2020 Air Quality Annual Status Report (ASR)

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

December 2020

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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].

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); and
- 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.

NO_2 is measured in the district by an automatic analyser and multiple diffusion tubes. There is an automatic analyser situated within Woodbridge, and in 2019 there were 74 diffusion tube monitoring locations covering 18 areas; Beccles, Blythburgh, Bungay, Farnham, Felixstowe, Framlingham, Kesgrave, Little Glemham, Leiston, Lowestoft, Martlesham, Melton, Oulton Broad, Saxmundham, Stratford St Andrew, the Trimleys, Woodbridge and Wrentham.

[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

The 2019 monitoring results show no exceedances of the NO_2 annual mean objective at a site of relevant receptor exposure.

To improve the accuracy of data collection, a number of triplicate sets of diffusion tubes are reported. In 2019 there are 15 new monitoring locations sited to investigate concerns raised by local residents and possible changes due to future development within the district. There were 16 sites with low concentrations that were removed at the end of 2018. NO_2 concentrations within both declared AQMAs are within the objective in 2019, Stratford St Andrew for the third year running and Woodbridge for the sixth year running. There is a general trend of NO_2 reductions across the district over time. Of the 72 locations monitored, 12 sites showed a slight increase from 2018 results, but all were still well within the objective level. Other than one site, the increases were less than 1.6 µg/m^3. The site at LOW 2 (Fir Lane, Lowestoft) shows an increase of 4.1µg/m^3 from 25.4µg/m^3 in 2018 to 29.5µg/m^3 in 2019. Concentrations at LOW 2 have shown an increase since 2015. LOW 2 is not located at a relevant receptor but on the pavement, in 2020 we have added a new site on the closest receptor to provide additional information and we will review data in the next ASR. Similar to last year, the dataset as a whole appears to have been adversely impacted due to the cold still conditions in January and February.

Woodbridge AQMA

The current Action Plan created in 2011 includes 20 measures to reduce NO_2 concentrations from both queueing and moving traffic at this junction. The Action Plan has been updated and a draft version of the Action Plan has been approved by Defra. Overall NO_2 concentrations within the AQMA have reduced since 2014 and have now been below the objective level for six consecutive years, with the average for 2019 being 32.2µg/m^3. As recommended by Defra, East Suffolk Council (ESC) is currently considering revocation of this AQMA.

Stratford St Andrew AQMA

The Action Plan received Defra approval in March 2018 and consists of 2 short term, priority action measures and 6 longer term aspirational measures. NO_2 concentrations have continued to fall in 2019 (36.2 µg/m^3) from 2017. There is a general trend of reducing concentrations over time. ESC is continuing to monitor in this location and the Steering Group will be looking at the aspirational measures within the Action Plan.

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; and
- 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. Key measures completed this year are:

- Campaign to reduce vehicle idling on the Port of Felixstowe completed with a reduction in NO_2 and SO_2 concentrations at the port side (action ESC4). These reductions occurred following the anti-idling campaign in 2018. Some sites show a marginal increase in NO_2 although all concentrations were within the annual mean NO_2 objective in 2019;
- Purchase of Electric Vehicles for successful trial use on Port of Felixstowe (ESC5). Two new Nissan Leaf electric vehicles used on Port in May 2018 and an additional one in 2019. Trialled a Terberg all-electric Internal Tractor in 2018 as part of feasibility study for suitability of EV in Port environment. The trial was successful, and the unit has returned in early 2020 for a further 2-month trial. There is now a fleet of three Nissan Leaf electric vehicles;
- Inclusion of Air Quality within the East Suffolk Council - Suffolk Coastal Local Plan (ESC8), there were two existing Local Plans adopted and published in 2013 and 2017. The new Local Plan covers 2018-2036 which was submitted to the Planning Inspectorate in March 2019. Examination hearings took place 20th

August – 20th September 2019 and consultation on Main Modifications was held from 1st May to 10th July 2020. The Local Plan was adopted in September 2020;

- Suffolk Travel Plan Guidance has been established (ESC10) and can be found on the Suffolk Council Website; 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;
- Installation of 11 Rapid Electric Vehicle Charging Units for Public use in Suffolk, Norfolk and Essex – Felixstowe site has been installed and activated (ESC15);
- Installation of Urban Traffic Management Control System (UTMC) in Lowestoft with connection to the Bascule Bridge lifts (ESC22). Unable to measure whether congestion has reduced due to the control system as no information was available before installation.

Key measures completed last year and therefore removed are:

- WBG17– Production of the Supplementary Planning Document;
- ESC16 – Trial to allow cycling on the promenade at Felixstowe;
- ESC17 – Redesign and update the air quality pages on the Council's website; and
- ESC24 – Improvement works at Oulton Broad Station North.

Lowestoft Gull Wing Bridge

In 2015 Suffolk County Council was given funding to identify and assess a number of ways to improving north-south connections across Lake Lothing. This scheme aimed to reduce congestion, encourage alternative modes of transport (public transport, walking and cycling), reduce accidents and regenerate Lowestoft. In 2020 the archaeological surveys and groundworks for the development started.

Development Consent Orders (DCO)

The DCO applications for East Anglia ONE North and East Anglia TWO offshore windfarms were submitted to the Planning Inspectorate in October 2019 and are currently undergoing examination.

The DCO application by EDF Energy for a new nuclear power station, Sizewell C, was submitted to the Planning Inspectorate in May 2020. A Public Consultation on improved proposals to the application was carried out in November/December 2020.

ESC has been scrutinising the proposals for all 3 DCO applications with regard to air quality impacts within the district, including the 2 declared AQMAs at Stratford St Andrew and Woodbridge.

Conclusions and Priorities

In 2019, NO_2 concentrations within the Woodbridge and Stratford St. Andrew AQMAs were below the annual mean 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 ESC are currently considering revocation as recommended by Defra.

Concentrations in the Stratford St. Andrew AQMA decreased further in 2019 and were below the annual mean NO_2 objective. The Action Plan received Defra approval in March 2018. 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 continuing and will inform implementation of any additional Action Plan measures if considered necessary.

Assessment of the DCO applications for the 2 offshore windfarms and the new nuclear power station continues to be high priority.

Local Engagement and How to get Involved

It is really important that we hear the views and comments of our residents, as your local knowledge 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 ESC 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.

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 the district which contributes to the wider charging network in 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 ESC during 2019. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

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

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

2 Actions to Improve Air Quality

2.1 Air Quality Management Areas

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

A summary of AQMAs declared by ESC 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: Map(s) of Monitoring Locations and AQMAs, which provides for a map of air quality monitoring locations in relation to the AQMA(s).

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 created in 2011 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 version of the Action Plan has been approved by Defra and is with ESC. That said, NO_2 concentrations within the AQMA have reduced since 2014 and have now been below the objective level for six consecutive years, with the average for 2019 being 32.2µg/m^3. The concentrations at all monitoring locations within the AQMA have not been within 10% of the NO_2 annual mean objective of 40µg/m^3 (below 36µg/m^3) for three consecutive years. The feasibility of AQMA revocation is therefore being considered, and the AQAP is accordingly presently on hold.

Stratford St Andrew AQMA

This AQMA was declared in June 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 (39.0 µg/m^3) and have continued to fall in 2018 (37.7 µg/m^3) and 2019 (36.2 µg/m^3). There is a general trend of reducing concentrations over time.

The initial reduction of 1 µg/m^3 following movement of the speed limit was lower than modelling had predicted. Speed surveys undertaken following the move have shown a reduction in speeds at all locations surveyed except on the southbound carriageway within the AQMA, where speeds appear to have increased slightly. ESC is continuing to monitor in this location. The Steering Group will be looking at the aspirational measures within the Action Plan in conjunction with the monitoring results to determine whether additional measures are considered necessary at this time.

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	NO_2 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/m^3	32	µg/m^3	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	NO_2 Annual Mean	Stratford St. Andrew	The four properties situated within 1-5 Long Row, main Road (A12), in Stratford St. Andrew	NO	42	µg/m^3	36	µg/m^3	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:

1. The Public Health Outcomes Framework should be referenced, in addition to the referenced local framework data, with a comparison between the Council's air quality impact and the nationally derived air quality impact;
2. The reported maximum Woodbridge AQMA concentration in 2018 was 32.8µg/m^3, therefore it is recommended to state the concentration correctly within AQMA Table 2.1 (currently stated as 32µg/m^3);
3. Distance correction has been completed at 16 diffusion tube locations where the concentrations did not exceed the 10% of the objective (36µg/m^3). Distance correction should only be completed at monitoring sites that have an annual mean NO_2 concentration greater than 36µg/m^3 and the relevant exposure is within 20m of the monitoring location;
4. Results of the diffusion tube values for 2018 are displayed in a bold format within Table B.1 of the main report. This should only be the case if the concentrations exceed the annual mean objective of 40µg/m^3;
5. The Council should consider revocation of the designated AQMAs based on current concentration trends. However, should the Council wish to maintain the AQMA boundaries, it is recommended that the Woodbridge AQAP is updated; and
6. Generally, the report is very good, provides a great deal of information and acts as a good first point of reference for members of the Public. The Council should continue their hard work in developing the County wide partnerships and improving local air quality.

ESC welcomes these comments from the 2019 appraisal, which have been taken onboard in this Annual Status Report for 2020. The Public Health outcomes Framework has been included in the $PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations section, and updates have been made to Table 2.1 and Table B.1 regarding the issues highlighted above.

ESC has taken forward a number of direct measures during the current reporting year of 2019 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: Woodbridge Junction AQAP and Stratford St. Andrew AQAP.

Key completed measures are:

- Campaign to reduce vehicle idling on the Port of Felixstowe completed with a reduction in NO_2 and SO_2 concentration at the port side (ES4);
- Purchase of electric vehicles for successful trial use on Port of Felixstowe. Trial to be continued (ES5);
- Inclusion of Air Quality within the East Suffolk Council – Suffolk Coastal Local Plan (ES8)
- Suffolk Travel Plan Guidance has been established (ESC10);
- Installation of 11 Rapid Electric Vehicle Charging Units for Public use in Suffolk, Norfolk and Essex – planned site within Felixstowe (ESC15); and
- Installation of an Urban Traffic Management Control System (UTMC) in Lowestoft with connection to the Bascule Bridge lifts (ESC22).

In this year's report on measure progress, we have removed a number of historic, successfully completed measures, (listed below) further details of which are available in last year's ASR:

- WBG17– Production of the Supplementary Planning Document;
- ESC16 – Trial to allow cycling on the promenade at Felixstowe;
- ESC17 – Redesign and update the air quality pages on the Council's website;
- ESC24 – Improvement works at Oulton Broad Station North.

ESC expects the following measures to be completed over the course of the next reporting year: Adopting NO_x abatement technologies on Internal Movement Vehicles (IMVs) in the port with 24 of these set to be introduced in 2021 to reduce emissions around the port area (ESC2); improvement of fleet emissions for freight haulage companies in Felixstowe to reduce emissions around the port area (ESC14); intent to

adopt the East Suffolk Cycling Strategy across the council to encourage more cycling (ESC16); raising awareness of air quality within schools (WBG18).

ESC's priorities for the coming year are to produce a new draft Air Quality Strategy and to facilitate the migration of both the public and the Council's own vehicle fleets toward low emission vehicles. We are also actively seeking ways to encourage staff to work from home following the lockdown due to the Covid-19 pandemic, therefore reducing emissions associated with transport. On the horizon is a project looking at ways of reducing travel between the Council sites at Melton and Lowestoft, which would also bring about a reduction in emissions associated with the Council's activities.

It is also noted that in line with the national Clean Air Strategy, an Air Quality Strategy is being drafted for the Port of Felixstowe over the coming reporting year, which aims to be adopted in 2021. A letter of intent has been published by the Port.

The principal challenges and barriers to implementation of measures that ESC anticipates facing are ensuring resources and funding impacted by Covid-19 can be maintained for measures, as several of these have had funding removed and therefore cannot be progressed.

Progress on providing information on Air Quality to Primary Schools has been slower than expected due to events being cancelled due to the restrictions surrounding Covid-19. Over the coming year the Council aims to continue;

- Working with primary schools to deliver air quality information/education;
- Promote anti-idling events such as Clean Air Day; and
- Promoting Modeshift STARS to help schools with Travel Planning.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
Woodbridge Action Plan											
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	Originally 2014 - 2015, now unknown - not implemented as yet	Woodbridge Town Council and Suffolk County Council	Funding unknown - possible bid for Community Infrastructure Levy (CIL) money in future	Reduction in peak queue lengths on Melton Hill.	Recent air quality modelling shows max reduction of 0.1 µg/m3 in AQMA.	Feasibility study undertaken. Negligible impact on AQMA NO_2 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 2019 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.
WBG 15c	Travel Plan for the District Council Offices	Promoting Travel Alternatives	Workplace Travel Planning	2009	ESC - Environmental Health	ESC	Travel Plan adopted. Key actions completed	2% for 15a, b & c combined	2016 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 AQMA. 2 EV charge points installed and Electric Pool Vehicle available for staff use.	**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.
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	Originally 2011-2012, now on hold - not implemented	SCC	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	2010 and on-going	SCC	Unknown	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	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	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
									possible schemes - no further progress. Funding could be sought from CIL. SCC have 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	2010 and on-going	SCC and ESC	SCC and ESC	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.	Restate 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
WBG 8	Investigate Clean Bus Technology Fund to retrofit buses	Promoting Low Emission Transport	Public Vehicle Procurement - Prioritising uptake of low emission vehicles	Unknown	ESC	ESC and Clean Bus Technology Grant/Fund	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 bur 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 the 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	On-going	ESC	ESC	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	

Measure No.	Measure	EU Category	EU Classification	Date Measure Introduced	Organisations involved	Funding Source	Key Performance Indicator	Reduction in Pollutant / Emission from Measure	Progress to Date	Estimated / Actual Completion Date	Comments / Barriers to implementation
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	2017 Suffolk County Council (SCC) lead and funded	SCC	SCC	Reduction in NO_2 concentrations in AQMA. Reduction in vehicle speed within AQMA. NO_2 concentrations in AQMA reducing since 2017 - 36µg/m3 in 2019. Speeds have reduced Northbound in the AQMA but have increased slightly Southbound	Reduction in concentration by up to 2 µg/m_3	Speed limit panel agreed experimental TRO. Speed limit moved. Traffic speed survey pre and post move. Survey shows decrease in vehicle speeds Northbound but increase in vehicle speeds Southbound at the site of the AQMA.	**Completed December 2017**	Air quality monitoring will now determine the effectiveness of this measure to reduce NO_2 concentrations. NO_2 concentrations within AQMA reduced 3-4µg/m^3 in 2017 (prior to speed limit changes), 1µg/m3 in 2018 after the speed limit move and 2µg/m3 in 2019.
STA 2	Assessment of planning applications for impact on air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Ongoing	ESC Environmental Health and Planning	ESC	No new housing introduced into area of exceedance (AQMA) unless mitigation measures are in place to offset impacts. No new housing introduced to date.	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	The assessment process takes account of national guidance (including EPUK / IAQM) and local procedures
STA 3	Measure 1 together with a southbound permanent vehicle activated sign	Traffic Management	Reduction of speed limits, 20mph zones	Unknown - not yet implemented	SCC	unknown	Reduction in NO_2 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. Steering Group discussions in 2020 surrounding use of a temporary VAS installed by SCC/ESC and run by the Parish Council.	unknown	Would need a site assessment and require capital funding (min £8,000) and revenue funding. Not yet approved. Concentrations in AQMA are falling year on year so measure may not be required.
STA 4	Measure 1 together with a northbound permanent vehicle activated sign	Traffic Management	Reduction of speed limits, 20mph zones	Unknown - not yet implemented	SCC	unknown	Reduction in NO_2 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 if required.	unknown	Would need a site assessment. Would require capital funding (min £8,000) and revenue funding. Not yet approved. Concentrations in AQMA are falling year on year so measure may not be required.
STA 5	Southbound speed camera just prior to cottages	Traffic Management	Reduction of speed limits, 20mph zones	Unknown - not yet implemented	SCC	unknown	Reduction in NO_2 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.	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. Concentrations in AQMA are falling year on year so unlikely to be required.
STA 6	Average speed camera system throughout Stratford St Andrew and Farnham	Traffic Management	Reduction of speed limits, 20mph zones	Unknown - not yet implemented	SCC	unknown	Reduction in NO_2 concentrations in AQMA. Reduction in vehicle speed within AQMA.	Reduction in concentration to below the objective	Consideration of option only. Aspirational measure due to high costs. Dependent on measure 1, 3, 4 and 5	unknown	Needs a site assessment to confirm adequate location and radar sightline, support from Suffolk Roadsafe Board and police. High capital funding cost of £250,000 and high revenue. Funding unlikely to be affordable. Concentrations in AQMA are falling year on year so unlikely to be required.

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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	2022 / 2023	EDF Energy if the DCO is successful	EDF Energy if the DCO is successful	Reduction in NO_2 concentrations in AQMA. Reduction in traffic flows within AQMA	Reduction in concentration to below the objective	Government funding (DfT) for a 4 village bypass (Farnham, Stratford St. Andrew, Little Glemham and Marlesford) was not successful. Alternative funding has not materialised. 4 village bypass not currently being pursued. DCO application for Sizewell C submitted with an integrated transport strategy. Two Village Bypass of Stratford St Andrew and Farnham is included in their proposals and subject to obtaining consent should be available for use by peak construction. Anticipated construction 2022/2023.	2024/2025	Sizewell C DCO Integrated Transport Strategy includes up to 1000 HGV on busiest day at peak, 750 HGV average day at peak. Early Years construction traffic will pass through AQMA at Stratford St Andrew until Two Villages Bypass is constructed and ready for use. Estimated construction period for bypass is 2 years.
STA 8	Mitigation of construction traffic emissions from Sizewell C and other Nationally Significant Infrastructure Projects (NSIPs) through the planning process	Policy Guidance and Development Control	Low Emissions Strategy	2019 and ongoing	ESC, currently working with EDF Energy & Scottish Power Renewables if the DCOs are successful	ESC staffing and EDF Energy / Scottish Power Renewables if the DCOs are successful	Number of low emission vehicles in fleet.	No significant increase in concentrations	Preliminary discussions on likely impacts at pre-application stage. Development Consent Order (DCO) applications now submitted for Sizewell C (SZC), EA1N and EA2 Offshore Windfarms. DCO for SZC includes proposal for construction of 2-village bypass on the A12, bypassing both Stratford St Andrew (and the AQMA) and Farnham. Additional monitoring requirements and mitigation particularly for SZC Early Years construction before the bypass under discussion as part of the DCO. Discussions on use of latest EURO classifications for the construction fleet for both applications.	2022/2023 and ongoing	DCO application for Sizewell C submitted with an integrated transport strategy which includes up to 1000 HGV on busiest day at peak, 750 HGV average day at peak, a Two Village Bypass of Stratford St Andrew and Farnham is included in their proposals and subject to obtaining consent should be available for use by peak construction. Anticipated construction 2022/2023. Modelling of the potential impact on the AQMA has been conducted for both SZC and EA1N & EA2 including cumulative impacts and is being reviewed.
General measures within the District: 2020 onwards ESC											
ESC1	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	2010	Port of Felixstowe	Port of Felixstowe	Number of RTG Cranes using improved efficiency power source. Number of blocks converted to electric. All 54 RTGs now converted. 38 blocks converted to electric.	unknown	As of March 2020 purchased 33 ECO-RTGs, 38 blocks on the Port now converted to electric and 54 RTGs are now electric capable. Port successfully commissioned all-electric RTG - does not require use of diesel engine to transfer it between blocks, uses lithium ion battery - therefore emissions free.	2020 - all 54 RTGs have now been delivered. Unknown timeframe for electric conversion of blocks 8 and 9 on Trinity Terminal. Retro-fitting of RTGs to all electric will continue in the future.	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 fitting LED to 12 cranes completed - will reduce energy usage. Now that all 54 RTGs are switched

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									Port now have 8 of these and any retro-fits going forward will be with this technology. Looking to convert Blocks 8 and 9 on Trinity Terminal to electric but on hold due to business impact of Covid-19.		to electric a 30% reduction in diesel use at the Port is predicted.
ESC2	Adopt NO_x abatement technologies on Internal Movement Vehicles (IMVs) in the port	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2010	Port of Felixstowe	Port of Felixstowe	Number of IMVs replaced. Reduction in NO_2 and SO_2 concentrations at the Port. 135 IMV units replaced at 2020. Emissions monitoring shows reduction in NO_2 and SO_2 over time with slight increase in 2017 then reduction in 2018. Some sites showing slight increases in NO_2 and SO_2 in 2019 and others show continued reductions although plateauing now. All NO_2 concentrations are within the annual mean Air Quality Objective.	unknown	83 IMVs replaced 2011-2016. 52 IMVs replaced 2017/2018. 17 replaced 2019. Total of 135 of the 260 units now replaced. 2 x new internal tractors for roll-on roll-off operations in 2018. IMVs are replaced on a 15 year cycle. 24 new IMVs due 2021.	On-going. 24 new IMVs due 2021	All new IMVs utilise AdBlue as part of exhaust gas recirculation technology and currently comply to Euro VI emissions standards instead of Euro iiia. The recently purchased IMVs are fitted with start/stop engine technology and the latest emission compliant Volvo engines. Expected to deliver a 10% reduction in emissions compared with a conventional tractor unit
ESC3	Increased use of rail transport for movement of goods at the Port of Felixstowe	Freight and Delivery Management	Other	2018	Port of Felixstowe	Port of Felixstowe	Number of daily freight services. Percentage rail modal share. 33 daily freight services, 28% modal share. Max capacity at current time.	unknown	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 and 2019	On-going	No further increase in number of services anticipated as currently train services from the Port are at capacity. Modal shift to rail is a top priority for the Port and senior managers liaise with Government frequently. The branch line improvement was completed but bottleneck at Ely.
ESC4	Campaign to reduce vehicle Idling on Port of Felixstowe	Other	Other	2017	Port of Felixstowe	Port of Felixstowe	Reduction in NO_2 and SO_2 levels port side. NO_2 and SO_2 concentrations showed decrease in 2018 after campaign. NO_2 concentrations showing continued decrease at some sites and slight increase a others. All within annual mean NO_2 Objective.	unknown	Campaign started end of 2017 port wide and also to third party site users, contractors and tenants. Campaign now completed.	**Completed 2019. This measure will be removed from the table next year**	NO_2 and SO_2 concentrations port side increased slightly in 2017 and then decreased slightly in 2018 following anti-idling campaign.
ESC5	Electric vehicle trials at the Port of Felixstowe	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2018	Port of Felixstowe	Port of Felixstowe	Number of miles undertaken by electric vehicles. Total of 16,000 miles undertaken to June 2020 by all 3 electric vehicles.	n/a	2 new Nissan Leaf electric vehicles on Port in May 2018 and additional one in 2019. Trialled a Terberg all-electric Internal Tractor in 2018 as part of feasibility study for suitability of EV in Port environment. Trial went well and unit has returned in early 2020	**Completed 2019. This measure will be removed from the table next year**	Trial was successful and Port now has a fleet of 3 Nissan Leaf electric vehicles.

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									for a further 2 month trial.		
ESC7	Assessment of planning applications for impact on air quality	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Ongoing	ESC Environmental Health and Planning	ESC Environmental Health and Planning	Number of Planning applications considered. Planning applications processed by Environmental Protection Team; 2018=1,282 **2019=1,075** (not including pre-application advice)	Unknown	Officers in Environmental Protection work with Planning to ensure that each relevant application is appropriately assessed for air quality impacts and responses sent to Planning where necessary.	On-going	The assessment process takes account of national guidance (including EPUK / IAQM) and local procedures. The Environmental Protection Team also deal with many requests for pre-application advice from applicants.
ESC8	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 Plan)	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2013	ESC Planning Department and Environmental Protection Team	ESC	Adoption of Local Plan documents. Air quality considered in relevant planning applications. 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. East Suffolk Council - Suffolk Coastal Local Plan covering period 2018-2036 adopted September 2020.	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 submitted to the Planning Inspectorate in March 2019, examination hearings took place 20th August – 20th September 2019 and consultation on Main Modifications was held from 1st May to 10th July 2020. Adopted September 2020.	2013 / 2017 / 2020 **Completed 2020**	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. 9,756 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/ Air quality is a key objective within the Sustainability appraisal framework against which all policies and site allocations have been 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, and Policy SCLP10.3: Environmental Quality.
ESC9	Promotion of travel alternatives in the Local Plan	Promoting Travel Alternatives	Promotion of walking	2013	ESC Planning Department and Environmental Protection Team	ESC	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. Expected to be adopted 2020.	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

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ESC10	Suffolk Travel Plan Guidance	Policy Guidance and Development Control	Other policy	2018	SCC with input from all Suffolk Local Authorities	SCC	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 2019. This measure will be removed from the table next year**	
ESC11	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	2018	ESC	ESC	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. Wood burning information promoted during Clean Air day 2019 and updated on website Autumn 2019.	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. No further work undertaken on this, but we are hoping to undertake this.
ESC12	Greener travel information available on the SCC website	Promoting Travel Alternatives	Personalised Travel Planning	2017	SCC	SCC	Number of visitors to the website. 2018 - 5134 visitors to Local Links developer travel plans and 1056 to SCC travel plans websites. 2019 (Apr-Dec) - 877,825 visits to Suffolk on Board (137,080 were related to school travel). 1,175 visits to SCC Travel Plan pages in 2019.	Unknown	SCC website updated for greener travel and travel planning. Number of visitors to websites monitored. April 2019 'Local Links' pages moved to 'Suffolk on Board' pages which also includes buses and other forms of public transport.	On-going	http://www.greensuffolk.org/travel/ Information on greener travel including journey planning, business support and car sharing.
ESC13	Promotion of travel alternatives for staff at ESC	Promoting Travel Alternatives	Promotion of cycling	2013	ESC	ESC	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 to in May and June 2019. 11 bikes purchased 2019/20. Pool bike used 5 times in 2019/20	Unknown	Staff encouraged to use cycles. Tax free bike 'Cycle 2 Work scheme' started 2013. 32 bikes purchased Nov 16 - April 19. Business mileage rate for cycling in place. Emergency 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.	On-going	Riduna Park building has covered and secure cycle parking/racks for 40 bikes, shower/changing/ drying facilities and lockers. ESC staff and member mileage claimed; 2015/16 - 827,840 2016/17 - 755,183 2017/18 - 718,107 2018/19 - 747,724 2019/20 - 772,334 investigating the latest increases which are partly due to under reporting of member mileage previously. 2018/19 figure has altered as they now use a more accurate calculation of staff travel.

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ESC14	Fleet emissions improvements for freight haulage companies based in Felixstowe	Vehicle Fleet Efficiency	Other	2018 to draw up list. 2020 to contact hauliers	ESC	ESC	Number of haulage firms engaged in the process	Unknown	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, alternative technologies - low rolling-resistance tyres, telematics, or improved aerodynamics). List of companies drawn up with contact details. Survey of hauliers undertaken Feb 2020 which received 9 responses. Looking to establish membership of ECO Stars scheme as a result of the survey	2021	Low response rate from hauliers survey. Responses obtained showed interest for sign up to ECO Stars scheme. Applied for Highways England Air Quality fund in conjunction with ECO Stars scheme. Still waiting to hear back from Highways England. On hold currently until disruption from Covid-19 has eased and response from Highways England obtained.
ESC15	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	2018	Highways England. Babergh and Mid Suffolk DC lead for all points on behalf of all relevant local authorities. ESC involvement with the tender	Highways England	For the Felixstowe charger within ESC; kWh of charge used, estimate of EV miles driven using this charge (0.34kWh per mile driven on average) 01/05/19-18/04/20 1,662.82 kWh used. Estimate 4,890 EV miles driven.	unknown	Rapid chargers installed by Highways England in Ipswich, UES Norwich, Bury St Edmunds, 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 11 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.
ESC18	Suffolk Car share	Alternatives to private vehicle use	Car & lift sharing schemes	2001	SCC and ESC	SCC	Annual increase in users of the site over the last 5 years. 2015 - 2,189 2016 - 2,339 2017 - 2,662 2018 - 2,896 2019 - 3,139	Unknown	Number site users over the last 5 years has increased from 2,189 in 2015 to 3,139 members in 2019	On-going	Free web based contact database. Site users are across whole of Suffolk we cannot obtain a breakdown for ESC area https://liftshare.com/uk/community/suffolk
ESC19	SCC adoption of national award scheme for School Travel Plans	Promoting Travel Alternatives	School Travel Plans	2017	SCC	SCC	Adoption of scheme - completed. Number of schools signed up to scheme and number who have received accreditation June 2019 - 12 schools within ESC, 0 accredited September 2020 - 14 schools signed up and 2 have Bronze accreditation.	Unknown	Modeshift STARS scheme adopted by SCC. 12 schools formally signed up within ESC in June 2019, increased to 14 in September 2020. 2 schools in ESC have gained Bronze accreditation and 4 primary schools have been working on their travel plans in 2019/20 - these 4 schools are located in Oulton Broad, Carlton Colville, Lowestoft and Martlesham.	On-going	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 https://www.suffolk.gov.uk/planning-waste-and-environment/planning-and-development-advice/travel-plans/school-travel-plans/

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ESC20	20 mph speed limit in Woodbridge	Traffic Management	Reduction of speed limits, 20mph zones	Unknown	SCC and Woodbridge Town Council	SCC and Woodbridge Town Council with possible funding bid for CIL monies	Reduction in measured average speed along routes	Marginal benefit in terms of emission reductions due to potential through traffic reduction	Proposal taken by Woodbridge Town Council to SCC Speed Limit Panel. Panel has agreed the 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. No additional information.	Unknown	Costings of physical works unknown. Potential success of any funding bid unknown. Need to ensure that proposals do not create any air quality concerns at locations along the route.
ESC21	Proposed third vehicular crossing of Lake Lothing	Transport Planning and Infrastructure	Other	Planning phase from 2010. Construction to start 2020	SCC	SCC	Lake Lothing Third Crossing open. Reduction in NO_2 concentrations in Lowestoft Town Centre (Bascule Bridge) and Oulton Broad	Unknown	Examination closed 5th June 2019. On 30 April 2020, the Secretary of State for Transport decided under section 114 of the Planning Act 2008 to make an Order granting development consent for the Lake Lothing Third Crossing. The Order came in to force on 21 May 2020. Construction is due to begin in 2020. Assuming the construction commences on-time and goes according to schedule, the crossing will open in 2022, significantly affecting traffic routes through urban Lowestoft.	2022	Lengthy timescale. Approximate costs in excess of £80million. Possible construction delays due to Covid-19. New crossing could result in a large reduction of traffic congestion in Oulton Broad and the Lowestoft Town Centre
ESC22	Installation of Urban Traffic Management Control System (UTMC) in Lowestoft with connection to the Bascule Bridge lifts.	Traffic Management	UTC, Congestion management, traffic reduction	2017/18	Suffolk County Council and Highways England began the project and Suffolk County Council has taken it over.	Highways England and SCC	Reduced congestion in Lowestoft Town Centre	Reduced vehicle emissions	UTMC now installed and working within Lowestoft. Control system installed for the Bascule Bridge and connected to UTMC.	**Completed 2018/19. This measure will be removed from the table next year**	Unable to measure whether congestion has reduced as no information available before
ESC23	Separate cycle and pedestrian crossing Lake Lothing	Promoting Travel Alternatives	Promotion of cycling	Unknown	ESC and SCC	Unknown but would involve SCC	More people encouraged to use cycling as a means of transport	Reduced vehicle emissions	Not proceeding – no available funding and afforded a very low priority by SCC for available future funds	**This measure will be removed from the table next year**	Funding for related infrastructure is problematic. There will be separated facilities on the actual crossing to accommodate walking and cycling - it is an ambition to have them on a separate bridge.
ESC25	East Suffolk Council - Waveney Local Plan (March 2019) covering the former	Policy Guidance and Development Control	Other policy	2019	ESC	ESC	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	Adopted 2019	Large and ambitious development plans in the former Waveney area require careful management. 9,235 homes expected to be delivered 2014-2036.

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	Waveney Local Planning Authority area, excluding the Broads Authority area.						Planning applications processed by Environmental Protection Team; 2018=1,282 2019=1,075 (not including pre-application advice)		for charging plug-in and ultra-low emission vehicles, WLP8.27: Renewable and low carbon energy and WLP8.28: Sustainable Construction		Annual monitoring information available on website www.eastsuffolk.gov.uk/planning/planning-policy-and-local-plans/suffolk-coastal-local-plan/monitoring-information/
ESC26	Improvement works to the cycling infrastructure in Lowestoft	Transport Planning and Infrastructure	Cycle network	2016	Highways England and SCC	Highways England - Phase 1. Phase 2 - unknown.	More people encouraged to use cycling as a means of transport. SCC has delivered 106 Bikeability courses within ESC September 2018 - July 19 of which 11 were in schools in and surrounding Lowestoft.	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. **This measure will be removed from the table next year.**	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 in which case we will add a new measure for that project.
ESC27	East Suffolk Council Cycling Strategy	Promoting Travel Alternatives	Promotion of cycling	2016	ESC	ESC	Strategy adopted - completed	Unknown	Waveney DC Cycling Strategy formally adopted 2016, final draft published 2018. Identified barriers and gaps in the cycling infrastructure. ESC intend to extend this document across the whole of the Council and possibly also include walking infrastructure. Initial public consultation October 2020 to look at where the gaps are in the district.	2021	This measure originally related only to the Waveney DC Cycling Strategy, which was adopted in 2016, measure now altered to ESC Cycling Strategy - may be Cycling and Walking Strategy depending on findings. Infrastructure gaps to be identified but funding opportunities may be problematic. We have created a cycle / foot route behind Morrisons in Felixstowe, from Grange Farm Rd to Grange Rd, this was completed December 2019.
ESC 28	Anti-idling events outside primary schools within East Suffolk	Public Information	Via other mechanisms	2019	ESC	ESC	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. See ESC 29 for updates	On-going. 7 events undertaken to date. This measure has now been combined with ESC29 to provide an assembly followed by an anti-idling event. **This measure will be removed from the table next year**	Graduate intern employed for 8 months
ESC 29	Air quality information/ education activities for primary schools within ESC including anti-idling events	Public Information	Via other mechanisms	2019	ESC	ESC	Number of schools visited. 16 schools engaged to date - 8 in 2018/19 and 8 in 2019/20	Unknown	A temporary officer was employed and undertook 7 anti-idling events and 2 Air Quality Ambassador events at the Council Offices involving 8 schools in the lead up to Clean Air Day 2019. Graduate intern employed 2019/20, undertook an assembly on air pollution alongside an anti-idling event at an additional 8 schools in ESC	On-going. 16 schools engaged to date	Graduate intern employed for 8 months to undertake this project. Graduate has now finished - unsure how this will be resourced going forward. Unable to continue these events at this time due to restrictions surrounding Covid-19.

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ESC 30	Promotion of cycling	Promoting Travel Alternatives	Promotion of cycling	Historic	ESC and SCC	ESC and SCC	Production of Cycling and Walking Strategy for ESC. A draft of this document is in the early stages. Number of bikeability lessons delivered in schools within ESC. SCC has delivered 106 Bikeability courses within ESC September 2018 - July 19 training 1,272 children to Level 1 or 2 standard.	Reduced vehicle emissions	ESC webpage on cycling in the district can be found at https://www.eastsuffolk.gov.uk/leisure/cycling/ SCC webpages on cycling; https://www.suffolkonboard.com/cycle/provides free cycle maps for areas in Suffolk and https://www.suffolk.gov.uk/children-families-and-learning/schools/walking-and-cycling-to-school/ provides information about cycling to school including bikeability.	On-going	ESC website includes information on cycling in the district including information on the current Waveney Cycling Strategy and production of a new Cycling and Walking Strategy for ESC. SCC webpages provide free cycle maps for Beccles, Felixstowe, Halesworth, Lowestoft and Woodbridge together with information on cycling including the SCC Cycling Strategy. Difficult to gain access to schools to run bikeability courses during Covid-19 pandemic
ESC 31	Electric charging points in Norse depots	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	Jul-20	ESC and Norse	ESC and Norse	Provision of charge points. Provision of electric vehicles. Annual mileage driven by electric vehicles.	Reduced vehicle emissions	8 electric charge points have been installed across the Norse depots in Lowestoft and Ufford. Total of 6 electric vehicles across both sites as of 2020.	2020	-
ESC 32	Norse consultant assessed alternative fuels	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2020	Norse	ESC and Norse	-	Reduced vehicle emissions	Feasibly of project is currently being discussed.	2020/ 2021	-
ESC 33	The Lowestoft Town Centre Masterplan - improvements to cycling, walking and public transport	Transport Planning and Infrastructure	Other	2020	ESC, Lowestoft Town Council, Lowestoft Vision, Suffolk County Council and Suffolk Chamber of Commerce	ESC	n/a	Unknown	Masterplan has moved into the Feasibility Stage and a bid for the Town Funds Money is being developed.	On-going	The aim of this masterplan is to decrease traffic and emissions which hopes to encourage more cycling and ped opportunities. This ideally will balance the different modes of travel through Station Square.
ESC 34	Fleet Migration for council and associated partners	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	2020	ESC and Norse	ESC and Norse	Number of Low emissions Vehicles acquired	Reduced vehicle emissions	Plan is being developed to introduce the first set of vehicles by April 2021	2021	-
ESC 35	Draft Air Quality Strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2020	ESC	ESC	Adoption of Strategy	n/a	Work has begun on drafting the strategy	2021	Final draft scheduled to have been produced by the end of 2020. Formal approval and adoption by Full Council is scheduled for 2021. Document will be reviewed and updated bi-annually.

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

As detailed in Policy Guidance LAQM.PG(16) (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.

ESC is taking a variety 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 local $PM_{2.5}$ concentrations is likely to be more effective.

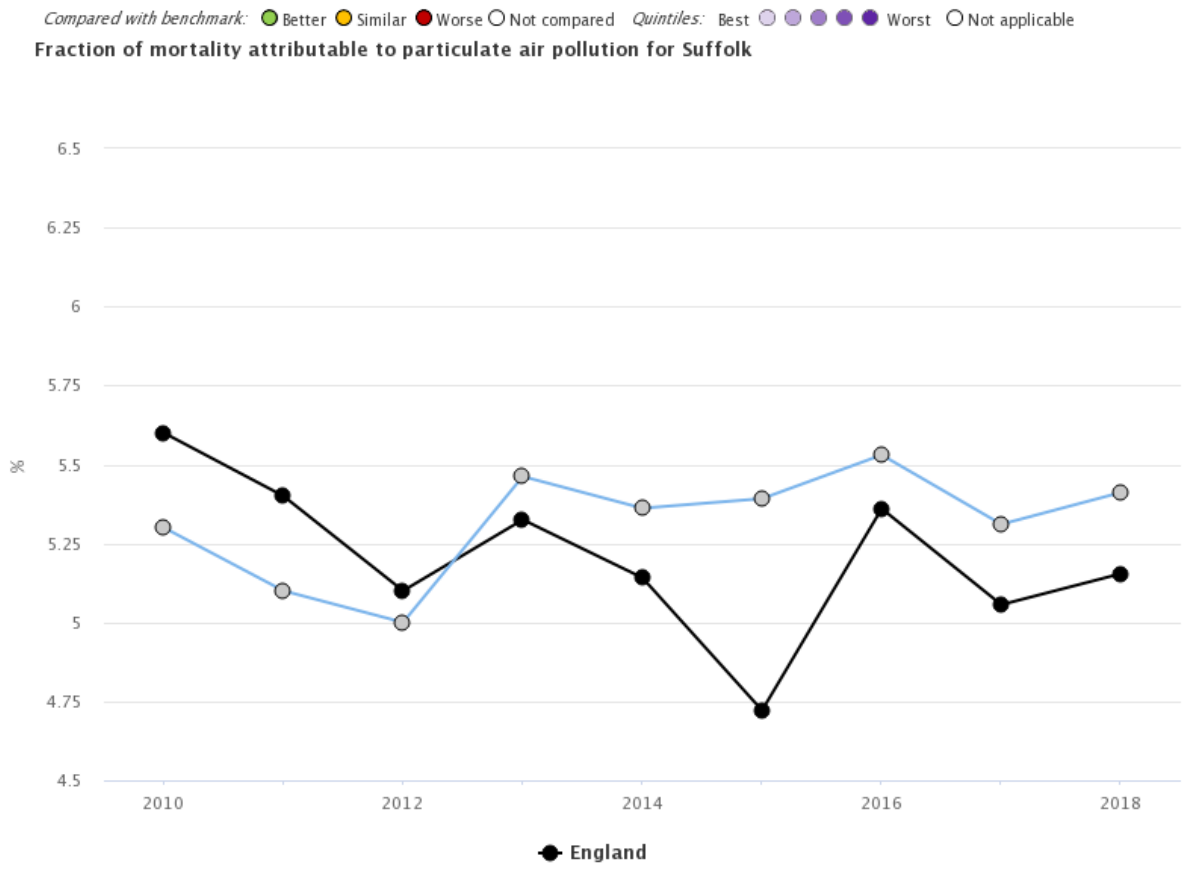
The Council, working in partnership with Suffolk County Council and other potential partners, is committed to promoting alternative forms of transport and modes of travel such as cycling, walking, car sharing and public transport with the aim of reducing the reliance on private cars. Both the Waveney 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 first phase of the works has been completed; however,

funding has been stopped so the second phase of improvement is uncertain.

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.

ESC notes the Public Health Outcomes Framework (PHOF) indicator DO1 – Fraction of mortality attributable to particulate ($PM_{2.5}$) air pollution for 2018 gives a value of 5.4% which is slightly below the value of 5.5% for the East of England region. For comparison, the PHOF indicator for whole of England is 5.2% which is 0.2% lower than in the Suffolk region.

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



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

- Assessments of planning applications to consider their 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 East Suffolk Council 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 that an 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);
    - 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);
- 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 (WBG3);
- School Travel - deliver air quality information/education and anti-idling events at all primary schools in Woodbridge (measure WBG15b);
- Travel Plan for the District Council offices (measure WBG15c);
- Promotion of walking and cycling in Woodbridge (measure WBG16);
- Raising air quality awareness through better website, press releases, publicity (measure WBG18);
- Possible A12 Stratford St. Andrew bypass would smooth the traffic flow thereby reducing $PM_{2.5}$ emissions (measure STA7);
- Mitigation of emissions from Sizewell C construction traffic through use of low emission Heavy Goods Vehicles (measure STA8);
- 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); and
- 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.

ESC undertook automatic (continuous) monitoring at one site during 2019. Table A.1 in Appendix A shows the details of the sites. Near real time monitoring results are available on the Air Quality England website at https://www.airqualityengland.co.uk/site/latest?site_id=SCW2. National monitoring results are available at https://uk-air.defra.gov.uk/networks/find-sites.

A map showing the location of this monitoring site is provided in Appendix D. Further details on how the monitor is calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

ESC undertook non-automatic (passive) monitoring of NO_2 at 74 sites during 2019. 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, proposed land development, or concerns raised by local residents. These are located with reference to the LAQM technical guidance. 15 new sites were added to the NO_2 monitoring network in 2019 across the district, within the following towns/parishes;

- Beccles – residential properties close to the bus station following local concerns.
- Blythburgh – residential properties on the kerbside of the A12 to confirm current levels and any future increases due to a number of Nationally Significant

Infrastructure Projects currently in the process of applying for Development Consent Orders.

- Felixstowe – residential properties close to Maidstone Road primary school which sees traffic congestion at school drop off and pick up following local concerns.
- Framlingham – 2 separate kerbside locations where street parking is causing congestion at times and 1 location on a mini roundabout, following local concerns.
- Kesgrave – An additional site on The Bell Inn PH to confirm levels together with triplication of the existing KSG 10 site.
- Lowestoft – 4 sites in Lowestoft to confirm current and future levels associated with traffic changes which will occur from the Third Crossing which has planning consent in Lowestoft.
- Martlesham – 2 sites associated with traffic using the Anson Road retail park following local concern.
- Oulton Broad – a site located on a congested stretch of Normanston Drive following local concern and officer knowledge.
- Wrentham – residential properties at the junction of the A12 and Southwold Road following local concern.

The following monitoring sites were removed at the end of 2018, to ensure that resources were allocated appropriately with reference to LAQM guidelines:

BEC 2 and OBR 3 – removed in June 2018 as they did not represent worse case exposure in these areas, replaced by BEC 3 and OBR 4.

CCL 1 and LOW 4 – kerbside sites removed as concentrations were low at 20µg/m^3 and 16µg/m^3 respectively, and nearby residential receptors were a distance back from the kerbside.

EYK 1 and MEL 8, 9 & 10 – originally sited due to local concerns regarding traffic travelling to and from the peninsula and along these routes. A 12-month monitoring study confirmed concentrations at these sites were low at 19µg/m^3, 20µg/m^3, 18µg/m^3 and 22µg/m^3 respectively, and they have been removed.

LEI 1 – removed as concentrations were low at 21 µg/m^3 and the nearby site of LEI 2 is located at the same road junction, showing marginally higher concentrations, so can act as an indicator for this location.

TRM 2, 6, 7, 9 & 11 – originally sited 2018 with a number of other sites in Trimley St. Martin, Trimley St. Mary and Walton along the High Road / High Street to assess concentrations at key sites following elevated NO_2 concentrations of 41µg/m^3 recorded High Road Trimley St Mary in 2017. Concentrations at these locations were low at 23 µg/m^3, 21µg/m^3, 20µg/m^3, 21µg/m^3 and 22µg/m^3 respectively. 7 sites remain in place along this route to monitor future concentrations.

3.2 Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias[4], "annualisation" (where the data capture falls below 75%), and distance correction[5]. 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. Note that the concentration data presented in Table A.3 represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e., the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2019 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.4 in Appendix A compares the ratified continuous monitored NO_2hourly 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.

During 2019 the continuous analyser, located at a relevant receptor within the Woodbridge AQMA, had reduced data capture of 70.6%, due to an accident damaging the building in which it is housed. The analyser was unable to collect data from 17/7/19

[4] https://laqm.defra.gov.uk/bias-adjustment-factors/bias-adjustment.html
[5] Fall-off with distance correction criteria is provided in paragraph 7.77, LAQM.TG(16)

to 31/10/19. The data collected during 2019 has therefore been annualised (as it is below 75%) using the method set out in LAQM.TG(16). Details on annualisation are provided in Appendix C. The annualised mean of 31µg/m^3 for 2019 shows a slight reduction from 32 µg/m^3 in 2018. This is within the AQS objective for the sixth year running.

The 1-hour objective is set at 200 µg/m^3 not to be exceeded more than 18 times per year. LAQM.TG(16) advises that the number of exceedances should only be reported where data capture is more than 85% of a full year. If data capture is less than 85% or monitoring is for less than a full year, then local authorities should instead report the 99.8th percentile for 1-hour NO_2. If the 99.8th percentile is greater than 200µg/m^3 this means that if there had been 100% data capture there would have been greater than 18 exceedances of 200µg/m^3 per calendar year. The 99.8th percentile of 1-hour means for 2019 from the continuous analyser in Woodbridge is 122µg/m^3, confirming that the 1-hour objective was not exceeded during 2019.

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 2019.

There was 1 diffusion tube site (STA 8: 36.2µg/m^3) which is within 10% of the Air Quality Objective (i.e., 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 2019 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.

All sites within Woodbridge have seen a continuous reduction in NO_2 concentrations with levels remaining below the AQS Objective since 2014.

Diffusion tubes in Little Glemham, Farnham, Saxmundham and Stratford have all shown continuing declines in NO_2 concentrations for the third consecutive year.

In the following areas, monitoring has shown NO_2 concentrations remaining at a similar level to those found in the previous 2 years:

- Martlesham
- Melton
- Kesgrave
- Lowestoft
- Oulton Broad
- Bungay
- Beccles

Appendix A: Monitoring Results

Table A.1 - Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
WBG	Woodbridge	Roadside	627596	249261	NO_2	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 (Easting)	Y OS Grid Ref (Northing)	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)
LOW 1 (Was DT9)	Belvedere Road 1, Lowestoft	Roadside	654606	292625	NO_2	NO	N/A	1	NO	2
LOW 2 (was DT2)	Fir Lane, Lowestoft	Kerbside	653209	293785	NO_2	NO	6	0.5	NO	2.9
LOW 3 (Was DT7)	Mill Road, Lowestoft	Roadside	654477	292395	NO_2	NO	6.8	1.2	NO	2.4
LOW 4 (was DT6)	Yarmouth Road, Lowestoft	Kerbside	653049	295534	NO_2	NO	8.8	0.5	NO	2.4
LOW 5 (Was DT8)	St Margarets Church, Lowestoft	Urban Background	654065	294200	NO_2	NO	N/A	N/A	NO	2.4
LOW 6a,b,c (Was PT4a,b,c)	Pier Terrace, Lowestoft	Roadside	654690	292625	NO_2	NO	0	4	NO	2.2
LOW 7 (Was DT11)	Pier Terrace 1, Lowestoft	Roadside	654671	292601	NO_2	NO	7	3	NO	2.4
LOW 8	Levington Court, lowestoft	Roadside	654660	292571	NO_2	NO	0	5.7	NO	1.7
LOW 9	24/26 Denmark Road, lowestoft	Roadside	654723	292914	NO_2	NO	9.4	2.3	NO	1.8
LOW 10	42 Waveney Drive	Roadside	653917	292414	NO_2	NO	4.5	0.8	NO	1.9
LOW 11	241 Stradbroke Road / Bloodmoor Road	Roadside	652552	290427	NO_2	NO	0	8.3	NO	1.8
DT10	Belvedere Road 2, Lowestoft	Roadside	654651	292619	NO_2	NO	n/a	1	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
DT12	Pier Terrace 2, Lowestoft	Roadside	654662	292598	NO_2	NO	0	11	NO	2.4
PT1a,b,c	Pier Terrace, Lowestoft	Roadside	654788	292824	NO_2	NO	0.5	3	NO	2.2
PT2a,b,c	Pier Terrace, Lowestoft	Roadside	654781	292814	NO_2	NO	0.2	4	NO	2.2
PT3a,b,c	Pier Terrace, Lowestoft	Roadside	654703	292636	NO_2	NO	0.5	2.5	NO	2.2
OBR 1 (was DT5)	Saltwater Way, Oulton Broad	Roadside	652046	292503	NO_2	NO	6	3	NO	2.4
OBR 2 (Was DT4)	Golden Court, Oulton Broad	Roadside	652304	293021	NO_2	NO	4	2	NO	2.4
OBR 3 (was DT3)	Dutchmans Court, Oulton Broad	Roadside	651889	292101	NO_2	NO	5	2.4	NO	2.4
OBR 4	Beccles Rd / Cotmer Rd, Oulton Broad	Roadside	651869	292127	NO_2	NO	0	5.2	NO	0.9
OBR 5	181 Normanston Drive	Roadside	652554	293282	NO_2	NO	0	6.4	NO	1.7
BEC 1 (Was DT14)	Ingate 1, Beccles	Roadside	642615	289909	NO_2	NO	0	1	NO	2.4
BEC 2	Ingate 2, Beccles	Roadside	642554	289908	NO_2	NO	4	2	NO	2.4
BEC 3	74 Frericks Rd, Beccles	Roadside	642553	289922	NO_2	NO	0	1.5	NO	1.8
BEC 4	1 Ingate, Beccles	Roadside	642564	289922	NO_2	NO	0	1.3	NO	1.7

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
BEC 5 ABC	11 Ingate, Beccles	Kerbside	642592	289916	NO_2	NO	0	0.9	NO	1.8
BEC 6	8 Old Market	Roadside	642158	290574	NO_2	NO	0	3	No	1.9
BUN 1 (Was DT13)	Trinity Street, Bungay	Roadside	633670	289817	NO_2	NO	0	1	NO	2.2
WRE 1	2 Southwold Road, Wrentham	Roadside	649883	282614	NO_2	NO	1.9	3.8	NO	1.8
BLY 1	Menagwins, Chapel Road, Blythburgh	Roadside	645183	275218	NO_2	NO	0	1.3	NO	1.8
CCL 1 (was DT1)	Castleton Avenue, Carlton Colville	Roadside	650614	290476	NO_2	NO	17	1.9	NO	3
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	Urban background	629253	234431	NO_2	NO	n/a	1.5	NO	2.3
FLX 22	Levington Road Felixstowe	Other	629172	233446	NO_2	NO	0	9	NO	1.8
FLX 23	Heathgate Piece Trimley St Mary	Suburban	628542	236592	NO_2	NO	0	25	NO	2

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
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	NO_2	NO	0	12	NO	2
FLX 31	44 Adastral Close Felixstowe	Other	628640	232795	NO_2	NO	0	13	NO	2
FLX 32	Dooley Inn rear Felixstowe	Other	627971	234242	NO_2	NO	0	18	NO	2
FLX 33	Dock gate 2 roundabout Felixstowe	Roadside	627884	234238	NO_2	NO	n/a	5	NO	1.8
FLX 34	Ferry Lane midway Felixstowe	Roadside	627934	234257	NO_2	NO	n/a	3	NO	1.9
FLX 35	Dooley Inn car park Felixstowe	Roadside	627959	234258	NO_2	NO	10	3	NO	1.8
FLX 36	Hodgkinson Road Felixstowe	Roadside	627989	234279	NO_2	NO	n/a	3	NO	1.9
FLX 37	Hodgkinson Road / Ferry Lane Felixstowe	Roadside	628012	234272	NO_2	NO	n/a	3.5	NO	1.7
FLX 38	Ferry Lane just past Hodgkinson Road Felixstowe	Roadside	628130	234280	NO_2	NO	n/a	1.5	NO	1.7

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
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	NO_2	NO	0	1.8	NO	1.9
FLX 41	Anzani House front Felixstowe	Other	628138	234696	NO_2	NO	0	36	NO	1.7
FLX 42	Anzani house side Felixstowe	Other	628160	234725	NO_2	NO	0	35	NO	1.7
FLX 43	128 Maidstone Road, Felixstowe	Roadside	629212	235265	NO_2	NO	0	6.5	NO	1.7
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	Lampost 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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
TRM 8	Lampost 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
KSG 9	118 Main Road, Kesgrave	Roadside	621680	245796	NO_2	NO	n/a	2.6	NO	1.9
KSG 10 ABC	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	NO_2	NO	11	5.8	NO	2
KSG 12	Dobbs Lane, Kesgrave	Roadside	623488	246019	NO_2	NO	6.2	3.5	NO	1.7
KSG 13	The Bell Inn PH, Main Road, kesgrave	Roadside	621809	245778	NO_2	NO	0	9	NO	1.75
WBG 1 a,b,c	93 Thoroughfare, Woodbridge	Roadside	627596	249261	NO_2	YES	0	1.3	YES	2.4

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
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

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
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	NO_2	NO	0	8	NO	2.2
WBG 23	50 St John's Street, Woodbridge	Roadside	627562	249235	NO_2	NO	1	1	NO	2.1
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
MRT 1ABC	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	NO_2	NO	0	65	NO	1.6
MRT 3	32 Lancaster Drive, Martlesham	Suburban	624777	244643	NO_2	NO	8	28	NO	1.6

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
MRT 4	Flat 1, Block 8 The Paddocks	Suburban	624461	245847	NO_2	NO	2.3	21.5	NO	1.8
MRT 5	Hobbycraft	Roadside	624769	245814	NO_2	NO	0	13.8	NO	1.8
LGM 1	Pear Tree House, Main Road, Little Glemham	Roadside	634203	258820	NO_2	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	NO_2	NO	n/a	3.8	NO	1.8
STA 6	Jacobs Cottage, Main Road,	Roadside	635794	260042	NO_2	NO	0	7	NO	1.3

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	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)
	Stratford St Andrew									
STA 7	30mph sign, Long Row, Stratford St Andrew	Roadside	635736	259984	NO_2	NO	n/a	1.9	NO	1.7
STA 8 ABC	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
EYK 1	185 The Street	Roadside	631676	251784	NO_2	NO	0	5.6	NO	1.8
FRAM 1	5 Station Road	Roadside	628375	263329	NO_2	NO	0	1.7	NO	2.2
FRAM 2	21 Station Road	Roadside	628401	263226	NO_2	NO	0	2	NO	1.7
FRAM 3	The Old Bakery, 23-25 Well Close Square	Roadside	628289	263446	NO_2	NO	0	3	NO	1.7

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean

Monitoring Results

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m³) (3) (4)				
							2015	2016	2017	2018	2019
WBG	627596	249261	Roadside	Automatic	70.57	70.57	35	37	37	32	31
LOW 1 (was DT9)	654600	292600	Roadside	Diffusion Tube	100	100	31	29	34	27	28
LOW 2 (was DT2)	653200	293700	Kerbside	Diffusion Tube	100	100	22	23	20	25	30
LOW 3 (was DT7)	654400	292300	Roadside	Diffusion Tube	100	100	20	21	24	23	20
LOW 4 (was DT6)	653049	295534	Kerbside	Diffusion Tube	–	–	18	19	18	16	–
LOW 5 (was DT8)	654000	294200	Urban background	Diffusion Tube	100	100	12	15	15	14	14
LOW 6a,b,c (was PT4a,b,c)	654600	292600	Roadside	Diffusion Tube	100	100	–	38	36	35	33
LOW 7 (was DT11)	654600	292600	Roadside	Diffusion Tube	100	100	28	31	30	29	30
LOW 8	654600	292500	Roadside	Diffusion Tube	100	100	–	–	–	–	21
LOW 9	654700	292900	Roadside	Diffusion Tube	100	100	–	–	–	–	28
LOW 10	653900	292300	Roadside	Diffusion Tube	75	75	–	–	–	–	23
LOW 11	652500	290400	Roadside	Diffusion Tube	100	100	–	–	–	–	26

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
DT10	654651	292619	Roadside	Diffusion Tube	–	–	30	29	–	–	–
DT12	654658	292598	Roadside	Diffusion Tube	–	–	25	27	–	–	–
PT1a,b,c	654788	292824	Roadside	Diffusion Tube	–	–	–	28	–	–	–
PT2a,b,c	654781	292814	Roadside	Diffusion Tube	–	–	–	27	–	–	–
PT3a,b,c	654703	292636	Roadside	Diffusion Tube	–	–	–	32	–	–	–
OBR 1 (was DT5)	654600	292600	Roadside	Diffusion Tube	100	100	26	27	26	26	28
OBR 2 (was DT4)	652300	293000	Roadside	Diffusion Tube	100	100	25	28	24	26	22
OBR 3 (was DT3)	651889	292101	Roadside	Diffusion Tube	–	–	21	24	24	23	–
OBR 4	651889	292101	Roadside	Diffusion Tube	100	100	–	–	–	22	22
OBR 5	652500	293200	Roadside	Diffusion Tube	100	100	–	–	–	–	19
BEC 1 (was DT14)	642600	289900	Roadside	Diffusion Tube	100	100	28	27	28	25	23
BEC 2 (was DT`5)	642554	289908	Roadside	Diffusion Tube	–	–	26	28	28	26	–
BEC 3	642500	289900	Roadside	Diffusion Tube	100	100	–	–	–	35	34
BEC 4	642500	289900	Roadside	Diffusion Tube	100	100	–	–	–	24	21
BEC 5 abc	642500	289900	Kerbside	Diffusion Tube	91.7	91.7	–	–	–	33	29

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
BEC 6	642100	290500	Roadside	Diffusion Tube	100	50	–	–	–	–	22
BUN 1 (was DT13)	633600	289800	Roadside	Diffusion Tube	100	100	28	29	26	26	26
WRE 1	649879	282622	Roadside	Diffusion Tube	91.7	91.7	–	–	–	–	18
BLY 1	645100	275200	Roadside	Diffusion Tube	91.7	91.7	–	–	–	–	28
CCL 1 (was DT1)	650608	290476	Roadside	Diffusion Tube	–	–	20	21	19	20	–
FLX 12	630363	234890	Roadside	Diffusion Tube	100	100	26	24	26	24	23
FLX 14	628604	232847	Other	Diffusion Tube	100	100	23	23	25	25	24
FLX 17	628817	236323	Suburban	Diffusion Tube	100	100	22	22	21	21	20
FLX 20	628669	233979	Suburban	Diffusion Tube	91.7	91.7	22	21	31	26	28
FLX 21	629253	234431	Urban background	Diffusion Tube	100	100	21	20	22	20	20
FLX 22	629172	233446	Other	Diffusion Tube	91.7	91.7	21	20	22	20	20
FLX 23	628542	236592	Suburban	Diffusion Tube	100	100	26	26	22	27	25
FLX 24	628358	234634	Suburban	Diffusion Tube	100	100	26	25	26	24	23
FLX 26 abc	627959	234246	Other	Diffusion Tube	100	100	37	34	37	35	32
FLX 27 abc	627960	234238	Other	Diffusion Tube	100	100	31	30	33	30	28

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
FLX 29	628712	232892	Other	Diffusion Tube	–	–	22	21	25	–	–
FLX 31	628640	232795	Other	Diffusion Tube	–	–	26	23	27	–	–
FLX 32	627971	234242	Other	Diffusion Tube	–	–	32	33	–	–	–
FLX 33	627884	234238	Roadside	Diffusion Tube	–	–	**54**	**53**	**54**	–	–
FLX 34	627934	234257	Roadside	Diffusion Tube	–	–	**42**	**40**	**41**	–	–
FLX 35	627959	234258	Roadside	Diffusion Tube	–	–	39	38	24	–	–
FLX 37	628012	234272	Roadside	Diffusion Tube	–	–	**41**	**40**	**43**	–	–
FLX 39	628760	236071	Roadside	Diffusion Tube	100	100	23	22	23	22	23
FLX 41	628138	234696	Other	Diffusion Tube	–	–	–	–	31	–	–
FLX 42	628160	234725	Other	Diffusion Tube	–	–	–	–	30	–	–
FLX 43	629212	235265	Roadside	Diffusion Tube	91.7	91.7	–	–	–	–	19
TRM 1	627140	237760	Roadside	Diffusion Tube	58.3	58.3	–	–	–	21	18
TRM 2	627592	237127	Roadside	Diffusion Tube	100	100	–	–	–	23	–
TRM 3 abc (was FLX40)	627618	237092	Roadside	Diffusion Tube	100	100	–	–	**41**	25	23
TRM 4	627618	237092	Roadside	Diffusion Tube	100	100	–	–	–	26	25

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
TRM 5	627629	237078	Roadside	Diffusion Tube	100	100	_	_	_	24	22
TRM 6	627645	237062	Roadside	Diffusion Tube	_	_	_	_	_	21	_
TRM 7	627746	236808	Roadside	Diffusion Tube	_	_	_	_	_	20	_
TRM 8	628270	236266	Roadside	Diffusion Tube	100	100	_	_	_	28	27
TRM 9	628369	236232	Roadside	Diffusion Tube	_	_	_	_	_	21	_
TRM 10	629340	235737	Roadside	Diffusion Tube	100	100	_	_	_	26	27
TRM 11	628450	235681	Roadside	Diffusion Tube	_	_	_	_	_	22	_
TRM 12	629641	235529	Roadside	Diffusion Tube	100	100	_	_	_	25	24
KSG 9	621680	245796	Roadside	Diffusion Tube	100	100	28	28	32	30	29
KSG 10 abc	621815	245785	Roadside	Diffusion Tube	100	100	_	_	35	35	32
KSG 11	621705	245682	Roadside	Diffusion Tube	_	_	_	_	20	_	_
KSG 12	623488	246019	Roadside	Diffusion Tube	_	_	_	_	17	_	_
KSG 13	621809	245778	Roadside	Diffusion Tube	100	100	_	_	_	_	24
WBG 1 abc	623488	246019	Roadside	Diffusion Tube	100	100	36	37	37	33	34
WBG 3	626997	248488	Suburban	Diffusion Tube	100	100	12	14	14	12	13

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
WBG 5	627604	249243	Roadside	Diffusion Tube	100	100	20	23	21	21	21
WBG 6	627593	249255	Roadside	Diffusion Tube	–	–	33	34	34	32	–
WBG 8	627601	249283	Roadside	Diffusion Tube	100	100	31	35	34	33	33
WBG 10	627570	249240	Roadside	Diffusion Tube	100	100	26	25	25	26	24
WBG 12	627664	249203	Roadside	Diffusion Tube	100	100	21	22	22	20	22
WBG 13	627585	249239	Roadside	Diffusion Tube	100	100	29	32	28	28	27
WBG 15	627590	249249	Roadside	Diffusion Tube	–	–	33	35	35	32	–
WBG 17	627614	249271	Roadside	Diffusion Tube	100	100	23	25	23	23	23
WBG 18	627627	249339	Roadside	Diffusion Tube	100	100	28	32	29	30	30
WBG 20	627604	249295	Roadside	Diffusion Tube	100	100	30	32	34	31	30
WBG 22	627633	249233	Roadside	Diffusion Tube	–	–	16	20	18	–	–
WBG 23	627562	249235	Roadside	Diffusion Tube	–	–	23	25	24	–	–
MEL 5	628145	250417	Roadside	Diffusion Tube	100	100	27	25	26	23	24
MEL 7	628177	250478	Kerbside	Diffusion Tube	100	100	25	25	26	24	24
MEL 8	628123	250433	Roadside	Diffusion Tube	–	–	–	–	–	20	–

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration (µg/m^3) (3) (4)				
							2015	2016	2017	2018	2019
MEL 9	628168	250457	Roadside	Diffusion Tube	–	–	–	–	–	18	–
MEL 10	628182	250504	Roadside	Diffusion Tube	–	–	–	–	–	22	–
MRT 1 abc	624633	245447	Suburban	Diffusion Tube	100	100	24	24	24	23	22
MRT 3	624777	244643	Suburban	Diffusion Tube	–	–	–	18	–	–	–
MRT 4	624461	245847	Suburban	Diffusion Tube	100	100	–	–	–	–	16
MRT 5	624769	245814	Roadside	Diffusion Tube	91.7	91.7	–	–	–	–	19
LGM 1	634203	258820	Roadside	Diffusion Tube	–	–	13	14	–	–	–
LGM 2	634051	258315	Roadside	Diffusion Tube	100	100	–	–	19	19	17
FAR 1	636273	260134	Roadside	Diffusion Tube	100	100	24	25	24	24	21
FAR 2 abc	636274	260120	Roadside	Diffusion Tube	100	100	30	29	28	27	24
STA 1 abc	635753	260002	Roadside	Diffusion Tube	100	100	**43**	38	35	34	32
STA 2	635732	259995	Roadside	Diffusion Tube	100	100	28	25	26	24	25
STA 6	635794	260042	Roadside	Diffusion Tube	100	100	24	23	22	21	20
STA 7	635736	259984	Roadside	Diffusion Tube	100	100	35	34	31	30	28
STA 8 abc	635743	259992	Roadside	Diffusion Tube	100	100	**44**	**43**	39	38	36

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 Annual Mean Concentration ($\mu g/m^3$) (3) (4)				
							2015	2016	2017	2018	2019
SAX 1	638683	263014	Roadside	Diffusion Tube	100	100	29	32	30	29	28
LEI 1	644557	262464	Roadside	Diffusion Tube	–	–	–	23	21	21	–
LEI 2	644557	262464	Roadside	Diffusion Tube	100	100	–	19	26	26	23
LEI 3	644325	262634	Roadside	Diffusion Tube	100	100	–	20	21	23	22
EYK 1	631676	251784	Roadside	Diffusion Tube	–	–	–	–	–	19	–
FRAM 1	628375	263329	Roadside	Diffusion Tube	100	100	–	–	–	–	21
FRAM 2	628401	263226	Roadside	Diffusion Tube	100	100	–	–	–	–	17
FRAM 3	628289	263446	Roadside	Diffusion Tube	100	100	–	–	–	–	21

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

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

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

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.**

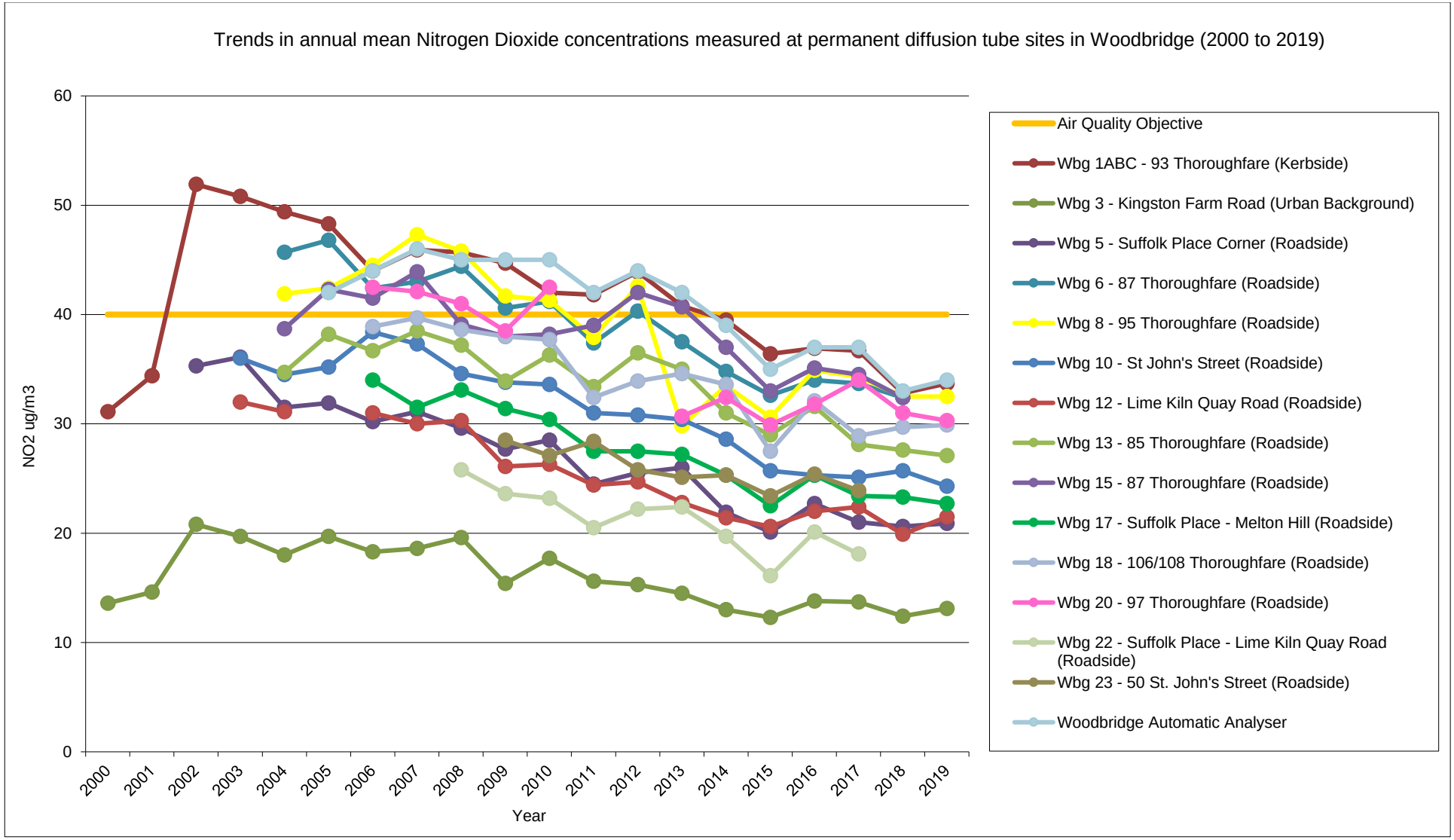
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

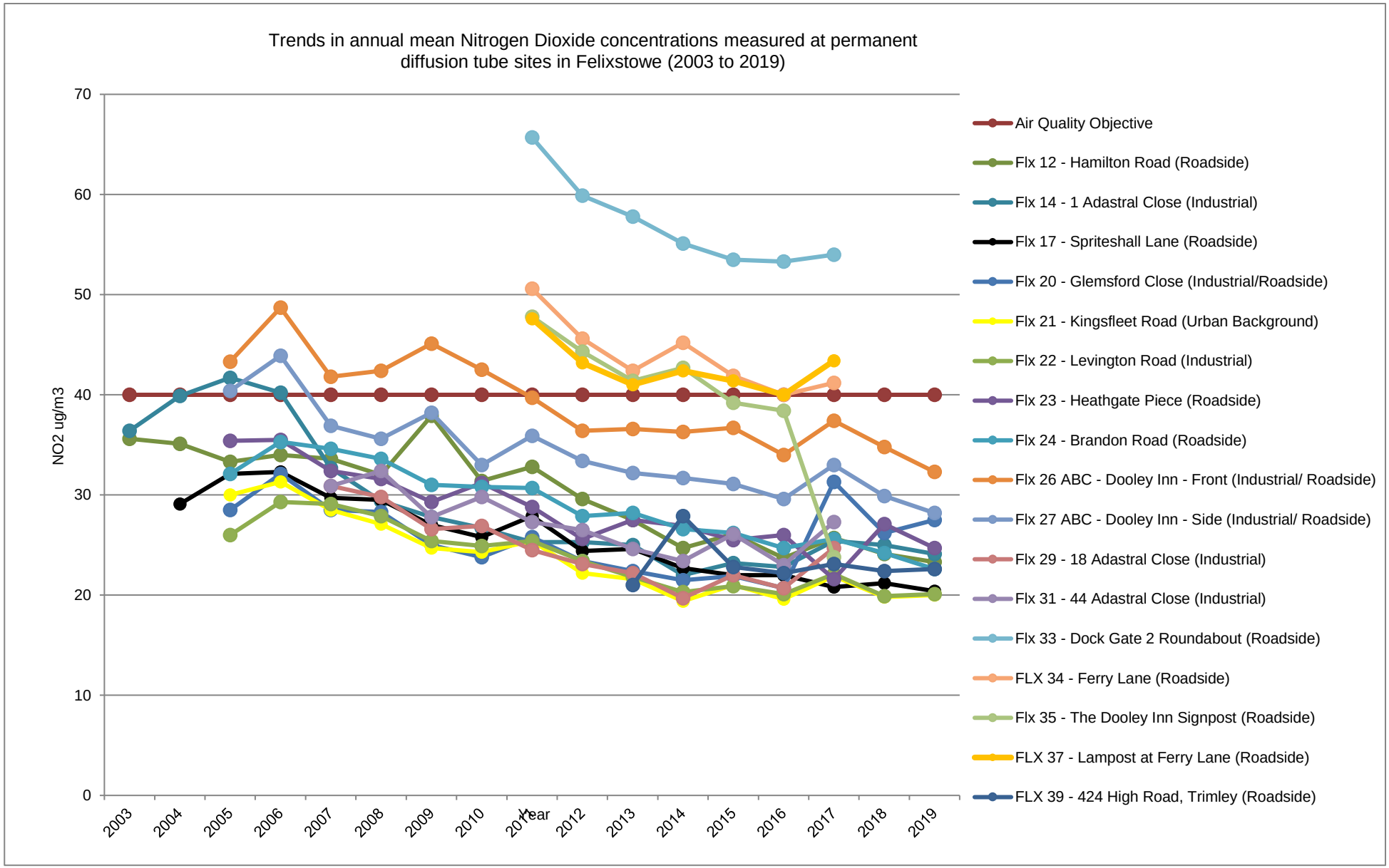
(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

(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.

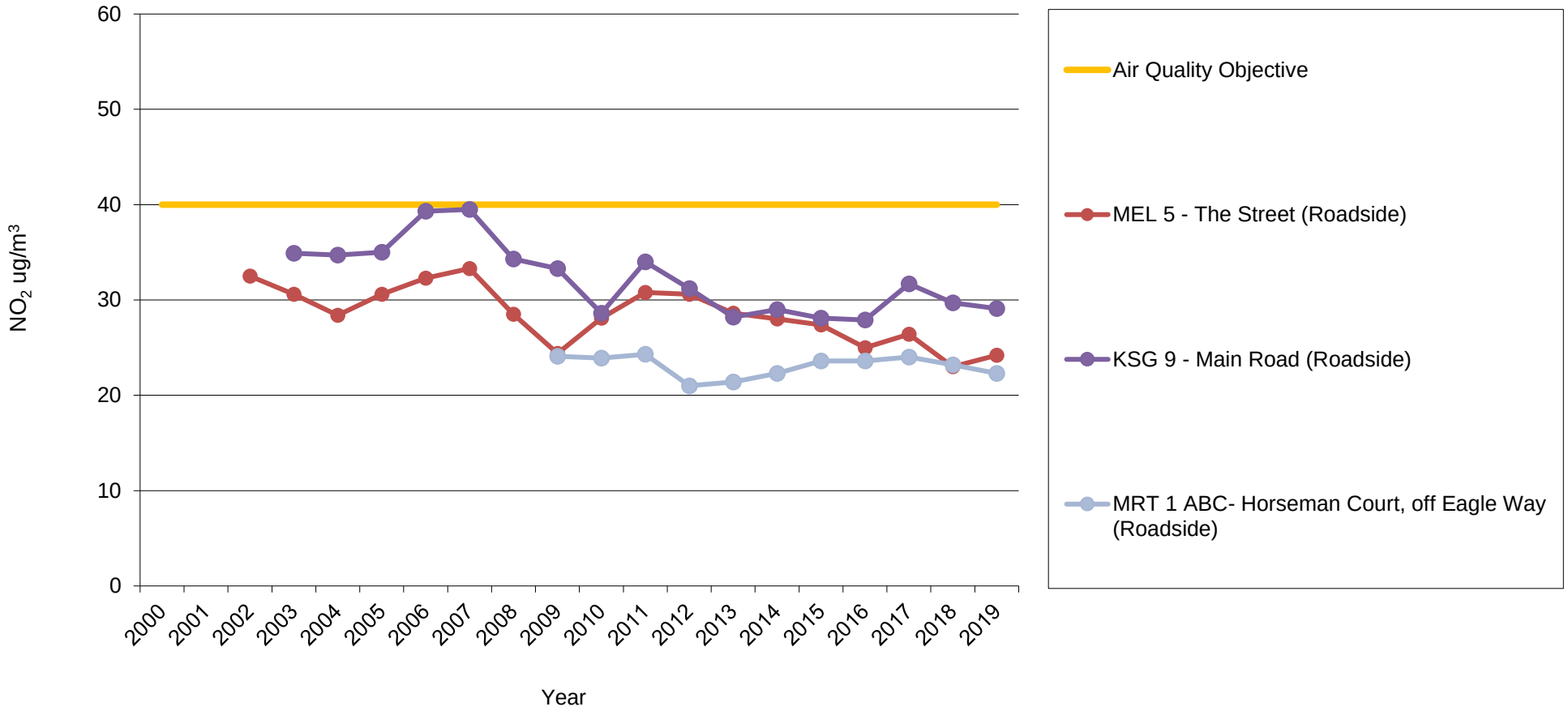
(4) Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

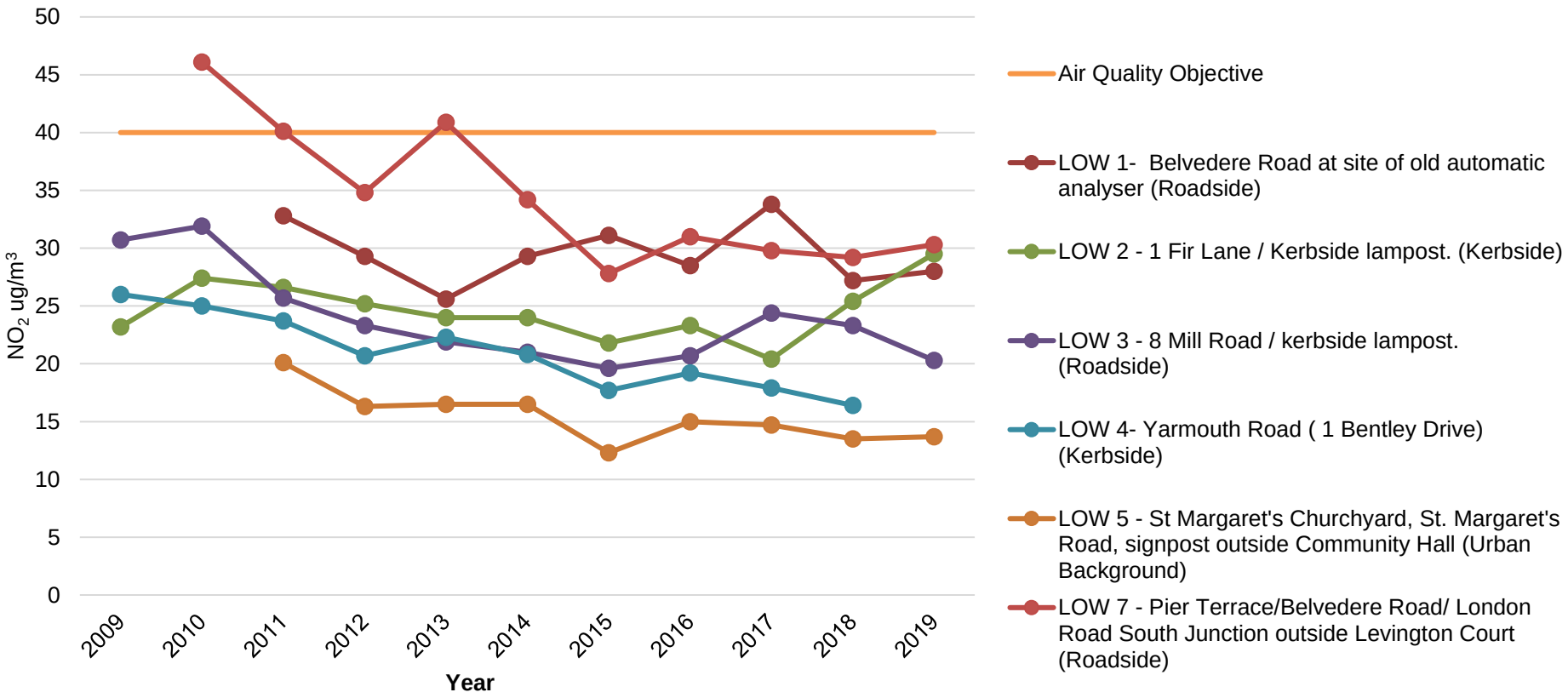



Trends in annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Felixstowe (2003 to 2019)
NO2 ug/m3
70
60
50
40
30
20
10
0
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Air Quality Objective
Flx 12 - Hamilton Road (Roadside)
Flx 14 - 1 Adastral Close (Industrial)
Flx 17 - Spriteshall Lane (Roadside)
Flx 20 - Glemsford Close (Industrial/Roadside)
Flx 21 - Kingsfleet Road (Urban Background)
Flx 22 - Levington Road (Industrial)
Flx 23 - Heathgate Piece (Roadside)
Flx 24 - Brandon Road (Roadside)
Flx 26 ABC - Dooley Inn - Front (Industrial/ Roadside)
Flx 27 ABC - Dooley Inn - Side (Industrial/ Roadside)
Flx 29 - 18 Adastral Close (Industrial)
Flx 31 - 44 Adastral Close (Industrial)
Flx 33 - Dock Gate 2 Roundabout (Roadside)
FLX 34 - Ferry Lane (Roadside)
Flx 35 - The Dooley Inn Signpost (Roadside)
FLX 37 - Lampost at Ferry Lane (Roadside)
FLX 39 - 424 High Road, Trimley (Roadside)

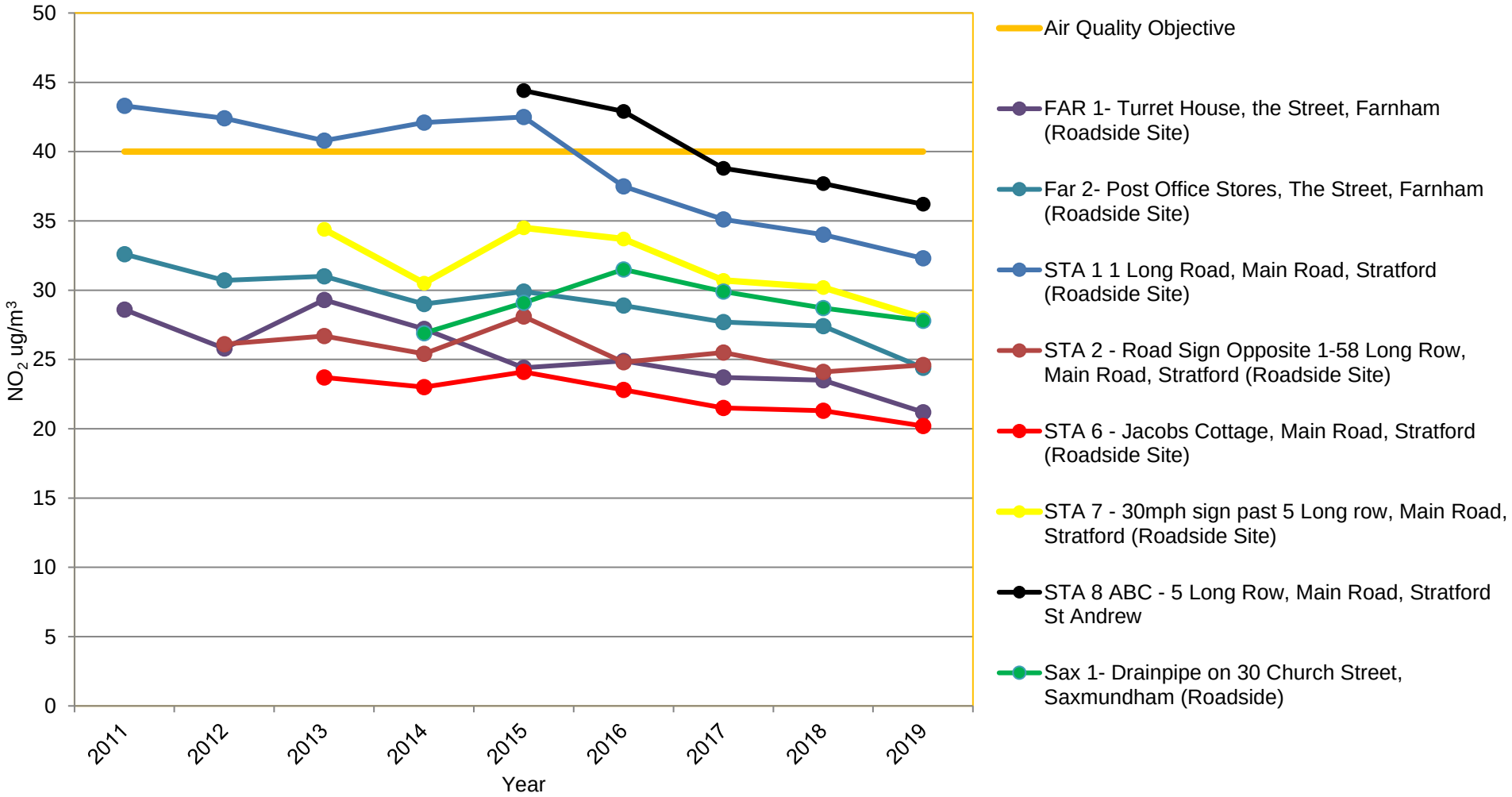
Trends in annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Martlesham, Melton and Kesgrave (2002 to 2019)

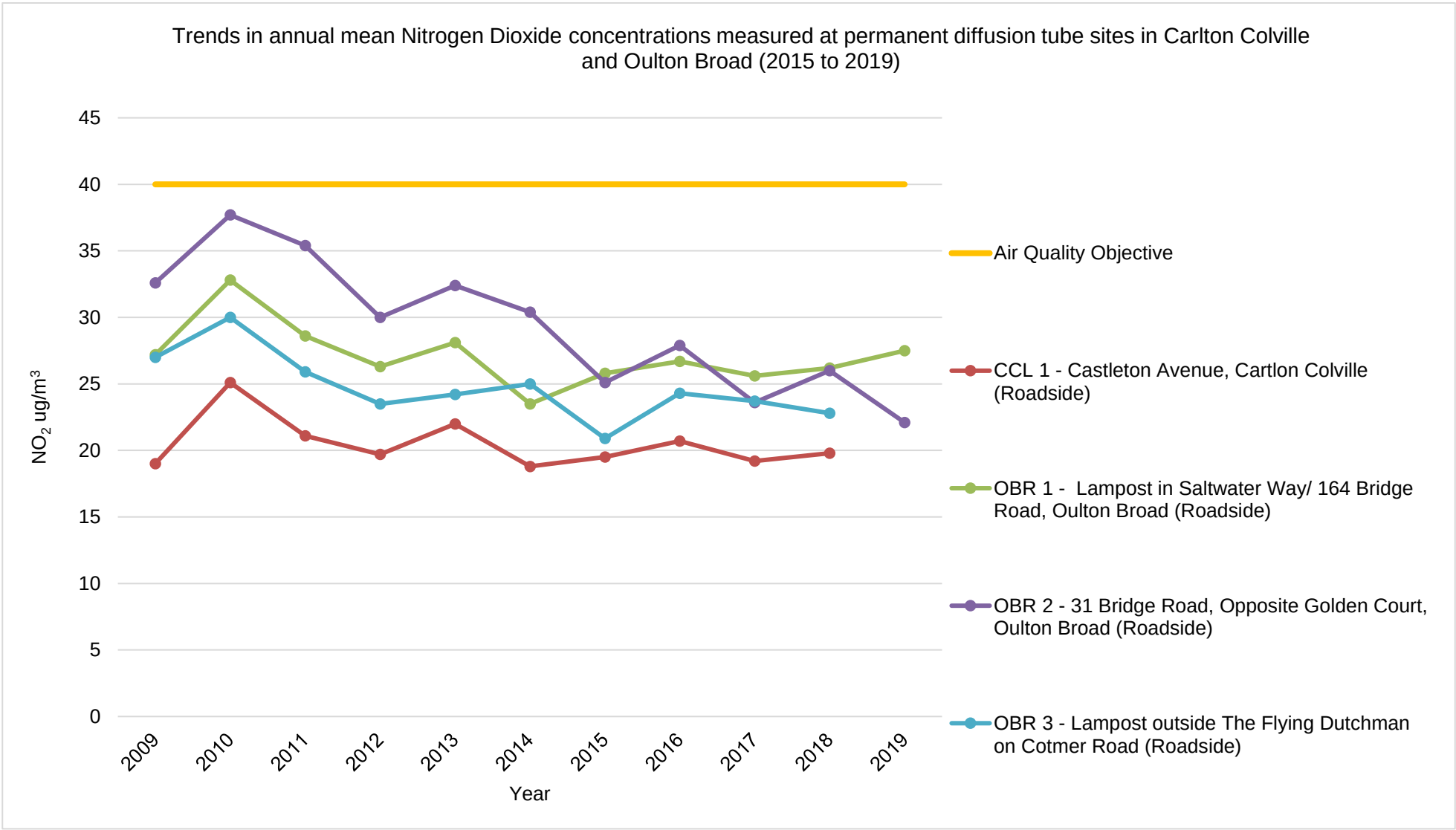


Trends in annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Lowestoft (2009 to 2019)



Trends in Annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Little Glemham, Farnham, Sxmundham and Stratford (2011 to 2019)




Trends in annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Carlton Colville and Oulton Broad (2015 to 2019)
45
40
35
30
25
20
15
10
5
0
NO2 ug/m3
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Air Quality Objective
CCL 1 - Castleton Avenue, Carlton Colville (Roadside)
OBR 1 - Lampost in Saltwater Way/ 164 Bridge Road, Oulton Broad (Roadside)
OBR 2 - 31 Bridge Road, Opposite Golden Court, Oulton Broad (Roadside)
OBR 3 - Lampost outside The Flying Dutchman on Cotmer Road (Roadside)

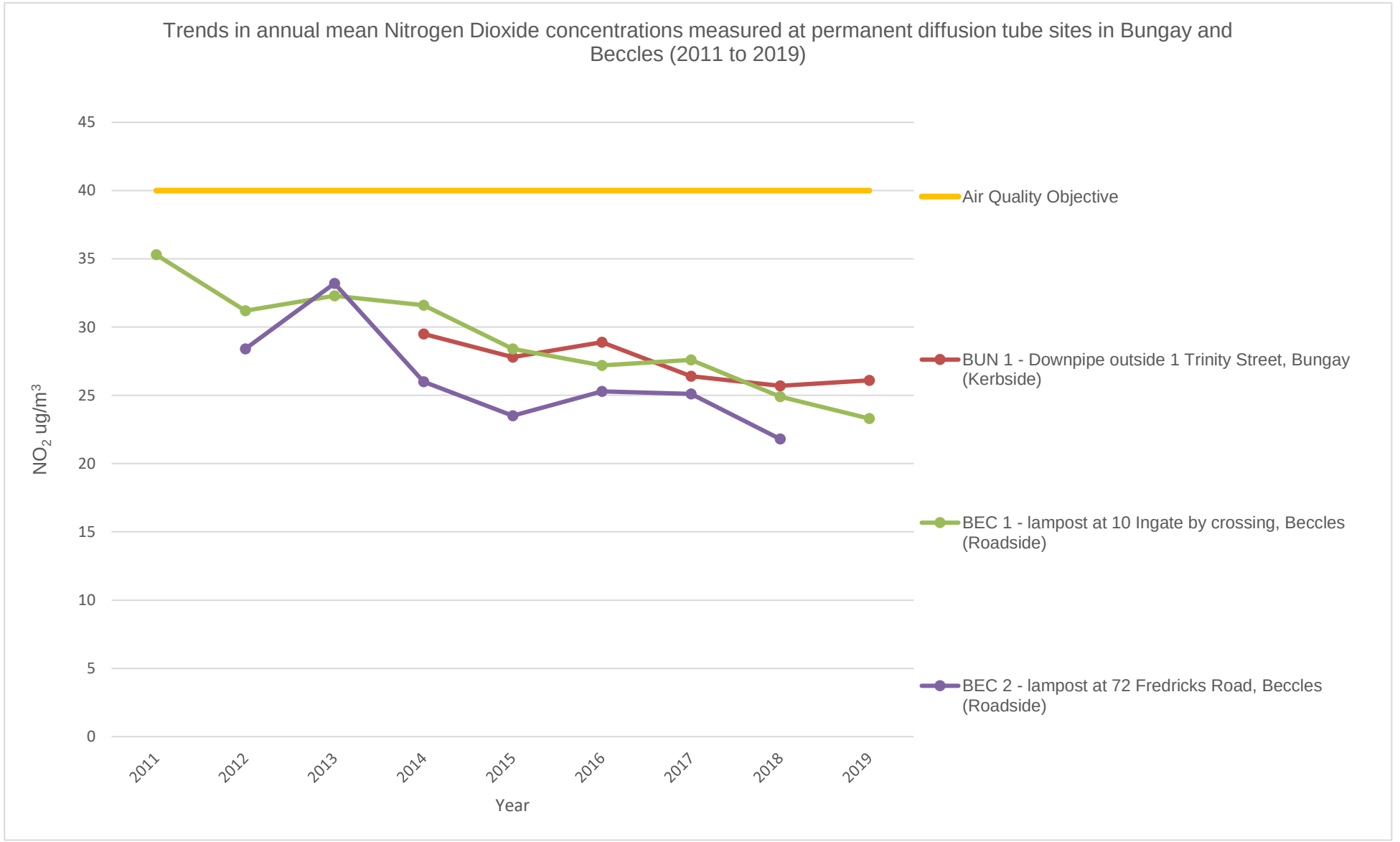

Trends in annual mean Nitrogen Dioxide concentrations measured at permanent diffusion tube sites in Bungay and Beccles (2011 to 2019)
45
40
35
30
25
20
15
10
5
0
NO2 ug/m3
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Air Quality Objective
BUN 1 - Downpipe outside 1 Trinity Street, Bungay (Kerbside)
BEC 1 - lampost at 10 Ingate by crossing, Beccles (Roadside)
BEC 2 - lampost at 72 Fredricks Road, Beccles (Roadside)

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2019 (%) (2)	NO_2 1-Hour Means > 200µg/m^3 (3)				
							2015	2016	2017	2018	2019
WBG	627596	249261	Roadside	Automatic	70.57	70.57	5	0	1	0	0 (122µg/m^3)

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 2019

Table B.1 - NO_2 Monthly Diffusion Tube Results - 2019

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
LOW 1 (was DT9)	654600	292600	41.2	51.8	34.8	33.8	30.8	30.1	32.3	34.7	33.7	35.3	51.0	38.6	37.3	28.0	~
LOW 2 (was DT2)	653200	293700	44.5	60.5	35.7	28.5	27.8	33.3	30.5	38.4	35.2	39.8	50.4	46.8	39.3	29.5	~
LOW 3 (was DT7)	654400	292300	31.0	34.7	25.7	33.6	24.9	24.7	23.2	21.7	23.1	23.5	35.6	22.6	27.0	20.3	~
LOW 5 (was DT8)	654000	294200	23.9	31.9	17.5	18.2	12.8	12.8	12.2	12.2	14.0	16.5	26.7	20.5	18.3	13.7	~
LOW 6a	654600	292600	52.2	46.4	41.0	59.0	48.0	43.3	38.8	35.1	43.5	34.2	51.7	32.5	~	~	~
LOW 6b	654600	292600	55.4	39.5	39.4	61.3	50.5	44.4	41.6	38.8	43.1	41.6	53.4	37.8	~	~	~
LOW 6c	654600	292600	46.5	42.4	39.6	59.2	46.3	43.7	40.9	36.4	41.8	37.3	51.1	34.7	~	~	~
LOW 6a,b,c-mean (was PT4abc)	654600	292600	51.4	42.8	40.0	59.8	48.3	43.8	40.4	36.8	42.8	37.7	52.1	35.0	44.2	33.2	~
LOW 7 (was DT11)	654600	292600	47.2	46.5	41.7	39.9	38.7	36.3	35.9	35.8	38.1	38.2	50.6	35.1	40.3	30.3	~
LOW 8	654600	292500	31.9	37.6	27.7	30.9	24.5	21.6	23.0	22.6	25.8	23.4	35.6	26.6	27.6	20.7	~
LOW 9	654700	292900	39.5	53.0	32.5	35.5	32.4	33.4	28.0	35.6	34.4	37.1	46.1	39.6	37.3	27.9	~

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
LOW 10	653900	292300	~	~	25.7	40.3	28.8	~	23.9	25.5	25.8	30.0	40.5	30.1	30.1	22.6	~
LOW 11	652500	290400	33.0	38.5	30.9	39.6	35.2	34.2	33.4	32.9	33.0	30.0	41.6	29.3	34.3	25.7	~
OBR 1 (was DT5)	652100	292700	39.3	47.9	34.2	40.8	32.7	33.9	29.5	32.5	31.5	33.9	46.3	37.6	36.7	27.5	~
OBR 2 (was DT4)	652300	293000	30.2	34.8	26.2	34.9	29.1	28.3	25.8	24.2	25.9	28.2	38.4	27.4	29.5	22.1	~
OBR 4	651800	292100	31.1	39.2	25.9	34.1	26.3	26.3	26.6	25.9	23.8	25.1	38.0	26.9	29.1	21.8	~
OBR 5	652500	293200	30.7	33.2	20.9	24.2	23.5	21.7	21.8	22.7	24.1	25.0	36.0	26.3	25.8	19.4	~
BEC 1 (was D14)	642600	289900	38.8	38.0	24.6	32.8	28.8	28.0	26.8	25.9	28.7	28.6	39.8	31.7	31.0	23.3	~
BEC 3	642500	289900	56.6	51.2	47.7	40.6	38.3	38.3	38.8	39.3	40.3	44.0	60.6	41.2	44.7	33.6	~
BEC 4	642500	289900	30.0	29.2	25.5	36.7	29.3	27.3	24.1	20.5	25.0	25.4	37.2	23.1	27.8	20.8	~
BEC 5a	642500	289900	42.3	35.5	34.6	51.0	43.0	38.4	33.6	~	37.2	35.4	42.8	29.7	~	~	~
BEC 5b	642500	289900	44.3	37.7	38.5	55.1	42.8	36.6	35.8	~	37.9	34.6	47.7	29.7	~	~	~
BEC 5c	642500	289900	~	~	29.9	50.7	43.2	36.3	~	~	38.3	35.4	48.3	26.3	~	~	~
BEC 5a,b,c – mean	642500	289900	43.3	36.6	34.3	52.3	43.0	37.1	34.7	~	37.8	35.1	46.3	28.6	39.0	29.3	~
BEC 6	642100	290500	~	~	~	~	~	~	22.9	23.9	21.8	26.4	37.4	29.2	26.9	21.8	~
BUN 1 (was DT 13)	633600	289800	48.3	36.3	31.3	42.2	33.6	26.5	28.7	26.1	29.0	33.5	50.0	32.8	34.9	26.1	~
WRE 1	649879	282622	28.2	27.0	~	27.4	21.4	20.8	21.0	24.0	23.1	22.2	26.8	24.1	24.2	18.1	~
BLY 1	645100	275200	37.6	~	31.5	48.0	36.9	38.1	37.0	39.4	33.3	32.8	49.0	30.3	37.6	28.2	~

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
FLX 12	630363	234890	32.4	48.2	36.5	21.7	22.8	18.8	25.5	34.0	29.0	30.3	37.9	36.1	31.1	23.3	~
FLX 14	628604	232847	46.6	44.4	37.8	22.9	14.9	24.6	28.6	36.7	29.0	28.0	34.8	36.6	32.1	24.1	~
FLX 17	628817	236323	27.4	39.1	26.9	27.3	23.9	21.9	23.3	24.7	25.7	24.8	32.1	29.6	27.2	20.4	~
FLX 20	628669	233979	41.7	56.3	38.4	20.6	25.2	27.3	~	42.7	35.0	35.5	34.6	45.5	36.6	27.5	~
FLX 21	629253	234431	33.0	43.5	27.4	19.7	18.1	15.5	21.1	24.6	24.8	27.0	33.2	31.3	26.6	20.0	~
FLX 22	629172	233446	33.5	37.1	31.3	16.4	18.7	18.7	22.3	29.6	~	24.8	30.0	32.1	26.8	20.1	~
FLX 23	628542	236592	26.4	43.0	26.2	46.7	36.2	30.0	30.2	30.6	31.4	31.6	35.4	27.8	33.0	24.7	~
FLX 24	628358	234634	38.3	44.1	31.0	21.6	25.2	24.2	26.3	25.3	29.0	30.8	30.8	35.4	30.2	22.6	~
FLX 26a	627959	234246	49.3	52.2	41.9	36.2	37.4	35.3	37.7	45.0	35.6	43.0	43.4	46.8	~	~	~
FLX 26b	627959	234246	47.6	57.4	48.5	37.8	33.5	40.0	38.7	45.0	43.5	42.5	51.9	44.9	~	~	~
FLX 26c	627959	234246	29.7	49.4	50.2	41.1	38.5	38.4	38.5	44.5	41.0	43.2	49.2	49.3	~	~	~
FLX 26 a,b,c - mean	627959	234246	42.2	53.0	46.9	38.4	36.5	37.9	38.3	44.8	40.0	42.9	48.2	47.0	43.0	32.3	~
FLX 27a	627960	234238	44.7	48.4	41.5	32.3	29.2	29.1	31.8	38.9	36.0	36.2	41.6	41.1	~	~	~
FLX 27b	627960	234238	39.4	36.3	41.6	28.7	36.7	31.3	32.8	36.2	35.8	38.1	37.8	44.5	~	~	~
FLX 27c	627960	234238	47.5	48.9	41.5	29.2	29.2	32.2	33.3	36.1	37.1	39.9	43.7	43.4	~	~	~
FLX 27 a,b,c - mean	627960	234238	43.9	44.5	41.5	30.1	31.7	30.9	32.6	37.1	36.3	38.1	41.0	43.0	37.6	28.2	~
FLX 39	628760	236071	31.5	45.2	28.3	28.9	26.0	24.1	25.0	27.9	27.3	30.9	34.4	32.5	30.2	22.6	~
FLX 43	629212	235265	27.3	42.2	25.5	18.3	19.1	18.3	~	25.3	21.1	24.5	30.2	29.5	25.6	19.2	~

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
TRM 1	627140	237760	23.7	40.0	22.6	24.7	20.0	~	21.0	22.5	~	~	~	~	24.9	18.1	~
TRM 3a	627618	237092	35.2	46.2	29.9	28.1	26.0	25.1	25.8	25.2	24.8	29.3	39.6	32.6	~	~	~
TRM 3b	627618	237092	38.4	43.7	30.2	26.8	26.8	24.8	26.1	26.6	26.5	31.0	42.1	32.8	~	~	~
TRM 3c	627618	237092	27.0	43.5	31.4	30.0	22.6	23.2	26.9	25.8	27.2	28.9	42.0	32.3	~	~	~
TRM 3a,b,c – mean	627618	237092	33.5	44.5	30.5	28.3	25.1	24.4	26.3	25.9	26.2	29.7	41.2	32.6	30.7	23.0	~
TRM 4	627613	237080	35.1	51.0	32.0	27.8	27.5	24.7	30.1	30.6	28.3	33.2	42.4	38.3	33.4	25.1	~
TRM 5	627629	237078	30.9	40.8	29.2	32.0	27.6	17.9	26.6	24.3	25.3	28.1	38.3	29.0	29.2	21.9	~
TRM 8	628270	236266	43.1	56.5	39.0	28.6	28.0	26.5	30.2	33.4	32.4	37.4	33.7	43.0	36.0	27.0	~
TRM 10	629340	235737	43.3	55.6	38.0	22.2	24.6	28.3	28.1	34.6	31.7	34.1	42.4	42.0	35.4	26.6	~
TRM 12	629641	235529	27.5	50.9	31.3	22.8	25.8	24.5	28.2	33.0	27.3	31.8	38.6	38.1	31.7	23.7	~
KSG 9	621680	245796	40.6	49.8	36.3	28.3	29.8	29.9	36.3	41.0	34.4	37.9	51.6	49.1	38.8	29.1	~
KSG 10a	621815	245785	41.1	53.4	40.0	44.1	40.2	41.1	34.3	41.3	40.0	38.3	56.1	40.4	~	~	~
KSG 10b	621815	245785	37.1	~	42.8	45.0	41.6	40.7	~	41.4	38.7	42.8	56.0	44.5	~	~	~
KSG 10c	621815	245785	40.9	52.9	41.0	46.9	42.6	36.2	35.3	42.2	40.8	43.6	55.7	43.5	~	~	~
KSG 10a,b,c - mean	621815	245785	39.7	53.2	41.3	45.3	41.5	39.3	34.8	41.6	39.8	41.6	55.9	42.8	43.1	32.3	~
KSG 13	621809	245778	29.1	38.9	33.2	35.3	30.2	28.3	26.2	26.6	26.4	30.3	41.7	35.1	31.8	23.8	~
WBG 1a	627596	249261	45.9	48.3	39.5	38.0	36.1	31.9	37.2	37.9	36.0	39.1	44.9	42.8	~	~	~
WBG 1b	627596	249261	37.1	40.2	40.9	39.2	35.7	34.0	39.4	39.6	47.4	40.8	47.3	39.6	~	~	~

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
WBG 1c	627596	249261	43.8	43.5	41.9	36.6	37.0	34.7	38.1	39.2	39.6	39.1	49.0	43.3	~	~	~
WBG 1 a,b,c - mean	627596	249261	42.3	44.0	40.8	37.9	36.3	33.5	38.2	38.9	41.0	39.7	47.1	41.9	40.1	33.7	~
WBG 3	626997	248488	20.7	18.3	15.6	15.3	10.4	10.5	11.3	13.4	13.3	15.7	20.1	22.2	15.6	13.1	~
WBG 5	627604	249243	27.8	28.3	23.9	30.9	21.3	18.2	20.1	21.8	22.3	24.1	30.7	29.1	24.9	20.9	~
WBG 8	627601	249283	39.9	45.9	38.6	36.1	32.7	33.1	37.4	39.3	37.6	38.4	44.0	41.9	38.7	32.5	~
WBG 10	627570	249240	33.8	37.4	26.0	36.4	26.3	24.6	22.0	25.6	24.2	26.5	37.1	27.0	28.9	24.3	~
WBG 12	627664	249203	30.4	35.4	28.4	17.6	19.5	17.1	21.8	27.7	23.8	26.1	28.4	31.0	25.6	21.5	~
WBG 13	627585	249239	35.3	38.6	32.9	35.4	29.4	26.1	28.7	30.3	29.4	29.3	41.4	31.0	32.3	27.1	~
WBG 17	627614	249271	31.9	33.8	25.0	29.8	21.5	22.5	23.2	25.6	22.9	24.6	31.1	32.2	27.0	22.7	~
WBG 18	627627	249339	33.8	46.2	28.5	41.3	32.8	31.1	30.8	33.1	32.0	35.5	44.7	37.8	35.6	29.9	~
WBG 20	627604	249295	33.6	46.2	37.8	27.3	30.8	30.6	33.6	38.4	35.8	35.6	42.1	41.2	36.1	30.3	~
MEL 5	628145	250417	37.8	35.6	30.7	26.4	24.9	25.8	30.4	34.3	30.9	31.3	39.5	39.1	32.2	24.2	~
MEL 7	628177	250478	31.0	37.4	32.3	31.7	24.8	24.4	26.9	29.1	29.3	32.6	40.1	40.2	31.7	23.7	~
MRT 1a	624633	245447	26.1	37.6	29.9	32.2	27.0	25.9	27.6	32.0	29.2	30.5	31.0	34.4	~	~	~
MRT 1b	624633	245447	28.8	33.3	25.3	31.9	22.2	26.8	26.1	31.7	29.1	28.4	28.7	35.1	~	~	~
MRT 1c	624633	245447	~	~	~	~	~	26.4	26.7	31.5	29.7	29.3	34.2	35.2	~	~	~
MRT 1a,b,c Mean	624633	245447	27.5	35.5	27.6	32.1	24.6	26.4	26.8	31.7	29.3	29.4	31.3	34.9	29.7	22.3	~
MRT 4	624461	245847	23.4	30.5	17.7	24.2	18.1	17.0	16.8	17.8	19.5	21.3	25.6	21.8	21.1	15.9	~

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
MRT 5	624769	245814	~	35.2	21.8	22.0	19.3	17.8	20.4	22.9	24.5	25.5	39.5	28.5	25.2	18.9	~
LGM 2	634051	258315	27.6	32.6	19.9	20.8	19.6	18.6	20.4	25.0	22.2	23.0	29.3	14.6	22.8	17.1	~
FAR 1	636273	260134	27.5	28.9	24.3	35.6	26.0	28.2	26.1	28.4	27.5	26.4	32.3	28.3	28.3	21.2	~
FAR 2a	636274	260120	27.8	35.6	27.5	36.2	24.4	28.5	32.9	36.3	31.3	33.9	42.6	30.8	~	~	~
FAR 2b	636274	260120	36.5	38.0	27.3	35.0	25.2	28.0	33.3	36.8	31.2	30.7	34.8	34.6	~	~	~
FAR 2c	636274	260120	26.8	39.6	30.8	35.8	29.2	29.4	29.8	36.0	25.8	33.7	41.6	34.7	~	~	~
FAR 2a,b,c-mean	636274	260120	30.4	37.7	28.5	35.7	26.3	28.6	32.0	36.4	29.4	32.8	39.7	33.4	32.6	24.4	~
STA 1a	635753	260002	42.2	52.5	37.3	39.0	36.6	37.7	38.8	48.2	39.6	41.6	47.9	41.5	~	~	~
STA 1b	635753	260002	44.8	55.7	40.0	48.2	38.4	36.6	37.0	49.9	40.9	44.6	51.5	44.1	~	~	~
STA 1c	635753	260002	33.5	52.8	40.9	42.9	38.7	38.9	40.3	51.1	40.5	45.1	48.6	44.8	~	~	~
STA 1a,b,c-mean	635753	260002	40.2	53.7	39.4	43.4	37.9	37.7	38.7	49.7	40.3	43.8	49.3	43.5	43.1	32.3	~
STA 2	635732	259995	30.3	41.2	28.1	30.9	25.5	28.3	33.0	40.7	32.2	30.9	37.6	34.4	32.8	24.6	~
STA 6	635794	260042	27.2	31.2	23.2	29.6	24.4	23.4	23.9	29.5	24.1	27.9	31.6	27.8	27.0	20.2	~
STA 7	635736	259984	30.4	33.5	31.8	43.6	38.6	36.7	55.0	37.2	35.6	34.1	43.6	28.0	37.3	28.0	~
STA 8a	635743	259992	37.4	51.3	40.1	48.3	41.3	40.2	42.9	56.2	42.0	44.2	49.3	44.2	~	~	~
STA 8b	635743	259992	43.7	59.9	43.8	51.9	44.4	44.3	48.0	55.9	46.5	49.7	56.2	52.7	~	~	~
STA 8c	635743	259992	46.1	60.4	41.2	53.7	45.5	44.7	50.5	59.8	47.7	49.9	55.2	48.7	~	~	~
STA 8a,b,c-mean	635743	259992	42.4	57.2	41.7	51.3	43.7	43.1	47.1	57.3	45.4	47.9	53.6	48.5	48.3	36.2	~

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	NO_2 Mean Concentrations (µg/m^3)														
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean		
															Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
SAX 1	638683	263014	44.5	40.3	33.4	39.4	36.0	34.2	35.5	33.2	34.7	35.2	46.5	32.4	37.1	27.8	~
LEI 2	644557	262464	29.9	44.3	28.0	31.1	27.7	29.5	33.0	32.8	28.2	23.2	30.3	25.4	30.3	22.7	~
LEI 3	644325	262634	31.5	36.2	22.1	34.2	26.7	26.7	25.2	26.9	26.7	30.4	33.0	29.6	29.1	21.8	~
FRAM 1	628375	263329	30.8	32.7	25.1	32.7	26.8	24.9	24.9	24.1	26.4	29.4	37.4	27.7	28.6	21.4	~
FRAM 2	628401	263226	22.2	26.6	18.6	27.6	19.1	20.2	16.3	17.6	19.6	23.7	31.1	23.6	22.2	16.6	~
FRAM 3	628289	263446	32.0	34.3	29.7	22.6	22.9	22.6	24.9	29.9	27.9	27.6	32.7	33.4	28.4	21.3	~

☒ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

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

☐ **Data has been distance corrected to nearest relevant public exposure in the final column**

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 for all applicable sites.

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

Biomass Screening

A biomass boiler screening was carried out by AECOM in 2020. There were 10 biomass boilers across 9 locations within the county. The screening assessment found that the locations were sufficient distance from each other and therefore were screened individually for annual/hourly NO_2 and annual/24 hourly PM_{10} emissions. The results found that none of the boiler sites exceeded the annual/hourly NO_2 target emissions or the annual/24 hourly PM_{10} target emissions.[6]

QA/QC of automatic monitoring

NO_2 concentrations were monitored by ozone chemiluminescence in Woodbridge in 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 (AURN). Calibrations were undertaken every 2-4 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 the United Kingdom Accreditation Scheme (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 instrument's 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

[6] AECOM (2020) Biomass Screening

ratification ensures that the data provided 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_2concentrations;
- for indicative comparison with the Air Quality Strategy Objectives based on the annual mean;
- for highlighting areas of high NO_2concentration; and
- where installation of an automatic analyser is not feasible
- they are useful for identifying areas of high NO_2concentration, 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 co-location studies with chemiluminescent analysers. Bias correction was undertaken after annualisation of the data. Following this, distance correction was not required with all concentrations below 36µg/m^3 at all relevant receptors. 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 SOCOTEC 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 UKAS.

The samples were analysed in accordance with SOCOTEC 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".

SOCOTEC 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 NO_2 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 .

During 2019 SOCOTEC achieved the highest score of 'Satisfactory' for 87.5% of their submitted results in the January-February round and 100% of their submitted results in the April-May, July-August and September-November rounds. Overall for 2019 SOCOTEC held the highest rank of **'Satisfactory'**.

Annualisation of 2019 automatic monitoring

During 2019 the continuous analyser sited in Woodbridge failed to achieve full data capture, obtaining only 70.57%. For sites with less than 85% data capture, the mean of the 2019 data must be "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.
- The three sites used here are 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.
- Obtain the unadjusted (not corrected for bias) annual mean (Am) for the calendar year for these sites. 1st Jan – 31st Dec.
- Work out the period mean (Pm) for the period of interest with analyser 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 (Ra). This is the adjustment factor.
- Multiply the measured period mean (M) for the short-term monitoring location by the adjustment factor (Ra) to give the estimate of the annual mean for 2019. Data used for the calculations is set out in the table overleaf.

The analyser recorded data from 01/01/19 to 10am on 17/07/19, and then from 2pm on 31/10/19 to 31/12/19. This will be the **Pm**.

Final calculation: the (unadjusted) measured period mean (Pm) was 34 µg/m^3

34 µg/m^3 (M) x 0.92 (R_a) = **31.3 µg/m^3 (annualised mean)**

Data from 3 AURN sites:

Station Name	Measure	Start Date	End Date	Average	Record Count	Total Concentration	Data Capture %	Units
Norwich Lakenfields (NO12)	Nitrogen Dioxide	01 Jan 2019 00:00	17 Jul 2019 10:00	12.85	4706	60450.53	99.30	µg/m³
Norwich Lakenfields (NO12)	Nitrogen Dioxide	31 Oct 2019 14:00	31 Dec 2019 00:00	16.67	1447	24121.62	99.72	µg/m³
				14.76				
St Osyth (OSY)	Nitrogen Dioxide	01 Jan 2019 00:00	17 Jul 2019 10:00	13.78	4678	64454.58	98.71	µg/m³
St Osyth (OSY)	Nitrogen Dioxide	31 Oct 2019 14:00	31 Dec 2019 00:00	10.92	1447	15800.28	99.72	µg/m³
				12.35				
Wicken Fen (WFEN)	Nitrogen Dioxide	01 Jan 2019 00:00	17 Jul 2019 10:00	8.89	4479	39810.59	94.51	µg/m³
Wicken Fen (WFEN)	Nitrogen Dioxide	31 Oct 2019 14:00	31 Dec 2019 00:00	11.64	1450	16883.31	99.93	µg/m³
				10.27				

Site	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)
WBG	8.47	13.08	12.72	10.27	12.35	14.76	0.82	1.06	0.86	**0.92**

Annualisation of 2019 diffusion tube data

Two diffusion tube sites failed to achieve full data capture; BEC 6 was a new site started midway through the year due to concerns raised by local residents and the tube at TRM 1 was stolen during June and September and then not replaced as the house was sold.

For sites with fewer than 9 months of data the mean of the 2019 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.
- 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 2019.
- 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 (Ra). This is the adjustment factor.
- Multiply the measured period mean (M) for the short-term monitoring location by the adjustment factor (Ra) to give the estimate of the annual mean for 2019.
- Data used for the calculations are set out in the table overleaf.

Calculations are as follows;

- BEC 6: the (unadjusted) measured period mean (pM) was 26.9 µg/m^3:
- 26.9 µg/m^3 (M) x 1.08 (Ra) = 29.1 µg/m^3 (annualised mean)
- TRM 1: the (unadjusted) measured period mean (pM) was 24.9 µg/m^3:

- 24.9 µg/m^3 (M) x 0.97 (Ra) = 24.1 µg/m^3 (annualised mean)
- The annualised means were bias adjusted as for all other sites.

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)
BEC 6	Jan-May	8.42	13.21	12.86	7.63	12.14	12.29	1.10	1.09	1.05	**1.08**
TRM 1	Jun, Sept-Dec	8.46	13.36	12.96	8.63	14.76	12.81	0.98	0.90	1.01	**0.97**

N.B
Annual mean for BEC 6 runs 09/01/19 to 09/01/20
Annual mean for TRM 1 runs 10/01/19 to 08/01/20

Period mean dates:

Site	Month	On/Off dates
BEC 6	Jan-May	09/01/19 - 05/06/19
TRM 1	Jun	06/06/19 - 03/07/19
TRM 1	Sept-Dec	03/09/19 – 09/01/20

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 SOCOTEC in 2019 in the 03/20 edition of ‘National Spreadsheet of Bias Adjustment Factors’ **was 0.75 using results from 24 different studies**. A copy of the output from the spreadsheet can be viewed overleaf.

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/20

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 2020
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 make your selection, choose [All] from the pop-up list	Year[5] To make your selection, choose [All] from the pop-up list	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[6]	Bias Adjustment Factor (A) (Cm/Dm)
Socotec Didcot	50% TEA in acetone	2019	UB	Kingston upon Hull City Council	12	30	23	32.2%	G	**0.76**
Socotec Didcot	50% TEA in acetone	2019	O	Kingston upon Hull City Council	11	32	26	19.1%	G	**0.84**
Socotec Didcot	50% TEA in acetone	2019	R	Vale of Glamorgan	11	40	24	68.0%	G	**0.60**
Socotec Didcot	50% TEA in acetone	2019	R	Watford Borough Council	12	35	30	16.8%	S	**0.86**
Socotec Didcot	50% TEA in acetone	2019	R	Dumfries & Galloway Council	13	35	31	11.9%	G	**0.89**
Socotec Didcot	50% TEA in acetone	2019	KS	Marylebone Road Intercomparison	12	32	65	40.5%	G	**0.71**
Socotec Didcot	50% TEA in acetone	2019	UB	City of York Council	12	22	16	35.6%	G	**0.74**
Socotec Didcot	50% TEA in acetone	2019	R	City of York Council	12	33	26	26.8%	G	**0.79**
Socotec Didcot	50% TEA in acetone	2019	R	City of York Council	9	32	23	37.2%	G	**0.73**
Socotec Didcot	50% TEA in acetone	2019	R	City of York Council	11	40	28	43.4%	G	**0.70**
Socotec Didcot	50% TEA in acetone	2019	R	Ipswich Boorough council	11	34	26	34.1%	G	**0.75**
Socotec Didcot	50% TEA in acetone	2019	R	Swale BC	12	51	39	31.7%	G	**0.76**
Socotec Didcot	50% TEA in acetone	2019	R	Swale BC	12	33	27	23.9%	G	**0.81**
Socotec Didcot	50% TEA in acetone	2019	R	Swale BC	12	40	31	26.7%	G	**0.79**
Socotec Didcot	50% TEA in acetone	2019	R	Wrexham County Borough Council	10	20	16	22.2%	G	**0.82**
Socotec Didcot	50% TEA in acetone	2019	R	City of Wolverhampton Council	12	39	27	48.4%	G	**0.67**
Socotec Didcot	50% TEA in acetone	2019	R	North Herts DC	12	59	46	28.5%	G	**0.78**
Socotec Didcot	50% TEA in acetone	2019	R	Horsham District Council	12	30	24	24.5%	G	**0.80**
Socotec Didcot	50% TEA in acetone	2019	R	Horsham District Council	11	31	22	44.5%	G	**0.69**
Socotec Didcot	50% TEA in acetone	2019	R	Horsham District Council	11	32	24	34.4%	G	**0.74**
Socotec Didcot	50% TEA in acetone	2019	B	Medway Council	10	21	13	59.5%	P	**0.63**
Socotec Didcot	50% TEA in acetone	2019	R	Medway Council	12	33	24	35.1%	G	**0.74**
Socotec Didcot	50% TEA in acetone	2019	R	Waverley Borough Council	10	38	30	27.5%	G	**0.78**
Socotec Didcot	50% TEA in acetone	2019	R	Waverley Borough Council	12	35	24	44.7%	G	**0.69**
SOCOTEC Didcot	50% TEA in acetone	2019		**Overall Factor[3] (24 studies)**				Use		**0.75**

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

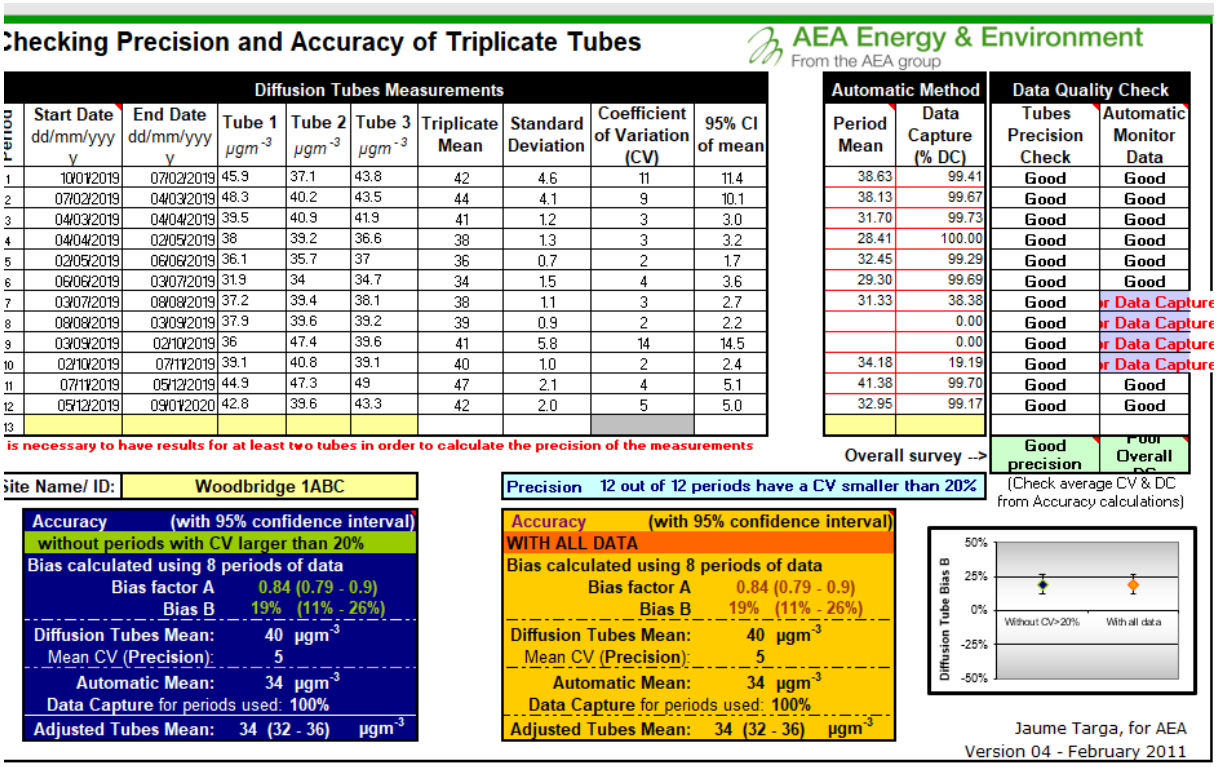
There is a kerbside chemiluminescent analyser recording NO_2 concentrations derived from road traffic emissions at the junction of Lime Kiln Quay Road, Thoroughfare, and St. John's Street in Woodbridge. The site is approximately 1 metre from the kerb and 14 metres from the traffic lights at the junction. 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: WBG 1 a,b,c



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	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1	10/01/2019	07/02/2019	45.9	37.1	43.8	42	4.6	11	11.4	38.63	99.41	Good	Good
2	07/02/2019	04/03/2019	48.3	40.2	43.5	44	4.1	9	10.1	38.13	99.67	Good	Good
3	04/03/2019	04/04/2019	39.5	40.9	41.9	41	1.2	3	3.0	31.70	99.73	Good	Good
4	04/04/2019	02/05/2019	38	39.2	36.6	38	1.3	3	3.2	28.41	100.00	Good	Good
5	02/05/2019	06/06/2019	36.1	35.7	37	36	0.7	2	1.7	32.45	99.29	Good	Good
6	06/06/2019	03/07/2019	31.9	34	34.7	34	1.5	4	3.6	29.30	99.69	Good	Good
7	03/07/2019	08/08/2019	37.2	39.4	38.1	38	1.1	3	2.7	31.33	38.38	Good	r Data Capture
8	08/08/2019	03/09/2019	37.9	39.6	39.2	39	0.9	2	2.2		0.00	Good	r Data Capture
9	03/09/2019	02/10/2019	36	47.4	39.6	41	5.8	14	14.5		0.00	Good	r Data Capture
10	02/10/2019	07/11/2019	39.1	40.8	39.1	40	1.0	2	2.4	34.18	19.19	Good	r Data Capture
11	07/11/2019	05/12/2019	44.9	47.3	49	47	2.1	4	5.1	41.38	99.70	Good	Good
12	05/12/2019	09/01/2020	42.8	39.6	43.3	42	2.0	5	5.0	32.95	99.17	Good	Good
13													

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

Overall survey --> Good precision | Poor Overall

Site Name/ ID: Woodbridge 1ABC

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 8 periods of data
Bias factor A 0.84 (0.79 - 0.9)
Bias B 19% (11% - 26%)
Diffusion Tubes Mean: 40 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 34 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 34 (32 - 36) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 8 periods of data
Bias factor A 0.84 (0.79 - 0.9)
Bias B 19% (11% - 26%)
Diffusion Tubes Mean: 40 µgm^{-3}
Mean CV (Precision): 5
Automatic Mean: 34 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 34 (32 - 36) µgm^{-3}

Jaume Targa, for AEA
Version 04 - February 2011

The precision results for the co-location study in Woodbridge show 12 out of 12 periods with a CV smaller than 20% and the average CV of all monitoring periods (at 5%) 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.

Even though the precision of the diffusion tubes is 'good' the automatic analyser had "Poor Data Capture" for 4 months and so the bias has been calculated using only 8 periods of data.

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

Bias calculated using 8 periods of data

Triplicate diffusion tube mean (2019) = 40µg/m^3 with a mean precision (expressed as the coefficient of variation - CV) of 5.

Automatic analyser annual mean (2019) = 34µg/m^3 with 70.57% data capture.

Adjusted tubes mean = 34 (32-36)µg/m^3

Bias adjustment factor (2019) = 0.84 based on 8 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 the 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. The national bias adjustment factor is then used for all other locations in the district.

During 2019 the local factor of 0.84 obtained at Woodbridge has been calculated using only 8 months of data, due to the analyser to being off-line July to October 2019. The decision was taken to still use this local factor to bias correct the Woodbridge diffusion tubes as it is more conservative than the national factor at 0.75. The national factor has then been used for all other diffusion tube locations within the district, as per previous years.

Precision results

The precision and accuracy checker was used for all triplicate diffusion tube sites across the district, the results of which can be seen in the tables which follow.

All triplicate diffusion tube sites had ‘good’ precision for 2019.

Precision and accuracy checker: BEC 5 a,b,c

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			42.3	44.3		43	1.4	3	12.7
2			35.5	37.7		37	1.6	4	14.0
3			34.6	38.5	29.9	34	4.3	13	10.7
4			51.0	55.1	50.7	52	2.5	5	6.1
5			43.0	42.8	43.2	43	0.2	0	0.5
6			38.4	36.6	36.3	37	1.1	3	2.8
7			33.6	35.8		35	1.6	4	14.0
8									
9			37.2	37.9	38.3	38	0.6	1	1.4
10			35.4	34.6	35.4	35	0.5	1	1.1
11			42.8	47.7	48.3	46	3.0	7	7.5
12			29.7	29.7	26.3	29	2.0	7	4.9
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	
Overall survey -->		Good precision	

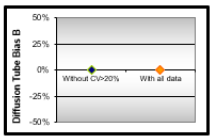
Site Name/ ID: BEC 5a,b,c

Precision 11 out of 11 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: FAR 2 a,b,c

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			27.8	36.5	26.8	30	5.3	18	13.3
2			35.6	38.0	39.6	38	2.0	5	5.0
3			27.5	27.3	30.8	29	2.0	7	4.9
4			36.2	35.0	35.8	36	0.6	2	1.5
5			24.4	25.2	29.2	26	2.6	10	6.4
6			28.5	28.0	29.4	29	0.7	2	1.8
7			32.9	33.3	29.8	32	1.9	6	4.8
8			36.3	36.8	36.0	36	0.4	1	1.0
9			31.3	31.2	25.8	29	3.1	11	7.8
10			33.9	30.7	33.7	33	1.8	5	4.5
11			42.6	34.8	41.6	40	4.2	11	10.5
12			30.8	34.6	34.7	33	2.2	7	5.5
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	

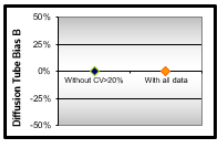
Site Name/ ID: FAR 2 a,b,c

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

(Check average CV & DC from Accuracy calculations)

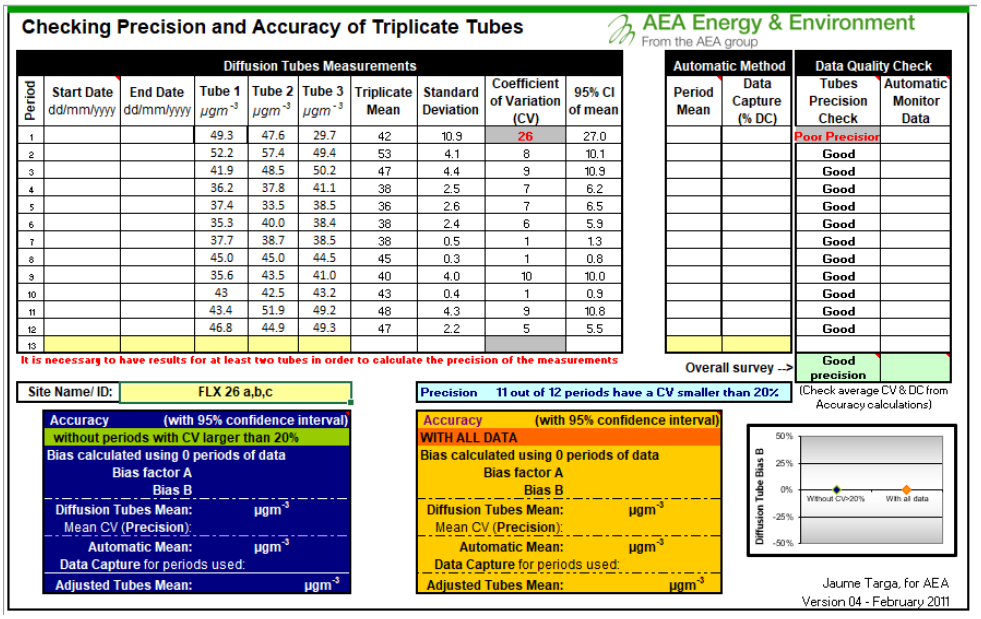
Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

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: FLX 26 a,b,c



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	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1			49.3	47.6	29.7	42	10.9	26	27.0			Poor Precision	
2			52.2	57.4	49.4	53	4.1	8	10.1			Good	
3			41.9	48.5	50.2	47	4.4	9	10.9			Good	
4			36.2	37.8	41.1	38	2.5	7	6.2			Good	
5			37.4	33.5	38.5	36	2.6	7	6.5			Good	
6			35.3	40.0	38.4	38	2.4	6	5.9			Good	
7			37.7	38.7	38.5	38	0.5	1	1.3			Good	
8			45.0	45.0	44.5	45	0.3	1	0.8			Good	
9			35.6	43.5	41.0	40	4.0	10	10.0			Good	
10			43	42.5	43.2	43	0.4	1	0.9			Good	
11			43.4	51.9	49.2	48	4.3	9	10.8			Good	
12			46.8	44.9	49.3	47	2.2	5	5.5			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: FLX 26 a,b,c

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}

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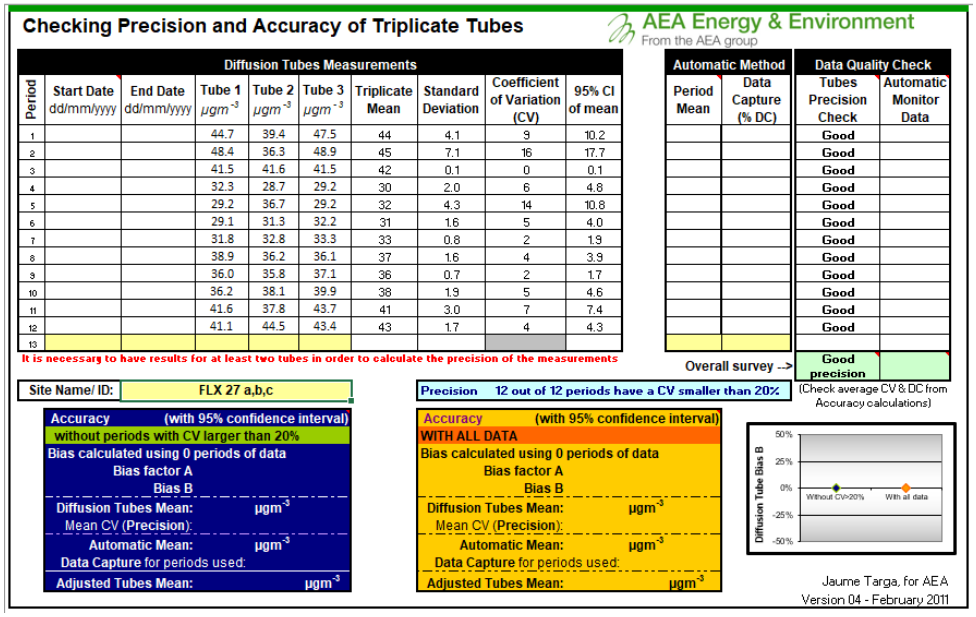
Version 04 - February 2011

Precision and accuracy checker: FLX 27 a,b,c



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	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1			44.7	39.4	47.5	44	4.1	9	10.2			Good	
2			48.4	36.3	48.9	45	7.1	16	17.7			Good	
3			41.5	41.6	41.5	42	0.1	0	0.1			Good	
4			32.3	28.7	29.2	30	2.0	6	4.8			Good	
5			29.2	36.7	29.2	32	4.3	14	10.8			Good	
6			29.1	31.3	32.2	31	1.6	5	4.0			Good	
7			31.8	32.8	33.3	33	0.8	2	1.9			Good	
8			38.9	36.2	36.1	37	1.6	4	3.9			Good	
9			36.0	35.8	37.1	36	0.7	2	1.7			Good	
10			36.2	38.1	39.9	38	1.9	5	4.6			Good	
11			41.6	37.8	43.7	41	3.0	7	7.4			Good	
12			41.1	44.5	43.4	43	1.7	4	4.3			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: FLX 27 a,b,c

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: KSG 10 a,b,c

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

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	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1			41.1	37.1	40.9	40	2.3	6	5.6			Good	
2			53.4		52.9	53	0.4	1	3.2			Good	
3			40.0	42.8	41.0	41	1.4	3	3.5			Good	
4			44.1	45.0	46.9	45	1.4	3	3.6			Good	
5			40.2	41.6	42.6	41	1.2	3	3.0			Good	
6			41.1	40.7	36.2	39	2.7	7	6.8			Good	
7			34.3		35.3	35	0.7	2	6.4			Good	
8			41.3	41.4	42.2	42	0.5	1	1.2			Good	
9			40.0	38.7	40.8	40	1.1	3	2.6			Good	
10			38.3	42.8	43.6	42	2.9	7	7.1			Good	
11			56.1	56	55.7	56	0.2	0	0.5			Good	
12			40.4	44.5	43.5	43	2.1	5	5.3			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

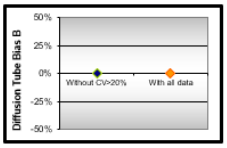
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: KSG 10 a,b,c

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 a,b,c

Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

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	Automatic Method: Period Mean	Automatic Method: Data Capture (% DC)	Data Quality Check: Tubes Precision Check	Data Quality Check: Automatic Monitor Data
1			52.2	55.4	46.5	51	4.5	9	11.2			Good	
2			46.4	39.5	42.4	43	3.5	8	8.6			Good	
3			41.0	39.4	39.6	40	0.9	2	2.2			Good	
4			59.0	61.3	59.2	60	1.3	2	3.2			Good	
5			48.0	50.5	46.3	48	2.1	4	5.2			Good	
6			43.3	44.4	43.7	44	0.6	1	1.4			Good	
7			38.8	41.6	40.9	40	1.5	4	3.6			Good	
8			35.1	38.8	36.4	37	1.9	5	4.7			Good	
9			43.5	43.1	41.8	43	0.9	2	2.2			Good	
10			34.2	41.6	37.3	38	3.7	10	9.2			Good	
11			51.7	53.4	51.1	52	1.2	2	3.0			Good	
12			32.5	37.8	34.7	35	2.7	8	6.6			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

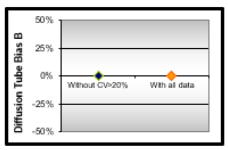
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: LOW 6 a,b,c

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 a,b,c

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			26.1	28.8		27	1.9	7	17.2			Good	
2			37.6	33.3		35	3.0	9	27.3			Good	
3			29.9	25.3		28	3.3	12	29.2			Good	
4			32.2	31.9		32	0.2	1	1.9			Good	
5			27.0	22.2		25	3.4	14	30.5			Good	
6			25.9	26.8	26.4	26	0.5	2	1.1			Good	
7			27.6	26.1	26.7	27	0.8	3	1.9			Good	
8			32.0	31.7	31.5	32	0.3	1	0.6			Good	
9			29.2	29.1	29.7	29	0.3	1	0.8			Good	
10			30.5	28.4	29.3	29	1.1	4	2.6			Good	
11			31	28.7	34.2	31	2.8	9	6.9			Good	
12			34.4	35.1	35.2	35	0.4	1	1.1			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

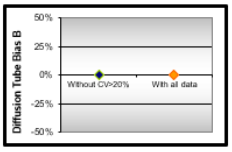
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: MRT 1 a,b,c

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 a,b,c

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			42.2	44.8	33.5	40	5.9	15	14.7			Good	
2			52.5	55.7	52.8	54	1.8	3	4.4			Good	
3			37.3	40.0	40.9	39	1.9	5	4.7			Good	
4			39.0	48.2	42.9	43	4.6	11	11.5			Good	
5			36.6	38.4	38.7	38	1.1	3	2.8			Good	
6			37.7	36.6	38.9	38	1.2	3	2.9			Good	
7			38.8	37.0	40.3	39	1.7	4	4.1			Good	
8			48.2	49.9	51.1	50	1.5	3	3.6			Good	
9			39.6	40.9	40.5	40	0.7	2	1.7			Good	
10			41.6	44.6	45.1	44	1.9	4	4.7			Good	
11			47.9	51.5	48.6	49	1.9	4	4.7			Good	
12			41.5	44.1	44.8	43	1.7	4	4.3			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

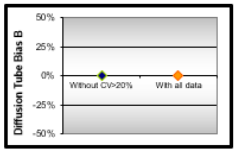
(Check average CV & DC from Accuracy calculations)

Site Name/ ID: STA 1 a,b,c

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}



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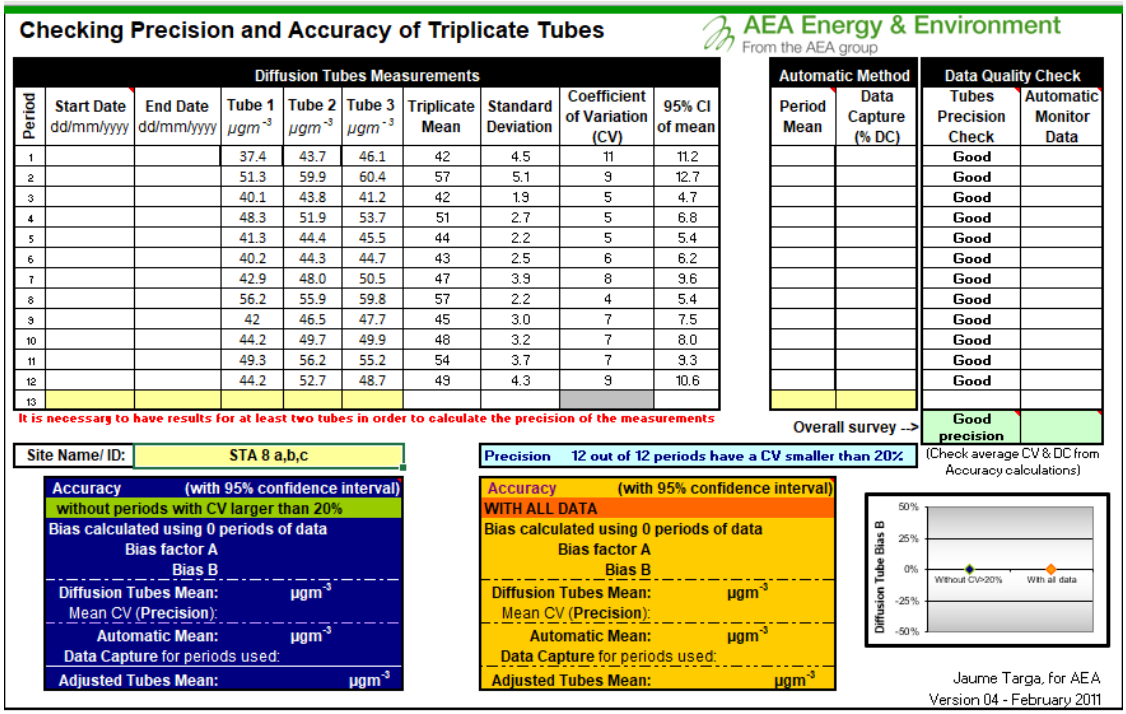
Version 04 - February 2011

Precision and accuracy checker: STA 8 a,b,c



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			37.4	43.7	46.1	42	4.5	11	11.2
2			51.3	59.9	60.4	57	5.1	9	12.7
3			40.1	43.8	41.2	42	1.9	5	4.7
4			48.3	51.9	53.7	51	2.7	5	6.8
5			41.3	44.4	45.5	44	2.2	5	5.4
6			40.2	44.3	44.7	43	2.5	6	6.2
7			42.9	48.0	50.5	47	3.9	8	9.6
8			56.2	55.9	59.8	57	2.2	4	5.4
9			42	46.5	47.7	45	3.0	7	7.5
10			44.2	49.7	49.9	48	3.2	7	8.0
11			49.3	56.2	55.2	54	3.7	7	9.3
12			44.2	52.7	48.7	49	4.3	9	10.6
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
		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: STA 8 a,b,c

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}

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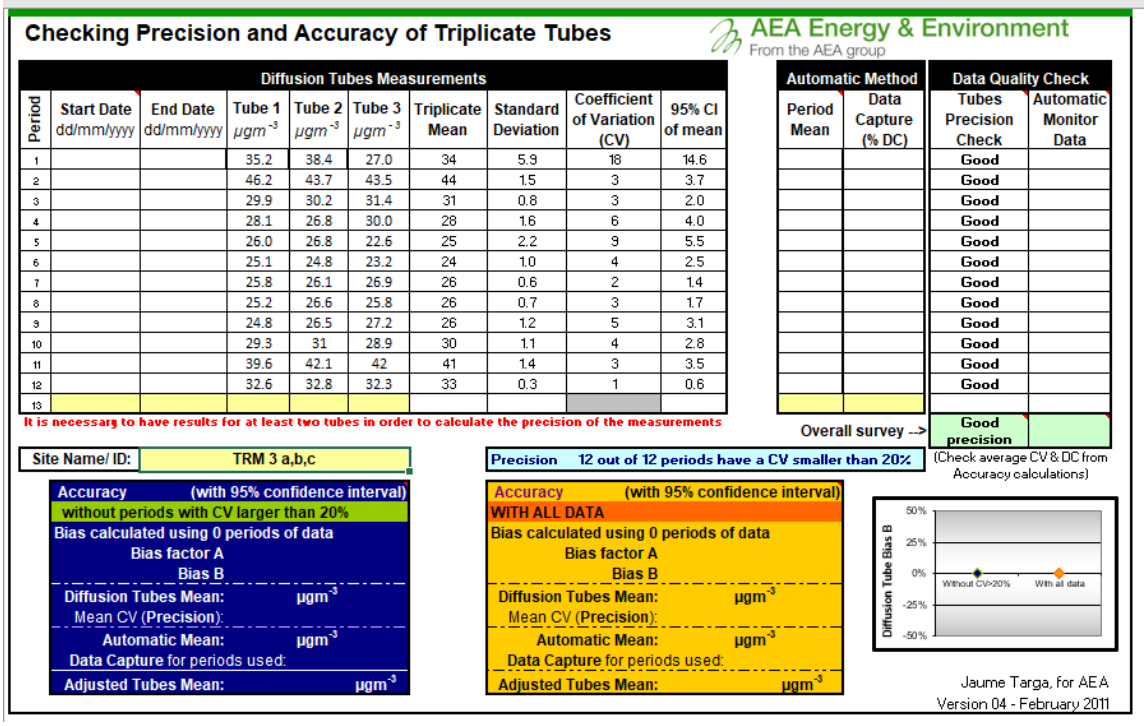
Precision and accuracy checker: TRM 3 a,b,c



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			35.2	38.4	27.0	34	5.9	18	14.6
2			46.2	43.7	43.5	44	1.5	3	3.7
3			29.9	30.2	31.4	31	0.8	3	2.0
4			28.1	26.8	30.0	28	1.6	6	4.0
5			26.0	26.8	22.6	25	2.2	9	5.5
6			25.1	24.8	23.2	24	1.0	4	2.5
7			25.8	26.1	26.9	26	0.6	2	1.4
8			25.2	26.6	25.8	26	0.7	3	1.7
9			24.8	26.5	27.2	26	1.2	5	3.1
10			29.3	31	28.9	30	1.1	4	2.8
11			39.6	42.1	42	41	1.4	3	3.5
12			32.6	32.8	32.3	33	0.3	1	0.6
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
		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: TRM 3 a,b,c

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

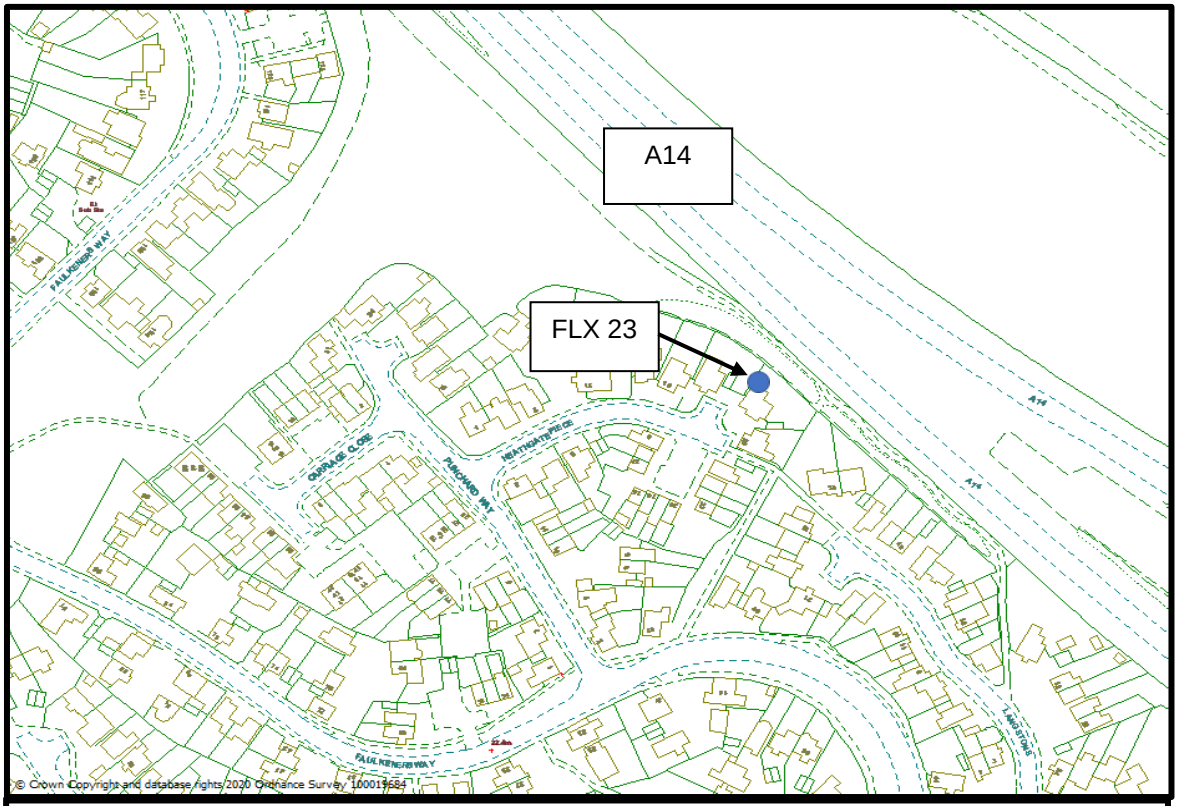
Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 0 periods of data
Bias factor A
Bias B
Diffusion Tubes Mean: µgm^{-3}
Mean CV (Precision):
Automatic Mean: µgm^{-3}
Data Capture for periods used:
Adjusted Tubes Mean: µgm^{-3}

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

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

Figure D. 1 Felixstowe Map 1



Key: Single Diffusion Tube site

Figure D. 2 Felixstowe Map 2

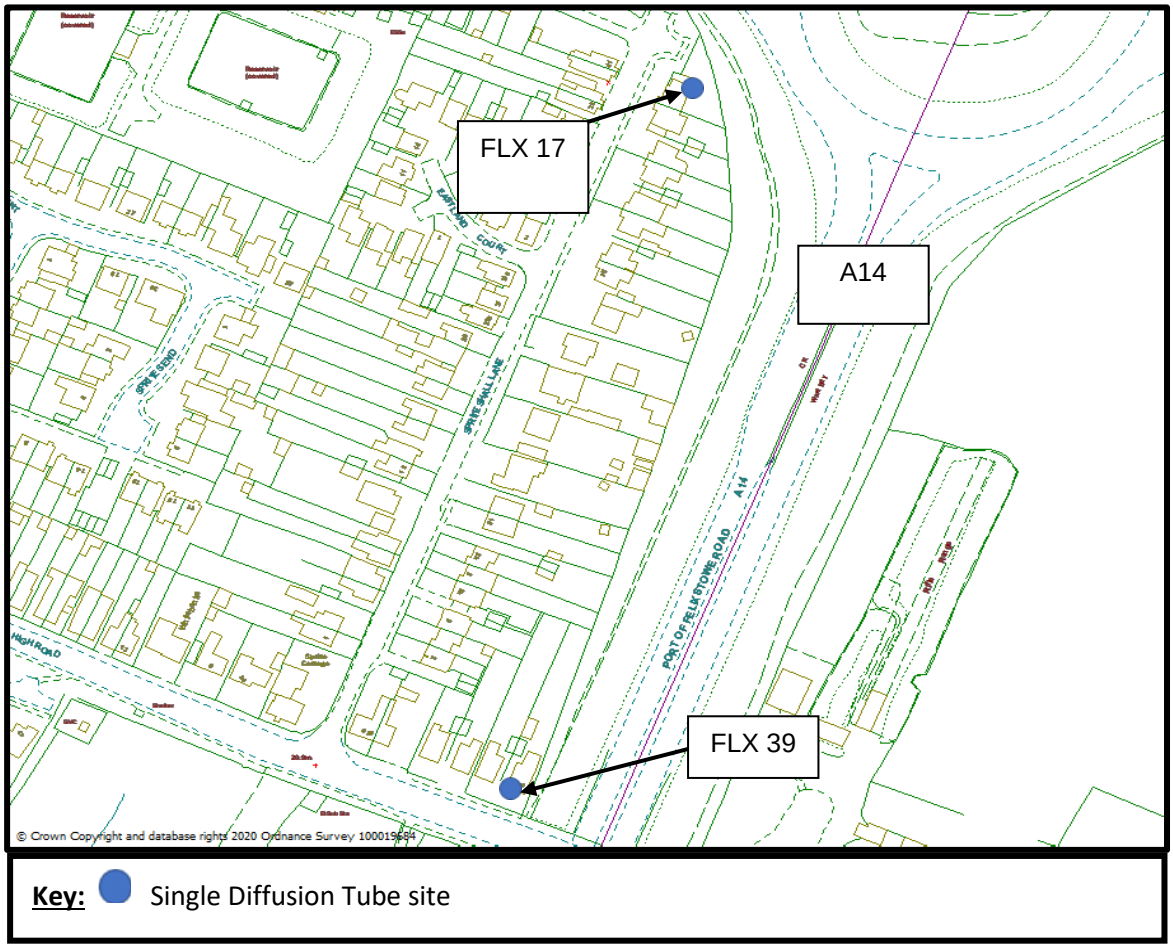
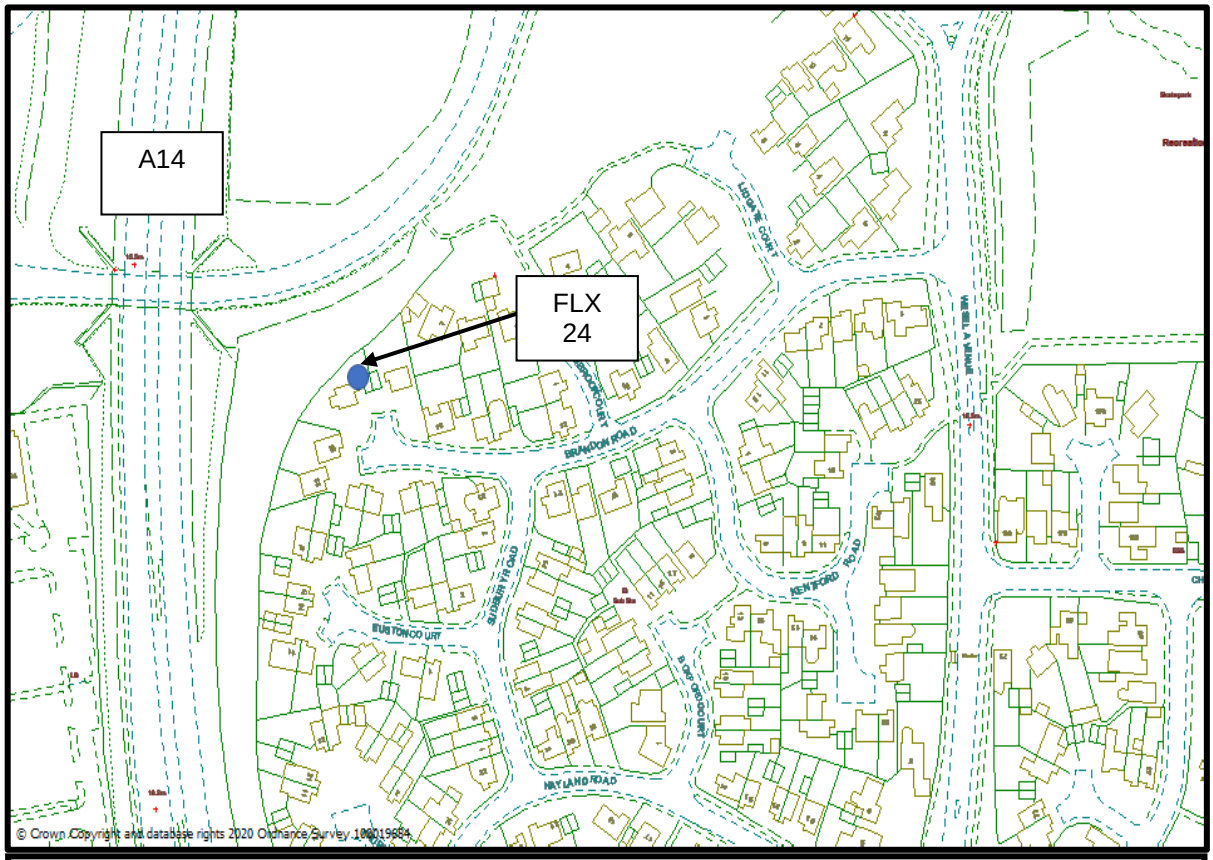
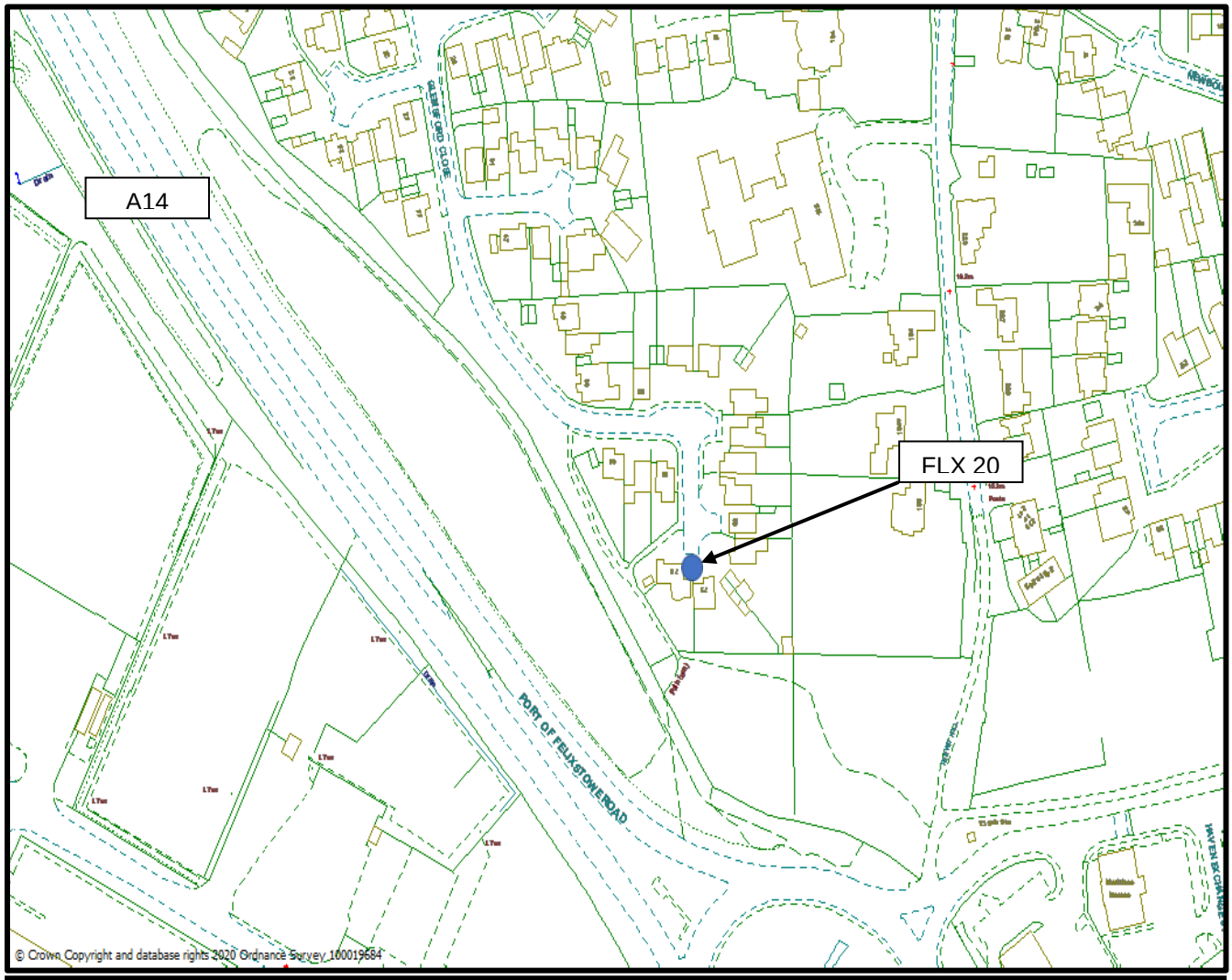


Figure D. 3 Felixstowe Map 3



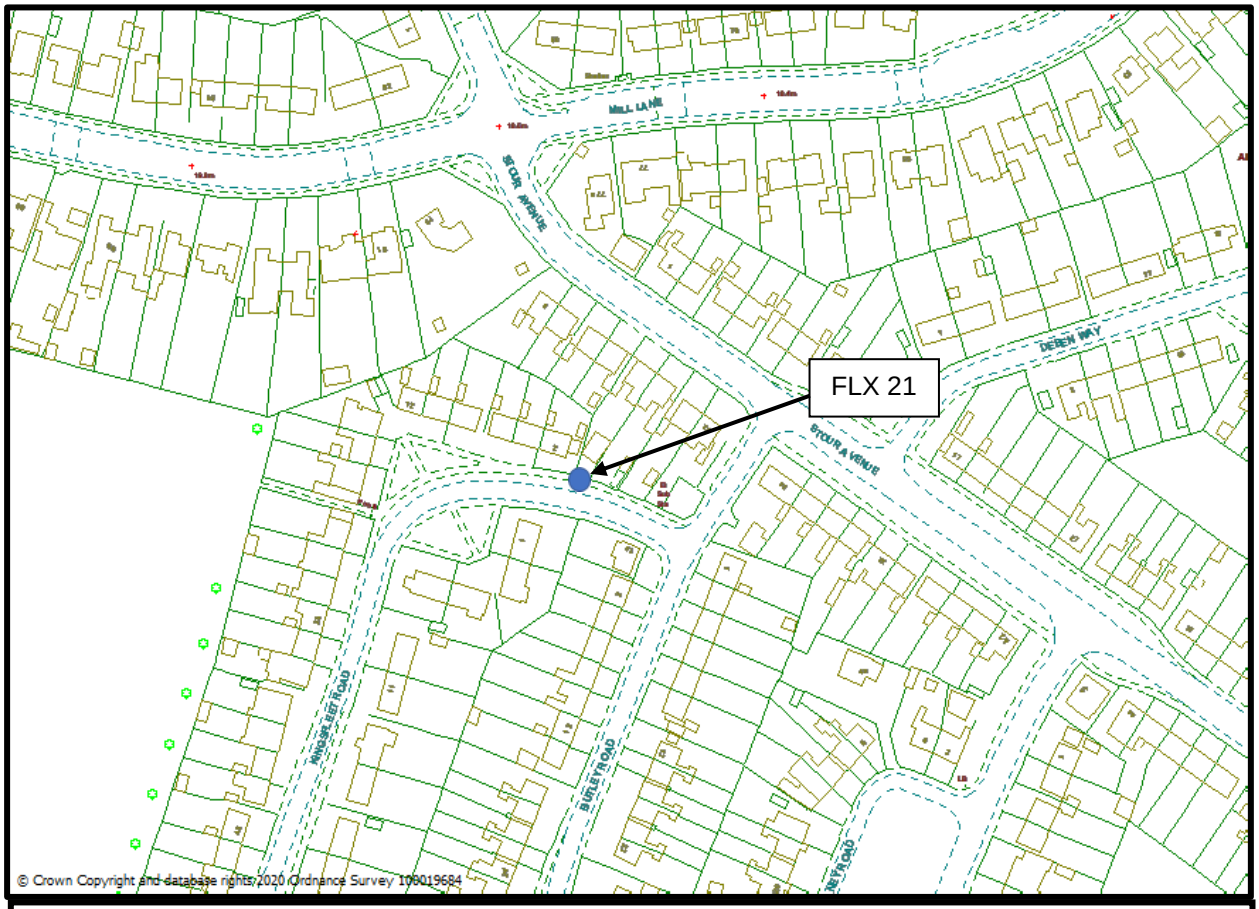
Key: Single Diffusion Tube site

Figure D. 4 Felixstowe Map 4



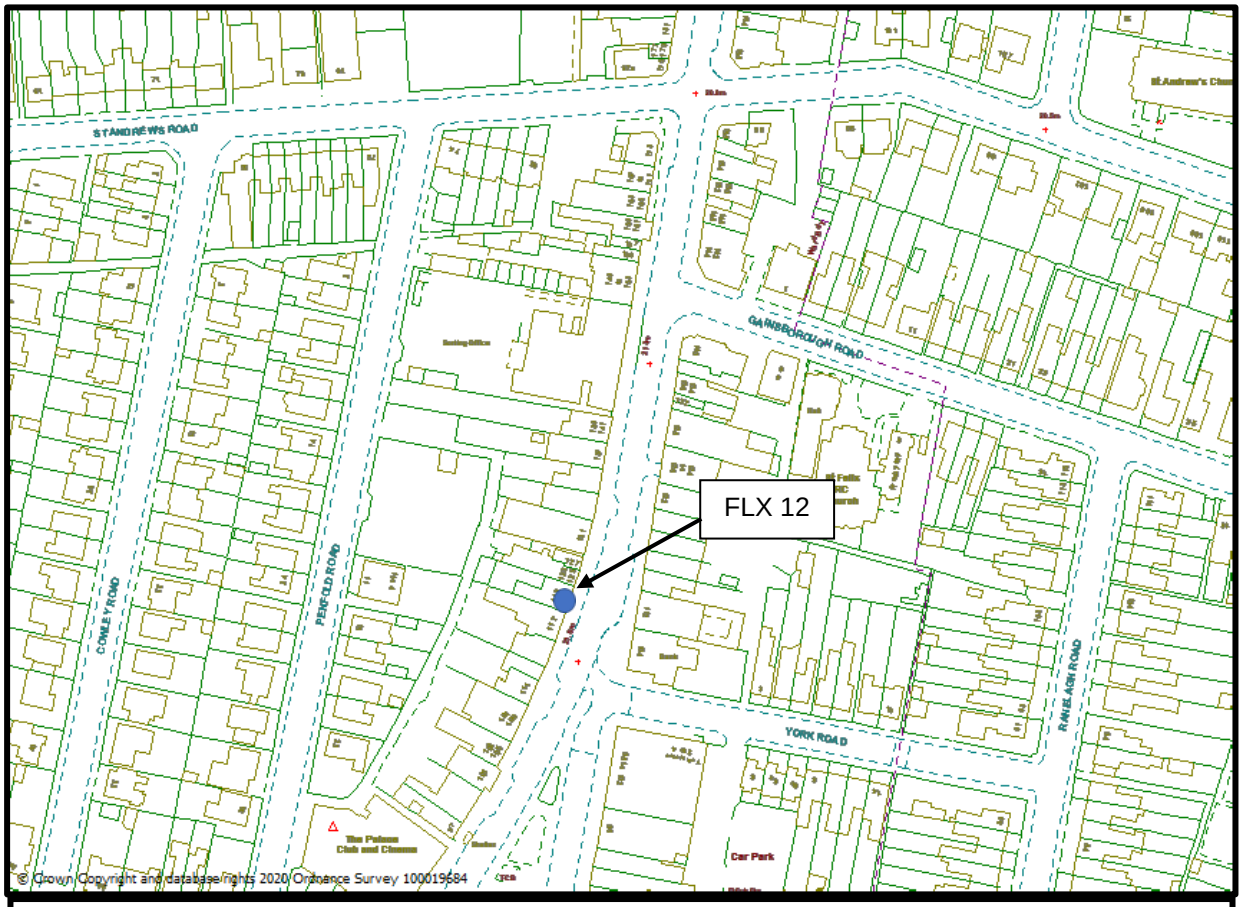
Key: Single Diffusion Tube site

Figure D. 5 Felixstowe Map 5



Key: Single Diffusion Tube site

Figure D. 6 Felixstowe Map 6



Key: Single Diffusion Tube site

Figure D. 7 Felixstowe Map 7

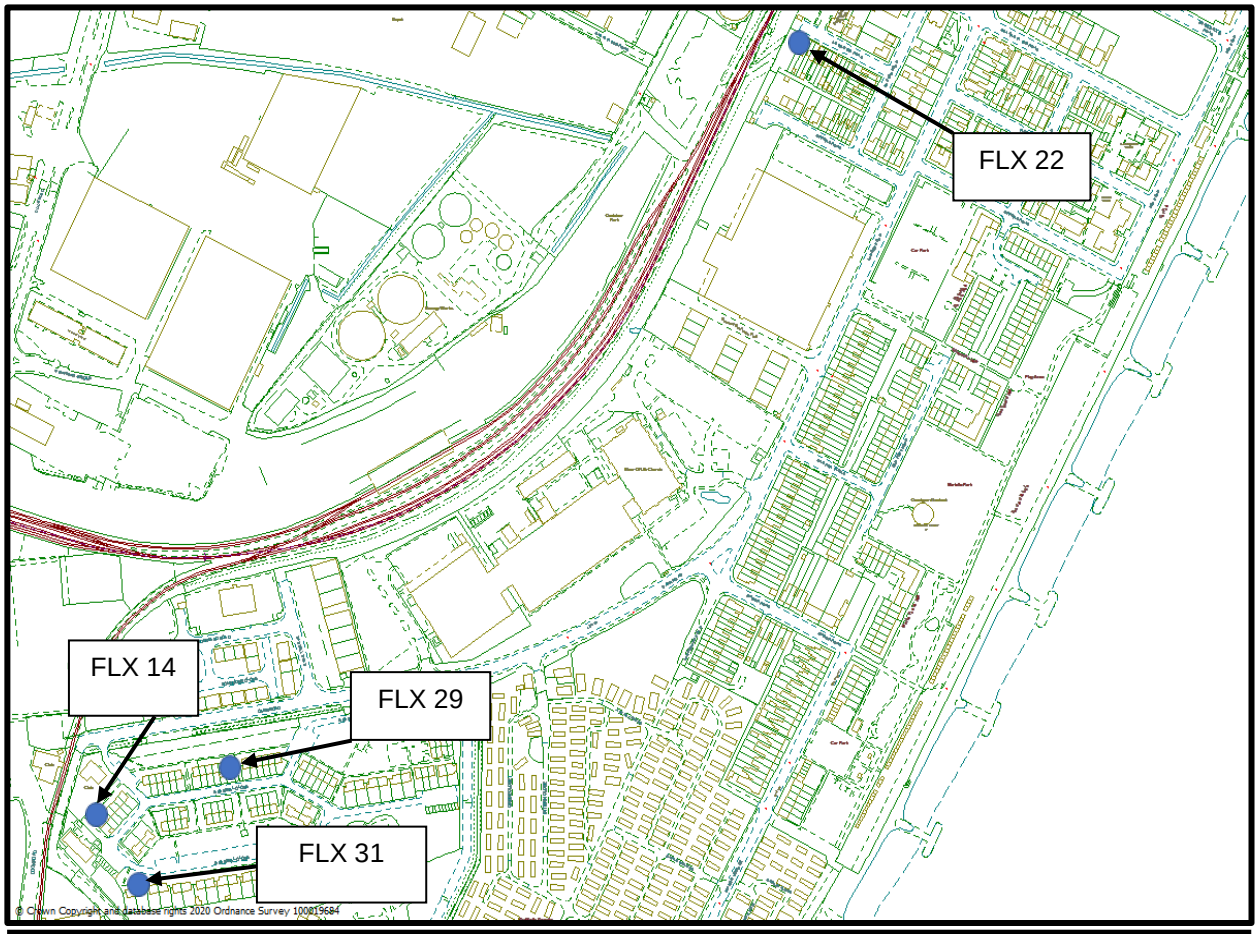


Figure D. 8 Felixstowe Map 8

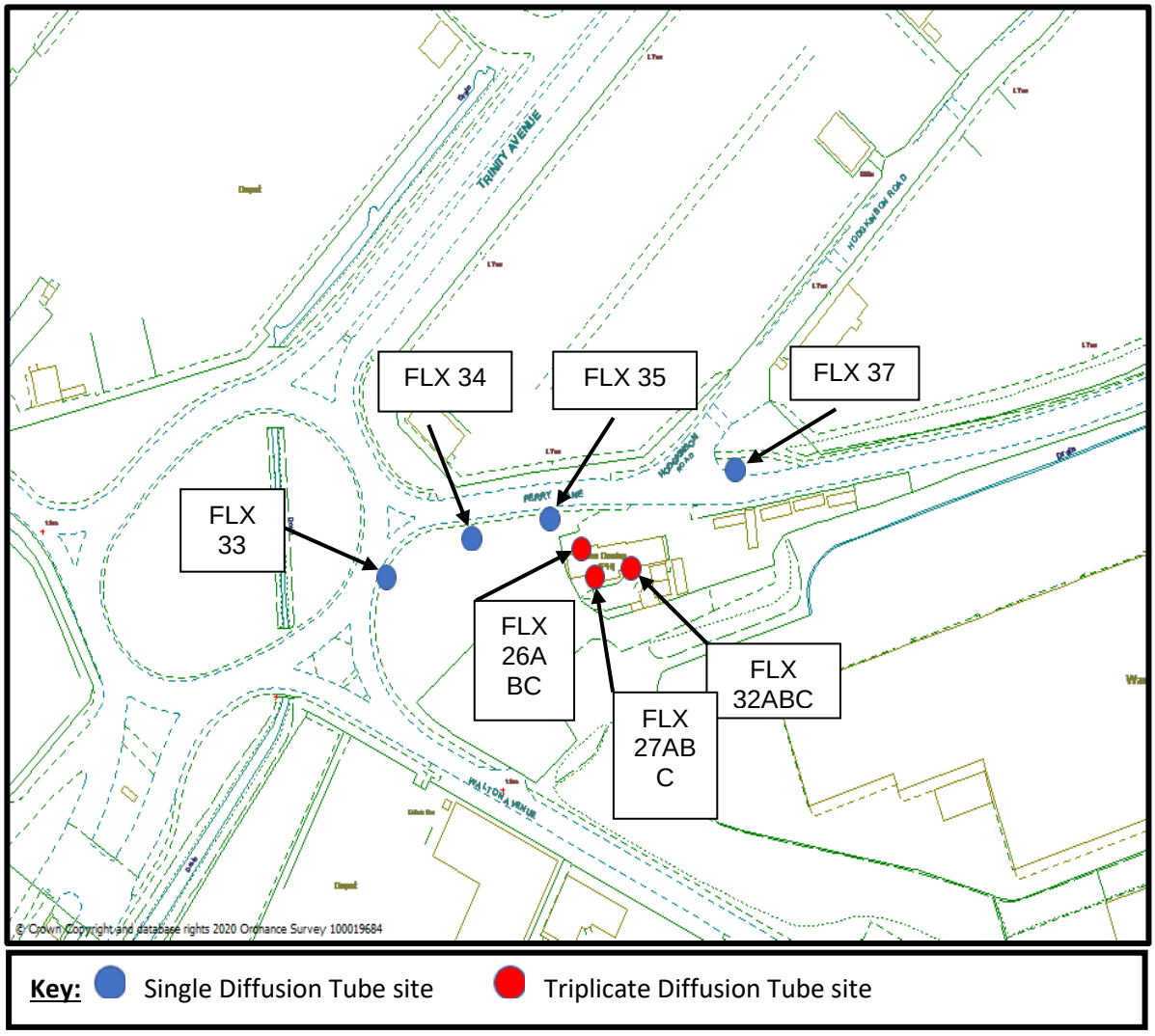


Figure D. 9 Beccles Map 1

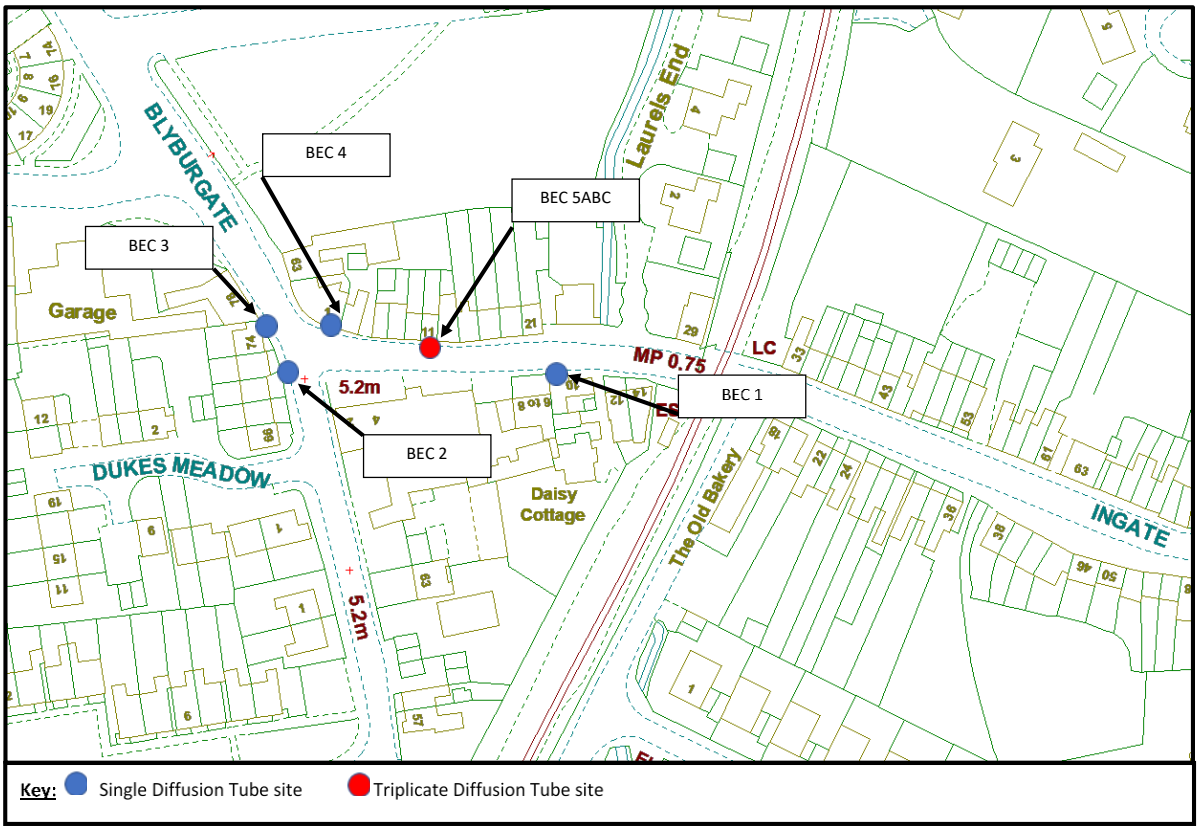


Figure D. 10 Beccles Map 2

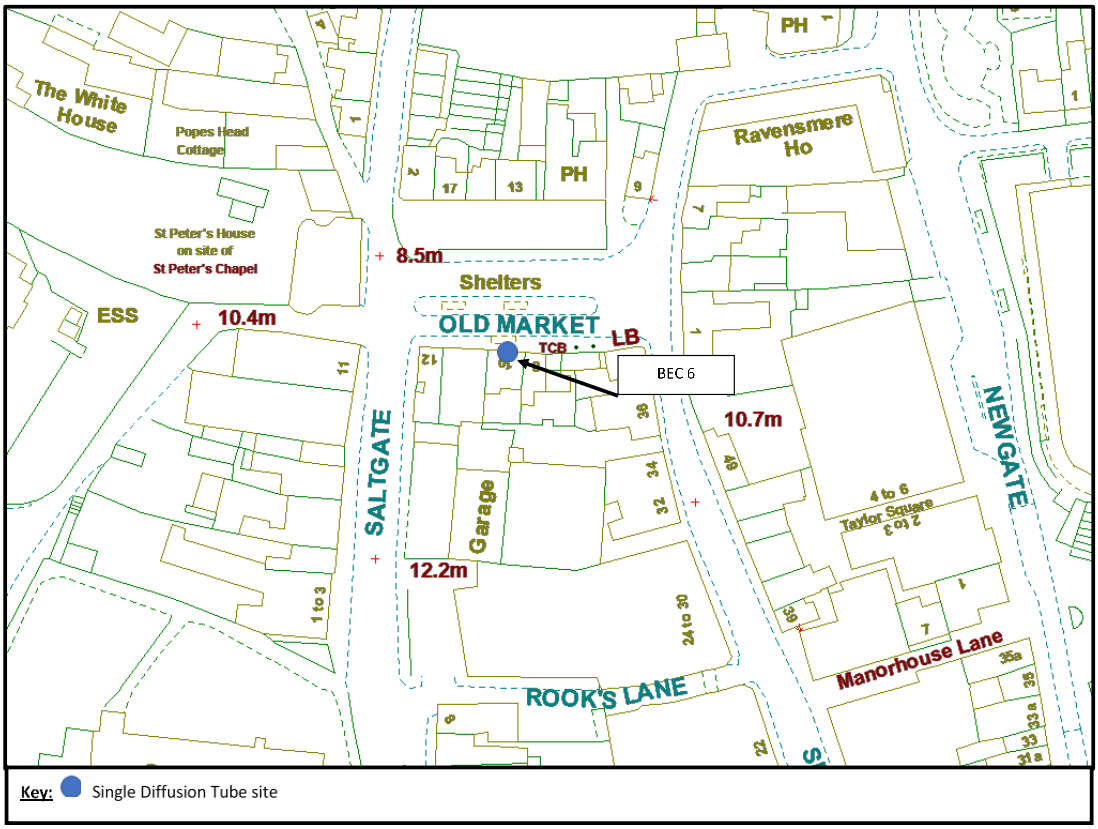


Figure D. 11 Blythburgh Map

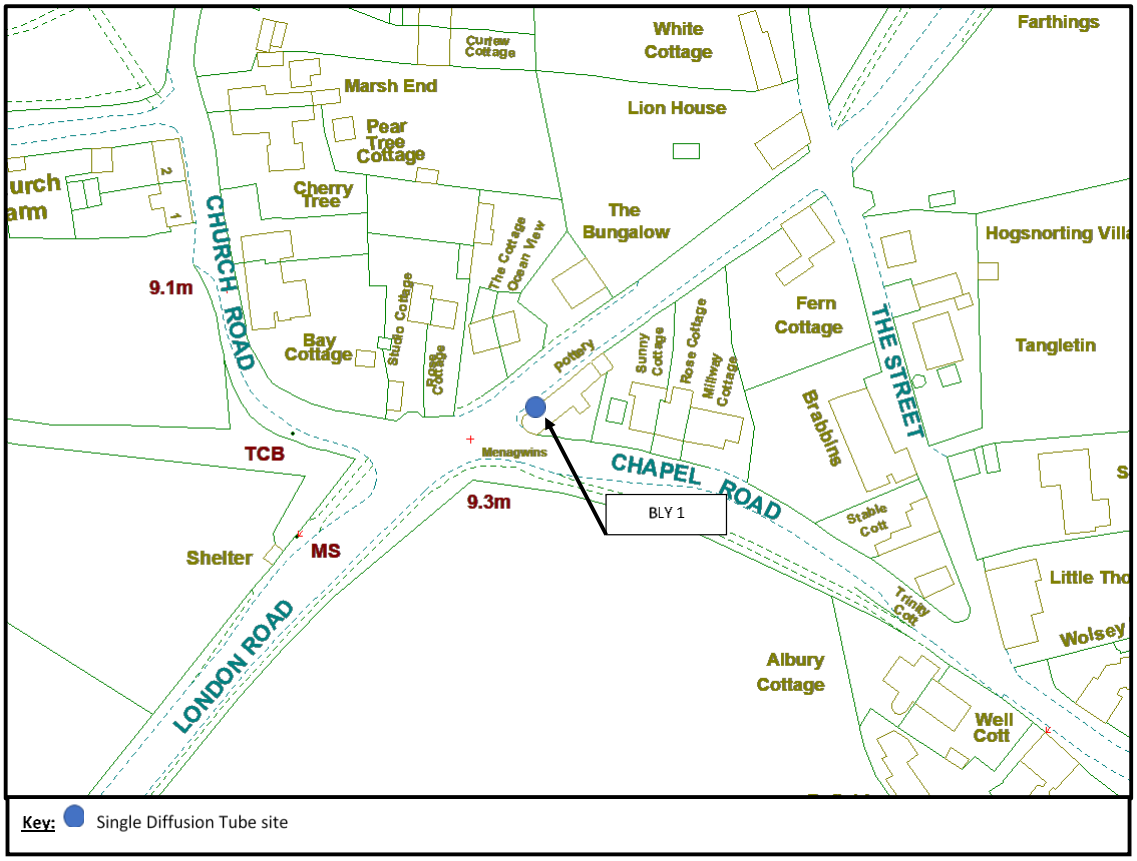


Figure D. 12 Bungay Map

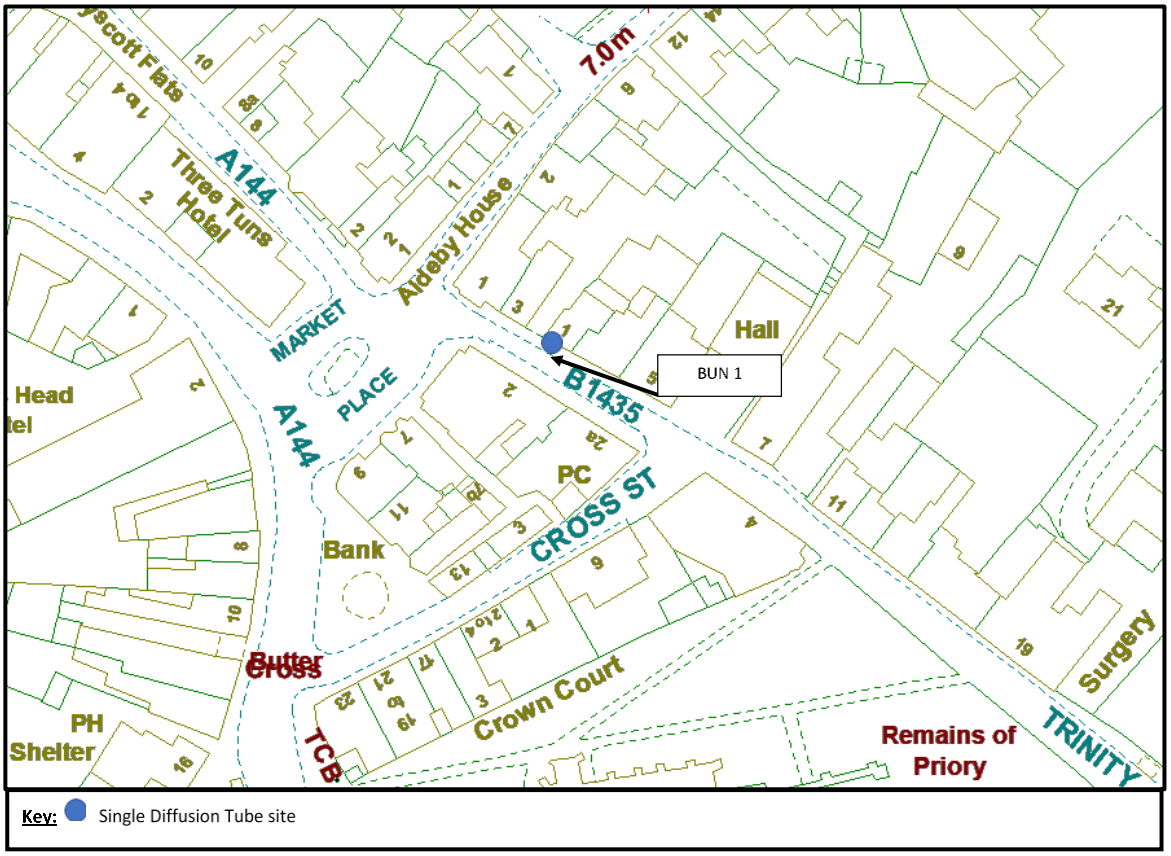


Figure D. 13 Kesgrave Map

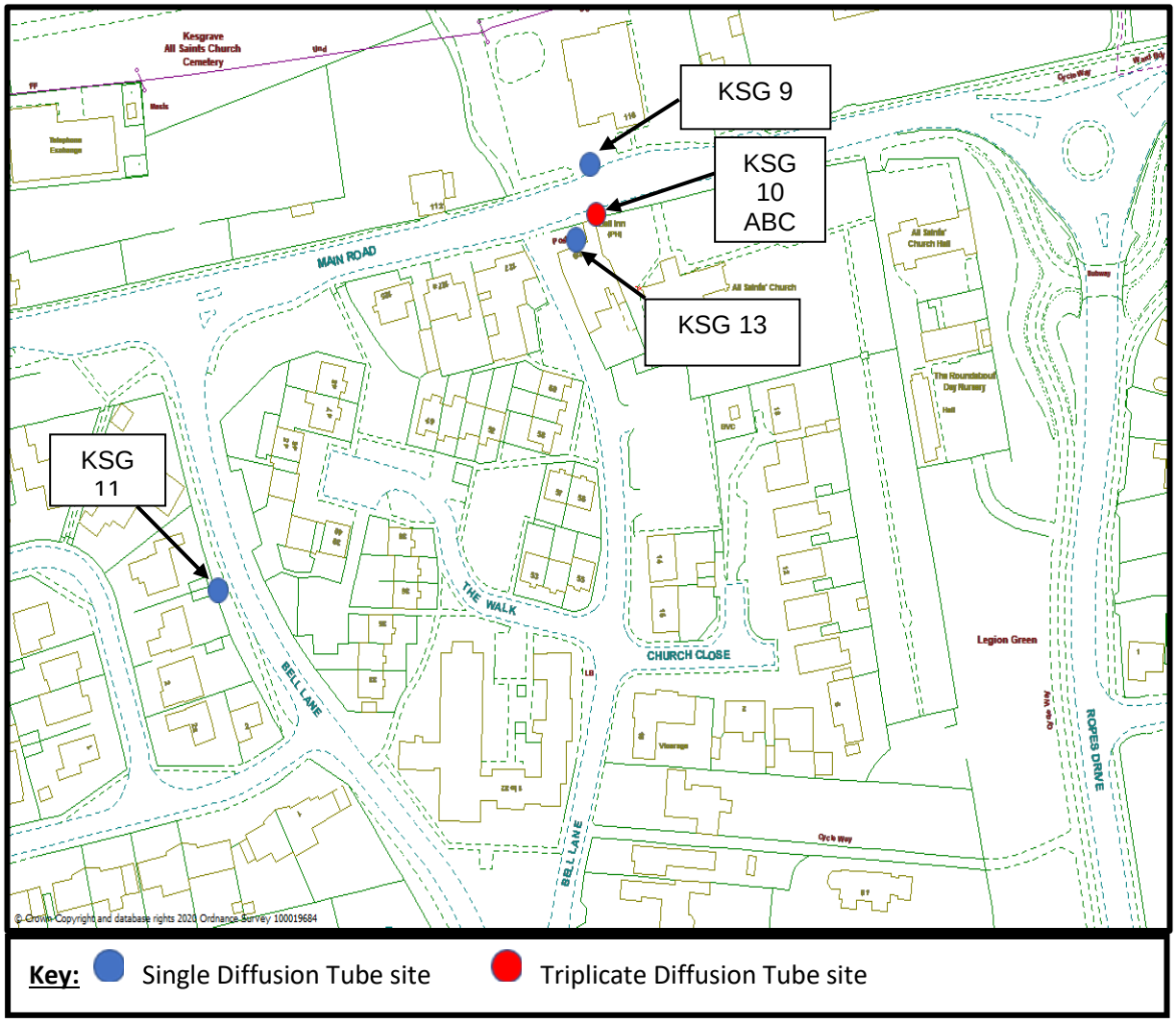


Figure D. 14 Leiston Map

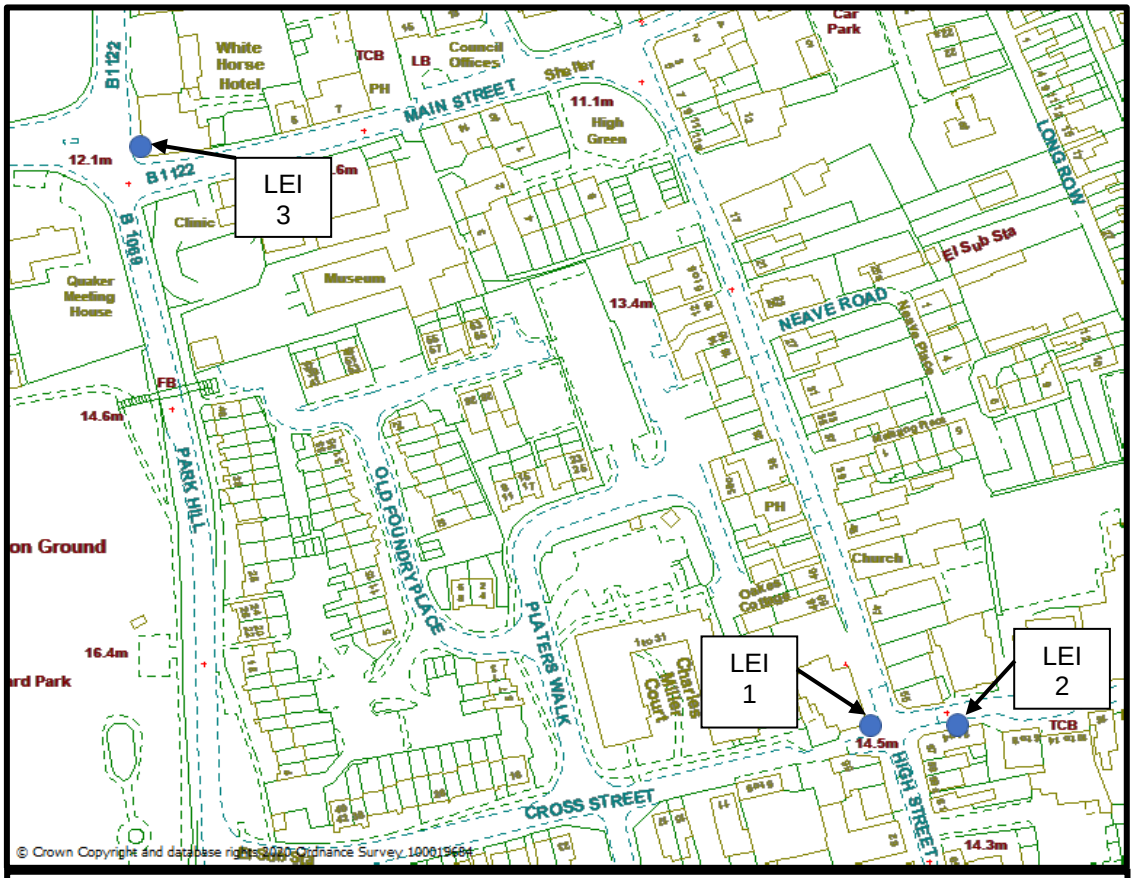


Figure D. 15 Little Glemham Map

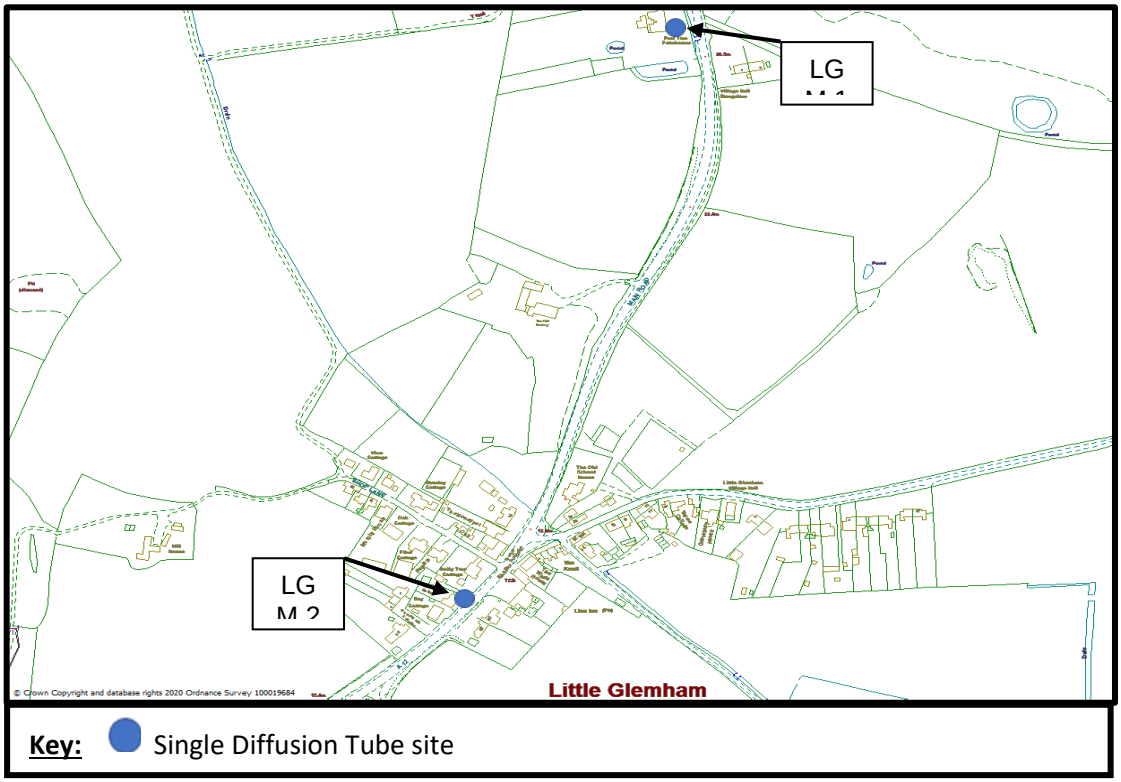


Figure D. 16 Lowestoft Map 1

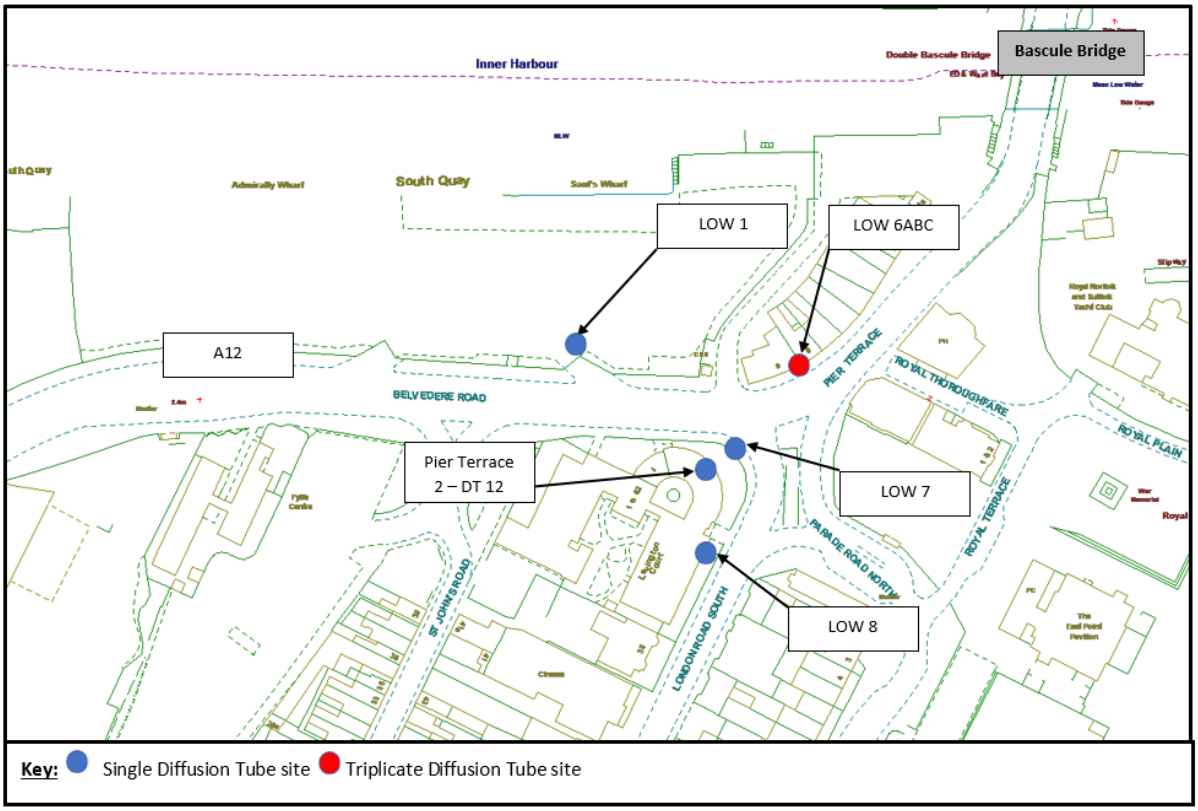


Figure D. 17 Lowestoft Map 2

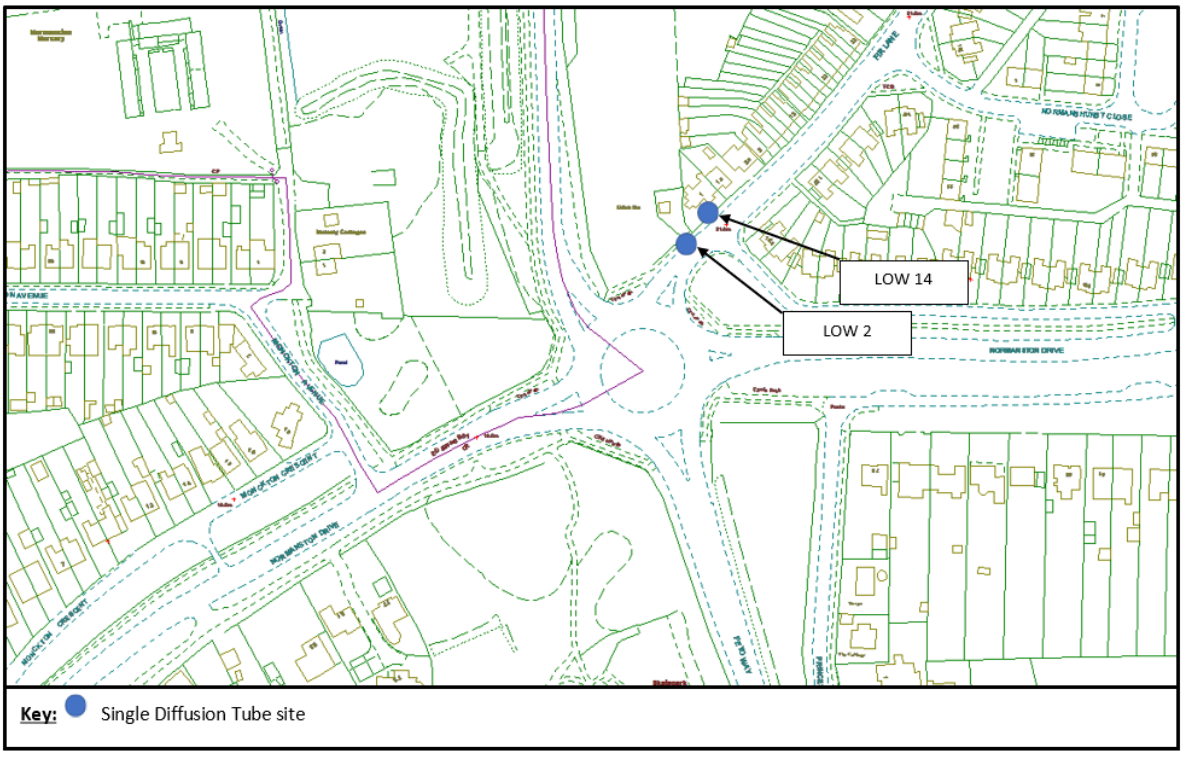


Figure D. 18 Lowestoft Map 3

Figure D. 19 Lowestoft Map 4

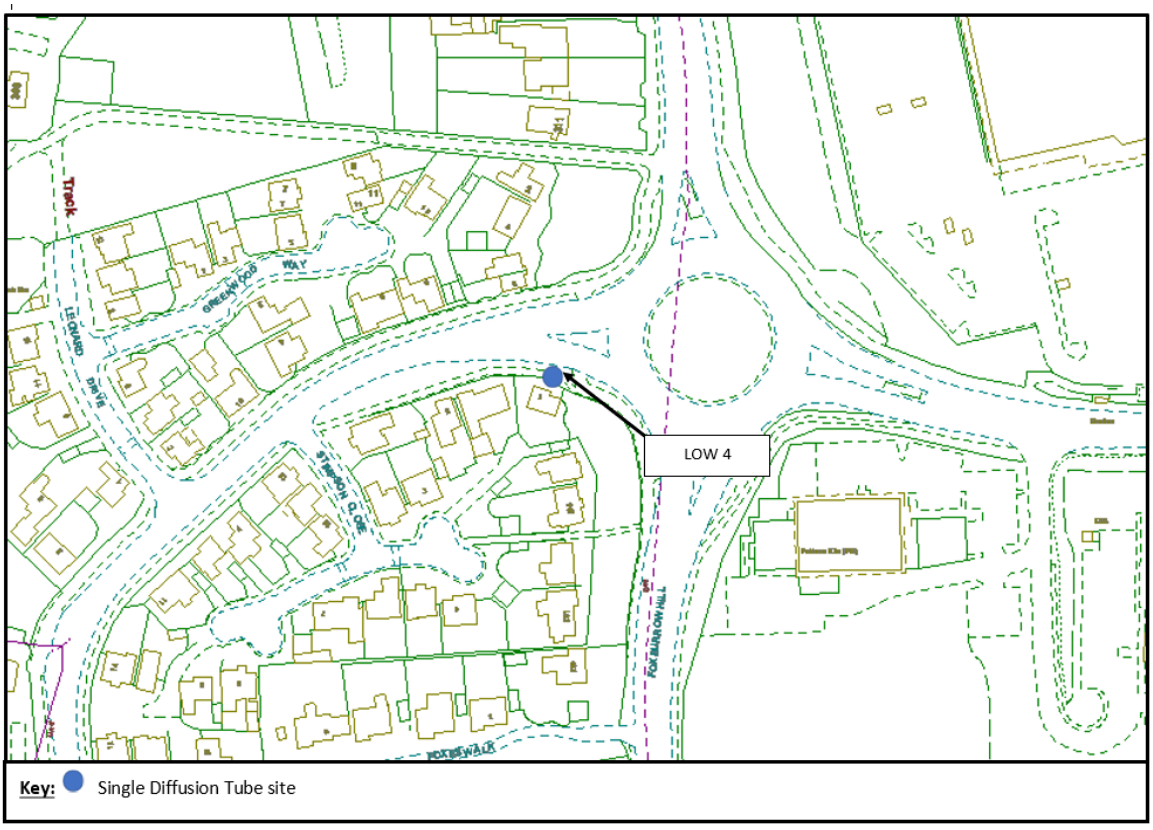


Figure D. 20 Lowestoft Map 5

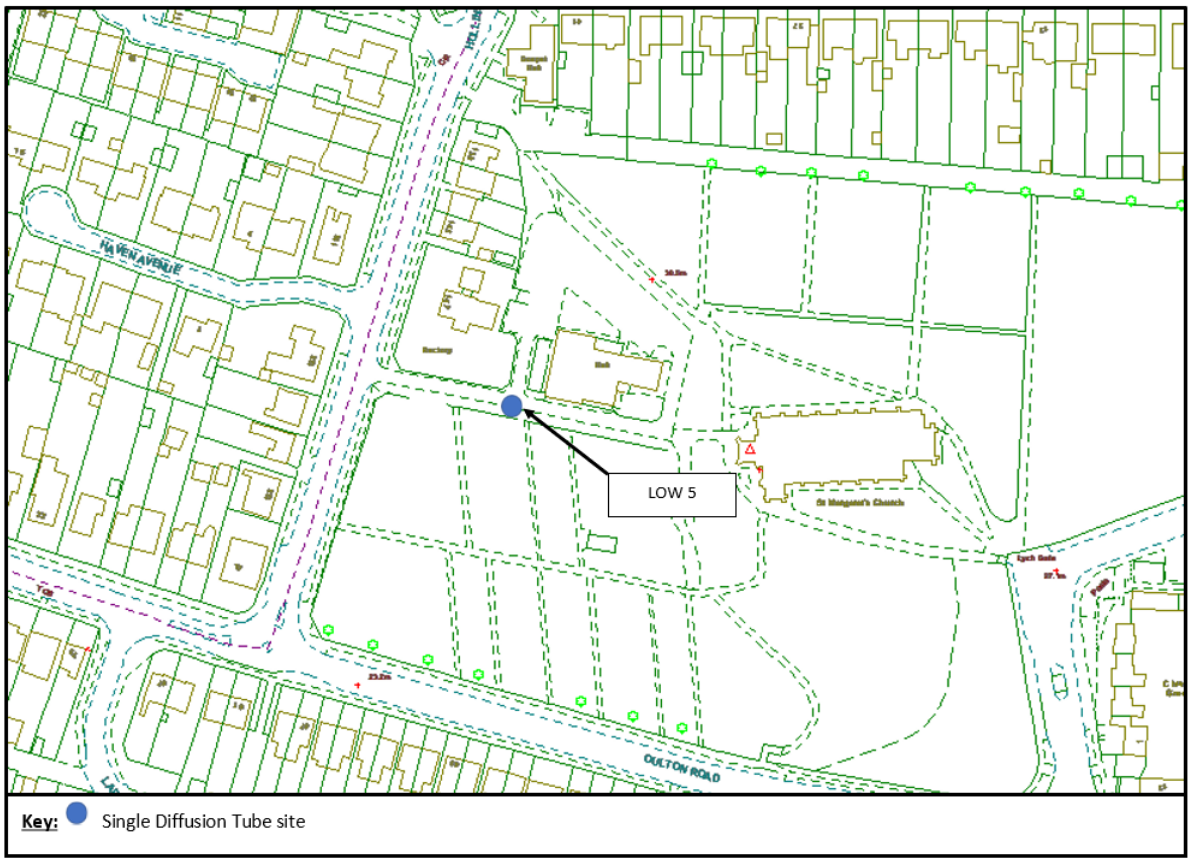


Figure D. 21 Lowestoft Map 6

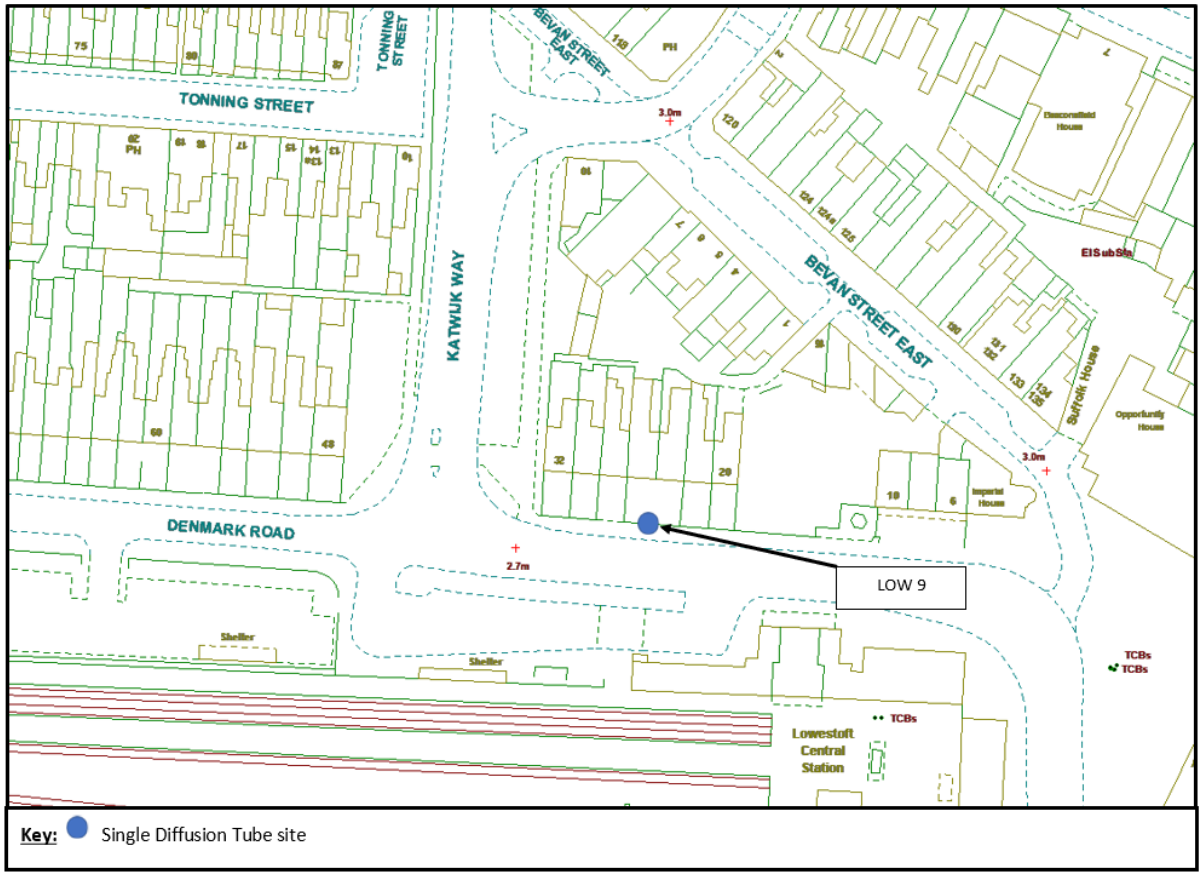


Figure D. 22 Lowestoft Map 7

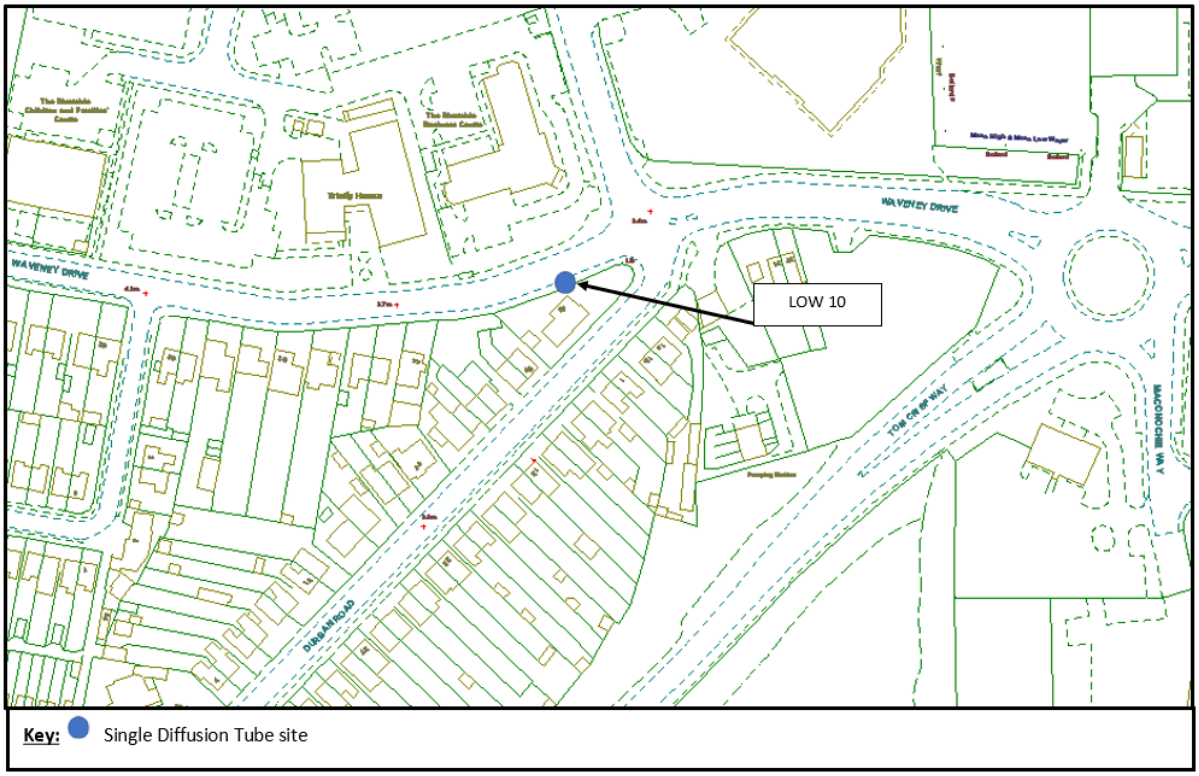


Figure D. 23 Lowestoft Map 8

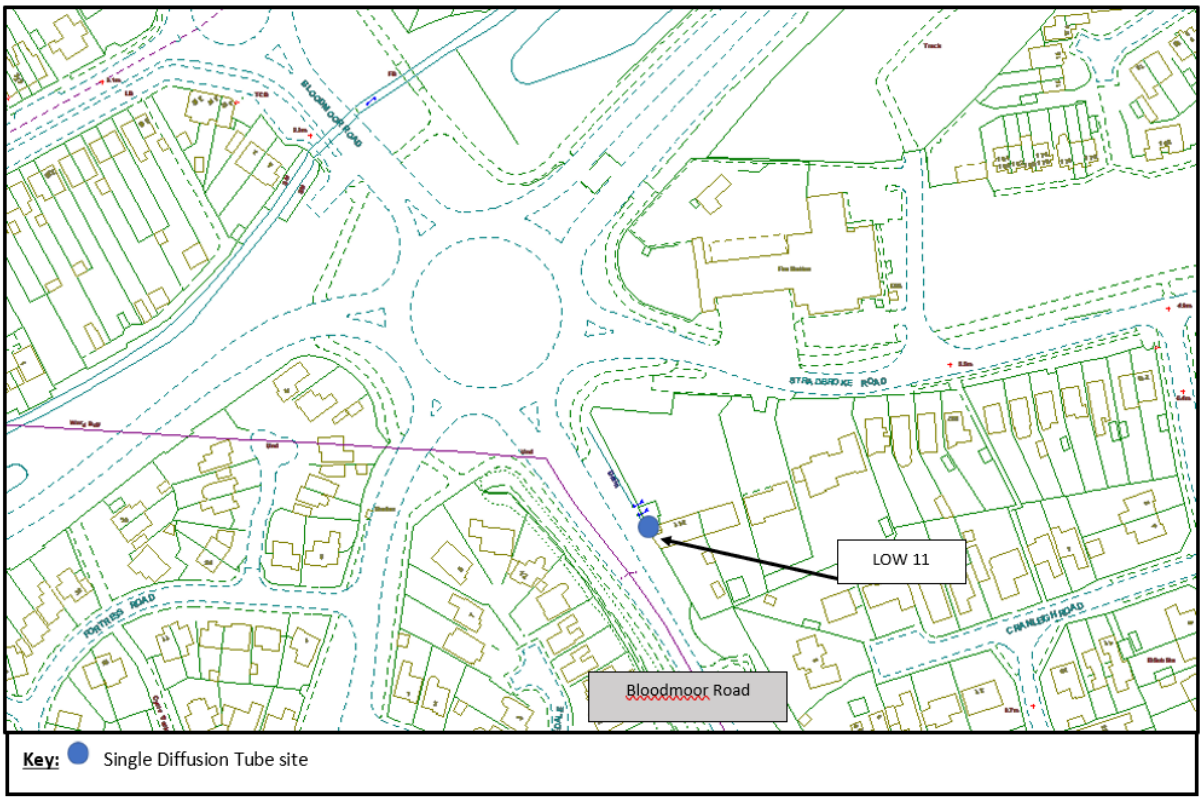


Figure D. 24 Martlesham Map 1

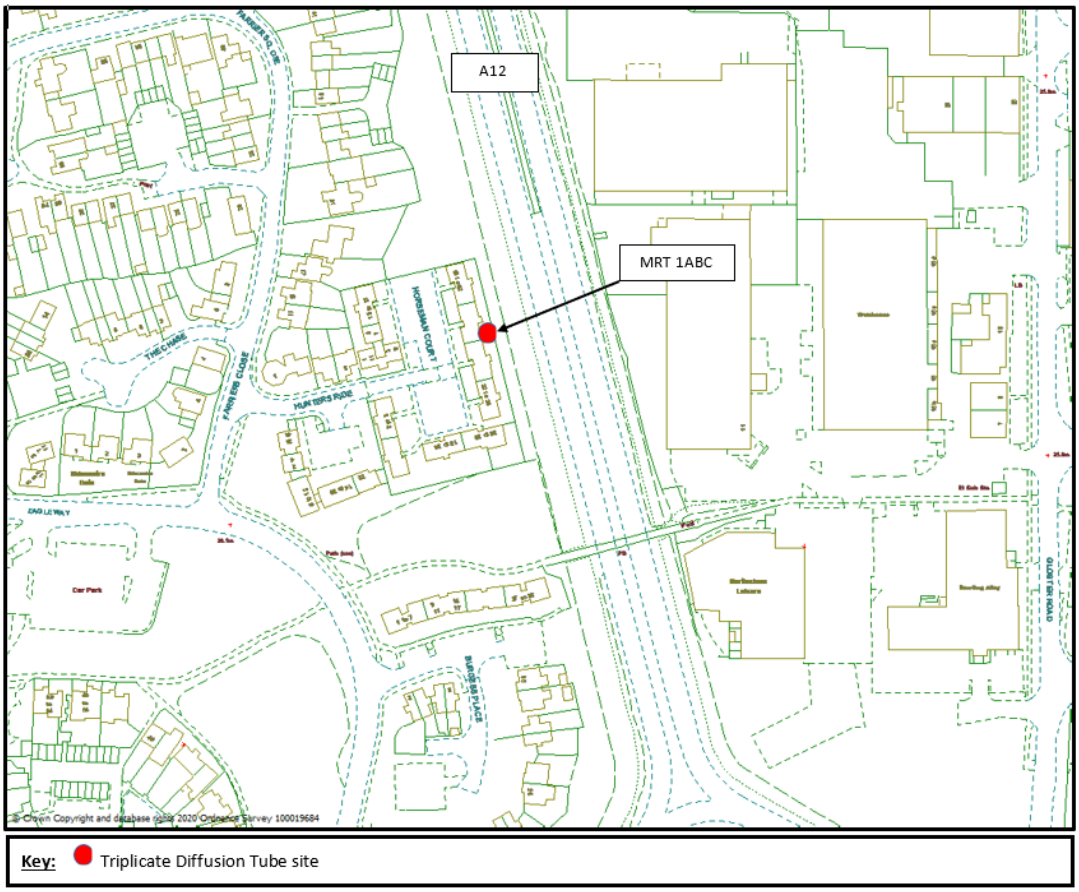


Figure D. 25 Martlesham Map 2

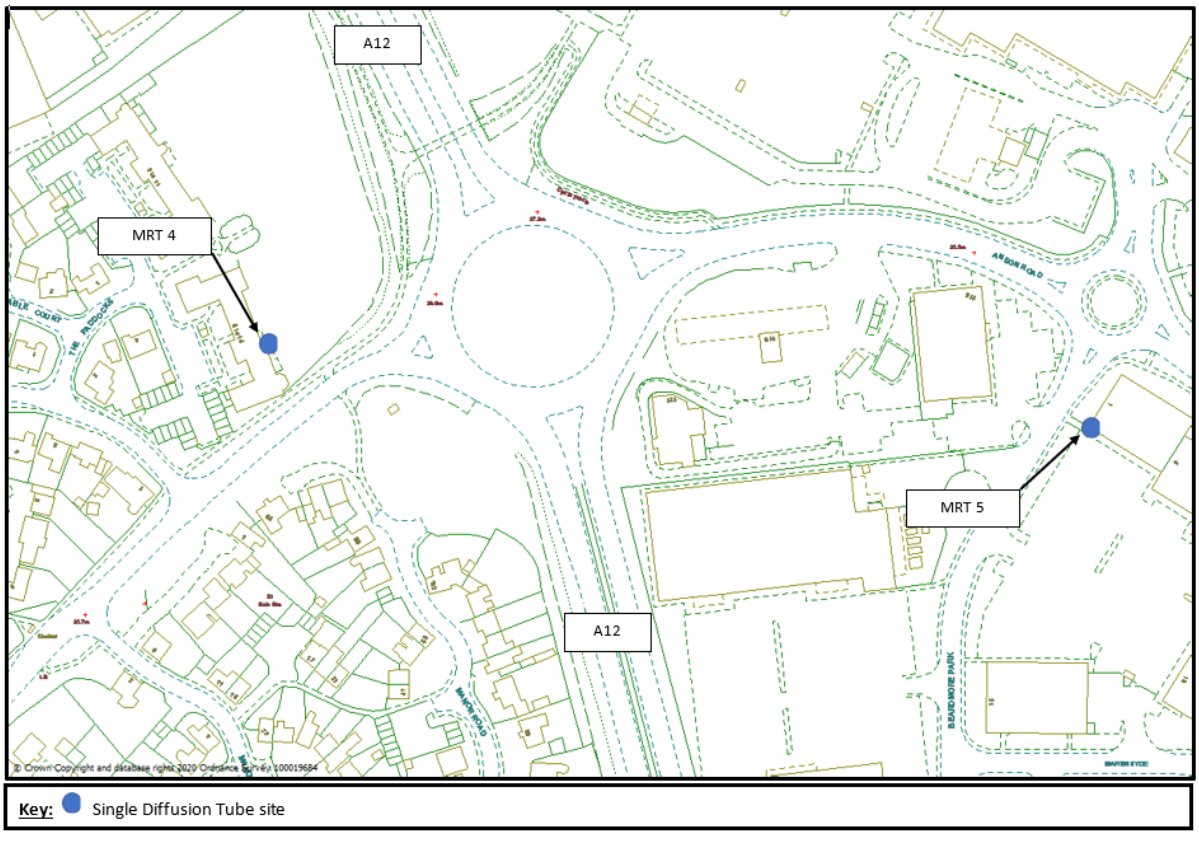


Figure D. 26 Melton Map

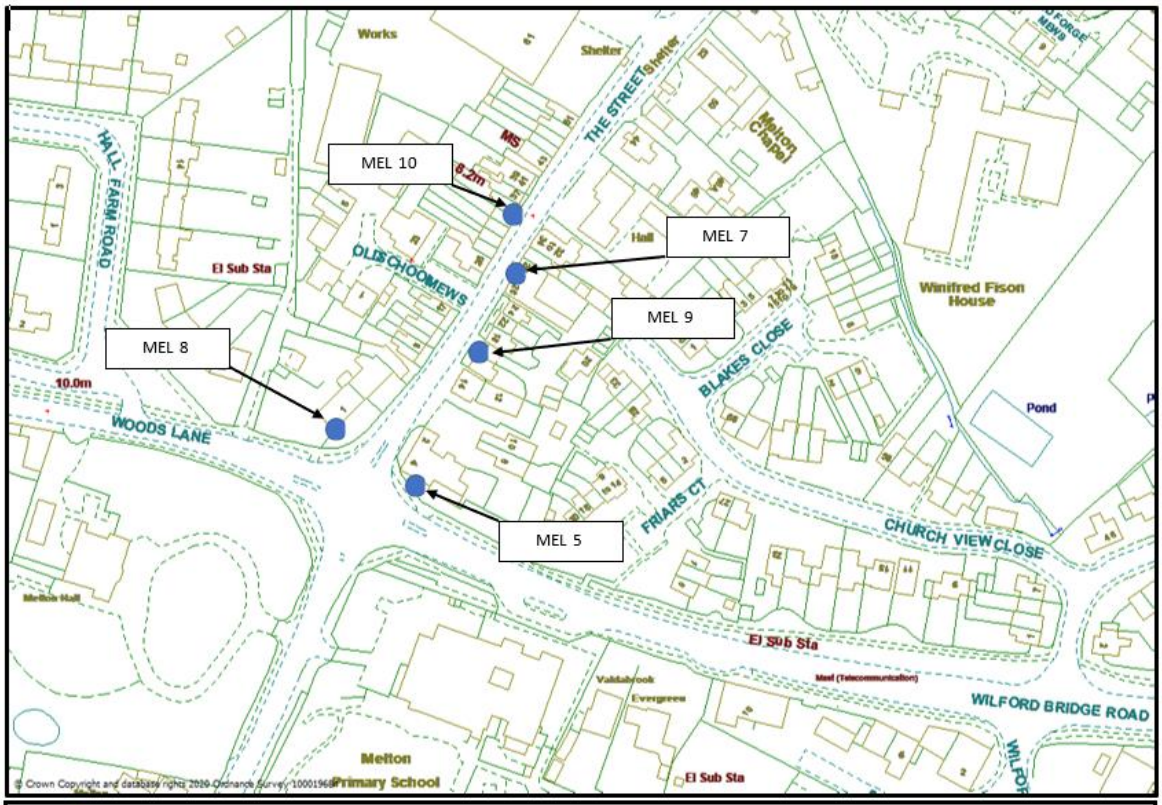


Figure D. 27 Oulton Broad Map 1

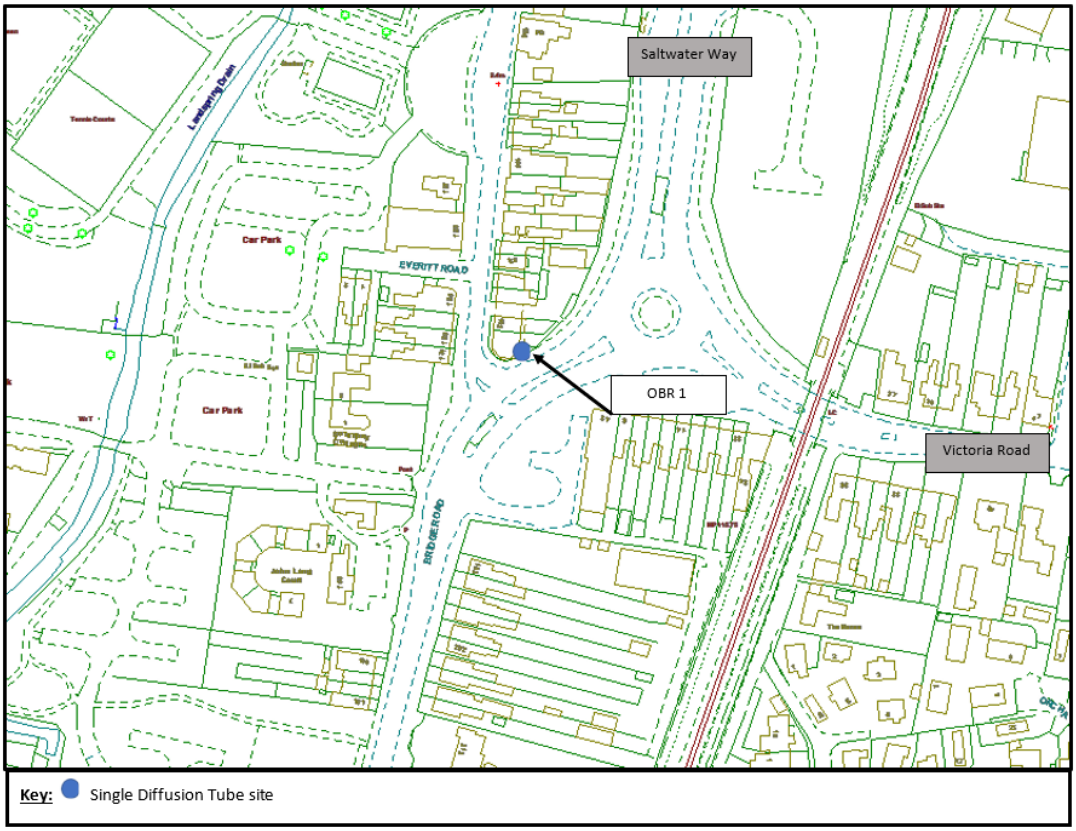


Figure D. 28 Oulton Broad Map 2

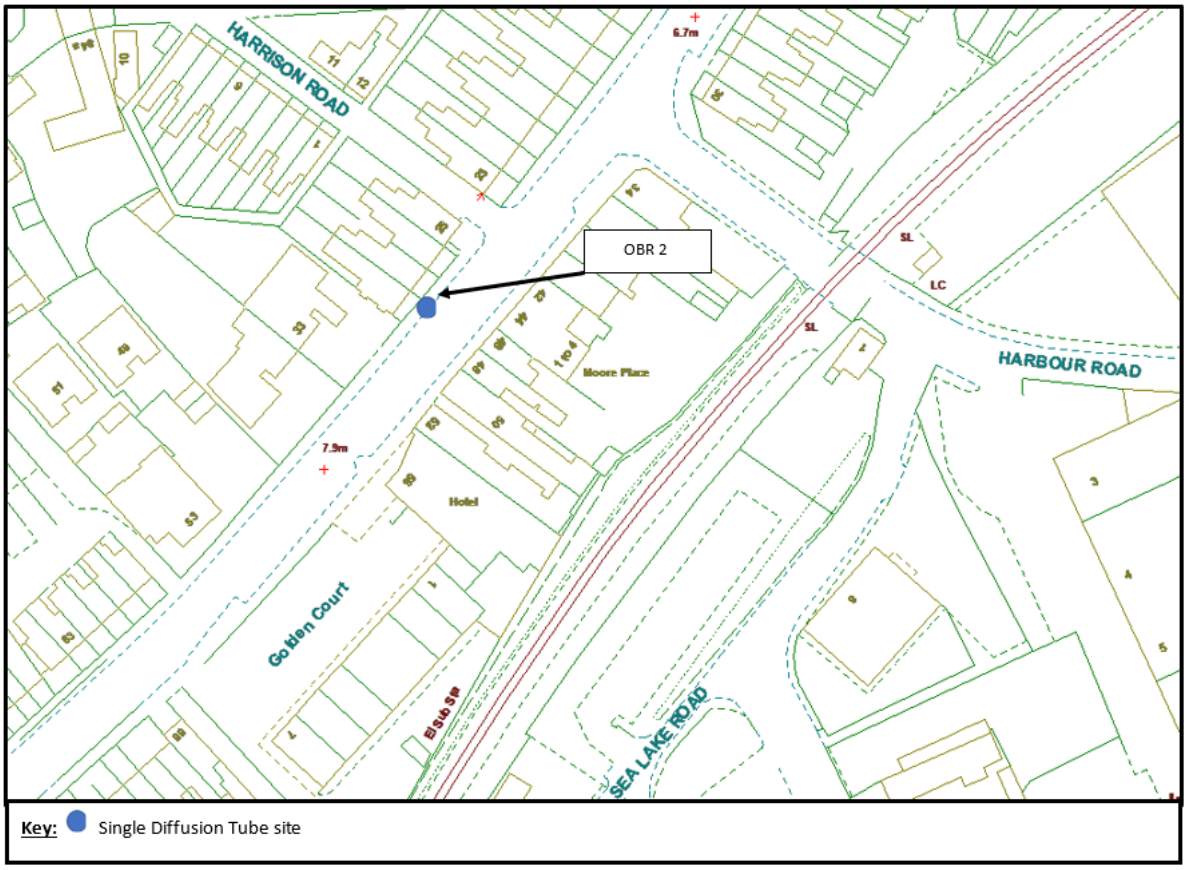


Figure D. 29 Oulton Broad Map 3

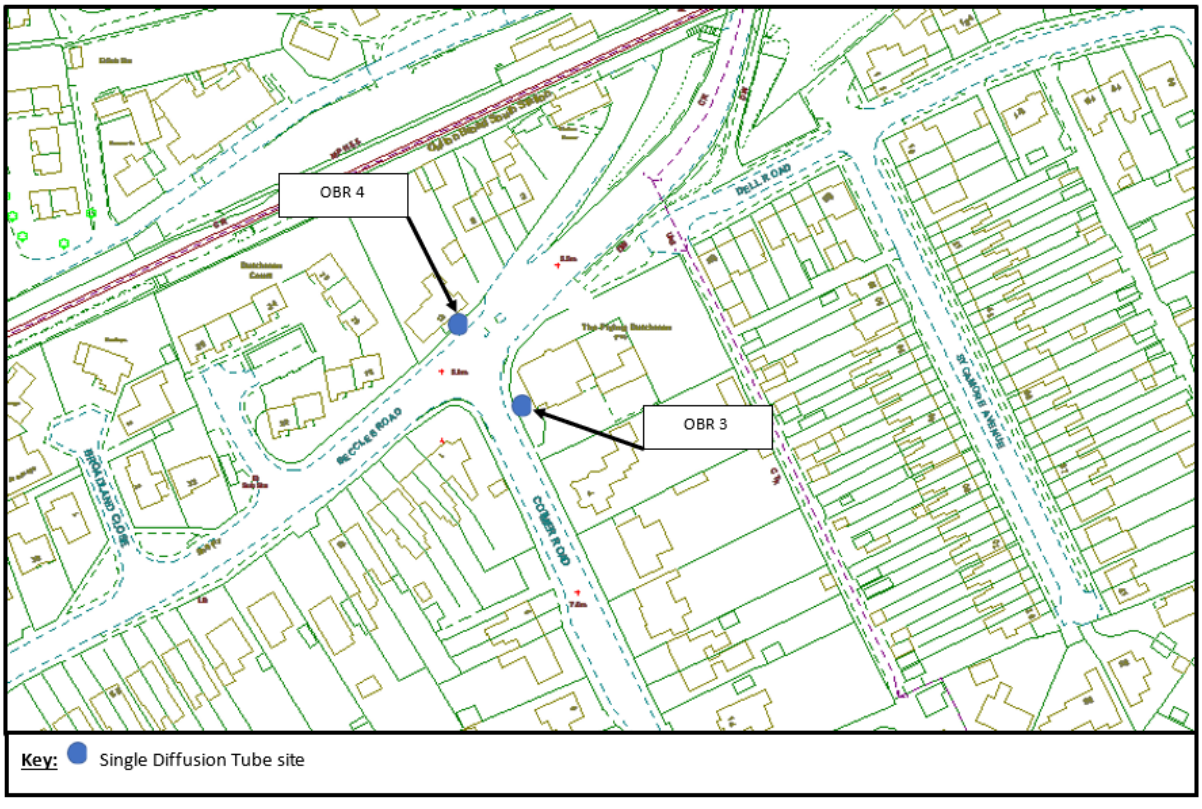


Figure D. 30 Oulton Broad Map 4

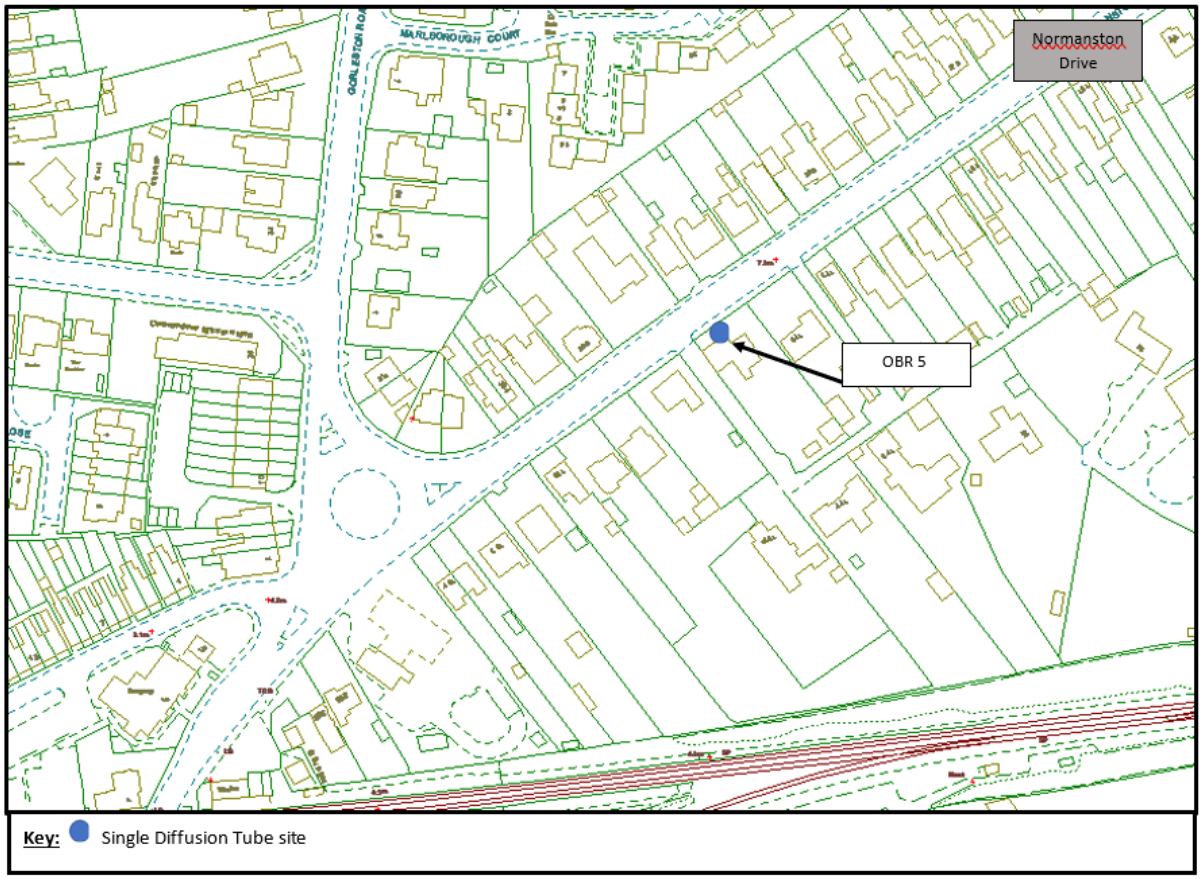


Figure D. 31 Saxmundham Map

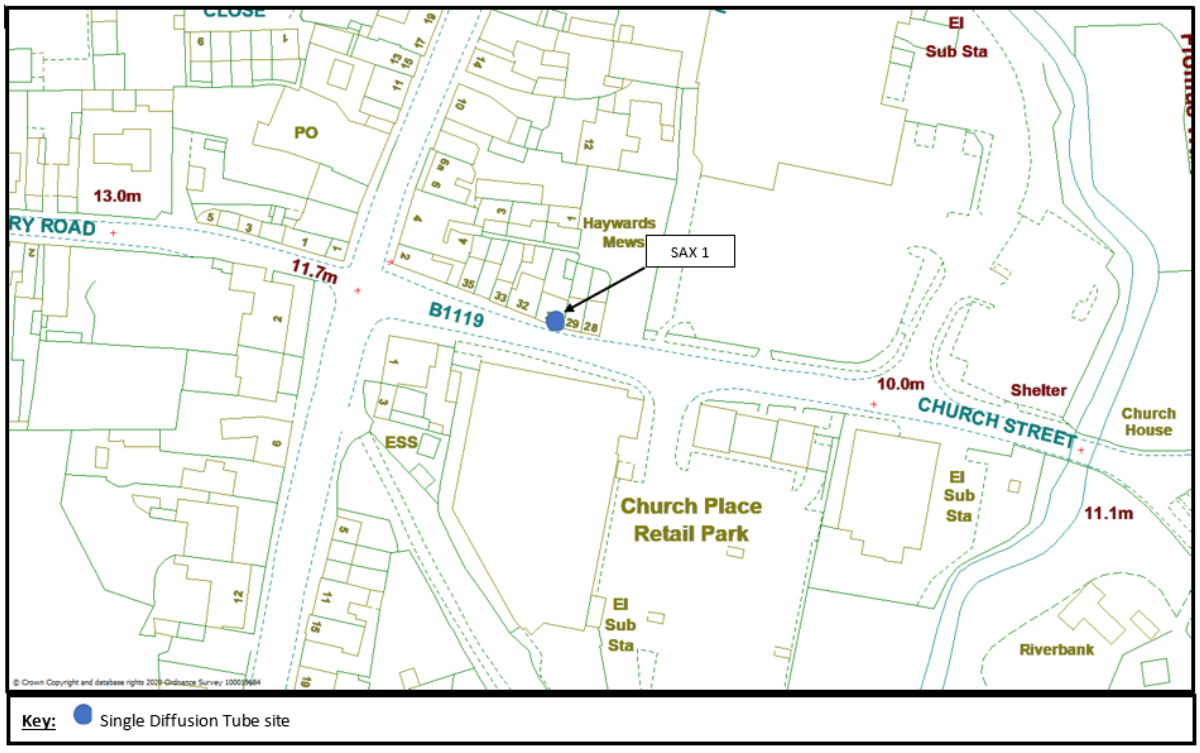


Figure D. 32 Stratford and Farnham Map

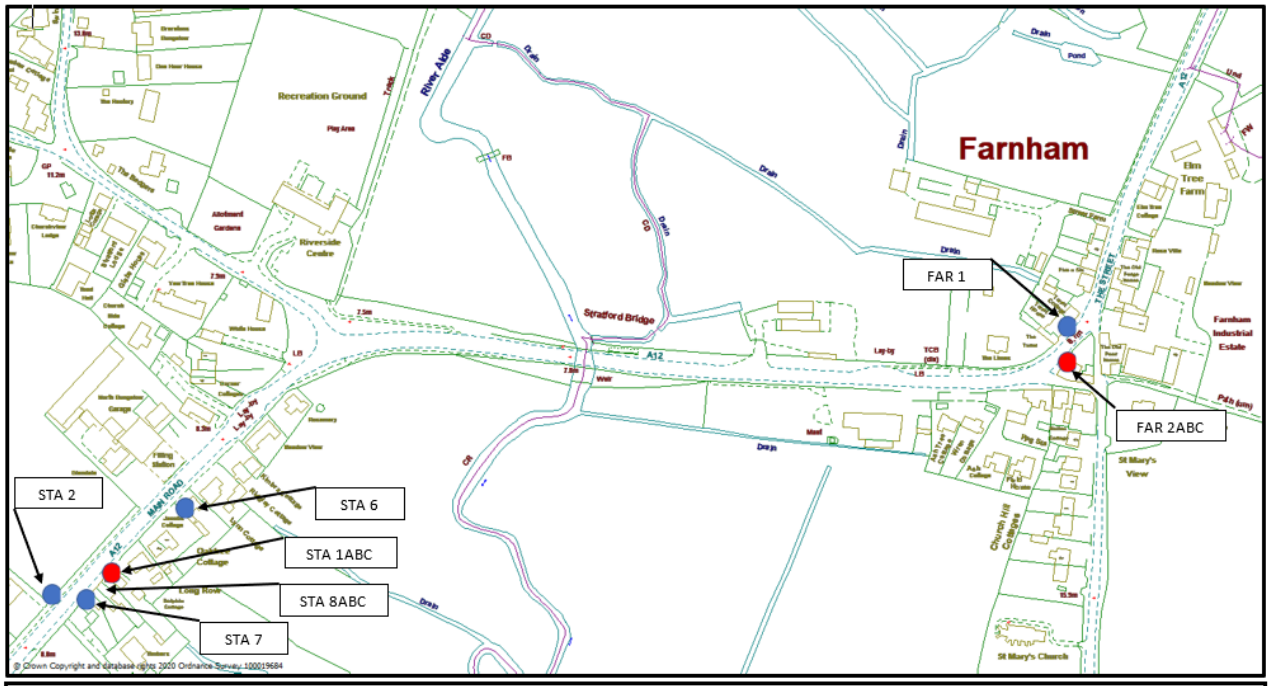


Figure D. 33 Trimley Map 1

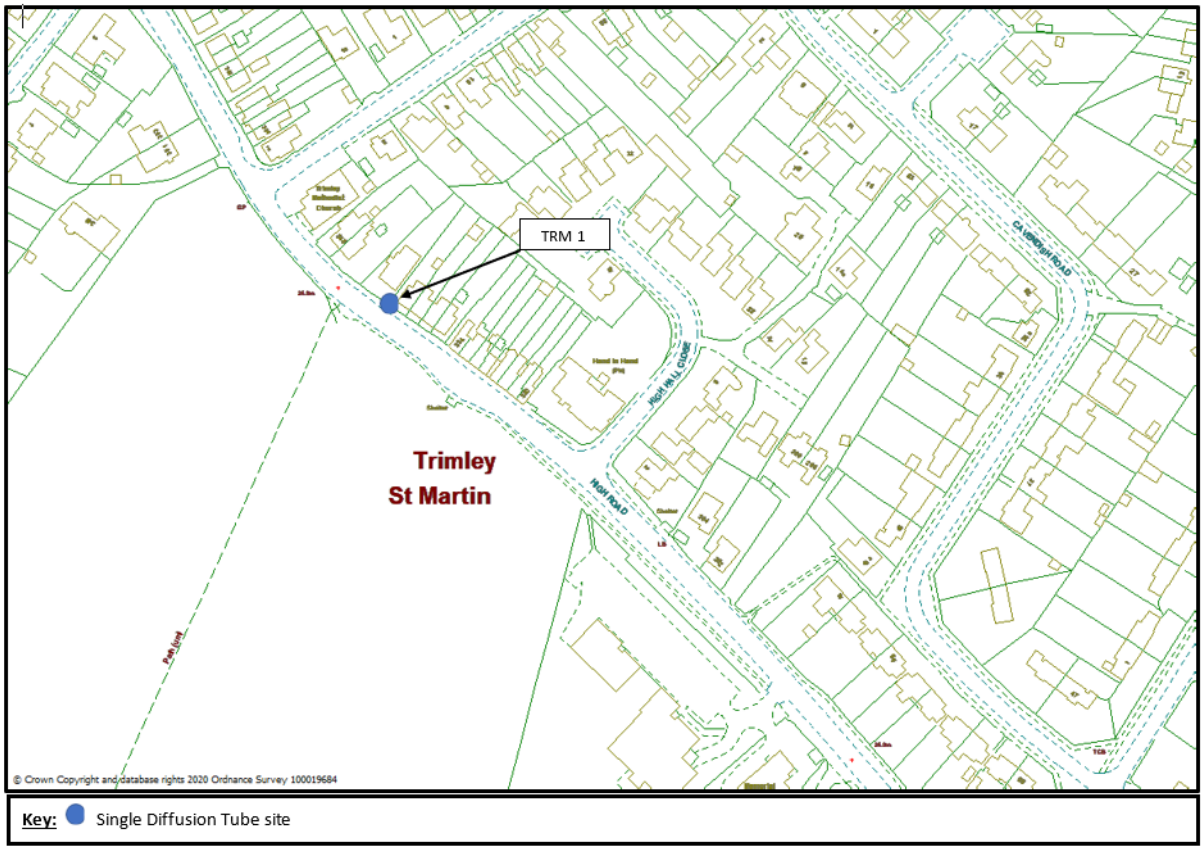


Figure D. 34 Trimley Map 2

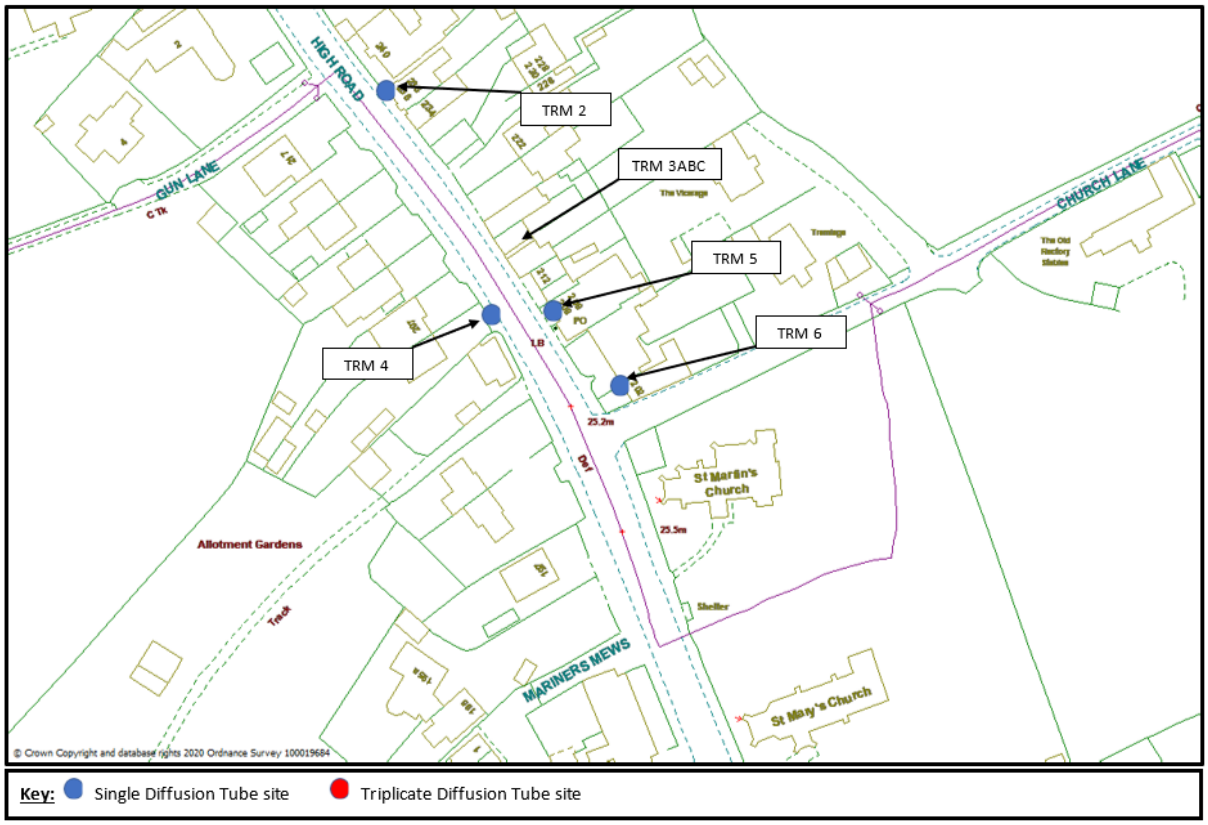


Figure D. 35 Trimley Map 3

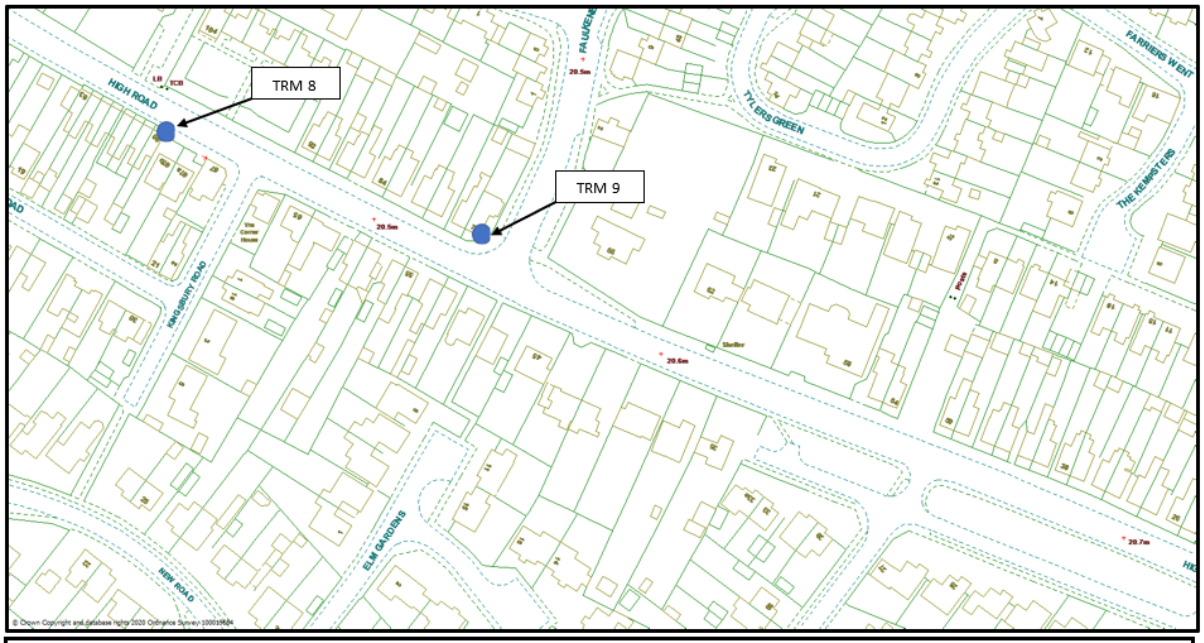


Figure D. 36 Trimley Map 4

Figure D. 37 Trimley Map 5

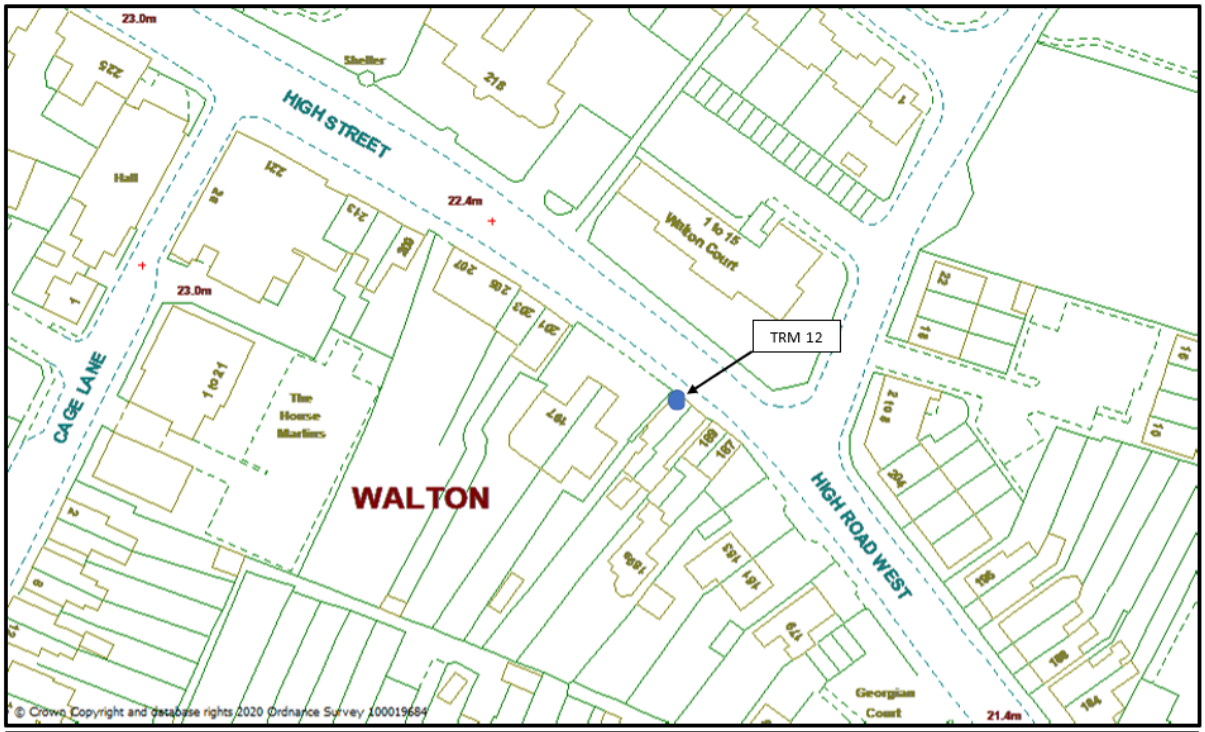


Figure D. 38 Woodbridge Map 1

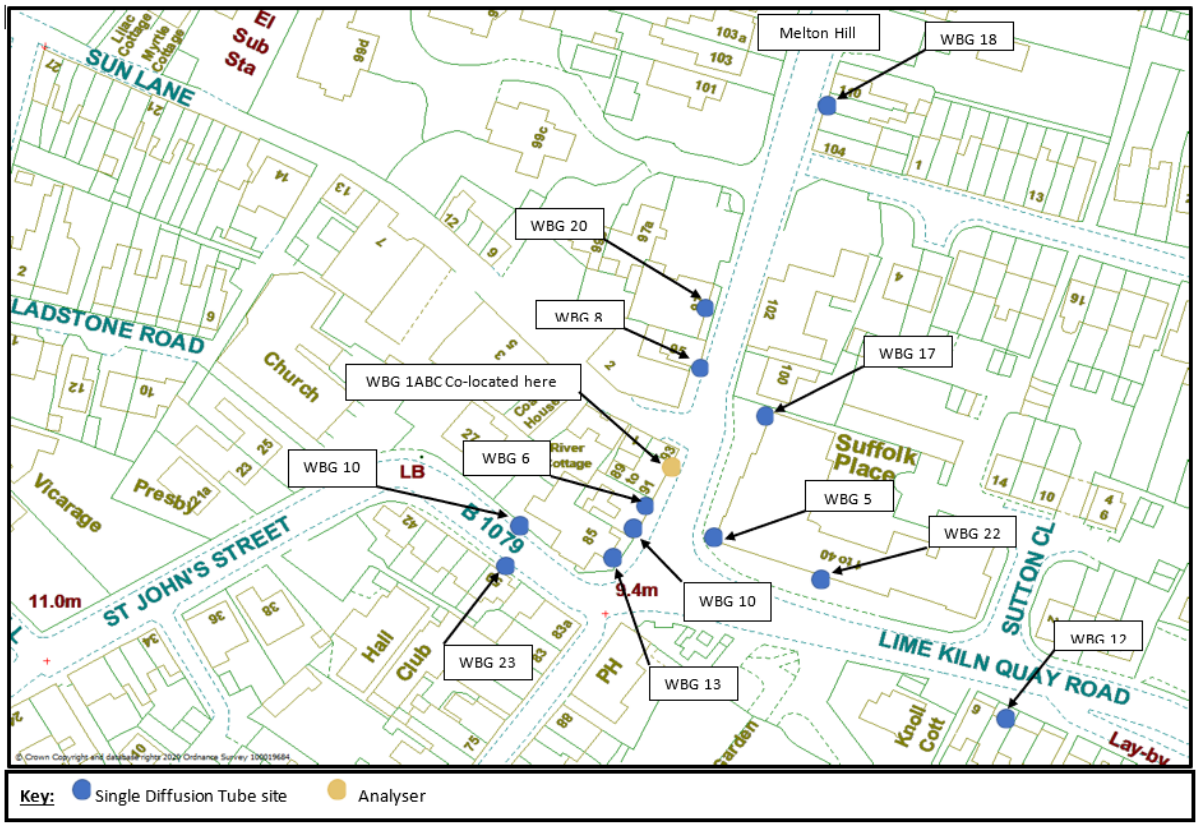


Figure D. 39 Woodbridge Map 2

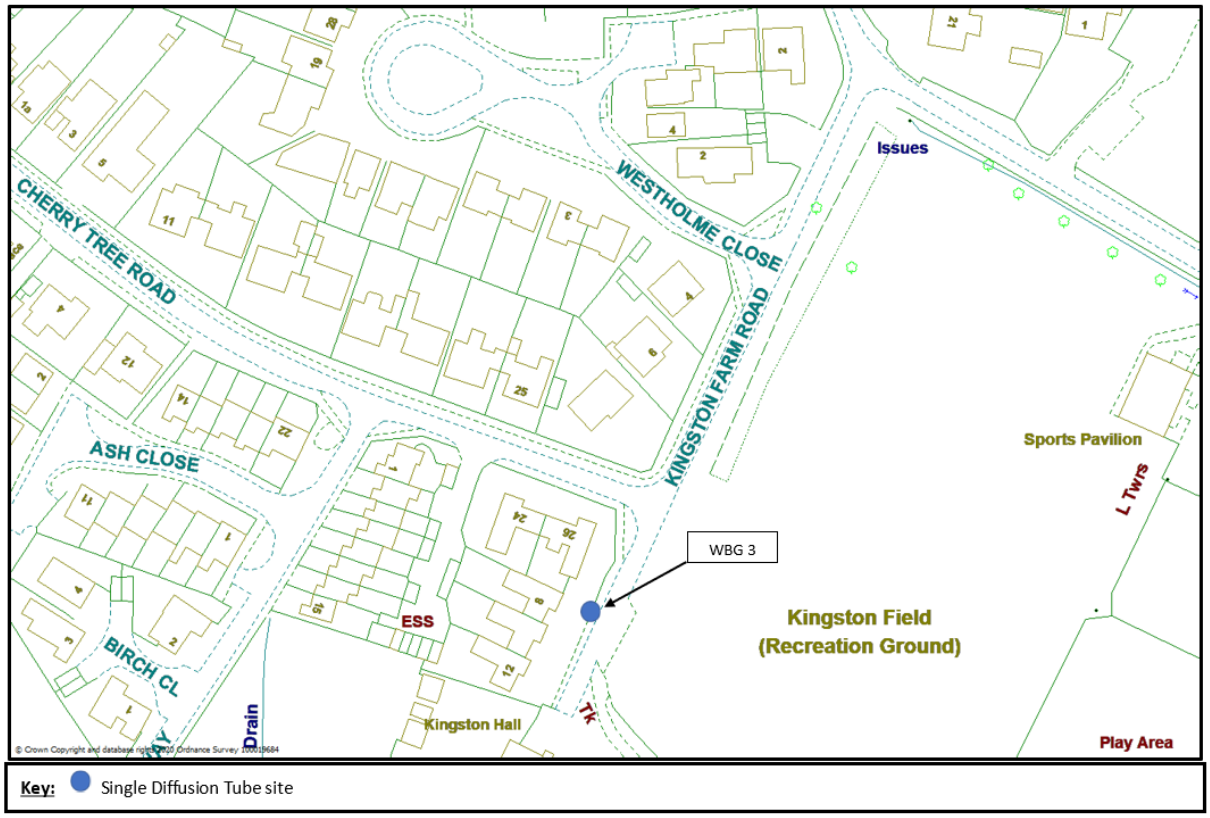


Figure D. 40 Wrentham Map 2

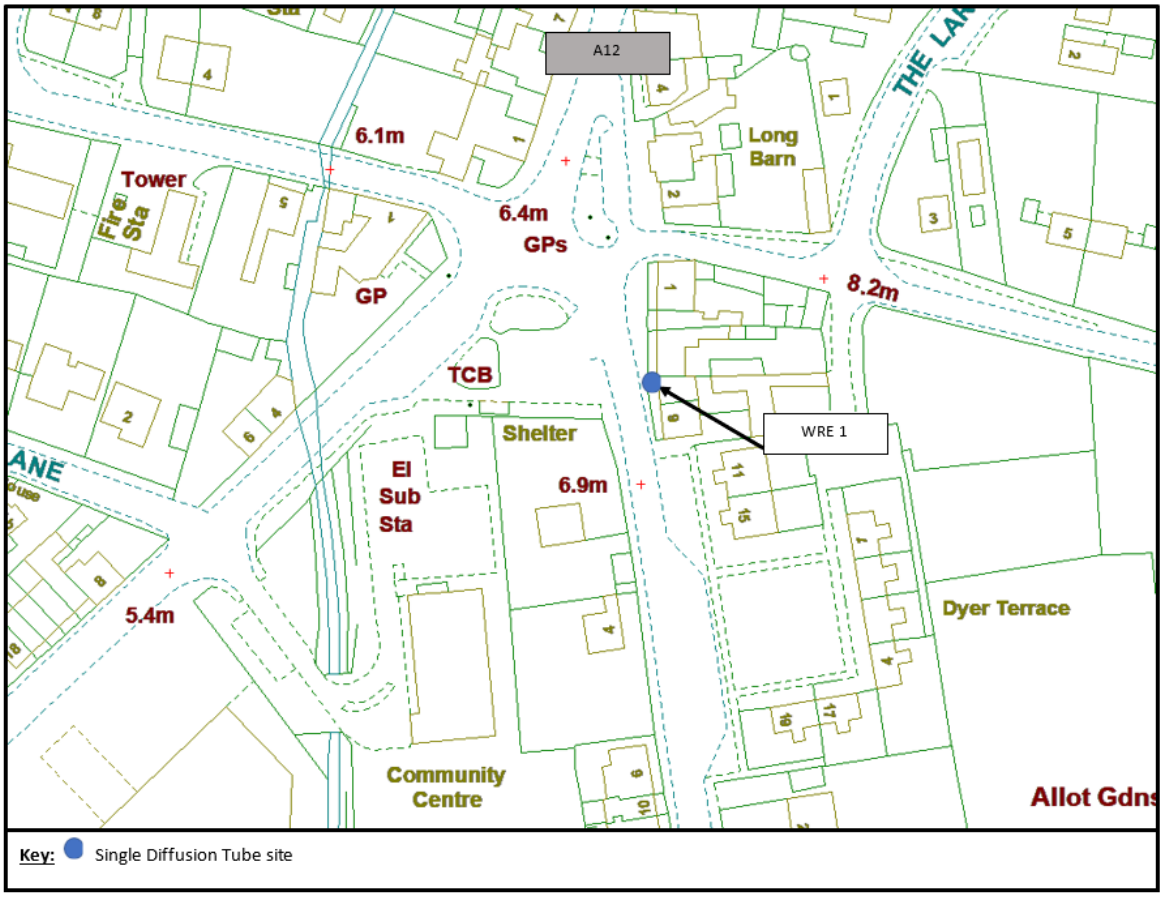


Figure D. 41 Woodbridge AQMA

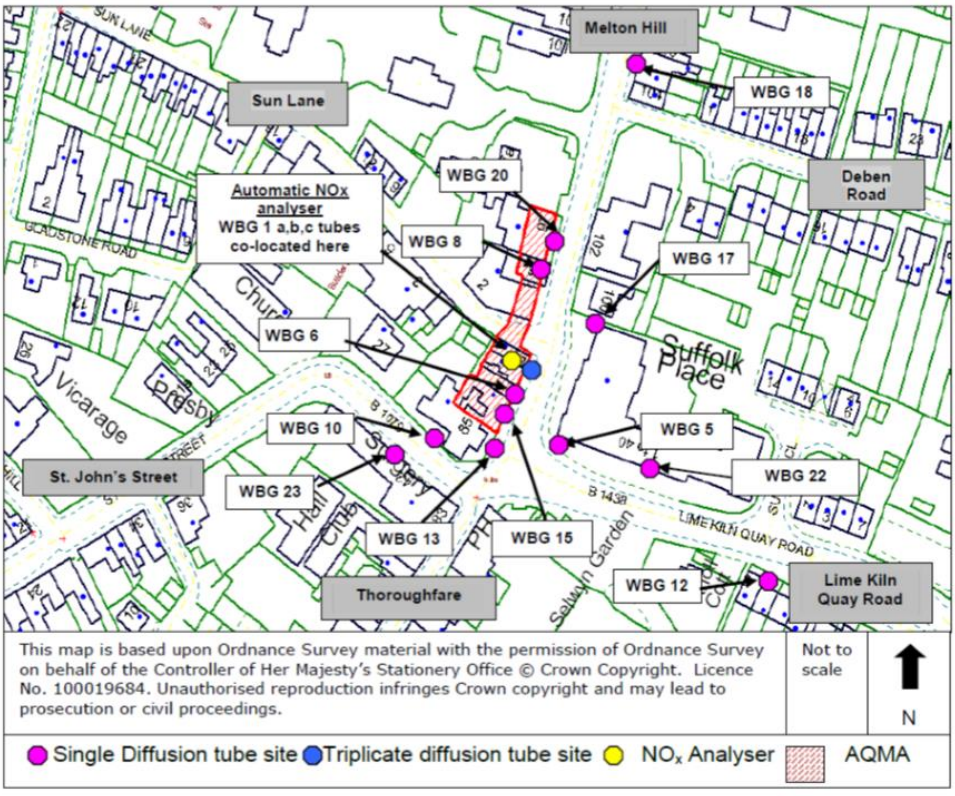
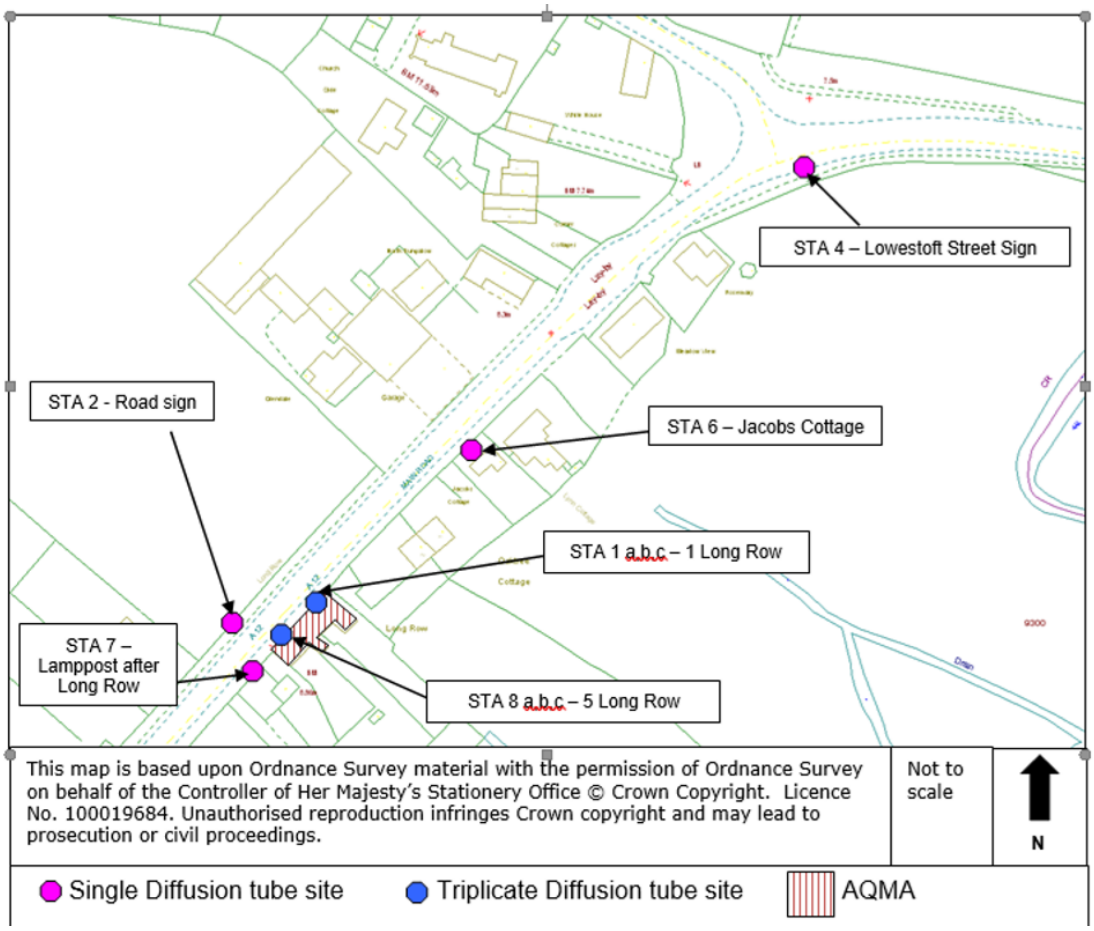


Figure D. 42 St Andrews AQMA



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England

Pollutant	Air Quality Objective[7]	
	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

[7] The units are in micrograms 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
AQO	Air Quality Objectives
ASR	Air quality Annual Status Report
AURN	Automatic Urban and Rural Network - UK's automatic monitoring network - the main network used for compliance reporting against the Ambient Air Quality Directives. It includes automatic air quality monitoring stations measuring oxides of nitrogen (NO_x), sulphur dioxide (SO_2), ozone (O_3), carbon monoxide (CO) and particles (PM_{10}, $PM_{2.5}$)
CV	Coefficient of Variation – a standardised measure of dispersion of a probability distribution or frequency distribution
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
ESC	East Suffolk Council
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less

$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SCC	Suffolk County Council
SO_2	Sulphur Dioxide
WBG	Woodbridge
UKAS	United Kingdom Accreditation Scheme