



**Breckland**  
COUNCIL

# 2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995  
Local Air Quality Management, as amended by the  
Environment Act 2021

Date: August 2023

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# Executive Summary: Air Quality in Our Area

## Air Quality in Breckland Council

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

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

The District of Breckland is approximately 500 square miles of mostly rural areas and comprises the principal market towns of Attleborough, Dereham, Swaffham, Thetford, and Watton. The district has a fairly low population density, with 141,500 residents recorded in the 2021 census<sup>5</sup>. One of the main sources of air pollution within the Breckland Council is found in Swaffham, where the A1065 runs through the centre of the town and is the main route for both local traffic and for traffic travelling to North Norfolk. The layout of the town leads to frequent traffic congestion, and this leads to elevated concentrations of nitrogen dioxide (NO<sub>2</sub>). For the past 5 years, monitored concentrations in Swaffham have generally monitored below the NO<sub>2</sub> annual mean Air Quality Objective of 40µg/m<sup>3</sup>. Previous Air Quality (AQ) reports with full details of all monitoring and results can be found on the Council website at this link <https://www.breckland.gov.uk/article/3244/Air-Pollution>.

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

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

<sup>3</sup> Defra. Air quality appraisal: damage cost guidance, January 2023

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

<sup>5</sup> Office for National Statistics. How the population changed in Breckland: Census 2021, June 2022

There is currently one Air Quality Management Area (AQMA) designated within Breckland Council (BC); AQMA No.2 within Swaffham spans the main vehicular route in the town centre, around the A1065. The current AQMA was declared in May 2017 due to exceedances of the NO<sub>2</sub> annual mean. The boundaries of Breckland's AQMA can be seen in Appendix D and online at [https://uk-air.defra.gov.uk/aqma/local-authorities?la\\_id=32](https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=32).

During 2022, Breckland Council monitored NO<sub>2</sub> using passive NO<sub>2</sub> diffusion tubes at 26 locations and two automatic monitoring stations. There were two co-located triplicate tubes at each of the automatic sites (diffusion tube sites S3 and 20).

The NO<sub>2</sub> diffusion tube network is in place to monitor NO<sub>2</sub> concentrations across Breckland Council, monitoring at known hotspot areas and also being used to identify any new sensitive areas of human exposure. No exceedances of the annual mean NO<sub>2</sub> Air Quality Objective of 40µg/m<sup>3</sup> have been measured in the last five years. In 2022, NO<sub>2</sub> concentrations decreased slightly from 2021 concentrations, with the greatest decrease seen at diffusion tube S14, from 17.8 µg/m<sup>3</sup> in 2021 to 12.9 µg/m<sup>3</sup> in 2022. Site S14 is located within the AQMA in Swaffham. Two diffusion tubes (T3 and W1) increased from 2021 concentrations, and a total of nine diffusion tubes (D1, S2, S4, S7, S8, S9, S14, T2 and W2) decreased in 2022. The remaining diffusion tubes showed negligible changes in 2022 compared to 2021 levels.

Automatic PM<sub>10</sub> monitoring is carried out at the Breckland East Wretham (BRE01) air quality monitoring site. In 2022, the site's data capture was low (67.6%) due to a sensor fault and emergency shutdowns for repairs. The annualised annual mean PM<sub>10</sub> concentration at this location was 15.0 µg/m<sup>3</sup> which is significantly below the annual mean PM<sub>10</sub> Air Quality Objective (40 µg/m<sup>3</sup>); this is a slight increase from 13 µg/m<sup>3</sup> measured in 2021.

Table A.7 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the daily mean Air Quality Objective of 50 µg/m<sup>3</sup>, not to be exceeded more than 35 times per year. There were three daily mean exceedances of 50 µg/m<sup>3</sup> in 2022, well below the allowed maximum of 35.

Currently, there is no monitoring of PM<sub>2.5</sub> carried out within Breckland Council. The new dual PM<sub>2.5</sub> and PM<sub>10</sub> analyser purchased to replace faulty equipment will allow for future PM<sub>2.5</sub> monitoring from 2023. For 2022, in accordance with LAQM. TG(22), the PM<sub>2.5</sub> concentrations can be estimated from PM<sub>10</sub> monitoring using either a local PM<sub>10</sub> and PM<sub>2.5</sub> monitoring ratio, or a nationally derived correction ratio of 0.7. As there is no local monitoring for PM<sub>2.5</sub>, the nationally derived correction ratio of 0.7 was applied to the 2022

PM<sub>10</sub> concentration (15 µg/m<sup>3</sup>) at the automatic monitoring site BRE01. Therefore, the estimated annual mean PM<sub>2.5</sub> concentration in 2022 at the site is 10.5 µg/m<sup>3</sup>, which is below the PM<sub>2.5</sub> obligatory Air Quality Objective of 25 µg/m<sup>3</sup>.

## Actions to Improve Air Quality

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

The Environmental Improvement Plan<sup>6</sup> sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term PM<sub>2.5</sub> targets. The National Air Quality Strategy, published in April 2023, provides more information on local authorities' responsibilities to work towards these new targets and reduce PM<sub>2.5</sub> in their areas. The Road to Zero<sup>7</sup> details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of AQMAs are designated due to elevated concentrations heavily influenced by transport emissions.

With regard to the [National Planning Policy Framework](#), air quality considerations have been adopted across the district when dealing with planning applications and the provision of pre-application advice. In 2017, an Air Quality Development Management Policy was implemented as part of the Air Quality Planning and Policy Guidance classification. Following the declaration of the AQMA in 2017 in Swaffham, an [Air Quality Action Plan](#) (AQAP) was produced and was published in 2018. Improvements in traffic queueing and delays are a strong focus in the AQAP, with proposed removal of the traffic lights on the Station Street/Mangate Street junction, encouragement of public transport use, and review of car parking enforcement and the town centre's one-way system.

Progress is ongoing on the actions outlined in the 2018 AQAP, including installation of infrastructure to encourage use of electric vehicles (EVs) within the town centre such as fast chargers that have been installed in Swaffham, Attleborough, Thetford, and Dereham.

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<sup>6</sup> Defra. Environmental Improvement Plan 2023, January 2023

<sup>7</sup> DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Increase in EV charging points have encouraged the introduction of three electric taxis licenced in Breckland Council, two hackney carriages, and one private hire. There are also two hybrid vehicles currently licenced, with more applications expected soon.



Breckland Council have also completed the following quantitative improvements in a bid to target sources of pollution:

- Breckland has joined with two neighbouring councils (Borough of King's Lynn and West Norfolk and North Norfolk Council) in a new household waste contract with Serco. This ensures that investments can be made in a brand-new fleet of refuse collection vehicles, including reduced emissions and hybrid vehicles. For more information, please visit [New household waste contract to start in Breckland and west Norfolk \(serco.com\)](https://www.serco.com).



- Breckland Council is working in association with Highways England, Babergh and Mid Suffolk District Councils, and six local authorities in Suffolk, Norfolk, and Essex on an initiative to install new charging points along key roads in East Anglia. This will support Government initiatives to increase the number of EVs and reduce the sale and use of conventional petrol and diesel cars in the UK. Breckland Council currently have four rapid charging points in the following Breckland car parks:
  - Swaffham - Pedlars Car Park Market Place, PE37 7AB
  - Attleborough - Queens Square Car Park, Queens Square, NR17 2AE
  - Thetford - Pike Lane Car Park, Pike Lane, IP24 2DR
  - Dereham - Cowper Road Car Park, Cowper Road, NR19 2DA



You are able to view all car electric charging points in the UK on the [Zap-Map website](#).

- Since January 2021, Breckland Council has committed further to addressing the climate emergency by appointing a full-time Climate change and Environment Officer to help with the delivery of the sustainability strategy.
- Breckland Council's first [Sustainability and Climate Change Strategy](#) comes after Breckland Council members voted to declare a climate emergency in September 2019. Since then, the Council has made tackling climate change a top priority and been developing its inaugural strategy.

- During October 2020, Breckland Council switched to a green energy tariff in all its buildings, reducing the Council's fossil fuel impact and working towards making the Council more environmentally-sustainable.
- The Council has also introduced an agile working policy and work smart scheme. This will enable our workforce to work in a flexible and agile way which embraces current technology and reduce the need to commute and reduce work-related travel. All officers are provided with laptops with email, calendar, and collaboration software from the Microsoft Office 365 solution (including Teams) also providing video and audio conferencing, chat, and document sharing. Employees will be contactable in the same way as if they were in the office.
- The Green Community Grants fund was set up to support communities in Breckland to take action for themselves. Its aim is to promote environmental sustainability and create positive behavioural change in response to climate change. The fund can also support school projects which encourage pupils to take action for the environment. The fund was open to applications from Monday 13 July to Sunday 12 September 2021. Breckland Council considered all the applications carefully and contacted the projects at the start of October to let them know whether they'd been successful. The Green Community Grants fund has since awarded £98,226 worth of grants, shared between 30 projects. Please visit [Green Community Grants - Breckland Council](#) for more information and to explore the map to find out more about each of the selected projects.





- Exciting new plans for the future of Watton and Swaffham have been drawn up as part of the Future Breckland project. Future Breckland: Thriving People and Places is a project to revitalise Breckland's five market towns and equip them for the future. The project has already seen a plan drawn up for Dereham; plans for Attleborough and Thetford will follow. Now, the newly revealed plans for Watton and Swaffham are setting out proposals that are individually tailored for each town. The proposals include long-term goals for the next decade, and shorter-term goals for the next one to three years. Some of the short-term suggestions put forward in the plan for Swaffham include trialling partial pedestrianisation schemes and car-free days, increasing tree planting and creating parklets and a green gateway, and installing EV charging points. For more information, please visit [28/03/22: Future plans drafted for Watton and Swaffham - Breckland Council](#).
- Within the masterplan for Swaffham there are ideas proposed that include increased planting of seasonal pollinating flowers, herb gardens, colourful rain gardens, and greenery throughout the town centre and areas heavily used by pedestrians, as well as planting of trees around the marketplace, which can improve the air quality. The plans also include temporary parking suspension trials to ease some of the traffic and encourage visitors to park in the car parks on Station Street and Theatre Street, which will be signposted with improved wayfinding. These are items which the council believe can be delivered in 2023, but there are more details within the masterplan which include larger and heavy-duty interventions in the longer-term. Please visit [The Swaffham Enhancement Masterplan - The Spaces Handbook \(breckland.gov.uk\)](#) for more information.

## Conclusions and Priorities

Breckland Council's 2023 ASR is an update of the monitoring carried out last year and illustrates that there has been a general improvement in air quality across the district over several years. This includes an improvement to NO<sub>2</sub> concentrations measured within Swaffham AQMA, where there has been no exceedance since 2017.

There were no exceedances of the NO<sub>2</sub> annual mean Air Quality Objective identified across the 26 passive monitoring sites and two automatic monitoring sites. There have been no exceedances within the AQMA since its declaration in 2017. In 2022, NO<sub>2</sub> concentrations decreased slightly from 2021 concentrations, with the greatest decrease seen at diffusion tube S14, from 17.8 µg/m<sup>3</sup> in 2021 to 12.9 µg/m<sup>3</sup> in 2022. The greatest

increase was at diffusion tube T3, from 10.4 µg/m<sup>3</sup> in 2021 to 13.2 µg/m<sup>3</sup> in 2022. After the increase in NO<sub>2</sub> concentrations from 2020 to 2021 due to the return to normal traffic flows following the Covid-19 pandemic in 2020, concentrations have assumed a downward trend.

The annual mean NO<sub>2</sub> concentration did not exceed 60 µg/m<sup>3</sup> at any monitoring locations in 2022, which indicates that an exceedance of the 1-hour mean objective (200 µg/m<sup>3</sup>) is unlikely at these sites.

The Council has commissioned Ricardo to carry out a detailed assessment to inform whether or not the AQMA in Swaffham should be revoked, in light of a sustained period of non-exceedances.

## Local Engagement and How to get Involved

As part of the ongoing AQMA process, and since publication of the AQAP and from the 2017 public forums discussing the improvements of the district's air quality, we welcome continuous suggestions from residents, local businesses, and interest groups in order to improve air quality in the area. We have further met with local and regional organisations and Councils to ensure that we are in touch with local concerns and are better placed to explore potential solutions.

Find out more about your local air quality by:

- Contacting the Air Quality Officer at Breckland (details at the beginning of this report) or email [envprotect@breckland.gov.uk](mailto:envprotect@breckland.gov.uk)
- Contact your local councillor with any concerns  
<http://democracy.breckland.gov.uk/mgMemberIndex.aspx?FN=ALPHA&VW=L IST&PIC=0>

Consider how and when you use your car, especially at peak times. Consider using public transport where possible for trips into towns, and walking or cycling for a non-polluting and healthy alternative.

## Local Responsibilities and Commitment

This ASR was prepared by the Ricardo Energy and Environment on behalf of Breckland Council with the support and agreement of the following officers and departments:

- Varuna Addy – Environmental Protection and Enforcement

- Jayne Tawana – Environmental Protection and Enforcement

This ASR has been approved by:

- Craig Fowler – Environmental Health and Licensing Manager

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

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# 1 Local Air Quality Management

This report provides an overview of air quality in Breckland Council during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

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

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

## 2 Actions to Improve Air Quality

### Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

A summary of AQMAs declared by Breckland Council can be found in Table 2.1. The table presents a description of the AQMA that is currently designated within Breckland Council. 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=32](https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=32) (see full list at <https://uk-air.defra.gov.uk/aqma/list>).

Appendix D: Map(s) of Monitoring Locations and AQMAs provides a map of the AQMA and also the air quality monitoring locations in relation to the AQMA. The Air Quality Objective pertinent to the current AQMA designation is NO<sub>2</sub> annual mean.

Breckland Council has commissioned Ricardo to carry out a detailed assessment in Swaffham to consider and evaluate a revocation of the AQMA.



**Table 2.1 – Declared Air Quality Management Areas**

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Breckland Council Air Quality Management Area Number 2 Order 2017	1 <sup>st</sup> May 2017	NO <sub>2</sub> Annual Mean	An area encompassing a number of residential properties in Station Street and London Road Swaffham	No	41 µg/m <sup>3</sup>	24.0 µg/m <sup>3</sup>	AP01/18 - Breckland Council Air Quality Action Plan - 2018 09/10/2018	<a href="#">Breckland Council Air Quality Action Plan</a>	Breckland Council Air Quality Management Area Number 2 Order 2017

- Breckland Council confirm the information on UK-Air regarding their AQMA(s) is up to date.
- Breckland Council confirm that all current AQAPs have been submitted to Defra.

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

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

1. The Council have considered the comments made during previous appraisals and addressed any outstanding issues in this year's ASR. This is commended and the Council is encouraged to continue with this approach in future.
2. The AQMA has not seen an exceedance of the annual mean objective for NO<sub>2</sub> since its declaration in 2017, with all monitoring locations below the objective in 2021. Next year, the Council will consider whether a detailed assessment is necessary to evidence the likelihood of future exceedances. The findings of this assessment will inform whether or not they move forward with steps to revoke the AQMA. This is welcomed.
3. The Council have provided clear evidence of several key actions to improve air quality during 2021 and frequently meet with local and regional organisations in the district to ensure that local concerns are being addressed. This is commended.
4. The Council have provided good mapping of all monitoring locations within the district and included a map clearly showing AQMA boundaries. However, the labelling in Figures D.2 and D.3 are not entirely clear against the base mapping. The Council is highly encouraged to update the labelling to improve readability.
5. Extensive Trend graphs have been provided for all monitoring data, which is commended.
6. The Council is commended for their extensive measures to reduce PM<sub>2.5</sub> emissions in the district.

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

More detail on these measures can be found in their respective [Action Plans](#). Key completed measures are:

- Walking and cycling facilities improvement in and around the town. The Town Plan is now final and available at <https://www.breckland.gov.uk/media/19645/Swaffham-Town-Delivery-Plan-2022/pdf/Draft-for-Publishing-Swaffham-Town-Delivery-Plan-final.pdf?m=637819928064470000>.
- Review of schools' travel arrangements and existing travel plans. The town plan is now finalised and available at <https://www.breckland.gov.uk/media/19645/Swaffham-Town-Delivery-Plan-2022/pdf/Draft-for-Publishing-Swaffham-Town-Delivery-Plan-final.pdf?m=637819928064470000>.
- Review of taxi licensing conditions. Breckland Council has begun licensing electric vehicles (EVs) in line with the revised conditions.

Breckland Council expects the following measures to be completed over the course of the next reporting year: A detailed assessment to consider whether there is sufficient evidence to revoke the AQMA in Swaffham. This will be the Council's priority before the next reporting year.

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

- Borough Council of King's Lynn and West Norfolk
- Norfolk County Council
- National Highways

Breckland Council anticipates that the measures stated above and in Table 2.2 will achieve compliance in Breckland Council Air Quality Management Area Number 2 Order 2017.

Whilst the measures stated above and in Table 2.2 will help to contribute towards compliance, Breckland Council anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of Breckland Council Air Quality Management Area Number 2 Order 2017.

**Table 2.2 – Progress on Measures to Improve Air Quality**

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	Consideration of Air Quality Impacts when providing comments on planning applications within an AQMA or where an AQMA could be impacted or created	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	Ongoing	Ongoing	District Council (LPA & Env Protection Team)	District Council (LPA & Env Protection Team)	None	None	None	None	1µg/m <sup>3</sup>	Number of pre application discussions and planning applications	Ongoing consultations - requiring review of AQ impacts of proposals and recommending mitigation including active travel and measure to encourage forms of low or non-polluting travel	Ongoing action – AQ as part of planning development to link in action around the local plan
8	Review town centre one-way system to create a better circulation of traffic around the town and, if appropriate, devise a revised layout	Transport Planning and Infrastructure	Other	2018	2023	County Council District Council Town Council	County Council District Council Town Council	None	None	Not yet determined	Not yet determined	1µg/m <sup>3</sup>	Emissions within national objectives	Breckland has been working with its partners at Norfolk County Council on its Swaffham Network Improvement Strategy April 2020 Survey work was carried out to examine the situation. Feasibility work concluded that an option to provide a two-way access from the south to the car park appeared possible. It is recommended that a scheme to provide a southern access to the Theatre Street carpark could be considered as part of the Town Centre improvement plans as detailed in point 6. Funding would need to be identified for both detailed design and implementation.	The Breckland Council Regeneration team are undertaking consultation, including Swaffham Town Council, on two large projects for Swaffham; Future Breckland and <a href="#">Heritage Action Zone (HAZ) Town Centre Masterplan</a> both these plans are likely to include proposals for enhancement of the Swaffham Market area and parking / accessibility / street access which will address items identified in the AQAP, so it is not considered to duplicate this action in this plan. The public consultations for both these documents are to be undertaken in late 2021 and should be completed by end March 2022, at which point the consultations will be reviewed and an action plan developed, and funding applied for.
9	Review town centre car parking arrangements to minimise vehicular traffic in sensitive areas and, if appropriate, devise a revised strategy	Traffic Management	Workplace Parking Levy, Parking Enforcement on highway	2018	2023	County Council District Council Town Council	County Council District Council Town Council	None	None	Not yet determined	Not yet determined	1µg/m <sup>3</sup>	Emissions within national objectives	Breckland has been working with its partners at Norfolk County Council see work carried out in item 8 above. Breckland Council have discussed the Station rd. HGV parking with the town council, and they are now in the process of updating the car parking orders to remove the HGV parking on that car park. This will require consultation and a formal order which will also allow for further EV charging locations.	See comments on action point 8 above with plan consultation to be completed by end March 2022

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
15	Improve walking and cycling facilities in and around the town	Promoting Travel Alternatives	Bus route improvements Cycle network Public cycle hire scheme	2018	2023	Count Council District Council Town Council	Count Council District Council Town Council	None	None	Not yet determined	Not yet determined	1µg/m³	Emissions within national objectives	This matter is being considered as part of the Future Breckland and <a href="#">Heritage Action Zone (HAZ) Town Centre Masterplan</a> plans consultation process potentially including provision of cycle stands in the town and setting up of safe cycle routes. Item 1 above requires developers to provide evidence within their transport assessments linking developments to the community and in this case the Town Centre. New cycle stands are set to be installed in 2023 to increase availability and signpost existing cycle stands in Swaffam.	Town Plan is now final and available at <a href="https://www.breckland.gov.uk/media/19645/Swaffham-Town-Delivery-Plan-2022/pdf/Draft-for-Publishing-Swaffham-Town-Delivery-Plan-final.pdf?m=637819928064470000">https://www.breckland.gov.uk/media/19645/Swaffham-Town-Delivery-Plan-2022/pdf/Draft-for-Publishing-Swaffham-Town-Delivery-Plan-final.pdf?m=637819928064470000</a>
16	Review existing travel arrangements to schools and any existing Travel Plans Including the role of car sharing	Promoting Travel Alternatives	Bus route improvements Cycle network Public cycle hire scheme	2018	2022	Count Council District Council Town Council	Count Council District Council Town Council	None	None	Not yet determined	Not yet determined	1µg/m³	Emissions within national objectives	Swaffham Town council to contact local schools to maintain their travel plans and encourage implementation of identified actions A fuller update is in hand, but the advice is that transport to the secondary academy is predominantly buses and walking, there aren't many parents who drop off students there. 1. The school does encourage car sharing to the extent it can but doesn't have a policy directed specifically to this. The school's main concern where cars are concerned is to control the bunching of cars at arrival and departure times on the relatively narrow access roads and reducing the number of car journeys is part of this. 2. Given the young age of the children, there is no policy to encourage cycling to school. Walking with parents/carers is of course encouraged, but some parents find the pathways narrow, often with overhanging bushes, and the proximity of fast and heavy traffic intimidating. 3. There is however a clear focus on the air pollution issue as the school is very close to the A1065. A video made by all classes in the school at the time of the COP environmental summit in November included a very telling item with children standing in the school grounds demonstrating the noise and pollution effect of the heavy traffic passing along the A1065 just behind the hedge.	Town Plan is now final and available at <a href="https://www.breckland.gov.uk/media/19645/Swaffham-Town-Delivery-Plan-2022/pdf/Draft-for-Publishing-Swaffham-Town-Delivery-Plan-final.pdf?m=637819928064470000">https://www.breckland.gov.uk/media/19645/Swaffham-Town-Delivery-Plan-2022/pdf/Draft-for-Publishing-Swaffham-Town-Delivery-Plan-final.pdf?m=637819928064470000</a>
17	Taxi Licensing conditions	Promoting Low Emission Transport / Alternative to Private Vehicle Use	Taxi Licensing conditions	2021	2021	District Council, taxi drivers		None	None	Not yet determined	Not yet determined	1µg/m³	Emissions within national objectives	Encourage/make it easier for other local businesses and householders to switch to electric. Within the next 12 months Breckland Council will be reviewing our Hackney Carriage and Private Hire Vehicle Licensing Specifications to encourage lower emissions and more environmentally friendly vehicles.	As of 2022, Breckland Council have licensed 4 electric vehicles in district, paving the way for greener transport options in the region.

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
18	Cross council collaboration and investment	Vehicle Fleet Efficiency	Other - Fleet efficiency	2021	2021	Breckland Council and the Borough Council of King's Lynn and West Norfolk. Serco.		No		£230m			Reduce carbon footprint.	Reduce carbon footprint. The contract largely uses a new fleet of vehicles with some electric vehicles. The new fuel-efficient trucks are quieter, produce less CO2 per mile and use 18% less fuel.	The contract will also see a brand-new fleet of bin collection trucks and other vehicles rolled out, which will operate across all three council areas. These will include reduced emissions and hybrid vehicles. Also the introduction of route optimisation, which came into effect in March 2022.
19	Sustainable Swaffham programme / EV Charging Installation	Promoting Low Emission Plant	Emission control equipment for small and medium sized stationary combustion sources / replacement of combustion sources / Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2021	2021/2022	Breckland Council and Breckland Council's Market Towns Initiative	Breckland Council's Market Towns Initiative	None	None	Not yet determined	Not yet determined	1µg/m <sup>3</sup>	Emissions within national objectives	Ongoing. Breckland Council is launching a new initiative which will make Swaffham one of Norfolk's most environmentally friendly towns. The Sustainable Swaffham programme will see the rollout of a number of 'green' schemes being consulted in late 2021 / early 2022 Breckland will be installing four additional charging points in the Theatre St car park in Swaffham which are being funded by the Market Town Initiative. There are currently there are 65 public devices across Breckland.	These initial green schemes will be followed up with further activity in the future, with the next focus expected to be on sustainable transport and green connectivity. However, the Swaffham district councillors are inviting all residents and businesses to help shape the future programmes and approaches by getting in touch directly. Please also see Breckland 2035 Sustainability Strategy, <a href="https://www.breckland.gov.uk/environment/climate-change">https://www.breckland.gov.uk/environment/climate-change</a>
22	Investigate Green Space Initiatives	Other	Other	2018/19	2022/23	District Council Town Council	District Council Town Council	None	None	Not yet determined	Not yet determined	1µg/m <sup>3</sup>	Emissions within national objectives	This matter crosses a number of different organisational controls so a review of this will need to include officers / councils responsible for green spaces at County/ District and town levels.	See Breckland 2035 Sustainability Strategy, <a href="https://www.breckland.gov.uk/environment/climate-change">https://www.breckland.gov.uk/environment/climate-change</a>

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

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

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

- Increasing EV chargers in council-owned public car parks, Breckland Council is working in association with Highways England, Babergh and Mid Suffolk District Councils, and six local authorities in Suffolk, Norfolk, and Essex on an initiative to install new charging points along key roads in East Anglia. This will support Government initiatives to increase the number of EVs and reduce the sale and use of conventional petrol and diesel cars in the UK. Breckland Council currently have four rapid charging points in the following Breckland car parks:
  - Swaffham - Pedlars Car Park Market Place, PE37 7AB
  - Attleborough - Queens Square Car Park, Queens Square, NR17 2AE
  - Thetford - Pike Lane Car Park, Pike Lane, IP24 2DR
  - Dereham - Cowper Road Car Park, Cowper Road, NR19 2DA
- Breckland Council are committed to delivering four additional electric vehicle charging points in the Theatre Street car park in Swaffham, expected to be completed in December 2022.
- Continuing to encourage the [anti-idling](#) messages on the Council's webpage.
- Adopting their new [Sustainability 2035 Strategy](#) and celebrating Breckland Council's first fully-electric private hire vehicle.

Additionally, Breckland Council have switched to a green energy tariff (which uses renewable energy) for all of its buildings, as an ongoing commitment to be more environmentally friendly. Moreover, Breckland Council raise awareness of the use of wood burners and open fires via their website. Although there are no smoke control areas in Breckland Council, the council have created an [open fires and wood burning stove](#) webpage to encourage best practice when using open fires and wood-burning appliances,

as they can be a source of air pollution. More information can be found on the [Burnright](#) website.

Breckland Council are now part of an Air Quality Partnership with Natural England, the Environment Agency, farming groups, ADAS, and the Agricultural and Horticulture Development Board to join up on ways of reducing PM emissions from farming/agriculture. Breckland are also a member of the Norfolk AQ group which includes neighbouring local authorities and Norfolk County Council.

Currently, there is no monitoring of PM<sub>2.5</sub> carried out within Breckland Council. However, in accordance with LAQM. TG(22), the annual mean PM<sub>2.5</sub> concentrations can be estimated from PM<sub>10</sub> monitoring using either a local PM<sub>10</sub> and PM<sub>2.5</sub> monitoring ratio, or a nationally derived correction ratio of 0.7. As there is no local monitoring for PM<sub>2.5</sub>, the nationally derived correction ratio of 0.7 was applied to the 2022 annual mean PM<sub>10</sub> concentration (15 µg/m<sup>3</sup>) at the automatic monitoring site at East Wretham (BRE01). Therefore, the estimated annual mean PM<sub>2.5</sub> concentration in 2022 at the automatic monitoring site is 10.5 µg/m<sup>3</sup>, which is below the PM<sub>2.5</sub> obligatory Air Quality Objective of 25 µg/m<sup>3</sup>.

The Public Health Outcomes Framework indicator<sup>8</sup> for the fraction of deaths attributable to PM<sub>2.5</sub> in Breckland was 4.7% during 2021 (latest available data), which is below both the regional average of 5.5% and the national average of 5.5%.

Furthermore, the current Defra 2022 background maps<sup>9</sup> for Breckland Council (2018 based) show that all 2022 background concentrations of PM<sub>2.5</sub> are below the annual mean Air Quality Objective for PM<sub>2.5</sub>. The highest concentration is predicted to be 11.2 µg/m<sup>3</sup> within the 1 x 1km grid square with the centroid grid reference of 585500, 282500. This is an area that encompasses a stretch of the A11 Thetford Bypass on the outskirts of Thetford, near to several distribution hubs and light industry at the Caxton Way Industrial Estate.

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<sup>8</sup> <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework>

<sup>9</sup> <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>



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

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

### Summary of Monitoring Undertaken

#### 3.1.1 Automatic Monitoring Sites

Breckland Council undertook automatic (continuous) monitoring at two sites during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem. The [Air Quality in England](#) page presents automatic monitoring results for Breckland Council, with automatic monitoring results also available through the [UK-Air website](#).

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

#### 3.1.2 Non-Automatic Monitoring Sites

Breckland Council undertook non-automatic (i.e. passive) monitoring of NO<sub>2</sub> at 26 sites during 2022. Table A.2 in Appendix A presents the details of the non-automatic sites.

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

## Individual Pollutants

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

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

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO<sub>2</sub> annual mean concentrations for the past five years with the air quality objective of 40 µg/m<sup>3</sup>. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e., the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that for triplicate sites 20(3), 20(3)A and 20(3)B, annual data is provided for 20(3)B only and for triplicate sites S3(3), S3A(3) and S3B(3) annual data is provided for S3B(3) only. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant. No diffusion tube NO<sub>2</sub> monitoring locations within Breckland Council required distance correction during 2022, as there were no monitoring site where the annual mean concentration is greater than 36 µg/m<sup>3</sup> and the monitoring sites are located at a point of relevant exposure.

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

Following the application of bias adjustment and annualisation to the raw data, no sites were reported to exceed the NO<sub>2</sub> annual mean objective in 2022.

### Monitoring within AQMA Number 2 Order 2017

Currently, there are seven diffusion tubes located within the boundary of AQMA Number 2 (see Figure A.2). These are diffusion tube S1, S7, S8, S9, S10, S13, and S14.

In 2016, the non-automatic monitoring location S8 reported an annual mean concentration of 41 µg/m<sup>3</sup>, prompting the declaration of the 2017 AQMA. By subsequent comparison, S8 has reported significantly lower annual mean NO<sub>2</sub> concentrations in subsequent years:

34.3  $\mu\text{g}/\text{m}^3$  in 2017, 30.5  $\mu\text{g}/\text{m}^3$  in 2018, 31.6  $\mu\text{g}/\text{m}^3$  in 2019, 24.1  $\mu\text{g}/\text{m}^3$  in 2020, 25.7  $\mu\text{g}/\text{m}^3$  in 2021, and 24.0  $\mu\text{g}/\text{m}^3$  in 2022. The  $\text{NO}_2$  concentrations have demonstrated a decreasing trend since the AQMA declaration, until 2019, when there was a 1.1  $\mu\text{g}/\text{m}^3$  increase in concentrations. Due to the Covid-19 pandemic and associated downturn in vehicles, it was not possible to determine if this slight increase in trend would have continued into 2020.

Though the 2021 concentrations increased slightly from 2020 concentrations, there was a decrease of 5.9  $\mu\text{g}/\text{m}^3$  observed at site S8 from 2019 to 2021, and a further decrease of 1.4  $\mu\text{g}/\text{m}^3$  from 2021 to 2022.

Breckland Council will continue to monitor at this location to determine future trends. The Council is awaiting authorisation to carry out a detailed assessment this year to determine if the AQMA can be revoked.

#### Monitoring outside of the AQMA

$\text{NO}_2$  monitoring is also carried out at 18 other non-automatic monitoring locations and two automatic monitoring locations (Figure A.1). Outside of the declared AQMA, Breckland Council previously saw increases in diffusion tube W2, from 12.3  $\mu\text{g}/\text{m}^3$  in 2019, to 15.9  $\mu\text{g}/\text{m}^3$  in 2020, and 19  $\mu\text{g}/\text{m}^3$  in 2021. This has now decreased slightly to 17.9  $\mu\text{g}/\text{m}^3$  in 2022. This diffusion tube is located in a residential area in Watton, so future trends should be investigated further to ensure the downward trend continues.

In 2022,  $\text{NO}_2$  concentrations generally decreased slightly from 2021 concentrations, with the greatest decrease seen at diffusion tube S14, from 17.8  $\mu\text{g}/\text{m}^3$  in 2021 to 12.9  $\mu\text{g}/\text{m}^3$  in 2022. Site S14 is located within the AQMA in Swaffham. Two diffusion tubes (T3 and W1) increased from 2021 concentrations, and a total of nine diffusion tubes (D1, S2, S4, S7, S8, S9, S14, T2, and W2) decreased in 2022. The remaining diffusion tubes with sufficient data capture showed negligible changes in 2022 compared to 2021 levels. Diffusion tube S13 had insufficient data capture, as measurements were only available for November and December 2022.

After the increase seen from 2020 to 2021 due to the return to normal traffic flow after the Covid-19 pandemic, concentrations from 2021 to 2022 show a decreasing trend.

There were no exceedances of the 1-hour mean objective (200  $\mu\text{g}/\text{m}^3$ ) at either the BRE01 or BRE02 automatic monitoring sites for  $\text{NO}_2$  in 2022, showing a continuation of the trends demonstrated from 2018 to 2022 – though it should be noted that data capture at BRE01 was below 85% for 2022. Additionally, the annual mean  $\text{NO}_2$  concentration did not exceed

60  $\mu\text{g}/\text{m}^3$  at any monitoring locations in 2022, which indicates that an exceedance of the 1-hour mean objective (200  $\mu\text{g}/\text{m}^3$ ) is unlikely at any site.

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

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM<sub>10</sub> annual mean concentrations for the past five years with the air quality objective of 40  $\mu\text{g}/\text{m}^3$ . Data capture was low (67.6%) at the monitoring site in East Wretham (BRE01) and the measured annual mean PM<sub>10</sub> concentration at this location in 2022 was 15  $\mu\text{g}/\text{m}^3$ , which is significantly below the annual mean PM<sub>10</sub> objective. This is a slight increase from the 13  $\mu\text{g}/\text{m}^3$  measured in 2021.

Table A.7 in Appendix A compares the ratified continuous monitored PM<sub>10</sub> daily mean concentrations for the past five years with the daily Air Quality Objective of 50  $\mu\text{g}/\text{m}^3$ , not to be exceeded more than 35 times per year. There were three exceedances of the daily mean limit of 50  $\mu\text{g}/\text{m}^3$  in 2022, which is an increase from 2021 but similar to monitoring results from 2018 to 2020.

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

Currently, there is not any monitoring of PM<sub>2.5</sub> carried out within Breckland Council. However, in accordance with LAQM.TG(22), the PM<sub>2.5</sub> concentrations can be estimated from PM<sub>10</sub> monitoring using either a local PM<sub>10</sub> and PM<sub>2.5</sub> monitoring ratio, or a nationally derived correction ratio of 0.7. As there is no local monitoring for PM<sub>2.5</sub>, the nationally derived correction ratio of 0.7 was applied to the 2022 annual mean PM<sub>10</sub> concentration (15  $\mu\text{g}/\text{m}^3$ ) at the automatic monitoring site East Wretham (BRE01). Therefore, the estimated PM<sub>2.5</sub> concentration in 2022 at the automatic monitoring site is 10.5  $\mu\text{g}/\text{m}^3$ , which is below the PM<sub>2.5</sub> obligatory Air Quality Objective of 25  $\mu\text{g}/\text{m}^3$ . As part of the Council's commitment to provide a clean and safe environment in relation to air quality, a dual PM<sub>2.5</sub>/PM<sub>10</sub> monitor will be used at Wretham in 2023.

### 3.1.6 Other Pollutants

In addition to monitoring NO<sub>2</sub> and PM<sub>10</sub>, the automatic analyser located at East Wretham (BRE01) also monitors ozone (O<sub>3</sub>) concentrations. There is no requirement to report this data for LAQM purposes.

The Air Quality Objective for ground level O<sub>3</sub> (to be met by 2005) states that the maximum daily concentration (measured as an 8-hour mean) of 100 µg/m<sup>3</sup> should not be exceeded more than 10 times per year.

Table A.8 in Appendix A summarises the number of exceedances over the last 5 years in line with the AQ objective.

## Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Inlet Height (m)
BRE01	East Wretham	Rural	591315	288704	NO <sub>2</sub> , PM <sub>10</sub> , O <sub>3</sub>	N	Chemiluminescence, TEOM corrected by VCM	0	10	0
BRE02	Swaffham	Roadside	582093	308469	NO <sub>2</sub>	N	Chemiluminescent	0	2	0

**Notes:**

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

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
A1	High Street Attleborough	Urban Centre	604550	295125	NO2	NO	0.0	6.0	NO	2.0
A2	Croft Green Attleborough	Urban Background	603843	294085	NO2	NO	0.0	7.0	NO	2.0
D1	High Street Dereham	Urban Centre	598920	313267	NO2	NO	0.0	2.0	NO	2.0
D2	Station Road Dereham	Urban Background	599283	313599	NO2	NO	0.0	8.0	NO	2.0
D3	Wellington Street Dereham	Urban Centre	599319	313197	NO2	NO	0.0	5.0	NO	2.0
S1	Impsons Butchers Swaffham	Urban Centre	581986	309007	NO2	YES	0.0	5.0	NO	2.5
S2	Ceres Books Swaffham	Urban Centre	582008	308764	NO2	NO	0.0	3.0	NO	2.0
S3(3), S3A(3), S3B(3)	London Street	Roadside	582182	308434	NO2	NO	0.0	4.0	YES	2.0
S4	Bridewell Place Swaffham	Roadside	582058	308625	NO2	NO	0.0	4.0	NO	2.0
S5	London Street Zebra Crossing	Roadside	582075	308496	NO2	NO	0.0	7.0	NO	2.0
S6	London Street N Roundabout	Roadside	582048	308609	NO2	NO	0.0	5.0	NO	2.0
S7	Station Road Swaffham	Roadside	581995	309118	NO2	YES	0.0	7.0	NO	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
S8	Station Road Swaffham	Roadside	581979	309147	NO2	YES	0.0	5.0	NO	2.0
S9	Anglia Computer Solutions Swaffham	Roadside	581965	309063	NO2	YES	0.0	4.0	NO	2.0
S10	Kev's Tackle Swaffham	Roadside	582007	309064	NO2	YES	0.0	3.0	NO	2.0
S11	13 Station Road Swaffham	Roadside	581990	309145	NO2	NO	0.0	3.0	NO	2.0
S12	Glazedale Lamp post Swaffham	Roadside	581978	309308	NO2	NO	0.0	3.0	NO	2.0
S13	33 Station Road Swaffham	Roadside	581991	309153	NO2	YES	0.0	3.0	NO	2.0
S14	Corner Whitecross	Roadside	581989	309204	NO2	YES	0.0	3.0	NO	2.0
T1	London Street Fire Station	Roadside	587126	283336	NO2	NO	0.0	3.0	NO	1.0
T2	55 Bury Road Thetford	Roadside	586846	282721	NO2	NO	0.0	3.0	NO	2.0
T3	41 E. Cavell Close Thetford	Suburban	587036	284579	NO2	NO	0.0	101.0	NO	2.0
W1	High Street Corals Watton	Urban Centre	591747	300796	NO2	NO	0.0	2.5	NO	2.0
W2	Charles Avenue Watton	Urban Background	591885	300622	NO2	NO	0.0	2.0	NO	2.0
20(3), 20(3)A, 20(3)B	Wretham SSSI	Rural	591315	288704	NO2	NO	0.0	55.0	YES	2.0



Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) <sup>(1)</sup>	Distance to kerb of nearest road (m) <sup>(2)</sup>	Tube Co-located with a Continuous Analyser?	Tube Height (m)
S30	London Street	Roadside	582122	308282	NO2	NO	0.0	2.5	NO	2.0

**Notes:**

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

(2) N/A if not applicable.

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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
BRE01	591315	288704	Rural	47.6	47.6	10	10	7	7	7.6
BRE02	582093	308469	Roadside	90.0	90.0	25.6	26.2	19.1	21	17.2

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

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

**Notes:**

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

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

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

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

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

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

**Table A.4 – Annual Mean NO<sub>2</sub> Monitoring Results: Non-Automatic Monitoring (µg/m<sup>3</sup>)**

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
A1	604550	295125	Urban Centre	100.0	100.0	23.8	24.6	16.4	17.4	17.1
A2	603843	294085	Urban Background	100.0	100.0	9.7	10.4	7.2	7.7	7.9
D1	598920	313267	Urban Centre	100.0	100.0	27.3	29.3	18.4	17.5	16.3
D2	599283	313599	Urban Background	100.0	100.0	22.5	22.6	13.6	21.8	21.6
D3	599319	313197	Urban Centre	100.0	100.0	20.0	22.4	18.7	18.6	18.2
S1	581986	309007	Urban Centre	92.4	92.4	20.0	20.0	13.3	14.7	14.5
S2	582008	308764	Urban Centre	100.0	100.0	28.6	28.7	19.5	23.1	21.6
S3(3), S3A(3), S3B(3)	582182	308434	Roadside	100.0	100.0	25.7	26.2	17.3	20.7	19.9
S4	582058	308625	Roadside	100.0	100.0	21.4	22.4	14.6	17.7	16.3
S5	582075	308496	Roadside	100.0	100.0	21.8	24.1	17.1	19.4	19.5
S6	582048	308609	Roadside	100.0	100.0	26.9	29.6	21.0	22.6	22.2
S7	581995	309118	Roadside	75.0	75.0	30.2	30.2	19.1	22.9	21.5
S8	581979	309147	Roadside	100.0	100.0	30.5	31.6	24.1	25.7	24.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
S9	581965	309063	Roadside	100.0	100.0	21.8	23.0	14.2	20.7	17.1
S10	582007	309064	Roadside	92.4	92.4	20.3	21.6	14.5	15.2	15.3
S11	581990	309145	Roadside	100.0	100.0	30.9	26.6	12.3	14.6	14.4
S12	581978	309308	Roadside	100.0	100.0	31.5	38.0	16.3	19.2	18.4
S13	581991	309153	Roadside	18.5	18.5	14.9	25.2	20.1	23.6	-
S14	581989	309204	Roadside	100.0	100.0	17.2	21.3	19.2	17.8	12.9
T1	587126	283336	Roadside	100.0	100.0	24.8	25.1	18.0	20.2	20.0
T2	586846	282721	Roadside	100.0	100.0	21.9	21.2	14.4	16.5	13.5
T3	587036	284579	Suburban	100.0	100.0	12.0	14.1	9.9	10.4	13.2
W1	591747	300796	Urban Centre	100.0	100.0	24.0	24.2	8.9	8.9	10.5
W2	591885	300622	Urban Background	100.0	100.0	11.8	12.3	15.9	19.0	17.9
20(3), 20(3)A, 20(3)B	591315	288704	Rural	100.0	100.0	10.8	10.1	6.7	6.9	7.3
S30	582122	308282	Roadside	100.0	100.0	10.2	11.5	7.1	8.4	8.2

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

Diffusion tube data has been bias adjusted.

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

**Notes:**

The annual mean concentrations are presented as  $\mu\text{g}/\text{m}^3$ .

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

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

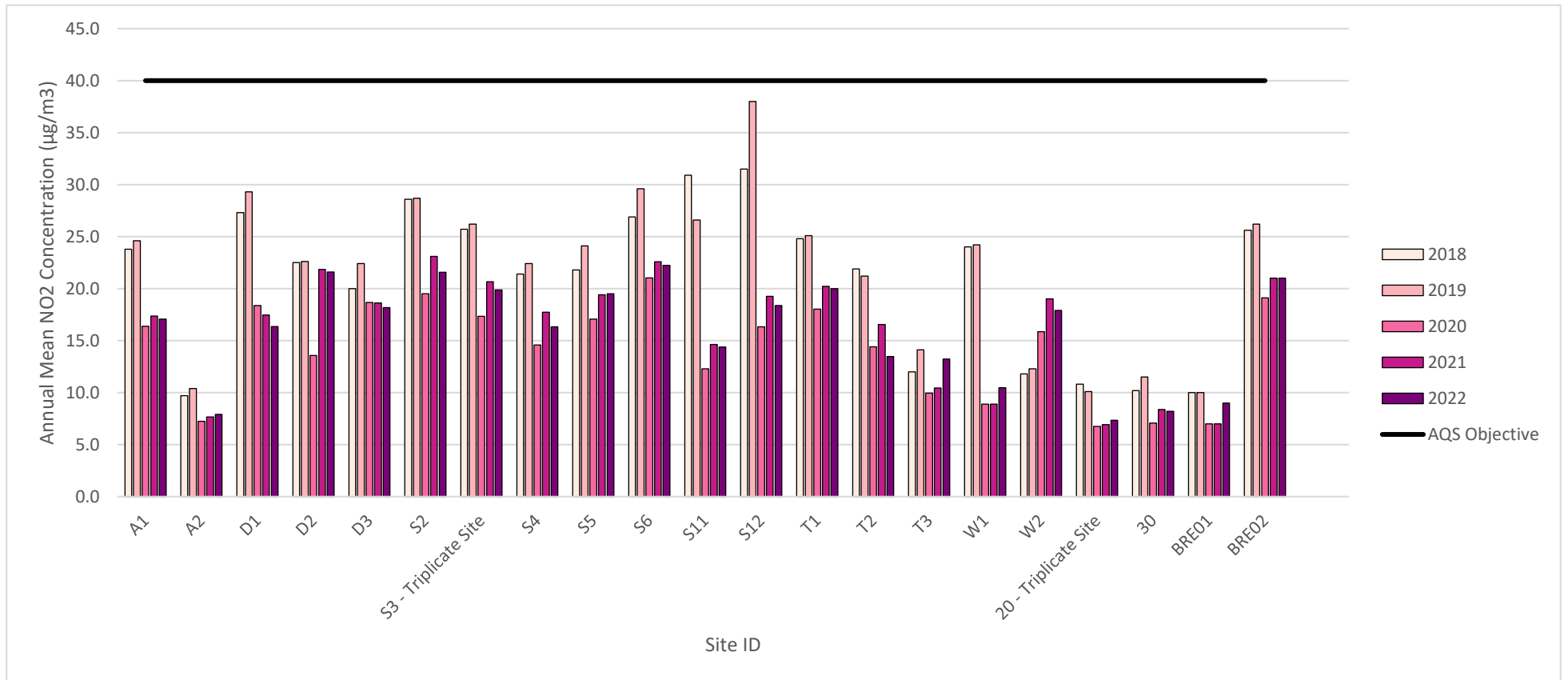
Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

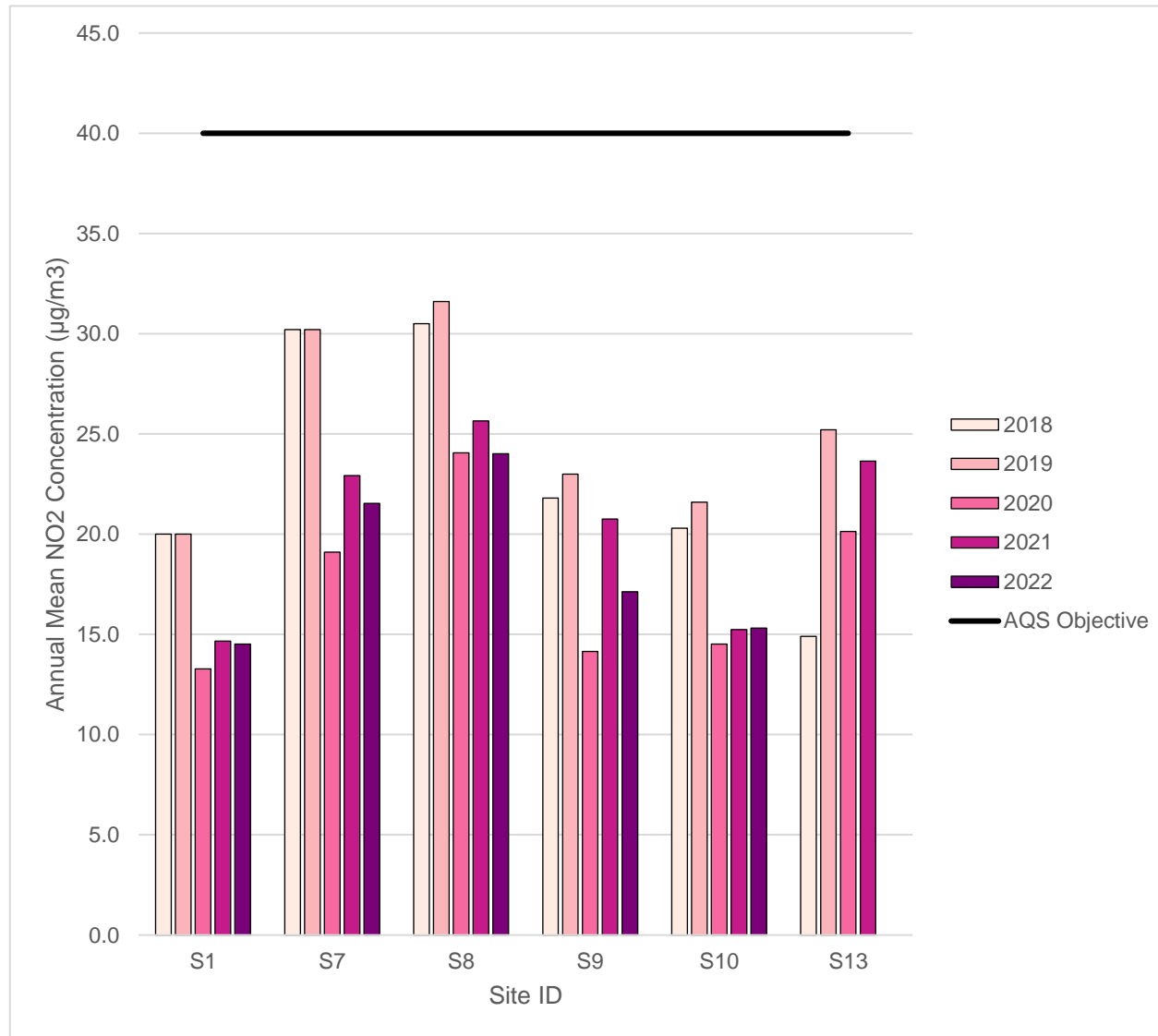
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

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

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



**Figure A.2 – Trends in Annual Mean NO<sub>2</sub> Concentrations – Within Declared AQMA**



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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
BRE01	591315	288704	Rural	47.6	47.6	0	0	0	0	<b>0 (47)</b>
BRE02	582093	308469	Roadside	90.0	90.0	0	0	0	<b>0 (97)</b>	0

**Notes:**

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

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

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

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

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



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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
BRE01	591315	288704	Rural	67.6	67.6	17	15	16	13	15

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

**Notes:**

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

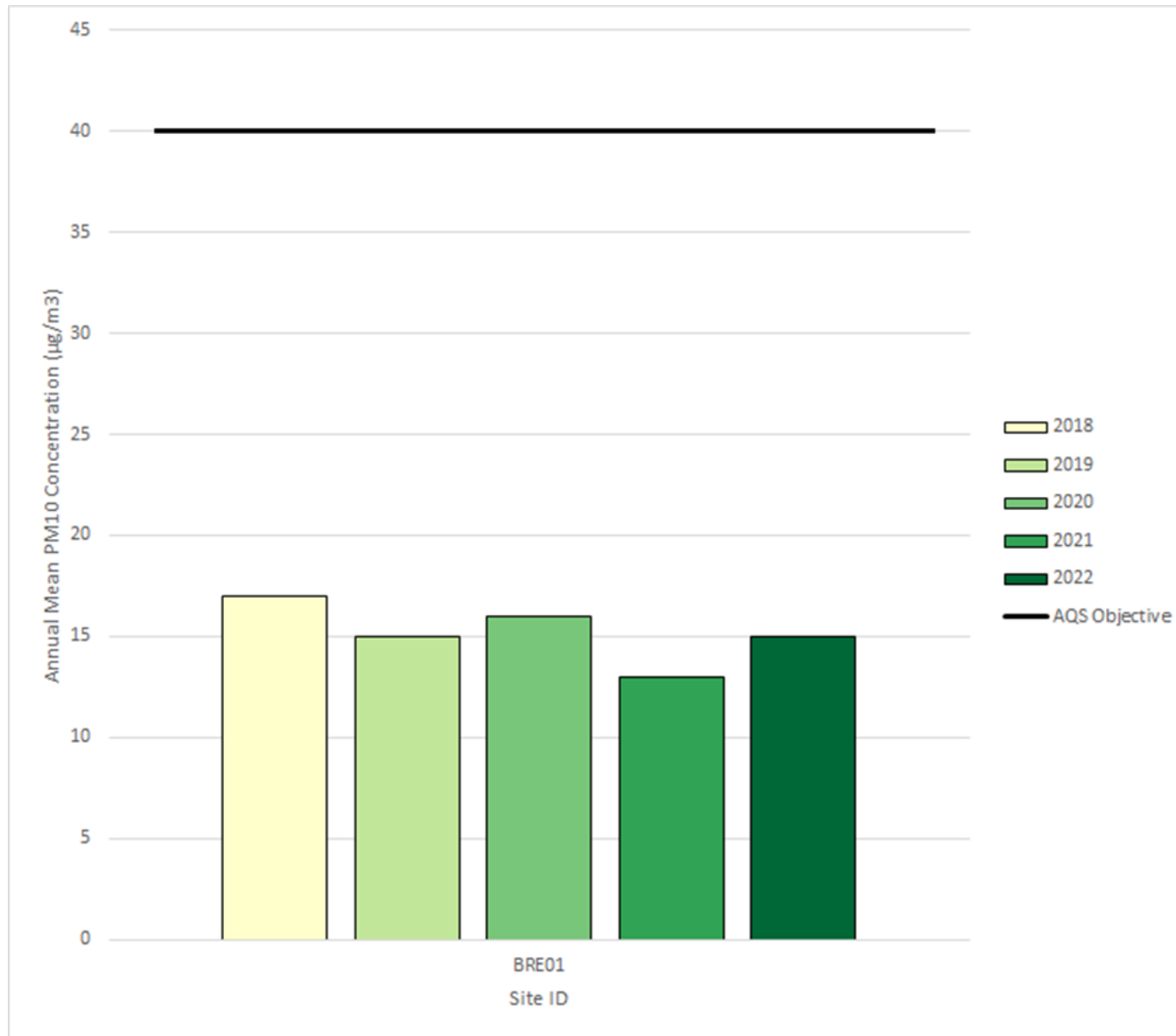
Exceedances of the PM<sub>10</sub> annual mean objective of 40 µg/m<sup>3</sup> are shown in **bold**.

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

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

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

Figure A.3 – Trends in Annual Mean PM<sub>10</sub> Concentrations



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

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
BRE01	591315	288704	Rural	67.6	67.6	4	3	3	0	3 (24)

**Notes:**

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

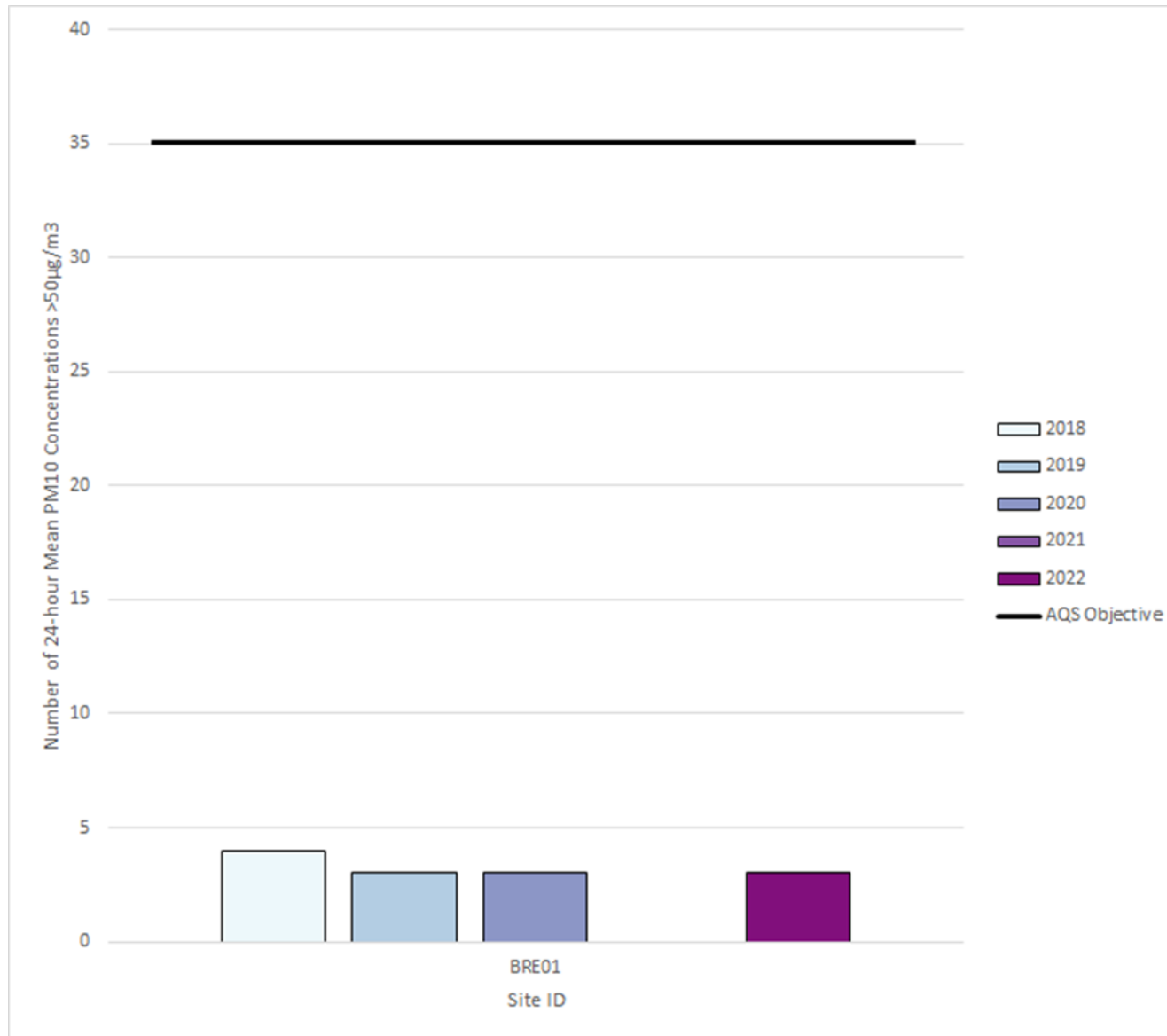
Exceedances of the PM<sub>10</sub> 24-hour mean objective (50 µg/m<sup>3</sup> not to be exceeded more than 35 times/year) are shown in **bold**.

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

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

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

Figure A.4 – Trends in Number of 24-Hour Mean PM<sub>10</sub> Results > 50 µg/m<sup>3</sup>



**Table A.8 – Annual Mean O3 Monitoring Results ( $\mu\text{g}/\text{m}^3$ )–  $100 \mu\text{g m}^{-3}$  not to be exceeded more than 10 times a year**

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) <sup>(1)</sup>	Valid Data Capture 2022 (%) <sup>(2)</sup>	2018	2019	2020	2021	2022
BRE01	591315	288704	Rural	59.7	59.7	29	18	25	12	49.7

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

**Notes:**

The annual mean concentrations are presented as  $\mu\text{g}/\text{m}^3$ .

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

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

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

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

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

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.83)	Comment
A1	604550	295125	27.6	20.8	24.5	19.6	18.1	15.5	16.9	18.3	19.7	20.0	21.3	24.3	20.6	17.1	
A2	603843	294085	14.3	10.0	11.8	7.4	7.4	5.4	5.7	6.7	9.0	11.4	11.9	13.3	9.5	7.9	
D1	598920	313267	22.5	18.4	21.8	17.9	14.5	12.2	15.0	16.6	17.5	19.0	30.9	30.1	19.7	16.3	
D2	599283	313599	35.2	28.7	25.5	22.9	25.4	23.4	26.0	23.2	30.5	29.1	19.9	22.5	26.0	21.6	
D3	599319	313197	33.8	23.2	19.8	16.4	19.6	18.3	18.6	17.4	21.6	23.7	24.8	25.8	21.9	18.2	
S1	581986	309007	21.2	14.9	19.7	18.8		13.1	13.6	18.8	15.8	17.0	19.5	20.0	17.5	14.5	
S2	582008	308764	33.8	25.4	23.7	21.7	27.9	24.9	22.0	23.1	28.3	28.2	26.2	26.7	26.0	21.6	
S3(3), S3A(3), S3B(3)	582182	308434	26.7	19.3	28.8	23.7	21.2	18.5	23.0	25.0	24.4	25.8	27.0	23.8	23.9	19.9	Triplicate Site with S3(3), S3A(3) and S3B(3) - Annual data provided for S3B(3) only
S4	582182	308434	24.0	16.8	24.5	20.1	18.5	14.9	16.1	19.4	19.5	18.8	21.1	22.5	19.7	16.3	
S5	582182	308434	32.5	24.2	24.4	22.0	24.9	18.8	19.2	20.3	27.0	20.9	22.6	25.1	23.5	19.5	
S6	582058	308625	33.0	29.1	23.8	22.9	27.8	24.9	23.6	22.1	27.1	30.7	29.6	26.8	26.8	22.2	
S7	582075	308496		20.6	31.1	29.6	24.9	19.8			25.4	27.2	29.7	25.1	26.0	21.5	
S8	582048	308609	37.3	26.3	24.5	24.7	30.3	25.2	26.7	25.0	33.2	29.4	32.9	31.8	28.9	24.0	
S9	581995	309118	29.5	17.4	20.5	20.8	19.7	14.0	17.6	19.1	22.1	19.9	23.3	23.9	20.6	17.1	
S10	581979	309147	24.9	20.5	15.2	14.9		16.2	16.1	14.3	18.0	19.7	21.4	21.9	18.5	15.3	
S11	581965	309063	22.5	16.4	18.9	16.2	17.7	12.5	14.6	15.5	17.9	17.5	19.4	19.0	17.3	14.4	
S12	582007	309064	28.0	19.0	25.9	22.7	20.7	14.9	19.0	22.1	21.7	21.0	24.8	25.8	22.1	18.4	
S13	581990	309145											27.1	28.2	-	-	
S14	581978	309308	25.9	16.4	15.1	13.1	14.5	11.2	12.8	12.4	16.4	11.1	18.0	20.1	15.6	12.9	
T1	581991	309153	33.4	23.4	26.5	20.6	20.8	19.3	22.2	22.4	25.1	22.8	26.0	26.6	24.1	20.0	
T2	581989	309204	20.0	15.8	13.4	9.7	11.0	7.6	14.4	18.6	19.2	19.8	21.9	23.2	16.2	13.5	
T3	587126	283336	27.4	17.9	23.1	19.6	16.2	14.4	7.5	8.1	11.0	13.9	14.7	17.2	15.9	13.2	
W1	586846	282721	17.7	13.5	11.7	8.3	7.6	6.6	7.0	7.0	10.5	12.2	22.2	27.1	12.6	10.5	
W2	587036	284579	32.9	23.3	24.7	21.8	20.4	18.3	20.2	20.0	25.2	22.1	14.2	15.7	21.6	17.9	
20(3), 20(3)A, 20(3)B	591747	300796	10.6	9.6	12.6	6.5	7.6	5.4	6.0	7.2	8.4	10.8	10.5	11.0	8.9	7.3	Triplicate Site with 20(3), 20(3)A and 20(3)B - Annual data provided for 20(3)B only
S30	591885	300622	13.8	10.0	12.7	9.6	7.2	5.6	6.6	8.1	8.9	10.1	12.4	13.3	9.9	8.2	

All erroneous data has been removed from the NO<sub>2</sub> diffusion tube dataset presented in Table B.1.

- Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.
- Local bias adjustment factor used.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column.
- Breckland Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

**Notes:**

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

NO<sub>2</sub> annual means exceeding 60 µg/m<sup>3</sup>, indicating a potential exceedance of the NO<sub>2</sub> 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

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

### New or Changed Sources Identified Within Breckland Council During 2022

Breckland Council has received a range of proposals which could lead to new sources with a potential to impact on air quality in the borough. A significant number of these proposals still await decision on application. These are as follows:

- Construction of 150 dwellings together with associated highway and landscaping works. Currently undecided. Planning reference (3PL/2023/0441/F).
- Reserved Matters application relating to Sub-Phase 1a (Infrastructure) of the consented Attleborough Sustainable Urban Extension, seeking approval of details regarding the northern roundabout junction with Buckenham Road, the High Street and the section of the Link Road connecting the High Street to the western boundary of Phase 1, a new junction on Buckenham Road to the south of Slough Lane, a southern attenuation basin, foul sewer to the proposed Sewage Pumping Station (to be in the southwestern corner of the SUE), temporary site works compound and details relating to layout, scale, appearance and landscaping following outline permission 3PL/2017/0996/O (as amended by 3PL/2021/1668/VAR). Currently undecided. Planning reference (3PL/2023/0278/D).
- Variation of Condition No2 on 3PL/2017/0878/F : Variation to reflect the as-built appearance and layout of the pig sheds, feed silos and manure store cover and proposed amendments including revised external materials and the addition of chimneys. Currently undecided. Planning reference (3PL/2021/0932/VAR).
- Construction of 8 poultry houses, feed bins and ancillary development. Accompanied by an Environmental Statement and non-technical summary. Currently undecided. Planning reference (3PL/2022/1300/F).
- Variation of conditions for 4,000 houses and associated infrastructure. Permission granted. Planning reference (3PL/2021/1668/VAR).
- Permission for the creation of 2 lagoons, 16 lightning rods for the expansion of an existing anaerobic digestion facility to increase throughput. Includes erection of a waste treatment reception building, storage tanks, gas upgrading unit and



associated infrastructure and landscape planting. Permission granted. Planning reference (3CM/2022/0007/CM).

- Permission for the expansion of Wood Lane Farm Poultry farm increasing the number of poultry housed. Application undergoing consultation. Application reference: EPR/FP3409LQ/V003.

## **Additional Air Quality Works Undertaken Breckland Council During 2022**

Breckland Council have commissioned Ricardo to conduct a detailed assessment to consider the revocation of the AQMA to commence in 2023.

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

The diffusion tubes for the year 2022 were supplied and analysed by Gradko International Ltd, the tubes were prepared using the 20% TEA in water method. All results have been bias adjusted, annualised (where required) and expressed as a Time Weighted Annual Mean NO<sub>2</sub> concentration before being presented in Table B.1.

Gradko International Ltd is a UKAS accredited laboratory and participates in laboratory performance and proficiency testing schemes. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO<sub>2</sub> concentrations reported are of a high calibre. The laboratory follows the procedures set out in the Harmonisation Practical Guidance and participates in the AIR proficiency-testing (AIR-PT) scheme. Defra and the Devolved Administrations advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR-PT scheme. Laboratory performance in the AIR-PT is also assessed by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Inter-Comparison Exercise.

In the 2022 AIR-PT results, Gradko scored 100% in AIR-PT AR050 (May – June 2022)<sup>10</sup>. At the time of writing this ASR, there were no results available for July 2022 onwards. The

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<sup>10</sup> Available at [https://laqm.defra.gov.uk/wp-content/uploads/2022/07/LAQM-NO2-Performance-data\\_Up-to-June-2022\\_V2.1.pdf](https://laqm.defra.gov.uk/wp-content/uploads/2022/07/LAQM-NO2-Performance-data_Up-to-June-2022_V2.1.pdf)

percentage score reflects the results deemed to be satisfactory based upon the z-score of  $< \pm 2$ .

### **Diffusion Tube Annualisation**

All diffusion tube monitoring locations within Breckland recorded data capture of at least 75% therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

## Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO<sub>x</sub>/NO<sub>2</sub> continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Breckland Council have historically applied a local bias adjustment to diffusion tube data in previous ASRs. A local bias adjustment was determined for 2022 using the two triplicate co-location sites S3(3), S3A(3) and S3B(3) and 20(3), 20(3)A and 20(3)B, which were compared with their respective co-located automatic continuous monitoring sites: Swaffham (BRE02) and East Wretham (BRE01). However, as both automatic continuous monitoring sites saw poor data capture across multiple months in 2022 at <75% data capture, the local bias adjustment factor of 0.84 has not been used.

Instead, Breckland Council have applied a national bias adjustment factor of 0.83 to the 2022 monitoring data. A summary of bias adjustment factors used Breckland Council over the past five years is presented in Table C.1.

**Table C.1 – Bias Adjustment Factor**

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.83
2021	Local	-	0.84
2020	Local	-	0.81
2019	Local	-	0.95
2018	Local	-	0.89

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

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

automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO<sub>2</sub> monitoring locations within Breckland Council required distance correction during 2022 as there were no monitoring site where the annual mean concentration is greater than 36µg/m<sup>3</sup> and the monitoring sites are located at a point of relevant exposure.

## QA/QC of Automatic Monitoring

Within Breckland Council, there are two automatic monitoring sites (BRE01 and BRE02). Breckland Council members are the Local Site Operator (LSO) for these two sites and carry out calibrations routinely. BRE02 is audited by Ricardo Energy and Environment (Ricardo) and both sites are Quality Assurance/Quality Control (QA/QC) by Ricardo. The Engineer Support Unit (ESU) for both of these sites is Matts Monitors Air Monitoring Systems.

The 2022 data was marked as 'ratified' at the time of writing this report. All live and historic data is available through the Air Quality in England website, available at <https://www.airqualityengland.co.uk/>.

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

PM<sub>10</sub> monitoring is carried out by a TEOM1400AB analyser. As stated in LAQM. TG(22) Chapter 7, the PM<sub>10</sub> TEOM1400AB can be used by local authorities after correction by the Volatile Correction Model (VCM). This method adds the 1.87 times the volatile fraction as measured by remote FDMSs to the TEOM data in order to correct for the underestimation of PM concentrations by the TEOM. This process is carried out by QA/QC processes, not by Breckland Council. VCM PM<sub>10</sub> data is available at [airqualityengland-statistics-report-BRE01-2021link.pdf](#).

Currently there is not any monitoring of PM<sub>2.5</sub> completed within Breckland. However, in accordance with LAQM. TG(22) Annex B: Derivation of PM<sub>2.5</sub> to PM<sub>10</sub> Ratio, the PM<sub>2.5</sub> concentrations can be estimated from PM<sub>10</sub> monitoring using either a local PM<sub>10</sub> and PM<sub>2.5</sub> monitoring ratio, or a nationally derived correction ratio of 0.7. As there is no local monitoring for PM<sub>2.5</sub>, the nationally derived correction ratio of 0.7 was applied to the 2022 annual mean PM<sub>10</sub> concentration (15 µg/m<sup>3</sup>) at the automatic monitoring site East Wretham (BRE01). Therefore, the estimated annual mean PM<sub>2.5</sub> concentration in 2022 at

the automatic monitoring site is  $10.5 \mu\text{g}/\text{m}^3$ , which is below the  $\text{PM}_{2.5}$  obligatory air quality objective of  $25 \mu\text{g}/\text{m}^3$ .

### Automatic Monitoring Annualisation

The automatic monitoring site at East Wretham (BRE01) had low data capture for  $\text{NO}_2$  (47.6%),  $\text{PM}_{10}$  (67.6%) and  $\text{O}_3$  (59.7%). Annualisation for each of the pollutants was carried out according to the guidance found in chapter 7 of LAQM.TG22, with annualisation factors and results presented in Table C.1.

Background sites at Norwich Lakenfields, Wicken Fen, and St Osyth were used to calculate the  $\text{NO}_2$  annualization factor. Sites at Norwich Lakenfields and South Holland Spalding Monkhouse School were used to calculate the  $\text{PM}_{10}$  annualisation factor. Sites at Norwich Lakenfields, Wicken Fen, Sibton, and Weybourne were used to calculate the  $\text{O}_3$  annualisation factor.

**Table C.2 – Annualisation Summary (concentrations presented in  $\mu\text{g}/\text{m}^3$ )**

Site ID	Annualisation Factor Norwich Lakenfields	Annualisation Factor Wicken Fen	Annualisation Factor St Osyth	Annualisation Factor South Holland Spalding Monkhouse School	Annualisation Factor Sibton	Annualisation Factor Weybourne	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
BRE01 – $\text{NO}_2$	0.83	0.80	0.88	-	-	-	0.84	9.1	7.6
BRE01 – $\text{PM}_{10}$	0.93	-	-	0.99	-	-	0.96	15.7	15
BRE01 – $\text{O}_3$	1.13	1.11	-	-	1.10	1.08	1.11	44.9	49.7

### $\text{NO}_2$ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the  $\text{NO}_2$  concentration at the nearest location relevant for exposure has been estimated using the  $\text{NO}_2$  fall-off with distance calculator available on the LAQM

Support website. Where appropriate, non-automatic annual mean NO<sub>2</sub> concentrations corrected for distance are presented in Table B.1.

No automatic NO<sub>2</sub> monitoring locations within Breckland Council required distance correction during 2021.

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

Figure D.1 – Map of All Monitoring Site in Breckland Council

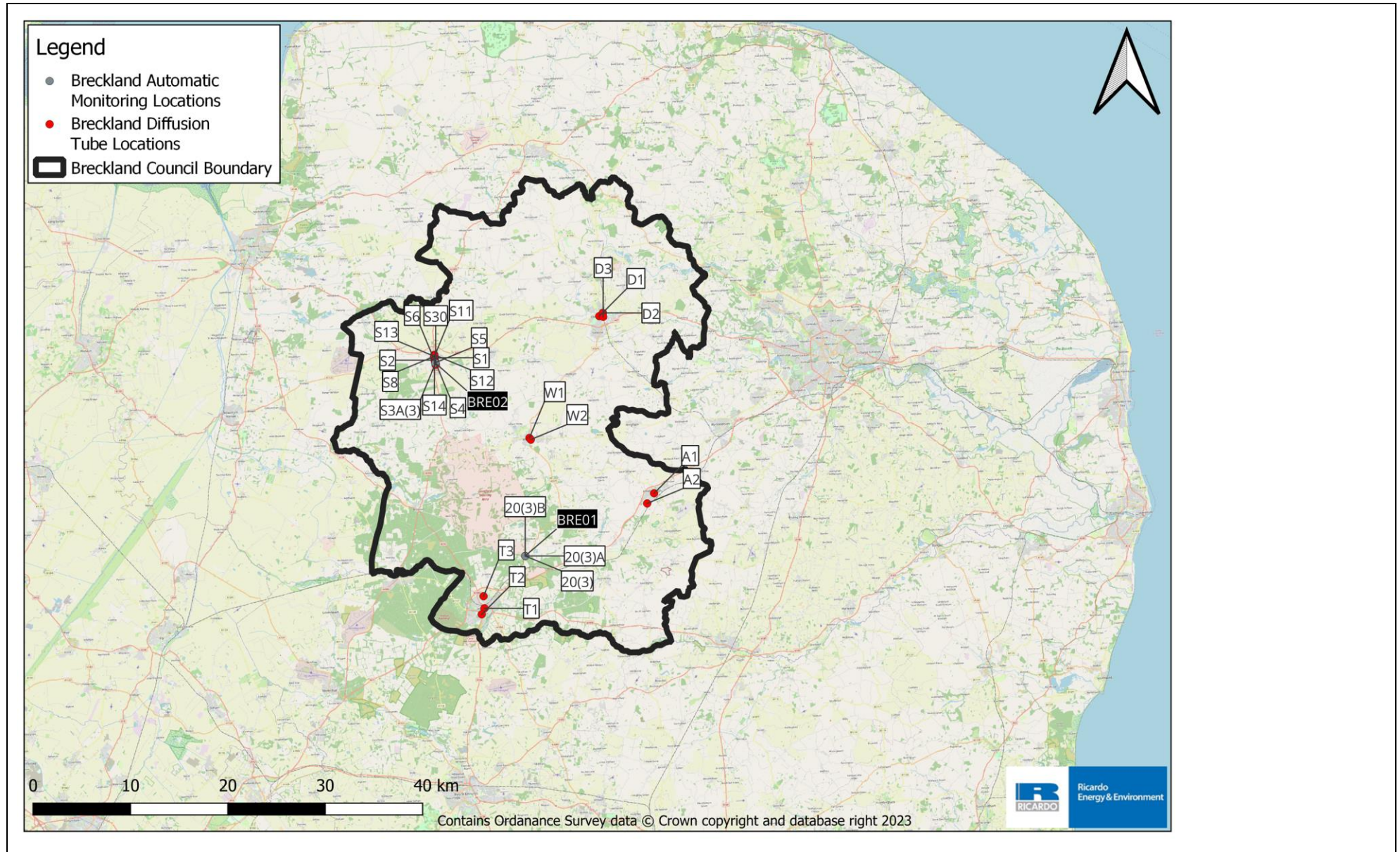




Figure D.2 – AQMA and diffusion tubes

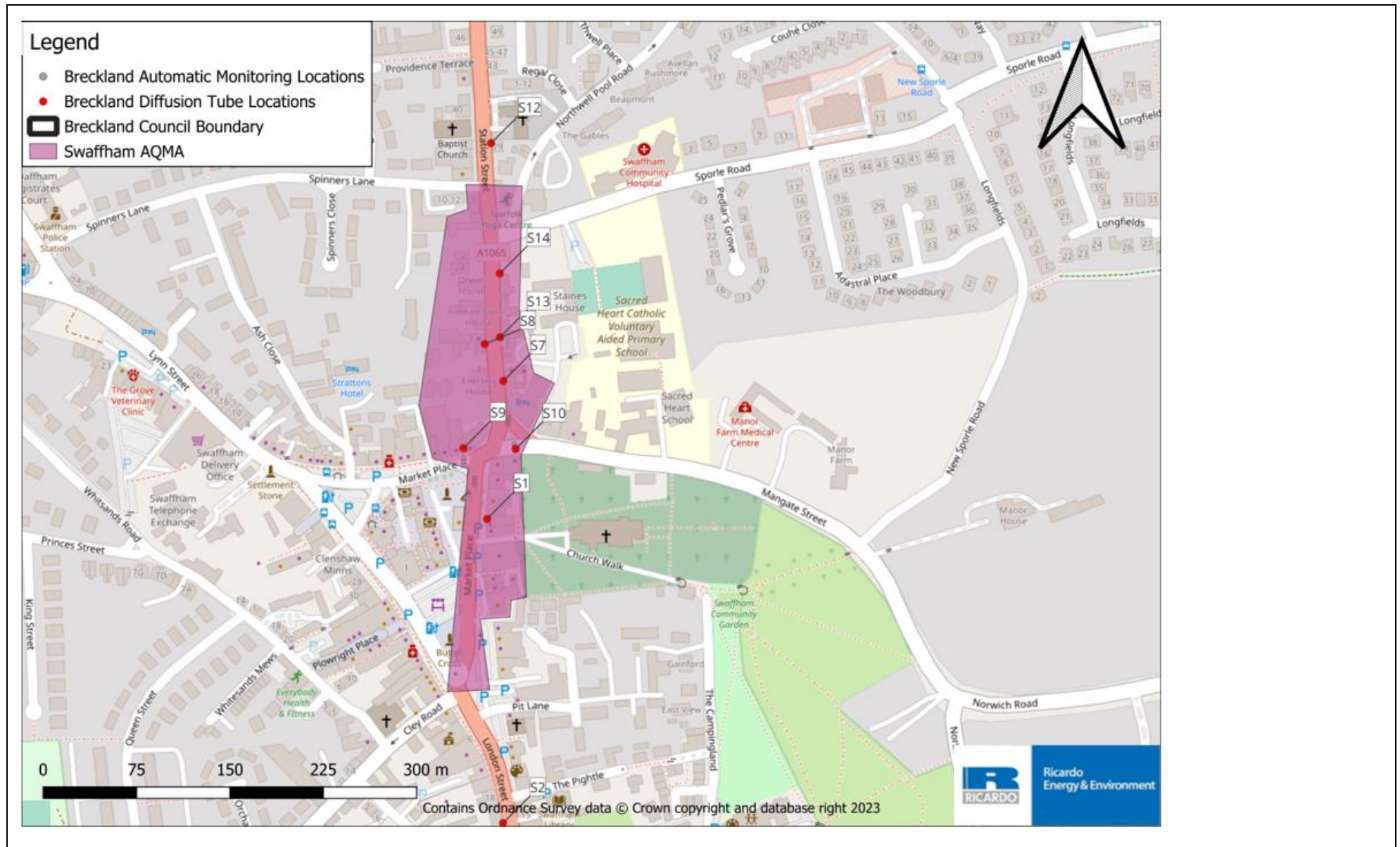


Figure D.3 – Swaffham monitoring sites

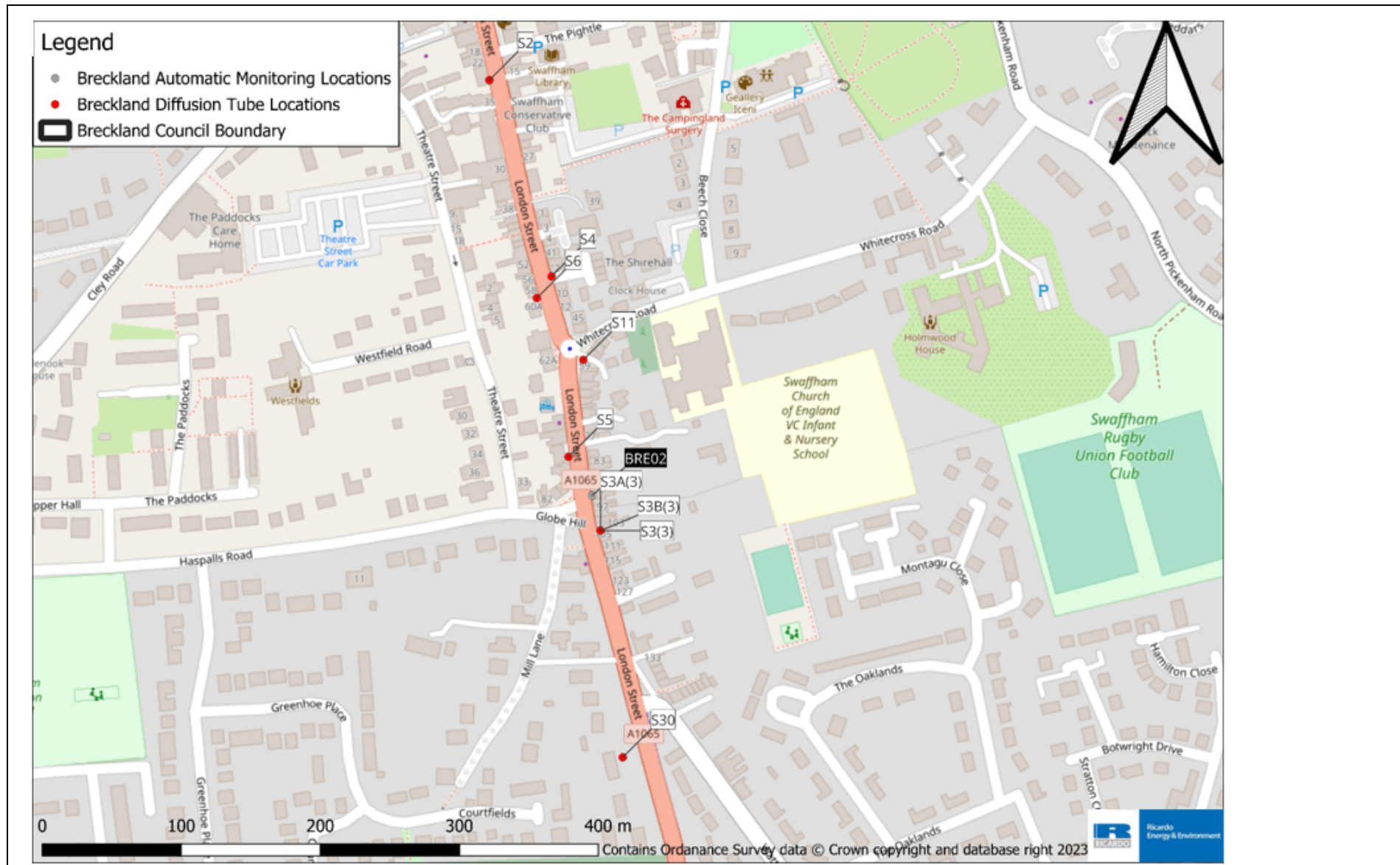


Figure D.4 – Dereham Diffusion Tubes

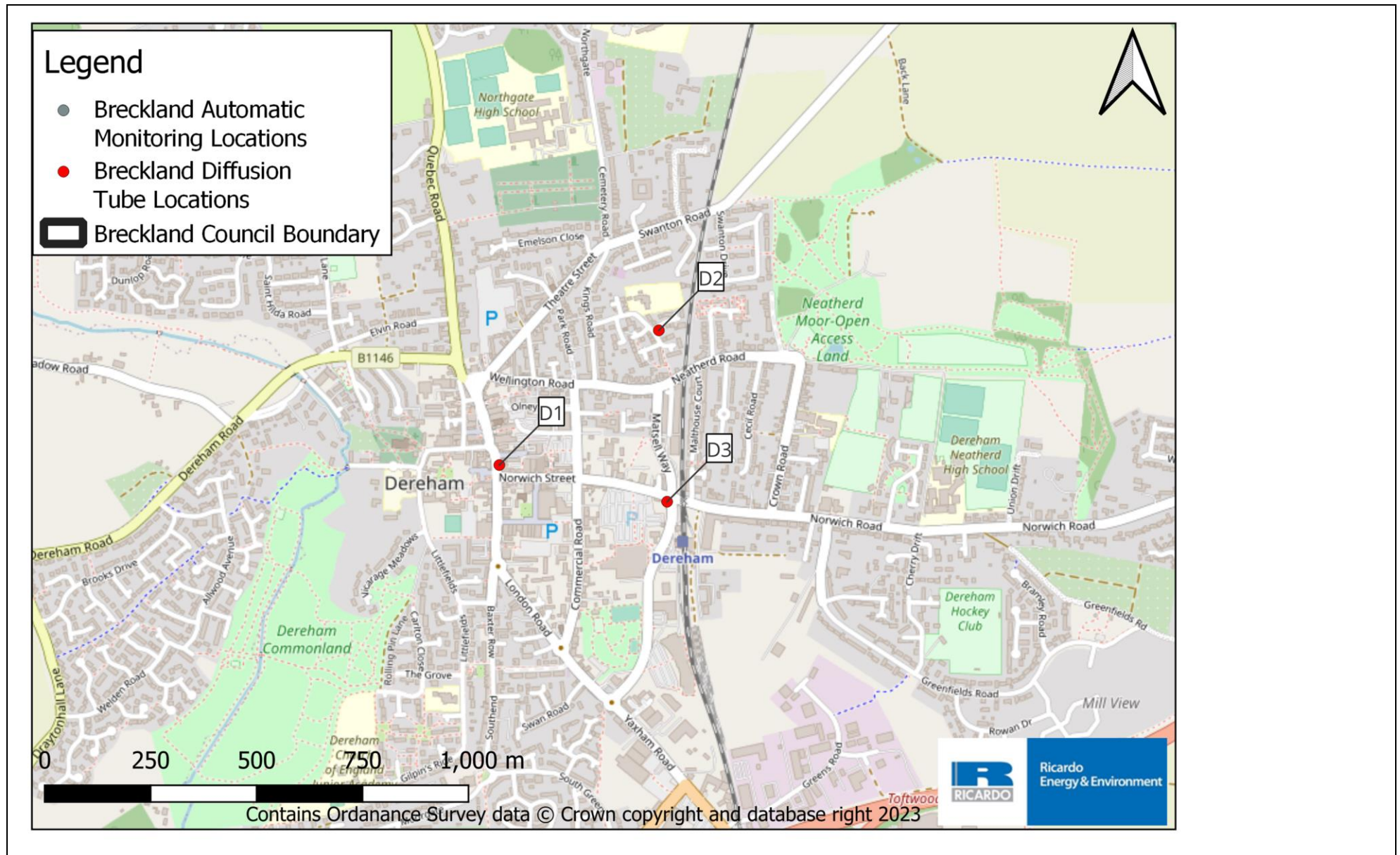


Figure D.5 – Watton Diffusion Tubes

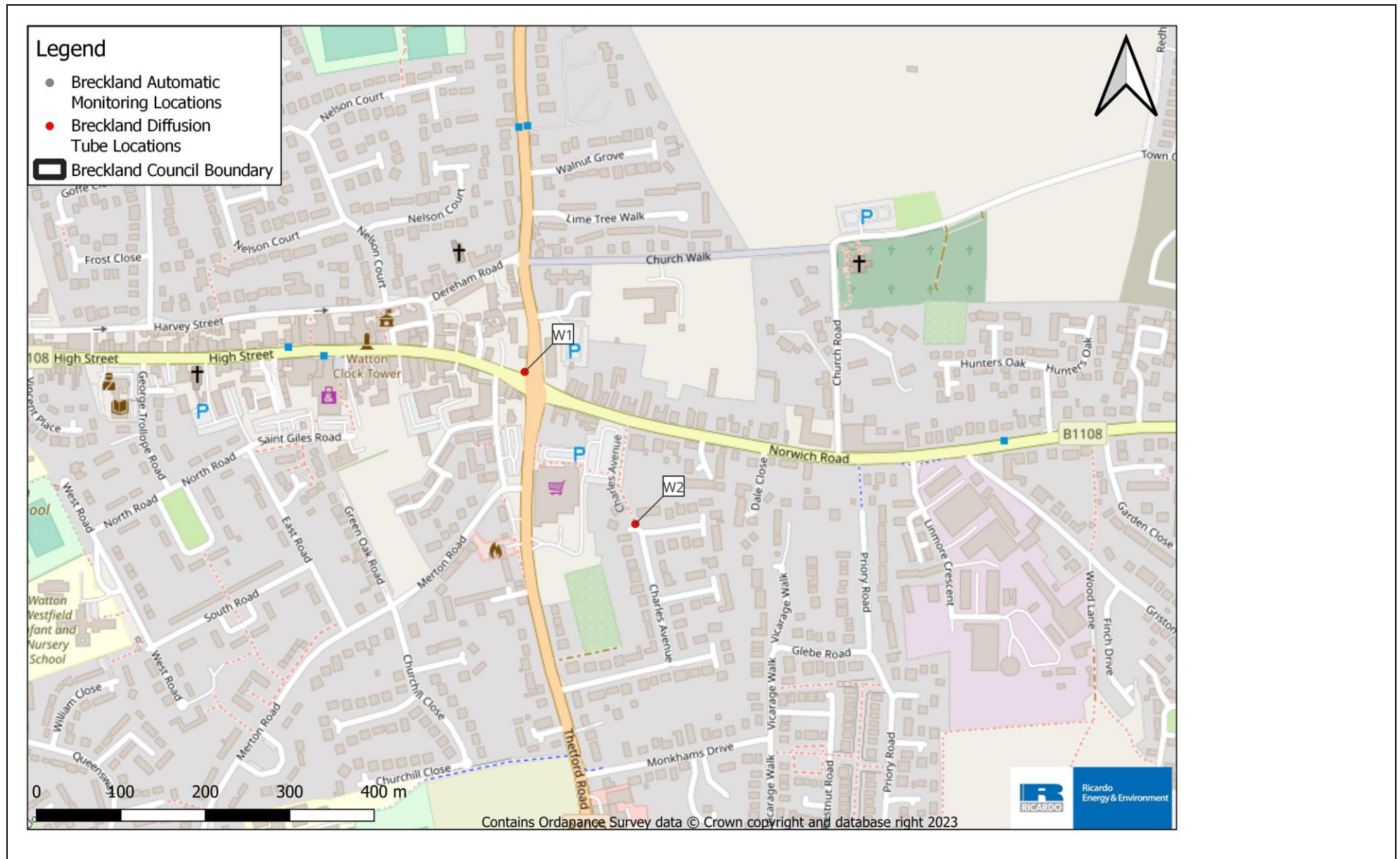


Figure D.6 – Attleborough Diffusion Tubes

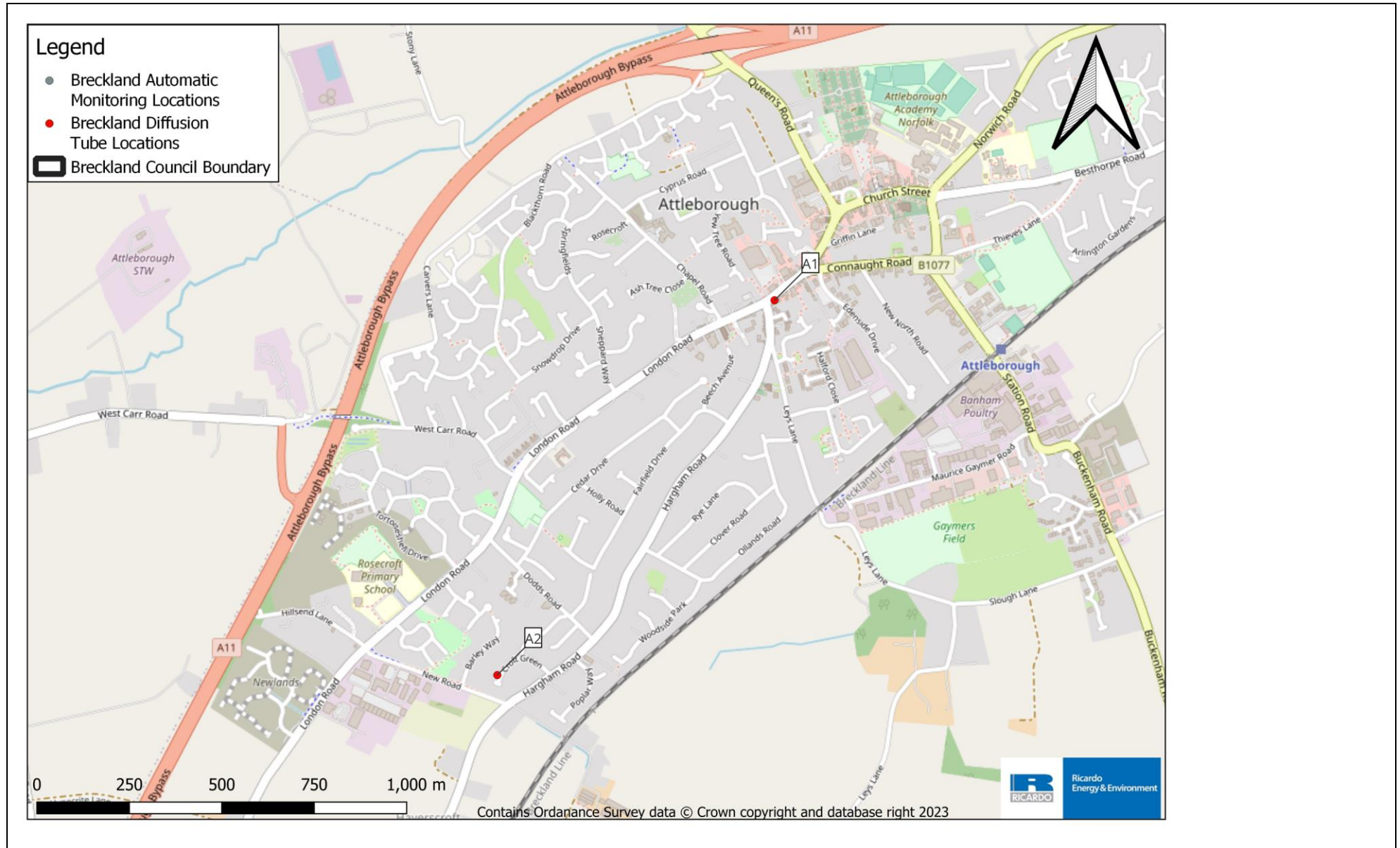


Figure D.7 – Wretham Monitoring Sites

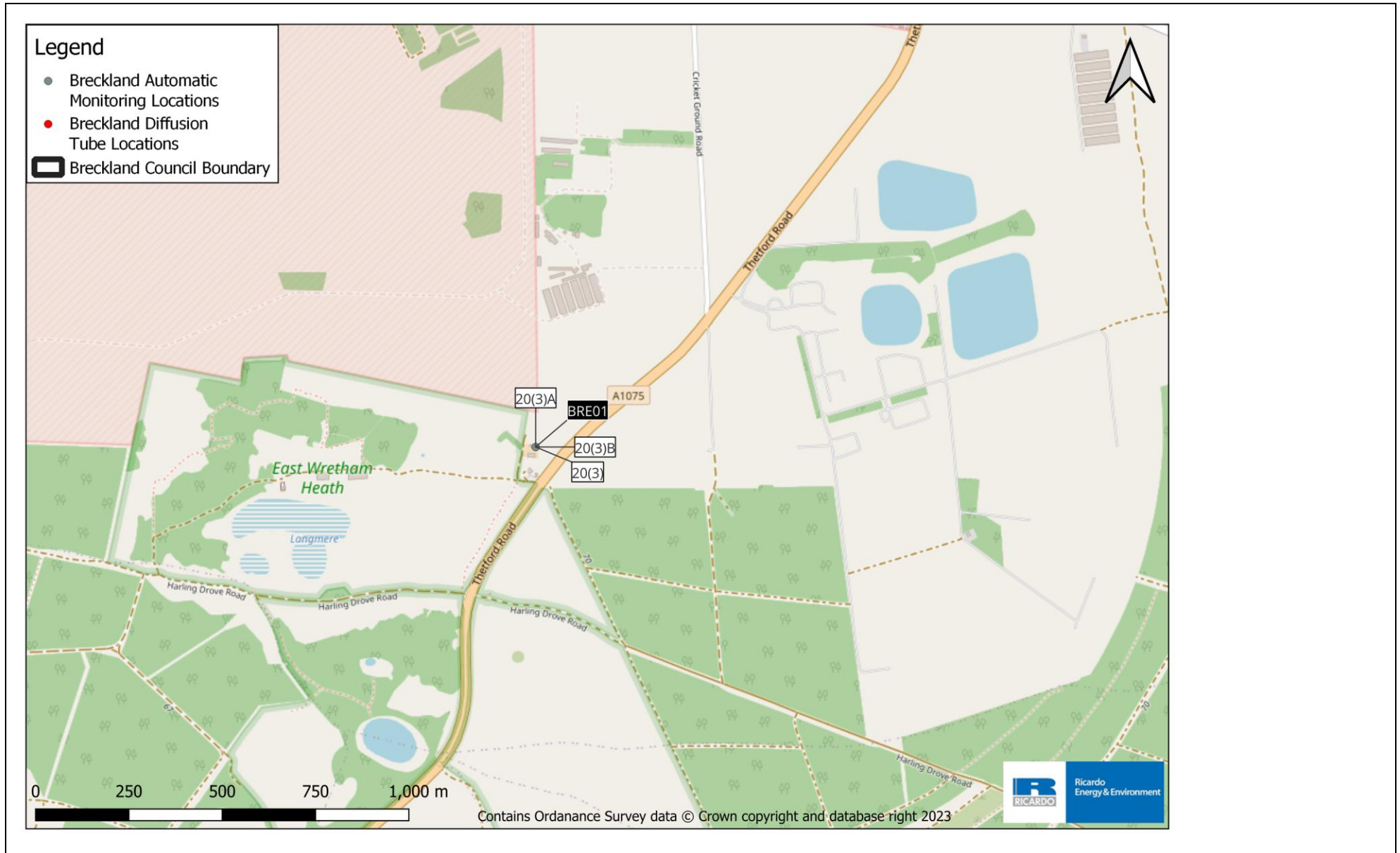
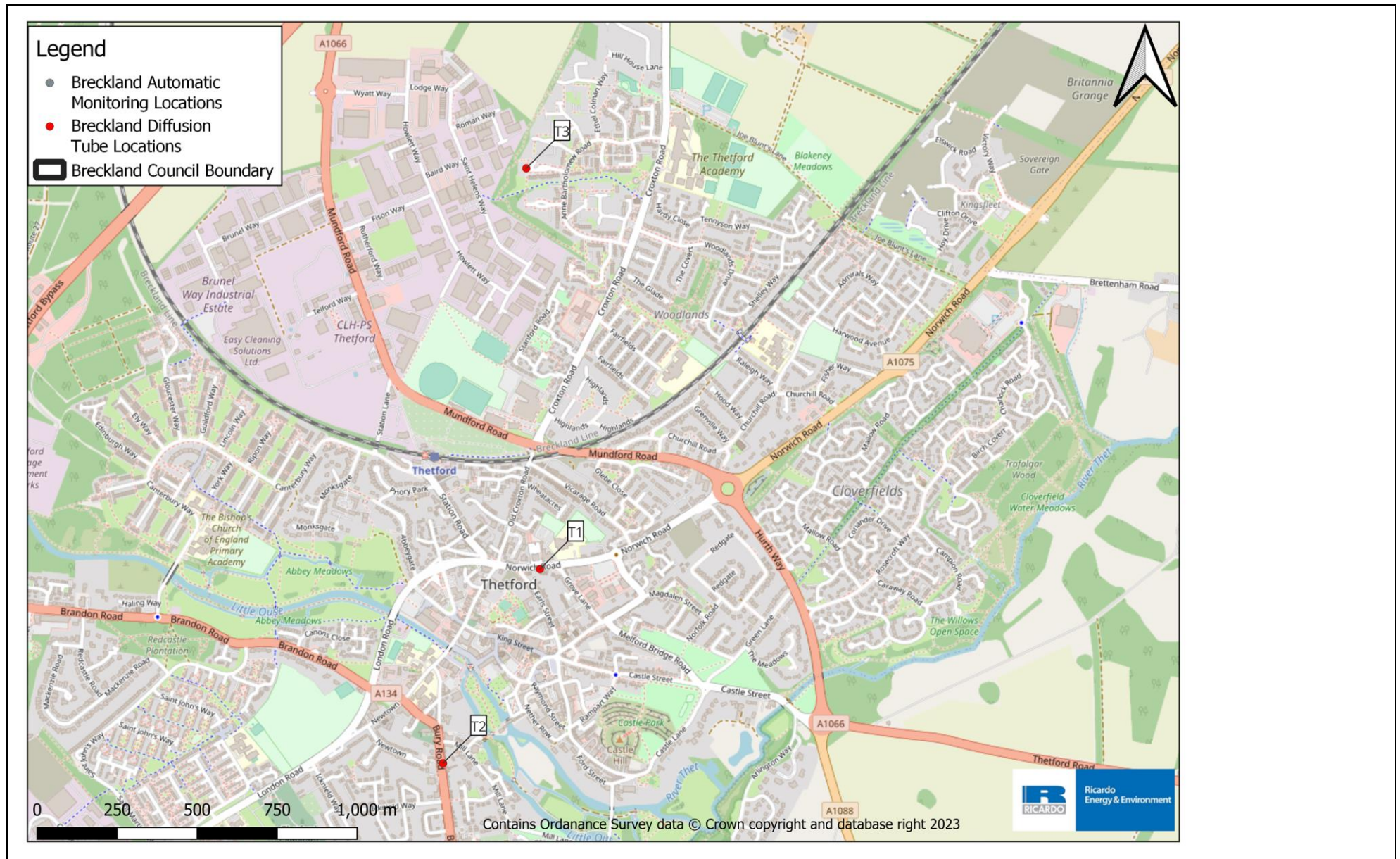


Figure D.8 – Thetford Diffusion Tubes







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

**Table E.1 – Air Quality Objectives in England<sup>11</sup>**

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

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<sup>11</sup> The units are in microgrammes of pollutant per cubic metre of air (µg/m<sup>3</sup>).

## Glossary of Terms

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

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- Breckland Council Air Quality Action Plan, available at [Breckland Council Air Quality Action Plan](#)
- New household waste contract to start in Breckland and west Norfolk, article available at [New household waste contract to start in Breckland and west Norfolk \(serco.com\)](#)
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- LAQM Diffusion Tube Data Processing Tool, available at [Air Quality Assessment | LAQM \(defra.gov.uk\)](#)

- LAQM National Diffusion Tube Bias Adjustment (03/23), available at [National Bias Adjustment Factors | LAQM \(defra.gov.uk\)](#)
- LAQM NO<sub>2</sub> Performance Data, available at [WASP – Annual Performance Criteria for NO<sub>2</sub> Diffusion Tubes \(defra.gov.uk\)](#)