
Tunbridge
Wells Borough
Council

2022 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: June, 2022

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Executive Summary: Air Quality in Our Area

Air Quality in Tunbridge Wells Borough

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[1,2].

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

Tunbridge Wells is a borough in the county of Kent. Kent is the most populous County Council area in the South East Region with a 2020 mid year population of 1,589100. Of all the Counties in the South East Region, Kent experienced the largest increase in population in absolute terms between 2019 and 2020, growing by 7500 people (0.47%). The borough of Tunbridge Wells consists of the main town of Royal Tunbridge Wells and a number of small towns and villages including Paddock Wood, Cranbrook and Hawkhurst. The borough is largely rural in character.

The mid-year population of the borough in 2020 was 118,900, which represents 7.5% of the population of Kent, based on figures from Kent County Council[1]. This was up from 118,700 in 2019 and is expected to rise to 122,700 by 2026. The main roads which serve the borough include the A26, A264, A267 and the A21.

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, July 2021

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

Royal Tunbridge Wells suffers from congestion, particularly on the approach roads to the town centre. Other pollution sources, including commercial, industrial and domestic sources, also contribute to the background pollution concentrations.

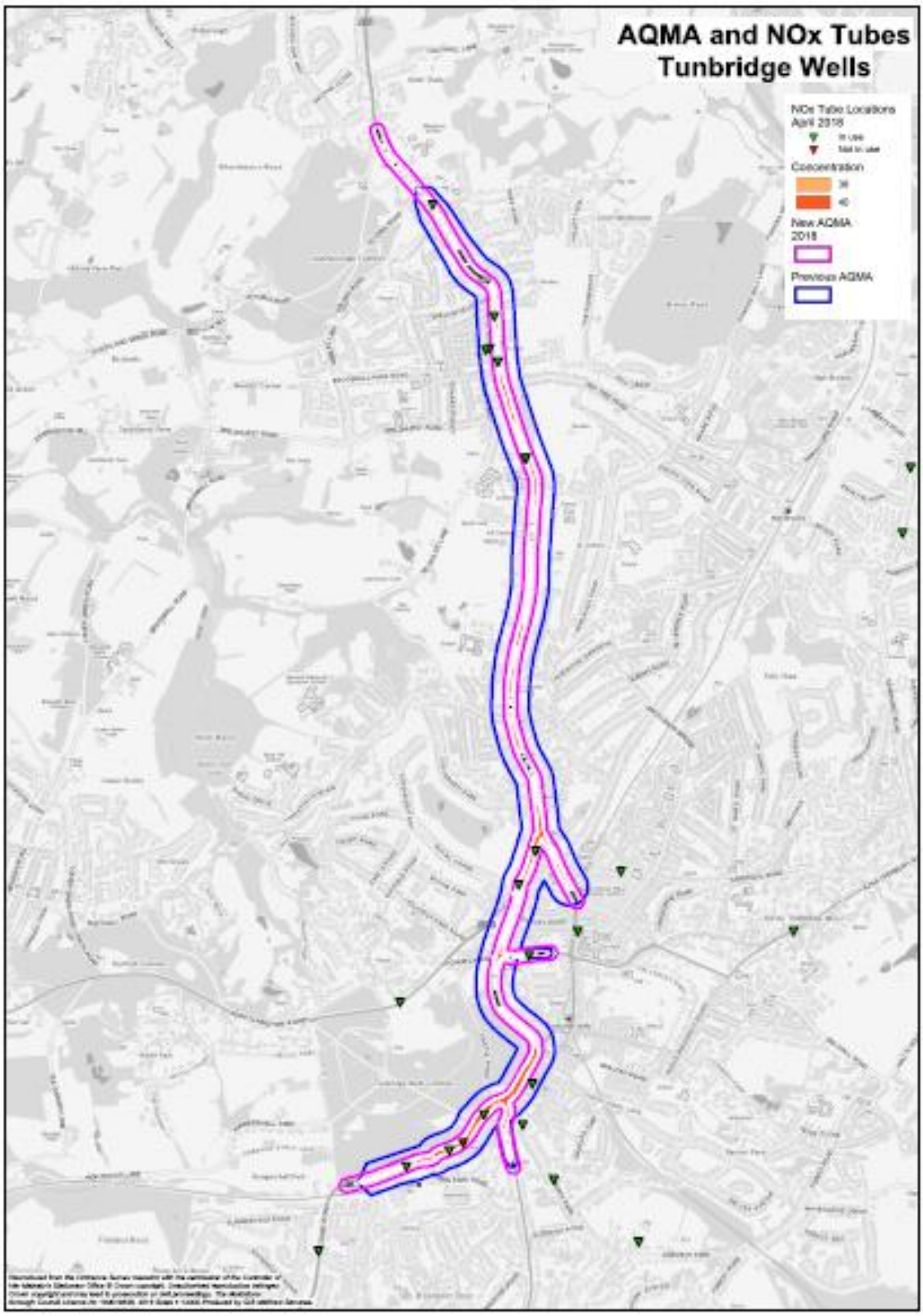
There are two Air Quality Management Areas (AQMAs) declared in the Borough due to exceedances of the annual mean Air Quality Strategy (AQS) objective for nitrogen dioxide (NO_2).

The A26 (Town Centre) AQMA

The main A26 (Town Centre) AQMA A26 AQMA was originally declared in 2005 and extended in 2011 due to exceedances outside of the original AQMA boundaries. At the end of 2016, Tunbridge Wells BC commissioned Air Quality Consultants Ltd to review the boundaries of its AQMA again. The review concluded that the northern and southern ends of the AQMA could be extended, but that the width of the AQMA could be reduced. This process was formally completed in 2018, with the new AQMA taking effect from 1st September 2018.

Comparison of new and old AQMA

Figure 1: Changes to Tunbridge Wells AQMA.



The Action Plan adopted by the Council in 2010 was largely completed by 2017, therefore a new action plan was produced during 2018 to cover the period 2018 to 2023. The new plan was adopted by the council in early 2019 and actions are currently being implemented, although progress in 2020 and 2021 was hampered by the COVID pandemic.

The 2021 annual mean NO_2 level, measured at the A26 St John's Roadside automatic monitoring location decreased to 26µgm^{-3} from 31µgm^{-3} in 2020. This was somewhat unexpected as we thought the pandemic had a less significant effect on traffic volumes expected in 2021 than it did in 2020. We noted, however, that many of the diffusion tube sites did show small increases in NO_2 levels in 2021 compared to 2020. We note that of the 29 tube sites where a comparison was possible, 16 sites showed an increased level, 10 sites were unchanged, which we define as the 2021 level being within ±1µgm^{-3} of the 2020 level, and three tube sites indicated a lower level in 2021 compared to 2020.

The 1-hour objective for NO_2 was met yet again at the automatic monitoring station, with no instances of the hourly mean exceeding 200µgm^{-3}. No exceedances of the hourly mean have been recorded in the last five years. We believe there has probably been a continuing trend of reductions in underlying NO_2 levels across the borough in the last 6 or 7 years, but the pandemic has rather masked this trend in the last couple of years.

Nevertheless, we have seen a steady decline in NO_2 levels at the automatic monitoring station over the past seven years, during which annual mean NO_2 levels have dropped from 48ugm^3 in 2014 to 26 ugm^3 in 2021. This reflects a national downward trend in pollution levels which is occurring as a result of the introduction of Euro VI engines, increased uptake of electric and hybrid vehicles, and the natural disappearance of some of the oldest and most polluting vehicles from the roads as they reach the end of their service lives. Since 2016, there have been no exceedances of the annual mean objective at relevant receptors.in the main AQMA.

More generally, however, in 2021, although the NO_2 levels measured at many of the diffusion tube sites appear to have slightly increased from their 2020 levels, they have by no means returned to their 2019 levels. The likely explanation is that 2021 was impacted less by COVID than 2020 was. It is nevertheless our assumption that the downward trend described above would still have continued in 2020 and 2021, even in the absence of COVID. Therefore we don't anticipate seeing future NO_2 levels returning to pre-pandemic levels. Nevertheless, although we are minded to revoke the main AQMA in Tunbridge Wells, we are proceeding with caution as it is clear that 2020 and 2021 data, have been affected by COVID and are therefore not a sound basis for making decisions about the AQMA.

In 2021, two diffusion tube locations recorded annual mean NO_2 levels above the annual mean objective. The two locations were TW63 and TW82.

TW63 is a triplicate site in the new Hawkhurst AQMA, and the annual mean recorded there showed a marginal exceedance of 40.4µgm^{-3}. The site was not distance corrected by the

diffusion tube data processing tool since it is on the façade of a building, but there is no residential property in that part of the building at ground floor level. The nearest relevant residential exposure is at first floor level, so is almost certain to be below the objective. TW63 is one of 10 diffusion tube locations currently active in Hawkhurst. None of the other locations was within 10% of the NO_2 annual mean objective in 2021.

TW82 was a new site for 2021 by Dorin Court on the Pembury Road. Pembury Road is one of the busier roads in Tunbridge Wells, and is prone to congestion at peak times, so high NO_2 levels would be expected by the roadside, however, the road is very wide, with few obstacles to the dispersion of NO_2, and the residential properties are well spaced and set well back from the road. Tube TW82 recorded an annual mean NO_2 level in 2021 of 41.7µgm^{-3}. This was distance corrected to 27.2µgm^{-3} at the nearest relevant receptor.

The Hawkhurst AQMA

A new AQMA was declared in Hawkhurst Hawkhurst AQMA at the end of 2021. This was based on a detailed assessment carried out in 2020 by Air Quality Consultants Ltd (AQC) based on data from 2019, and reported in the 2021 ASR.

In 2020, site TW63 (Smugglers Rest) was upgraded to a triplicate site to improve the robustness of the data. Two additional sites were established in Hawkhurst, namely TW78 and TW79, (see Map 13) although exceedances are not thought likely at these locations.

The detailed air quality assessment of Hawkhurst undertaken in 2020 was reported in the 2021 ASR. The conclusion recommended that a small AQMA should be declared on the uphill section of Cranbrook Road, which would include about 30 properties. TWBC accepted this recommendation, and declared the AQMA in December of 2021. A copy of the AQMA order is shown below.

TUNBRIDGE WELLS BOROUGH COUNCIL

THE HAWKHURST AIR QUALITY MANAGEMENT AREA (AQMA) ORDER 2021

ENVIRONMENT ACT 1995 PART IV – SECTION 83(1)

Whereas Tunbridge Wells Borough Council ("The Council") is satisfied that as a result of its air quality review and the Detailed Assessment report dated June 2020 the air quality objective for Nitrogen Dioxide (NO_2) (annual mean) may not be achieved by the relevant date prescribed by the Air Quality (England) (Wales) Regulations 2000 in some parts of the area described below.

The Council, in exercise of the powers conferred on it by section 83(1) of the Environment Act 1995 HEREBY ORDER THAT:-

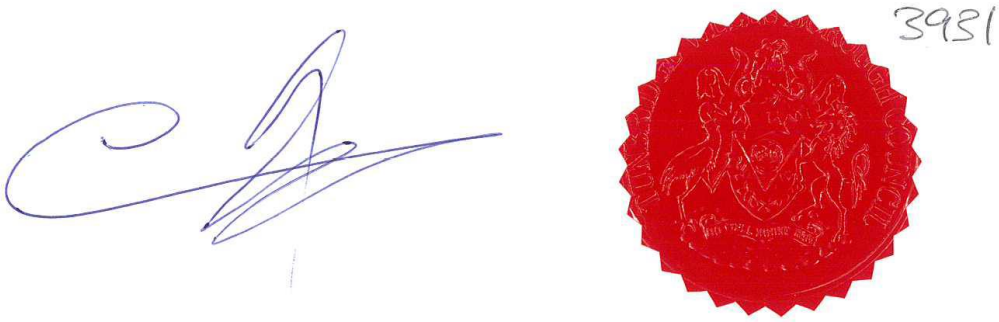
1. Residential properties in the southern part of Cranbrook Road in the centre of Hawkhurst, as outlined in red on the attached map shall be designated as an Air Quality Management Area, to be known as the Hawkhurst Town Air Quality Management Area.

2. The Air Quality Management Area will be an air quality management area in relation to Nitrogen Dioxide (NO_2) only.

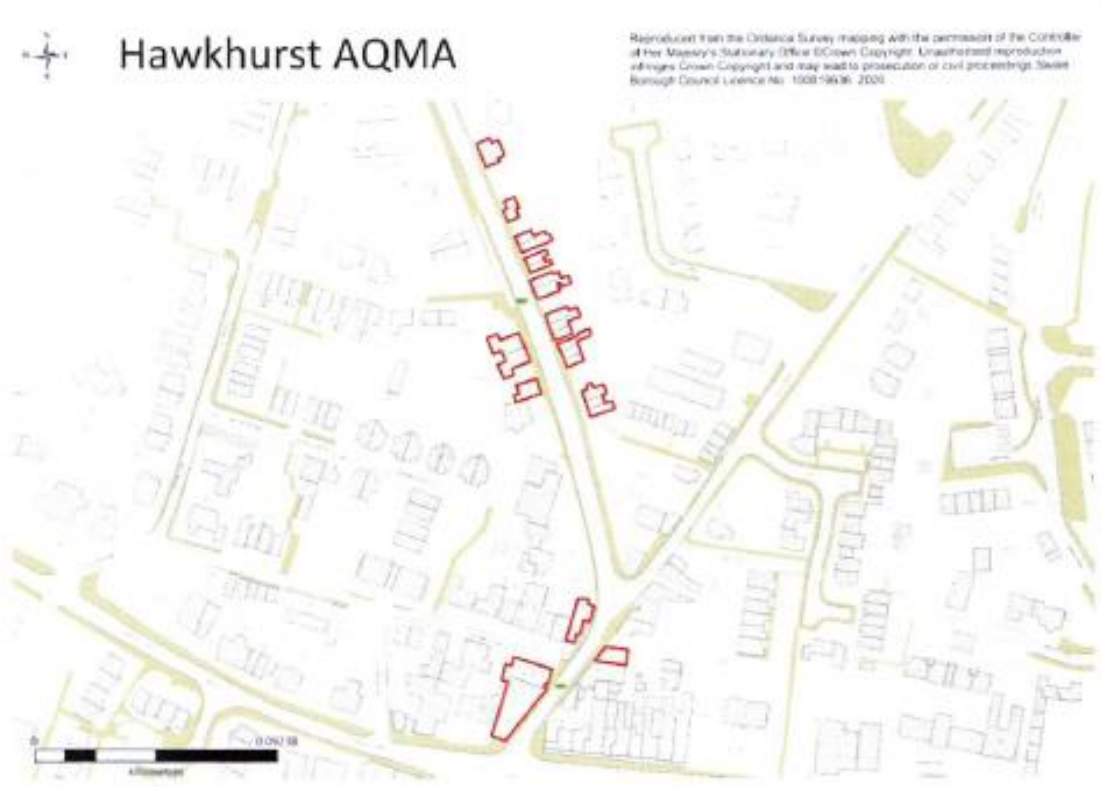
3. The order shall be cited as The Hawkhurst Air Quality Management Area Order (2021).

4. The order shall come into force on 1st December 2021 and shall remain in force until varied or revoked by subsequent order.

THE COMMON SEAL OF TUNBRIDGE WELLS BOROUGH COUNCIL WAS HERE UNTO AFFIXED ON THE 1st DAY OF December 2021 AND SIGNED IN THE PRESENCE OF Solicitor – Authorised Signatory



Authorised Signatory



It remains the view of officers that the 2019 data was somewhat anomalous, particularly for site TW63, as it showed very large fluctuations between months which could not be explained. One of the highest levels was recorded in June 2019, which would normally be expected to be one of the lowest months of the year. The preferred approach would have been to re-evaluate the need for an AQMA based on 2020 data. It was noted that NO_2 levels in January and February 2020 (ie prior to the first COVID lockdown) were considerably lower than the corresponding months in 2019. However, the remainder of 2020 results were affected by lockdowns, (some more than others) so could not inform the decision about whether or not to declare the AQMA.

A limited consultation exercise was undertaken in the summer of 2020, to inform local residents about the AQMA. A more extensive consultation with local residents and other

stakeholders will take place on the proposed new AQAP which we expect to finalise a draft of by August 2022, with the consultation running between September and November 2022.

Whilst a full AQAP is yet to be developed, as an interim measure, TWBC has developed a planning position statement which describes how air quality considerations will be addressed for planning applications in the vicinity of Hawkhurst. The planning position statement can be found here:-

Hawkhurst Planning Position Statement

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[5] sets out the case for action, with goals to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

The priorities for our effort and resources in 2021 were:-

- To complete the declaration of the new AQMA in Hawkhurst
- To progress the development of the DEFRA funded digital schools air quality resource which we now call ‘Pollution Patrol,’
- To procure a new contract for air quality data management and ratification after the existing contract with ADMS ended in March 2021.
- To explore the opportunities for funding the purchase of a $PM_{2.5}$ analyser for TWBC

Our expenditure of effort on these priorities precluded a lot of progress on the main Air

[5] Defra. Clean Air Strategy, 2019

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Quality Action Plan, but we recognise that the A26 AQMA has been in compliance with the AQS objectives for some time, and we expect it to be revoked in the near future.

For ease of reference, the summary of progress on the action plan given below is largely reproduced from the 2021 ASR with minor updates where appropriate.

The new Air Quality Action Plan (AQAP) for Tunbridge Wells Borough Council was adopted by the council in early 2019. The aims of the action plan are as follows:

1. To ensure that TWBC is complying with relevant air quality legislation.
2. To achieve a higher standard of air quality across the Tunbridge Wells borough.
3. To engage with partners and colleagues including those representing Highways and Transportation, Public Health, Economic Development, local bus companies and other relevant stakeholders, to improve air quality across the borough.
4. To build on previous work in this area in order to drive further improvements in air quality with the ultimate aim of being able to revoke the Air Quality Management Area.

The proposed general borough-wide measures to improve air quality include:-

- Support for measures to increase the use of sustainable transport modes such as walking and cycling.
- Investigation of a Low Emission Standard for buses.
- Incorporation of an SPD into the emerging Local Plan
- Improve the vehicle emissions for taxis.
- Reduce the idling of engines whilst stationary.
- Engaging with schools to reduce the impact of school traffic.
- Incorporate initiatives into planning policy and the local plan

In addition, a few of the existing policies and strategies also in place to help improve air quality within the borough include:

- Kent and Medway Air Quality Partnership Air Quality and Planning Technical Guidance (Updated 2016)
- Kent County Council Local Transport Plan (2016-2031)
- Tunbridge Wells Borough Local Plan (2006) (currently being updated). The draft Local Plan went out for public consultation in Autumn 2019.
- Tunbridge Wells Borough Development Plan – Transport strategy (2015 – 2026)

Our Clean Air For Schools (CAFS) project continues to run across the boroughs of Tunbridge Wells Borough Council (TWBC), Maidstone Borough Council (MBC) and Swale Borough Council (SBC). In practice, little engagement with schools was possible in 2021, owing to the pandemic, however, the scheme will certainly resume as soon as conditions allow. The scheme has been extremely successful in introducing the subject of air quality to pupils and teachers, promoting our anti idling campaign and encouraging the school to consider how their individual behaviour can help to improve the air quality in their local community. We have engaged with over 80 primary schools since 2018 across the three boroughs by delivering interactive assemblies, creating a CAFS information section on each local authority website and creating additional teaching material. The Pollution Patrol digital schools air quality resource is expected to become a major vehicle for engagement with schools once it is launched in 2022.

As part of the CAFS project, schools were also able to borrow a ‘Plume Flow’ indicative pollution monitoring device, in order to conduct their own experiments, for example comparing pollution levels of different routes to the school or pollution encountered whilst using different modes of transport to school, e.g. walking, cycling, car, bus etc.

In 2021, TWBC, as part of the Mid Kent Environmental Health Partnership, in partnership with Canterbury City Council, was awarded an air quality grant from DEFRA for £103,000 in order to develop a digital resource to educate and inform children about air quality in a fun and interactive way. Excellent progress on the development of this resource has been made during 2021. It is hoped that this resource will ultimately be rolled out across the whole of Kent.

We have produced a new anti-idling sign, as shown below, which is being deployed at various locations around the Borough. Our Parking Services team are also using this sign where they find appropriate locations, and have started an ‘education campaign of speaking to motorists who they find idling their engines, but stopping short of formal enforcement.

Figure 2: New Anti-Idling Signage Deployed in Tunbridge Wells

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

Details of all measures completed, in progress or planned are set out in **Error! Reference source not found.**. More detail on these measures can be found in their respective Action Plans including the Tunbridge Wells Borough Council Air Quality Action Plan (2018-2023), Tunbridge Wells Borough Development Plan Transport Strategy 2015 – 2026 (July 2015), Kent County Council Local Transport Plan (2016-2031), Tunbridge Wells Borough Council Draft Local Plan relating to the Council's proposed strategy for the future development in the borough (public consultation carried out in September to November 2019) with the aim for adoption in early 2022.

Actions from the AQAP are included in this report at Appendix 2.2. The actions fall into three themes, namely Transport, Planning and Public Health. Examples of actions included in the Action Plan are:-

- Support for measures to increase the use of sustainable transport modes such as walking and cycling.
- Consider the establishment of an Air Quality Protection zone to replace the AQMA, when we are confident that the AQMA can be revoked.
- Expansion of the Car Club scheme.
- Investigation of a Low Emission Standard for buses.
- Incorporation of an air quality SPD into the emerging Local Plan
- Use S106 funding to introduce a bike share scheme.
- Engaging with schools to reduce the impact of school traffic.

AQAP progress summary

Cycling, walking and alternative transport schemes

- **TR 1 - Support the development of cycling and walking infrastructure to increase the use of sustainable transport modes such as walking and cycling** - The Local cycling and walking infrastructure plan that focuses on Tunbridge Wells Town Centre has been prepared in draft and due to go out to consultation.. **Ongoing in 2021.**
- **TR 4 - Review opportunities to facilitate the implementation of a Bike Share Scheme. With possible options to provide initial support funding using S106 or grant funding, including. private investor funding. Including as appropriate docking stations and electric bicycle facilities** - Funding has been identified by Kent County Council to investigate the potential of implementing an electric bike share scheme in Tunbridge Wells and are currently at the very early stages of a scoping report. **Stalled through lack of resources for the time being.**
- **PH1 - Infrastructure developments in parks to support cycling and walking links to and through parks to enable sustainable access and support commuting routes**. Improvements to the 21st Century Way cycle route have been delivered which links to Grosvenor & Hilbert Park and Colebrook Recreation Ground. The draft LCWIP analyses several walking and cycling routes through parks and across the Commons in Tunbridge Wells and Rusthall. **Partially completed**

Buses, public transport and taxis

- **TR 2 - Securing Grant funding for buses –** KCC was successful in get some grant funding for the Better Bus Strategy in 2021, however the award was much less than hoped for and we don't yet know whether or not TWBC will benefit from it.
- **TR 3 - Investigate Low Emission Standard for Buses and/or HGV's. Either a graduated scheme of improvement "Low Emissions Zone" or a Euro VI "Clean Air Zone" -** Quarterly Quality Bus Partnership meetings are held with Arriva (the largest operator) and KCC. Arriva currently reports on progress towards improving emission standards at these meetings. Work to review the Borough Transport

Strategy is underway and will consider this issue further. Support freight routing as set out in the KCC Freight Action Plan. This action has not progressed, partly because of the pandemic, which has placed additional pressures on both TWBC and the local bus companies. The decline in pollution levels, particularly along the A26 AQMA has reduced the impetus for a Clean Air Zone in TWBC.

- **TR8 - Reduce idling of engines whilst stationary with focus on Taxi's, coaches/ buses and HGV's. -** Wider anti idling campaign started in TWBC targeting schools and other key locations for banners and signage. Social media and TWBC residents' magazine used to publicise the campaign and raise awareness. Signage has been finalised (see Figure 2) installed in about 20 locations so far across the Borough. Parking Services have been investigating possible enforcement options, but are likely to introduce a policy of providing advice to motorists, rather than formal enforcement, in the first instance. The anti-idling campaign outside schools located near the AQMA is expected to continue through our CAFS project.
- **TR9 - Emissions Standard for Taxis (Euro 6 standard) –** Ongoing through vehicle checks and licensing of taxi vehicles to encourage drivers to replace vehicles to meet current licensing standards. **No progress in 2021.**
- **TR10 - The Council will support KCC in their delivery of a 'Demand Response Transport service as part of Kent Connected and Kent Connected** – KCC are currently working on this, but it is not yet clear whether it will be introduced in TWBC

Electrical vehicle charging improvements

- **PI4 - An effective Electric Vehicle charging network is available for use within the Borough** - Discussions with KCC Highways to further the network to include on street charging and other schemes, currently dependent on local funding and other KCC schemes. Parking Services have worked with KCC to secure funding for the installation of EV in all of TWBC's car parks. Other funding opportunities for additional EV charging are also being explored. A new EV charging point has been installed in Mount Pleasant Road.
- **TR7 - Explore ways in which the Parking Strategy can contribute to improving air quality, by the review of parking restrictions/enforcement** - encourage EV use through parking promotion, currently awaiting the outcome of the borough transport strategy. Parking Services have been involved with the introduction of new

restrictions in part of Mount Pleasant Road and Monson Road, with this area now being only open to buses and taxis, as well as cyclists and pedestrians. Parking Services are also engaging with motorists over engine idling issues.

Emissions from delivery vehicles

- **TR 5 - Review opportunities to reduce emissions from delivery vehicles -** Guidance prepared for developers of this type of scheme to be provided at the planning stage. Issue will be included in review of the Borough Transport Strategy (currently in draft). **Await outcome and progress of strategy.**

Reduction in vehicle ownership

- **TR 6 - Direct the ongoing expansion of the Tunbridge Wells Car club** – Progress on this was limited because of COVID but we still intend to expand the car club when possible. Despite slow progress, it is still our intention to add three additional vehicles to the TWBC CoWheels car club scheme. The scheme continues to be popular and well supported.

Action through planning and future development

- **PI2 - Incorporate a requirement for sustainable travel choices and car club schemes into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality. The Local Plan to introduce as appropriate a requirement for air quality impacts to be considered as part of Transport Assessments and Transport Statements, and for air quality impacts arising from transport to be a consideration in determining the appropriateness of transport mitigation and the overall transport impacts arising from the development. The Local Plan to introduce a requirement for ongoing monitoring of the impacts of development on air quality as appropriate in those locations within the Borough most at risk of poor air quality, transport mitigation and the overall transport impacts arising from the development.** Sustainable travel is a common theme running through the Pre Submission Local Plan. It is particularly relevant to development management policy TP2 (transport design and accessibility) which ensures provision is made for car club schemes and prioritises active travel. This theme is also covered by Strategic Policy 6 (STR6) Transport and Parking. Appendix 3 of the Pre Submission

Local Plan details the monitoring that would take place within the plan period to ensure a continued reduction in air pollution occurs at key locations in the borough. The Local Plan Review process is ongoing.

- **PI3 - Incorporate the development of a future 'Air Quality Protection Area' into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality** - The borough wide local plan consultation took place during September to November 2019. The comments were being collated and finalised in 2020. The Local Plan Review process is ongoing.
- **PI5 - Support the protection of existing and development of new Green Infrastructure (GI) as part of the Green Infrastructure Policy** - Progressed by Planning Policy and Development Management, although increasingly part of the climate change agenda rather than air quality management. The Council has negotiated a number of GI improvements as part of new developments in the borough (most new developments have some form of GI). Also maintain GI via the Kent High Weald Partnership. No further update available for 2021

Promotion of air quality

- **PH2 - Engage with schools to reduce impact of school traffic. Work with KM Charity Team to increase the number of schools using green travel** - Very positive engagement through the Clean Air for Schools Project is growing. Successfully working with and engaging with schools through assemblies, competitions, activities and teaching material. Promoted through social media and publications from TWBC and schools. Very little engagement with schools was possible during 2021 because of the pandemic, however, we have made excellent progress in developing the DEFRA funded 'Pollution Patrol' resource, which will be rolled out to schools from 2022 onwards.
- **PH4** - **Improved Air Quality/sustainability web pages –** project for 2020 as part of the TWBC review and update of their website. **Completed in 2020;** not only have our in house web pages been updated, but we also have a new and informative website for the Kent and Medway Air Quality Partnership. The new web pages can be found here:-

  Tunbridge Wells Air Quality Pages

Review of air quality monitoring in TWBC

- **PH 5 - Annual progress report to Cabinet timed with annual reporting (of the Annual Status Report, ASR), to DEFRA -** Annual report (ASR) submitted to DEFRA and presented to cabinet and general public. **Ongoing annual requirement.**
- **PH 6 - Review of air quality monitoring provision in TW Area -** More intensive monitoring of Hawkhurst Village and to declare an AQMA in Hawkhurst. Further investigation throughout 2020. Review of diffusion tubes was carried out in 2021, with additional tubes added in the town centre, Pembury Road, Hawkhurst, Goudhurst and Cranbrook. Also we are hoping to acquire a PM2.5 BAM analyser during 2022..

Conclusions and Priorities

The main conclusions of the 2021 ASR are these:-

Current monitoring suggests that all AQS objectives were met at all locations in the Borough in 2021 (having also been met in 2020). Although the objectives appear to have been met in the A26 AQMA for a number of years, there were exceedances in 2019 in Hawkhurst which have led to the declaration of the new Hawkhurst AQMA.

The NO_2 annual mean level recorded at our automatic monitoring station in the A26 AQMA was somewhat lower than that recorded in 2020. Conversely many of the diffusion tube sites recorded a slight increase in 2021 compared to 2020. Clearly both 2020 and 2021 were affected by COVID restrictions, and were lower than they would otherwise have been, but we are of the view that some decreases would have been seen, even without the impact of COVID, in continuation of the trend of reducing NO_2 levels which we have seen for a number of years.

Measurements of particulate matter of less than 10 micrometres in diameter (PM_{10}) measured at the air quality station remain well below the objective. The level recorded for 2021 was 19µgm^{-3} which was up slightly from 18µgm^{-3} in 2020. PM_{10} levels in Tunbridge Wells have been consistently below the objective level of 40µgm^{-3} for many years.

$PM_{2.5}$ is not measured in the Borough, but was estimated according to the procedure described in Chapter 7 of LAQM TG16 to be 12.1µgm^{-3}.

Our Priorities for 2022 are as follows:-

To develop an Air Quality Action Plan for the new Hawkhurst AQMA. We anticipate completing a consultation draft by August 2022, holding the consultation between September and November 2022, and finalising the plan by February 2023.

Complete the development of the 'Pollution Patrol' DEFRA funded digital schools air quality resource, with a view to launching it in the first half of 2022.

Seek approval for the use of S106 funding to purchase a recondition BAM PM2.5 analyser and have it installed in the A26 air quality monitoring station.

Local Engagement and How to get Involved

As the main source of air pollution within Tunbridge Wells Borough Council is transport, the easiest way for the public to get involved with helping improving air quality within the area would be to look at alternatives to the way they usually travel.
The following are suggested alternatives to private travel that would contribute to improving the air quality within the Borough:

- Use public transport where available – This reduces the number of private vehicles on the roads thus helping to reduce congestion and air pollution levels;
- Walk or cycle if your journey allows – Choosing to walk or cycle your journey reduces the number of vehicles on the road and regular exercise helps keep people fit and healthy;
- Car/lift sharing – Where a number of individuals are making similar journeys, such as travelling to work or to school, car sharing reduces the number of vehicles on the road and therefore the amount of emissions being released. This is being promoted via travel plans through the workplace and within schools; and
- Alternative fuel / more efficient vehicles – Choosing a vehicle that meets the specific needs of the owner, fully electric, hybrid fuel and more fuel efficient cars are available and all have different levels of benefits in reducing the amount of emissions being released. The installation of Electric Vehicle charging points is being promoted through the use of conditions attached to relevant planning permissions.

Engagement with Schools during 2021 was hampered by the COVID pandemic, thus there was little activity in 2021 on our Clean Air For Schools project, as was also the case in 2020. Nevertheless, we regard this project as being very successful and we intend to restart the project as soon as conditions allow.

Figure 3: Logo of Clean Air for Schools Project (from school assembly material)

We have engaged with over 80 primary schools since 2018 across the three boroughs by delivering interactive assemblies, creating a CAFS information section on each local authority website and creating additional teaching material.
In 2020, an application to DEFRA for funding was made by Tunbridge Wells Borough Council in partnership with Canterbury City Council in order to develop a digital educational resource which will be used as part of the Clean Air For Schools project.

In 2021, we learned that our application had been successful and we were pleased to receive a grant of £104,000 from DEFRA, out of a total project cost of £117,000, with the balance being contributed by the other local authorities across Kent. Throughout 2021 we have been developing the resource with our partners TMC Strategic Communications Ltd. The resource has now become known as the Pollution Patrol. It is designed to help primary school children learn about air quality in a fun and interactive way. Tunbridge Wells Borough Council, Maidstone Borough Council and Swale Borough Council are all part of the Mid Kent Environmental Health Service, so they all play a significant part in the development of the resource, and the finished product will be available to schools across the whole of Kent.

The Pollution Patrol is a group of animated cartoon characters and the school children are able to watch them explore their fictional home town of Sooting, looking for pollution sources. Some still images from the resource are presented below.

Figure 4: Still frame of Pollution Patrol interactive digital learning resource.

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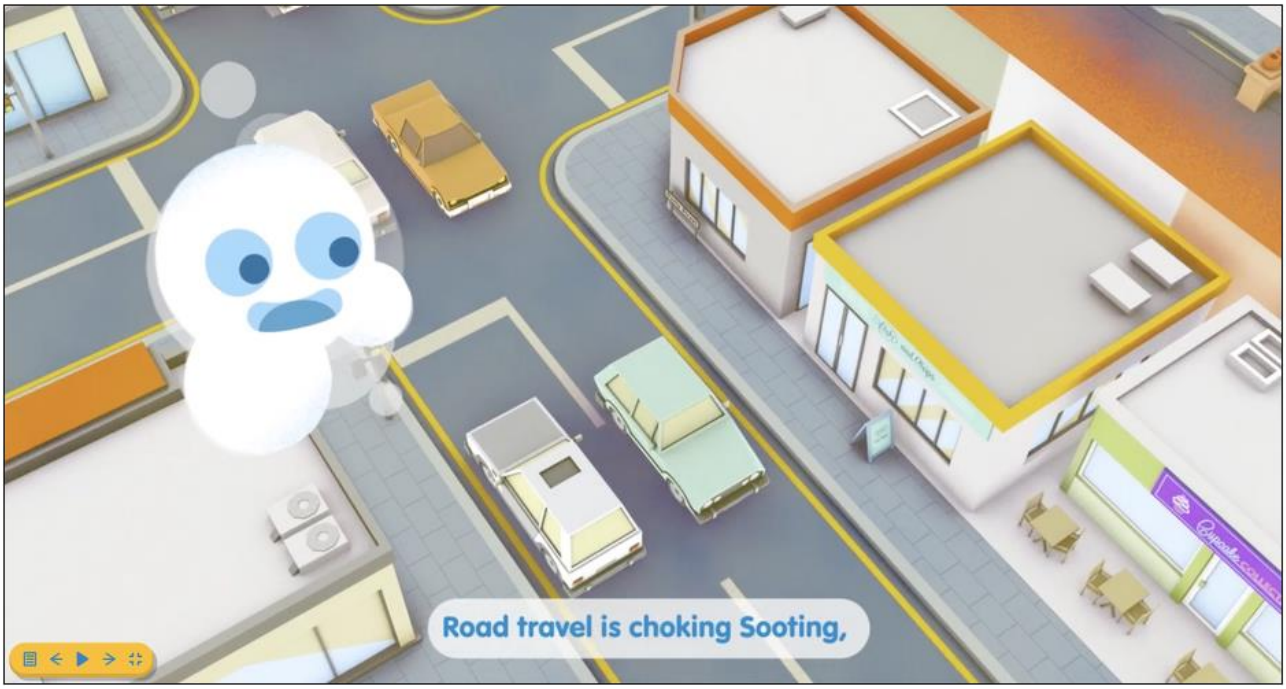
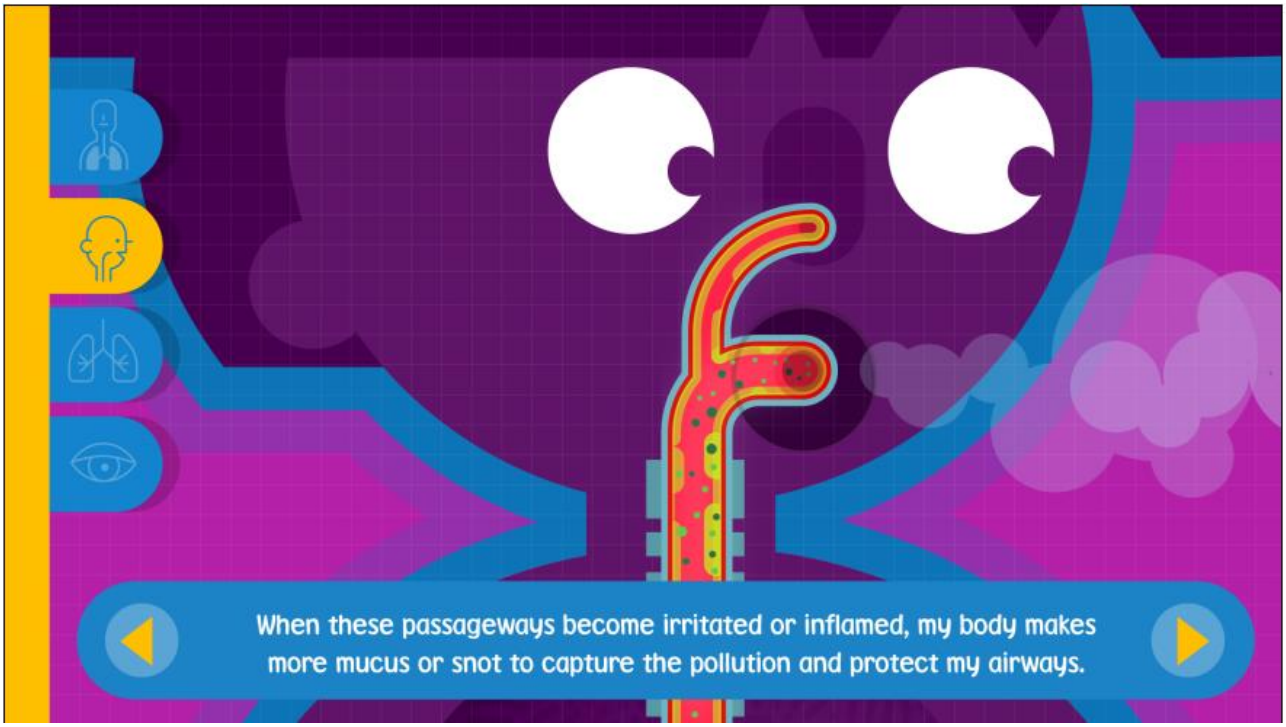


Figure 5: Still frame of Pollution Patrol interactive digital learning resource.

Figure 6: Still frame of interactive activity within Pollution Patrol digital learning resource.



The Pollution Patrol resource also offers interactive stories, games and ideas for lessons, and provides educational information to schools and parents as well as children.

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Health Department of Tunbridge Wells Borough Council Name> Council with the support and agreement of the following officers and departments:

Dr Stuart Maxwell – Mid Kent Environmental Services

Delainey Curry – Mid Kent Environmental Services

Kelly Shew – Mid Kent GIS Team

Timings preclude our ASRs being approved by Councillors prior to submission to DEFRA. The main findings of the ASR will be presented to a meeting of the Communities Cabinet Advisory Board, later in 2022.

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

If you have any comments on this ASR please send them to Dr Stuart Maxwell at:

Address

Tunbridge Wells Borough Council

The Town Hall

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1 Local Air Quality Management

This report provides an overview of air quality in Tunbridge Wells Borough during 2021. 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 Tunbridge Wells Borough 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 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

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

- NO_2 annual mean;

We are likely to revoke the A26 AQMA in the foreseeable future, because it has been in compliance with all AQS objectives for a number of years. We are proposing to introduce an Air Quality Protection Zone prior to the revocation of the AQMA (see monitoring section).

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 National Highways?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
A26 AQMA	Declared <2005>, Amended <2011> Amended 2018	NO2 Annual Mean	The A26 between Park Road and Neville Terrace also including Grosvenor Road, at 0-30m from the road (centre line)	NO	41.8	18.5	TWBC AQAP 2018	A26 AQMA Action Plan
Hawkhurst AQMA	Declared December 2021	NO2 Annual Mean	Residential properties in the southern part of Cranbrook Road in the centre of Hawkhurst	NO			In preparation	N/A

☒ **Tunbridge Wells Borough Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **Tunbridge Wells Borough Council confirm that all current AQAPs have been submitted to Defra.**

Progress and Impact of Measures to address Air Quality in Tunbridge Wells Borough Council

Defra's appraisal of last year's ASR concluded

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

1. The Council have provided a thorough and concise report which contains the required content.

2. The Council have included a detailed review of the current AQMA, and the proposed new AQMA. Decisions regarding revocation/declaration are clearly outlined and justified. The Councils decisions regarding both the current and proposed AQMAs are supported.

3. QA/QC procedures have been applied appropriately and accurately, with sufficient detail included in the appendix.

   Noted

4. Whilst progress has been limited in 2020, the report includes clear reporting on where progress has been made with regard to the Councils AQAP measures and outlines key priorities for 2021. The Council could consider adding Key Performance Indicators (KPI) to Table 2.2 to continue to measure their progress in future years.

   Owing to the fact that all AQ Objectives have been met in the A26 AQMA for a number of years, the Council has been prioritising the declaration of the new AQMA in Hawkhurst and the development of the associated Air Quality Action Plan. Therefore A26 AQAP is due to run until 2023, and therefore has almost reached the end of its expected life. We therefore feel that it's probably not worthwhile to add KPIs at this stage.

5. The Council should consider including a reference to the Public Health Outcomes Frameworks, reporting on the value for indicator D01, the fraction of mortality attributable to particulate air pollution. This can be found at: https://fingertips.phe.org.uk/profile/public-health-outcomes-framework.

We have included a reference to the D01 indicator in the 2022 ASR

6. Discussion of trends in the monitoring data within Section 3 is limited. The Executive Summary includes some mention, mainly with regard to AQMAs. The Council should provide a more extensive discussion of monitoring trends across the borough, as they did in their 2020 ASR.

   TWBC was somewhat cautious about including additional discussion of trends in the 2021 ASR because we didn't want to overstate the significance of the 2020 data which was clearly affected by the COVID pandemic. Likewise for 2021 data

7. Table A.6 contains two entries for automatic monitoring results. The Council have left the example from the template within Table A.6. This gives the impression there are two continuous monitors recording PM_{10}. This is potentially misleading as it shows an "exceedance" where there is none.

   We find the inclusion of examples in the template something of a mixed blessing

Tunbridge Wells Borough Council has taken forward a number of direct measures during the current reporting year of 2020 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. 23 measures are included within Table 2.2, with the type of measure and the progress Tunbridge Wells Borough Council has made during the reporting year of 2020 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2. We note that whilst the COVID pandemic restricted progress on the Action Plan in 2020 to some extent, nevertheless, there was compliance with all air quality objectives in TWBC in 2020.

Only one measure in the Action Plan has been completed at this stage, although we would note that the Action Plan was only adopted in early 2019, and progress in 2020, and to a lesser extent in 2021,was hampered by the COVID situation. The action completed was PH4 which was to improve our Air Quality web pages. As part of this, we have reviewed and updated our TWBC's own web pages, but we have also launched a new and improved website for the Kent and Medway Air Quality Partnership, which can be found at www.kentair.org.uk The KMAQP website will be used to host all TWBC air quality reports in the future.

Although only one action has been completed to date, we would also note, that a number of actions are ongoing, and as such have no real completion date. For example we

undertake to review our monitoring provision annually, which we do, and will continue to do for the foreseeable future. Another example would be our 'Clean Air For Schools' programme, which we expect will be developed and expanded for a number of years and is likely to continue for as long as we judge it to be successful.

Tunbridge Wells Borough Council's priorities for the coming year are listed below. (reference numbers from the AQAP are included where appropriate)

1 To complete the development of an Air Quality Action Plan for the new Hawkhurst AQMA. This is expected to be completed in February 2023. Timings for this are, to some extent, governed by the length of the public consultation, which is expected to run between September and November 2022. Timings are also constrained by the political timetable at TWBC

2 To continue with the Clean Air For Schools programme – **PH2**. It is anticipated that the 'Pollution Patrol' DEFRA funded digital schools resource will be the main vehicle for engaging with schools in future.

3 To continue with the incorporation of air quality measures into the new local plan - **PL1.** This is an area in which a lot of effort is expected to be expended during 2022

4 To expand Tunbridge Wells Car Club – **TR6** This action was carried over from 2021. The TWBC Co Wheels car club is popular and has been well supported. It is currently still intended to add another 3 cars to the Car Club, hopefully in 2022.

5 Another measure which we have been working on in TWBC in 2021, although not part of our AQAP, is to consider the acquisition of $PM_{2.5}$ monitoring for the first time in the Borough. There is a small amount of S106 funding available for monitoring and we are making a case that the acquisition of a PM2.5 monitor would be a good use of this funding. Although the budget would not be sufficient to set up a new monitoring station, we have established that we could acquire and install a reconditioned PM2.5 BAM in the existing monitoring station for the budget that we do have available. We are preparing a report to Councillors, requesting approval of the use of the funds for this purpose and expect that this will be agreed, with the BAM to be installed in the early part of 2022.

6 Also during 2021 we had to procure a new data management contract following the ended of the existing contract with ADMS in March 2021. Ricardo Energy and Environment was the successful bidder for the new contract.

Tunbridge Wells Borough Council worked to implement these measures in partnership with the following stakeholders during 2021:

- Kent County Council;
- TMC Strategic Communications Ltd;
- UK Health Security Agency
- Air Quality Consultants Ltd

Progress on the AQAP has been slower than expected for a number of reasons.

1 Owing to additional demands on the Environmental Health Team as a result of the COVID pandemic, especially in the early part of 2021.

2 Tunbridge Wells Borough Council believes that compliance with all air quality objectives has already been achieved in the majority of the Borough including in all of the existing A26 AQMA. Although, we do wish to confirm this with data from a year unaffected by lockdowns and other disruptions from the COVID pandemic, it does tend to make the A26 AQAP a lower priority.

3 Conversely, having identified a recent exceedance of the NO_2 Annual Mean Objective in Hawkhurst, our efforts were more focussed on formally declaring the new AQMA, and will be focussed on the development of a new AQAP in 2022.

Compliance with all air quality objectives was achieved in the new Hawkhurst AQMA, both in 2020 and in 2021, however, it is not clear whether this will be repeated in a year unaffected by COVID. Our current modelling suggests that compliance will be achieved by 2025, however, we remain of the view that the 2019 data used as the basis for this modelling was somewhat high, and therefore compliance might well be achieved sooner than predicted. We also note that the 2025 date is modelled in the absence of the Air Quality Action Plan which is still to be developed. It could be reasonably expected that the AQAP could also help to bring forward compliance.

The measures stated above and in Table 2.2 will help to contribute towards compliance, Tunbridge Wells Borough Council does not anticipate that any further additional measures be required in subsequent years to achieve compliance and enable the revocation of the A26 AQMA, however we are yet to consider what measures will be necessary in Hawkhurst.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	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
Tr1	Support the development of cycling and walking infrastructure to increase the use of sustainable transport modes such as walking and cycling.	Promoting Travel Alternatives	Promotion of cycling	2018	2019	TWBC Economic Development Team and KCC Transport	Developers & highway infrastructure funding	NO	Fully funded	£100k - £500k	Planning	unquantifiable		Phase 1 LCWIP (Local Cycling and Walking Infrastructure Plan) prepared in Draft that focuses on RTW town centre. Consultation on the draft will start early 2020. Phase 2 LCWIP to be commissioned and will cover low traffic neighbourhoods and inter-urban routes.	Lengthy Timescale
Tr2	Securing Grant funding for buses	Vehicle Fleet Efficiency	Vehicle Retrofitting programmes	2018	2021	Local Authority Environmental Health, Local Authority Transport Dept.	Defra and LA	NO	Not Funded	< £10k	Planning	unquantifiable		On-going, KCC did receive an allocation from the Government's Better Bus Strategy in 2021, but this was much smaller then the amount that they applied for and it is not clear at present whether TWBC will benefit from this.	
Tr3	Investigate Low Emission Standard for Buses and/or HGV's. Either a graduated scheme of improvement "Low Emissions Zone" or a Euro VI "Clean Air Zone" Support freight routing as set out in the KCC Freight Action Plan	Vehicle Fleet Efficiency	Other	2018	2024	Environmental Protection Team in conjunction with QPB and Economic Development Team	Local Authority, Funding: Defra Air Quality Grant will be sought if opportunity arises	NO	Partially Funded	< £10k	Planning	Reduced vehicle emissions		Bus companies have been badly impacted by the COVID pandemic, so there seems to be very little scope for progressing this action at the present time.Not progressed at this time. Currently no budget allocation. However experience of completed project in neighbouring authority with much higher levels of pollution demonstrated very little gain for cost.	Unlikely to go ahead at this time as a result of the impact of COVID on local bus companies.

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Tr4	Review opportunities to facilitate the implementation of a Bike Share Scheme. With possible options to provide initial support funding using S106 or grant funding, inc. private investor funding. Including as appropriate docking stations and electric bicycle facilities	Promoting Travel Alternatives	Promotion of cycling	2018	2024	Sustainability, Economic Development, and Healthy Lifestyles Team, with support from Parking Services and Environmental Health.	Funding to implement project awarded by KCC. Very early stages of scoping in progress	NO	Partially Funded		Planning	unquantifiable		Funding has been identified by Kent County Council to investigate the potential of implementing an electric bike share scheme in Tunbridge Wells. The bike share scheme is not going to go ahead at this stage due to lack of capacity	
Tr5	Review opportunities to reduce emissions from delivery vehicles	Freight and Delivery Management	Other	2018	2023	Environmental Protection and Economic Development	Within existing budgets	NO	Not Funded	< £10k	Planning	unquantifiable		Guidance prepared for developers of this type of scheme to be provided at the planning stage. Issue will be included in review of the Borough Transport Strategy.	
Tr6	Direct the ongoing expansion of the Tunbridge Wells Car club.	Alternatives to private vehicle use	Car Clubs	2018	2022	With Planning Policy, Parking and KCC	s106	NO	Partially Funded	£10k - 50k	Implementation	unquantifiable		Expansion of the car club could not go ahead in 2021 due to the Covid situation, however, the car club did remain operational, albeit at a reduced level. Nevertheless, funding has been secured from S106 agreements for three additional cars and a new location for an EV charging point will be sought. The car club continues to be well supported and popular and we are still in the process of adding the 3 new cars.	Delayed by COVID but now resumed
Tr7	Explore ways in which the Parking Strategy can contribute to improving air quality, by the review of parking restrictions/enforcement	Promoting Low Emission Transport	Priority parking for LEV's		2022	TWBC Parking Services	Within existing budgets	NO	Funded	< £10k	Planning	unquantifiable		Issue to be covered in emerging Borough Transport Strategy.Parking Services have been involved with the introduction of new restrictions in part of Mount Pleasant Road and Monson Road, with this area now being only open to buses and taxis, as well as cyclists and pedestrians.	

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Tr8	Reduce idling of engines whilst stationary with focus on Taxi's, coaches/ buses and HGV's. With an option to extend to anti-idling campaigns outside schools located near the AQMA.	Traffic Management	Anti-idling enforcement	2018	2022	Environmental Protection Team and Parking Services	Within existing budgets	NO	Partially Funded	< £10k	Implementation	unquantifiable		The DEFRA funded Pollution Patrol resource, will be a novel way to help to tackle idling. Wider anti idling campaign started in TWBC targeting schools and other key locations for banners and signage. Social media and TWBC residents magazine used to publicise the campaign and raise awareness. Parking Services are speaking to drivers found idling their engines in order to discourage idling, but are not issuing FPNs at this stage.	
Tr9	Emissions Standard for Taxis (Euro 6 standard)	Vehicle Fleet Efficiency	Promoting Low Emission Public Transport		2024	TWBC Licensing Team	Within existing budgets	NO	Funded	< £10k	Planning	unquantifiable		Ongoing through vehicle checks and licensing of taxi vehicles	
Tr10	The Council will support KCC in their delivery of a 'Demand Response Transport service as part of Kent Connected and Kent Connected +	Promoting Travel Alternatives	Other		2024	KCC Public Transport Team	Within existing budgets	NO			Implementation	unquantifiable		KCC's Public Transport Team currently working on an Enhanced Bus Partnership Scheme and DRT but it is not yet clear whether it will be introduced in TWBC.	
Tr11	To revise and update the Councils own 2011 Travel Plan.	Promoting Travel Alternatives	Workplace Travel Planning		2022	Sustainability	Within existing budgets	NO	Funded	< £10k	Planning	unquantifiable		To be progressed	
Tr12	To deliver an adaptive traffic management control system	Traffic Management	UTC, Congestion management, traffic reduction		2024	KCC Highways		NO			Planning	unquantifiable		To be progressed	

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Pl1	Good air quality is appropriately recognised in the Local Plan - Development Plan Document/SPD in emerging local plan.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2017	2024	TWBC Planning Policy	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		SPD has been prepared and provided to planning policy for adoption. In line with the local plan,The Pre-Submission Local Plan is currently undergoing Reg 19 consultation and includes three air quality themes development management policies. These are entitled Air Quality, Air Quality Management Areas, and Biomass Technology. They are designed to prevent unacceptable air quality impacts, ensure air quality neutral development and strongly encourage air quality positive proposal in planning applications.	

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PI2	Incorporate a requirement for sustainable travel choices and car club schemes into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality. The Local Plan to introduce as appropriate a requirement for air quality impacts to be considered as part of Transport Assessments and Transport Statements, and for air quality impacts arising from transport to be a consideration in determining the appropriateness of transport mitigation and the overall transport impacts arising from the development. The Local Plan to introduce a requirement for ongoing monitoring of the impacts of development on air quality as appropriate in those locations within the Borough most at risk of poor air quality.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2024	TWBC Development Control and Planning Policy	Within existing budgets	NO		< £10k	Implementation	unquantifiable		SPD had been written and provided to planning policy for adoption in line with the local plan.Sustainable travel is a common theme running through the Pre Submission Local Plan. It is particularly relevant to development management policy TP2 (transport design and accessibility) which ensures provision is made for car club schemes and prioritises active travel. This theme is also covered by Strategic Policy 6 (STR6) Transport and Parking.Development management policy TP1 – Transport Assessments/Statements, Travel Plans and Mitigation, does not mention air quality specifically. However, the previously mentioned policies above would ensure this process takes place.Appendix 3 of the Pre Submission Local Plan details the monitoring that would take place within the plan period to ensure a continued reduction in air pollution occurs at key locations in the borough.	
PI3	Incorporate the development of a future 'Air Quality Protection Area' into the emerging Local Plan to support ongoing air quality improvements and maintaining good air quality.	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	2024	TWBC Planning Policy, Sustainability and Environmental Health	Within existing budgets		Funded	< £10k				SPD has been written and provided to planning policy for adoption.	

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PI4	An effective Electric Vehicle charging network is available for use within the Borough	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging		2021	Sustainability, Development Control, Parking Services. KCC Highways		NO			Planning	unquantifiable		Discussions with KCC Highways regarding on street charging and other schemes.Parking Services have worked with KCC to secure funding for the installation of EV in all of TWBC's car parks. Other funding opportunities for additional EV charging are also being explored. A new EV charging point has been installed in Mount Pleasant Road.	
PI5	Support the protection of existing and development of new Green Infrastructure(GI) as part of the Green Infrastructure Policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2016	2024	TWBC landscape and biodiversity	TWBC and KCC	NO	Funded	< £10k	Implementation	unquantifiable		Progressed by Planning Policy and Development Management, although increasingly part of the climate change agenda rather than air quality management. The Council has negotiated a number of GI improvements as part of new developments in the borough (most new developments have some form of GI) Also maintain GI via the Kent High Weald Partnership	
PH1	Infrastructure developments in parks to support cycling and walking links to and through parks to enable sustainable access and support commuting routes.	Promoting Travel Alternatives	Other	2018	2022	TWBC Parks and Economic Development	TWBC and KCC	NO	Partially Funded		Implementation	unquantifiable		Improvements to the 21st Century Way cycle route have been delivered which links to Grosvenor & Hilbert Park and Colebrook Recreation Ground. The draft LCWIP analyses several walking and cycling routes through parks and across the Commons in Tunbridge Wells and Rusthall.	

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PH2	Engage with schools to reduce impact of school traffic Work with KM Charity Team to increase the number of schools using green travel	Promoting Travel Alternatives	School Travel Plans	2018	2022	TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		Project was successfully rolled out and is now in second year. Officers are delivering assemblies to schools taking part in the scheme and providing anti idling banners to put outside. Schools are being asked to design and implement an anti idling campaign and tell TWBC what they have done with a prize to the winner. Schools also provided with a Plumeflow portable monitoring device to look map levels or polluting around he school and on different routes to school to raise awareness and promote walking, cycling etc as well using less trafficked routes to walk to school. Have applied to DEFRA for funding to develop a digital educational resource aimed at primary schools, to educate and inform about air quality in fun an interactive way.	Progress during 2020 was more or less impossible due to COVID situation
PH3	Raising Awareness of Air Quality and health issues	Public Information	Other	2018	2024	KCC Public Health TWBC Environmental Protection	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		Working on articles for residents magazines etc and promoting our Clean Air For Schools promotion.. AQ remains a lower priority for overall public comms attention. New Kent and Medway Air Quality Partnership website includes more health information	Much was achieved via the Clean Air for Schools Project which involved working with and engaging with schools through assemblies, competitions, activities and teaching material. Promoted through social media and publications from TWBC and schools

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PH4	Improved Air Quality/sustainability web pages.	Public Information	Via the Internet	2019	2020	TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Completed	unquantifiable		Websites have been updated and Clean Air for Schools promotion with additional material. Kent and Medway Air Quality Partnership website has undergone additional improvements in 2021	
PH5	Annual progress report to Cabinet timed with annual reporting (of the Annual Status Report, ASR), to DEFRA.	Public Information	Other	2018		TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		This report will be included on our Intranet and submitted for noting.	
PH6	Review of air quality monitoring provision in TW Area	Public Information	Other	2014		TWBC Environmental Protection Team	Within existing budgets	NO	Funded	< £10k	Implementation	unquantifiable		The continuous monitoring station was upgraded in 2019 following equipment failure.. Results indicate that NO2 is not in excess of the annual mean objective and that no objectives are being exceeded for particulates. The diffusion tube network is reviewed annually and the updated round was started in January 2020. More extensive monitoring of a potential hotspot in Hawkhurst has been implemented to address anomalous results and gain a more detailed data set. Additonal tubes were added in Rusthall, Langton Green, and in Camden Road.	We have establsihed additional diffusion tube sites in Hawkhurst, following the declararion of the new AQMA. The results of the new tubes in 2021,as expected, have been low, tending to confirm the boundaries of the AQAP. We are seeking member approval for the use of some S106 funding to set up some PM2.5 monitoing, which is expected to be done in 2022

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PH7	Review the opportunity to identify the 'cost of illness' by using the newly developed Public Health England tool in the: 'Estimations of costs to the NHS and social care due to the health impacts of air quality.'	Public Information	Other	2018	2022	TWBC and KCC		NO	Funded		Aborted	unquantifiable		Owing to the additional demands on Officer's time as a result of the COVID situation, staff have not had sufficient time to familiarise themselves with the tools in 2020. Too complicated - national data will be used.	Unlikely to go ahead as originally envisaged

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

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

New (2020) data from the Public Outcomes Framework (indicator D01) indicates that for the fraction of deaths, attributable to $PM_{2.5}$, in Tunbridge Wells is 5.7%. This is very slightly higher than the national average of 5.6%.

We note that in the neighbouring Borough of Maidstone, in Upper Stone Street, which has considerably higher levels of pollution that anywhere in Tunbridge Wells Borough, the annual mean level of $PM_{2.5}$ was 14µgm^{-3}, which is comfortably below the objective of 25µgm^{-3}. The PM_{10} annual mean in Upper Stone Street was 22µgm^{-3}. Using the method for estimating $PM_{2.5}$ levels, given in LAQM TG16 Chapter 7, we can calculate a $PM_{2.5}/PM_{10}$ ratio for Upper Stone Street of 14/22 = 0.6363. Applying this to the PM_{10} annual mean level measured in Tunbridge Wells gives 19 x 0.696 = 12.1. Therefore, the estimated $PM_{2.5}$ level in Tunbridge Wells is 12.1µgm^{-3}, which is less than half of the objective level.

LAQM.TG16 Table A1 Action Toolbox provides a list of measures that can be implemented to tackle $PM_{2.5}$, and some of these measures are included in our AQAP including anti idling campaigns, encouraging behavioural change (CAFS and via the development of the Pollution Patrol which includes an element on domestic burning) and promotion of cycling and walking. However it is recognised that any measures employed to reduce NO_2 and PM_{10} will also have a beneficial effect on $PM_{2.5}$.

During 2021, TWBC was investigating the possibility of establishing some $PM_{2.5}$ monitoring in the Borough. Some S106 funding was available for monitoring and whilst this was not sufficient to set up a new monitoring station, it would just about cover the cost of the purchase and installation of a reconditioned $PM_{2.5}$ BAM into the existing monitoring station on the A26. A report has been prepared requesting authorisation from Members to use the S106 funding for this purpose, and it is expected that the purchase will go ahead in early 2022.

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

This section sets out the monitoring undertaken within 2021 by Tunbridge Wells Borough Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2017 and 2021 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Tunbridge Wells Borough Council undertook automatic (continuous) monitoring at 1 site during 2021. Table A.1 in Appendix A shows the details of the automatic monitoring site.

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

Tunbridge Wells Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 42 sites during 2021. 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.

Thirteen new tube sites were created in 2021. These were:-

TW77 Liptraps lane (opposite Robin Hood Pub) New Jan 21

TW78 By café and opposite Post Office Road HH 9 New Feb 21

TW79 On drainpipe of 1 Hurstlea High St HH HH10 New Feb 21

TW80 Cranbrook Stone Street HH11 new Feb 21

TW81 Goudhurst Chemist on the High St HH12 New Feb 21

TW82 Pembury Road - By Dorin Court, Pembury Rd TN2 3RH New Feb 21

TW83 Carrs Corner Roundabout Crescent Road TN1 2UN New Feb 21

TW84 50 Camden Road TW TN1 2QD Alisha Barbers new Feb 21

TW85 68 Camden road TW TN1 2QP Rosie Baylis New Feb 21

TW86 By TW free school Mount Ephraim TN4 8FA New Feb 21

TW87 Langton Green Road/ Third Street LG TN3 0ER New Feb 21

TW88 Rusthall High Street - Laudrette TN4 8RW New Feb 21

TW89 Lamppost opposite the Colonade (by all Saints Lodge) New May 21

Additionally, four sites were closed in 2021. These were:-

TW21 Victoria Road, T. Wells

TW24 Opposite Still Lane, 22/24 London Road, Southborough

TW38 Pembury Road, By Seven Springs, Tunbridge Wells (replaced by TW71)

TW56 32 Liptraps lane, TN2 3AA

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_2)

Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. 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 2021 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

We have been aware that since 2016, when NO_2 levels within and araound the main AQMA in Tunbridge Wells are distance corrected to the nearest relevant receptor, no exceedances of the annual mean objective for nitrogen dioxide have been observed. Since 2016 NO_2 levels have continued to decline and the need for the AQMA is correspondingly greatly reduced. We wanted to see a clear trend of NO_2 reductions over a number of years before we would consider revoking the AQMA, and in this respect, the COVID pandemic which impacted results in 2020 and 2021 has somewhat muddied the waters. It is clear that NO_2 levels in 2020 and probably in 2021, were lower than they would otherwise have been

3.1.4 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

Pm_{10} levels are relatively low in Tunbridge Wells and continue to be comfortably below the relevant objectives. The 24 hour PM_{10} objective was only exceeded on one day in 2021.

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) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM1	A26 St Johns Road, Southborough	Roadside	558260	141599	NO2; PM10	YES (St Johns Tunbridge Wells)	Chemiluminescent; TEOM	18	4	3

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TW01	62 LONDON ROAD, SOUTHBOROUGH, TUNBRIDGE WELLS	Roadside	558100	142200	NO_2	Yes - Tunbridge Wells	4.2	2.0	No	2.4
TW02	11 THE HURST, TUNBRIDGE WELLS	Urban Background	560000	141300	NO_2	No	6.0	1.6	No	2.4
TW19	Maidstone Road, Paddock Wood	Roadside	566800	144800	NO_2	No	2.5	1.8	No	2.5
TW20	Mount Ephraim, T. Wells	Roadside	558300	139800	NO_2	No	2.8	2.0	No	2.3
TW22	Pembury Road, T. Wells	Roadside	559400	139500	NO_2	No	16.0	1.0	No	2.3
TW23	Neville Gate, T. Wells	Urban Background	558800	138300	NO_2	No	16.0	0.7	No	2.4
TW25	Hospice in the Weald (St John's Road)	Roadside	558136	142017	NO_2	Yes - Tunbridge Wells	1.8	2.6	No	2.9
TW31	London Road Mt Epraim junction	Roadside	558227	139757	NO_2	Yes - Tunbridge Wells	3.1	1.0	No	2.7
TW34.1, TW34.2, TW34.3	The Cutout St John Road TW AQ	Roadside	558250	141750	NO_2	Yes - Tunbridge Wells	14.0	4.0	Yes	3.0
TW41	by 38 The Pantiles, London Rd/Pantiles, Tunbridge Wells	Roadside	558076	138762	NO_2	Yes - Tunbridge Wells	4.8	1.8	No	2.3

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) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TW43	Junction Church Rd/Clarence Rd, Tunbridge Wells	Roadside	558271	139451	NO_2	Yes - Tunbridge Wells	2.6	1.3	No	2.6
TW53	Warrington Road, Paddock Wood	Roadside	567638	144732	NO_2	No	9.0	1.8	No	2.0
TW55	Badsell Road opposite Mascalls park., Paddock Wood	Roadside	566746	144112	NO_2	No	11.0	1.8	No	2.5
TW58	Union House, Tunbridge Wells	Roadside	557927	138609	NO_2	Yes - Tunbridge Wells	7.4	1.3	No	2.5
TW60	12 Gorse Road	Urban Background	560230	140150	NO_2	No	10.0	30.0	No	2.4
TW61	5 Warwick Park TN2 5TA	Roadside	558242	138715	NO_2	No	18.0	1.5	No	2.2
TW62	Pembury High Street	Roadside	562284	140746	NO_2	No	3.9	1.0	No	2.0
TW63.1 HH, TW63.2 HH, TW63.3 HH	Cranbrook Road, Hawkhurst Smugglers Rest triplicate (new January 2020)	Roadside	576065	130604	NO_2	No	0.0	1.0	No	1.4
TW66 HH	8 The Colonade, Rye Road, Hawkhurst re-opened site	Roadside	576103	130566	NO_2	No	2.0	2.0	No	2.4
TW67 HH	Happy Garden Chinese, Highgate Hill, Hawkhurst	Roadside	575998	130528	NO_2	No	7.5	1.8	No	1.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TW68 HH	Old Infant School, Cranbrook Road, Hawkhurst	Roadside	576051	130602	NO_2	No	0.2	3.0	No	1.6
TW69 HH	Near Substation, Cranbrook Road, Hawkhurst	Roadside	576062	135116	NO_2	No	3.0	2.5	No	1.6
TW70 HH	Outside 8/9 Cranbrook Road, Hawkhurst	Roadside	576051	130734	NO_2	No	0.2	1.2	No	1.8
TW71	Tube on post just besides of entrance next to Seven Springs Home	Roadside	560838	140389	NO_2	No	7.0	1.5	No	2.6
TW72	Southborough new flats (new January 2020)	Roadside	558140	142080	NO_2	No	2.0	3.0	No	2.0
TW73	Summervale Rd (new January 2020)	Roadside	558137	142215	NO_2	No	15.0	4.5	No	1.8
TW74	Papa Johns (new January 2020)	Roadside	557354	138128	NO_2	Yes - Tunbridge Wells	0.0	5.0	No	1.6
TW75	6 Bayhall Road (prev HH9 tube in 2020)	Roadside	559208	139317	NO_2	No	3.0	3.0	No	1.8
TW76	107 Forest Road by Lyle Pub (New Mar 20)	Roadside	559537	138500	NO_2	No	9.0	2.8	No	2.0
TW77	Liptraps lane (opp Robin Hood Pub) New Jan 21	Roadside	559813	140829	NO_2	No	24.0	3.0	No	2.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TW78 HH	By Café and Opp Post Office Road HH 9 New Feb 21	Roadside	575993	130594	NO_2	No	2.3	1.0	No	2.6
TW 79 HH	on drainpipe of 1 Hurstlea High St HH HH10 New Feb 21	Other	575967	130575	NO_2	No	0.0	5.8	No	1.4
TW80 HH	Cranbrook Stone Street HH11 new Feb 21	Kerbside	577758	136010	NO_2	No	1.0	0.5	No	1.8
TW81HH	Goudhurst Chemist on the High St HH12 New Feb 21	Kerbside	572277	137785	NO_2	No	0.0	0.0	No	1.2
TW82	Pembury Road - By Dorin Court Pembury Rd TN2 3RH New Feb 21	Roadside	559166	139398	NO_2	No	7.5	1.0	No	2.6
TW83	Carrs Corner Roundabout Crescent Road TN1 2UN New Feb 21	Roadside	558778	139491	NO_2	No	0.0	2.6	No	2.6
TW84	50 Camden Road TW TN1 2QD Alisha Barbers new Feb 21	Roadside	558789	139777	NO_2	No	0.6	1.0	No	2.0
TW85	68 Camden road TW TN1 2QP Rosie Baylis New Feb 21	Roadside	558825	139824	NO_2	No	0.4	1.4	No	2.2
TW86	By TW free school Mount Ephraim TN4 8FA New Feb 21	Roadside	558276	139876	NO_2	Yes - Tunbridge Wells	17.2	1.3	No	1.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
TW87	Langton Green Road/ Third Street LG TN3 0ER New Feb 21	Roadside	554552	139178	NO_2	No	11.6	1.1	No	2.0
TW88	Rusthall High Street - Laudrette TN4 8RW New Feb 21	Kerbside	556128	139700	NO_2	No	3.1	0.7	No	1.8
TW89 HH	Lamppost opp the Colonade (by all Saints Lodge) New May 21 HH13	Roadside	576088	130553	NO_2	No	12.6	2.9	No	2.6
TW01	62 LONDON ROAD, SOUTHBOROUGH, TUNBRIDGE WELLS	Roadside	558100	142200	NO_2	Yes - Tunbridge Wells	4.2	2.0	No	2.4
TW02	11 THE HURST, TUNBRIDGE WELLS	Urban Background	560000	141300	NO_2	No	6.0	1.6	No	2.4
TW19	Maidstone Road, Paddock Wood	Roadside	566800	144800	NO_2	No	2.5	1.8	No	2.5
TW20	Mount Ephraim, T. Wells	Roadside	558300	139800	NO_2	No	2.8	2.0	No	2.3

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_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	558260	141599	Roadside	99.5	99.5	**40**	37	34	31	26

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **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^3.

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

All means have been "annualised" as per LAQM.TG16 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_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
TW01	558100	142200	Roadside	100	100.0	35.9	35.9	32.2	22.3	25.7
TW02	560000	141300	Urban Background	100	100.0	12.1	12.1	11.9	9.3	9.3
TW19	566800	144800	Roadside	92,3	92.3	23.6	23.6	16.9	18.0	19.2
TW20	558300	139800	Roadside	100	100.0	37.6	37.6	34.8	24.7	27.9
TW22	559400	139500	Roadside	100	100.0	36.2	36.2	30.5	23.7	24.6
TW23	558800	138300	Urban Background	100	100.0	11.0	11.0	11.0	7.6	8.1
TW25	558136	142017	Roadside	100	100.0	32.9	32.9	30.7	22.2	22.6
TW31	558227	139757	Roadside	100	100.0	36.2	36.2	37.5	27.6	31.0
TW34.1, TW34.2, TW34.3	558250	141750	Roadside	100	100.0	38.2	37.4	31.3	24.7	25.6
TW41	558076	138762	Roadside	100	100.0	**45.1**	**45.1**	**48.7**	34.5	35.9
TW43	558271	139451	Roadside	100	100.0	29.7	29.7	27.8	20.9	20.8
TW53	567638	144732	Roadside	92.3	92.3	15.2	15.2	16.7	10.5	11.8
TW55	566746	144112	Roadside	100	100.0	18.8	18.8	16.3	13.7	16.7
TW58	557927	138609	Roadside	82.7	82.7	**48.0**	**48.0**	**42.9**	31.3	27.5
TW60	560230	140150	Urban Background	92.3	92.3	16.9	16.9	16.3	11.3	12.7
TW61	558242	138715	Roadside	100	100.0	16.1	16.1	13.7	11.7	12.4
TW62	562284	140746	Roadside	82.7	82.7	26.2	26.2	22.0	16.5	15.5
TW63.1 HH, TW63.2 HH, TW63.3 HH	576065	130604	Roadside	100	100.0	**56.7**	**56.7**	**52.7**	34.8	**40.4**
TW66 HH	576103	130566	Roadside	90.4	90.4			24.8	17.8	21.6
TW67 HH	575998	130528	Roadside	100	100.0			34.4	24.9	30.5

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2021 (%) [2]	2017	2018	2019	2020	2021
TW68 HH	576051	130602	Roadside	100	100.0			35.8	28.9	29.7
TW69 HH	576062	135116	Roadside	92.3	92.3			**41.4**	32.6	34.7
TW70 HH	576051	130734	Roadside	100	100.0			37.0	26.8	28.6
TW71	560838	140389	Roadside	100	100.0			31.3	27.2	28.0
TW72	558140	142080	Roadside	84.6	84.6				29.0	20.3
TW73	558137	142215	Roadside	100	100.0				13.9	14.6
TW74	557354	138128	Roadside	91.7	92.3				18.0	19.7
TW75	559208	139317	Roadside	100	100.0				17.3	15.2
TW76	559537	138500	Roadside	100	100.0				18.1	24.5
TW77	559813	140829	Roadside	100	100.0					23.9
TW78 HH	575993	130594	Roadside	75	75.0					23.9
TW 79 HH	575967	130575	Other	81.8	75.0					11.3
TW80 HH	577758	136010	Kerbside	72.7	67.3					20.0
TW81HH	572277	137785	Kerbside	81.8	75.0					25.5
TW82	559166	139398	Roadside	100	92.3					**41.7**
TW83	558778	139491	Roadside	100	92.3					24.5
TW84	558789	139777	Roadside	90.9	84.6					23.2
TW85	558825	139824	Roadside	100	92.3					19.0
TW86	558276	139876	Roadside	100	92.3					15.9
TW87	554552	139178	Roadside	90.9	84.6					19.0
TW88	556128	139700	Kerbside	90.9	84.6					14.3
TW89 HH	576088	130553	Roadside	75	50.0					21.1

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16**

☒ **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 µg/m^3.

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**.

Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 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_2 Concentrations levels at Automatic Monitoring Station

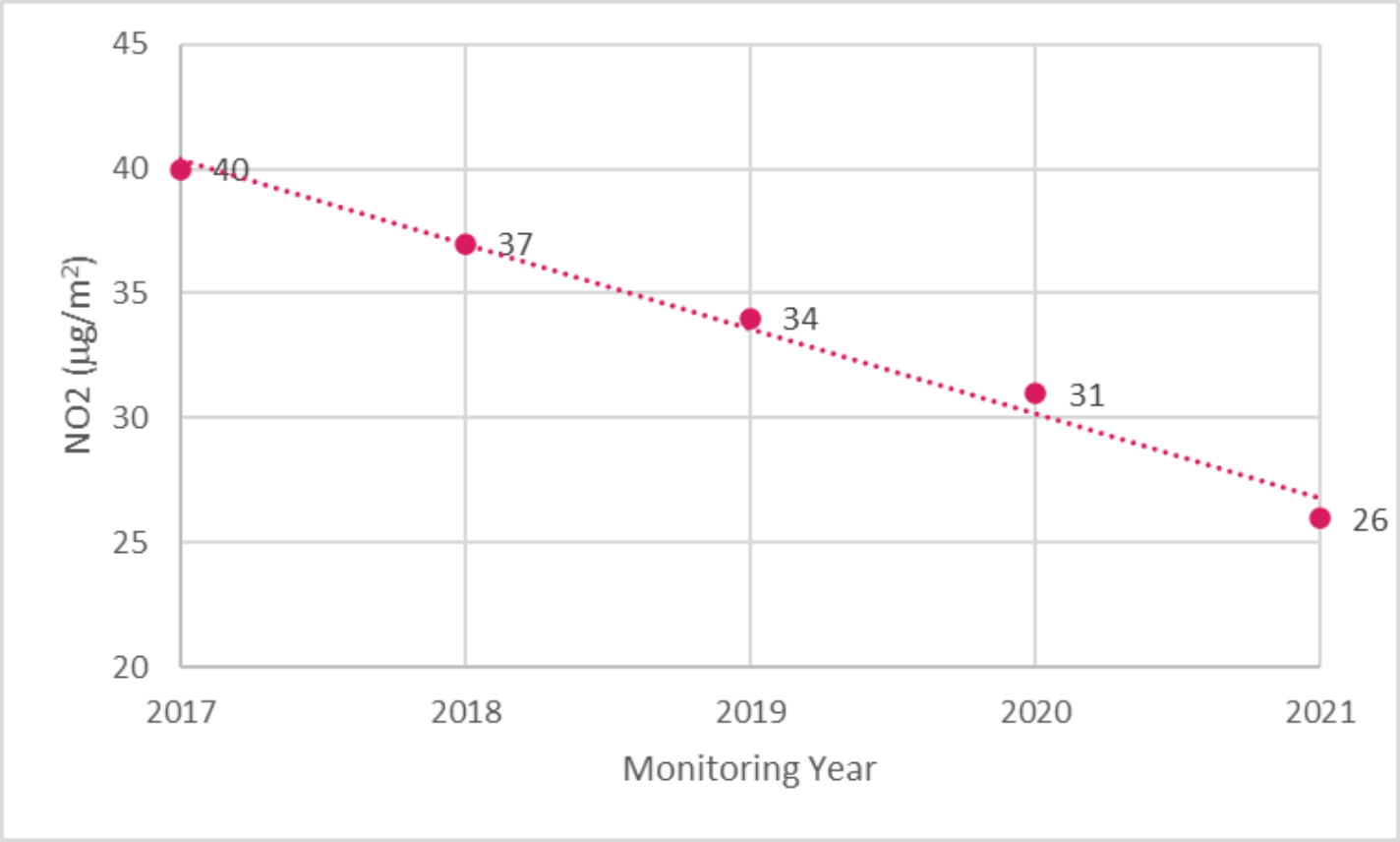


Figure A.2 – Trends in Annual Mean NO_2 Concentrations levels at Diffusion Tubes inside the AQMA.

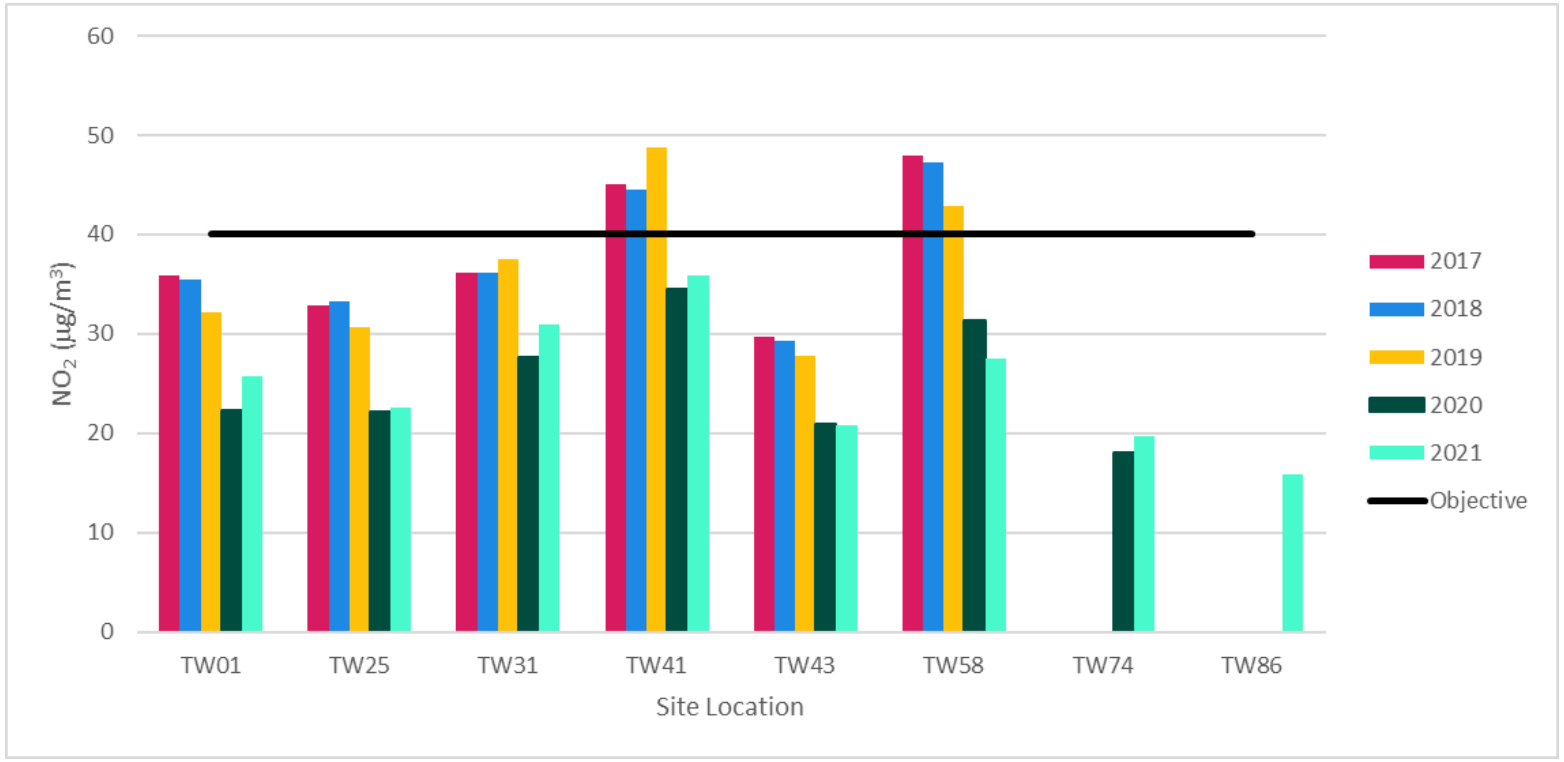


Figure A.5 – Trends in Annual Mean NO_2 Concentrations at Diffusion Tubes in Hawkhurst.

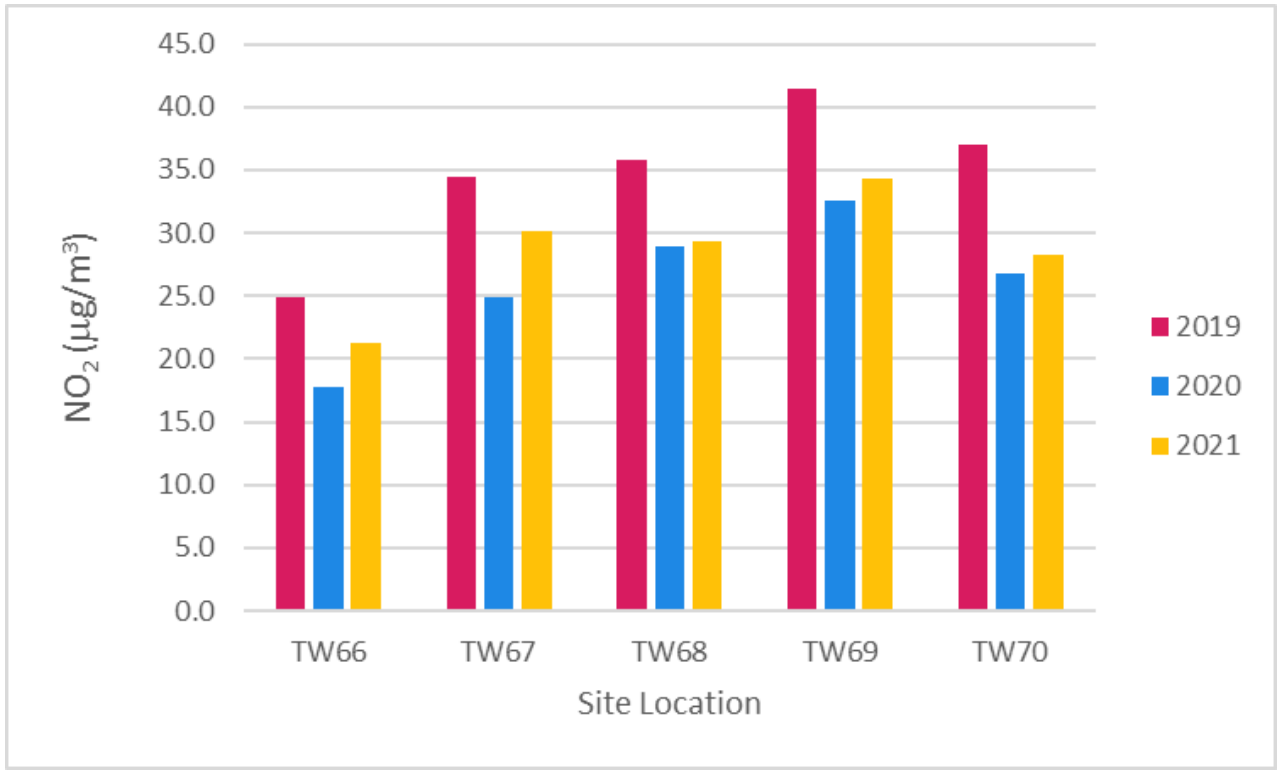


Figure A.6 – Trends in Annual Mean NO_2 Concentrations at Urban Background Diffusion Tube Sites.

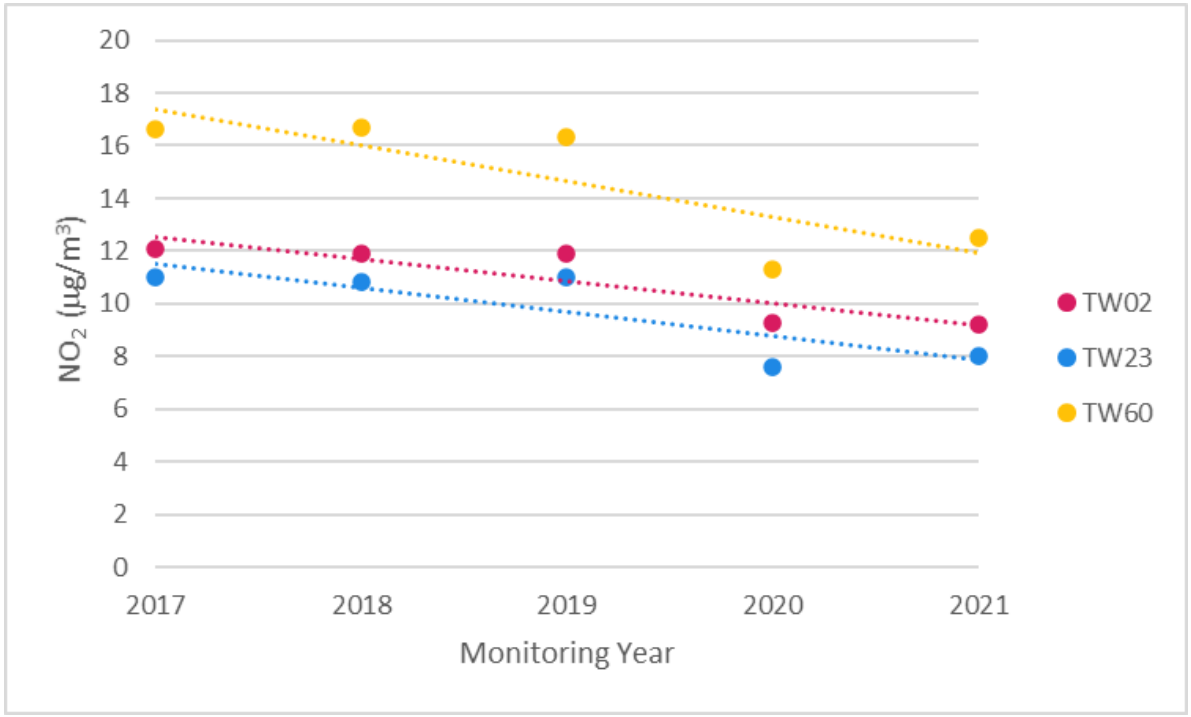


Figure A.7 – Trends in Annual Mean NO_2 Concentrations at Diffusion Tubes sites outside the AQMA.

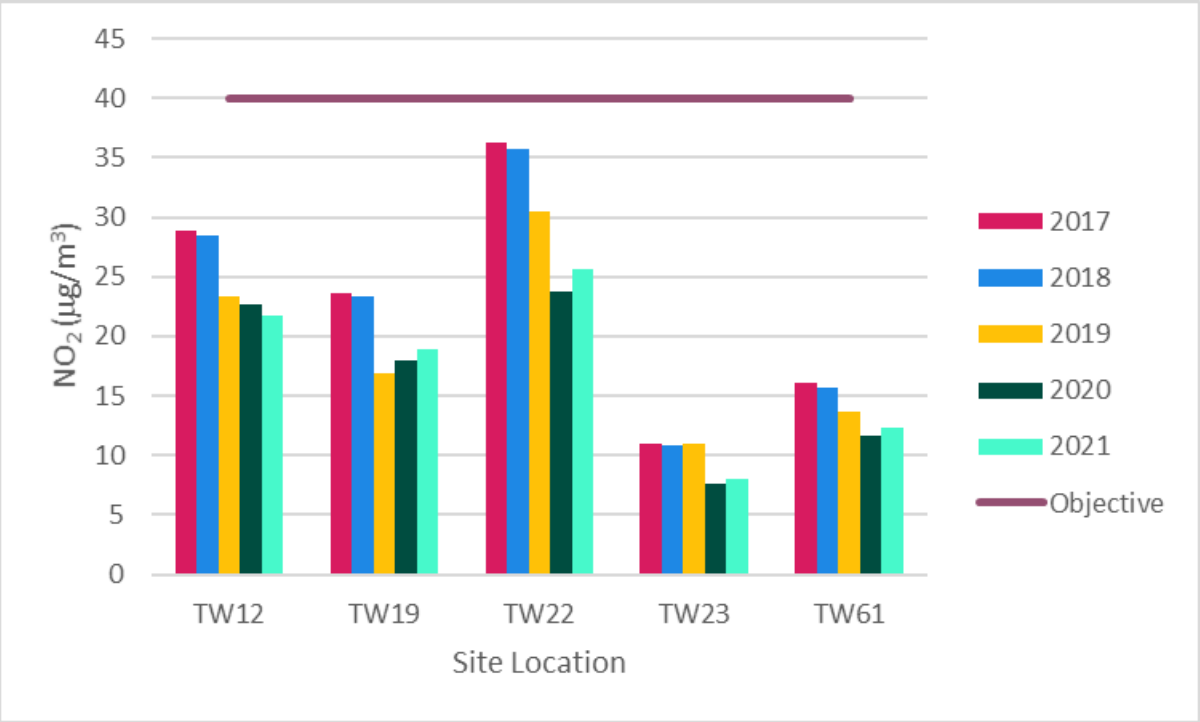


Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	558250	141750	Roadside	99.5	99.5	0	0	0	0	0

Notes:

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

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**.

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_{10} Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	558250	141750	Roadside	99.17	99.17	**24**	**27**	**21**	**18**	**19**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

Notes:

The annual mean concentrations are presented as µg/m^3.

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

All means have been "annualised" as per LAQM.TG16 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.6 – Trends in Annual Mean PM_{10} Concentrations

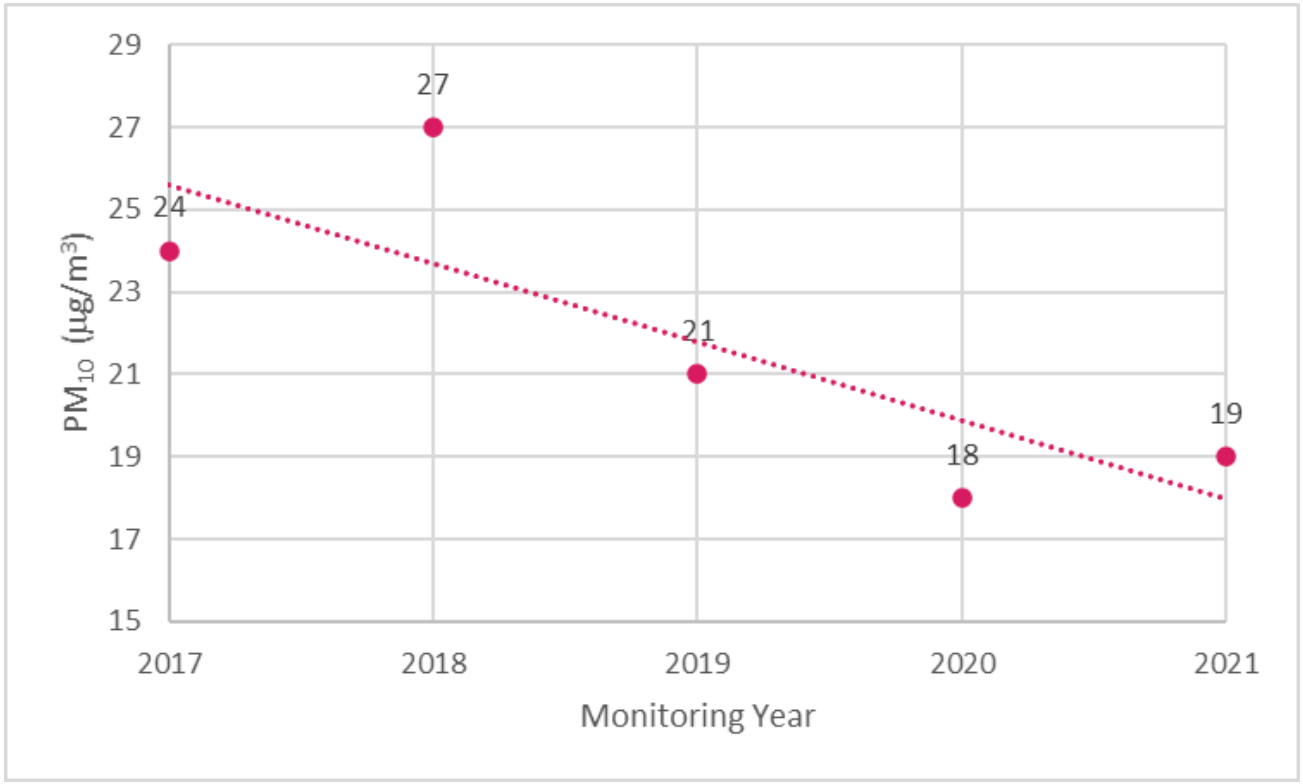


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2021 (%) (2)	2017	2018	2019	2020	2021
CM1	558250	141750	Roadside	99.17	99.17	13	13	10	1	1

Notes:

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

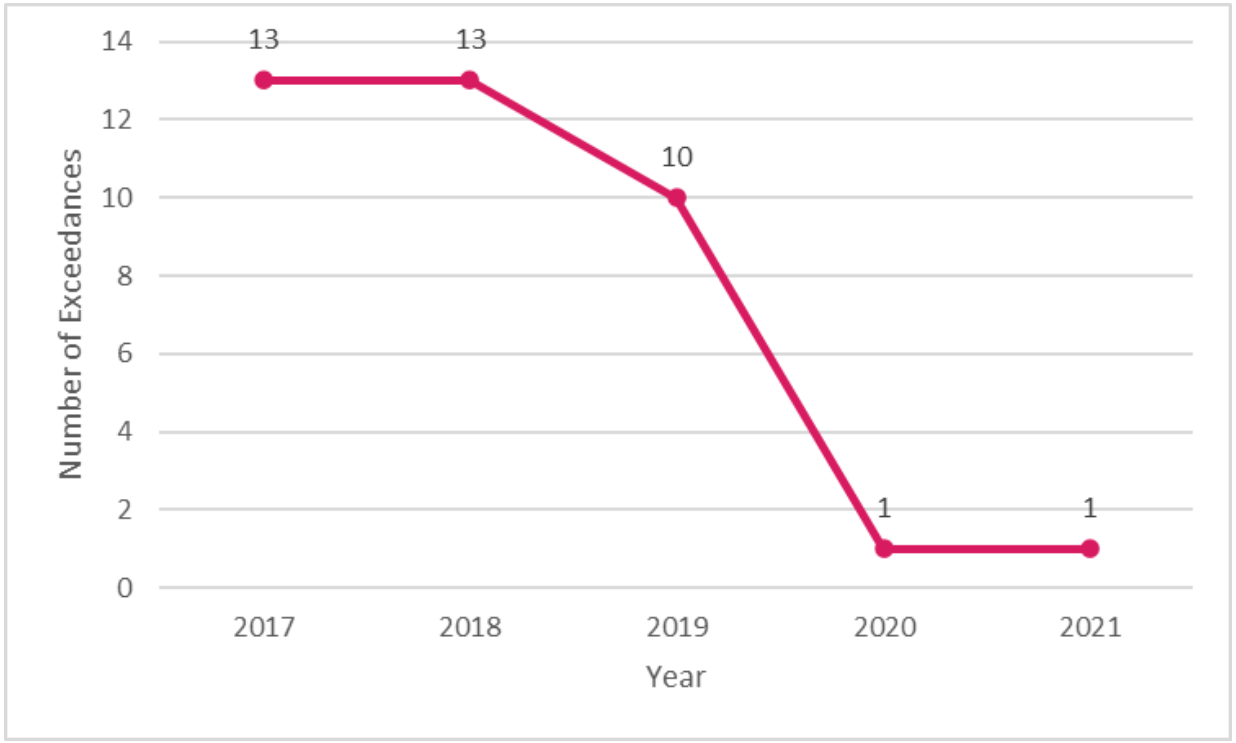
Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

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.5 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3



Appendix B: Full Monthly Diffusion Tube Results for 2021

Table B.1 – NO_2 2021 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TW01	558100	142200	36.8	30.9	37.8	31.3	35.2	31.8	28.0	24.3	37.9	37.4	38.6	35.7	33.8	25.7		
TW02	560000	141300	15.2	14.7	16.7	12.0	8.8	9.1	6.5	7.6	11.2	12.9	18.8	13.2	12.2	9.3		
TW19	566800	144800	30.9	25.5	25.2	25.3	22.1	22.6	20.8		26.2	24.6	30.6	23.7	25.2	19.2		
TW20	558300	139800	41.4	34.1	42.8	39.9	32.8	34.3	33.2	30.9	38.2	40.5	33.2	38.6	36.7	27.9		
TW22	559400	139500	38.4	29.3	37.8	38.1	31.3	33.5	26.6	25.8	37.1	33.5	22.4	34.9	32.4	24.6		
TW23	558800	138300	15.4	9.7	13.8	11.7	8.3	9.0	6.1	5.0	11.0	11.6	14.2	12.3	10.7	8.1		
TW25	558136	142017	35.0	23.2	34.1	30.5	26.5	27.9	27.7	20.6	32.3	33.4	35.5	30.2	29.7	22.6		
TW31	558227	139757	41.2	35.4	50.3	40.2	37.4	41.7	34.0	38.9	47.3	43.9	43.5	36.2	40.8	31.0		
TW34.1	558250	141750	30.7	29.8	37.6	33.4	34.5	30.6	33.5	29.3	40.2	31.4	32.8	32.4	-	-		Triplicate Site with TW34.1, TW34.2 and TW34.3 - Annual data provided for TW34.3 only
TW34.2	558250	141750	34.5	33.3	35.4	38.5	34.5	37.5	29.1	31.3	41.1	31.4	31.4	31.8	-	-		Triplicate Site with TW34.1, TW34.2 and TW34.3 - Annual data provided for TW34.3 only
TW34.3	558250	141750	35.4	34.0	37.1	35.4	34.7	36.5	29.5	29.7		31.6	30.8	30.9	33.7	25.6		Triplicate Site with TW34.1, TW34.2 and TW34.3 - Annual data provided for TW34.3 only
TW41	558076	138762	44.9	39.2	46.0	51.4	54.0	49.6	42.5	38.8	58.8	50.0	43.8	47.4	47.2	35.9		
TW43	558271	139451	35.4	28.6	32.6	29.1	26.2	24.5	21.9	20.4	34.3	31.9	14.2	29.9	27.4	20.8		
TW53	567638	144732	13.6	15.5	19.7	16.0	11.2	16.0	11.1		15.7	15.7	19.5	16.4	15.5	11.8		
TW55	566746	144112	24.7	20.5	25.7	22.4	15.4	24.4	18.3	17.9	25.4	19.4	26.1	23.3	22.0	16.7		
TW58	557927	138609	44.0	38.5	29.0	33.6	38.3	41.0	36.4	28.0		<0.5	35.3	37.2	36.1	27.5		
TW60	560230	140150	18.2	18.8	18.1	15.2	14.5	13.1	13.3		19.9	18.6	16.7	16.9	16.7	12.7		
TW61	558242	138715	23.4	14.4	20.0	15.4	10.4	13.8	10.5	12.0	15.0	17.0	24.3	20.0	16.4	12.4		
TW62	562284	140746	27.2	22.2	26.9	3.4	19.6			12.5	24.6	23.0	21.1	23.8	20.4	15.5		
TW63.1 HH	576065	130604	48.1	52.9	50.0	53.2	58.8	59.3	59.3	46.3	54.9	54.6	51.6	48.8	-	-		Triplicate Site with TW63.1 HH, TW63.2 HH and TW63.3 HH - Annual data provided for TW63.3 HH only
TW63.2 HH	576065	130604	51.3	50.9	55.0	46.6	49.6	60.8	60.8	45.1	64.6	58.0	49.3	56.4	-	-		Triplicate Site with TW63.1 HH, TW63.2 HH and TW63.3 HH - Annual data provided for TW63.3 HH only
TW63.3 HH	576065	130604	46.4	54.8	53.7	53.7	55.4	49.9	49.9	40.5	67.9	55.3	46.6	51.5	53.1	40.4		Triplicate Site with TW63.1 HH, TW63.2 HH and TW63.3 HH - Annual data provided for TW63.3 HH only
TW66 HH	576103	130566	33.8	27.6	30.0		24.5	27.7	27.7	19.1	30.9	30.4	34.8	25.6	28.4	21.6		

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TW67 HH	575998	130528	42.1	40.9	46.2	39.1	39.1	31.8	31.8	35.3	43.9	44.5	49.7	37.8	40.2	30.5		
TW68 HH	576051	130602	42.1	37.8	41.4	39.4	37.2	40.8	40.8	35.3	46.2	41.7	41.6	25.1	39.1	29.7		
TW69 HH	576062	135116	49.0	34.9	48.0	40.8	38.2	44.2	44.2		44.4	53.9	59.4	45.6	45.7	34.7		
TW70 HH	576051	130734	36.3	36.3	36.8	35.0	39.2	34.9	34.9	35.0	46.6	46.0	38.0	33.1	37.7	28.6		
TW71	560838	140389	43.4	32.8	40.5	33.6	36.2	33.9	34.1	26.9	45.0	42.6	37.8	35.5	36.9	28.0		
TW72	558140	142080		38.4	39.6	19.6	27.9	24.4	25.0	19.8		0.5	41.2	31.0	26.7	20.3		
TW73	558137	142215	23.3	25.4	22.2	20.8	18.8	18.5	14.5	15.2	24.8	20.9	19.3	7.6	19.3	14.6		
TW74	557354	138128		28.8	30.1	34.2	21.1	24.3	20.1	20.5	28.1	23.8	27.9	26.8	26.0	19.7		
TW75	559208	139317	25.0	18.5	23.4	16.5	11.5	18.7	15.0	15.3	22.6	21.7	27.5	23.9	20.0	15.2		
TW76	559537	138500	36.0	27.9	35.5	29.5	32.7	32.4	21.7	25.8	35.9	32.4	43.7	33.5	32.3	24.5		
TW77	559813	140829	30.6	30.1	34.9	31.7	29.1	24.2	27.8	25.0	33.0	35.8	40.8	33.7	31.4	23.9		
TW78 HH	575993	130594	33.0		33.4	26.7	27.8	33.0	33.0	26.1			36.6	33.2	31.4	23.9		
TW 79 HH	575967	130575		17.4	15.1	16.2		13.6	13.6	9.7	13.8		18.4	15.7	14.8	11.3		
TW80 HH	577758	136010		24.9		25.8		27.7		24.0	29.2	28.9	39.5	26.0	28.3	20.0		
TW81HH	572277	137785		37.9	24.5	45.3		35.6		30.0	36.7	26.9	37.3	27.9	33.6	25.5		
TW82	559166	139398		40.8	60.5	59.0	52.1	62.5	51.3	43.8	51.2	61.1	68.8	53.0	54.9	41.7	27.2	
TW83	558778	139491		30.1	40.3	40.0	28.7	21.9	28.5	23.5	34.4	34.4	42.2	30.9	32.3	24.5		
TW84	558789	139777		30.0	30.3	30.0	29.0		25.7	21.5	33.7	35.0	34.1	36.4	30.6	23.2		
TW85	558825	139824		22.6	28.3	25.9	21.2	21.4	19.4	18.3	26.6	27.0	32.3	32.1	25.0	19.0		
TW86	558276	139876		23.0	28.1	27.6	17.3	18.1	17.8	11.2	22.9	19.4	23.1	21.3	20.9	15.9		
TW87	554552	139178		23.8	26.6	25.6	25.7	25.5	22.5	18.1	32.1	26.6		23.6	25.0	19.0		
TW88	556128	139700		19.1	20.7	19.9	16.0	17.2	11.3		24.5	17.0	21.8	20.2	18.8	14.3		
TW89 HH	576088	130553	x	x	x	x	25.8	28.1	28.1		28.7		34.4	29.1	29.0	21.1		
TW01	558100	142200	36.8	30.9	37.8	31.3	35.2	31.8	28.0	24.3	37.9	37.4	38.6	35.7	33.8	25.7		
TW02	560000	141300	15.2	14.7	16.7	12.0	8.8	9.1	6.5	7.6	11.2	12.9	18.8	13.2	12.2	9.3		

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1.**

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG16.**

☒ **Local bias adjustment factor used.**

☐ **National bias adjustment factor used.**

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

☒ **Tunbridge Wells Borough Council confirm that all 2021 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

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**.

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 Tunbridge Wells Borough During 2021

Tunbridge Wells Borough Council has not identified any new sources relating to air quality within the reporting year of 2021.

Additional Air Quality Works Undertaken by Tunbridge Wells Borough Council During 2021

Tunbridge Wells Borough Council has not completed any additional works within the reporting year of 2021

QA/QC of Diffusion Tube Monitoring

All diffusion tubes deployed in Tunbridge Wells Borough during 2021 were supplied by Socotec (Didcot). Socotec is a UKAS accredited laboratory and participates in the in the new AIR-PT (Proficiency Test) Scheme previously known as the Workplace Analysis Scheme for Proficiency (WASP)) for NO_2 tube analysis and the Annual Field Inter-Comparison Exercise. These provide strict performance criteria for participating laboratories to meet, thereby ensuring NO_2 concentrations reported are of a high calibre. The lab follows the procedures set out in the Harmonisation Practical Guidance. In the latest available results, Socotec Didcot scored as follows: AIR-PT AR042 (Jan to Feb 2021) 100%. At the time of writing, AIR-PT AR042 appears to be the most up to date result available. The percentage score reflects the results deemed to be satisfactory based upon the z-score of $< \pm 2$. Based on 23 studies, 87% of all local Authority co-location studies in 2021, using the 50% TEA in acetone preparation method, were rated as ‘good’ (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%). All diffusion tubes were deployed in accordance with the 2021 diffusion tube calendar.

Diffusion Tube Annualisation

All diffusion tube date processing has been carried out using the Diffusion Tube Data Processing Tool. Data from two diffusion tube sites required annualisation during 2021. The sites were TW80 and TW89. Annualisation was carried out using the Diffusion Tube Data Processing Tool, with hourly data from automatic monitoring stations at Canterbury and Thurrock. The effect of the annualisation was to reduce the level at TW80 from 28.3µgm^{-3} to 26.3µgm^{-3}, and to reduce the level at TW89 from 29.0µgm^{-3} to 27.8µgm^{-3}.

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.TG16 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_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Tunbridge Wells Borough Council have applied a local bias adjustment factor of 0.76 to the 2021 monitoring data. A summary of bias adjustment factors used by over the past five years is presented in

Table C.1.

We usually prefer to use a local bias correction factor where possible. In this case the alternative was to use a national bias correction factor of 0.78, which was not vastly different to the local bias correction factor of 0.76 and so the choice would not have had a massive impact on the overall results. However, we had good data capture and good precision of our tube results, for all 12 periods, and good data capture from the automatic analyser, so there was really no reason not to use the local bias correction factor. We also note that the local bias correction factor of 0.76 of similar magnitude to the bias correction factor used in recent previous years.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2021	Local	-	0.76
2020	Local	-	0.76
2019	National	04/20	0.75
2018	Local		0.74
2017	Local		0.72

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

TW82 was a new site for 2021 by Dorin Court on the Pembury Road. Pembury Road is one of the busier roads in Tunbridge Wells, and is prone to congestion at peak times, so high NO_2 levels would be expected by the roadside, however, the road is very wide, with few obstacles to the dispersion of NO_2, and the residential properties are well spaced and set well back from the road. Tube TW82 recorded an annual mean NO_2 level in 2021 of 41.7µgm^{-3}. This was distance corrected to 27.2µgm^{-3} at the nearest relevant receptor.

QA/QC of Automatic Monitoring

Calibration of the Upper Stone Street monitoring station is undertaken fortnightly by MBC's Environmental Protection Team. Owing to its rural nature, the station at Detling is calibrated

less frequently; usually 4 weekly. Matts Monitors undertake 6 monthly servicing, and the QA/QC is part of the K&MAQMN which includes daily data checks and annual audits. The K&MAQMN contract is run by Air Quality Data Management and Envitech Europe who ratify the data. Data is available via the KentAir website www.kentair.org.uk although this has recently been through a major upgrade and full functionality is not yet available. All of MBC's previous ASRs are available via the MBC website.

QA/QC of Automatic Air Quality Instruments

For some years, data ratification at Tunbridge Wells Borough Council has been undertaken by Air Quality Data Management (AQDM). Our contract with AQDM ended on 31st March 2021, and from 1st April 2021, data ratification was undertaken by Ricardo Energy and Environment. Both companies provided similar but slightly different information regarding their AQ/QC procedures. For completeness, both sets of information are included below.

ADMS

Air quality measurements from automatic instruments are validated and ratified to the standards described in the Local Air Quality Management – Technical Guidance LAQM (TG16)

https://laqm.defra.gov.uk/technical-guidance

by Air Quality Data Management (AQDM) http://www.aqdm.co.uk

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NOx) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since

the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM_{10} and $PM_{2.5}$) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Generally this operates at three, six or twelve month intervals. However, unexpected faults can be identified during the instrument routine services or independent audits which are often at 6-monthly intervals. In practice, therefore, the data can only be fully ratified in 12-month or annual periods. The data processing performed during the three and six monthly cycles helps build a reliable dataset that is finalised at the end of the year.

There is a diverse range of additional information that can be essential to the correct understanding and editing of data anomalies. These may include

- the correct scaling of data
- ignoring calibrations that were poor e.g. a spent zero scrubber
- closely tracking rapid drifts or eliminating the data
- comparing the measurements with other pollutants and nearby sites
- corrections due to span cylinder drift
- corrections due to flow drifts for the particulate instruments
- corrections for ozone instrument sensitivity drifts
- eliminating measurements for NO_2 conversion inefficiencies
- eliminating periods where calibration gas is in the ambient dataset
- identifying periods were instruments are warming-up after a powercut
- identification of anomalies due to mains power spikes
- correcting problems with the date and time stamp
- observations made during the sites visits and services

The identification of data anomalies, the proper understanding of the effects and the application of appropriate corrections requires expertise gained over many years of

operational experience. Instruments and infrastructure can fail in numerous ways that significantly and visually affect the quality of the measurements. There are rarely simple faults that can be discovered by computer algorithms or can be understood without previous experience.

The PM_{10} concentrations require scaling into Gravimetric Equivalent concentration units by use of the Volatile Correction Model (VCM) http://www.volatile-correction-model.info or by corrections published by Defra https://uk-air.defra.gov.uk/networks/monitoring-methods?view=mcerts-scheme depending on the measurement technique.

Further information about air quality data management, expert data ratification and examples of bad practices are given on the Air Quality Data Management (AQDM) website http://www.aqdm.co.uk.

QC Audits

The National Physical Laboratory, (NPL) carry out annual audits to rigorously evaluate analysers to obtain an assessment of performance level. This information, in conjunction with the full analyser data set and calibration and service records, help ensure data quality specifications have been met during the preceding period. Additionally, an assessment of the station calibration cylinder concentrations provides an indication that the cylinder concentrations remain stable and therefore suitable for data scaling purposes.

The following describes the audit process:-

1 Oxides of Nitrogen

1.1 Analyser Response Factors

A stable "intercalibration standard", validated against NPL primary standards, is transported to each site and is sampled by the analyser.

The analyser also samples from a cylinder containing certified metrology grade zero air, or catalytic scrubbers of known efficiency.

The analyser factor quoted is the response to the intercalibration standard, expressed in $nmol.mol^{-1}.logged\ unit^{-1}$, with the zero point being the response to zero air.

For oxides of nitrogen analysers, the NO_x and NO channel response factors are

derived from an NO in nitrogen cylinder.

1.2 Analyser Linearity

To determine analyser linearity, a series of amount fractions are produced (using dynamic dilution techniques) covering the analyser range. The analyser output is noted for each of these amount fractions. A linear regression is then carried out, relating analyser output to the dilution factor at each point. The linearity error is defined as the maximum residual of the regression slope.

1.3 Analyser noise levels.

This is defined here as the standard error of ten successive spot readings of analyser output when fully stabilised on zero (zero noise) or span (span noise) amount fraction.

1.4 NO_x analyser Converter Efficiency

NO_2 to NO Converter efficiency is determined as follows:

A stable amount fraction of NO is produced, (by two stage dynamic dilution) and the analyser outputs, NO_x and NO, are noted after a suitable stabilisation period.

Ozone is added to the sample, converting some NO to NO_2, note however, the total NO_x in the sample remains constant. Again, following appropriate stabilisation times, the NO_x and NO outputs are noted.

Converter (in)efficiency is defined as the change in scaled NO_x signal as a percentage ratio of the change in the scaled NO signal.

1.5 Estimation of Site Cylinder Amount fractions

The site cylinder amount fractions are evaluated by sampling from the site cylinder and using the analyser response factors, section 1.1, to derive their amount fraction.

2 **Particle Analysers.**

2.1 Analyser Flow Rates

Flow rates are measured by calibrated flow audit measurement systems. A leak

check is also carried out.

2.2 Analyser Calibration Constants

TEOM Analyser calibration constants are measured by consideration of the change in frequency induced by placing pre-weighed masses on the analyser sensors.

RICARDO ENERGY AND ENVIRONMENT

QA/QC of Automatic Air Quality Instruments

Air quality measurements from automatic instruments are validated and ratified to the standards of the AURN and those described in the Local Air Quality Management – Technical Guidance LAQM (TG16) https://laqm.defra.gov.uk/technical-guidance

Validation

This process operates on data during the data collection stage. All data are continually screened algorithmically and manually for anomalies. There are several techniques designed to discover spurious and unusual measurements within a very large dataset. These anomalies may be due to equipment failure, human error, power failures, interference or other disturbances. Automatic screening can only safely identify spurious results that need further manual investigation.

Raw data from the gaseous instruments (e.g. NOx, O_3, SO_2 and CO) are scaled into concentrations using the latest values derived from the manual and automatic calibrations. These instruments are not absolute and suffer drifts. Both the zero baseline (background) and the sensitivity may change over time. Regular calibrations with certified gas standards are used to measure the zero and sensitivity. However, these are only valid for the moment of the calibration since the instrument will continue to drift. Raw measurements from particulate instruments (e.g. PM_{10} and $PM_{2.5}$) generally do not require scaling into concentrations. The original raw data are always preserved intact while the processed data are dynamically scaled and edited.

Ratification

This is the process that finalises the data to produce the measurements suitable for reporting. All available information is critically assessed so that the best data scaling is applied and all anomalies are appropriately edited. Generally this operates at three, six or twelve month intervals. However, unexpected faults can be identified during the instrument

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- corrections due to span cylinder drift
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- eliminating measurements for NO2 conversion inefficiencies
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The PM_{10} concentrations require scaling into Gravimetric Equivalent concentration units by use of the Volatile Correction Model (VCM) http://www.volatile-correction-model.info or by corrections published by Defra https://uk-air.defra.gov.uk/networks/monitoring-methods?view=mcerts-scheme depending on the measurement technique.

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The following describes the audit process:-

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NO_2 to NO Converter efficiency is determined using gas point titration as follows:

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Ozone is added to the sample, converting some NO to NO_2, note however, the total NO_x in the sample remains constant. Again, following appropriate stabilisation times, the NO_x and NO outputs are noted.

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2 Particle Analysers.

2.1 Analyser Flow Rates

Flow rates are measured by calibrated flow audit measurement systems. A leak check is also carried out.

2.2 Analyser Calibration Constants

TEOM Analyser calibration constants are measured by consideration of the change in frequency induced by placing pre-weighed masses on the analyser sensors.

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

Data from the TEOM used in TWBC is corrected using the Volatile Correction Model (VCM)

Automatic Monitoring Annualisation

All automatic monitoring locations within Tunbridge Wells Borough recorded data capture of greater than 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..

NO_2 Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

No automatic NO_2 monitoring locations within Tunbridge Wells Borough required distance correction during 2021

Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor Canterbury	Annualisation Factor Thurrock	Annualisation Factor	Annualisation Factor	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
TW80 HH	0.9842	0.8743			0.9293	28.3	26.3	
TW89 HH	1.0110	0.9029			0.9569	29.0	27.8	

Table C.3 – Local Bias Adjustment Calculation

	Local Bias Adjustment Input 1	Local Bias Adjustment Input 2	Local Bias Adjustment Input 3	Local Bias Adjustment Input 4	Local Bias Adjustment Input 5
Periods used to calculate bias	12				
Bias Adjustment Factor A	0.76 (0.71 - 0.82)				
Diffusion Tube Bias B	32% (23% - 41%)				
Diffusion Tube Mean (µg/m^3)	33.7				
Mean CV (Precision)	4.6%				
Automatic Mean (µg/m^3)	25.6				

Notes:

A single local bias adjustment factor has been used to bias adjust the 2021 diffusion tube results.

Table C.4 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
TW82	1.0	8.5	41.7	8.1	27.2	

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

Figure D.1 – Map of Non-Automatic Monitoring Sites

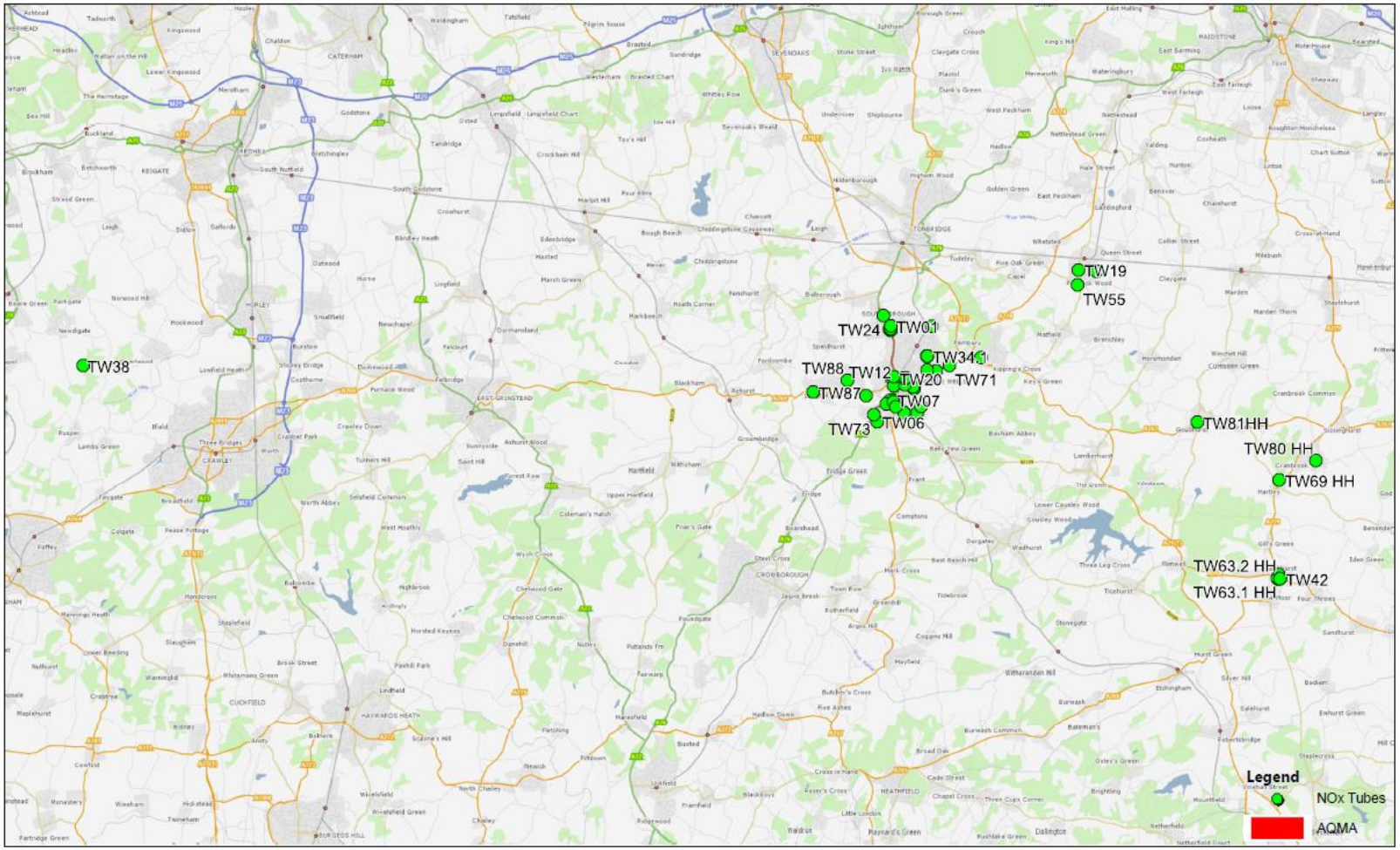


Figure D.2 – Map of TW69HH, TW81HH, TW80HH

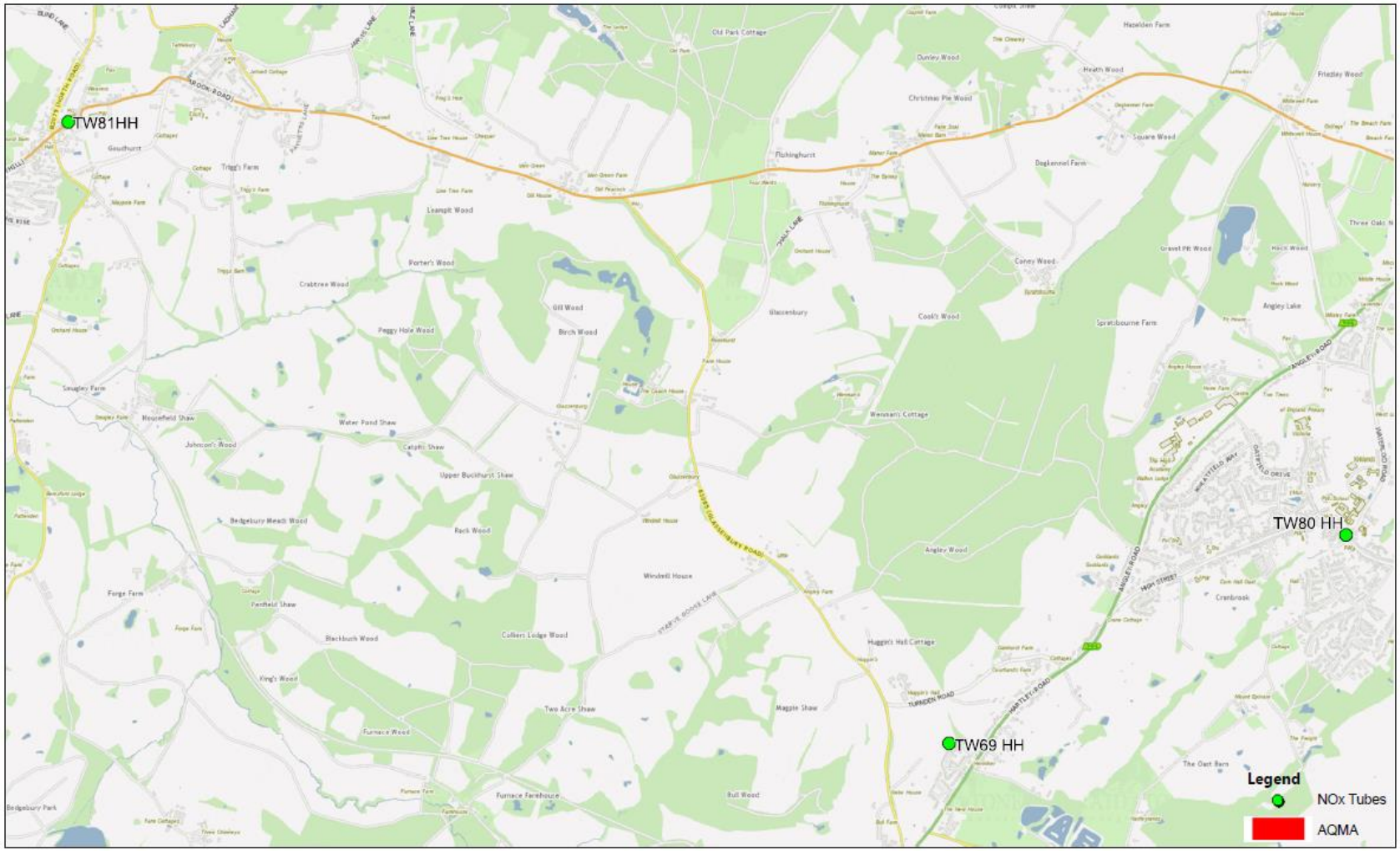


Figure D.3 – Map of TW63.1,2 and 3HH, TW 67HH , TW69HH, TW70HH, TW78HH, TW79HH and TW89HH.

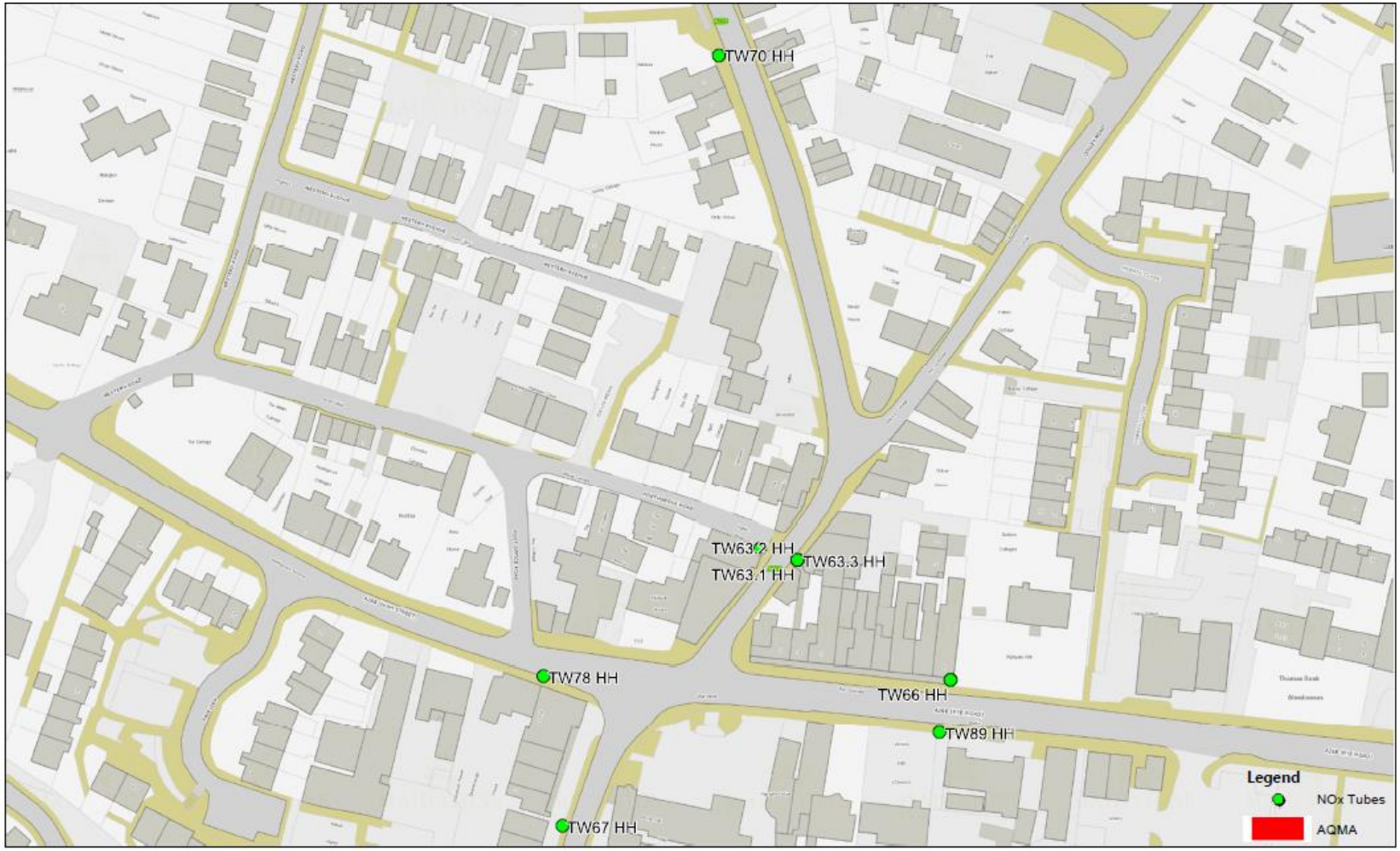


Figure D.4 – Map of TW19, TW53, and TW55.

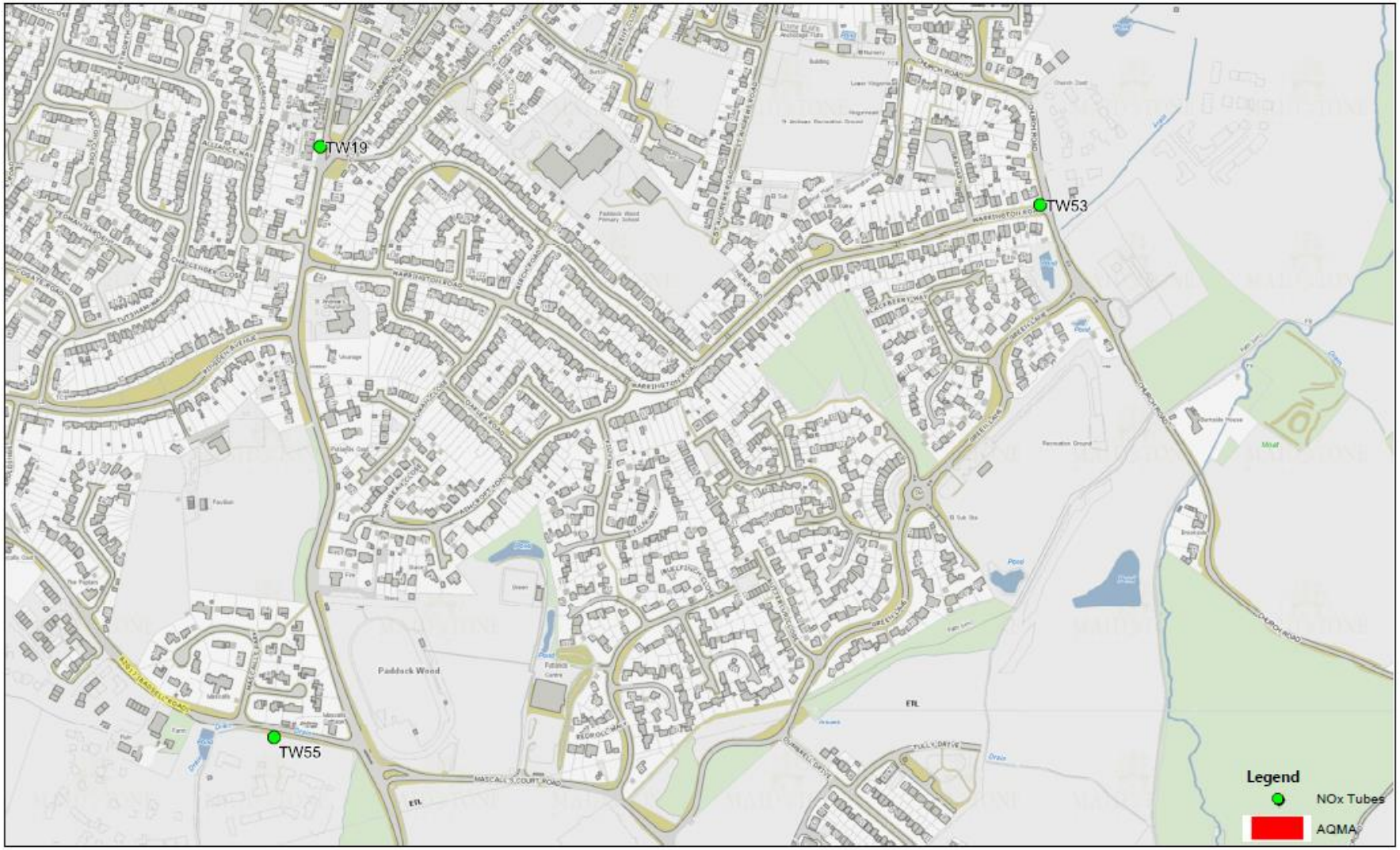


Figure D.5 – Map of TW38

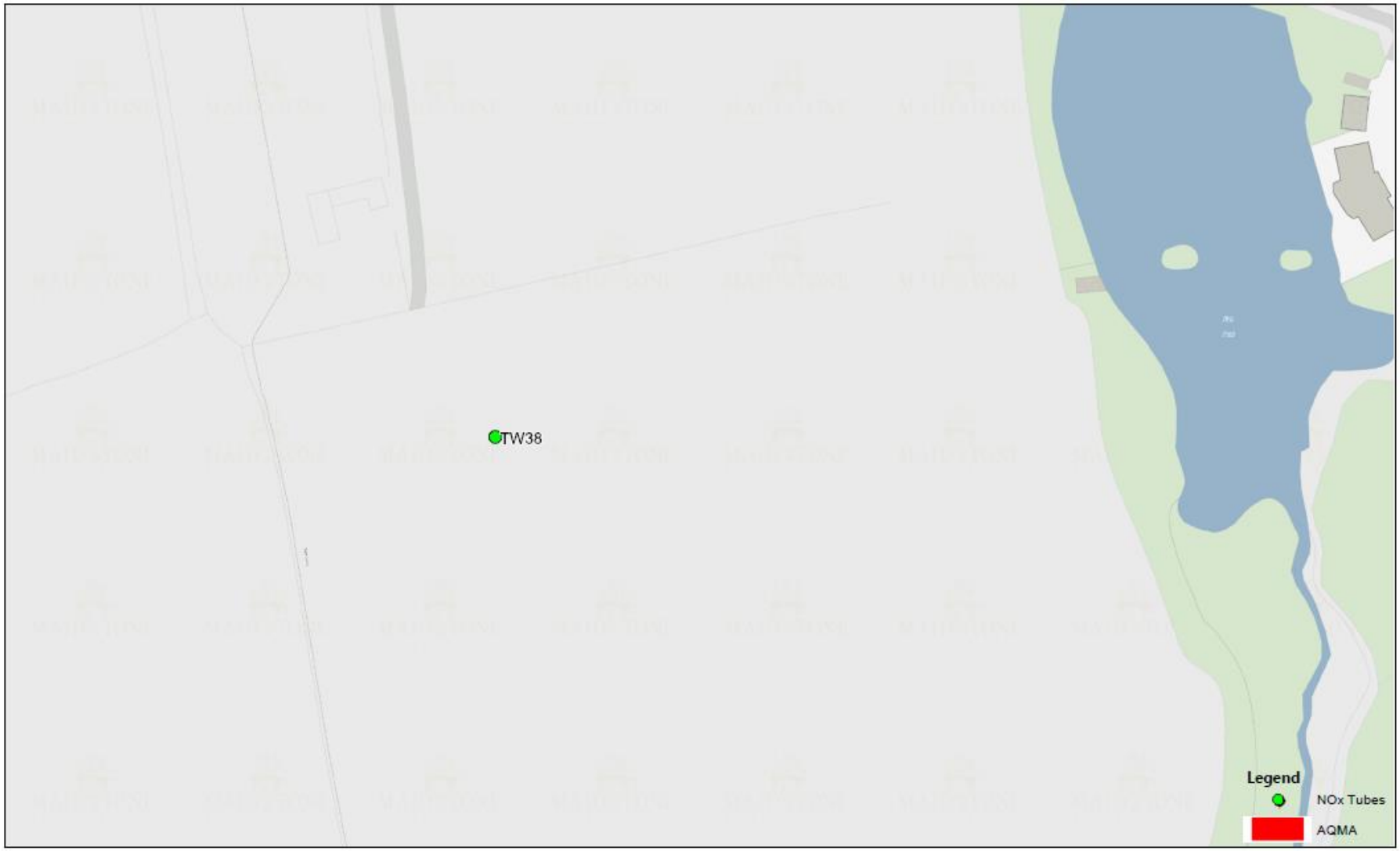


Figure D.6 – Map of TW02

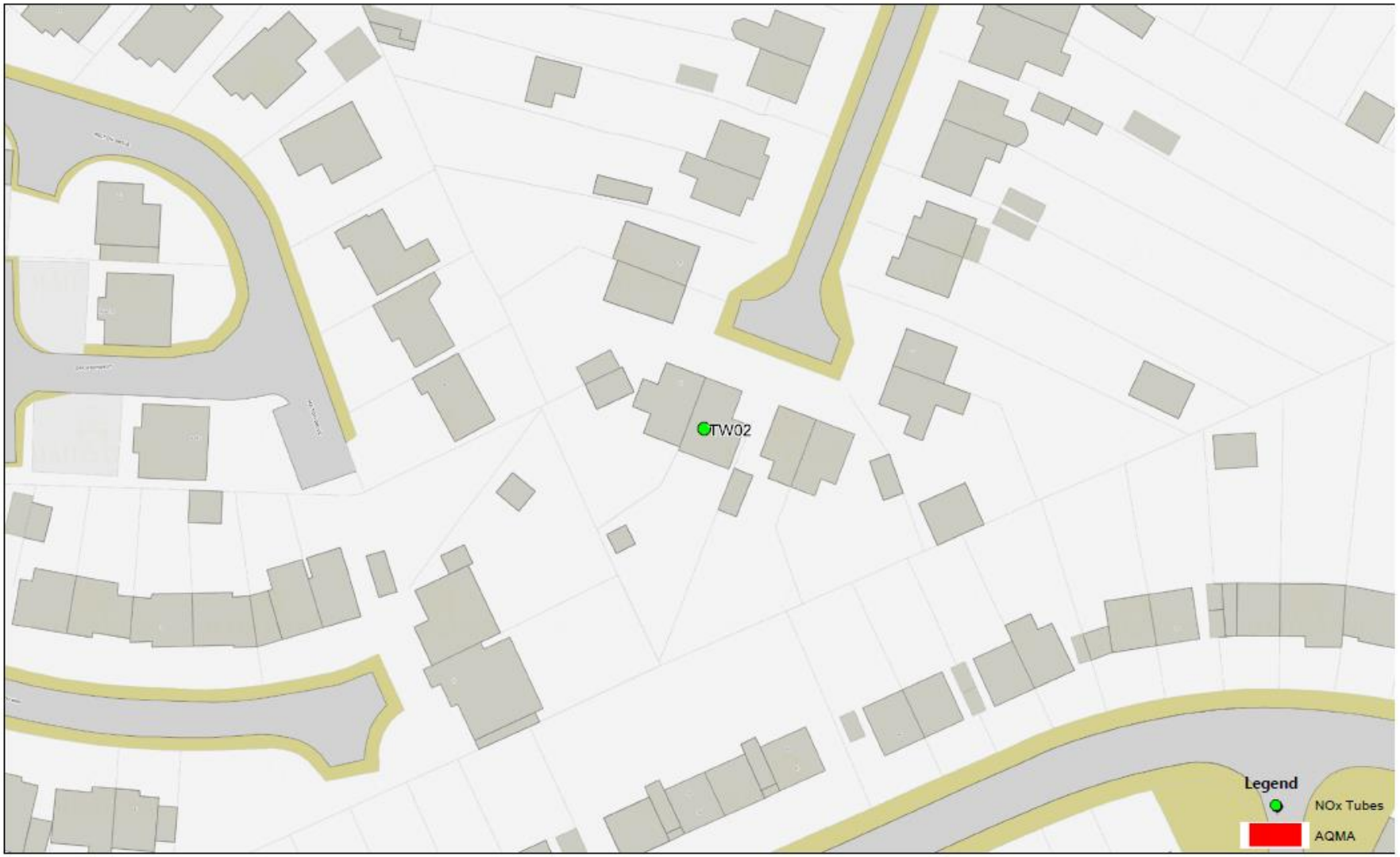


Figure D.7 – Map of TW60, TW71 and TW77

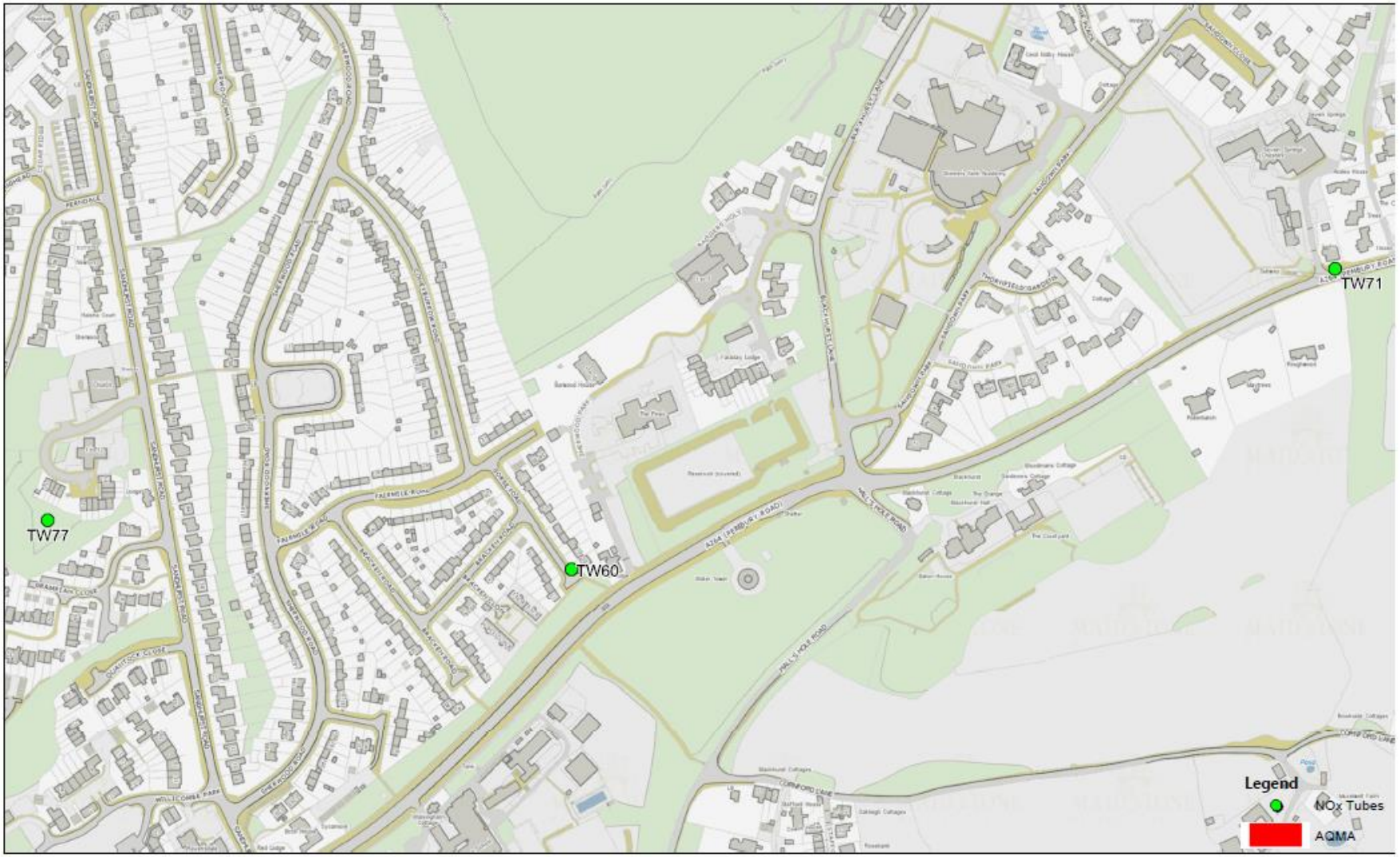


Figure D.8 – Map of TW22, TW75 and TW82

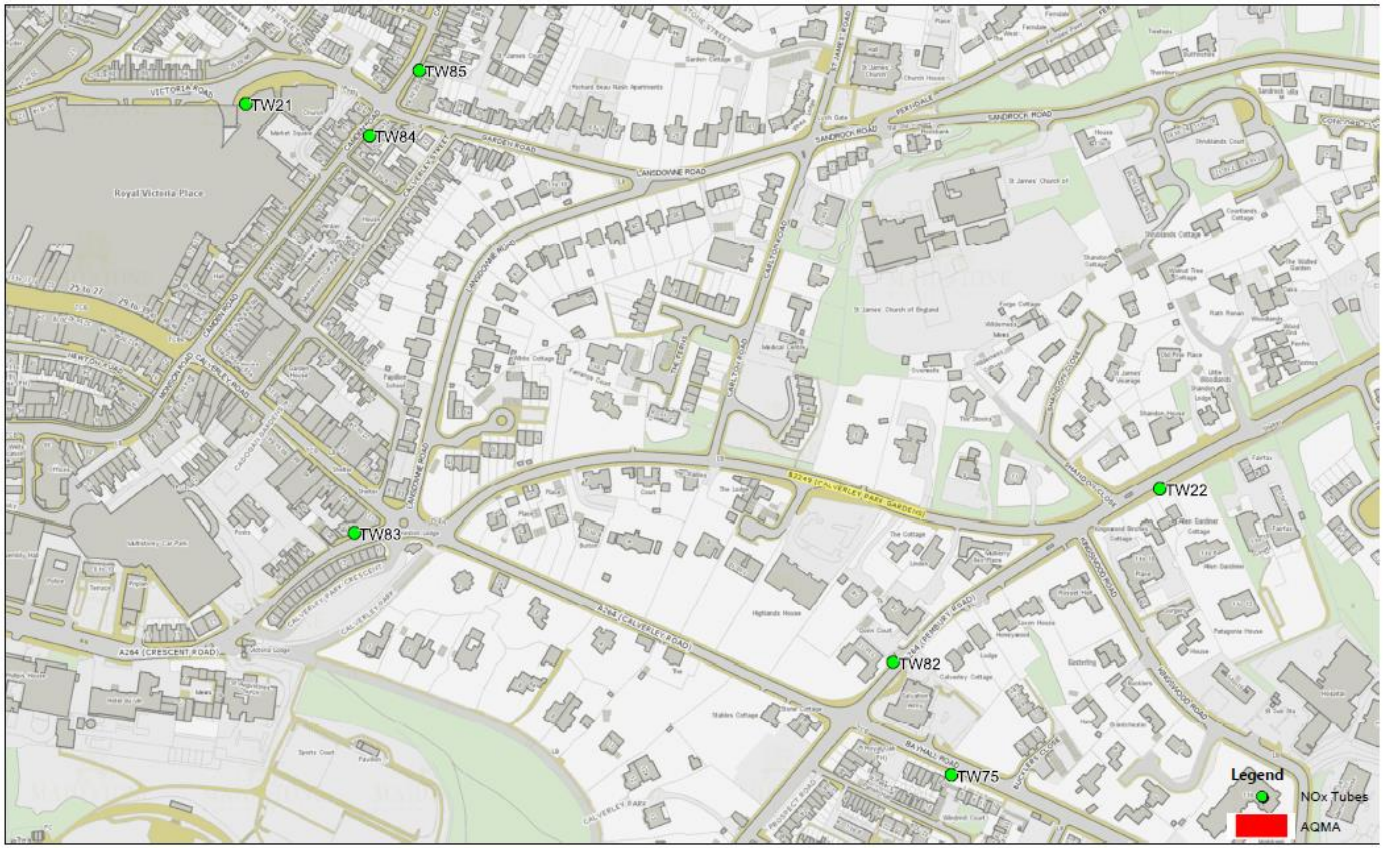


Figure D.9 – Map of TW12, TW20, TW21, TW31, TW43, TW83, TW84, TW85 and TW86

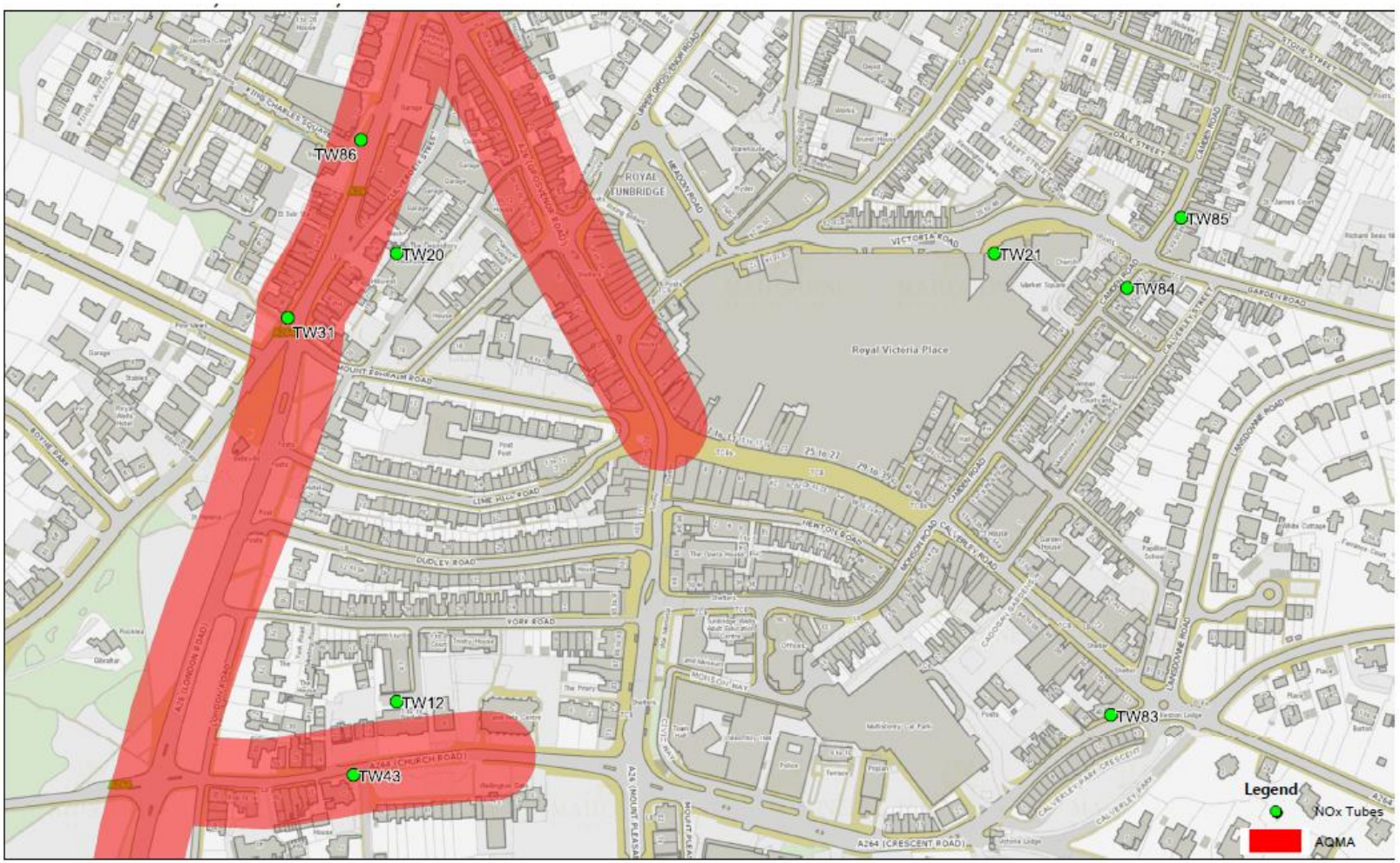


Figure D.10 – Map of TW07, TW41, TW58, TW61 and TW64

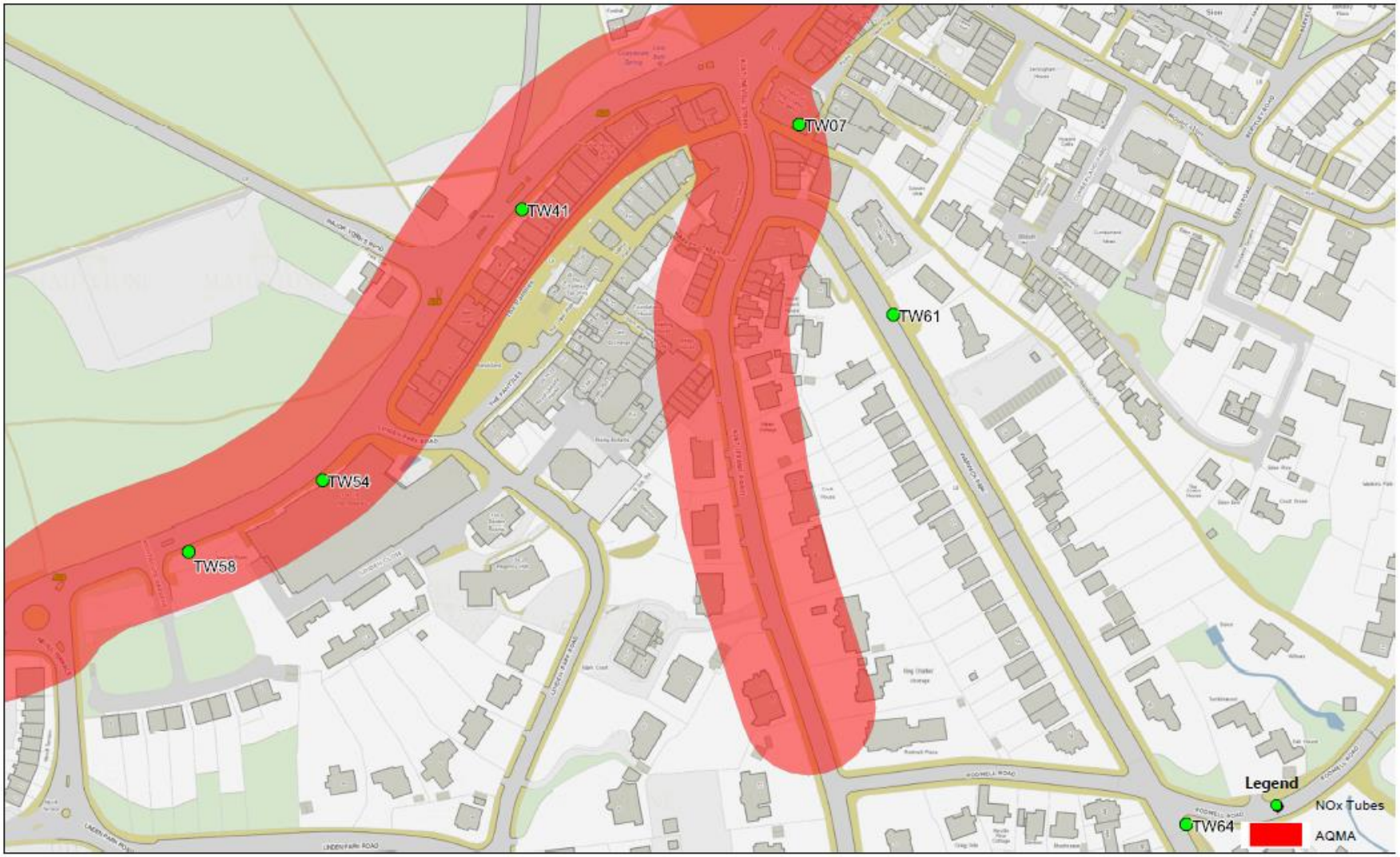


Figure D.11 – Map of TW23, TW64 and TW76

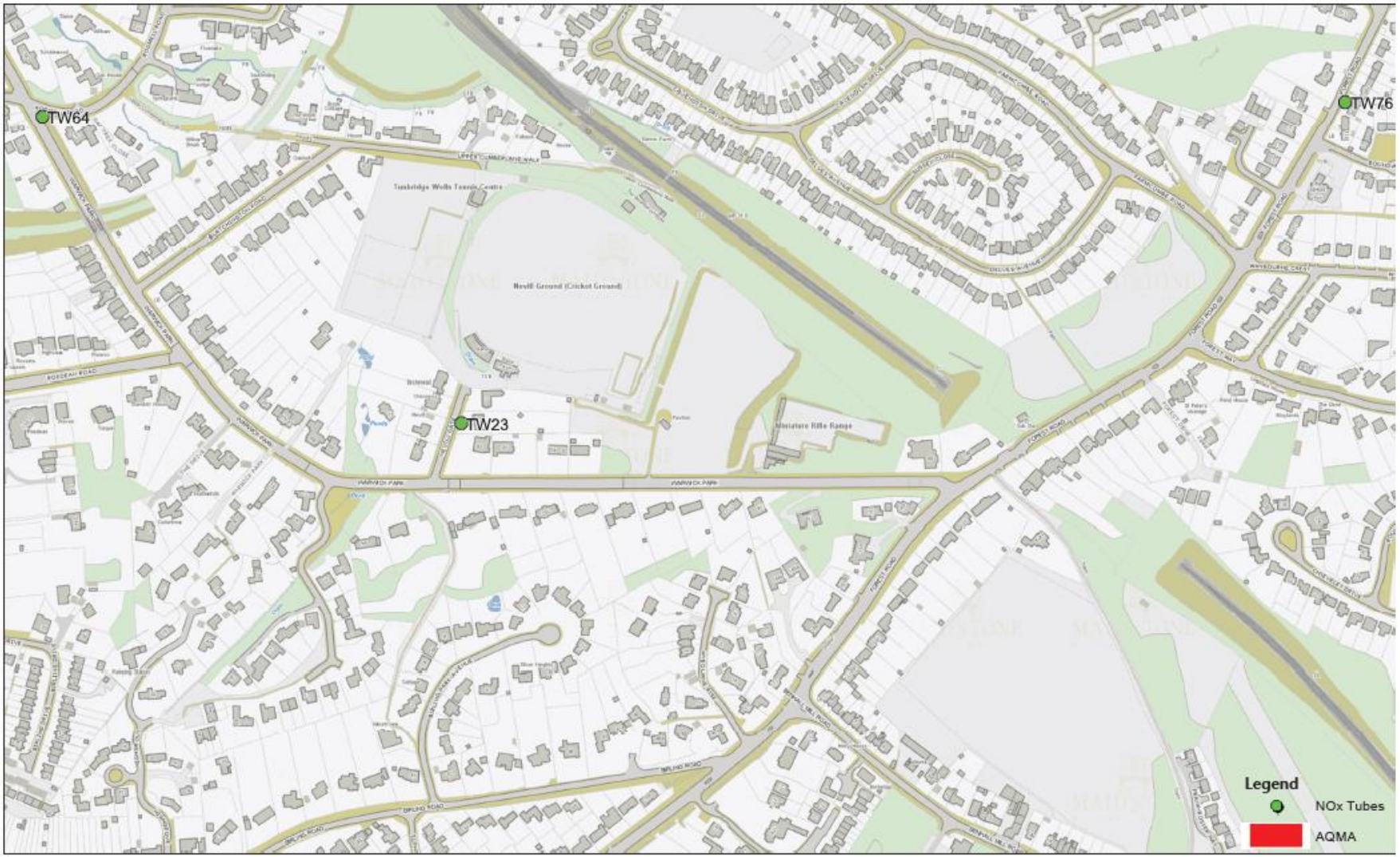


Figure D.12 – Map of TW06 and TW73

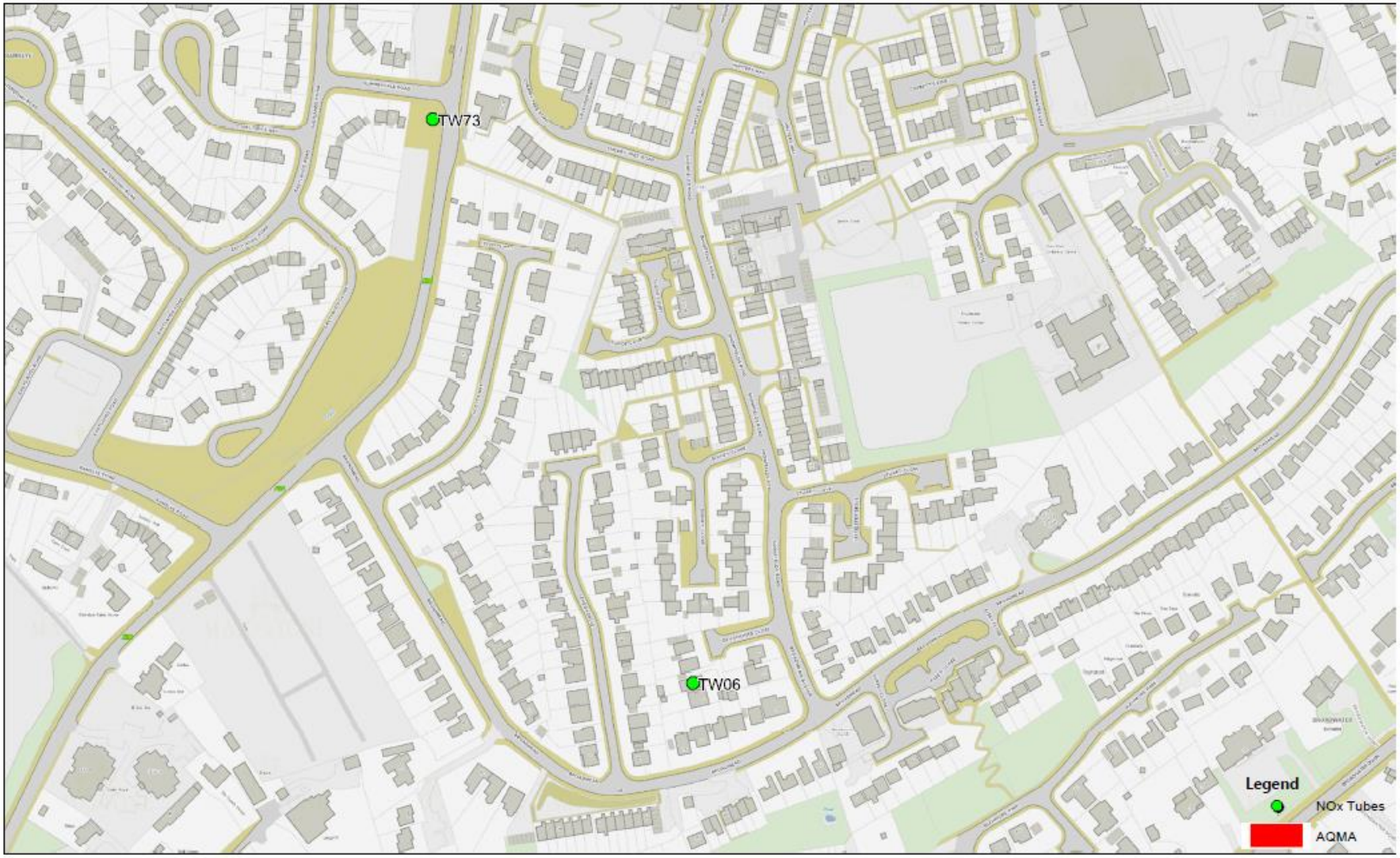


Figure D.13 – Map of TW50, TW87 and TW88.

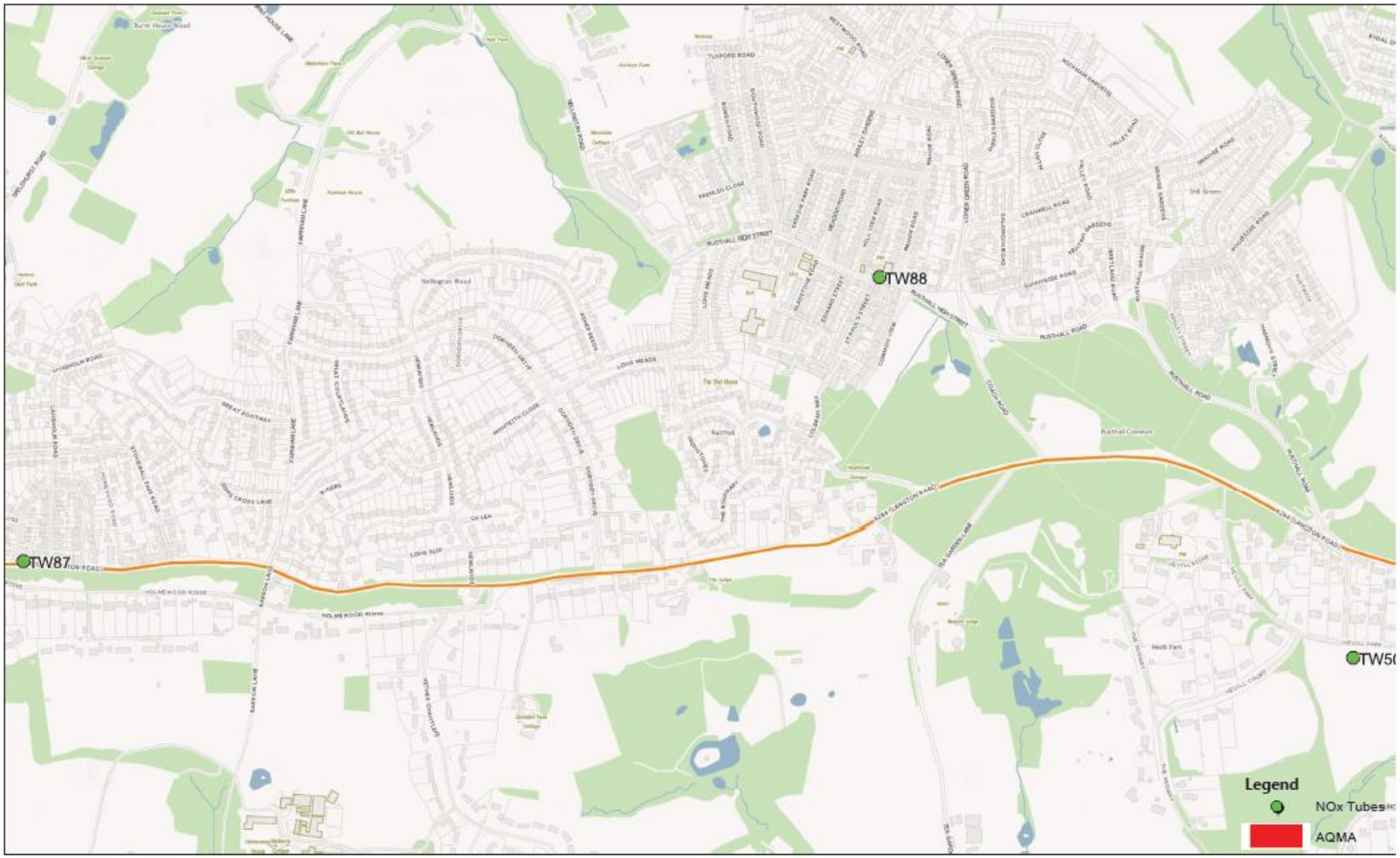


Figure D.14 – Map of TW24

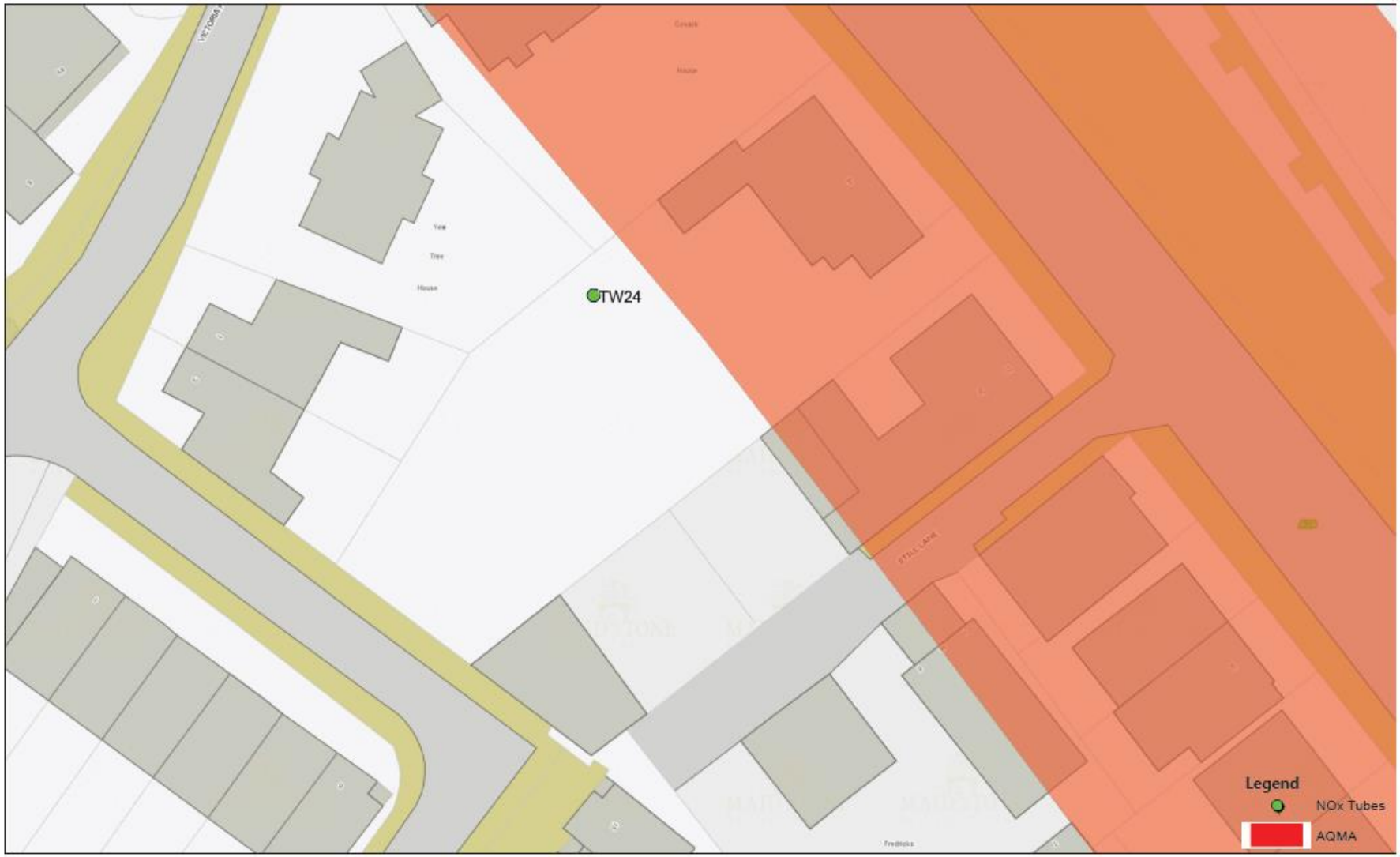


Figure D.15 – Map of TW01 and TW74

Figure D.16 – Map of TW25, TW51, TW52 and TW72

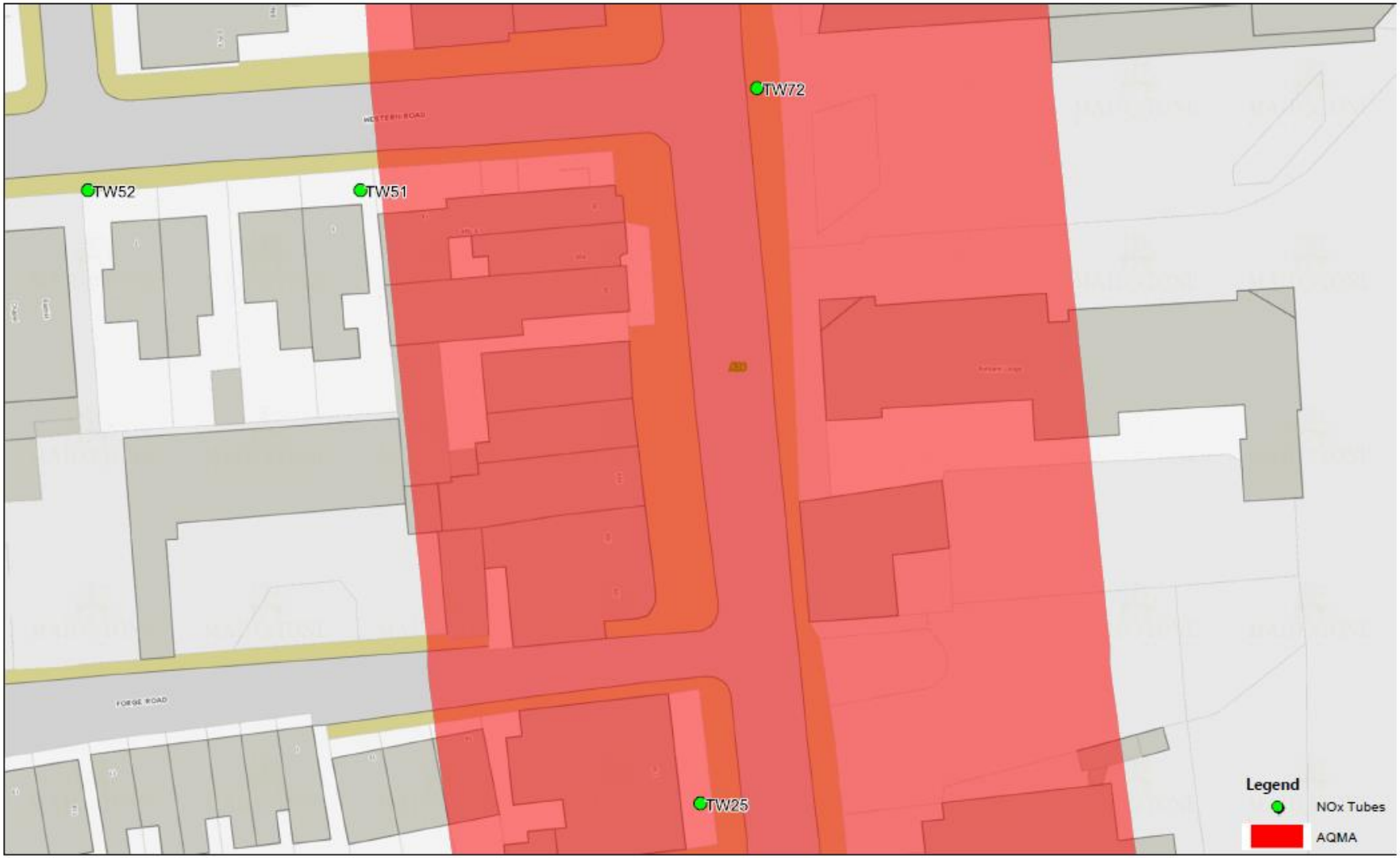
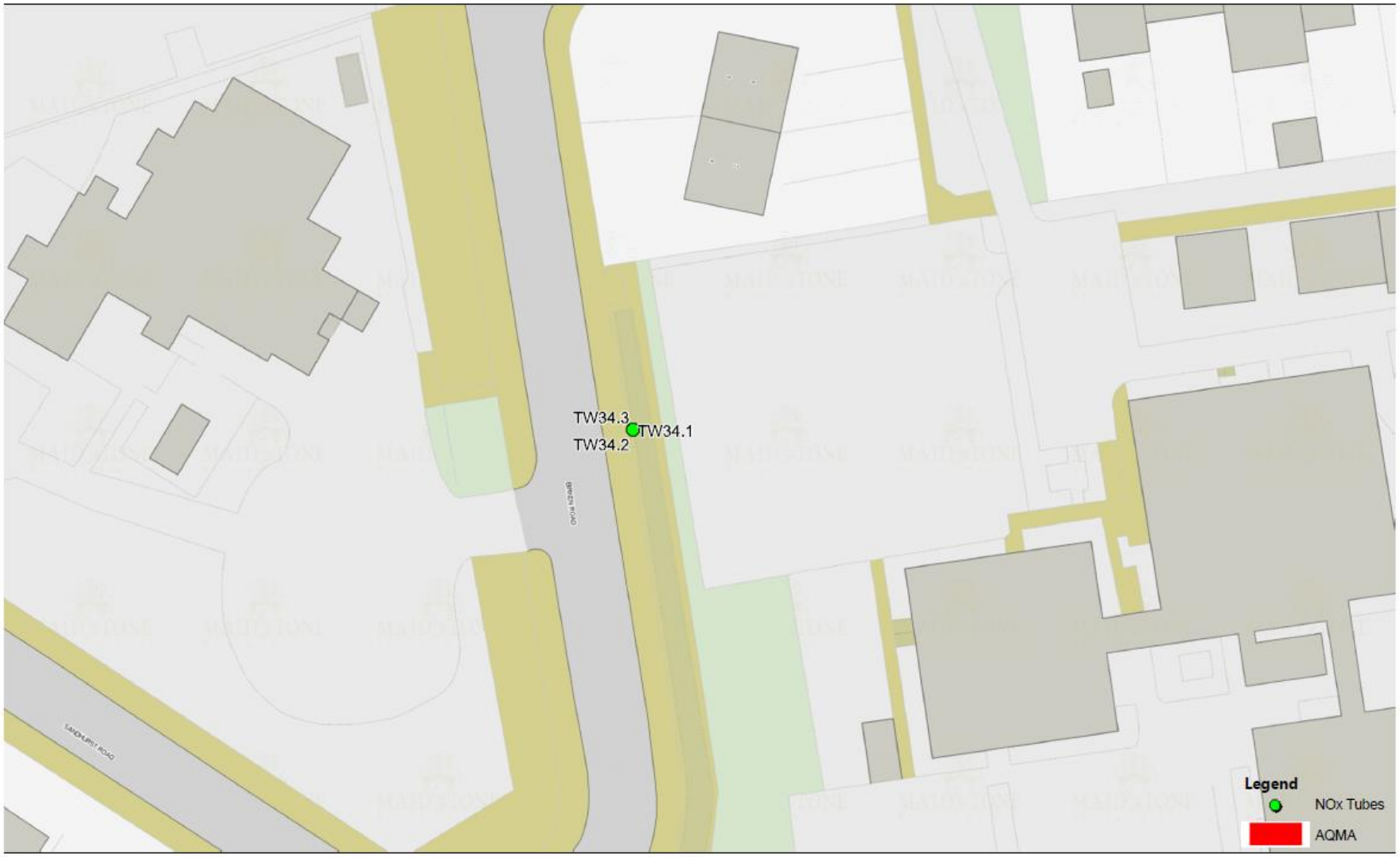


Figure D.17 – Map of TW34.1, 2 and 3.



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

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

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

Glossary of Terms

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

References

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- Tunbridge Wells Borough Council Air Quality Action Plan – November 2009
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- https://laqm.defra.gov.uk/documents/LAQM%20NO2%20Performance%20data_Up%20to%20March%202021_v2.pdf