a revised taxi emissions policy for Epsom & Ewell Licensed Hackney Carriages and Private Hire Vehicles which will have equivalency to the standard required in the nearby London Ultra Low Emission Zone. This will initially remove the worst polluting Euro 4 diesels and permitting, for the first time, zero emission taxis such as electric. The Council has already adopted a financial incentive by offering a discount on licence fees for electric and hybrid vehicles.

Domestic wood burning as a lifestyle choice is increasing and has been identified as a significant contributor to local air pollution, accounting for 25% of all PM<sub>2.5</sub> emissions. In 2022, Epsom & Ewell Borough Council, in partnership with Surrey County Council, participated in a consortium bid led by Hertfordshire County Council and Global Action Plan for air quality funding from Defra. The bid proposed a public information campaign around an autumnal 'Clean Air Night' with consistent branding and messaging to raise awareness of the changes brought about by the Air Quality (Domestic Solid Fuels Standards) Regulations 2020 and contribution of wood burning stoves to local air pollution and adverse health impacts. The bid was unsuccessful; however, this topic remains a priority for Epsom & Ewell Borough Council, and work is ongoing with Surrey County

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<sup>6</sup> DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Council and Global Action Plan to seek funding to support the 'Clean Air Night' project and public information campaign.

### **Conclusions and Priorities**

The quality of the air in Epsom and Ewell remains very good with all areas within the national objectives. The recent area of study in London Road Ewell continues but appears to be remaining within the national objective which had been a concern following previous modelling which had suggested a possible exceedance in this location.

Although 2022 was the second year in which the NO<sub>2</sub> levels within the AQMA were below the national objectives, in line with guidance the Council will reassess the position once the entire dataset has been analysed for 2023 and if levels remain stable, plan to carry out a detailed assessment to revoke the AQMA in 2024.

The Council will not be revisiting the Air Quality Action Plan for Ewell High Street, having delivered all the viable measures and seen air quality improve to the degree that concentrations are now within the national objective. Instead, we will concentrate on pursuing the adopted Climate Change Action Plan and implement the taxi and private hire emissions policy outlined above.

The Council is also exploring adding photo voltaic panels to a variety of its buildings and is in the early stages of determining whether it is viable to move into smaller and more energy-efficient accommodation.

The Council will continue to work in partnership locally and regionally to deliver improvements in air quality.

### **Local Engagement and How to get Involved**

The Council encourages individuals to change their behaviour so as to reduce emissions from transport, their home and their work. The Epsom and Ewell borough is compact with public transport links through to areas of south and south west London as well as routes to Sussex and the south coast. The Council operates an electric enforcement vehicle and has installed 14 electric vehicle charging points in its car parks with a further 2 to follow whilst working together with the County Council in considering opportunities for on street charging. On behalf of residents, the Council pays an annual fee for membership of the air alert system whereby anyone can sign up for free text messages and/or use an App to receive information about predicted periods of poor air quality. For vulnerable people or

those with respiratory conditions, this helps to provide a warning to allow them to plan their activities. There are 70 residents who currently benefit from the text service with many more able to benefit from the app.

### **Local Responsibilities and Commitment**

This ASR was prepared by the Public Protection Service of Epsom & Ewell Borough Council and agreed by the by the Chair of the Environment Committee.

If you have any comments on this ASR please send them to [contactus@epsom-ewell.gov.uk](mailto:contactus@epsom-ewell.gov.uk)

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# 1 Local Air Quality Management

This report provides an overview of air quality in Epsom and Ewell during 2022. 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 Epsom & Ewell Borough Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

## 2 Actions to Improve Air Quality

### Air Quality Management Areas

Air Quality Management Areas (AQMA) 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.

A summary of AQMA declared by Epsom & Ewell Borough Council can be found in Table 2.1. The table presents a description of the single AQMA that is currently designated within Epsom and Ewell. Appendix D: Map(s) of Monitoring Locations and AQMA provides maps of the AQMA and also the air quality monitoring locations in relation to the AQMA. The air quality objectives pertinent to the current AQMA designation is the NO<sub>2</sub> annual mean.

We recognise that the actions which flowed from the original declaration have expired and that we have not actively progressed the remaining actions originally identified nor identified further actions. This is because the levels within the AQMA have shown a long term and sustained improvement to the degree that there has been two years of measurements recording levels at below the national objectives supporting the conclusion that the AQMA has been successful. Should this trend continue it will be possible to revoke the AQMA in the next 18 months, subject to detailed assessment.

**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	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Ewell High Street Air Quality Management Area	09/07/2007	NO2 Annual Mean	An area encompassing the section of High Street, Ewell from the junction with Spring Street to the junction with Cheam Road and continues a further 30 metres south on High Street Ewell	NO	63	34.9	2	Ewell High Street Air Quality Action Plan 2010	<a href="http://aqma.defra.gov.uk/action-plans/EEBC%20AQAP.pdf">http://aqma.defra.gov.uk/action-plans/EEBC%20AQAP.pdf</a>

☒ Epsom & Ewell Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date (confirm by selecting in box).

☒ Epsom & Ewell Borough Council confirm that all current AQAPs have been submitted to Defra.

## **Progress and Impact of Measures to address Air Quality in Epsom & Ewell**

Defra's appraisal of last year's ASR concluded the report is well structured, detailed, and provides the information specified in the guidance.

DEFRA assessors have continued to recommend the Council update the Ewell High Street AQAP with new measures and similar observations were made in the 2021 assessment. The Council will not be updating this legacy action plan but instead will aim to revoke the AQMA should conditions permit for the 2023 calendar year and preliminary monitoring results for the first quarter of 2023 would suggest this is on course. We strongly believe the best use of our resource is to revoke this AQMA and once complete, to focus on the new requirement for an air quality strategy for authorities with no declared AQMAs.

Between 2010 and 2015 The Council took forward a number of direct measures in successful pursuit of improving air quality in Ewell Village. These included:

- Removing the formally marked parking bays from 53 to 67 High Street
- Varying on-street car parking on Church Street junction
- Alterations to the junction of Cheam Road/High Street
- Placing restrictions on delivery times and stopping on High Street between Cheam Road and Spring Street junctions

A combination of completed measures and improvements in the fleet have led to a sustained 20-25 µg/m<sup>3</sup> reduction in levels of nitrogen dioxide at this location.

More detail on these measures can be found in the legacy Ewell High Street Air Quality Action Plan available at <http://aqma.defra.gov.uk/action-plans/EEBC%20AQAP.pdf>.

Epsom & Ewell Borough Council's priorities for the coming year are to ensure sufficient quality data collection to allow a judgement to be made whether to proceed to revoke the AQMA in the 2024 calendar year.

## **PM<sub>2.5</sub> – Local Authority Approach to Reducing Emissions and/or Concentrations**

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of PM<sub>2.5</sub> (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that PM<sub>2.5</sub> has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

We recognise the fraction of mortality attributable to particulate air pollution (new method) within the Public Health Outcomes Framework to benchmark the effect on particulate exposure to the population. Presently the estimate from the Office of Health Improvement and Disparities is 6% for this indicator using standard 1km square particulate dispersion modelling. The Council's own higher resolution modelling featuring baseline 2017 data indicates 1.8% to 5.6% although this used earlier methodology. From this we conclude the mortality burden bears more similar resemblance to population centres to the north, including the outer part of greater London, than it does to the southern more rural localities in Surrey and Sussex.

Local source apportionment work shows the majority of PM<sub>2.5</sub> is background in nature with sources outside the borough but that concentrations remained within the objectives. There is no one single source of PM<sub>2.5</sub> but instead road transport (exhaust and non exhaust fractions), and "other" (including combustion in commercial, institution and agricultural sectors) are the main contributors.

This modelling confirms the difficulties with any one single Council operating on its own in controlling PM<sub>2.5</sub>. Nevertheless the Council will not completely disregard PM<sub>2.5</sub>. It is concluded that actions to reduce other pollutants and particulates generally are appropriate to reduce PM<sub>2.5</sub> when combined with regional and national efforts through the Surrey Air Alliance. One example of this is the Surrey Air Alliance jointly produced video promoting responsible wood burning <https://youtu.be/TogvwcyM0oc>.

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

This section sets out the monitoring undertaken within 2022 by Epsom & Ewell Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a six-year period between 2017 and 2022 to allow monitoring trends to be identified and discussed.

#### Summary of Monitoring Undertaken

##### 3.1.1 Automatic Monitoring Sites

Epsom & Ewell Borough Council did not undertake any continuous monitoring in 2022.

##### 3.1.2 Non-Automatic Monitoring Sites

Epsom & Ewell Borough Council undertook non- automatic (i.e. passive) monitoring of NO<sub>2</sub> at 25 sites and one travel blank during 2022. 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.

#### Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

##### 3.1.3 Nitrogen Dioxide (NO<sub>2</sub>)

**Error! Reference source not found.** and Table A.2 in Appendix A compare the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Note that the concentration data presented represents the

concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 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.

#### **3.1.4 Particulate Matter (PM<sub>10</sub>)**

The Council did not carry out any particulate monitoring in 2022.

#### **3.1.5 Sulphur Dioxide (SO<sub>2</sub>)**

The Council did not carry out monitoring for sulphur dioxide in 2022.



## Appendix A: Monitoring Results

**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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
EE1	EE1 The Clock tower-Roadside	Roadside	520732	160762	NO2	No	13.0	2.5	No	2.1
EE3	EE3 26 The Crescent-Background	Urban Background	519293	160026	NO2	No	9.0	2.0	No	2.0
EE6	EE6 Jct Kingston Rd/ Worcester Park Rd-Kerbside	Kerbside	520525	165040	NO2	No	8.2	6.8	No	2.1
EE7	EE7 Jct Ruxley Lane/Kingston Rd-Kerbside	Kerbside	520916	164636	NO2	No	4.2	6.8	No	2.3
EE9	EE9 Chessington Road, Ewell	Roadside	519830	163740	NO2	No	2.4	3.2	No	2.4
EE10	EE10 High Street, Ewell - kerbside	Kerbside	521998	162633	NO2	Yes - Ewell High Street AQMA	0.5	1.3	No	2.1
EE14	EE14 Hook Road Epsom-roadside	Roadside	520885	161308	NO2	No	3.4	1.6	No	2.0
EE16	EE16 Church Street/High Street Ewell	Roadside	522026	162624	NO2	Yes - Ewell High Street AQMA	0.1	1.1	No	1.7

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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
EE17	EE17 40A High Street Ewell	Roadside	522025	162563	NO2	Yes - Ewell High Street AQMA	0.1	2.0	No	2.2
EE22	EE22 High Street, Epsom - roadside	Roadside	520965	160871	NO2	No	3.0	0.5	No	2.3
EE36	EE36 Capitol Square, Church Street	Urban Centre	521069	160817	NO2	No	0.2	9.2	No	2.1
EE37	EE37 British Heart Foundation, High Street	Roadside	520726	160857	NO2	No	0.6	4.5	No	2.4
EE38	EE38 Station approach south	Roadside	520726	160857	NO2	No	0.1	2.8	No	1.8
EE39	EE39 The Parade	Roadside	520844	160729	NO2	No	0.2	3.3	No	2.1
EE42	EE42 High Street/East Street	Roadside	521004	160901	NO2	No	0.0	7.7	No	2.1
EE43	EE43 Kiln Lane	Roadside	521478	161447	NO2	No	0.3	5.5	No	2.3
EE45	EE45 Castle Parade	Roadside	522211	163103	NO2	No	0.4	8.3	No	2.1
EE46	EE46 Waterloo Road	Kerbside	520724	161027	NO2	No	4.6	0.6	No	2.1
EE47	EE47 Chessington Road	Roadside	520713	162968	NO2	No	0.2	4.7	No	1.9
EE48	EE48 Ewell High Street South	Roadside	522022	162502	NO2	Yes - Ewell High Street AQMA	0.4	1.7	No	2.1

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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
EE49	EE49 37 South Street, Epsom	Roadside	520580	160586	NO2	No	0.2	3.5	No	2.2
EE50	EE50 Major Plaice Ewell High Street	Kerbside	521975	162677	NO2	Yes - Ewell High Street AQMA	7.5	0.9	No	2.1
EE51	EE51 Station approach north	Roadside	520702	160872	NO2	No	3.0	3.3	No	1.8
EE52	EE52 77 London Road, Ewell	Roadside	522303	163213	NO2	No	0.5	4.6	No	1.8
EE53	EE53 115 London Road, Ewell	Roadside	522369	163289	NO2	No	0.0	14.5	No	1.8

**Notes:**

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

**Table A.2 – Annual Mean NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)**

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
EE1	520732	160762	Roadside	100	92.3	29.6	26.5	23.0	22.2	24.1
EE3	519293	160026	Urban Background	100	100.0	14.8	15.0	14.1	13.6	14.0
EE6	520525	165040	Kerbside	100	90.4	30.4	33.0	27.8	27.6	28.4
EE7	520916	164636	Kerbside	100	92.3	33.5	34.2	28.0	29.7	29.7
EE9	519830	163740	Roadside	100	100.0	23.5	24.4	20.6	21.2	22.2
EE10	521998	162633	Kerbside	100	67.3	34.8	<b>46.3</b>	<b>44.0</b>	32.3	34.9
EE14	520885	161308	Roadside	100	90.4	25.2	25.3	20.8	21.5	21.9
EE16	522026	162624	Roadside	100	100.0	25.5	27.8	22.4	22.6	23.8
EE17	522025	162563	Roadside	100	100.0	28.9	31.4	29.1	26.3	25.7
EE22	520965	160871	Roadside	100	84.6	35.1	35.4	31.3	31.5	26.6
EE36	521069	160817	Urban Centre	100	84.6	23.5	23.3	19.9	20.6	20.6
EE37	520726	160857	Roadside	100	75.0	26.9	32.7	25.4	26.5	28.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
EE38	520726	160857	Roadside	100	65.4	23.3	24.2	16.2	17.8	20.0
EE39	520844	160729	Roadside	100	100.0	29.9	24.6	21.5	23.0	24.3
EE42	521004	160901	Roadside	100	100.0	23.1	24.5	20.1	19.4	19.1
EE43	521478	161447	Roadside	100	100.0	26.0	25.5	21.7	22.6	23.2
EE45	522211	163103	Roadside	100	76.9	23.9	21.3	17.7	19.0	21.2
EE46	520724	161027	Kerbside	100	92.3	27.1	27.9	21.5	22.5	22.2
EE47	520713	162968	Roadside	100	100.0	23.5	25.1	19.2	21.2	21.9
EE48	522022	162502	Roadside	100	92.3	27.8	28.4	22.1	23.5	24.4
EE49	520580	160586	Roadside	100	100.0	34.1	34.2	25.5	28.6	30.9
EE50	521975	162677	Kerbside	100	92.3	36.2	35.7	33.6	31.1	32.1
EE51	520702	160872	Roadside	100	90.4	30.1	25.0	21.0	23.2	25.6
EE52	522303	163213	Roadside	100	100.0		<b>40.0</b>	30.3	34.3	32.1
EE53	522369	163289	Roadside	100	100.0		23.0	16.0	18.2	18.4

☒ 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  $\mu\text{g}/\text{m}^3$ .

Exceedances of the  $\text{NO}_2$  annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

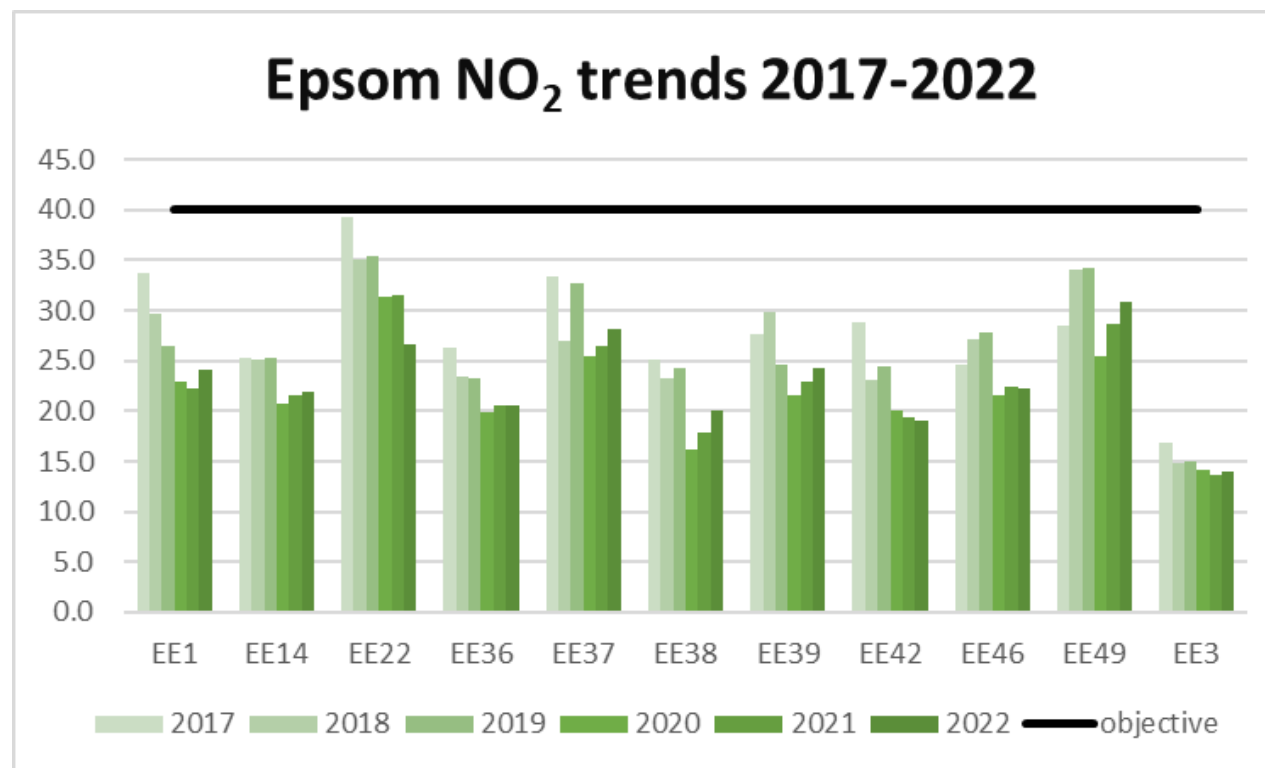
$\text{NO}_2$  annual means exceeding  $60\mu\text{g}/\text{m}^3$ , indicating a potential exceedance of the  $\text{NO}_2$  1-hour mean objective are shown in **bold and underlined**.

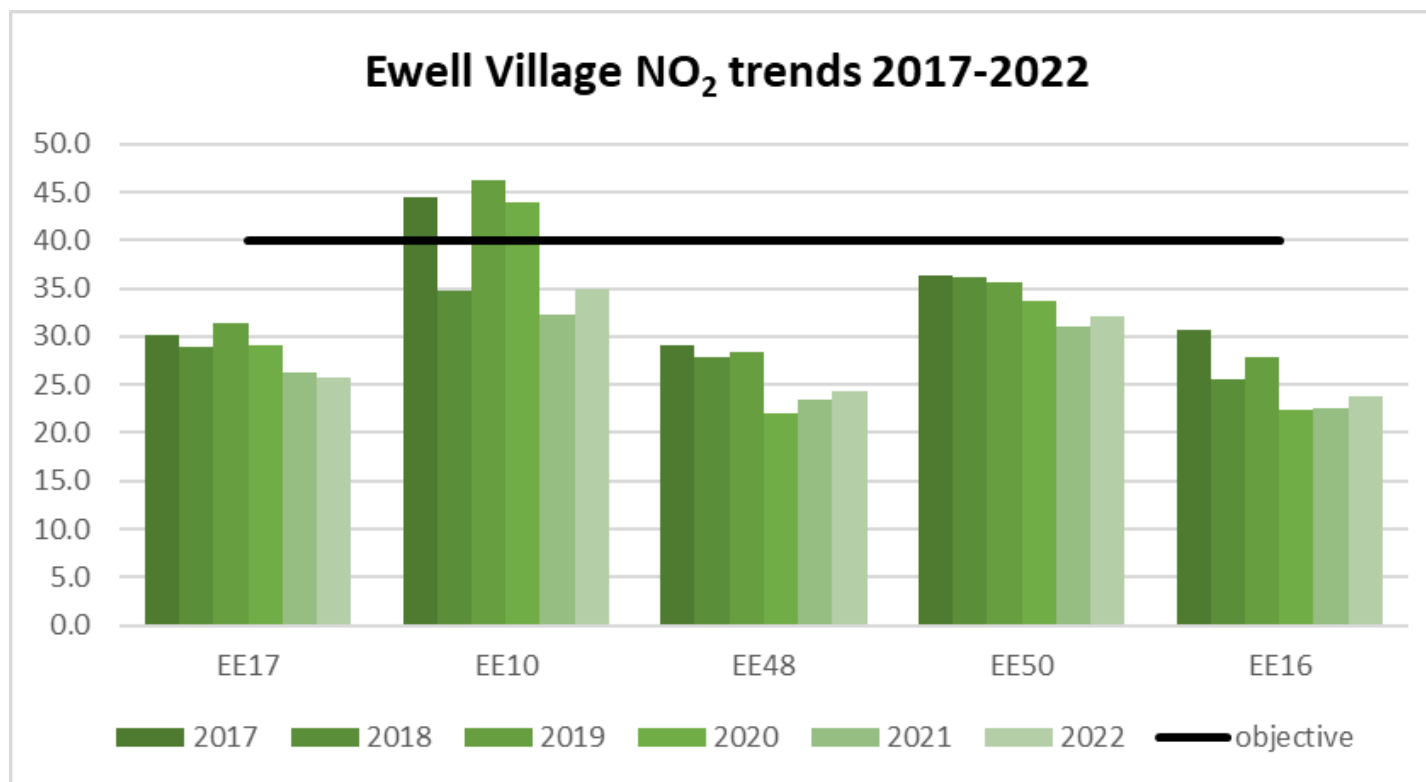
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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.

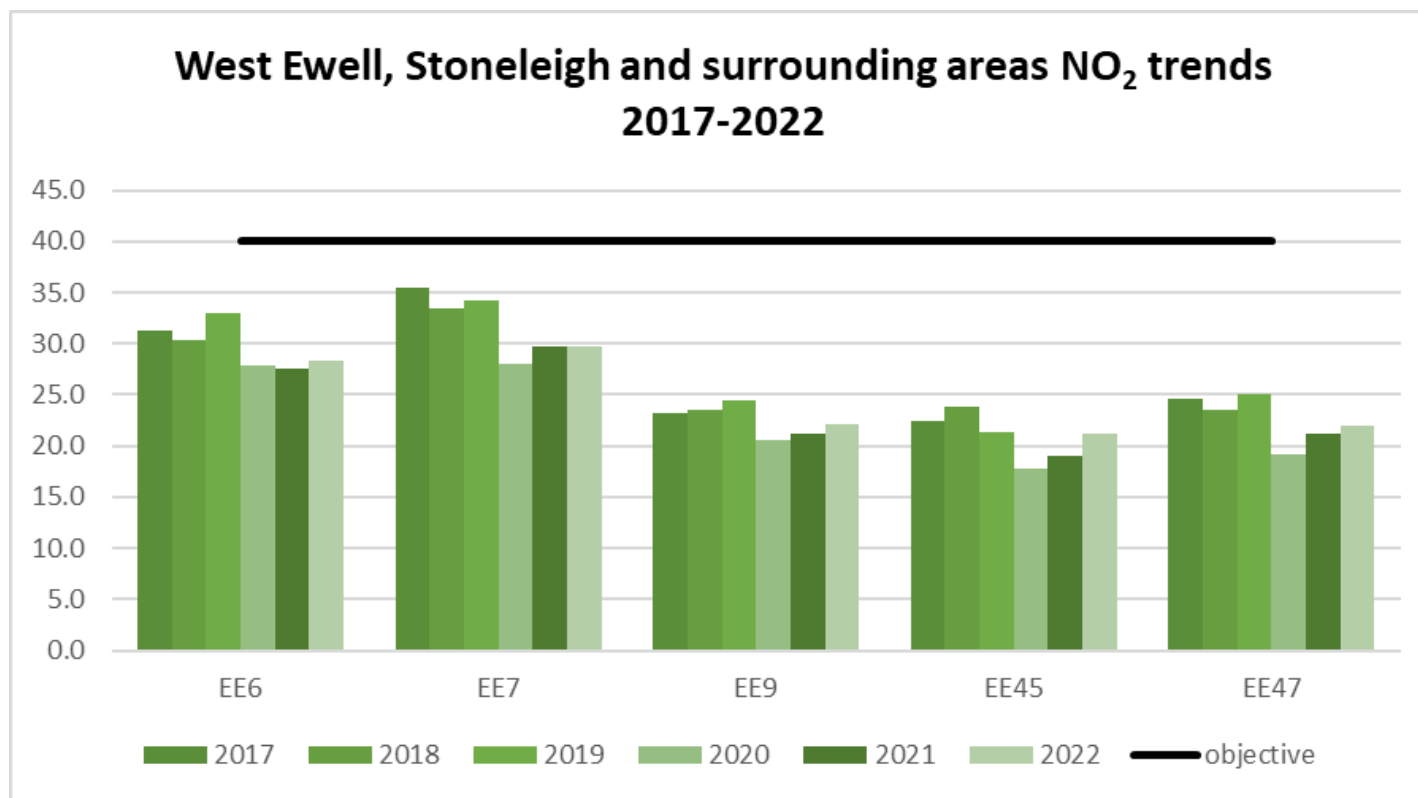
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

**Figure A.1 – Trends in Annual Mean NO<sub>2</sub> Concentrations****Figure 1 - Epsom**



**Figure 2 - Ewell Village**





**Figure 3 - West Ewell, Stoneleigh and Surrounding Areas**

## Appendix B: Full Monthly Diffusion Tube Results for 2022

**Table B.1 – NO<sub>2</sub> 2022 Diffusion Tube Results (µg/m<sup>3</sup>)**

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing )	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
EE1	520732	160762	27.0	16.0		23.0	20.0	21.0	24.0	31.0	29.0	27.0	30.0	31.0	25.4	24.1	-	
EE3	519293	160026	22.0	13.0	15.0	12.0	10.0	8.0	11.0	16.0	18.0	14.0	17.0	21.0	14.8	14.0	-	
EE6	520525	165040	33.0	36.0	35.0	22.0	24.0	22.0	29.0	33.0	32.0	32.0	31.0		29.9	28.4	-	
EE7	520916	164636	37.0	28.0		24.0	25.0	30.0	30.0	34.0	33.0	35.0	35.0	33.0	31.3	29.7	-	
EE9	519830	163740	26.0	27.0	25.0	17.0	19.0	18.0	17.0	26.0	26.0	25.0	27.0	27.0	23.3	22.2	-	
EE10	521998	162633			35.0	27.0			35.0	37.0	43.0	39.0	41.0	38.0	36.9	34.9	-	
EE14	520885	161308	27.0	28.0	27.0	16.0	16.0	15.0	22.0	27.0	24.0	26.0	25.0		23.0	21.9	-	
EE16	522026	162624	35.0	27.0	26.0	16.0	23.0	20.0	18.0	29.0	30.0	27.0	26.0	24.0	25.1	23.8	-	
EE17	522025	162563	34.0	24.0	23.0	22.0	18.0	22.0	27.0	26.0	32.0	29.0	35.0	32.0	27.0	25.7	-	
EE22	520965	160871	39.0	25.0	20.0	21.0	27.0		31.0	44.0		33.0	3.0	37.0	28.0	26.6	-	
EE36	521069	160817	30.0	23.0	22.0	17.0	18.0		15.0	23.0		21.0	21.0	27.0	21.7	20.6	-	
EE37	520726	160857	31.0		26.0	25.0		29.0	25.0	33.0		33.0	33.0	32.0	29.7	28.2	-	
EE38	520726	160857	23.0	28.0	25.0	14.0		12.0			24.0		28.0	28.0	22.8	20.0	-	
EE39	520844	160729	28.0	27.0	26.0	22.0	23.0	24.0	21.0	30.0	25.0	26.0	26.0	29.0	25.6	24.3	-	
EE42	521004	160901	20.0	24.0	22.0	17.0	18.0	21.0	18.0	28.0	23.0	20.0	3.0	27.0	20.1	19.1	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing )	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted <(x.x)>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
EE43	521478	161447	27.0	26.0	25.0	19.0	16.0	22.0	16.0	28.0	23.0	29.0	30.0	32.0	24.4	23.2	-	
EE45	522211	163103	21.0	26.0	29.0	20.0	16.0		21.0			20.0	20.0	28.0	22.3	21.2	-	
EE46	520724	161027	25.0	23.0		18.0	20.0	25.0	24.0	28.0	29.0	4.0	30.0	31.0	23.4	22.2	-	
EE47	520713	162968	26.0	24.0	22.0	20.0	18.0	17.0	20.0	29.0	27.0	23.0	21.0	29.0	23.0	21.9	-	
EE48	522022	162502	27.0		26.0	22.0	22.0	21.0	18.0	30.0	28.0	27.0	30.0	32.0	25.7	24.4	-	
EE49	520580	160586	27.0	35.0	33.0	24.0	32.0	30.0	26.0	40.0	34.0	35.0	37.0	37.0	32.5	30.9	-	
EE50	521975	162677		31.0	30.0	26.0	32.0	30.0	34.0	37.0	39.0	33.0	37.0	43.0	33.8	32.1	-	
EE51	520702	160872	31.0	28.0	27.0		21.0	18.0	25.0	37.0	25.0	23.0	28.0	33.0	26.9	25.6	-	
EE52	522303	163213	40.0	24.0	30.0	24.0	24.0	26.0	31.0	54.0	42.0	35.0	37.0	39.0	33.8	32.1	-	
EE53	522369	163289	20.0	22.0	20.0	13.0	15.0	15.0	13.0	23.0	20.0	24.0	21.0	26.0	19.3	18.4	-	

☒ All erroneous data has been removed from the NO<sub>2</sub> 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.

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

☒ Epsom & Ewell Borough Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

#### Notes:

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

NO<sub>2</sub> annual means exceeding 60µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 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 Epsom and Ewell During 2022**

Epsom & Ewell Borough Council has not identified any new sources relating to air quality within the reporting year of 2022.

### **Additional Air Quality Works Undertaken by Epsom & Ewell Borough Council**

Epsom & Ewell Borough Council has not completed any additional works within the reporting year of 2022.

### **QA/QC of Diffusion Tube Monitoring**

The diffusion tubes are supplied and analysed by Lambeth Scientific Services. The method of preparation is 50% TEA in acetone. The lab follows the procedures set out in the Practical Guidance Documents.

The analysing laboratory participates in the AIR NO<sub>2</sub> Proficiency Testing Scheme for diffusion tubes which provides Quality Assurance / Quality Control (QA/QC).

Diffusion tube monitoring was completed in adherence with the 2022 Diffusion Tube Monitoring Calendar.

### **Diffusion Tube Annualisation**

Owing to data capture of below 75% due to tube theft and tampering, it was necessary to perform annualisation calculations on tube references EE10 and EE38. To support the calculations, background automatic monitoring data was sourced from nearby representative DEFRA AURN sites at Horley, Surrey and London Harlington. Calculations were performed by the Diffusion Tube Data Processing Tool.

**Table C.1 – Annualisation Summary (concentrations presented in  $\mu\text{g}/\text{m}^3$ )**

Site ID	Annualisation Factor Horley	Annualisation Factor London Harlington	Annualisation Factor -	Annualisation Factor -	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
EE10	1.0203	0.9697			0.9950	36.9	36.7
EE38	0.9331	0.9223			0.9277	22.8	21.1

### Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 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  $\text{NO}_x/\text{NO}_2$  continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Epsom & Ewell have applied a national bias adjustment factor of 0.95 to the 2022 monitoring data. A summary of bias adjustment factors used by Epsom & Ewell Borough 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	Adjustment Factor
2022	National	03/23	0.95
2021	County	-	0.94
2020	County	-	0.97
2019	County	-	1.03
2018	National	06/19	0.9

**NO<sub>2</sub> Fall-off with Distance from the Road**

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure can be estimated using the Diffusion Tube Data Processing Tool/NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website.

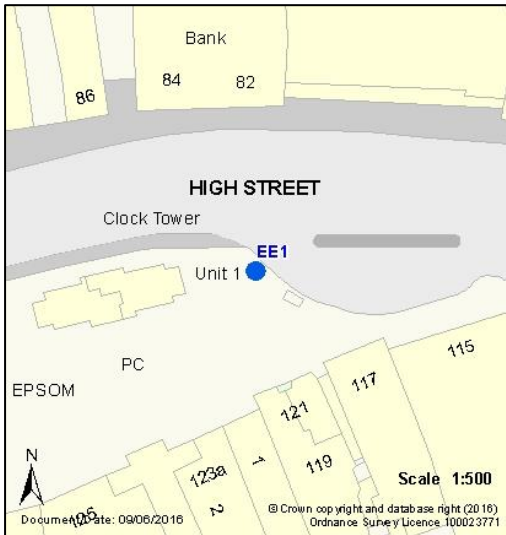
As all measured and corrected results in 2022 were below 36 µg/m<sup>3</sup>, consistent with para 7.84, no distance fall off calculations were necessary for 2022.

**NO<sub>2</sub> Fall-off with Distance from the Road**

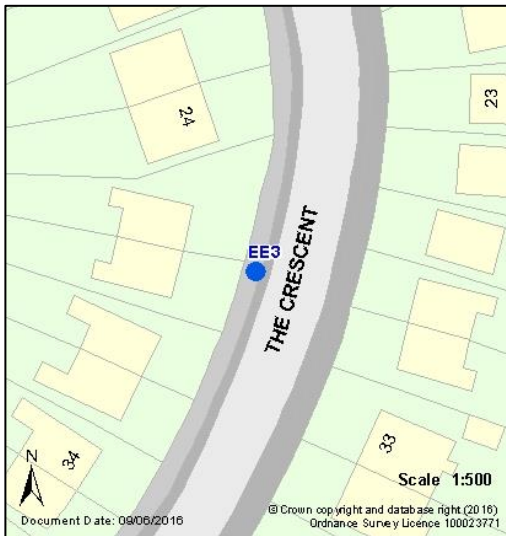
Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO<sub>2</sub> concentration at the nearest location relevant for exposure has been estimated using the NO<sub>2</sub> fall-off with distance calculator available on the LAQM Support website.

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

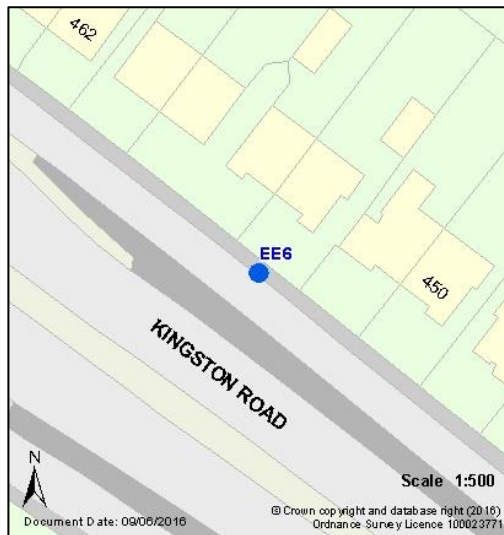
Figure D.1 – Map of Non-Automatic Monitoring Sites



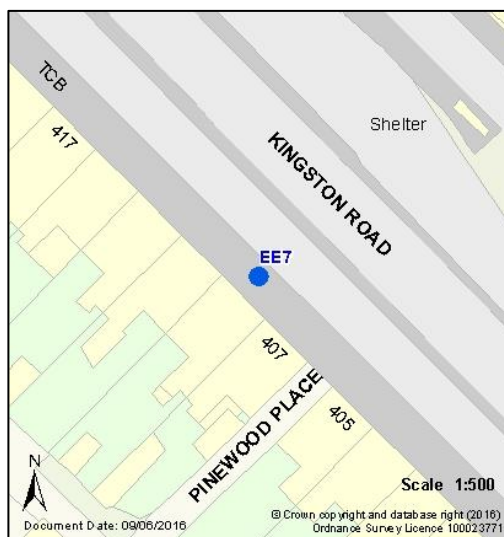
EE1 Clock Tower Epsom



EE3 The Crescent Epsom



EE6 Kingston Road, Ewell

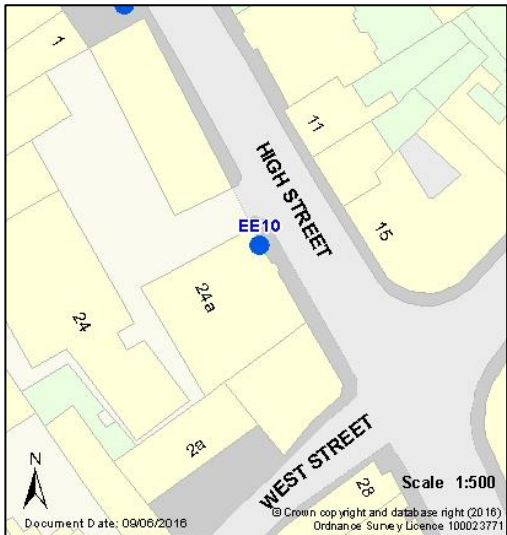


EE7 Kingston Road Ewell

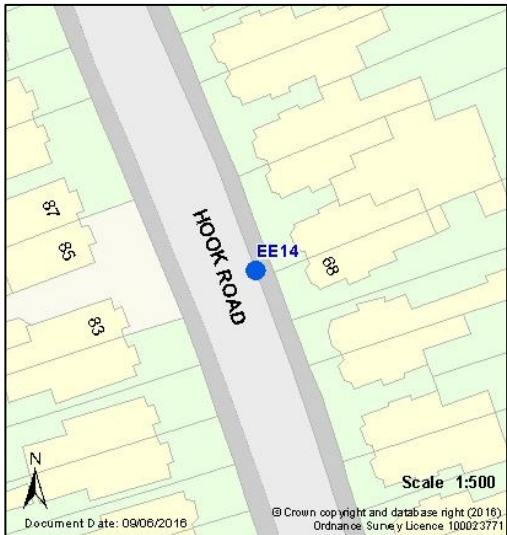


EE9 Chessington Road  
Ewell

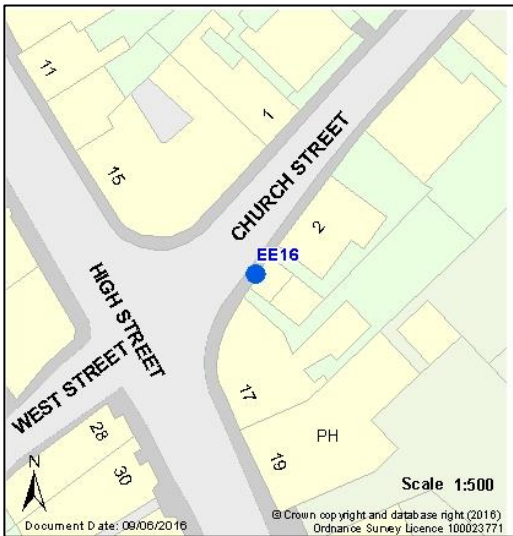




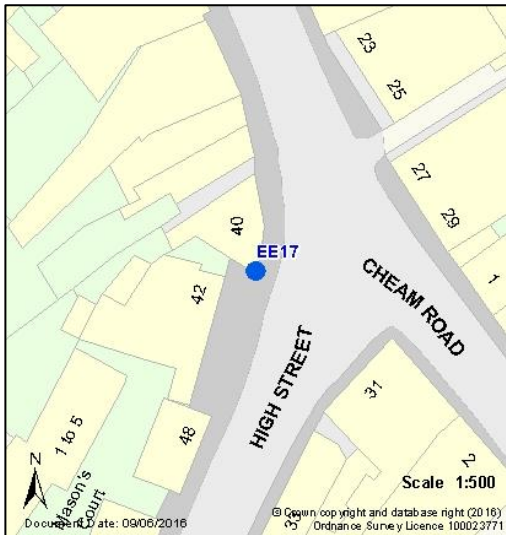
EE10 High Street Ewell



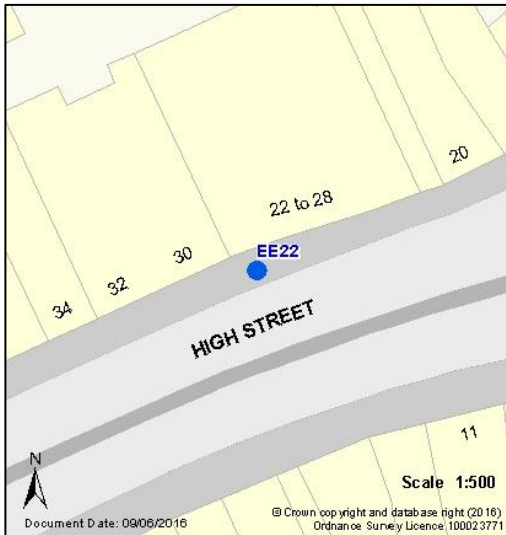
EE14 Hook Road Epsom



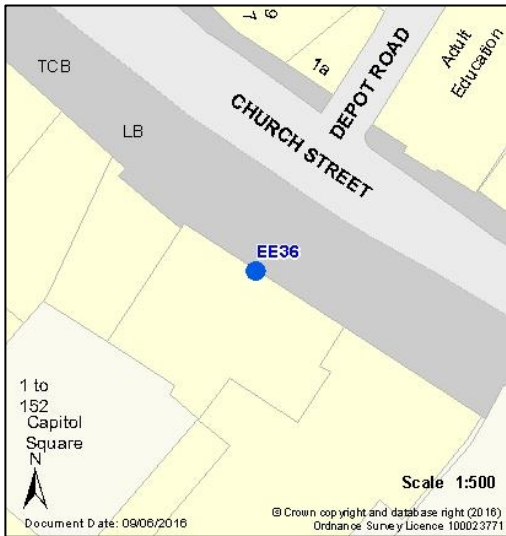
EE 16 Church Street Ewell



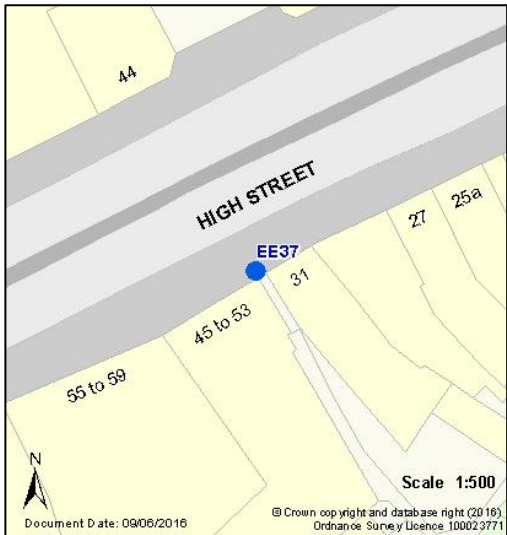
EE17 High Street Ewell



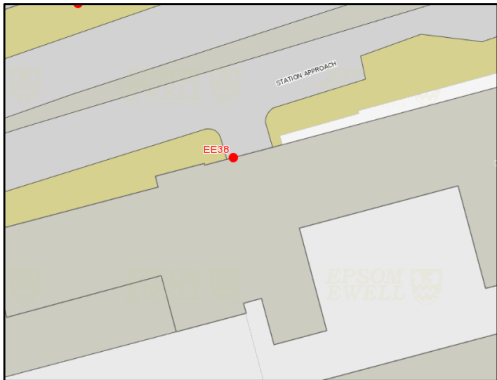
EE22 High Street Epsom



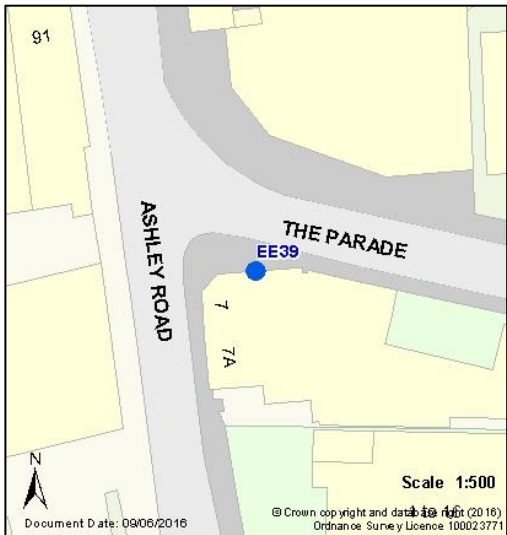
EE36 Church Street Epsom



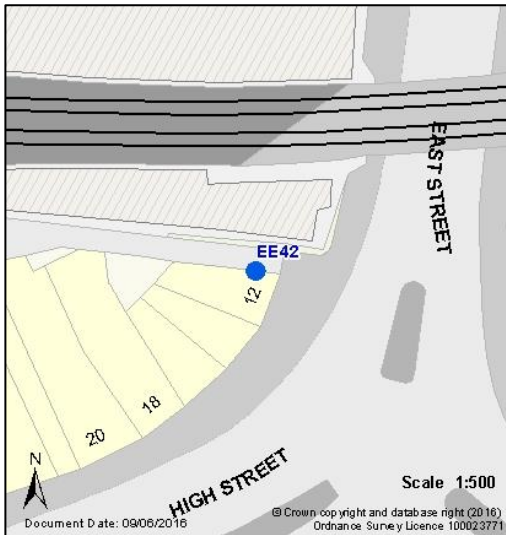
EE37 High Street Epsom



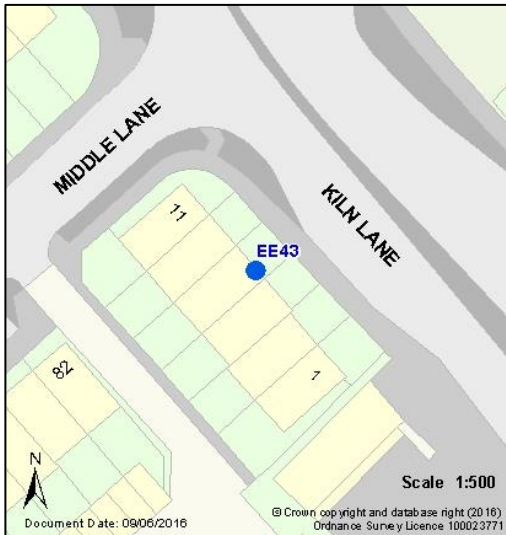
EE38 Station Approach  
South Epsom



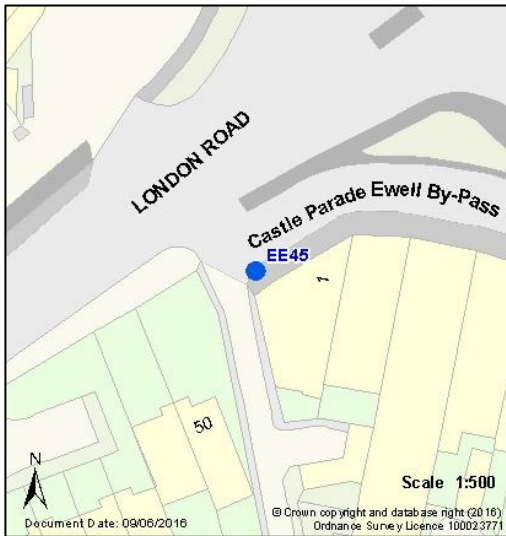
EE39 The Parade Epsom



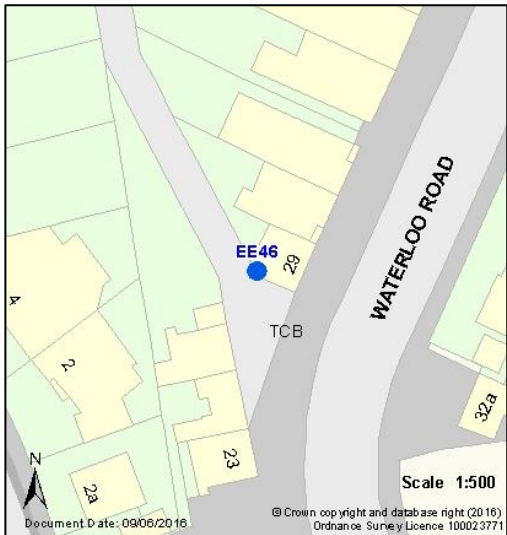
EE42 East Street Epsom



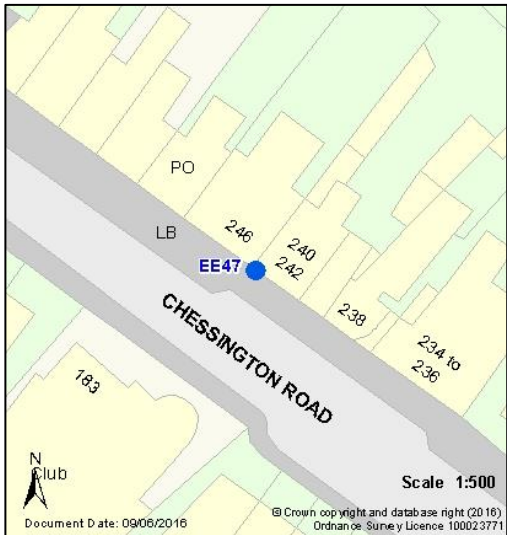
EE43 Kiln Lane Epsom



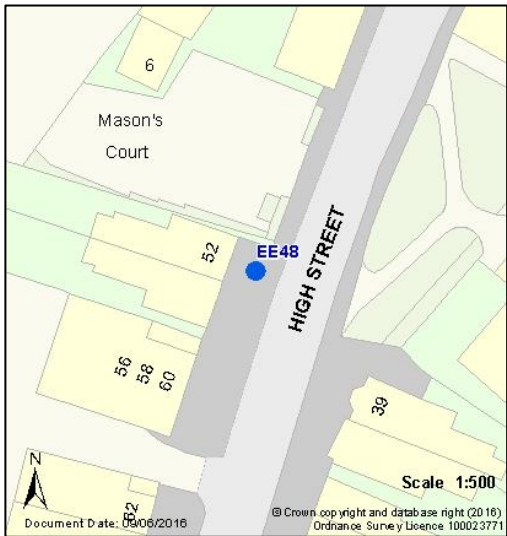
EE45 Castle Parade Ewell



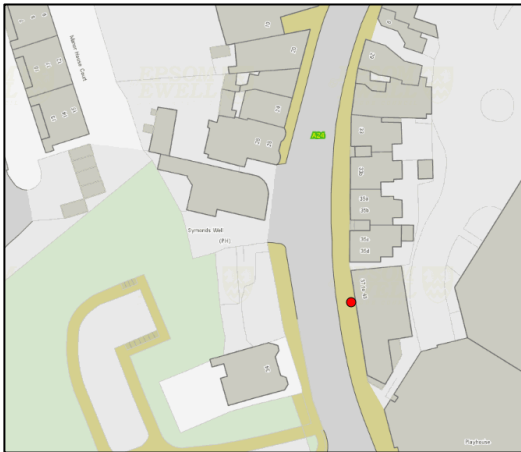
EE46 Waterloo Road  
Epsom



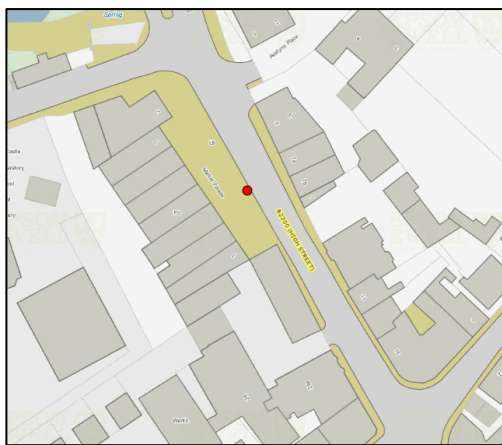
EE47 Chessington Road  
Ewell



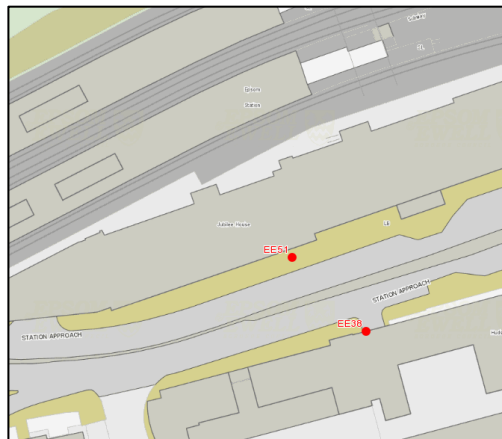
EE48 High Street Ewell



EE49 – South Street Epsom

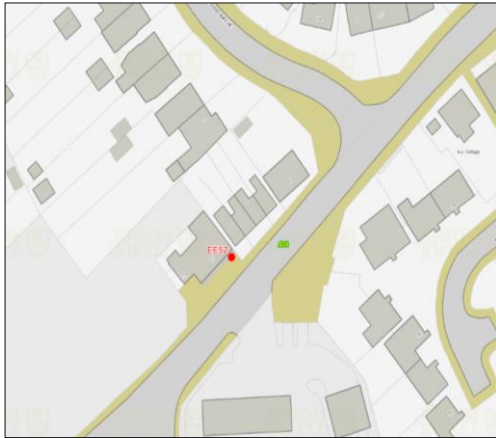


EE50 High Street Ewell

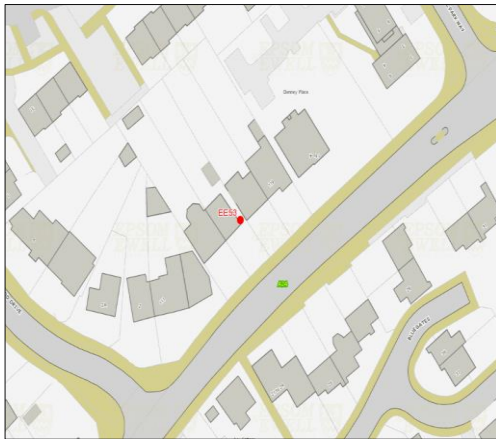


EE51 Station Approach  
North





EE52 – London Road Ewell  
(1)

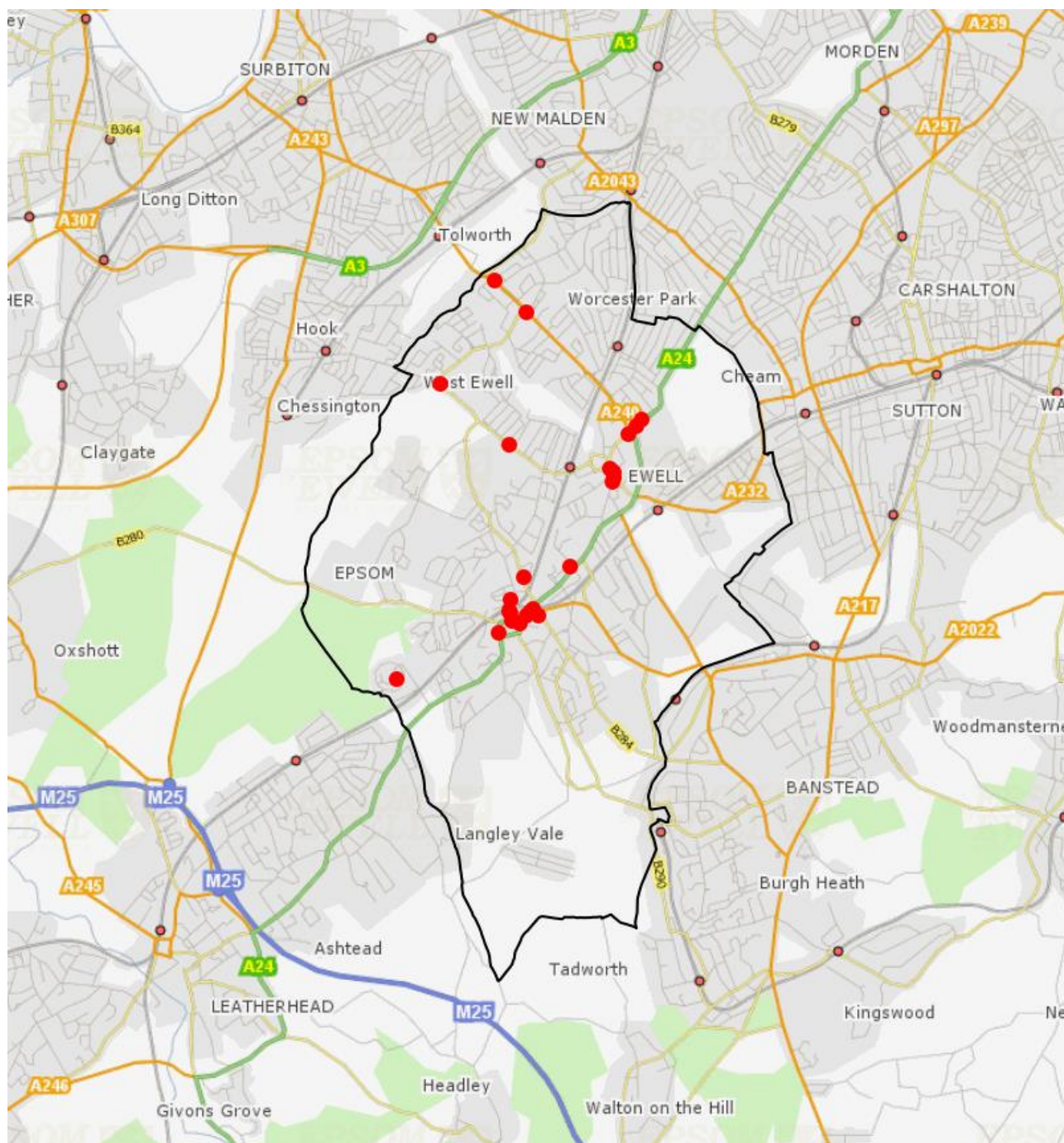


EE53 – London Road Ewell  
(2)

### Map of monitoring locations within Ewell High Street Air Quality Management Area



Map of monitoring locations within Epsom and Ewell





## Appendix E: Summary of Air Quality Objectives in England

**Table E.1 – Air Quality Objectives in England<sup>7</sup>**

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO <sub>2</sub> )	200µg/m <sup>3</sup> not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO <sub>2</sub> )	40µg/m <sup>3</sup>	Annual mean
Particulate Matter (PM <sub>10</sub> )	50µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM <sub>10</sub> )	40µg/m <sup>3</sup>	Annual mean
Sulphur Dioxide (SO <sub>2</sub> )	350µg/m <sup>3</sup> , not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	125µg/m <sup>3</sup> , not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO <sub>2</sub> )	266µg/m <sup>3</sup> , not to be exceeded more than 35 times a year	15-minute mean

<sup>7</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen Oxides
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of 10µm or less
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO <sub>2</sub>	Sulphur Dioxide

## References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022.  
Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022.  
Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Air Quality Annual Status Report. June 2022 Published by Epsom & Ewell Borough Council