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 Test Valley Borough Council

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].

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.

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.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is a corrosive gas which is predominantly produced from the combustion of coal or crude oil.
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.

[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

Due to the importance of the potential impact of poor air quality on health, Test Valley Borough Council (TVBC) is required to review and assess air quality within the Borough on a regular basis. This involves the production of an Annual Status Report by the end of June each year and is intended to maintain continuity in the Local Air Quality Management process. This report includes the results of on-going monitoring of Nitrogen Dioxide (NO_2) within the Borough where emissions from a range of sources could adversely impact sensitive receptors.

This Annual Status Report includes the results of Nitrogen Dioxide (NO_2) diffusion tube monitoring carried out in 2023, with good data recovery achieved throughout the reporting period and an overall data capture rate of 84%. Monitoring shows a decrease of 1.8 $\mu g/m^3$ in the average NO_2 levels at 17 established sites monitored by TVBC, from 21.2 $\mu g/m^3$ in 2022 to 19.4 $\mu g/m^3$ in 2023. This is comparable to national trends, which show levels of NO_2 continuing to fall at roadside localities (Defra, 2024[a]). These 17 established monitoring sites operated by TVBC, show predominantly decreasing trends at each locality, with levels of NO_2 remaining significantly decreased when compared to 2019, the most recent period not subject to disruption associated with the Covid-19 pandemic.

A total of 21 sites were monitored during 2023 in Test Valley Borough, with three new locations added. Data at a single site (S18C) was insufficient (<25%) for calculation of the required annual mean and following guidance sought from the LAQM helpdesk (unique reference code 009625), has been excluded from the data return and discussion of annual mean results within this report. However, the site location information and raw monthly data are included within the tables presented in the ASR for the purpose of completeness. The 20.0 $\mu g/m^3$ annual mean concentration of NO_2 recorded in 2023 at the 20 locations with sufficient results (Table A.3 – mean for 2023) is lower than the mean roadside background levels in England of 21.8 $\mu g/m^3$ (Defra, 2024[a]). Whilst continued and targeted monitoring will be carried out in the TVBC area, there is no evidence that the annual mean concentration of NO_2 is likely to exceed the specific Air Quality Objective of 40 $\mu g/m^3$.

The relatively low concentrations of NO_2, as shown in the results from 2023, have occurred despite an estimated UK-wide increase in all motor vehicle traffic, with the estimated vehicle miles travelled in 2023 only 2.3% lower than pre-Pandemic (2019) (DoT, 2024[a]).

Combined with monitoring for NO_2, air quality is also addressed across the TVBC area through Environmental Permitting of processes which may have the potential to cause pollution to the atmosphere, and engagement with the Environment Agency where such sites fall within their remit.

Through strategic planning TVBC are also working towards accessible and connected communities, in partnership with Hampshire County Council (HCC), who manage local highways infrastructure. TVBC engages with HCC on air quality issues, with events such as the Clean Air Day and The Clean Air Project being promoted through HCC's My Journey Hampshire website (https://myjourneyhampshire.com/education/air-quality-for-schools/). TVBC also works with other organisations, such as Sustrans, on sustainable transport and infrastructure planning.

Based on the findings of this report, TVBC has found no evidence that the levels of any other relevant pollutants are likely to exceed the specific Air Quality Objectives and therefore has not identified the need to designate any Air Quality Management Areas.

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 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.

TVBC takes its responsibilities for air quality very seriously and proposals within the Borough are carefully assessed in accordance with the Local Plan. The current Revised

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[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

Local Plan 2011-2029 was adopted in January 2016 and reviewed in 2021. The Council is currently in the process of proceeding through the statutory stages of preparation for the Draft Local Plan 2040, which has incorporated 3 stages of public consultation. Development that would or could generate potentially significant levels of pollution will only be permitted if it can be demonstrated that there would not be any adverse impact on human health, the natural environment or general amenity. Following national guidance on air quality in relation to land-use planning & development control (IAQM, 2017), an air quality assessment, including modelling of air quality, is required where infrastructure planning may lead to increased traffic flow or new sources of emissions (e.g. biomass boilers). TVBC is conscious of the need to keep air quality issues in mind when looking at development within the Borough over time.

Sustainable transport and improved cycling infrastructure is key to promoting a reduction in motor vehicle use, a key source of NO_2 within the TVBC area. Through Transport Development and Infrastructure planning and in association with Hampshire County Council, TVBC are currently working to develop a Local Cycling & Walking Infrastructure Plan (LCWIP) for the northern part of the Borough comparable to that launched for the south in 2022. Community travel plans are also one of the key requirements for larger developments within the Borough and can help offset or prevent potential increases in motor vehicle traffic.

TVBC also aims to lead by example, with a programme of fleet modernisation and electrification, the council currently operates 15 Electrical Vehicles (EV's) and in 2023 replaced its fleet of diesel pavement sweepers for electrical ones. Other traditionally petrol powered equipment, such as hedge trimmers, strimmers and leaf blowers, are also being replaced with electric equivalents, with 17 items replaced in 2023. The Council's decarbonisation commitment also aims to reduce energy use, decreasing NO_2 emissions from gas boilers within Council buildings and reducing use of electricity from the National Grid – not only reducing local emissions, but also assisting the UK Government to achieve national air quality targets.

In association with Hampshire County Council and Public Health Hampshire the Council are currently working to produce an Air Quality Strategy in order to further raise public awareness of air quality within the Borough and to set out objectives and measures that can help improve local air quality and which will contribute to national air quality objectives.

TVBC will continue to explore with HCC potential strategies to reduce particulate matter, including PM_{10} & $PM_{2.5}$ and how to target these and measure any associated impact on

public health. Where complaints are made in relation to domestic solid fuel burning, or other smoke associated nuisance, TVBC will investigate and provide information and guidance to those involved, with the potential for further action where required.

The southern part of the Test Valley Borough is encompassed by the Partnership for South Hampshire (PfSH) with the PUSH Air Quality Impact Assessment published in 2018 (https://www.push.gov.uk/wp-content/uploads/2018/10/Air-Quality-impact-assessment.pdf). Further collaborative work on planning, including air quality, has been carried out with the publication of the PfSH Spatial Position Statement in December 2023 (https://www.push.gov.uk/work/planning-and-infrastructure/). TVBC will continue to work on projects through PfSH to improve air quality for urban south Hampshire, such as the University Hospital Southampton (Bargain Farm) Park and Ride which was completed in 2022 for NHS staff. The site operated a park and ride for Southampton Football Club during 2023 and is aimed to be opened to the public at weekends.

Conclusions and Priorities

In summary the 2024 Air Quality Status Report highlights that:

- Monitoring of NO_2 within the TVBC area continues to indicate that the current Air Quality Objectives have been met, with no current requirement to implement AQMAs.

- The overall trends in the data indicate an improvement in air quality within the region compared to 2019, with a continued decrease in concentrations of NO_2 between 2022 and 2023 (please refer to Figure A.2).

- Planning applications with the potential to impact air quality in Test Valley and within the vicinity of the Southampton Urban Area will continue to be carefully considered.

- Monitoring will continue to be directed to areas identified as at risk from poor air quality, or where residents raise concerns, with regular review of monitoring sites and redeployment of equipment where required.

- TVBC will respond and investigate potential statutory nuisance issues associated with smoke/emissions in order to address particulate emissions.

The rapid drop off in NO_2 experienced during 2020, associated with a decrease in traffic volume linked to shifts in working patterns during the Covid-19 pandemic, had initially been followed by a gradual increase in 2021 and 2022 as traffic volumes rebounded. However, the data from monitoring in 2023 indicates that an overall trend of decreased

concentrations of NO_2 is now continuing, with a drop from an average within the Borough of 26.0 μg/m^3 in 2019 to 20.0 μg/m^3 in 2023. This possibly reflects the large reduction in road transport emissions of NO_2 over a comparable period, as newer vehicles subject to stricter emissions standards enter the transport fleet (Defra, 2024[a]).

There is the potential to sustain the reduction in NO_2 within the TVBC area through the increased use of electric vehicles and if home working arrangements, reducing the need for work-based travel, are continued. The Council continues to operate a flexible working policy, allowing staff to minimise vehicle travel wherever possible. Ultra-Low Emission Vehicle (ULEV) ownership per 100,000 population within Test Valley Borough is nearly 60% higher than the UK average, contributing to lower-than-average vehicle emissions from a proportion of local traffic (HoCL, 2024). The use of Battery Electric Vehicles (BEV's) and Plug-in Hybrid Electric Vehicles (PHEV's) is also increasing within the UK, accounting for 2.7% of all cars in use, an increase from 1.9% in 2022. Combined with a 43% increase in BEV Vans (1.2% of vans on UK roads) (SMMT, 2024), the associated decrease in emissions is predicted to reduce concentrations of NO_2 and other pollutants at roadside exposure sites.

Challenges to air quality in the TVBC area will remain as a result of climate change, potential increases in domestic solid fuel burning, potential ongoing increases in traffic volume due to the record number of vehicles now registered in the UK (SMMT, 2024) and directives from some institutions for personnel to return to office-based working. Ongoing Inflationary challenges and the reported cost of living crisis may also continue to influence uptake of EV's. Whilst high energy prices are predicted to drop in the short term, the adoption of solid fuel burning and continuing risk of energy cost increases may result in the continuation of solid fuel use.

Local Engagement and How to get Involved

TVBC is actively promoting sustainable travel which will help improve air quality. The 4th Andover Festival of Cycling was held between the 29th-30th July 2023, organised by Halo Sports in association with Stannah, Test Valley Borough Council and Hampshire County Council. The festival promotes the use of the local cycle lane network for both leisure and commuting purposes. The 2024 event is scheduled for Saturday and Sunday 6th & 7th July.

Information on wood burning stoves and open fires, which have grown in popularity in recent years and can have an impact on air quality in built up areas relating to particulate

matter (PM_{10} and $PM_{2.5}$), is available on the TVBC website on the dedicated Air Quality page:

https://www.testvalley.gov.uk/housingandenvironmentalhealth/environmentalprotection/air-quality

In order to decrease emissions through reducing the burning of garden waste, TVBC encourages residents to consider home composting:

https://www.testvalley.gov.uk/wasteandrecycling/recycling/homecomposting

Alternatively, a garden waste collection service is available through an annual subscription service:

https://www.testvalley.gov.uk/wasteandrecycling/garden-waste-info

Garden waste recycling facilities are also available at Hampshire County Councils Household Waste Recycling Centres:

https://www.hants.gov.uk/wasteandrecycling

Further information on aspects relating to air quality and sustainable transport for TVBC, including links to EV charging locations within the TVBC area, are available on the Council's website:

Air Quality:

https://www.testvalley.gov.uk/housingandenvironmentalhealth/environmentalprotection/air-quality

Sustainability:

https://www.testvalley.gov.uk/aboutyourcouncil/corporatedirection/environmentandsustainability

Travel Planning:

https://www.testvalley.gov.uk/transportparkingandstreets/traffic-management/travelplans

Cycling and Walking:

https://www.testvalley.gov.uk/communityandleisure/cyclingwalking

With updates for new sustainable travel initiatives such as, bus services, walking and cycling provision and residents travel plans:

https://www.testvalley.gov.uk/communityandleisure/my-local-area-new/andover-romans/augusta-park/east-anton-augusta-park-community-travel-plan

and through the My Journey link on the following TVBC webpage

http://testvalley.gov.uk/transportparkingandstreets

Useful information on air quality at home can also be found on the Hampshire County Council Clean Air at Home webpage:

https://myjourneyhampshire.com/air-quality/clean-air-at-home/

Local Responsibilities and Commitment

This ASR was prepared by the Housing and Environmental Health Service of Test Valley Borough Council with the support and agreement of the following officers and departments:

Sean Feist – Housing and Environmental Health Service

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This ASR has been approved by:

Mark Lee – Environmental Health Manager

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 Sean Feist at:

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1 Local Air Quality Management

This report provides an overview of air quality in Test Valley Borough 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 Test Valley 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

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.

Test Valley Borough Council currently does not have any declared AQMAs. A local Air Quality Strategy (AQS) is under development to prevent and reduce polluting activities with officers from multiple services actively engaged in the development of strategy proposals.

Pending the adoption of a formal AQS the Council continues to utilise a number of local and regional plans and strategies in order to minimise and/or reduce potential impacts on air quality within the Borough and to prevent and reduce polluting activities.

Monitoring data for 2023 indicates continued compliance with the Air Quality Objective for Nitrogen Dioxide (NO_2) of 40.0 micrograms per cubic metre ($\mu g/m^3$) with no evidence that this will be exceeded.

Examples of the management strategies utilised are listed below:

- Hampshire Local Transport Plan (LTP – 4)
  https://www.hants.gov.uk/transport/localtransportplan
- Test Valley Borough Council Revised Local Plan (2011 – 2029) and Draft Local Plan 2040
  https://www.testvalley.gov.uk/planning-and-building/planningpolicy/local-development-framework

- Cycle Strategy and Network SPD
  https://www.testvalley.gov.uk/planning-and-building/planningpolicy/supplementary-planning-documents/cyclestrategyspd
- Test Valley Borough Council Corporate Plan 2023 – 2027
  https://www.testvalley.gov.uk/aboutyourcouncil/corporate-plan-2023-2027

- Partnership for Urban South Hampshire Air Quality Impact Assessment (PUSH)

  [Home - Partnership for South Hampshire (push.gov.uk)](http://push.gov.uk)

For reference, maps of TVBC's monitoring locations are available in Appendix D.

2.2 Progress and Impact of Measures to address Air Quality in Test Valley Borough

Defra's appraisal of last year's ASR concluded that "*the report is well structured, detailed, and provides the information specified in the Guidance. With the following comments provided to help inform future reports:*

1.   The Council very clearly describes the measures in place to tackle air quality in the borough and highlights great progress made in 2022 and obvious public engagement.

2.   The council employed short term diffusion tubes as a screening survey to test out areas for potential hot spots. It is great that the council is keeping its monitoring network under close review.

3.   The council continues to take on feedback from previous reviews and directly address it in its monitoring strategy or annual report. This is commended.

4.   A few $\mu g/m^3$ were spotted as not superscripted in text. The council should ensure all relevant pollutant names and units are appropriate subscripted or superscripted in future reports.

5.   Overall, the report is detailed and provides great insight into the work that Test Valley Borough Council are doing within its area, and all of the measures it has put in place to improve air quality."

Test Valley Borough Council will continue to review publicly available data and information on $PM_{2.5}$ emissions along with local trends in NO_2. The position of monitoring sites will also be actively reviewed, taking into consideration the position of major transport routes within Test Valley Borough and how the locations of potential future development and expansion of housing may impact on those routes. To address potential air quality issues and assess new locations for monitoring, short term deployments have been carried out at 3 locations in the 2023 reporting year (S18C, S18D & S19). Further short - medium term deployments will be utilised to screen alternative locations in 2024.

Test Valley Borough Council has proceeded with a number of direct measures during the current reporting year of 2023 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.1. 21 measures are included within Table 2.1, with the type of measure and the progress TVBC have made during the reporting year of 2023 presented. Where there have been, or continue to be,

barriers restricting the implementation of the measure, these are also presented within Table 2.1.

More detail on these measures can be found in their respective Action Plans. Copies of the main reference plans/strategies can be found via the web-links listed below:

Hampshire Local Transport Plan (LTP – 4)

https://www.hants.gov.uk/transport/localtransportplan

Test Valley Borough Council Revised Local Plan (2011 – 2029) and Draft Local Plan 2040

https://www.testvalley.gov.uk/planning-and-building/planningpolicy/local-development-framework

Test Valley Borough Council's Climate Emergency Action Plan

http://www.testvalley.gov.uk/aboutyourcouncil/corporatedirection/environmentandsustainability/climate-emergency-action-plan

Test Valley Borough Council's Sustainability Framework

http://www.testvalley.gov.uk/aboutyourcouncil/corporatedirection/environmentandsustainability/sustainability-framework

Environmental Health website information

https://www.testvalley.gov.uk/housingandenvironmentalhealth/environmentalprotection/air-quality

TVBC has instigated the following projects over the 2023 reporting year, with completion anticipated in 2024:

- Bourne House Depot Decarbonisation Project - including improving insulation, replacing heating system (including gas boiler to air source heat pump for office area), and solar panel installation on roof.
- Test Valley Community Energy Project - Supporting communities and residents to decarbonise and reduce sources of air pollution.
- Heat network studies - Investigation of heat network zones and feasibility of zone in Andover town centre. This project is exploring heat network zones across the borough based on a national methodology and modelling approaches. A more detailed feasibility assessment is planned for Andover. The outputs of this stage of work will inform whether further steps are undertaken.

These measures are aimed at reducing carbon emissions with the added benefit of a reduction in the use of fossil fuel gas for heating and hot water purposes. This not only reduces the Nitrogen Oxide (NOx) emissions associated with heating of domestic and commercial properties, but also reduces consumption of electricity from the National Grid, reducing the reliance on fossil fuel power generation and decreasing associated emissions.

TVBC also expects the following measures to be completed over the course of the next reporting year:

- Northern Test Valley Local Cycling & Walking Infrastructure Plans – reduced traffic in line with increased uptake of active travel.

TVBC's priorities in respect of local air quality management for the coming year are:

- Development of the Council's Air Quality Strategy to set out the framework for maintaining and improving the good air quality within the Borough;
- Working with HCC and Sustrans on the Northern Test Valley Local Cycling & Walking Infrastructure Plan;
- Continued focus on the monitoring of NO_2 within the borough, reviewing and adapting the monitoring network where appropriate;
- Working with local businesses to ensure compliance with environmental permits;
- Responding to reports of smoke related issues, such as bonfires and domestic solid fuel burning, with the provision of information on related air quality issues to those involved;
- Ensuring that potentially significant air quality impacts associated with new development are identified and properly considered in accordance with Policy E8 of the Council's Local Plan;
- Working with our neighbouring local authorities with regards to the non-compliance for NO_2 in the Southampton Urban Area Clean Air Zone.

TVBC continues to work on decreasing the impact on air quality from its own transport fleet through the modernisation and, where possible, electrification of vehicles and powered equipment. Euro 5 category Heavy Goods Vehicles were replaced with Euro 6 vehicles in the 2023/24 financial year. A further three Battery Electric light goods vehicles were also added to the fleet during 2023, bringing the total number of battery powered light goods vehicles to 15. In a drive to decarbonise the Councils activities and address the declared Climate Emergency, TVBC has switched fuels for its vehicle fleet from Diesel to

Hydrotreated Vegetable Oil (HVO – a diesel alternative). An additional beneficial impact may also be the reduction of NO_2 and fine particulates (PM_{10} and $PM_{2.5}$) associated with vehicle exhaust emissions. These fuels are reported to achieve an approximate 7-14% decrease in Nitrogen Oxides (a combination of Nitrogen Oxide - NO_x, and NO_2) combined with a 28 - 46% decrease in fine particulate matter exhaust emissions (Kuronen at al., 2007). Whilst the results of other studies draw less conclusive results (e.g. Suarez-Bertoa et al., 2019), this shift could provide further incentive for adoption of diesel alternatives. TVBC aims to be an effective demonstrator for the adoption of new technology to reduce emissions, with the aim to encourage local businesses to adopt strategies and procedures that could help improve air quality.

The principal challenges and barriers to implementation that TVBC anticipates facing are that the main driver for air quality in the borough continues to be associated with vehicular traffic. With regional background monitoring data confirming higher levels of NO_2 and $PM_{2.5}$ along major roads, such as the A303 and M27, along with urban areas (Defra, 2020; Appendix F). The road network, particularly within the historic settlements of Andover and Romsey, also poses additional challenges for traffic management, which is largely beyond the control of TVBC, and is the responsibility of Hampshire County Council and Highways England.

Limitations for alternatively powered vehicles and plant remain a barrier to uptake. The currently available electric options for dustcarts are not sufficiently suitable to meet the operational requirements within the Test Valley Borough Council area. However, all fleet replacements are Euro 6 compliant.

TVBC anticipates that the measures stated above and in Table 2.1 will help maintain compliance within the Test Valley area and TVBC will continue to work with partners in neighbouring authorities, PfSH, Sustrans, Highways England and Hampshire County Council to monitor and achieve the required Air Quality Objectives.

Table 2.1 – 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	Pocket Park	Traffic Management	Re-prioritising road space away from cars	2019	2020	Local Authority County Council	Developers & highway infrastructure funding	No	Funded	£500k - £1M	Completed	Reduced Vehicle Emissions	-	Work completed	-
2	Bargain Farm / Nursling Park and Ride	Alternatives to Private Vehicle Use	Bus based park and ride	2021	2022	Local Authority	Developers	No	Funded	Unknown	Completed	Reduced Vehicle Emissions	-	Opened October 2022	Currently operated for NHS staff Monday - Friday and opened to the Public at weekends
3	Home Working/Agile Working	Promoting Travel Alternatives	Encourage/Facilitate Homeworking	2020	Ongoing	Local Authority	N/A	No	N/A	Savings	Completed	Reduced Vehicle Emissions	-	Agile Working policy finalised January 2022	-
4	Andover Airfield Business Park	Freight and Delivery Management	Route Management Plans/Strategic Routing	2010	Ongoing	Local Authority	Developers / Operators	No	Funded	Unknown	Implementation	Reduced Vehicle Emissions	TRO	Ongoing	-
5	King Alfreds Cycleway	Transport Planning and Infrastructure	Cycle Network	2020	2020	Local Authorities (Wessex Region)	Mixed	No	Funded	Unknown	Completed	Reduced Vehicle Emissions	-	-	-
6	Environmental Permits	Environmental Permits	Introduction/Increase of environment charges through permit systems and economic instruments	Ongoing	Ongoing	Local Authority	Self-funding	No	Funded	Unknown	Implementation	Reduction in Pollutants/Emissions	Permit compliance	Ongoing	-
7	Electric Vehicles and Plant	Policy Guidance and Development Control	Sustainable Procurement Guidance	2015	Ongoing	Local Authority	Budgets	No	Funded	Unknown	Implementation	Reduction in Pollutants/Emissions	-	15 electric vehicles, 25 electric plant items and 3 dustcarts with electric bin lifts	High costs / Availability of suitable alternatives
8	Community travel plans for new neighbourhoods	Transport Planning and Infrastructure	Public transport improvements – interchanges stations and services	2001	Ongoing	Local Authority Developers County Council	Developers	No	Funded	Unknown	Implementation	Reduction in Pollutants/Emissions	-	Services in place for Picket Twenty, Picket Piece and Abbotswood	Phased development
9	Renewable and low carbon energy study	Policy Guidance and Development Control	Other Policy	2019	2020	Local Authority	Local Authority	No	Funded	£10k - 50k	Completed	Reduction in Pollutants/Emissions	-	Study to highlight capacity in the area and assist sustainable development	-
10	Southern Test Valley Local Cycling & Walking Infrastructure Plans	Transport Planning and Infrastructure	Cycle Network	2020	2022	Local Authority County Council Sustrans	Shared	No	Unknown	Unknown	Planning	Reduced Vehicle Emissions	-	Completed	-

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
11	Northern Test Valley Local Cycling & Walking Infrastructure Plans	Transport Planning and Infrastructure	Cycle Network	2020	2023	Local Authority County Council Sustrans	Shared	No	Unknown	Unknown	Planning	Reduced Vehicle Emissions	-	In planning and preparation stage	-
12	Salary Sacrifice for Bicycles	Promoting Travel Alternatives	Promotion of Cycling	2012	Ongoing	Local Authority	Local Authority	No	Funded	Unknown	Implementation	Reduced Vehicle Emissions	-	Available on website	-
13	Walking and Cycling Guides	Promoting Travel Alternatives	Promotion of Cycling/Walking	2010	Ongoing	Local Authority	Local Authority	No	Funded	Unknown	Implementation	Reduced Vehicle Emissions	-	Available on website, promoted via social media and paper guides	-
14	Travel Plan	Promoting Travel Alternatives	Promote use of rail and inland waterways	2015	Ongoing	Local Authority	Local Authority	No	Funded	Unknown	Implementation	Reduction in Pollutants/Emissions	-	Ongoing	-
15	Taxi Licensing	Promoting Low Emission Transport	Taxi Licensing Conditions	2014	Ongoing	Local Authority	Licence Fee	No	Funded	Unknown	Implementation	Reduced Vehicle Emissions	-	Reviewed regularly	-
16	Green Waste Recycling	Other	Other	2004	Ongoing	Local Authority	Local Authority & Subscribers	No	Funded	Unknown	Implementation	Reduction in Pollutants/Emissions	Number of Subscribers	Ongoing	Subscription fee and space for waste bin
17	Alternative Low Carbon Fuel Adoption	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	2022	Ongoing	Local Authority	Local Authority	No	Funded	Unknown	Implementation	Reduced Vehicle Emissions	Fuel consumption / emissions tests	Implementation ongoing	-
19	Bourne House Depot Decarbonisation Project	Policy Guidance and Development Control	Low Emissions Strategy	2023	2024	Local Authority	DESNZ	No	Funded	£100k - £500k	Complete	Reduced Gas and Mains Electricity Usage	Electricity Usage	Installation works complete, now monitoring implications.	Project included improving insulation, replacing heating and solar panels on roof.
20	Test Valley Community Energy Project	Policy Guidance and Development Control	Low Emissions Strategy	2023	2024	Local Authority; Community Energy South, Dragonfly Power	DLUHC	No	Funded	£100,000	Implementation	Reduced Gas and Mains Electricity Usage	-	In planning and preparation stage	Supporting communities and residents to decarbonise. Reducing combustion of fossil fuels at local and national scales aiding a reduction in sources of air pollution.
21	Heat network studies – investigation of heat network zones and feasibility of zone in Andover town centre	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	2023	2024	Local Authority, Heat Network Delivery Unit	DESNZ, TVBC	No	Funded	£100k - £500k	Implementation	Reduced Gas and Mains Electricity Usage	-	Heat network zone study commenced	Feasibility Study for heat network zones across the borough including detailed feasibility assessment planned for Andover.

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.

Test Valley Borough Council is taking a number of measures to address PM$_{2.5}$, with publicly available data for PM$_{2.5}$ being monitored to determine any changes in background and roadside annual mean concentrations. Key sources of PM$_{2.5}$ include road traffic, industrial emissions and wood burning stoves. Whilst TVBC only has a limited role in road traffic management it will continue to work with Hampshire County Council and Highways England in addition to Hampshire County Council's Public Health team and the Office for Health Improvement & Disparities/UK Health Security Agency to reduce PM$_{2.5}$ emissions wherever possible.

Where permitted activities relate to the emissions of fine particulate matter TVBC will ensure appropriate corrective action is carried out where any exceedance of the permitted limits are detected and work with the relevant operators to ensure Best Available Techniques are applied to minimise emissions. Where complaints are received relating to potential statutory nuisance from domestic solid fuel burning, TVBC will investigate and where the type of fuel is suspected to be supplied contrary to The Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020 this will be reported to the regulator (Hampshire Trading Standards). Guidance on the use of wood burning stoves, particularly relevant to urban areas, is provided on the TVBC website. The garden waste recycling scheme is also promoted by TVBC, with the potential impact of reducing bonfires and associated particulate matter. The scheme has been a success, with increased numbers of subscribers from 11,000 in 2016 to 19,238 in December 2023.

As part of the Air Quality Annual Summary Report, Test Valley Borough Council reviews the latest air quality data on particulates available from the Office for Health Improvement

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

& Disparities (OHID - previously Public Health England). According to the latest data available for 2022, the fraction of mortality attributable to particulate air pollution in the Test Valley area was 5.7%, an increase of 0.3% since 2021***** (OHID, 2024[a]). This fraction of mortality is comparable to that within the South East region (5.7%) and the average for England (5.8%). For comparison the fraction of mortality attributable to particulate air pollution in TVBC is down from 7.1% in 2018.

The latest estimates available for concentrations of total $PM_{2.5}$ within the Test Valley have not been updated since 2021, when 7.2 µg/m^3 was the reported figure. This is a decrease from the 7.5 µg/m^3 reported for 2020***** (OHID, 2024[b]). Average concentrations of total $PM_{2.5}$ estimated for Hampshire and England in 2021 are reported at 7.4 µg/m^3 and for the South East region 7.3 µg/m^3.

[* please note that new methods for calculating both the fraction of mortality and concentrations of particulate matter have been employed since 2022 and therefore may not be directly comparable to previous years].

For the reporting year of 2023 background $PM_{2.5}$ concentrations for Test Valley Borough have been calculated utilising Defra's background mapping resource (https://laqm.defra.gov.uk/air-quality/air-quality-assessment/background-maps/). This data indicates a modelled maximum annual average background concentration of $PM_{2.5}$ at 10.21 µg/m^3, with a minimum background value of 7.37 µg/m^3 and mean of 8.03 µg/m^3. This is compared against the reference year of 2018 where the maximum, minimum and mean annual average background concentrations are reported as 11.05 µg/m^3, 8.03 µg/m^3 and 8.11 µg/m^3 respectively. The spatial variation in background concentrations of $PM_{2.5}$ can be seen in Appendix F. These maps show, that for both 2018 (Figure F1) and 2023 (Figure F2), the higher levels of $PM_{2.5}$ are strongly associated with primary traffic routes and areas of greater urbanisation. A clear reduction in concentrations of $PM_{2.5}$ is modelled for the Romsey and Andover urban centres by 2023, with projections for $PM_{2.5}$ concentrations >10 µg/m^3 limited to areas around the M271, M27 and M3 in the south of the Borough. It is noted that short or long term impacts associated with behavioural change during and post Covid lockdowns is not accounted for in the modelled projections for 2023 (Defra, 2020).

To provide a comparison between the above modelled data within Test Valley Borough and measured data at automatic monitoring sites, the Southampton Central AURN data (also utilised within this report for annualisation of incomplete diffusion tube data) has been checked for the reporting years 2018 and 2022 (2023 data is not yet available). This

shows a drop in annual average $PM_{2.5}$ concentrations derived from measured data within this highly urbanised Air Quality Management Area, from 13.3 µg/m³ in 2018 to 9.0 µg/m³ in 2022. This may indicate that $PM_{2.5}$ concentrations have fallen faster than predicted due to a decrease in traffic movements associated with the Covid Pandemic and the influx of newer vehicles subject to more stringent emissions controls (DoT, 2024[a]). The latest data for the UK in 2023 indicates that average roadside $PM_{2.5}$ levels have decreased to 7.7 µg/m³, with urban background levels at 7.2 µg/m³ (Defra 2024[b]).

The relatively low measured values for both Southampton and the UK may indicate that the modelled values for Test Valley Borough, based on assumptions made in 2018, are higher for 2023 than those that would be observed through direct measurement. The primary barrier for carrying out monitoring for $PM_{2.5}$ within the Borough remains the high cost of monitoring equipment and associated resources, with no clear indication (through association with relatively low NO_2) that air quality objectives are at risk of being breached.

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

This section sets out the monitoring undertaken within 2023 by Test Valley Borough 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 Automatic Monitoring Sites

Test Valley Borough Council does not currently have any automatic (continuous) monitoring sites.

3.1.2 Non-Automatic Monitoring Sites

Test Valley Borough Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 21 sites during 2023. Table A.2 in Appendix A presents the details of the non-automatic sites. Data are presented within this report for 20 of these sites, with a single site, location S18C not achieving >25% data coverage for the 2023 monitoring period and following guidance (LAQM reference code 009625) has been excluded from the data return submitted to the Department for Environment, Food & Rural Affairs.

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.

Deployment sites for air quality monitoring continue to be regularly reviewed by TVBC, with consideration given to concerns or information provided by the public. 3 sites were investigated in 2023 to screen areas over periods of between 5 to 12 months, these were locations where traffic flows are known to be relatively high, regularly delayed or where there is restricted air movement. Relatively low levels of NO_2 were identified at the 3 screening locations monitored in 2023 with annualised and bias corrected average NO_2 concentrations at less than 60% of the 40 µg/m^3 air quality objective. Data at a fourth site

– continued from 2022 (S18C) – did not meet the specific data quality requirements for the 2023 period and cannot be included within a discussion on annual mean concentrations. It is noted that the uncorrected monthly data for this location was lower than at other sites in the vicinity (S1 and S6) at approximately 30 µg/m^3 (please refer to Appendix B, Table B1). Equipment was re-deployed at another site to avoid duplication and to increase the spatial coverage of monitoring.

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$_2$)

Table A.3 in Appendix A compares 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 does not include distance corrected values, as following the relevant guidance these were not required. Erroneous values have also been excluded following the guidance within this document.

Annual mean raw and bias corrected NO$_2$ concentrations at the 20 monitoring stations within the TVBC area did not exceed the air quality monitoring objectives of 40 µg/m^3 during the 2023 monitoring period. Mean annual bias corrected NO$_2$ concentrations of 20.0 µg/m^3 are calculated for the 20 locations with viable data, with a range from 10.3 to 30.3 µg/m^3. A bias correction factor of 0.77 has been applied for 2023 in line with the appropriate technical guidance. To place the TVBC results in context, a comparison is made with the national roadside average for England of 21.8 µg/m^3 (Defra, 2024[a]). This national average continues to decrease despite a rise in traffic volume as road journeys increase after a drop during 2020, 2021 and 2022. Total estimated vehicle miles during 2023 were only 2.3% below the pre-Pandemic levels recorded in 2019 (DoT, 2024[a]). Total annual vehicle miles estimated within the Hampshire administrative area during 2023

remained at levels similar to 2015, with total vehicle miles travelled 3.8% lower than the peak during 2019. The total estimate for Hampshire of 9.47 billion vehicle miles is an increase of 2.6% from 2022 (DoT. 2024[b]).

An overall decrease of 1.8 µg/m^3 in average annual NO_2 concentrations is observed at the 17 established monitoring locations, from 21.2 µg/m^3 in 2022 to 19.4 µg/m^3 in 2023. With a total decrease across the 5 years of monitoring at these 17 locations of 6.6 µg/m^3, from 26.0 µg/m^3 in 2019 to 19.4 µg/m^3 in 2023. This average decrease of 1.3 µg/m^3 per year is slightly below the national average decrease at roadside sites of 1.9 µg/m^3 per year (Defra, 2024[a]). 16 of the monitoring sites show relatively stable or decreasing trends when compared to 2022, with an average decrease at these locations of 1.9 µg/m^3. A single locality showed a minor increase between 2022 and 2023 with a rise in NO_2 concentration of 0.6 µg/m^3.

Location S6 (Winchester Road, Romsey) shows a slight decrease in NO_2 of 0.8 µg/m^3 between 2022 and 2023, however levels remain above concentrations observed prior to 2020. This occurs in a position in relatively close proximity to a second monitoring location, approximately 20m to the east (S1), where a significant decrease has been observed from 35.3 µg/m^3 in 2019 to 21.2 µg/m^3 in 2023. Site S1 is the only locality to have shown an increase in annual average concentration of NO_2 between 2022 and 2023, with a rise of 0.8 µg/m^3. The average concentrations of NO_2 at the two locations have shown an overall decrease from 31.6 µg/m^3 in 2019 to 25.8 µg/m^3 in 2022 which was unchanged in 2023. The cause of the change in distribution of NO_2 in this area remains unknown, however further monitoring at sites S18c and S18d indicated that significant drop off with distance occurs with exposure in proximity to the nearest receptors < 23 ug/m^3.

With the exception of location S6 (Winchester Road, Romsey) all other locations record lower concentrations of NO_2 than during 2020 despite the increase in traffic volumes in 2023 (DoT, 2024[a]). This indicates the critical impact that the national strategy for reducing vehicle exhaust emissions has on air quality, particularly in relation to NO_2, at the local level.

The results from monitoring carried out in 2023 indicate that air quality within Test Valley Borough complies with the relevant air quality objective for NO_2 and are below the threshold (36 µg/m^3) where distance correction to the nearest receptor is necessary. Combined with the absence of consistent trends that may indicate a future breach of the air quality objective this information indicates that no action to declare an AQMA is required at this time.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Test Valley Borough Council does not have any Automatic Monitoring Sites.

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)
S1	Winchester Road - East	Roadside	436129	121398	NO_2	No	5.9	1.0	No	1.5
S2	Duttons Road	Roadside	435376	121786	NO_2	No	1.5	1.5	No	2.0
S3	Palmerstons Street - West	Roadside	435474	121089	NO_2	No	3.0	1.3	No	2.0
S4	Romsey (A27) By-pass	Roadside	434927	120689	NO_2	No	5.3	3.0	No	2.0
S5	Palmerstons Street - East	Roadside	435473	121125	NO_2	No	0.0	2.0	No	1.8
S6	Winchester Road - West	Roadside	436079	121388	NO_2	No	6.0	1.5	No	2.0
S7	Alma Road - South	Roadside	435696	121245	NO_2	No	2.3	2.0	No	2.0
S8	Alma Road - North	Roadside	435630	121403	NO_2	No	8.9	2.6	No	2.0
S9	Chilworth Road	Roadside	441760	118091	NO_2	No	22.0	1.0	No	2.0
S10	Nursling Street, Nursling	Kerbside	436991	116319	NO_2	No	17.5	0.5	No	2.0
S11	North Baddesley	Roadside	439617	119978	NO_2	No	7.5	2.0	No	1.5
S12	Kings Somborne	Roadside	435869	130958	NO_2	No	4.0	1.5	No	1.5

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)
S13	Weyhill (A342), Andover	Roadside	432084	146585	NO_2	No	10.5	2.5	No	1.5
S14	Humberstone Road (East)	Roadside	436498	144936	NO_2	No	4.1	1.5	No	2.0
S15	Little Ann (A343)	Roadside	433514	143078	NO_2	No	14.0	2.0	No	2.0
S16	Nursling (A3057)	Roadside	437747	116652	NO_2	No	9.4	1.5	No	1.5
S17	New Street, Andover	Roadside	436682	146683	NO_2	No	5.6	1.5	No	2.4
S18C	Winchester Road - South	Roadside	436105	121382	NO_2	No	0.0	7.4	No	2.2
S18D	Winchester Road - B, Romsey	Roadside	436077	121394	NO_2	No	0.0	8.4	No	2.0
S18E	Winchester Road, Andover	Roadside	436545	145179	NO_2	No	6.1	2.3	No	2.3
S19	New Street - B, Andover	Roadside	436684	146688	NO_2	No	4.8	4.5	No	2.4

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 NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

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
S1	436129	121398	Roadside	100	92.6	35.3	32.2	28.3	20.6	21.2
S2	435376	121786	Roadside	100	92.6	24.5	21.8	21.9	22.3	18.7
S3	435474	121089	Roadside	100	100.0	30.1	23.9	23.2	23.3	21.2
S4	434927	120689	Roadside	100	92.6	22.5	18.6	17.8	17.5	17.4
S5	435473	121125	Roadside	100	92.6	25.4	21.8	19.6	20.5	18.7
S6	436079	121388	Roadside	100	100.0	27.9	21.8	26.3	31.1	30.3
S7	435696	121245	Roadside	100	92.6	24.4	18.8	19.6	18.2	16.2
S8	435630	121403	Roadside	92.3	84.8	25.1	18.9	19.2	19.8	18.1
S9	441760	118091	Roadside	100	100.0	30.3	22.3	24.6	23.2	20.6
S10	436991	116319	Kerbside	100	100.0	29.1	26.4	26.2	26.3	23.6
S11	439617	119978	Roadside	100	92.6	30.6	25.4	24.0	24.6	23.3
S12	435869	130958	Roadside	100	83.2	16.5	11.8	12.0	12.2	10.8
S13	432084	146585	Roadside	100	92.6	16.8	15.4	18.0	14.7	13.6
S14	436498	144936	Roadside	100	92.6	16.5	14.1	13.9	14.0	12.0
S15	433514	143078	Roadside	100	92.6	24.3	18.7	19.0	18.1	16.6
S16	437747	116652	Roadside	100	92.6	26.8	21.3	21.8	21.9	20.0
S17	436682	146683	Roadside	100	92.6	35.4	30.2	30.2	32.1	28.1
S18A	434723	145058	Suburban	-	-	-	-	-	10.0	-
S18B	435418	135124	Roadside	-	-	-	-	-	7.0	-
S18C	436105	121382	Roadside	100	15.4	-	-	-	-	-
S18D	436077	121394	Roadside	100	42.4	-	-	-	-	22.8
S18E	436545	145179	Roadside	100	34.7	-	-	-	-	22.5
S19	436684	146688	Roadside	92.3	84.8	-	-	-	-	23.5

☒ **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 **<u>bold and underlined</u>**.

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%).

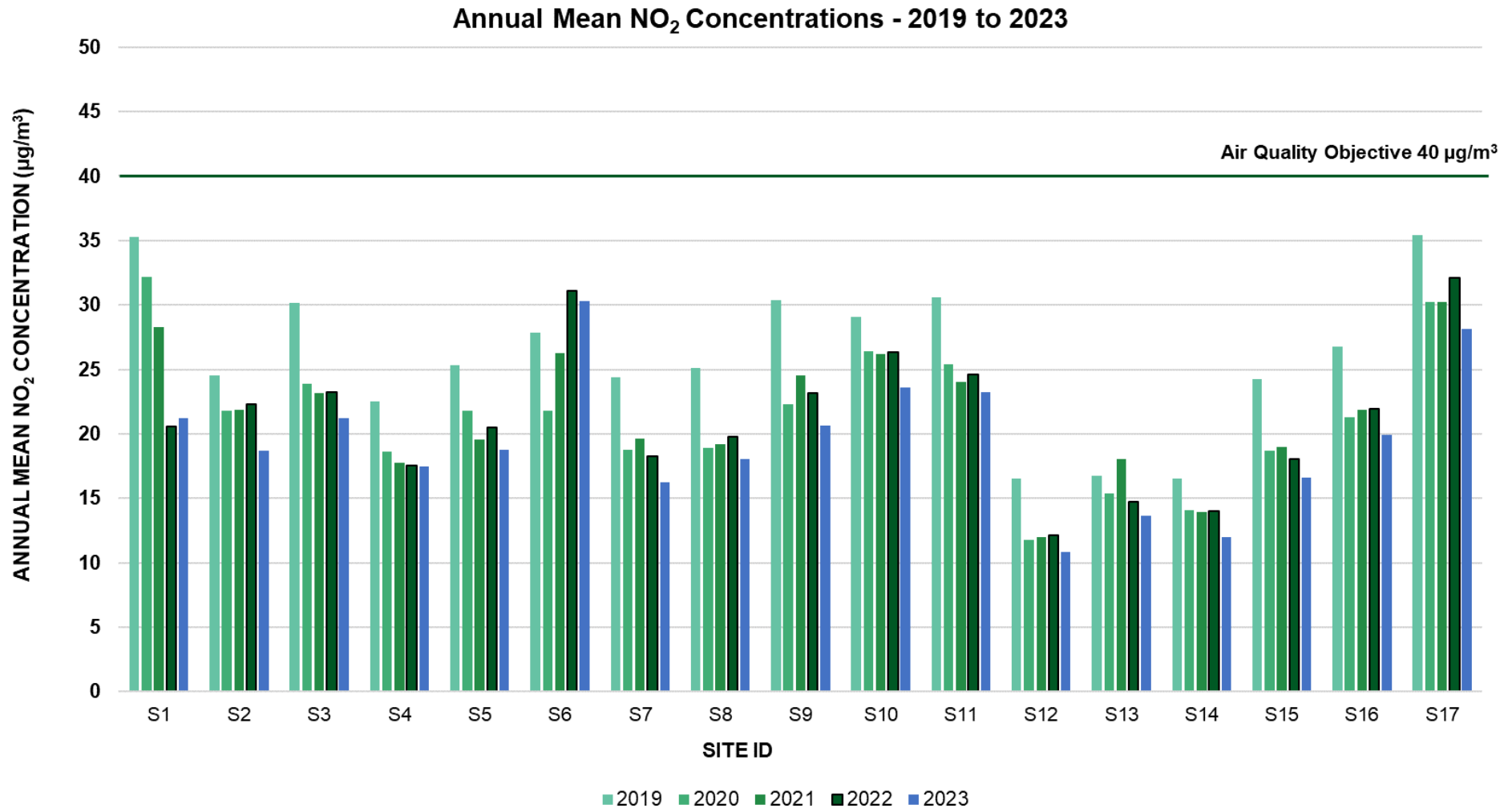**Figure A.1 – Trends in Annual Mean NO₂ Concentrations**

Figure A.1. Annual mean concentrations of NO₂ (in µg/m³) for the 5-year period 2019 to 2023 at 17 monitoring sites where data is available for trend analysis. The majority of sites, with the exception of S6, show decreasing concentrations of NO₂ after the drop off in 2020. All sites show concentrations of NO₂ within the air quality objective of 40 µg/m³.

Appendix B: Full Monthly Diffusion Tube Results for 2023

Table B.1 – NO₂ 2023 Diffusion Tube Results (µg/m³)

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
S1	436129	121398	31.6	32.8	25.5	27.3	21.0	23.8	21.5	23.6	31.7	30.1	33.9	E	27.5	21.2	n/a	E – Erroneous Data
S2	435376	121786	26.2	27.7	22.7	26.7	23.2	23.5	17.4	21.9	25.3	25.7	27.2	E	24.3	18.7	n/a	E – Erroneous Data
S3	435474	121089	35.2	27.5	29.1	26.5	19.2	25.9	27.4	24.8	35.2	28.4	25.0	26.2	27.5	21.2	n/a	Dec Data within Yr to-date Ave 10% and 4Yr Dec Ave 10% Range
S4	434927	120689	25.8	21.4	22.7	23.5	13.8	21.7	22.6	19.4	27.0	28.5	22.7	E	22.6	17.4	n/a	E – Erroneous Data
S5	435473	121125	25.1	31.9	23.0	28.4	21.7	26.0	16.0	19.4	25.8	24.3	26.0	E	24.3	18.7	n/a	E – Erroneous Data
S6	436079	121388	49.5	39.5	40.0	38.3	30.6	36.6	35.2	34.3	42.0	47.2	41.5	37.6	39.4	30.3	n/a	Dec Data within Yr to-date Ave 10% and 4Yr Dec Ave 10% Range
S7	435696	121245	26.5	26.7	21.3	22.8	16.1	16.0	16.5	17.1	24.2	20.7	24.1	E	21.1	16.2	n/a	E – Erroneous Data
S8	435630	121403	30.3	25.1	24.5	M	18.9	20.9	17.9	18.2	27.9	23.0	27.9	E	23.5	18.1	n/a	M – Tube Missing E – Erroneous Data
S9	441760	118091	27.3	20.5	28.6	29.1	21.4	21.8	23.2	25.8	37.0	36.3	26.3	24.3	26.8	20.6	n/a	Dec Data within Yr to-date Ave 10% and 4Yr Dec Ave 10% Range
S10	436991	116319	39.3	41.4	29.5	32.6	20.3	27.5	30.9	27.3	30.4	29.8	27.6	31.5	30.7	23.6	n/a	Dec Data within Yr to-date Ave 10% and 4Yr Dec Ave 10% Range
S11	439617	119978	37.5	35.1	28.4	29.0	20.4	26.1	25.7	28.0	33.5	34.8	33.9	E	30.2	23.3	n/a	E – Erroneous Data
S12	435869	130958	18.1	16.7	14.0	12.9	12.9	E	10.5	10.5	12.6	15.4	17.3	E	14.1	10.8	n/a	E – Erroneous Data
S13	432084	146585	23.4	19.7	16.5	19.4	16.6	16.3	13.2	14.6	16.9	17.6	20.5	E	17.7	13.6	n/a	E – Erroneous Data
S14	436498	144936	24.4	17.2	15.0	18.4	14.4	12.4	8.4	9.4	15.2	17.6	18.5	E	15.5	12.0	n/a	E – Erroneous Data
S15	433514	143078	26.6	27.7	22.8	24.8	19.8	19.4	17.2	17.8	16.0	22.7	22.5	E	21.6	16.6	n/a	E – Erroneous Data
S16	437747	116652	31.5	32.6	22.8	26.9	28.5	24.2	16.7	21.9	26.8	24.7	28.4	E	25.9	20.0	n/a	E – Erroneous Data
S17	436682	146683	39.8	39.5	35.4	41.3	47.4	39.7	25.9	29.1	37.2	31.4	35.3	E	36.5	28.1	n/a	E – Erroneous Data

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
S18C	436105	121382	31.6	30.0	x	x	x	x	x	x	x	x	x	x	-	-	n/a	<25% data available during reporting period due to date of re-deployment (X)
S18D	436077	121394	x	x	25.5	26.9	23.3	27.0	21.0	x	x	x	x	E	24.7	22.8	n/a	X – Tube Not Deployed E – Erroneous Data
S18E	436545	145179	x	x	x	x	x	x	x	25.0	34.6	31.0	27.5	E	29.5	22.5	n/a	X – Tube Not Deployed E – Erroneous Data
S19	436684	146688	31.5	30.3	23.4	23.9	36.9	37.9	M	28.1	35.9	31.1	26.0	E	30.5	23.5	n/a	M – Tube Missing E – Erroneous Data

☒ **All erroneous data has been removed from the NO₂ diffusion tube dataset presented in Table B.1**.

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

☒ **National bias adjustment factor used.**

☒ **Test Valley Borough Council confirm that all 2023 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m^3 are shown in **bold**.

NO₂ annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO₂ 1-hour mean objective are shown in **<u>bold and underlined</u>**.

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 Test Valley Borough Council During 2023

TVBC has not identified any significant new sources relating to air quality within the reporting year of 2023. Road traffic volumes, which were relatively low during 2020 and 2021, resulted in a noticeable drop in NO_2 concentrations during this period. Road traffic data for 2023 indicates that volumes of traffic have increased and are now only 2.3% below that in 2019 (DoT, 2024[a]: DoT, 2024[b]). However, monthly recorded NO_2 levels at the majority of sites during 2023 have not returned to pre-pandemic levels and show a decrease compared to 2022.

Additional Air Quality Works Undertaken by Test Valley Borough Council During 2023

TVBC has not completed any additional works within the reporting year of 2023.

QA/QC of Diffusion Tube Monitoring

The diffusion tubes used by TVBC are supplied and analysed (50% TEA in Acetone) by Socotec Laboratories, Didcot, Oxfordshire. The laboratory is UKAS accredited in accordance with International Standard ISO/IEC 17025:2017, with a consistent score of 100% for the Laboratory Performance in AIR NO_2 Proficiency Testing Scheme (AIR-PT) for rounds of performance testing between January to February 2023 (AR055) and September to October 2023 (AR059).

Monitoring within TVBC has been completed in adherence to the 2023 Diffusion Tube Monitoring Calendar (± 2Days). Missing data within table B1 are due to loss of tubes during the monitoring period (M), with a total of 2 missing tubes recorded at locations S8 (April) and S19 (July). Where months are labelled with X, tube deployments were not carried out during this period. Erroneous data (E) has also been removed following the relevant guidance. Data recovery for the 2023 monitoring period is good, 100% data capture was achieved during monitoring periods at 4 locations, 83 to 93% at 14 locations and 34 to 42% at 2 locations. The latter two locations were temporary deployments where

92 to 100% data capture was recorded for the duration of the deployment (Table A4). A single location, S18C, did not have enough data during the monitoring period to be included within the report.

Data quality is interpreted as good. A single clear erroneous result of 0.8 µg/m^3 was reported for location S12 during June and excluded from the analyses – this is potentially due to partial obstruction noted within the diffusion tube. Some monthly variation can be observed within the data; however, a significant negative shift was noted within the raw data during December 2023 (table B.1). No clear indication for the cause of the lower values recorded has so far been identified, with the absence of analytical errors confirmed by the laboratory.

Diffusion tube results may be influenced by meteorological conditions (Jones et al., 2010; Heal et al., 2019). Variation in predominant weather patterns or other regional factors affecting air quality may have therefore influenced the data captured over this period – either directly or by influencing traffic movements. In the south of the UK, December 2023 was characterised by a westerly Atlantic flow, resulting from a stronger than average westerly Jetstream, which gave rise to the milder temperatures and higher rainfall recorded (Met Office, 2024). The monthly average report compiled by the Met Office (Met Office, 2024) for December 2023 indicates that the Test Valley Borough experienced above average temperatures with a mean temperature anomaly of +1.5 to 2.5 °C compared to the 1991 – 2020 average. Higher rainfall was also observed with between 125 and 175% of the average rainfall compared to the 1991 – 2020 period, combined with a mean windspeed anomaly across the Borough of between +0.5 to 1.5 knots. These factors may have influenced the effectiveness of the diffusion tubes during this deployment period. Localised flooding and poor weather within Test Valley Borough in December may also have resulted in lower traffic volumes during the period compared to previous years. However, estimates from the Department of Transport indicate that UK vehicle miles travelled during December 2023 was only 2 – 6% lower than 2019 (DoT, 2024[c]) potentially reducing the likelihood of variations in traffic impacting the results from this month.

Following guidance within section 7.211 (Erroneous Data) of the Local Air Quality Management Technical Guidance (TG22) (Defra, 2022) and adopting a precautionary approach, Diffusion Tube data for 15 sites in December has been excluded from the analyses. The threshold adopted was to exclude data from December that fell outside of a 10% variation between data recorded during December within the 4-year period from 2019 to 2022; or that were outside of 10% of the mean for the preceding 11 months (Jan – Nov

2023). Data that fell within either of these thresholds was retained in Table B1 and utilised for annualisation. It should be noted that the subsequent bias corrected annualised data shows only a mean difference between data inclusive of the December values of +0.4 $\mu g/m^3$, with differences of 0.17 to 0.94 $\mu g/m^3$ at individual sites. This step, to ensure compliance with the technical guidance, does not impact the overall decreasing trend in annual average concentrations of NO_2 recorded within Test Valley Borough or at individual sites between 2019 and 2023.

Diffusion Tube Annualisation

Two diffusion tube monitoring sites required annualisation for data collected during the 2023 monitoring period. Diffusion tube S18D was deployed for 5 months at Winchester Road, Romsey, with 42% data capture during the 2023 period. Diffusion tube S18E was deployed for 5 months at Winchester Road, Andover, with 34% data capture for the 2023 period, with deployment carried over into 2024.

Four automatic monitoring sites with the required >85% data recovery and within closest proximity to the relevant exposure locations were selected for calibration: Southampton (A33), Southampton (Centre), Reading (New Town) and Reading (London Road). Results from monitoring at the two sites indicates compliance with the national air quality objective for NO_2 of 40 $\mu g/m^3$, with annualised and bias corrected annual means of 22.8 $\mu g/m^3$ and 21.7 $\mu g/m^3$ at sites S18D (Romsey) and S18E (Andover) respectively. Data at a third site, S18C located in Romsey, spanned the 2022 and 2023 monitoring periods and fell below the 25% threshold for annualisation during 2023.

Table C.1 – Annualisation Summary (concentrations presented in $\mu g/m^3$)

Site ID	Annualisation Factor Southampton, Central	Annualisation Factor Reading, London Road	Annualisation Factor Reading, New Town	Annualisation Factor Southampton, A33	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
S18D	1.3015	1.0800	1.1874	1.2107	1.1949	24.7	29.6
S18E	0.9102	1.0475	1.1207	0.9883	1.0167	27.7	28.1

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 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.

Test Valley Borough Council have applied a national bias adjustment factor of 0.77 to the 2023 monitoring data. A summary of bias adjustment factors used by Test Valley Borough Council over the past five years is presented in Table C.2.

The national bias adjustment factor has been derived from the March 2024 version of the National Diffusion Tube Bias Adjustment Factor Spreadsheet. This utilised a total of 28 studies employing ESG (50% TEA in Acetone) diffusion tubes analysed at the SOCOTEC laboratory in Didcot during 2023. All studies indicated 'Good' precision, with individual study locations yielding a range of bias factors from 0.62 to 1.06, with the mean from 28 studies of 0.77 utilised for the TVBC data adjustment.

Table C.2 – 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	09/20	0.77

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 Test Valley Borough Council required distance correction during 2023.

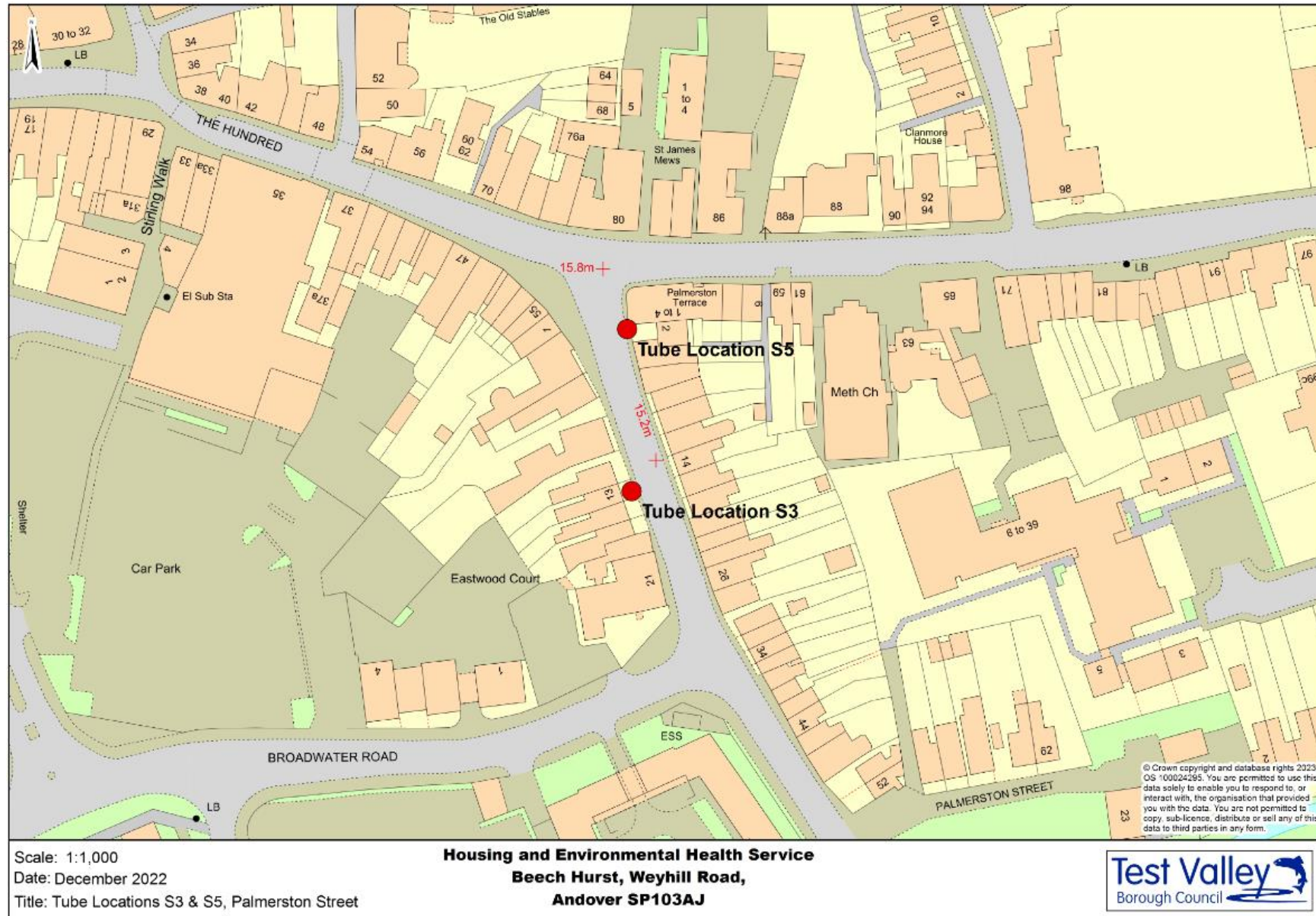# Appendix D: Map(s) of Monitoring Locations and AQMAs

Figure D.1 – Maps of Non-Automatic Monitoring Sites
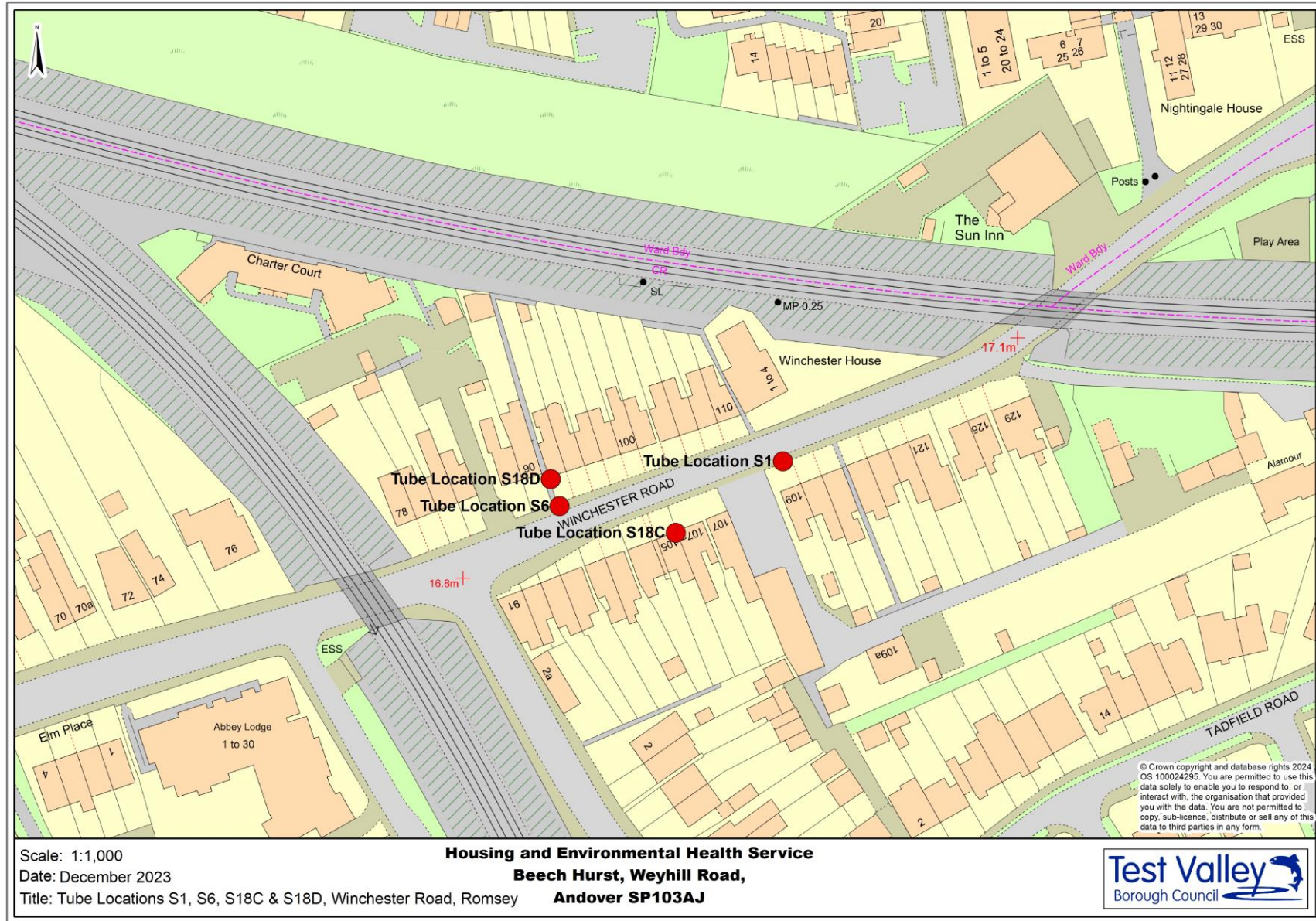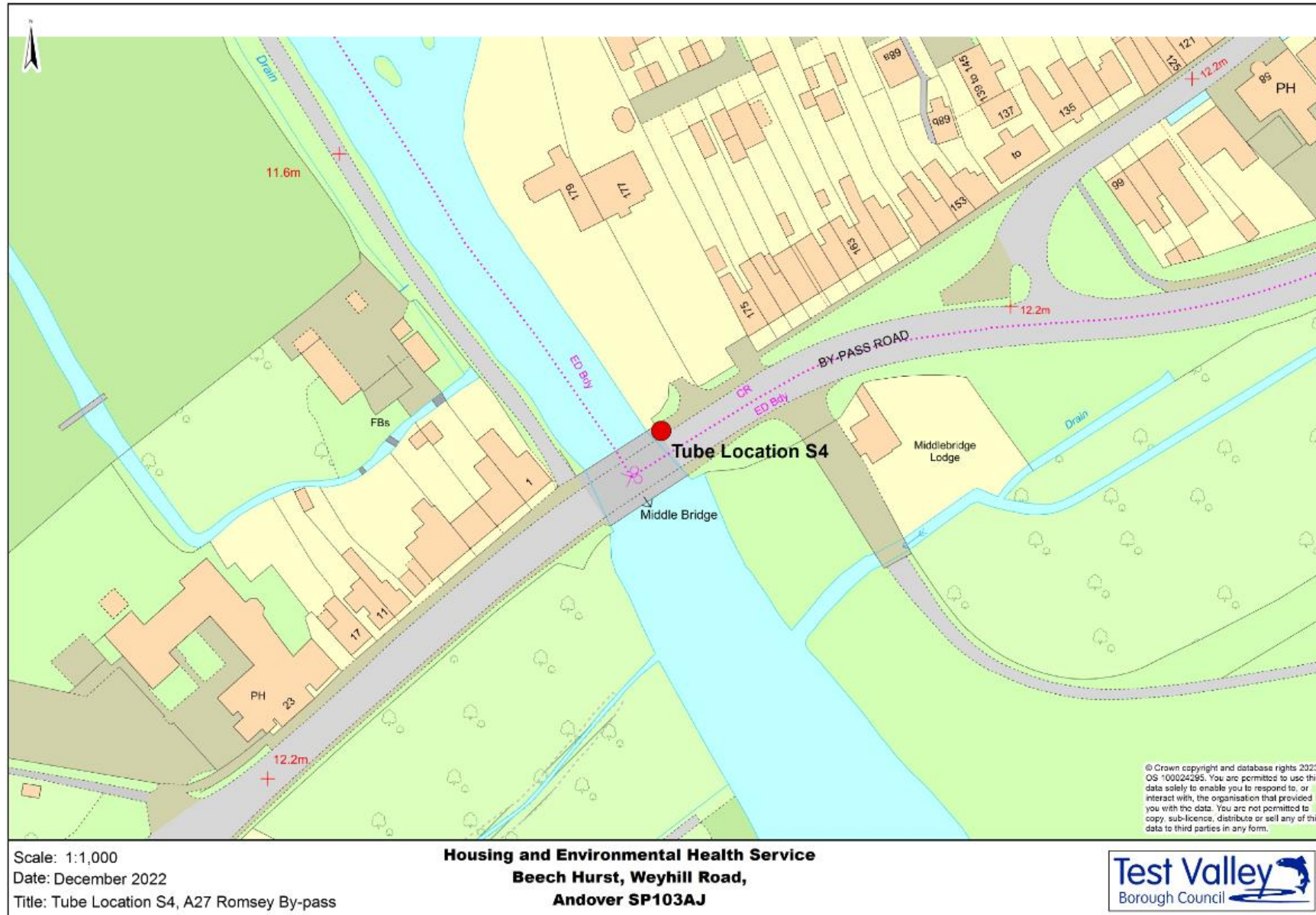
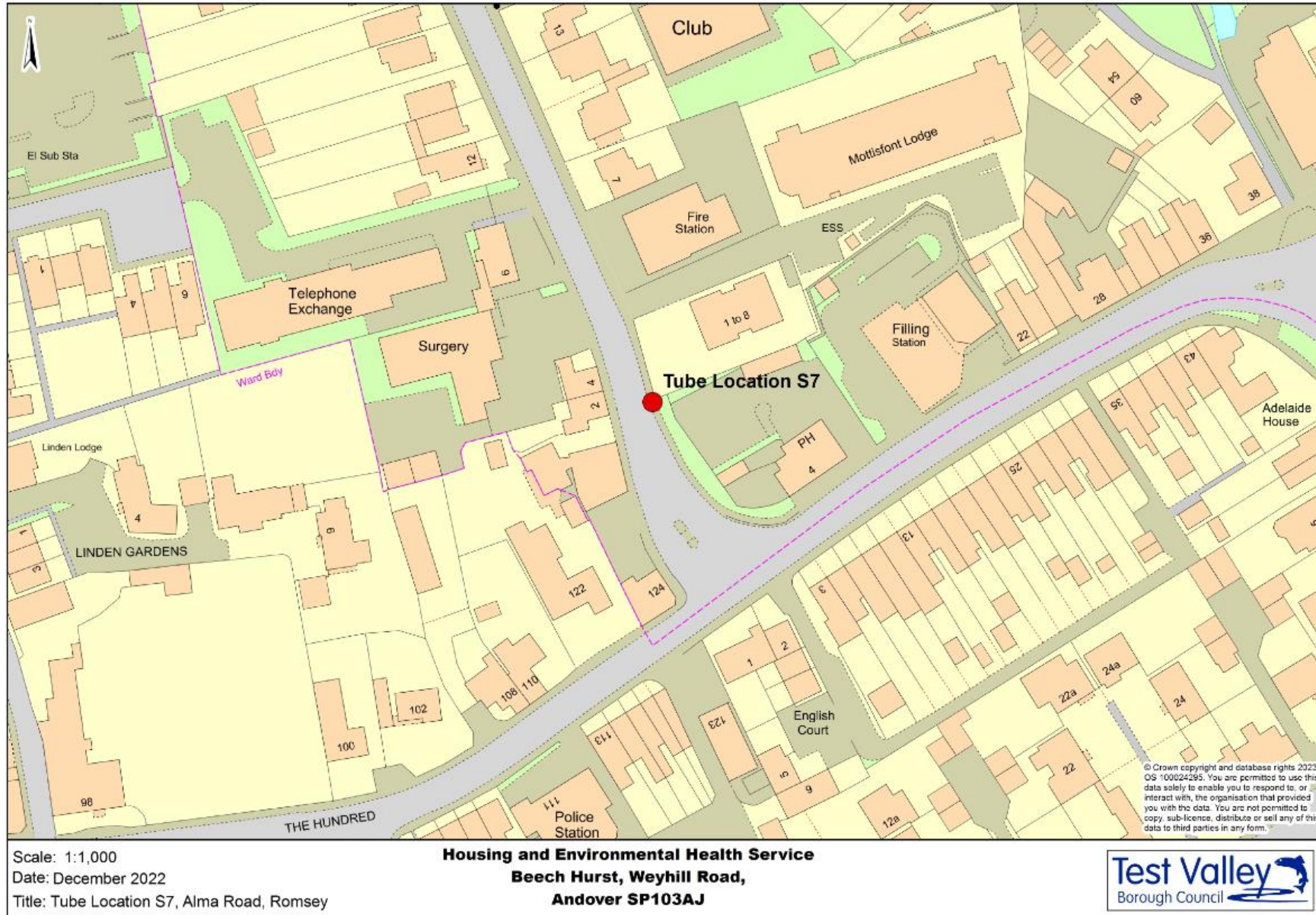Non-Automatic Monitoring Sites: Numbers S1, S6 & S18C, Winchester Road, Romsey

Non-Automatic Monitoring Sites: Number S2, Duttons Road, Romsey

Non-Automatic Monitoring Sites: Numbers S3 & S5, Palmerston Street, Romsey

Non-Automatic Monitoring Sites: Number S4, A27 Romsey By-pass

Non-Automatic Monitoring Sites: Number S7, Alma Road, Romsey

Non-Automatic Monitoring Sites: Number S8, Alma Road, Romsey

Non-Automatic Monitoring Sites: Number S9, Chilworth Road, Chilworth

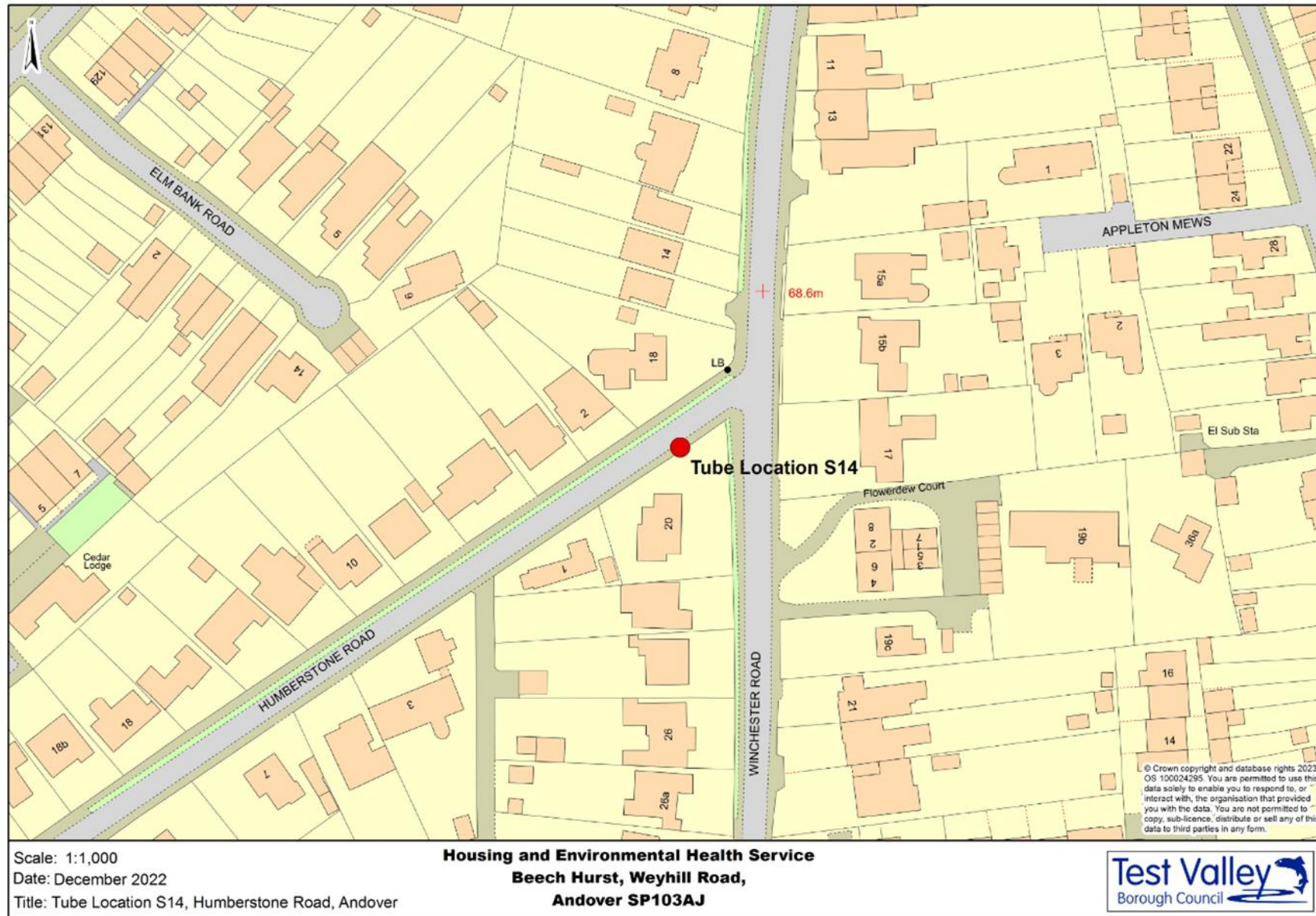Non-Automatic Monitoring Sites: Number S10, Nursling Street, Nursling

Non-Automatic Monitoring Sites: Number S11, Botley Road, North Baddesley

Non-Automatic Monitoring Sites: Number S12, A3057, Kings Somborne

Scale: 1:1,000
Date: December 2022
Title: Tube Location S13, Weyhill

**Housing and Environmental Health Service
Beech Hurst, Weyhill Road,
Andover SP103AJ**

Non-Automatic Monitoring Sites: Number S13, A342, Weyhill

Non-Automatic Monitoring Sites: Number S14, Humberstone Road, Andover

Non-Automatic Monitoring Sites: Number S15, A343, Little Ann

Non-Automatic Monitoring Sites: Number S16, Romsey Road, Nursling

Non-Automatic Monitoring Sites: Number S17 & S19, New Street, Andover

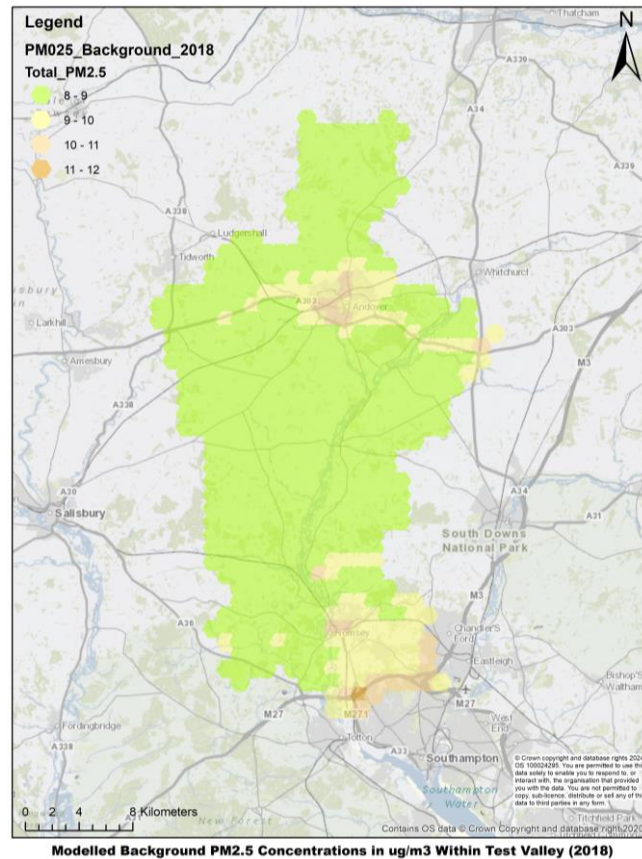Non-Automatic Monitoring Sites: Number S18E, Winchester Road, Andover

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

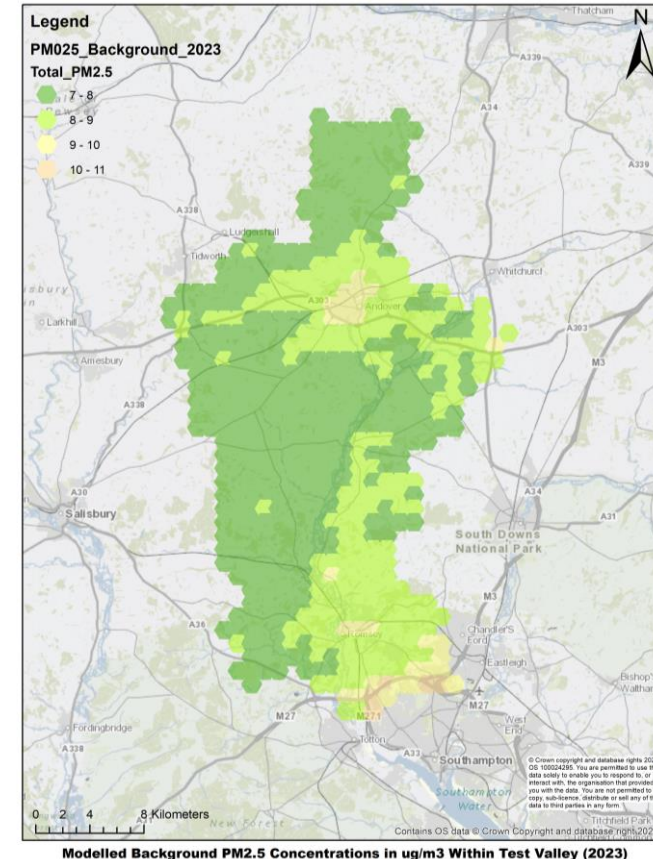[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Appendix F: Modelled Annual Average PM$_{2.5}$ within Test Valley Borough

Figure F.1 – Background PM$_{2.5}$ Modelled annual Average 2018

Figure F.2 – Background PM$_{2.5}$ Modelled annual Average 2023

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

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