2016 Air Quality Annual Status Report (ASR)

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

August 2016

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Executive Summary: Air Quality in Our Area

Air Quality continues to be an issue and a challenge to deal with within Thurrock. The council has maintained its monitoring network and will continue to do so, the monitoring from both roadside sites and urban background sites show that in the last 5 years concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10} & $PM_{2.5}$) continue to fall in most locations; the level of decrease is very slight however, and not improving as well as expected. It is important that the council continues to drive forward its action plan measures that are focused on its Air Quality Management Areas (AQMAs), so it can fulfil its commitment to improving air quality within its AQMAs and the whole borough.

The council has recently created a new Action Plan for the recently declared AQMA 24, Tilbury and has also created Action Plans for the two new AQMAs to be declared in July 2016 (AQMAs 25) Aveley & (AQMA 26) Purfleet By-Pass. The Council has also produced a new Air Quality and Health Strategy, which has reviewed current evidence on air quality & health within the borough and appraised options to tackle the causes of poor air quality as well as identify policies and actions to reduce exposure.

Air Quality in Thurrock

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

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

Thurrock currently has 16 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. They are often saturated with traffic

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

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 on the Defra Air Quality website via this web-link:- 1

The main pollutant of concern in Thurrock is nitrogen dioxide (NO_2) and to a lesser extent particulate matter (PM_{10}); 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 primarily related to NO_2 and the long-term objective or annual mean 40 $\mu g/m^{-3}$ objective, which is the principal issue in all 16 AQMAs. Out of these AQMAs there are currently four declared for $PM_{10,}$ for the short-term objective or daily mean objective of 35 permitted exceedences of >50 $\mu g/m^{-3}$.

Later this year an additional two AQMAs will be declared in Thurrock for breaching the annual mean objective for NO_2; one in Aveley High Street and Ship Lane, Aveley and a second declared along the Purfleet By-pass, north of Purfleet. Air Quality Action Plans (AQAPs) along with a new Air Quality Strategy Document (AQSD) have already been devised and can be viewed via the Thurrock Council Website here:- https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy

The Council works in collaboration with the Environment Agency (EA) on any air quality issues from industrial activities within the borough, consulting as necessary on these industrial activities, that is 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).

The Council has recently completed a detailed study into air quality at three of the locations in the Thurrock AQMA, covering Pilgrims Roundabout, Treacle Mine Roundabout and Elizabeth Road/Devonshire Road roundabout. Nitrogen dioxide concentrations within these locations are some of the highest measured within Thurrock. They are also locations where heavily trafficked roads meet and congestion occurs. Three traffic management options were assessed and of the options tested the introduction of a 30mph speed limit is predicted to have the most

beneficial impact on air quality. It is proposed that work will be undertaken next financial year to implement the speed reduction.

Local Priorities and Challenges

In 2015, a decision was taken by Thurrock Council to develop an integrated Health and Air Quality Strategy through which to tackle the health problems associated with and exacerbated by air pollution within the Borough.

Thurrock's Health and Air Quality Strategy has framed the authority's approach to improving air quality related health and wellbeing throughout the Borough and to reduce air pollution exposure to safe levels for human health. The Strategy provides the context for the Council to manage air quality through a suite of policies to prevent new AQMAs from arising as well as outlining a number of actions and measures to improve air quality in each AQMA with a view to moving towards compliance and future revocation.

The overall strategic aims of this Thurrock Health and Qir Quality Strategy are twofold:

1. To improve air quality related health and well-being throughout the Borough; and
2. To reduce air pollution exposure to safe levels for human health.

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 web: 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 from accessing a wealth of information, firstly from the Council's air quality webpage: https://www.thurrock.gov.uk/air-quality/air-quality-monitoring

They can find out what air quality is in there region from the London Air Quality Network: http://www.londonair.org.uk/london/asp/publicbulletin.asp?la_id=34&MapType=Google or from the EssexAir website: http://www.essexair.org.uk/

The Public can also keep informed on the latest air quality forecasting from the Defra UK-AIR website: https://uk-air.defra.gov.uk/

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1 Local Air Quality Management

This report provides an overview of air quality in Thurrock Council during 2015. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Thurrock Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England can be found in Table E.1 in Appendix E.

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority must prepare an Air Quality Action Plan (AQAP) within 12-18 months setting out measures it intends to put in place in pursuit of the objectives.

A summary of AQMAs declared by Thurrock Council can be found in Table 2.1. Further information related to declared or revoked AQMAs, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=282

We propose to declare two new AQMAs later this year for breaching the annual mean objective for NO_2, the first is along Aveley High Street and along Ship Lane in Aveley. The second AQMA will be declared along the Purfleet By-pass north of the Purfleet area (see monitoring section). We also propose to amend certain AQMAs (see monitoring section) and also propose to revoke some AQMAs based on a Detailed Assessment Report for NO_2 & PM_{10} which will be submitted to Defra alongside this report. (see monitoring section).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA 1	NO_2 annual mean	Grays Town Centre	An area encompassing a number of properties along London Road Grays, Orsett Road & Stanley Road Grays	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
AQMA 2	NO_2 annual mean	Grays, South Stifford	An area encompassing Residential properties along London Road South Stifford.	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 3	NO_2 annual mean	Grays	An area encompassing Residential properties along Hogg Lane & Elizabeth Road.	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 4	NO_2 annual mean	Grays, Chafford Hundred	An area encompassing Residential properties along A1306 west of Chafford Hundred Visitor Centre	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 5	NO_2 annual mean PM_{10} daily mean	Grays, Chafford Hundred & North Stifford	An area encompassing Residential properties along Warren Terrace A1306 & A13	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 7	NO_2 annual mean PM_{10} daily mean	West Thurrock	A Hotel (IBIS) near to M25 north of the Dartford Crossing	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 8	NO_2 annual mean	West Thurrock	A Hotel next to Jct 31 of the M25	https://consult.thurrock.gov.uk/portal/tc/pt/trans

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
	PM_{10} daily mean	/ Purfleet		port/aqstrategy
AQMA 9	NO_2 annual mean	West Thurrock / Aveley	A Hotel next to Jct 31 of the M25	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 10	NO_2 annual mean PM_{10} daily mean	Purfleet	An area encompassing Residential properties along London Road Purfleet near to Jarrah Cottages	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 12	NO_2 annual mean	Purfleet	An area encompassing Residential properties along A1306 on the Watts Wood Estate	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 13	NO_2 annual mean	Purfleet / Aveley	An area encompassing Residential properties along A1306 London Road Aveley Arterial Road	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 15	NO_2 annual mean	South Ockendon	1 residential dwelling near the M25 on the edge of Irvine Gardens	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 16	NO_2 annual mean	Near North	1 residential dwelling near the M25 off Dennis Road	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy

AQMA Name	Pollutants and Air Quality Objectives	City / Town	One Line Description	Action Plan
		Ockendon		
AQMA 21	NO_2 annual mean	Purfleet	A former Hotel on Stonehouse Lane	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 23	NO_2 annual mean	West Thurrock	An area encompassing Residential properties along London Road West Thurrock	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 24	NO_2 annual mean	Tilbury	An area encompassing Residential properties along Calcutta Road, Dock Road & St Chads Road	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 25	NO_2 annual mean	Aveley	**Pending Declaration** An area encompassing Residential properties along Aveley High St & Ship Lane	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy
AQMA 26	NO_2 annual mean	Purfleet	**Pending Declaration** An area encompassing Residential properties along the Purfleet By-pass	https://consult.thurrock.gov.uk/portal/tc/pt/transport/aqstrategy

2.2 Progress and Impact of Measures to address Air Quality in the Borough of Thurrock

Thurrock Council has taken the opportunity to review its strategy and approach to managing air quality in the Borough. During the current reporting year of 2015a cross-directorate Air Quality Officer Task Group was established to work more effectively at managing the sources and impacts of poor air quality in Thurrock; and develop and integrated Health and Air Quality Strategy to identify ways to reduce air pollution and public exposure.

In order to improve understanding of the causes and extent of air quality issues in Thurrock the Council undertook a comprehensive review of local data and intelligence to form the basis of the evidence base for the development of the Strategy.

Following on from the preparation of the Thurrock Air Quality and Health Evidence Base it was necessary to consider this evidence in identifying the issues that the Strategy will need to focus on resolving.

The overall strategic aims of this Thurrock Health and Air Quality Strategy are twofold:

- To improve air quality related health and well-being throughout the Borough; and
- To reduce air pollution exposure to safe levels for human health.

In accordance with the above, the Strategy has therefore considered ways to:

Objective 1: Reduce childhood exposure to air pollution, particularly in and around schools;

Objective 2: Encourage people to stay healthy longer by encouraging a modal shift where possible to active modes of transport where safe to do so;

Objective 3: Prioritise public health interventions in AQMAs and health deprived areas; and

Objective 4: Reduce the number of air quality management areas in order to limit exposure to and health impacts from air pollution.

In order to meet the above aims and objectives, it was necessary to set out a suite of policies for effectively managing air quality throughout the Borough which will facilitate decision making on air quality issues and work to prevent new AQMAs from arising wherever possible. Table 2.2 summarises these policies.

Table 2.2 – Thurrock Air Quality Strategy Aims

	Policy	Summary
AQS 1	Air Quality and Health	To promote good public health in relation to the impacts of poor air quality, public health interventions will be prioritised in Thurrock with: • An AQMA; and • In 20% most deprived; or • History of respiratory of cardio vascular problems amongst its residents

	Policy	Summary
AQS 2	Monitoring and Review	The Council will ensure the whole Borough is modelled at least every five years to ensure that AQMAs remain justified
AQS 3	Declaration	New AQMAs will only be declared where: • Modelling indicates an exceedance; and • Relevant receptors exist; and • Three years of diffusion tube data corroborate
AQS 4	Revocation	Annual Status Reports will be used to consider revocation of AQMAs
AQS 5	Action Planning Prioritisation	1. Where pollutant concentrations are highest; followed by 2. AQMAs in most 20% health deprived LSOA; and finally 3. AQMAs where levels are less than 20% below limit value forecast three years in future
AQS 6	Clean Air Zone	Detailed consideration of a CAZ will be triggered if: • Other measures not proving to be effective; • New evidence emerges to benefits of CAZs; or • National initiative aimed at their widespread deployment

	Policy	Summary
AQS 7	Reducing emissions from transport	The council will deliver transport interventions aimed at reducing emissions from transport generally across the Borough, but in particular within AQMAs.
AQS 8	Development and Air Quality Impacts	When deciding whether air quality is relevant to a planning application, consideration of: • Significantly affect traffic • Introduce new point sources of air pollution • Increase exposure to poor air quality • Unacceptable impacts during construction (dust) • Affect biodiversity • Lead to declaration of a new AQMA
AQS 9	Air Quality Assessments for Development Proposals	To address Air Quality concerns the Council may request: • Baseline AQ situation; • Whether operational or construction phase could affect AQ; • Significant increase in people exposed to poor AQ; • For major development, 24 hour traffic counts; and • Any mitigation measures required.

	Policy	Summary
AQS 10	Air Quality Mitigation and Planning Conditions/Obligations	The Council will work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented.

The development of the Strategy was also an opportune time to review and revise the existing air quality action plans for each AQMA, as well as develop AQAPs for the new AQMAs in Tilbury (AQMA 24), Aveley (AQMA 25) and Purfleet Bypass (AQMA 26). These action plans focus primarily on the period from 2016 to 2020; although in some cases include some longer term actions as well.

Thurrock Council's priorities for the coming year are:-

Table 2.2a - Progress on Measures to improve Air Quality within Thurrock's AQMAs

	No.	Action	Outcome	Delivery Date	Reference to existing strategy or plan
AQMA 10 – London Road, Purfleet	1	Engine Switch-Off Switch Zone	0.5 – 1.0 µg/m^3 (Actions 1 and 2 combined)	Mar 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	2	Roadside Emissions Testing		Mar 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	3	HGV Distributor Road/ Dualling	15.0+ µg/m^3 (Actions 3 and 4 combined)	2021	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	4	Weight Restriction		2021	Thurrock Air Quality and Health Strategy and AQMA Action Plans

	5	Land Use Planning	No increase	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	6	Freight Quality Partnership	Inform routing strategies, awareness and liaison	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	7	Eco-Driver Training	0.5 µg/m^3	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	8	Pollution Retrofit Equipment	15.0+ µg/m^3 (Actions 8 and 9 combined)	TBD – Dependent on availability of external funding	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	9	Clean Air Zone		TBD – Monitoring of AQ and with regard to updated national policy	
	10	Personalised Journey Planning	3.0 µg/m3 overall	TBD – Subject to outcome of volunteer recruitment	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	11	Business Travel Plans (modeshift)	1.0 µg/m3	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
AQMA 3 –Hogg Lane/Elizabeth Road	12	Investigate Mature Landscaping Barrier	5.0+ µg/m3*	Nov 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	13	30 mph limit	5.0+ µg/m3*	Sep 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	14	School Travel Plans	0.5 µg/m3	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans, Sustainable Modes of travel to Schools strategy (SMOTS)
	15	A1012/A1036 Priority 'hamburger' roundabout feasibility	5.0+ µg/m3*	Sep 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
AQMA 5 – A1306	16	Investigate Mature Landscaping Barrier	5.0+ µg/m3*	Nov 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans

	17	Variable Message Signing for Lakeside	1.0 µg/m3	2021	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	18	Business Travel Plans (modeshift)	1.0 µg/m3	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	19	Pilgrims Roundabout Signalisation	5.0+ µg/m3*	Sep 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
AQMA 24 – Tilbury (Calcutta Road)	20	Engine Switch Off Zone	3.0+ µg/m3*	Mar 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	21	School Travel Plans	3.0 µg/m3 overall	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans, Sustainable Modes of travel to Schools strategy (SMOTS)
	22	Improved Walking and Cycling Infrastructure and marketing and promotion campaign	3.0 µg/m3 overall	Mar 2018	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	23	Personalised Journey Planning	3.0 µg/m3 overall	TBD – Subject to outcome of volunteer recruitment	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	24	Eco Driving	3.0 µg/m3 overall	Sep 2017: Subject to available funding	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	25	AQ Mitigation in new developments	No increase in at risk population	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	26	Personalised Journey Planning	3.0 µg/m3 overall	TBD – Subject to outcome of volunteer recruitment	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	27	Business Travel Plans (modeshift)	1.0 µg/m3	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans

AQMA 25 - Aveley	28	HGV Traffic Management Scheme: Stifford Road	8.0 µg/m3 (Actions 24 and 25 combined)	April 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	29	HGV Traffic Management Scheme: Ship Lane		April 2018	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	30	Engine Switch Off Zone	3.0+ µg/m3*	Mar 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	31	School Travel Plans	3.0 µg/m3 overall	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans, , Sustainable Modes of travel to Schools strategy (SMOTS)
AQMA 26 – Purfleet Bypass	32	Mature Landscaping Barrier	2.0+ µg/m3*	Nov 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	33	Land Use Planning	No further increases	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	34	Eco-Driver Training	0.5 µg/m3	Ongoing: Subject to available funding	Thurrock Air Quality and Health Strategy and AQMA Action Plans
AQMA 1, 2, 23 Grays (London Road)	35	Engine Switch Off Zone	0.5 µg/m3	Mar 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	36	School Travel Plans	0.5 µg/m3	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans, Sustainable Modes of travel to Schools strategy (SMOTS)
	37	Enforcement of Weight Restriction	3.0 µg/m3	Sep 2017	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	38	Land Use Planning (Gumley Road and Askey Farm Lane)	No increase	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	39	Eco-Driver Training	0.5 µg/m3	Ongoing: Subject to available funding	Thurrock Air Quality and Health Strategy and AQMA Action Plans

	40	Personalised Journey Planning	3.0 µg/m3 overall	TBD – Subject to outcome of volunteer recruitment	Thurrock Air Quality and Health Strategy and AQMA Action Plans
	41	Business Travel Plans (modeshift)	1.0 µg/m3	Ongoing	Thurrock Air Quality and Health Strategy and AQMA Action Plans

Table 2.2b – Progress on Measures to Improve Air Quality as wider-ranging more generalised measures

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
1	Public Awareness Raising & Education	Public Information	via the Internet	Env Protection Team/ Highways & Public Health	Date	Ongoing	N/A	N/A	Effects not quantifiable but may encourage modal shift and lead to long-term improvements	Ongoing	To Inform the Public of the state of Air Quality disemination 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	Strategic Planning		2012/13	N/A	<1%		Ongoing	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	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Encourage modal shift
4	Action to road vehicle emissions	Promoting Travel Alternatives	School Travel Plans	Highways / Strategic Planning		2004	N/A	<1%		Complete	Encourage modal shift

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
5	Action to road vehicle emissions	Promoting Travel Alternatives	Promotion of walking	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Encourage modal shift
6	Action to road vehicle emissions Public Transport (Metrorail)	Promoting Travel Alternatives	Promote use of rail and inland waterways	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Encourage modal shift
7	Action to road vehicle emissions	Promoting Travel Alternatives	Personalised Travel Planning	Highways / Strategic Planning		2010/11	N/A	<1%		2015/16	Encourage modal shift
8	Action to road vehicle emissions	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	Highways / Strategic Planning		2010/11	N/A	<1%		Ongoing	Encourage modal shift
9	Action to road vehicle emissions	Transport Planning and Infrastructure	Cycle network	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Encourage modal shift
10	Action to road vehicle emissions	Transport Planning and Infrastructure	Public transport improvements-interchanges stations and services	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Encourage modal shift
11	Action to road vehicle emissions	Transport Planning and Infrastructure	Bus route improvements	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Encourage modal shift

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
12	LAPC Inspections, of local industry	Environmental Permits	Other	Environmental Protection team		1990	N/A	N/A	Effects not quantifiable, but probably limits local component of background pollution	Ongoing	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	Highways / Strategic Planning		2010/11	N/A	<1%		2014/15	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	Highways / Strategic Planning		2010/11	N/A	<1%		2014/15	Improve HGV driving efficiency to improve vehicle emissions (funding available until March 2015)
15	Enforcement of local Taxi licencing	Promoting Low Emission Transport	Taxi Licensing conditions	Licencing		Ongoing	N/A	<1%	Effects not quantifiable	Ongoing	Ensure that Road vehicles are road worthy and EU compliant vehicles

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
16	Provision of Electric vehicle car charging points around the borough	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Highways / Strategic Planning		2009	N/A	<1%		Ongoing	Alternative fuelled vehicles
17	Council Introduced Home working / flexible working hours	Promoting Travel Alternatives	Encourage / Facilitate home-working	TBC		2014	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	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Switch from Diesel to less polluting alternatives
19	Cycle Parking for AQMA 5	Transport Planning and Infrastructure	Other	Highways / Strategic Planning		2013/2014	N/A	<1%		Completed	Increase capacity for cycle network
20	Local Sustainable Transport Fund (LSTF) Improvement of Transport infrastructure (Boroughwide) Initiative	Transport Planning and Infrastructure	Other	Highways / Strategic Planning		2010/2014	N/A	<1%		Completed	Improvement of Transport Infrastructure

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
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	Highways / Strategic Planning		2010/11	N/A	<1%		2015/16	Partnership with local freight and logistic industry to provide discussion platform around freight issues.
22	Pollution absorbent paint barrier (AQMA 13)	Transport Planning and Infrastructure	Other	Environmental Protection Team /Highways / Strategic Planning		2013	Monitor NO2 diffusion tube results, see if there is an improvement	1-2%	No noticeable improvement	Complete	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	Highways / Strategic Planning		2014	N/A	<1%		ongoing	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	Highways / Strategic Planning		2013	N/A	<1%		2013	Improve flow of stationary traffic for smoother driving, hence attempt to lower emissions

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
25	SCOOT/ UTMC (AQMA 1 & AQMA 5)	Traffic Management	UTC, Congestion management, traffic reduction	Highways / Strategic Planning		2014	N/A	<1%		2014	
26	HGV weight restriction (AQMAs 1, 2)	Traffic Management	Other	Highways / Strategic Planning		2013	N/A	<1%		2013 / 2014	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	Highways / Strategic Planning		Ongoing	N/A	<1%		Ongoing	Improve accessibility of public transport :Completed scheme, but will make future improvements as part of the Mastplan for Thurrock
28	Road layout review - future bus priority measures (AQMA 23)	Transport Planning and Infrastructure	Other	Highways / Strategic Planning		?				? Future	
29	Air Quality Officer Working Group	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Environmental Protection Team		2014/15	n/a	n/a		2015/16	To coordinate action between council departments (Health, Transport & Environment) and determine focus areas/initiatives

Measure No.	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	Key Performance Indicator	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
30	Air Quality Study	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Highways / Strategic Planning		2014/15	n/a	n/a		2015/16	To investigate improvement options in AQMA 3, 4 and 5.

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

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

As set out previously, the Council has been working on a new 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 NO2 in individual AQMAs, however it is acknowledged that many of the interventions proposed will also have beneficial reductions in PM2.5 also. The following measures are examples of interventions proposed to also address $PM_{2.5}$ (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^3): Introduction of weight restrictions/enforcement to discourage HGVs
- Engine Switch-off Zones (3.0+ µg/m^3): Traffic orders and publicity to reduce idling at level crossings etc
- Speed limit reduction (5.0+ µg/m^3): Localised traffic enforcement and speed reductions
- Clean Air Zone (15.0 µg/m^3): Traffic enforcement/management to prevent or charge high polluting vehicles for using certain roads

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

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

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

Thurrock Council undertook automatic (continuous) monitoring at four sites during 2015. Table A.1 in Appendix A shows the details of the sites and also provides the latest monitoring results for these sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem, these pollutants have been screened out in previous reports as the levels were low or non-existent within the borough, and no new sources have been identified since for these pollutants so they are no longer deemed as being an issue. National monitoring results are available at https://uk-air.defra.gov.uk/data/

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 (passive) monitoring of NO_2 at 46 sites during 2015 Table A.2 in Appendix A shows the details of the sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for "annualisation" and bias. Further details on adjustments are provided in Appendix C.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 in Appendix A compares the ratified and adjusted monitored NO_2 annual mean concentrations for the past 5 years with the air quality objective of 40µg/m^3.

For diffusion tubes, the full 2015 dataset of monthly mean values is provided in Appendix B.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past 5 years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year. All of thurrock's AQMA's are declared for the annual mean objective for NO_2 recent monitoring suggests that this is still the case in most of these AQMA's however for the last few years there has been slight reductions in concentrations in most of these AQMA's and some have been consistently below the objectives for a number of years now.

The Council alongside this report has carried out a Detailed Assessment Report for NO_2 and PM_{10} (DA 2016) which main aim is to review its AQMA's through conducting detailed Air Quailty Modelling using an Advanced Dispersion Model (ADMS), this has been calibrated to the current monitoring data from the year 2014. The report highlights and confirms through the modelling that a number of these AQMAs are now below the annual objective for NO_2 where there was relevant public exposure previously and from this the Council intends to Revoke 8 AQMA's (AQMA's 8,9,12,13,15,16 & 21) for annual Mean NO_2. Also 2 of these (AQMA's 8 & 9) will be revoked for the hourly objective for NO_2. Currently the Council has 4 of these

AQMA's declared for the daily mean PM_{10} as well (AQMA's 5,7,8 & 10). The modelling confirms that there is no longer an issue with PM_{10} within these 3 AQMA's, (AQMA's 5,7 & 8) and the Council intends to Revoke these also, but AQMA 10 will still remain declared for PM_{10}.

The overall result will be 10 remaining AQMA's, 9 of which are declared for the annual mean objective for NO_2 (AQMA's (1,2,3,4,5,10,23,24 & 25) with one of these declared for PM_{10} also (AQMA 10) most of these have decreased in size but a few have also increased in size i.e.(AQMA's 3 & 25). The remaining 1 AQMA is declared soley for the hourly objective for NO_2 as the annual mean objective does not apply here as it is a single dwelling that is designated as a Hotel and not a permanent residence (AQMA 7).

More recent monitoring data for NO_2 for 2015 confirms that this is still the case, and that the Council will be revoking these later this year.

The highest recorded 1-hour concentration in 2015 for NO_2 was at Thurrock 8 at 199 $\mu g/m^3$ this is below the 200 $\mu g/m^3$ limit of 18 permitted exceedences annually.

3.2.2 Particulate Matter (PM_{10})

Table A.5 in Appendix A compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past 5 years with the air quality objective of 40$\mu g/m^3$.

Table A.6 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past 5 years with the air quality objective of 50$\mu g/m^3$, not to be exceeded more than 35 times per year.

2015 monitoring along with detailed modelling from 2014 confirms that there are currently no areas breaching the air quality objectives for PM_{10}. However there are some exceedences from automatic monitoring stations over 2015. Thurrock 8 had (10 exceedences of the permitted 35 exceedences), Thurrock 1 had (2 exceedences of the permitted 35 exceedences), and Thurrock 3 had (2 exceedences of the permitted 35 exceedences).

3.2.3 Particulate Matter ($PM_{2.5}$)

Table A.7 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations for the past 5 years. Thurrock Council currently has one

automatic monitoring station (Thurrock 3; Stanford Le-Hope), which is a roadside site that monitors $PM_{2.5}$. The site has seen a year on year decrease in concentrations of $PM_{2.5}$ since it first stared operating. $PM_{2.5}$ concentrations have reduced from 17.93 $\mu g/m^3$ in 2011 to 10.06 $\mu g/m^3$ in 2015.

3.2.4 Sulphur Dioxide (SO_2)

Table A.8 in Appendix A compares the ratified continuous monitored SO_2 concentrations for year 2015 with the air quality objectives for SO_2.

There are currently two locations monitoring SO_2 within the borough, Thurrock 1, Grays and Thurrock 4, Tilbury. There have been no pollution incidences regarding this pollutant since monitoring began back in 1996 at Thurrock 1, SO_2 concentrations fall year on year and remain very low, well below the air quality objectives.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
Thurrock 1 (TK1)	Thurrock, Grays AURN	Urban Background	561066	177894	NO_2 PM_{10} O_3 SO_2	No	Chemiluminescent TEOM FDMS UV absorption UV Fluorescence	38	Y	3.5
Thurrock 8 (TK8) & Formerly *(TK2)	Purfleet, London Road	Roadside	556701 *(556737)	177937 *(177928)	NO_2 PM_{10}	Yes	Chemiluminescent Beta Attenuated Mass	2.6	Y	1.5
Thurrock 3 (TK3)	Stanford-le-Hope, Manorway	Roadside	569358	182736	NO_2 PM_{10} $PM_{2.5}$	No	Chemiluminescent TEOM FDMS TEOM FDMS	3	Y	2.8
Thurrock 4 (TK4)	Tilbury, Calcutta Road	Roadside	563900	176282	NO_2 SO_2	Yes	Chemiluminescent UV Fluorescence	5.5	Y	1.5

(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

Site ID	Site Name	Site Type	X OS Grid Ref	Y OS Grid Ref	Pollutants Monitored	In AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube collocated with a Continuous Analyser?	Height (m)
LRAR	London Road Arterial Road	R	555301	179438	NO2	13	N	0.5	N	1.5
PRS	Purfleet Rail Station	R	555389	178145	NO2	No	N	1.5	N	2
WC	Watts Crescent	R	556314	178765	NO2	12	N	2	N	2
JC	Jarrah Cottages	R	556701	177937	NO2	10	N	2.6	Y (TK8)	1.5
STON	Stonehouse Lane	R	557132	177970	NO2	21	N	30	N	1.5
IBIS	Ibis Hotel	UB	557570	177789	NO2	7	N	52	N	2
GDSO	Gatehope Drive	UB	557595	181060	NO2	15	Y (23m)	105	N	1.25
LT	Lakeside Tesco Roundabout	R	557981	178700	NO2	No	N	1	N	2

KCNO	Kemps Cottage	UB	558148	183532	NO2	16	Y (10m)	57	N	2
WT	London Road W Thurrock	R	558483	177678	NO2	23	N	4	N	1.5
HR	Howard Road	R	559118	179462	NO2	5	Y (0m)	29	N	1.5
NAS2	A1306	R	559720	179630	NO2	5	N	4.5	N	2
LRSS	London Road South Stifford	R	559785	177910	NO2	2	N	3.5	N	2
LRG	London Road Grays	R	560624	177811	NO2	1	N	2.5	N	2
NAS4	Wingfield Grays	UB	560772	178434	NO2	No	Y	N/A	N	1.5
ER	Elizabeth Road	R	560954	179535	NO2	3	N	0.5	N	2
PS	Poison Store AURN Site	UB	561066	177894	NO2	1	N	38	Y (TK1)	3.5
HL	Hogg Lane	R	561108	178922	NO2	3	N	1.2	N	2
NAS1	Queensgate Centre Grays	R	561469	178063	NO2	1	Y (0m)	5	N	2
CR	Cromwell Road Grays	I	561572	178154	NO2	1	N	0.5	N	2

SRG	Stanley Road Grays	R	561685	177833	NO2	1	Y (2.5m)	5	N	2
NAS3	Chestnut Avenue Grays	UB	561830	179878	NO2	No	Y	N/A	N	1.5
WES	William Edwards School	R	561958	180967	NO2	No	N	N/A	N	2
B	Bulphan	RB	563855	184772	NO2	No	N	N/A	N	2
TL	Calcutta Road Tilbury	R	563867	176293	NO2	No	N	0.5	N	2
PKSL	Park Road	R	567781	182400	NO2	No	Y (24m)	9	N	2
SL	Stanford Library	UB	568501	182459	NO2	No	N	N/A	N	2
M	Manorway Monitoring Station	R	569357	182737	NO2	No	N	3	Y (TK3)	2.75
FRC	Francisco Close (Chafford Hundred)	I	559136	179084	NO2	No	Y (10m)	17	N	2
SLHRS	Stanford-le-Hope Railway Station	R	568162	182296	NO2	No	N	4.5	N	2
ETRS	East Tilbury Rail Station	R	567655	179003	NO2	No	Y	2.5	N	1.5
TILA	Dock Road (Tilbury)	R	563498	176483	NO2	{ 24 }	N	2.5	N	2

TILB	Broadway Intersection (Tilbury)	R	563645	176348	NO2	{ 24 }	N	2.5	N	2
TILC	St Andrews Road (Tilbury)	R	563600	176321	NO2	No	N	2.5	N	1.5
TILD	Calcutta Road East (Tilbury)	R	563995	176291	NO2	{ 24 }	N	0.5	N	2
TILE	Calcutta Road North (Tilbury)	R	563870	176305	NO2	{ 24 }	N	2	N	2
TK4 (A&B)	Thurrock 4 (co-located duplicated site)	R	563900	176282	NO2	{ 24 }	Y	5.5	Y (TK4)	1.5
PBP	Purfleet By-pass	R	556257	178438	NO2	No	Y (5.5m)	9.5	N	1.5
PBPA	Purfleet By-pass	R	556221	178461	NO2	No	Y (3.2m)	9.5	N	1.5
LYD	Lydden	UB	560057	179873	NO2	4	Y (26m)	18	N	2
AVSL	Aveley Ship Lane	R	556713	180167	NO2	No	Y (1m)	2	N	2
AVHS	Aveley High Street	R	556661	180180	NO2	No	N	0.75	N	2
SOAA	South Ockendon Arisdale Avenue	R	558785	182323	NO2	No	Y (6 m)	7	N	2
TSR	Tilbury Sydney Road	UB	564122	176152	NO2	No	N	N/A	N	2

DR	Devonshire Road	R	560279	178944	NO2	No	Y (10.5m)	6	N	1.5
LRARN	London Road Art Road (North)	R	555286	179501	NO2	13	Y (0.5m)	19.5	N	2
LRARS	London Road Art Road (South)	R	555357	179362	NO2	13	Y (40m)	15	N	1
LRARMN	London Road Art Road (Mid-North)	R	555299	179453	NO2	13	N	8	N	2
LRARMS	London Road Art Road (Mid-South)	R	555329	179397	NO2	13	N	7	N	2
JRP	Joslin Road Purfleet	UB	556395	178002	NO2	No	N	N/A	N	2

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3]				
					2011	2012	2013	2014	2015
Thurrock 1	Urban Background (UB)	Automatic	99%	99%	28.17	28.72	27.46	26.46	25.4
Thurrock 3	Roadside (R)	Automatic	98.9%	98.9%	33.92	32.76	30.04	25.07	22.9
Thurrock 4	R	Automatic	98.9%	98.9%	38.56	39.3	34.55	32.77	30
Thurrock 8	R	Automatic	89.5%	89.5%	**62.27**	**62.65**	**62.84**	**61.04**	**55.5**
LRAR	R	Diffusion Tube	92%	92%	**50.27**	**57.23**	**58.28**	**58.52**	**52.15**
PRS	R	Diffusion Tube	100%	100%	31.88	35.71	35.26	34.7	33.5
WC	R	Diffusion Tube	92%	92%	38.7	**40.54**	**43.43**	**40.68**	38.58
JC	R	Diffusion Tube	100%	100%	**47.03**	**52.51**	**58.84**	**56.76**	**53.43**
STON	R	Diffusion Tube	N/A	N/A	**40.5**	**42.49**	**41.38**	Site Ended 12/2013	Site Ended 12/2013
IBIS	UB	Diffusion Tube	75%	75%	**46.02**	**45.78**	**46.25**	**49.12**	**52.65**
GDSO	UB	Diffusion Tube	100%	100%	29.47	30.28	28.46	28.58	27.81
LT	R	Diffusion Tube	100%	100%	**52.31**	**53.73**	**61.99**	**50.05**	**52.39**
KCNO	UB	Diffusion Tube	100%	100%	32.63	34.22	35.21	34.25	34.19
WT	R	Diffusion Tube	100%	100%	38.8	**43.9**	**40.13**	38.68	38.7
HR	R	Diffusion Tube	100%	100%	29.2	30.85	31.41	31.01	30.23
NAS2	R	Diffusion Tube	100%	100%	**53.04**	**53.93**	**51.69**	**50.02**	**50.27**
LRSS	R	Diffusion Tube	100%	100%	**43.08**	**49.33**	**44.76**	**40.63**	**40.48**
LRG	R	Diffusion Tube	92%	92%	37.51	38.69	39.74	37.73	37.55

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2015 (%) [2]	NO_2 Annual Mean Concentration (µg/m^3) [3]				
					2011	2012	2013	2014	2015
NAS4	UB	Diffusion Tube	N/A	N/A	21.51	21.75	20.88	Site Ended 12/2013	Site Ended 12/2013
ER	R	Diffusion Tube	100%	100%	**46.95**	**53.48**	**56.68**	**52.69**	**52.94**
PS	UB	Diffusion Tube	100%	100%	26.04	27.11	27.72	26.23	24.92
HL	R	Diffusion Tube	100%	100%	29.93	33.87	33.3	35.09	31.32
NAS1	R	Diffusion Tube	100%	100%	34.19	33.12	35.01	32.86	30.06
CR	Intermediate (I)	Diffusion Tube	100%	100%	30.84	36.06	31.95	33	32.74
SRG	R	Diffusion Tube	100%	100%	27.95	31.14	33.09	30.52	27.9
NAS3	UB	Diffusion Tube	100%	100%	22.48	23.69	22.67	21.71	21.05
WES	R	Diffusion Tube	100%	100%	28.37	31.77	31.38	30.28	29.85
B	RB	Diffusion Tube	92%	92%	18.36	20.61	18.44	17.51	16.26
TL	R	Diffusion Tube	92%	92%	35.74	**40.54**	37.13	35.17	31.96
PKSL	R	Diffusion Tube	100%	100%	30.69	33.34	31.01	28.62	28.02
SL	UB	Diffusion Tube	100%	100%	26.34	25.93	27.34	25.55	24.92
M	R	Diffusion Tube	100%	100%	32.65	34.35	32.74	25.44	25.7
FRC	I	Diffusion Tube	100%	100%	29.50	32.6	34.34	33.66	31.92
SLHRS	R	Diffusion Tube	N/A	N/A	30.21	28.12	29.45	Site Ended 12/2013	Site Ended 12/2013
ETRS	R	Diffusion Tube	N/A	N/A	27.75	31.46	28.35	Site Ended 12/2013	Site Ended 12/2013
TILA	R	Diffusion Tube	100%	100%	32.3	**43.15**	**40.32**	39.79	37.75
TILB	R	Diffusion Tube	100%	100%	**40.44**	**42.64**	**42.03**	39.25	37.96
TILC	R	Diffusion Tube	83%	83%	38.64	**43.83**	**40.39**	37.44	34.13

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3)				
					2011	2012	2013	2014	2015
TILD	R	Diffusion Tube	100%	100%	33.52	39.09	38.08	33.53	32.55
TILE	R	Diffusion Tube	100%	100%	33.12	36.9	35.26	35.46	33.14
TK4 (A&B)	R	Diffusion Tube	100%	100%	31.54	36.06	32.79	30.72	30.86
PBP	R	Diffusion Tube	92%	92%	(<75%) **41.96**	**41.11**	**40.69**	38.09	37.00
PBPA	R	Diffusion Tube	100%	100%	No Data	No Data	No Data	35.66	32.93
LYD	UB	Diffusion Tube	92%	92%	No Data	35.97	34.42	34.11	30.94
AVSL	R	Diffusion Tube	92%	92%	No Data	**46.99**	**45.15**	**45.43**	**42.27**
AVHS	R	Diffusion Tube	92%	92%	No Data	(<75%) 38.96	39.41	38.5	37.51
SOAA	R	Diffusion Tube	100%	100%	No Data	32.01	33.03	32.68	31.31
TSR	UB	Diffusion Tube	100%	100%	No Data	33.27	31.88	26.87	28.65
DR	R	Diffusion Tube	100%	100%	No Data	(<75%) 30.93	29.79	32.91	30.01
LRARN	R	Diffusion Tube	100%	100%	30.46	34.26	33.93	34.73	32.81
LRARS	R	Diffusion Tube	100%	100%	28.62	31.55	30	32.6	27.73
LRARMN	R	Diffusion Tube	100%	100%	No Data	(<75%) **44.52**	**44.51**	**43.39**	38.10
LRARMS	R	Diffusion Tube	100%	100%	No Data	(<75%) 39.35	38.79	39.67	33.87
JRP	UB	Diffusion Tube	100%	100%	No Data	No Data	No Data	No Data	27.25

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

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

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

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

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

Figure 1: Rolling Annual Mean for NO_2 (automatic monitoring sites)

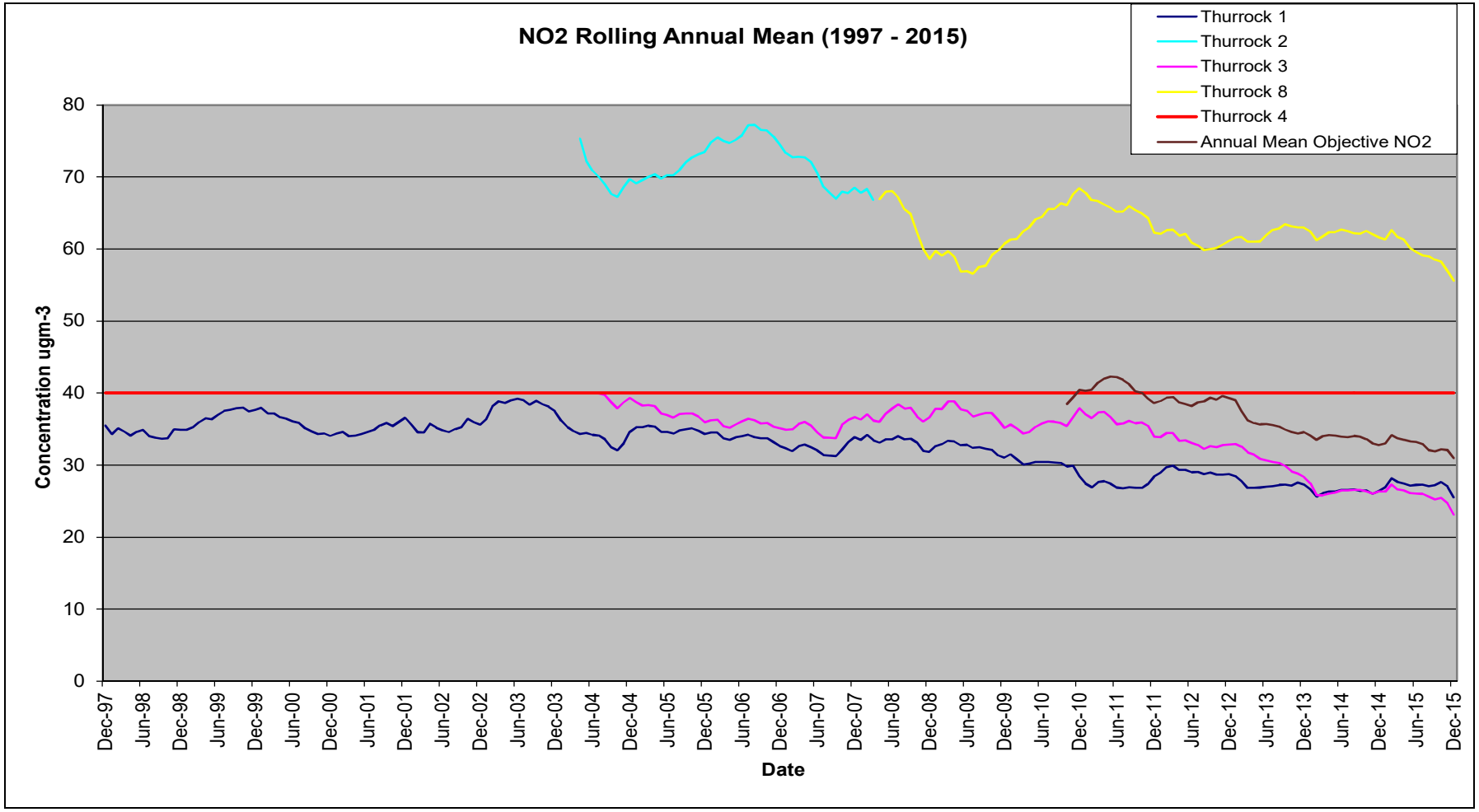


Figure 2: Rolling Annual Mean for NO_x (automatic monitoring sites)

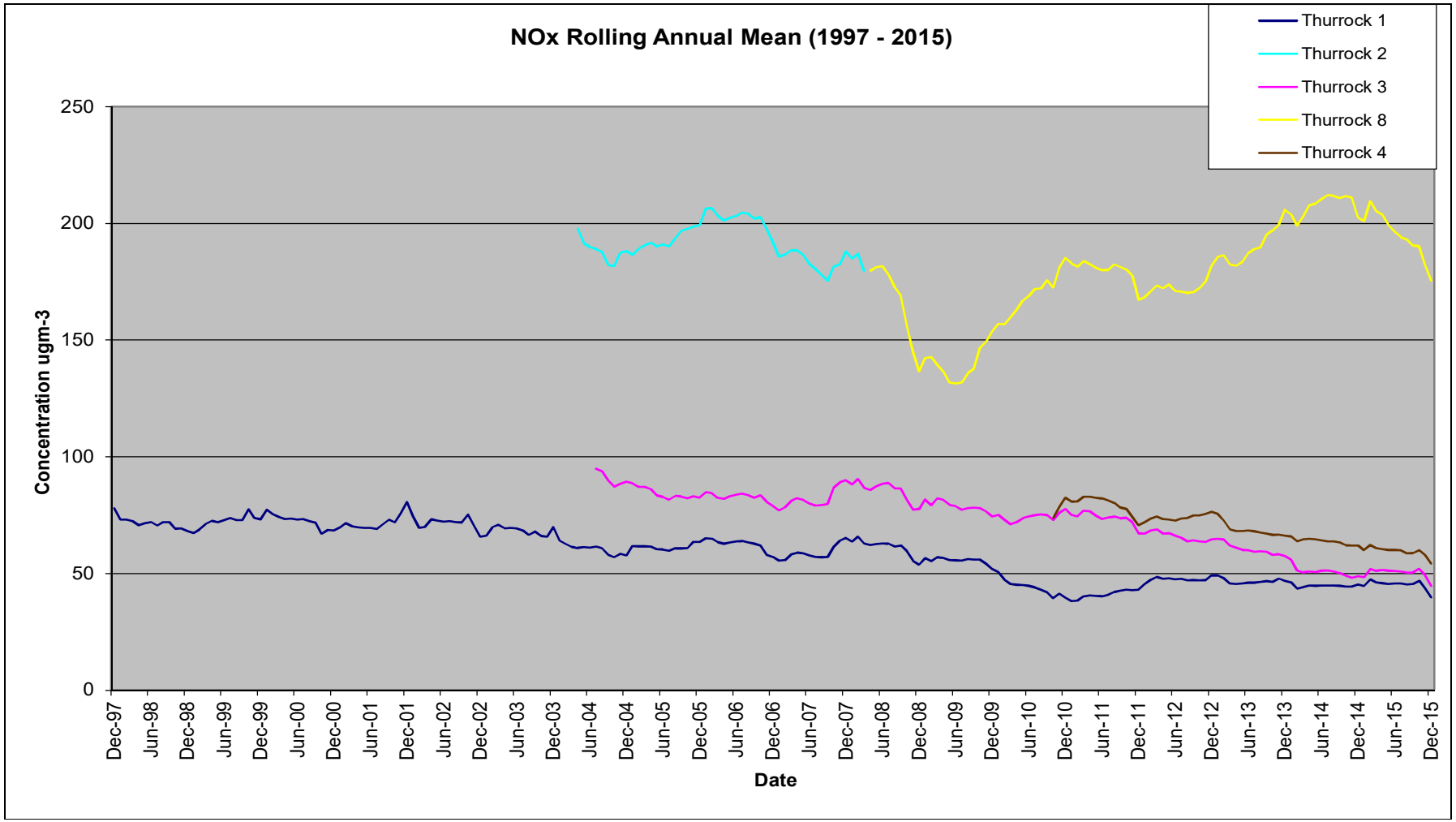


Figure 3: Rolling Annual Mean for % NO_2 of NO_x (automatic monitoring sites)

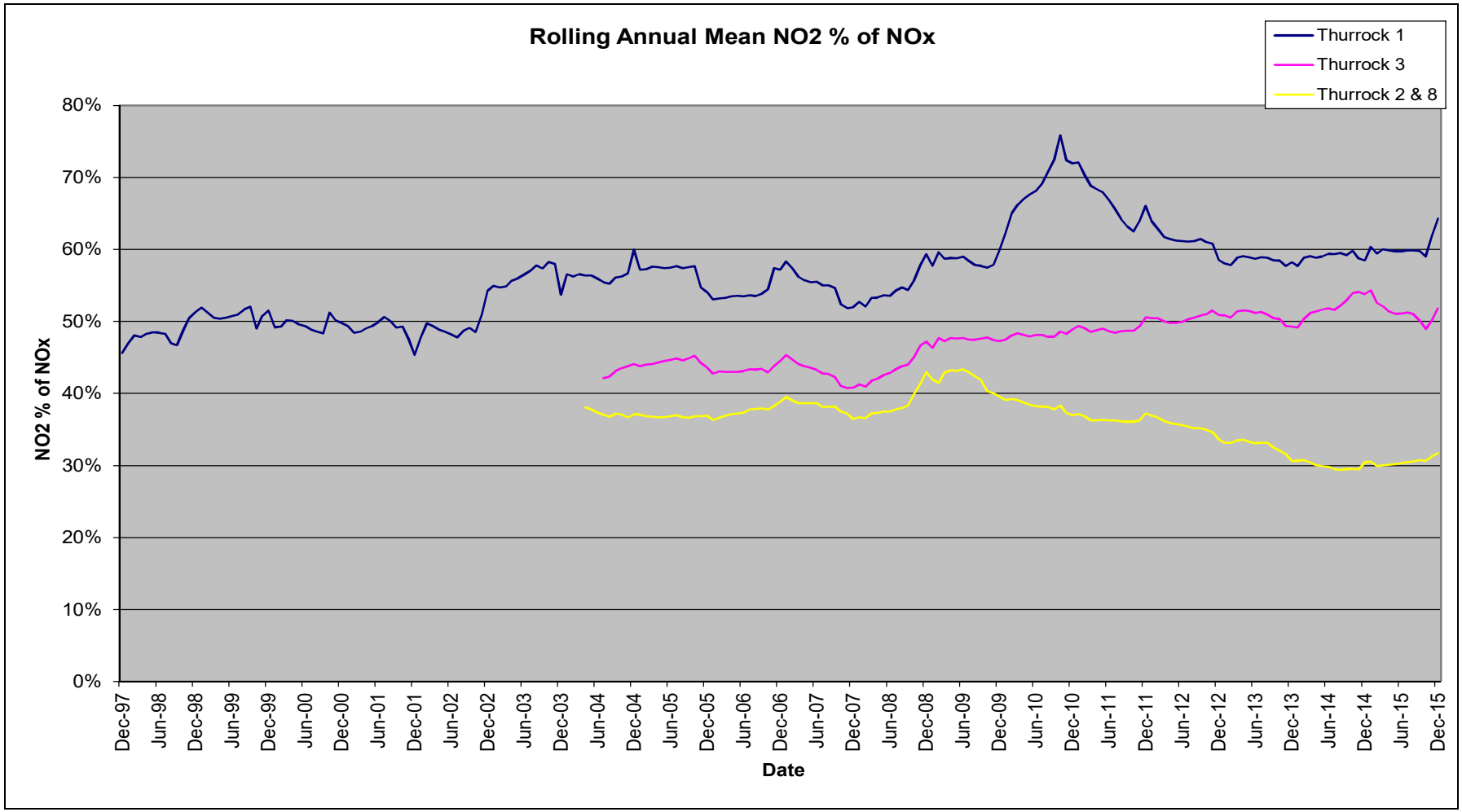


Table A.4 – 1-Hour Mean NO_2 Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2011	2012	2013	2014	2015
Thurrock 1	Urban Background	Automatic	99%	99%	0 (97.1)	0	0	0	0
Thurrock 3	Roadside	Automatic	98.9%	98.9%	0	0	0	0	0
Thurrock 4	Roadside	Automatic	98.9%	98.9%	0	0	0	0	0
Thurrock 8	Roadside	Automatic	89.5%	89.5%	4	7 (181)	5	5	0

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

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

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

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

Table A.5 – Annual Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM_{10} Annual Mean Concentration (µg/m^3) (3)				
				2011	2012	2013	2014	2015
Thurrock 1	Urban Background	98.3	98.3	24.85	17.65	19.16	19.28	17.08
Thurrock 3	Roadside	66.59	66.59	23.37	(1)22.57	24.33	19.76	16.98 (3)(17.14)
Thurrock 8	Roadside	98.85	98.85	27.71	23.91	27.43	26.83	24.87

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

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

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

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 4: Rolling Annual Mean for PM_{10} (automatic monitoring sites)

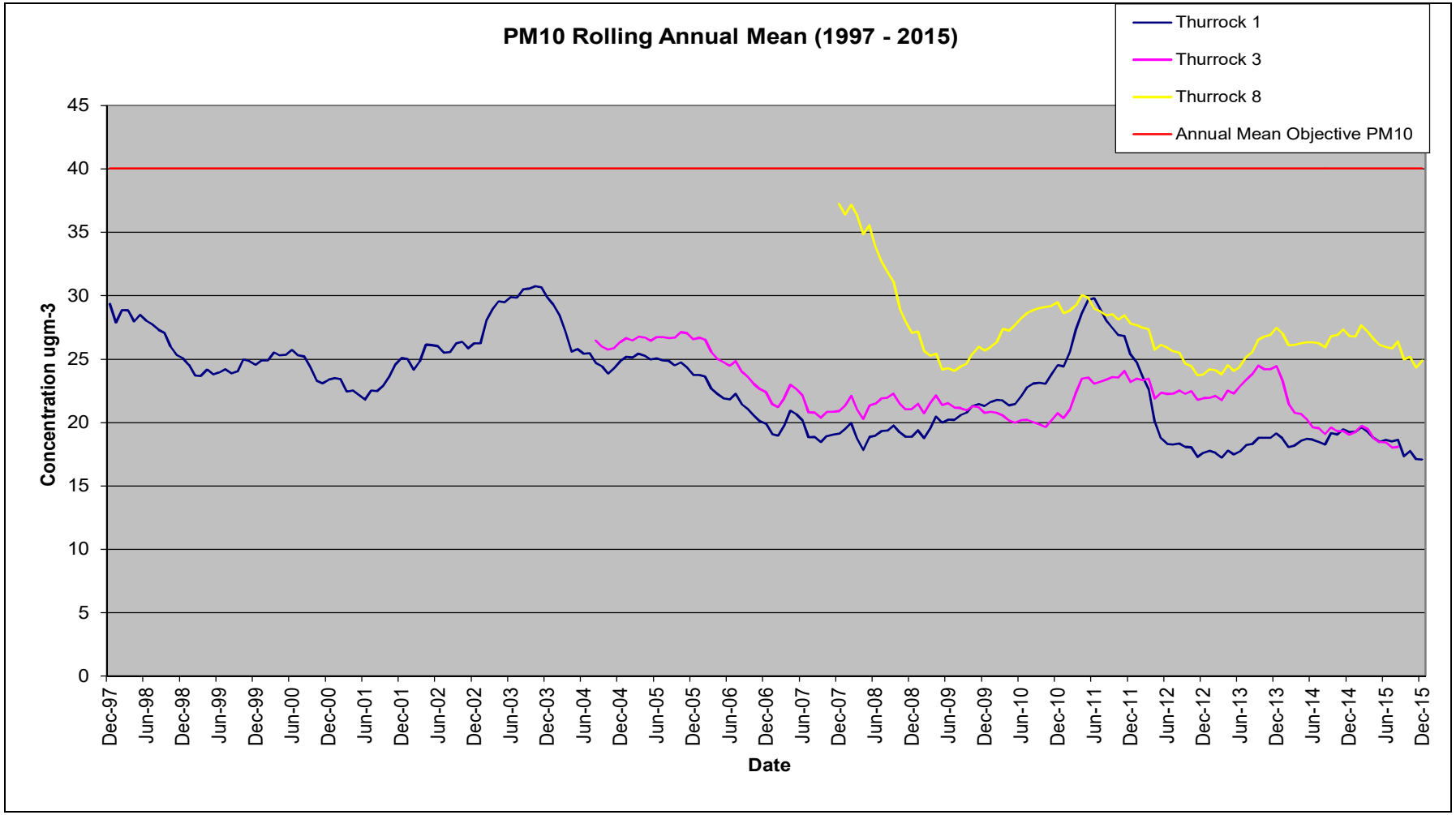


Table A.6 – 24-Hour Mean PM_{10} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	PM_{10} 24-Hour Means > 50µg/m^3 (3)				
				2011	2012	2013	2014	2015
Thurrock 1	Urban Background	98.3	98.3	25	10	4	11	2
Thurrock 3	Roadside	66.59	66.59	18	14 (3)(43)	16	9	2 (3)(29.5)
Thurrock 8	Roadside	98.85	98.85	24	14	21	22	22

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

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

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

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

Figure 5: Rolling Daily Mean Exceedences for PM_{10} (automatic monitoring sites)

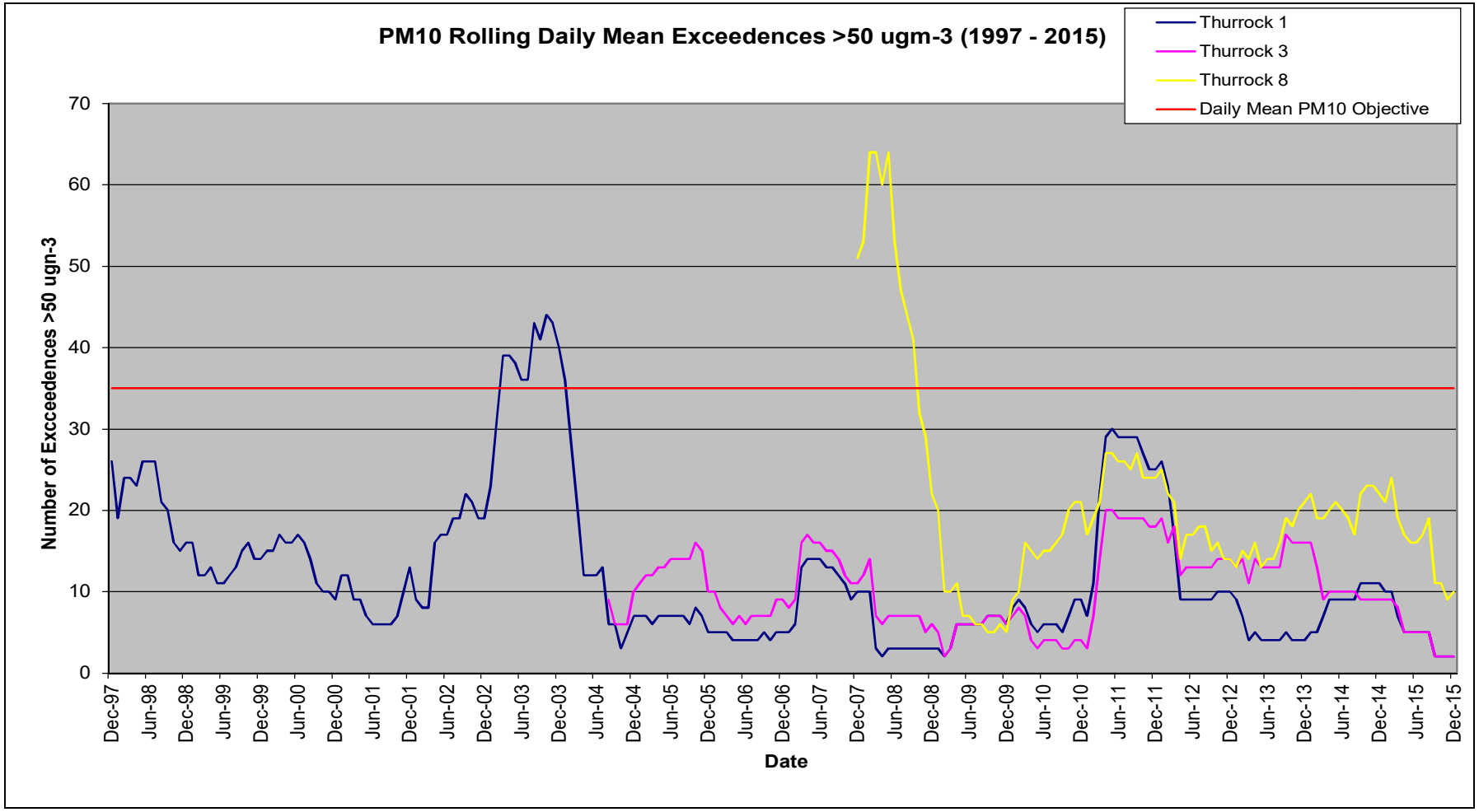


Table A.7 – $PM_{2.5}$ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	$PM_{2.5}$ Annual Mean Concentration ($\mu g/m^3$) (3)				
				2011	2012	2013	2014	2015
Thurrock 3	Roadside	95.34	95.34	17.93	15.25	14.07	14.23	10.06

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

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

(3) All means have been "annualised" as per Technical Guidance LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 6: Rolling Annual Mean for $PM_{2.5}$ (automatic monitoring sites)

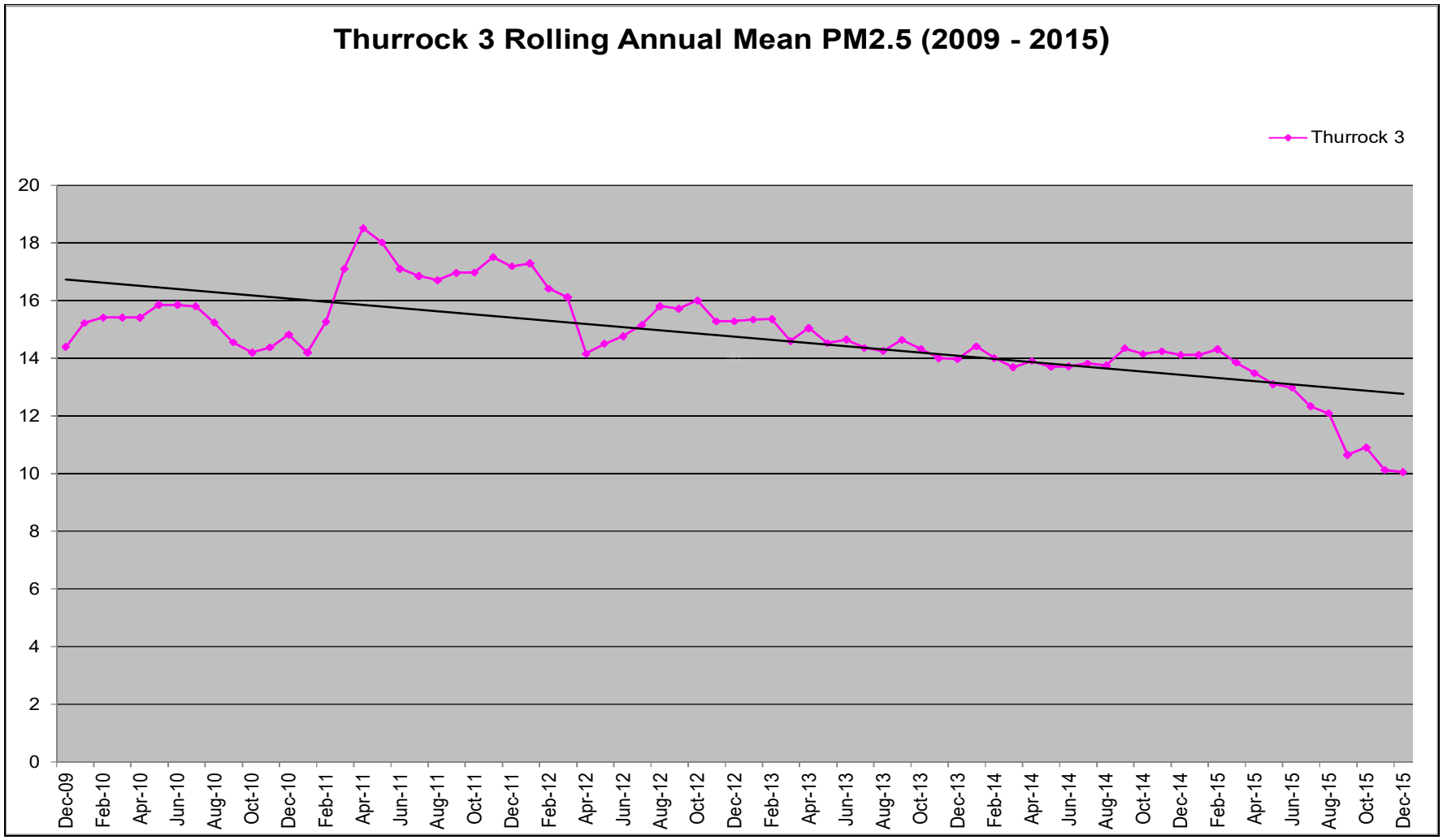


Table A.8 – SO_2 Monitoring Results

Site ID	Site Type	Valid Data Capture for monitoring Period (%) (1)	Valid Data Capture 2015 (%) (2)	Number of Exceedances (percentile in bracket) (3)		
				15-minute Objective (266 µg/m^3)	1-hour Objective (350 µg/m^3)	24-hour Objective (125 µg/m^3)
Thurrock 1	Urban Background	77.19	77.19	0	0	0
Thurrock 4	Roadside	84.67	84.67	0	0	0

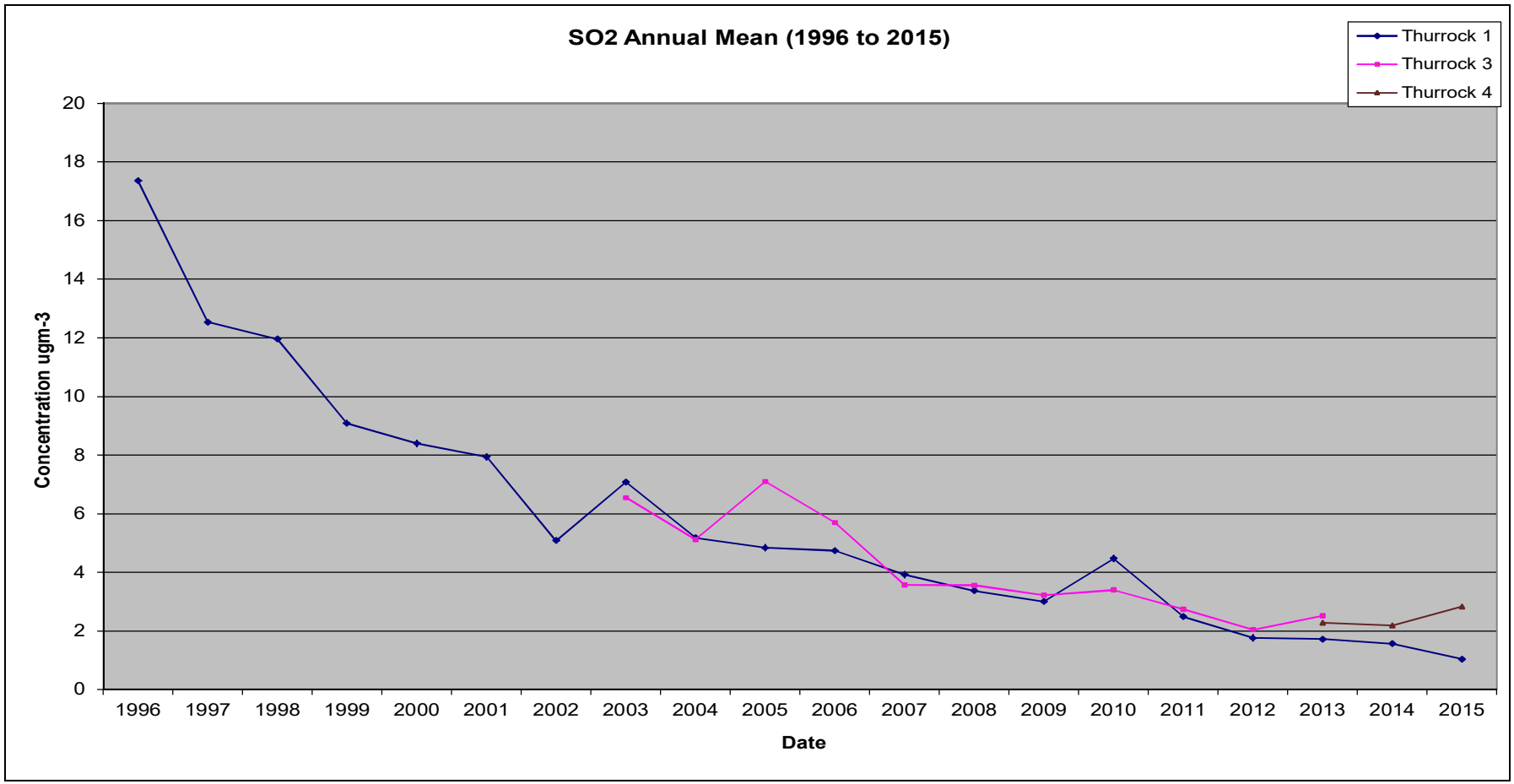
Notes: Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year)

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

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

(3) If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

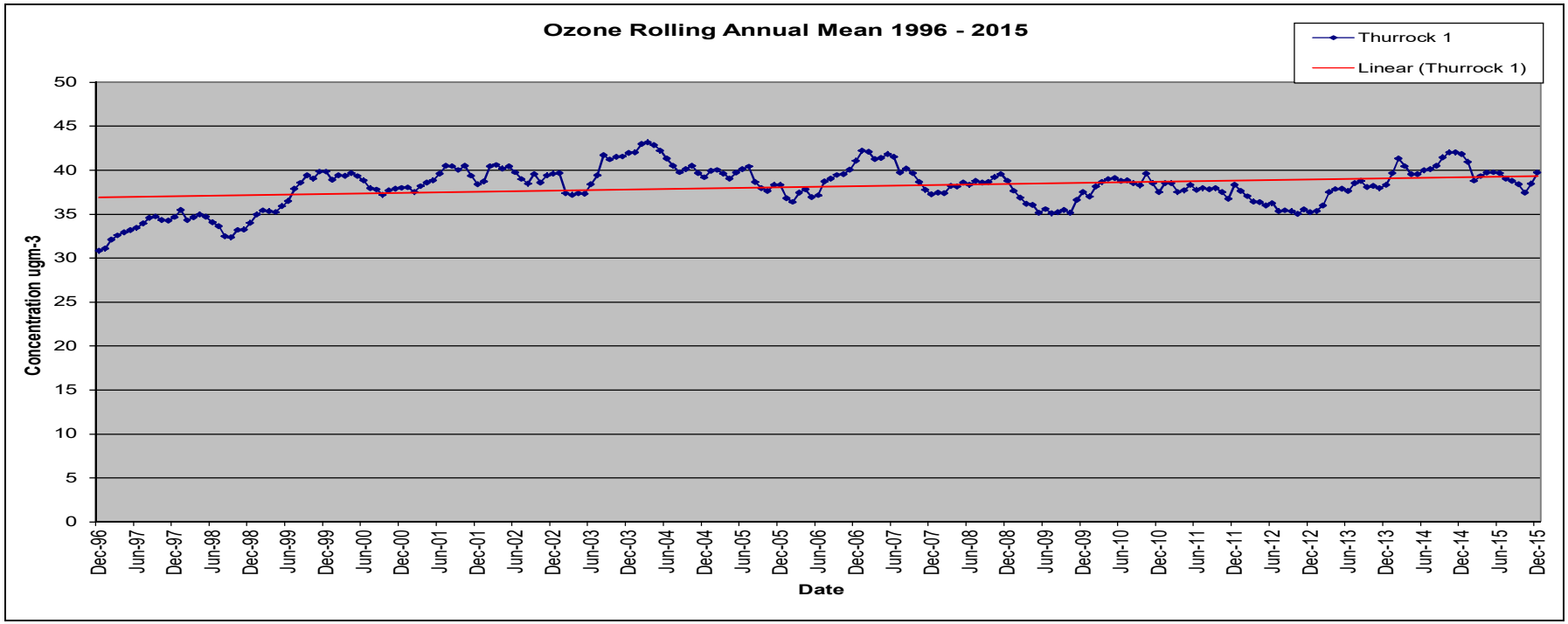
Figure 7: Annual Mean for SO_2 (automatic monitoring sites)



Ozone (O_3) Monitoring

	2010	2011	2012	2013	2014	2015
No Exceedences of the Daily Maximum 100 ug/m-3	7	11	8	5	3	4
Annual Mean	38	38	36	38	42	42
Annual mean Daily Max 8-hr	55	56	52	55	60	59
Air Quality Strategy Obj: Daily max 8-hr running mean 100 ug/m-3 on more than 10 days	0	11	0	0	0	0

Figure 8: Rolling Annual Mean for O_3 (automatic monitoring sites)



Appendix B: Full Monthly Diffusion Tube Results for 2015

Table B.1 – NO_2 Monthly Diffusion Tube Results - 2015

Site ID	NO_2 Mean Concentrations ($\mu g/m^3$)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
LRAR	**50.86**	**64.71**	**47.70**	**50.91**	**45.01**	**56.78**	**47.20**	**51.70**	**60.27**	**62.48**	N/D	36.05	**57.86**	**52.15**
PRS	**43.73**	36.83	35.13	33.26	27.05	26.96	30.18	31.66	31.23	**44.97**	25.74	35.19	36.81	33.5
WC	**46.27**	39.93	**40.91**	37.38	36.04	N/D	37.80	27.65	38.47	**44.41**	39.14	36.43	**42.4**	38.58
JC	**62.02**	**51.41**	**51.20**	**51.45**	**46.64**	**53.63**	**46.27**	**54.16**	**58.67**	**62.78**	**56.33**	**46.62**	**58.72**	**53.43**
IBIS	**54.33**	**54.43**	**51.25**	39.02	**56.31**	**50.71**	N/D	**51.96**	N/D	N/D	**60.47**	**55.39**	**57.86**	**52.65**
GDSO	39.18	35.63	25.39	23.16	24.07	17.79	25.48	26.03	26.53	27.50	31.35	31.62	30.56	27.81
LT	**69.86**	**49.71**	**53.45**	**40.60**	**47.22**	**57.71**	**50.26**	33.95	**59.11**	**59.44**	**72.30**	35.09	**57.58**	**52.39**
KCNO	**48.88**	39.99	36.37	29.27	33.74	33.51	36.95	31.97	31.19	32.01	26.60	29.86	37.58	34.19
WT	**47.32**	**42.07**	39.18	30.47	39.33	38.43	**42.13**	31.85	35.13	**42.35**	**40.75**	35.44	**42.53**	38.7
HR	**41.02**	34.98	27.35	26.62	27.52	27.92	29.18	28.18	28.14	33.68	31.79	26.34	33.22	30.23
NAS2	**68.16**	**46.53**	**50.56**	**48.13**	**49.86**	**49.11**	**52.53**	39.59	**57.73**	**48.26**	**44.45**	**48.38**	**55.25**	**50.27**
LRSS	**46.55**	**44.38**	38.61	39.59	**44.84**	**47.79**	**45.23**	34.34	37.79	**48.23**	31.33	27.13	**44.49**	**40.48**
LRG	**46.35**	39.28	34.95	34.22	37.02	**43.65**	35.95	33.41	39.26	39.75	29.19	N/D	**41.26**	37.55
ER	**79.72**	**51.38**	**46.37**	**56.46**	**50.97**	**44.83**	**41.92**	**50.61**	**55.82**	**61.34**	**46.55**	**49.27**	**58.17**	**52.94**
PS	34.19	32.27	26.58	21.93	21.32	21.37	20.98	20.82	23.62	25.79	22.83	20.84	26.79	24.92
HL	**44.97**	37.35	32.91	29.56	26.15	17.35	26.14	29.80	32.15	35.58	34.81	29.08	34.42	31.32
NAS1	34.53	31.52	26.86	28.94	28.99	29.83	29.08	30.17	31.78	35.78	26.85	26.34	33.03	30.06
CR	**47.44**	34.56	27.95	28.00	29.42	31.06	29.30	30.63	32.61	39.17	33.18	29.57	35.98	32.74
SRG	36.75	31.15	24.61	20.94	22.47	21.76	22.61	21.52	21.69	29.26	23.80	22.43	30.66	27.9

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
NAS3	28.44	26.45	23.05	18.58	16.38	18.93	17.22	18.10	20.24	24.32	22.64	18.23	23.13	21.05
WES	38.38	36.82	27.22	27.45	27.95	29.16	27.96	24.04	28.56	35.72	31.03	23.92	32.8	29.85
B	27.55	18.22	16.03	14.60	14.06	14.06	13.40	14.32	14.72	16.78	N/D	15.09	17.86	16.26
TL	**45.10**	33.60	28.64	29.51	29.88	28.82	32.81	N/D	29.87	34.13	29.67	29.55	35.12	31.96
PKSL	34.59	34.38	28.07	25.91	29.05	27.03	24.20	22.59	25.72	35.42	25.82	23.53	30.8	28.02
SL	36.75	31.15	24.61	20.94	22.47	21.76	22.61	21.52	21.69	29.26	23.80	22.43	27.38	24.92
M	35.66	31.20	27.23	25.42	23.72	24.62	22.43	21.37	26.61	29.12	22.20	18.76	28.24	25.7
FRC	**44.64**	35.58	31.82	29.81	28.65	28.96	26.29	22.97	32.00	38.69	34.43	29.19	35.07	31.92
TILA	**50.91**	**44.57**	34.21	28.91	39.85	36.10	**41.67**	32.24	31.28	35.55	**41.14**	36.59	**41.48**	37.75
TILB	**45.96**	39.95	**42.36**	31.87	36.34	37.53	39.75	26.71	36.24	**42.12**	34.13	**42.58**	**41.71**	37.96
TILC	N/D	30.18	33.12	30.43	35.10	36.59	27.96	N/D	33.50	37.49	38.16	38.78	37.51	34.13
TILD	39.81	37.90	30.30	27.99	33.01	34.13	31.66	29.15	31.23	32.10	33.64	29.70	35.77	32.55
TILE	**40.65**	37.39	31.15	29.43	34.46	28.88	35.76	30.90	26.81	34.05	35.49	32.66	36.41	33.14
TK4 (A&B)	37.74	32.21	29.82	29.82	29.91	30.34	29.80	27.59	27.91	33.02	31.24	30.91	33.91	30.86
PBP	**48.64**	**42.58**	**44.87**	32.31	32.36	30.58	34.94	31.97	N/D	**41.78**	36.35	30.65	**40.66**	37.00
PBPA	**41.15**	37.89	32.10	34.26	28.36	24.38	30.20	34.02	36.36	37.27	33.87	25.29	36.19	32.93
LYD	39.14	36.03	31.98	22.37	27.65	31.37	29.94	30.49	N/D	31.46	31.36	28.58	34.00	30.94
AVSL	36.78	**43.15**	39.72	N/D	39.30	**41.57**	**44.02**	**42.32**	**44.34**	**48.88**	**43.74**	**41.14**	**46.45**	**42.27**
AVHS	**40.29**	35.23	39.11	38.14	N/D	36.86	33.47	39.30	**41.22**	**44.60**	32.56	31.86	**41.22**	37.51
SOAA	37.55	38.77	32.54	32.67	24.48	26.98	26.63	32.34	27.83	37.36	28.93	29.68	34.41	31.31
TSR	31.72	30.86	31.46	24.87	28.16	28.03	26.86	25.92	25.46	30.20	30.87	29.34	31.48	28.65
DR	**41.58**	34.37	29.51	26.49	26.45	27.86	26.88	28.53	27.24	32.84	31.85	26.50	32.98	30.01
LRARN	**47.73**	39.58	29.72	31.65	31.70	26.95	35.29	33.26	28.65	33.07	28.78	27.34	36.05	32.81
LRARS	**40.39**	33.20	27.95	26.64	25.03	24.96	29.41	27.03	25.81	21.33	26.37	24.58	30.47	27.73

Site ID	NO_2 Mean Concentrations (µg/m^3)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean	
													Raw Data	Bias Adjusted (1)
LRARMN	**55.11**	**48.25**	39.78	25.71	32.76	33.57	39.19	37.90	36.87	**43.87**	32.39	31.81	**41.87**	38.10
LRARMS	**49.48**	39.66	32.63	29.94	30.46	32.66	24.94	25.96	36.88	**45.04**	32.59	26.21	37.22	33.87
JRP	35.44	31.94	29.06	28.50	22.21	21.54	21.22	27.14	29.05	35.52	21.35	24.01	29.94	27.25

(1) See Appendix C for details on bias adjustment

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

Data Annualised Calculation Factor for PM10 for Thurrock 3 Stanford le-Hope Roadside site for 2015

annualised factor calculation (Annual Mean)

site	annual mean 2015	period mean	Ratio
A (TK1, Thurrock)	17.08	17.31	0.986713
B (BX1, Slade Green, Bexley)	13.59	13.25	1.02566
C (RB7, Ley Street, Redbridge)	18.85	18.14	1.03914
D (SK6, Elephant & Castle, Southwark)	23.91	24.27	0.985167
		average Ratio =	**1.00917**

(Annual mean 2015 x Ratio = Annualised mean)	Annual mean	Ratio	Annualised result
TK3 (Stanford Le-Hope)	16.98	**1.00917**	**17.14**

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 Thurrock 1, Grays AURN site, the QA/QC is managed by Bureau Veritas (BV) and by Ricardo AEA, the site Audits are conducted by Ricardo AEA. Service contracts do vary, all the gas analysers are maintained by Enviro Technology, and the PM_{10} FDMs is maintained by Air Quality Monitors.

For Thurrock 3, Stanford-le-Hope site, this is an affiliated site on the AURN network and is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London (KCL), the site Audits are conducted by Ricardo AEA. The Service contracts are managed by Enviro Technology.

For Thurrock 4, Tilbury site, this is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London (KCL). The site Audits are conducted by Ricardo AEA. The Service contracts are managed by Enviro Technology.

For Thurrock 8, Purfleet site, this is also part of the London Air Quality Network (LAQN). The QA/QC is managed by Environmental Research Group (ERG) at King College London

(KCL). The site Audits are conducted by the National Physical Laboratory (NPL). The Service contracts are managed by Enviro Technology.

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

QA/QC of Diffusion Tube Monitoring

Diffusion Tube studies for Gradko analysis using 20% TEA in water over 2012 demonstrated overall Good Precision
http://laqm.defra.gov.uk/documents/Tube_Precision_2015_version_03_15-Final.pdf

http://laqm.defra.gov.uk/documents/LAQM-AIR-PT-Rounds-1-12-(April-2014-February-2016)-NO2-report.pdf

Appendix D: Map(s) of Monitoring Locations

Figure 9: NO_2 Diffusion Tube Locations (West Thurrock)

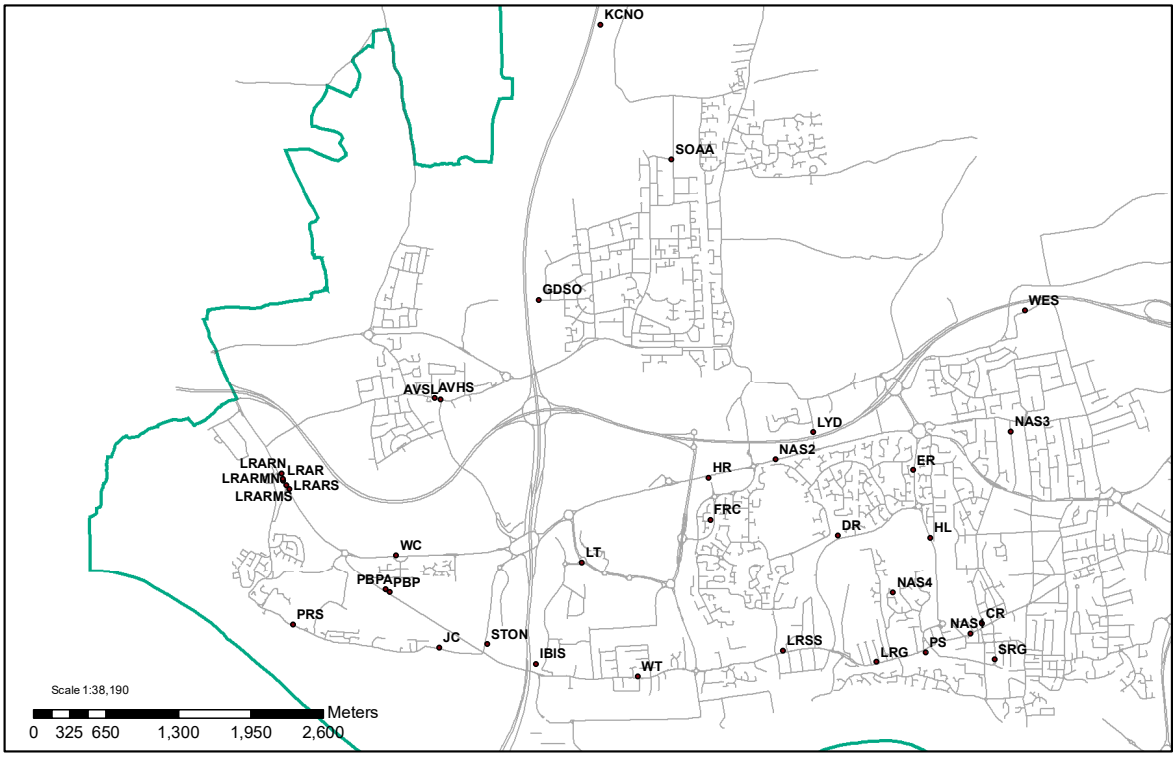


Figure 10: NO_2 Diffusion Tube Locations (East Thurrock)

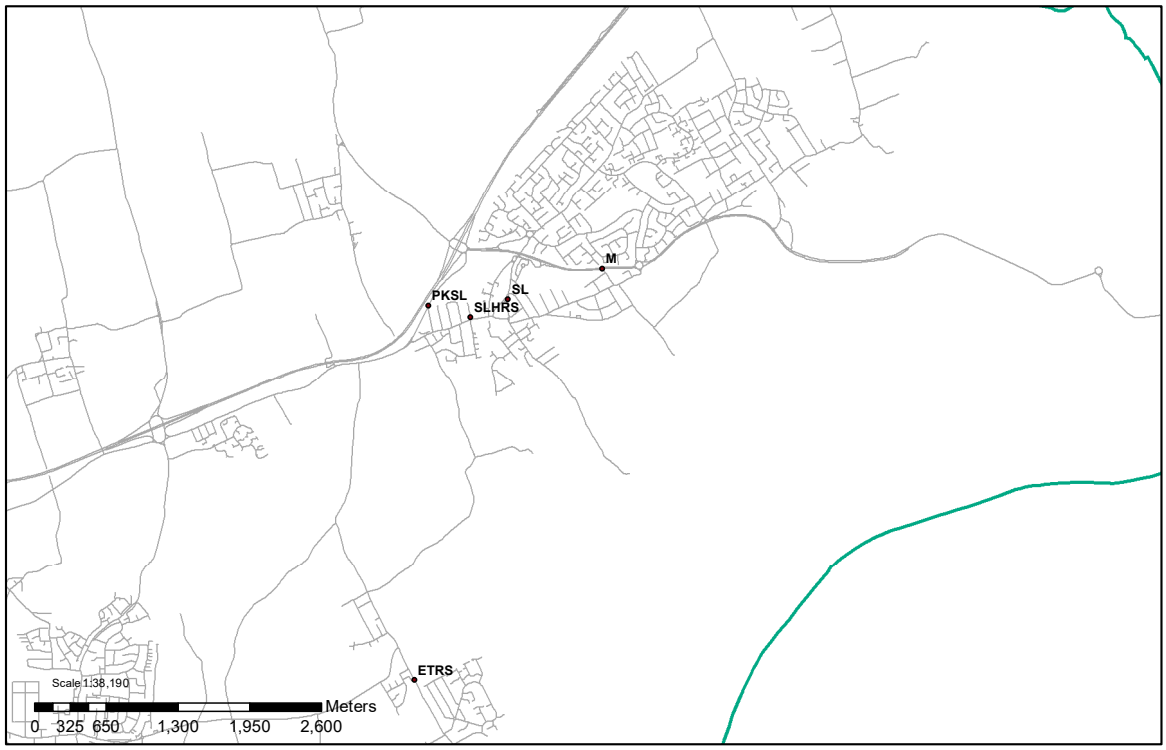


Figure 11: NO_2 Diffusion Tube Locations (Tilbury)

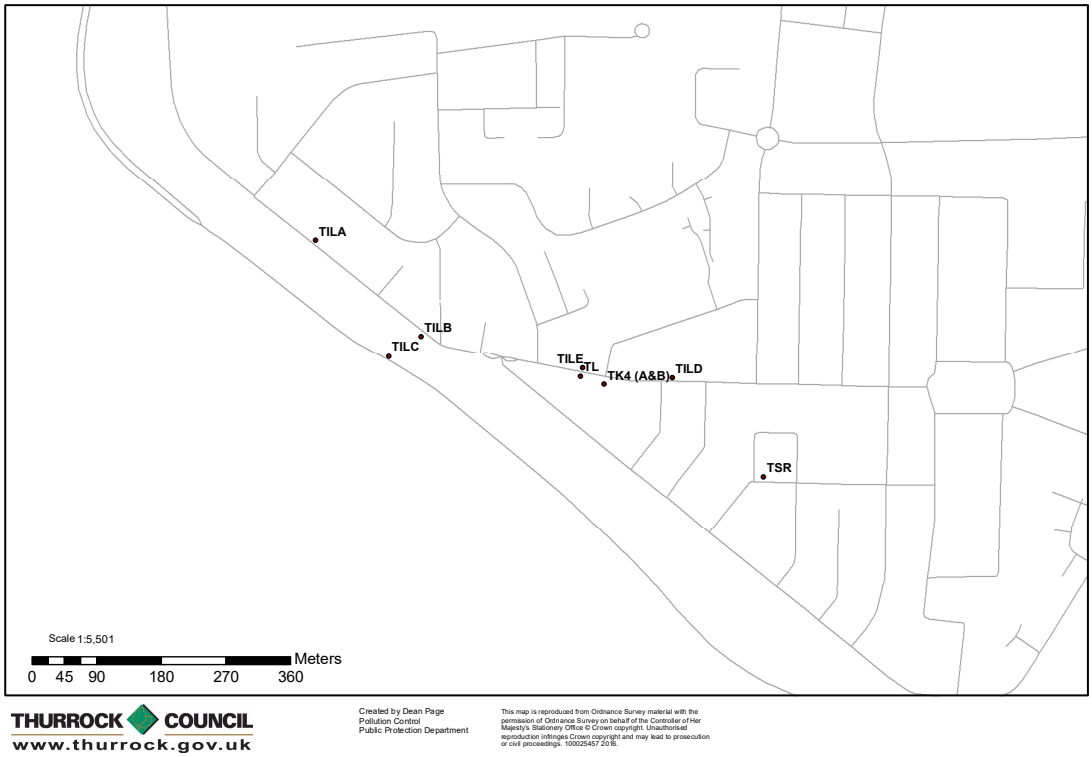
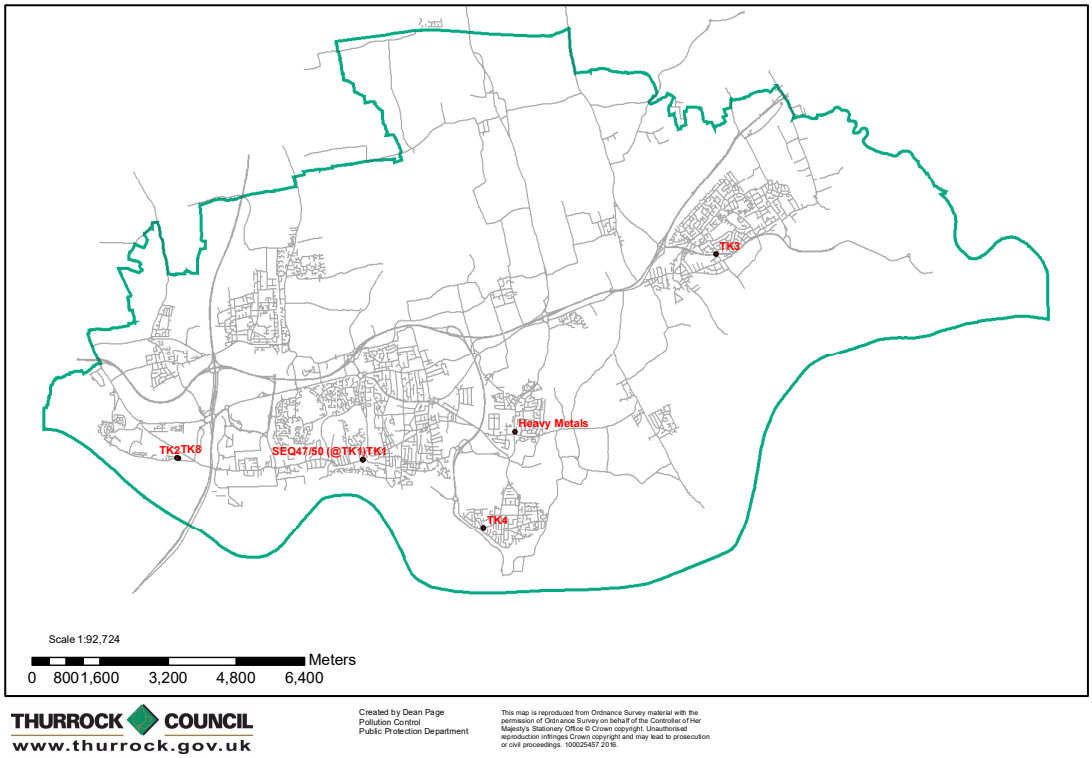


Figure 12: Automatic Monitoring sites location (Thurrock)



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[4]	
	Concentration	Measured as
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350 µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
	125 µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
	266 µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

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

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Air quality Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide
AURN	Automatic Urban & Rural Network
LAQN	London Air Quality network
ERG	Environmental Research Group
KCL	Kings College London

O_3	Ozone
ADMS	Advanced Dispersion Model/s
IPPC	Integrated Pollution Prevention & Control
LA-IPPC	Local Authority - Integrated Pollution Prevention & Control
AQSD	Air Quality Strategy Document
NPL	National Physical Laboratory

References

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Thurrock (2016). - Air Quality & Health Strategy, 2016