



# 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 Thurrock Borough Council

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

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 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>.

Thurrock currently has 18 Air Quality Management Areas (AQMAs); these are a result of traffic related pollution along busy roads. Many of these roads are the main commuter routes or used for logistical purposes. There is often a large amount of traffic during peak hours and in many of these areas there is relevant public exposure, predominantly in the form of residential dwellings which are in relatively close proximity to these roads. A full list of the AQMAs can be found in [Table 2.1](#) of this report or on the Defra UK Air website via [this web-link](#).

The main pollutants of concern in Thurrock are nitrogen dioxide (NO<sub>2</sub>) and particulate matter (PM<sub>10</sub> & PM<sub>2.5</sub>); both of these pollutants arise from road traffic emissions. Thurrock only has AQMAs which are declared for road traffic-based emissions, there are no industrial based AQMAs. The AQMAs are all declared for exceedance of the long-term objective for NO<sub>2</sub> (40 µg/m<sup>3</sup>). Out of the 18 AQMAs there are currently four that are also declared for PM<sub>10</sub>, for the short-term objective or 24-hour mean objective of 35 permitted exceedances of >50 µg/m<sup>3</sup>.

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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, January 2023

<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

The 2016 Air Quality Action Plans (AQAP) along with an Air Quality & Health Strategy Document (AQHSD) have been devised to provide an approach for the council to manage air quality within its 18 AQMAs, ensure compliance with established regulatory thresholds and also prevent new AQMA's arising in the future. The document can be viewed via the Thurrock Council Website links:

- [Thurrock Air Quality](#)
- [Thurrock Air Quality and Health Strategy, including AQAP that covers all declared AQMAs](#)

The Council works in collaboration with the Environment Agency (EA) on air quality issues from industrial activities within the borough, consulting as necessary on permitting variations/applications which the EA are responsible for under the Integrated Pollution Prevention & Control Directive (IPPC). The Council also carries out its statutory duties under Local Authority integrated Pollution & Prevention Control Regime (LA-IPPC).

In 2016 the council undertook a detailed modelling assessment to re-determine the extent of NO<sub>2</sub> & PM<sub>10</sub> exceedances over most of the borough and including all 18 AQMA's. The report found that 8 AQMA's should be revoked for NO<sub>2</sub> and all four for PM<sub>10</sub> should also be revoked. However, the report was not accepted by Defra as the assessment had not followed the procedures outlined the Defra Local Air Quality Management (LAQM) Technical Guidance (TG16). Following this assessment, the Council set up 12 additional monitoring locations from 2017 using NO<sub>2</sub> diffusion tubes within these locations. The Council planned to monitor at these locations for at least three years and make a determination in 2020 as to whether these AQMAs can be revoked for NO<sub>2</sub> on the basis of the monitoring results. It should be highlighted that owing to the Covid-19 pandemic, the 2020 results are not to be used alone in determining AQMA revocations, therefore the monitoring at the new locations is ongoing.

Thurrock Council joined the AirTEXT service in 2018 which is provided by Cambridge Environmental Research Consultants (CERC). This service allows members of the public to see air pollution forecasting based on detailed dispersion modelling for the area in which they live. They can also sign up to AirTEXT pollution alerts and receive voice, email or text messages when air pollution is forecast to be moderate or higher. This service is aimed to provide people who suffer with respiratory illnesses, as well as those which suffer with heart problems, detailed information about air quality on a given day, and alert them when not to go outside. Further information can be found on the [Air Text website](#) and the [CERC website](#).

Overall, NO<sub>2</sub> concentrations increased slightly between 2021 and 2022 with all but three passive monitoring sites reporting an increase in annual mean concentrations. The average change was +1.9 µg/m<sup>3</sup> across the passive monitoring network. This increase is likely a result of a partial return to pre-pandemic traffic levels.

PM<sub>10</sub> concentrations have reduced slightly, in line with previous years, between 2021 and 2022 with an average reduction of 5%. However, results should be treated with caution because the average is skewed by data from the TK8 monitoring station which saw the largest reduction of 14% but only had 63% valid data capture during the 2022 monitoring period.

In 2022, Thurrock Council monitored PM<sub>2.5</sub> at two locations: TK3 and TK9 monitoring stations, in Stanford-le-Hope and Tilbury respectively. While concentrations at both sites are higher than the newly introduced air quality objective for this pollutant, they were compliant with the applicable air quality target at the time. Concentrations at both sites have remained stable over the last five years, where data is available.

There is currently one location monitoring SO<sub>2</sub> within the borough located at Thurrock 1, Grays. SO<sub>2</sub> concentrations were well below the air quality objectives in 2022, with no exceedances reported.

## **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 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

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

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

important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

In 2016, the council, in consultation with stakeholders, produced a strategy that frames its approach to tackling poor air quality and reducing exposure to safe levels across the borough. The [Thurrock Air Quality and Health Strategy \(2016\)](#) sets out the council's overarching objectives for air quality and contains policies and actions that the council will take to improve air quality.

The actions contained in the Air Quality and Health Strategy consist of borough-wide actions and specific actions to improve air quality in prioritised AQMAs in the borough. The creation of the Congestion Task Force (CTF), which brings together stakeholders with a major stake in the strategic road network, such as Highways England, Kent County Council, Essex County Council and Thurrock Council and the Police, in collaboration to formulate and implement actions to better manage the road network following incidents at Dartford Crossing. This engagement is on-going and seeking to eliminate other pinch-points which contribute to poor air quality, such as devolving powers to enforce yellow box junctions at Junctions of the M25, which cause significant congestion. Additional measures to be implemented by the Council include investment in new technologies to help dynamically tackle congestion, limiting the impact of traffic on air quality.

The Council aims to re-evaluate its Air Quality and Health Strategy to take into consideration new opportunities and develop additional and improved policies and actions. This was planned to be developed over the 2019/20 and 20/21 financial years, however delays associated with Covid-19 have re-directed resources and this will continue to be looked into over 2024/25 with the aid of a borough-wide air quality model which is currently under development.

## Conclusions and Priorities

During 2022, NO<sub>2</sub> concentrations were monitored across the borough by a network of 66 diffusion tube sites (including one duplicate and one triplicate site) and four automatic monitoring sites. There were no reported exceedances of the AQS Objectives for NO<sub>2</sub> in 2022. Once corrected for distance, only one site – the TK8 monitoring station within AQMA 10 – reported an annual mean concentration within 10% of the AQS objective.

There was an average increase in annual mean NO<sub>2</sub> concentrations of 7% recorded at the monitoring sites located within AQMAs when comparing annual mean concentrations at

passive monitoring locations between 2021 and 2022. This increase has likely occurred as a result of traffic returning to the borough's roads in 2022 in the aftermath of the Covid-19 pandemic. An average increase of 9% was recorded at monitoring sites outside the borough's AQMA's.

In relation to the 1-hour AQS Objective for NO<sub>2</sub>, there was one exceedance reported in 2022. This occurred at the TK9 monitoring station in Tilbury and is well below the permitted 18x1h exceedances permitted. All diffusion tube sites in 2022 were below 60µg/m<sup>3</sup>, which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites.

2022 monitoring confirms that there are currently no areas breaching the annual mean air quality objective for PM<sub>10</sub>. There were some exceedances of the 24-hour mean objective in 2022 at all three automatic sites, however these remained below the number of permitted exceedances per year. The maximum number of exceedances of the PM<sub>10</sub> 24-hour mean objective was jointly at the Thurrock 1 and 3 monitoring stations in 2022 (3 exceedances out of the permitted 35 exceedances per year).

Thurrock Council currently has two automatic monitoring stations (Thurrock 3; Stanford Le-Hope and Thurrock 9; Tilbury), that monitor PM<sub>2.5</sub>. All concentrations over the past five years have reported above the new PM<sub>2.5</sub> air quality objective of 10µg/m<sup>3</sup> to be met by 2040 but well below the air quality target at the time (10µg/m<sup>3</sup>).

No changes to AQMA designations are currently proposed by the Council despite repeated years of compliance with the AQS objectives for which many were declared. This is to ensure that impetus to continually improve air quality for our residents is not diluted.

Thurrock Council are aiming to conduct a detailed assessment relating to the status of all declared AQMA's across the borough, particularly with regard to the AQMA's that do not currently have monitoring sites associated with them. At the time of writing, work on this project is underway, with an expected completion date in Spring 2024.

## Local Engagement and How to get Involved

The public can assist in air pollution matters by continuing to address concerns when they think there is an air quality issue in the borough by reporting it via the [Thurrock Council website](https://www.thurrock.gov.uk/report) <https://www.thurrock.gov.uk/report> or by contacting our contact centre Tel: 01375 652955. The Environmental Health Team will continue to assist and address any such concerns as necessary.

The public can keep informed on local air quality matters by accessing a wealth of information on the [Council's air quality webpage](#).

They can find out what air quality is in their region from the [London Air Quality Network \(LAQN\)](#) or from the [EssexAir website](#):

The Public can also keep informed on the latest air quality forecasting from the Defra [UK-AIR website](#).

The public can now access the latest forecasting information for air quality which uses detailed dispersion modelling to predict air quality in near real-time using the newly subscribed [AirTEXT service](#) for Thurrock.

The public can also [subscribe](#) free to an AirTEXT alert service using a free mobile app.

## **Local Responsibilities and Commitment**

This ASR was prepared by the Air Quality Officer of Thurrock Borough Council with the support and agreement of the following officers and departments:

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This ASR has been approved by:

Gavin Dennett



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This ASR has not been signed off by a Director of Public Health.

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# 1 Local Air Quality Management

This report provides an overview of air quality in Thurrock Councils district 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 Thurrock 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 (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.

A summary of AQMAs declared by Thurrock Council can be found in Table 2.1. The table presents a description of the 18 AQMAs that are currently designated within Thurrock Borough Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO<sub>2</sub> annual mean;
- PM<sub>10</sub> 24-hour mean;

**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
AQMA 1	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing a number of properties along London Road Grays, Orsett Road & Stanley Road Grays	NO	48.8 µg/m <sup>3</sup> (NAS1)	27.4 µg/m <sup>3</sup> (LRG)	>5	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 2	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing Residential properties along London Road South Stifford.	NO	48 µg/m <sup>3</sup> (LRSS)	27.1 µg/m <sup>3</sup> (LRSS)	4	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 3	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing Residential properties along Hogg Lane & Elizabeth Road.	NO	49 µg/m <sup>3</sup> (ER)	32.6 µg/m <sup>3</sup> (ER)	3	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>

AQMA 4	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing Residential properties along A1306 west of Chafford Hundred Visitor Centre	NO	65.5 µg/m <sup>3</sup> (NAS2) - proxy location, within AQMA 5	31.9 µg/m <sup>3</sup> (NAS2) - proxy location, within AQMA 5	3	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 5	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing Residential properties along Warren Terrace A1306 & A13	NO	NO2 = 65.5 µg/m <sup>3</sup> (NAS2)	NO2 = 31.9 µg/m <sup>3</sup> (NAS2)	3	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
	2001 (Amended 2005)	PM10 24 Hour Mean	An area encompassing Residential properties along Warren Terrace A1306 & A14	NO	PM10 = No Data. Exceedance was based on modelling only	New modelling work is underway at the time of writing but not yet complete	Unknown	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 7	2001 (Amended 2005)	NO2 Annual Mean	A Hotel (IBIS) near to M25 north of the Dartford Crossing	YES	NO2 = 52 µg/m <sup>3</sup> (IBIS)	NO2 = 32.0 µg/m <sup>3</sup> (IBIS)	3	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>

	2001 (Amended 2005)	PM10 24 Hour Mean	A Hotel (IBIS) near to M25 north of the Dartford Crossing	NO	PM10 = No Data. Exceedance was based on modelling only	New modelling work is underway at the time of writing but not yet complete	Unknown	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 8	2001 (Amended 2005)	NO2 Annual Mean	A Hotel next to Jct 31 of the M25	YES		NO2 = 28.6 µg/m3 (PIH)	>5	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
	2001 (Amended 2005)	PM10 24 Hour Mean	A Hotel next to Jct 31 of the M26	NO	PM10 = No Data. Exceedance was based on modelling only	New modelling work is underway at the time of writing but not yet complete	Unknown	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 9	2001 (Amended 2005)	NO2 Annual Mean	A Hotel next to Jct 31 of the M25	YES	No Data exceedance was based on modelling only	25.1 µg/m3 (THB)	>5	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>



AQMA 10	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing Residential properties along London Road Purfleet near to Jarrah Cottages	NO	69.8 µg/m <sup>3</sup> (TK2) automatic site	NO2 = 39.3 µg/m <sup>3</sup> (TK8)	1	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
	2001 (Amended 2005)	PM10 24 Hour Mean	An area encompassing Residential properties along London Road Purfleet near to Jarrah Cottages	NO	PM10 = No Data. Exceedance was based on modelling only	New modelling work is underway at the time of writing but not yet complete	Unknown	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 12	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing Residential properties along A1306 on the Watts Wood Estate	NO	50.5 µg/m <sup>3</sup> (WC)	26.3 µg/m <sup>3</sup> (WC)	4	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 13	2001 (Amended 2005)	NO2 Annual Mean	An area encompassing Residential properties along A1306 London Road Aveley Arterial Road	NO	55.2 µg/m <sup>3</sup> (LRAR)	30.9 µg/m <sup>3</sup> (LRAR)	3	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>

AQMA 15	2001 (Amended 2005)	NO2 Annual Mean	1 residential dwelling near the M25 on the edge of Irvine Gardens	YES	40 µg/m3 (GDSO)	18.7 µg/m3 (GDSO)	>5	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 16	2001 (Amended 2005)	NO2 Annual Mean	1 residential dwelling near the M25 off Dennis Road	YES	42.6 µg/m3 (KCNO)	18.6 µg/m3 (KCNO)	>5	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 21	2005	NO2 Annual Mean	A former Hotel on Stonehouse Lane	NO	44.6 µg/m3 (STON)	No monitoring within this AQMA	Unknown	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 23	2005	NO2 Annual Mean	An area encompassing Residential properties along London Road West Thurrock	NO	55.1 µg/m3 (WT)	28.3 µg/m3 (WT)	>5	Air Quality and Health Strategy (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>

AQMA 24	2014	NO2 Annual Mean	An area encompassing Residential properties along Calcutta Road, Dock Road & St Chads Road	NO	40.5 µg/m3 (TL)	28.3 µg/m3 (TILB)	3	Action Plan for AQMA 24 - Tilbury (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 25	2016	NO2 Annual Mean	An area encompassing Residential properties along Aveley High St & Ship Lane	NO	41 µg/m3 (AVSL)	29.9 µg/m3 (AVSL)	3	Action Plan for AQMA 25 - Aveley (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>
AQMA 26	2016	NO2 Annual Mean	An area encompassing Residential properties along the Purfleet Bypass	NO	37.8 µg/m3 (PBP)	23.1 µg/m3 (PBP)	>5	Action Plan for AQMA 26 – Purfleet bypass (2016)	<a href="https://www.thurrock.gov.uk/air-quality/air-quality-monitoring">https://www.thurrock.gov.uk/air-quality/air-quality-monitoring</a>

Thurrock Council confirm the information on UK-Air regarding their AQMA(s) is up to date.

Thurrock Council confirm that all current AQAPs have been submitted to Defra.

## Progress and Impact of Measures to address Air Quality in Thurrock Council district

Defra's appraisal of last year's ASR concluded *the following*:

*The report is well structured, detailed, and provides the information specified in the Guidance. The following comments are designed to help inform future reports:*

*1. Extensive Trend graphs have been provided for all monitoring data, which is commended.*

*2. The council is commended for their in-depth discussion of their approach to tackling PM2.5 emissions with reference Public Health Outcomes Framework to account for the health effects of PM2.5.*

*3. The decision of STMBC to revoke both AQMA 15 and 16 following consecutive years of compliance is welcomed. The work in progress to produce detailed assessments relating to the status of all declared AQMAs across the borough is highly encouraged.*

*4. The Council have provided clear and accurate mapping of the diffusion tube network, which is commended.*

*5. There is a minor formatting issue with the report. The title of the report is "2021 Air Quality Annual Status Report". This is incorrect and should read "2022 Air Quality Annual Status Report". Additionally, all headers and footers in the report should be updated accordingly. The council is highly encouraged to download the latest version of the Annual Status Report Template on Defra's Website (<https://laqm.defra.gov.uk/air-quality/annual-reporting/annual-status-report-templates-england-exc-london/>) and update this document accordingly.*

*Comment: These errors have been rectified for this year's report.*

*6. The Council should clarify whether they have uploaded their diffusion tube data onto the DTDES. A few of the checkboxes beneath Table B.1 have been deleted from the original template and this make it slightly confusing for the reader.*

*Comment: These errors have been rectified for this year's report.*

*7. The council is recommended to continue to review their current monitoring regime, specifically the addition of several new non-automatic monitoring sites (diffusion tubes) across the region. This is important as additional sites will help to identify whether there are other key areas of relevant exposure where there may be exceedances and the appropriate measures can be adopted accordingly.*

*Comment: Thurrock Council is in the process of carrying out a borough-wide air quality modelling exercise which will help inform the siting of potential new monitors, both passive and continuous.*

*8. The Council have provided evidence of progress against the AQAP measures. They could also include the and funding status for each measure to improve air quality in TC. The AQAP was published in 2016. The Council intends re-evaluate its Air Quality and Health Strategy, which contains the overarching Air Quality Action Plan to take into consideration new opportunities and develop additional and improved policies and actions over the next reporting year with a target date for completion of Autumn 2023.*

*Comments: Table 2.2 has been corrected for this year. Additionally, due to unforeseen delays in the provision of our air quality model, delivery of the new AQAP has been delayed with an expected date for completion of Spring 2025.*

Thurrock Council has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 30 measures are included within Table 2.2, with the type of measure and the progress Thurrock Council have made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in the Air Quality Action Plan which sits within Thurrock's Air Quality and Health Strategy. Key completed measures are:

- Action 7: Personalised Travel Planning
- Action 24: Improve traffic signalling at traffic light junction within AQMA 13
- Action 26: HGV weight restriction in AQMAs 1 & 2
- Action 29: Air Quality Working Group

Thurrock Council expects the following measures to be completed over the course of the next reporting year:

- Action 21: Freight Quality Partnership expansion
- Action 30: Borough-wide air quality modelling exercise

Thurrock Council's priorities for the coming year are to ensure delivery of these proposed action measures, and review post implementation whether they have delivered noticeable improvements in air quality, if not then additional measures may be required in due course.

Thurrock Council worked to implement these measures in partnership with the following stakeholders during 2022:

- Neighbouring local authorities;
- National Highways;
- Environment Agency;
- Defra;
- Port Health Authority.

The principal challenges and barriers to implementation that Thurrock Council anticipates facing are challenges in identifying funding sources, and lack of resources to plan and implement measures.

Progress on the measures which may have rolled over from previous years has been slower than expected due to challenges in securing identified funding resources from external partners. Additionally, due to the increasing demands on Council resources, there has been the risk of some schemes slipping in previous years. The proposed review of the Air Quality and Health Strategy will help improve the focus on schemes to address air quality, by developing new actions and policies, and set in place a formal process for progressing these actions.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	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	Public Awareness Raising & Education	Public Information	via the Internet	Ongoing	Ongoing	Env Protection Team/ Highways & Public Health	Env Protection Team/ Highways & Public Health	NO	Partially Funded		Planning	N/A	N/A	The council operates its own website as well as participating in the Essex Air site which is currently being updated to provide more comprehensive and accessible information for the public.	To Inform the Public of the state of Air Quality dissemination of air quality reports and download of AQ data from Thurrock Council website/ LAQN, EssexAir & Defra
2	Smarter Choices-Work Place Travel Planning : Action to road vehicle emissions	Promoting Travel Alternatives	Workplace Travel Planning	2012/13	Ongoing	Strategic Planning	Strategic Planning	NO	Funded		Planning	<1%	N/A	The process of encouraging modal shift is at the heart of policy. The council is developing a new Transport Strategy and Vision which further promotes sustainable transport and modal shift. The council continues to promote travel plans in education, residential and employment settings. Additional walking and cycling infrastructure continues to be planned to support more walking and cycling trips through the development of a new Local Cycling and Walking Implementation Plan.	Encourage modal shift (13 organisations supported since beginning of Local Sustainable Transport Fund (LSTF))
3	Action to road vehicle emissions	Promoting Travel Alternatives	Promotion of cycling	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Partially Funded		Implementation	<1%	N/A	The council continues to promote alternative modes of travel, and encourage	Encourage modal shift

Measure No.	Measure	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	
															modal shift. The development of new cycle infrastructure across the borough progresses with the development of an LCWIP, and provision of low cost access to cycles through the ForwardMotion cycle hub. The completion of a cycle route on Calcutta Road is in progress and works of the route in Brennan Road - Tilbury continues.	
4	Action to road vehicle emissions	Promoting Travel Alternatives	School Travel Plans	2004	Complete	Highways / Strategic Planning	Highways / Strategic Planning	NO	Partially Funded		Implementation	<1%	N/A	The council continues to promote school travel plans, with dedicated resource in 2022/23. The borough achieved its first Platinum rated school, and increased the number of schools with accreditation. Next year, the council is looking to re-establish its walking buses.	Encourage modal shift	
5	Action to road vehicle emissions	Promoting Travel Alternatives	Promotion of walking	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded		Implementation	<1%	N/A	The wayfinding programme has come to an end, though some schemes are being finalised to help promote walking and cycling. A scheme was also installed in Orsett Heath Park.	Encourage modal shift	
6	Action to road vehicle emissions Public	Promoting Travel Alternatives	Promote use of rail and inland waterways	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Aborted	<1%	N/A	Not progressed	Encourage modal shift	



Measure No.	Measure	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
	Transport (Metrorail)														
7	Action to road vehicle emissions	Promoting Travel Alternatives	Personalised Travel Planning	2010/11	2015/16	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded		Completed	<1%	N/A	Programme has completed and not progressed further	Encourage modal shift
8	Action to road vehicle emissions	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2010/11	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Partially Funded		Planning	<1%	N/A	The council has a sustainable travel brand - shared with Southend Borough Council and Essex County Council - ForwardMotion which is used to promote active and sustainable travel, and supporting materials are being refreshed including the website.	Encourage modal shift
9	Action to road vehicle emissions	Transport Planning and Infrastructure	Cycle network	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Partially Funded		Planning	<1%	N/A	The cycle network is increasing with completion of the Dock Road/Calcutta Road cycle scheme, and commencement of the Brennan Road scheme. Consultations on other cycle schemes are ongoing. Aim is to have a traffic free cycle scheme from North Stifford to Stanford-le-Hope.	Encourage modal shift
10	Action to road vehicle emissions	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Partially Funded		Implementation	<1%	N/A	The council has an ongoing shelter replacement programme and makes enhancements to existing infrastructure. The council is looking to replace the final bus shelter at Grays bus	Encourage modal shift

Measure No.	Measure	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
														station to complete the renewal project at this site.	
11	Action to road vehicle emissions	Transport Planning and Infrastructure	Bus route improvements	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Planning	<1%	N/A	Due to significant changes in the Thurrock bus market, this has not been progressed. Thurrock Council continues to monitor its Bus Service Improvement Plan and look to adopt its Enhanced Partnership.	Encourage modal shift
12	LAPC Inspections, of local industry	Environmental Permits	Other	1990	Ongoing	Environmental Protection team	Environmental Protection team	NO	Funded	< £10k	Implementation	Effects not quantifiable, but probably limits local component of background pollution	N/A	LAPPC work is ongoing and part of our normal regulatory work.	Prevention of Pollution & Nuisance
13	Action to road vehicle emissions (116 drivers trained by SAFED up to March 2013)	Vehicle Fleet Efficiency	Driver training and ECO driving aids	2010/11	2014/15	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Aborted	<1%	N/A	No longer being implemented	Improve HGV driving efficiency to improve vehicle emissions
14	Action to road vehicle emissions (ECO Stars Freight Accreditation Scheme, 42 businesses currently have accreditation from the scheme)	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2010/11	2014/15	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Aborted	<1%	N/A	No longer being implemented	Improve HGV driving efficiency to improve vehicle emissions (funding available until March 2015)
15	Enforcement of local Taxi licencing	Promoting Low Emission Transport	Taxi Licencing conditions	Ongoing	Ongoing	Licencing	Licencing	NO	Funded		Implementation	<1%	N/A	Ongoing	Ensure that Road vehicles are road worthy and EU compliant vehicles
16	Provision of Electric vehicle car charging points around the borough	Promoting Low Emission Transport	Procurring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV	2009	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Planning	<1%	N/A	Thurrock has a contract with EV charging supplier, and looking to seek additional funding to	Alternative fuelled vehicles

Measure No.	Measure	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
			recharging, Gas fuel recharging											increase capacity. Hydrogen fuelling is being explored within the Thames Freeport bid.	
17	Council Introduced Home working / flexible working hours	Promoting Travel Alternatives	Encourage / Facilitate home-working	2014	Ongoing	TBC	TBC	NO	Not Funded		Implementation	N/A	N/A	Ongoing	To reduce and save money on unnecessary vehicle journeys
18	Introduction of Hybrid Buses into the fleet	Alternatives to private vehicle use	Other	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded		Implementation	<1%	N/A	Except for a very small number of buses, Thurrock has a clean bus fleet. Buses operated by First Essex Buses run hybrid vehicles while nearly all Ensign Buses are Euro 6 compliant. Only buses operated by Nibs and some school operators may not Euro 6.	Switch from Diesel to less polluting alternatives
19	Cycle Parking for AQMA 5	Transport Planning and Infrastructure	Other	2013/2014	Completed	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded		Implementation	<1%	N/A	A parking strategy has been adopted where cycle parking is a formal requirement of all new developments for both short and long-term stays.	Increase capacity for cycle network
20	Local Sustainable Transport Fund (LSTF) Improvement of Transport infrastructure (Boroughwide) Initiative	Transport Planning and Infrastructure	Other	2010/2014	Completed	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Aborted	<1%	N/A	No longer being implemented	Improvement of Transport Infrastructure
21	Freight Quality Partnership (FQP) Expansion of FQP (as of 2014 were 45 members in the FQP in Thurrock (AQMA 23)	Freight and Delivery Management	Freight Partnerships for city centre deliveries	2010/11	2015/16	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Implementation	<1%	N/A	The Thurrock Freight, Logistics and Transporting Partnership was reformed, but has not met in a number of years.	Partnership with local freight and logistic industry to provide discussion platform around freight issues.

Measure No.	Measure	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
22	Pollution absorbent paint barrier (AQMA 13)	Transport Planning and Infrastructure	Other	2013	Complete	Environmental Protection Team /Highways / Strategic Planning	Environmental Protection Team /Highways / Strategic Planning	NO	Not Funded		Aborted	1-2%	Monitor NO2 diffusion tube results, see if there is an improvement	This action is no longer being pursued due to a lack of evidence of the efficacy of such a barrier.	Experimental mitigation measure to attempt to reduce NO2 pollution within AQMA 13
23	Public Transport - Eco driver training	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	2014	ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Aborted	<1%	N/A	No longer being implemented	Improve driver efficiency in the bus fleet (limited application only 16 drivers trained, Ensign bus fleet operators)
24	Improve traffic signalling at traffic light junction within (AQMA 13)	Traffic Management	Other	2013	2013	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded		Completed	<1%	N/A	Completed	Improve flow of stationary traffic for smoother driving, hence attempt to lower emissions
25	SCOOT/ UTMC (AQMA 1 & AQMA 5)	Traffic Management	UTC, Congestion management, traffic reduction	2014	2014	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded		Completed	<1%	N/A	Completed	
26	HGV weight restriction (AQMA 1, 2)	Traffic Management	Other	2013	2013 / 2014	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded		Completed	<1%	N/A	Completed	Divert HGVs away from AQMAs along Devonshire road, to alleviate London Road from HGVs & Congestion
27	Improve Bus / Rail interchange (AQMA 5)	Transport Planning and Infrastructure	Public transport improvements- interchanges stations and services	Ongoing	Ongoing	Highways / Strategic Planning	Highways / Strategic Planning	NO	Partially Funded		Implementation	<1%	N/A	Ongoing programme to improve bus stops	Improve accessibility of public transport :Completed scheme, but will make future improvements as part of the Masterplan for Thurrock
28	Road layout review - future bus priority measures (AQMA 23)	Transport Planning and Infrastructure	Other	Unknown	TBC	Highways / Strategic Planning	Highways / Strategic Planning	NO	Not Funded		Aborted			Not implemented	
29	Air Quality Officer Working Group	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014/15	2015/16	Environmental Protection Team	Environmental Protection Team	NO	Not Funded	< £10k	Completed	n/a	n/a	Air Quality Officer is now in post and the first working group meeting was held on 20/04/22	To coordinate action between council departments (Health, Transport & Environment) and determine focus areas/initiatives

Measure No.	Measure	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
30	Air Quality Study	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2014/15	2015/16	Highways / Strategic Planning	Highways / Strategic Planning	NO	Funded	£10k - 50k	Implementation	n/a	n/a	Work with a consultant is now underway on developing a borough-wide air quality model	To investigate improvement options in AQMA 3, 4 and 5.

## 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.

The dominant sources of PM<sub>2.5</sub> in Thurrock include road transport, industry, and construction. Almost all actions within the Air Quality Action plan are designed to tackle PM<sub>2.5</sub> in addition to other pollutants.

Thurrock Council is taking the following measures to address PM<sub>2.5</sub>:

The Council has published an integrated Health and Air Quality Strategy to renew its approach to addressing poor air quality and reduce exposure across its area. The focus of the air quality policies and actions are targeted at exceedances of NO<sub>2</sub> in individual AQMAs, however it is acknowledged that many of the interventions proposed will also have beneficial reductions in PM<sub>2.5</sub> concentrations. The following measures are examples of interventions proposed to also address PM<sub>2.5</sub> (see Table 2.2 for full list of interventions proposed):

- Land Use Planning (no increase): Policies focusing on avoiding exacerbating existing AQMAs such as car free developments and promoting sustainable transport.
- HGV Traffic Management (10.0+ µg/m<sup>3</sup>): Introduction of weight restrictions/enforcement to discourage HGVs
- Engine Switch-off Zones (3.0+ µg/m<sup>3</sup>): Traffic orders and publicity to reduce idling at level crossings e.tc
- Speed limit reduction (5.0+ µg/m<sup>3</sup>): Localised traffic enforcement and speed reductions
- Clean Air Zone (15.0 µg/m<sup>3</sup>): Traffic enforcement/management to prevent or charge high polluting vehicles for using certain roads.

Thurrock Council currently undertakes PM<sub>2.5</sub> monitoring at two sites, Thurrock 3; Stanford-Le-Hope, and Thurrock 9; Tilbury. PM<sub>10</sub> monitoring is also undertaken in the district and can therefore be used to estimate PM<sub>2.5</sub> concentrations at these locations, as recommended in box 7.7 of LAQM.TG(22). The estimated PM<sub>2.5</sub> concentration in 2022 at

the automatic monitoring sites Thurrock 1 and Thurrock 8 were  $12.1\mu\text{g}/\text{m}^3$  and  $14.2\mu\text{g}/\text{m}^3$  respectively. These concentrations are above the new  $\text{PM}_{2.5}$  air quality objective of  $10\mu\text{g}/\text{m}^3$  to be met by 2040.

The Council also has several Smoke Control Areas, in order to prevent any use of unauthorised domestic heating appliances and fuel substances within residential buildings within these areas. The Council's Environmental Protection Team have new powers to issue FPN's for [Smoke control area enforcement](#) and requirements set out in the Clean Air Act 1993 as amended by the Environment Act 2021. Details on Thurrock Smoke Control Areas can be provided via address [Air.Quality@thurrock.gov.uk](mailto:Air.Quality@thurrock.gov.uk) Additional information on Smoke Control Areas i.e. registered appliances & fuels etc. can be found on the [UK GOV website](#).

The current Defra background maps for Thurrock Council (these can be found online on the [UK Air Website](#)) show that all background concentrations of  $\text{PM}_{2.5}$  are around the annual mean air quality objective for  $\text{PM}_{2.5}$ . The highest concentration is predicted to be  $12.2\mu\text{g}/\text{m}^3$  in 2022 within the 1 x 1km grid square both with the centroid grid reference of 556500, 177500. This point is located at Purfleet docks, to the West of the railway line. The closest AQMA to this point is AQMA 10 which has been declared for exceedance of the  $\text{NO}_2$  annual mean and  $\text{PM}_{10}$  24-hour mean.

The [Public Health Outcomes Framework data tool](#) compiled by Public Health England quantifies the mortality burden of  $\text{PM}_{2.5}$  within England on a county and local authority scale (latest available data: 2021). The 2021 fraction of mortality attributable to  $\text{PM}_{2.5}$  pollution in Thurrock is 6.0%. This is above both the fractions reported for the East of England region which is 5.5% and the fraction across England which is 5.1%.

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

This section sets out the monitoring undertaken within 2022 by Thurrock Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

### Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

Thurrock Council undertook automatic (continuous) monitoring at 4 sites during 2022. Table A. 1 in Appendix A shows the details of the automatic monitoring sites. The [LondonAir Webpage](#) presents automatic monitoring results for Thurrock Council, with automatic monitoring results also available through the UK-Air website.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

#### 3.1.2 Non-Automatic Monitoring Sites

Thurrock Council undertook non- automatic (i.e. passive) monitoring of NO<sub>2</sub> at 66 sites during 2022. Table A. 2 in Appendix A presents the details of the non-automatic sites.

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

### Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater



than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

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

Table A. 3 and Table A. 4 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.

Table A. 5 in Appendix A compares the ratified continuous monitored NO<sub>2</sub> hourly mean concentrations for the past five years with the air quality objective of 200µg/m<sup>3</sup>, not to be exceeded more than 18 times per year.

In 2022, the NO<sub>2</sub> monitoring network detected no exceedances of the annual mean limit for this pollutant. Only two sites recorded annual means within 10% of the 40µg/m<sup>3</sup> limit. These were TK8 with a mean concentration of 39.1 µg/m<sup>3</sup> and diffusion tube LT at 36.7 µg/m<sup>3</sup>. TK8 is within AQMA 10. LT is not within or close to an AQMA. All NO<sub>2</sub> monitoring data from continuous monitors was ratified by the Environmental Research Group. No changes to existing AQMAs or declaration of new AQMAs are proposed in light of these results.

Figure A. 1 to Figure A. 6 show trends in annual mean NO<sub>2</sub> concentration over the last five years. Notably, there is a clear increase at a majority of monitoring sites between 2021 and 2022 after a period of many years of steady reductions. This trend is visible at sites both within and outside the borough's AQMAs. It is likely that this is a result of traffic levels rebounding in the aftermath of the Covid-19 pandemic.

Further analysis of inter-annual trends when comparing the change within AQMAs and outside them reveals that, on average, NO<sub>2</sub> annual means at monitoring sites outside AQMAs dropped by 13% between 2020 and 2021 but then increased by 9% between 2021 and 2022. This change was broadly reflected within the borough's AQMAs with a 13% drop between 2020 and 2021, followed by a 7% rise between 2021 and 2022.

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

Table A. 6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 40µg/m<sup>3</sup>. Figure A. 8 shows that PM<sub>10</sub> concentrations have been in slow but steady decline over the last five years.

Figure A. 9 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the air quality objective of 50µg/m<sup>3</sup>, not to be exceeded more than 35 times per year.

All PM<sub>10</sub> monitoring sites were compliant with both the annual and 24h mean limit values in 2022. All PM<sub>10</sub> data has been ratified by the Environmental Research group. No changes to existing AQMAs or declaration of new AQMAs are proposed in light of these results.

### 3.1.5 Particulate Matter (PM<sub>2.5</sub>)

Table A. 8 in Appendix A presents the ratified and adjusted monitored PM<sub>2.5</sub> annual mean concentrations for the past five years.

PM<sub>2.5</sub> was monitored at two sites in Thurrock during 2022. Both sites were compliant with the Air Quality Strategy target of the time for this pollutant. Figure A. 10 shows that PM<sub>2.5</sub> concentrations in Thurrock have been stable over the last five years with little change. This is likely to be because the majority of PM<sub>2.5</sub> in Thurrock is “background” and this pollutant can travel for thousands of kilometers.

All PM<sub>2.5</sub> data is ratified. Thurrock Council has recently added another PM<sub>2.5</sub> monitoring site and data from this year will be reported in next year’s Annual Status Report.

### 3.1.6 Sulphur Dioxide (SO<sub>2</sub>)

Table A. 9 in Appendix A compares the ratified continuous monitored SO<sub>2</sub> concentrations for 2022 with the air quality objectives for SO<sub>2</sub>. Thurrock Council monitors SO<sub>2</sub> at one site. This site showed no exceedances of the 15 minute, 1 hour or 24h mean limit values for this pollutant during the reporting year.

## 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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
Thurrock 1 (TK1)	Thurrock, Grays AURN	Urban Background	561066	177894	NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub> , O <sub>3</sub> , SO <sub>2</sub>	No	Chemiluminescent, BAM 1020, UV absorption, UV fluorescence	38	N/A	3.5
Thurrock 8 (TK8)	Purfleet, London Road	Roadside	556701	177937	NO <sub>2</sub> , PM <sub>10</sub>	AQMA 10	Chemiluminescent, BAM 1020	2.6	2	1.5
Thurrock 3 (TK3)	Stanford-le-Hope, Manorway	Roadside	569358	182736	NO <sub>2</sub> , PM <sub>10</sub> , PM <sub>2.5</sub>	No	Chemiluminescent, BAM 1020, BAM 1020	3	22	2.8
Thurrock 9 (TK9)	Dock Road Tilbury	Roadside	563489	176497	NO <sub>2</sub> , PM <sub>2.5</sub>	AQMA 24	Chemiluminescent, BAM 1020	5.7	5.5	1.6

**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) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
B	Bulphan (RB)	Rural	563855	184772	NO2	No	0.0	0.0		2.0
CR	Cromwell Road Grays From January 2001 (I)	Industrial	561572	178154	NO2	1	0.0	0.5		2.0
ER	Elizabeth Road (R)	Roadside	560954	179535	NO2	3	2.5	0.5		2.0
GDSO	Gatehope Drive (UB)	Urban Background	557595	181060	NO2	15	23.0	105.0		1.3
HL	Hogg Lane (R)	Roadside	561108	178922	NO2	No	27.5	1.2		2.0
HR	Howard Road (R)	Roadside	559118	179462	NO2	5	0.0	29.0		1.5
IBIS	Ibis Hotel (UB)	Urban Background	557570	177789	NO2	7	50.0	52.0		2.0
JC	Jarrah Cottages (R)	Roadside	556701	177937	NO2	10	0.0	2.6	Yes	1.5
KCNO	Kemps Cottage (UB)	Urban Background	558148	183532	NO2	16	10.0	57.0		2.0
LRAR	London Road Arterial Road (R)	Roadside	555301	179438	NO2	13	15.5	0.5		1.5
LRG	London Road Grays (R)	Roadside	560624	177811	NO2	1	4.8	2.5		2.0
LRSS	London Road South Stifford (R)	Roadside	559785	177910	NO2	2	4.0	3.5		2.0
LT	Lakeside Tesco Roundabout (R)	Roadside	557981	178700	NO2	No	48.0	1.0		2.0
ML, MM, MR	Manorway Monitoring Station	Roadside	569357	182737	NO2	No	22.0	3.0	Yes	2.8

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)
PKSL	Park Road (R)	Roadside	567781	182400	NO2	No	24.0	9.0		2.0
PRS	Purfleet Rail Station (R)	Roadside	555389	178145	NO2	No	0.0	1.5		2.0
PS	Poison Store AURN Site (UB)	Urban Background	561066	177894	NO2	No	0.0	38.0	Yes	3.5
SL	Stanford Library (UB)	Urban Background	568501	182459	NO2	No	7.0	0.0		2.0
SRG	Stanley Road Grays (R)	Roadside	561685	177833	NO2	1	2.5	5.0		2.0
TL	Calcutta Road Tilbury (R)	Roadside	563867	176293	NO2	24	6.0	0.5		2.0
WC	Watts Crescent (R)	Roadside	556314	178765	NO2	12	32.0	2.0		2.0
WES	William Edwards School (R)	Roadside	561958	180967	NO2	No	38.0	0.0		2.0
WT	London Road W Thurrock (R)	Roadside	558483	177678	NO2	23	10.0	4.0		1.5
NAS1	Queensgate Centre Grays (R)	Roadside	561469	178063	NO2	1	0.0	5.0		2.0
NAS2	A1306 (R) From Jan 2001	Roadside	559720	179630	NO2	5	20.0	4.5		2.0
NAS3	Chestnut Avenue Grays (UB)	Urban Background	561830	179878	NO2	No	8.0	0.0		1.5
TILA	North Dock Road (R)	Roadside	563498	176483	NO2	24	14.0	2.5		2.0
TILB	Dock Road Broadway interstecion (R)	Roadside	563645	176348	NO2	24	9.0	2.5		2.0
TILC	St Andrews Road (R)	Roadside	563600	176321	NO2	No	0.0	2.5		1.5

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)
TILD	Calcutta Road between Malta & Bermuda Road ( R )	Roadside	563995	176291	NO2	24	6.0	0.5		2.0
TILE	Northside Calcutta Road ( R )	Roadside	563870	176305	NO2	24	8.0	2.0		2.0
FRC	Francisco Close ( I )	Industrial	559136	179084	NO2	No	10.0	17.0		2.0
LRARN	London Road Arterial Road (North) ( I )	Industrial	555286	179501	NO2	13	0.5	19.5		2.0
LRARS	London Road Arterial Road (South) ( I )	Industrial	555357	179362	NO2	No	40.0	15.0		1.0
PBP	Purfleet By-pass ( R )	Roadside	556257	178438	NO2	26	5.5	9.5		1.5
PBPA	Purfleet By-pass A ( R )	Roadside	556221	178461	NO2	No	3.2	9.5		1.5
LYD	Lydden ( I )	Industrial	560057	179873	NO2	No	26.0	18.0		2.0
AVSL	Aveley Ship Lane ( R )	Roadside	556713	180167	NO2	25	1.0	2.0		2.0
AVHS	Aveley High Street ( R )	Roadside	556661	180180	NO2	25	6.5	0.8		2.0
SOAA	South Ockendon Arisdale Avenue	Roadside	558785	182323	NO2	No	6.0	7.0		2.0
TSR	Tilbury Sydney Road ( UB )	Urban Background	564122	176152	NO2	No	0.0	0.0		2.0
DR	Devonshire Road ( R )	Roadside	560279	178944	NO2	No	10.5	6.0		1.5

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)
LRARMN	London Road Arterial Road (Mid North) ( I )	Industrial	555299	179453	NO2	13	0.0	8.0		2.0
LRARMS	London Road Arterial Road (Mid South) ( I )	Industrial	555329	179397	NO2	13	9.0	7.0		2.0
JRP	Joslin Road Purfleet ( UB )	Urban Background	556384	178001	NO2	No	13.0	0.0		2.0
MRS	Manor Rd School ( UB )	Urban Background	562413	177747	NO2	No	0.0	1.5		2.0
MTV	St Mary The Virgin Church ( UB )	Urban Background	562615	177774	NO2	No	4.0	56.0		2.0
ACHL	Armada Court / Hogg Lane (façade) ( R )	Roadside	561093	178974	NO2	3	9.0	8.0		1.5
CC	(Catherine Close) footpath (façade) ( I )	Industrial	560770	179866	NO2	No	32.0	20.0		1.5
ERFA	Elizabeth Rd (façade) site A ( R )	Roadside	560962	179527	NO2	3	32.0	8.2		1.5
ERFB	Elizabeth Rd (façade) site B ( R )	Roadside	560963	179558	NO2	No	0.5	8.0		1.5
ERTM	Elizabeth Rd / Treaclemine R'bout (façade) ( R )	Roadside	560965	179796	NO2	No	0.5	8.5		1.5
NC	Nutberry Close (façade) ( I )	Industrial	561077	179912	NO2	No	6.6	19.5		1.5

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)
HD	Hawkins Drive (façade) ( R )	Roadside	560003	179694	NO2	5	8.4	9.0		1.5
GRPL	Grifon Rd / Pilgrims Lane R'bout (façade) ( I )	Industrial	559551	179547	NO2	5	5.6	19.5		1.5
PIH	Premier Inn Hotel WT ( R )	Roadside	557299	178802	NO2	8	6.6	21.0		1.5
WCF	Watts Crescent (façade) ( R )	Roadside	556290	178749	NO2	12	7.5	17.0		1.5
THA	Thurrock Hotel (façade south facing) site A ( I )	Industrial	557386	179065	NO2	9	0.0	78.0		1.5
THB	Thurrock Hotel (façade east facing) site B ( I )	Industrial	557437	179099	NO2	9	0.0	39.0		1.5
SCR LTC	Stifford Clays Road (LTC) (UB)	Urban Background	562383	181157	NO2	No	29.0	55.5		1.5
BSA LTC	Baker Street (A) (North) ( I )	Industrial	563486	181070	NO2	No	9.0	1.5		1.5
BSB LTC	Baker Street (B) (South) ( I )	Industrial	563574	180770	NO2	No	7.2	1.3		1.5
HR LTC	Heath Road ( I )	Industrial	563785	180157	NO2	No	6.5	0.9		1.5
SR LTC	Station Road ( I )	Industrial	567351	177555	NO2	No	0.0	1.5		1.5
TTS LTC	Treetops School (UB)	Urban Background	563828	179597	NO2	No	0.0	38.0		1.5
TK9A, TK9B	Tilbury Dock Road Thurrock 9	Roadside	563489	176497	NO2	24	5.7	5.5	Yes	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. 3 – Annual Mean NO<sub>2</sub> Monitoring Results: Automatic Monitoring (µg/m<sup>3</sup>)**

Site 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
Thurrock 1	561066	177894	Urban Background	99.0	99.0	24.8	23.4	19.3	20.6	19.1
Thurrock 3	569358	182736	Roadside	94.3	94.3	27.6	25.3	21.2	22.1	21.7
Thurrock 8	556701	177932	Roadside	95.5	95.5	<b>51.6</b>	<b>47.7</b>	<b>41.6</b>	<b>41.9</b>	39.3
Thurrock 9	563489	176497	Roadside	98.4	98.4	<b>N/A</b>	<b>N/A</b>	<b>N/A(3)</b>	29.1	29.2

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.

#### Notes:

The annual mean concentrations are presented as µg/m<sup>3</sup>.

Exceedances of the NO<sub>2</sub> annual mean objective of 40µg/m<sup>3</sup> 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<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
B	563855	184772	Rural	100.0	100.0	15.2	14.6	11.9	9.5	12.3
CR	561572	178154	Industrial	100.0	100.0	30.9	33.0	24.0	22.2	21.7
ER	560954	179535	Roadside	100.0	100.0	<b>49.8</b>	<b>48.8</b>	38.1	30.5	32.6
GDSO	557595	181060	Urban Background	90.4	90.4	25.3	25.7	19.2	16.8	18.7
HL	561108	178922	Roadside	100.0	100.0	33.7	31.8	24.6	22.0	23.3
HR	559118	179462	Roadside	100.0	100.0	30.3	27.7	22.2	20.7	21.2
IBIS	557570	177789	Urban Background	100.0	100.0	<b>45.3</b>	<b>47.0</b>	37.4	28.9	32.0
JC	556701	177937	Roadside	100.0	100.0	<b>49.5</b>	<b>46.6</b>	37.4	32.1	35.1
KCNO	558148	183532	Urban Background	100.0	100.0	29.4	29.3	21.9	17.7	18.6
LRAR	555301	179438	Roadside	100.0	100.0	<b>51.2</b>	<b>50.1</b>	36.7	30.8	30.9
LRG	560624	177811	Roadside	100.0	100.0	36.2	36.7	26.4	25.6	27.4
LRSS	559785	177910	Roadside	100.0	100.0	39.2	39.0	24.3	26.1	27.1
LT	557981	178700	Roadside	90.4	90.4	<b>54.7</b>	<b>52.0</b>	39.9	34.1	36.7
ML, MM, MR	569357	182737	Roadside	100.0	100.0	28.5	26.5	21.6	18.9	20.6
PKSL	567781	182400	Roadside	100.0	100.0	29.4	26.0	20.7	18.1	19.7
PRS	555389	178145	Roadside	92.3	92.3	34.4	32.0	22.6	19.4	23.5
PS	561066	177894	Urban Background	92.3	92.3	25.4	24.9	18.8	18.0	19.4
SL	568501	182459	Urban Background	100.0	100.0	26.2	25.5	19.5	17.8	18.7
SRG	561685	177833	Roadside	76.9	76.9	29.6	30.6	23.0	21.4	25.1
TL	563867	176293	Roadside	100.0	100.0	32.9	34.8	28.0	23.8	24.7
WC	556314	178765	Roadside	76.9	76.9	<b>41.1</b>	39.1	29.7	24.8	26.3
WES	561958	180967	Roadside	100.0	100.0	29.5	26.6	20.3	16.8	18.6
WT	558483	177678	Roadside	100.0	100.0	38.2	35.5	27.5	22.6	28.3
NAS1	561469	178063	Roadside	82.7	82.7	32.9	31.0	23.6	21.7	23.4
NAS2	559720	179630	Roadside	82.7	82.7	<b>51.3</b>	<b>49.9</b>	37.6	29.3	31.9

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
NAS3	561830	179878	Urban Background	73.1	73.1	23.9	24.8	18.8	15.8	18.4
TILA	563498	176483	Roadside	92.3	92.3	38.0	39.8	31.1	23.4	25.7
TILB	563645	176348	Roadside	92.3	92.3	<b>42.4</b>	<b>41.2</b>	32.8	26.8	28.3
TILC	563600	176321	Roadside	100.0	100.0	37.8	33.3	28.2	22.5	25.2
TILD	563995	176291	Roadside	63.5	63.5	35.0	35.1	31.3	25.3	22.4
TILE	563870	176305	Roadside	100.0	100.0	33.4	35.2	31.7	22.8	25.5
FRC	559136	179084	Industrial	100.0	100.0	30.6	31.0	23.9	20.6	22.5
LRARN	555286	179501	Industrial	100.0	100.0	31.4	33.0	24.1	22.0	23.8
LRARS	555357	179362	Industrial	100.0	100.0	25.8	26.4	19.8	17.7	21.6
PBP	556257	178438	Roadside	92.3	92.3	33.1	31.0	24.1	20.3	23.1
PBPA	556221	178461	Roadside	92.3	92.3	33.1	30.7	23.8	21.6	24.3
LYD	560057	179873	Industrial	82.7	82.7	29.9	26.7	22.1	18.3	18.7
AVSL	556713	180167	Roadside	100.0	100.0	<b>40.7</b>	<b>45.0</b>	32.5	26.8	29.9
AVHS	556661	180180	Roadside	100.0	100.0	35.6	35.1	26.5	23.5	27.2
SOAA	558785	182323	Roadside	100.0	100.0	32.5	29.2	21.0	19.8	20.9
TSR	564122	176152	Urban Background	100.0	100.0	26.8	28.5	24.2	20.3	20.9
DR	560279	178944	Roadside	100.0	100.0	26.5	27.9	21.0	17.3	19.5
LRARMN	555299	179453	Industrial	100.0	100.0	39.6	36.7	26.6	23.9	26.1
LRARMS	555329	179397	Industrial	92.3	92.3	37.5	34.3	25.4	23.7	24.4
JRP	556384	178001	Urban Background	73.1	73.1	26.4	24.1	18.1	16.3	21.7
MRS	562413	177747	Urban Background	84.6	84.6		23.5	19.5	17.0	20.0
MTV	562615	177774	Urban Background	100.0	100.0		21.5	17.5	14.8	16.1
ACHL	561093	178974	Roadside	100.0	100.0	32.7	35.3	27.7	22.1	24.1
CC	560770	179866	Industrial	100.0	100.0	25.6	26.0	20.0	18.2	18.7
ERFA	560962	179527	Roadside	100.0	100.0	32.5	32.5	23.8	19.2	21.3
ERFB	560963	179558	Roadside	100.0	100.0	31.4	32.2	25.8	20.3	23.1
ERTM	560965	179796	Roadside	100.0	100.0	37.5	37.1	26.1	24.4	27.1
NC	561077	179912	Industrial	100.0	100.0	33.8	34.5	28.7	22.8	25.5
HD	560003	179694	Roadside	100.0	100.0	32.7	31.5	25.5	21.8	24.2

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
GRPL	559551	179547	Industrial	100.0	100.0	32.5	31.0	24.4	22.0	22.9
PIH	557299	178802	Roadside	92.3	92.3	35.1	30.7	24.1	31.9	28.6
WCF	556290	178749	Roadside	82.7	82.7	32.7	32.6	24.4	24.8	27.0
THA	557386	179065	Industrial	100.0	100.0	34.3	29.7	24.0	19.8	22.9
THB	557437	179099	Industrial	92.3	92.3	35.7	31.8	24.4	21.0	25.1
SCR LTC	562383	181157	Urban Background	100.0	100.0	32.4	30.1	22.3	17.6	20.3
BSA LTC	563486	181070	Industrial	100.0	100.0	24.0	25.9	18.9	17.0	18.3
BSB LTC	563574	180770	Industrial	100.0	100.0	30.2	28.3	23.5	20.1	20.9
HR LTC	563785	180157	Industrial	100.0	100.0	27.3	29.0	22.1	17.7	18.6
SR LTC	567351	177555	Industrial	67.3	67.3	18.7	17.1	15.4	13.1	12.2
TTS LTC	563828	179597	Urban Background	100.0	100.0	23.7	21.5	19.2	16.0	17.5
TK9A, TK9B	563489	176497	Roadside	82.7	82.7			29.4	23.1	25.9

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 NO<sub>2</sub> annual mean objective of  $40\mu\text{g}/\text{m}^3$  are shown in **bold**.

NO<sub>2</sub> annual means exceeding  $60\mu\text{g}/\text{m}^3$ , indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

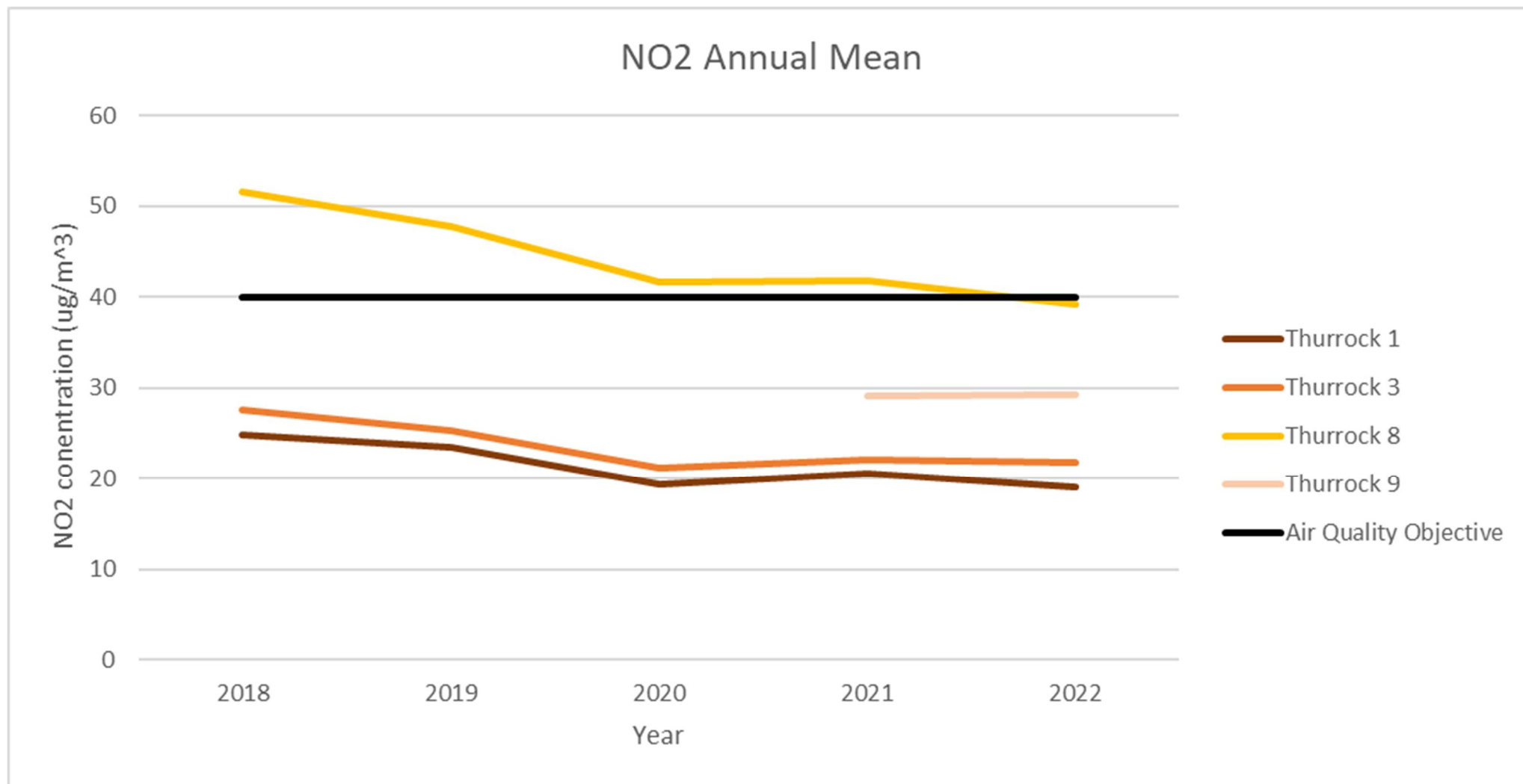
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

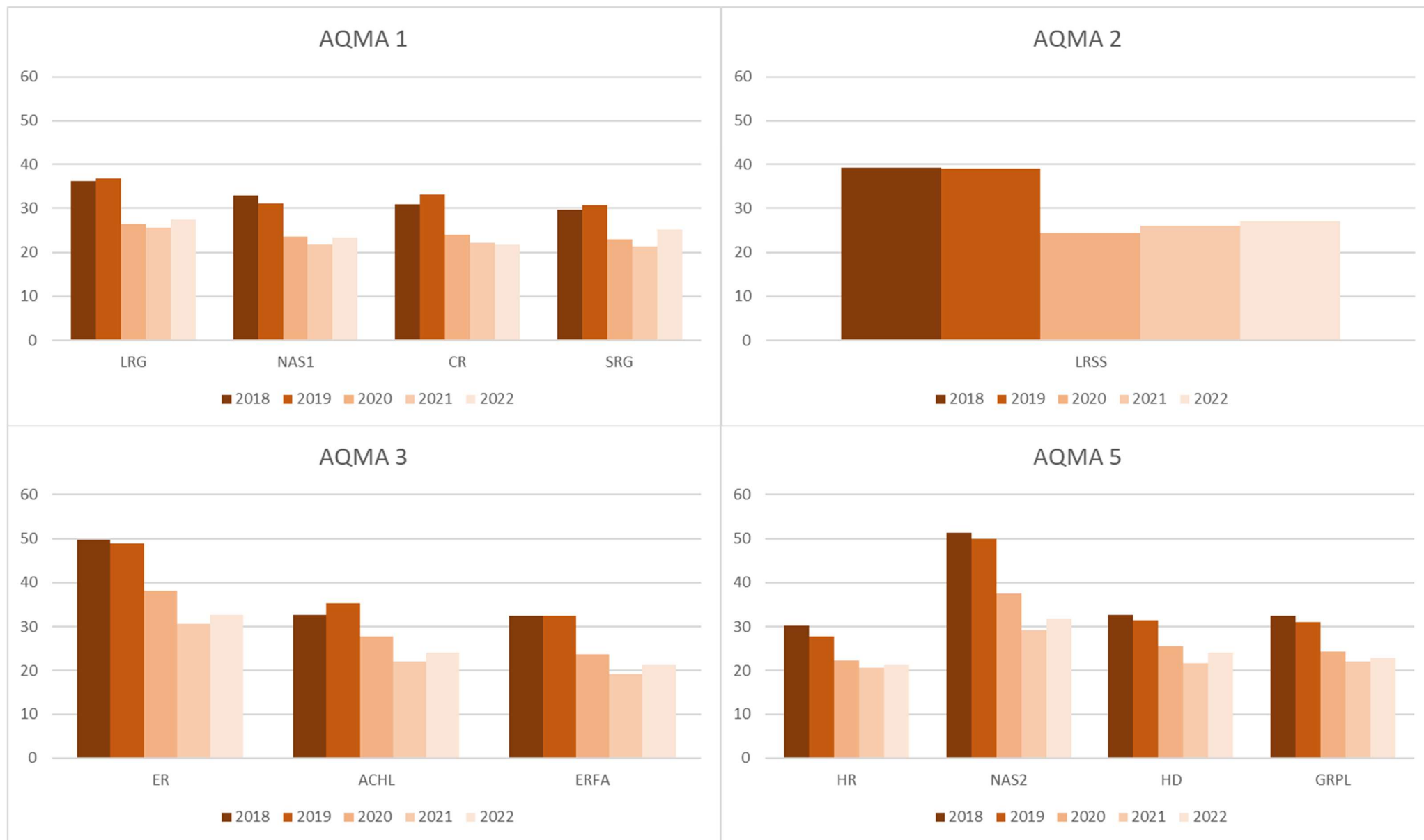
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(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> Concentration

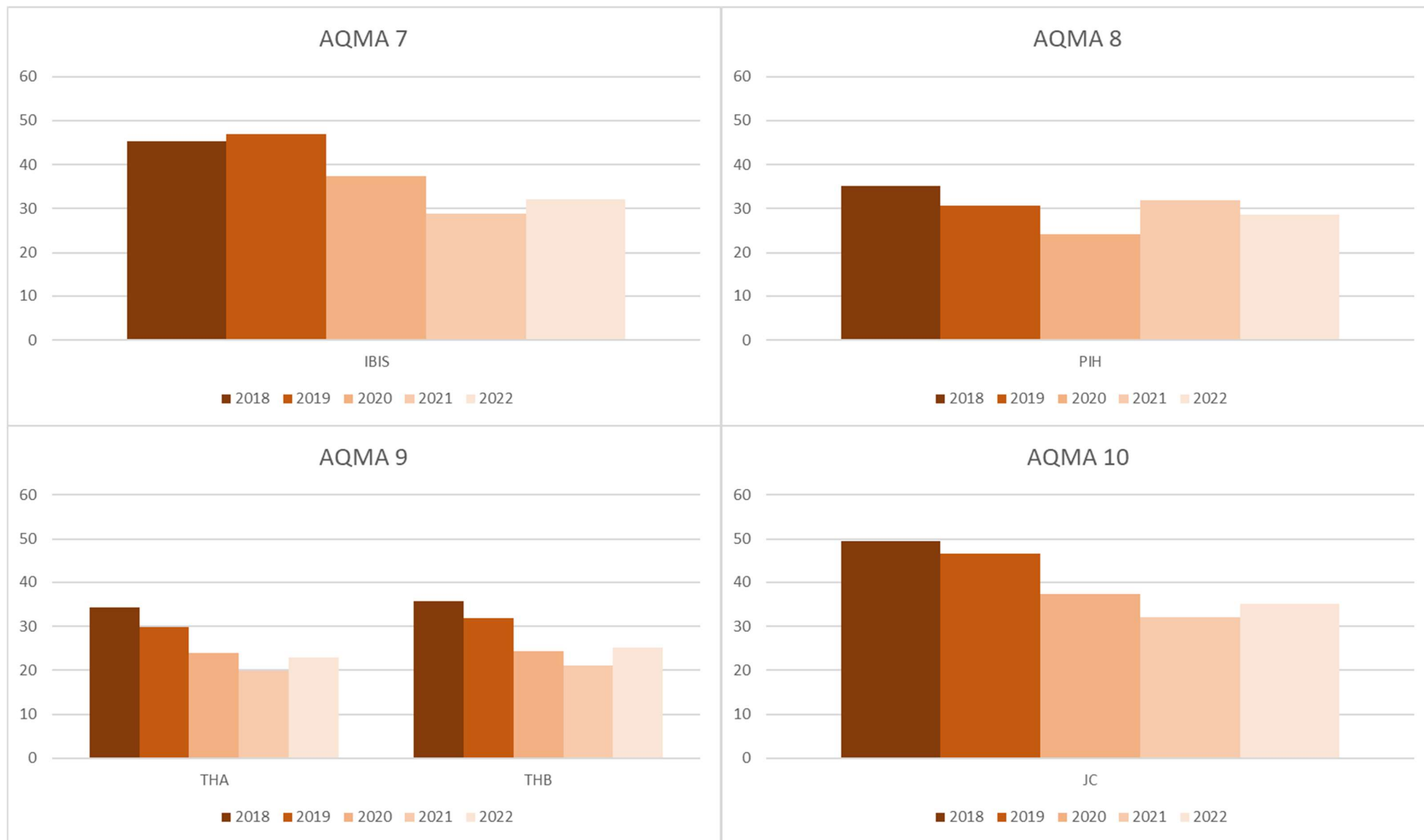


**Figure A. 2 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Passive Monitoring Sites in AQMA 1, 2, 3 and 5**

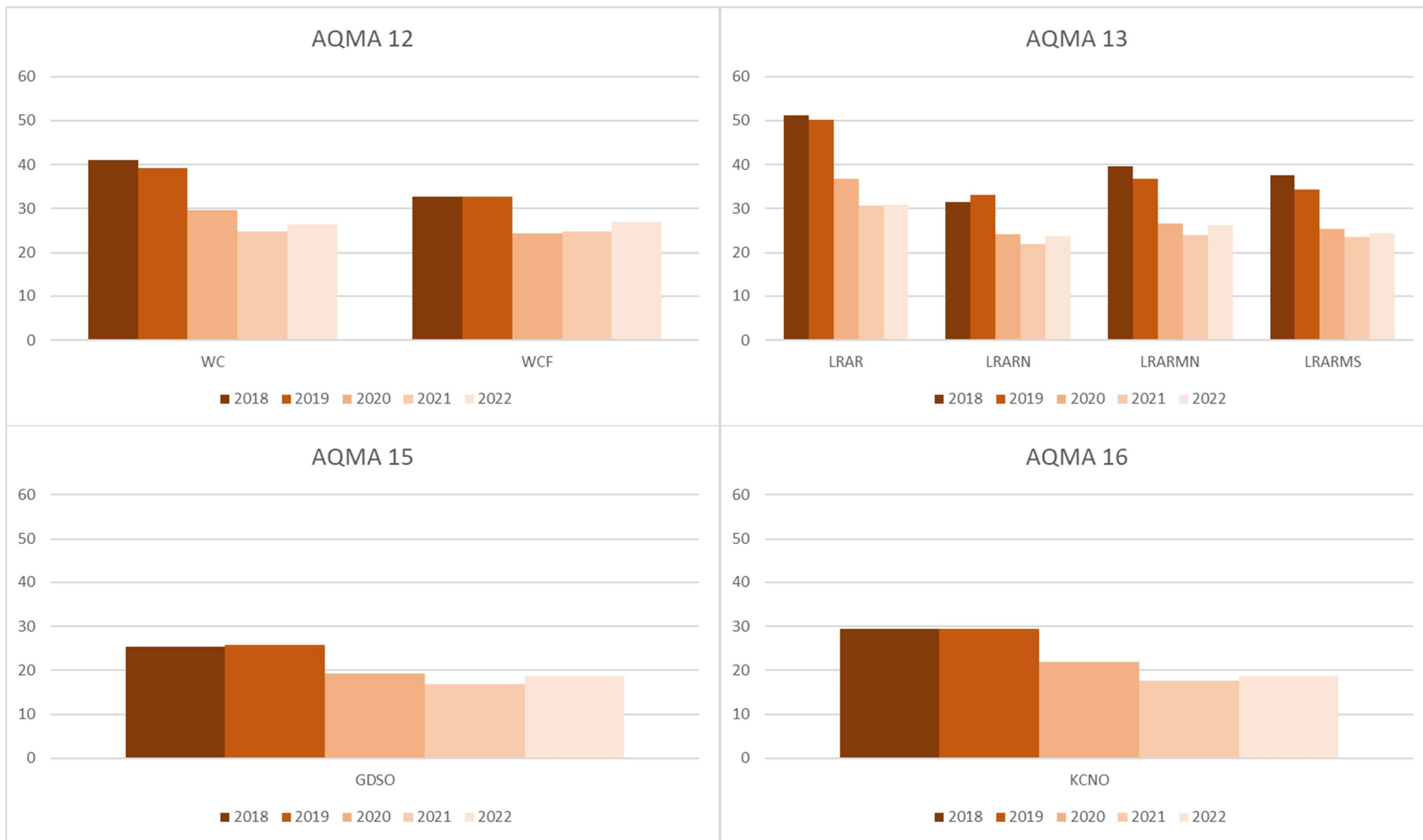




**Figure A. 3 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Passive Monitoring Sites in AQMA 7, 8, 9 and 10**



**Figure A. 4 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Passive Monitoring Sites in AQMA 12, 13, 15 and 16**



**Figure A. 5 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Passive Monitoring Sites in AQMA 23, 24, 25 and 26**

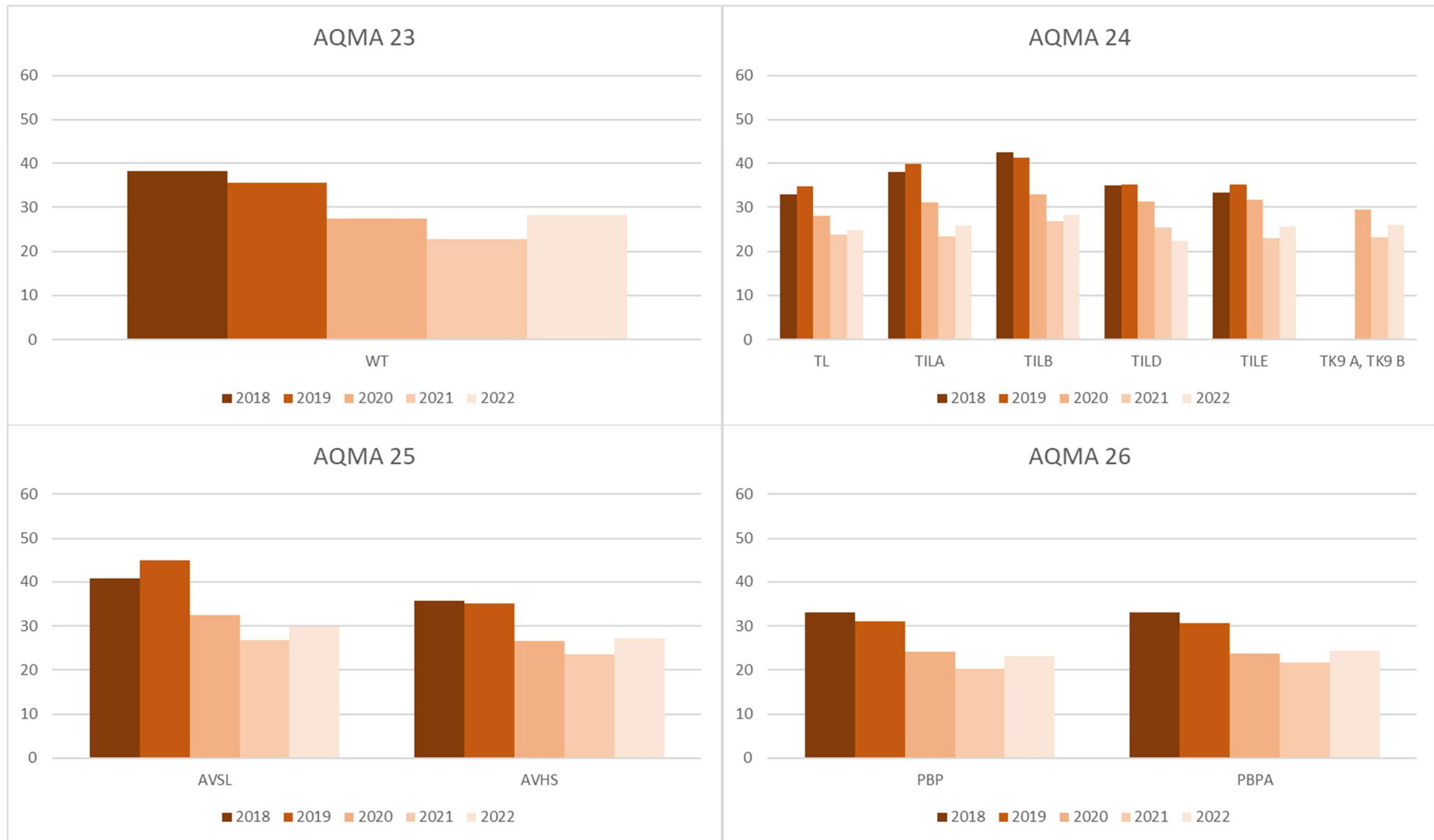
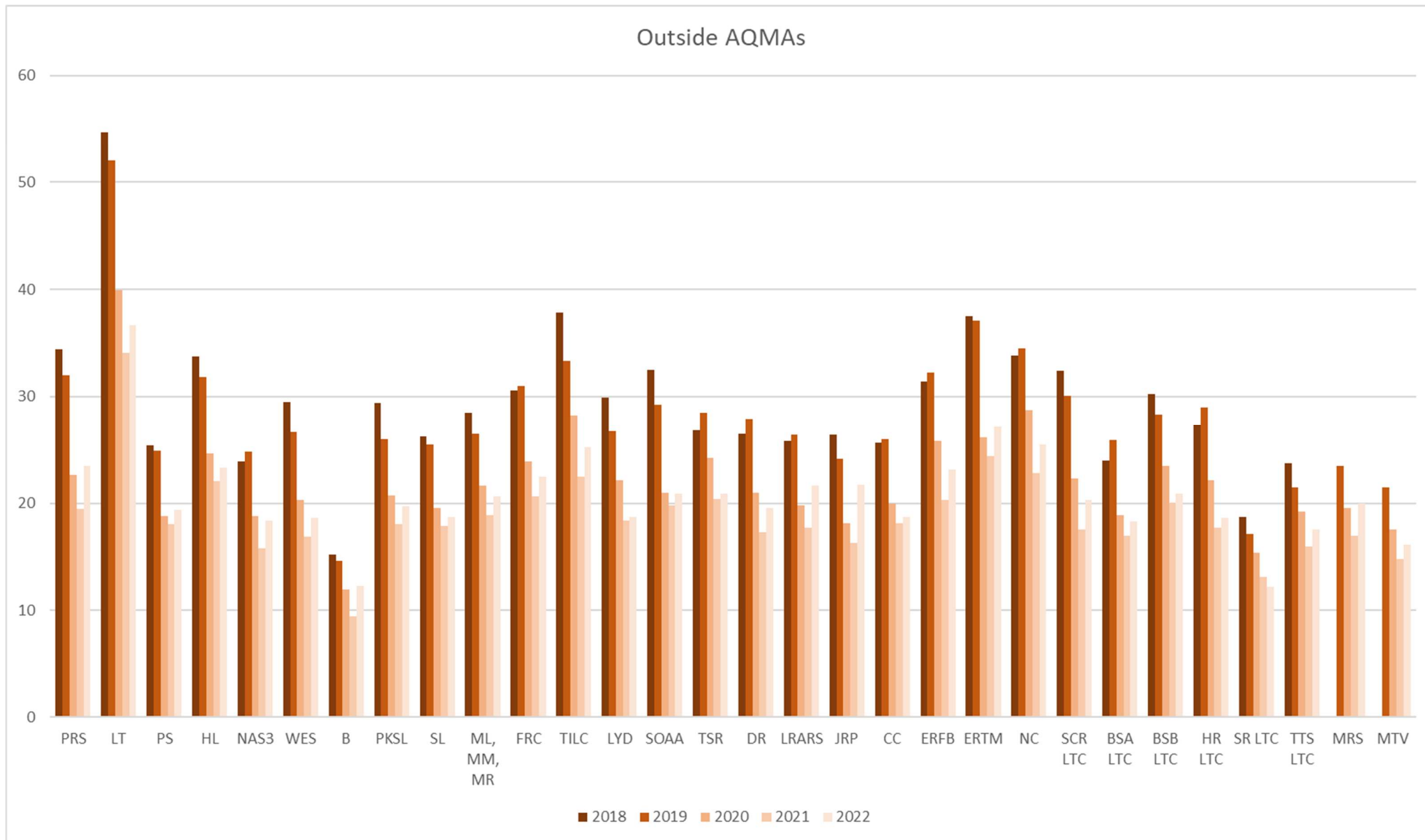


Figure A. 6 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Passive Monitoring Sites outside AQMAs



**Table A. 5 – 1-Hour Mean NO<sub>2</sub> Monitoring Results, Number of 1-Hour Means > 200µg/m<sup>3</sup>**

Site 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
Thurrock 1	561066	177894	Urban Background	99.0	99.0	0	0	0	0	0
Thurrock 3	569358	182736	Roadside	94.3	94.3	0	0	0	0	0
Thurrock 8	556701	177932	Roadside	95.5	95.5	0	1	0	0	0
Thurrock 9	563489	176497	Roadside	98.4	98.4	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	0	1

**Notes:**

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

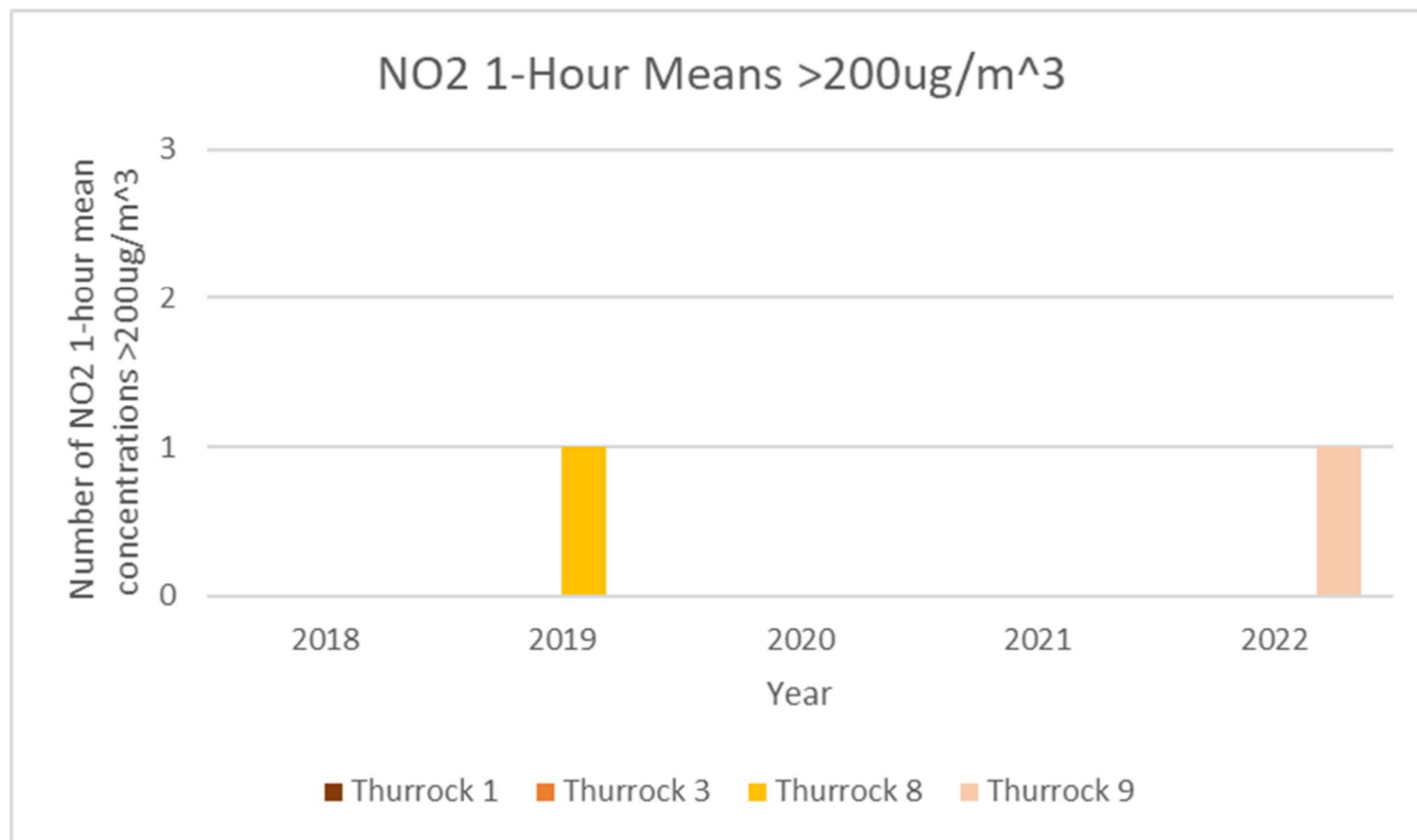
Exceedances of the NO<sub>2</sub> 1-hour mean objective (200µg/m<sup>3</sup> not to be exceeded more than 18 times/year) are shown in **bold**.

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%).

**Figure A. 7 – Trends in Number of NO<sub>2</sub> 1-Hour Means > 200µg/m<sup>3</sup>**



**Table A. 6 – Annual Mean PM<sub>10</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site 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
Thurrock 1	561066	177894	Urban Background	91.3	91.3	<b>18.9</b>	<b>20.5</b>	<b>18.6</b>	<b>17.1</b>	<b>17.0</b>
Thurrock 3	569358	182736	Roadside	94.3	94.3	18.4	17.4	16.7	16.8	16.6
Thurrock 8	556701	177932	Roadside	<b>63.1</b>	<b>63.1</b>	26.7	23.2	23.5	22.1	19.1

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

**Notes:**

The annual mean concentrations are presented as µg/m<sup>3</sup>.

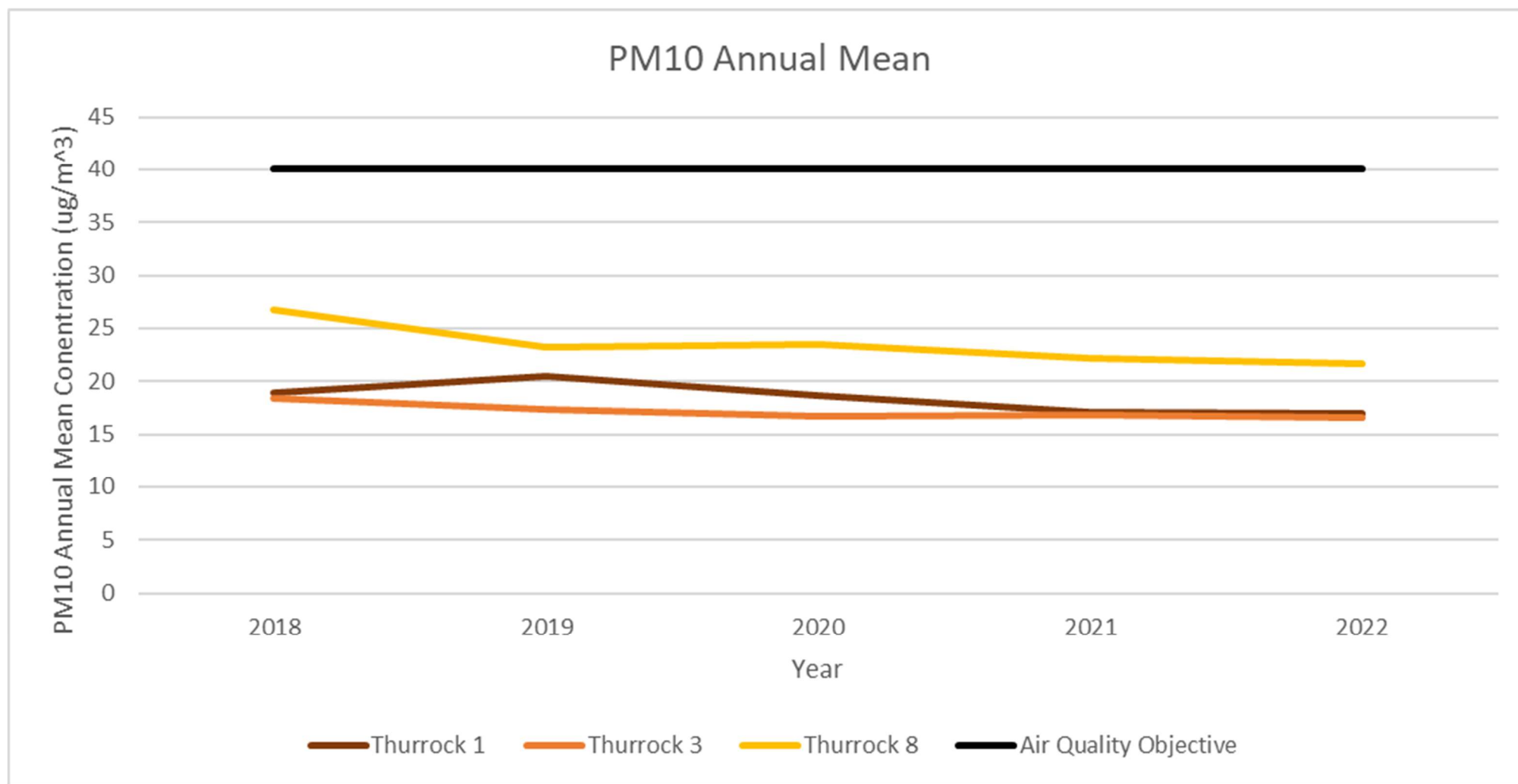
Exceedances of the PM<sub>10</sub> annual mean objective of 40µg/m<sup>3</sup> are shown in **bold**.

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%).

Figure A. 8 – Trends in Annual Mean PM<sub>10</sub> Concentrations





**Table A. 7 – 24-Hour Mean PM<sub>10</sub> Monitoring Results, Number of PM<sub>10</sub> 24-Hour Means > 50µg/m<sup>3</sup>**

Site 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
Thurrock 1	561066	177894	Urban Background	91.3	91.3	4	14	9	1	3
Thurrock 3	569358	182736	Roadside	94.3	94.3	<b>3 (34)</b>	10	<b>5 (30.4)</b>	2	3
Thurrock 8	556701	177932	Roadside	<b>63.1</b>	<b>63.1</b>	16	15	9	6	1 (35)

**Notes:**

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

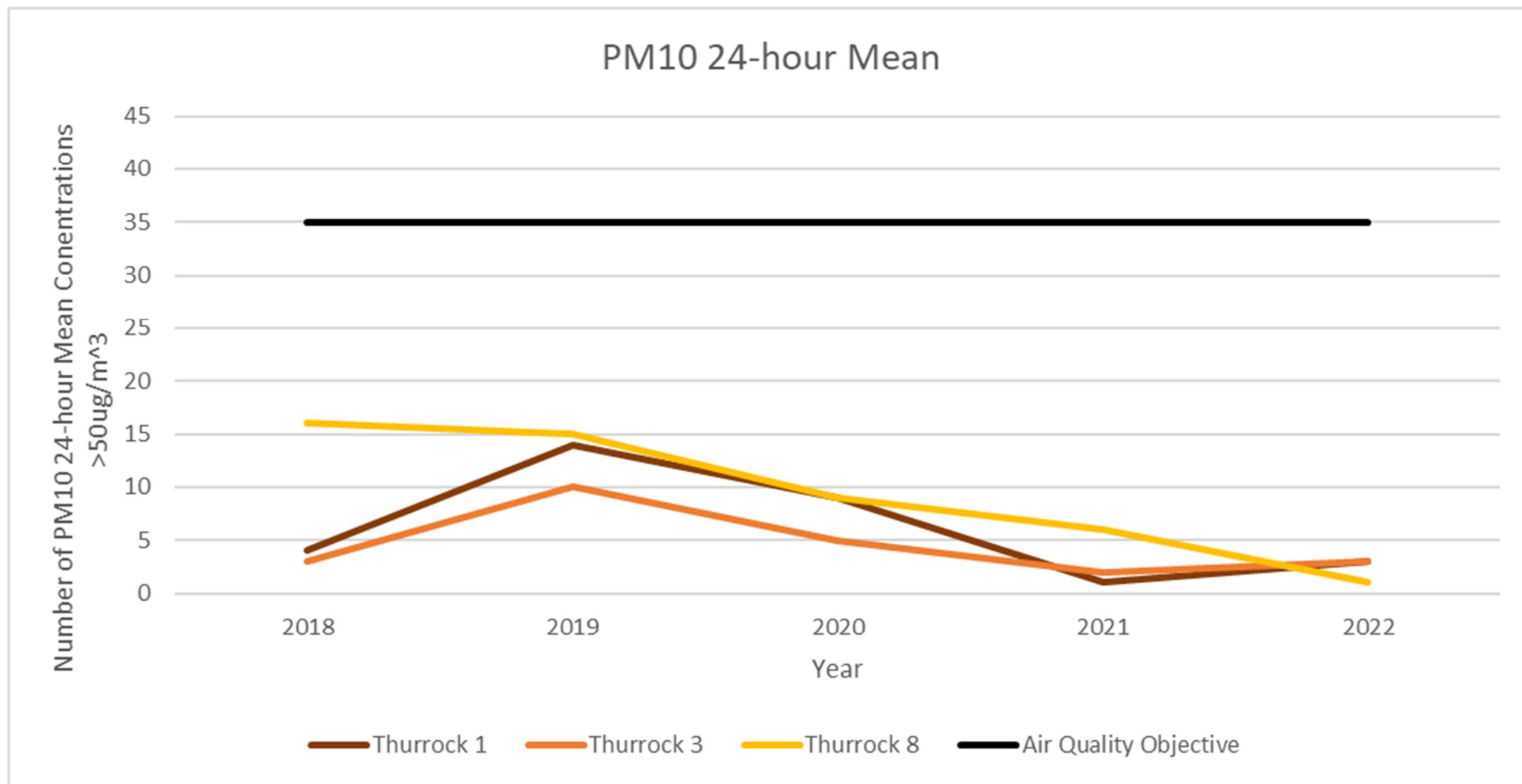
Exceedances of the PM<sub>10</sub> 24-hour mean objective (50µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

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%).

Figure A. 9 – Trends in Number of 24-Hour Mean PM<sub>10</sub> Results > 50µg/m<sup>3</sup>



**Table A. 8 – Annual Mean PM<sub>2.5</sub> Monitoring Results (µg/m<sup>3</sup>)**

Site 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
Thurrock 3	569358	182736	Roadside	84.2	84.2	10.1	11.6	11.6	11.8	11.7
Thurrock 9	563489	176497	Roadside	94.4	94.4	N/A	N/A	N/A	10.8	11.2

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

**Notes:**

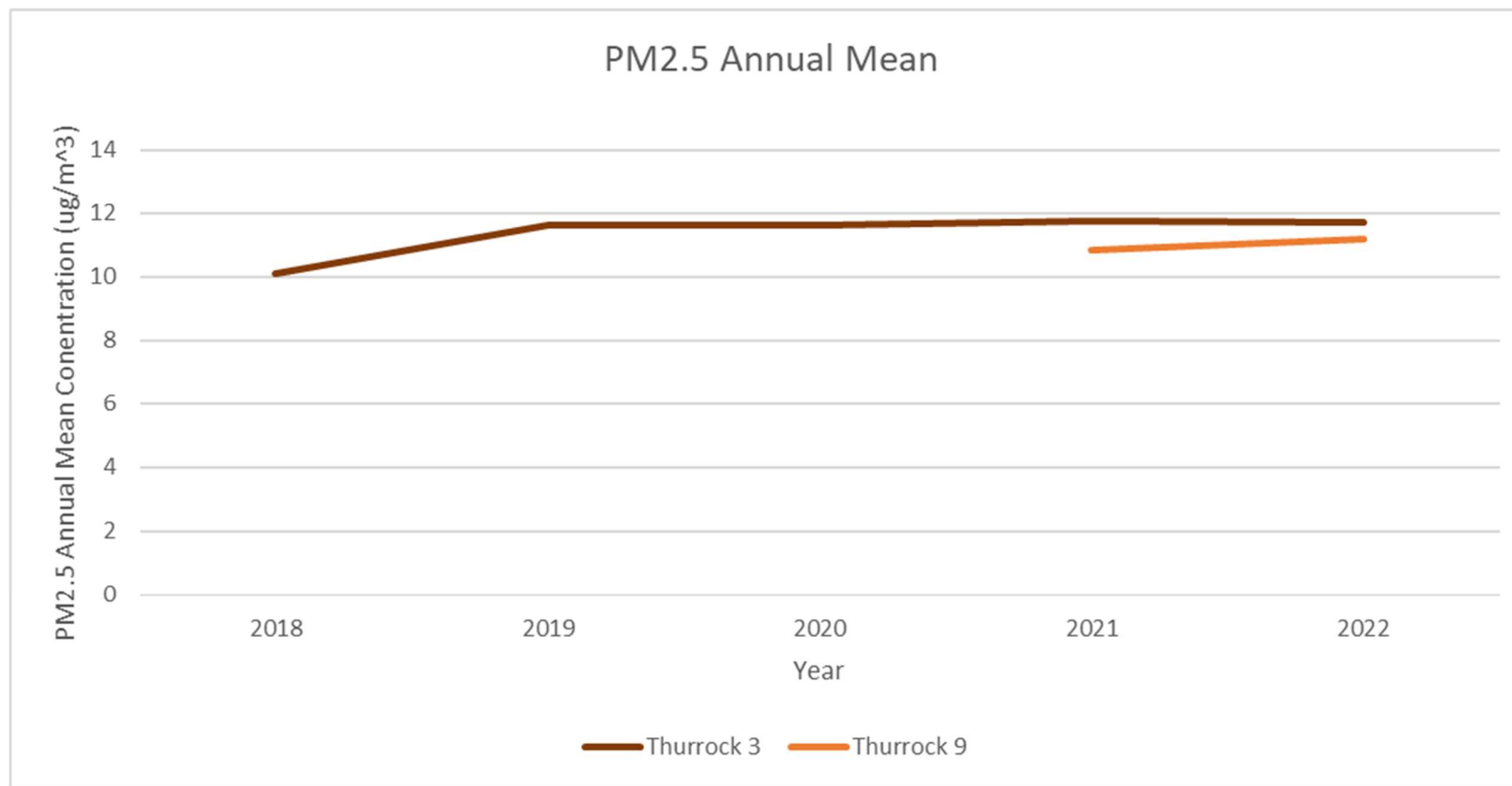
The annual mean concentrations are presented as µg/m<sup>3</sup>.

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. 10 – Trends in Annual Mean PM<sub>2.5</sub> Concentrations**



**Table A. 9 – SO<sub>2</sub> 2022 Monitoring Results, Number of Relevant Instances**

Site 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>	Number of 15-minute Means > 266µg/m <sup>3</sup>	Number of 1-hour Means > 350µg/m <sup>3</sup>	Number of 24-hour Means > 125µg/m <sup>3</sup>
Thurrock 3	569358	182736	Roadside	84.2	84.2	10.1	11.6	11.6
Thurrock 9	563489	176497	Roadside	94.4	94.4	N/A	N/A	N/A

**Notes:**

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO<sub>2</sub> objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are 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%).

## 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
B	563855	184772	18.5	14.2	19.3	11.7	11.8	20.9		11.6	11.8	14.1	11.4	18.0	14.8	12.3	-	
CR	561572	178154	36.8	27.3	34.1	25.3	21.1	14.5	14.3	23.5	25.8	28.2	30.5	32.1	26.1	21.7	-	
ER	560954	179535	52.9	38.8	47.0	36.6	21.0	32.9	34.4	36.5	41.4	40.2	42.8	47.0	39.3	32.6	-	
GDSO	557595	181060	28.1	23.4	21.7	17.8	18.6	17.4	32.1	17.6	21.7		24.6	25.4	22.6	18.7	-	
HL	561108	178922	43.2	28.3	36.3	24.4	19.3	19.6	21.2	21.9	28.6	28.7	30.5	34.4	28.0	23.3	-	
HR	559118	179462	37.6	26.4	29.6	24.2	18.7	20.3	19.3	22.2	24.0	25.5	27.9	30.4	25.5	21.2	-	
IBIS	557570	177789	43.7	42.1	40.5	33.3	35.7	40.7	28.5	34.6	31.7	42.2	45.4	44.2	38.5	32.0	-	
JC	556701	177937	50.1	34.0	54.1	40.7	35.4	44.9	23.5	25.0	64.3	44.9	49.0	41.7	42.3	35.1	-	
KCNO	558148	183532	31.0	26.1	22.2	18.1	21.2	18.7	17.0	17.6	21.5	21.1	26.7	28.0	22.4	18.6	-	
LRAR	555301	179438	46.2	43.4	54.2	38.8	31.1	24.7	26.0	25.4	43.9	45.6	29.5	38.1	37.2	30.9	-	
LRG	560624	177811	40.5	32.7	39.6	32.2	24.0	27.9	17.1	37.7	34.6	34.5	36.5	39.4	33.1	27.4	-	
LRSS	559785	177910	40.9	33.8	41.0	30.2	28.4	28.8	16.8	34.8	34.7	32.5	35.8	33.8	32.6	27.1	-	
LT	557981	178700	55.6	42.1	47.3		39.6	39.2	36.4	44.7	44.6	44.3	48.1	44.6	44.2	36.7	25.6	
ML	569357	182737	37.8	25.0	31.6	25.5	19.6	21.0	20.7	23.0	23.2	22.9	26.3	28.3	-	-	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
MM	569357	182737	37.7	24.3	34.0	24.5	19.6	20.0	20.6	23.0	22.6	23.5	24.9	23.7	-	-	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
MR	569357	182737	36.6	23.1	31.3	25.5	19.5	10.7	20.6	23.4	22.9	22.1	25.4	28.6	24.8	20.6	-	Triplicate Site with ML, MM and MR - Annual data provided for MR only
PKSL	567781	182400	31.9	21.7	27.8	21.9	20.0	18.4	19.6	21.8	22.7	23.5	26.9	28.4	23.7	19.7	-	
PRS	555389	178145	35.0	23.2	41.8	26.3	19.1	21.5		31.2	27.4	26.4	27.5	31.4	28.3	23.5	-	
PS	561066	177894	28.7	23.6	27.3	20.4	17.8	22.8	22.3		21.1	21.6	25.5	25.9	23.4	19.4	-	
SL	568501	182459	31.1	22.2	26.8	20.0	16.6	20.7	16.5	18.3	21.7	24.1	24.7	27.2	22.5	18.7	-	
SRG	561685	177833	36.0	28.2	37.0	25.4	23.0			25.3		30.0	31.2	35.6	30.2	25.1	-	
TL	563867	176293	39.0	30.2	25.6	27.0	25.7	31.3	28.1	25.1	27.6	32.4	32.8	33.0	29.8	24.7	-	
WC	556314	178765	38.8		45.2	34.1	27.6	21.8	22.4		33.3	27.7		34.7	31.7	26.3	-	
WES	561958	180967	32.6	18.5	27.0	22.0	18.7	19.7	17.7	19.8	21.2	22.2	23.2	26.4	22.4	18.6	-	
WT	558483	177678	42.6	36.7	38.9	32.5	27.9	28.4	33.1	29.8	31.9	33.0	36.6	37.6	34.1	28.3	-	
NAS1	561469	178063	33.6	27.8			23.9	25.3	27.5	26.5	27.8	28.6	30.4	30.7	28.2	23.4	-	

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
NAS2	559720	179630	49.7	50.8			23.7	34.3	22.3	36.0	36.4	39.9	45.1	46.1	38.4	31.9	-	
NAS3	561830	179878	32.4	21.3				17.1	25.2	15.1	18.0	20.8	22.2	27.4	22.2	18.4	-	
TILA	563498	176483		35.9	31.7	24.5	23.2	28.8	25.5	25.8	32.6	35.2	41.9	35.1	30.9	25.7	-	
TILB	563645	176348	42.2		43.0	31.8	31.6	32.0	24.9	30.0	28.5	37.3	38.0	36.2	34.1	28.3	-	
TILC	563600	176321	38.7	32.3	34.9	21.7	34.6	27.4	26.1	24.5	27.3	32.4	35.1	29.8	30.4	25.2	-	
TILD	563995	176291	41.7	34.2	34.4	30.2		15.0	13.2		17.5		33.7		27.5	22.4	-	
TILE	563870	176305	43.7	33.9	35.4	29.4	26.9	13.5	25.3	26.2	31.3	33.8	33.7	35.3	30.7	25.5	-	
FRC	559136	179084	37.7	28.1	34.6	25.1	19.2	21.0	21.3	24.3	23.9	28.0	29.9	32.0	27.1	22.5	-	
LRAR N	555286	179501	35.9	29.0	32.9	24.1	22.7	27.9	19.6	32.8	30.2	29.3	27.7	32.4	28.7	23.8	-	
LRAR S	555357	179362	28.6	21.4	24.2	19.1	18.2	36.5	28.7	39.5	15.0	16.3	43.7	20.7	26.0	21.6	-	
PBP	556257	178438	37.6	26.3	33.9	22.6	22.2	23.4	24.4		27.3	27.0	29.9	30.9	27.8	23.1	-	
PBPA	556221	178461	37.6	27.8	37.5	25.2	20.1	24.8		42.5	28.0	21.6	27.3	29.8	29.3	24.3	-	
LYD	560057	179873	31.9	23.9			19.6	20.0	20.1	20.6	17.5	25.3	18.9	27.1	22.5	18.7	-	
AVSL	556713	180167	45.1	27.9	48.9	32.4	30.8	33.8	28.6	32.7	38.1	38.0	37.8	38.9	36.1	29.9	-	
AVHS	556661	180180	35.6	37.0	45.6	27.2	21.1	27.7	39.0	31.5	30.8	32.4	33.7	32.0	32.8	27.2	-	
SOAA	558785	182323	31.6	21.8	29.1	20.7	20.1	23.2	18.6	19.5	24.0	29.1	33.3	31.6	25.2	20.9	-	
TSR	564122	176152	35.6	26.6	29.9	22.5	21.9	28.1	18.2	18.8	19.9	24.8	26.8	28.6	25.1	20.9	-	
DR	560279	178944	29.7	23.4	29.8	19.1	15.4	18.1	32.5	18.3	20.5	23.0	26.3	26.0	23.5	19.5	-	
LRAR MN	555299	179453	40.0	30.1	38.5	30.1	24.7	25.3	27.1	30.4	31.7	33.0	31.9	33.9	31.4	26.1	-	
LRAR MS	555329	179397	37.5	26.4	38.0	28.7	22.1	18.2	28.6		30.5	27.9	33.1	32.7	29.4	24.4	-	
JRP	556384	178001	27.3	20.2	36.1			19.0	39.6		20.9	22.7	24.2	25.4	26.2	21.7	-	
MRS	562413	177747	32.2	20.4	30.9	18.8	15.4		21.0		30.4	22.0	23.3	26.2	24.1	20.0	-	
MTV	562615	177774	13.2	19.1	29.0	17.9	13.0	20.8	14.2	15.6	18.7	19.7	20.6	30.8	19.4	16.1	-	
ACHL	561093	178974	39.3	28.1	37.6	24.9	21.6	21.2	21.8	22.7	28.9	31.2	34.4	37.3	29.1	24.1	-	
CC	560770	179866	31.5	21.5	28.7	22.6	17.6	17.6	18.0	21.4	22.8	20.0	23.4	25.1	22.5	18.7	-	
ERFA	560962	179527	34.4	24.4	27.6	21.8	32.1	21.4	19.9	20.7	24.6	25.5	24.9	30.6	25.7	21.3	-	
ERFB	560963	179558	35.8	25.1	29.1	24.1	24.6	26.8	24.6	24.1	31.1	29.4	29.8	29.8	27.9	23.1	-	
ERTM	560965	179796	43.3	30.2	45.1	33.8	22.3	26.1	28.0	31.9	31.7	28.8	33.1	37.1	32.6	27.1	-	
NC	561077	179912	38.2	33.4	28.6	23.3	23.4	45.2	36.2	19.3	28.4	28.2	30.8	33.0	30.7	25.5	-	
HD	560003	179694	39.0	27.9	33.8	29.1	32.2	23.1	23.0	28.0	25.7	26.7	28.3	33.2	29.2	24.2	-	
GRPL	559551	179547	43.2	29.6	31.9	27.3	21.7	21.1	20.7	24.0	25.7	26.4	28.2	31.1	27.6	22.9	-	
PIH	557299	178802	54.5	52.2	41.5	28.5	21.7	25.9	41.3		28.2	26.3	30.5	28.9	34.5	28.6	-	

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
WCF	556290	178749	38.8		70.5		20.4	27.0	26.2	18.4	27.1	31.1	35.4	30.4	32.5	27.0	-	
THA	557386	179065	28.1	23.7	40.7	29.3	21.3	25.8	25.2	24.2	28.6	26.5	30.9	27.4	27.6	22.9	-	
THB	557437	179099	26.9	23.3	44.3	27.1	24.1	26.5	25.4	53.4	24.9	28.0		29.1	30.3	25.1	-	
SCR LTC	562383	181157	34.8	25.6	30.1	16.5	22.5	11.1	20.3	19.7	23.3	29.7	30.4	29.7	24.5	20.3	-	
BSA LTC	563486	181070	31.6	22.1	28.0	17.6	17.0	22.3	16.8	17.7	18.9	24.3	24.4	23.5	22.0	18.3	-	
BSB LTC	563574	180770	34.3	25.5	31.1	24.2	21.0	19.4	22.9	24.6	25.1	24.3	23.7	26.6	25.2	20.9	-	
HR LTC	563785	180157	34.0	23.4	25.4	19.5	16.7	14.7	17.5	19.1	20.5	23.2	27.1	28.0	22.4	18.6	-	
SR LTC	567351	177555	22.5	15.8	19.7	15.3					12.0	14.6	15.7	19.5	16.9	12.2	-	
TTS LTC	563828	179597	28.8	22.7	27.9	19.0	15.3	18.1	14.8	17.1	18.3	21.0	23.6	26.4	21.1	17.5	-	
TK9A	563489	176497	38.5	29.9			28.6	29.1	25.3	24.6	30.1	32.8	36.9	35.3	-	-	-	Duplicate Site with TK9A and TK9B - Annual data provided for TK9B only
TK9B	563489	176497	43.4	33.7			26.5	26.5	23.1	23.0	32.3	33.6	36.9	34.4	31.2	25.9	-	Duplicate Site with TK9A and TK9B - Annual data provided for TK9B only

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.

Local bias adjustment factor used.

National bias adjustment factor used.

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

Thurrock 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 Thurrock Council district During 2022**

Thurrock Council has not identified any new sources relating to air quality within the reporting year of 2022.

There have been a number of developments over the 2022 reporting year that have required Air Quality Assessments. All have been found to have a “negligible” or “not significant” impacts on air quality after mitigation.

### **Additional Air Quality Works Undertaken by Thurrock Council During 2022**

Thurrock Council has not completed any additional works within the reporting years of 2022.

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

All diffusion tubes during the 2022 reporting year were from Gradko and used a mixture of 20% TEA in water method. Gradko International Ltd is a UKAS accredited laboratory. Gradko participates in the [AIR Proficiency Testing \(PT\) scheme for diffusion tubes](#), operated by LGC Standards and supported by the Health and Safety Laboratory (HSL), which provides a Quality Assurance / Quality Control (QA/QC) framework for local authorities carrying out diffusion tube monitoring as a part of their local air quality management process. The percentage of results submitted by Gradko International Ltd that were subsequently determined to be satisfactory was 100% for tests in AIR-PT rounds 49 and 50 (January to June 2022).

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

## Diffusion Tube Annualisation

In 2022, data capture for the majority of diffusion tube sites was greater than 75%, with the exception of Sites TILD and SR LTC.

The data for these sites was therefore annualised using DEFRA's 'Diffusion Tube Data Processing Tool V3.0', in accordance with the methodology stipulated in LAQM.TG22.

The AURN background sites used for annualisation were Thurrock London Road - Grays (Urban Background), and Bexley Belvedere West (Urban Background). Both sites had annual data capture of >85% and were within 50 miles radius of Thurrock.

A summary of the calculation is presented in Table C.1 below.

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

Site ID	Annualisati on Factor TK1	Annualisati on Factor Bexley – Belvedere West	Annualisati on Factor Barking and Dagenham – Scrattons Farm	Annualisati on Factor <Site 4 Name>	Average Annualisati on Factor	Raw Data Annual Mean	Annualised Annual Mean
TILD	0.98	0.98			0.98	27.5	0.98
SR LTC	0.89	0.86			0.87	16.9	0.89
TK8 PM10	0.88		0.88		0.88	21.7	19.1

## Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR has 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.

Thurrock Council have applied a national bias adjustment factor of 0.83 to the 2022 monitoring data. A summary of bias adjustment factors used by Thurrock Borough Council over the past five years is presented in Table C. 2. The bias adjustment factor was selected using Defra's Database Diffusion Tube Bias Factors version 02\_23.

**Table C. 2 – Bias Adjustment Factor**

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	Jun-23	0.83
2021	National	Jun-21	0.84
2020	National	Jun-21	0.81
2019	National	Jun-21	0.91
2018	National	Mar-19	0.93

**Table C. 3 – Local Bias Adjustment Calculation**

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	11	10			
Bias Factor A	0.88 (0.79 - 1)	0.94 (0.84 - 1.07)			
Bias Factor B	13% (0% - 27%)	6% (-6% - 19%)			
Diffusion Tube Mean ( $\mu\text{g}/\text{m}^3$ )	25.5	31.2			
Mean CV (Precision)	2.9%	4.8%			
Automatic Mean ( $\mu\text{g}/\text{m}^3$ )	22.5	29.3			
Data Capture	94%	99%			
Adjusted Tube Mean ( $\mu\text{g}/\text{m}^3$ )	22 (20 - 26)	29 (26 - 33)			

**Notes:**

The local bias adjustment factor was not used to adjust 2022 diffusion tube data in line with the recommendations of Chapter 7 of the LAQM TG22 guidance. Local factors are presented here for information only.

**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 Diffusion Tube Data Processing Tool available on the LAQM Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B. 1. A summary of the Diffusion Tube Data Processing Tool outputs for the only site that required distance correction is presented in Table C. 4. Once corrected for distance, the result at monitoring site LT is well below the annual mean objective meaning that no exceedances of this objective were reported in Thurrock Council during 2022.

**Table C. 4 – NO<sub>2</sub> Fall off With Distance Calculations (concentrations presented in µg/m<sup>3</sup>)**

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted)	Background Concentration	Concentration Predicted at Receptor	Comments
LT	1	49	36.7	22.6	25.6	
TK8	2	4.6	39.3	27.8	37.1	Within 10% of objective

## QA/QC of Automatic Monitoring

There are a number of different organisations responsible for carrying out QA/QC at various stations and equipment at Thurrock's automatic monitoring sites.

For TK1 & 3, the QA/QC is managed by Bureau Veritas (BV). For TK8 & 9, QA/QC is managed by the Environmental Research Group (ERG) at Imperial College London.

Calibrations for all sites are done every fortnight by Thurrock Council Environmental Health Officers & the Air Quality Officer.

All data can be viewed online via the [LAQN website](#).

## PM<sub>10</sub> and PM<sub>2.5</sub> Monitoring Adjustment

PM<sub>10</sub> and PM<sub>2.5</sub> monitoring within Thurrock is carried out using Beta Attenuation Monitors (BAMs).

## Automatic Monitoring Annualisation

PM<sub>10</sub> data capture at the TK8 automatic monitoring site was well below the required level and as such was annualised using Thurrock London Road – Grays, and Barking and Dagenham – Scrattons Farm. Calculations are summarised in Table C.1. Both sites had >85% valid data capture and were within 50 miles of the relevant sites in Thurrock, as per the requirements for annualisation data laid out in LAQM TG22.

## 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.

In 2022 only one automatic monitoring site had an annual mean NO<sub>2</sub> reading of >36µg/m<sup>3</sup>. This was TK8, in Purfleet. Once corrected for distance the annual mean at the nearest receptor was estimated to be 37.1µg/m<sup>3</sup>, which is compliant with the relevant national air quality objective. Distance correction calculations used Defra's NO<sub>2</sub> Fall Off Calculator and results are presented in Table C. 4.

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

Figure D. 1 – Map of Monitoring Sites in West Thurrock, AQMAs 7, 8, 9, 10, 12, 13, 23 and 25

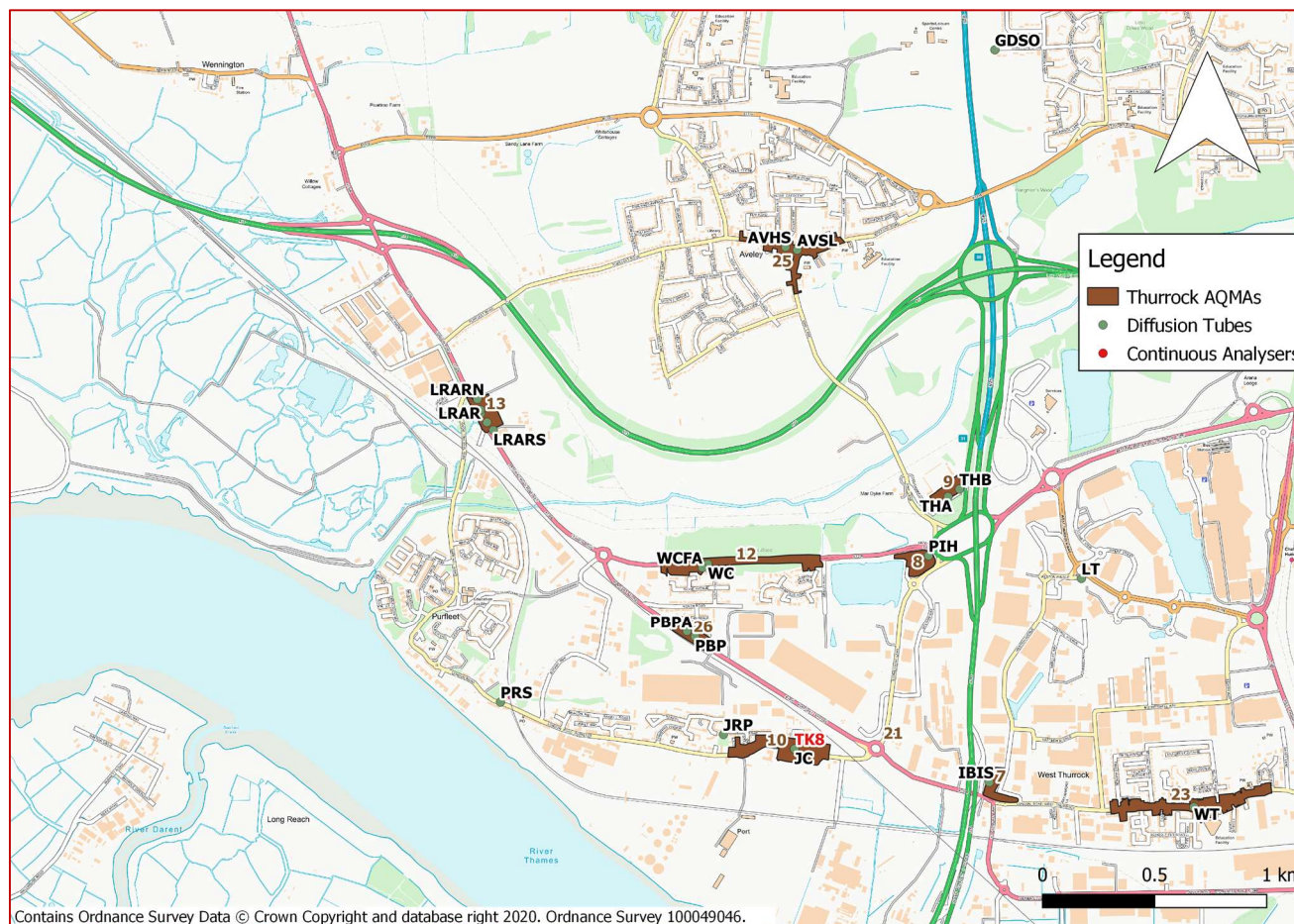


Figure D. 2 – Map of Monitoring Sites in North Thurrock, AQMAs 15 and 16

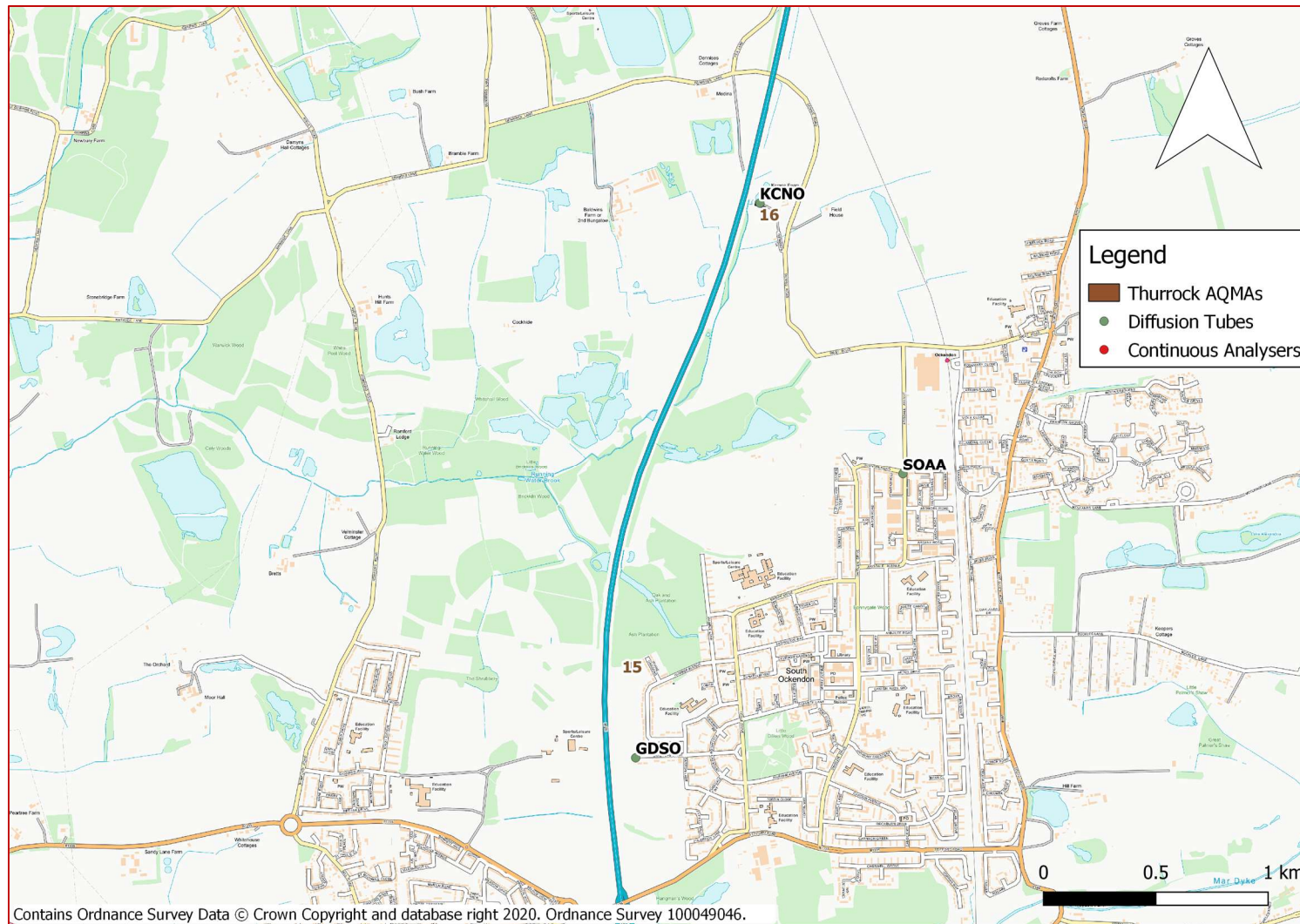


Figure D. 3 – Map of Monitoring Sites in Central Thurrock, AQMAs 1, 2, 3, 4, 5 and 23

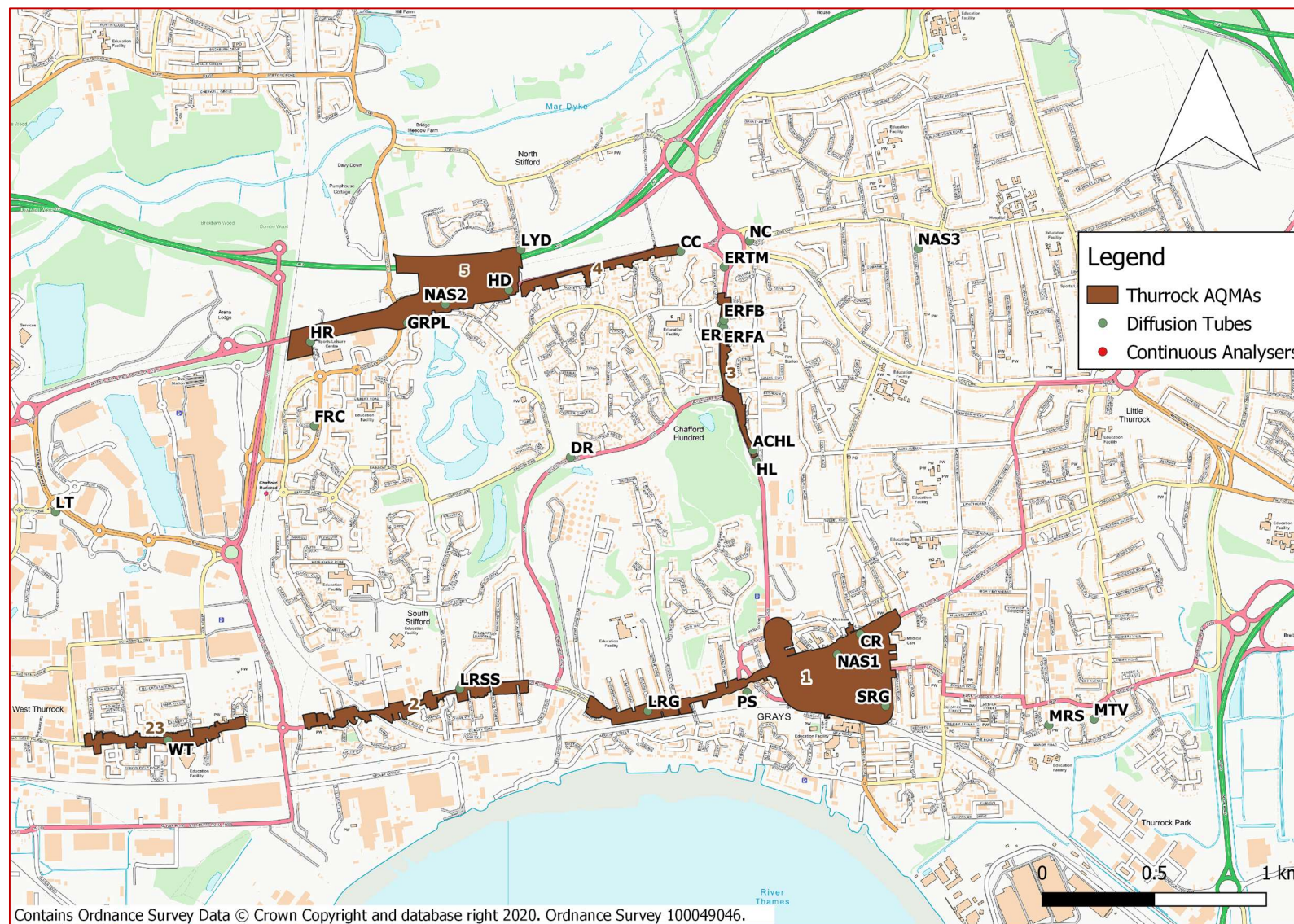




Figure D. 4 – Map of Monitoring Sites in East Thurrock, AQMA 3 and 4, monitoring sites outside AQMAs

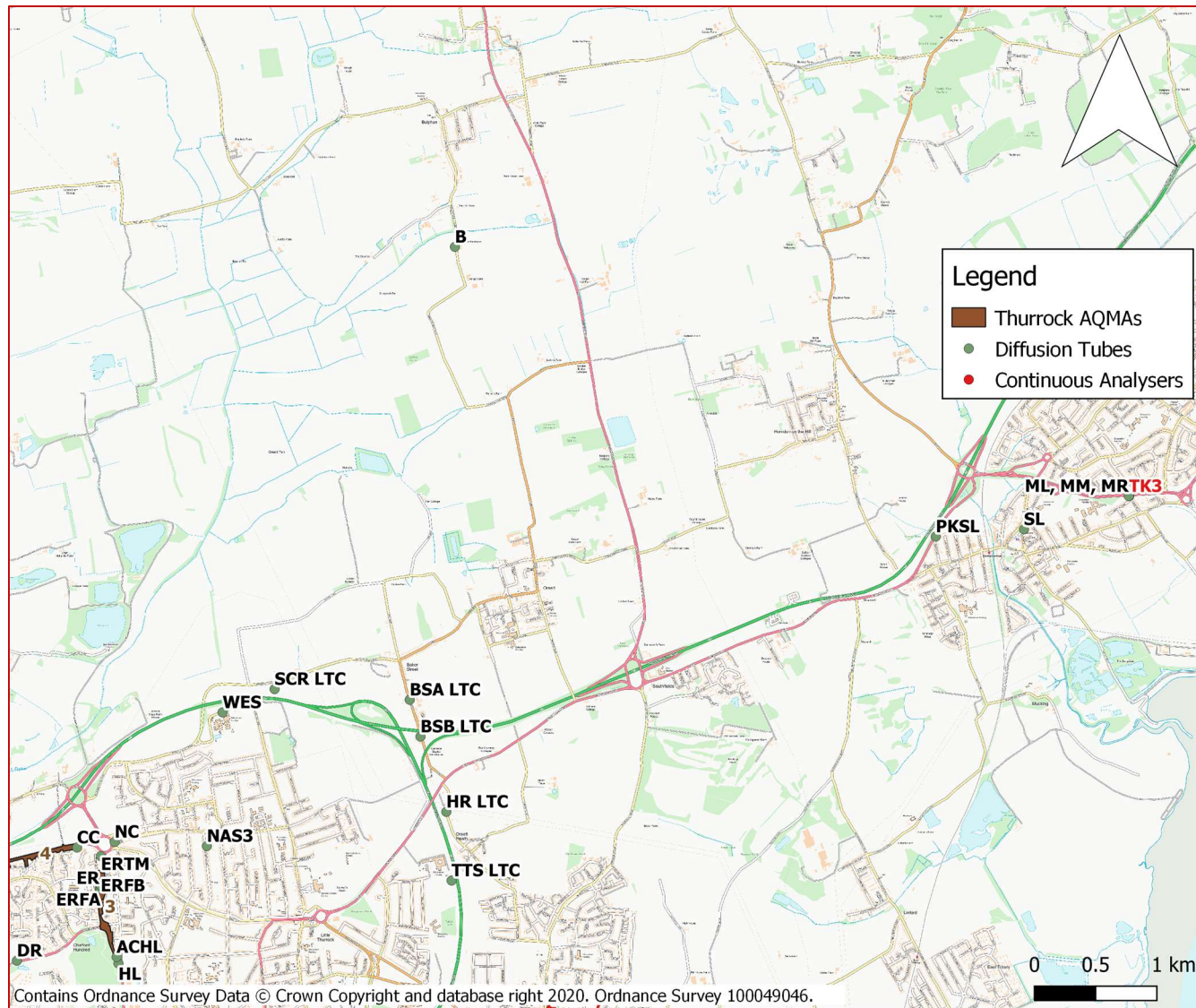
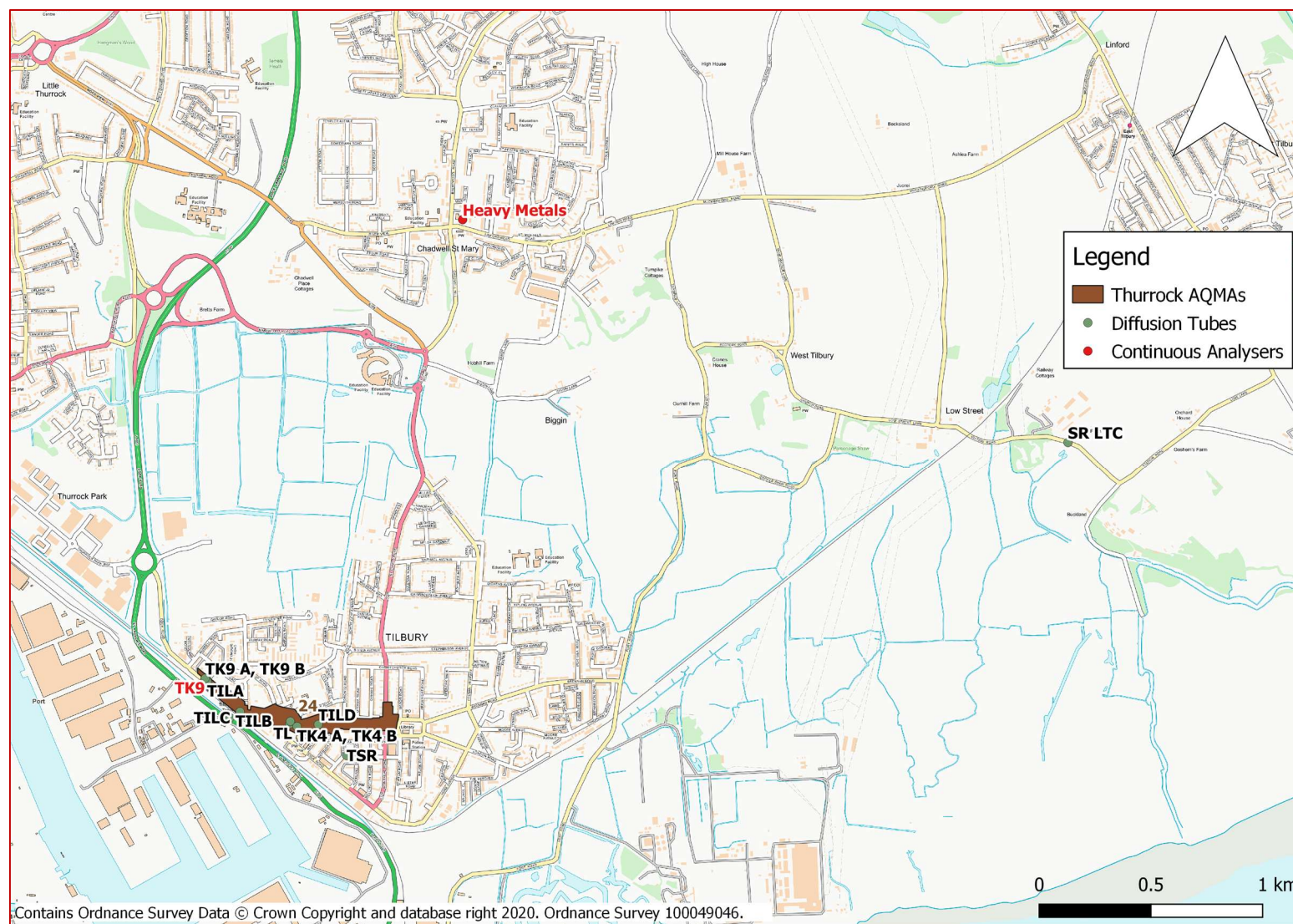


Figure D. 5 - Map of Monitoring Sites in Tilbury, AQMA 24



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

### 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
TEOM	Tapered Element Oscillating Microbalance

## 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.