2019 Air Quality Annual Status Report (ASR)

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

November 2019

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Executive Summary: Air Quality in Our Area

Air Quality in East Suffolk 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 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].

In May 2018 an Order was made by Parliament to create the new East Suffolk Council (encompassing both Suffolk Coastal and Waveney District Council) and this came into existence on 1 April 2019. This is the first Annual Status Report (ASR) for East Suffolk Council.

Generally, the air quality within East Suffolk is good. There are two small localised areas where the objective for annual mean nitrogen dioxide (NO_2) has been exceeded in the past, and Air Quality Management Areas (AQMAs) are currently declared;

- Several houses on the road junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge (Woodbridge Junction).
- Four residential properties within Long Row, Main Road (A12) in Stratford St Andrew.

Each AQMA is discussed briefly overleaf, with more detail provided in Chapter 2.

The main source of emissions within East Suffolk is road traffic which means that the pollutants of concern are nitrogen dioxide (NO_2) and particulate matter. Within the town of Felixstowe emissions from, and associated with, the Port are also a source of these two pollutants.

[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

NO_2 is measured in the district by automatic analyser and diffusion tubes. There is an automatic analyser situated within Woodbridge, and 74 diffusion tube monitoring locations covering 17 areas; Felixstowe, the Trimleys, Kesgrave, Melton, Woodbridge, Martlesham, Little Glemham, Farnham, Stratford St. Andrew, Saxmundham, Leiston, Eyke, Lowestoft, Carlton Colville, Oulton Broad, Beccles and Bungay.

The 2018 monitoring results show **no** relevant receptor location where NO_2 is above the annual mean objective.

To improve the accuracy of data collection, a number of triplicate and duplicate sets of diffusion tubes are reported along with a number of new monitoring locations in the district. NO_2 concentrations within both declared AQMAs are within the objective in 2018, Stratford St Andrew for the second year running and Woodbridge for the fifth year running. There is a general trend of NO_2 reductions across the district over time. Of the 74 locations monitored, only 9 sites showed a slight increase from 2017 results, but all were still well within the objective level. Other than three sites, the increases were less than 1.7µg/m^3. The FLX23 increase reflects an unusually low value for this site in 2017, and the DT2 and DT4 increase, when distance corrected to nearest relevant exposure are 18.8 µg/m^3 and 23.3µg/m^3 respectively. Looking at the dataset as a whole, the annual average appears to have been adversely impacted due to the cold still conditions in January.

Woodbridge AQMA

This AQMA was declared in 2006, further details can be seen at https://uk-air.defra.gov.uk/aqma/details?aqma_id=528 The current Action Plan includes 20 measures to reduce NO_2 concentrations from both queueing and moving traffic at this junction. Studies looking at the layout of the junction and the local weather, in particular the wind speed and direction, indicate that emissions from the junction are being ‘funnelled’ in the direction of Melton Hill away from the junction, and then

dispersed very slowly within the canyoned area of the AQMA. In light of these findings, many of the options in the original Action Plan are unlikely to have any significant impact on NO_2 levels. The Action Plan has therefore been updated, the draft approved by Defra and will shortly be put for public consultation.NO_2 concentrations within the AQMA have reduced since 2014 and have now been below the objective level for five years, with the average for 2018 of 32.8µg/m^3.

Stratford St Andrew AQMA

This AQMA was declared in 2014 and further details can be seen at https://uk-air.defra.gov.uk/aqma/details?aqma_id=1036

The Action Plan received Defra approval in March 2018 and consists of 2 short term, priority action measures and 6 longer term aspirational measures. http://www.eastsuffolk.gov.uk/assets/Environment/Environmental-Protection/Air-Quality/AQAP-Stratford-St.-Andrew-Final-November.pdf The main priority measure, for the County Council to move the 30/50mph change of speed limit sign further south out of the village was undertaken in December 2017. NO_2 concentrations fell below the objective for the first time in 2017 (39µg/m^3), and again in 2018 (37.7µg/m^3). Monitoring is being undertaken to determine average vehicle speeds. There is a general trend of reducing concentrations over time.

In order to fulfil the council's statutory duties, ESC continues to retain one 0.4 full-time equivalent dedicated air quality officer within the Environmental Protection Team, with support from other members of the team undertaking air quality work, including responses to planning applications and pro-active campaigns for raising awareness. Links and contacts have been forged through the Suffolk Air Quality Group to allow partnership working with the following organisations:

- Suffolk local authorities;
- Suffolk County Council (Highways and Public Health);
- Highways England;
- Public Health England;
- The Environment Agency

- Steering Groups set up for the AQMAs allow close working with relevant Suffolk County Council Highways Officers and relevant local partners.

Actions to Improve Air Quality

There have been a number of actions undertaken during the last year to help reduce air quality emissions and/or provide information to aid us with our air quality plans. These are detailed in Chapter 2, and include the following highlights:

1. The air quality pages on the East Suffolk website have been updated, to reflect the month long program of initiatives which were delivered ahead of Clean Air Day on 20th June 2019: https://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/clean-air-day-20-june-2019/ The initiatives are summarised below:

- Running weekly anti-idling events outside local schools: Anti-idling events are a great way to engage with drivers, educate them about the impact of idling on local air quality, and encourage them to switch off their engines. Research has shown that idling events can decrease local air pollution levels in that particular area.

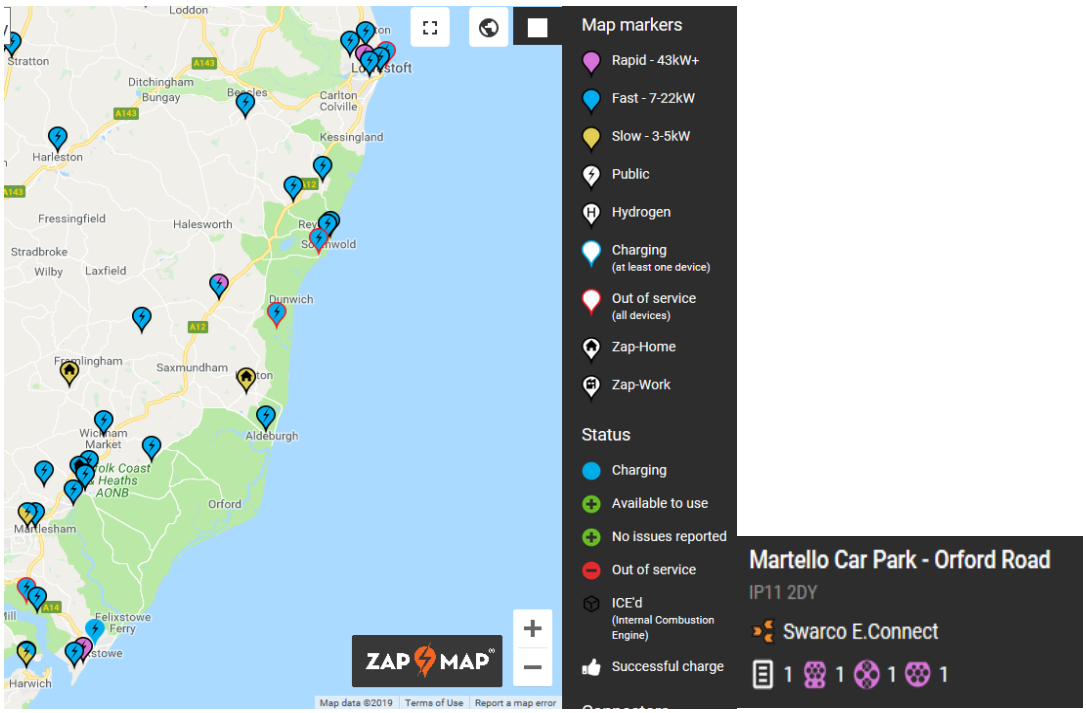
- Inviting Key Stage 2 pupils to participate in an Air Quality lesson at the Council offices, which they then delivered to their peers on Clean Air Day. They learned about bio-indicators of clean air, designed “Clean Air Super heroes” and made pledges to improve air quality in the district.

https://www.itv.com/news/anglia/2019-06-20/the-school-pupils-pledging-to-clean-up-the-air-we-breathe/

- Encouraging staff to make air quality pledges
- Running an awareness campaign about indoor air quality. The UK population spends up to 90% of its time indoors which means that the air we are most exposed to is inside our buildings. Ahead of Clean Air Day, Council staff completed a checklist with guidance on keeping air healthy within the home.

2. Assessment of all relevant planning applications for air quality by the Environmental Protection Team, including larger applications such as the application for a new highway crossing of Lake Lothing, Lowestoft, which will connect Riverside Road to the south of Lake Lothing with Peto Way to the north of Lake Lothing. The EP Team have also assessed and provided comment on the Sizewell C Power Station applications, and Windfarm applications from Scottish Power Renewables as they progress. We are working with both applicants to ensure that air quality is fully considered to our satisfaction within their DCO applications.

3. Installation of a rapid electric vehicle charging unit for public use in Felixstowe at Martello Park North, IP11 2EE, following a successful bid to Highways Agency.



Locations of electric vehicle charging points in ESC

4. Travel Plan guidance for Suffolk has been published by the County Council in conjunction with the district councils. https://www.suffolk.gov.uk/assets/Roads-and-transport/public-transport-and-transport-planning/Local-Links/26444-Suffolk-Travel-Plan-Guidance-V5-Web-Version-LR.pdf

5. Provision of information to the Public and commerce on reducing emissions from solid fuel and wood burning, including Ready to Burn campaign. https://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/biomass-and-wood-burning/wood-burning-are-you-ready-to-burn/

6. The Port at Felixstowe has taken delivery of 33 low emission ECO-Rubber Tyred Gantry (eRTG) Cranes to date. 34 container storage blocks have now been converted to provide electric power for e-capable RTGs. The Berth 9 yard redevelopment is now in the final stage of completion, 10 new blocks have been created, with 8 out of those 10 e-RTG capable. 42 RTGs have now been converted to electric (eRTG). 24 Internal Movement Vehicles (IMVs) were delivered in 2018, with 17 more planned for 2019. The new style internal movement vehicles are fitted with start stop technology and the latest EURO 6 class efficient engines. The port now has a fleet of 3 electric internal vehicles.

The new and upgraded equipment will reduce emissions of SO_2 NO_2 and particulates from Port activities.

7. The Port has implemented a campaign to reduce vehicle idling within its boundary which will help reduce port-side emissions of NO_2 and particulates.

8. The Suffolk Coastal Local Plan is currently at final draft stage, and it is anticipated that it will be adopted by December 2019. The Waveney Local Plan was adopted on 20 March 2019. The Local Plans which cover the ESC area, will seek to improve air quality not just in the two Air Quality Management Areas (AQMAs), but throughout the District. Development proposals will be expected to minimise and mitigate air pollution and to contribute towards the achievement of air quality objectives. An Air Quality Assessment may be required in support of any development proposals; this will be produced in accordance with the latest publication of EPUK & IAQM "Land-Use Planning and Development Control: Planning for Air Quality".

9. Urban Traffic Management Control (UTMC) system is now installed and working within Lowestoft. The connection of the bridge control system to the traffic signals control system was completed in summer 2018. The signals respond to the bridge and re-direct traffic accordingly. This allows different signal timings to be set to optimise traffic flow, not only at busy times, but to completely change the signal priorities when the Bascule Bridge lifts. This should help to reduce congestion and associated emissions.

Conclusions and Priorities

In 2018 NO_2 concentrations within the Woodbridge and Stratford St. Andrew AQMAs were below the objective, as were all monitored levels of NO_2 throughout the district. The Action Plan for Woodbridge has been updated, a draft approved by Defra and it will shortly be put out for public consultation.

Concentrations in the Stratford St. Andrew AQMA decreased further in 2018 and were below the annual mean NO_2 objective. The Action Plan is published and the

main measure within it to move the speed limit has been undertaken. Continued monitoring in 2019 will enable us to determine whether this has been successful.

The Sizewell C Power Station, Scottish Power Renewables offshore windfarm developments, the Lake Lothing 3rd crossing, and the Ipswich Northern Route developments will all have an impact on air quality. These offer opportunities for environmental improvements, but also present challenges in ensuring that the best health outcomes are delivered, and the DCO and planning permissions do, and will continue to, require considerable levels of resourcing by the team.

Priorities:

- To support sustainable growth as identified in the Local Plan and minimise the impact of National Infrastructure projects.
- To support the ports (Felixstowe and Lowestoft) to publish AQ action plans, once Defra release guidance later this year.
- Ensure that the new bridge and infrastructure at Lake Lothing is not detrimental to air quality elsewhere in Lowestoft. It is expected that the impact on air quality will be positive in Central Lowestoft. Our air quality monitoring will continue in this area and we are investigating the need for any additional monitoring sites.
- Assessment of NO_2 concentrations monitored in the vicinity of the Bascule Bridge to determine the impact of the UTMC in Lowestoft town centre and its connection to the bridge controls.
- Continued promotion and encouragement of a cultural shift from the use of motor vehicles to alternative forms of transport.
- Continue monitoring for NO_2 across the district to inform our air quality work and priorities.
- Continue to provide input for all relevant planning applications.
- Continue to raise the profile of electric vehicles and aid/promote installation of electric vehicle charge points within the district.
- Continue to raise the profile of air quality within our organisation, with other organisations, and with the public.

- Evaluate the possibility of producing an Air Quality Strategy for East Suffolk Council.
- Continue to address $PM_{2.5}$ by establishing a partnership and defining roles with the newly appointed Director of Public Health and Public Protection at Suffolk County Council
- Evaluation of Suffolk County Council's traffic data regarding the 1-week traffic trial in Woodbridge once it is received.
- Evaluation of NO_2 monitoring results and traffic speed survey at Stratford St. Andrew to determine effectiveness and whether any other Action Plan measures need to be developed further.
- Undertake further anti-idling events outside schools within East Suffolk.
- Investigate provision of additional educational air quality events with East Suffolk schools.

Local Engagement and How to get Involved

It is really important that we hear the views and comments of our residents, as your local knowledgeable is invaluable. We are working with a number of Town and Parish Councils to look at air quality concerns in their areas. We have recently updated the air quality pages on our website, and these should now be easier to navigate and include lots of air quality information.

If you would like to be more directly involved in environmental issues you may wish to join the East Suffolk Greenprint Forum . This group provides a link between public and voluntary organisations and community groups. It is a hub for community groups to share skills and experiences as well as acting to assist local environmental action in communities and organisations. It has successfully operated since 1996 and has approximately 200 members. The Greenprint Forum is facilitated by East Suffolk Council and is steered by representatives of local organisations including the Suffolk Coast & Heaths AONB, the East Suffolk Partnership and others.

The main source of air pollution in the district is traffic on our roads. We are currently meeting the air quality objectives set by the Government, but it will also require a concerted public effort with each person doing their bit to increase active travel and

reduce the use of the motor vehicle where possible. As well as reducing emissions, this will also help local residents to increase their fitness and health by choosing to walk or cycle more regularly. “Active Travel” is cleaner, cheaper and healthier for residents, offering a wide range of positive benefits. There is now also a Cycling Strategy for the whole of Suffolk produced by the County Council.

Following on from our successful anti-idling campaign leading up to Clean Air Day in June, we are looking to undertake further events in the 2019/20 school year. If you would like to volunteer to join us at these events, find out more here: http://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/anti-idling-campaign/

The www.greensuffolk.org/travel website has advice on all aspects of alternative greener travel options. Information is also supplied to aid businesses, developers and schools with constructing Travel Plans to suit their needs and free support and advice is available. Businesses may be eligible for up to 50% match funding towards the cost and installation of initiatives to support healthier and greener travel in the workplace.

You can obtain advice on safe cycling routes, download Suffolk cycle maps and find general supportive information on cycling at https://www.suffolkonboard.com/cycle/ In addition Sustrans, a charity devoted to promoting cycling as a healthier alternative form of transport, also provides useful information which is available on their website at https://www.sustrans.org.uk/ncn/map

We are working to improve the electric vehicle charging network within both districts and Suffolk. You could consider making your next car purchase an electric one and not only enjoy the economic saving, but also reduce your emissions. Details of local electric charging points can be found at www.zap-map.com/live/ and the site also gives general information about owning electric cars.

Even if you are not thinking of going electric, every driver can do their bit to help emission reduction through the practise of smarter driving. Information is available from the Energy Saving Trust Website via the link:

http://www.energysavingtrust.org.uk/travel . By driving '*smarter*' you can both save money and reduce harmful emissions to the atmosphere.

If you would like any further information on national air quality, including the latest news, air pollution forecasts, the latest measured levels and a summary, interactive monitoring, and general information about air pollution, consult the Defra website http://www.ukair.defra.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in East Suffolk District Council during 2018. 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.

In May 2018 an Order was made by Parliament to create the new East Suffolk Council (encompassing both Suffolk Coastal and Waveney District Council) and this came into existence on 1 April 2019. This is the first ASR for East Suffolk Council.

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 East Suffolk 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 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 compliance with the objectives.

A summary of AQMAs declared by East Suffolk 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=265 . Alternatively, see Appendix D: Maps of Monitoring Locations and AQMAs, which provides a map of air quality monitoring locations in relation to the AQMAs.

The Woodbridge AQMA was declared in 2006. The current Action Plan includes 20 measures to reduce NO_2 concentrations from both queueing and moving traffic at this junction. Studies looking at the layout of the junction and the local weather, in particular the wind speed and direction, indicate that emissions from the junction are being 'funnelled' in the direction of Melton Hill away from the junction, and then dispersed very slowly within the canyoned area of the AQMA. In light of these findings, many of the options in the original Action Plan are unlikely to have any significant impact on NO_2 levels. The Action Plan has therefore been updated, a draft approved by Department for Environment, Food and Rural Affairs (Defra), and will be put out for public consultation shortly. NO_2 concentrations within the AQMA have reduced since 2014 and have now been below the objective level for five years, with the average for 2018 being 32.8 µg/m^3.

The Stratford St Andrew AQMA was declared in 2014. The Action Plan received Defra approval in March 2018 and consists of 2 short term, priority action measures and 6 longer term aspirational measures.
http://www.eastsuffolk.gov.uk/assets/Environment/Environmental-Protection/Air-Quality/AQAP-Stratford-St.-Andrew-Final-November.pdf

The main priority measure, for the County Council to move the 30/50mph change of speed limit sign further south out of the village, was undertaken in December 2017. Monitoring is being undertaken to determine average vehicle speeds. NO_2 concentrations fell below the objective for the first time in 2017 (39 µg/m^3), and again in 2018 (37.7 µg/m^3).

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City / Town	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance (maximum monitored/modelled concentration at a location of relevant exposure)				Action Plan		
						At Declaration		Now		Name	Date of Publication	Link
Air Quality Management Area Order No. 1, 2006	03.04.06	NO2 Annual Mean	Woodbridge	An area encompassing a number of properties near the junction of Lime Kiln Quay Road, Thoroughfare and St. John's Street in Woodbridge	NO	48	µg/m3	32	µg/m3	Air Quality Action Plan for the Woodbridge Junction	2011	http://www.eastsuffolk.gov.uk/assets/Environment/Environmental-Protection/Air-Quality/FinalAirQualityActionPlanWoodbridgeFeb2011.pdf
Air Quality Management Area Order No. 3, 2014	18.06.14	NO2 Annual Mean	Stratford St. Andrew	The four properties situated within 1-5 Long Row, main Road (A12), in Stratford St. Andrew	NO	42	µg/m3	38	µg/m3	Air Quality Action Plan for Stratford St Andrew - Final	Mar-18	http://www.eastsuffolk.gov.uk/assets/Environment/Environmental-Protection/Air-Quality/AQAP-Stratford-St.-Andrew-Final-November.pdf

☒ **East Suffolk Council confirm the information on UK-Air regarding their AQMA(s) is up to date**

2.2 Progress and Impact of Measures to address Air Quality in East Suffolk Council

Defra's appraisal of last year's ASR concluded:

"That the implementation of AQAP measures and hard work from the Council has clearly resulted in improved local air quality. The AQAPs are fairly complete in presentation, containing detailed discussion of progress, barriers, completion dates, alongside containing a number of objective KPIs and reduction targets. Furthermore, measures are specific to each AQMA. This is considered an example of best practice".

and;

"Generally, this is a very good report, well written and acts as an excellent reference for concerned members of the public to better understand the actions and hard work the Council is doing to improve local air quality."

East Suffolk Council has taken forward a number of direct measures during the current reporting year of 2018 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2.

More detail on these measures can be found in their respective Action Plans, which can be viewed on the Council's website at;
http://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/air-quality-reports/

Key completed measures are:

- Measure ESC1: The Port at Felixstowe has taken delivery of 33 low emission ECO-Rubber Tyred Gantry (eRTG) Cranes
- Measure ESC 4: The Port at Felixstowe implemented an anti-idling campaign within the Port boundary.

- Measure ESC5: Electric vehicle trials at the Port of Felixstowe completed. Port now has a fleet of 3 electric vehicles.
- Measure ESC 12: Travel Plan guidance for Suffolk has been published by the County Council in conjunction with the district councils.
- Measure ESC 15: Installation of a rapid electric vehicle charging unit for public use in Felixstowe at Martello Park North, IP11 2EE, following a successful bid to Highways Agency.
- Measure ESC 22: Urban Traffic Management Control (UTMC) system is now installed, connected to the Bascule Bridge lifts and working within Lowestoft.
- Measure ESC 25: Adoption of the East Suffolk Council – Waveney Local Plan.
- In addition, significant engagement work was completed to support "Clean Air Day" on 20th June 2019.

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

- Measure ESC 8 and ESC 9: The Suffolk Coastal Local Plan will be published, with air quality guidance and sustainable travel encouraged and promoted within it.
- Measure ESC 11: Additional public promotion will be undertaken regarding emissions from domestic burning and how to reduce them.
- Measure WBG 15b / ESC 19: We will work closely with Suffolk County Council to increase participation of schools in travel plan schemes.
- Measure WBG 16: We will continue to promote cycling and walking in Woodbridge
- Measure ESC 28: Undertake further anti-idling events outside schools within East Suffolk.
- Measure ESC 29: Investigate provision of additional educational air quality events with East Suffolk schools.

East Suffolk Council's priorities for the coming year are:

- To support sustainable growth as identified in the Local Plan, and minimise the impact of large infrastructure projects, such as Sizewell C Power Station, the wind farm development by Scottish Power Renewables, the Lake Lothing 3rd crossing, and the Ipswich Northern Route.
- Continue to address $PM_{2.5}$ by establishing a partnership and defining roles with the Director of Public Health and Public Protection at Suffolk County Council.
- Look into producing an Air Quality Strategy for the district.
- Support the two Ports to publish Air Quality Action Plans in accordance with new Defra guidance.
- Undertake further anti-idling events outside schools within East Suffolk and investigate provision of additional educational air quality events for schools.

The principal challenges and barriers to implementation that East Suffolk Council anticipates facing are:

- Resourcing to ensure that the many DCOs and other significant developments within the district are fully assessed to ensure the best possible air quality improvements and health outcomes for ESC residents.
- Resourcing to ensure that non-statutory provisions such as awareness raising and supporting Active Travel measures are given sufficient priority.
- Uncertainty around Brexit and the implementation of a new Clean Air Act.

Progress on certain measures has been slower than expected due to reliance on organisations (such as Suffolk County Council) which have competing priorities, and this will continue to be a local challenge.

East Suffolk Council anticipates that the measures stated above and in Table 2.2 will continue to achieve compliance in both the Woodbridge and Stratford St. Andrew AQMAs.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Woodbridge Action Plan Measures											
WBG 3	Extension of restrictions to Thoroughfare (8am-6pm)	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Suffolk County Council, Woodbridge Town Council. Funding unknown possible bid for Community Infrastructure Levy (CIL) money in future	2013 - 2014	2014 - 2015 originally, now unknown but possibly 2020 for Town Council to enforce Thoroughfare restriction	Reduction in peak queue lengths on Melton Hill	Recent air quality modelling shows max reduction of 0.1µg/m3 in AQMA.	Feasibility study undertaken. Negligible impact on AQMA NO2 conc. so no further work will be undertaken by SCDC on this measure. Woodbridge Town Council wish to change the Traffic Regulation Order (TRO) for the Thoroughfare with stricter enforcement. 3 options currently being consulted on, one of which includes extension of restrictions. Measure to remain in updated Action Plan as 'aspirational' for Woodbridge Town Council.	Originally 2014 - 2015 Now possibly 2020 for Town Council to enforce restrictions once Decriminalisation Act in force.	Town Council wish to alter and enforce the TRO but unable to do so until decriminalisation act in force. See Measure 4 below for further detail. Police provided ticket enforcement for 1 day and number of restricted vehicles entering from 10am-4pm reduced from 160 to 110.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
WBG 17	Integration with Planning System	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	ESC Environmental Health and Planning Local Authority Funded	2010/2011	2011	Produce Supplementary Planning Document for Suffolk and consult. SPD produced and Consulted on.	1%	Supplementary Planning Document produced. Superseded by EPUK & IAQM guidance on Planning & Development Control. Woodbridge Steering Group joined by members of Planning. Environmental Health and Development Control are working together to ensure Air Quality is considered during both the planning application process, and during policy development. Updated Action Plan will retain a measure for assessment of planning applications	2012/2013 Completed SPD	Ensure air quality assessments are submitted for planning applications when required. Air quality projects will bid for Community Infrastructure Levy (CIL) funding.
WBG 15c	Travel Plan for the District Council Offices	Promoting Travel Alternatives	Workplace Travel Planning	Lead and funded ESC Environmental Health	n/a	2009	Travel Plan adopted. Key actions completed	2% for 15a, b & c combined	2016 new Travel Plan adopted for new Council Offices in Melton. Offices moved Nov 2016. Original site to be used for housing. Traffic survey of Council Offices undertaken to determine impact on AQMA. Travel survey indicates that fewer staff now driving through AQMA - only 15 staff who responded said they travel through the	Completed. Reporting on success of Travel Plan will be taken into new Updated Action Plan.	Need to investigate how to determine effectiveness of Travel Plan year on year. Electric Pool Vehicle use - 7,373 miles in 2018.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									AQMA. 2 EV charge points installed and Electric Pool Vehicle available for staff use.		
WBG 2	Install right hand turning lane at lights on Thoroughfare/ Melton Hill arm of junction	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Suffolk County Council. Funding not secured but likely LTP.	Originally 2011-2012, now on hold	Unknown	Reduction in peak queue lengths	Marginal benefit	Preliminary design prepared - will move carriageway closer to Suffolk Place residential home - may increase emissions here therefore has not been progressed to date. Measure to be retained in updated Action Plan as 'aspirational'	Not progressed to date	This measure was investigated and there appeared not to be enough room at the junction. SCC has advised that this should be left in the Action Plan as it could be looked at again in more detail if there are no other alternatives.
WBG 16	Promotion of cycling and walking in Woodbridge	Promoting Travel Alternatives	Promotion of cycling	Suffolk County Council - funding unknown	2010	on-going	None currently	Marginal benefit	Cycling and walking reviewed by County Council. New footpath on Pytches Road and 30mph lit sign to calm traffic and aid walking to school. 5 new cycle racks behind Café Nero and 3 on Market Hill. Sandy Lane cycle scheme implemented. SCC to investigate drawing up a list of possible schemes - no further progress. Funding could be sought from CIL. SCC have	On-going	Cycle racks and Sandy Lane cycle scheme can only have a positive impact to increase the number of people cycling and reduce the number of vehicles on the road. If we have a list of potential schemes any funding which can be accessed (via Planning system or other) can then be used.

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									produced a new Cycle Map for Woodbridge. Measure will be kept in updated Action Plan as 'aspirational'		
WBG 15b	School Travel Plans	Promoting Travel Alternatives	School Travel Plans	Suffolk County Council originally. Now lead and funded ESC Environmental Health	n/a	2010	Contact schools to remind them about Travel Plan. Contact Woodbridge School re adopting a Travel Plan.	2% for 15a, b & c combined	All schools in Woodbridge historically adopted a Travel Plan. Exception is Woodbridge School who have been encouraged to produce one in future – they do provide significant information about sustainable travel to the school for all pupils. New footpath on Pytches Road and 30mph 'reduce your speed sign' for Woodbridge CPS users. School Travel Plans may no longer be in use at some of the schools so SCC advised postcode plots of students could be undertaken to identify any schools which may put significant traffic through AQMA. These can then be targeted. Postcode plots have not been possible to obtain from SCC to date so will need to re-assess a way forward.	Re-word measure in updated Action Plan. Looking now at working with all Woodbridge primary schools to deliver air quality information /education and anti-idling events. SCC are now promoting Modeshift Stars to help schools with Travel Planning – July 2019 12 schools in ESC have formally signed up.	Will have a positive effect to reduce cars using junction, but no real way to measure whether emission reduction target will be reached. Look to target specific schools who potentially have significant pupil vehicular traffic through the AQMA for further work. This is proving difficult to determine for Data Protection reasons. Moving forward we will look to deliver air quality information/education and anti-idling events at all primary schools in Woodbridge.

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WBG 8	Investigate Clean Bus Technology Fund to retrofit buses	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	ESC	Not known	Not known	Number of buses through Woodbridge fitted with new technology	Marginal benefit for AQMA	This action depends on any future opportunities for funding. We have approached relevant bus companies but are unsure what interest there is in a scheme such as this.	Not known	This measure will be kept within the updated Action Plan as an aspirational measure for future consideration. We would need to submit a successful bid and have local bus companies engage. To qualify for the grant the Council would need a guarantee that buses through AQMA are upgraded and used within an AQMA for 5 years. NO_2 concentrations within the AQMA have been below the Objective for 5 years now which may impact success with the grant funding.
WBG 18	Raise air quality awareness	Public Information	Via the Internet	ESC Environmental Health Local Authority Funded	n/a	on-going	Website promotion of air quality and reports. Web pages updated and promoted 2019: https://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/	n/a	Articles published in local magazines and papers. ESC website air quality pages redesigned and updated in 2019. Enhanced use of Twitter (@EastSuffolk) and Facebook	On-going	

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Stratford St Andrew Action Plan Measures											
STA 1	Move the location of the southern 30mph speed limit sign southwards	Traffic Management	Reduction of speed limits, 20mph zones	Suffolk County Council (SCC) lead and funded	2016	2017	Reduction in NO_2 concentrations in AQMA. Reduction in vehicle speed within AQMA.	Reduction in concentration by up to 2 µg/m^3	Speed limit panel agreed experimental TRO to move sign for up to 18 months. Speed limit moved. Traffic speed survey commissioned at same locations pre move. Speed survey shows decrease in vehicle speeds Northbound but increase in vehicle speeds Southbound at the site of the AQMA. NO_2 concentrations within the AQMA reduced 3-4µg/m^3 in 2017 (prior to speed limit changes) and a further 1µg/m^3 in 2018 after the speed limit move.	Completed December 2017	Air quality monitoring will now determine the effectiveness of this measure to reduce NO_2 concentrations. Post speed limit move NO_2 concentrations within the AQMA have decreased by 1µg/m^3 in 2018.
STA 2	Assessment of planning applications for impact on air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	East Suffolk Council (ESC) Environmental Health. Local authority funded	Ongoing	Ongoing	No new housing introduced into area of exceedance (AQMA) unless mitigation measures are in place to offset impacts.	No significant increases in concentrations due to new developments	Officers in Environmental Protection work with Planning to ensure that each application is appropriately assessed for air quality.	On-going. 2021 review of Action Plan.	The assessment process takes account of national guidance (including EPUK / IAQM) and local procedures

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STA 3	Measure 1 together with a southbound permanent vehicle activated sign	Traffic Management	Reduction of speed limits, 20mph zones	SCC lead and funded. Source funding not currently identified	2018	unknown	Reduction in NO2 concentrations in AQMA. Reduction in vehicle speed within AQMA.	Reduction in concentration to below the objective	Follow on from measure 1 if it was not successful. Discussions required between SCDC and SCC.	unknown	Would need a site assessment. Would require capital funding (min £8,000) and revenue funding. Not yet approved
STA 4	Measure 1 together with a northbound permanent vehicle activated sign	Traffic Management	Reduction of speed limits, 20mph zones	SCC lead and funded. Source funding not currently identified	2018	unknown	Reduction in NO2 concentrations in AQMA. Reduction in vehicle speed within AQMA	Reduction in concentration to below the objective	Ideally this camera would be installed alongside measure 3 to smooth all traffic flow close to the AQMA. Discussions required between SCDC and SCC.	unknown	Would need a site assessment. Would require capital funding (min £8,000) and revenue funding. Not yet approved.
STA 5	Southbound speed camera just prior to cottages	Traffic Management	Reduction of speed limits, 20mph zones	SCC lead and funded. Source funding not currently identified	Dependent on measure 1, 3 and 4	12 months from agreeing scheme	Reduction in NO2 concentrations in AQMA. Reduction in vehicle speed within AQMA.	Reduction in concentration to below the objective	Follow on from measure 1 if it was not successful and measures 3 and/or 4 were not undertaken. Some discussions required between ESC and SCC	unknown	Would need a site assessment to confirm adequate location and radar sightline. Need support from Suffolk Roadsafe Board and police. Would require capital funding of £40,000
STA 6	Average speed camera system throughout Stratford St Andrew and Farnham	Traffic Management	Reduction of speed limits, 20mph zones	SCC lead and funded. Source funding not currently identified - funding unlikely to be affordable	Dependent on measure 1, 3, 4 and 5	18 months from agreeing scheme	Reduction in NO2 concentrations in AQMA	Reduction in concentration to below the objective	Consideration of option only. Aspirational measure due to high costs	unknown	Would need a site assessment to confirm adequate location and radar sightline. Need support from Suffolk Roadsafe Board and police. Would require high capital funding of £250,000 and high revenue. Not yet approved.

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STA 7	Possible A12 Stratford St Andrew bypass	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	SCC lead with collaboration from ESC. £1million funding from Central Government to develop full business case. Department for Transport Funding sought for majority of project. Developer funding hoped for from EDF Energy (Sizewell C), some funding from SCC and ESC in form of CIL	unknown	unknown	Reduction in NO2 concentrations in AQMA. Reduction in traffic flows within AQMA	Reduction in concentration to below the objective	The Council is promoting a 4-village bypass (Farnham, Stratford St. Andrew, Little Glemham and Marlesford) as part of the Suffolk Energy Gateway (SEGway). Strategic Outline Business Case submitted to Department for Transport in December 2017 to try and secure Government funding. Likely to hear from DfT in Autumn 2018 Funding bid rejected by DfT but alternative funding opportunities still being pursued as indicated in the rejection letter from DfT.	unknown	DfT funding, in addition to funding from EDF Energy in lieu of mitigation for Sizewell C, is essential for this to happen. Sizewell C Stage 2 Consultation proposals include the option of a 4-village bypass for Farnham and Stratford St Andrew.
STA 8	Mitigation of emissions from Sizewell construction traffic through planning process	Policy Guidance and Development Control	Low Emissions Strategy	ESC Planning and Environmental Health	The application is expected to be submitted in Q1 2020	Beyond 2020	Number of low emission vehicles in fleet. Reduction in traffic flows within AQMA	No significant increase of concentrations	Preliminary discussions on likely impacts with EDF Energy at pre-application stage. EDF Energy are currently in a stage 4 consultation ending on 27 September 2019.	Long term (post 2025)	Initial modelling predicts increases in vehicles (particularly HGVs) associated with construction traffic along A12 accessing Sizewell. Peak construction year of 2024 could have increases 375 HGVs and >1000 total vehicle movements per day. Modelling of the potential impact on AQMA has been conducted. Sizewell C Stage 4 Consultation

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											proposals include the option of a 2 village bypass for Farnham and Stratford St Andrew.
General measures within the District: 2019 onwards											
ESC1 (was SCDC9)	Evaluate and implement efficient power technologies (e.g. hybrid-electric) for cargo handling equipment (rubber tyre gantry (RTG) cranes) in the Port of Felixstowe	Promoting Low Emission Plant	Other measure for low emission fuels for stationary and mobile sources	Lead and funded Port of Felixstowe	On-going	On-going	Number of RTG Cranes using improved efficiency power source.	n/a	The Port has purchased 33 ECO-RTGs to date including 9 in 2019. 34 blocks on the Port converted to date. Electric conversion of 8 blocks on Landguard Terminal 2019. 42 RTGs are now electric capable on port.	0n-going. Plan to convert 54 RTGs over the coming years up to 2020	To mitigate the increase in electricity demand the Port has been progressing energy efficiency projects and renewable energy generation (Solar PV) and are now able to generate 0.5MW of energy from solar power. Quay crane lighting upgrade project underway to fit LED, 7 cranes fitted and 5 more to be completed - will reduce energy usage of Port. Once all 54 RTGs are switched over from diesel to electric a 30% reduction in diesel use at the Port is targeted.
ESC2 (was SCDC10)	Adopt NOX abatement technologies on Internal Movement Vehicles (IMVs) in the port	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	Lead and funded Port of Felixstowe	2010	On-going replacement plan	Emissions monitoring of NO2 and SO2 at the Port. Number of IMVs replaced. Emissions monitoring	n/a	83 IMVs replaced between 2011 and end of 2016. 52 IMVs have been replaced through 2017/2018. 17 planned for replacement 2019. Totalling 135 of the 260 units in use on	On-going	Replacement IMVs comply with Euro 6 emission standards instead of Euro iiia. The recently purchased IMVs are fitted with start/stop engine technology and the latest emission

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							continues to be undertaken - reduction in NO2 and SO2 over time with slight increase in 2017. 135 IMVs replaced.		the Port. 2 x new internal tractors for roll-on roll-off operations in 2018. All new IMVs utilise Adblue as part of exhaust gas recirculation technology and currently comply to Euro 6 emissions standards. The most recent IMVs purchased (2016-2018) are fitted with start/stop technology. IMVs are replaced on a 15-year cycle.		compliant Volvo engines. Expected to deliver a 10% reduction in emissions compared with a conventional tractor unit
ESC3 (was SCDC11)	Increased use of rail transport for movement of goods at the Port of Felixstowe	Freight and Delivery Management	Other	Lead and funded Port of Felixstowe	2017	2019	Number of daily freight services. Percentage rail modal share.	unknown	There are currently 33 daily freight services from the Port - the maximum that the network can handle. Port continues to maximise length of each rail service. 28% rail modal share in 2018	On-going	No further increase in number of services anticipated until Branch Line capacity works are undertaken in 2019.
ESC4 (was SCDC38)	Campaign to reduce vehicle Idling on Port of Felixstowe	Other	Other	Port of Felixstowe lead and funded	2017	2017	Reduction in NO2 and SO2 levels port side.	unknown	Campaign started end of 2017 port wide and also to third party site users, contractors and tenants. Measure in response to slight increase in NO2 and SO2 concentrations recorded in 2017 port-side.	2018	NO2 and SO2 concentrations port side increased slightly in 2017, and then reduced slightly in 2018. Idling campaign put in place to further reduce port side emissions.

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ESC5 (was SCDC16)	Electric vehicle trials at the Port of Felixstowe	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	Lead and funded Port of Felixstowe	2017	2018	Number of miles undertaken by electric vehicles	n/a	2 new Nissan Leaf electric vehicles on Port in May 2018 and a trialling a Terberg all-electric Internal Tractor in June 2018 as part of feasibility study for suitability of EV in Port environment. In 2019 Port now has a fleet of 3 electric vehicles	2018/19 Completed	The trial will inform the Port whether electric vehicle use is a way forward for them. Trial was successful and Port now has a fleet of 3 electric vehicles.
ESC6 (was SCDC19)	Energy Management System (EnMS) in place at The Port of Felixstowe. Certified to ISO 50001	Policy Guidance and Development Control	Other policy	Lead and funded Port of Felixstowe	On-going	On-going	No direct indicator. Continued certification to ISO 5001	n/a	Energy Management system implemented (EnMS) successfully in 2013 certified to ISO 5001. The EnMS is regularly reviewed and forms the backbone of the Environmental Management System. In 2018, the port's 5 year energy plan will be reviewed for the next 5 year period. The port passed its last 3 year energy accreditation period in September 2016. 9 Solar PV panel installations on roof surfaces at the Port help to mitigate additional energy needs from electrified RTGs. 501 MWh generated 2018.	Completed	Port's five year carbon reduction plan is an annual reduction of approximately 4000 tonnes CO2. Plan reviewed annually and now part of EnMS. Plan will be evaluated and re-drawn for a further 5-year period in 2019.

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ESC7 (was SCDC27 / WDC20)	Assessment of planning applications for impact on air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	ESC Environmental Health and Planning Local Authority Funded	Ongoing	Ongoing	Number of Planning applications considered. In 2018 - 1282 Planning applications processed by Environmental Protection team, assessed for air quality impacts and responses sent to Planning where relevant.	Unknown	Officers in Environmental Protection work with Planning to ensure that each relevant application is appropriately assessed for air quality.	On-going	The assessment process takes account of national guidance (including EPUK / IAQM) and local procedures
ESC8 (was SCDC29)	Air quality included in the East Suffolk Council - Suffolk Coastal Local Plan (Core Strategy & Development Management Policies, Site Allocations and Area Specific Policies and Felixstowe Peninsula Area Action	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	ESC Planning Department lead and funded	n/a	2013 - Core strategy & Development Management Policies. 2017 - Site Allocations and Area Specific Policies, and Felixstowe Peninsula Area Action Plan East Suffolk Council - Suffolk Coastal Local Plan to cover period 2018 - 2036 examination 2019 and adoption 2020	Adoption of Local Plan documents. Air quality considered in relevant planning applications.	Unknown	Existing documents adopted and published in 2013 and 2017. Previous Site Allocations and Area Specific Policies document completed with air quality recommendations included. The East Suffolk Council - Suffolk Coastal Local Plan to cover 2018-2036 has been submitted to the Planning Inspectorate for examination. Air quality is a key objective within the Sustainability appraisal framework against which all	East Suffolk Council - Suffolk Coastal Local Plan Core Strategy & Development Management Policies adopted July 2013. East Suffolk Council - Suffolk Coastal Local Plan Site Allocations and area Specific Policies, and Felixstowe Peninsula Area Action Plan adopted January 2017.	To ensure that developments are appropriate and the air quality impacts are adequately assessed. Large and ambitious development plans in the former Suffolk Coastal area require careful management. 10,476 homes expected to be delivered between 2018-2036. Annual monitoring information available on website www.eastsuffolk.gov.uk/planning/planning-policy-and-local-plans/suffolk-coastal-local-plan/monitoring-information/

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	Plan)								policies and site allocations will be assessed. Policy SCLP7.1: Sustainable Transport, SCLP7.2: Parking Proposals and Standards includes electric charge points and encourages park & ride sites, SCLP9.1: Low Carbon and Renewable Energy and SCLP9.2: Sustainable Construction	East Suffolk Council - Suffolk Coastal Local Plan covering period 2018-2036 expected to be adopted 2020.	
ESC9 (was SCDC30 / WDC3)	Promotion of travel alternatives in the Local Plan	Promoting Travel Alternatives	Promotion of walking	ESC Planning Department lead and funded	n/a	n/a	Sustainable travel included in the adopted Local Plan documents	Unknown	Existing documents adopted and published in 2013 and 2017. The East Suffolk Council - Suffolk Coastal Local Plan to cover 2018-2036 has been submitted to the Planning Inspectorate for examination.	East Suffolk Council - Suffolk Coastal Local Plan covering period 2018-2036 expected to be adopted 2020.	Policy SCLP7.1: Sustainable Transport encourages people to use non-car modes of transport. Supports developments that integrate into pedestrian, cycle and public transport networks
ESC10 (was SCDC31 / WDC8)	Suffolk Travel Plan Guidance	Policy Guidance and Development Control	Other policy	SCC lead and funded. Input from Suffolk authorities	2017	2018	Travel Plan guidance produced for Suffolk	Unknown	Completed: https://www.suffolk.gov.uk/assets/Roads-and-transport/public-transport-and-transport-planning/Local-Links/2019-02-01-FINAL-Suffolk-Travel-Plan-Guidance-Web-Version.pdf	Completed	

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ESC11 (was SCDC39 / WDC21)	Provision of information to the Public and commerce on reducing emissions from solid fuel and wood burning, including Ready to Burn campaign	Public Information	Via the Internet	East Suffolk Council lead and funded	2017	2018/19	Information available on East Suffolk website - completed. Information disseminated to the Public and commercial sectors.	Unknown	Council website page on biomass and wood burning added and publicised. Article in Greenprint Forum newsletter. Information being sent out to any burning complaints. Information sent to 300 businesses in Suffolk, all Parish Councils, highlighted to all air quality Consultees during ASR 2017 Consultation, leaflets provided at Business drop-in events.	On-going: https://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/biomass-and-wood-burning/	Investigating promotion of Ready to Burn scheme to local wood suppliers as there is no-one locally
ESC12 (was SCDC34 / WDC7)	Greener travel information available on the SCC website	Promoting Travel Alternatives	Personalised Travel Planning	Lead and funded Suffolk County Council	n/a	Implemented	Number of visitors to the website.	Unknown	SCC website updated for greener travel and travel planning. 5134 visitors to the Local Links website and 1056 visitors to SCC Travel Plans website 2018.	On-going	http://www.greensuffolk.org/travel/
ESC13 (was SCDC25 / WDC11)	Promotion of travel alternatives for staff at ESC	Promoting Travel Alternatives	Promotion of cycling	Lead and funded ESC	n/a	n/a	Council promotes cycling and walking as a positive alternative form of travel for its staff. Tax free bike 'Cycle 2 Work scheme' available for staff to sign up	Unknown	Staff encouraged to use cycles. Tax free bike 'Cycle 2 Work scheme' started in 2013. 12 bikes purchased 2018/19 with 32 bikes purchased since changed provider in November 2016. Business mileage rate for cycling in place. Emergency	On-going	New Riduna Park building has following facilities: Covered and secure cycle parking/racks for 40 bikes, shower/changing/ drying facilities and lockers. East Suffolk staff and member mileage claimed reduced from 827,840 miles in

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							to in May and June each year.		Ride Home scheme in place. Travel Survey in 2017 indicates increased number of staff who cycle to work. 4 pool bikes provided for use and promoted, recording of usage just started and will be reported on next year.		2015/16 to 755,183 in 2016/17 and again to 718,107 in 2017/18. Mileage increased 2018/19 to 859,280, we are investigating the increase which is partly due to under reporting of member mileage previously.
ESC14 (was SCDC26)	Fleet emissions improvements for freight haulage companies based in Felixstowe	Vehicle Fleet Efficiency	Other	Lead and funded ESC Environmental Health	2017	2018 to draw up list 2020 to contact hauliers	Number of haulage firms engaged in the process	Unknown	Haulage firm Maritime head office is in Felixstowe. 1,000 HGVs operating across the UK from 23 depots, 90% are Euro V and VI. Program of vehicle replacement every 3 years. Contact haulage companies around the Port to ascertain fleet make up and any emission reduction programs in place. Investigate promotion of emission improvements (driver training, fleet replacement). List of companies drawn up with contact details.	2020	Until we begin contacting haulage companies we cannot know what is currently in place and what level of engagement there will be.

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ESC15 (was SCDC40)	Installation of 11 Rapid Electric Vehicle Charging Units for Public use in Suffolk, Norfolk and Essex – planned site within Felixstowe	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Babergh and Mid Suffolk DC lead for all points on behalf of all relevant local authorities. Highways England funded. Suffolk Coastal involvement with the tender	2016/17	2018	2018	unknown	https://www.midsuffolk.gov.uk/news/making-east-anglia-miles-better-for-generations-to-come/ Rapid chargers installed in Ipswich, UEA Norwich, Bury St Edmunds, Needham Market, Felixstowe and Great Yarmouth.Rapid charger within Felixstowe in ESC installed and activated.	Completed 2019	Babergh and Mid Suffolk District Councils are leading a Highways England funded project of seven local authorities, in Suffolk, Norfolk and Essex, working together to install rapid charging points along strategic roads in East Anglia. The project supports the Government initiatives to increase the number of electric vehicles and end the sale of conventional petrol and diesel cars in the UK by 2040. Motorists across East Anglia can now recharge their electric vehicles in as little as 30 minutes at one of a network of 11 new rapid chargers, installed along the region's strategic road networks.
ESC16 (was SCDC36/ WDC6)	Trial to allow cycling on the promenade at Felixstowe	Transport Planning and Infrastructure	Cycle network	ESC Senior Management Team Projects Officer and Environmental Health Local Authority Funded	2016	2016	Trial implemented and cycling allowed to continue on promenade after 1 year trial	Unknown	Trial in place and 1 year completed October 2017. Recommendation to remove cycling ban agreed at full Cabinet November 2017. Ban removed	2017 Completed. Will remove from table next ASR	Competing public uses of promenade - safety of pedestrians - no safety issues reported during 12 month trial

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ESC17 (was SCDC33 / WDC9)	Redesign and update the air quality pages on the East Suffolk website	Public Information	Via the Internet	ESC lead. Local Authority Funded	2016	2017	Updated web pages. Web pages updated 2018 - completed.	Unknown	New website now in place. Information updated and more accessible, new sections on biomass and wood burning, and monitoring data added.	2018 Completed. Will remove from table next ASR	https://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/
ESC18 (was SCDC22 / WDC13)	Suffolk Car share	Alternatives to private vehicle use	Car & lift sharing schemes	Lead and funded Suffolk County Council, ESC promoting		Implemented	Annual increase in users of the site.	Unknown	Number site users has increased from 1,599 in 2010 to 2,768 In March 2018. Increase between May 2017 and March 2018 is 2,643 to 2,768. 3024 members in June 2019	On-going	Free web-based contact database. Site users are across whole of Suffolk https://liftshare.com/uk/community/suffolk
ESC19 (was SCDC35)	SCC adoption of national award scheme for School Travel Plans	Promoting Travel Alternatives	School Travel Plans	SCC lead and funded	2017	2017	Adoption of scheme - completed. Number of schools signed up to scheme	Unknown	Modeshift STARS scheme adopted by SCC. Free to use national award scheme for schools who have demonstrated excellence in supporting cycling, walking, and other forms of sustainable travel. Helps schools to write and monitor their travel plans. 12 schools formally signed up within ESC in June 2019	On-going	12 schools have formally signed up in ESC but none are accredited as yet. https://www.suffolk.gov.uk/planning-waste-and-environment/planning-and-development-advice/travel-plans/school-travel-plans/
ESC20 (was SCDC37)	20 mph speed limit in Woodbridge	Traffic Management	Reduction of speed limits, 20mph zones	Suffolk County Council and Woodbridge Town Council Funding	2016	2017/18	Reduction in measured average speed along routes	Marginal benefit in terms of emission reductions	Proposal taken by Woodbridge Town Council to the SCC Speed Limit Panel. Panel has agreed the	Unknown at this point	Costings of physical works unknown. Potential success of any funding bid unknown. Need to

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				unknown at this stage - looking at CIL funding bid				due to through traffic reduction	proposal for 20mph zones/limits on the central B1438 and historic core roads in Woodbridge. This will include the AQMA. Proposal confirming physical measures required to make the 20mph zone on B1438 self-enforcing required. Funding being sought to take this forward. Once a scheme is in known with costings can look for funding avenues - one possibility is CIL.		ensure that proposals do not create any air quality concerns at locations along the route.
ESC21 (was WDC1)	Proposed third vehicular crossing of Lake Lothing	Transport Planning and Infrastructure	Other	Suffolk County Council lead and funded	Since 2010	Construction to start 2020	New crossing which could result in a large reduction of traffic congestion in Oulton Broad and the Lowestoft Town Centre	Examination closed 5th June 2019. There will now be a period of three months for the Examining Authority to write its report and make a recommendation to the Secretary of State. The Secretary of State will then have	Funding secured, now in planning phase	2022	Lengthy timescale. Approximate costs in excess of £80million

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								three months in which to make a decision.			
ESC22 (was WDC19)	Installation of Urban Traffic Management Control System (UTMC) in Lowestoft with connection to the Bascule Bridge lifts.	Traffic Management	UTC, Congestion management, traffic reduction	Suffolk County Council and Highways England began the project and Suffolk County Council has taken it over.	unknown	2017/18	Reduced congestion in Lowestoft Town Centre	Unknown	UTMC now installed and working within Lowestoft. Control system installed for the Bascule Bridge and connected to UTMC	Completed 2018/19	
ESC23 (was WDC2)	Separate cycle and pedestrian crossing Lake Lothing	Promoting Travel Alternatives	Promotion of cycling	Lead and funded ESC	2014	Unknown	More people encouraged to use cycling as a means of transport	Reduced vehicle emissions	Implementation on-going	Funding being sought	Important link to the cycle network. Funding for related infrastructure is problematic.
ESC24 (was WDC4)	Improvement works at Oulton Broad Station North	Traffic Management	UTC, Congestion management, traffic reduction	Lead and funded Network Rail		Late 2016	Reduce the down time' of the level crossing barriers and improve journey times for people using Bridge Road Oulton Broad	Reduction in traffic congestion and associated emissions	Works complete. Nitrogen Dioxide concentration levels show a reduction in 2017 at the Golden Court monitoring position in Bridge Road (DT4) from 25µg/m3 in 2016 to 22 µg/m3 in 2017.	Completed 2017. Will remove from table next ASR	

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
ESC25 (was WDC3)	East Suffolk Council - Waveney Local Plan (March 2019) covering the former Waveney Local Planning Authority area, excluding the Broads Authority area	Policy Guidance and Development Control	Other policy	Lead and funded ESC Planning Department	n/a	2019	Adoption of Local Plan documents. Air quality considered in relevant planning applications. Policies to promote alternative forms of travel	Unknown	East Suffolk Council - Waveney Local Plan adopted March 2019. Covers period 2014-2036. Policy WLP8.21: Sustainable Transport also supports facilities for charging plug-in and ultra-low emission vehicles, WLP8.27: Renewable and low carbon energy and WLP8.28: Sustainable Construction	Adopted 2019	Large and ambitious development plans in the former Waveney area require careful management. 9,235 homes expected to be delivered 2014-2036. Annual monitoring information available on website www.eastsuffolk.gov.uk/planning/planning-policy-and-local-plans/suffolk-coastal-local-plan/monitoring-information/
ESC26 (was WDC17)	Improvement works to the cycling infrastructure in Lowestoft	Transport Planning and Infrastructure	Cycle network	Lead and funded Highways England	2016	2016 First phase	More people encouraged to use cycling as a means of transport.	Unknown	£1 million spent to date on A47 Yarmouth Road improvements. Speed limit on Yarmouth Road reduced to 30mph between Leisure way and Corton Long Lane. Vehicle activated speed limit sign north of Gunton Avenue and renewed lines and signs along A47	First phase completed. Completion date for Second phase of improvements unknown at this stage as funding has been stopped	Proposal was to undertake future works to Gunton Avenue and Sussex Road to improve cycle network, but the Highways England funding has been stopped before its completion. Project funding may be resurrected in the future.
ESC27 (was WDC6)	The Waveney District Council Cycling Strategy	Promoting Travel Alternatives	Promotion of cycling	Lead and funded ESC	2015	2016	Strategy adopted - completed	Unknown	The strategy was formally adopted in 2016 and the final draft was published in 2018. Has identified barriers and gaps in the cycling infrastructure. SCC provides free cycle	Cycling Strategy adopted 2016. Final draft in Public domain 2018 On-going	Infrastructure gaps identified but funding opportunities are problematic

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									maps for Lowestoft, Beccles and Halesworth at https://www.suffolkonboard.com/cycle/ SCC has delivered 78 Bikeability courses within ESC in 2018/19 training 936 children to Level 1 or 2 standard. ESC's ultimate intention is to review this document and extend it across the whole of East Suffolk – there is no timeframe for this at present.		
ESC 28	Anti-idling events outside primary schools within East Suffolk	Public Information	Via other mechanisms	Lead and funded ESC	2019	2019 / 2020	Number of events undertaken	Unknown	A temporary officer was employed and undertook 7 anti-idling events outside schools in ESC in the lead up to Clean Air Day 2019. A graduate intern has been resourced to undertake additional events in the 2019/20 school year.	On-going 7 events undertaken to date	Graduate intern employed for 8 months only - hoping to resource a second graduate intern to follow on for a further 8 months
ESC29	Air quality information/ education activities for primary schools within ESC	Public Information	Via other mechanisms	Lead and funded ESC	2019	2019 / 2020	Number of schools engaged	Unknown	A temporary officer was employed and undertook 2 Air Quality Ambassador events at the Council Offices involving 8 schools in the lead up to Clean Air Day 2019. A graduate intern has been	On-going. 8 schools engaged to date	Graduate intern employed for 8 months only - hoping to resource a second graduate intern to follow on for a further 8 months

Measure No.	Measure	EU Category	EU Classification	Organisations involved and Funding Source	Planning Phase	Implementation Phase	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									resourced to investigate undertaking additional school educational events in the 2019/20 school year.		

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.

East Suffolk Council is taking a wide range of measures to address $PM_{2.5}$.

The Suffolk Air Quality Group (which ESC is a member of), has engaged with Suffolk County Council (SCC) Public Health in order to move forward together with regard to Particulate Matter. The Joint Strategic Needs Assessment, now includes a chapter on Air Quality in Suffolk (https://www.healthysuffolk.org.uk/jsna/jsna-topic-reports/air-quality). The local transport survey shows that 64.7% of employees drive to work and 53.9% are single occupants despite efforts to encourage car sharing, however the rural nature of Suffolk presents transport challenges. Overall it is estimated that 118 people in Suffolk die early each year with air quality as a contributing factor. The Public Health team has used the Defra / Public Health England Air Quality Toolkit for Directors of Public Health to develop a self-assessment framework for understanding the Suffolk air quality situation. This highlights where there are Management gaps and potentially areas to prioritise. Questionnaires were sent out to relevant stakeholders for completion and a need for strategic leadership on air quality across Suffolk has been identified. Currently discussions are on-going on how this can be effectively managed. A co-ordinated and partnership approach to reducing the local $PM_{2.5}$ concentration is likely to be more effective.

The Council, working in partnership with Suffolk County Council and other potential partners, is committed to promoting alternative forms of transport and modes of travel such as cycling, walking, car sharing and public transport with the aim of reducing the reliance on private cars. Both the Waveney and Suffolk County Council Cycling Strategies recognise the need for continued promotion of

cycling and for greater improvements to the cycling infrastructure. Suffolk County Council has spent £1 million to date on cycle improvements within Lowestoft with the possibility of additional future works (ESC 26). The East Suffolk Business Plan encourages greater leisure, activity and health opportunities in East Suffolk, including cycle-friendly district policies and initiatives. The Waveney Cycle Strategy has considered infrastructure issues and put forward potential improvements to the cycle network with the aim of encouraging more people to cycle and remove existing barriers. The document also provides supporting information about issues such as the design of development projects that should be taken into account when planning proposals are being prepared and determined. The document can be found by following the below link; (http://www.eastsuffolk.gov.uk/environment/environmental-protection/air-quality/get-involved/) (ESC16). The ultimate intention of East Suffolk Council is to review the Waveney Cycle Strategy and extend it across East Suffolk. The measures listed in table 2.2 should impact positively in reducing emissions by promoting a change in travel culture and providing advice, support and the necessary infrastructure to encourage the use of other means of transport rather than the car. The promotion of active travel in the form of cycling and walking within the District has wider benefits and has strong links to the Public Health Outcomes Framework in terms of improving the health and wellbeing of the population, as well as improving the local air quality.

Reductions in $PM_{2.5}$ emissions are also targeted by the following measures related to Planning:

- Assessment of planning applications for impact on air quality (ESC7).
- Air quality is included in the new Local Plan Site Allocations Document and Felixstowe Area Action Plan (ESC8).
- The Local Plan promotes travel alternatives for the district which aims to reduce emissions from motor vehicle use (ESC9). This is being embedded further in the SCDC Local Plan review which has recently begun. The Environmental Protection Team has fed into the draft local plan options consultation seeking to control fugitive emissions of $PM_{2.5}$ from construction and

demolition sites at the planning stage of developments by ensuring that developers use best practice and ensure that adequate air quality assessment is also provided when required.

Suffolk County Council has a number of measures that aim to increase the number of people walking, cycling and using greener travel methods within the district, with the aim of reducing the reliance on private cars. This has strong links with the Public Health Outcomes Framework in terms of improving the health and wellbeing of the population as well as improving local air quality through reduced congestion and vehicle emissions:

- Suffolk car and lift sharing scheme (ESC18).
- Production of Travel Plan guidance for Suffolk to encourage a greater level of consistency across Suffolk, will be important if used in Planning process (ESC10)
- Provision of Greener Travel Information (ESC12).
- Adoption of a national award scheme to assist schools with Travel Plans (ESC19).
- Suffolk County Council has indicated, with regard to electric vehicle charging in the UK, that Motor Fuels Group and Chargemaster will be rolling out 400 rapid EV chargers across their PFS network. In addition, Highways England has installed 11 rapid chargers in 'blackspots' on their strategic network in Suffolk, Norfolk and Essex including a site within Felixstowe in ESC (ESC15). The electric vehicle charging network in Suffolk needs further development if we are to increase the number of plug in vehicles in use on Suffolk's roads.

There are a number of measures which will reduce $PM_{2.5}$ emissions both locally to the Council Offices, within the two AQMAs, and more widely across the district:

- Promotion of travel alternatives for staff (ESC13).

- The updated dedicated air quality page on the East Suffolk Website provides information and encouragement to members of the public who are interested in 'doing their bit' in improving air quality and signposts people to other links (ESC17).
- Provision of information to the Public and commerce on reducing emissions from solid fuel and wood burning (ESC11).
- Future traffic restrictions and improved enforcement to the Thoroughfare close to the Woodbridge AQMA will reduce congestion at this junction by freeing up the left filter lane at the lights (measures WBG 2 and 3).
- School Travel - deliver air quality information/education and anti-idling events at all primary schools in Woodbridge (measure WBG 15b).
- Travel Plan for the District Council offices (measure WBG 15c).
- Promotion of walking and cycling in Woodbridge (measure WBG 16).
- Better integration of air quality in the Planning system (measure WBG 17).
- Raising air quality awareness through better website, press releases, publicity (measure WBG 18).
- Possible A12 Stratford St. Andrew bypass would smooth the traffic flow thereby reducing $PM_{2.5}$ emissions (measure STA 7).
- Mitigation of emissions from Sizewell C construction traffic through use of low emission Heavy Goods Vehicles (measure STA 8).
- Emission reduction measures being undertaken by the Port of Felixstowe will aid to reduce emissions of $PM_{2.5}$. Efficient power technologies fitted to Rubber-Tyred Gantry cranes (RTGs) – ECO-RTGs and electric RTGs replacement program in place (ESC1) and abatement technologies fitted to Internal Movement Vehicles and replacement program in place (ESC2) Campaign in place to reduce vehicle idling on the Port of Felixstowe, emission reductions will be realised with reduced vehicle idling (ESC4).

- Planning consent is underway for a proposed third vehicular crossing of Lake Lothing in Lowestoft. This would significantly reduce congestion and therefore PM emissions within Lowestoft (ESC21). In association with this planning application the District Council is looking to fund a separate cycle and pedestrian crossing which would improve network links in Lowestoft and help to encourage walking and cycling in the town (ESC23).
- Works by Network Rail to reduce the down time of the level crossing barriers in Bridge Road, Oulton Broad have been undertaken. This has reduced congestion and therefore associated vehicle emissions. (ESC24).
- The Highways Agency, and now Suffolk County Council, has joined all the Lowestoft traffic signals onto one Urban Traffic Management Control (UTMC) system. Reduction in congestion will bring with it reduction in emissions of NO_2 and PM (ESC22).

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.

East Suffolk Council undertook automatic (continuous) monitoring at 1 site during 2018. Table A.1 in Appendix A shows the details of the site.

National monitoring results are available at https://uk-air.defra.gov.uk/networks/find-sites

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

East Suffolk Council undertook non- automatic (passive) monitoring of NO_2 at 74 sites during 2018. 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) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. “annualisation” and/or distance correction), are included in Appendix C.

The diffusion tube network is updated as required in response to new potential sources of pollution, new receptors being introduced, or proposed land development. These are located with reference to the LAQM technical guidance. 19 new sites were added to the NO_2 monitoring network in 2018.

11 new sites were added in Trimley St. Martin, Trimley St. Mary and Walton (TRM 1 to TRM 12) along the High Road / High Street, following elevated NO_2 concentrations of 41µg/m^3 recorded at FLX 40 on High Road Trimley St Mary in 2017. This site has been triplicated for improved QA/QC (FLX 40 now TRM 3), and additional monitoring sites have been added to assess concentrations at key sites.

3 new sites have been added at the Melton crossroads (MEL 8, 9 and 10) in order to confirm concentrations at key points in this locality due to observed increasing traffic levels from the Peninsula.

1 new site in Eyke (EYK 1) has been sited to confirm concentrations following concerns raised regarding increased traffic passing through the village due to developments at the Bentwaters site.

1 new site has been added in Oulton Broad (OBR 4) at a congested road junction with a residential receptor close to the roadside.

3 new sites have been added in Beccles at Ingate (BEC 3, 4 and 5). Traffic queues in this location when the railway gates are closed and residential receptors are close to the kerbside.

The following tubes were removed in 2018, to ensure that resources are allocated appropriately with reference to LAQM guidelines:
FLX29, FLX31, FLX33, FLX34, FLX35, FLX37, FLX40, FLX41, FLX42, KSG11, KSG12,

4 sites were removed from Dock Gate 2 roundabout / Ferry Lane in Felixstowe. These sites were put in place to determine concentration gradients along Ferry Lane to inform the Action Plan for the AQMA before it was revoked. They are not representative

of relevant exposure, as the only exposure at this location is the Dooley Inn Public House (the revoked AQMA). Monitoring continues at the Dooley Inn. 2 sites have been removed from Kesgrave as 2017 NO_2 levels were confirmed to be low at 20 and 17µg/m^3.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, “annualisation” and distance correction. 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 2018 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.

The results from the continuous analyser, located at a relevant receptor within the Woodbridge AQMA, show a reduction in the annual mean NO_2 concentration from 37µg/m^3 in 2017, to 32µg/m^3 in 2018. This is within the objective (40µg/m^3) for the fifth year running. The 1-hour objective is set at 200µg/m^3 not to be exceeded more than 18 times per year and during 2018 there were no exceedances of 200µg/m^3 recorded.

The results from diffusion tube monitoring show that there are no sites across the district with annual mean concentrations at or above the objective level of 40µg/m^3 in 2018;

There was 1 diffusion tube site (STA 8: 37.7µg/m^3) which is classed as 'borderline' (any site above 36µg/m^3 and therefore close to, but not above, the objective level of 40µg/m^3). This site is within the declared AQMA at Stratford St Andrew.

There are no instances of the annual mean exceeding 60µg/m^3 in 2018 and therefore the risk of exceeding the 1-hour objective at any locations is very low.

Trend graphs showing annual mean NO_2 concentrations at all diffusion tube sites within the district with 5 or more years of data are presented in Appendix A, Figure A.1.

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)
WBG	Woodbridge	Roadside	627596	249261	NO2	YES	Chemiluminescent	0	1	2.6

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

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)
DT1 (now CCL1)	Castleton Avenue, Carlton Colville	Roadside	650608	290476	NO_2	NO	17	1.9	NO	3
DT2 (now LOW2)	Fir Lane, Lowestoft	Kerbside	653220	293794	NO_2	NO	6	0.5	NO	2.9
DT3 (now OBR3)	Dutchmans Court, Oulton Broad	Roadside	651885	292105	NO_2	NO	5	2.4	NO	2.4
DT4 (now OBR2)	Golden Court, Oulton Broad	Roadside	652242	292955	NO_2	NO	4	2	NO	2.4
DT5 (now OBR1)	Saltwater Way, Oulton Broad	Roadside	652498	292751	NO_2	NO	6	3	NO	2.4
DT6 (now LOW4)	Yarmouth Road, Lowestoft	Kerbside	653049	295534	NO_2	NO	8.8	0.5	NO	2.4
DT7 (now LOW3)	Mill Road, Lowestoft	Roadside	654470	292395	NO_2	NO	6.8	1.2	NO	2.4
DT8 (now LOW5)	St Margarets Church, Lowestoft	Urban Background	654305	293914	NO_2	NO	N/A	N/A	NO	2.4
DT9 (now LOW1)	Belvedere Road 1, Lowestoft	Roadside	654651	292619	NO_2	NO	N/A	1	NO	2
DT11 (now LOW7)	Pier Terrace 1, Lowestoft	Roadside	654658	292598	NO_2	NO	7	3	NO	2.4

DT13 (now BUN1)	Trinity Street, Bungay	Roadside	633661	289813	NO_2	NO	0	1	NO	2.2
DT14 (now BEC1)	Ingate 1, Beccles	Roadside	642614	289906	NO_2	NO	0	1	NO	2.4
DT15 (now BEC2)	Ingate 2, Beccles	Roadside	642614	289906	NO_2	NO	4	2	NO	2.4
PT4 (now LOW6a,b,c)	Pier Terrace, Lowestoft	Roadside	654685	292621	NO_2	NO	0	4	NO	2.2
OBR 4	Beccles Rd / Cotmer Rd, Oulton Broad	Roadside	651868	292123	NO_2	NO	0	5.2	NO	0.9
BEC 3	74 Fredericks Rd, Beccles	Roadside	642621	289909	NO_2	NO	0	1.5	NO	1.8
BEC 4	1 Ingate, Beccles	Roadside	642567	289916	NO_2	NO	0	1.3	NO	1.7
BEC 5	11 Ingate, Beccles	Kerbside	642583	289917	NO_2	NO	0	0.9	NO	1.8
FLX 12	Hamilton Road Felixstowe	Roadside	630363	234890	NO_2	NO	0	5	NO	2.3
FLX 14	1 Adastral Close Felixstowe	Other	628604	232847	NO_2	NO	0	5.8	NO	2
FLX 17	Spriteshall Lane Trimley St Mary	Suburban	628817	236323	NO_2	NO	0	31	NO	2
FLX 20	Glemsford Close Felixstowe	Suburban	628669	233979	NO_2	NO	10	54	NO	2
FLX 21	Kings Fleet Road Felixstowe	Suburban	629253	234431	NO_2	NO	n/a	1.5	NO	2.3
FLX 22	Levington Road Felixstowe	Industrial	629172	233446	NO_2	NO	0	9	NO	1.8
FLX 23	Heathgate Piece Trimley	Suburban	628542	236592	NO_2	NO	0	25	NO	2

	St Mary									
FLX 24	Brandon Road Felixstowe	Suburban	628358	234634	NO_2	NO	0	32	NO	2.5
FLX 26 a,b,c	Dooley Inn front Felixstowe	Other	627959	234246	NO_2	NO	0	13	NO	3.4
FLX 27 a,b,c	Dooley Inn side Felixstowe	Other	627960	234238	NO_2	NO	0	23	NO	2.8
FLX 29	18 Adastral Close Felixstowe	Other	628712	232892	NO2	NO	0	12	NO	2
FLX 31	44 Adastral Close Felixstowe	Other	628640	232795	NO2	NO	0	13	NO	2
FLX 32	Dooley Inn rear Felixstowe	Other	627971	234242	NO2	NO	0	18	NO	2
FLX 33	Dock gate 2 roundabout Felixstowe	Roadside	627884	234238	NO2	NO	n/a	5	NO	1.8
FLX 34	Ferry Lane midway Felixstowe	Roadside	627934	234257	NO2	NO	n/a	3	NO	1.9
FLX 35	Dooley Inn car park Felixstowe	Roadside	627959	234258	NO2	NO	10	3	NO	1.8
FLX 36	Hodgkinson Road Felixstowe	Roadside	627989	234279	NO2	NO	n/a	3	NO	1.9
FLX 37	Hodgkinson Road / Ferry Lane Felixstowe	Roadside	628012	234272	NO2	NO	n/a	3.5	NO	1.7
FLX 38	Ferry Lane just past	Roadside	628130	234280	NO2	NO	n/a	1.5	NO	1.7

	Hodgkinson Road Felixstowe									
FLX 39	424 High Road Trimley St Mary	Roadside	628760	236071	NO_2	NO	0	11	NO	1.6
FLX 40 (now TRM 3a,b,c)	216 High Road Trimley St Martin	Roadside	627618	237092	NO2	NO	0	1.8	NO	1.9
FLX 41	Anzani House front Felixstowe	Roadside	628138	234696	NO2	NO	0	36	NO	1.7
FLX 42	Anzani house side Felixstowe	Roadside	628160	234725	NO2	NO	0	35	NO	1.7
MEL 5	6 The Street Melton	Roadside	628145	250417	NO_2	NO	0.5	3.6	NO	1.9
MEL 7	28 The Street Melton	Kerbside	628177	250478	NO_2	NO	0	0.3	NO	1.7
MEL 8	The Beeches, The Street	Roadside	628123	250433	NO_2	NO	0	10	NO	1.8
MEL 9	16 The Street	Roadside	628168	250457	NO_2	NO	0	4.7	NO	1.8
MEL 10	Lamp-post o/s 35 The Street	Roadside	628182	250504	NO_2	NO	0	1.2	NO	2
KSG 9	118 Main Road, Kesgrave	Roadside	621680	245796	NO_2	NO	n/a	2.6	NO	1.9
KSG 10	The Bell Inn, Main Road, Kesgrave	Roadside	621815	245785	NO_2	NO	0	2.7	NO	1.6
KSG 11	Bell Lane / Quebec Drive, Kesgrave	Roadside	621705	245682	NO2	NO	11	5.8	NO	2

KSG 12	Dobbs Lane, Kesgrave	Roadside	623488	246019	NO2	NO	6.2	3.5	NO	1.7
WBG 1 a,b,c	93 Thoroughfare, Woodbridge	Roadside	627596	249261	NO_2	YES	0	1.3	YES	2.4
WBG 3	Kingston Farm Road, Woodbridge	Suburban	626997	248488	NO_2	NO	n/a	1	NO	1.9
WBG 5	Corner of Suffolk Place, Woodbridge	Roadside	627604	249243	NO_2	NO	0	2.5	NO	2.3
WBG 6	87 Thoroughfare, Woodbridge	Roadside	627593	249255	NO_2	YES	0	2	NO	2.2
WBG 8	95 Thoroughfare Woodbridge	Roadside	627601	249283	NO_2	YES	0	3	NO	2.4
WBG 10	Signpost St John's Street, Woodbridge	Roadside	627570	249240	NO_2	NO	0.5	2	NO	2.1
WBG 12	8 Lime Kiln Quay Road, Woodbridge	Roadside	627664	249203	NO_2	NO	0.5	5	NO	1.8
WBG 13	Traffic lights 85 Thoroughfare, Woodbridge	Roadside	627585	249239	NO_2	NO	2.5	2.5	NO	1.9
WBG 15	Guttering of 87 Thoroughfare Woodbridge	Roadside	627590	249249	NO_2	YES	0	2	NO	2.5
WBG 17	North end Suffolk Place, Woodbridge	Roadside	627614	249271	NO_2	NO	0	7	NO	1.9
WBG 18	106/108 Thoroughfare, Woodbridge	Roadside	627627	249339	NO_2	NO	0	1.5	NO	2.2

WBG 20	97 Thoroughfare, Woodbridge	Roadside	627604	249295	NO_2	YES	0	1.5	NO	1.5
WBG 22	Suffolk Place facing Lime Kiln Quay Road, Woodbridge	Roadside	627633	249233	NO2	NO	0	8	NO	2.2
WBG 23	50 St John's Street, Woodbridge	Roadside	627562	249235	NO2	NO	1	1	NO	2.1
MRT 1a,b	Horseman Court, Eagle Way, Martlesham	Suburban	624633	245447	NO_2	NO	0	21	NO	1.7
MRT 2	59 Manor Road, Martlesham	Suburban	624499	245777	NO2	NO	0	65	NO	1.6
MRT 3	32 Lancaster Drive, Martlesham	Suburban	624777	244643	NO2	NO	8	28	NO	1.6
LGM 1	Pear Tree House, Main Road, Little Glemham	Roadside	634203	258820	NO2	NO	0	19	NO	1.5
LGM 2	Carlton Lodge, Main Road, Little Glemham	Roadside	634051	258315	NO_2	NO	0	6.3	NO	1.7
FAR 1	Turret House, The Street, Farnham	Roadside	636273	260134	NO_2	NO	0	3	NO	1.8
FAR 2 a,b,c	Post Office Stores, The Street, Farnham	Roadside	636274	260120	NO_2	NO	0	2	NO	1.9
STA 1 a,b,c	1 Long Row, Stratford St Andrew	Roadside	635753	260002	NO_2	YES	0	2	NO	1.6

STA 2	Opposite Long Row, Stratford St Andrew	Roadside	635732	259995	NO_2	NO	n/a	1.7	NO	1.8
STA 4	Street sign on the bend, Main Road, Stratford St Andrew	Roadside	635878	260117	NO2	NO	n/a	3.8	NO	1.8
STA 6	Jacobs Cottage, Main Road, Stratford St Andrew	Roadside	635794	260042	NO_2	NO	0	7	NO	1.3
STA 7	30mph sign, Long Row, Stratford St Andrew	Roadside	635736	259984	NO_2	NO	n/a	1.9	NO	1.7
STA 8 a,b,c	5 Long Row, Stratford St Andrew	Roadside	635743	259992	NO_2	YES	0	2	NO	1.6
SAX 1	Church Street, Saxmundham	Roadside	638683	263014	NO_2	NO	0	1	NO	1.8
LEI 1	Cross Street, Leiston	Roadside	644528	262463	NO_2	NO	0.4	2.5	NO	2.2
LEI 2	Sizewell Road, Leiston	Roadside	644557	262464	NO_2	NO	0.5	1.4	NO	2.2
LEI 3	Station Road, Leiston	Roadside	644325	262634	NO_2	NO	0	2.3	NO	1.9
TRM1	Oak Cottage, 342 High Road, Trimley St Martin	Roadside	627140	237760	NO_2	NO	0	1.9	NO	1.8
TRM 2	236 High Road, Trimley St Martin	Roadside	627592	237127	NO_2	NO	0	1.9	NO	1.9

TRM 3a,b,c (was FLX 40)	216 High Road Trimley St Martin	Roadside	627618	237092	NO_2	NO	0	1.8	NO	1.9
TRM 4	Lamppost 421 to r/h/s 205 High Road, Trimley	Roadside	627613	237080	NO_2	NO	0	1.6	NO	1.9
TRM 5	McColls Shop, 206/208 Trimley St Mary	Roadside	627629	237078	NO_2	NO	0	4.2	NO	1.7
TRM 6	202 High Road, Trimley St Martin	Roadside	627645	237062	NO_2	NO	0	8.5	NO	1.6
TRM 7	173 High Road, Trimley St Mary	Roadside	627746	236808	NO_2	NO	0	3	NO	1.7
TRM 8	Lamppost 299 O/S 69 High Road, Trimley St Mary	Roadside	628270	236266	NO_2	NO	1.8	1.4	NO	1.9
TRM 9	74 High Road, Trimley St Mary	Roadside	628369	236232	NO_2	NO	0	7	NO	1.8
TRM 10	293 High Street, Walton	Roadside	629340	235737	NO_2	NO	0	2.9	NO	2
TRM 11	252/254 High Street, Walton	Roadside	628450	235681	NO_2	NO	0	3.7	NO	2
TRM 12	193 Pink House, Walton	Roadside	629641	235529	NO_2	NO	0	2.3	NO	2
EYK 1	185 The Street	Roadside	631676	251784	NO_2	NO	0	5.6	NO	1.8

Notes:

(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 2018 (%) [2]	NO_2 Annual Mean Concentration ($\mu g/m^3$) [3]				
					2014	2015	2016	2017	2018
WBG	Roadside	Automatic	n/a	99.6	39	35	37	37	32
DT1 (now CCL1)	Roadside	Diffusion Tube	n/a	41.7	15	15	15	19	20
DT2 (now LOW2)	Kerbside	Diffusion Tube	n/a	100	19	18	18	20	25
DT3 (now OBR3)	Roadside	Diffusion Tube	n/a	100	23	19	22	24	23
DT4 (now OBR2)	Roadside	Diffusion Tube	n/a	100	28	23	25	24	26
DT5 (now OBR1)	Roadside	Diffusion Tube	n/a	100	22	23	24	26	26
DT6 (now LOW4)	Kerbside	Diffusion Tube	n/a	41.7	18	15	15	18	16
DT7 (now LOW3)	Roadside	Diffusion Tube	n/a	83.3	19	18	18	24	23
DT8 (now LOW5)	Urban Background	Diffusion Tube	n/a	100	17	12	15	15	14
DT9 (now LOW1)	Roadside	Diffusion Tube	n/a	75	29	31	29	34	27
DT11 (now LOW7)	Roadside	Diffusion Tube	n/a	100	30	25	27	30	29
DT13 (now BUN1)	Roadside	Diffusion Tube	n/a	100	30	28	29	26	26
DT14 (now BEC1)	Roadside	Diffusion Tube	n/a	100	32	28	27	28	25
DT15 (now BEC2)	Roadside	Diffusion Tube	n/a	41.7	24	24	25	28	26
PT4 (now LOW6a,b,c)	Roadside	Diffusion Tube	n/a	100	–	–	36	36	35
OBR 4	Roadside	Diffusion Tube	n/a	58.3	–	–	–	–	22

BEC 3	Roadside	Diffusion Tube	n/a	58.3	_	_	_	_	35
BEC 4	Roadside	Diffusion Tube	n/a	58.3	_	_	_	_	24
BEC 5	Kerbside	Diffusion Tube	n/a	58.3	_	_	_	_	33
FLX 12	Roadside	Diffusion Tube	n/a	100	25	26	24	26	24
FLX 14	Industrial	Diffusion Tube	n/a	100	22	23	23	25	25
FLX 17	Roadside	Diffusion Tube	n/a	100	23	22	22	21	21
FLX 20	Industrial	Diffusion Tube	n/a	100	22	22	21	31	26
FLX 21	Suburban	Diffusion Tube	n/a	91.7	19	21	20	22	20
FLX 22	Industrial	Diffusion Tube	n/a	100	20	21	20	22	20
FLX 23	Roadside	Diffusion Tube	n/a	100	27	26	26	22	27
FLX 24	Roadside	Diffusion Tube	n/a	100	27	26	25	26	24
FLX 26	Roadside	Diffusion Tube	n/a	100	36	37	34	37	35
FLX 27	Roadside	Diffusion Tube	n/a	100	32	31	30	33	30
FLX 29	Industrial	Diffusion Tube	n/a	n/a	20	22	21	25	Removed
FLX 31	Industrial	Diffusion Tube	n/a	n/a	23	26	23	27	Removed
FLX 32	Industrial	Diffusion Tube	n/a	n/a	29	32	33	Removed	
FLX 33	Roadside	Diffusion Tube	n/a	n/a	**55**	**54**	**53**	**54**	Removed
FLX 34	Roadside	Diffusion Tube	n/a	n/a	**45**	**42**	**40**	**41**	Removed
FLX 35	Roadside	Diffusion Tube	n/a	n/a	34	32	31	24	Removed

FLX 36	Roadside	Diffusion Tube	n/a	n/a	36	Removed			
FLX 37	Roadside	Diffusion Tube	n/a	n/a	**42**	**41**	**40**	**43**	Removed
FLX 38	Roadside	Diffusion Tube	n/a	n/a	33	Removed			
FLX 39	Roadside	Diffusion Tube	n/a	100	28	23	22	23	22
FLX 40 (now TRM 3)	Roadside	Diffusion Tube	n/a	n/a	_	_	_	**41**	Renamed TRM 3
FLX 41	Roadside	Diffusion Tube	n/a	n/a	_	_	_	31	Removed
FLX 42	Roadside	Diffusion Tube	n/a	n/a	_	_	_	30	Removed
MEL 5	Roadside	Diffusion Tube	n/a	100	27	27	25	26	23
MEL 7	Kerbside	Diffusion Tube	n/a	91.7	_	25	25	26	24
MEL 8	Roadside	Diffusion Tube	n/a	100	_	_	_	_	20
MEL 9	Roadside	Diffusion Tube	n/a	100	_	_	_	_	18
MEL 10	Roadside	Diffusion Tube	n/a	100	_	_	_	_	22
KSG 9	Roadside	Diffusion Tube	n/a	100	29	28	28	32	30
KSG 10	Roadside	Diffusion Tube	n/a	91.7	_	_	_	35	35
KSG 11	Roadside	Diffusion Tube	n/a	n/a	_	_	_	20	Removed
KSG 12	Roadside	Diffusion Tube	n/a	n/a	_	_	_	17	Removed
WBG 1	Roadside	Diffusion Tube	n/a	100	39	36	37	37	33
WBG 3	Suburban	Diffusion Tube	n/a	100	13	12	14	14	12
WBG 5	Roadside	Diffusion Tube	n/a	100	22	20	23	21	21

WBG 6	Roadside	Diffusion Tube	n/a	100	35	33	34	34	32
WBG 8	Roadside	Diffusion Tube	n/a	100	33	31	35	34	33
WBG 10	Roadside	Diffusion Tube	n/a	91.7	28	25	25	25	26
WBG 12	Roadside	Diffusion Tube	n/a	100	21	20	22	22	20
WBG 13	Roadside	Diffusion Tube	n/a	100	28	26	28	28	28
WBG 15	Roadside	Diffusion Tube	n/a	100	37	33	35	35	32
WBG 17	Roadside	Diffusion Tube	n/a	100	25	23	25	23	23
WBG 18	Roadside	Diffusion Tube	n/a	100	34	27	32	29	30
WBG 20	Roadside	Diffusion Tube	n/a	100	32	30	32	34	31
WBG 22	Roadside	Diffusion Tube	n/a	n/a	20	16	20	18	Removed
WBG 23	Roadside	Diffusion Tube	n/a	n/a	24	22	23	24	Removed
MRT 1	Roadside	Diffusion Tube	n/a	100	22	24	24	24	23
MRT 2	Roadside	Diffusion Tube	n/a	n/a	16	Removed			
MRT 3	Roadside	Diffusion Tube	n/a	n/a	**–**	**–**	17	Removed	
LGM 1	Roadside	Diffusion Tube	n/a	n/a	14	13	14	Removed	
LGM 2	Roadside	Diffusion Tube	n/a	91.7	-	-	-	19	19
FAR 1	Roadside	Diffusion Tube	n/a	100	27	24	25	24	24
FAR 2	Roadside	Diffusion Tube	n/a	100	29	30	29	28	27
STA 1	Roadside	Diffusion Tube	n/a	100	**42**	**42**	38	35	34

STA 2	Roadside	Diffusion Tube	n/a	100	25	28	25	26	24
STA 4	Roadside	Diffusion Tube	n/a	n/a	15	Removed			
STA 6	Roadside	Diffusion Tube	n/a	100	23	24	23	22	21
STA 7	Roadside	Diffusion Tube	n/a	100	30	34	34	31	30
STA 8	Roadside	Diffusion Tube	n/a	100	_	**44**	**43**	39	38
SAX 1	Roadside	Diffusion Tube	n/a	100	27	29	32	30	29
LEI 1	Roadside	Diffusion Tube	n/a	50	_	_	23	21	21
LEI 2	Roadside	Diffusion Tube	n/a	50	_	_	18	26	26
LEI 3	Roadside	Diffusion Tube	n/a	100	_	_	20	21	23
TRM1	Roadside	Diffusion Tube	n/a	100	_	_	_	_	21
TRM 2	Roadside	Diffusion Tube	n/a	100	_	_	_	_	23
TRM 3 (was FLX 40)	Roadside	Diffusion Tube	n/a	100	_	_	_	**41**	25
TRM 4	Roadside	Diffusion Tube	n/a	100	_	_	_	_	26
TRM 5	Roadside	Diffusion Tube	n/a	91.7	_	_	_	_	24
TRM 6	Roadside	Diffusion Tube	n/a	100	_	_	_	_	21
TRM 7	Roadside	Diffusion Tube	n/a	100	_	_	_	_	20
TRM 8	Roadside	Diffusion Tube	n/a	100	_	_	_	_	28
TRM 9	Roadside	Diffusion Tube	n/a	100	_	_	_	_	21
TRM 10	Roadside	Diffusion Tube	n/a	100	_	_	_	_	26

TRM 11	Roadside	Diffusion Tube	n/a	100	_	_	_	_	22
TRM 12	Roadside	Diffusion Tube	n/a	100	_	_	_	_	25
EYK 1	Roadside	Diffusion Tube	n/a	100	_	_	_	_	19

☒ **Diffusion tube data has been bias corrected**

☒ **Annualisation has been conducted where data capture is <75%**

Notes:

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

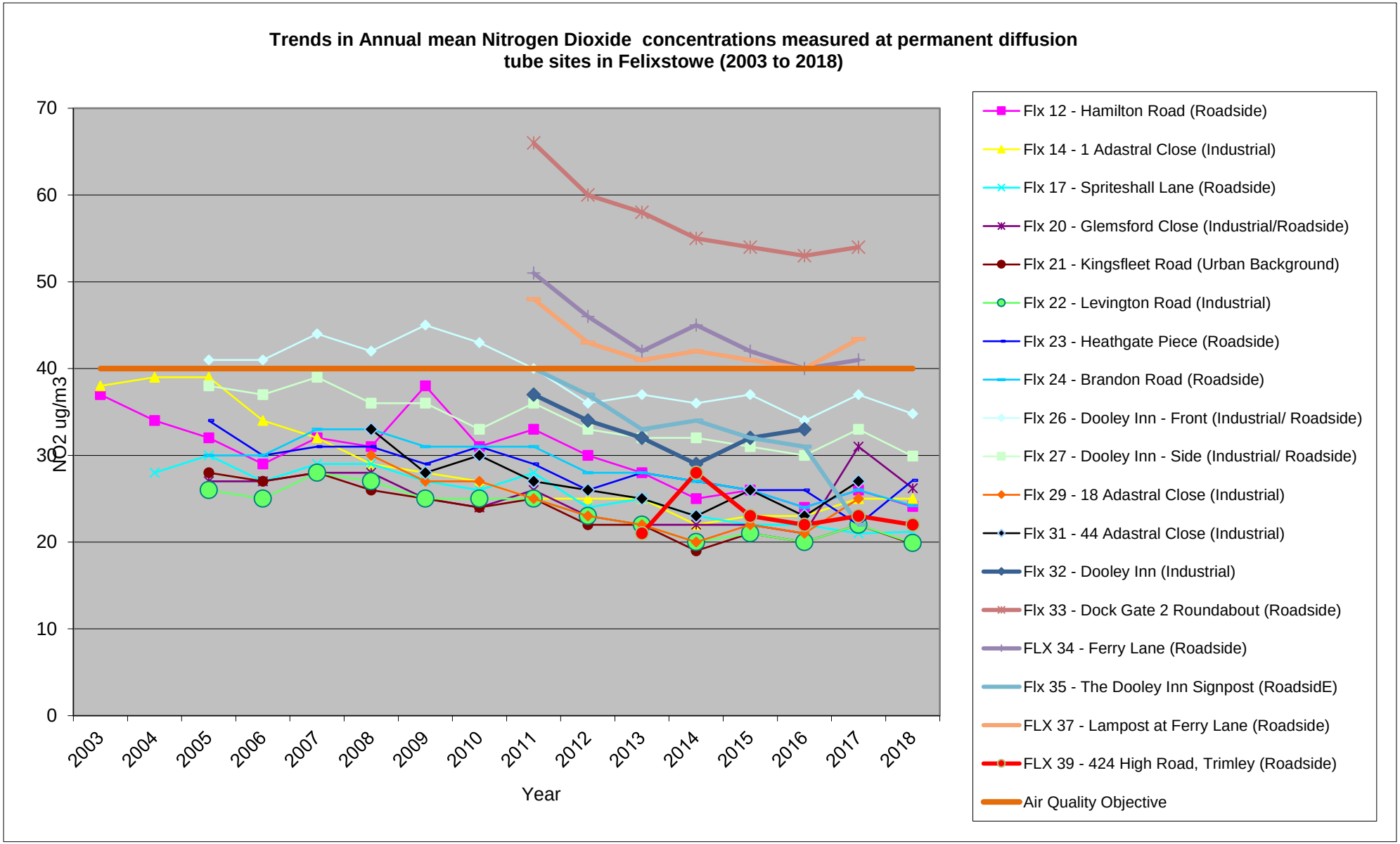
NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined.**

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

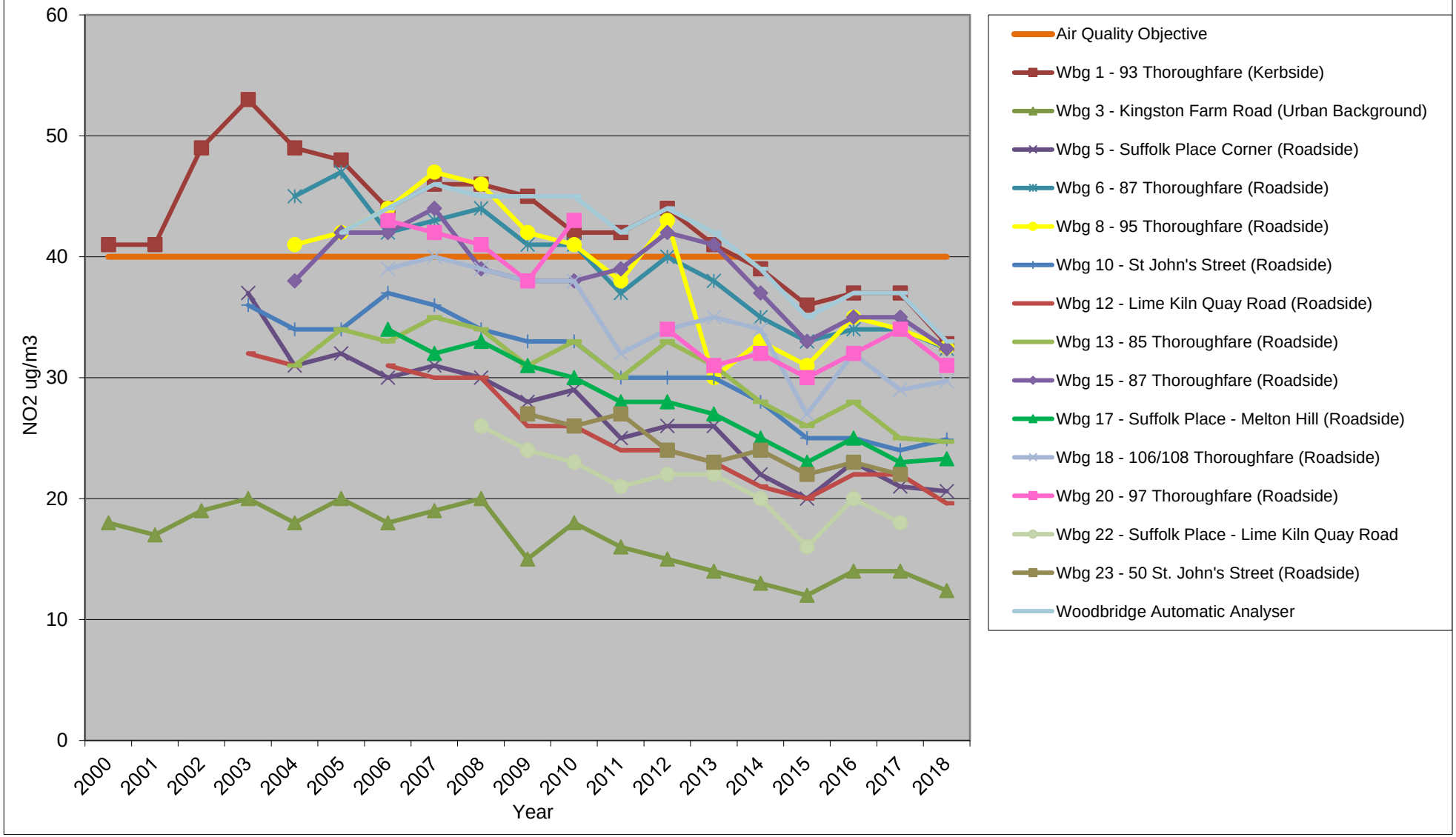
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

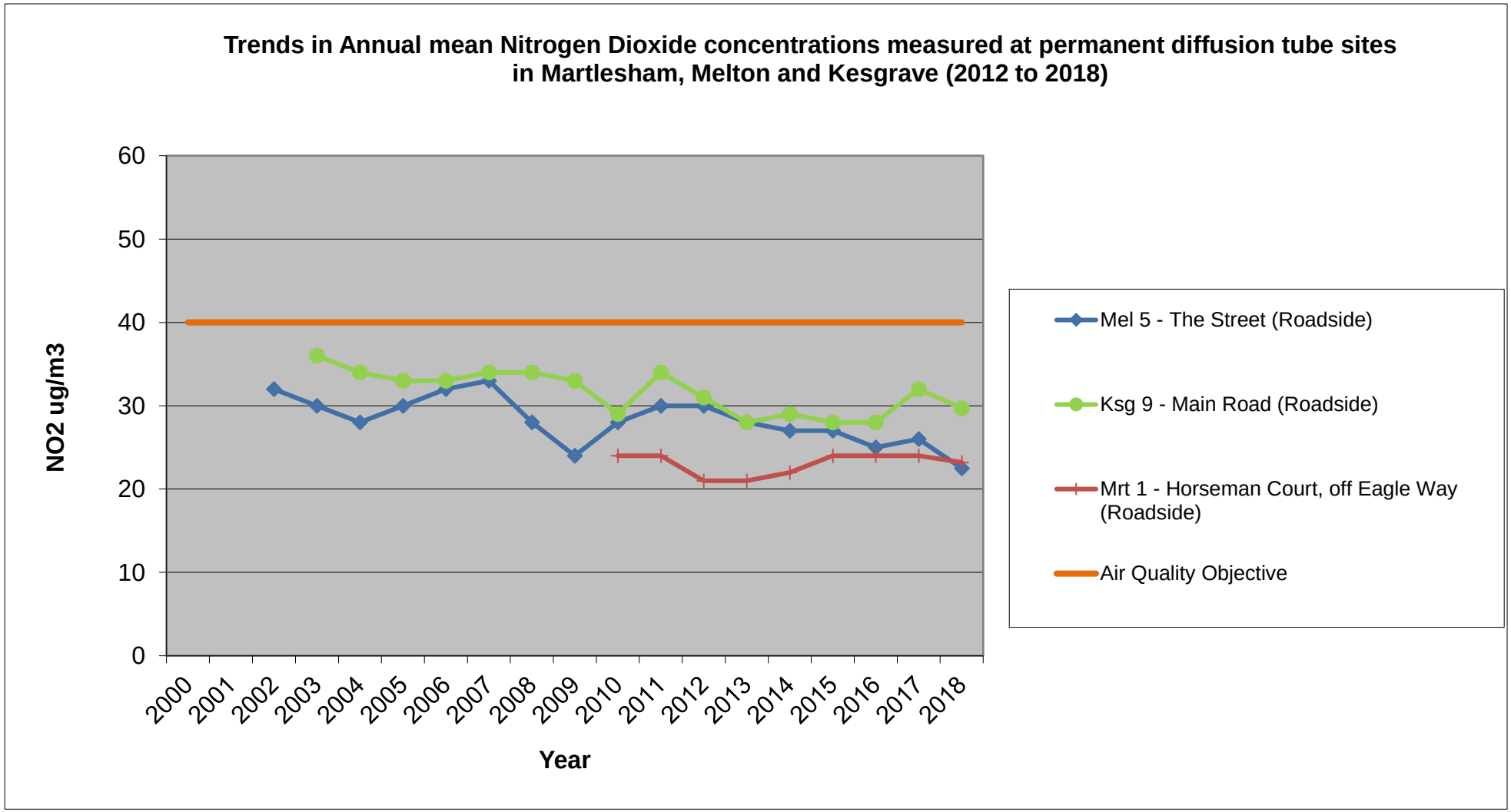
(3) Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

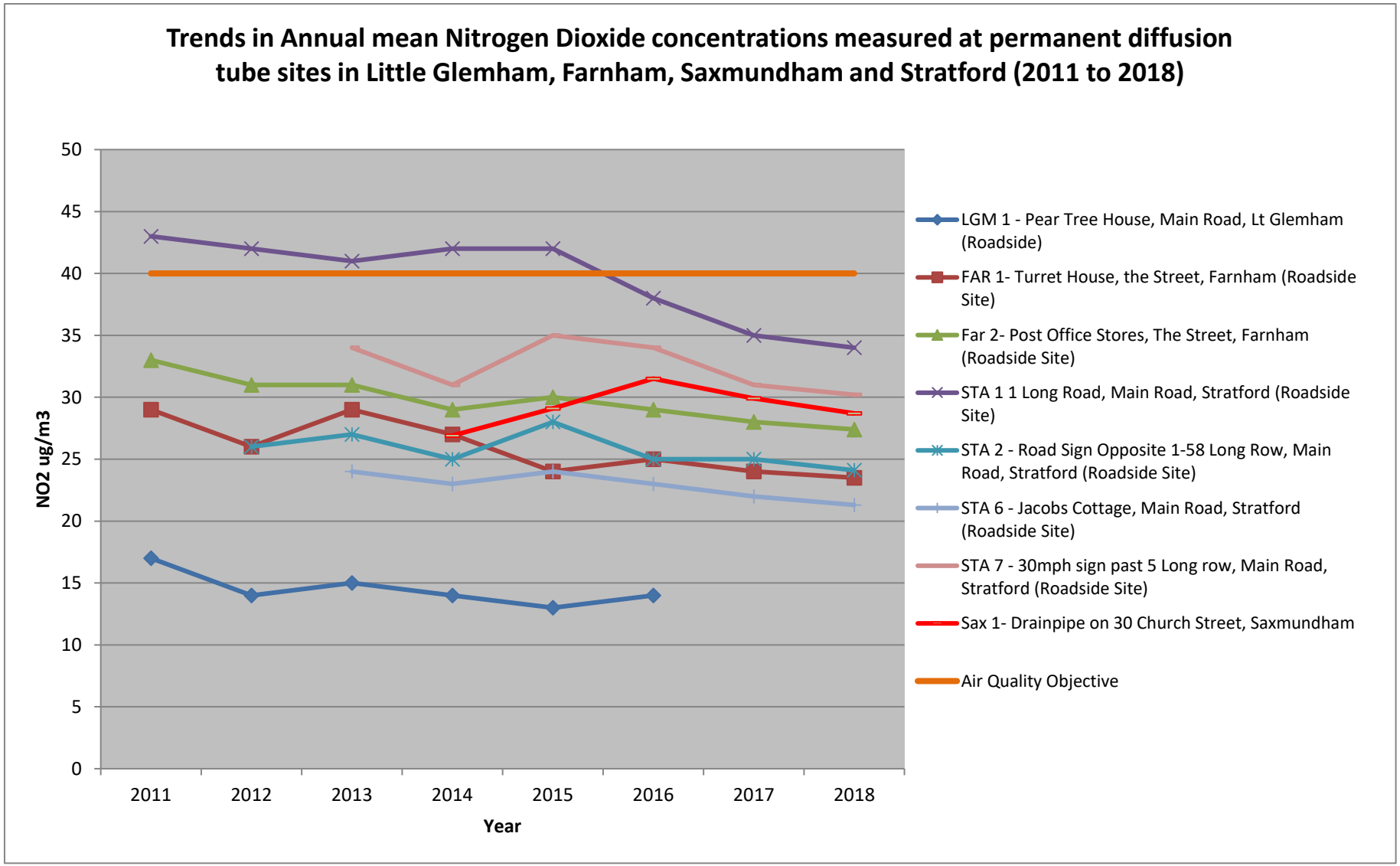
Figure A.1 – Trends in Annual Mean NO_2 Concentrations

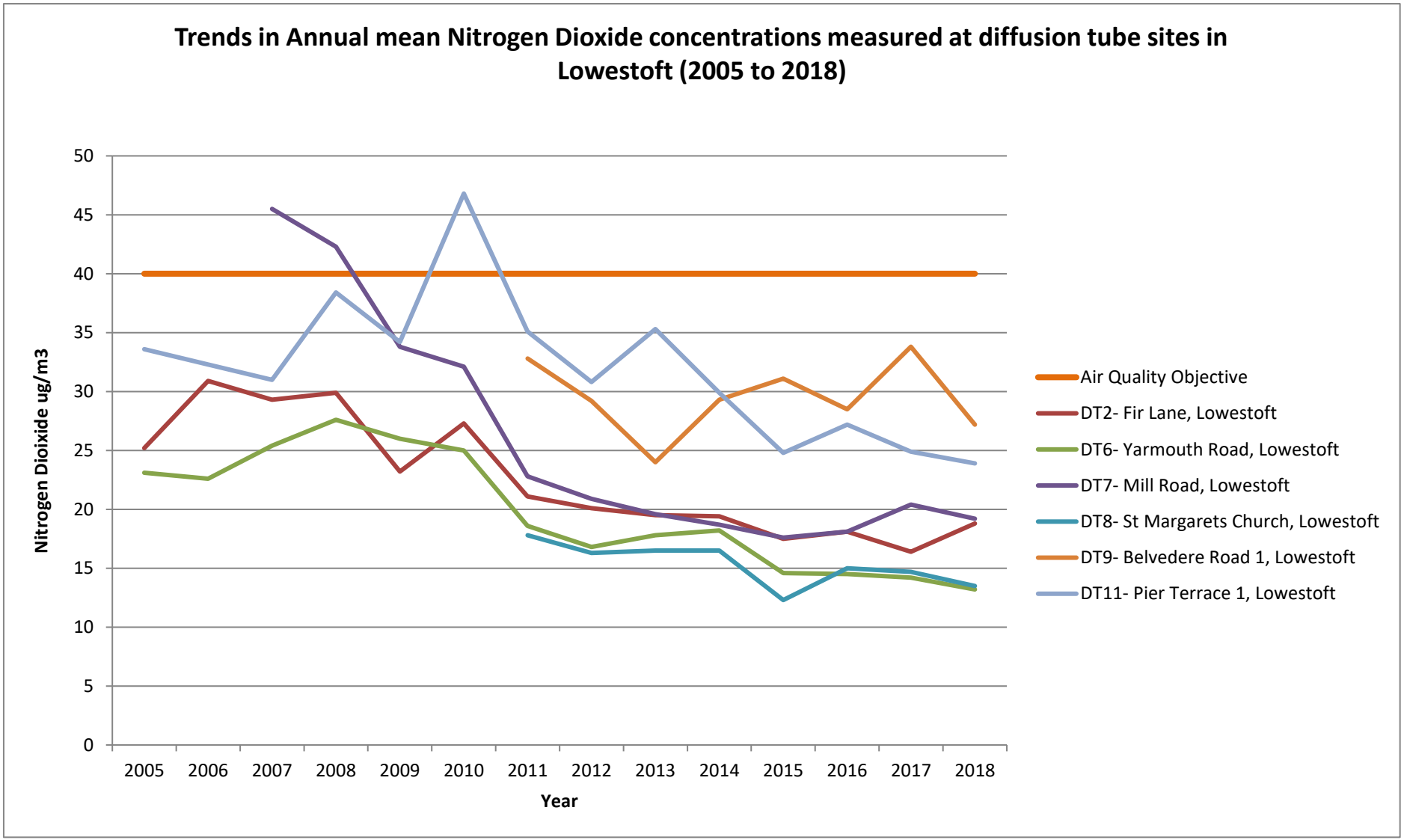


Trends in annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Woodbridge (2000 to 2018)




Trends in Annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Martlesham, Melton and Kesgrave (2012 to 2018)
NO2 ug/m3
60
50
40
30
20
10
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Year
Mel 5 - The Street (Roadside)
Ksg 9 - Main Road (Roadside)
Mrt 1 - Horseman Court, off Eagle Way (Roadside)
Air Quality Objective


Trends in Annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Little Glemham, Farnham, Saxmundham and Stratford (2011 to 2018)
NO2 ug/m3
50
45
40
35
30
25
20
15
10
5
0
2011
2012
2013
2014
2015
2016
2017
2018
Year
LGM 1 - Pear Tree House, Main Road, Lt Glemham (Roadside)
FAR 1- Turret House, the Street, Farnham (Roadside Site)
Far 2- Post Office Stores, The Street, Farnham (Roadside Site)
STA 1 1 Long Road, Main Road, Stratford (Roadside Site)
STA 2 - Road Sign Opposite 1-58 Long Row, Main Road, Stratford (Roadside Site)
STA 6 - Jacobs Cottage, Main Road, Stratford (Roadside Site)
STA 7 - 30mph sign past 5 Long row, Main Road, Stratford (Roadside Site)
Sax 1- Drainpipe on 30 Church Street, Saxmundham
Air Quality Objective


Trends in Annual mean Nitrogen Dioxide concentrations measured at diffusion tube sites in Lowestoft (2005 to 2018)
Nitrogen Dioxide ug/m3
50
45
40
35
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Year
Air Quality Objective
DT2- Fir Lane, Lowestoft
DT6- Yarmouth Road, Lowestoft
DT7- Mill Road, Lowestoft
DT8- St Margarets Church, Lowestoft
DT9- Belvedere Road 1, Lowestoft
DT11- Pier Terrace 1, Lowestoft

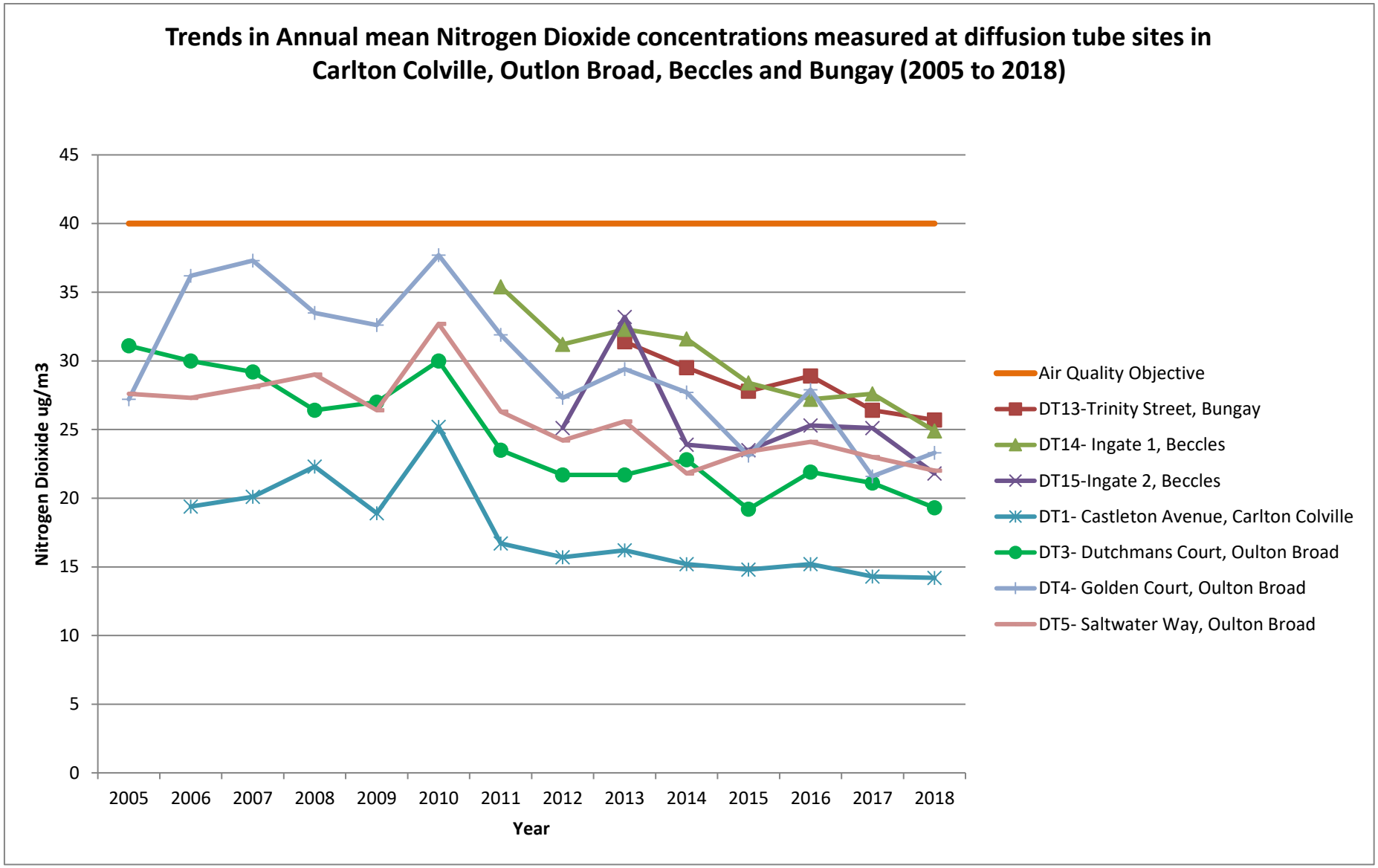

Trends in Annual mean Nitrogen Dioxide concentrations measured at diffusion tube sites in Carlton Colville, Outlon Broad, Beccles and Bungay (2005 to 2018)
Nitrogen Dioxide ug/m3
45
40
35
30
25
20
15
10
5
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Year
Air Quality Objective
DT13-Trinity Street, Bungay
DT14- Ingate 1, Beccles
DT15-Ingate 2, Beccles
DT1- Castleton Avenue, Carlton Colville
DT3- Dutchmans Court, Oulton Broad
DT4- Golden Court, Oulton Broad
DT5- Saltwater Way, Oulton Broad

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 2018 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
					2014	2015	2016	2017	2018
WBG	Roadside	Automatic	99.6	99.6	0	5	0	**1**	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.

Appendix B: Full Monthly Diffusion Tube Results for 2018

Table B.1 – NO_2 Monthly Diffusion Tube Results – 2018

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 (0.76) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
DT9 (now LOW 1)	48.0	35.7	43.5	34.1	30.1	22.7	39.3	34.5	34.1	34.4	38.2	34.9	35.8	**27.2**	
DT2 (now LOW 2)	37.0	29.0	27.9	26.8	32.2	35.9	28.1	30.6	36.6	35.6	43.5	37.7	33.4	**25.4**	**18.8**
DT7 (now LOW 3)	26.7	24.1	44.5	40.0	48.0	~	~	22.1	21.0	28.4	26.5	25.6	30.7	**23.3**	**19.2**
DT6 (now LOW 4)	23.3	20.9	29.2	24.1	22.6	~	~	~	~	~	~	~	24.0	**16.4**	**13.2**
DT8 (now LOW 5)	23.5	19.7	24.7	23.0	14.3	9.1	14.3	13.6	13.8	18.2	21.7	17.8	17.8	**13.5**	~
PT4a (now LOW 6a)	41.4	41.6	57.5	48.3	64.4	51.8	47.2	34.9	36.1	45.7	36.4	34.5	~	~	~
PT4b (now LOW 6b)	48.2	40.8	57.0	50.3	64.8	49.3	48.8	39.8	39.1	44.4	40.3	41.4	~	~	~
PT4c (now LOW 6c)	41.2	33.2	57.7	50.0	58.4	52.8	44.8	37.3	39.0	46.6	38.5	40.5	~	~	~
PT4a,b,c (now LOW 6a,b,c) (mean)	43.6	38.5	57.4	49.5	62.5	51.3	46.9	37.3	38.1	45.6	38.4	38.8	45.7	**34.7**	~

DT11 (now LOW 7)	45.5	33.6	38.5	36.8	47	38.5	44	37.5	37.4	36.6	31.9	34.4	38.5	**29.2**	**23.9**
DT5 (now OBR 1)	35.8	38.8	34.6	36.5	33.4	30.7	36.9	30.2	29.6	34.9	41.6	30.1	34.4	**26.2**	**22.0**
DT4 (now OBR 2)	45.7	39.4	29.7	31.4	22.4	20.3	44.7	34.4	33.3	41.7	36.2	31.1	34.2	**26.0**	**23.3**
DT3 (now OBR 3)	32.9	26.0	32.7	35.8	27.1	22.8	32.5	29.1	28.3	33.5	33.0	26.1	30.0	**22.8**	**19.3**
OBR 4	~	~	~	~	~	22.9	29.4	17.9	22.1	28.8	35.3	30.1	26.6	**22.0**	~
DT1 (now CCL 1)	31.5	26.1	32.5	23.9	30.5	~	~	~	~	~	~	~	28.9	**19.8**	**14.2**
DT14 (now BEC1)	37.4	33.2	44.8	42.5	28.4	255	34.6	29.7	30.4	28.2	27.9	31.3	32.8	**24.9**	~
DT15 (now BEC2)	42.1	41.4	37.5	30.6	36.2	~	~	~	~	~	~	~	37.6	**25.7**	**21.8**
BEC 3	~	~	~	~	~	37.4	39.5	40.1	47.7	46.9	45	36.7	41.9	**34.7**	~
BEC 4	~	~	~	~	~	39.8	36.1	25.6	23.1	29.4	26.6	24.8	29.3	**24.2**	~
BEC 5	~	~	~	~	~	43.9	52.8	35.1	32.2	41.4	39.5	35.9	40.1	**33.2**	~
DT13 (now BUN1)	42.0	27.6	38.6	36.2	36.1	33.0	36.3	33.3	29.7	38.5	36.4	17.6	33.8	**25.7**	~
FLX 12	39.9	31.6	40.1	33.4	23.3	18.6	26.9	30.6	35.8	36.7	28.4	34.5	31.7	**24.1**	~
FLX 14	43.4	31.6	40.9	33.8	22.8	20.9	27.1	30.8	38.1	39.9	30.7	35.1	32.9	**25.0**	~
FLX 17	30.1	21.9	36.4	30.7	28.9	23.6	28.9	24.2	25.5	28.4	31.2	24.3	27.8	**21.2**	~
FLX 20	64	36.5	39.1	32.8	20.1	16.8	27.2	30.3	35.9	32.5	41.6	37	34.5	**26.2**	~
FLX 21	37.4	25	31.7		17.1	14.7	22.1	23.3	26.8	28.4	29.9	30.5	26.1	**19.8**	~
FLX 22	33.6	24.7	35.1	25.8	15.8	14.2	21.9	25.5	29.2	32.9	25.4	30	26.2	**19.9**	~
FLX 23	32.7	32.7	40.1	36.6	51.7	39.5	40.1	28.8	29.7	31.5	35.4	28.9	35.6	**27.1**	~
FLX 24	41.3	28.7	46.1	34.2	25.3	19.3	28.1	29.1	35.8	24	34.5	35.2	31.8	**24.2**	~
FLX 26a	53.2	39.3	54.0	48.2	35.9	30.2	41.6	43.3	46.5	44.8	39.9	44.8	43.5	~	~
FLX 26b	50.5	35.4	65.3	49	48.6	33.0	44.1	42.9	42.9	47.4	52.8	43.5	46.3	~	~
FLX 26c	52	52.1	61.4	54.2	40.2	33.8	42.2	43.4	47.7	48.4	51	46	47.7	~	~

FLX 26 a,b,c - mean	51.9	42.3	60.2	50.5	41.6	32.3	42.6	43.2	45.7	46.9	47.9	44.8	45.8	**34.8**	~
FLX 27a	46.2	37.5	51.5	41.1	27.8	27.1	34.1	35.5	39.9	42.3	42.6	40.6	38.9	~	~
FLX 27b	41.6	38.6	52.3	43.3	29.2	25.4	36.5	38.7	38.8	39.7	41.7	42.5	39.0	~	~
FLX 27c	51.2	36.9	51.8	44	30.9	22.9	35.0	35.9	43.0	45	44.7	40.7	40.2	~	~
FLX 27 a,b,c- mean	46.3	37.7	51.9	42.8	29.3	25.1	35.2	36.7	40.6	42.3	43.0	41.3	39.3	**29.9**	~
FLX 39	28	29.6	37.5	34	25.9	22.4	30	27.3	27.8	30.1	35.7	25.6	29.5	**22.4**	~
TRM 1	29.9	31.1	40.0	28.5	21.5	16.6	25.3	24.5	24	32.2	27.2	25.9	27.2	**20.7**	~
TRM 2	32.3	31.4	38.4	30.8	29.6	22.7	30.5	26.1	27.6	33.2	34.9	30.7	30.7	**23.3**	~
TRM 3A	36.4	36.7	41.8	34	28	21.6	32	27.4	28.1	33.8	37.2	31.5	32.4	~	~
TRM 3B	32.4	35.6	38.2	32	29.1	23.7	31.5	23.6	28.6	36	37.7	35.5	32.0	~	~
TRM 3C	35.2	35.9	37.6	35.4	28.5	22.8	31.7	27.4	30.6	35.1	38.2	27.5	32.2	~	~
TRM 3 A,B,C - mean	34.7	36.1	39.2	33.8	28.5	22.7	31.7	26.13	29.10	35.0	37.70	31.50	32.2	**24.5**	~
TRM 4	38	36.9	46.5	39.1	25.1	20.6	29.4	32.2	30.4	36.2	42.1	34.8	34.3	**26.0**	~
TRM 5	29.8	34.2		30.1	33.6	25.3	36.0	26.9	29.1	34.7	33.5	28.2	31.0	**23.6**	~
TRM 6	30	29.5	35.5	31.6	24.4	19.4	24.4	24.3	26.3	33	34.8	27.4	27.4	**20.8**	~
TRM 7	30.1	26	34.2	29.8	22.1	17.8	24.9	24.3	27.9	28.8	26	26.5	26.5	**20.2**	~
TRM 8	46	37.5	46.4	37.8	24.3	20.9	33.0	32.6	36.5	38.7	44.1	39.7	36.5	**27.7**	**25.3**
TRM 9	30.8	26.4	34.2	31.1	20.9	17.9	26.2	25.2	29	21.3	31.3	29.3	27.0	**20.5**	~
TRM 10	45.6	33.2	47.0	34.8	24.1	19.1	29.0	31.3	35.3	33.7	40.1	34.7	34.0	**25.8**	~
TRM 11	38.4	30	37.4	30.2	21.6	19.3	26.4	24.2	30	29.8	33	26.8	28.9	**22.0**	~
TRM 12	43.3	29.7	42.3	34.3	22.8	18.6	29.2	29.3	31.3	35.7	36.5	36.7	32.5	**24.7**	~
KSG 9	54.6	34.4	46.7	42.9	25.3	21.5	38.4	41.9	40.0	36.6	42.1	44.6	39.1	**29.7**	~
KSG 10	41.4	49.7	62.4	45.8	40.7	34.2	48.2	44.6	41.5	45.8	50.3	43.2	45.7	**34.7**	~
WBG 1a	55.8	54.9	55.4	39.7	39.8	31.5	37.5	37.9	43.1	43.3	38	38.6	43.0	~	~

WBG 1b	58.5	53.7	55.9	41.2	40.1	33.2	39.3	38.4	45.5	43.8	36.3	40.7	43.9	~	~
WBG 1c	54.3	50.3	54.6	41.2	32.2	31.8	37.8	38.9	41.2	47.7	41.3	42.3	42.8	~	~
WBG 1 a,b,c - mean	56.2	53.0	55.3	40.7	37.4	32.2	38.2	38.4	43.3	44.9	38.5	40.5	43.2	**32.8**	~
WBG 3	20.5	18.3	21.4	15.4	11.8	8.6	12.6	14.1	16.2	20.9	18.8	16.4	16.3	**12.4**	~
WBG 5	33.3	33.6	29.1	26.1	26.6	23.4	25.0	22.2	24.0	27.5	29.9	24	27.1	**20.6**	~
WBG 6	57.1	49.8	53.2	40.1	39.4	29	38.3	38.1	41.8	41.1	41	42.4	42.6	**32.4**	~
WBG 8	56.9	48	54.8	41.4	36.7	28.8	44.1	39.2	40	41.1	38.8	43.3	42.8	**32.5**	~
WBG 10	42.5	41.5	47.2	32.6	31.6	26.6	38.2	28.8	23.8	30.2	31.8	30.2	33.8	**25.7**	**24.9**
WBG 12	37.3	26.8	35.3	25	15.9	14.9	22.1	28.1	27.3	27.9	27.1	26.1	26.2	**19.9**	**19.6**
WBG 13	44.4	46.5	46	35.1	34.7	27.2	32.9	31.2	29.8	37.7	36.1	34.3	36.3	**27.6**	**24.7**
WBG 15	51.4	53.1	50.6	39.1	41.9	33.9	39.4	37	39.9	45.2	37.1	42.5	42.6	**32.4**	~
WBG 17	38	37.9	40.7	32.5	22.1	21.3	35.2	27.4	25.3	29	31.8	26.8	30.7	**23.3**	~
WBG 18	38.8	49.3	45.4	38.2	38.4	32.5	42.4	34.8	34.7	40.1	39.9	34.7	39.1	**29.7**	~
WBG 20	58.6	47.6	53.2	37.8	30.3	26.4	37.1	44.4	43.0	41.5	35	34.9	40.8	**31.0**	~
MEL 5	34.9	26.3	39.2	32.0	18.0	20.6	27.4	29.5	33.0	32.2	32.8	37	30.2	**23.0**	**22.5**
MEL 7	38.8	36.3	40.5	32.6	24.8	20.4	29.5		29.5	30.1	38.5	32.7	32.2	**24.4**	~
MEL 8	26.8	24.7	30.9	28.7	21.2	17.4	23.5	25.5	30.0	28.3	30.7	27.7	26.3	**20.0**	~
MEL 9	29.8	24.5	31.1	24.0	16.3	14.0	20	22.14	24.6	26.2	28.5	24.1	23.8	**18.1**	~
MEL 10	38.8	31.6	34.8	26.8	20.0	18.2	23.1	25.6	30.8	32.7	33	32.5	29.0	**22.0**	~
MRT 1a	37.5	32.6	41.1	31.7	29.3	24.4	31.7	29.8	28.3	29	31	25.6	~	~	~
MRT 1b	35.4	30.7	36.8	29.4	27.6	22.4	28.9	29.7	29.7	29	32.1	30.0	~	~	~
MRT 1a,b,- Mean	36.5	31.7	39.0	30.6	28.5	23.4	30.3	29.8	29.0	29.0	31.6	27.8	30.6	**23.2**	~
LGM 2		25.2	30	26.7	19.7	15.1	24.2	27.6	25.8	26.9	26.8	25.4	24.9	**18.9**	~
FAR 1	29.2	30.3	35.3	28.1	36.7	31.1	28.9	29.6	29.9	34.8	28.6	27.8	30.9	**23.5**	~
FAR 2a	34.9	33.3	41.4	34.6	33.9	27.7	39.1	36.3	35.1	41.5	37.0	29.1	~	~	~

FAR 2b	39.4	38.8	42.9	34.6	34.1	29.1	39.2	37.9	34.9	41.1	38	34.7	~	**~**	**~**
FAR 2c	35.6	40.7	40	37.3	31.5	28.4	38.3	37	30.2	40.9	33.3	34.8	~	**~**	**~**
FAR 2a,b,c-mean	36.6	37.6	41.4	35.5	33.2	28.4	38.9	37.1	33.4	41.2	36.1	32.9	36.0	**27.4**	**~**
STA 1a	43.6	36.9	48.8	49.8	41.4	34.9	52.6	43.9	41.6	46.2	44	34.1	~	**~**	**~**
STA 1b	48.3	30.4	56.1	49.9	45.3	38.9	43.9	49.5	41.6	47.7	47.4	33	~	**~**	**~**
STA 1c	49.9	46.6	54.4	50.6	46	39.4	45.4	46	43.2	50	50.7	37.2	~	**~**	**~**
STA 1a,b,c-mean	47.3	38.0	53.1	50.1	44.2	37.7	47.3	46.5	42.1	48.0	47.4	34.8	44.7	**34.0**	**~**
STA 2	35.4	30.9	34.3	33.7	30.2	24.7	37	37.9	31.7	32.5	33.4	18.9	31.7	**24.1**	**~**
STA 6	26.7	31.1	34	29.8	30	23.2	32.5	25.7	25.3	28.2	27.3	22.9	28.1	**21.3**	**~**
STA 7	33.6	39.5	44	33.2	46.8	40.6	44.8	41.1	40.2	43.1	35	34.2	39.7	**30.2**	**~**
STA 8a	49.7	51.2	59.4	50.8	44.5	35.9	60.5	51.5	41.5	47	47	37.8	~	**~**	**~**
STA 8b	49.3	45.8	52.2	55.4	50.3	38.4	61.4	51.8	43.5	47.9	56.6	41.6	~	**~**	**~**
STA 8c	51.5	46	59.2	54.8	48.6	43.4	65.8	53.5	47.7	48.4	57	40	~	**~**	**~**
STA 8a,b,c-mean	50.2	47.7	56.9	53.7	47.8	39.2	62.6	52.3	44.2	47.8	53.5	39.8	49.6	**37.7**	**~**
SAX 1	36.5	40.4	49.2	35.6	34.2	33.9	39.5	35	36.1	44.8	33.9	33.6	37.7	**28.7**	**~**
LEI 1	27.4	28.3	35.3	27.2	26.4	21.5	24.5	24.4	25.7	27.9	26.7	27.8	26.9	**20.5**	**20.0**
LEI 2	34.4	37.5	40.8	38.8	30.1	23	37.7	32.2	29.1	35.8	39.8	29	34.0	**25.9**	**24.7**
LEI 3	29.9	32.3	37.3	31.3	31.3	24.7	29.1	25.6	27.4	32.5	30.8	26.6	29.9	**22.7**	**~**
EYK 1	24.3	25.7	29.4	24.7	23.1	18.6	24.5	21.4	23.4	29.8	27	21	24.4	**18.6**	**~**

☒ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Annualisation has been conducted where data capture is <75%**

☒ **Where applicable, data has been distance corrected for relevant exposure**

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) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

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

QA/QC of automatic monitoring

NO_2 concentrations were monitored by ozone chemiluminescence in Woodbridge in East Suffolk Council (ESC). Quality assurance of the data from the continuous monitoring station was carried out by Ricardo-AEA following the same procedures used for sites within the Government's Automatic Urban and Rural Network. Calibrations were undertaken every 2-3 weeks by a Council Officer. The procedures adopted for the calibrations were modelled on those developed by AEA Energy & Environment for use in the national monitoring networks. The calibrations were undertaken using certified calibration gas provided by BOC with traceability to National Metrology Standards obtained via regular UKAS Quality Control Audits carried out by Ricardo-AEA. The audits provide a range of information that is utilised within the data management process for the data sets.

Audit tests are undertaken once a year by Ricardo-AEA. They include accredited audit zero and span calibrations, linearity, NO_x converter efficiency, flow and leak checks as well as checks of the instruments sampling system. Data presented in this report have been fully ratified by Ricardo-AEA.

The data set was screened, scaled and validated using all available routine site calibrations, audit results and service engineer records. This was an ongoing process with checks made daily to ensure high data capture is achieved. A final process of data ratification ensures that the data provide the most accurate record of the pollution concentrations across the measurement period. The data management process adopted is that evolved and implemented by Ricardo-AEA within the data management programme of the AURN UK national monitoring network. This process is expected to deliver data sets that meet the EU Data Quality Objective of a measurement uncertainty of better than 15%.

QA/QC of diffusion tube monitoring

Diffusive samplers, or diffusion tubes, (as described in paragraphs 7.178 - 7.198 of the Technical Guidance LAQM.TG(16)) are widely used for indicative monitoring of ambient nitrogen dioxide (NO_2) in the context of Review and Assessment. Diffusion tubes are particularly useful:

- when simple, indicative techniques will suffice;
- to give an indication of longer-term average NO_2 concentrations;
- for indicative comparison with the Air Quality Strategy Objectives based on the annual mean;
- for highlighting areas of high NO_2 concentration; and
- where installation of an automatic analyser is not feasible

They are useful for identifying areas of high NO_2 concentration, particularly when dealing with sources such as traffic emissions, which do not change much from day to day.

Diffusion tubes are used widely by ESC. Diffusion tubes were deployed, and analysed, as set out in the Technical Guidance LAQM.TG(16) paragraphs 7.178-7.198, and in accordance with the "NO_2 Diffusion Tubes for LAQM: Guidance Note for Local Authorities". At the end of the monitoring period any erroneous data was deleted and the annual average then calculated for each site. For any sites with data capture less than 75% (9 months) the results were then annualised. As diffusion tubes tend to under or over read this can result in low accuracy and it is necessary to bias correct the results based upon local or national collocation studies with chemiluminescent analysers. Bias correction was undertaken after annualisation of the data. Following this, any required distance correction calculations were undertaken. Further details of all stages are outlined in the following text.

Analytical laboratory

The analytical laboratory used for supply and analysis of NO_2 diffusion tubes for ESC is Environmental Scientifics Group (ESG) based in Didcot. The monitoring is undertaken using Palmes passive diffusion tubes exposed on a monthly basis. The tubes are prepared by spiking acetone:triethanloamine (TEA) (50:50) onto the grids prior to the tubes being assembled. The tubes are then desorbed with distilled water and the extract analysed using a segmented flow auto-analyser with ultraviolet detection. The laboratory is formally accredited under the United Kingdom Accreditation Scheme (UKAS).

The samples were analysed in accordance with ESG standard operating procedure ANU/SOP/1015 issue 1, which meets the guidelines set out in Defra's 'Diffusion Tubes For Ambient NO_2 Monitoring practical Guidance'.

The results were initially calculated assuming an ambient temperature of 11^{o}C, and the reported values adjusted to 20^{o}C to allow for direct comparison with EU limits.

The diffusion tubes are stored and installed in accordance with the "NO_2 Diffusion Tubes for LAQM: Guidance Note for Local Authorities".

ESG participates in the Defra promoted independent analytical proficiency testing (PT) scheme AIR-PT to check analytical performance. This is operated by LGC Standards and supported by the Health and Safety Laboratory. AIR-PT started in 2014 and combines two long running proficiency testing schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme. For NO_2 diffusion tubes, the test sample types used are called AIR NO2 and these are distributed to participating laboratories on a quarterly basis.

With consent from participating laboratories, LGC Standards provides a summary of the proficiency testing data to the LAQM Helpdesk updated on a quarterly basis following completion of each AIR-PT round. This information is hosted on their webpages at http://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html .
ESG Scientifics, at Didcot achieved the highest score of **'Satisfactory'** during 2018.

Annualisation of 2018 diffusion tube data

Short-term to Long-term Data adjustment

Some diffusion tube sites failed to achieve full data capture mainly due to re-location mid-year. For sites with fewer than 9 months of data the mean of the 2018 data has been "annualised" using the procedure set out in LAQM.TG(16) Box 7.9. The method is as follows:

- Identify 2-4 nearby, long term, continuous monitoring sites, ideally those forming part of the national network. These should be background sites (Urban background, Suburban or Rural) to avoid any very local effects that may occur at Urban Centre, Roadside or Kerbside sites, and should wherever possible lie within a radius of about 50 miles. Three sites have been used here; Wicken Fen (Rural Background), St. Osyth (Rural Background) and Norwich Lakenfields (Urban background). These sites are part of the UK Automatic Urban and Rural Network (AURN) and are the closest sites to us with sufficient data capture for the year in question. Data for Norwich Lakenfields is provisional from 1/10/18 onwards.
- Obtain the unadjusted (not corrected for bias) annual mean (Am) for the calendar year for these sites. As this calculation is to estimate the annual mean for a diffusion tube site, the diffusion tube calendar year for 2018 was based on the diffusion tube exposure periods rather than 1st Jan – 31st Dec 2018.
- Work out the period mean (Pm) for the period of interest with diffusion tube results at each of the comparison sites separately.
- Calculate the ratio of the annual mean to the period mean (Am:Pm) for each period at each location.
- Calculate the average of these ratios (R_a). This is the adjustment factor.
- Multiply the measured period mean (M) for the short-term monitoring location by the adjustment factor (R_a) to give the estimate of the annual mean for 2018.
- Calculations are set out in the table overleaf.

Site	Missing months	Annual mean NO_2, Wicken Fen µg m^{-3} (Am)	Annual mean NO_2, St Osyth µg m^{-3} (Am)	Annual mean NO_2, Norwich Lakenfields µg m^{-3} (Am)	Period mean NO_2, Wicken Fen µg m^{-3} (Pm)	Period mean NO_2, St Osyth µg m^{-3} (Pm)	Period mean NO_2, Norwich Lakenfields µg m^{-3} (Pm)	Ratio Annual: Period mean Wicken Fen (Am:Pm	Ratio Annual: Period mean St Osyth (Am:Pm)	Ratio Annual: Period mean Norwich Lakenfields (Am:Pm)	Average Am:Pm of all sites (R_a)
LOW 4	Jun - Dec	8.01	12.72	11.71	9.24	13.54	13.18	0.87	0.94	0.89	**0.90**
OBR 4	Jan – May	8.01	12.72	11.71	7.12	12.13	10.66	1.13	1.05	1.10	**1.09**
CCL 1	Jun - Dec	8.01	12.72	11.71	9.24	13.54	13.18	0.87	0.94	0.89	**0.90**
BEC 2	Jun - Dec	8.01	12.72	11.71	9.24	13.54	13.18	0.87	0.94	0.89	**0.90**
BEC 3	Jan – May	8.01	12.72	11.71	7.12	12.13	10.66	1.13	1.05	1.10	**1.09**
BEC 4	Jan – May	8.01	12.72	11.71	7.12	12.13	10.66	1.13	1.05	1.10	**1.09**
BEC 5	Jan – May	8.01	12.72	11.71	7.12	12.13	10.66	1.13	1.05	1.10	**1.09**

LOW 4: the (unadjusted) measured period mean (M) was 24.0 µg/m^3: 24.0 µg/m^3 (M) x 0.90 (R_a) = **21.6 µg/m^3 (annualised mean)**
OBR 4: the (unadjusted) measured period mean (M) was 26.6 µg/m^3: 26.6 µg/m^3 (M) x 1.09 (R_a) = **29.0 µg/m^3 (annualised mean)**
CCL 1: the (unadjusted) measured period mean (M) was 28.9 µg/m^3: 28.9 µg/m^3 (M) x 0.90 (R_a) = **26.0 µg/m^3 (annualised mean)**
BEC 2: the (unadjusted) measured period mean (M) was 37.6 µg/m^3: 37.6 µg/m^3 (M) x 0.90 (R_a) = **33.8 µg/m^3 (annualised mean)**
BEC 3: the (unadjusted) measured period mean (M) was 41.9 µg/m^3: 41.9 µg/m^3 (M) x 1.09 (R_a) = **45.7 µg/m^3 (annualised mean)**
BEC 4: the (unadjusted) measured period mean (M) was 29.3 µg/m^3: 29.3 µg/m^3 (M) x 1.09 (R_a) = **31.9 µg/m^3 (annualised mean)**
BEC 5: the (unadjusted) measured period mean (M) was 40.1 µg/m^3: 40.1 µg/m^3 (M) x 1.09 (R_a) = **43.7 µg/m^3 (annualised mean)**

- The annualised means will then be bias adjusted as for all other sites.

N.B Annual mean for all sites runs 04/01/18 to 09/01/19.

Period mean dates:

Jan – 4/1 - 2/2
Feb – 2/2 – 5/3
Mar – 5/3 – 29/3
Apr – 29/3 – 4/5
May – 4/5 – 7/6
Jun - 7/6 – 4/7
Jul – 4/7 – 1/8
Aug – 1/8 – 7/9
Sep – 7/9 – 1/10
Oct – 1/10 – 29/10
Nov – 29/10 – 6/12
Dec - 6/12 – 9/1

NO_2 Diffusion Tube Bias Adjustment

Diffusion tubes are a useful low-cost method for indicative monitoring of ambient nitrogen dioxide (NO_2) concentrations. However, diffusion tubes are affected by several sources of interference which can cause substantial under or overestimation (often referred to as "bias") compared to the chemiluminescent analyser (defined within Europe as the reference method).

Any such "bias" is a problem where diffusion tube results are to be compared with air quality objectives. As a result, local authorities are required to quantify the "bias" of their diffusion tube measurements and apply an appropriate bias adjustment factor to the annual mean if required.

Local Authorities can either:

1. Carry out their own co-location study (in which the accuracy of the diffusion tubes is quantified by exposure alongside an automatic chemiluminescence analyser), and use the results to calculate a bias adjustment factor.

2. Use a combined bias adjustment factor, based on the result of many co-location studies (using the same laboratory and tube preparation method).

National Bias Adjustment Factor

Combined “national” bias adjustment factors for UK diffusion tube laboratories, based upon Local Authority co-location studies throughout the UK, are provided on behalf of Defra and the Devolved Administrations. A database of these bias adjustment factors is available at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html. **The national bias adjustment factor** given for ESG Didcot in 2018 in the 03/19 edition of ‘National Spreadsheet of Bias Adjustment Factors’ **was 0.76 using results from 21 different studies**. A copy of the output from the spreadsheet can be viewed overleaf.

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/19

Follow the steps below **in the correct order** to show the results of **relevant** co-location studies
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet
This spreadhseet will be updated every few months: the factors may therefore be subject to change. This should not discourage their immediate use.

This spreadsheet will be updated at the end of June 2019
LAQM Helpdesk Website

The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.

Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.

Step 1: Select the Laboratory that Analyses Your Tubes from the Drop-Down List
If a laboratory is not shown, we have no data for this laboratory.

Step 2: Select a Preparation Method from the Drop-Down List
If a preparation method is not shown, we have no data for this method at this laboratory.

Step 3: Select a Year from the Drop-Down List
If a year is not shown, we have no data[2]

Step 4: Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor[3] shown in blue at the foot of the final column.

If you have your own co-location study then see footnote[4]. If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[2] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m³)	Automatic Monitor Mean Conc. (Cm) (µg/m³)	Bias (B)	Tube Precision[5]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2018	R	Cambridge City Council	12	42	30	40.2%	G	**0.71**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Canterbury City Council	11	38	28	35.8%	G	**0.74**
SOCOTEC Didcot	50% TEA in acetone	2018	UB	Canterbury City Council	12	16	12	36.3%	G	**0.73**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Hambleton District Council	12	21	18	20.8%	G	**0.83**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Ipswich Borough Council	12	34	29	17.9%	G	**0.85**
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	12	41	27	54.2%	G	**0.65**
SOCOTEC Didcot	50% TEA in acetone	2018	UB	City of York Council	11	22	15	52.0%	G	**0.66**
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	12	34	26	30.8%	G	**0.76**
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	11	30	23	32.9%	G	**0.75**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Dumfries and Galloway Council	12	36	30	19.8%	G	**0.83**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Knowsley MBC	12	47	38	26.5%	G	**0.79**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Suffolk Coastal DC	11	44	33	32.4%	G	**0.76**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Thanet District Council	10	26	21	25.4%	G	**0.80**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	11	33	23	42.2%	G	**0.70**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	12	33	29	17.2%	G	**0.85**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	12	30	26	16.1%	G	**0.86**
SOCOTEC Didcot	50% TEA in acetone	2018	UB	Slough Borough Council	10	38	31	25.6%	G	**0.80**
SOCOTEC Didcot	50% TEA in acetone	2018	SU	Slough Borough Council	11	32	22	46.7%	G	**0.68**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Slough Borough Council	11	39	32	22.5%	G	**0.82**
SOCOTEC Didcot	50% TEA in acetone	2018	R	Vale of Glamorgan	12	39	25	57.8%	G	**0.63**
SOCOTEC Didcot	50% TEA in acetone	2018	KS	Marylebone Road Intercomparison	9	95	87	9.1%	G	**0.92**
SOCOTEC Didcot	50% TEA in acetone	2018		**Overall Factor[3] (21 studies)**				**Use**		**0.76**

NO_2 Diffusion Tube Bias Adjustment - Local Co-location Study within East Suffolk Council.

There is a kerbside chemiluminescent analyser recording NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge within Suffolk Coastal District Council. The site is approximately 1 metre from the kerb and 14 metres from the traffic lights at the junction. This area of the junction is very narrow and enclosed by tall buildings, creating a canyon effect.

The bias adjustment factor was calculated using the Precision and Accuracy Spreadsheet available for download from http://laqm.defra.gov.uk/bias-adjustment-factors/local-bias.html The output from the spreadsheet can be seen overleaf.

Precision is calculated based on diffusion tube data only. Diffusion tube precision can be described as the ability of a measurement to be consistently reproduced, i.e. how similar the results of duplicate or triplicate tubes are to each other. Unlike bias, poor

precision cannot be adjusted for. It can only be improved by careful handling of the tubes in both the laboratory and the field.

For the purposes of Local Air Quality Management, tube precision is separated into two categories, "Good" or "Poor", as follows: tubes are considered to have "good" precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20%, and the average CV of all monitoring periods is less than 10%. Tubes are considered to have "poor" precision where the CV of four or more periods is greater than 20% and/or the average CV is greater than 10%.

Precision and accuracy checker: FAR 2

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 μgm^{-3}	Tube 2 μgm^{-3}	Tube 3 μgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1			34.9	39.4	35.6	37	2.4	7	6.0			Good	
2			33.3	38.8	40.7	38	3.8	10	9.5			Good	
3			41.4	42.9	40	41	1.5	4	3.6			Good	
4			34.6	34.6	37.3	36	1.6	4	3.9			Good	
5			33.9	34.1	31.5	33	1.4	4	3.6			Good	
6			27.7	29.1	28.4	28	0.7	2	1.7			Good	
7			39.1	39.2	38.3	39	0.5	1	1.2			Good	
8			36.3	37.9	37	37	0.8	2	2.0			Good	
9			35.1	34.9	30.2	33	2.8	8	6.9			Good	
10			41.5	41.1	40.9	41	0.3	1	0.8			Good	
11			37.0	38	33.3	36	2.5	7	6.2			Good	
12			29.1	34.7	34.8	33	3.3	10	8.1			Good	
13													
											Overall survey -->	Good precision	

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

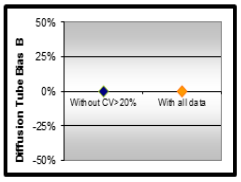
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	μgm^{-3}
Mean CV (Precision):	
Automatic Mean:	μgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	μgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	μgm^{-3}
Mean CV (Precision):	
Automatic Mean:	μgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	μgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: FLX 26

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1			53.2	50.5	52	52	1.4	3	3.4
2			39.3	35.4	52.1	42	8.7	21	21.7
3			54.0	65.3	61.4	60	5.7	10	14.3
4			48.2	49	54.2	50	3.3	6	8.1
5			35.9	48.6	40.2	42	6.5	16	16.0
6			30.2	33.0	33.8	32	1.9	6	4.7
7			41.6	44.1	42.2	43	1.3	3	3.2
8			43.3	42.9	43.4	43	0.3	1	0.7
9			46.5	42.9	47.7	46	2.5	5	6.2
10			44.8	47.4	48.4	47	1.9	4	4.6
11			39.9	52.8	51	48	7.0	15	17.4
12			44.8	43.5	46	45	1.3	3	3.1
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
		Good	
		Poor Precision	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
	Overall survey -->	Good precision	

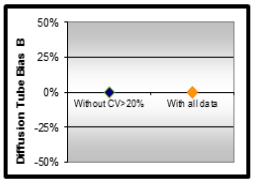
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 11 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: FLX 27

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1			46.2	41.6	51.2	46	4.8	10	11.9
2			37.5	38.6	36.9	38	0.9	2	2.1
3			51.5	52.3	51.8	52	0.4	1	1.0
4			41.1	43.3	44	43	1.5	4	3.8
5			27.8	29.2	30.9	29	1.6	5	3.9
6			27.1	25.4	22.9	25	2.1	8	5.2
7			34.1	36.5	35.0	35	1.2	3	3.0
8			35.5	38.7	35.9	37	1.7	5	4.3
9			39.9	38.8	43.0	41	2.2	5	5.4
10			42.3	39.7	45	42	2.7	6	6.6
11			42.6	41.7	44.7	43	1.5	4	3.8
12			40.6	42.5	40.7	41	1.1	3	2.7
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
	Overall survey -->	Good precision	

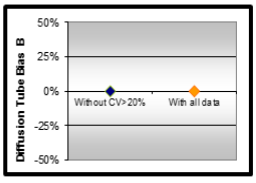
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: LOW 6

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1			41.4	48.2	41.2	44	4.0	9	9.9
2			41.6	40.8	33.2	39	4.6	12	11.5
3			57.5	57.0	57.7	57	0.4	1	0.9
4			48.3	50.3	50.0	50	1.1	2	2.7
5			64.4	64.8	58.4	63	3.6	6	8.9
6			51.8	49.3	52.8	51	1.8	4	4.5
7			47.2	48.8	44.8	47	2.0	4	5.0
8			34.9	39.8	37.3	37	2.5	7	6.1
9			36.1	39.1	39.0	38	1.7	4	4.2
10			45.7	44.4	46.6	46	1.1	2	2.7
11			36.4	40.3	38.5	38	2.0	5	4.8
12			34.5	41.4	40.5	39	3.8	10	9.3
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
Overall survey -->		Good precision	

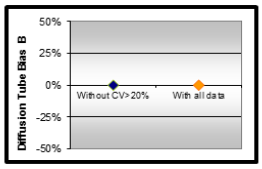
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: MRT 1

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1			37.5	35.4		36	1.5	4	13.3
2			32.6	30.7		32	1.3	4	12.1
3			41.1	36.8		39	3.0	8	27.3
4			31.7	29.4		31	1.6	5	14.6
5			29.3	27.6		28	1.2	4	10.8
6			24.4	22.4		23	1.4	6	12.7
7			31.7	28.9		30	2.0	7	17.8
8			29.8	29.7		30	0.1	0	0.6
9			28.3	29.7		29	1.0	3	8.9
10			29	29		29	0.0	0	0.0
11			31	32.1		32	0.8	2	7.0
12			25.6	30.0		28	3.1	11	27.7
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
Overall survey -->		Good precision	

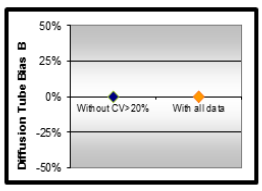
(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval) without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: STA 1

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1			43.6	48.3	49.9	47	3.3	7	8.1			Good	
2			36.9	30.4	46.6	38	8.2	21	20.3			Poor Precision	
3			48.8	56.1	54.4	53	3.8	7	9.5			Good	
4			49.8	49.9	50.6	50	0.4	1	1.1			Good	
5			41.4	45.3	46	44	2.5	6	6.2			Good	
6			34.9	38.9	39.4	38	2.5	7	6.1			Good	
7			52.6	43.9	45.4	47	4.7	10	11.6			Good	
8			43.9	49.5	46	46	2.8	6	7.0			Good	
9			41.6	41.6	43.2	42	0.9	2	2.3			Good	
10			46.2	47.7	50	48	1.9	4	4.8			Good	
11			44	47.4	50.7	47	3.4	7	8.3			Good	
12			34.1	33	37.2	35	2.2	6	5.4			Good	
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Good precision

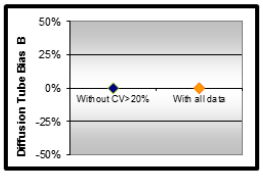
Site Name/ ID:

Precision: 11 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: STA 8

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements										Automatic Method		Data Quality Check	
Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean	Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
1			49.7	49.3	51.5	50	1.2	2	2.9			Good	
2			51.2	45.8	46	48	3.1	6	7.6			Good	
3			59.4	52.2	59.2	57	4.1	7	10.2			Good	
4			50.8	55.4	54.8	54	2.5	5	6.2			Good	
5			44.5	50.3	48.6	48	3.0	6	7.4			Good	
6			35.9	38.4	43.4	39	3.8	10	9.5			Good	
7			60.5	61.4	65.8	63	2.8	5	7.0			Good	
8			51.5	51.8	53.5	52	1.1	2	2.7			Good	
9			41.5	43.5	47.7	44	3.2	7	7.9			Good	
10			47	47.9	48.4	48	0.7	1	1.8			Good	
11			47	56.6	57	54	5.7	11	14.1			Good	
12			37.8	41.6	40	40	1.9	5	4.7			Good	
13													

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Overall survey --> Good precision

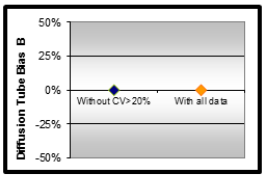
Site Name/ ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

(Check average CV & DC from Accuracy calculations)

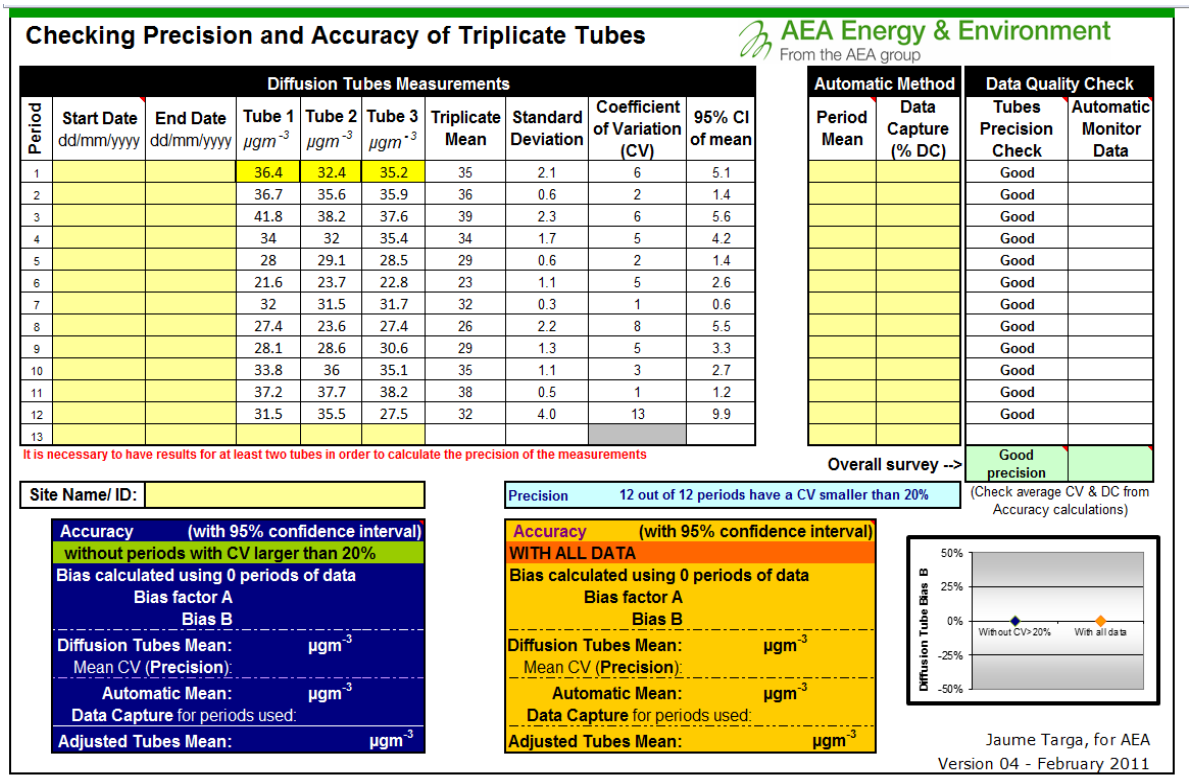
Accuracy (with 95% confidence interval) without periods with CV larger than 20%	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}

Accuracy (with 95% confidence interval) WITH ALL DATA	
Bias calculated using 0 periods of data	
Bias factor A	
Bias B	
Diffusion Tubes Mean:	µgm^{-3}
Mean CV (Precision):	
Automatic Mean:	µgm^{-3}
Data Capture for periods used:	
Adjusted Tubes Mean:	µgm^{-3}



Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: TRM 3



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1			36.4	32.4	35.2	35	2.1	6	5.1
2			36.7	35.6	35.9	36	0.6	2	1.4
3			41.8	38.2	37.6	39	2.3	6	5.6
4			34	32	35.4	34	1.7	5	4.2
5			28	29.1	28.5	29	0.6	2	1.4
6			21.6	23.7	22.8	23	1.1	5	2.6
7			32	31.5	31.7	32	0.3	1	0.6
8			27.4	23.6	27.4	26	2.2	8	5.5
9			28.1	28.6	30.6	29	1.3	5	3.3
10			33.8	36	35.1	35	1.1	3	2.7
11			37.2	37.7	38.2	38	0.5	1	1.2
12			31.5	35.5	27.5	32	4.0	13	9.9
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
		Good	
	Overall survey -->	Good precision	

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

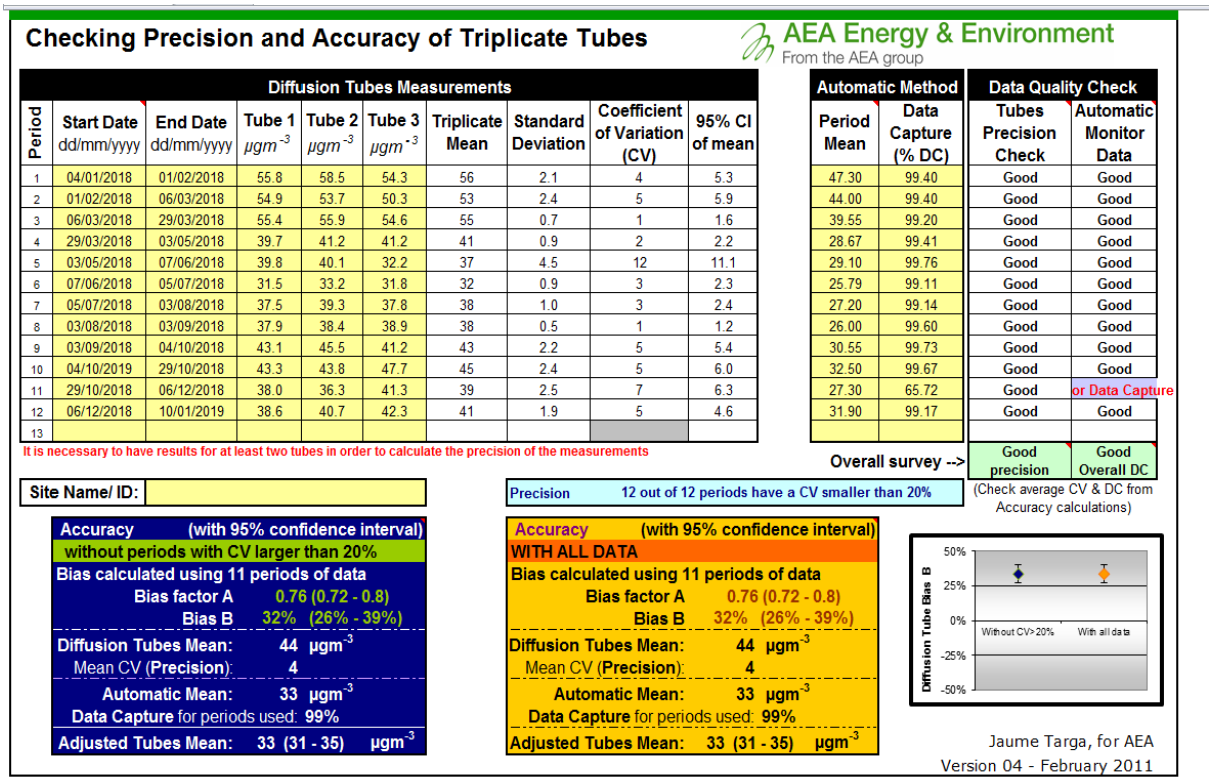
Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

Precision and accuracy checker: Woodbridge



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	04/01/2018	01/02/2018	55.8	58.5	54.3	56	2.1	4	5.3
2	01/02/2018	06/03/2018	54.9	53.7	50.3	53	2.4	5	5.9
3	06/03/2018	29/03/2018	55.4	55.9	54.6	55	0.7	1	1.6
4	29/03/2018	03/05/2018	39.7	41.2	41.2	41	0.9	2	2.2
5	03/05/2018	07/06/2018	39.8	40.1	32.2	37	4.5	12	11.1
6	07/06/2018	05/07/2018	31.5	33.2	31.8	32	0.9	3	2.3
7	05/07/2018	03/08/2018	37.5	39.3	37.8	38	1.0	3	2.4
8	03/08/2018	03/09/2018	37.9	38.4	38.9	38	0.5	1	1.2
9	03/09/2018	04/10/2018	43.1	45.5	41.2	43	2.2	5	5.4
10	04/10/2019	29/10/2018	43.3	43.8	47.7	45	2.4	5	6.0
11	29/10/2018	06/12/2018	38.0	36.3	41.3	39	2.5	7	6.3
12	06/12/2018	10/01/2019	38.6	40.7	42.3	41	1.9	5	4.6
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
47.30	99.40	Good	Good
44.00	99.40	Good	Good
39.55	99.20	Good	Good
28.67	99.41	Good	Good
29.10	99.76	Good	Good
25.79	99.11	Good	Good
27.20	99.14	Good	Good
26.00	99.60	Good	Good
30.55	99.73	Good	Good
32.50	99.67	Good	Good
27.30	65.72	Good	or Data Capture
31.90	99.17	Good	Good
	Overall survey -->	Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID:

Precision: 12 out of 12 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 11 periods of data
Bias factor A 0.76 (0.72 - 0.8)
Bias B 32% (26% - 39%)
Diffusion Tubes Mean: 44 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 33 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 33 (31 - 35) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 11 periods of data
Bias factor A 0.76 (0.72 - 0.8)
Bias B 32% (26% - 39%)
Diffusion Tubes Mean: 44 µgm^{-3}
Mean CV (Precision): 4
Automatic Mean: 33 µgm^{-3}
Data Capture for periods used: 99%
Adjusted Tubes Mean: 33 (31 - 35) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

The precision results for the co-location study show 11 out of 12 periods with a CV smaller than 20% and the average CV of all monitoring periods (at 4%) is less than 10%. **The precision is therefore classed as "Good".**

Local authorities are advised to use the outputs from the blue box on the spreadsheet. Diffusion tubes for which there is poor precision are automatically disregarded.

The results from ESC co-location study are as follows:

Bias calculated using 12 periods of data

Triplicate diffusion tube mean (2018) = 44µg/m^3 with a mean precision (expressed as the coefficient of variation - CV) of 4.

Automatic analyser annual mean (2018) = 33µg/m^3 with 99% data capture.

Adjusted tubes mean = 33 (31-35) µg/m^3

Bias adjustment factor (2018) = 0.76 based on 12 months data.

Discussion of Choice of Factor to Use

Historically, the local bias adjustment factor obtained from the Woodbridge co-location study has been used to adjust annual mean NO_2 concentrations from diffusion tube sites within Woodbridge area only. This location is unusual, being a street canyon: it is considered representative of the other diffusion tube monitoring sites within Woodbridge, but not necessarily of diffusion tube locations elsewhere within the district. However, the 2018 bias adjustment factor of 0.76 obtained at Woodbridge is the same as the "national" bias adjustment factor of 0.76 from the March 2019 version of the National Diffusion Tube Bias Adjustment Factor Spreadsheet.

Distance correction calculations

Monitoring sites are usually located in the areas of concern to represent the worst-case public exposure, but it is not always possible to measure concentrations at the

desired location for practical reasons and in some cases the relevant public exposure is located a short distance away.

A calculator has been produced by Defra which estimates the annual mean NO_2 concentration at one distance from a road, using measurements made at a different distance from the same road. The calculator can be found at: https://laqm.defra.gov.uk/tools-monitoring-data/no2-falloff.html

This calculator has been used to predict concentrations at the nearest point of relevant public exposure for the following diffusion tube monitoring sites;

WBG 10 - signpost in St. John's Street next to 85 Thoroughfare, Woodbridge
WBG 12 - 8 Lime Kiln Quay Road (tube on front fence), Woodbridge
WBG 13 - traffic lights at front of 85 Thoroughfare, Woodbridge
MEL 5 - 6 The Street, Melton
LEI 1 – signpost on corner of Cross Street and High Street, Leiston
LEI 2 – lamppost on corner of Station Road and Valley Road, Leiston
LOW 2 – kerbside lamppost at 1 Fir Lane, Lowestoft
LOW 3 – kerbside lamppost at 8 Mill Road, Lowestoft
LOW 4 – Yarmouth Road (1 Bentley Drive), Lowestoft
LOW 7 – Traffic lights sited Belvedere Road/London Road South junction at Levington Court, Lowestoft
OBR 1 – Lamppost in Saltwater Way / 164 Bridge Road, Oulton Broad
OBR 2 – Lamppost at 31 Bridge Road opposite Golden Court, Oulton Broad
OBR 3 – Lamppost at The Flying Dutchman, Cotmer Road, Oulton Broad
CCL 1 – Lamppost at roundabout of Castleton Avenue and Chapel Road, Carlton Colville
BEC 2 – Lamppost at 72 Fredericks Road, Beccles

The distance correction calculator requires background concentrations to be input for each location. Background concentrations were derived from the Defra Background maps which can be found at https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html.

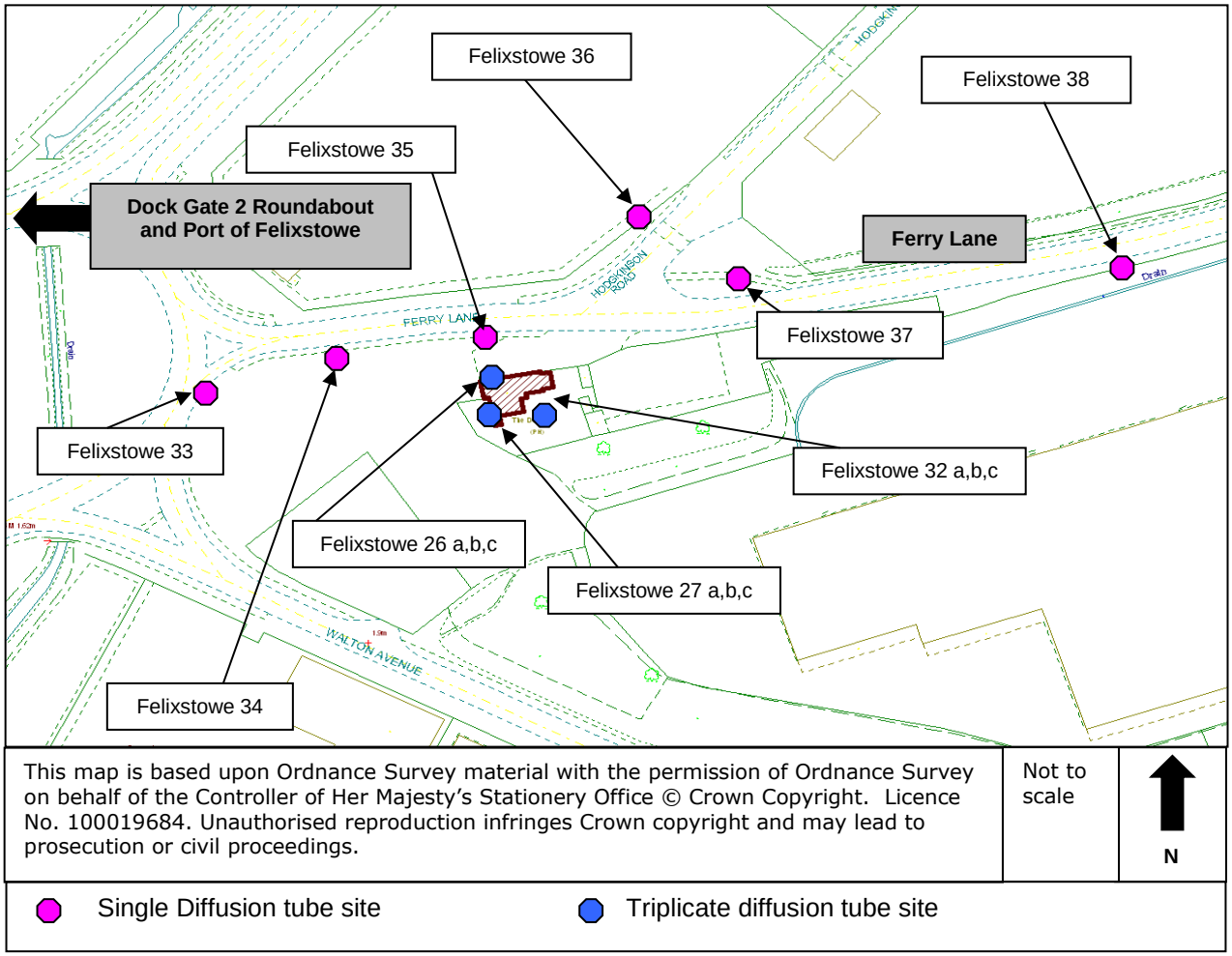
Input and output figures for the distance correction calculator are shown in the following table;

Input figures and results for relevant sites using the Defra Fall Off With Distance from Roads Calculator (v4.2)

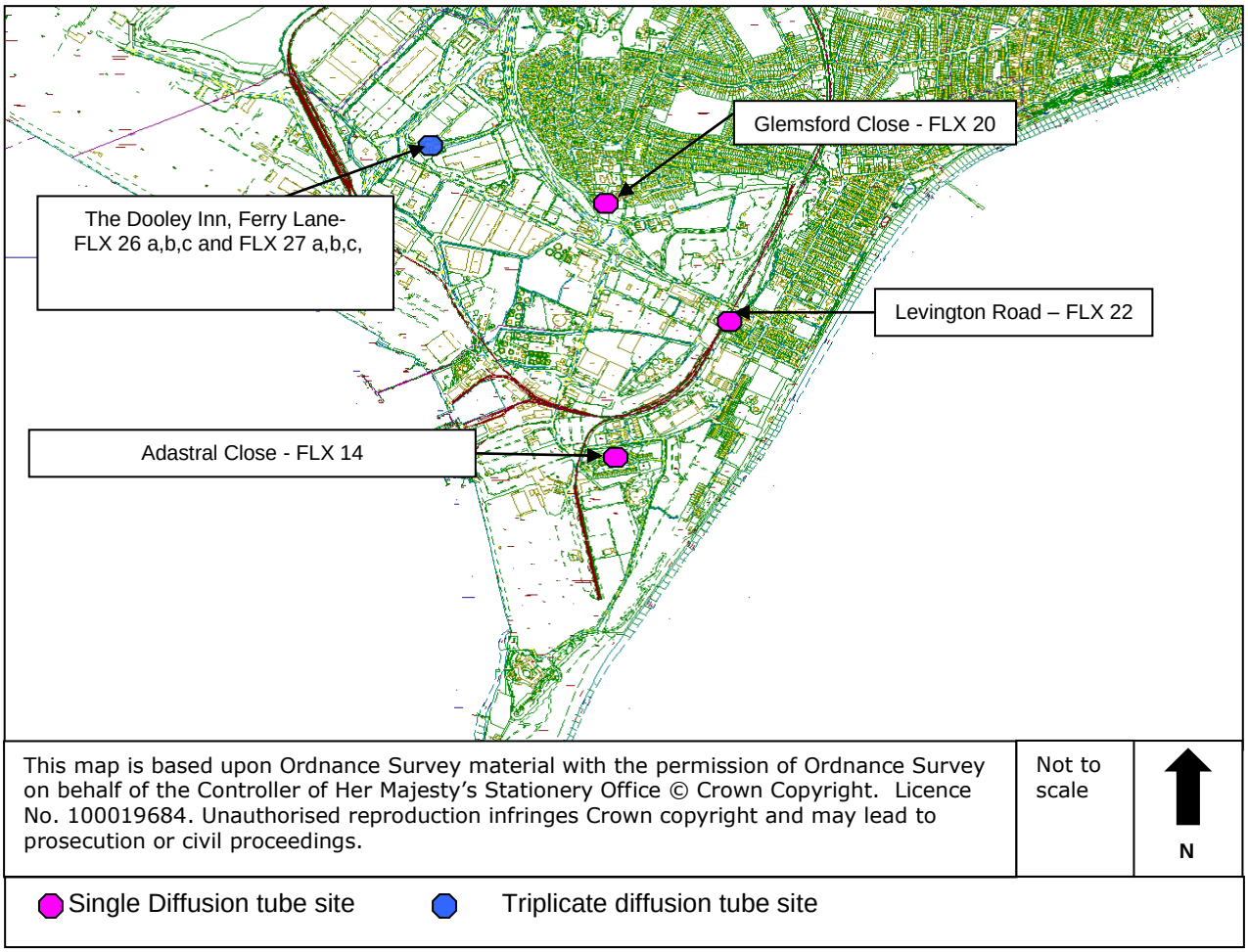
Site	Distance from kerb to monitoring site (m)	Distance from monitoring site to receptor (m)	Grid square for obtaining background map concentrations	Background NO_2 concentration 2018 from Defra maps ($\mu g/m^3$)	2018 NO_2 data ($\mu g/m^3$)	
					Diffusion tube annual mean uncorrected for distance	Annual mean with Defra distance correction calculator
WBG 10	2	0.5	627 249	10.5	25.7	**24.9**
WBG 12	5	0.5	627 249	10.5	19.9	**19.6**
WBG 13	2.5	2.5	627 249	10.5	27.6	**24.7**
MEL 5	3.6	0.5	628 250	9.5	23.0	**22.5**
LEI 1	2.5	0.4	644 262	7.9	20.5	**20.0**
LEI 2	1.4	0.5	644 262	7.9	25.9	**24.7**
TRM 8	1.4	1.8	628 236	14.1	27.7	**25.3**
LOW 2	0.5	6	653 293	10.8	25.4	**18.8**
LOW 3	1.2	6.8	654 292	13.0	23.3	**19.2**
LOW 4	0.5	8.8	653 295	10.2	16.4	**13.2**
LOW 7	2.5	7	654 292	13.0	29.2	**23.9**
OBR 1	3.2	6	652 292	11.0	26.2	**22.0**
OBR 2	2	2.3	652 293	10.8	26	**23.3**
OBR 3	2.4	5	651 292	10.2	22.8	**19.3**
CCL 1	1.9	17	650 290	9.2	19.8	**14.2**
BEC 2	2	4	642 289	10.5	25.7	**21.8**

Appendix D: Maps of Monitoring Locations and AQMAs

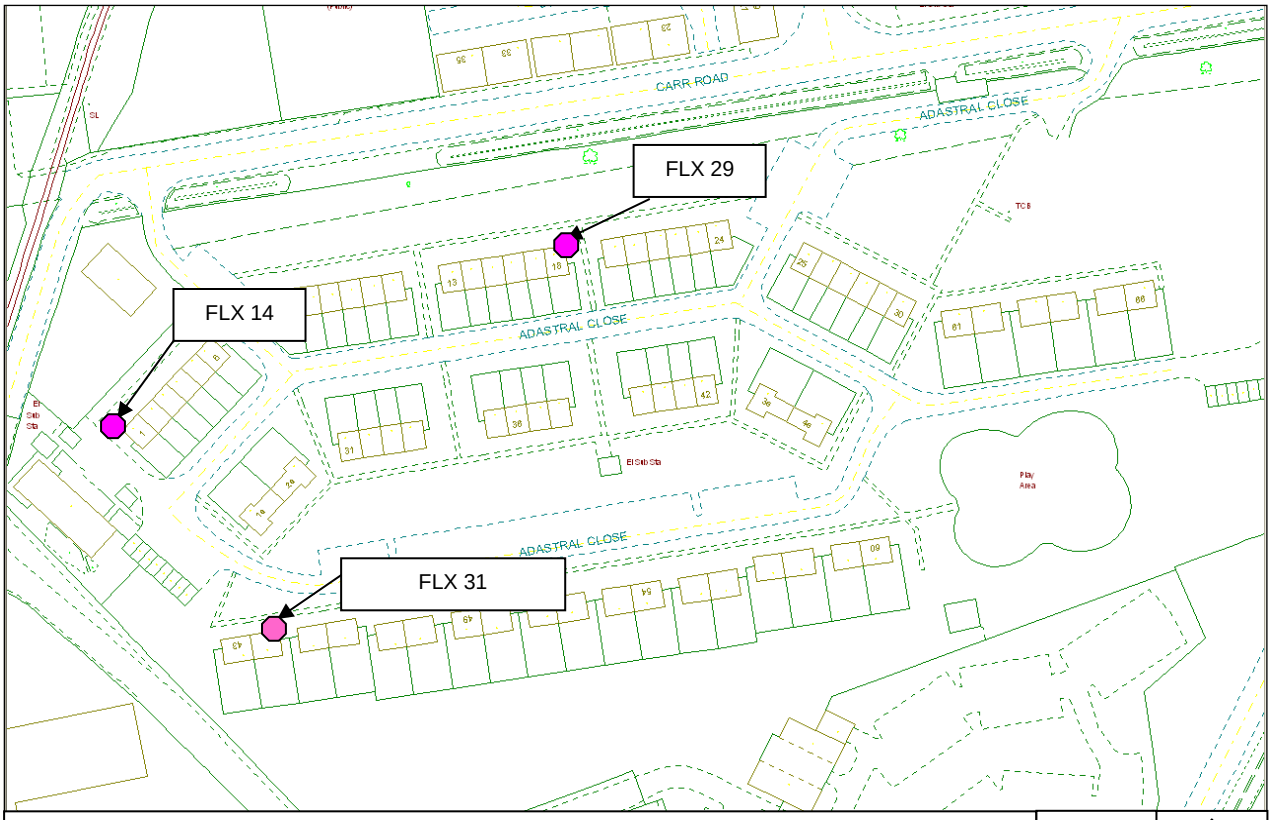
Map 1: Map of diffusion tubes: Felixstowe - FLX 26 abc, FLX 27 abc, FLX 32, FLX 33, FLX 34, FLX 35, FLX 36, FLX 37 and FLX 38 . (Hatched in red is location of the revoked AQMA at Ferry Lane).



Map 2: Map of diffusion tubes: Felixstowe - FLX 26 a, b, c, FLX27 a, b, c, FLX 20, FLX 14 and FLX 22.



Map 3: Map of diffusion tubes: Felixstowe - FLX 14, FLX 29 and FLX 31.



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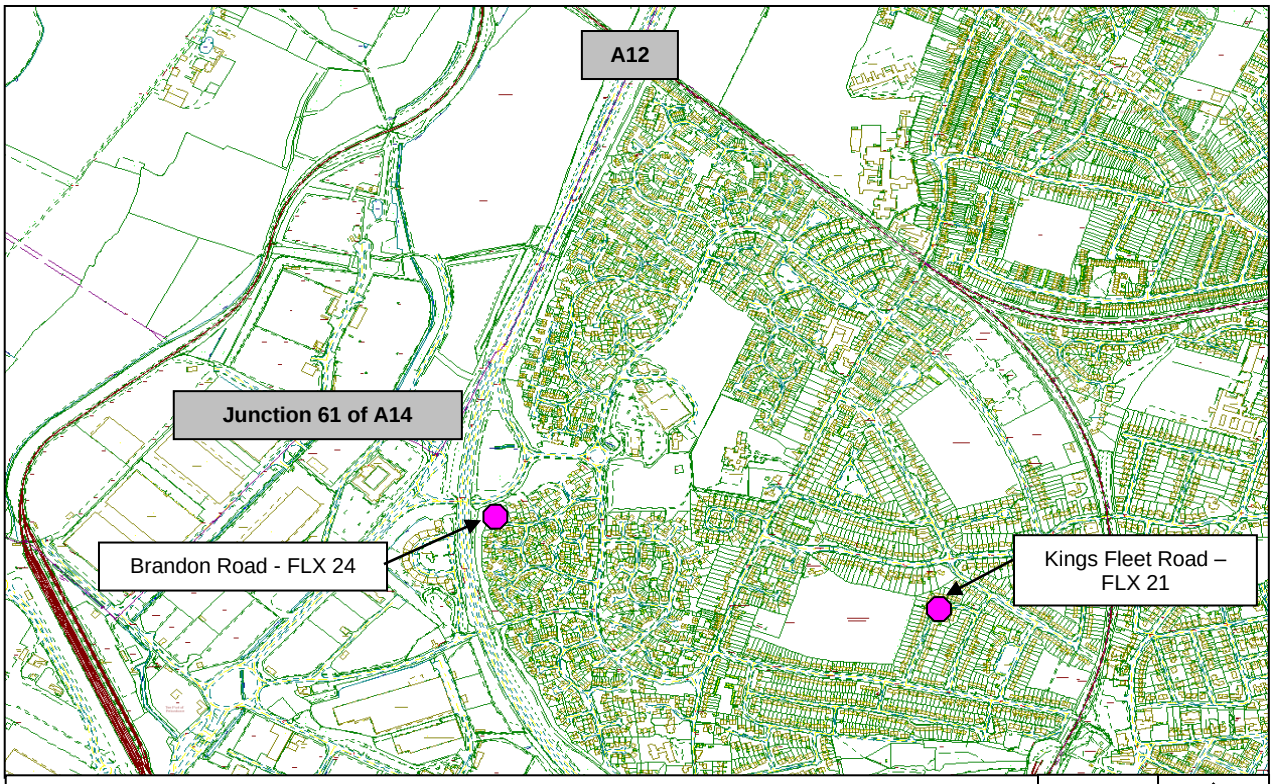
Not to scale

N

Single Diffusion tube site

Map 4: Map of diffusion tubes: Felixstowe - FLX 24 and FLX 21.



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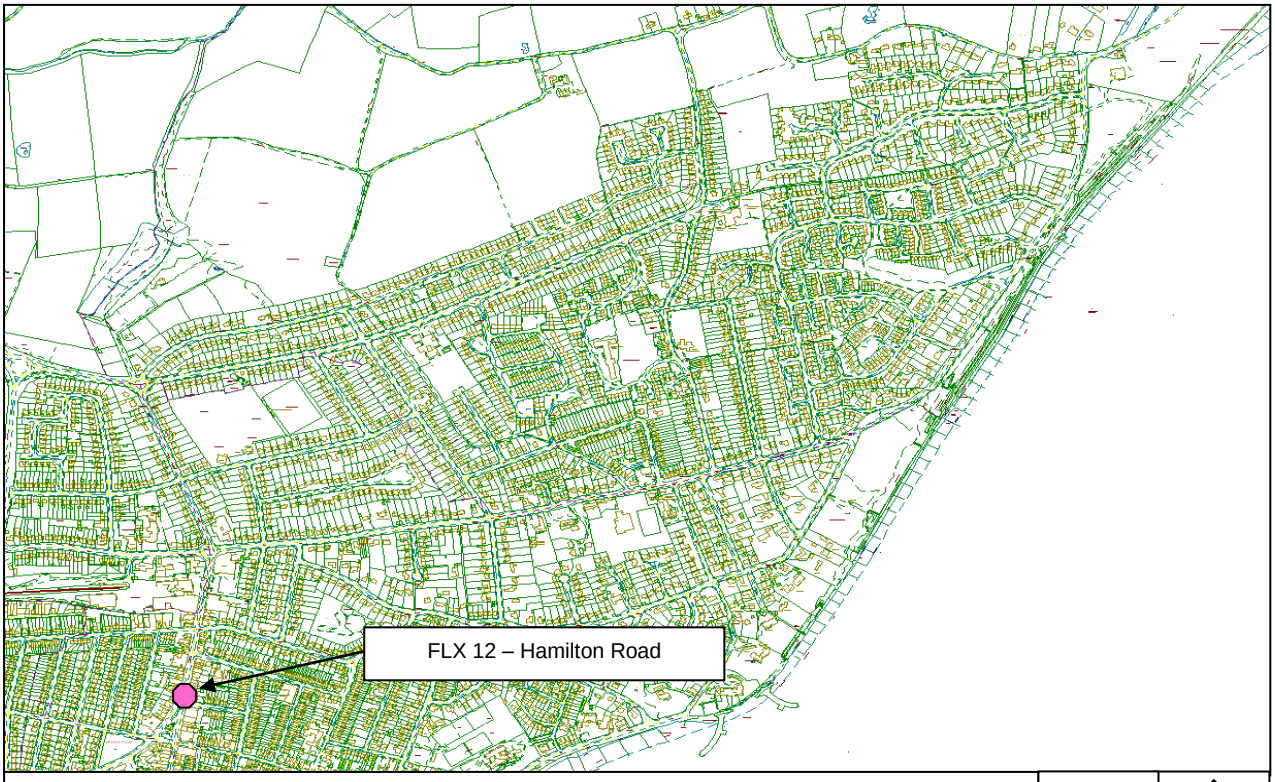
Single Diffusion tube site

Map 5: Map of diffusion tube: Felixstowe - FLX 12



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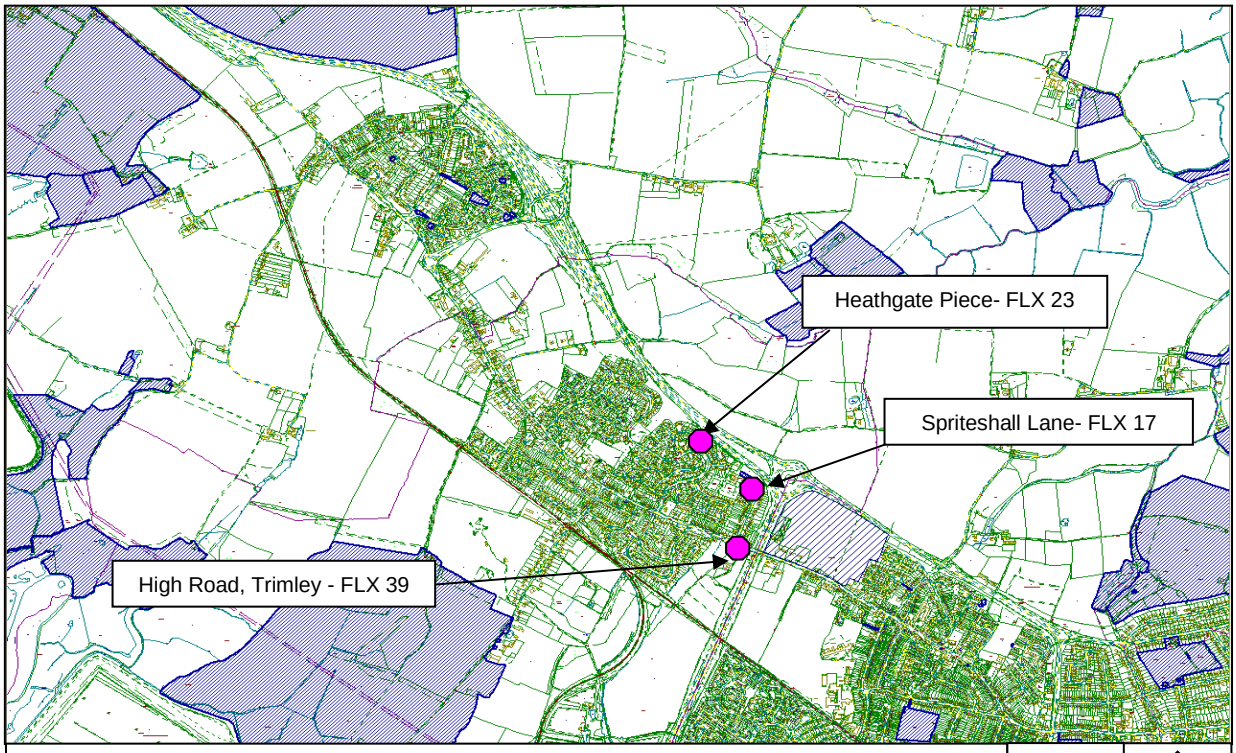
Single Diffusion tube site

Map 6: Map of diffusion tubes: Felixstowe - FLX 17, FLX 23 and FLX 39.



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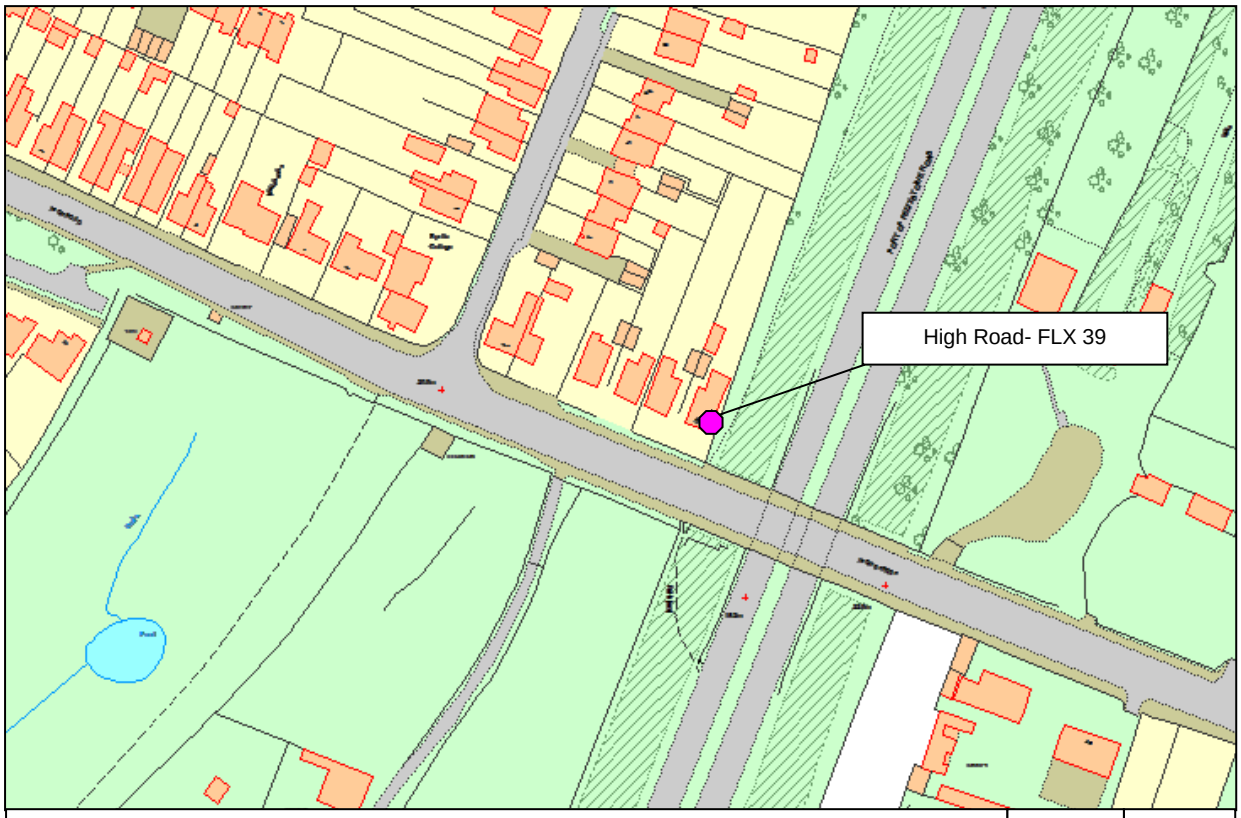
Single diffusion tube site

Map 7: Map of diffusion tube: Felixstowe - FLX 39



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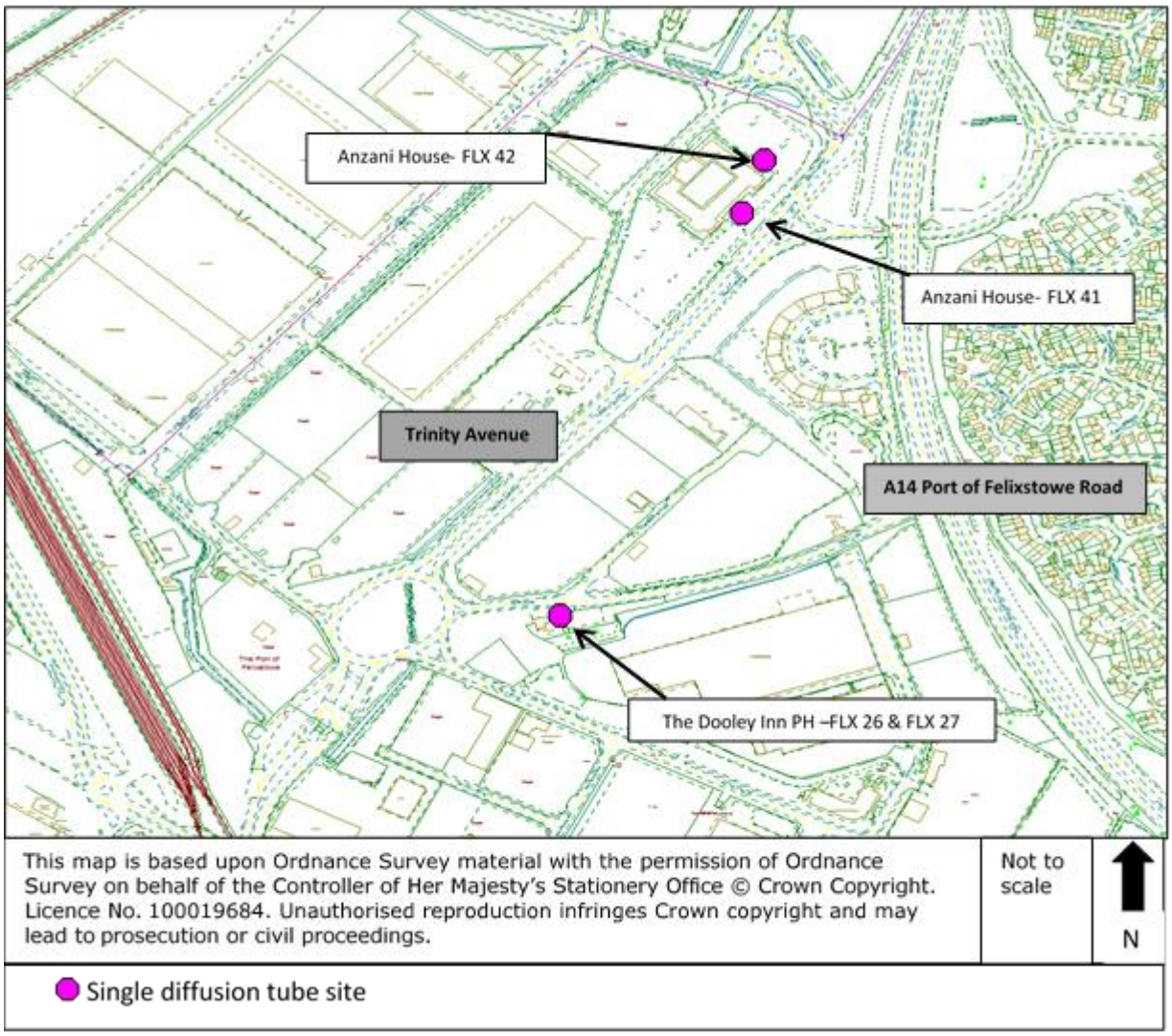
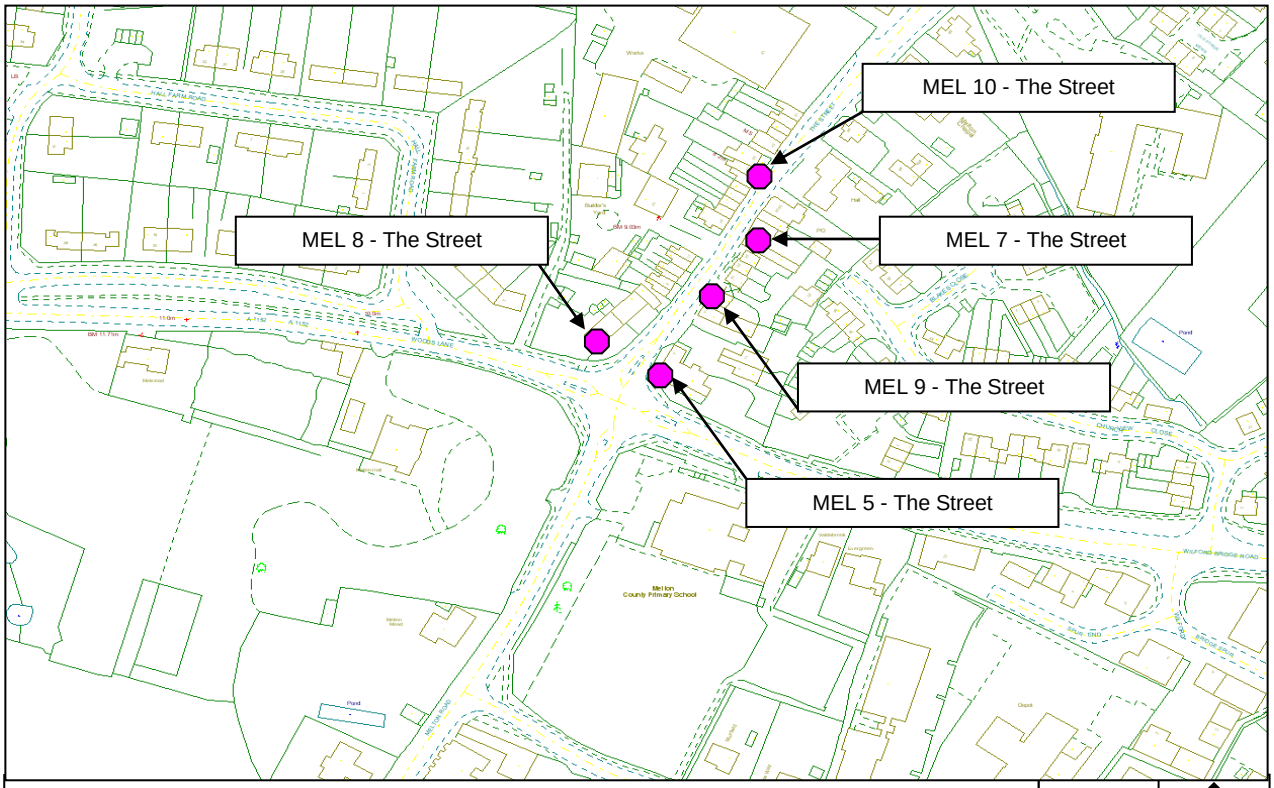
Single diffusion tube site

Map 8: Map of diffusion tubes: Felixstowe - FLX26a,b,c, FLX27a,b,c, FLX 41 and FLX 42



Map 9: Map of diffusion tubes: Melton - MEL 5, MEL7, MEL 8, MEL9 and MEL 10.



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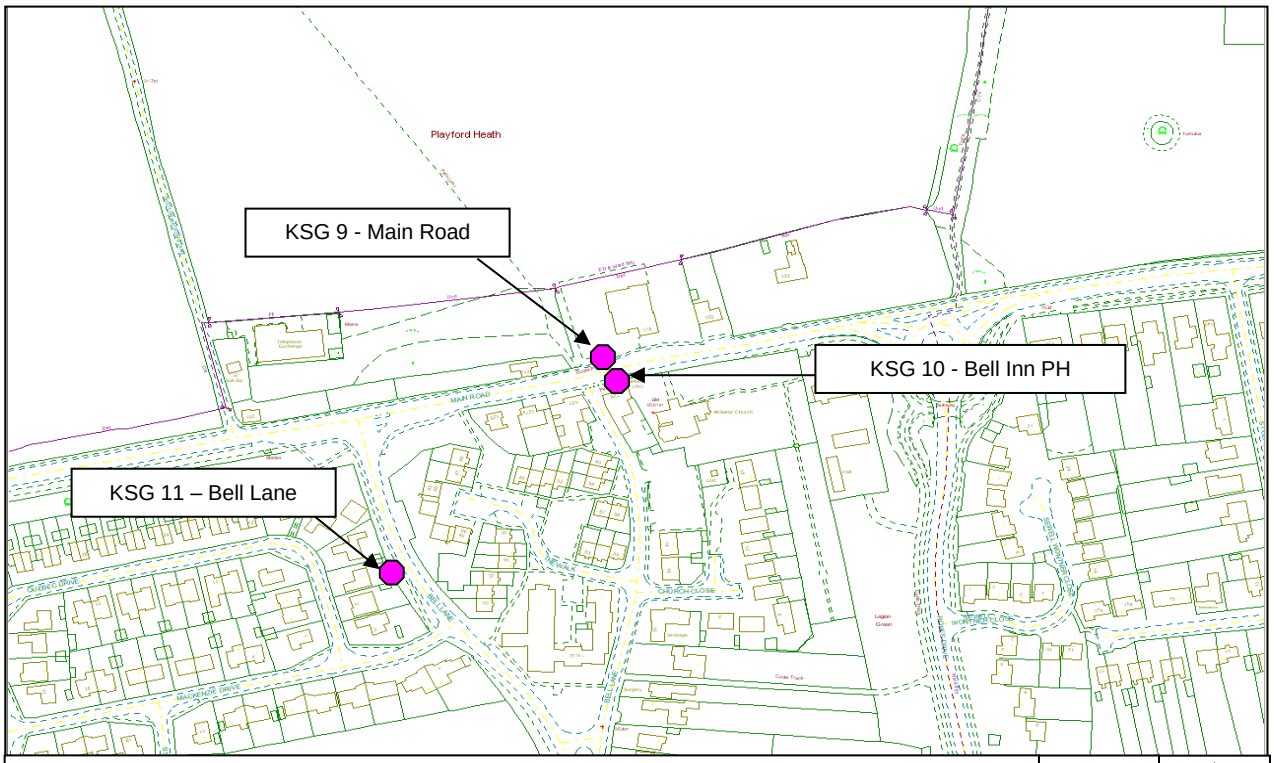
Single Diffusion tube site

Map 10: Map of diffusion tubes: Kesgrave - KSG 9, KSG 10 and KSG 11



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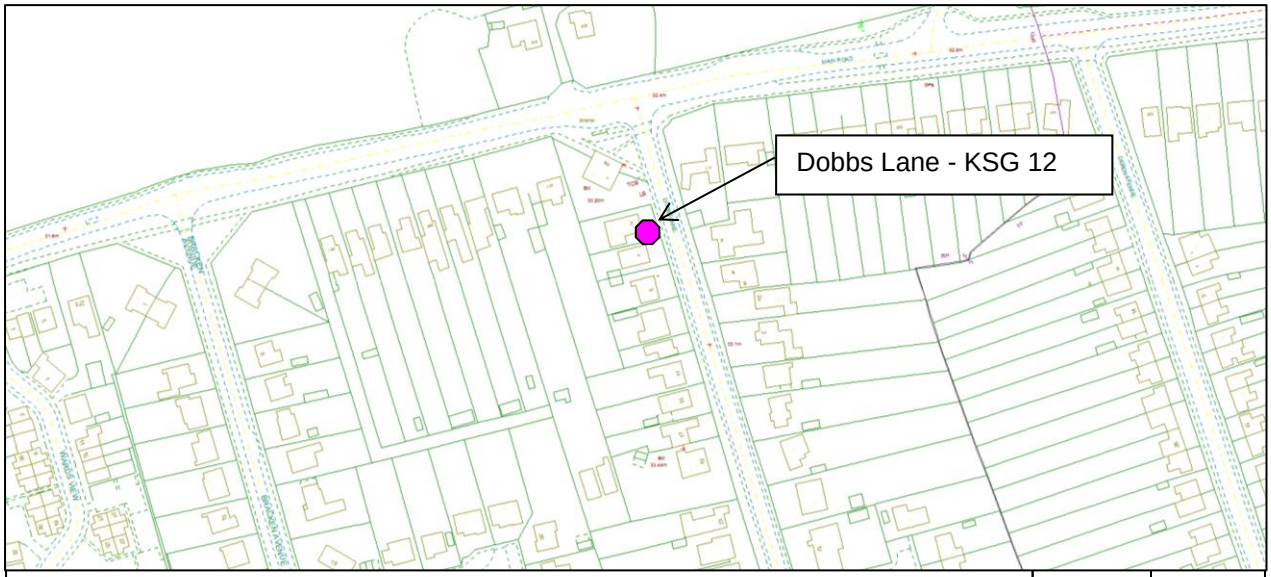
Single Diffusion tube site

Map 11: Map of diffusion tube: Kesgrave - KSG 12.



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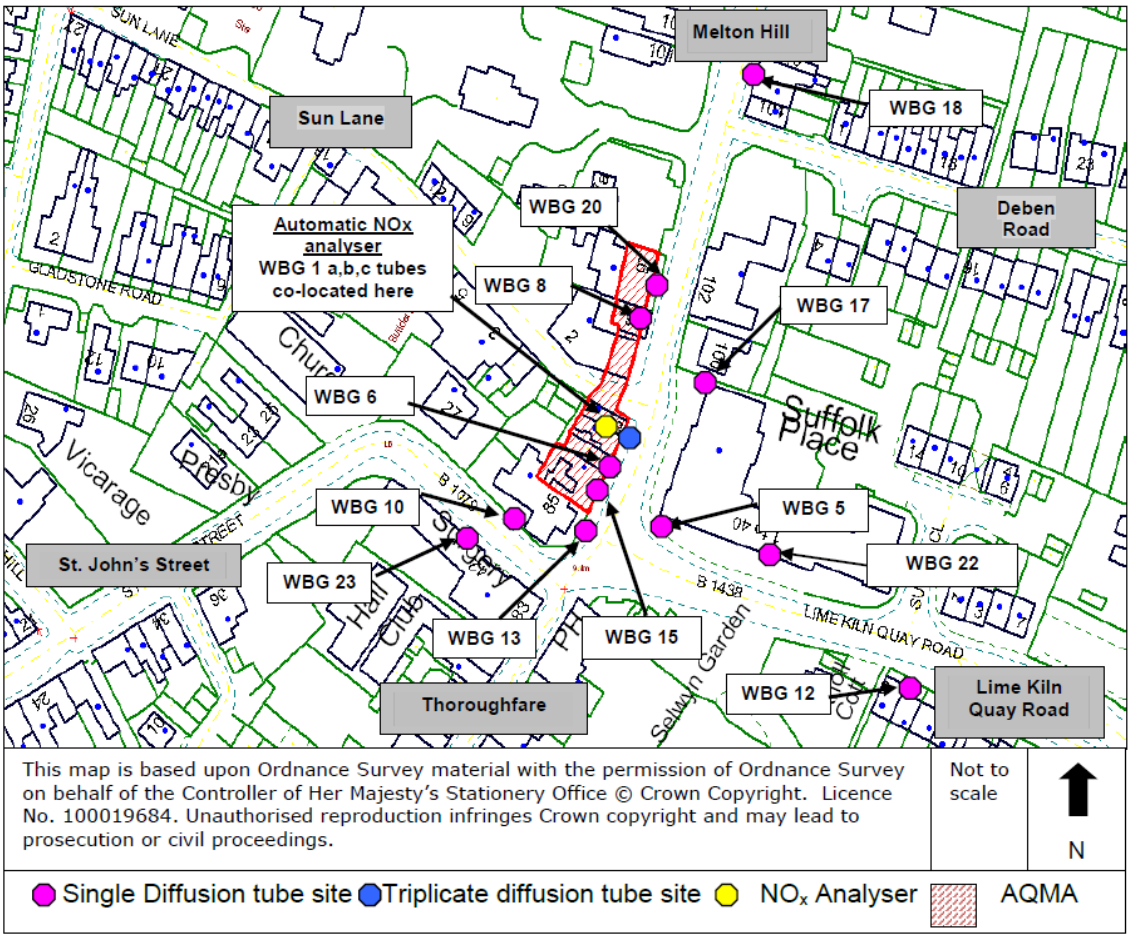
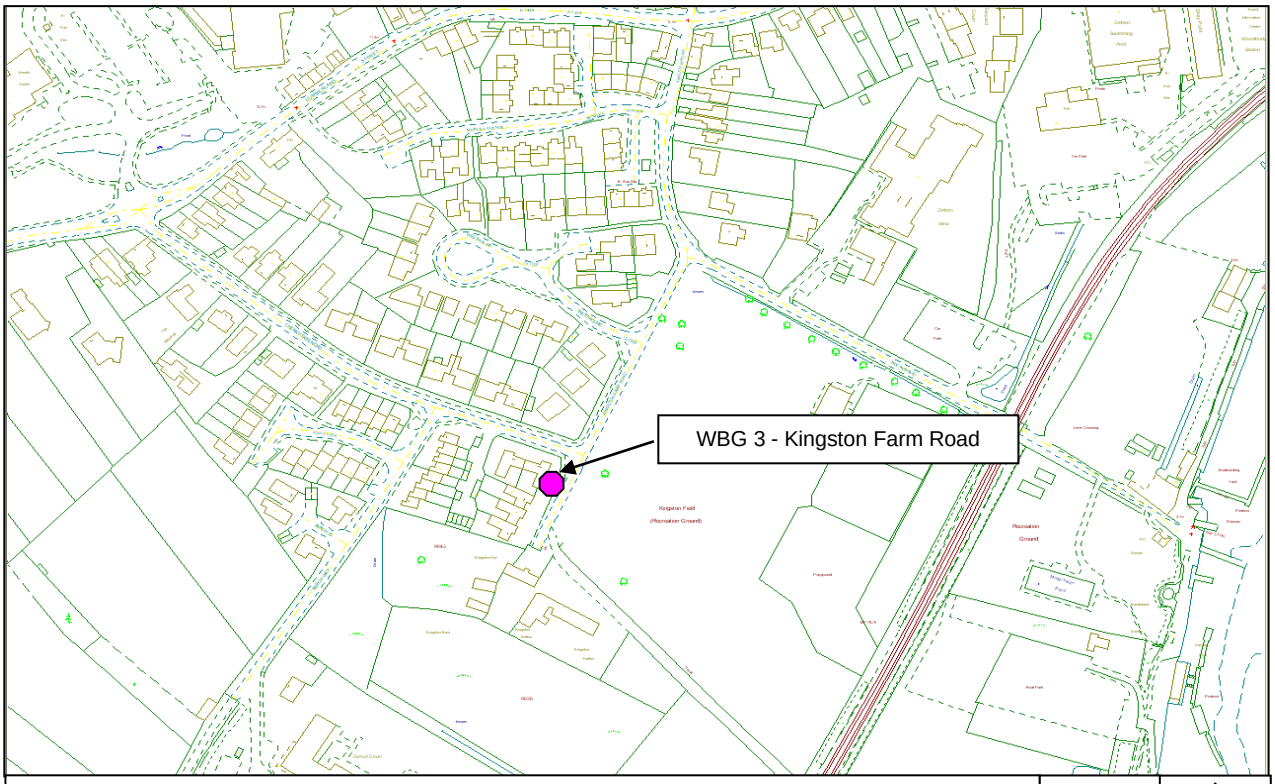
Single Diffusion tube site

Map 12: Map of diffusion tubes: Woodbridge - WBG 1abc, 5, 6, 8, 10, 12, 13, 15, 17, 18, 20, 22, 23 and Automatic NOx analyser.



Map 13: Map of diffusion tube: Woodbridge - WBG 3.



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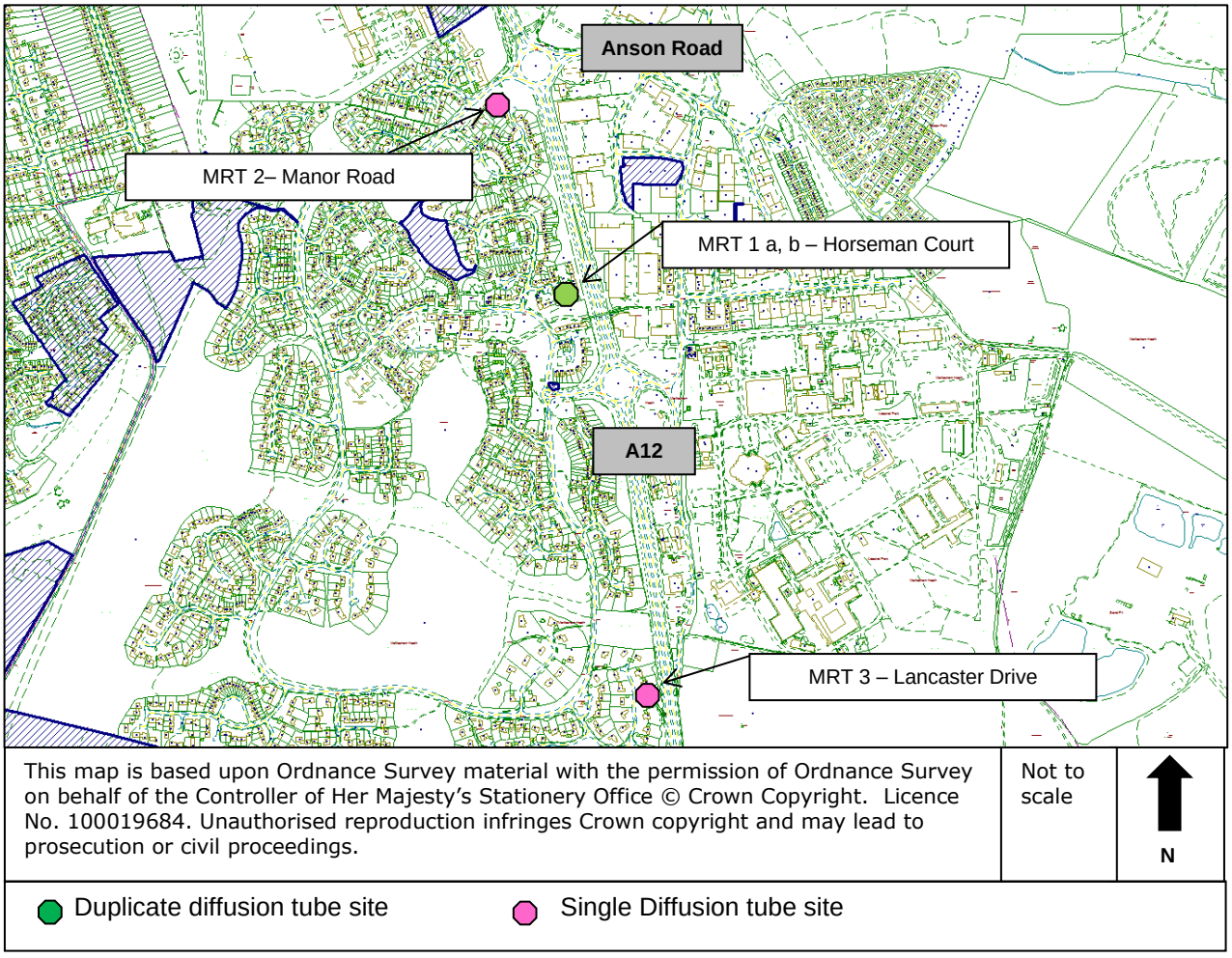
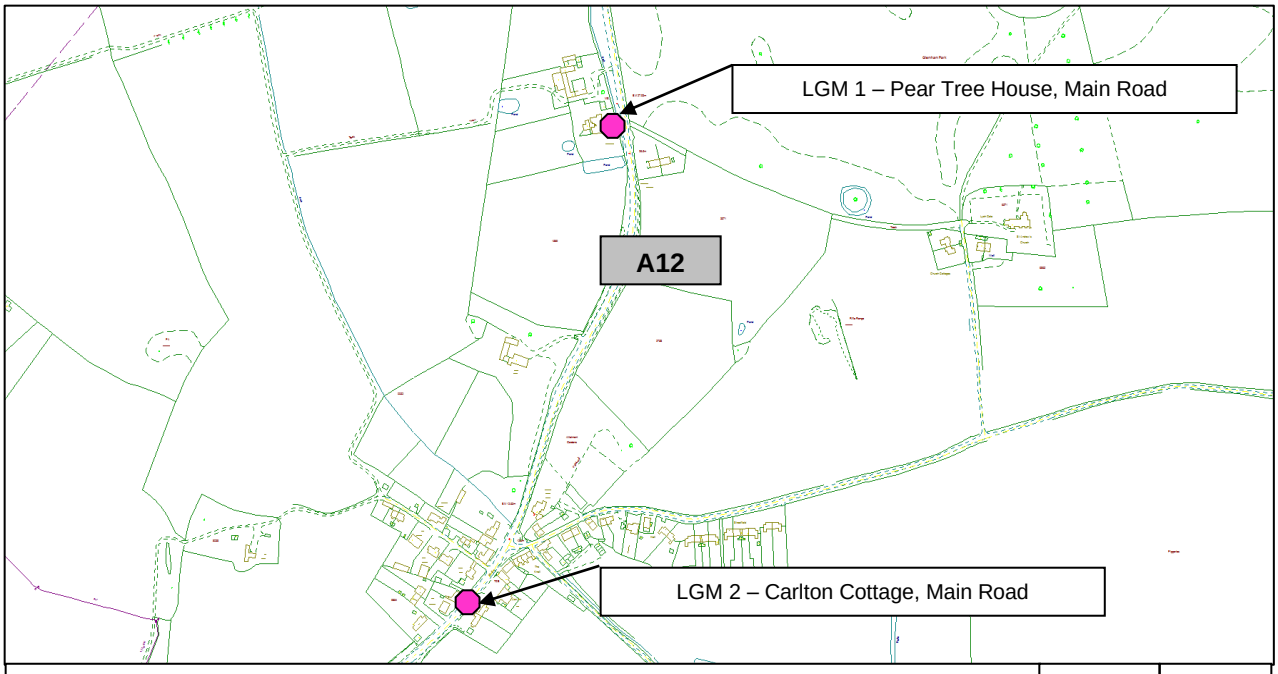
Single Diffusion tube site

Map 14: Map of Diffusion Tubes: Martlesham - MRT 1a,b, MRT 2 and MRT 3



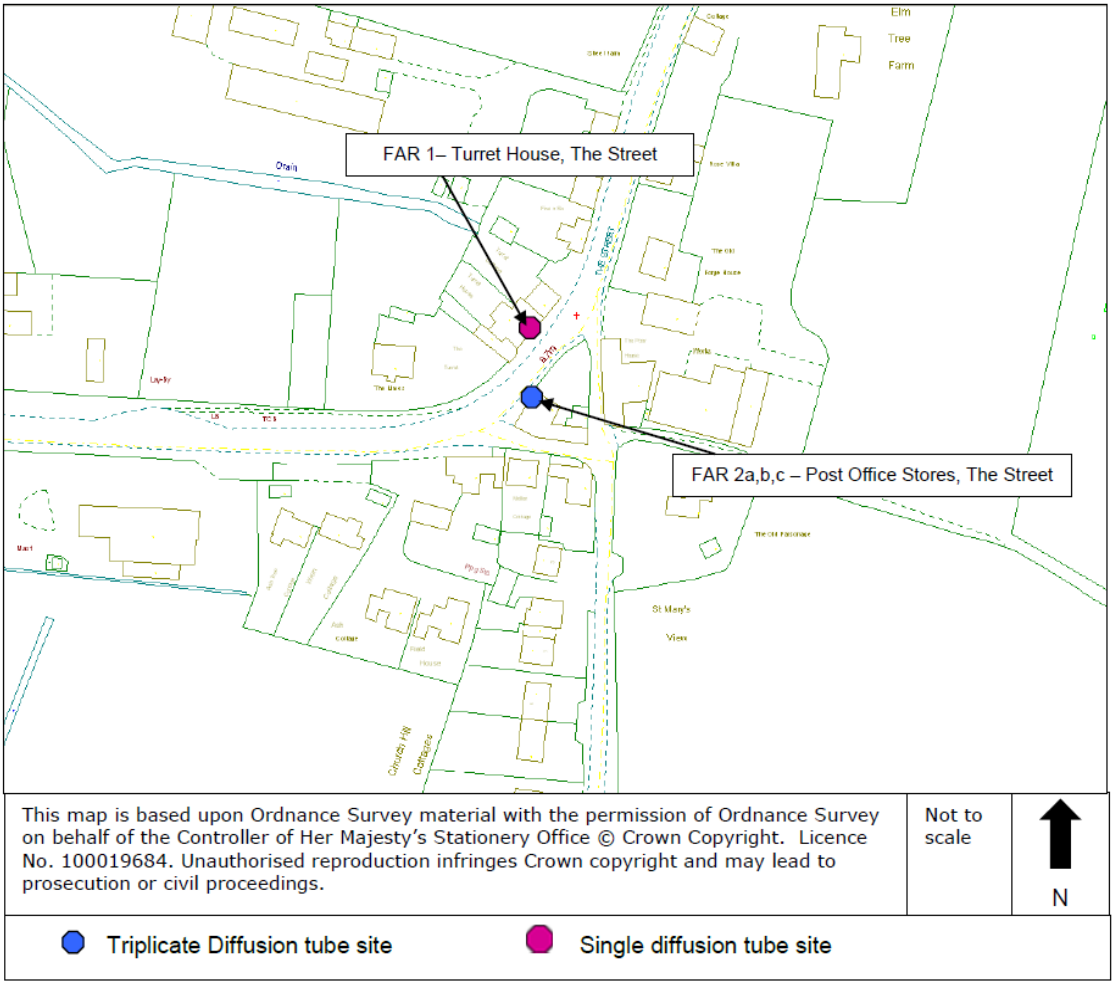
Map 15: Map of diffusion tubes: Little Glemham - LGM 1 and LGM 2.



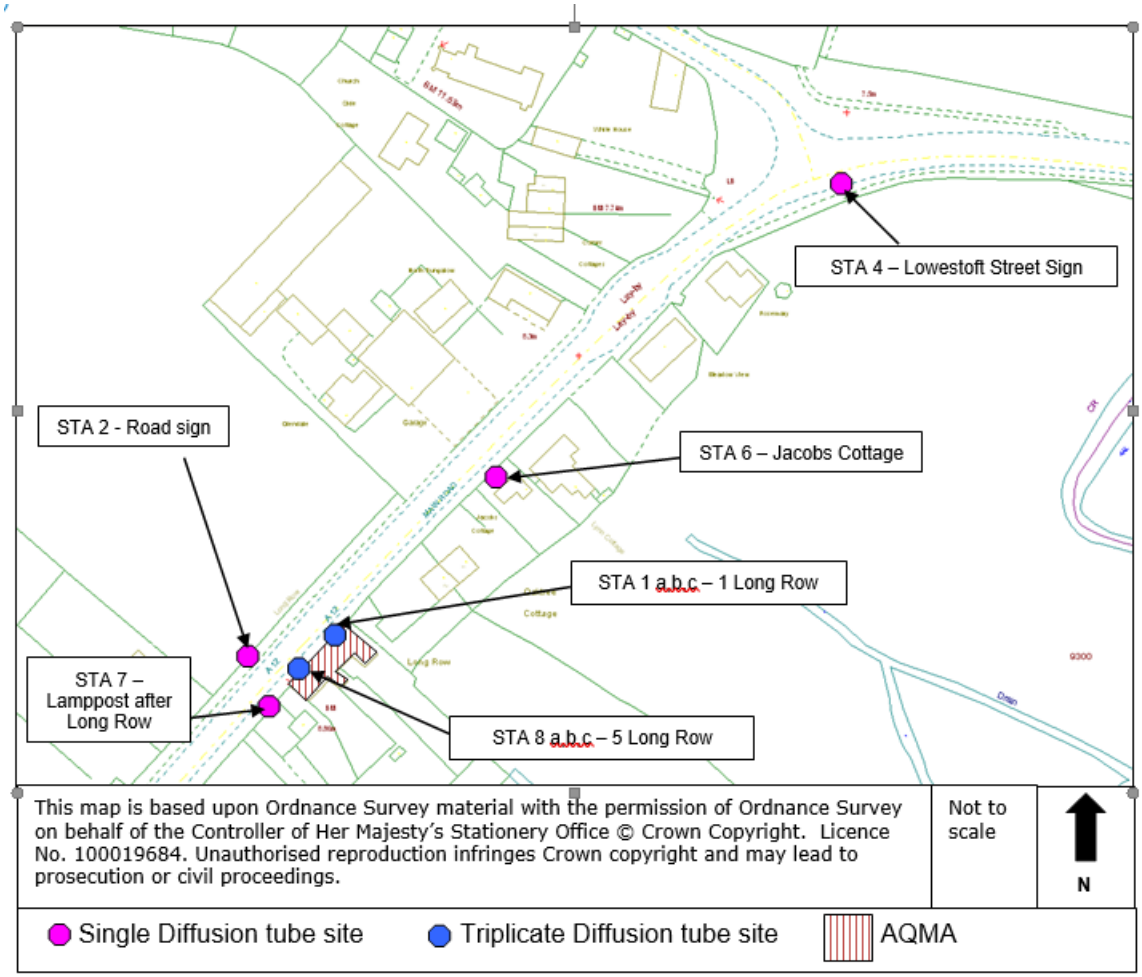
Not to scale

Single Diffusion tube site

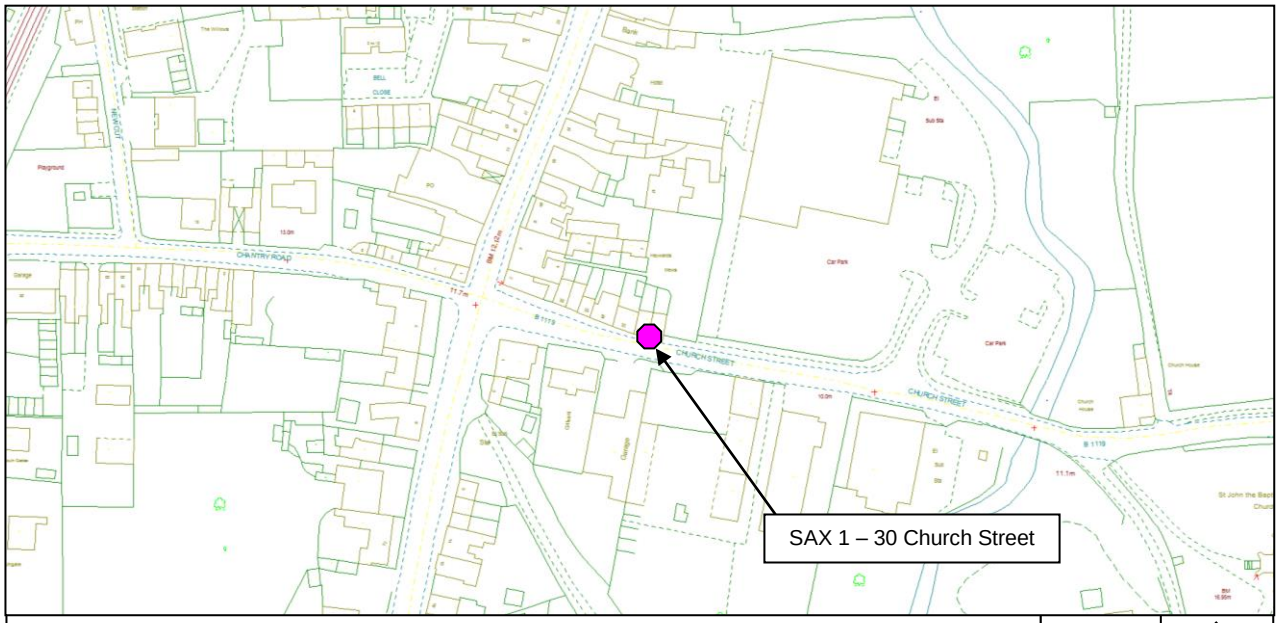
Map 16: Map of diffusion tubes: Farnham - FAR 1 & FAR 2a, b, c.



Map 17: Map of diffusion tubes: Stratford St Andrew - STA 1abc, STA 2, STA 4, STA6, STA 7, STA 8abc



Map 18: Map of diffusion tube: Saxmundham - SAX 1.



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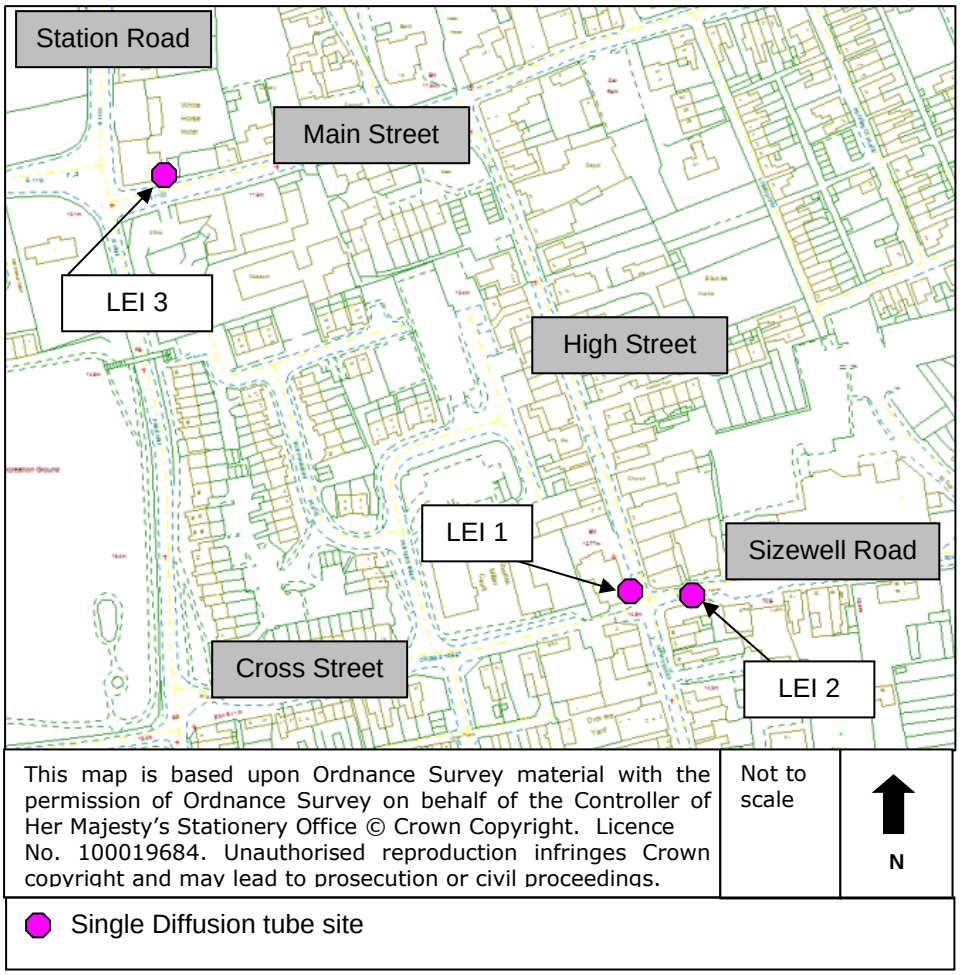
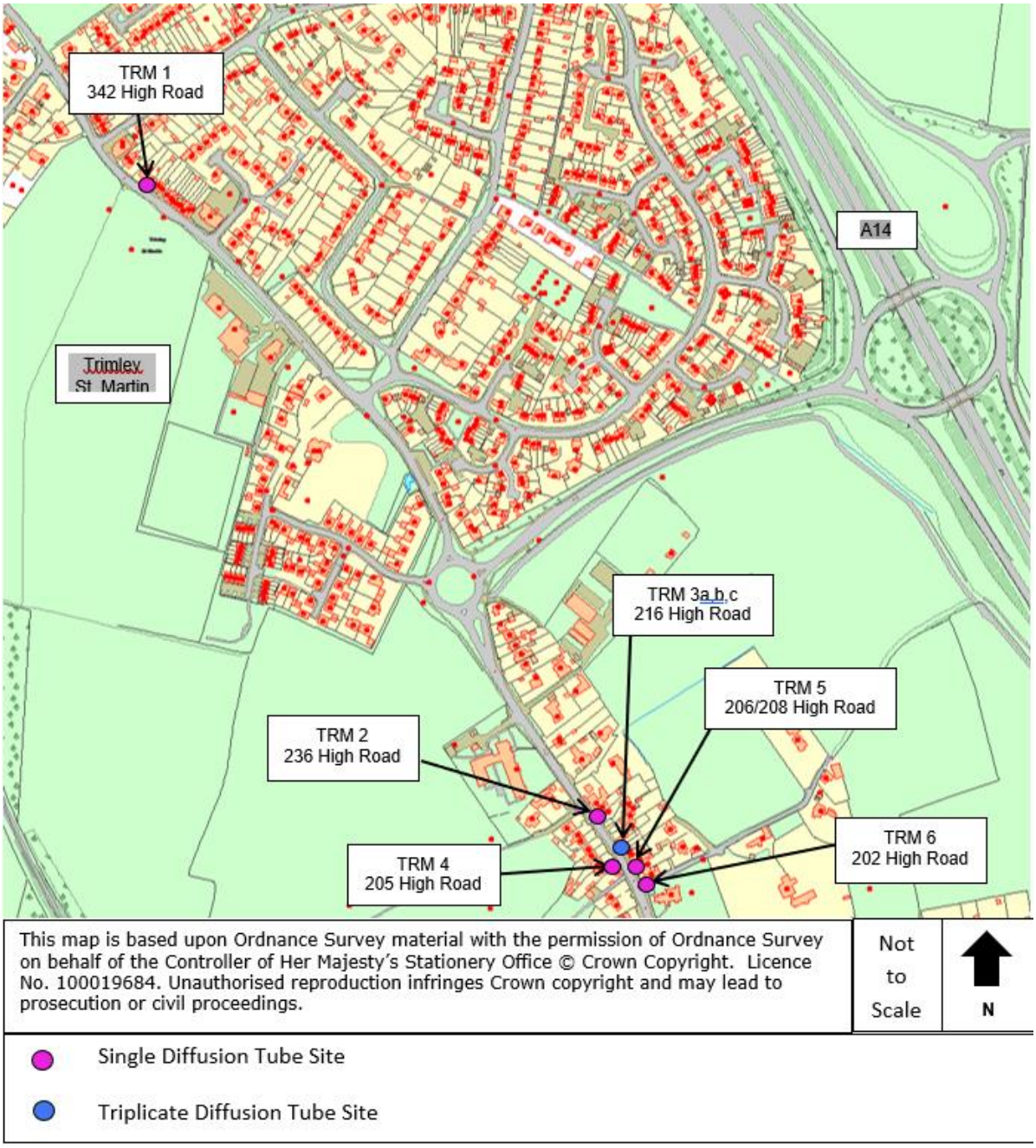
Single Diffusion tube site

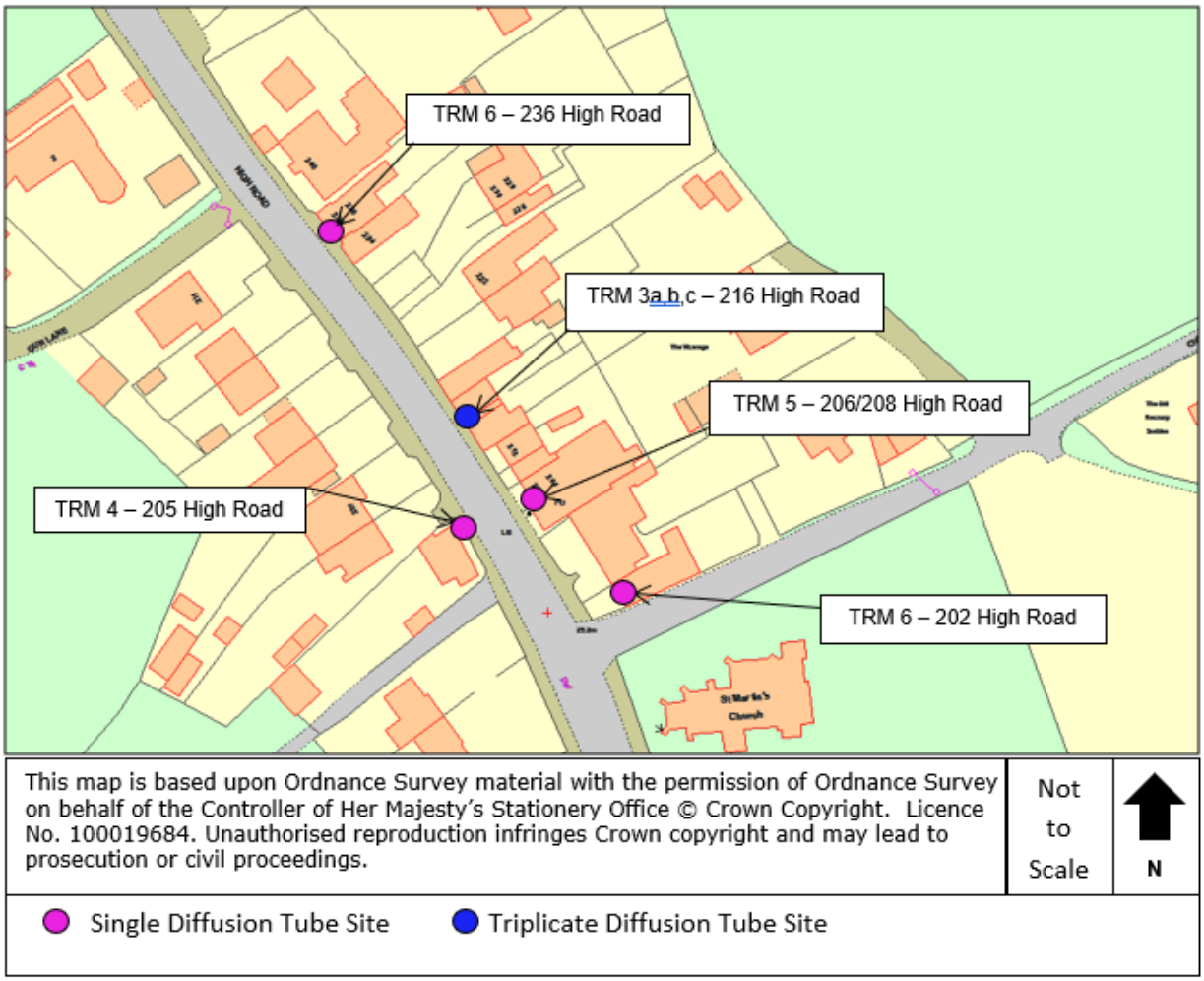
Map 19: Map of diffusion tubes: Leiston - LEI 1, LEI 2 & LEI 3.



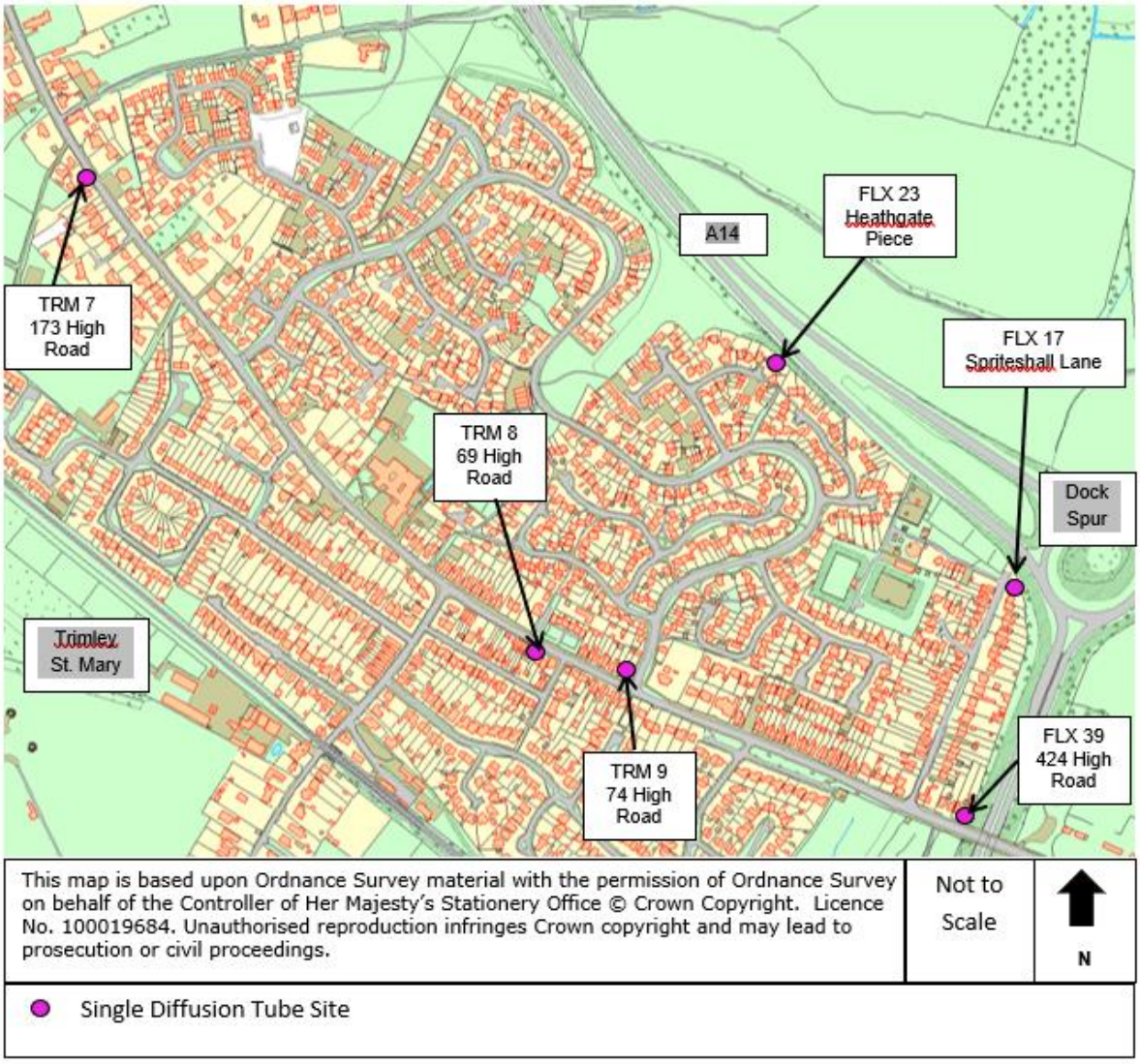
Map 20: Map of diffusion tubes: Trimley St Martin - TRM 1 to TRM 6



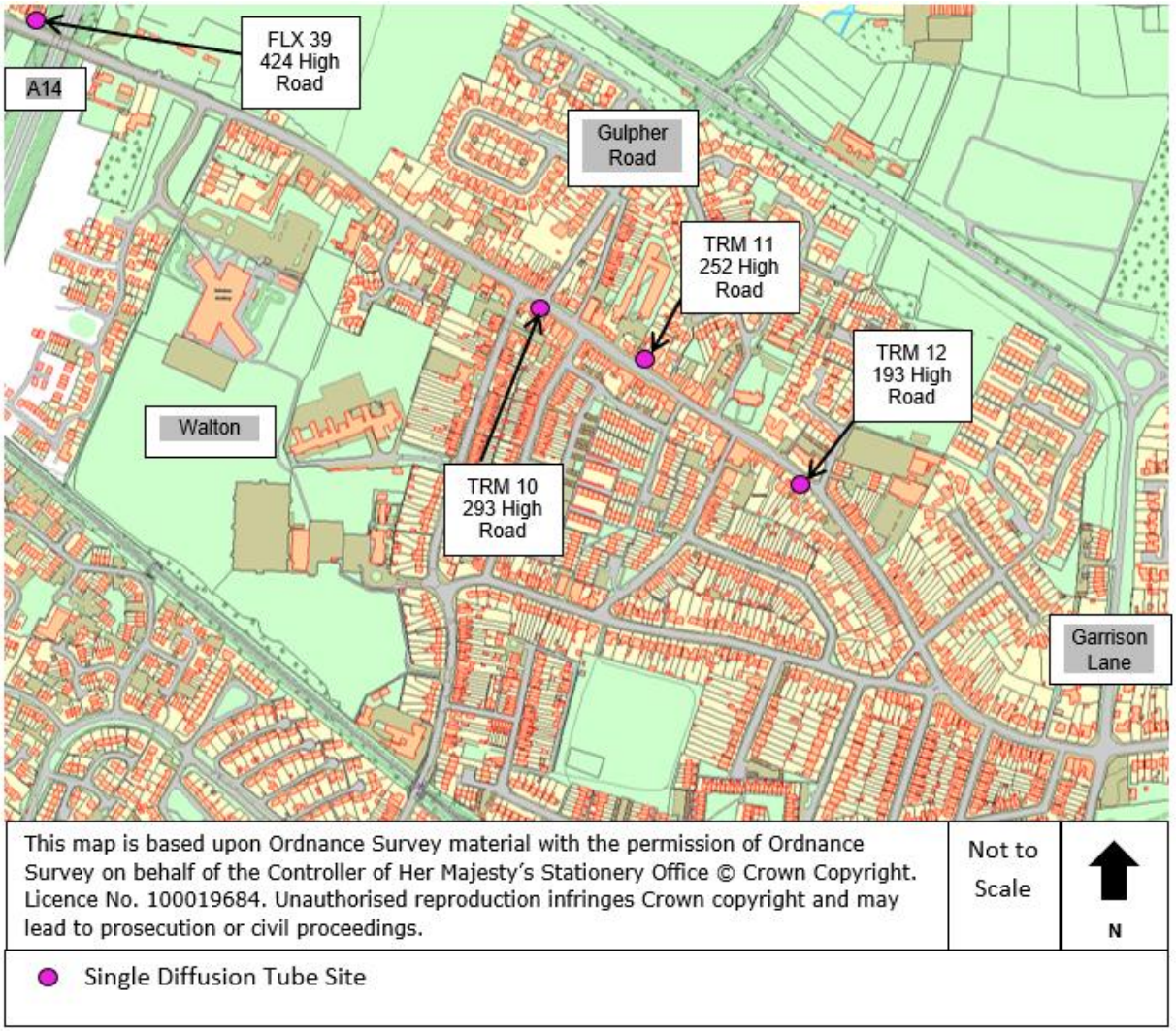
Map 21: Map of diffusion tubes: Trimley St Martin - TRM 2 to TRM 6.



Map 22: Map of diffusion tubes: Trimley St Mary - TRM 7, TRM 8, TRM 9, FLX 17, FLX 23 and FLX 39.



Map 23: Map of diffusion tubes: Walton - TRM 10, TRM 11, TRM 12 and FLX 39



Map 24: Map of diffusion tubes: Eyke - EYK 1

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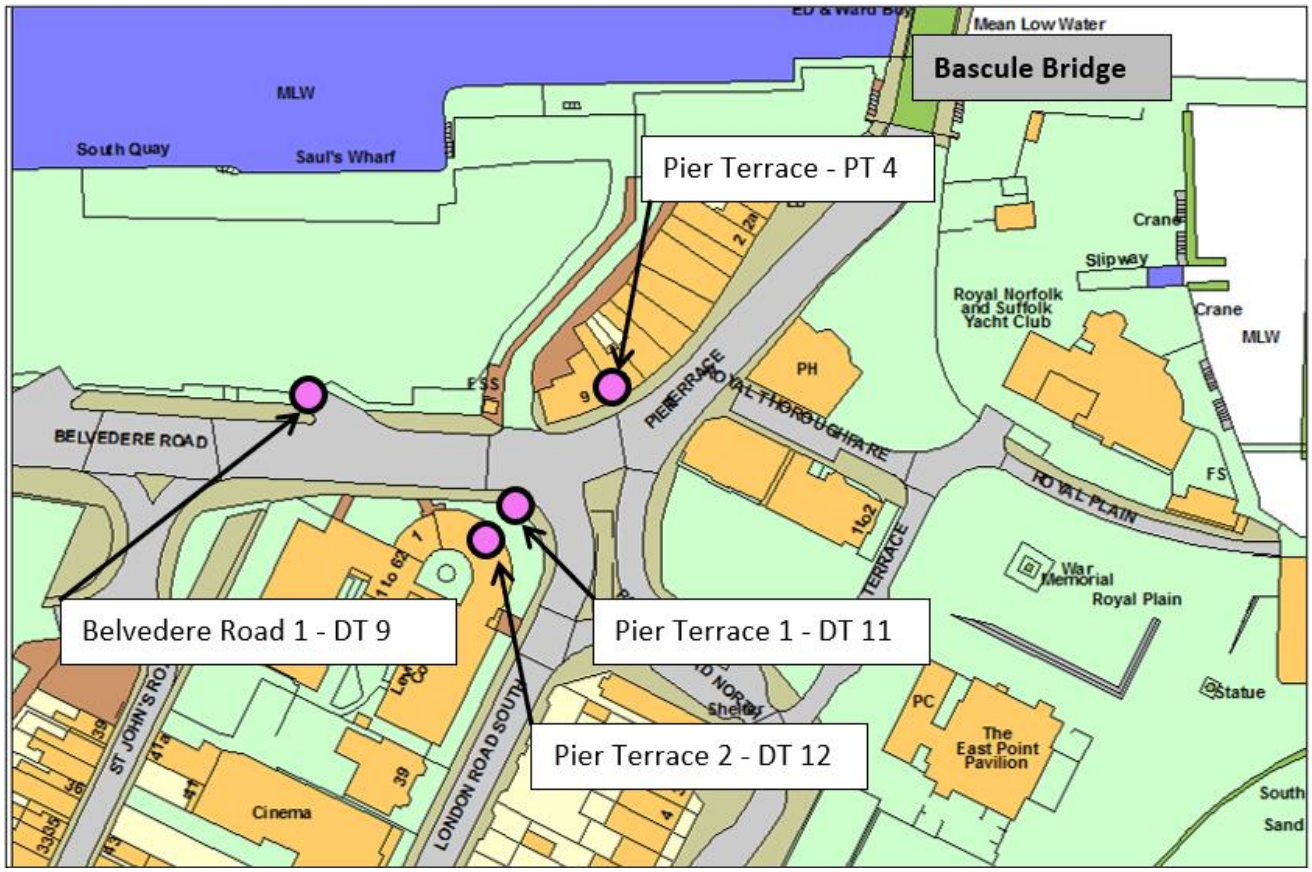
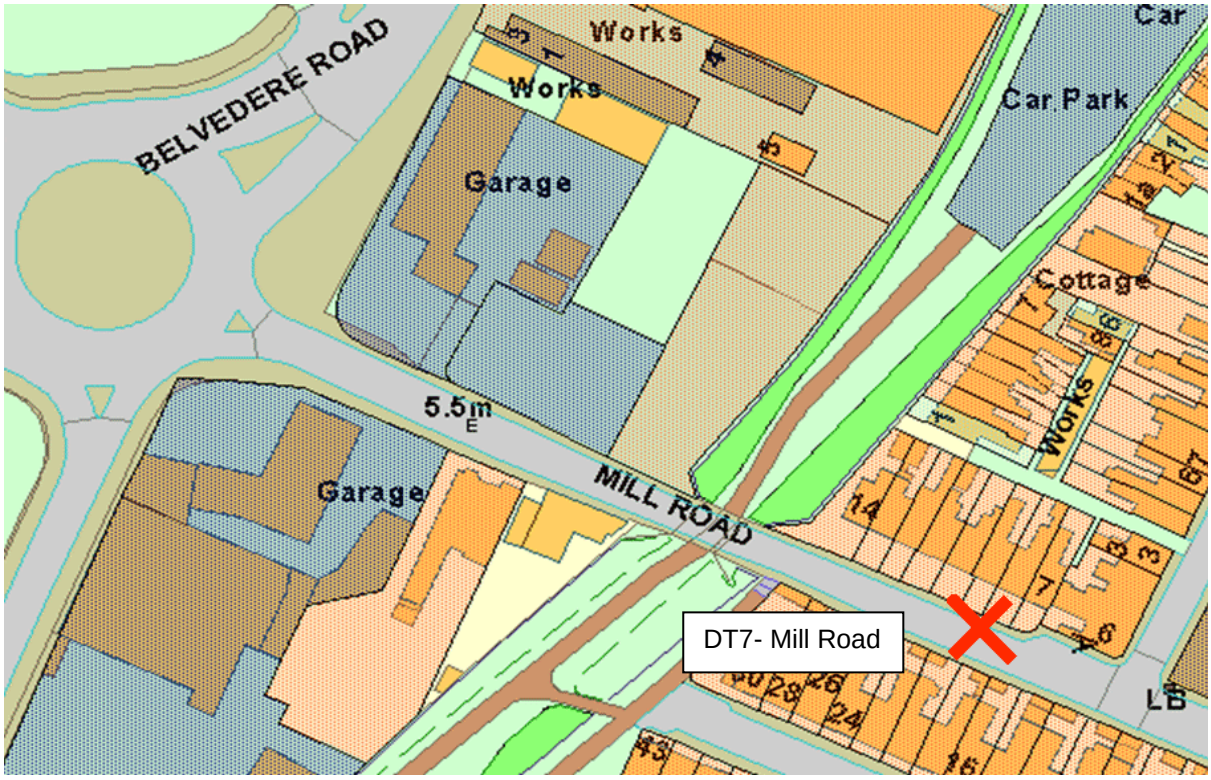
Single Diffusion Tube Site

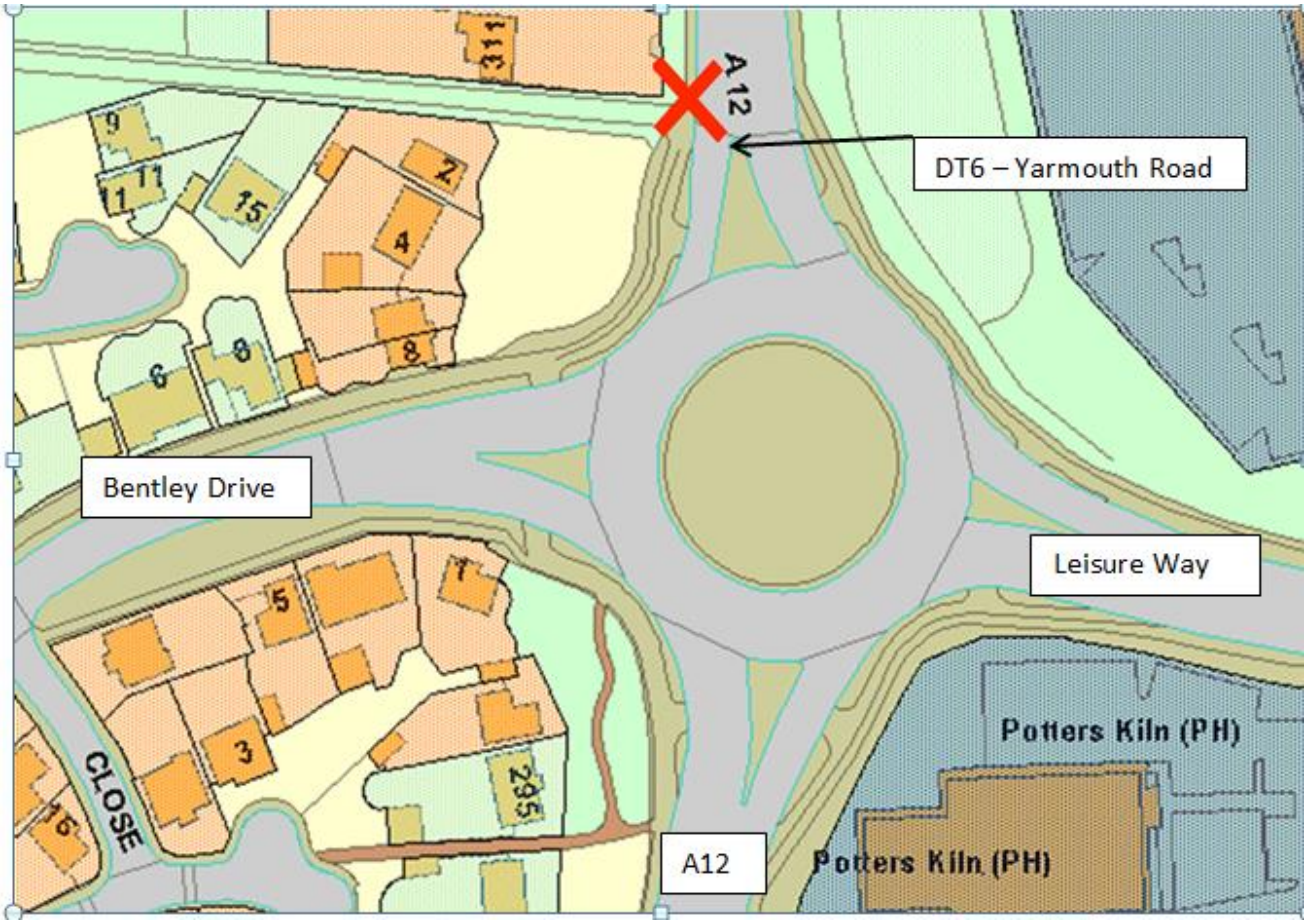
Map 25: Map of diffusion tubes: Lowestoft PT 3, PT 4 (LOW 6abc), DT 9 (LOW 1), DT 10, DT 11 (LOW 7) and DT 12



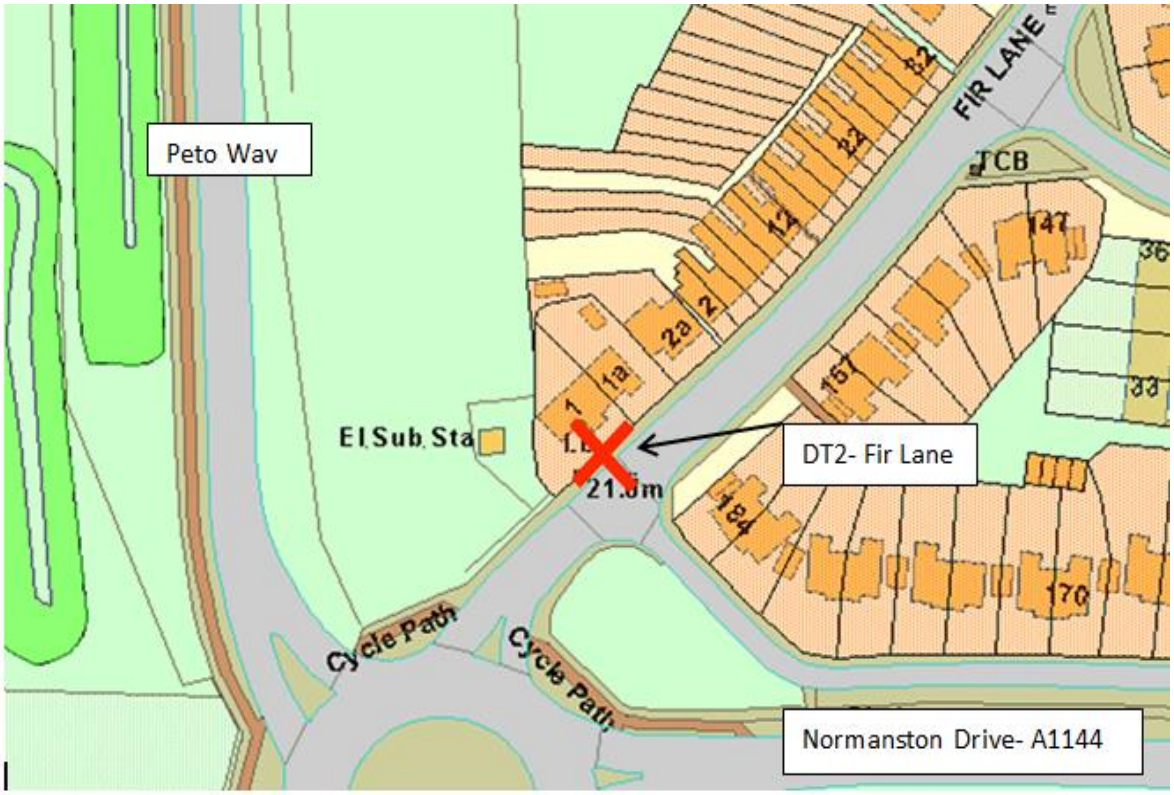
Map 26: Map of diffusion tube: Lowestoft - DT 7 (LOW 3)



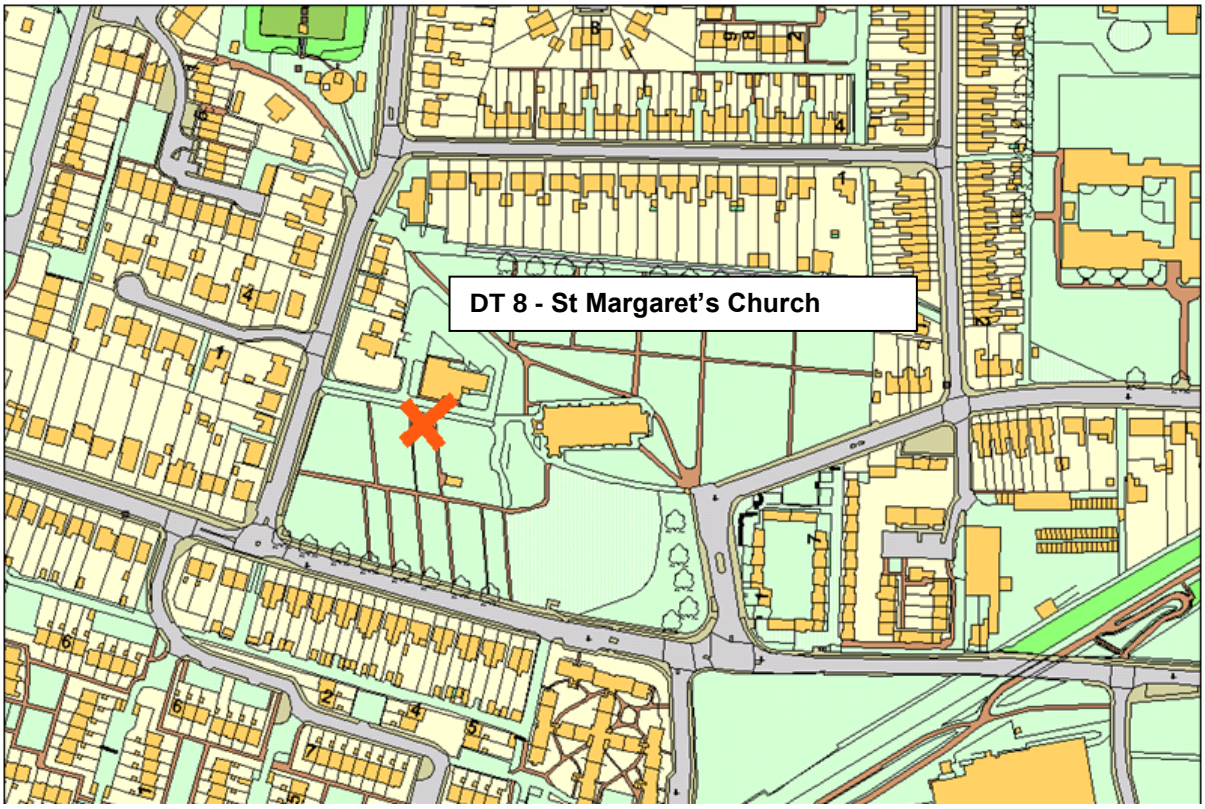
Map 27: Map of diffusion tube: Lowestoft - DT 6 (LOW 4)



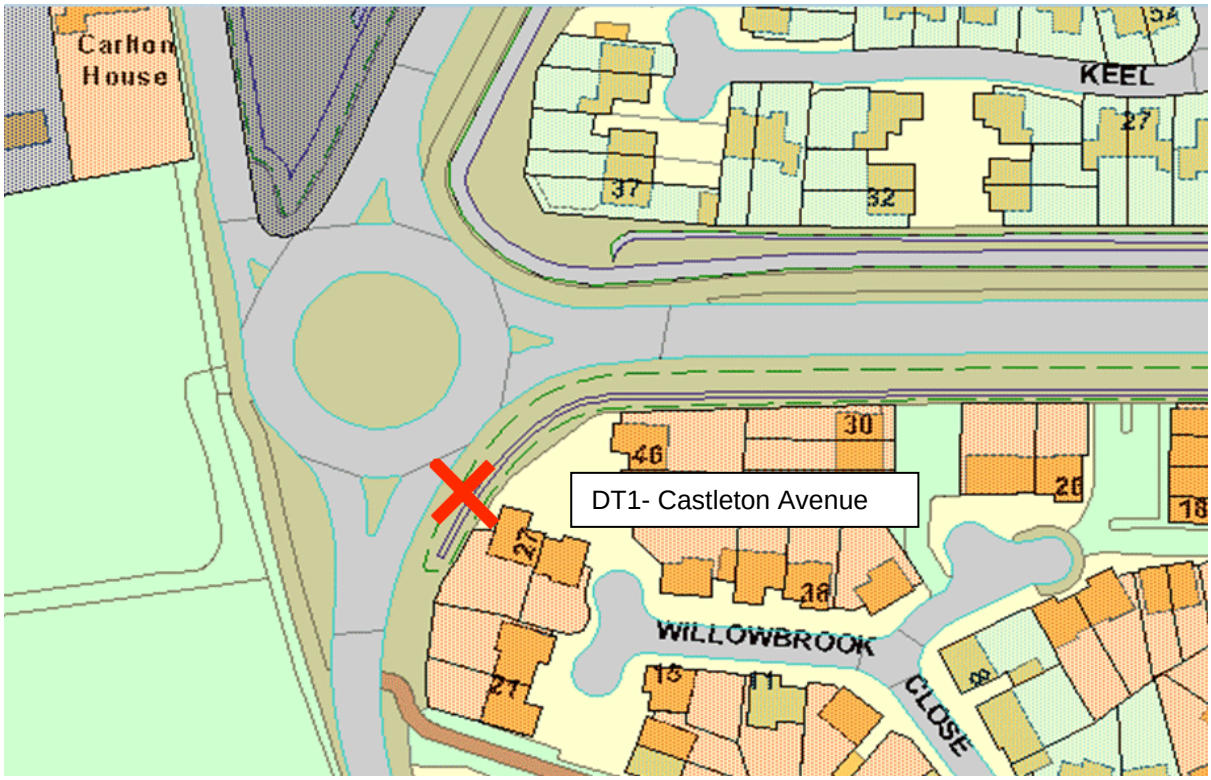
Map 28: Map of diffusion tube: Lowestoft - DT 2 (LOW 2).



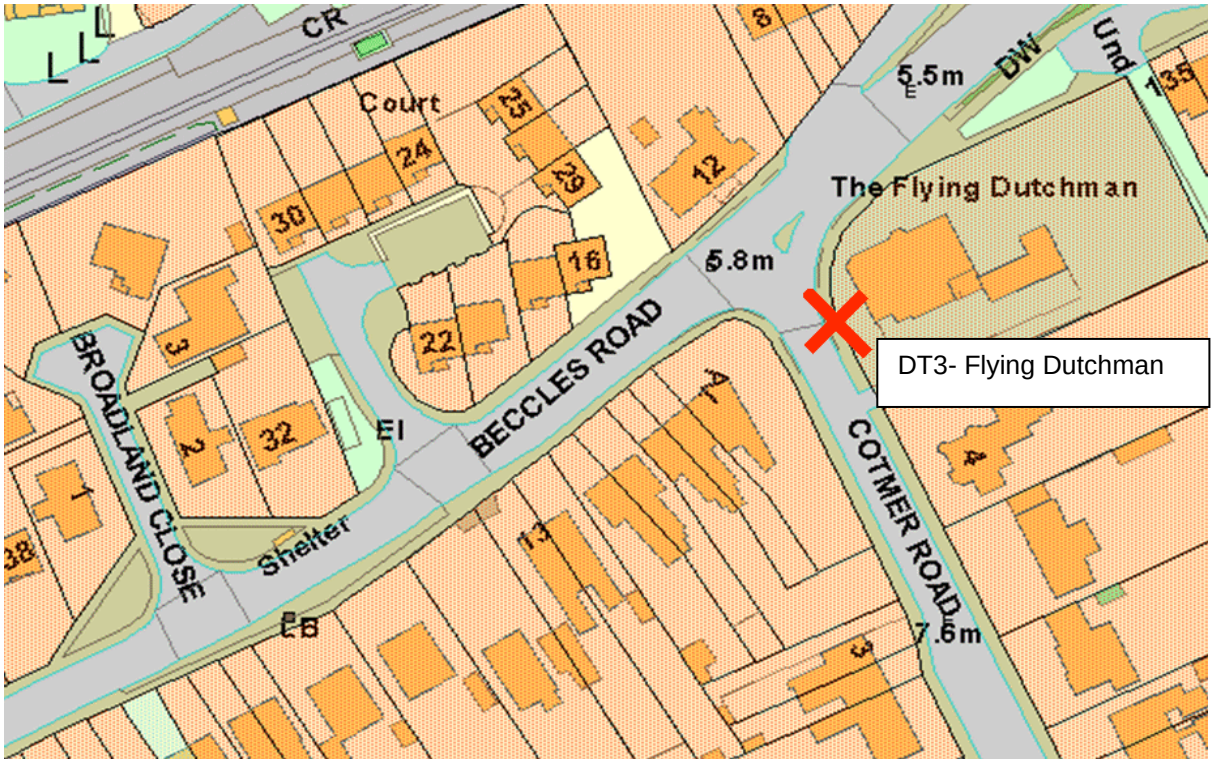
Map 29: Map of diffusion tube: Lowestoft - DT 8 (LOW 5).



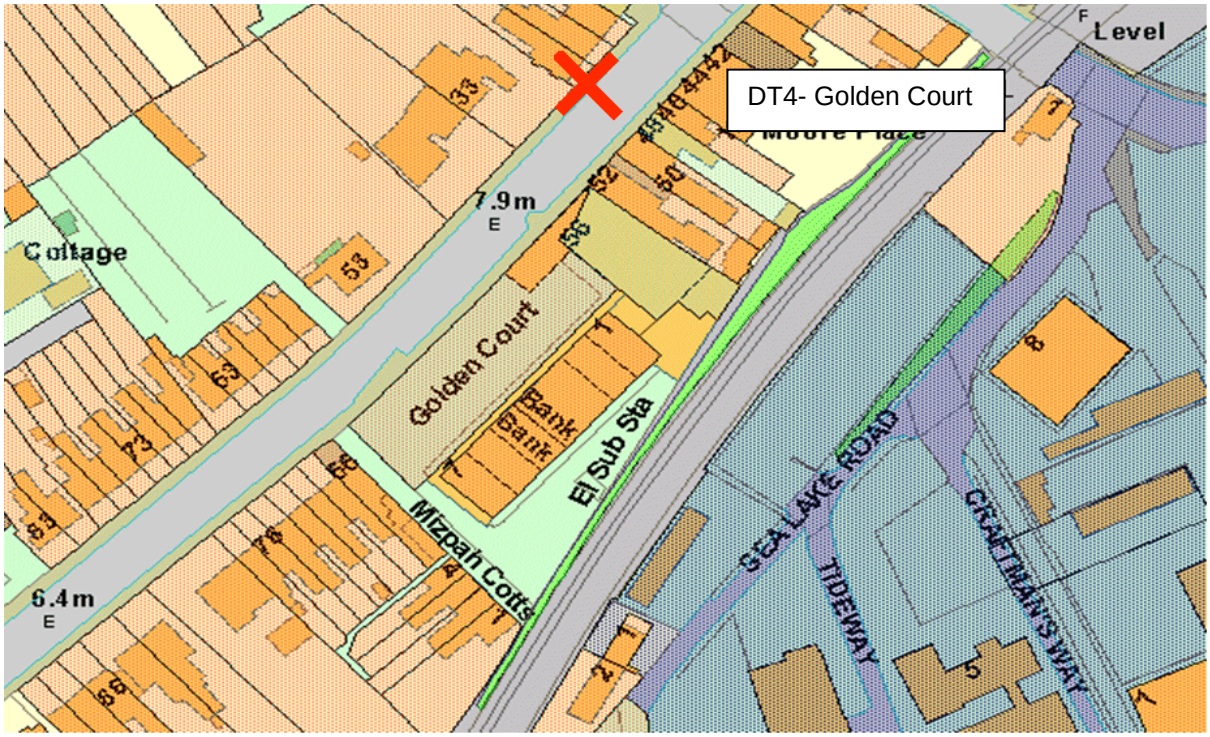
Map 30: Map of diffusion tube: Carlton Colville - DT 1 (CCL 1).



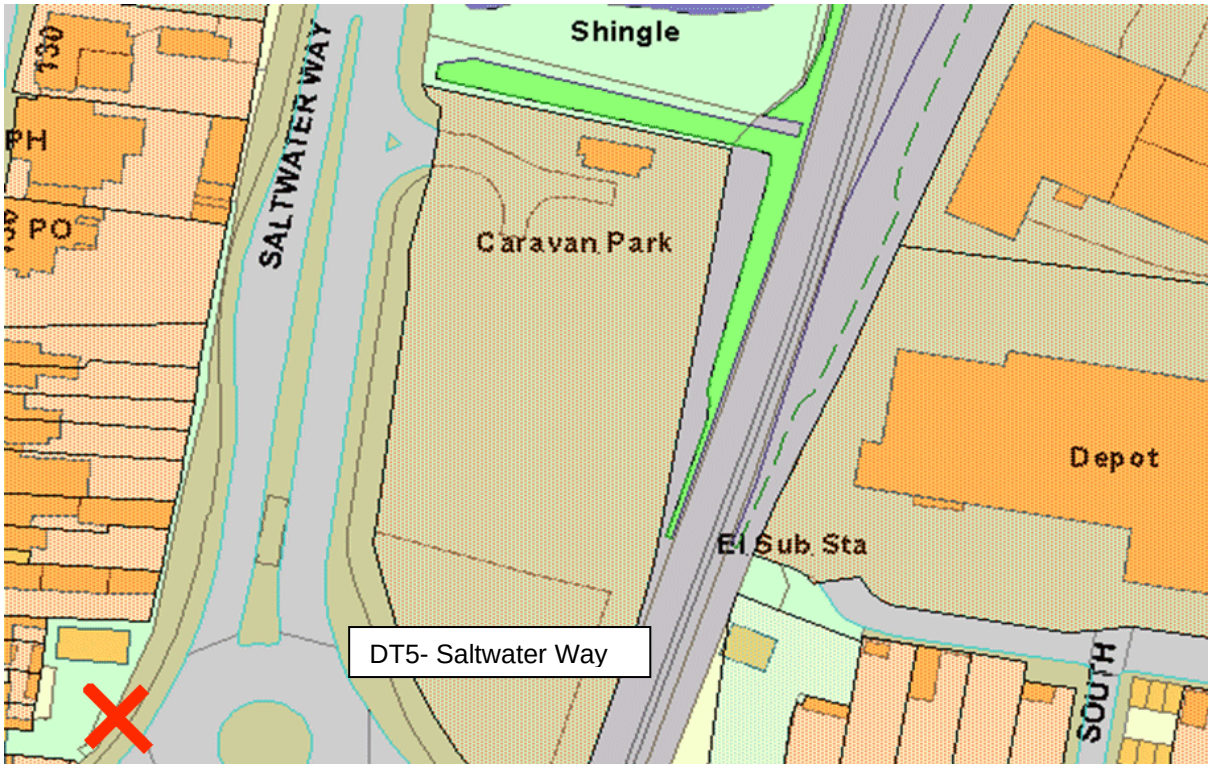
Map 31: Map of diffusion tube: Oulton Broad - DT3 (OBR 3).



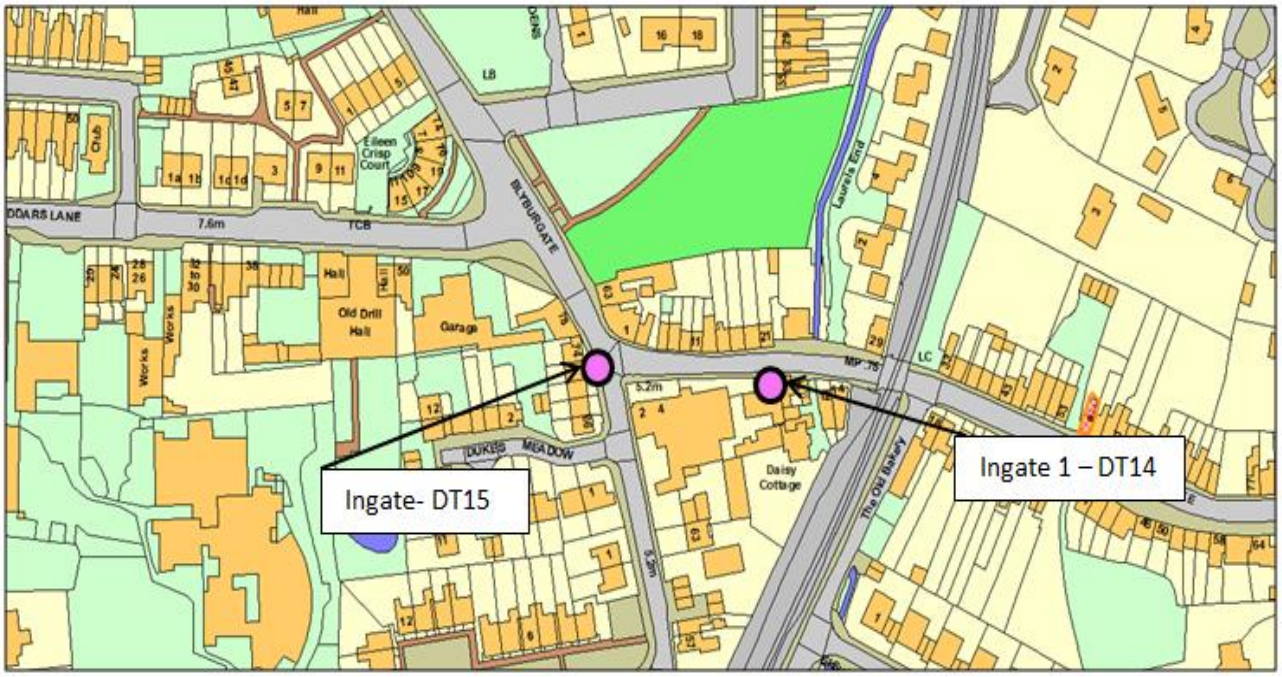
Map 32: Map of diffusion tube: Oulton Broad - DT 4 (OBR 2).



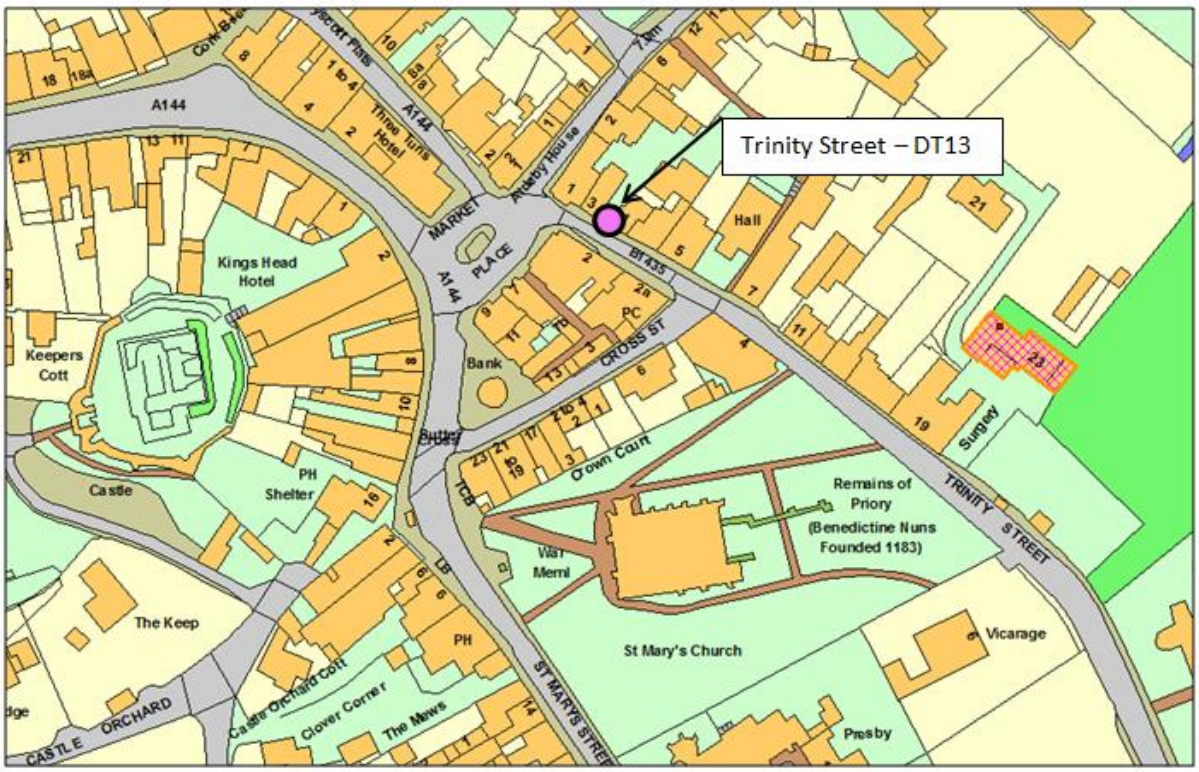
Map 33: Map of diffusion tube: Oulton Broad - DT 5 (OBR 1)



Map 34: Map of diffusion tubes: Beccles - DT 14 (BEC 1) and DT 15 (BEC 2).



Map 35: Map of diffusion tube: Bungay - DT 13 (BUN 1)



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
CIL	Community Infrastructure Levy
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EMS	Environmental Management System
EnMS	Energy Management System
EPUK	Environmental Protection UK
ERTG	Electric Rubber Tyre Gantry Crane
ESC	East Suffolk Council
EU	European Union
FDMS	Filter Dynamics Measurement System
HGV	Heavy Goods Vehicles
IMV	Internal Movement Vehicle
LAQM	Local Air Quality Management
LTP	Local Transport Plan
MOVA	Microprocessor Optimised Vehicle Actuation
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
RTG	Rubber Tyre Gantry Cranes
SCC	Suffolk County Council
SCDC	Suffolk Coastal District Council
SO_2	Sulphur Dioxide
SPD	Supplementary Planning Document
TRO	Traffic Regulation Order
WDC	Waveney District Council

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17. Air Quality Consultants Ltd Spreadsheet of Bias Adjustment Factors (03/18 and 06/18) accessed on the Local Air Quality Management Support Website at http://laqm.defra.gov.uk/bias-adjustment-factors/national-bias.html