2024 Air Quality Annual Status Report (ASR)

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

Date: June 2024

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Executive Summary: Air Quality in Our Area

Air Quality in Three Rivers

Breathing in polluted air affects our health and costs the NHS and our society billions of pounds each year. Air pollution is recognised as a contributing factor in the onset of heart disease and cancer and can cause a range of health impacts, including effects on lung function, exacerbation of asthma, increases in hospital admissions and mortality. In the UK, it is estimated that the reduction in healthy life expectancy caused by air pollution is equivalent to 29,000 to 43,000 deaths a year[1].

Air pollution particularly affects the most vulnerable in society, children, the elderly, and those with existing heart and lung conditions. Additionally, people living in less affluent areas are most exposed to dangerous levels of air pollution[2].

Three Rivers is a sub-urban district of 88.8 square kilometres located in south-west Hertfordshire. It borders Watford and Hertsmere Boroughs to the east, Buckinghamshire Council (Chiltern and South Bucks Areas) to the west, St Albans City & District and Dacorum Borough to the north, and the London Boroughs of Hillingdon and Harrow are to the south. The latest estimated population of Three Rivers is 93,800 (Source: Office for National Statistics - Census 2021).

The key road links through the District are the M1 and M25 motorways, which are likely significant sources of local air pollutant emissions. There are no significant pollutant sources within the district apart from road traffic emissions.

From 1st May 2019, Three Rivers District Council delegated certain Environmental Health functions to Watford Borough Council (WBC) including local air quality management.

Table ES 1 provides a brief explanation of the key pollutants relevant to Local Air Quality Management and the kind of activities they might arise from.

[1] UK Health Security Agency. Chemical Hazards and Poisons Report, Issue 28, 2022.

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

Table ES 1 - Description of Key Pollutants

Pollutant	Description
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a gas which is generally emitted from high-temperature combustion processes such as road transport or energy generation.
Particulate Matter (PM_{10} and $PM_{2.5}$)	Particulate matter is everything in the air that is not a gas. Particles can come from natural sources such as pollen, as well as human made sources such as smoke from fires, emissions from industry and dust from tyres and brakes. PM_{10} refers to particles under 10 micrometres. Fine particulate matter or $PM_{2.5}$ are particles under 2.5 micrometres.

The main pollutants of concern in the District are NO_2, PM_{10} and $PM_{2.5}$. These are mainly associated with road traffic. NO_2 is formed during the combustion process when Nitrogen in the air bonds with Oxygen. Road vehicles emit particulate matter from their exhaust and from non-exhaust sources such as brake, tyre and road surface wear and the resuspension of road dust.

The latest monitoring data shows a general trend of decreasing concentrations of NO_2. This is in line with the national trend. Defra recently reported that "between 2007 and 2019 inclusive, the annual mean NO_2 concentration at roadside sites reduced by an average of 1.8 µg/m^3 each year. This reduction was observed at most long-running monitoring sites across the UK; which could be a consequence of the large reduction in road transport emissions of NO_2 over the same period in the UK, as newer vehicles subject to stricter emissions standards enter the transport fleet".

In 2023, NO_2 concentrations did not exceed the annual mean objective at any of the Council's diffusion tube sites. There is a general trend of reduction over the last 5 years.

There were no exceedances of the 1-hour objective.

There are no new major sources of emissions in the District. The Council has not introduced any new AQMAs, Action Plans or strategies.

The Council intends to begin drafting a new AQAP in July 2024.

Actions to Improve Air Quality

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

The Environmental Improvement Plan[3] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term targets for fine particulate matter ($PM_{2.5}$), the pollutant of most harmful to human health. The Air Quality Strategy[4] provides more information on local authorities' responsibilities to work towards these new targets and reduce fine particulate matter in their areas.

The Road to Zero[5] details the Government's approach to reduce exhaust emissions from road transport through a number of mechanisms, in balance with the needs of the local community. This is extremely important given that cars are the most popular mode of personal travel and the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Local Planning and Policy

Local Plan

Three Rivers District Council is preparing a new Local Plan that will set out how the Council plan for future growth and development in Three Rivers. This plan will form the blueprint for how the Council will sustainably develop the district until 2041, including managing needs for housing, jobs and supporting infrastructure – for example, shops, community facilities, transport, open spaces, schools and healthcare.

The new Local Plan will identify possible sites for development and will out the policies against which the Council will assess planning applications.

[3] Defra. Environmental Improvement Plan 2023, January 2023

[4] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

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

Climate Emergency & Sustainability Strategy 2023-2027

The original strategy was written in 2021 in response to the council's declaration of a "climate emergency", and this updated version has been produced to reflect changes at an international, national, and local level, to policy, technology, and experience.

Since declaring a "climate emergency" in 2019, the Council has worked to reduce its own emissions, whilst encouraging and enabling others to reduce their emissions, improve sustainability and resilience to the effects of climate change, to enable the Council to achieve net-zero carbon for its own emissions by 2030, and support the District in reaching net-zero carbon by 2045.

This strategy focuses on what the Council and its partners are doing and plan to do within the parameters of the current legal, financial, regulatory, and technological frameworks, under which we must operate to deliver substantial carbon emission reductions.

The Climate Emergency and Sustainability Strategy 2023-2027 is the detailed work behind the Council's Corporate Framework where one of the Council's four overarching objectives is to strive towards net-zero and be climate resilient.

The strategy is supported by an Action Plan which details quantifiable, short-, medium- and long-term actions needed to meet our aims and is updated continuously and reviewed bi-annually by the Climate Change, Leisure, and Community Committee.

The need to reduce emissions, while adapting and building resilience to the effects of climate change, remain the most urgent tasks of our time. Mitigation is necessary to limit the extent of global temperature rise and the severity of its impacts, however it is also critical to adapt to the impacts of climate change that we are already experiencing.

Our ability to reach net zero is greatly dependent on national and international action and policy on climate change. Addressing the planetary scale problem of climate change requires urgent and strong top-down leadership, and global collective action.

The following selected text from the Strategy makes specific reference to local air quality:

<u>What must the council do to reach net-zero by 2030 and improve sustainability?</u>

Travel and Air Quality

Where suitable progress switching the fleet to low-emission or electric vehicles.

Continue to encourage remote working and virtual meetings to reduce staff travel.

Install electric charging points at council buildings for staff and fleet.

When staff travel is necessary encourage sharing, and low carbon forms of transport.

How is the council supporting the district to reach net-zero by 2045 and improve sustainability?

Travel and Air Quality

Promote and encourage the use of public transport and active travel.

Adopt and implement a Local Cycling and Walking Infrastructure Plan.

Increase the availability of community services in neighbourhoods to reduce the need for travel.

Support our partners and stakeholders in the development and promotion of strategic sustainable passenger transport and infrastructure.

Develop a county-wide programme that supports a transition to low-carbon private hire vehicles and taxis.

Maximise opportunities in new developments to increase sustainable low- and zero-carbon transport infrastructure.

Ensure Air Quality Management Plans are successfully delivered.

Encourage behavioural change on vehicle idling through education and partnership working.

Expand public electric vehicle charging infrastructure within Three Rivers.

How can residents and businesses help contribute to a sustainable, net-zero district by 2045?

Travel and Air Quality

Increase use of public transport and active travel.

Turn vehicle engines off when not in use to reduce pollution from idling.

Businesses to review active travel plans to encourage use of public and active transport, increase cycling facilities and electric vehicle infrastructure.

Install electric charging points on private property.

Local initiatives

Ev charging points

There are now 53 electric charging points available to the public in Three Rivers.

Planned charging facilities

The Council's Transport & Parking Projects Team is investigating electric vehicle charging points for public car parks to encourage drivers of electric vehicles to visit local shops. These chargepoints will also be available to residents who do not have a charge point at home.

The Council also supports the introduction of rapid electric vehicle charge points for use by taxi firms around the district.

The Council is working with Hertfordshire County Council to identify locations where on-street charging may be appropriate and developing a process and set of rules to support the installation of chargers in on-street locations.

Electric vehicle charging grants

Government grants are available to help homeowners or landlords to install a home chargepoint or to help employers install a chargepoint at business premises. For more information and to apply for a charge point grant, visit the GOV.UK website.

Walking and cycling

How we manage and improve walking and cycling routes in the district

Three Rivers District Council promotes cycling and walking, to encourage better travel and reduce climate change - better for you, the people around you and for your local environment.

You can reduce your carbon footprint while living a healthier, happier and more enjoyable life! Start walking and cycling more, using the information and links below to help you on your way.

Cycling

We want to enable and encourage people of all abilities to use their bike to get around - particularly people who do not often ride a bike. We also want to make walking easier for everyone.

Getting started and essential equipment

Want to ride but don't know where to begin? British Cycling have some great advice in the articles below.

Get Started - Cycling basics - https://www.britishcycling.org.uk/knowledge/bike-kit/get-started/article/20200409-Get-Started-Cycling-Basics-0

Essential kit to carry - https://www.britishcycling.org.uk/knowledge/bike-kit/article/izn20140402-Sportive-What-s-in-your-pockets-0

You can also find more information on the Green Our Herts facebook page.

Government Cycling Schemes

Many employers now offer affordable access to cycling through the Government's Cycle To Work Scheme which allows you to purchase a new bicycle and equipment paid for on a monthly basis. Speak to your employers' Human Resources department to see if it is something they offer.

Walking

You can find useful information to support walking at:

http://walkit.com/ - "The Urban walking route planner"

https://www.livingstreets.org.uk/ - a wide range of information from this major walking campaign group.

https://www.walkscore.com/ - find out how 'walkable' your area is - and get advice if you're looking to move!

Bus travel planning

For information on bus services, visit the Intalink Partnership at www.intalink.org.uk.

The Intalink Journey planner provides maps and timetables and even allows you to track the location of your bus.

Other Journey Planners are also available including the Travel line Journey Planner (providing routes and times for all travel in Great Britain) Transport for London (TFL) Journey Planner (for travel in and around London). You can find live bus times by using the Travel Line SMS service.

Intalink tickets allow unlimited travel across Hertfordshire using a range of bus service operators, so you don't need to buy separate tickets for each route - ticket offers can be found here: www.intalink.org.uk/tickets.

The Intalink Partnership represents the operators and Local Authorities in Hertfordshire to develop better coordinated bus and rail services. Intalink is currently producing a Plan to improve Bus Services. For more information, visit the Intalink Bus Service Improvement Plan page.

Public bus services in Hertfordshire are provided by commercial firms, with some subsidised by Hertfordshire County or Three Rivers District Council, which contributes to five key routes around the District.

Free Air Pollution Alerts

Three Rivers District Council has signed up to a notification service called 'Herts & Beds Air Pollution Alert System'. The system is provided by Ricardo Energy and Environment. The service provides a text or email alert straight to your mobile when levels of air pollution in your area increase to a moderate level or above.

This service sits alongside a website that provides 'at-a-glance' air quality information for Hertfordshire and Bedfordshire. Coloured markers on a map pinpoint exact areas and give an immediate pollution summary ranging from 1-10.

Conclusions and Priorities

In 2023, NO_2 concentrations did not exceed the annual mean objective at any of the Council's diffusion tube sites. There is a general trend of reduction over the last 5 years.

There were no exceedances of the 1-hour objective.

Two Airscan Units (low-cost sensors provided by Iknaia, funded by HCC) have been deployed within the PM_{10} AQMA, one on Wyatts Road and the other on Rickmansworth Road. There have been problems with the recording of data since the units were deployed, however, this has recently been rectified.

At the time of writing, one month's data was available (17/05/2024-17/06/2024). An average PM_{10} concentration of 5.2ug/m^3 was recorded at Wyatts Road. An average PM_{10} concentration of 4.5ug/m^3 was recorded at Rickmansworth Road.

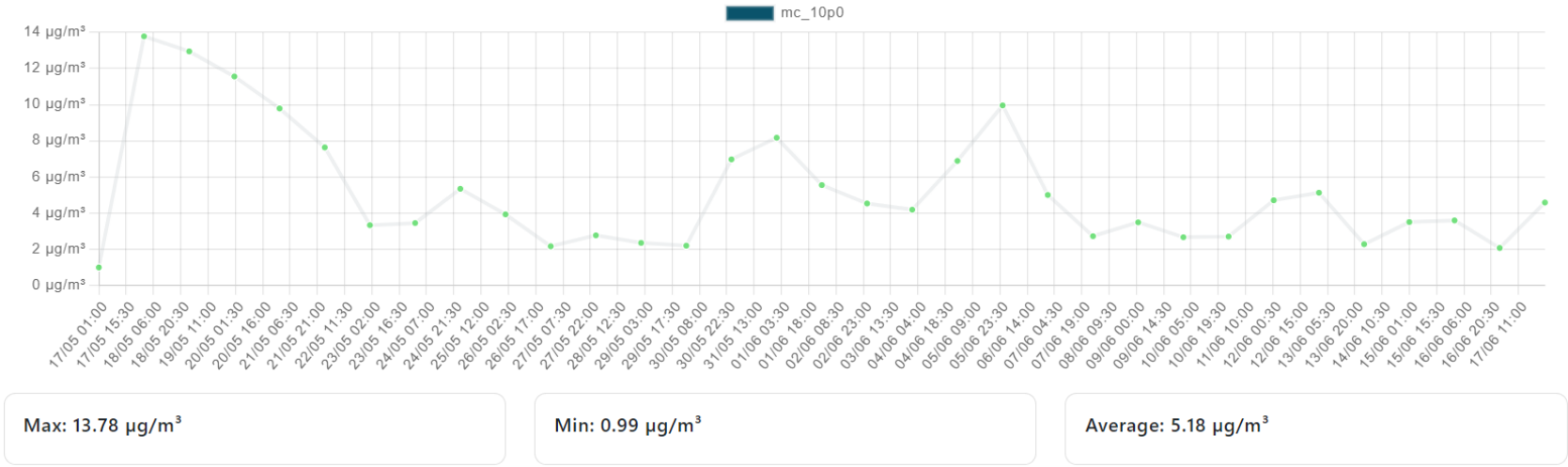
For the 24-hour period (17/06/2024-18/06/2024), an average PM_{10} concentration of 2.1ug/m^3 was recorded at Wyatts Road. An average PM_{10} concentration of 1.9ug/m^3 was recorded at Rickmansworth Road.

The data is presented below in Figures 1 to 4.

WBC are hoping to be able to report a full year's data from the sensor in next year's ASR.

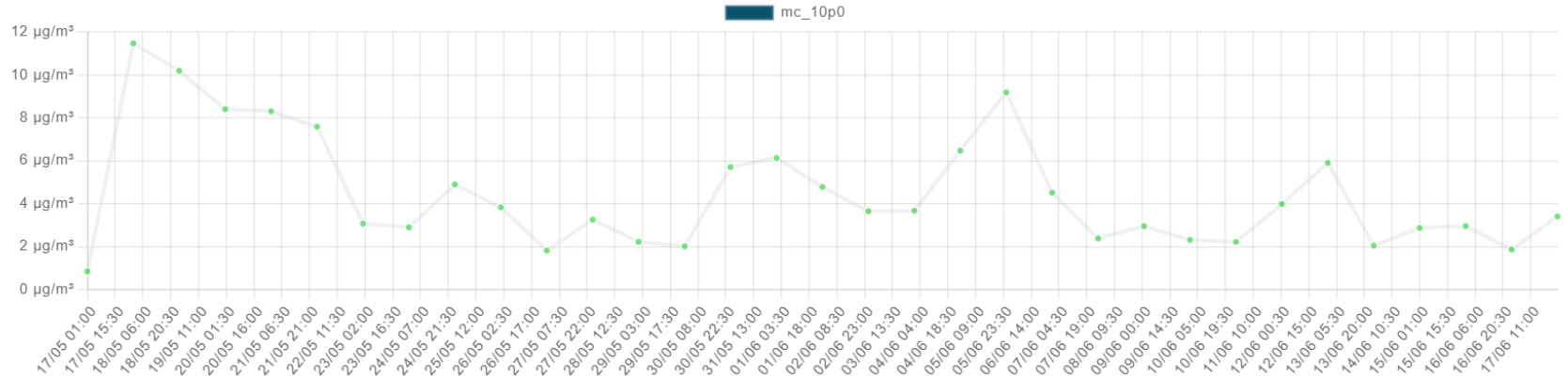
Drafting a new AQAP is a priority for the coming year.

Figure 1 - Wyatts Road PM_{10} concentrations recorded over a four-week period (17/05/2024-17/06/2024)



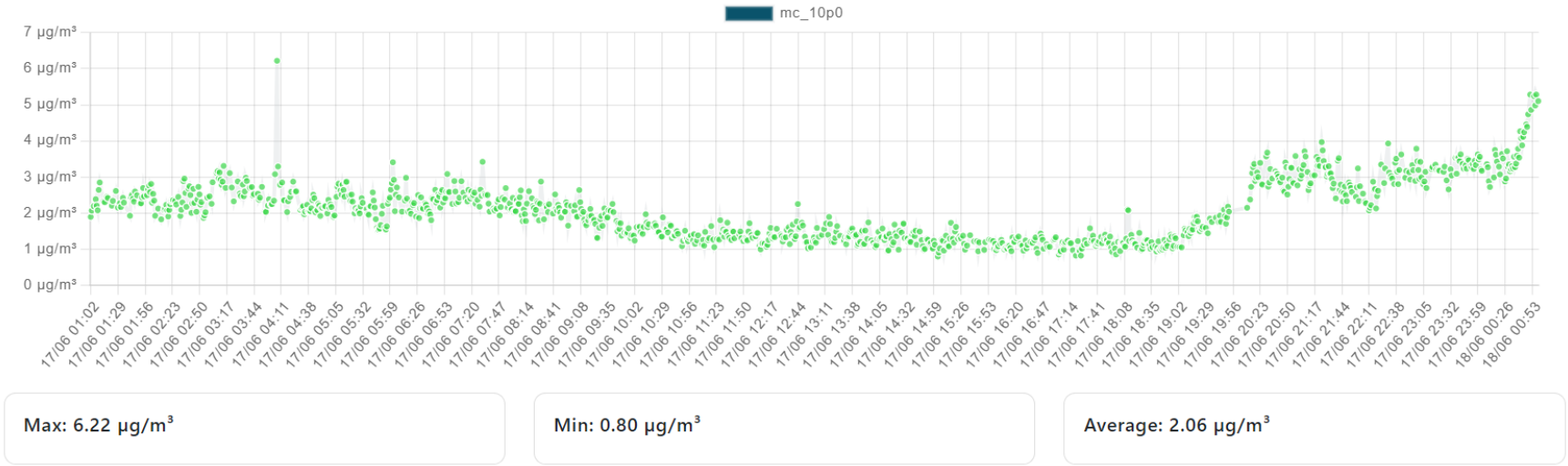
Max: 13.78 µg/m³ | Min: 0.99 µg/m³ | Average: 5.18 µg/m³

Figure 2 - Rickmansworth Road PM_{10} concentrations recorded over a four-week period (17/05/2024-17/06/2024)



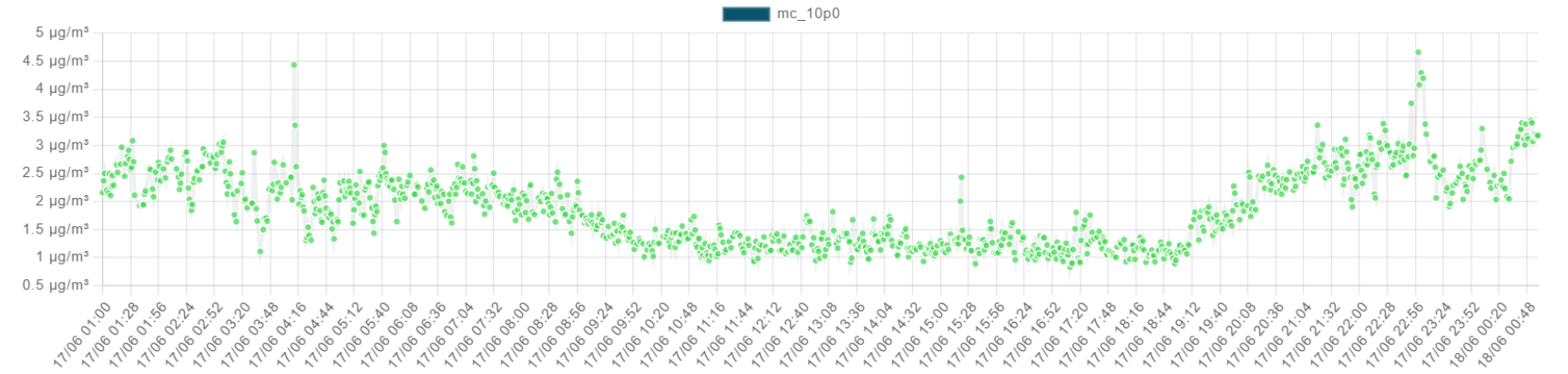
Max: 11.47 µg/m³ | Min: 0.85 µg/m³ | Average: 4.48 µg/m³

Figure 3 - Wyatts Road PM10 concentrations recorded over a 24-hour period (17/06/2024-18/06/2024)



Max: 6.22 µg/m³ | Min: 0.80 µg/m³ | Average: 2.06 µg/m³

Figure 4 - Rickmansworth Road PM10 concentrations recorded over a 24-hour period (17/06/2024-18/06/2024)



Max: 4.66 µg/m³ | Min: 0.83 µg/m³ | Average: 1.86 µg/m³

Local Engagement and How to get Involved

It is important that members of the public appreciate the impact of their transport choices on air quality. The current Three Rivers District Council AQAP highlights that the District is developing strategies to develop Sustainable Travel and Better Buses to inform how it will support the County Council's bus services. Three Rivers District Council has also supported Office for Low Emissions Vehicles (OLEV) initiatives to install electric vehicle charging points.

Local Responsibilities and Commitment

This ASR was prepared by the Community & Environmental Services Team of Watford Borough Council.

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 the Community & Environmental Services Team at:

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Housingandwellbeing@watford.gov.uk

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in Three Rivers District Council during 2023. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

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

2.1 Air Quality Management Areas

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

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

- NO_2 annual mean;
- PM_{10} 24-hour mean.

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Number of Years Compliant with Air Quality Objective	Name and Date of AQAP Publication	Web Link to AQAP
Chorleywood NO_2 AQMA	Declared 01/04/2001	NO_2 Annual Mean	Along the M25 south of Junction 18 to just north of where the motorway crosses the River Chess	YES	>40	22.5	2	Three Rivers District Council Air Quality Action Plan, July 2013	https://www.airqualityengland.co.uk/local-authority/hnb-reports
Chorleywood PM_{10} AQMA	Declared 01/04/2001	PM_{10} 24 Hour Mean	A slightly narrower area from just north of Junction 18, along the M25 to just north of where the motorway crosses the River Chess	YES	>50, exceeded more than 35 times in a year	Two Airscan Units have been deployed within the AQMA. WBC are hoping to be able to report data from the sensor in next year's ASR.	PM_{10} concentrations have not been monitored at this location since 2017.	Three Rivers District Council Air Quality Action Plan, July 2013	https://www.airqualityengland.co.uk/local-authority/hnb-reports

☒ **Three Rivers District Council confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **Three Rivers District Council confirm that all current AQAPs have been submitted to Defra.**

2.2 Progress and Impact of Measures to address Air Quality in Three Rivers District 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 an in-depth section discussing the comments from the previous ASR, and the comments have been noted and changes made in the ASR. This should continue this in future ASRs to ensure all reports are to a good standard.

2. Previous years comments regarding the laboratory have been rectified, with the lab, method used, and its location clearly as part of this ASR.

3. AQAP is out of date and requires updating for the next years ASR

   WBC intends to begin drafting a new AQAP in July 2024.

4. Monitoring for PM_{10} should be considered as TRDC has a declaration for PM_{10} monitoring, to identify compliance and possible revocation of AQMA. TRDC sated they intend to do this within the next reporting year.

   Two Airscan Units (low-cost sensors provided by Iknaia, funded by HCC) have been deployed within the PM_{10} AQMA, one on Wyatts Road and the other on Rickmansworth Road. There have been problems with the recording of data since the units were deployed, however, this has recently been rectified.

5. Monitoring locations S1-S3 are defined as the highest NO_2 concentration however, the Figure A.2 shows that there were no tubes deployed at this location. TRDC should comment on the location of these sites and any possible explanation for the steep drop in concentration

   Diffusion tubes at S1(NB), S2(NB) and S3(NB) were deployed in triplicate (they were originally collocated with a AQMesh sensor). The tubes were attached to a signpost at a bus stop. This was not considered to be the best location for the tubes. Also, the tubes regularly used to go missing. Monitoring ceased at this location in the March. The Council had concerns about a particular section of Uxbridge Road, three new locations were chosen, monitoring commenced in the April.

6. Monitoring figures D.1 and D.2 need to be improved and labelled clearly as it is difficult to establish location of monitoring tubes.

   Labels have been added to Figure D.2. I have tried to label Figure D.1, however, the labels did not make the map any clearer. I am unable to make the map bigger, as it will not fit on one page. Figure D.1 was originally provided to give an indication of coverage, individual maps for each monitoring location are provided.

7. Defra recommends that Directors of Public Health approve draft ASRs. Sign off is not a requirement, however collaboration and consultation with those who have responsibility for Public Health is expected to increase support for measures to improve air quality, with co-benefits for all. Please bear this in mind for the next annual reporting process too.

Watford Borough Council intends to draft a new Air Quality Action Plan (AQAP). Details of all measures (that were included in the 2013 action plan) are set out in Table 2.2. Seven measures are included within Table 2.2.

More detail on these measures can be found in the Three Rivers District Council Air Quality Action Plan, July 2013. Key completed measures are:

- 2 x indicative PM2.5 AQ Monitors (now removed);
- OLEV initiative;
- AirTEXT;
- LTP, Walking, Cycling and bus strategy;
- Improvement of bus network;
- Additional cycle routes;
- Alternative routes via green ways.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1 (3)	LTP, Walking, Cycling and bus strategy	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£100k - £500k	Completed	NO2/PM10/PM2.5	Decrease in private car use	Ongoing	A long-term plan that sets out home walking and cycling can be improved in the Three Rivers District is out for public consultation.
2 (4)	Improvement of bus network	Transport Planning and Infrastructure	Bus route improvements	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£100k - £500k	Completed	NO2/PM10/PM2.5	Increased bus use	Ongoing	The Intalink Partnership represents the operators and Local Authorities in Hertfordshire to develop better coordinated bus and rail services. Intalink is currently producing a Plan to improve Bus Services.
3 (6)	Additional cycle routes	Transport Planning and Infrastructure	Cycle network	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£50k - £100k	Completed	NO2/PM10/PM2.5	Increase cycling	Ongoing	A long-term plan that sets out home walking and cycling can be improved in the Three Rivers District is out for public consultation.
1	AirTEXT	Public Information	Via other mechanisms	2015	2018	TRDC	TRDC	NO	Funded	< £10k	Completed	Exposure of most vulnerable	Hits on Hertfordshire Air Quality Forecast website	Operational	TRDC has signed up to the Herts & Beds Pollution Alert System.
2	2 x indicative PM2.5 AQ Monitors	Other	Other	2017	2017	TRDC	HCC	NO	Funded	£10k - 50k	Completed	Inform future projects id required	PM2.5 AQ Data	Equipment installed	The equipment was installed in 2017, monitoring ceased in the same year. The equipment was removed and placed in storage on 5th December 2019.

Measure No.	Measure Title	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
5	OLEV initiative	Promoting Low Emission Transport	Procuring alternative Refuelling infrastructure to promote Low Emission Vehicles, EV recharging, Gas fuel recharging	2015	2020	TRDC/OLEV	OLEV	NO	Funded	£10k - 50k	Completed	NO2/PM10/PM2.5	Increased electric vehicle ownership	Ongoing	The Council is investigating using capital funding to encourage electric driving in the district. The Council's Transport & Parking Projects team is procuring electric vehicle charging points for public car parks to encourage drivers of electric vehicles to visit local shops. These rapid chargepoints will also be available to residents who do not have a charge point home.
7	Alternative routes via green ways	Transport Planning and Infrastructure	Other	2015	2020	TRDC/HCC	TRDC/HCC	NO	Funded	£50k - £100k	Completed	Reduce exposure	Use of greenways	Ongoing	No information provided

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

As detailed in Policy Guidance LAQM.PG22 (Chapter 8) and the Air Quality Strategy[6], local authorities are expected to work towards reducing emissions and/or concentrations of fine particulate matter ($PM_{2.5}$)). There is clear evidence that $PM_{2.5}$ (particulate matter smaller 2.5 micrometres) has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Exposure to high concentrations of particulate matter can exacerbate lung and heart conditions, significantly affecting quality of life, increasing hospital admissions and deaths. Children, the elderly and those with pre-existing respiratory and cardiovascular disease, are known to be more susceptible to the health impacts from air pollution.

Inhalation of particulate matter can have adverse impacts on human health, the greatest impact is believed to be from long term exposure to $PM_{2.5}$, which increase age-specific mortality risk, particularly from cardiovascular causes.

The following is taken from the Hertfordshire Local Authorities Report on Particulate Matter ($PM_{2.5}$) in Ambient Air in 2022 for Hertfordshire County Council Public Health:

Poor air quality is considered to be the largest environmental risk to the public's health and contributes to all non-communicable disease, although most commonly referenced are:

- Cardiovascular disease;
- Lung cancer;
- Respiratory diseases;
- Increased chance of hospital admissions and visits to Emergency Departments.

Evidence also states that air pollution is a significant contributor to preventable ill health and early death.

Whilst legal limits are in place, evidence suggests that health effects occur significantly below these limits, as recognised by the 2021 WHO guideline value of $5ug/m^3$.

[6] Defra. Air Quality Strategy – Framework for Local Authority Delivery, August 2023

The only specific indicator for air pollution is included within the Public Health Outcomes Framework and relates to particulate matter (PM) with a diameter of 2.5um or smaller (Public Health Outcome Indicator (PHOI) 3.01).

PHOI 3.01 is 'the fraction of annual all-cause mortality attributable to long-term exposure to current levels of anthropogenic particulate pollution.' The indicator is based on an estimated amount of $PM_{2.5}$ derived by Defra modelling from local measurement, including one site in Borehamwood, Hertfordshire and another in Sandy, Bedfordshire. That data is then adjusted by way of population to give a population weighted figure before its use in deriving the PHOI.

The $PM_{2.5}$ focussed PHOI reflects the adverse impact that this type of air pollution can have on public health as a result of the fine particles being carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.

However, it is important to recognise that the figures published for PHOI 3.01 are estimates and therefore cannot be used for performance monitoring; they can only provide an indication of the scale of the issue.

It is for this reason that this report no longer makes direct reference to the PHOI figures, but uses the population weighted Defra modelled $PM_{2.5}$ concentrations in their place.

The fraction of mortality attributable to particulate air pollution (new method) for England (2022) is 5.8%. The PHOF data is available at:

https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/4/gid/1000043/pat/159/par/K02000001/ati/15/are/E92000001/iid/93861/age/230/sex/4/cat/-1/ctp/-1/yrr/1/cid/4/tbm/1/page-options/ovw-do-0_car-ao-1_car-do-0.

Three Rivers District Council is taking the following measures to address $PM_{2.5}$:

An Officer of the Council attends the Hertfordshire and Bedfordshire Air Quality Forum.

The Council will ensure compliance with the Environmental Permitting Regulations to help reduce $PM_{2.5}$ concentrations.

It is anticipated that:

- Measures to reduce emissions of NO_x by encouraging a move away from internal combustion engine vehicles to ultra-low emission vehicles (ULEV) will reduce $PM_{2.5}$ emissions from exhausts;

- Measures to reduce road travel altogether will reduce $PM_{2.5}$ emissions from brake and tyre wear and dust re-suspension.

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

This section sets out the monitoring undertaken within 2023 by Three Rivers District Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2019 and 2023 to allow monitoring trends to be identified and discussed.

3.1 Summary of Monitoring Undertaken

3.1.1 Non-Automatic Monitoring Sites

Three Rivers District Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 25 sites during 2023. Table A.1 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.

3.2 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.

3.2.1 Nitrogen Dioxide (NO_2)

Error! Reference source not found. and Table A.2 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 2023 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.

Figure A.1 presents trends in NO_2 annual mean concentrations at diffusion tube sites TR15 to TR40 Between the years 2019 to 2023. In 2023, there were no exceedances of the annual mean objective. Over the last 5 years there has been a general trend of reduction experienced at diffusion tube sites TR15 and TR16. Over the last 2 years there has been a general trend of reduction experienced at diffusion sites TR17 to TR40, with the exception of TR27 and TR31, where NO_2 annual mean concentrations increased by 2 $\mu g/m^3$ and 0.1 $\mu g/m^3$ respectively.

Figure A.2 presents trends in NO_2 annual mean concentrations in the Chorleywood AQMA between the years 2019 to 2023. In 2023, there were no exceedances of the annual mean objective. There is a general trend of reduction experienced at all diffusion tube sites with the AQMA.

There will be no changes to existing AQMAs or the declaration of a new AQMA.

There were no exceedances of the 1-hour objective.

Appendix A: Monitoring Results

Table A.1 – 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)
TR15	Glen View	Other	506430	198590	NO2	No	97.0	17.0	No	2.5
TR16	The Retreat	Other	508100	201800	NO2	No	8.0	1.0	No	2.7
TR17	Bridge Road	Kerbside	508177	200550	NO2	No	3.0	2.0	No	2.8
TR18	Glenthorn	Other	508517	199701	NO2	No	22.0	3.0	No	2.7
TR19	Old Solesbridge Lane	Rural	504165	197033	NO2	Yes - Chorleywood AQMA	28.0	0.0	No	2.0
TR20	Brewery Cottages	Kerbside	503785	196504	NO2	No	4.0	3.0	No	2.8
TR21	North Lodge	Roadside	503133	196806	NO2	No	20.0	0.0	No	2.8
TR22	Wyatt's Road	Kerbside	504177	196752	NO2	Yes - Chorleywood AQMA	20.0	0.0	No	3.0
TR23	Wyatt's Close	Kerbside	504182	196435	NO2	Yes - Chorleywood AQMA	23.0	0.0	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)
TR24	Sunrise	Roadside	504127	196288	NO2	Yes - Chorleywood AQMA	31.0	0.0	No	2.8
TR25	Chestnut Avenue	Kerbside	504125	195961	NO2	Yes - Chorleywood AQMA	12.0	0.0	No	2.7
TR26	Exchange Mansion	Kerbside	505720	194679	NO2	No	5.0	2.0	No	2.7
TR27	Uxbridge Road 1	Roadside	505482	194331	NO2	No	17.0	0.0	No	3.0
TR28	Uxbridge Road 2	Kerbside	505415	194278	NO2	No	4.0	1.0	No	2.7
TR29	Uxbridge Road 3	Kerbside	505274	194258	NO2	No	25.0	2.0	No	3.1
TR30	Swannells Walk	Other	503741	19495	NO2	No	8.0	27.0	No	2.0
TR31	Tara	Kerbside	503897	193483	NO2	No	17.0	2.0	No	2.9
TR32	Denham Way 1	Kerbside	503388	192966	NO2	No	22.0	0.0	No	2.6
TR33	Crosslands	Roadside	503311	192771	NO2	No	25.0	0.0	No	2.8
TR34	Denham Way 2	Roadside	503287	192556	NO2	No	23.0	1.0	No	2.7
TR35	Denham Way 3	Kerbside	503162	192221	NO2	No	16.0	1.0	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)
TR36	St Mary's Court	Kerbside	506184	194131	NO2	No	7.0	3.0	No	2.6
TR37	Church Street	Kerbside	506337	193876	NO2	No	3.0	3.0	No	2.8
TR39	Hampermill Lane	Kerbside	510808	194633	NO2	No	9.0	2.0	No	3.1
TR40	Prince of Wales PH	Roadside	507846	192411	NO2	No	32.0	3.0	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.2 – 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 2023 (%) (2)	2019	2020	2021	2022	2023
TR15	506430	198590	Other	75.0	75.0	21.2	16.5	16.3	16.9	14.2
TR16	508100	201800	Other	92.3	92.3	25.1	17.5	18.9	18.3	15.9
TR17	508177	200550	Kerbside	92.3	92.3				25.5	23.8
TR18	508517	199701	Other	92.3	92.3				16.2	15.5
TR19	504165	197033	Rural	75.0	75.0				12.9	10.0
TR20	503785	196504	Kerbside	92.3	92.3				25.9	23.5
TR21	503133	196806	Roadside	92.3	92.3				22.4	21.7
TR22	504177	196752	Kerbside	92.3	92.3				13.9	13.1
TR23	504182	196435	Kerbside	92.3	92.3				16.9	14.8
TR24	504127	196288	Roadside	92.3	92.3				26.3	22.5
TR25	504125	195961	Kerbside	92.3	92.3				24.3	21.0
TR26	505720	194679	Kerbside	92.3	92.3				17.2	15.6
TR27	505482	194331	Roadside	82.7	82.7				23.1	25.1

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 2023 (%) [2]	2019	2020	2021	2022	2023
TR28	505415	194278	Kerbside	92.3	92.3				27.1	26.6
TR29	505274	194258	Kerbside	92.3	92.3				21.9	20.6
TR30	503741	19495	Other	92.3	92.3				24.9	24.2
TR31	503897	193483	Kerbside	92.3	92.3				18.4	18.5
TR32	503388	192966	Kerbside	92.3	92.3				22.5	21.3
TR33	503311	192771	Roadside	92.3	92.3				22.2	21.4
TR34	503287	192556	Roadside	92.3	92.3				24.2	20.4
TR35	503162	192221	Kerbside	92.3	92.3				18.3	17.9
TR36	506184	194131	Kerbside	82.7	82.7				17.8	16.5
TR37	506337	193876	Kerbside	92.3	92.3				18.2	16.6
TR39	510808	194633	Kerbside	92.3	92.3				24.5	23.3
TR40	507846	192411	Roadside	92.3	92.3				22.4	20.7

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

☒ **Diffusion tube data has been bias adjusted.**

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

Notes:

The annual mean concentrations are presented as 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.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

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

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

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

Figure A.1 – Trends in Annual Mean NO_2 Concentrations

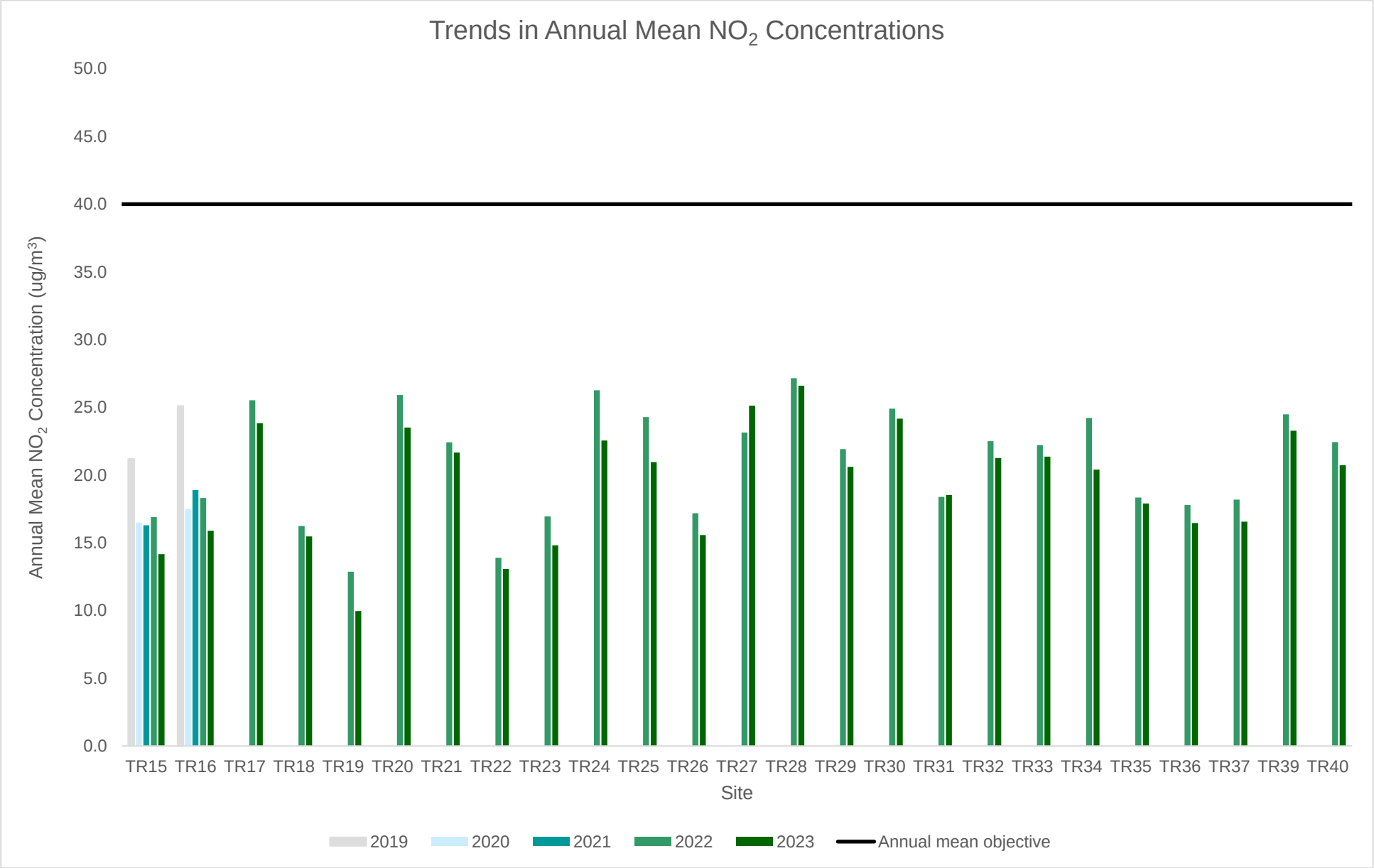
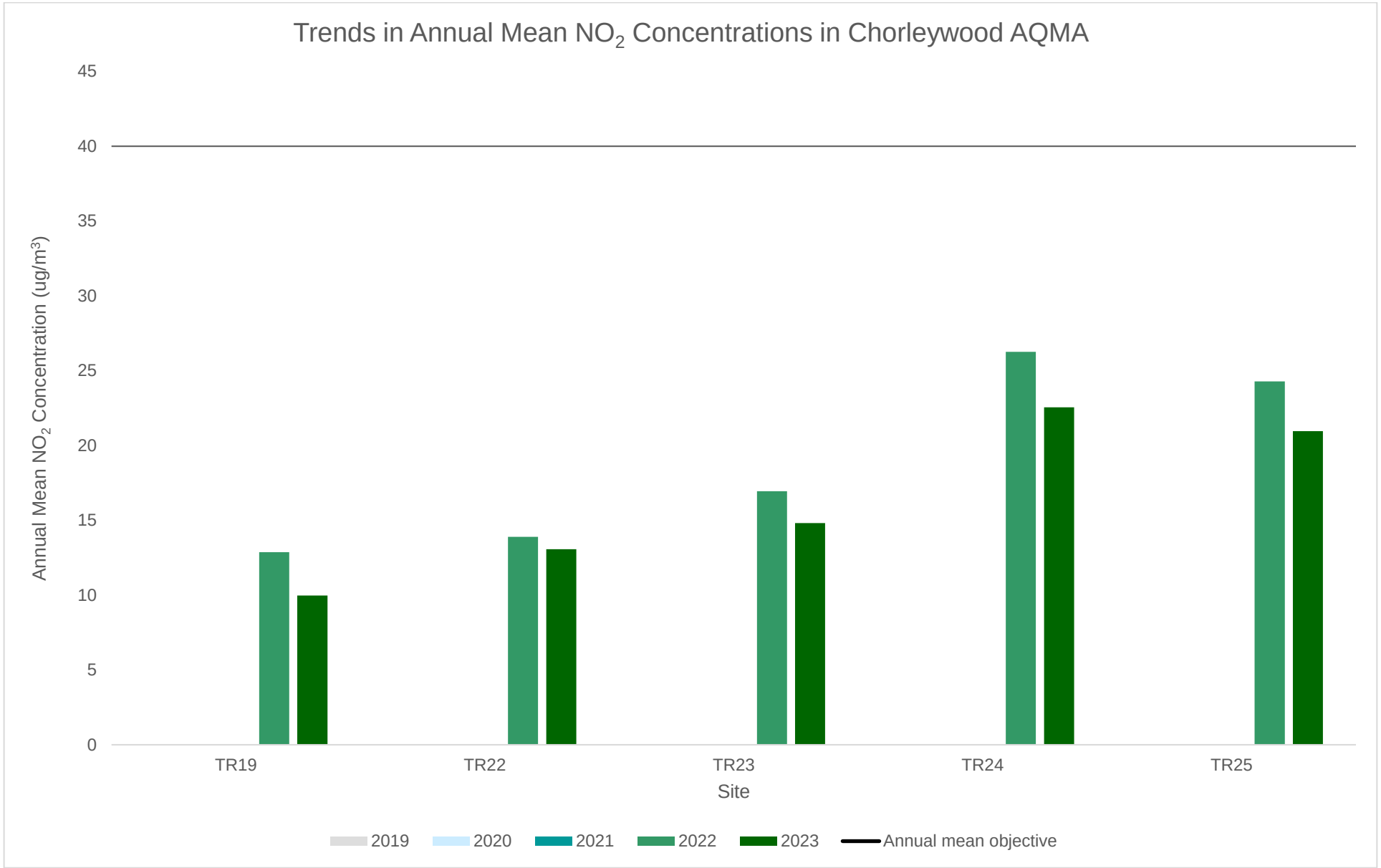


Figure A.2 - Trends in Annual Mean NO_2 Concentrations in Chorleywood AQMA



Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO_2 2023 Diffusion Tube Results ($\mu g/m^3$)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TR15	506430	198590	21.2	23.5	19.8	22.6	15.8	16.7	12.7	16.2	17.0				18.4	14.2	-	
TR16	508100	201800	31.2	31.8	19.4	20.1	18.3	17.3	17.1	20.1	17.7	12.2	21.9		20.6	15.9	-	
TR17	508177	200550	42.5	38.8	29.2	32.2	23.1	25.8	30.1	30.9	30.6	33.0	24.2		30.9	23.8	-	
TR18	508517	199701	27.5	24.8	20.4	24.3	18.3	17.2	13.7	16.9	16.7	19.7	21.6		20.1	15.5	-	
TR19	504165	197033	17.1	17.3	14.1	17.3	13.5	13.2	10.1			0.9	13.0		12.9	10.0	-	
TR20	503785	196504	35.1	36.8	28.9	34.2	24.7	26.8	22.3	30.0	30.8	35.1	31.1		30.5	23.5	-	
TR21	503133	196806	32.1	33.5	27.4	31.9	23.2	25.2	26.5	26.9	25.7	32.6	24.6		28.1	21.7	-	
TR22	504177	196752	21.3	22.2	17.2	19.2	16.7	14.5	10.1	14.1	14.0	19.8	17.6		17.0	13.1	-	
TR23	504182	196435	23.9	24.9	21.2	23.9	15.6	16.1	11.9	15.5	14.2	23.6	20.9		19.2	14.8	-	
TR24	504127	196288	20.7	36.8	37.5	36.5	26.1	23.8	24.2	27.9	30.3	35.2	23.1		29.3	22.5	-	
TR25	504125	195961	29.9	37.9	28.5	27.9	30.1	27.4	18.3	25.2	22.8	23.7	27.7		27.2	21.0	-	
TR26	505720	194679	29.3	28.3	15.0	22.7	14.2	14.0	14.4	19.1	19.3	23.2	23.0		20.2	15.6	-	
TR27	505482	194331	44.2	40.3	28.9	35.5	29.7	31.7	23.8	30.1	27.4	34.7			32.6	25.1	-	
TR28	505415	194278	44.3	44.0	30.0	41.9	29.8	31.2	25.1	33.4	31.6	35.7	33.1		34.6	26.6	-	
TR29	505274	194258	39.5	37.1	18.4	31.2	19.3	24.8	23.2	25.7	26.4	23.6	25.2		26.8	20.6	-	
TR30	503741	19495	43.0	39.9	29.3	31.6	30.4	26.8	26.1	29.1	25.6	28.8	34.7		31.4	24.2	-	
TR31	503897	193483	33.5	33.3	21.7	26.4	21.3	20.6	16.1	20.0	19.7	25.2	26.9		24.1	18.5	-	
TR32	503388	192966	36.5	38.3	25.2	28.9	24.8	24.2	20.2	27.6	23.0	31.0	24.0		27.6	21.3	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.77)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
TR33	503311	192771	34.9	29.9	23.3	30.2	28.5	28.0	18.6	27.3	29.4	33.0	22.1		27.7	21.4	-	
TR34	503287	192556	38.3	40.0	24.1	31.1	24.9	25.9	17.6	19.8	19.7	21.7	28.4		26.5	20.4	-	
TR35	503162	192221	28.6	30.7	19.8	22.5	17.0	15.5	13.6	27.9	23.7	29.1	27.5		23.3	17.9	-	
TR36	506184	194131	26.0	29.7	22.9	20.4	14.3	16.8	18.0	20.2	21.9	23.6			21.4	16.5	-	
TR37	506337	193876	30.9	30.1	17.4	22.5	18.6	18.9	14.9	20.9	17.5	22.1	22.7		21.5	16.6	-	
TR39	510808	194633	38.2	36.2	28.5	32.6	26.6	26.5	23.6	30.2	27.1	32.0	31.0		30.2	23.3	-	
TR40	507846	192411	33.3	39.8	20.3	30.0	18.0	23.9	20.5	25.7	24.0	30.5	30.1		26.9	20.7	-	

☒ **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.TG22.**

☒ **Local bias adjustment factor used.**

☒ **National bias adjustment factor used.**

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

☒ **Three Rivers District Council confirm that all 2023 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 Three Rivers During 2023

Three Rivers District Council has not identified any new sources relating to air quality within the reporting year of 2023.

Additional Air Quality Works Undertaken by Three Rivers District Council During 2023

Three Rivers District Council has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

Diffusion tubes were supplied by SOCOTEC (Didcot laboratory) in 2023. The method of preparation used was 50% TEA (triethanolamine) in acetone.

SOCOTEC are UKAS accredited. Diffusion Tubes were analysed in accordance with SOCOTEC's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in DEFRA's 'Diffusion Tubes For Ambient NO_2 Monitoring: Practical Guidance.'

SOCOTEC participate in the AIR PT intercomparison scheme for comparing spiked Nitrogen Dioxide diffusion tubes. SOCOTEC currently holds the highest rank of a Satisfactory laboratory.

In the most recent round (AIR PT AR059 September - October 2023), 100% of results submitted were determined to be satisfactory.

SOCOTEC were considered to have good diffusion tube precision in 2023.

Monitoring was completed in adherence with the 2023 Diffusion Tube Monitoring Calendar.

Diffusion Tube Annualisation

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

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2024 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_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.

Three Rivers District Council have applied a national bias adjustment factor of 0.77 to the 2023 monitoring data. A summary of bias adjustment factors used by Three Rivers District Council over the past five years is presented in Table C.1.

National Diffusion Tube Bias Adjustment Factor Spreadsheet (Spreadsheet Version Number: 03/24)

National Diffusion Tube Bias Adjustment Factor Spreadsheet — Spreadsheet Version Number: 03/24

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

This spreadsheet will be updated at the end of June 2024

LAQM Helpdesk Website

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

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

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

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

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

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

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

Analysed By[1]	Method (To undo your selection, choose (All) from the pop-up list)	Year[5] (To undo your selection, choose (All))	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) ($\mu g/m^3$)	Automatic Monitor Mean Conc. (Cm) ($\mu g/m^3$)	Bias (B)	Tube Precision[6]	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2023		Overall Factor[3] (28 studies)					Use	0.77

[1] For Casella Stanger/Bureau Veritas (NOT Bureau Veritas Labs) use Gradko 50% TEA in Acetone.
For Casella Seal/GMSS/Casella CRE/Bureau Veritas Labs/Eurofins/ use Environmental Scientific Groups.
From 2011 for Environmental Scientific Groups use ESG Glasgow.
From 2011 for Harwell Scientific Services use ESG Didcot.
For 2017 for SOCOTEC use ESG Didcot, as name changed mid year.
For 2018 SOCOTEC entered as Didcot and Glasgow. Glasgow analysis lab moved to Didcot mid 2018.
For Staffordshire CC SS/Staffordshire County Analyst use Staffordshire Scientific Services.
For Bodycote Health Sciences and Clyde Analytical Laboratories use Exova.
For Rotherham MBC use South Yorkshire Labs.
For Dundee CC use Tayside SS.
For Leicester Scientific Services use Staffordshire Scientific Services.
For South Yorkshire Air Quality Samplers use South Yorkshire Labs. As of January 2010 sampler body changed. As of April 2010 sampler cap changed.
Lancashire County Analysts withdrew from the Field intercomparison at the end of 2010. No submissions were supplied in 2011.
Walsall MBC closed in March 2011.
Bristol Scientific Services closed at the end of 2011.
Somerset County Council did not start the Marylebone road intercomparison until June 2012.
Exova stopped providing diffusion tubes at the end of 2013.
Kent Scientific Services stopped providing diffusion tubes at the end of 2013.
Kirklees Council stopped providing diffusion tubes in the middle of 2016.
Northampton BC stopped providing diffusion tubes in 2017

[2] In this situation it would be reasonable to use data from the nearest year.

[3] Overall factors have been calculated using orthogonal regression to allow for uncertainty in both the automatic monitor and diffusion tube. The uncertainty of the diffusion tube has been assumed to be double that of the automatic monitor.

[4] If you have your own co-location study, please send your data to us, so that it can be included here. If this is not possible, but you wish to combine these factors with your own, select and copy the relevant data from this spreadsheet and paste them into a new one (otherwise your calculations will include hidden data). Then add your own data and calculate the bias. To obtain a new correction factor that includes your data, average the bias (B) values, expressed as a factor, i.e. -16% is -0.16. Next add 1 to this value, e.g. -0.16 + 1.00 = 0.84 in this example, then take the inverse to give the bias adjustment factor 1/0.84 = 1.19. (This will not be exactly the same as the correction factor calculated using orthogonal regression as used in this spreadsheet, but will be reasonably close).

To add data download a questionnaire

[5] Where an annual dataset falls into two years it has been ascribed to the year in which most of the data has fallen.

[6] Tube precision is determined as follows: G = Good precision - coefficient of variation (CV) of diffusion tube replicates is considered G when the CV of eight or more periods is less than 20%, and the average CV of all monitoring periods is less than 10%; P = Poor precision - CV of four or more periods >20% and/or average CV >10%; S = Single tube, therefore not applicable; na = not available.

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2023	National	03/24	0.77
2022	National	03/23	0.76
2021	National	03/22	0.78
2020	National	03/21	0.77
2019	National	Not recorded	0.75

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.

No diffusion tube NO_2 monitoring locations within Three Rivers required distance correction during 2023.

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

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

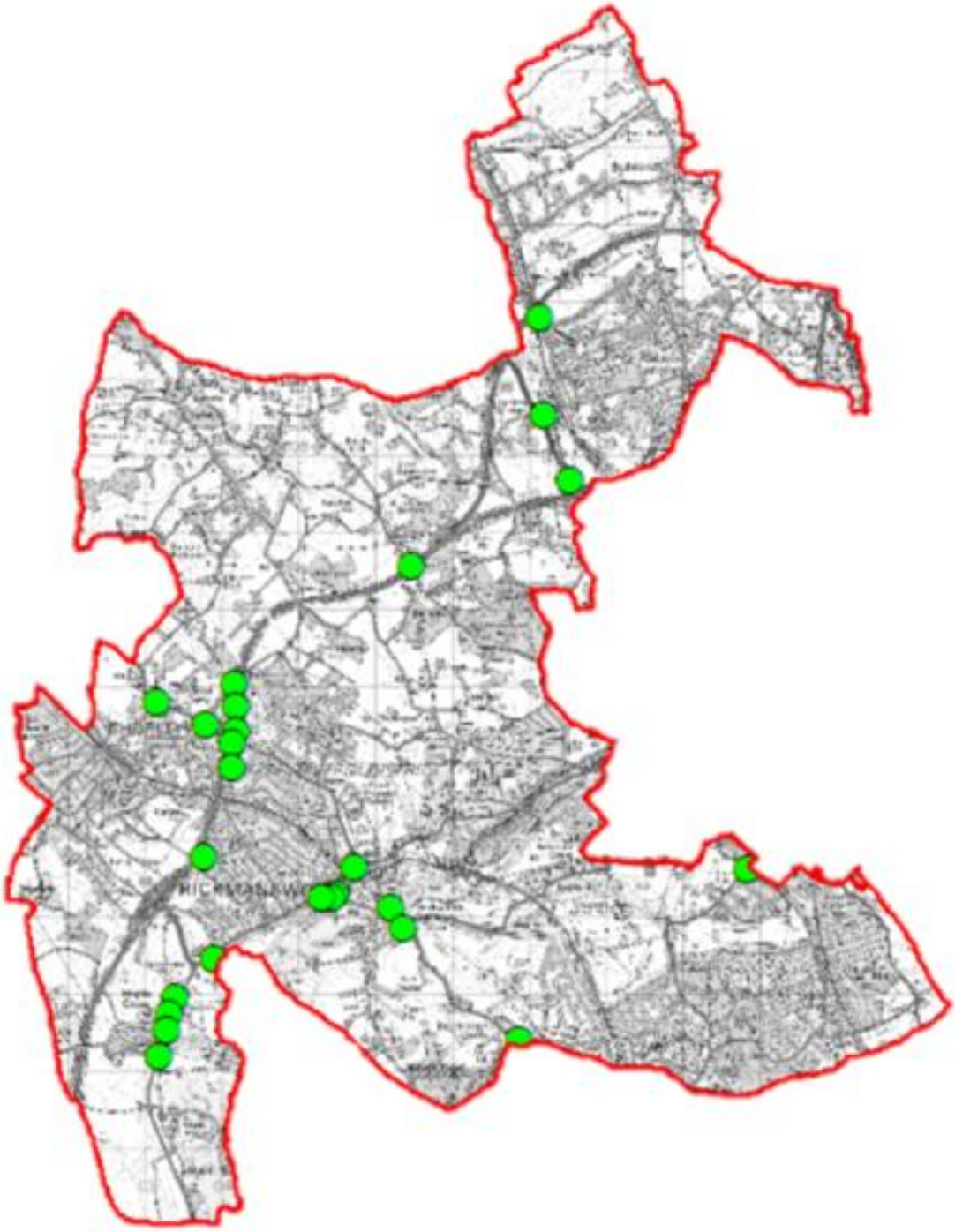


Figure D.2 - Map showing Non-Automatic Monitoring Sites in and around the Chorleywood NO_2 AQMA

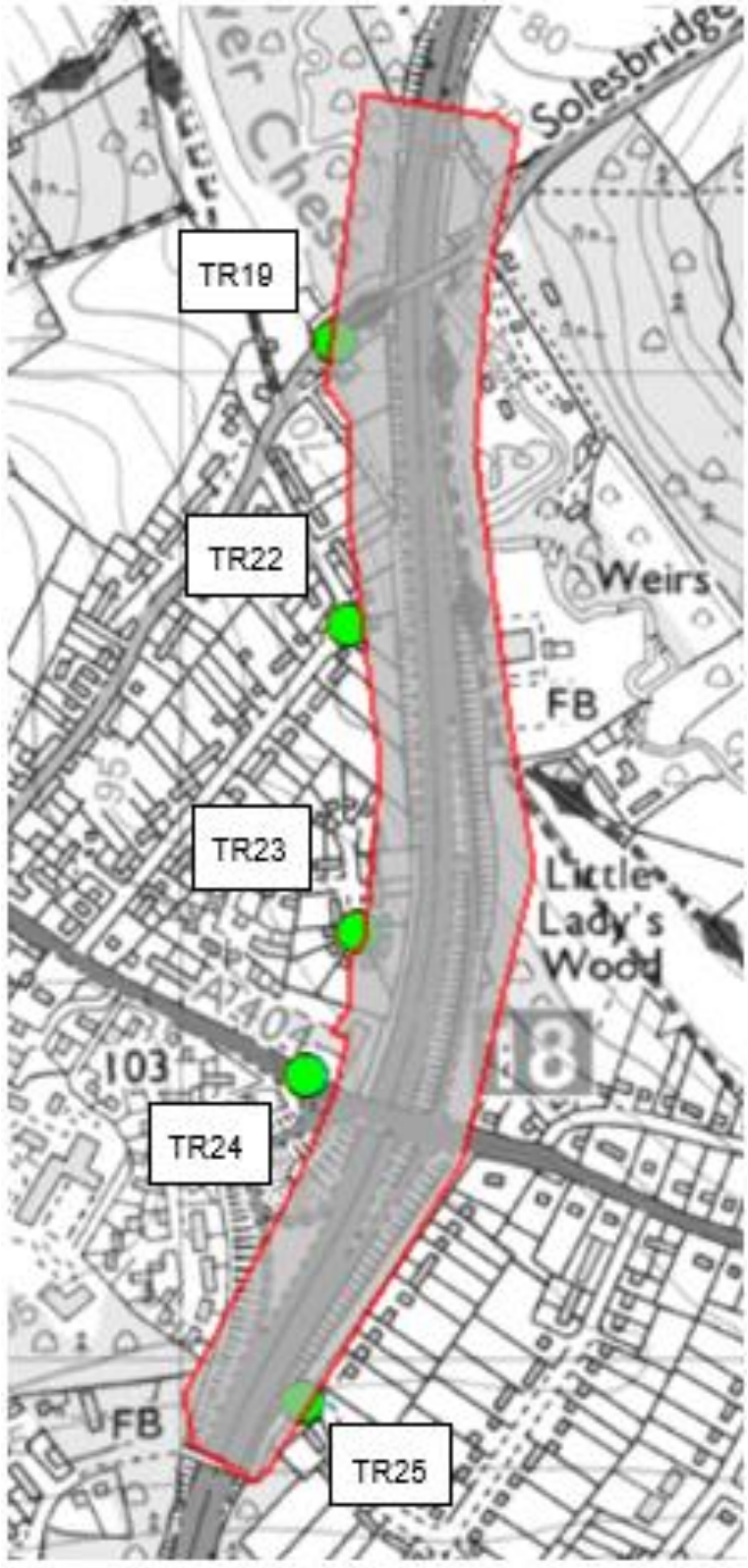
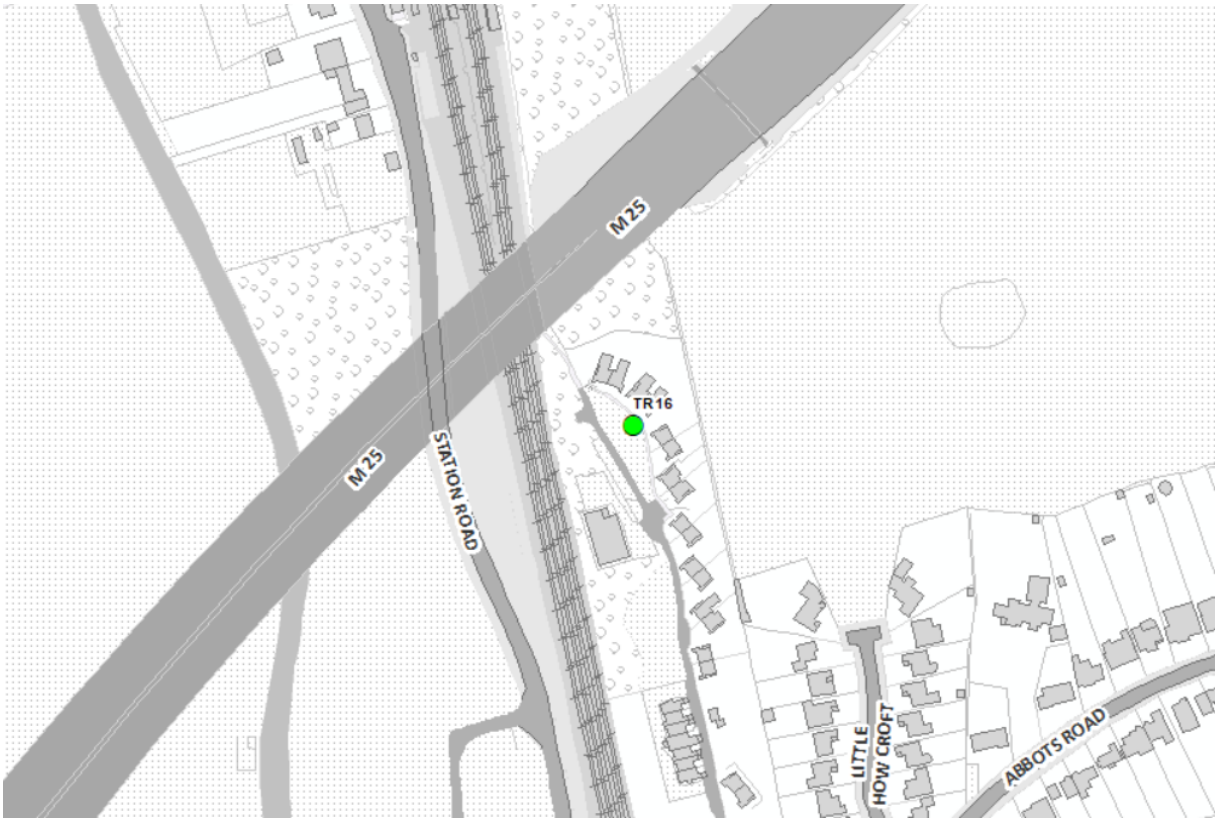


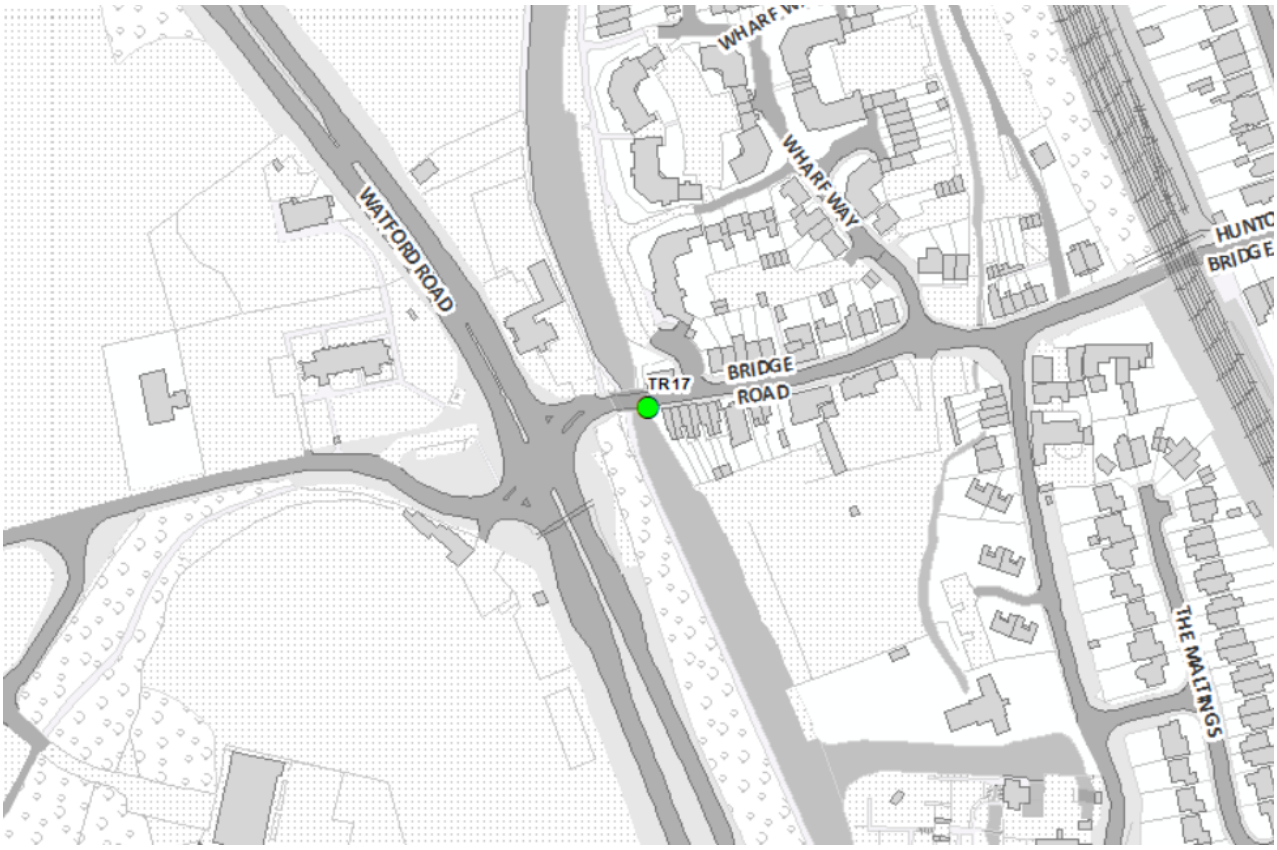
Figure D.3 - Maps showing Non-Automatic Monitoring Sites

TR15 Glen View

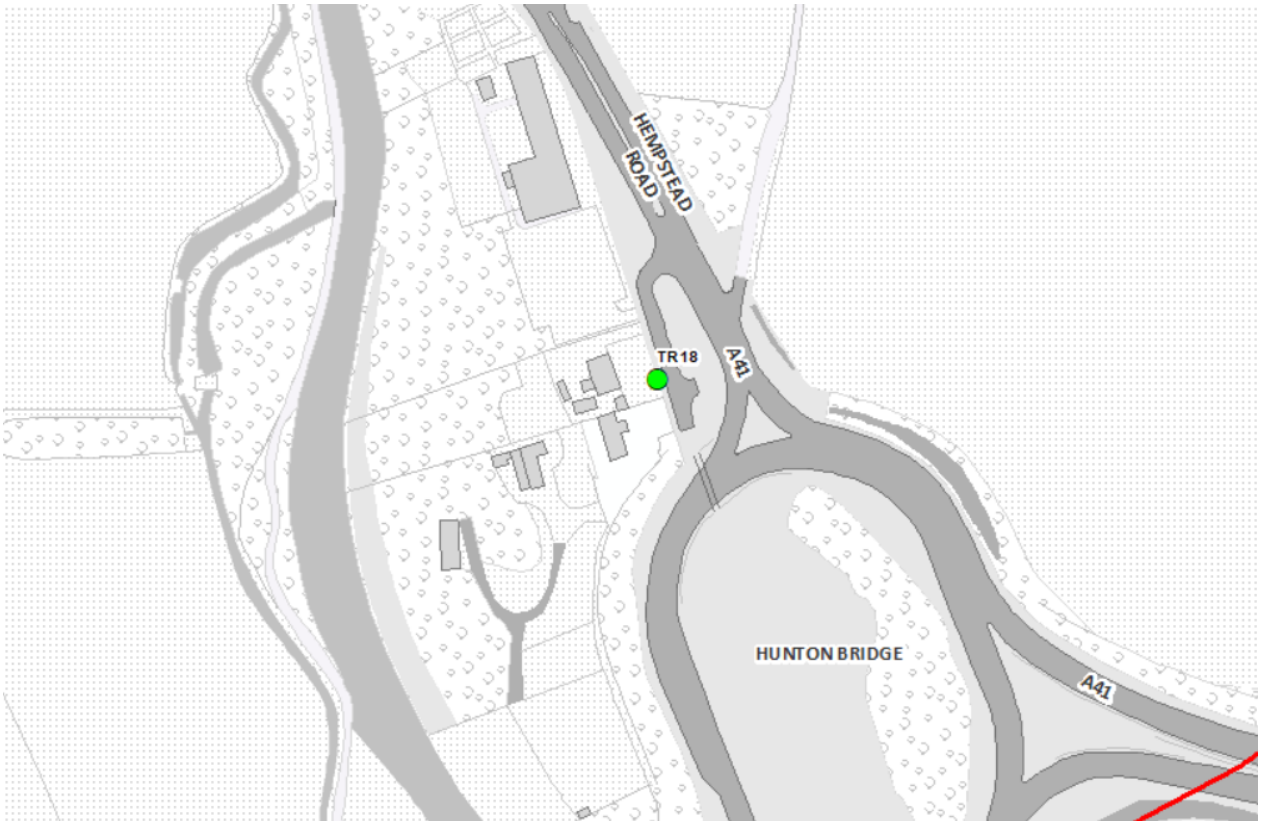
TR16 The Retreat



TR17 Bridge Road



TR18 Glenthorn



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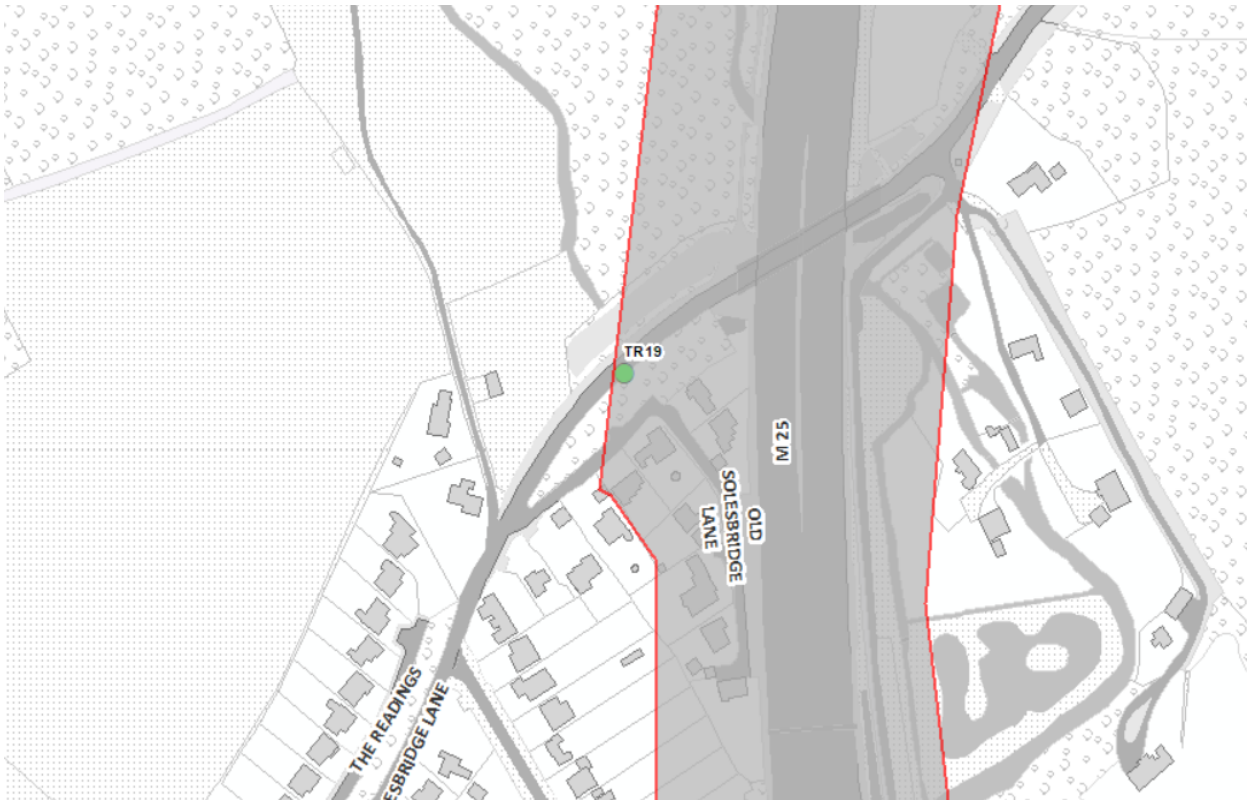
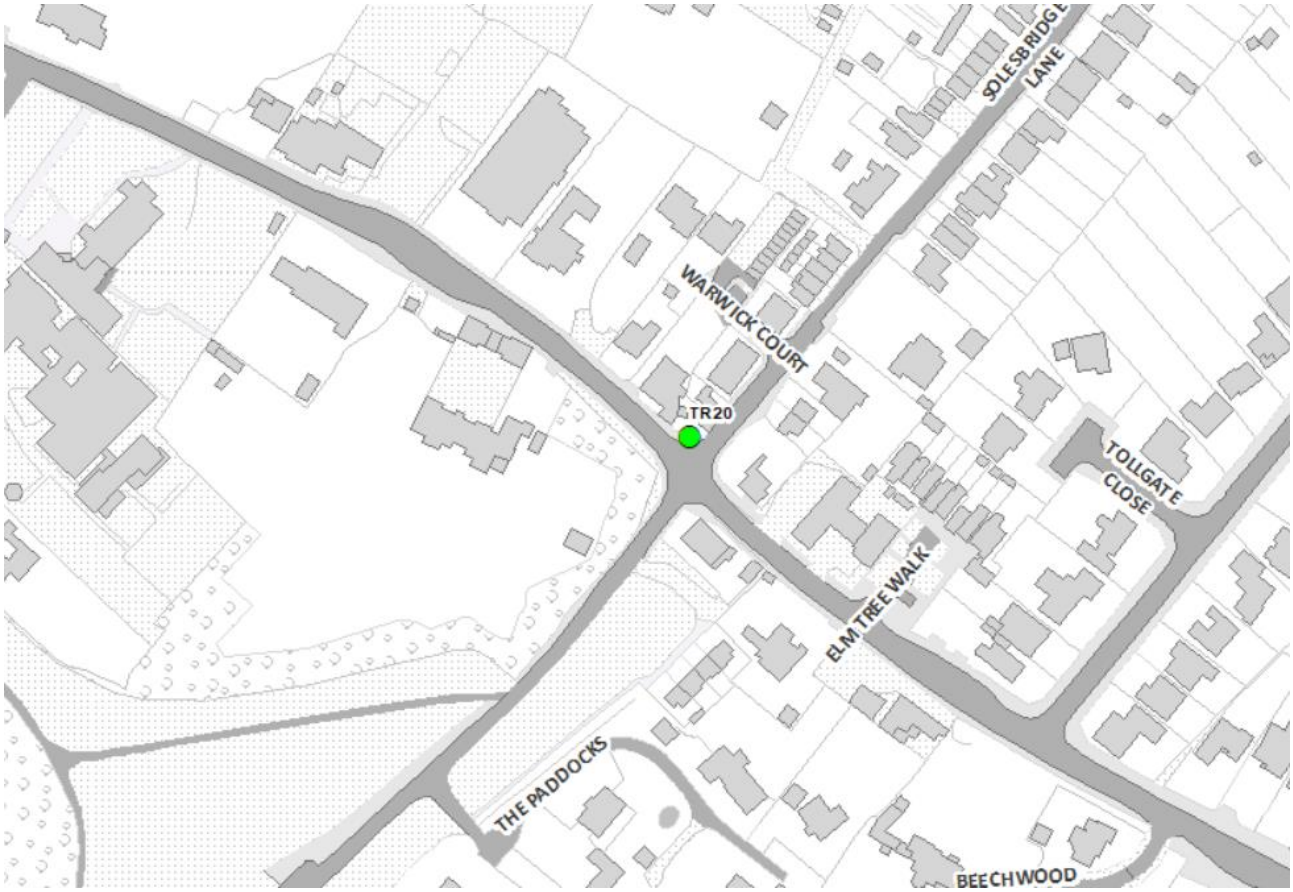


TR20 Brewery Cottage



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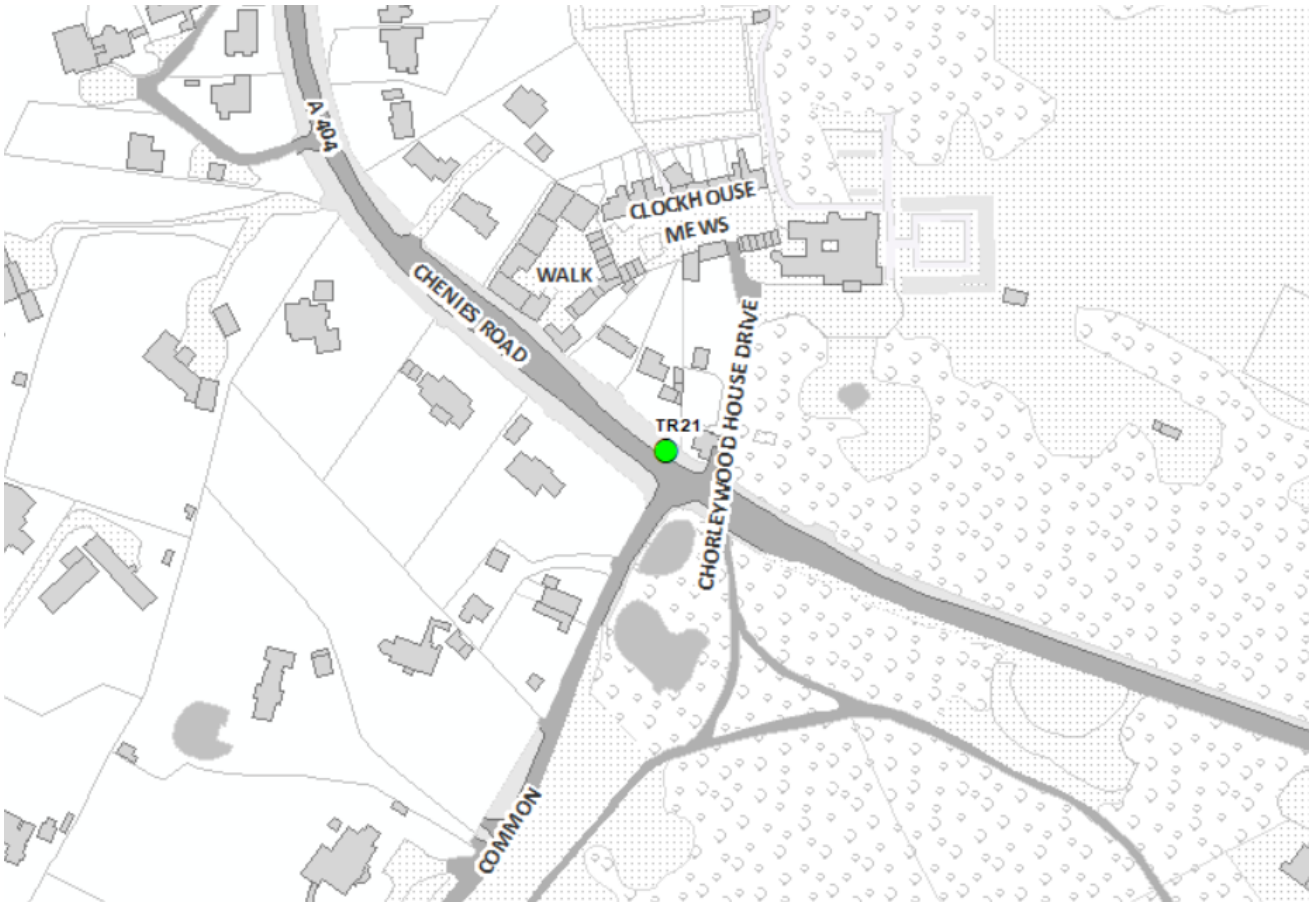
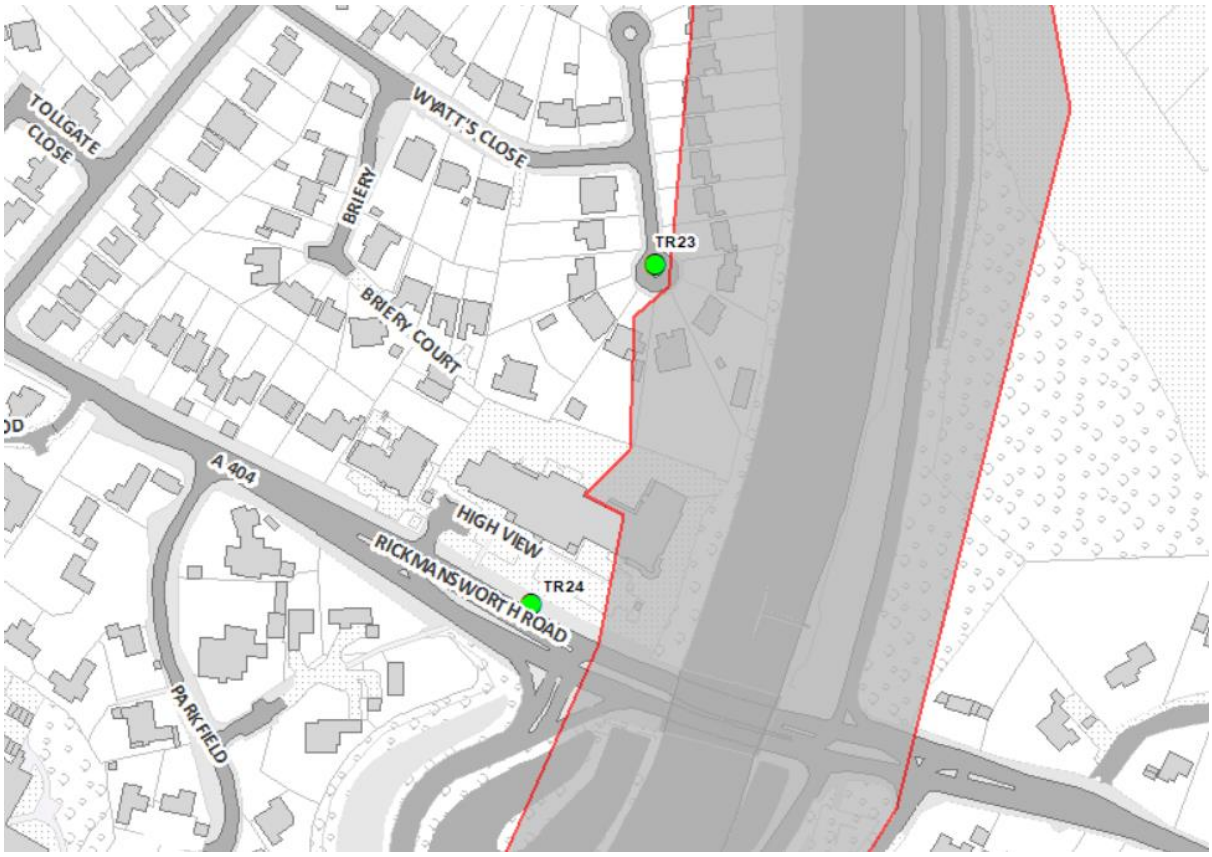


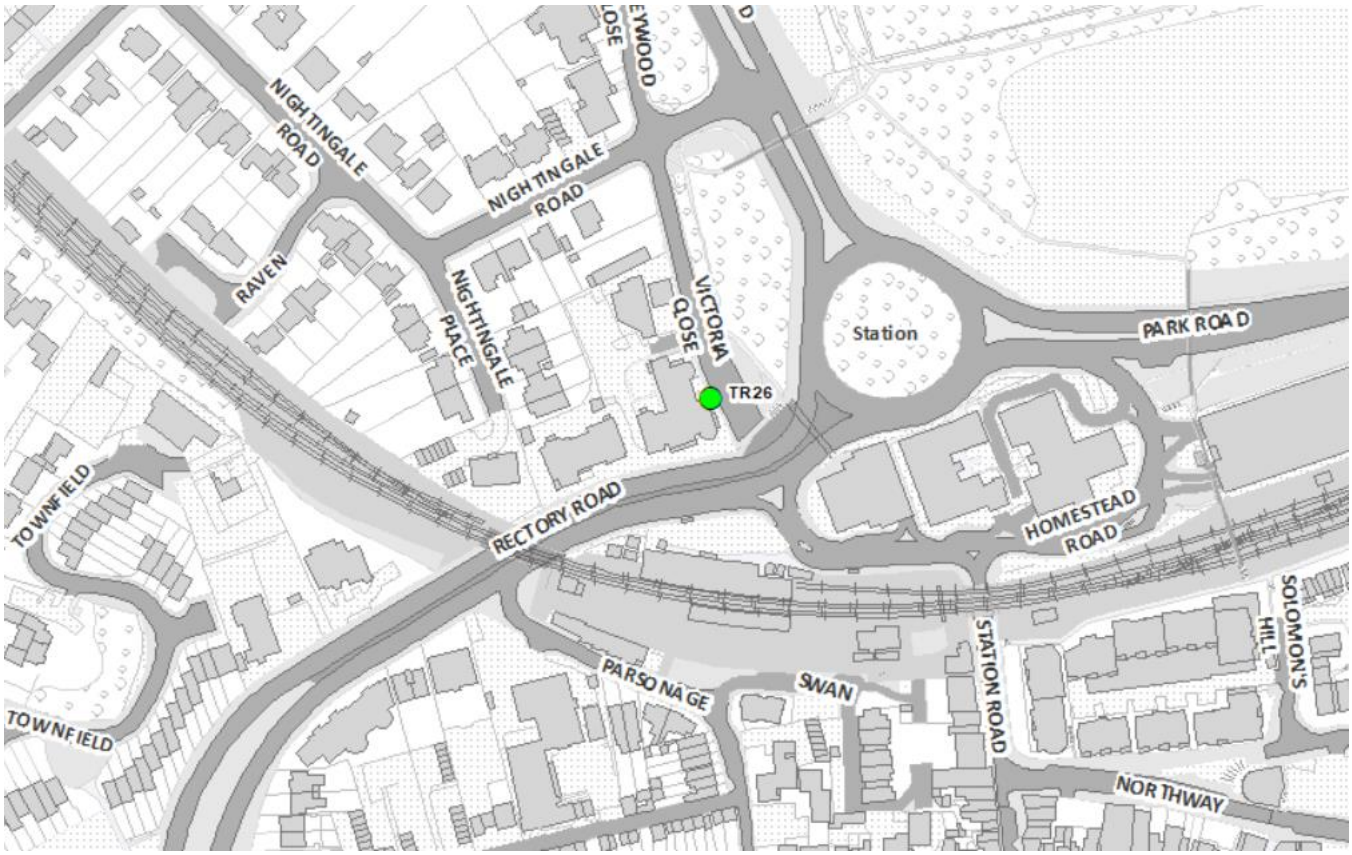
TR22 Wyatt's Road

TR23 Wyatt's Close & TR24 Sunrise



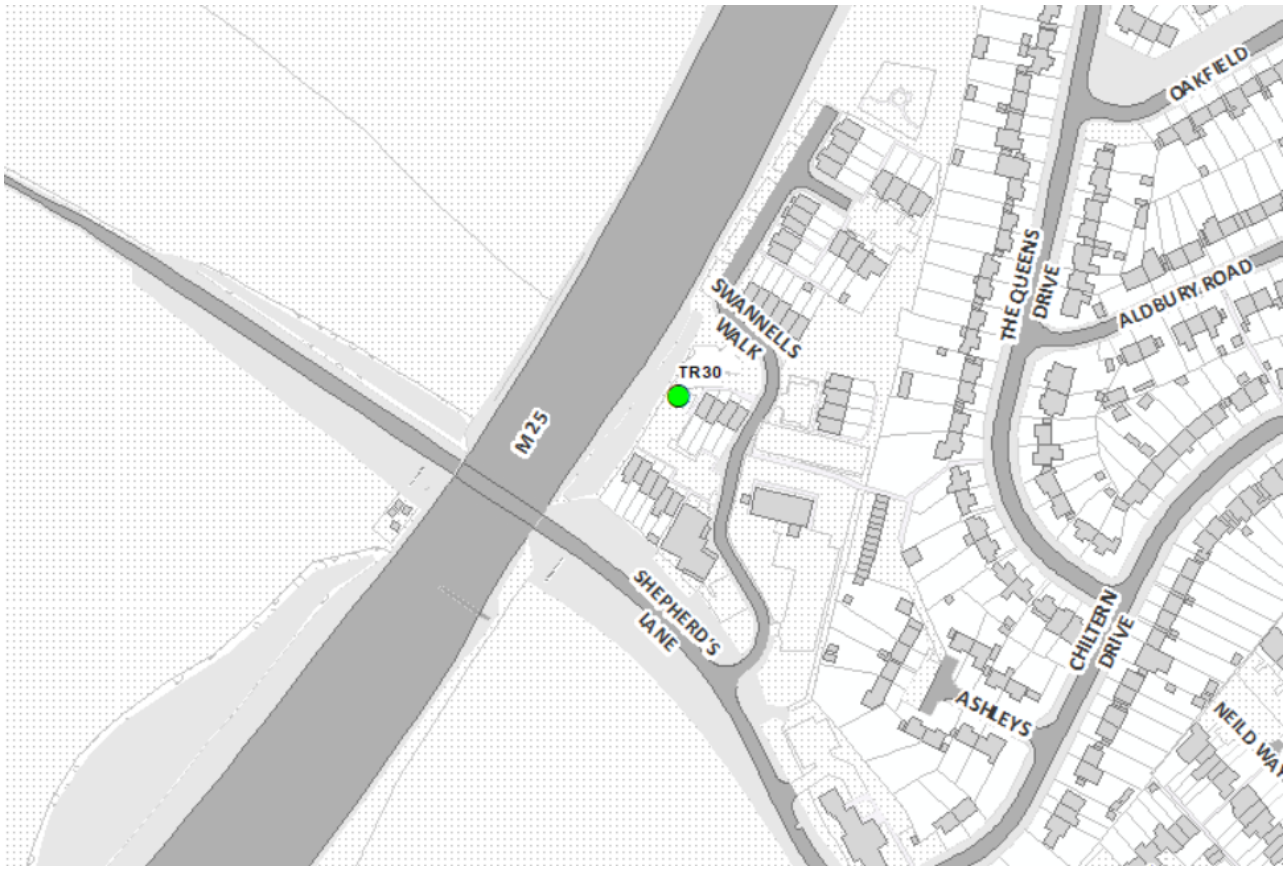
TR25 Chestnut Avenue

TR26 Exchange Mansion



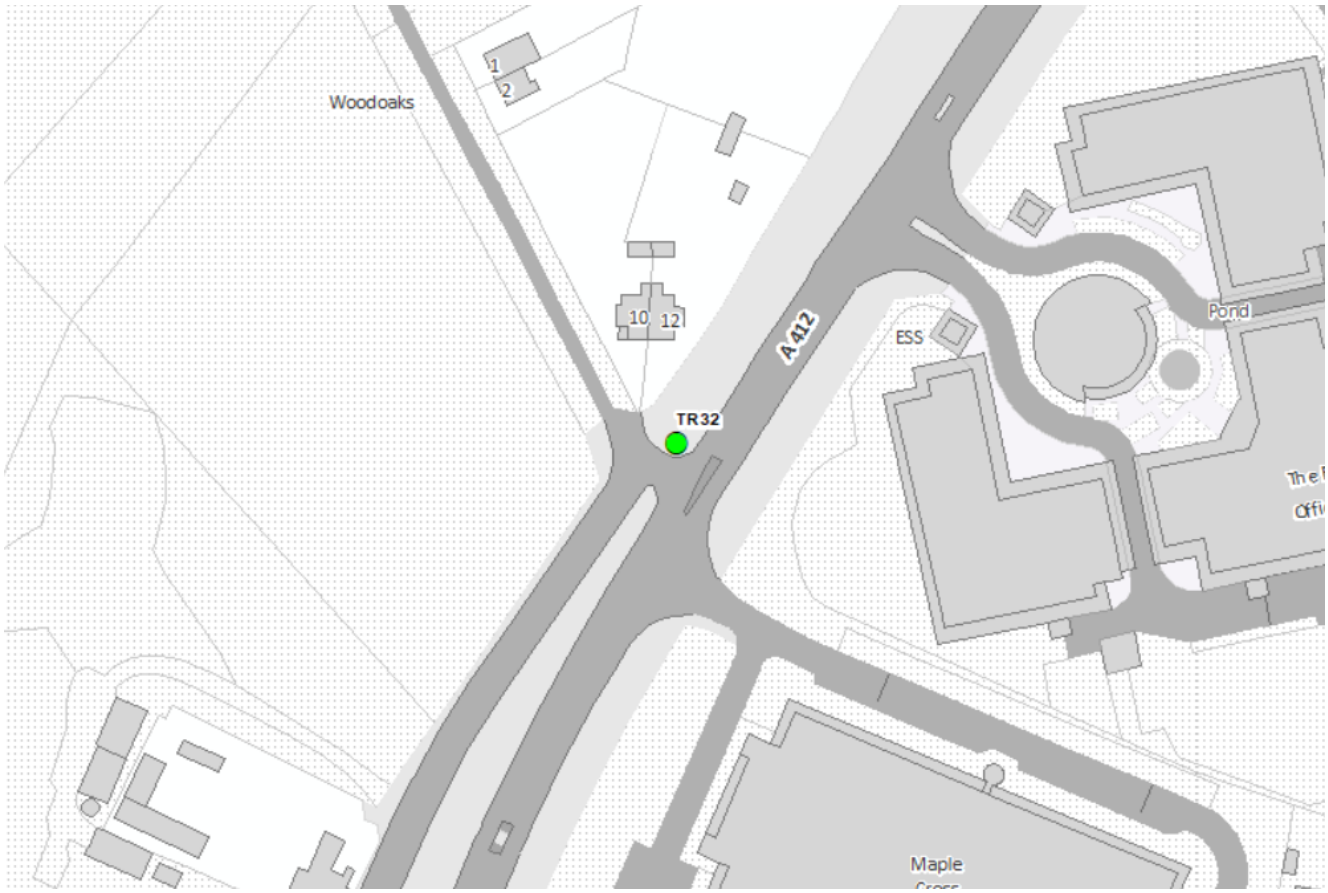
TR27 Uxbridge Road 1, TR28 Uxbridge Road 2 & TR29 Uxbridge Road 3

TR30 Swannells Walk



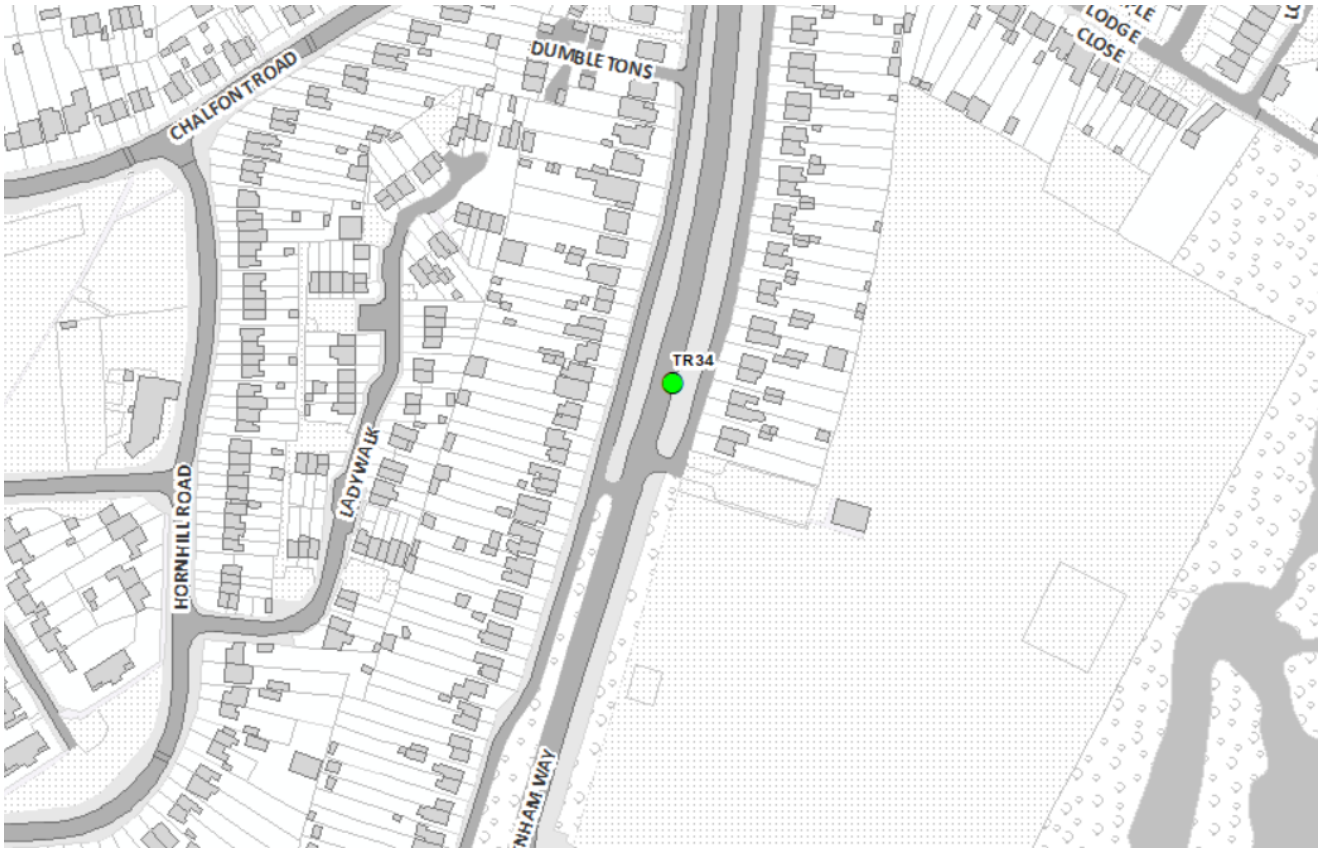
TR31 Tara

TR32 Denham Way 1



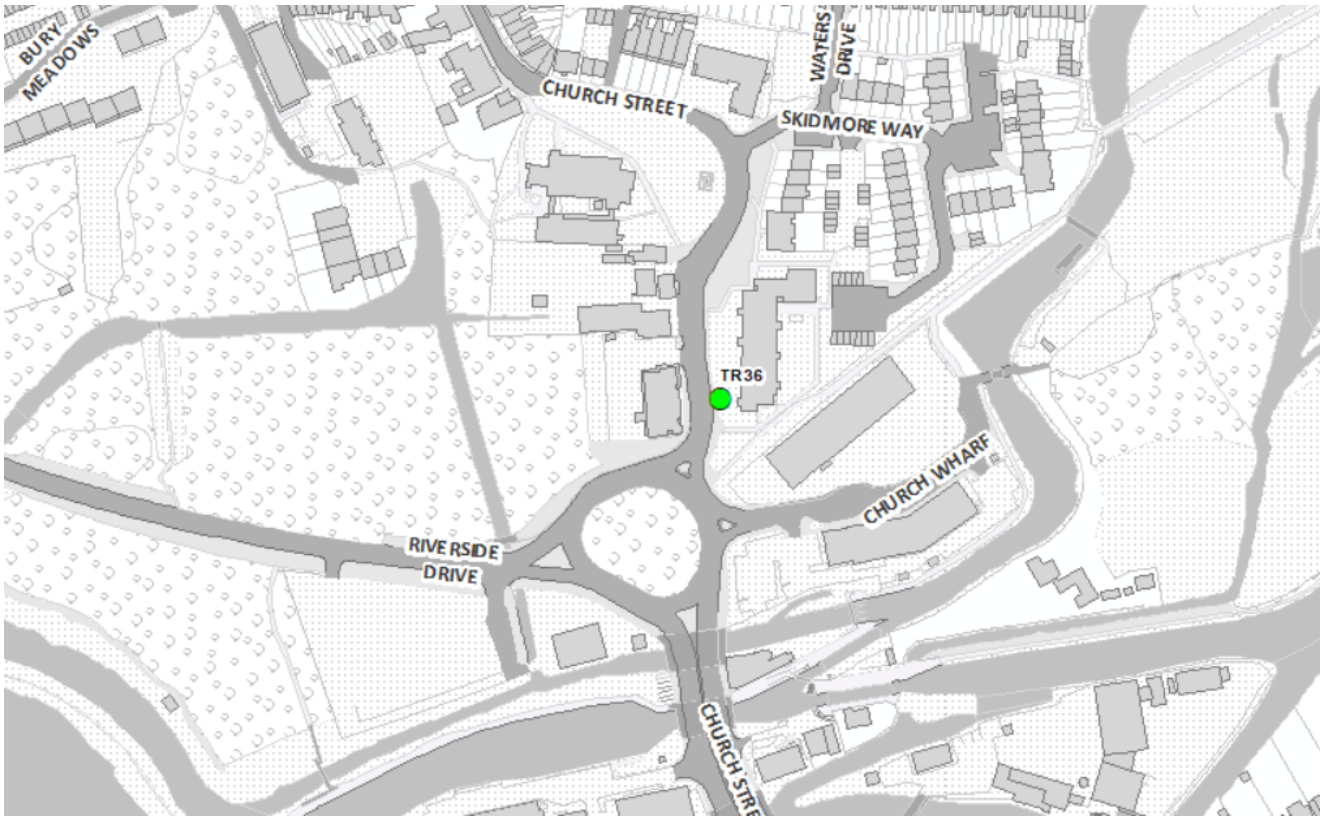
TR33 Crosslands

TR34 Denham Way 2

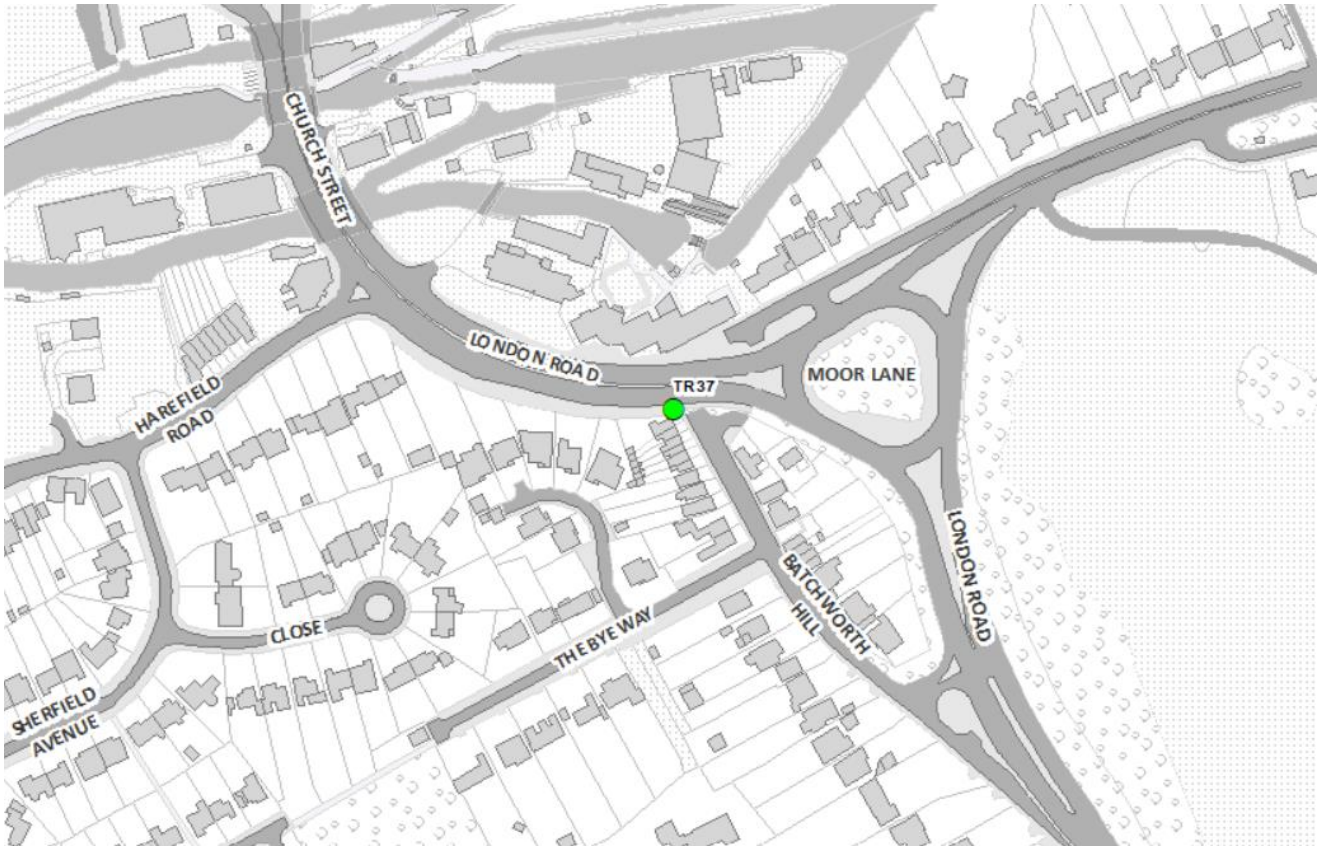


TR35 Denham Way 3

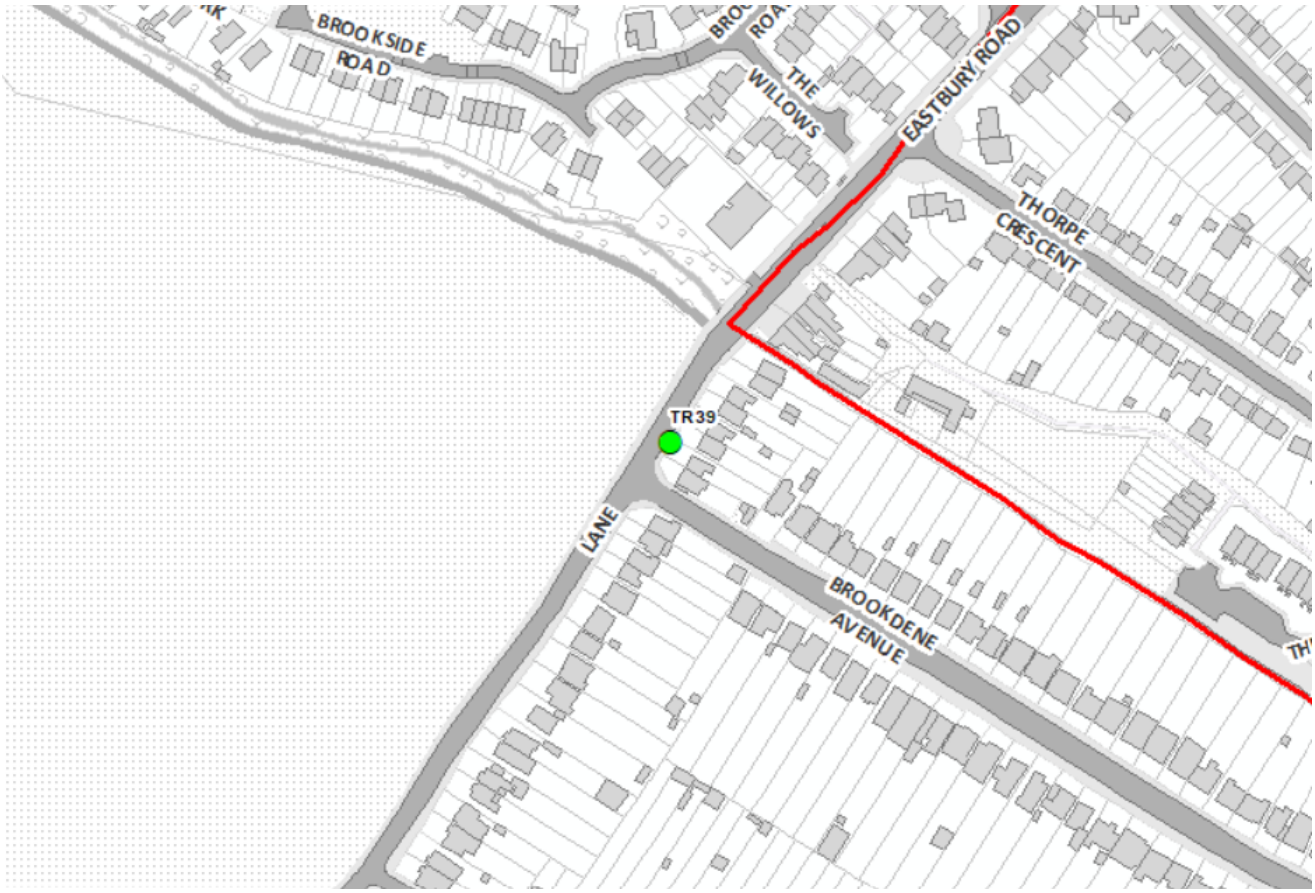
TR36 St Mary's Court



TR37 Church Street

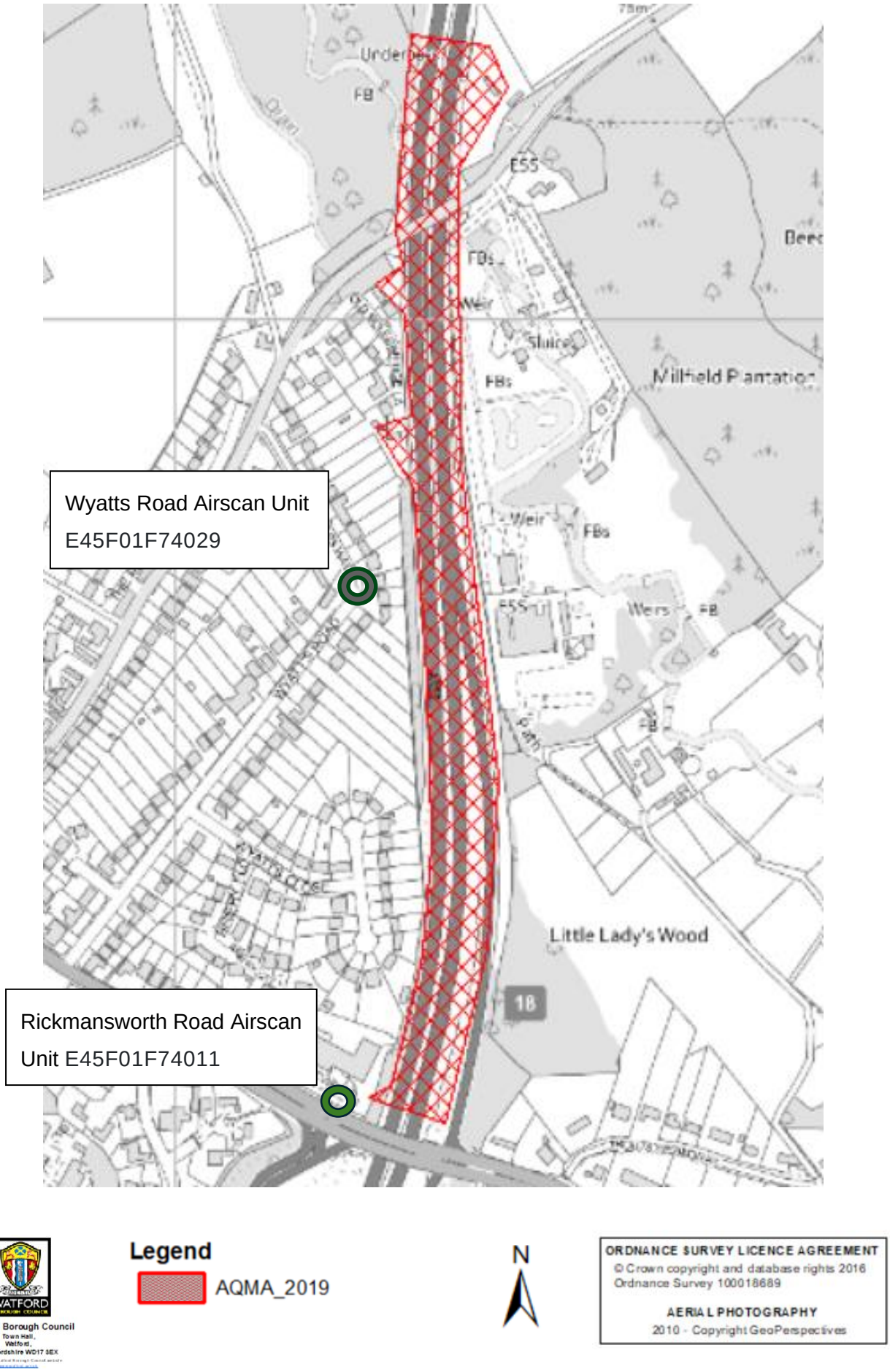


TR39 Hampermill Lane



TR40 Prince of Wales PH

Figure D.4 - Map showing the Chorleywood PM_{10} AQMA



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

*The Environment Act 2021 established a legally binding duty on Government to bring forward at least two new air quality targets in secondary legislation.

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 introduced the following air quality targets:

Annual Mean Concentration Target for $PM_{2.5}$

The annual mean concentration target is that by the end of 31st December 2040 the annual mean level of $PM_{2.5}$ in ambient air must be equal to or less than 10 µg/m³ ("the target level").

Population exposure reduction target for $PM_{2.5}$

The population exposure reduction target is that there is at least a 35% reduction in population exposure by the end of 31st December 2040 ("the target date"), as compared with the average population exposure in the three-year period from 1st January 2016 to 31st December 2018 ("the baseline period"), determined in accordance with regulation 8.

[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

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