Air Quality Action Plan for Wiltshire

FINAL

2024- 2029

Wiltshire Council

Wiltshire Council
Draft Air Quality Action Plan

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

2024 - 2029

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Foreword

Residents, businesses, and visitors to Wiltshire are able to enjoy extensive areas of unspoilt countryside and a high-quality environment. Air quality over the majority of Wiltshire is very good.

Local authorities have a duty to review and assess air quality under the “Local Air Quality Management Regime” introduced by the Environment Act 1995 (EA95). Review and Assessment has established air quality over the majority of Wiltshire is extremely good but there are a number of areas within our towns & the city of Salisbury that have elevated levels of nitrogen dioxide due to road traffic. Eight locations exceed the annual mean objective and have been declared “Air Quality Management Areas” (AQMAs) under terms of the Environment Act 1995.

Poor air quality impacts us all, directly, and indirectly. The annual mortality of human-made air pollution in the UK is roughly equivalent to between 28,000 and 36,000 deaths every year. It is estimated that between 2017 and 2025 the total cost to the NHS and social care system of air pollutants (fine particulate matter and nitrogen dioxide), for which there is more robust evidence for an association, will be around £15 billion. Improving air quality is not something Wiltshire Council can achieve on its own. Improving Air quality will need us all to contribute through changes in the way we do things.

Air quality has improved within Wiltshire’s AQMAs. For example, many streets in Salisbury that used to exceed the objective, no longer do so. The AQMA declared in 2001 in respect of fine particulates (PM10) in Bradford on Avon, has been revoked. Particulate levels are less than half the objective now however there is still work to be done.

This Action Plan has been developed in response to those exceedances of the annual mean objective, updating and replacing the previous Wiltshire Air quality Action Plan. It is one document of a suite of policies designed to improve air quality. These include:

- **The Air Quality Strategy for Wiltshire**, which seeks to reduce exposure to air pollutants across the county.

- **Wiltshire Core Strategy Core Policy 55 (and any subsequent local plan amendments),** which seeks to ensure that air quality is factored into development which has the potential to have an impact on air quality. This AQAP will be supported by a reviewed policy in the Local Plan review.

- **Supplementary Planning Guidance for Developers on Air Quality**, which seeks to mitigate the impact of new development on air quality across the county but particularly in the AQMAs.

The Environment Act 2021(EA21) has further strengthened the requirements of the EA95 and introduced more rigorous requirements for achieving improved Air Quality, which are welcomed. All councils must now consider air quality impacts in their decision making.

The evidence base with respect to the health impacts and economic costs associated with poor air quality has vastly increased since the EA95 was introduced, for example new standards have been introduced in relation to very fine particulates (PM2.5) which will benefit everyone's health.

When the last action plan was published, there was no formal format for its content and structure. DEFRA has now issued a template and formalised requirements in schedule 11 of the EA21. This Action Plan reflects those requirements. This together with our supporting policies, strengthened legislation and further changes proposed by DEFRA to support local authorities, has created a step change that will assist Local Authorities to improve air quality and protect all our health.

I am pleased to commend this Action Plan as a key step in continuing progress with improvements in air quality and protection of health.

Councillor Nick Holder.
Cabinet Member for Environment, Waste, Climate Change and Public Protection.

Executive Summary

This Air Quality Action Plan (AQAP) has been produced in fulfilment of Wiltshire Council's statutory duties as set out by the Local Air Quality Management Framework. It outlines the action we will take to improve air quality in Wiltshire between 2023 and 2026.

This Action Plan replaces the previous AQAP which ran from 2015 – 2020. Projects delivered directly & indirectly through the past Action Plan include:

- Ensuring Air Quality was incorporated into wider spatial planning & transport policy.
- Supporting the implementation of LTP (Local Transport Plan) 3 where it brings about improvements in Air Quality
- Implementing key junction improvements identified by the Devizes Transport strategy (including acceleration of A361/London Road junction improvements, and addition of new cycle towpaths improvements/ contraflow cycle lane)
- Establishment of local air quality groups to spearhead their own local initiatives to improve air quality within Air Quality Management Areas (AQMAs);
- Supporting bids to OLEV and for the introduction of electric buses in Salisbury.
- Developing revised Supplementary Planning Guidance on Air Quality for Developers.
- Developing a dedicated Air Quality website giving access to data to Wiltshire residents & others.
- Introducing a Know & Respond text service for vulnerable persons to alert them of poor Air Quality episodes.

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children and older people, and those with heart and lung conditions. There is also often a strong correlation with inequalities, because areas with poor air quality are also often the less affluent areas (Ref. 1, Ref. 2)

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £15 billion. The public health impacts on residents who live

and work in areas of poor air quality are significant. It is estimated that there are 40,000 excess deaths each year (Ref. 3) attributed to serious respiratory and cardiovascular conditions, lung cancer, diabetes, and dementia (Ref. 4). The total costs of air pollution to society are estimated to be £25.3 billion (Ref. 5) - almost twice the cost of smoking.

Wiltshire Council is committed to reducing the exposure of people in Wiltshire to poor air quality in order to improve health.

We have developed actions that can be considered under the following broad topics:

- Alternatives to private vehicle use,
- Environmental permits,
- Freight and delivery management,
- Policy guidance and development control,
- Promoting low emission transport,
- Promoting low emission plant,
- Promoting travel alternatives,
- Public information,
- Transport planning and infrastructure,
- Traffic management and,
- Vehicle fleet efficiency.

Our priorities vary by AQMA, but are governed by these four overarching principles:

1) To secure the air quality objectives in the AQMAs,
2) To maintain good air quality across the rest of the county,
3) To lead by example through Wiltshire Council's own actions and,
4) To communicate and disseminate information to residents and other stakeholders.

In this AQAP we outline how we plan to effectively tackle air quality issues within our control, both at a strategic level across the county, and within each individual AQMA. Wiltshire Council recognises that there are a large number of air quality policy areas that are outside of our influence (such as vehicle emissions standards agreed in Europe), but for which we may have useful evidence, and so we will continue to work

with regional and central government on policies and issues beyond Wiltshire Council's direct influence.

Responsibilities and Commitment

This AQAP was prepared by the Environmental Control & Protection Team, part of Public Protection Services, with the support of the following, departments and organisations:

Wiltshire Council,

- Public Protection Services
- Sustainable Transport Team
- Passenger Transport Team
- Spatial Planning Team
- Development Management
- Public Health Wiltshire
- Carbon Reduction Team
- Community Engagement Team

External organisations,

- National Highways (Highways England)
- AECOM Air Quality & Permitting.

The Draft AQAP was reviewed at Cabinet Liaison in December 2022. It has also been reviewed by the Senior Leadership Team & the Place Directorate Heads of Service, prior to a public consultation in July to September 2023.

The final AQAP was approved by cabinet / full council on 19 March 2024

This AQAP will be subject to an annual review. Progress each year will be reported in the Annual Status Reports (ASRs) produced by the Council and submitted to DEFRA, as part of our statutory Local Air Quality Management (LAQM) duties. The AQAP will be subject to an update after five years, should the requirement remain.

If you have any comments on this AQAP, please send them to Wiltshire Council at:

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Tel: 01225 770556 Email: publicprotectionwest@wiltshire.gov.uk

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Introduction

This report outlines the actions that Wiltshire Council will deliver between 2024-2026 in order to reduce concentrations of, and exposure to nitrogen dioxide thereby positively impacting on the health and quality of life of residents and those visiting Wiltshire.

It has been developed in recognition of the legal requirement on the local authority to work towards National Air Quality Strategy (AQS) objectives under Part IV of the Environment Act 1995, as amended by the Environment Act 2021; to meet relevant regulations made under that Act, and to meet the requirements of the Local Air Quality Management (LAQM) statutory process.

The AQAP is structured such that the current air quality in Wiltshire is first outlined, in the context of each AQMA. The consequent priorities with regard to air quality are then presented, followed by a description of the measure development process, and then the measures themselves. Much of the technical supporting information is provided in appendices, including dispersion modelling inputs.

This Plan will be reviewed every five years and progress on measures set out within this Plan will be reported on annually within Wiltshire's ASR, which is submitted to DEFRA. It is recognised that continual improvements in air quality should also be made beyond the statutory objectives where possible, such as working towards the World Health Organisation's interim and final air quality guidelines (Ref. 6), which may move more to the forefront over the lifetime of this Plan. These form an aspirational aim of the AQAP as we seek to continually improve health outcomes, through this area of work.

Summary of Current Air Quality in Wiltshire

Our Annual Status Report (ASR) provides a detailed account of air quality within the county. This and earlier reports are all made available on our new Wiltshire Council webpages which are also designed to assist people and organisations to reduce their impact on air quality.

Air quality in Wiltshire is predominantly very good with the majority of the county having clean air compliant with the Air Quality Objectives (AQOs). There are a small number of locations where the combination of traffic volume, road layout and topography have resulted in pollutants being trapped allowing concentrations to increase to unacceptable levels. Nitrogen Dioxide (NO_2) and fine particulate matter (PM_{10}) are the two pollutants that are the primary cause for concern and the Environmental Control & Protection Team (EC&P) conduct both automatic and passive diffusion tube monitoring for these pollutants.

Where these pollutant concentrations are known to be in exceedance of an AQO, at locations of relevant exposure (i.e., places where people will be subject to exposure to a pollutant for a period of time), Air Quality Management Areas (AQMA) have been declared. There are 8 in total and are shown in **Error! Reference source not found.** : Wiltshire AQMAs

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	City/Town
AQMA 1 Salisbury City Centre	23/11/2007	NO_2 Annual Mean	Salisbury
AQMA 2 Salisbury London Road	11/11/2007	NO_2 Annual Mean	Salisbury
AQMA 3 Salisbury Wilton Road (extended)*	03/03/2016*	NO_2 Annual Mean	Salisbury
AQMA 4 Bradford-on-Avon	26/11/2001**	NO_2 Annual Mean	Bradford-on-Avon
AQMA 5 Westbury	26/11/2001	NO_2 Annual Mean	Westbury
AQMA 6 Marlborough	12/05/2011	NO_2 Annual Mean	Marlborough
AQMA 7 Devizes	23/11/2007***	NO_2 Annual Mean	Devizes
AQMA 8 Calne	21/02/2013	NO_2 Annual Mean	Calne

* Wilton Road AQMA in Salisbury amended in March 2016 to cover a wider extent of roads including A36 trunk road between St Pauls roundabout Skew Bridge, and portion of Devizes Road.
** During April 2021 the Bradford-on-Avon AQMA was amended to remove Particular Matter PM_{10} as a pollutant of concern with continued compliance with the relevant National Air Quality Objectives.
*** AQMA amended in November 2009 to cover main roads within Devizes.

Current pollutant trends have been moving towards an overall improvement in air quality within Wiltshire. This AQAP is based primarily on concentrations as monitored

in 2019, prior to the impact of COVID-19, which is recognised had a potentially anomalous effect on pollutant concentrations in 2020 & to an extent in 2021. That said, concentrations in these years are discussed below to provide a better idea of the trends observed in recent years.

Despite the downward trend in NO_2 concentrations, exceedances of the NO_2 annual mean objective were reported in six of the eight AQMAs in 2019. Only Salisbury London Road and Devizes did not exhibit any monitored exceedances of the NO_2 annual mean AQO in 2019. There was one hourly mean concentration greater than 200 µg/m^3, but this did not represent an exceedance of the objective.

Average PM_{10} concentrations have remained consistent and were below the annual mean objective in 2019, hence the amendment of the Bradford on Avon AQMA Order to remove this pollutant from it. Across all of the PM_{10} monitoring locations, there were only five reported instances where the 24-hour mean was greater than the permitted threshold of 50 µg/m^3, which is well below the permitted 35 exceedances per site per annum. As such there were no exceedances of either PM_{10} AQO in Wiltshire in 2019.

In 2020, a further reduction of annual mean NO_2 concentrations was seen at all 72 of our monitoring sites, with only three sites exceeding the annual mean objective at the façade of relevant exposure locations, down from eight in 2019. No exceedances of the 1 hour mean objective were recorded, or considered likely, across the county.

The continuous monitoring across Wiltshire also confirmed that there were no exceedances of the PM_{10} AQOs (annual mean or 24-hour mean) in 2020. The annual mean concentrations were similar to those recorded in 2019, so did not exhibit such a significant drop off related to COVID-19 as was seen with nitrogen dioxide. 24-hour mean concentrations greater than 50 µg/m^3 were recorded at just one of the three sites, with the overall number well below the 35 exceedances permitted by the objective.

The following is a summary of each AQMA covered by this AQAP.

Salisbury AQMAs

Salisbury community area has a land area of 19km^2 with a population of 62,200 (2011 Census). The city is the third largest community area based on habitants after Chippenham and Trowbridge. Its proximity to the Stonehenge World Heritage site, the cathedral and other attractions make it a draw for international tourism and as a

consequence the combination of these notable features has led to increased road traffic in the area.

There are three AQMAs in Salisbury, declared in respect of the annual mean objective for nitrogen dioxide:

- Salisbury City
- London Road (A30) and
- Wilton Road (A36)

The first AQAP for Salisbury was based on the first Salisbury Transport Plan. The plan resulted in the development of five park & ride schemes, variable message signing and real time bus passenger information. Latterly schemes such as the removal of car parking from the Guild Hall & Market place have been implemented and three electric buses have been introduced that run on the Salisbury Park and Ride network.

A number of community air quality working groups were established under the terms of the AQAP for Wiltshire 2010-2015. The first Salisbury Community Action Plan was developed by the Salisbury Air Quality Steering Group and adopted by the Salisbury Area Board in 2015. The Action Plan is regularly kept under review & updated, being based on the promotion of cycling, walking and public transport initiatives. Much work has been focused on Salisbury post the Novachok incident to revitalise and enhance the city. This culminated in the development of the Central Area Framework which includes measures supportive of improving air quality, particularly on Fisherton Street and improving transport links at the railway station.

Previous Salisbury Transport Strategies highlighted the pressures of traffic along the following junctions: Park Wall Junction, St Marks Roundabout, College Roundabout, Exeter Street Roundabout and Harnham Gyrator. It is in these areas that traffic management measures have been designed to ease congestion.

Figure 2-1: Map of Salisbury City Centre AQMA

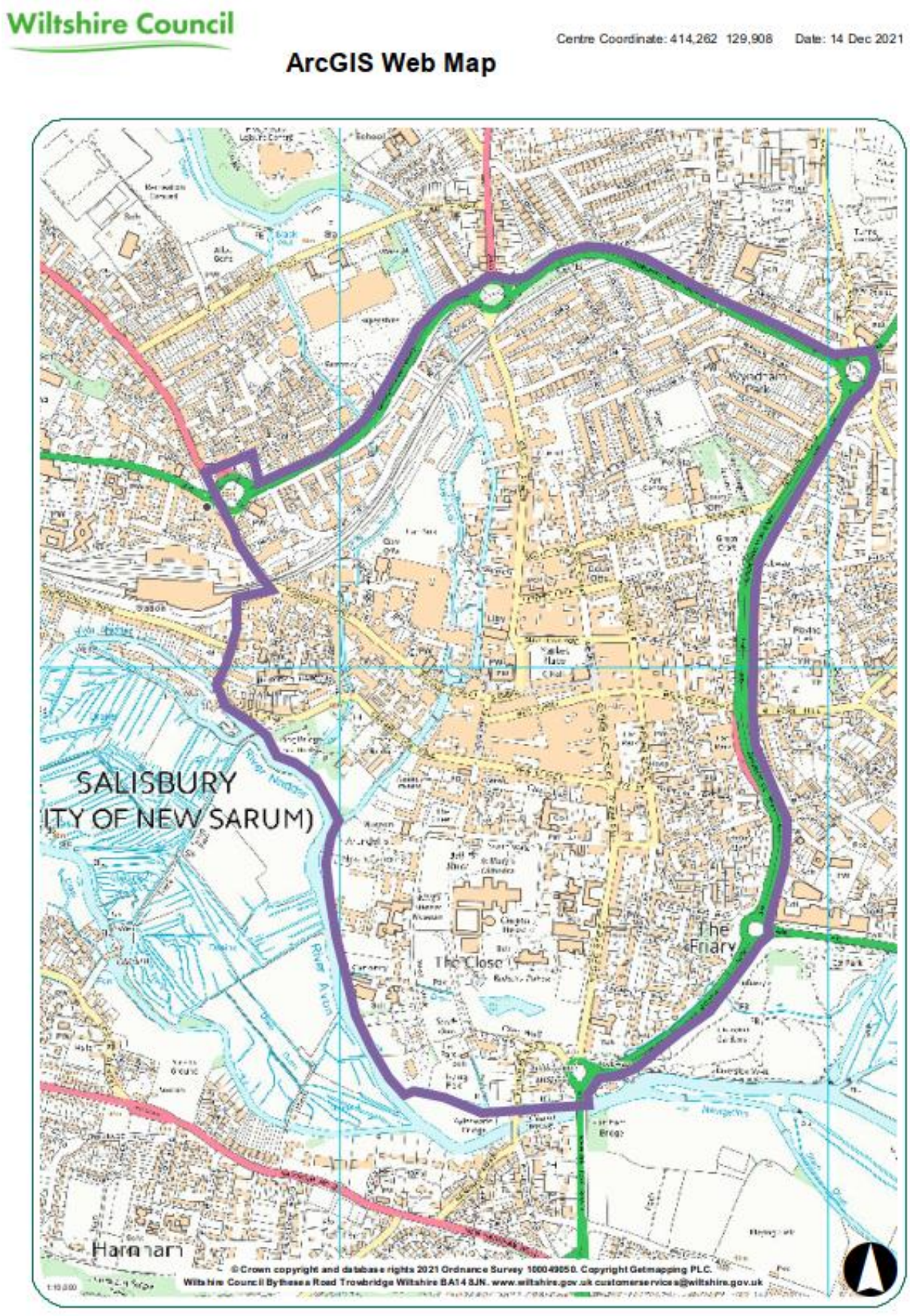


Figure 2-2: Map of Salisbury London Road AQMA

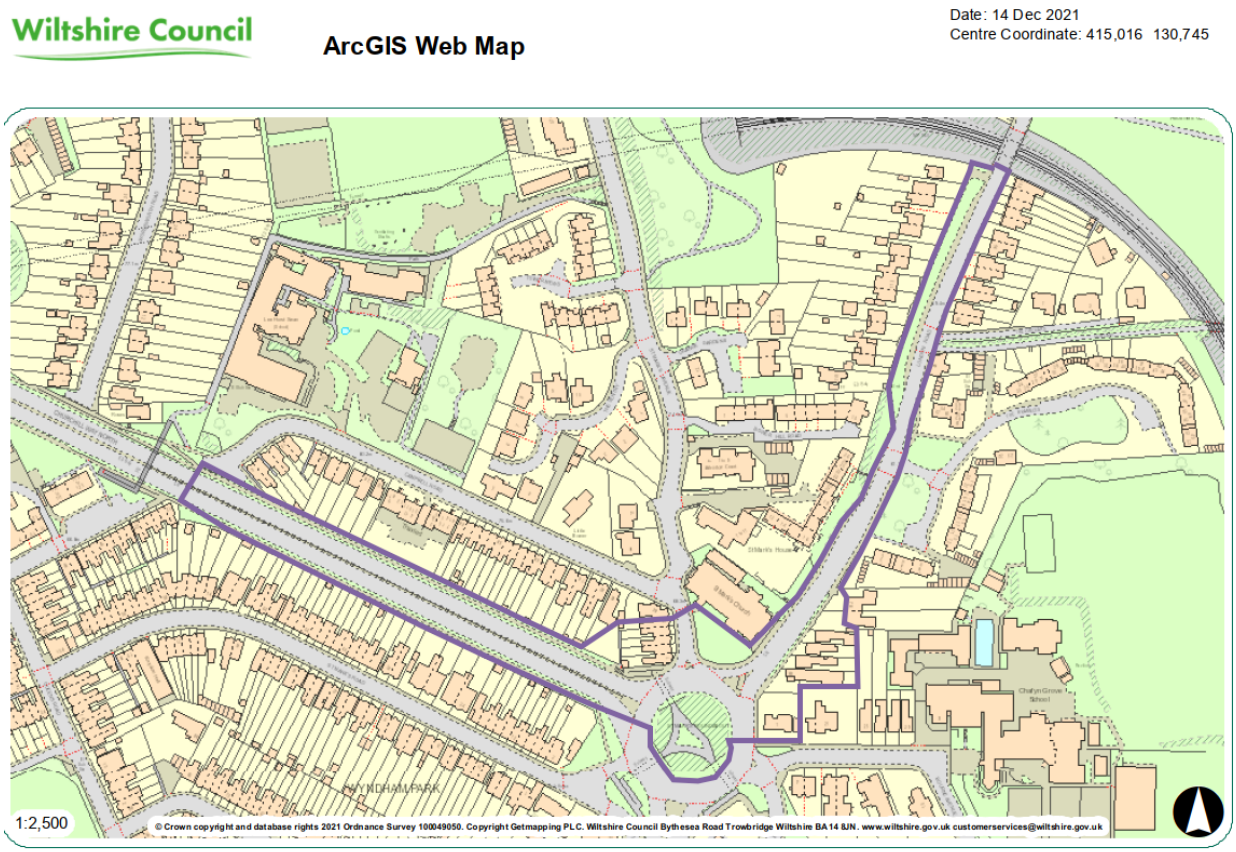
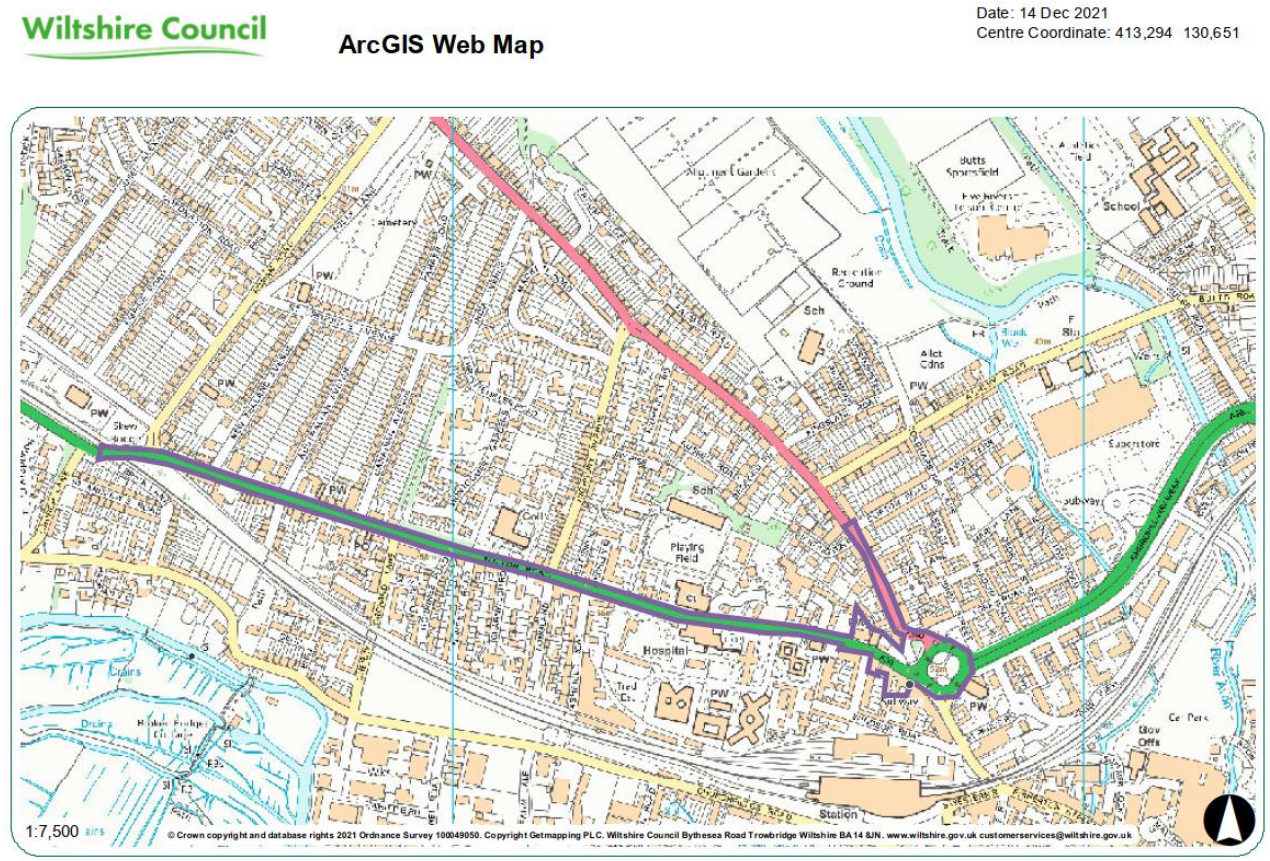


Figure 2-3: Map of Salisbury Wilton Road (A36) AQMA



Across the Wilton Road and London Road AQMAs, the concentrations of NO_2 recorded have dropped over the past few years with only a few locations along these A-roads remaining above the annual mean AQO. Nitrogen dioxide concentrations in Salisbury City have also shown some improvement across all monitoring locations, though some exceedances remain, particularly on Southwestern Road. Further measures are therefore considered to be required to bring concentrations below the AQO.

Bradford-on-Avon AQMA

The market town of Bradford-on-Avon is the main settlement in the area with a population of approximately 9400 in town; and 17,500 in the wider community area.

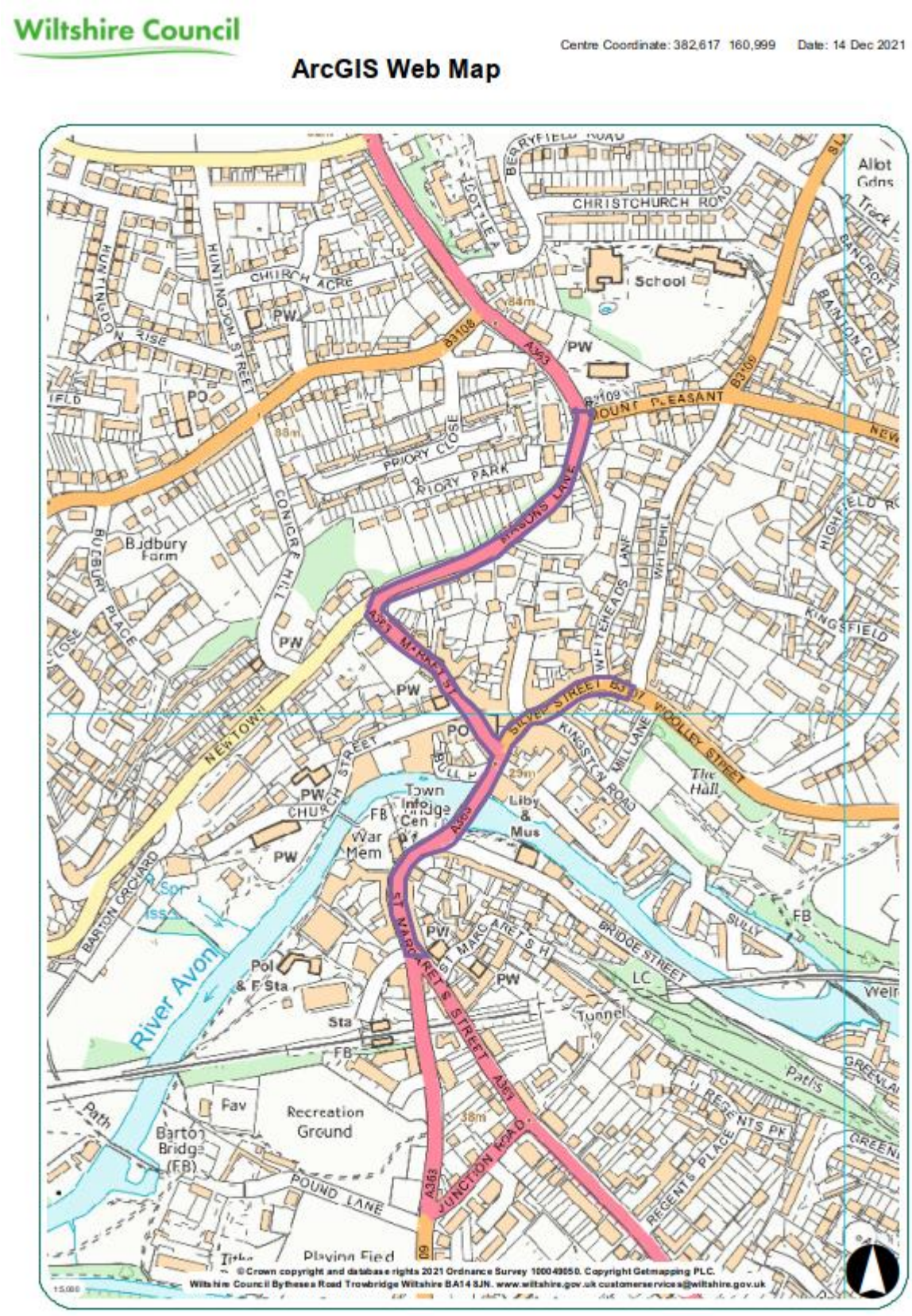
The town centre suffers from traffic congestion and poor air quality, a result of its topography, narrow streets, and single bridge across the river. In the summer, the area attracts many tourists especially day trippers from Bath which further adds to the area's traffic problems. The town has therefore been subject to a number of transport studies and air quality management plans.

The AQMA in Bradford-on-Avon was originally declared for exceedances of the annual mean objectives for nitrogen dioxide and fine particulates. The area covers the main roads in the centre of the town, as demonstrated in Figure 2-4. The AQMA Order was amended in April 2021 to remove PM_{10} as a pollutant of concern amid continued compliance with the AQOs for this pollutant. The annual mean concentration of nitrogen dioxide remains in exceedance on Masons Lane.

A Community Action Plan was produced in partnership with the Bradford-on-Avon Air Quality Alliance in 2015, with the goal of becoming a Clean Air Town by 2020, achieve the AQOs and establish the required structures and mechanisms to conduct actions that will achieve the aforementioned goals. A professional Origin and Destination Survey was undertaken, whose findings indicated a significant potential for local, community-based actions to address air quality issues within the AQMA.

Bradford on Avon's White Stripe group continued to work on improving air quality within the town and the Town Council has undertaken a public consultation to identify people's key priorities in terms of what needs to be achieved by any changes to the traffic network following removal of the temporary one-way system established during the early part of the COVID pandemic, which demonstrated improvements to air quality.

Figure 2-4: Map of Bradford-on-Avon AQMA



Westbury AQMA

Westbury is an important market town located between Trowbridge and Warminster with a population of approximately 18,000. The town has seen significant increase in housing & commercial developments in recent years the town suffers from traffic congestion and an AQMA was declared on the A350 through the town for exceedances of the nitrogen dioxide annual mean AQO, the extent of which is illustrated in Figure 2-5.

The A350 forms part of the Major Road network (MRN) and as such is an important transport link. Improvements to the road are being pursued from the north to south, with the latest proposals focusing on Melksham. Several improvements to the route have been made over recent years; currently Wiltshire Council is developing business cases for further improvements to the M4 junction 17, Chippenham Bypass and at Melksham.

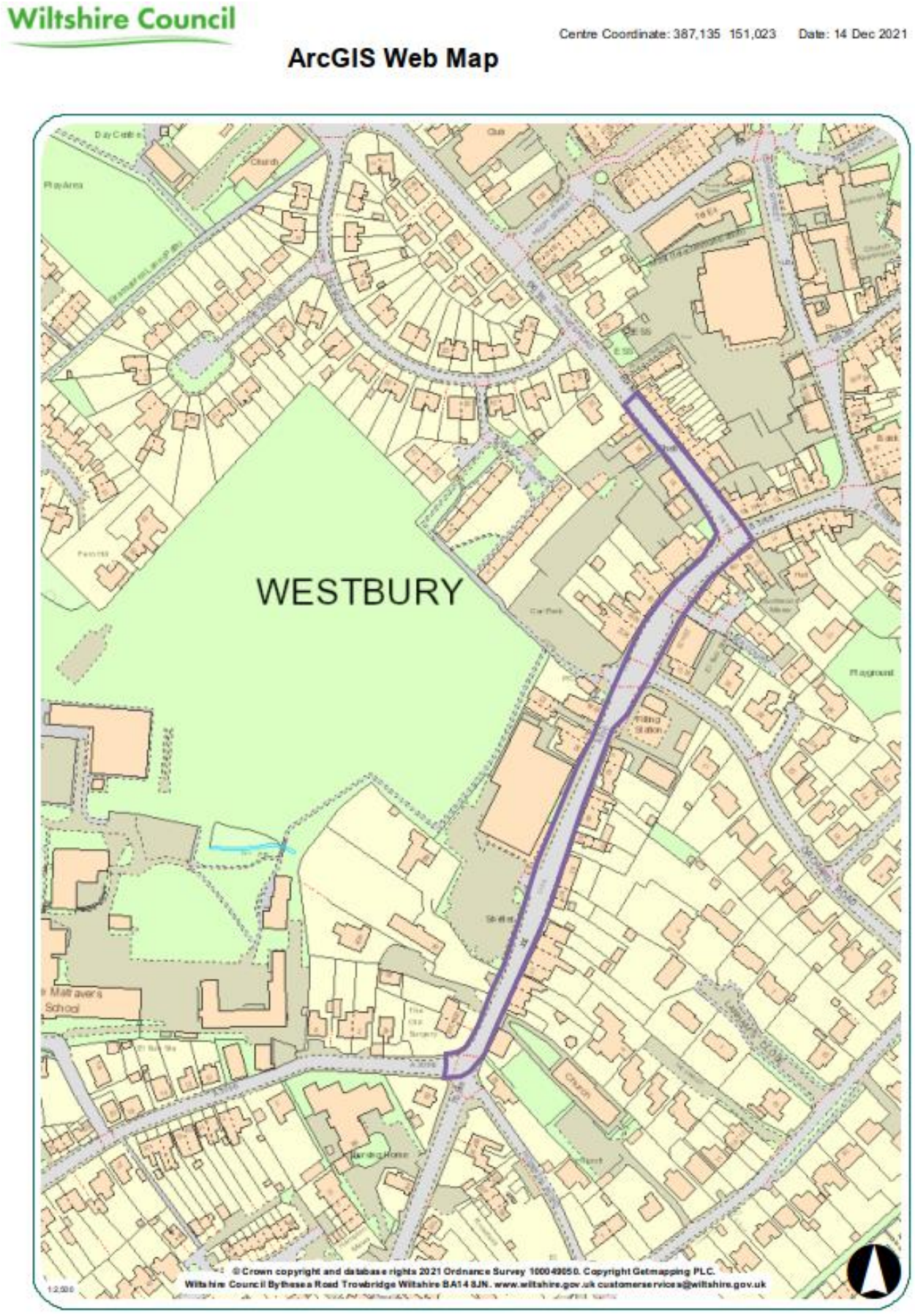
One area of concern is the impact of the Bath Clean Air Zone and the displacement of traffic from the zone onto Wiltshire roads, specifically the A350. This is being monitored closely by Wiltshire Highways & Transport.

The original AQAP focused on a proposed A350 bypass for the town. The cancellation of the bypass in 2009 forced a shift in action planning toward other measures such as promoting cycling and walking within Westbury. This is through the improvement of current cycle routes and footpaths as well as undertaking school travel planning to promote cycling for students. Wiltshire Council's Business Plan 2022- 2032 sets out an objective for vibrant, well-connected communities and includes an aim for,

"Major road programmes to reduce congestion and air pollution, and explore solutions to issues at J17 M4, Salisbury, Melksham and Westbury".

The annual mean concentrations of nitrogen dioxide are observed to show an overall decline over the previous five years, but exceedances remained in 2019.

Figure 2-5: Map of Westbury AQMA

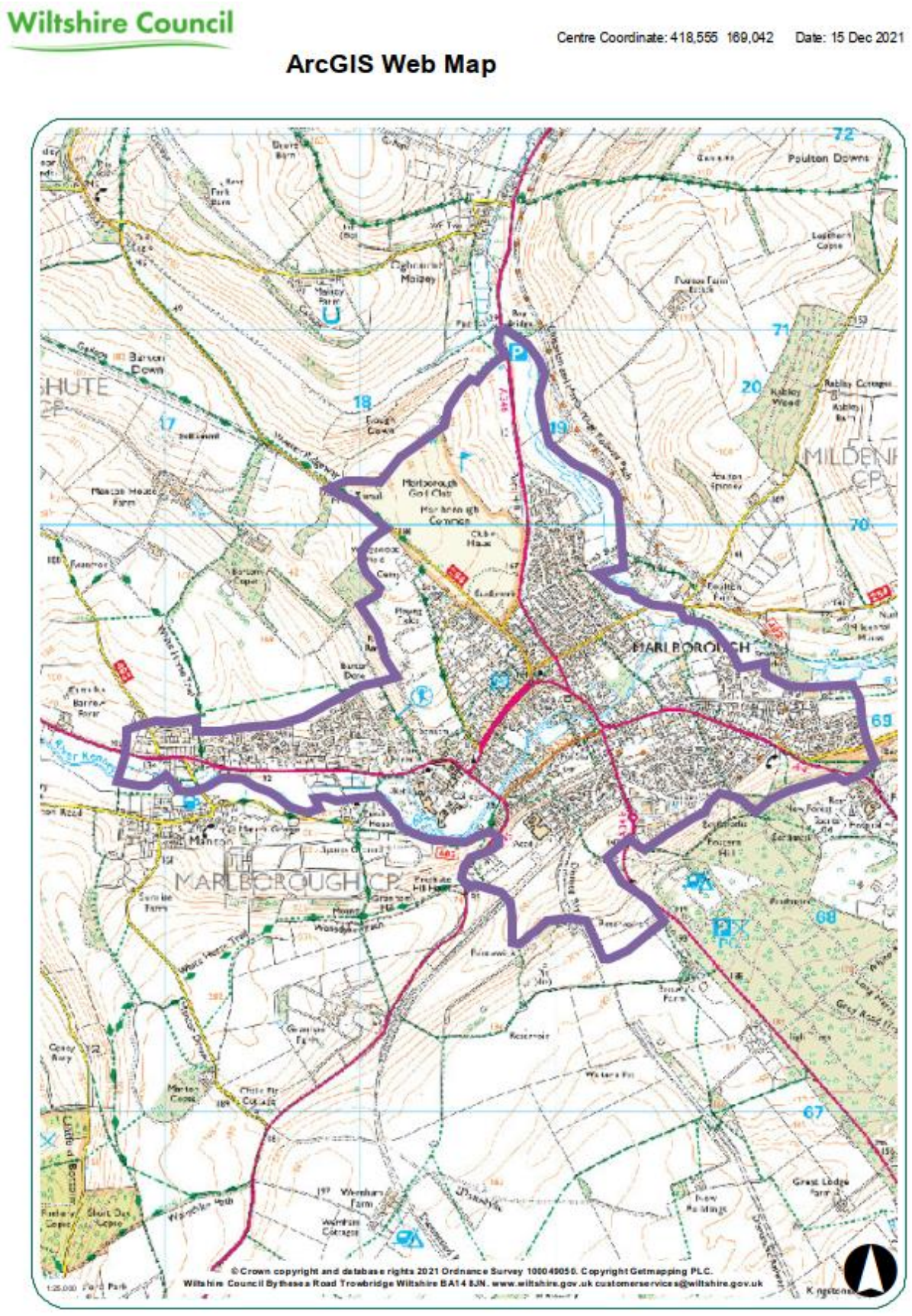


Marlborough AQMA

Marlborough is a small market town with roughly 17,920 habitants. It is connected to the M4 via the A346 which provides access for its residents to the neighbouring towns of Swindon and Newbury. The Marlborough Area Neighbourhood Plan includes local concerns about traffic levels on the A338/A346 through the town and a desire to see HGV traffic reduced. The lack of transport options has been highlighted as a contributor to residents tending to opt to use private vehicles. The AQMA in Marlborough was declared in 2011 for exceedances of the annual mean objective for nitrogen dioxide and covers the entire town as described by the town council boundary (with the exception of a small area to the southwest of the town), as shown in Figure 2-6. Exceedances of the objective are limited to the A346 through the town (Herd Street, in particular).

The annual mean nitrogen dioxide concentrations across the Marlborough AQMA have fluctuated around the AQO but have shown steady improvement over the last few years with lower concentrations. Some exceedances remain in the AQMA, and measures will target these areas to reduce pollution further.

Figure 2-6: Map of Marlborough AQMA



Devizes AQMA

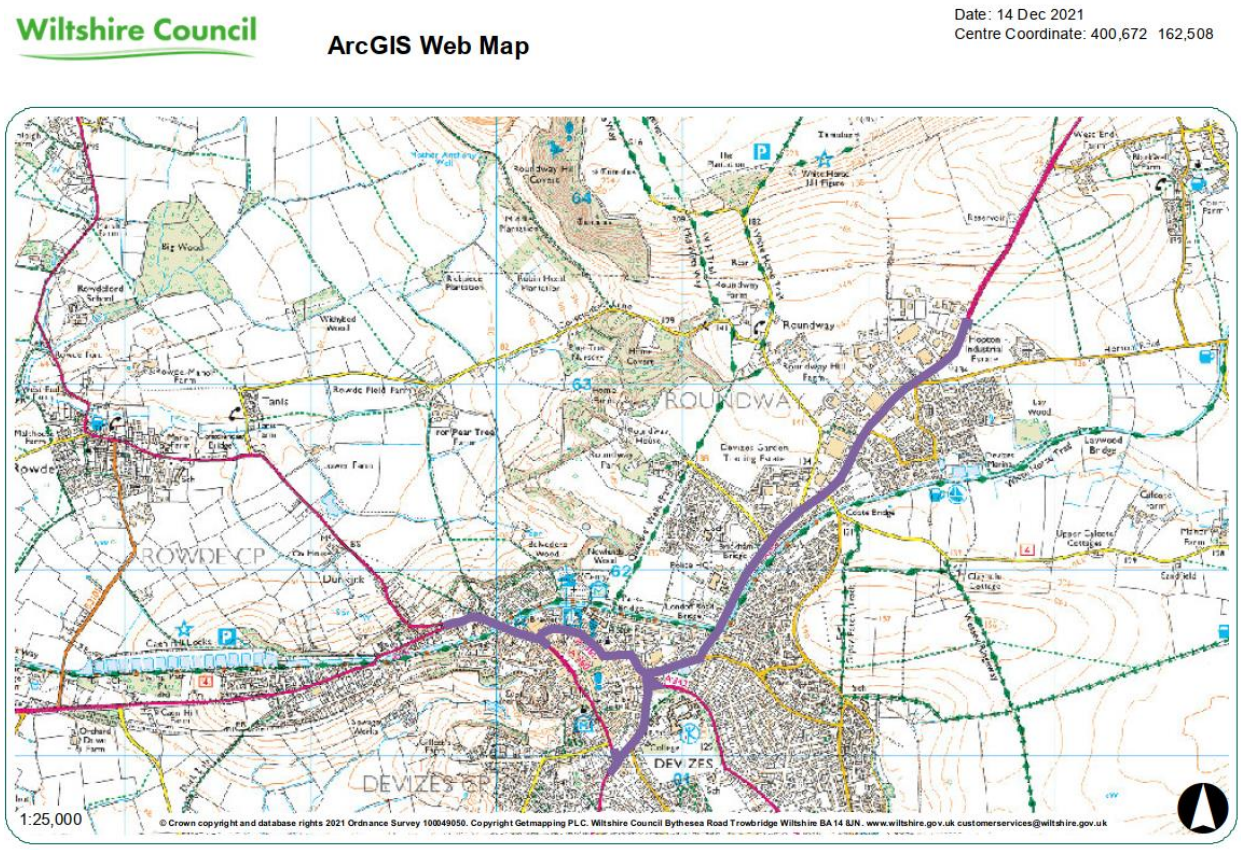
Devizes is a market town with approximately 30,730 habitants. A single AQMA was declared for exceedance of the nitrogen dioxide annual mean objective, in the latter part of 2009 covering a small area along Shanes Castle at the junction of the A342 and A361, and was subsequently amended in 2013, to encompass the main roads within Devizes town. The current extent of the AQMA is shown in figure 2.7 below.

Road traffic in Devizes is the predominant source of emissions causing the exceedances. The Devizes Transport Strategy 2012 detailed objectives of reducing transport related emissions, reducing the traffic congestion experienced in the town centre and residential areas, and promote sustainable transport.

The Community Action Plan for Devizes aimed to encourage a model shift, encourage fewer drivers in the town centre and use more sustainable form of transport. The measures in the former Action Plan looked to specifically encourage walking, cycling, use more sustainable transport; to review the parking arrangements; and manage traffic in congested areas. Key junctions were also looked to be modelled within the town that cause delays with the aim to improve the traffic flow at these points. Many of these measures are still relevant to help ease congestion in and around the AQMA.

The nitrogen dioxide concentrations measured along the main roads in the AQMA have seen slight drops below the annual mean objective in 2019. Although it is worth noting that the concentrations have fluctuated around the annual mean AQO for the past few years.

Figure 2-7: Map of Devizes AQMA



Calne AQMA

Calne has an estimated 24,325 habitants (2018). Due to the ease of access via the M4 to other neighbouring towns such as Swindon and Chippenham, people have tended to travel out to other areas for jobs. It is noted the market town has been identified as a potential area for significant development, which could lead to worsening air quality through increase road traffic and domestic combustion emissions.

The main source of pollution in Calne is the emissions generated by road transport. Appropriately the steps taken to meet the annual mean AQO for nitrogen dioxide will include reducing the emissions from these sources.

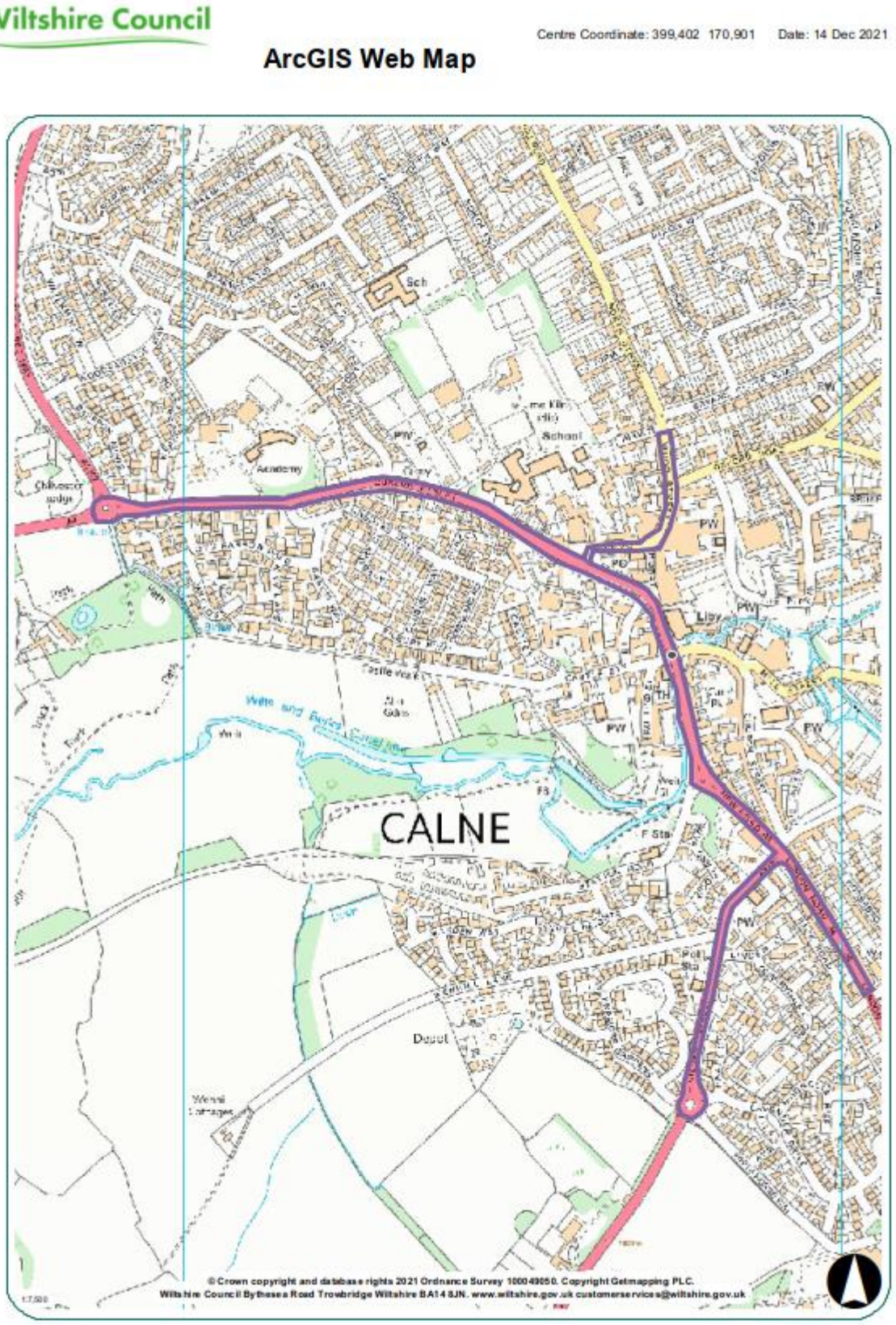
An AQMA was declared in Calne at the start of 2013 in respect of an exceedance of the nitrogen dioxide annual mean objective. The area covered by the AQMA centres on the A4 through Calne, and sections of two adjoining roads, as illustrated in Figure 2-8.

The local community plan for Calne was last produced in 2018 with the aim of encouraging the use of other forms of sustainable transport, modal shift and reducing the number of drivers within the local area. The notable actions put forward include the provision of a Heavy Goods Vehicles (HGV) spur road across land occupied by Hills Waste to re-route refuse related traffic away from the AQMA and encouraging the promotion of clean vehicles in the community. These measures and others are still considered to be relevant especially as they were only recently implemented.

More recently Wiltshire Council in conjunction with Calne Area Transport Group (CATG) have developed the Calne Transport Strategy. The purpose of the strategy is to outline the proposed approach to meeting specific transport objectives for Calne and Calne Without and identify a prioritised list of complimentary schemes and interventions that are shown to address known and well-evidenced issues.

Nitrogen dioxide concentrations in Calne have seen small fluctuations over the previous five years (2015 – 2019), with some monitoring locations exceeding the annual mean AQO. It is now therefore considered appropriate to identify further measures, and if necessary, re-visit previously suggested schemes, to secure compliance with the AQOs.

Figure 2-8: Map of Calne AQMA



Wiltshire Council's Air Quality Priorities

Public Health: Health Protection.

Estimates of mortality related to air pollution vary, but Defra's own estimates of the mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages (Ref. 3), Public Health England's Public Health Outcomes Framework (Ref. 7) identifies mortality attributable to air quality as an indicator for Public Health. This indicator addresses the fraction of mortality attributable to particulate air pollution ($PM_{2.5}$), a value for which is presented for each local authority. In Wiltshire, this fraction has been calculated at 4.2%, which lies below the national average of 5.1% in 2019.

Local air quality presents a significant concern for public health, and as such local authorities are now required to promote inter-departmental links to increase awareness of the effects of local air quality on public health, in addition to encouraging local action. All AQMAs are currently declared for exceedances of the annual mean nitrogen dioxide objective (40 µg/m^3).

Nitrogen dioxide emission reduction initiatives implemented to target road transport emissions may simultaneously aid in addressing emissions of $PM_{2.5}$. This may subsequently contribute to improving Wiltshire's mortality fraction attributable to particulate air pollution.

Planning and Policy.

The Air Quality Strategy for Wiltshire (Ref. 9) was published in 2019, superseding the former strategy from 2015 (Ref. 10), and provides four strategic priorities with regard to Air Quality in the county:

1) To secure the air quality objectives in the AQMAs,
2) To maintain good air quality across the rest of the county,
3) To lead by example through Wiltshire Council's own actions and,
4) To communicate and disseminate information to residents and other stakeholders.

These form the basis of the priorities for this AQAP and influence the measures that will be taken to improve air quality across Wiltshire.

The Wiltshire Core Strategy (Ref. 11), adopted in January 2015, included both a general policy regarding air quality and specific policies regarding housing growth and job creation across the county, all of which are applicable to this AQAP. Core Policy 55 provides the overarching information on air quality which will be taken into consideration within this AQAP.

Core policy 55

"Development proposals, which by virtue of their scale, nature or location are likely to exacerbate existing areas of poor air quality, will need to demonstrate that measures can be taken to effectively mitigate emission levels in order to protect public health, environmental quality and amenity. Mitigation measures should demonstrate how they will make a positive contribution to the aims of the Air Quality Strategy for Wiltshire and where relevant, the Wiltshire Air Quality Action Plan. Mitigation may include:

i. landscaping, bunding or separation to increase distance from highways and junctions;

ii. possible traffic management or highway improvements to be agreed with the local authority;

iii. abatement technology and incorporating site layout/separation and other conditions in site planning;

iv. traffic routing, site management, site layout and phasing; and

v. where appropriate, contributions will be sought toward the mitigation of the impact a development may have on levels of air pollutants."

Core Policy 8 detailed progress on the plan period (2006 – 2026) to provide approximately 1,600 homes (with majority of these based directly in Calne town) and the provision of new employment land. By 2014, over half of these houses were provided and 6 hectares of employment land was committed to being provided.

Core Policy 12 within the strategy detailed progress on the plan to provide approximately 1,390 homes with majority of these based directly in Westbury town, 2500 homes with majority of these based directly in Devizes town and the provision of new employment land by 2026. By 2014, over half of these housing were provided, and approximately 18.5 hectares and 10 hectares of employment land was committed to being provided to Westbury and Devizes respectively. These are a consideration

included as part of the Action Plan to ensure they adhere to frameworks mentioned previously.

The Core Strategy was influenced by the third Local Transport Plan (LTP3) (Ref. 12), the strategic objectives of which include:

- SO2: to provide, Support and/or promote a choice of sustainable transport alternatives including walking, cycling, buses, and rail.
- SO3: To reduce the impact of traffic on people's quality of life and Wiltshire's built and natural environment.
- SO11: To reduce the level of air pollutant and climate change emissions from transport.
- SO13: to reduce the need to travel, particularly by private car.
- SO14: To promote travel modes that are beneficial to health.

Other relevant strategies that influence this AQAP include the Health and Wellbeing Strategy (Ref. 13), Energy Change and Opportunity Strategy (Ref. 14) and the Green & Blue Infrastructure Strategy for Wiltshire (Ref. 16). The Wiltshire Core Strategy is being reviewed and will be adopted within the lifetime of this AQAP (Quarter 4 of 2024). It is progressing towards the publication stage (Quarter 3 of 2023). Core Policy 55 and the Area Strategy Policies are being reviewed and updated where necessary. This AQAP will influence the development of these policies and for part of the evidence base for the LPR.

Source Apportionment

The AQAP measures presented in this report are intended to be targeted towards the predominant sources of emissions within Wiltshire AQMAs.

A source apportionment exercise was carried out by Wiltshire Council in 2021, based on both monitored nitrogen dioxide concentrations and road emissions nitrogen oxides (NOx). The key findings are as follows:

- Across all AQMAs, road contributions accounted for at least 74% of the nitrogen dioxide concentrations at the monitoring locations which returned the highest ambient concentrations, with the regional and local backgrounds making up the rest of the total. Regional and local background contributions tended to be a relatively even split.

- In all the AQMAs traffic was the main source of pollution;
- A large portion of NO_x emissions can be attributed to diesel cars (between 40-60% in all AQMAs);
- LGVs were found to be the next dominant source of NOx pollution after diesel cars in Marlborough, Westbury, and Devizes; and
- Generally, buses and HGVs were found to contribute around 10%-15% of NO_x emissions in each AQMA.

Required Reduction in Emissions

A summary of the maximum annual mean nitrogen dioxide concentrations at diffusion tube sites within the eight AQMAs (Ref. 8) is provided below in Table 3-1.

Table 3-1: Required NO_x reductions to achieve the AQO

AQMA	Maximum Modelled NO_2 Concentration in AQMA (µg/m^3)		Modelled Road NOx (µg/m^3)		Required Road NOx for 40 NO_2 (µg/m^3)		Required Road NOx reduction (µg/m^3) (% reduction required)	
	2019	2026	2019	2026	2019	2026	2019	2026
Salisbury City Centre	**47.3**	28.6	65.9	32.0	48.8	57.6	17.1 (26%)	-
Salisbury London Road	**42.4**	26.0	54.3	26.5	48.8	57.6	5.5 (10%)	-
Salisbury Wilton Road	**51.1**	30.9	75.1	37.0	48.80	57.58	26.3(35.0)	-
Bradford-on-Avon	**68.5**	**43.7**	135.8	76.0	61.1	66.8	74.7 (55%)	9.2 (12%)
Westbury	**48.1**	27.9	81.8	40.4	62.1	68.3	19.7 (24%)	-
Devizes	**56.7**	34.3	105.1	55.5	63.2	69.9	42.0 (39%)	-
Calne	**53.2**	32.5	95.7	51.0	63.2	68.8	32.6 (34%)	-

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.
*Data Modelling for Marlborough is not being taken forward as it did not correlate with real world readings.

Emissions from combustion sources consist of some nitrogen dioxide but mainly nitric oxide. This reacts rapidly in the atmosphere to form nitrogen dioxide. The two gases existing in equilibrium and so calculations take this into account, hence references to both.

The data for 2019 shows that the annual mean nitrogen dioxide concentration at various locations in the AQMAs are above the 40 µg/m^3 AQO. Details on the required NOx emission reductions to achieve the annual mean AQO of 40 µg/m^3 is given in Table 3-1.

The required reduction in NO_x emissions has been calculated in line with Technical Guidance LAQM.TG(16) (Ref. 17) Chapter 7 (Box 7.6) using Defra's NO_x to NO_2 calculator as outlined in Appendix D: Reduction in road NOx Emission Calculation.
As outlined in Table 3-2, all AQMAs are predicted to be below the annual mean objective value of 40 µg/m^3 by 2026 with the exception of Bradford-on-Avon, in the absence of any additional measures to combat air quality issues. This is based on an interpolation of the trend in modelled concentrations between 2019 and 2026.

Table 3-2: Estimated year of compliance without any interventions

AQMA	Estimated Year of Compliance without measures (Based on Modelling)
Bradford-on-Avon	2028
Calne	2024
Devizes	2024
Marlborough	2024
Westbury	2022
Salisbury London Road	2020
Salisbury Wilton Road	2023
Salisbury City Centre	2022

Modelling is not an exact science, and it is envisaged that measures will be required to ensure the improvement of air quality is accelerated and maintained below AQO. It should also be noted that the estimated year of compliance is based upon national fleet assumptions used in the Emissions Factor Toolkit (EFT, Ref. 19), which may not be completely reflective of each area where the vehicle fleet composition may be different. Given the disruptive nature of COVID-19, it is also likely that the national fleet projections that are inherent to these forecast improvements may change in a different way to that which was predicted pre-pandemic.

Although these dates indicate when at level of 40ug/m^3 or below will be achieved in order to revoke an AQMA order DEFRA have stated that either of the following criteria must be achieved:

- 3 years of emissions at or below 10% of the AQO (i.e., 36ug/m^3 with respect to the annual mean object for nitrogen dioxide) or,
- 5 years below the AQO (i.e., 40ug/m^3 with respect to the annual mean objective for nitrogen dioxide).

Key Priorities

As already stated, the Council's key priorities, as aligned with the Air Quality Strategy, are as follows. Each measure is designed to enhance one or more of these strategic priorities.

1) To secure the air quality objectives in the AQMAs,
2) To maintain good air quality across the rest of the county,
3) To lead by example through Wiltshire Council's own actions and,
4) To communicate and disseminate information to residents and other stakeholders.

Development and Implementation

Consultation and Stakeholder Engagement

In developing/updating this AQAP, we have worked with other local authorities, agencies, businesses, and the local community to improve local air quality in the development of the measures presented. The AQAP measures have been developed in consultation with our partners for each AQMA, namely:

Wiltshire Council

- Public Protection Services
- Passenger Transport Team
- Sustainable Transport Team
- Spatial Planning Team
- Development Management Team
- Public Health Wiltshire
- Carbon Reduction Team
- Community Engagement Managers
- Economy & Regeneration Team

External organisations

- National Highways (Highways England)
- AECOM Air Quality & Permitting.

Once put forward as potentially viable by the stakeholders, each measure was also considered in detail in partnership with our independent consultants, AECOM, for its applicability to dispersion modelling of the impact of the intervention. Some measures, such as direct traffic interventions, lend themselves readily to quantification. measures, such as behavioural change, are far more difficult to quantify. Where possible, measures have been modelled for their potential impact. These scenarios are generally set up to be aspirational, i.e., the maximum improvements a particular measure can reasonably achieve in isolation, and the practicalities of implementation may mean impacts differ in reality. This approach does give the Council a target to work towards.

Amendments to the Environment Act 2021 enhance the role of 'Air Quality Partners' in action planning by placing a statutory duty on their co-operation, and we will engage with relevant parties in this context, as appropriate, through the cycle of this AQAP.

Schedule 11 of the Environment Act 1995 requires local authorities to consult the bodies listed, which will be undertaken at the draft stage of the AQAP.

The response to our consultation stakeholder engagement is given in Appendix A: Response to Consultation'. Table 4-1 outlines the scope of consultation.

Table 4-1: Consultation Undertaken

Yes/No	Consultee
Yes	The Secretary of State (Defra)
Yes	The Environment Agency
Yes	The highways authority
Yes	All neighbouring local authorities
Yes	Other public authorities as appropriate, such as Public Health
Yes	Bodies representing local business interests and other organisations as appropriate
Yes	Local parish and Wiltshire Council councillors
Yes	Local air quality groups
Yes	Members of the public

Steering Group

Consultation with our key partners and stakeholders began in March 2020. The following partners attended an initial meeting on 19th March 2020:

Wiltshire Council

- Public Protection Services,
- Sustainable Transport Team,
- Passenger Transport Team,
- Spatial Planning Team,
- Development Management,
- Public Health Wiltshire,
- Community Engagement Managers for areas with AQMAs,
- Economy & Regeneration Service,
- Carbon Reduction.

External organisations

- National Highways

* The Economy & Regeneration Service was not consulted until May 2021 and therefore did not attend this initial meeting

The initial meeting covered the following topics:

- The legal basis for air quality management,
- Air quality challenges in Wiltshire,
- The role of Air Quality Strategy adopted in 2019 in setting the direction for improving air quality and the rationale for a new action plan,
- Basic source apportionment and require reductions within AQMAs and,
- Areas of common ground & opportunities for interdepartmental working.

Further meetings were held with each individual partner over the following 6 months to identify existing areas of policy alignment/compatibility along with the potential challenges and opportunities for further joint working.

Air quality consultants AECOM were engaged in December 2020 to assist us with the collection of baseline traffic data and source apportionment along with a “long list” of air quality measures to be used as a starting point for discussions with key partners within the Council’s Transport and Spatial Planning teams. Further consultation with colleagues occurred in May, June and July 2021 to identify potential measures from within the ‘long list’ that could be incorporated into a ‘shortlist’ of measures.

Detailed dispersion modelling of the shortlist was carried out by AECOM in November 2021 and an initial draft action plan completed in January 2022. This was broadly accepted by the Environmental Control & Protection Team, who then undertook further development & consultation with internal stakeholders, and sought the views of both the portfolio holder for Public Health & Public Protection, Leisure, Libraries, Facilities Management & Operational Assets and Wiltshire Council’s Cabinet before advancing to public consultation.

Internal consultation

The development of the Action Plan has been led by a small group of officers within the Environmental Control & Protection Team. They have worked closely with air quality partners as detailed above to avoid the need for large, inefficient gatherings. Due to COVID most gatherings were conducted over MS Teams.

In late 2021 the council directorates underwent a restructure and Public Protection Services moved from the Communities & Neighbourhoods Directorate to a new Environment Directorate. A key activity of new Environment directorate is to develop mechanisms to engage the community and stakeholders with the council’s environmental agenda, including the establishment of a new Climate and Environment Forum that will support partnership working, share information and capture successes.

In late 2022 the plan was presented to the Place Directorate Heads of Service, the Senior Leadership Team and Cabinet Liaison for final comments before public consultation.

AQAP Measures

Table 5-11 shows the Action Plan measures and comprises:

- a list of the actions that form part of the plan,
- the responsible individual and departments/organisations who will deliver this action,
- estimated cost of implementing each action (overall cost and cost to the local authority),
- expected benefit in terms of pollutant emission and/or concentration reduction,
- the timescale for implementation and,
- how progress will be monitored.

The table is split into strategic policy measures that will help to set the agenda for general air quality improvements across Wiltshire. Each AQMA is then afforded localised, specific modelled measures that have been quantitatively assessed for the potential impact on nitrogen dioxide concentrations. In many cases, the specific measures are not expected to achieve compliance with the objectives in isolation, so it is the Council's intention that a combination of the strategic and specific measures will work towards compliance with the AQO sooner than would otherwise have been achieved naturally. It is acknowledged that progress towards the implementation of these strategic and specific modelled measures will require significant time and resource from within the Environmental Control & Protection Team. A business case will therefore be made for funding towards a dedicated Air Quality Action Plan Implementation Officer whose role will be to work with our key air quality partners to help us drive forward the measures set out in this action plan.

In addition, both strategic and specific modelled measures provide the basis for valuing air quality impacts within AQMAs in order to offset any additional 'residual' pollutant contribution from new development. Further details can be found in the council's Air Quality Strategic Planning Document (SPD).

Each measure is summarised in the following section, which includes a simple cost benefit analysis based on the metrics outlined in Table 5-1. As many of the measures are conceptual at this stage, these are largely qualitative comparisons, but should aid the interpretation of the relative efficacy of each measure.

This comparison also recognises that whilst measures may have varying impacts on air quality, that is not always the only consideration for their implementation. None of the metrics are given a stronger weighting as a result. The metrics within the analysis can be described as follows:

- Air Quality Benefit (AQ) – the maximum direct benefit on NO_2 concentrations (i.e. in 2019). This will be based on modelled data where possible, and experience of similar measures,
- External Benefits (Ex) – the perceived externalities associated with the measure, i.e. the knock-on impacts on two other key priorities, climate change and transportation,
- Alignment with existing policies (Po) – reflects the measure's alignment with existing policies, at both a local and national level and,
- Expected Cost (£) – anticipated financial implications of measure, the direct cost of implementation.

Table 5-1: Measure Cost Benefit Analysis (CBA)

Level	Air Quality Benefit (AQ)	External Benefits (Ex)	Alignment with existing policies (Po)	Expected Cost (£)
0	No discernible or direct benefit, even a disbenefit, to NO_2	No discernible benefits to other priority areas, climate and transport policy	Diverges completely from existing Council and National policy	Zero cost, or part of existing spend
1	Low (<1 µg/m^3) benefit to NO_2	Low benefits to climate and transport	Low alignment with existing policy	Low (<£10,000) cost
2	Medium (1-5 µg/m^3) benefit to NO_2	Medium benefits to climate and transport	Medium alignment with existing policy	Medium (£10,000-£100,000) cost
3	High (>5 µg/m^3) benefit to NO_2	High benefits to climate and transport	High alignment with existing policy	High (£100,000 – £1000,000) cost
Example Calculation: Measure Z: AQ (2) x Ex (2) x Po (3) - £ (1) = Overall Rating (11) CBA Rating Banding: -3–0 = Undesirable Measure 0–5 = Low Priority Measure 5–10 = Medium Priority Measure 10+ = High Priority Measure				

Alongside the calculation within the descriptions of the measures, the CBA rating of each measure is provided in brackets within each green box summarising the measures for each area, and in Table 5-11.

Updates on implementation of these measures will be reported in the Annual Status Report prepared for DEFRA and published in June each year.

Strategic Polices

The more strategic level policies, i.e., those that are applied across multiple / all AQMAs, and generally across the county, are summarised as follows. Each measure is assigned an ID number and the CBA rating in brackets. Air Quality cannot be considered in isolation and so have drawn links with policies and strategies from across the authority:

S1 Electric Vehicle Charging Infrastructure Strategy (15)

S2 Local Transport Plans (15)

S3 Local Walking & Cycling Infrastructure Plans (16)

S4 Bus Service Improvement Plan (15)

S5 Car Clubs & E-Bike Schemes

S6 Taxi Low Emission Licensing (10)

S7 Low Traffic Neighbourhoods (LTNs) (10)

S8 Promoting Active Travel (8)

S9 Fleet Recognition Schemes (8)

S10 Limit Road Work Hours to Outside of Peak Periods (3)

S11 Area Boards with AQMAs (3)

S12 Delivering Air Quality Improvements through the Planning System (18)

S13 The Green & Blue Infrastructure Strategy (8)

S14 The Wiltshire Climate Strategy (8)

S15 Air Quality Website (2)

S16 Climate Change & Environment Forum (6)

S17 Support Air quality Events Such as Clean Air Day (3)

S18 Promotion & Support of no Idling Schemes (8)

S19 UK100

S20 Combustion Control and Regulation (8)

S1 Electric Vehicle Charging Infrastructure Strategy

Wiltshire Council's Cabinet agreed in October 2021 to approve a new electric vehicle charging infrastructure plan (Ref. 20), a decision that will help to reduce both nitrogen dioxide and carbon emissions in the county and improve facilities for EV drivers by both upgrading what is already in place and increasing the number of available chargers. The plan covers all elements of the charging infrastructure, including destination and residential charging, offering charging hubs at Wiltshire Council and private sites, charging for public transport and private hire vehicles, and renewable energy generation to satisfy increasing power demand. Up to £275,000 capital investment has been allocated via the Strategy.

It is envisaged that the strategy, whilst primarily focused on climate change as the key driver, will also have complimentary effects on Wiltshire's AQMAs. This strategy will be replaced by a longer term and more comprehensive strategy that will form part and this will address the DfT recently published EV Infrastructure Strategy

S1 CBA: AQ (2) x Ex (3) x Po (3) - £ (3) = Overall Rating (15)

S2 Local Transport Plans

The Local Transport Plan 3 covers the period April 2011 to March 2026 and forms a key strategic policy document in delivering improved air quality as the cause of excess levels of nitrogen dioxide is transport. LTP4 is under development and will supersede the current plan.

The current plan is accompanied by a suite of strategies including those on:

- Public Transport
- Smarter Choices
- Car Parking Strategy

Error! Reference source not found. ***CBA: AQ (2) x Ex (3) x Po (3) - £ (3) = Overall Rating (15)***

S3 Local Cycling & Walking Infrastructure Plans (LCWIPs)

These form an important part of the LTP. At the time of writing these Plans are being developed for the principal settlements and market towns as well as the key routes between them.

The government's Strategy for Active Travel, Gear Change, published in 2020, sets out an overarching objective "*to see a future where half of all journeys in towns and cities are cycled or walked".*

The draft Framework Wiltshire Local Cycling and Walking Infrastructure Plan (LCWIP) and the draft Salisbury LCWIP were published for consultation in summer 2022. LCWIPS for Chippenham, Trowbridge and Devizes will be published in 2023, and LCWIPs for the remaining market towns will be published in subsequent years.

S3 CBA: AQ (2) x Ex (3) x Po (3) - £ (2) = Overall Rating (16)

S4 Bus Service Improvement Plan (BSIP)

As part of the national Bus Strategy for England all Councils are required to produce a bus service improvement plan (BSIP) that outlines its vision for services in their area. These aim to:

- Support the local economy - Improved access to shops and areas of employment to help build back and improve the economy post covid
- Improve services to support vulnerable and elderly residents to access essential services such as shopping and medical appointments
- Reduce carbon output and improvement in air quality by reducing the number of car journeys across Wiltshire
- Support leisure travel and local tourism - Through improved weekend, rail link services and more extended bus services.

Wiltshire Council's BSIP seeks to prioritise services at locations which operate through and AQMA in recognition of the need to mitigate poor air quality. As such, the authority will ensure our work to bring zero-emission buses to the county will prioritise routes operating in these areas to maximise the benefits of reduced emissions and improved air quality.

Linking active travel and public transport significantly extends the length of active travel journey and extends the coverage which public transport provides. It is important therefore to consider how best different methods of travel, particular public transport and its connectivity with other public & active modes can be combined to maximise benefit for users and air quality outcomes.

S4 CBA: AQ (2) x Ex (3) x Po (3) - £ (3) = Overall Rating (15)

S5 Car clubs and E-Bike schemes

Salisbury currently has a car Club Scheme and Wiltshire Council is supportive of expansion of such schemes in order to reduce the need for private vehicle ownership within urban areas. We are also supportive of E-bike hire schemes particularly where they involve the ability to hire cargo bikes. Wiltshire council will investigate how we can best support and encourage development and expansion of these schemes. This may include seeking central government finance to achieve this and/ or developer contributions

S5 CBA: AQ (2) x Ex (2) x Po (3) - £ (2) = Overall Rating (10)

S6 Taxi Low Emission Licensing

The current condition states that: *"on first application for a licence, only vehicles under five years old from the date of first registration will be considered".*

There is currently little further provision for vehicle age or emissions rating within the Council's taxi and private hire vehicle licensing requirements (with the exception of wheelchair accessible vehicles, which are required to be a certain age). This policy will be revisited, though the exact parameters will be subject to councillor scrutiny. Initial meetings were undertaken with the prior to COVID -19 with the then Head of Service. These discussions will be reinitiated with the new management. Aspirationally, all licensed vehicles would be zero emissions capable if the market permits.

S6 CBA: AQ (2) x Ex (2) x Po (3) - £ (2) = Overall Rating (10)

S7 Low Traffic Neighbourhoods (LTNs)

Low Traffic Neighbourhoods' (LTNs) are area-based interventions that use 'modal filters' (planters, bollards, or camera gates) to remove through motor traffic from residential streets, and so lend themselves readily as AQMA policy interventions. These have achieved some successful implementations in London especially during the COVID-19 pandemic. Benefits will be highly localised, and associated with distributional impacts, so detailed investigations will need to be undertaken prior to any implementation.

S7 CBA: AQ (2) x Ex (3) x Po (2) - £ (2) = Overall Rating (10)

S8 Promoting Active Travel

Various programmes exist across the county that encourage active travel, all of which should have a net benefit on air quality by removing journeys that would otherwise have been undertaken in nitrogen dioxide emitting vehicles. These will be built on through the life of the AQAP.

Some of these initiatives include the Public Health funded project 'Get Wiltshire Walking' (Ref. 21) walks, which offers free, guided weekly routes to anyone who would like to join, returned from 4th May 2021. Cycling is also a focus, and the 'Connecting Wiltshire: Cycling' (Ref. 22) provides information on how to get into cycling in Wiltshire, including popular routes, cycle hire, and much more. This measure is also linked to the Wiltshire Smarter Choices strategy (Ref. 23).

Integration with other measures is highly relevant and important here in order to extend active travel journeys through integration with other modes such as bus and rail.

Further information related to active travel can be found on the Council's Connecting Wiltshire website.

S8 CBA: AQ (1) x Ex (3) x Po (3) - £ (1) = Overall Rating (8)

S9 Fleet Recognition Schemes

Various fleet recognition schemes exist, which aim to encourage more efficient and cleaner operations for HGVs, buses, coaches, vans and taxis. One of the most well-known of these is the ECO Stars Fleet Recognition Scheme (Ref. 24). We intend to investigate the viability of bringing this, or other such schemes, to Wiltshire based businesses, particularly those that operate a high number of LGVs, given this is the predominant source of vehicular emissions (outside of diesel cars) in a majority of the AQMAs.

S9 CBA: AQ (1) x Ex (3) x Po (3) - £ (1) = Overall Rating (8)

S10 Limit Road Work Hours to Outside of Peak Periods

As all road users will know, whilst vital to maintaining the network, road works can cause congestion that leads to idling emissions that exacerbate air quality issues. Whilst it is not feasible that these should not occur, it is intended to further investigate optimising scheduling, so that within AQMAs, road works are not active within peak periods of travel demand.

S10 CBA: AQ (2) x Ex (3) x Po (1) - £ (3) = Overall Rating (3)

S11 Area Boards with AQMAs

The Council has established a number of local air quality groups to spearhead local initiatives to improve air quality where AQMAs have been declared. These groups report directly to their Area Boards. The groups are composed of local councillors, interest groups and private individuals and they draw upon expertise of other services and experts as they deem necessary. They are tasked with reporting to their Area Board annually. These have been implanted through the last AQAP cycle and will be continued.

S11 CBA: AQ (1) x Ex (1) x Po (3) - £ (1) = Overall Rating (3)

S12 Delivering Air Quality Improvements through the Planning System

Developers have the power to make or break the AQAP. The 2012 Supplementary Planning Document (SPD), remains in draft form and has been largely superseded. Consequently, an updated SPD is urgently required, one which provides clarity to developers regarding what we expect from them in terms of air quality.

A new SPD has been developed alongside this action plan for consultation and adoption by the council. The new SPD compliments core policy 55 of the Core Strategy, establishing a risk rating procedure for proposed sites on the basis of their impact on air quality and requires good design along with measures to mitigate/offset impacts of proposals. Provision is made to request financial contributions to assist in the delivery of measures contained within this action plan.

It is important to note that the Core Strategy is being reviewed. The new Local Plan Review will be adopted in the lifetime of this AQAP and hence will become a policy consideration. Core Policy 55 will be updated where necessary to reflect national planning policy and guidance. However, it is clear that the policies in the Local Plan Review will continue to support the objectives of this and all future AQAPs, as well as the proposed SPD, once adopted.

S12: CBA: AQ (2) x Ex (3) x Po (3) - £ (0) = Overall Rating (18)

S13 The Green & Blue Infrastructure Strategy

The Wiltshire Green Blue Infrastructure (Ref. 16) Strategy focuses on the natural environment and how by creating a strong, well-considered network of green and blue corridors and spaces we can support adaption and resilience to climate change, halt loss of and improve biodiversity and contribute to the health and wellbeing of our communities. This will have a complimentary effect on air quality, both through localised mitigation, and a regional reduction in overall emissions.

Tree planting and other nature-based solutions have a role in contributing to both a greater sense of wellbeing, as well as making a contribution to improved air quality, if

planned so as not to inhibit dispersion. The council has a funded programme for tree planting within communities.

S13 CBA: AQ (1) x Ex (3) x Po (3) - £ (1) = Overall Rating (8)

S14 The Wiltshire Climate Strategy

Wiltshire Council has declared a climate emergency and aims to be carbon neutral by 2030. Climate and air quality policies often overlap, so joint consideration will be essential to our success in both areas. The Wiltshire Climate Strategy (Ref. 26) enhances focus on both carbon and nitrogen dioxide emissions. Over 1,000 people and organisations commented on the strategy, which covers seven delivery themes; transport, built environment, waste, green economy, energy generation, storage, and distribution, natural environment, food and farming, and a carbon neutral council.

S14 CBA: AQ (2) x Ex (3) x Po (3) - £ (0) = Overall Rating (18)

S15 Air Quality Website

The Council will make its data, reports, guidance, and general information available via a website for use by consultants and the community for the formulation of action plans, community sponsored initiatives and wider mitigation. New webpages have been developed on the Wiltshire Council domain providing advice and sign posting for those wishing to take active steps toward reducing their impact on air quality. These will be further developed over the life time of this plan.

S15 CBA: AQ (1) x Ex (3) x Po (3) - £ (1) = Overall Rating (8)

S16 Climate and Environment Forum

Wiltshire Council's Environment Directorate has recently established a Climate & Environment forum. It is a non-statutory body, whose recommendations are not binding but provides a citizens panel the opportunity to discuss and shape climate change and environmental policy.

S16 CBA: AQ (1) x Ex (2) x Po (3) - £ (0) = Overall Rating (6)

S17 Support Air quality Events Such as Clean Air Day

We will look to support events related to air quality promotion in the county,

Council led events will be well publicised on our website. Organisers of private events should contact the Public Protection team, to discuss whether support can be provided.

The ultimate aim of such events is to promote awareness and engagement with air quality as an issue and encourage behaviours that lead to an overall reduction in nitrogen dioxide emissions as a result.

S17 CBA: AQ (1) x Ex (2) x Po (3) - £ (0) = Overall Rating (6)

S18 Promotion & Support of 'No Idling' Schemes

Generally, requests for advice on these come from those living in the vicinity of schools & schools themselves. They are relevant particularly in areas of high traffic congestion, taxi ranks and streets with multiple bus stops in close proximity eg Endless Street and Blue Boar Row in Salisbury. We will work with interested parties to promote voluntary schemes to encourage drivers to switch off engines when stationary and use auto/ stop start when queuing in congestion.

S18 CBA: AQ (1) x Ex (3) x Po (3) - £ (1) = Overall Rating (8)

S19 The UK100

The UK 100 is a network of highly ambitious local government leaders which seeks to devise and implement plans for the transition to cleaner energy that are ambitious, cost effective and take the public and business with them.
The Council will continue to support and play an active role in the UK100
A recent report from the UK100 introduced the concept of 'Clean Air Net Zero'

S19 CBA: AQ (1) x Ex (3) x Po (3) - £ (0) = Overall Rating (9)

S20 Combustion Control and Regulation

This AQAP is primarily focused on transport emissions as these are the primary local source of nitrogen dioxide exceedances but point sources such as industrial chimneys, vents and flues must not be ignored. There is an opportunity to provide strong governance of combustion sources (typically more related to PM_{10} and $PM_{2.5}$ emissions) both within and outside the AQMAs which impact overall air quality in them. Emerging from the government's 2019 Clean Air Strategy, was a clear focus on wood burning stoves, as burning wood and coal in open fires and stoves makes up 38% of the UK's primary emissions of $PM_{2.5}$.

In anticipation of more stringent objectives relating to fine particulates in the coming years, we intend to be proactive, whilst having regard to issues of social exclusion & rural poverty. The implementation of the Eco-design 2022 regulations for small wood burning stoves, will be important over the lifetime of this AQAP, although it is recognised that this will likely need to be focused on urban centres, where on-grid power solutions are available.

Industrial and commercial sources should be addressed jointly by both Climate Change and Air Quality policies. Biomass contributes 10% of the UKs primary emissions of $PM_{2.5}$ and this contribution is reported to be increasing.

Further, the Council has powers it can exercise against people causing a statutory nuisance through bonfires and will investigate allegations of nuisance made.

Whilst there are currently no smoke control areas in Wiltshire, the merits of declaration of these can also be investigated.

S20 CBA: AQ (1) x Ex (3) x Po (3) - £ (1) = Overall Rating (8)

Modelled Measures

Air dispersion modelling was undertaken for identified measures. ADMS (Air Dispersion Modelling Software, Ref. 32) was used to model the road traffic within each respective Salisbury AQMA. Further details are provided in the following sections: Appendix E: Dispersion Modelling and Appendix F: Model Verification.

It should be noted that no single measure alone will have the desired effect of achieving compliance with the AQO in the AQMAs and therefore it will likely take a combination of multiple measures to reduce pollutant concentrations to compliance.

A subset of results for the baseline and future year scenarios with and without the are presented throughout the main report. For comparison, the 2019 baseline results are also modelled with the measures in place to provide some insight into the effectiveness and expected impacts of the measure.

Salisbury AQMAs

The following four measures have been modelled within the three Salisbury AQMAs:

A1 Improvements to active travel routes in the City centre (10)

A2 Improving the rail station connectivity with the city (15)

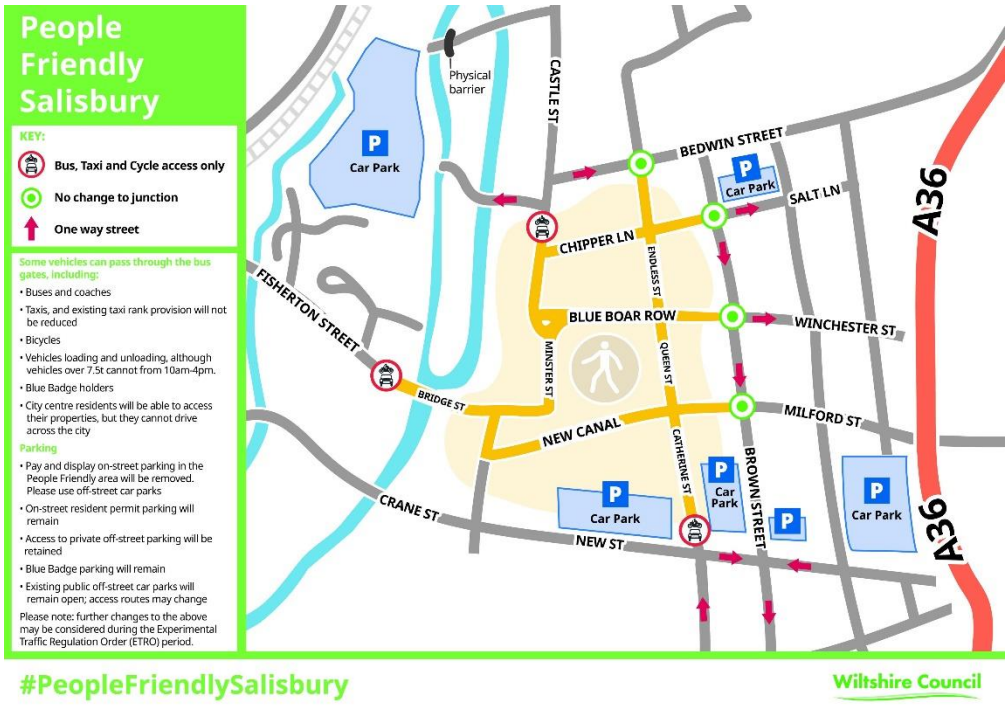
A3 Improvements to junction near Wilton, Harnham gyratory and Exeter Street roundabout (4)

A4 MOVA upgrade on A36 roundabout traffic lights along Churchill Way (7)

A1 Improvements to active travel routes in the city centre.

The People Friendly Streets initiative, as illustrated in Figure 5-1, was introduced during the COVID pandemic to enhance the city realm. It placed priority on pedestrians rather than cars and was complimentary to the aim of the Air quality management area, The scheme implementation coincided with the second COVID lockdown and was withdrawn in late 2020 due to concerns around the impact on businesses in the city centre. The scheme involved the implementation of a series of bus gates on roads in and around the Guildhall & Market Square, so was focused on reducing through traffic through the city centre creating a safer and more pleasant environment for those shopping and using the city centre, beyond that already achieved by removing cark parking from the Market Square. Wide exemptions were incorporated into the scheme for emergency vehicles; buses and coaches; taxis; zone residents; Blue Badge holders and the loading of vehicles. Vehicles over 7.5t were only excluded between 10am and 4pm.

Figure 5-1: People Friendly Streets



In the short period that the scheme was in place, Vivacity monitoring was undertaken which showed approximately an 11% shift toward sustainable travel modes across all of the monitoring locations (further details are provided in the Appendix). This measure was therefore beneficial from a purely air quality perspective.

Alternative schemes will be investigated as part of the AQAP with similar objectives as set out in the draft Salisbury Local Cycling and Walking Infrastructure Plan (LCWIP).

Table 5-2 illustrates the locations that would benefit from the largest potential NO_2 reductions with the measure in place.

Table 5-2: Results of the Baseline and Future year scenario with and without measure A1

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RS091	Merchant House 21 Oatmeal Row SP1 1TH	37.7	35.7	-1.9	23.3	22.3	-1.0
RS089	Flat 2 48 - 52 Silver Street SP1 2NE	36.5	34.6	-1.8	22.5	21.5	-0.9

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RS229	132 Castle Street SP1 3UA	35.3	33.6	-1.7	22.1	21.2	-0.9
RS065	The White Horse Hotel Castle Street SP1 1BN	34.6	32.9	-1.7	21.7	20.8	-0.9
RS275	Flat 1 11-13 Minster Street SP1 1TB	34.5	32.9	-1.7	21.6	20.7	-0.9
RS064	Flat 127 South Western Road SP2 7RR	28.7	28.7	-0.1	19.1	19.1	-0.1
RS134	109A Fisherton Street SP2 7SP	30.6	30.4	-0.2	19.9	19.8	-0.1

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

The predicted concentrations at the receptors were generally observed to already be below the annual mean objective of 40 µg/m^3 in 2019 (with the exception of Southwestern Road), with drops in the nitrogen dioxide concentration of up to 1.9 µg/m^3 resulting from the implementation of pedestrianisation in the city centre. The implementation of the scheme indicates that a possible reduction of the nitrogen dioxide concentrations in the future year 2026 scenario of up to 1.0 µg/m^3 at sensitive receptors in and around the connected roads. This appears small but in air quality reduction terms it is significant.

A1 CBA: AQ (2) x Ex (3) x Po (2) - £ (2) = Overall Rating (10)

A2 Improving the rail station connectivity with the city.

Southwestern Railways are implementing a cycle hub in the station forecourt in the summer of which will include 94 cycle parking spaces and 10 e-bike docking charging stations, which would serve to reduce overall vehicle trips associated with the station.

Following the Central Area Framework, the Council is currently designing improvements to the rail station, Fisherton Street and Southwestern Road including two new bus stops in the station forecourt (enabling the Amesbury bus and the

Downton bus to be extended to the station), improved routes for people who walk or use mobility vehicles around the forecourt, wider footways and more planting along Fisherton Street and Southwestern Road, supported by funding from the Future High Streets initiative. This measure will be updated through the life cycle of the AQAP as more detailed plans have become available.

A2 CBA: AQ (2) x Ex (3) x Po (3) - £ (3) = Overall Rating (15)

A3 Improvements to junction near Wilton, Harnham Gyratory and Exeter Street roundabout.

As previously noted, the junctions near Wilton have been identified as having congestion issues that has triggered air quality issues in the area. Potential improvements at these junctions are aimed at easing congestion and improving traffic flow in the Salisbury City Centre AQMA. The modelling of this measure was carried out with the following assumptions:

- Park Wall junction is located over a mile away from the modelled road network, this junction was not included; and
- Estimated improvements in travel time were implemented to affected roads during the AM (07:00 to 10:00) and PM peak periods (16:00 to 19:00) based on conservative estimates (i.e. 23% reduction in travel time, Ref. 34).

Table 5-3 below illustrates the locations that would benefit from the largest potential NO_2 reductions with the measure in place.

Table 5-3: Results of the Baseline and Future year scenario with and without measure A3

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RS017	Flat 2 131 Exeter Street SP1 2SG	39.2	38.7	-0.5	24.2	24.0	-0.3
RS055	Waters Edge 1 New Bridge Road Harnham SP2 8AA	31.9	31.4	-0.5	20.8	20.5	-0.3

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RS071	60 Hurley House Carmelite Way SP1 2HN	33.9	33.5	-0.5	21.3	21.1	-0.2
RS072	38 Norton House Carmelite Way SP1 2HL	33.9	33.4	-0.5	21.3	21.0	-0.2
RS070	80 Cleeve House Carmelite Way SP1 2HN	33.5	33.0	-0.5	21.0	20.8	-0.2

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

The predicted concentrations at the receptors were generally observed to already be below the annual mean objective of 40 µg/m^3 in 2019, though one site was within 10% of the AQO. The improvements to the respective junctions indicate that a possible reduction of the NO_2 concentrations in the future year 2026 scenario of up to 0.3 µg/m^3 at sensitive receptors on and around the connected roads.

A3 CBA: AQ (1) x Ex (3) x Po (2) - £ (2) = Overall Rating (4)

A4 MOVA upgrade on A36 roundabout traffic lights along Churchill Way.

The MOVA upgrades across roundabouts traffic lights along A36 help encourage quicker flow across the northern part of the Salisbury City Centre and Wilton Road AQMAs. The modelling of this measure was carried out with the following assumptions (further details provided in the Appendix):

- Based on possible improvements of 10-20%, a conservative estimate of 10% increase in speed has been applied for this measure to applicable roads.
- This improvement was applied to the AM (07:00 to 10:00) and PM peak periods (16:00 to 19:00).

Table 5-4 displays the locations that would benefit from the largest potential NO_2 reductions with the measure in place.

Table 5-4: Results of the Baseline and Future year scenario with and without measure A4

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RS059	3B York Road SP2 7AP	**51.1**	**50.8**	-0.3	30.9	30.7	-0.2
RS185	22 Castle Road SP1 3RJ	**45.6**	**45.3**	-0.3	27.9	27.7	-0.2
RS198	2 Nelson Road SP1 3LT	**43.1**	**42.7**	-0.4	26.4	26.2	-0.2
RS048	5 St Marks Avenue SP1 3DH	**42.4**	**42.1**	-0.3	26.0	25.8	-0.2
RS152	64 Meadow Road SP2 7BL	**41.0**	**40.6**	-0.4	25.0	24.8	-0.2
RS117	6D Wilton Road SP2 7EE	46.1	45.8	-0.3	26.0	25.9	-0.1
RS114	26 Wilton Road SP2 7EJ	39.1	38.9	-0.2	22.3	22.3	-0.1

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

Nitrogen dioxide concentrations predicted at sensitive receptors for 2019 baseline scenario at Churchill Way North/West and adjoining roundabouts were above the nitrogen dioxide annual mean AQO. These concentrations are predicted to drop below the thresholds in 2026, and with the MOVA upgrades, additional drops of up to 0.2 µg/m^3 are expected.

A4 CBA – AQ (1) x Ex (3) x Po (3) - £ (2) = Overall Rating (7)

Further Measures

The following measures specific to Salisbury are included within the AQAP, but have not been explicitly modelled:

A5 Improvements to the A36 Trunk Road through Salisbury (3)

A6 Targeting Ind. Estate LGVs (3)

A7 Salisbury Park and Ride (6)

A8 Salisbury Transport & Parking Strategy (15)

A5 Improvement to the A36 Trunk road through Salisbury.

National Highways has previously carried out a study on Southampton Road and was not able to identify a feasible improvement scheme. This considered additional traffic lanes, junction improvements and removing the central barrier. Modelling of those options showed that the traffic problems would be moved around, but not resolved or improved. National Highways, in partnership with Wiltshire Council, is now prioritising Southampton Road and College Roundabout, and is currently working on an Option Assessment Report (OAR) for this part of the road, which will look at various solutions to improve traffic flows and reduce congestion.

National Highways has identified a number of improvement options, and is testing these using traffic modelling to identify potential improvement options in the area, and to establish their effectiveness. The two authorities are also undertaking traffic surveys to provide up-to-date traffic flows data. Once the report has been completed, National Highways will report its findings and recommendations to the council, undertake further feasibility, value for money and design work before moving the scheme forward.

It is recognised that there is a historic and ongoing desire for a Salisbury bypass. The Council supports the principle of a bypass for Salisbury but the strategic need for it will be understood through the Department for Transport / National Highways M4 to Dorset Coast RIS2 (Road Investment Strategy) study 2020-2025. If identified as a need and a priority, the scheme would be progressed through a subsequent round(s) of the RIS and / or through the DfT's Major Road Network / Large Local Majors process and the Western Gateway Sub-national Transport Body. This is unlikely to deliver any

improvements in the short to medium term and costs would be well in excess of £100 million.

A5 CBA: AQ (3) x Ex (2) x Po (1) - £ (3) = Overall Rating (3)

A6 Targeting Industrial Estate Light Good Vehicles

Light Goods Vehicles (LGV) emissions from the Industrial Estate are known to largely contribute to exceedances on Southwestern Road. The feasibility of wider re-development of the industrial estate will be explored, as will the creation of preferential routes for LGVs.

A6 CBA – AQ (1) x Ex (2) x Po (2) - £ (1) = Overall Rating (3)

A7 Salisbury Park and Ride

The Salisbury Park & Ride services (Ref. 29) are an ideal way for people to visit the historic city and limit the environmental impact of their journey. They continue to form a key part of the solution to the nitrogen dioxide exceedances in the city. Salisbury has five Park & Ride sites on the main routes into the city that offer:

- Modern comfortable buses with low floors for easy access,
- Three buses on the network are electric. The council will look to introduce further electric buses if funding from the government becomes available.
- Buses running every 12 to 15 minutes,
- over 2,000 parking spaces,
- Free car parking for all and,
- Free bus travel for concessionary bus pass holders after 09:30 weekdays and all-day Saturdays and Bank Holidays,

All the sites are open from Monday to Saturday but are closed on Sundays and public holidays:

- Wilton off A36 The Avenue (west of the city);
- Britford A338 Downton Road (to the southeast

- London Road A30 London Road (to the northeast) and
- Petersfinger A36 Southampton Road (to the east)
- The Beehive Park & Ride* (to the north of the city)

*Temporarily closed during the COVID19 pandemic & used as a Coronavirus testing site during the pandemic.

During the pandemic bus patronage fell. The services will need support to return to their previous trajectory of gradual increasing usage.

The council aims to improve usage of the Park & Ride system through a variety of measures including:

- Improved and extended bus lane along the A345 Castle Road
- Bus priority through signals (i.e., allowing signals to change faster if the bus is late) to be implemented at strategic junctions as funding becomes available.
- Measures identified as part of the Salisbury Parking Implementation Plan (see below).

A7 CBA – AQ (2) x Ex (3) x Po (3) - £ (3) = Overall Rating (15)

A8 Salisbury Transport & Parking Strategies

The Salisbury Transport Strategy (Ref. 30), covering the Salisbury and Wilton area, has been developed to support the growth identified in the South Wiltshire Core Strategy and the Wiltshire Core Strategy. This work will be updated to address proposals for new development set out within the emerging Local Plan Review.

In addition to the Council wide strategy, a parking implementation plan specific to Salisbury will be developed as part of LTP4, which will further encourage the uptake of low emission vehicles in the county.

Any LTP4 strategies including the Salisbury Parking Implementation Plan and Salisbury LCSWIP will be informed by air quality levels in the city moving through the lifetime of the AQAP, and both will prioritise more sustainable means of transport where possible.

A8 CBA – AQ (1) x Ex (2) x Po (3) - £ (1) = Overall Rating (5)

Bradford-on-Avon AQMA

Nitrogen dioxide concentrations within Bradford-on-Avon have remained relatively static over the years, with several monitoring locations have exceeded the annual mean objective. It is now appropriate to identify further measures, and if necessary, re-visit previously suggested schemes, to secure compliance with the air quality objectives.

The following three measures were modelled individually for the Bradford-on-Avon AQMA:

A9 Re-introduction of one-way system (16)

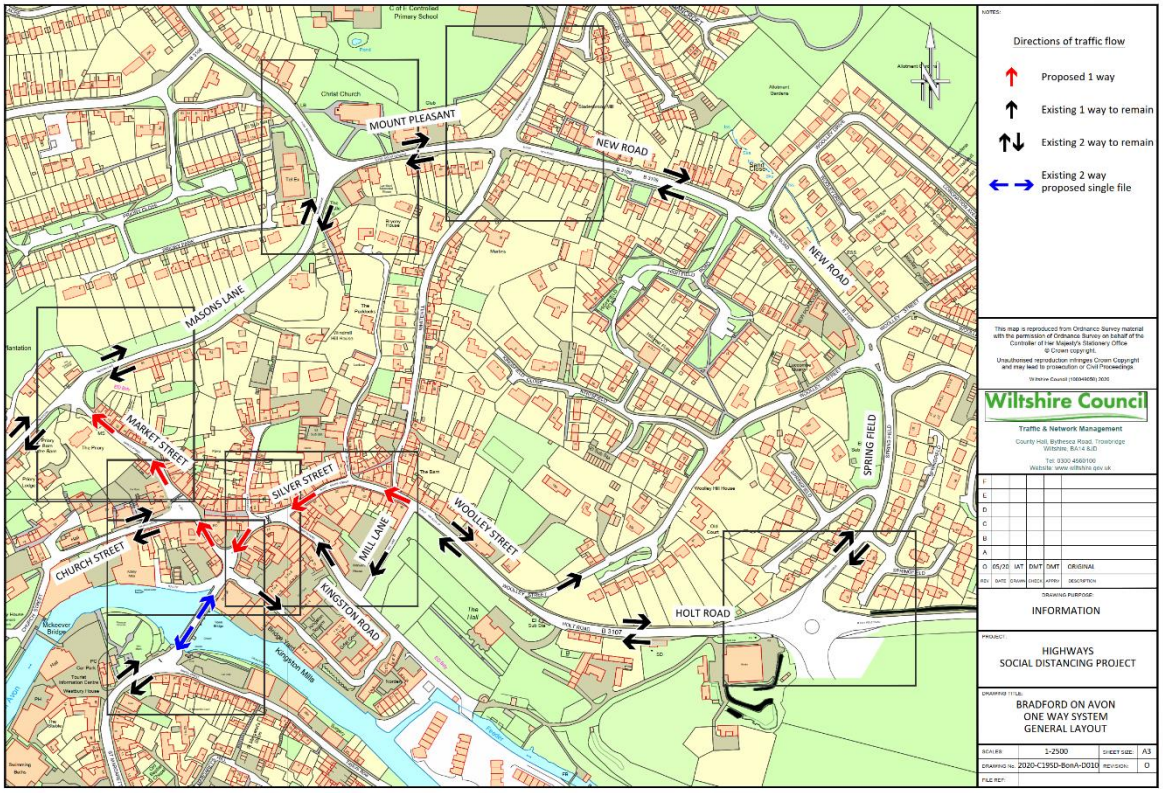
A10 Stricter weight limits restriction on Town Bridge (11)

A11 Tree crown reduction on Masons Lane (2)

A9 Re-introduction of one-way system

During the COVID-19 pandemic, some streets were converted into a one-way system in Bradford-on-Avon town, primarily to facilitate social distancing along the pavements. Market Street and Silver Street were made into one-way streets. The re-introduction of this one-way system, and the impact on the surrounding road network was modelled to look at identifying the possible improvements a more permanent scheme could achieve.

Figure 5-2: Map of One-way System Changes Made During 2020



A similar road network to that shown in Figure 5-2 above was modelled in ADMS through an assumed conversion of Silver Street and Market Street into one-way roads. The opposing traffic flows removed from these two roads were then diverted onto a loop around Bridge Yard and Kingston Road as an alternative route for traffic.

Table 5-5 displays the largest impacts from the measure in place, which are modelled along Masons Lane and Market Street.

Table 5-5: Results of the Baseline and Future year scenario with and without measure A9

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RB26	Silver Street Bradford On Avon BA15 1JX	68.5	30.0	-38.5	43.7	19.9	-23.8
RB33	Swan Hotel Church Street BA15 1LN	**65.1**	**43.8**	-21.4	**41.3**	27.6	-13.7

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RB39	10 Market Street BA15 1LL	**53.9**	36.7	-17.2	34.1	23.1	-11.0
RB38	15A Market Street BA15 1LL	**49.8**	33.7	-16.1	31.5	21.4	-10.1
RB40	7A Market Street BA15 1LH	24.9	19.0	-5.9	16.4	13.0	-3.4
RB43	7 Masons Lane BA15 1QN	**54.8**	**54.1**	-0.7	34.3	33.9	-0.4
RB12	Westbury House St Margarets Street BA15 1DE	36.3	37.3	+1.0	24.0	24.6	+0.6
RB14	42 Silver Street BA15 1JX	**41.1**	**42.0**	+0.9	26.9	27.6	+0.7

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

A9 CBA – AQ (3) x Ex (3) x Po (2) - £ (2) = Overall Rating (16)

A10 Stricter weight limits restriction on Town Bridge

The town bridge, located across the River Avon, was modelled to have a stricter weight restriction imposed along the bridge by introducing a 7.5-tonne weight limit to replace the 18-tonne weight limit. This measure was aimed at reducing the HGVs travelling through the town via the bridge across the AQMA. The EFT v10.1 (Ref. 19) was amended by adjusting the default fleet composition of the Heavy Goods Vehicles (HGVs) where possible, assuming all were below the required weight threshold. This change was imposed across the entire modelled road network in Bradford-on-Avon.

Table 5-6 displays the largest impacts from the measure in place, which are modelled along Masons Lane and Market Street.

Table 5-6: Results of the Baseline and Future year scenario with and without measure A10

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RB42	10 Masons Lane BA15 1QN	**56.1**	**51.5**	-4.6	35.1	33.4	-1.7
RB43	7 Masons Lane BA15 1QN	**54.8**	**50.3**	-4.5	34.3	32.6	-1.7
RB26	Flat 3 Silver Street BA15 1JX	**68.5**	**63.9**	-4.6	**43.7**	**42.3**	-1.5
RB33	Swan Hotel Church Street BA15 1LN	**65.1**	**60.6**	-4.6	**41.3**	39.9	-1.4
RB30	Shambles Day Nursery Unit 2 10 The Shambles	**64.4**	**59.9**	-4.5	**40.9**	39.5	-1.4
RB39	10 Market Street BA15 1LL	**53.9**	**50.1**	-3.8	34.1	32.9	-1.2

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

Receptors on Masons Lane (RB 41-47) had an average nitrogen dioxide concentration change of approximately -2.4 µg/m^3 and -0.9 µg/m^3 in 2019 and 2026 scenarios respectively. Receptors located on Market Street (RB 26, 30-40) had an average change of approximately -2.6 µg/m^3 and -0.8 µg/m^3 in two respective scenarios. The model output predicted with the measure implemented in 2026 that all receptors except RB 26 would be below the annual mean objective value of 40 µg/m^3.

A10 CBA – AQ (2) x Ex (3) x Po (2) - £ (1) = Overall Rating (11)

A11 Tree crown reduction on Masons Lane

This measure was chosen as it targets the removal of the observed canyon effect, caused by vegetation on one side of the road and housing on the other, of emissions released from vehicles travelling along Masons Lane re-circulating, increasing nitrogen dioxide concentrations. By removing the foliage from one side of the road, dispersion

should improve, and concentrations are expected to decrease along the route and yield improved air quality at the façades of the properties on Masons Lane. ADMS has the option to include so called 'street-canyons' on modelled roads, which was included within the baseline scenarios, and this was removed from the model as part of the measure analysis as a proxy for the vegetation removal.

Table 5-7 displays the largest impacts from the measure in place, modelled along Masons Lane.

Table 5-7: Results of the Baseline and Future year scenario with and without measure A11

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RB42	10 Masons Lane BA15 1QN	**56.1**	35.1	-22.0	35.1	21.5	-13.6
RB43	7 Masons Lane BA15 1QN	**54.8**	34.3	-19.8	34.3	22.1	-12.2

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

Elevated nitrogen dioxide concentrations were modelled in 2019 at receptors RB 42 (56.1 µg/m^3) and RB 43 (54.8 µg/m^3). These receptors are estimated to have a significant drop through the removal of the canyon of 22.0 and 19.8 µg/m^3 µg/m^3 respectively. This would equate to being below the annual mean objective value for nitrogen dioxide in 2019. Similar reductions, though to a lesser extent, were also modelled in the 2026 future scenario with a reduction to just over 50% of the annual mean objective for nitrogen dioxide. This measure is localised purely to Masons Lane and has no air quality impacts in other areas of the AQMA. It is considered likely that these impacts are an overestimate of the potential improvements, as the canyon effect is removed completely, whereas in reality the properties will remain so some entrainment of emissions will still occur.

A11 CBA – AQ (3) x Ex (1) x Po (1) - £ (1) = Overall Rating (2)

Westbury AQMA

Modelled Measures

The AQMA in Westbury is along the A350 which forms part of the Major Road Network. Options for improvements to the exiting road system are extremely limited by the physical layout of the road through the town centre.

One measure for specific to Westbury AQMA was modelled for potential impacts.

A12 Junction optimisation at A350 (9)

A12 Junction optimisation at A350

The proposed improvements centre around two roundabouts along the A350:

- Roundabout where A350 meets B3098 (Bratton Road); and
- Roundabout where A350 meets B3097 (Station Road).

The locations of the potential improvements are at the heart of the AQMA in Westbury and these are envisaged to help improve the traffic flow through the town. Speeds on the affected roads were increased to model improvements in traffic flows from the junction changes. Table 5-8 displays the locations with the highest nitrogen dioxide potential impacts with the measure in place, modelled at receptors along Haynes Street and Warminster Road.

Table 5-8: Results of the Baseline and Future year scenario with and without measure A12

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RW30	Flat 1 18 Warminster Road BA13 3PB	**48.1**	**46.3**	-1.9	27.9	26.7	-1.2
RW26	53 Haynes Road BA13 3HD	**43.7**	**42.2**	-1.5	25.2	24.2	-1.0
RW06	69 Warminster Road BA13 3PJ	**43.0**	**41.6**	-1.4	24.6	23.7	-0.9
RW33	49B Warminster Road BA13 3PJ	**42.7**	**41.3**	-1.4	24.4	23.5	-0.9

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

With the measure in place, reductions of up to 1.9 µg/m^3 and 0.9 µg/m^3 in the baseline and future year scenarios were modelled across the receptors in the vicinity of the AQMA. The greatest impacts are likely to be observed on Warminster Road, with traffic congestion prevalent along this road, as demonstrated by the reductions in nitrogen dioxide concentrations at receptors RW 30, RW 06 and RW 33.

A12 CBA – AQ (2) x Ex (3) x Po (2) - £ (3) = Overall Rating (9)

Further Measures

Three further measures for the Westbury AQMA have been included within the AQAP, but were not explicitly modelled:

A13 Improvements to the A350 (6)

A14 Peak hour re-routing of traffic (2)

A15 Sustainable Last Mile Deliveries (7)

Error! Reference source not found. **Improvements to the A350.**

It is an objective of the Wiltshire Councils Business Plan 2022-2032 to have vibrant, well-connected communities. The plan includes an aim for "*major road programmes to reduce congestion and air pollution, and explore solutions to issues at J17 M4, Salisbury, Melksham and Westbury".*

Westbury Town Council has asked Wiltshire Council for assistance in developing a plan for an Eastern A350 by-pass of the town.

Wiltshire Council intends to bid for funds to make improvements to the A350 in Westbury in the next round of government funding in 2025, by which time compliance with the objective may already have been achieved. That, and the fact that no detailed plans are available at present to facilitate dispersion modelling, mean this measure was not considered for its quantitative impact, though this would likely be 'High' by the definitions in Table 5-1 within the AQMA itself.

A13 CBA – AQ (3) x Ex (1) x Po (3) - £ (3) = Overall Rating (6)

A14 Peak Hour Re-Routing of Traffic

We will investigate the viability of alternative routes through the AQMA during morning and evening peak periods, in order to help ease congestion at the busiest times. This may be limited to particular vehicle types, such as HGVs.

A14 CBA – AQ (2) x Ex (2) x Po (1) - £ (2) = Overall Rating (2)

A15 Sustainable Last Mile Deliveries.

LGVs have been identified as a significant source of traffic emissions in both Westbury and Marlborough, many of which will be related to deliveries. We propose to explore whether viable schemes can be brought forward. An e-bike delivery scheme in Salisbury has unfortunately closed due to issues of viability. Whether viability and acceptance will change thought the lifetime of time this plan will observed. The way ahead might be achieved by starting with an e-Bike hire scheme and E-bike cargo hire over a wider area than one town to build critical mass.

A15 CBA – AQ (1) x Ex (3) x Po (3) - £ (2) = Overall Rating (7)

Marlborough AQMA

The exceedances of the nitrogen dioxide annual mean are on the A346 through the town. This provides a significant North/south transport link between the M4/ Swindon to the south coast. It is acknowledged that with the town there is a desire to see a reduction in HGVs passing through the town and for the route to be de-primed, the latter having been refused by the Highway Authority (Wiltshire Council).
Modelling has been carried out, but the baseline modelled data for 6 Barn Street was 75ug/m^3 compared with measured data of 37ug/m^3. We have rejected the modelling as this disparity between measured and modelled is not credible to take forward. The following two measures have subsequently been developed:

A16 facilitate shift from diesel to electric (18)

A17 Improve connectivity within Marlborough Area (4)

A16 Facilitate a shift from diesel to electric vehicles.

The major contributor to poor air quality is diesel powered cars. The transition to electric vehicles as supported by Government policy will not occur if there is an absence of infrastructure to support people in making this move. There is a significant amount of public parking in the centre of Marlborough, and we will therefore seek to facilitate establishment of private (serving new development) and public electric charging points in line with the draft SPD on Air Quality. We will also seek delivery of foot and cycleway provision to maximise opportunities to improve connectivity in the immediate area, in line with the emerging Marlborough Neighbourhood plan.

A16 CBA: AQ (2) x Ex (3) x Po (3) - £ (0) = Overall Rating (18)

A17 Improve connectivity within the Marlborough area.

There is a particular dependence on the private car in the Marlborough area. There is no longer a rail link from Marlborough, the nearest stations being Great Bedwyn and

Swindon. Through the life of this plan, we will examine means to build greater connectivity between public transport services and promote their use in order to reduce dependency on the private car and reduce social exclusion through lack of access to public transport through S106 and CIL funding and other opportunities that may arise including bidding for grant funding from DEFRA.
Marlborough Town Council is undertaking a traffic survey and modelling. The Action plan is a “living” document and through its life will be reviewed. Any measures that are supported locally can reviewed for potential incorporation into the plan.

A17 CBA: AQ (1) x Ex (2) x Po (2) - £ (0) = Overall Rating (4)

Devizes AQMA

A single measure has been considered for the Devizes AQMA, related to improvements around a specific junction.

A18 Junction improvements around Shanes Castle/Wadworth junction (6)

A18 Junction improvements around Shanes Castle/Wadworth junction

Where the A342 Dunkirk Hill and the A361 Bath Road meet, air quality concentrations have been elevated because of heavy queuing along the roads. The modelled traffic speeds were raised to simulate a reduction in congestion on roads the vicinity of Shanes Castle and Wadworth junction. **Error! Reference source not found.** illustrates the locations with the highest nitrogen dioxide potential impacts with the measure in place, modelled at receptors along A342 Dunkirk Hill and the A361 Bath Road.

Table 5-9: Results of the Baseline and Future year scenario with and without measure A18

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026*		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RD004	Shanes Castle Bath Road SN10 2AY	**46.4**	**46.3**	-0.1	28.4	28.2	-0.2

Recept or ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026*		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RD008	The Cedars Bath Road SN10 2AP	28.0	27.1	-0.9	17.9	16.8	-1.2
RD009	25 The Nursery SN10 2AG	32.9	31.6	-1.4	21.0	19.2	-1.7
RD010	16 The Nursery SN10 2AQ	32.1	30.7	-1.4	20.5	18.7	-1.8
RD011	1 The Old Artichoke Apartments SN10 2AA	31.5	30.2	-1.3	20.1	18.5	-1.6
RD012	6 Melbourne Place SN10 2AB	28.8	27.6	-1.2	18.5	17.0	-1.5
RD013	Red House Bath Road SN10 2AN	26.4	25.4	-1.0	17.0	15.8	-1.2
RD018	3 Cyprus Terrace SN10 1JR	**47.4**	**47.3**	-0.1	28.8	28.6	-0.1

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective. *2026 baseline speeds are lower, hence the greater improvement in concentrations

With the measure in place, reductions of up to 1.4 µg/m^3 and 1.8 µg/m^3 in the baseline and future year scenarios are expected across modelled receptors in the vicinity of the AQMA. The greatest impacts are likely to be observed on The Nursery Road, with traffic congestion prevalent along this road, as demonstrated by the reductions in NO_2 concentrations at receptors RD009, RD010 and RD011.

A18 CBA: AQ (2) x Ex (3) x Po (2) - £ (3) = Overall Rating (9)

Further Measures

Two further measures for the Devizes AQMA have been included within the AQAP:

A19 Devizes Transport Strategy (8)

A20 Devizes Canal Towpath Cycle route (7)

A19 Devizes Transport Strategy

A Transport Strategy for Devizes has been in place since 2016, and the Council will continue to implement, and possibly refresh, the plan to target pollution hotspots.

A19 CBA – AQ (1) x Ex (3) x Po (3) - £ (1) = Overall Rating (8)

A20 Devizes Canal Towpath Cycle route

The provision of new cycle way along canal towpath should help to encourage active journeys in the town. The works is in progress at the time of writing. Four out of five phases are complete, but no funding for phase 5 has been identified at this stage. Funding to completion will be sought as part of the AQAP.

A20 CBA – AQ (1) x Ex (3) x Po (3) - £ (2) = Overall Rating (7)

Calne AQMA

Two measures were modelled for their impact on NO_2 concentrations, as follows:

A21 Re-routing traffic via high street (2)

A22 Upgrade of buses from Euro IV to Euro VI (7)

A21 Re-routing traffic via High Street

The traffic flow through Calne Town Centre has been identified to be very high (Ref. 31). To help ease the delays and congestion, the previously pedestrianised High Street was modelled to allow traffic to flow through again. Traffic was simulated to be removed from the adjacent links and rerouted through the High Street (further details provided in the Appendix). Table 5-10 shows the locations with the largest potential impacts on nitrogen dioxide with the measure in place.

Table 5-10: Results of the Baseline and Future year scenario with and without measure A21

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RC43	Mole End Quarr, Barton SN11 0EB	15.0	14.7	-0.3	10.2	10.0	-0.2
RC56	12 Curzon Street SN11 0DD	25.3	25.1	-0.2	15.9	15.8	-0.1
RC59	6 Curzon Street SN11 0DD	24.1	23.9	-0.2	15.2	15.1	-0.1
RC34	5 Market Hill SN11 0BU	14.5	14.4	-0.1	9.9	9.8	-0.1
RC51	6 - 8 Wood Street SN11 0DA	21.3	21.3	+0.1	13.7	13.7	<0.1
RC57	Flat 2 5A Wood Street SN11 0BZ	21.9	22.0	+0.1	14.0	14.1	+0.1
RC54	5 The Square SN11 0BY	23.2	23.4	+0.2	14.7	14.9	+0.1
RC49	Flat 1A 1 Phelps Parade SN11 0HA	21.7	21.9	+0.3	13.9	14.0	+0.1
RC30	2 London Road SN11 0AB	29.7	29.7	<0.1	18.7	18.7	<0.1

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

There impacts of re-opening the High Street to road traffic are two-fold. Firstly, concentrations along the southern half of both the Square and Curzon Street (RC 43, RC 56, RC 59, and RC 24) all display a reduction in NO_2 concentrations across both the baseline and future year scenarios. Secondly, there are slight increases noted at other receptors (RC 51, RC 57, RC 54 and RC 49) along the Square which are closer to the High Street but there is an overall net benefit experienced across all impacted receptors in the vicinity of the High Street of -0.3 µg/m^3 and -0.2 µg/m^3 in the 2019 and 2026 scenarios respectively. As this scenario was based on the manual adjustment of

traffic flows rather than an updated strategic traffic model, it is considered likely that further distributional impacts may occur elsewhere within the vicinity that could not be considered due to the limitations of the method.

A21 CBA – AQ (1) x Ex (2) x Po (2) - £ (2) = Overall Rating (2)

A22 Upgrade of buses from Euro IV to Euro VI

Decreases in nitrogen dioxide concentrations are modelled across the entire road network with the biggest impacts found on sensitive receptors on New Road and to a lesser extent on The Square/Wood Street. In particular, Receptors RC 31 and RC 28 were considerably above the annual mean AQO for nitrogen dioxide and through changes of the engine standard, concentrations at these receptors were estimated to decrease by up to 0.5 µg/m3 and 0.4 µg/m3 within the 2019 and 2026 scenarios, respectively.

Table 5-11A: Results of the Baseline and Future year scenario with and without measure A22

Receptor ID	Address	NO_2 Annual Mean (µg/m^3)					
		2019			2026		
		Without Measure	With Measure	Change in NO_2	Without Measure	With Measure	Change in NO_2
RC31	Girl Guides Hall Silver Street SN11 0JE	**53.2**	**52.7**	-0.5	32.4	32.0	-0.4
RC28	30 New Road SN11 0JQ	**51.2**	**50.8**	-0.5	31.2	30.8	-0.4
RC29	35A New Road SN11 0JQ	32.0	31.7	-0.3	19.7	19.4	-0.2
RC55	The Wheatsheaf Curzon Street SN11 0DD	29.2	28.9	-0.3	18.1	17.9	-0.2
RC45	13A Wood Street, SN11 0BZ	26.5	26.2	-0.2	16.6	16.4	-0.2

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 µg/m^3, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

Since developing and modelling this objective Calne has achieved 100% Euro 6 buses. The bus operators change their fleets and timetables so it is not certain that this will be maintained. Wiltshire Council's air quality monitoring data has been put to practical use and been used to support applications for applications for clean buses and clean bus technology. We will continue to work with the Passenger Transport Team and bus providers to support applications for this purpose, as well as promoting use of public transport and working to improve connectivity.

A22 CBA – AQ (1) x Ex (3) x Po (3) - £ (2) = Overall Rating (7)

Further Measures

Further measures for the Calne AQMA have been included within the AQAP, but were not considered for modelling as they are investigative measures:

A23 Support implementation of Calne Transport Strategy (CTS)

A24 Provision of electric vehicle recharging points within the town & Sustainable transport options ((1)

A23 Support implementation of Calne Transport Strategy (CTS)

No plan or strategy stands in isolation, and we seek to ensure common objectives are identified and the AQAP and associated data is used to support kindred projects and initiatives. Calne Area Transport Group (CATG) issues faced by the town. The strategy identifies four key themes which are supportive of improving air quality within the town. These are:

- Improvements to the pedestrian and cycle network
- Highway improvements
- Public Transport network improvements
- Use of smarter travel choices.

We will look to support CTS initiatives that improve air quality.

A23 CBA – AQ (2) x Ex (2) x Po (3) - £ (2) = Overall Rating (10)

A24 Pursue provision of electric vehicle recharging points within the town & sustainable transport options.

It has been a concern of the Calne Air Quality Group that the town lacks infrastructure necessary to facilitate and accommodate electric vehicle charging. This can potentially be addressed in a number of ways, particularly through the Development Control Process. We already ask for provision and S106 funding in response to planning consultations amongst other measures.

A24 CBA – AQ (2) x Ex (2) x Po (3) - £ (2) = Overall Rating (10)

AQAP Measures Table

Table 5-11 – Air Quality Action Plan Options & Measures

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
Strategic Measures												
S1	All	Electric Vehicle Charging Infrastructure Strategy	Promoting Low Emission Transport	Procuring alternative refuelling infrastructure to promote Low Emission Vehicles, EV recharging, gas fuel recharging	WC	2020-2022	Ongoing	No. of additional EV charging points installed	Not Modelled – less than 1 µg/m^3	Cabinet meeting on 12th October 2021 to discuss new EV charging infrastructure plan.	Ongoing	Will be used to increase the number of electric vehicles charging points across Wiltshire. Currently 76 EV charging points in council owned car parks. Looking to ensure the right charging points (i.e Fast 7kw AC, Rapid 50kw DC and Ultra Rapid 200kw DC) are installed in the correct locations
S2	All	Local Transport Plans	Framework Policy	Policy & guidance	WC	2022 onward development of LTP4	LTP3 2016-2026 LTP4 2026-2036	See plans for specific KPIs	Not Modelled est 1-5ug/m^3	See plan specific implemenation reports	Ongoing	These are the framework for the strategic policy for growth and development are developed in conjunction wit the core strategy/ the emerging Local Plan
S3	All	Local Cycling & Walking Infrastructure Plans	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	WC	2022-2023	Plans in development	See plans for specific KPIs	Not Modelled-est 1-5ug/m^3	Public consultation of first plans underway	Ongoing	The LCWIPs will be a long-term commitment beyond the life of the AQAP
S4	All	Bus service Improvement Plan	Promoting Travel Alternatives	Public Transport enhancement	WC	Complete	Ongoing	See plan for specific KPIs	Not Modelled-est 1-5ug/m^3		Ongoing	Wiltshire Council's BSIP seeks to prioritise services at locations which operate through and AQMA in recognition of the need to mitigate poor air quality. As such, the authority will ensure our work to bring zero-emission buses to the county will prioritise routes operating in these areas to maximise the benefits of reduced emissions and improved air quality

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
S5	All	Car Clubs & E Bike Hire Schemes	Sustainable transport	Sustainable Transport	WC	2022	Dependant on funding	Implementation of schemes	Not Modelled estimated at 1-5ug/m^3		Beyond life of AQAP	One car club in Salisbury, interest within Devizes in establishing a club.
S6	All	Taxi Low Emission Licensing	Promoting Low Emission Transport	Taxi Licensing conditions	WC	Ongoing	Ongoing	Percentage of fleet at least Euro 6, or hybrid / ULEV	Not Modelled – less than 1 µg/m^3	Discussion held with previous Head of service pre covid	Ongoing	Engage with Taxi Licensing team to encourage uptake of low emission vehicles within the private hire and taxi fleet operating in the county
S7	All	Low Traffic Neighbourhoods (LTNs)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	WC	TBC	TBC	No. of LTNs	Not Modelled, impacts unknown	N/a	Unknown	Investigate trials of LTNs in any relevant AQMAs. Dependent on local resident engagement
S8	All	Promoting Active Travel (also cycle/ walking schemes)	Promoting Travel Alternatives	Intensive active travel campaign & infrastructure	WC	Ongoing	Ongoing	Modal Shift	Not Modelled – less than 1 µg/m^3	Various initiatives already underway	Ongoing	Get Wiltshire Walking walks returned from 4 May 2021. Get Wiltshire Walking is a Public Health funded project. Connecting Wiltshire: cycling – provides information on how to get into cycling in Wiltshire.
S9	All	Fleet Recognition Schemes	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	WC	2022	2022-2026	Firms signed up to scheme	Not Modelled, impacts estimated for CBA as 1-5ug/m^3	N/a	2028	Investigate the viability of implementing fleet recognition schemes such as EcoStars https://www.ecostars-uk.com/
S10	All	Limit Road Work Hours to Outside of Peak Periods	Traffic Management	UTC, Congestion management, traffic reduction	WC	2022	2022-2026	-	Not Modelled, impacts estimated for CBA as 1-5ug/m^3	N/a	2024	Investigating viability of minor works outside of peak hours only. Should aid congestion, and therefore reduce emissions

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
S11	All	Community AQ groups for Area Boards with AQMAs	Policy Guidance and Development Control	Regional Groups Co-ordinating programmes to develop Area wide Strategies to reduce emissions and improve air quality	WC	Ongoing	Ongoing	Activity of Groups	Not Modelled, impacts estimated for CBA as <1ug/m^3	All AQMAs have Area Boards	Ongoing	Variable ongoing activity across groups. Several groups are active, some will need to be revisited.
S12	All	Delivering Air Quality Improvements through the Planning System	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WC	2009-Present	2022-2026	References in planning application documents	Not modelled, specific to each application est cumulative effect 1-5ug/m^3	Draft produced	2024	Revised Draft SPD will be consulted on alongside the AQAP. New development will be required to adhere to Air Quality Strategy, and Core Policy 55. The ultimate aim is to secure mitigation either directly or if more appropriate, by offsetting via s106 and CIL funding applications.
S13	All	The Green & Blue Infrastructure Strategy into air quality policy, to support core policy 52 of the Wiltshire Core Strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WC	2021	2022	See Strategy for specific KPIs	Not Modelled, impacts est at <1ug/m^3	Adopted February 2022	Ongoing	See Ref. 16 for further details
S14	All	Wiltshire Climate Strategy into air quality policy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WC	2021	2022-27	See Strategy for KPIs	Not Modelled, impact est 1-5ug/m^3	Adopted February 2022	Ongoing	Climate and air quality policies often overlap, so joint consideration will be essential to success in both areas
S15	All	Air Quality Website	Public Information	Via the Internet	WC	Ongoing	Ongoing	Page visits	Not Modelled, impacts unknown est <1ug/m^3	Website active	Ongoing	New website developed to sign post people to the right information and resources to reduce their impact on Air Quality. Wiltshire AQ data published on AQE website.

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
S16	All	Environment and Climate Forum	Public Information	Via other mechanisms	WC	Ongoing	Ongoing	Number of Issues Covered by Forum	Not Modelled, impacts unknown est <1ug/m^3	Group to be established shortly	Ongoing	Established primarily in response to climate emergency but can help to cover topics within the AQAP
S17	All	Support air quality events such as Clean Air Day	Public Information	Via other mechanisms	WC	Ongoing	Ongoing	Number of events supported	Not Modelled, impacts unknown est <1ug/m^3	A number of events supported in 2020	Ongoing	Intention to support any events related to air quality promotion in the county
S18	All	Promotion & Support of No Idling Schemes	Public Information	Via other mechanisms	WC	2022-2026	Life of the AQAP	No of schemes	Not Modelled, impact est <1ug/m^3	-	Ongoing	PPS service commitment to Climate Change programme
S19	The UK100	Promoting Climate change & Air Quality good practice across local authorities/ partnership working	Partnership working	Via other mechanisms	WC/Partners	Ongoing	Ongoing	-	Not modelled	-	Ongoing	https://www.uk100.org/
S20	All	Combustion Control and Regulation	Promoting Low Emission Plant	Regulations for fuel quality for low emission fuels for stationary and mobile sources	WC	Ongoing	Ongoing	Number of smoke control complaints	Not Modelled, impacts unknown	Not generally an issue to date	Ongoing work for the Council	Whilst there are currently no smoke control areas, these can be implemented where needed. The Council has powers it can exercise against people causing a statutory nuisance and nvestigates allegations of nuisance made. Also plan to implement Eco-design 2022 regulations for small wood burning stoves, which are increasing in popularity
AQMA Specific Measures												
A1	Salisbury (City Centre)	Improvements to active travel routes in the city centre	Traffic Management	UTC, Congestion management, traffic reduction	WC	2022	2022-2026	Implementation	Potential reductions of up to 1.0 µg/m^3 with a similar scheme	Scheme removed due to concern of impact on businesses	TBC	People Friendly Streets was implemented for a brief period in 2020 but discontinued. Behavioural change was achieved. investigate options for revised measures

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
A2	Salisbury (City Centre)	Improving Rail station connectivity with city centre	Traffic Management	UTC, Congestion management, traffic reduction	WC	2021-2022	2022-2023	Parking controls at station	To be populated when detailed plans are available	Planning phase at present	2024-2025	implementation of rail station forecourt scheme including EV charging and relocation of car parking in order to encourage modal shift in order to encourage modal and improve fleet emissions
A3	Salisbury (A36 Wilton Road)	Improvements to junction near Wilton, Harnham gyratory and Exeter Street roundabout.	Traffic Management	UTC, Congestion management, traffic reduction	WC	2021-2022	2022-2023	Junction idling times	Up to 0.3 µg/m^3	Planning phase at present	2025	The junctions near Wilton have been identified as having congestion issues that has triggered air quality issues in the area. Potential improvements at these junctions are aimed at easing congestion and improving traffic flow in the Salisbury AQMAs.
A4	Salisbury (A36 Wilton Road)	MOVA upgrade on A36 roundabout traffic lights along Churchill Way.	Traffic Management	UTC, Congestion management, traffic reduction	WC	2022	2022-2023	Junction idling times	Up to 0.2 µg/m^3	Planning phase at present	2025	Improving traffic flows and emissions through MOVA technology
A5	Salisbury (All)	Improvement to A36 Trunk Road through Salisbury	Traffic Management	Strategic highway improvements, Reprioritising road space away from cars, inc Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	WC, HA	2018 - Present	Post 2022	Project status	Not modelled, would require detailed consideration / options appraisal. Would likely achieve 'Medium' to 'High' improvements though	-	-Unknown	Will be the subject of continuing discussions between Wiltshire Council and National Highways.

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
A6	Salisbury (All)	Targeting Ind. Estate LGVs	Promoting Low Emission Transport	Company Vehicle Procurement - Prioritising uptake of low emission vehicles	WC	2022-2023	Post 2022	-	Unknown, not modelled. Likely to be minimal impacts.	Being considered for feasibility	Post 2024	LGV emissions from the Industrial Estate are known to largely contribute to exceedances on Southwestern Road. The feasibility of wider re-development of the industrial estate will be explored, as will the creation of preferential routes for LGVs
A7	Salisbury (All)	Salisbury Park and Ride	Transport Planning and Infrastructure	Other	WC	Complete	Ongoing	Park and Ride Usage	Not modelled, current measure	Implemented	Ongoing	Measures to encourage better use of Park & Ride to be explored including improved bus priority along the A345
A8	Salisbury (All)	Salisbury Transport & Parking measures as set out in Parking Implementation Plan	Traffic Management	Parking measures	WC	2018-Present	Ongoing	Publication / updates of strategies	Not modelled, current measure	-	Ongoing	Transport and Parking strategies specific to Salisbury will help to improve air quality in the city.
A9	Bradford-on-Avon	Re-introduction of one-way system.	Traffic Management	UTC, Congestion management, traffic reduction	WC	2021	2022-2023	One-way system implementation date	See Table 5-5	Previously imposed, so known to be effective	2024-2025	Diverting traffic away from Market Street and Mason's Lane aiming to reduce concentrations in AQMA. Previously enforced through Experimental Traffic Regulation Order
A10	Bradford-on-Avon	Stricter weight limits restriction on Town Bridge	Traffic Management	Emission based parking or permit charges	WC	2021	2022-2023	Weight Limit Implementation Date	Up to 0.9 µg/m^3	N/a	2024	Heavier vehicles are bigger emitters, so by potentially removing these from the AQMA will reduce NO_2 concentrations
A11	Bradford-on-Avon	Tree crown reduction on Masons Lane	Policy Guidance and Development Control	Other Policy	WC	2021	2022-2023	Foliage Coverage	Up to 13.6 µg/m^3 along Manson's Lane only (assuming canyon effect removed)	N/a	2024-2025	Foliage on western side of Mason's Lane creates canyon effect combined with buildings on opposite side. Cutting this back would aid dispersion

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
A12	Westbury	Junction optimisation at A350/Bratton Rd (B3098) and A350/ Station Rd (B3097)	Traffic Management	UTC, Congestion management, traffic reduction	WC	2021	2022-2023	Idling time at roundabouts	Up to 1.2 µg/m^3	Planning phase at present	Ongoing	The aim is to reduce idling time by improving congestion, and therefore reduce emissions
A13	Westbury	Improvements to the A350 through Westbury	Traffic management	Traffic management	WC	-	-	Implementation of highway improvements	Estimated as med- High	Improvement being made to A350 from north to South.	Ongoing	Improvements are being implemented progressively to the A350 from north to south. Proposals for Chippenham and Melksham are in development
A14	Westbury	Peak hour re-routing of traffic	Traffic Management	UTC, Congestion management, traffic reduction	WC	2021 - 2022	2022-2023	Traffic flow through key junctions in peak hours	Not modelled, at early stages of consideration	N/a	Ongoing	Investigating with Transport team viability of alternative routes to the AQMA during morning and evening peaks
A15	Westbury, Marlborough	Sustainable Last Mile Deliveries	Freight and Delivery Management	Delivery and Service plans	WC	2021	2022-2023	Number of deliveries made by renewable means	Not Modelled, impacts unknown	N/a	Unknown	Investigate the viability of incentivising sustainable modes of last mile delivery, such as the e-cargo bikes trialled in London, given LGVs are dominant contributor sources in both these AQMAs
A16	Marlborough	Facilitate a shift from diesel to electric vehicles	Infrastructure/ Traffic Management	UTC, Congestion management, traffic reduction	WC	2021	2022-2024	Queue time at junctions	No Modelled	N/a	2025	Facilitate shift to low emission vehicles & reduce congestion,
A17	Marlborough	Improve connectivity within the Marlborough area	Public transport	Public transport	WC			Provision of improved public transport	Not modelled est at <1ug/m^3	-	-	Support Passenger Transport Team through bids for funding.
A18	Devizes	Traffic improvements around Shanes Castle/Wadworth junction	Traffic Management	UTC, Congestion management, traffic reduction	WC	2021	2022-2023	Queue time at junctions	Up to 1.8 µg/m^3	N/a	2024	Should aid congestion, and therefore reduce emissions
A19	Devizes	Devizes Transport Strategy	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	WC	2016	Ongoing	-	Not Modelled, impacts unknown	A plan has been in place since 2016	Ongoing	Continue to implement, and possibly refresh, plan to target pollution hotspots

Measure No.	AQMA	Measure	EU Category	EU Classification	Lead Authority	Planning Phase	Implementation Phase	KPI	Target Pollution Reduction in the AQMA	Progress to Date	Estimated Completion Date	Comments
A20	Devizes	Devizes Canal Towpath Cycle route	Transport Planning and Infrastructure	Cycle network	WC	2019 - 2021	Ongoing	Number of cyclists using route	Not Modelled, impacts unknown	Provision of cycle way along canal towpath	Ongoing	Works in progress. Tow Path – 4 out 5 phases complete. No funding for phase 5 identified at this stage. Works ongoing
A21	Calne	Re-routing traffic via high street	Traffic Management	UTC, Congestion management, traffic reduction	WC	2021	2022-2023	Implementation of re-routing	Up to 0.2 µg/m^3	N/a	2024-2025	Opening up another through route should ease congestion at junctions
A22	Calne	Upgrade of buses from Euro IV to Euro VI	Vehicle Fleet Efficiency	Other	WC	2021	2022-2023	Percentage of fleet Euro VI	Up to 0.4 µg/m^3	90% of journeys currently Euro VI	2023 and Ongoing	Improvement has been achieved but further work required.
A23	Calne	Support Implementation of Calne Transport Strategy	Policy, Public transport enhancement, active travel	Policy, Public transport enhancement, active travel	WC	2021	Ongoing	See plan for specific KPIs	Not Modelled. Est 1-5ug/m^3		Beyond life of AQAP	Calne Transport Strategy
A24	Calne	Pursue provision of electric vehicle recharging points within the town & sustainable transport options	Transport Planning & Infrastructure	Facilitating shift to ULEV/ Re-prioritising road space away from cars	WC	2023	2023-2026	Charging point provision/ sustainable transport options available.	Not Modelled – Likely to be 1-5 µg/m^3 at hyper local scale		2026	Addresses concerns made by Calne Air Quality Group regarding provision of charging points and desire to increase sustainable transport options.

Appendix A: Response to Consultation

Table A.1 – Summary of Responses to Consultation and Stakeholder Engagement on the AQAP

Consultee	Category	Response
Highway Operations (includes; Passenger Transport Team, Fleet Services, Street scene, & Parking Services)	Internal	Commentary provided by Passenger Services team on bus services and potential for upgrading to cleaner emissions. Further information sought from the team on wording and nature of bus related objectives with respect to Marlborough & Calne
Sustainable Transport Team	Internal	Detailed commentary provided with respect to measures and adopted policy within the team's remit. Measures updated and modified in line with most comments. Further information sought from the team.
Public Health Wiltshire	Internal	Typos and one query as to whether the plan referred only to nitrogen dioxide- yes, the plan is to address exceedances of the annual mean objective in relation to all 8 AQMAs.
Facilities Management	Internal	No comments
Waste Management	Internal	No Comments
Strategic Planning Team	Internal	No Comments
Development Services	Internal	No Comments
Climate Change	Internal	Comments provided, closer ties on delivering joint goals to be developed

Economy & Regeneration	Internal	No Comments
Partnership & Engagement Team (Community Area Boards)	Internal	No Comments
Natural & Historic Environment Team	Internal	No Comments
Legal Services	Internal	No Comments

Table A.2 – Summary of Responses to Public Consultation grouped into categories of most frequently asked questions/concerns.

Public comment	Response
There is little in the way of actual plans and no objectives or action plans that have time delivery that can be monitored and assessed.	We consider that the measures include those set out in table 5-11 represent the outcome of a prolonged period of consultation with key partners to determine their viability. Further details of this process can be found in the section titled 'Development and Implementation'.

The action plan does not consider fine particulates (PM2.5)	PM2.5 is not included within the LAQM framework and there is no duty to monitor in the same way as is required for other pollutants such as nitrogen dioxide and PM10. The action plan is required by the Environment Act to Address breaches of the UK air quality annual mean objective in eight locations in Wiltshire. Boarder objectives are detailed in the Air Quality Strategy for Wiltshire which we plan to review & will include issues such as PM2.5. Although Pm2.5 concentration are mainly influenced by transboundary sources the council can help to reduce levels within it's control. Examples of this action are inspecting industrial installations via the LAPPC to ensure levels of VOCs meet permit requirements and taking action via Environmental Protection Act 1990 provisions where bonfires are found to be causing a statutory nuisance.
The monitoring of air quality is not comprehensive enough meaning pollution ‘hotspots’ are missed. There needs to be more monitoring.	In total we have around 70 monitoring sites spread across Wiltshire comprising a mix of passive diffusion tubes and automatic analysers. The air pollution levels reported are sourced from a combination of our annual status report and ADMS modelling software. The ASR can be downloaded here https://www.wiltshire.gov.uk/article/6472/Air-quality-annual-reports.
There is a lack of detail on how the air quality ADMS modelling works	The AQAP refers to the technical aspects of the ADMS modeling software on page 40 via Reference 32 http://www.cerc.co.uk/environmental-software/ADMS-Roads-model.htm

There should be no idling signage setup in each AQMA and fines handed out to repeat offenders who leave engines idling	THE DFT have advised us on the following in relation to engine idling: 1) Under Regulation 98 of the Road Vehicles (Construction and Use) Regulations 1986, it is an offence to cause emissions or noise by leaving engines running unnecessarily whilst a vehicle is stationary. These requirements apply when a vehicle is parked at the roadside. Enforcement is carried out by the police. Also, under the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002, local authorities may issue fixed penalty notices for this offence. 2) 'Switch off engine' signs require DfT authorisation. However, there are strict guidelines on the number, location etc. for authorisation of these signs. These signs are not intended for general use. Applications will only be considered on a site specific basis where there is evidence that engines are habitually left running. We are exploring the option of no idling schemes with colleagues in our highways team. We will be exploring schemes targeted at sites and times where unnecessarily idling is known to be a particular problem such as schools at the start and end of

	the school day, or around areas which are particularly vulnerable to poor air quality.
There needs to be a bypass for Westbury and Salisbury to achieve significant air quality improvements to these towns.	The original AQAP focused on a proposed A350 bypass for Westbury. The cancellation of the bypass in 2009 forced a shift in action planning toward other measures such as promoting cycling and walking within Westbury. It is recognised that there is a historic and ongoing desire for a Salisbury bypass. The Council supports the principle of a bypass for Salisbury but the strategic need for it will be understood through the Department for Transport / National Highways M4 to Dorset Coast RIS2 (Road Investment Strategy) study 2020-2025. If identified as a need and a priority, the scheme would be progressed through a subsequent round(s) of the RIS and / or through the DfT's Major Road Network / Large Local Majors process and the Western Gateway Sub-national Transport Body. This is unlikely to deliver any improvements in the short to medium term and costs would be well in excess of £100 million.
The council should adopt a ULEZ or clean air zone scheme similar to Bath or Bristol to charge polluting vehicles	The UK Supreme Court ordered the government in 2015 to produce new air quality plans to bring air pollution down to legal levels in the "shortest possible time". Since 2017, the Government has used its powers under the Environment Act 1995 to 'direct' 64 local authorities to produce clean air plans. Clean air zones are often the most effective way to deliver compliance, in the shortest possible

	time and government funding has been granted to each of the 64 directed local authorities to assist with the setup of these types of schemes. Wiltshire Council was not one of these 64 councils directed by the government to produce clear air plans and therefore plans to seek compliance with legal emissions targets through this updated air quality action plan.
Why is the Westbury incinerator being allowed so close to the Westbury AQMA?	The incinerator planning application was refused by the council; however, this decision was subsequently approved by the planning inspector following an appeal. However, the poor air quality in Westbury is wholly caused by slow moving traffic (in particular diesel cars) along the A350 between Warminster Road and Haynes Road.
Large scale housebuilding should not be allowed close to AQMAs	A new SPD has been developed alongside this action plan for consultation and adoption by the council. The new SPD compliments core policy 55 of the Core Strategy, establishing a risk rating procedure for proposed sites on the basis of their impact on air quality (including proximity to existing AQMAs) and requires good design along with measures to mitigate/offset impacts of proposals. Provision is made to request financial contributions to assist in the delivery of measures contained within this action plan. This is a new area of work for the council and one we hope help ensure that developments must take into their impact on AQMAs.

The AQAP report is too long and difficult to read	Unfortunately, we are unable to change the format of the report as it is a requirement of Defra to structure the report in this way. However, recognising this we have also published a plain English non-technical summary document which can be downloaded on our air quality pages https://www.wiltshire.gov.uk/air-quality-reports
The pollution limits for nitrogen dioxide are too low at 40 ug/m3. The limits should be redrawn to require levels to be below the latest WHO standards of 10ug/m3.	The Environment Act 1995 (as amended in 2021) and the associated Air Quality (England) Regulations 2000 set the UK framework for local authorities in England. The Regulations specify that the UK air quality annual mean objective for Nitrogen Dioxide is 40 ug/m3.
The air quality measures don't go far enough.	We consider that the measures include those set out in table 5-11 represent the outcome of a prolonged period of consultation with key partners to determine their viability. Further details of this process can be found in the section titled 'Development and Implementation'.
The air quality measures won't work as predicted	The modelled measures have been subject to detailed ADMS Roads dispersion modelling which is the gold standard for air quality predictions. Many of these measures would be subject to detailed feasibility plans prior to their implementation and so the exact detail may change following this.

The proposed one way system at BoA will cause air quality to worsen on new road and Springfield	Monitoring of the areas highlighted took place when the social distancing one way system was in place in 2020/2021 and nitrogen dioxide levels were found to be significantly below the annual objective. The re-implementation of a similar traffic scheme to that of the social distancing scheme would assist in achieving the Bradford-on-Avon air quality objective in a shorter timeframe.
Car parking charges across council owned car parks should be based on vehicle emissions with the most polluting vehicles paying more.	Car parking charges based on emissions was explored at shortlisting stage however this option was ruled out as it was not sufficiently compatible with the policies of the parking service team.
HGVs are more polluting than cars so why do you claim that diesel cars are the most polluting?	The data on traffic emissions for vehicle was obtained using Department for Transport traffic counts, Wiltshire Council's own traffic counts and the source apportionment and emissions factor toolkit methodology https://laqm.defra.gov.uk/wp-content/uploads/2021/11/EFTv11.0-user-guide-v1.0.pdf On a vehicle-by-vehicle basis it is correct that emissions from HGVs are greater than diesel cars. However, the traffic counts confirm that there are significantly more diesel cars on the road than HGVs, and therefore as a collective, diesel cars are significantly more polluting.

Appendix B: Reasons for Not Pursuing Action Plan Measures

Table B.1 – Action Plan Measures Not Pursued and the Reasons for that Decision.

Action category	Action description	Reason action is not being pursued (including Stakeholder views)
Low Traffic Neighbourhoods within AQMAs	% car use reduction and/or diversionary re-routing	After consultation with transport colleagues, it was decided that there was not enough evidence that these measures would deliver the necessary air quality improvements to the A350.
Peak hr re-routing in Westbury	Moving peak hr traffic to different links	The risks of causing congestion at other locations as there are limited options for alternative routes in Westbury.
EV parking incentives in Westbury, Marlborough, Salisbury, Devizes	Incentivise lower emission vehicle adoption by having cheaper parking charges for these vehicles	Car parking charges based on emissions was explored at shortlisting stage however this option was ruled out as it was not sufficiently compatible with the current policies of the parking service team. There was also a concern that those on lower incomes who could not afford an electric vehicle would be disproportionately penalised.
Ped Crossing on Herd Street, Marlborough	Relocate pedestrian crossing to improve traffic flow	After consultation with highways we decided that the pedestrian safety benefits far outweighed the small improvement in air quality benefit.
Bus upgrade in Marlborough to all with euro 6 engines or above	Remove more polluting euro 4 engines from bus network	After consultation with public transport, we discovered that all buses going through Marlborough have euro 6 engines.
Investigate ownership of Calne Woodlands Social club	If the façade could be removed would benefit dispersion and reduce build up of pollutants	The council has no control over this parcel of land and the legal implications were considered too great to see the measure as viable option.

Appendix C: Source Apportionment Breakdown

Source apportionment has been provided for:

- The total nitrogen dioxide concentrations at the monitoring location with the highest nitrogen dioxide concentration in 2019 in each AQMA; and
- Road NOx component, using finer resolution of fleet breakdown data at Council traffic count sites.

Salisbury

Figure C. 1: Salisbury AQMAs NO_2 Source Apportionment at Highest Monitored Concentration

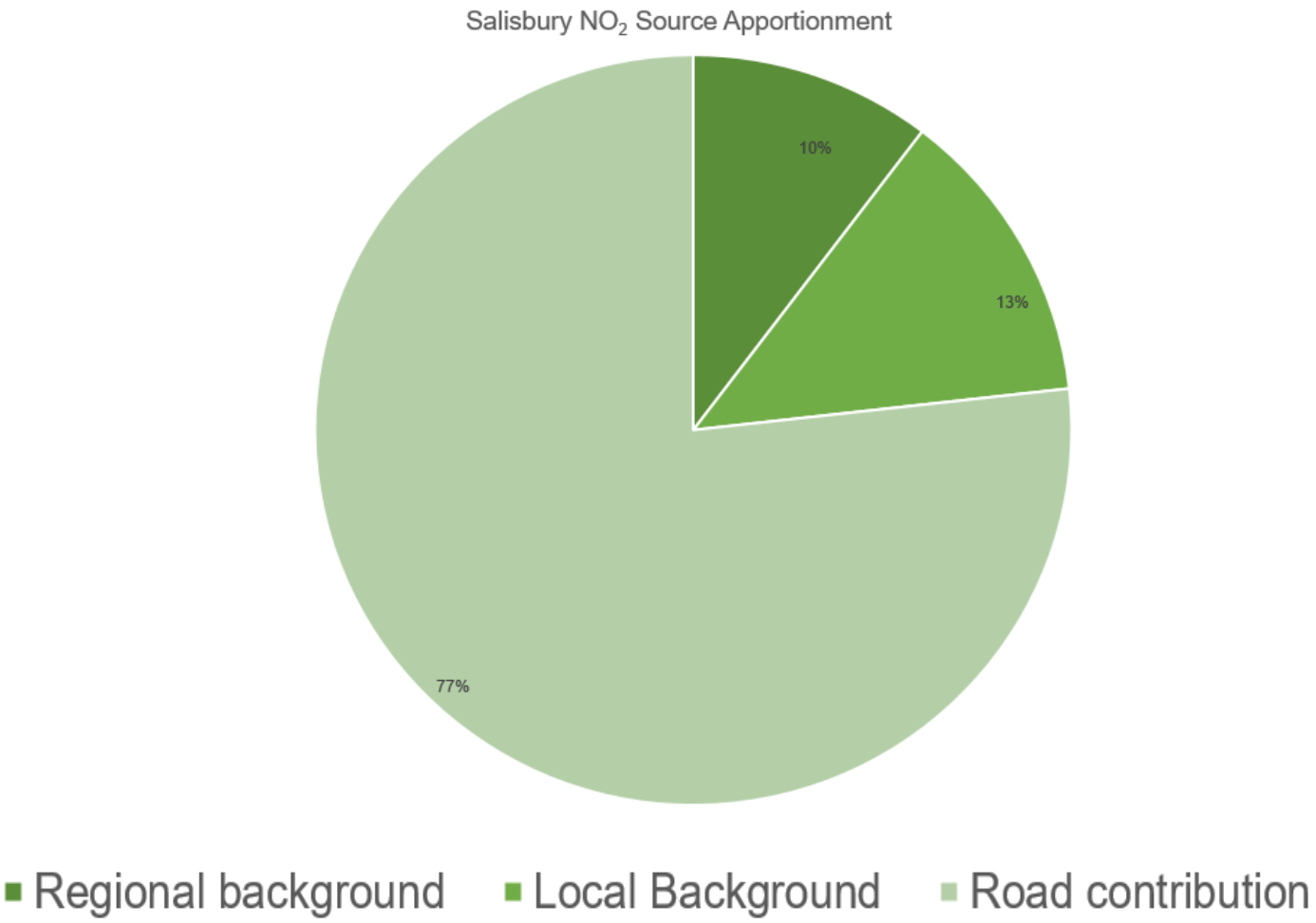
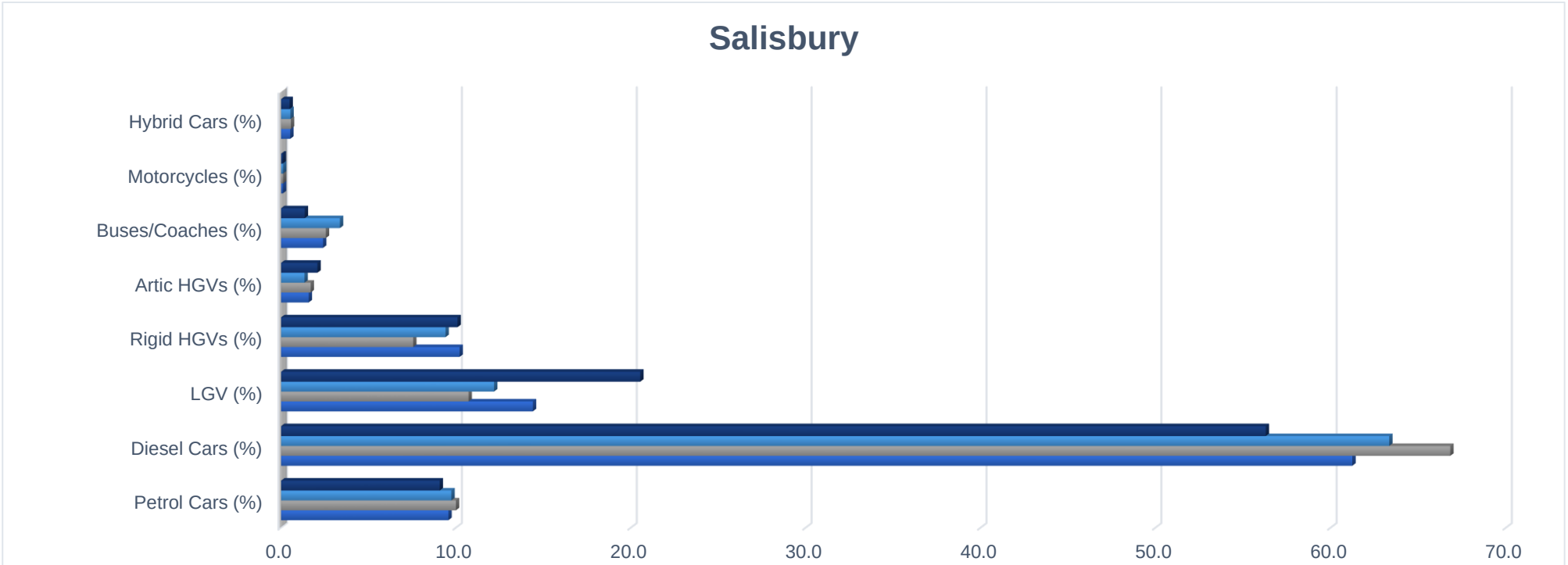


Figure C. 2: Salisbury AQMAs Road NOx Source Apportionment



	Petrol Cars (%)	Diesel Cars (%)	LGV (%)	Rigid HGVs (%)	Artic HGVs (%)	Buses/Coaches (%)	Motorcycles (%)	Hybrid Cars (%)
NE Salisbury A30	9.1	56.3	20.5	10.1	2.1	1.4	0.1	0.5
N Salisbury Castle St	9.7	63.3	12.2	9.4	1.3	3.4	0.1	0.5
NW Salisbury Fisherton St	10.0	66.8	10.7	7.6	1.7	2.6	0.1	0.6
S Salisbury Exeter St	9.6	61.2	14.4	10.2	1.6	2.4	0.1	0.5

Bradford-on-Avon:

Figure C. 3: Bradford-on-Avon AQMA NO_2 Source Apportionment at Highest Monitored Concentration

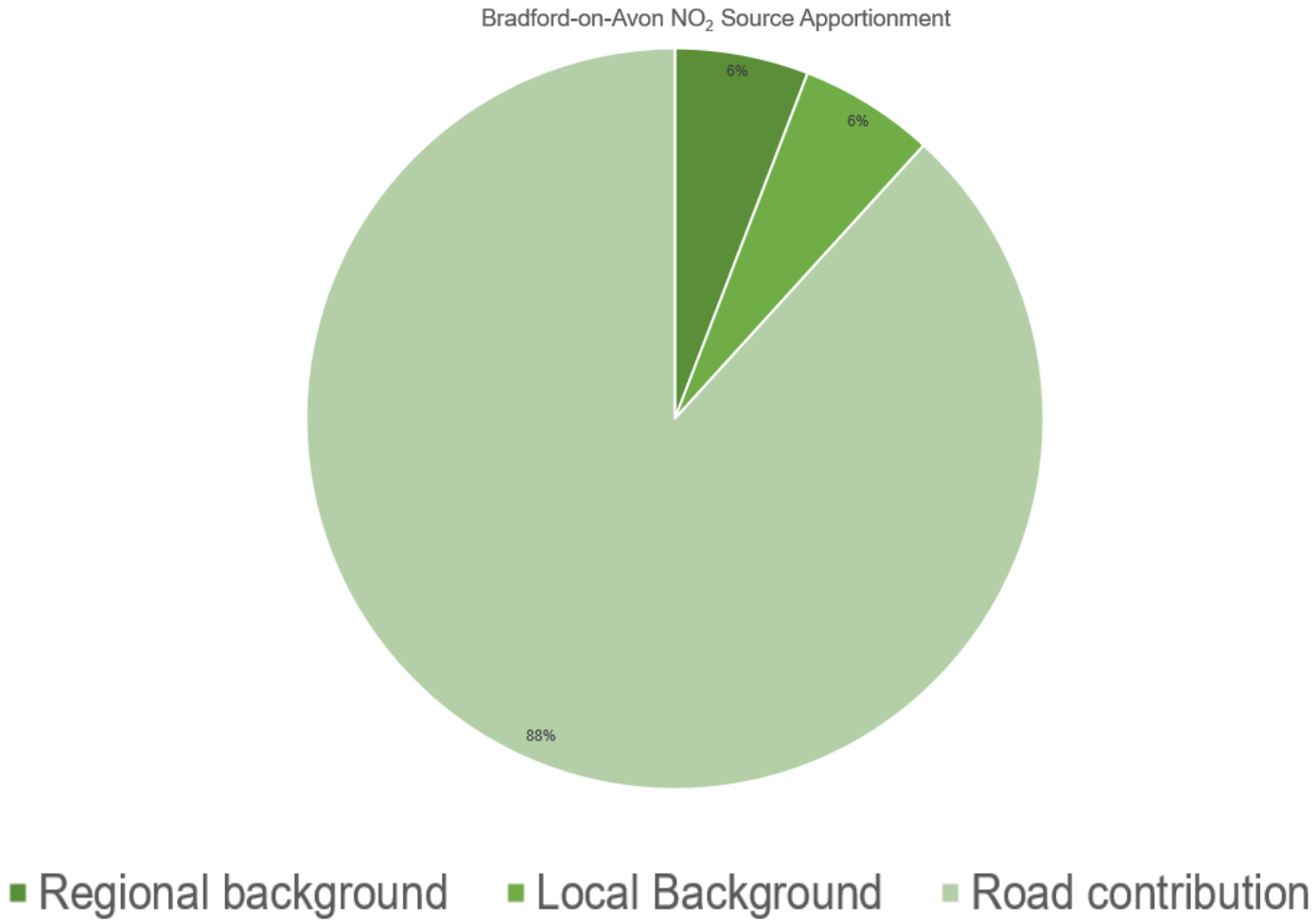
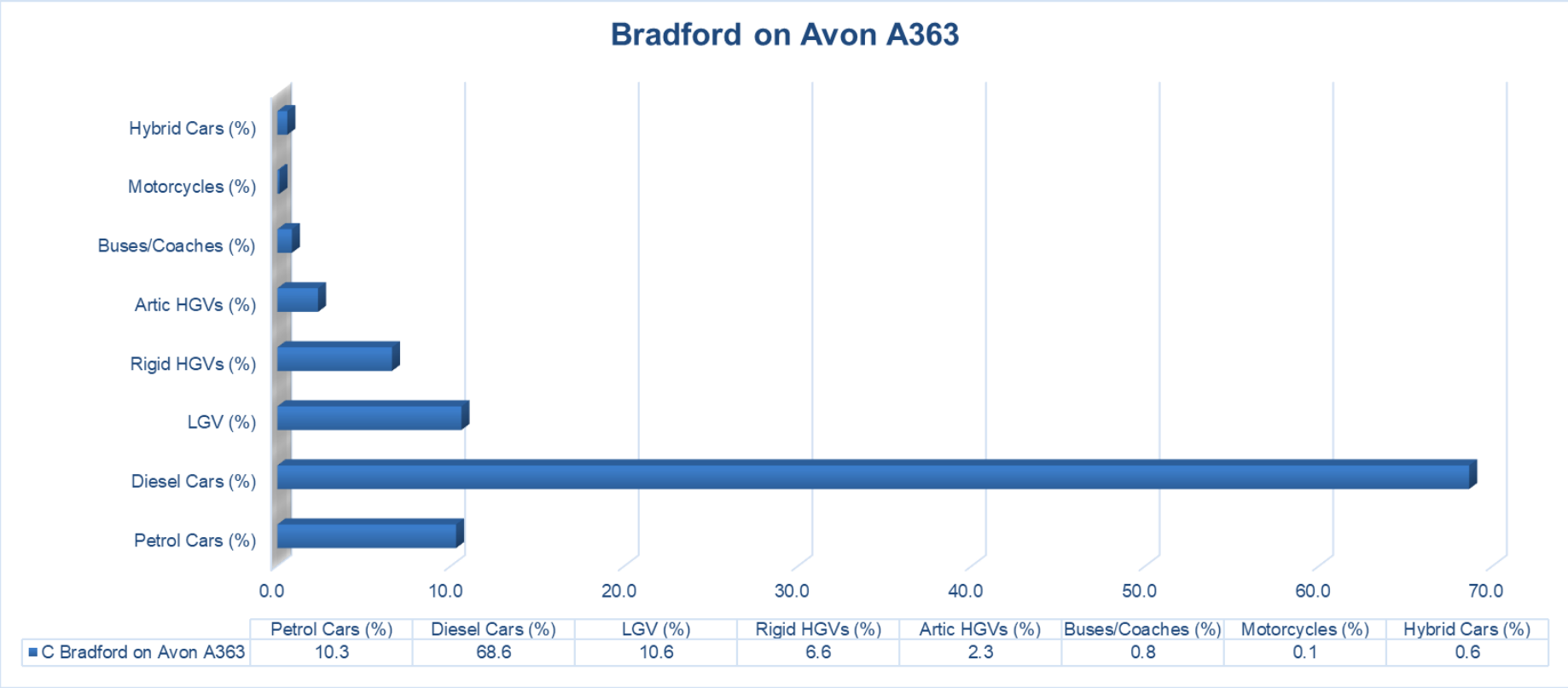


Figure C. 4: Bradford-on-Avon AQMA Road NOx Source Apportionment



	Petrol Cars (%)	Diesel Cars (%)	LGV (%)	Rigid HGVs (%)	Artic HGVs (%)	Buses/Coaches (%)	Motorcycles (%)	Hybrid Cars (%)
C Bradford on Avon A363	10.3	68.6	10.6	6.6	2.3	0.8	0.1	0.6

Westbury

Figure C. 5: Westbury AQMA NO_2 Source Apportionment at Highest Monitored Concentration

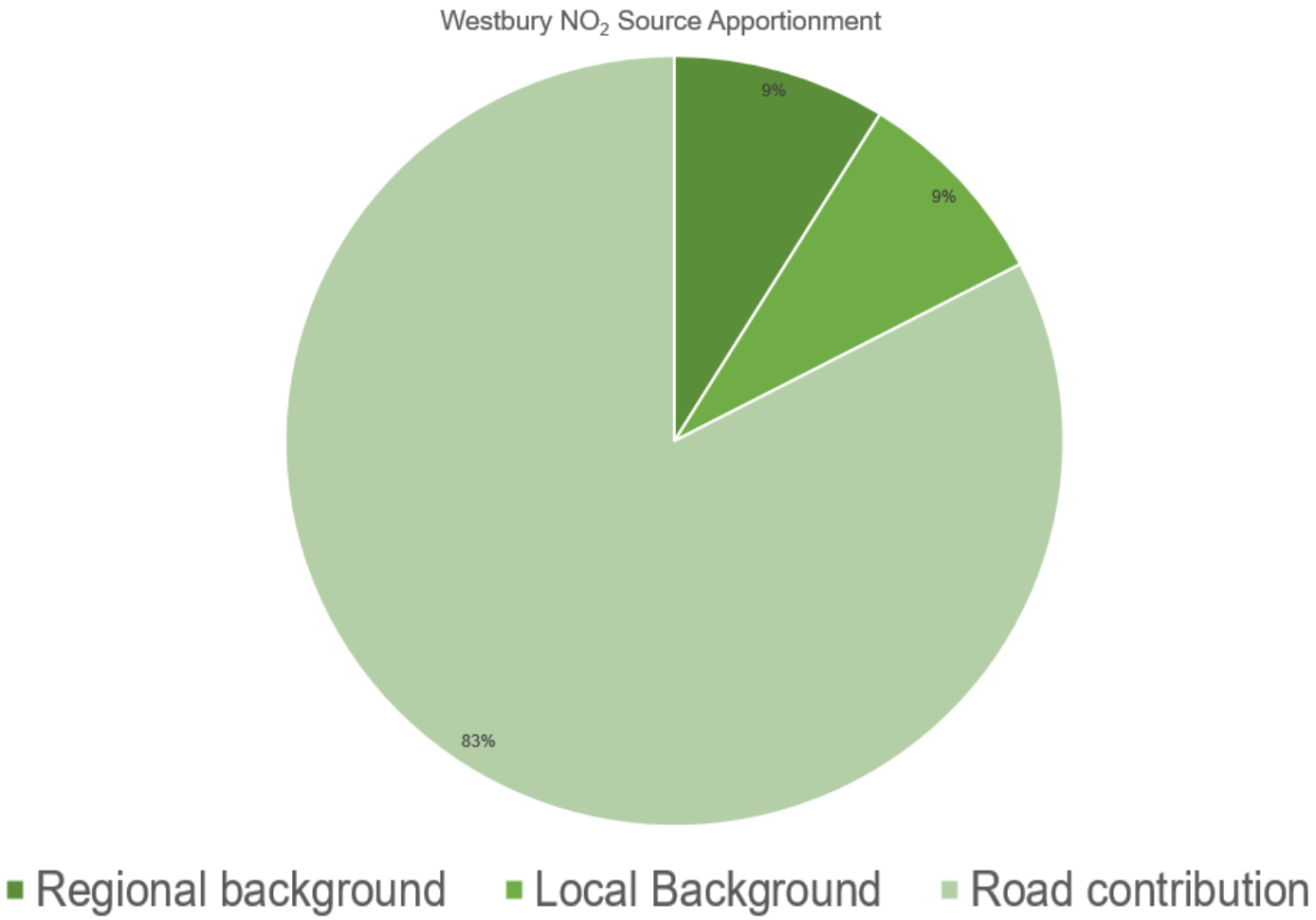
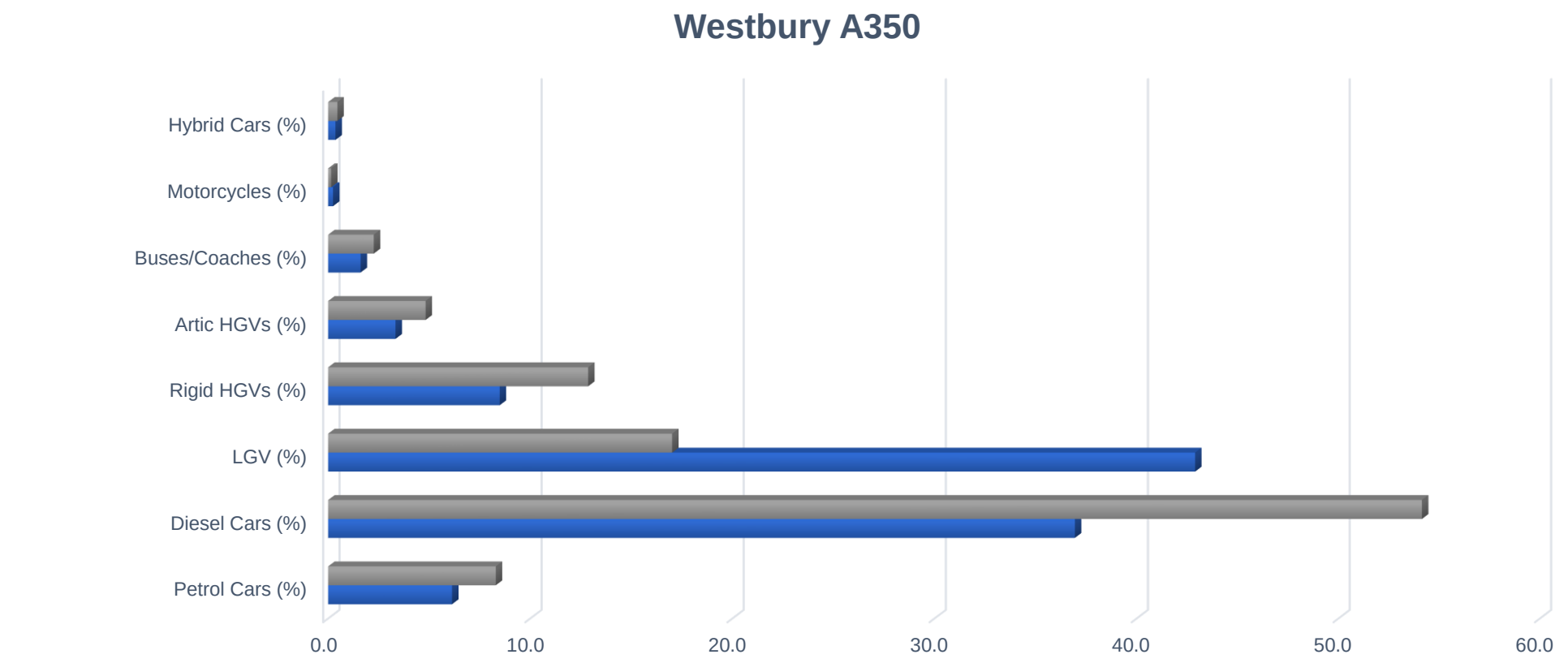


Figure C. 6: Westbury AQMA Road NOx Source Apportionment



	Petrol Cars (%)	Diesel Cars (%)	LGV (%)	Rigid HGVs (%)	Artic HGVs (%)	Buses/Coaches (%)	Motorcycles (%)	Hybrid Cars (%)
C Westbury A350 Haynes Road	8.3	54.1	17.0	12.9	4.8	2.3	0.1	0.5
N Westbury A350 Heywood	6.1	36.9	42.9	8.5	3.3	1.6	0.2	0.4

Marlborough

Figure C. 7: Marlborough AQMA NO_2 Source Apportionment at Highest Monitored Concentration

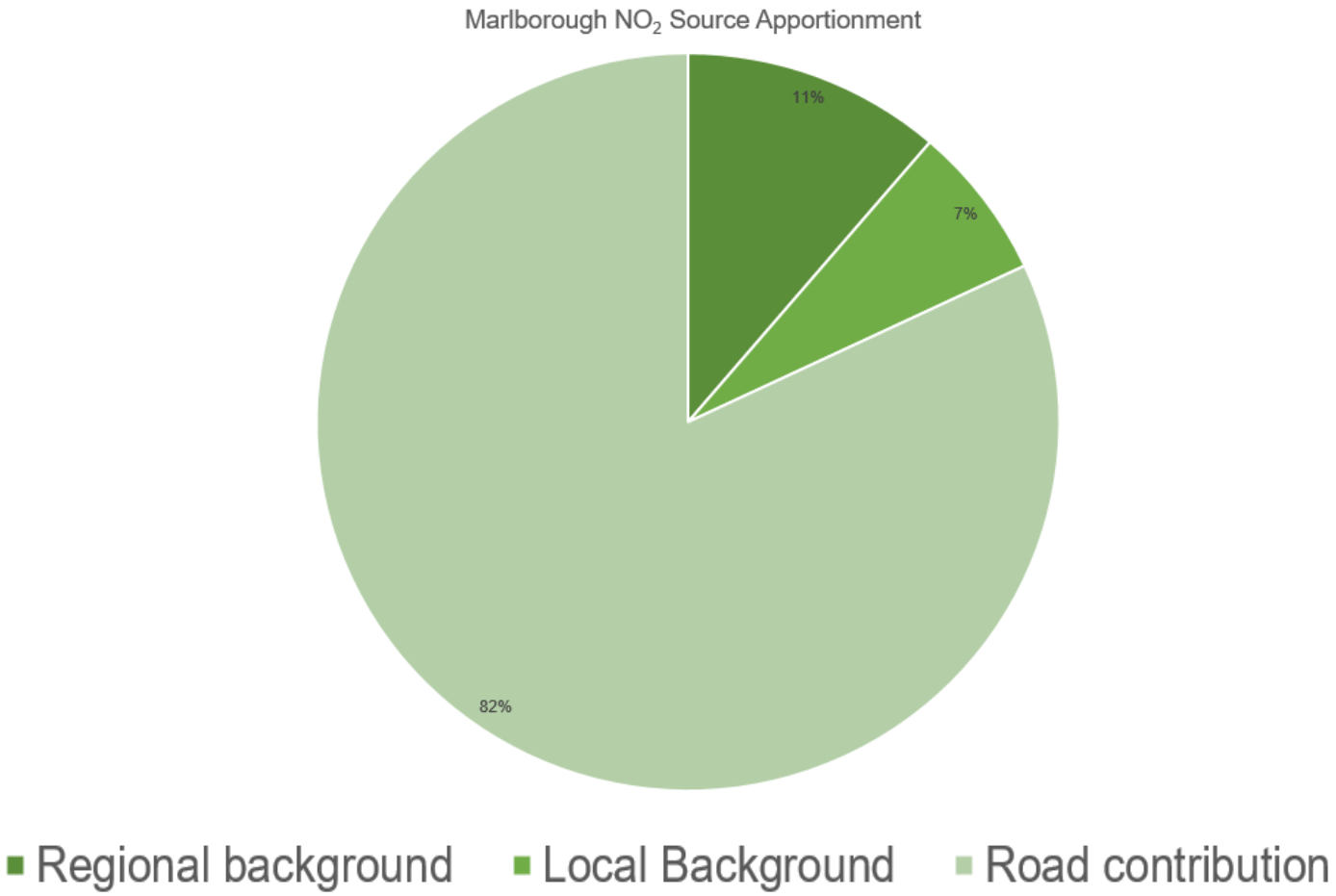
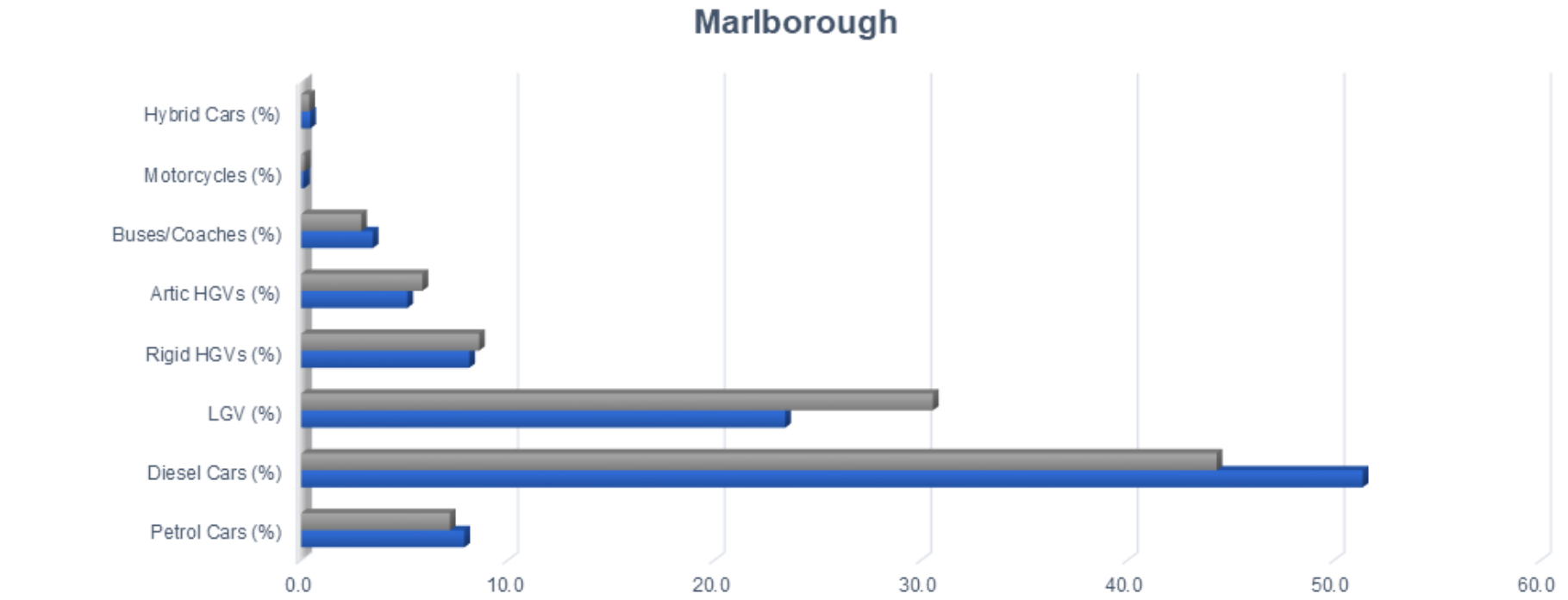


Figure C. 8: Marlborough AQMA Road NOx Source Apportionment- remove the Westbury text from key



	Petrol Cars (%)	Diesel Cars (%)	LGV (%)	Rigid HGVs (%)	Artic HGVs (%)	Buses/Coaches (%)	Motorcycles (%)	Hybrid Cars (%)
E Marlborough A346 Barn St	7.2	44.3	30.6	8.6	5.9	2.9	0.2	0.4
W Marlborough A345 High St	7.9	51.4	23.4	8.1	5.1	3.5	0.1	0.4

Devizes

Figure C. 9: Devizes AQMA NO_2 Source Apportionment at Highest Monitored Concentration

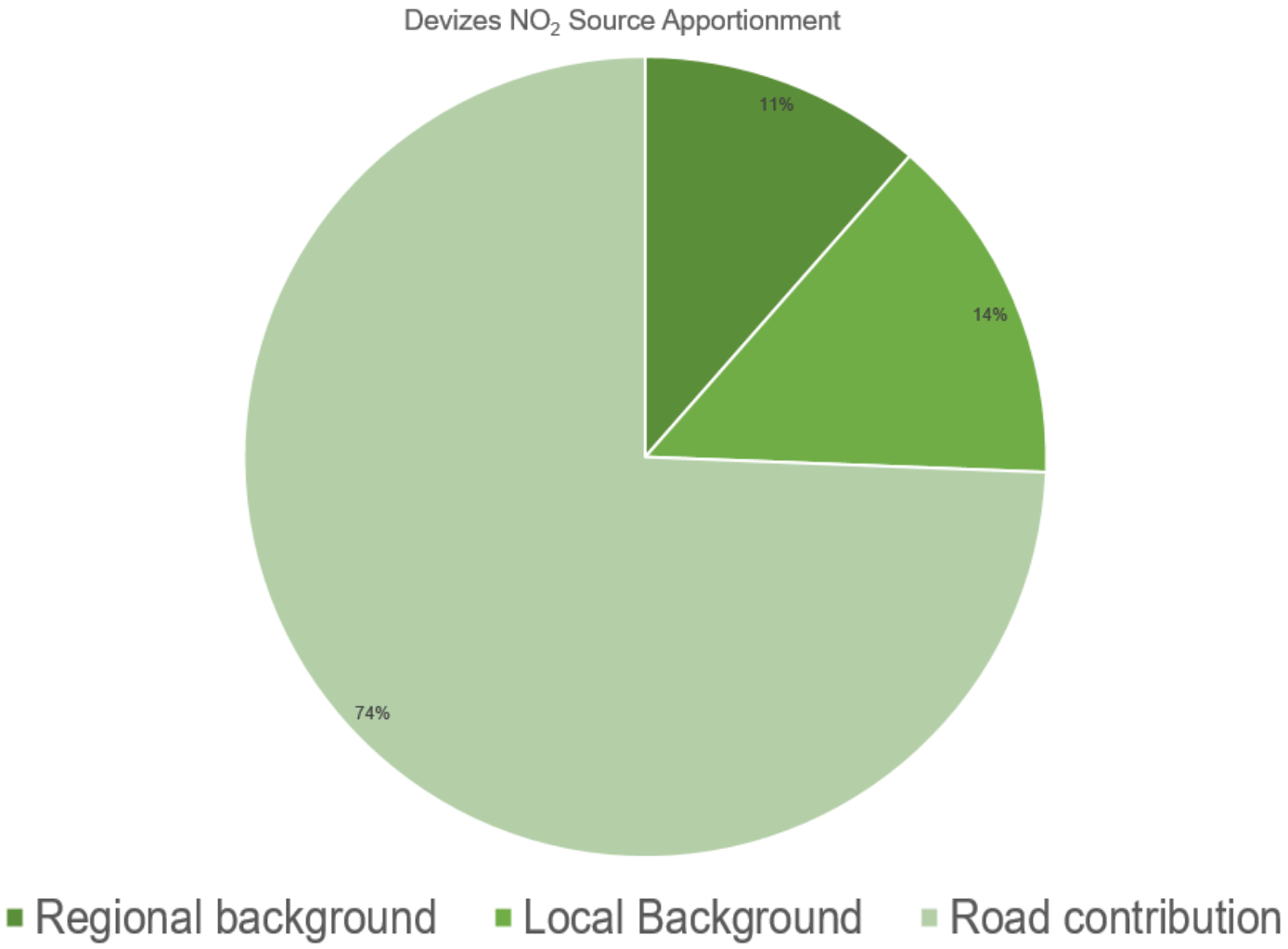
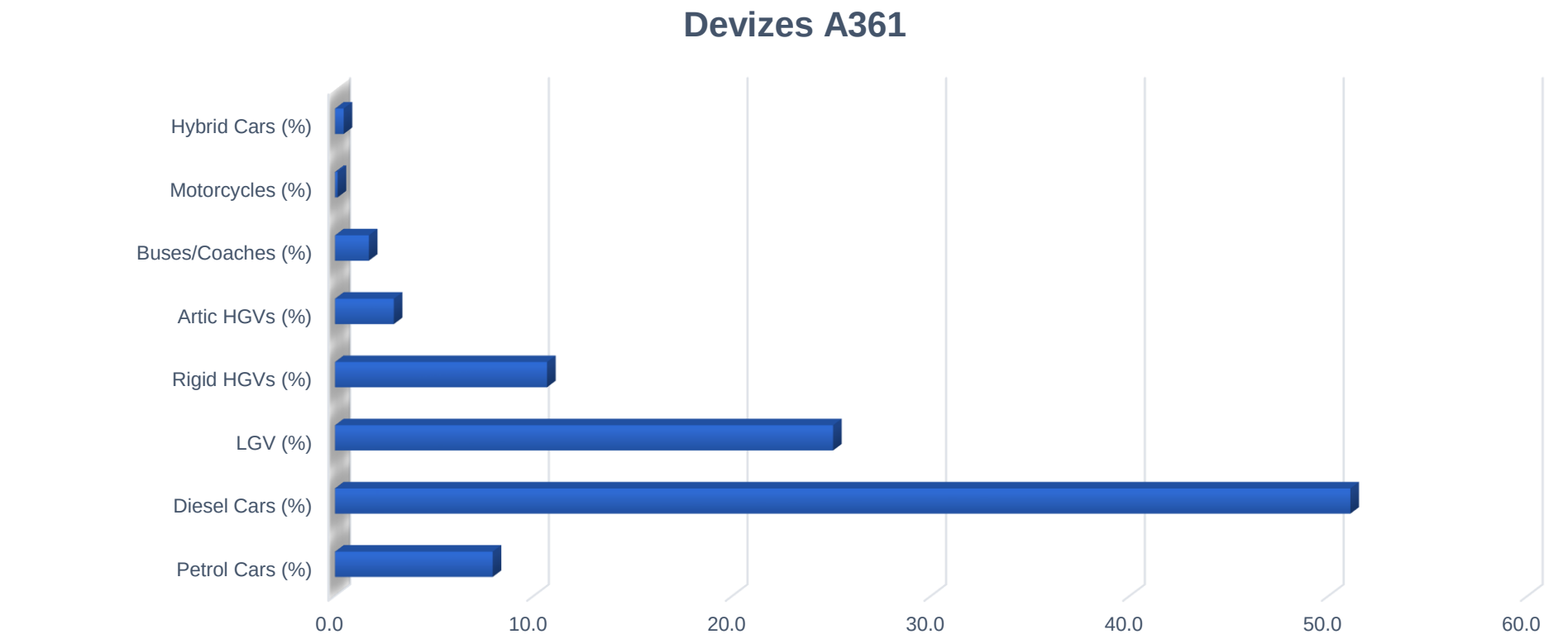


Figure C. 10: Devizes AQMA Road NOx Source Apportionment



	Petrol Cars (%)	Diesel Cars (%)	LGV (%)	Rigid HGVs (%)	Artic HGVs (%)	Buses/Coaches (%)	Motorcycles (%)	Hybrid Cars (%)
NW Devizes A361 Northgate St	7.9	51.1	25.1	10.7	3.0	1.7	0.1	0.4

Calne

Figure C. 11: Calne AQMA NO_2 Source Apportionment at Highest Monitored Concentration

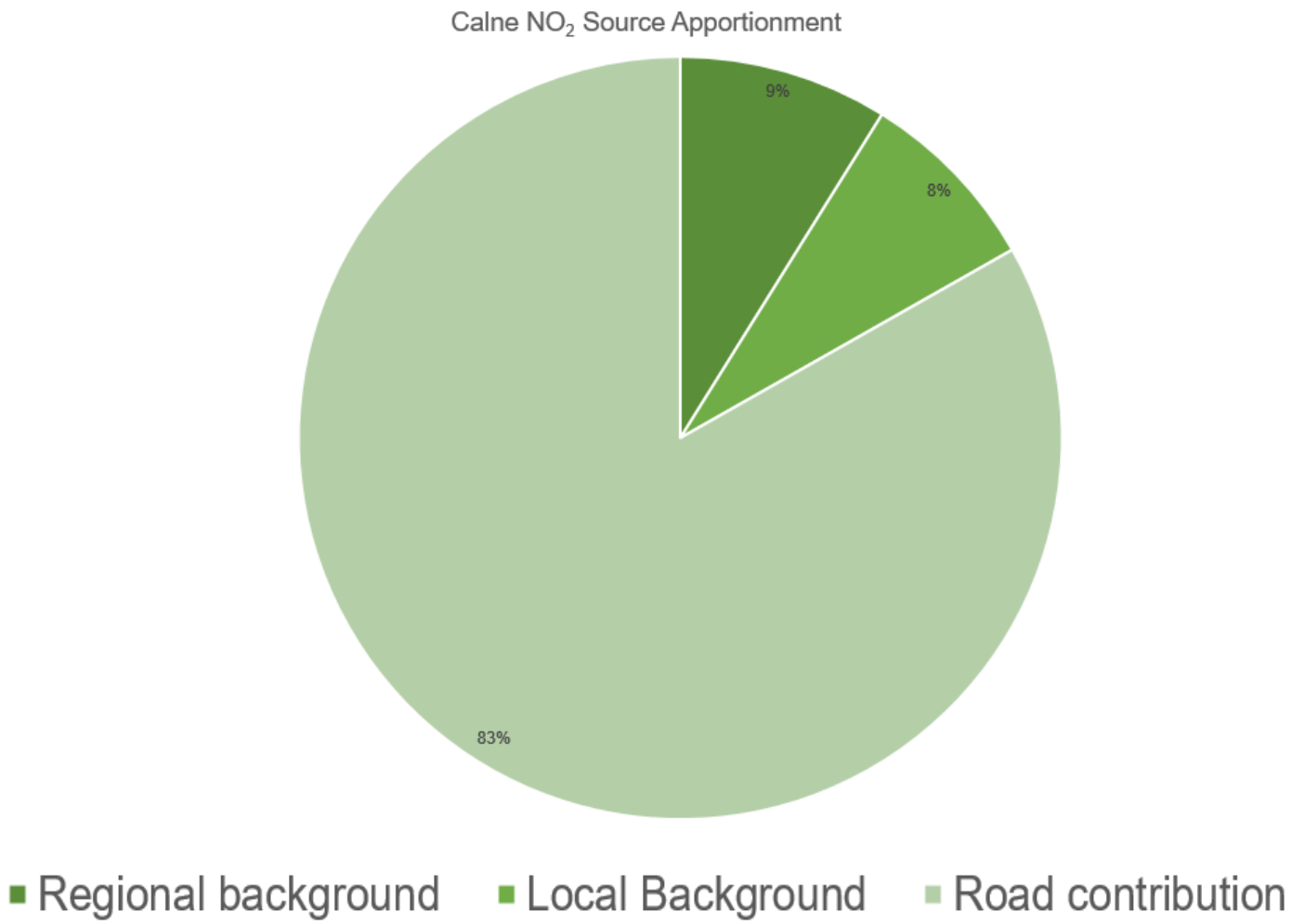
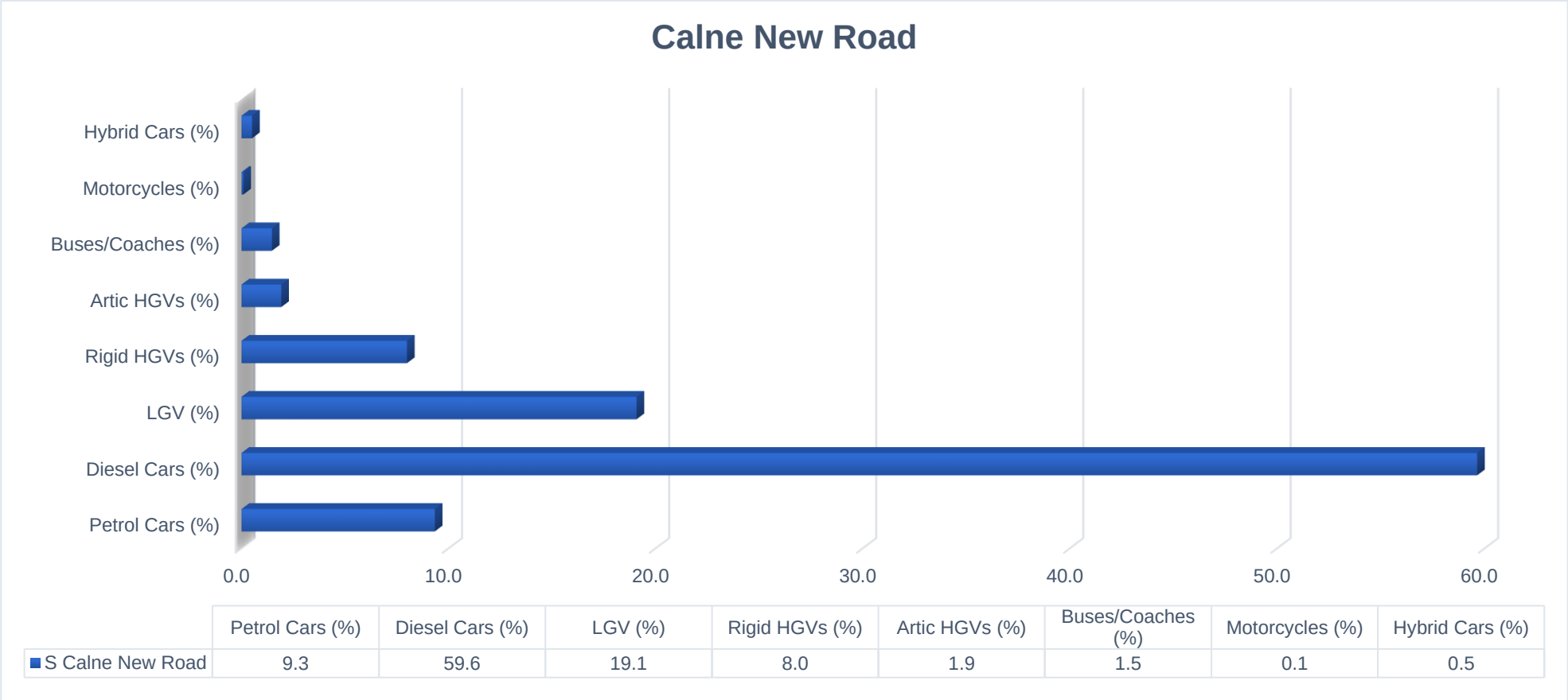


Figure C. 12: Calne AQMA Road NOx Source Apportionment



	Petrol Cars (%)	Diesel Cars (%)	LGV (%)	Rigid HGVs (%)	Artic HGVs (%)	Buses/Coaches (%)	Motorcycles (%)	Hybrid Cars (%)
S Calne New Road	9.3	59.6	19.1	8.0	1.9	1.5	0.1	0.5

Appendix D: Reduction in road NOx Emission Calculation

The following is provided as an example of how the reduction in road NO_x emission required to meet the 40 µg/m^3 annual mean objective for NO_2 has been calculated. In this example, the measured or modelled NO_2 is 46 µg/m^3. It is based on the required reduction in the road NO_x concentration at the worst-case relevant exposure location.

Step 1: Use the NO_x to NO_2 calculator (see para 7.86 of Technical Guidance LAQM.TG(16)) to obtain the NO_x concentration that equates to the 46 µg/m^3 NO_2, which is 71.84 µg/m^3.

Step 2: Obtain the local background concentrations of NO_2 for the year of interest. This is 12.28 µg/m^3, from the background maps (see para 7.68 Technical Guidance LAQM.TG(16)).

Step 3: Calculate the road NO_x concentration required to give a total NO_2 concentration of 40 µg/m^3 i.e. the annual mean objective (road NO_x-required). This can be done using the NO_2 from NO_x calculator by entering a total NO_2 concentration of 40 µg/m^3 along with the local background NO_2 concentrations. The calculator gives the road NO_x-required concentration which is 57.3 µg/m^3.

Step 4: Calculate the road NO_x reduction to go from the road NO_x-current to the road NO_x-required. In this example the road NO_x reduction is 14.5 µg/m^3 (71.8 minus 57.3 µg/m^3), which represents a 20.2% reduction in road NO_x (14.5/71.8 as a percentage).

Table D.1: Reduction in road NOx Emission Calculation

AQMA	Maximum Modelled NO_2 Concentration in AQMA ($\mu g/m^3$)		Background NO_2		Modelled Road NO_2		Modelled Road NOx ($\mu g/m^3$)		Required Road NOx for 40 NO_2 ($\mu g/m^3$)		Required Road NOx reduction ($\mu g/m^3$) (% reduction required)		% Reduction Required	
	2019	2026	2019	2026	2019	2026	2019	2026	2019	2026	2019	2026	2019	2026
Salisbury City Centre	**47.3**	28.6	16.0	12.4	31.3	16.3	65.9	32.0	48.8	57.6	17.1 (26%)	-	25.98	-
Salisbury London Road	**42.4**	26.0	16.0	12.4	35.1	18.6	54.3	26.5	48.8	57.6	5.5 (10%)	-	10.20	-
Salisbury Wilton Road	**51.1**	30.9	16.0	12.4	26.4	13.6	75.1	37.0	48.8	57.6	26.3 (35.0)	-	35.0	-
Bradford-on-Avon	**68.5**	**43.7**	10.0	8.0	58.5	35.7	135.8	76.0	61.1	66.8	74.7 (55%)	9.2 (12%)	55.0	12.1
Westbury	**48.1**	27.9	9.5	7.3	38.6	20.6	81.8	40.4	62.1	68.3	19.7 (24%)	-	24.0	-
Marlborough	**58.5**	33.6	12.0	9.5	46.5	24.1	103.1	48.7	57.0	63.6	46.1 (45%)	-	44.7	-
Devizes	**56.7**	34.3	9.0	6.9	47.7	27.4	105.1	55.5	63.2	69.9	42.0 (39%)	-	39.9	-
Calne	**53.2**	32.5	9.0	7.1	44.2	25.4	95.7	51.0	63.2	68.8	32.6 (34%)	-	34.0	-

NO_2 concentrations shown in bold indicate exceedances of the AQS objective for annual mean NO_2 set at 40 $\mu g/m^3$, and underlined figures indicate potential exceedances of the short-term (1-hour) NO_2 objective.

Appendix E: Dispersion Modelling

ADMS Modelling

Modelling was carried out using ADMS-Roads v5 (Advanced Dispersion Modelling Software, Ref. 32) to predict pollutant concentrations in future scenarios based on historical data. The baseline year and the future year were 2019 and 2026 respectively. Both the baseline and future years were modelled to display the potential impacts of each measures at receptors in the AQMAs.

Meteorological Data

Meteorological data from different stations (Boscombe Down and Lyneham), meteorological stations representative of conditions at the respective AQMA, has been used in this assessment. The wind rose for Lyneham Airport for the year 2019 is shown in Figure E. 1 and Figure E. 2. This meteorological data year has been used in model verification to align with the most recent year of monitoring data available, and for all road traffic assessment model scenarios. Boscombe Down has complete data; Lyneham was missing 10% cloud cover data, with any missing data taken from nearby meteorological station Fairford.

Both sites therefore have acceptable data available for dispersion modelling. Boscombe Down had 8,607 of 8,760 useable lines, so 98.3% useable data. Lyneham Airport had 8,652 of 8,760 useable lines, so 98.8% useable data.

See the details below outlining the relevant meteorological stations and distances from each respective area.

- Salisbury - Boscombe Down (10 km),
- Bradford-on-Avon - Lyneham (25 km)
- Westbury - Lyneham (31 km)
- Marlborough -Lyneham (21 km)
- Devizes - Lyneham (17 km)
- Calne - Lyneham (7 km)

Figure E. 1: Boscombe Down Airport 2019 Meteorological Data Wind Rose

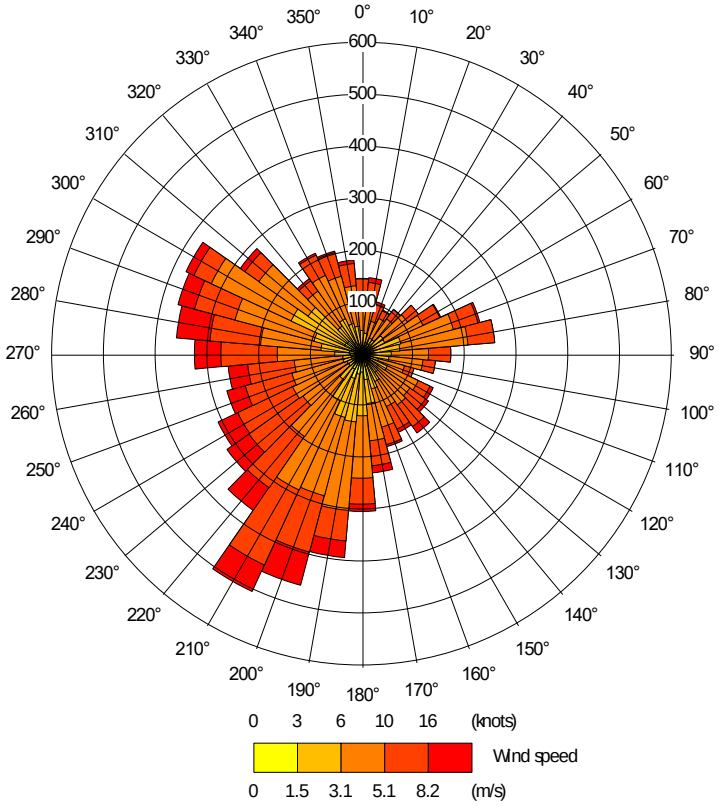
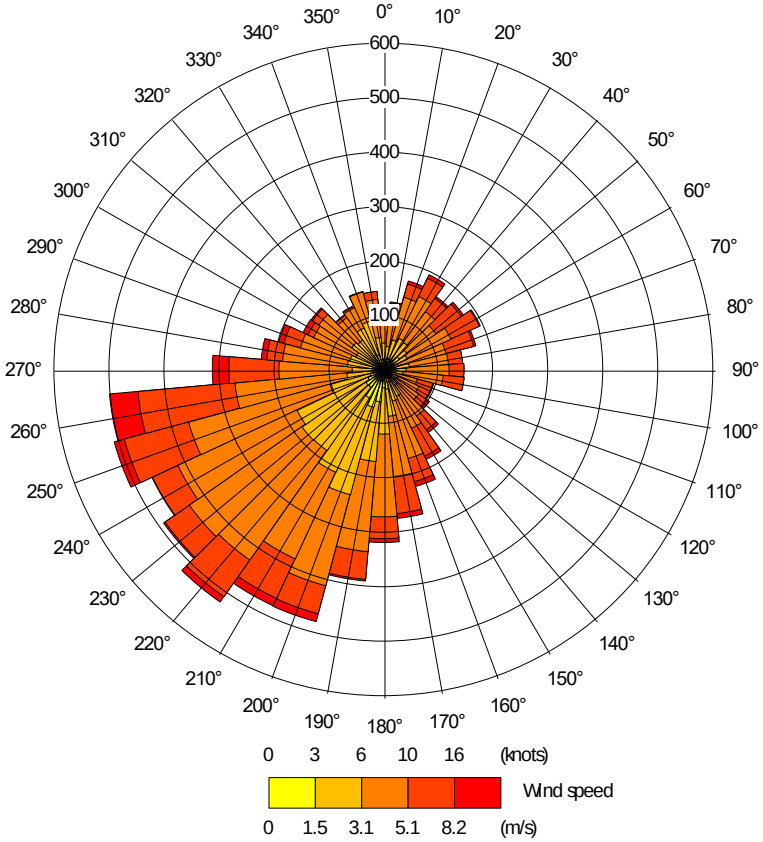


Figure E. 2: Lyneham Airport 2019 Meteorological Data Wind Rose



Background Maps

Defra publishes maps of background pollutant concentrations for each 1km x 1km grid square covering the whole of the United Kingdom. The most recent release of the background maps uses 2018 meteorological data as the reference year, and provides projections of background concentrations of NO_2, PM_{10} and $PM_{2.5}$ from 2018 to 2030 (Ref. 33). The mapped background NO_2, PM_{10} and $PM_{2.5}$ concentrations at each AQMA are within their respective annual mean AQS objectives for human health, and the maps generally predict a decrease in concentrations in future years.

For each AQMA, the appropriate background monitoring carried out by Wiltshire Council in the respective area was used, with any missing data for the AQMA taken from the aforementioned mapped backgrounds. The monitored 2019 background concentrations were also scaled to 2026 where relevant, using the forecasts within the Defra background maps.

EFT version

Traffic emissions for the detailed dispersion modelling have been calculated using Defra's Emission Factor Toolkit (EFT) version 10.1 (Ref. 19) for the selected years of assessment (using a 'Basic Split', 'Urban (Not London)' set up).

NOx to NO_2

Annual mean NO_2 concentrations were calculated from the modelled road-NO_x concentrations following the methodology in LAQM.TG(16) (Ref. 17). Defra's NO_x to NO_2 calculator v8.1 (Ref. 35) was used with the 'All other urban UK traffic' mix to convert modelled road NO_x to NO_2 concentrations, which were then added to background NO_2 concentrations for the relevant location and year.

Traffic Data

Traffic data used for modelling purposes was provided from Atkins for the baseline scenario in 2018 and for the future year scenario in 2026. These were provided in a format of one-way and two-way traffic and included the following information:

- Traffic flows for each peak period of the day - Time Periods (Average Hour):
    - AM Peak: 07:00-10:00;
    - Inter Peak: 10:00-16:00;
    - PM Peak: 16:00-19:00;
    - Off Peak: 19:00-07:00;
- Heavy Duty Vehicles percentage on each road link; and
- Speeds for each road link over each averaging period.

With the latest available NO_2 monitoring data for 2019 at time of modelling available, to ensure consistency the traffic data for 2018 was adjusted up to 2019 (the same year of monitoring) using ATC (Automatic Traffic Count) data available on roads for 2018 and 2019 across the AQMAs.

The data was provided in Average Annual Weekday Traffic (AAWT) for each period and therefore scaling factors were applied using the total AAWT and AADT (Average Annual Daily Traffic) to convert the traffic flows for each period into AADT period flows.

Where traffic data was not clearly representative of actual road traffic, these were supplemented/replaced with data from other sources. These included:

- Assumed speeds on roundabouts were 20 kph to simulate junction congestion, whereby information was not provided on these sections of the road network (Applied to AQMAs);
- Where speeds were deemed modelled in excess of designated speed limits on specific links, these links had speeds reduced to the enforced road limits;
- The Salisbury modelled network had traffic on certain road links replaced with ATC data provided from Tracsis (the modelled Atkins data heavily underestimated the traffic flows on certain links as compared to actual count data, due to known limitations with the traffic model); and
- Marlborough modelled domain had speeds (A346 only) updated with traffic data counts from the Wiltshire traffic team (Atkins traffic data had not modelled all roads in that area and therefore an unrepresentative speed was identified on the A346).

Receptors

Sensitive receptors were selected across all modelled roads based on information obtained from address base. A comprehensive network of receptors was modelled in each AQMA, representative of worst-case exposure at each road. Figures demonstrating the indicative location of each receptor are provided below, and a full list of the receptor locations considered is available on request.

Figure E.1: Modelled Road Network and Sensitive Receptors in Salisbury City Centre

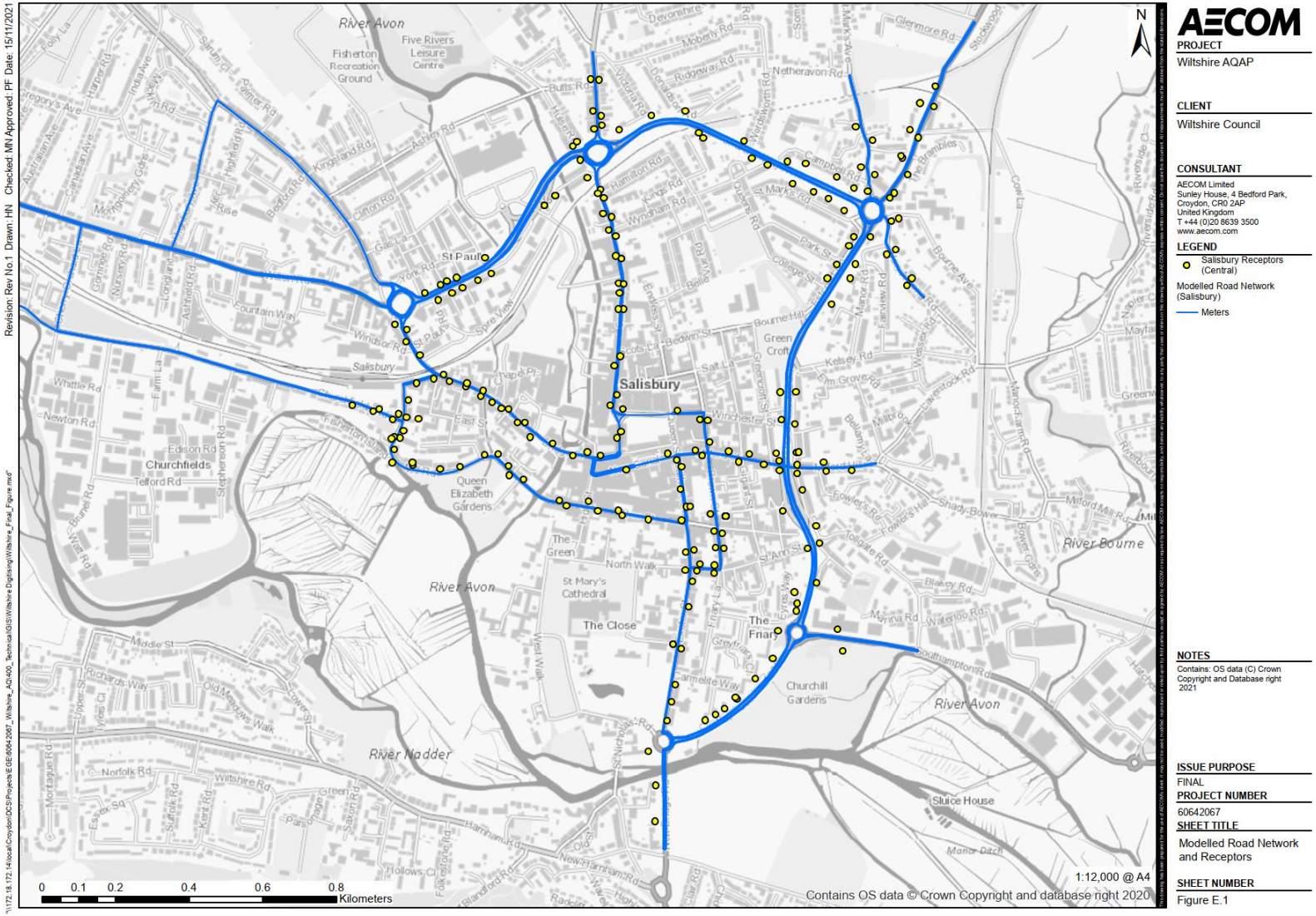


Figure E.2: Modelled Road Network and Sensitive Receptors in Salisbury Wilton Road

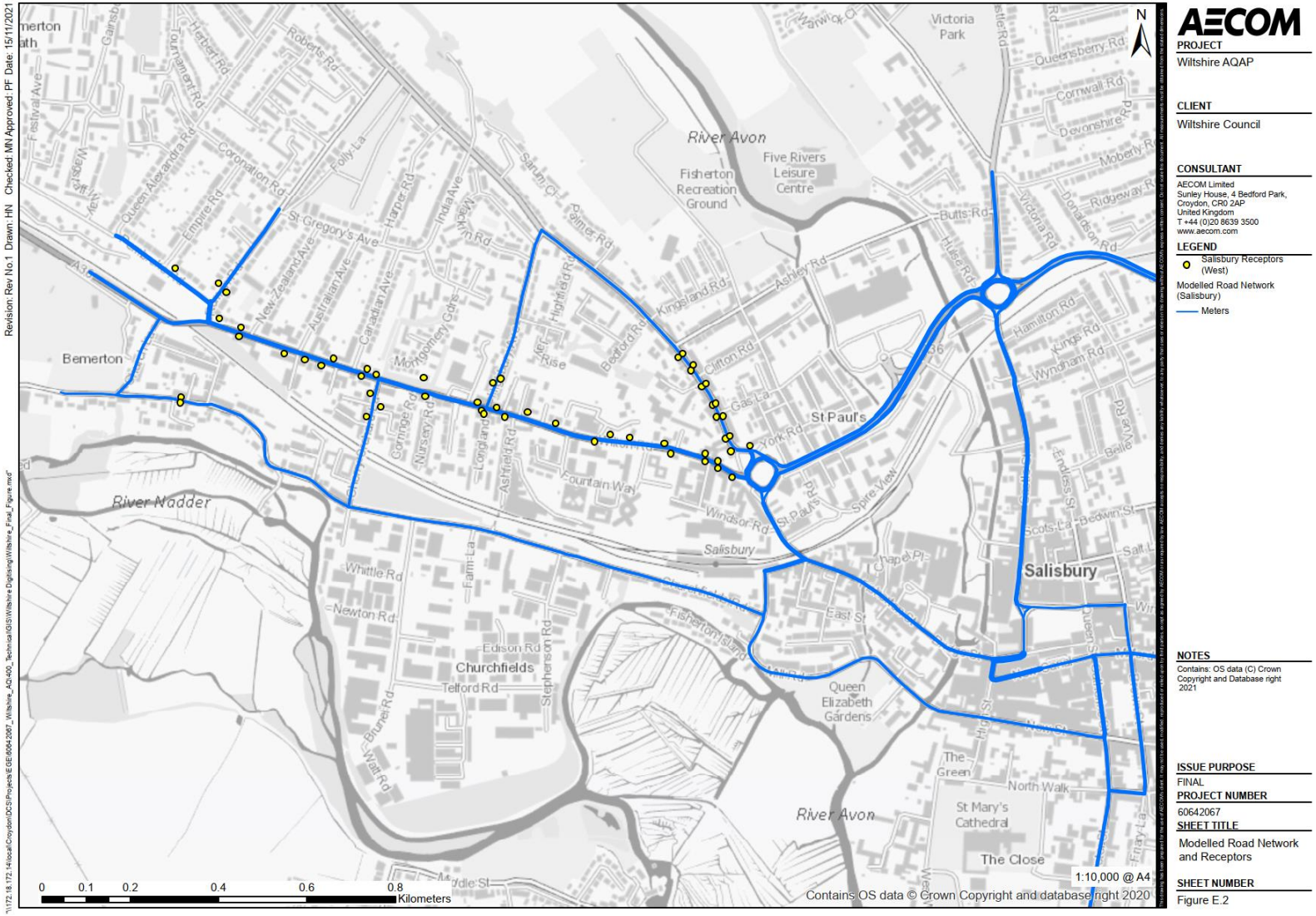


Figure E.3: Modelled Road Network and Sensitive Receptors in Bradford-on-Avon

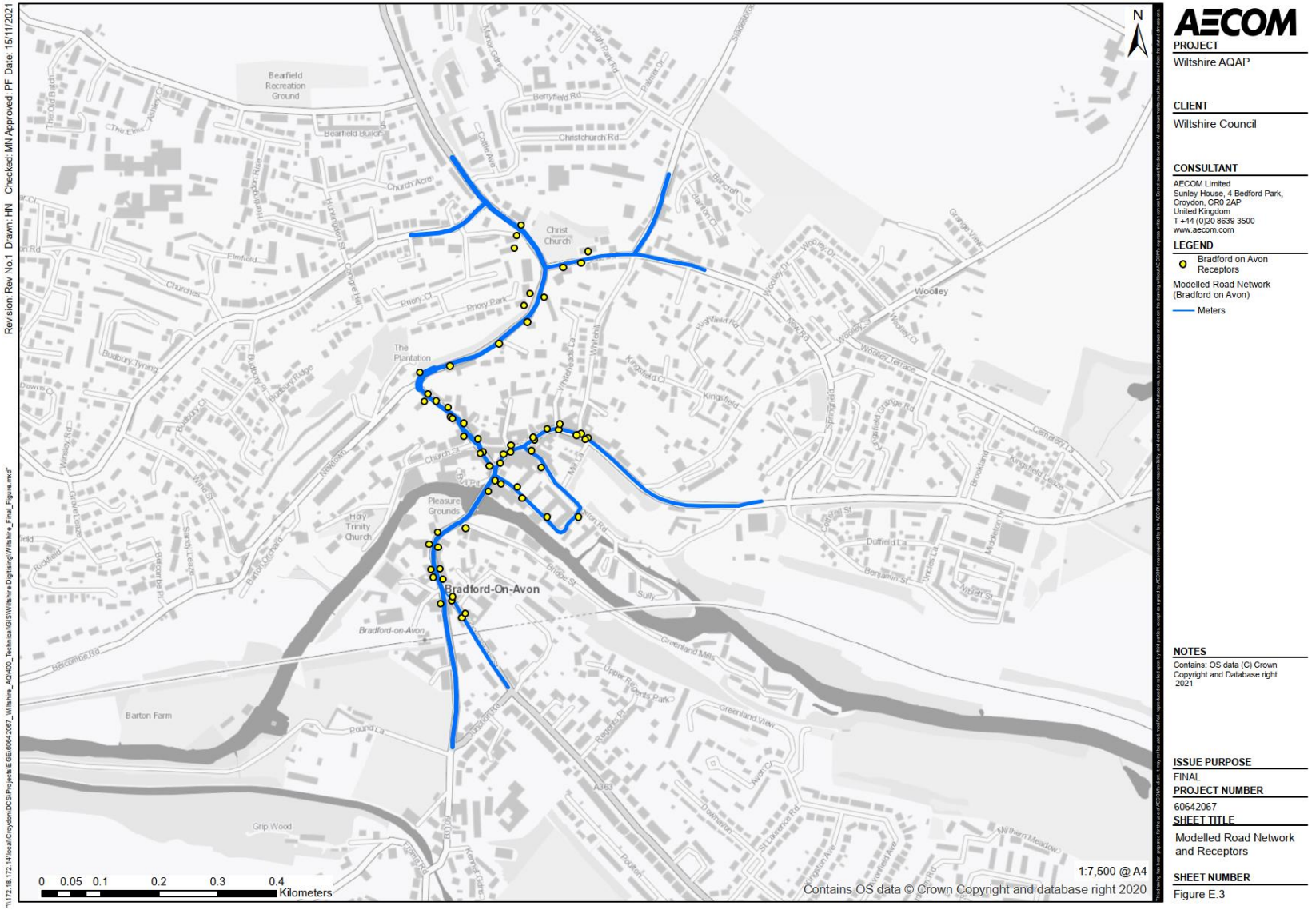


Figure E.4: Modelled Road Network and Sensitive Receptors in Westbury

Figure E.5: Modelled Road Network and Sensitive Receptors in Marlborough

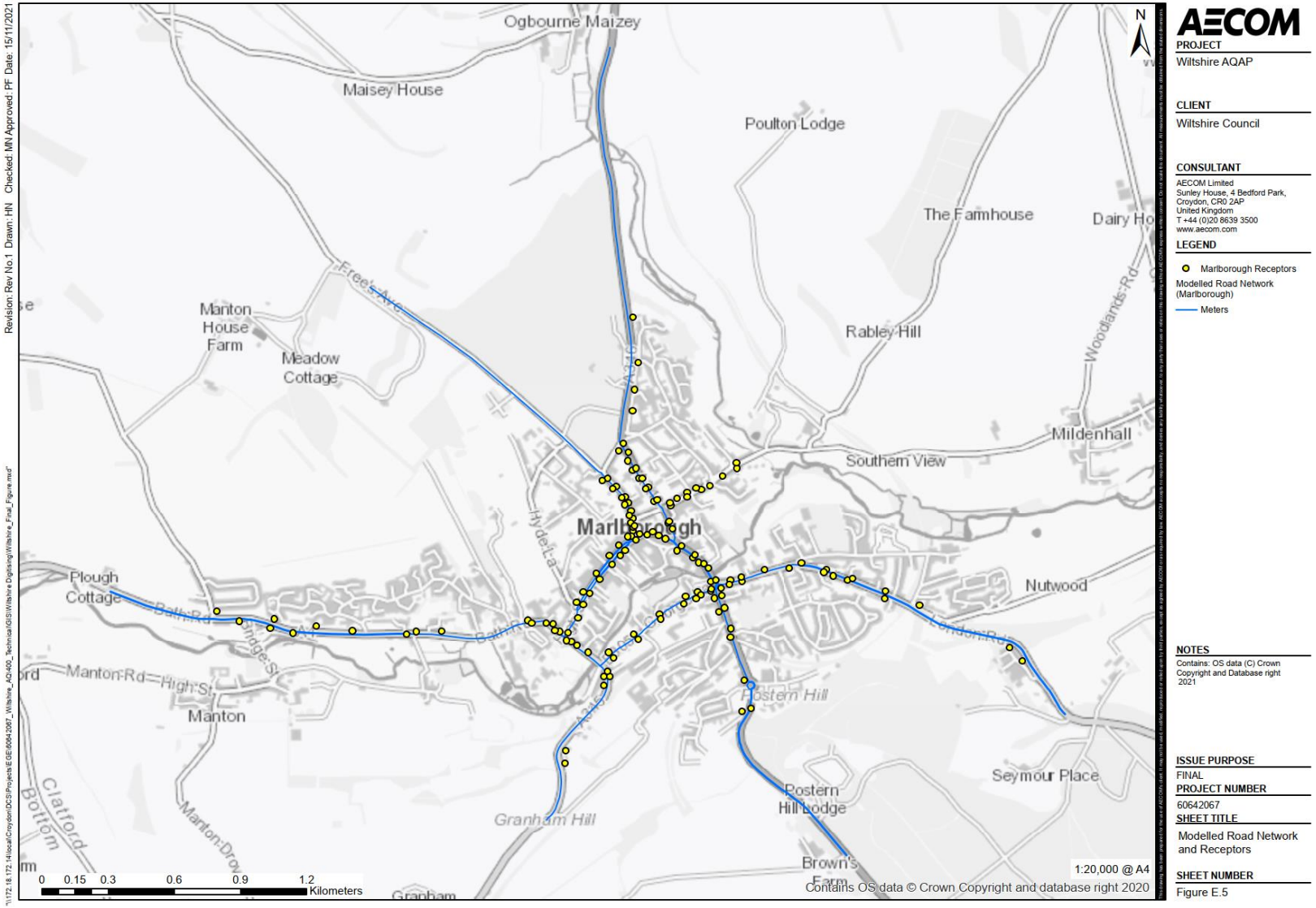


Figure E.6: Modelled Road Network and Sensitive Receptors in Devizes

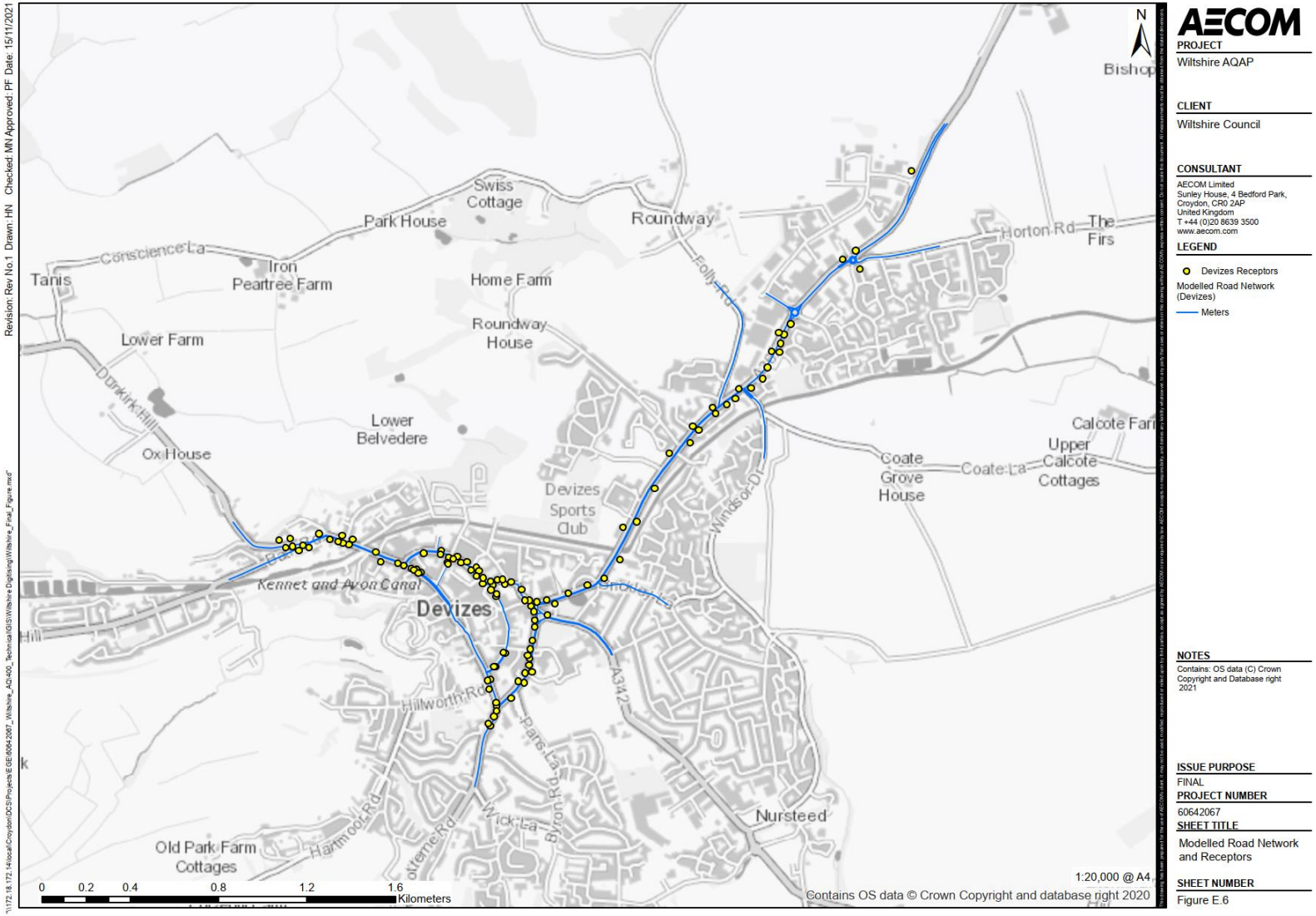
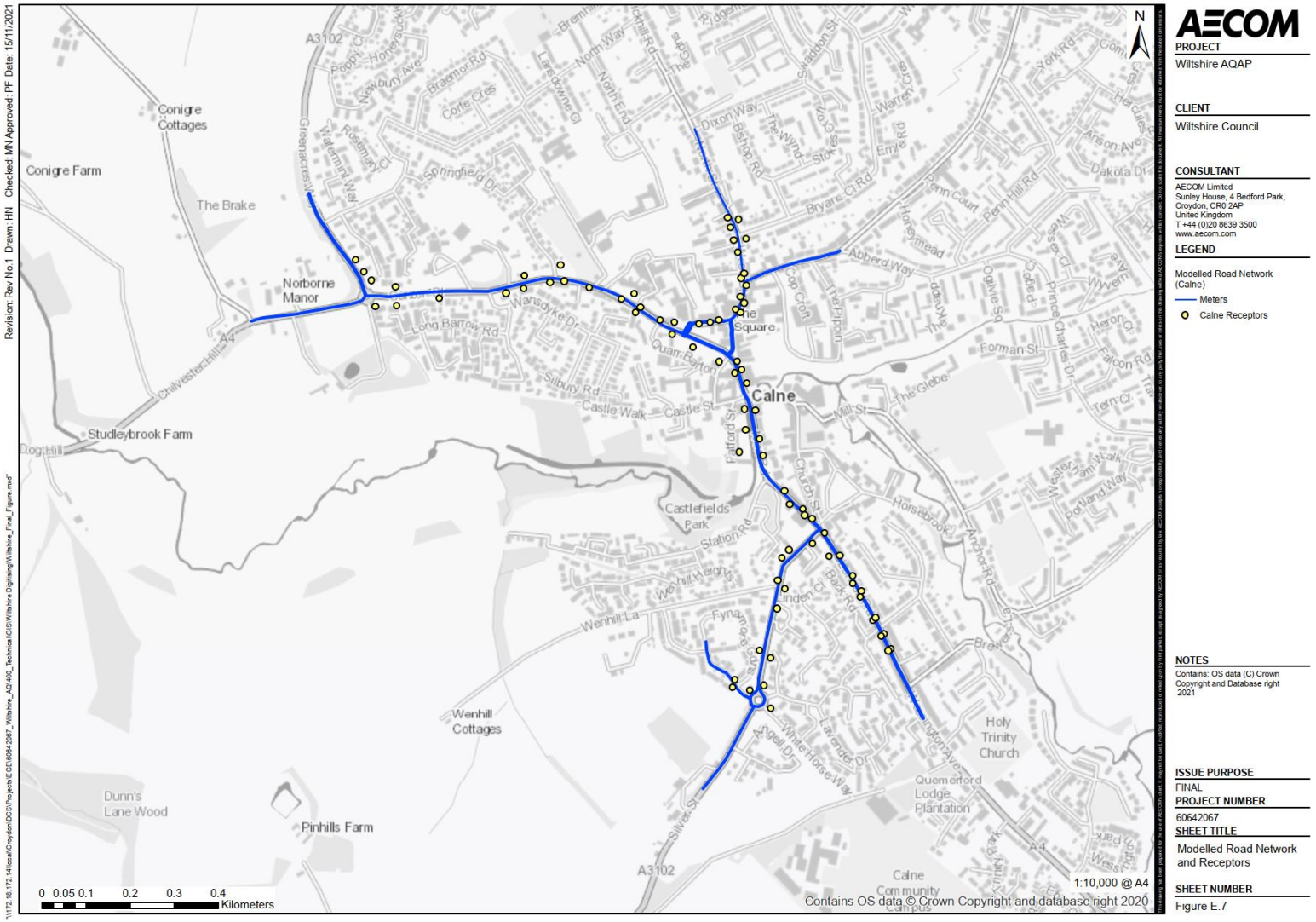


Figure E.7: Modelled Road Network and Sensitive Receptors in Calne



Assumptions and Limitations

The Wiltshire Traffic Model (WTM) which provides the traffic flows that fed into the Air Quality modelling has the following limitations:

- The WTM is a strategic model that has a large area of detailed modelling covering the entirety of Wiltshire, plus surrounding areas of significant importance (e.g. Swindon and Bath). The regional scale of the model means that in some instances, individual roads do not correlate well with observed traffic counts;
- The WTM version used at the time of modelling was in the process of being updated to provide a better corelation between modelled and observed data; and
- For the Salisbury AQMA (and to a lesser extent for other AQMAs), the WTM creates a simplification of the highway network structure, which excludes intricate details in the urban areas.

Measure A1 (Reintroduction of pedestrianisation in the City Centre):

From Vivacity sensors that are located directly along roads which were modelled in the network, an 11% reduction in vehicle use was observed from the period which the scheme was undertaken for (i.e. from 21/10/2021 to 30/11/2020) when compared to the available data for 2021, which was applied to the following road locations:

- Castle Street;
- Silver Street;
- New Canal;
- Bridge Street;
- Fisherton Street;
- Blue Boar Row;
- Winchester Street;
- Catherine Street;
- Brown Street; and
- Portion of St Ann Street located between St John's Street and Brown Street.

Measure A2 (Improvement of rail station connectivity with city centre):

Specific details of the measure that will be implemented are awaited.

Measure A3 (Improvements to junction near Wilton, Harnham Gyratory and Exeter Street roundabout):

Based on the limited information available (Ref. 34), the conservative option from a 23% reduction in delays along the route from Downton Road to London Road in preference to the 64% reduction between Harnham Gyratory and College Roundabout was used for modelling. The route between Downton Road to London Road also overlapped the modelling road network to a greater extent, thus making it more suitable for use. This reduction was estimated during the peak periods and therefore applied to the AM and PM peaks. Roads affected by the measure include connected roads to the Exeter Street Roundabout and Harnham Gyratory.

Measure A4 (MOVA upgrade on A36 roundabout traffic lights along Churchill Way):

It was assumed the impacts of this system would be felt during the peak periods and therefore adjustments were applied to the AM and PM peaks only. Information obtained from the MOVA website (Ref. 36), estimates between a 10% to 20% increase in speeds on roads the system is applied on. The conservative estimate of a 10% improvement was applied to the speeds at junctions on the following roads:

- St Pauls Roundabout;
- A36 Wilton Road;
- Churchill Road West;
- Castle Roundabout;
- Churchill way North;
- St Mark's Roundabout;
- St Marks Avenue;
- A30;
- Wain-A-Long Road; and
- Churchill Way East (North section only).

Measure A9 (Re-introduction of one-way system):

The following streets were modelled to have one-way access only:

- Market Street; and
- Silver Street.

The measure was modelled by removing traffic from the opposing direction on the one-way streets and re-introducing the greater of the traffic flows from the two roads mentioned above to be re-routed through Kingston Road and Bridge Yard. It was assumed that these two roads were 20mph, and no changes to the HGV % were implemented.

Measure A10 (Stricter weight limits restriction on Town Bridge):

This measure was implemented by changing the default fleet composition in the EFT to remove the Artic HGVs (weight of these vehicles are >14 tonnes) and ensuring that all the Rigid HGVs are <7.5 tonnes in weight. The overall number of HGVs was assumed to remain the same.

Measure A11 (Cutting back foliage on Masons Lane):

The canyon and associated effects experienced in the baseline scenarios were removed from sections of Masons Lane where applicable. This aided dispersion of the road NOx emissions along this road. No changes to the vehicular traffic were made.

Measure A12 (Junction optimisation at A350):

For this measure, speeds were assumed to be increased to 20 mph along all roads near the A350 improvements, which include the following:

- Station Road;
- A350 West End;
- A350 Haynes Road;
- A350 Warminster Road; and
- Bratton Road (Portion of road between A350 and Edward Street.

Measure A16 (Facilitate a shift from diesel to electric vehicles & reduce emissions contributed by HGV traffic):

Not modelled.

Measure A17 (Upgrade of buses from Euro IV to Euro VI):

Based on the current fleet composition available for traffic within the EFT and information available on the composition of the standard of buses operating in Marlborough, the fleet composition has been adjusted to ensure all buses will have Euro VI standards. Information about the changes to the bus composition in the baseline and future years for with and without the measure are shown below in the Table E. 1. As the baseline models were run prior to bus fleet information being made available, the default assumptions within the EFT were adjusted, normalised to the Council fleet information.

Table E. 1: Bus Compositions with and without measure Marlborough

Bus Composition	Pre-Euro I	Euro I	Euro II	Euro III	Euro IV	Euro V (Exhaust Gas Recirculation)	Euro V (Selective Catalytic Reduction)	Euro VI
2019								
Baseline	-	-	0.02	0.08	0.08	0.07	0.20	0.56
Measure	-	-	0.00	0.00	0.02	0.00	0.00	0.97
Changes	-	-	-0.02	-0.08	-0.06	-0.06	-0.20	+0.41
2026								
Baseline	-	-	-	0.01	0.01	0.01	0.04	0.93
Measure	-	-	-	-	-	-	-	1.00
Changes	-	-	-	-0.01	-0.01	-0.01	-0.04	+0.07

Measure A18 (Traffic improvements around Shanes Castle/Wadworth junctions):

For this measure, speeds were assumed to be increased to 20 mph along the Eastern portion of the A361 Bath Road that runs from the Shanes Castle to Belle Vue Road. This assumption was applied to the AM, IP and PM periods which are most likely to have observed speeds changes from junction improvements.

Measure A21 (Re-routing traffic via High Street):

This measure aims to re-open the High Street for vehicle access to by-pass Curzon Street. The Northbound traffic was diverted away from southern section of Curzon Street and re-routed through the High Street. Based on similar junctions within Wiltshire AQMAs, a 10% diversion of traffic was estimated to be travelling along the High Street.

Measure A22 (Upgrade of buses from Euro IV to Euro VI):

Based on the current fleet composition available for traffic within the EFT and information available on the composition of the standard of buses operating in Calne, the fleet composition has been adjusted to ensure all buses will have Euro VI standards. Information about the changes to the bus composition in the baseline and future years for with and without the measure are shown below in the Table E. 2. As the baseline models were run prior to bus fleet information being made available, the default assumptions within the EFT were adjusted, normalised to the Council fleet information.

Table E. 2: Bus Compositions with and without measure Calne

Bus Composition	Pre-Euro I	Euro I	Euro II	Euro III	Euro IV	Euro V (Exhaust Gas Recirculation)	Euro V (Selective Catalytic Reduction)	Euro VI
2019								
Baseline	-	-	0.02	0.08	0.08	0.07	0.20	0.56
Measure	-	-	0.01	0.06	0.06	0.05	0.15	0.66
Changes	-	-	-0.01	-0.02	-0.02	-0.02	-0.05	+0.1
2026								
Baseline	-	-	-	0.01	0.01	0.01	0.04	0.93
Measure	-	-	-	-	-	-	-	1.00
Changes	-	-	-	-0.01	-0.01	-0.01	-0.04	+0.07

Appendix F: Model Verification

The results predicted by a dispersion model may differ from measured concentrations for many reasons, including uncertainties associated with traffic flows and emissions factors, errors with the monitoring data itself and limitations inherent to the modelling software. In light of this, and in accordance with advice in LAQM.TG(16) (Ref. 17), for roads-based air quality assessments it is best-practice to perform a comparison of modelled results with local monitoring data to minimise these modelling uncertainties. This model verification process provides a factor, by which the output of the ADMS-Roads model can be adjusted, to gain greater confidence in the final results.

Wiltshire Council undertake extensive nitrogen dioxide monitoring using automatic monitors and diffusion tubes within all of the AQMAs, all of which were initially considered for their applicability to the dispersion modelling exercise. Where sites were not deemed suitable for inclusion, the reasons are demonstrated.

Owing to the geographic diversity of the AQMAs, which are spread across the county, a verification factor has been derived for each AQMA.

Bradford-on-Avon AQMA

In accordance with LAQM.TG(16), number of monitoring sites within the vicinity of the modelled domain were excluded from consideration for verification for the reasons presented in Table F. 1 below.

Table F. 1: Sites not considered for Verification – Bradford-on-Avon AQMA

Site ID	Monitoring Site Type	Monitored total NO_2 ($\mu g/m^3$)	Reason for Exclusion
DT35	Diffusion Tube	28	Triplicate site co-located with automatic monitor – Automatic monitor provides more robust comparison.
DT36	Diffusion Tube	28	
DT34	Diffusion Tube	28	

Table F. 2 below shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required.

Table F. 2: Comparison of Unadjusted vs. Monitored NO_2 – Bradford-on-Avon AQMA

Site ID	Background NO_2 ($\mu g/m^3$)	Monitored total NO_2 ($\mu g/m^3$)	Modelled total NO_2 ($\mu g/m^3$)	% Difference (modelled vs. monitored)
AM2	10.0	31.0	16.6	-46.3
DT33	10.0	61.0	17.6	-71.1
DT37	10.0	44.0	27.5	-37.5

The model was shown to be under predicting at all locations. It is recommended in LAQM.TG(16) that all modelled results are within ±25% threshold of monitored concentrations with a preference for the concentration to be within ±10%. Further model adjustments have been made to obtain closer alignment of the modelled concentrations to the monitored concentrations. Model adjustment is undertaken based on the road NO_x component and not NO_2 so as to not introduce bias toward the background component.

Figure F. 1 shows a scatterplot of the modelled road NO_x concentrations versus monitored road NO_x concentrations, and the trend line based on linear regression

passing through zero. The equation of the trend line gives an adjustment factor of 2.387. This adjustment factor was applied to all modelled road NO_x outputs before conversion of NO_x to NO_2 and the addition of background concentrations.

The adjusted modelled results are summarised in Table F. 3 and Figure F. 2. Post adjustment, all modelled NO_2 concentrations are within the ±25% threshold recommended as being acceptable in LAQM.TG(16), and one of the sites are within the desirable ±10%. The adjustment reduces Root Mean Square Error (RMSE) from 20.3 µg/m^3 to 4.2 µg/m^3, and fractional bias from 0.5 to 0.01 indicating that adjusted modelled concentrations show a good agreement with measured values.

Table F. 3: Adjusted Road NOx and NO_2 – Bradford-on-Avon AQMA

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NOx (µg/m^3)	Adjusted Modelled total NO_2 (based upon empirical NOx / NO_2 relationship) (µg/m^3)	Monitored total NO_2 (µg/m^3)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
AM2	-66%	**2.387**	33.7	27.5	31.0	-11.2
DT33	-61%		106.1	57.9	61.0	-5.1
DT37	-50%		84.3	49.5	44.0	12.6

Figure F. 1: Modelled Road NOx vs Monitored Road NOx Before and After Adjustment – Bradford-on-Avon AQMA

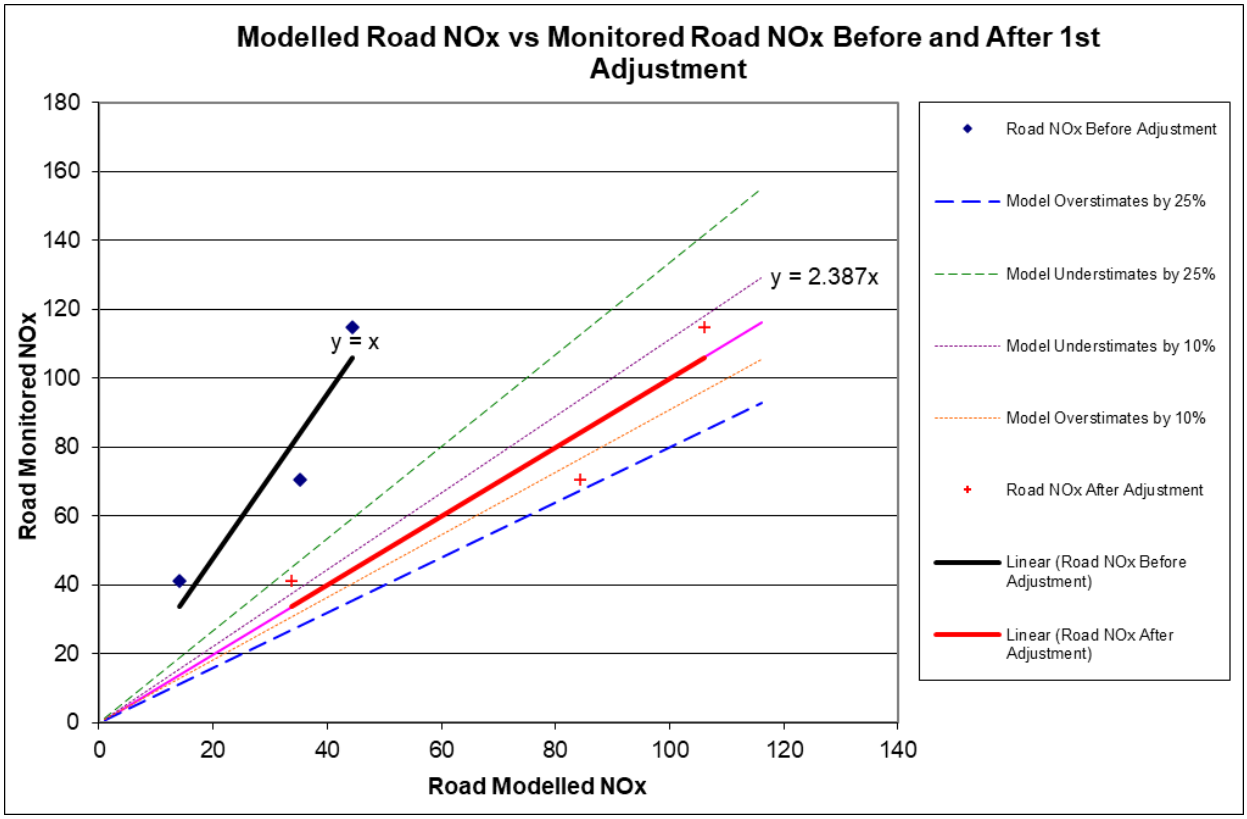
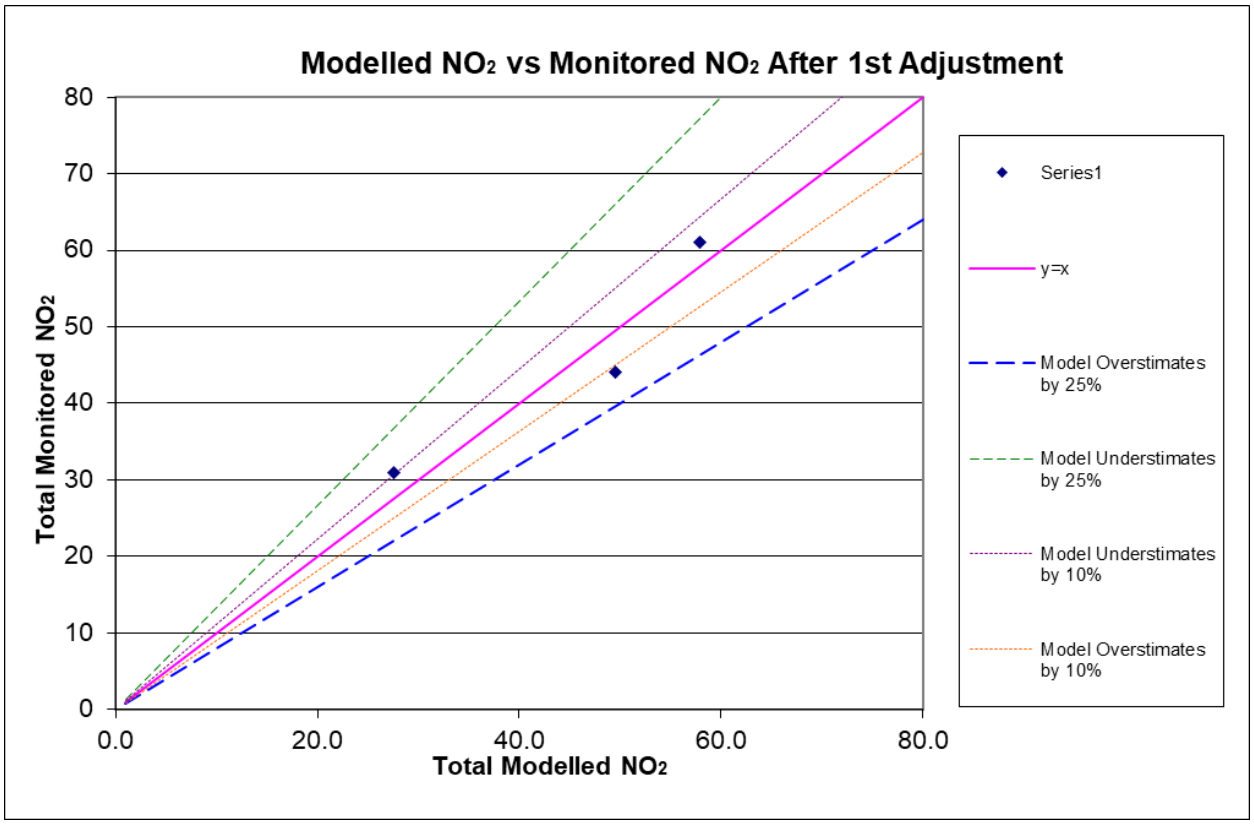


Figure F. 2: Adjusted Modelled NO_2 vs. Monitored NO_2 – Bradford-on-Avon AQMA



Calne

No sites were removed from the verification process. Table F. 4 below shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required.

Table F. 4: Comparison of Unadjusted vs. Monitored NO_2 – Calne AQMA

Site ID	Background NO_2 (µg/m3)	Monitored total NO_2 (µg/m3)	Modelled total NO2 (µg/m3)	% Difference (modelled vs. monitored)
DT21	9.0	24.0	16.8	-48.2
DT20	9.0	28.0	21.2	-35.6
DT19	9.0	49.0	33.7	-38.2

The model was shown to be overpredicting at all locations with the exception of DT19. It is recommended in LAQM.TG(16) that all modelled results are within ±25% threshold of monitored concentrations with a preference for the concentration to be within ±10%. Further model adjustments have been made to obtain closer alignment of the modelled concentrations to the monitored concentrations. Model adjustment is undertaken based on the road NO_x component and not NO_2 so as to not introduce bias toward the background component.

Figure F. 3 shows a scatterplot of the modelled road NO_x concentrations versus monitored road NO_x concentrations, and the trend line based on linear regression passing through zero. The equation of the trend line gives an adjustment factor of 1.732. This adjustment factor was applied to all modelled road NO_x outputs before conversion of NO_x to NO_2 and the addition of background concentrations.

The adjusted modelled results are summarised in Table F. 5 and Figure F. 4. Post adjustment, all modelled NO_2 concentrations are within the ±25% threshold recommended as being acceptable in LAQM.TG(16), and all of the results are within the desirable ±10%. The adjustment reduces RMSE from 10.5 µg/m^3 to 1.4 µg/m^3, and fractional bias from 0.3 to 0.01 indicating that adjusted modelled concentrations show a good agreement with measured values.

Table F. 5: Adjusted Road NOx and NO_2 – Calne AQMA

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NOx ($\mu g/m^3$)	Adjusted Modelled total NO_2 (based upon empirical NOx / NO_2 relationship) ($\mu g/m^3$)	Monitored total NO_2 ($\mu g/m^3$)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
DT21	-50%	**1.732**	24.8	22.2	24.0	-7.7
DT20	-37%		39.7	29.4	28.0	5.1
DT19	-42%		84.7	48.9	49.0	-0.3

Figure F. 3: Modelled Road NOx vs Monitored Road NOx Before and After Adjustment – Calne AQMA

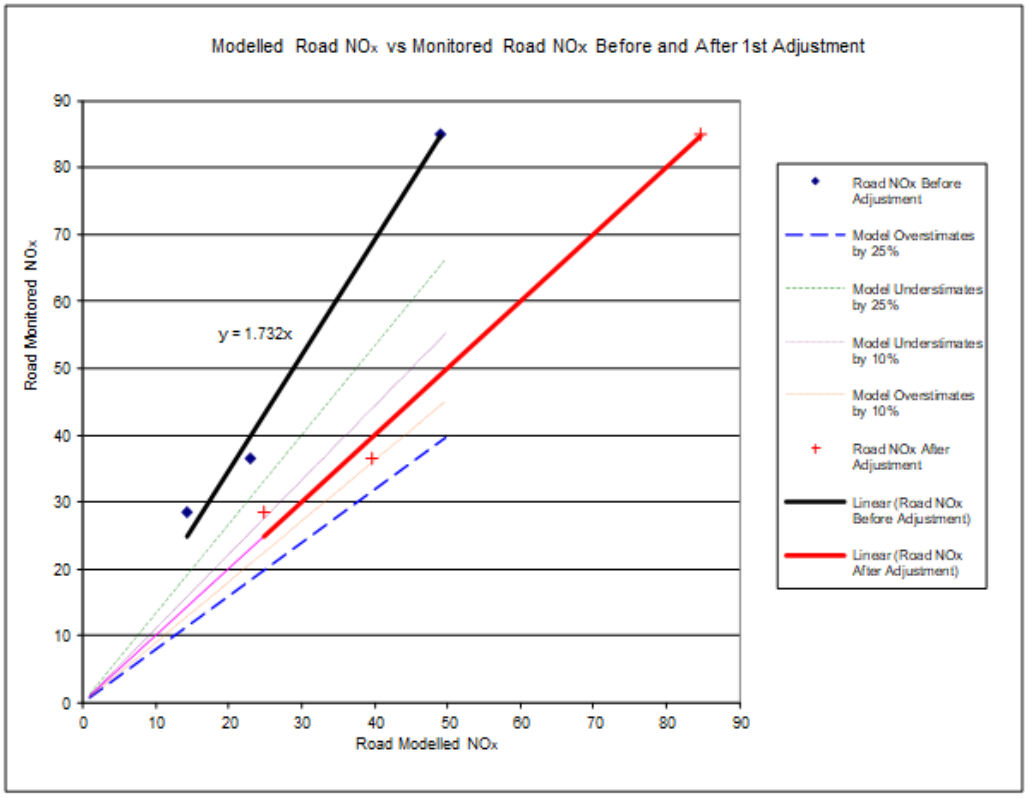
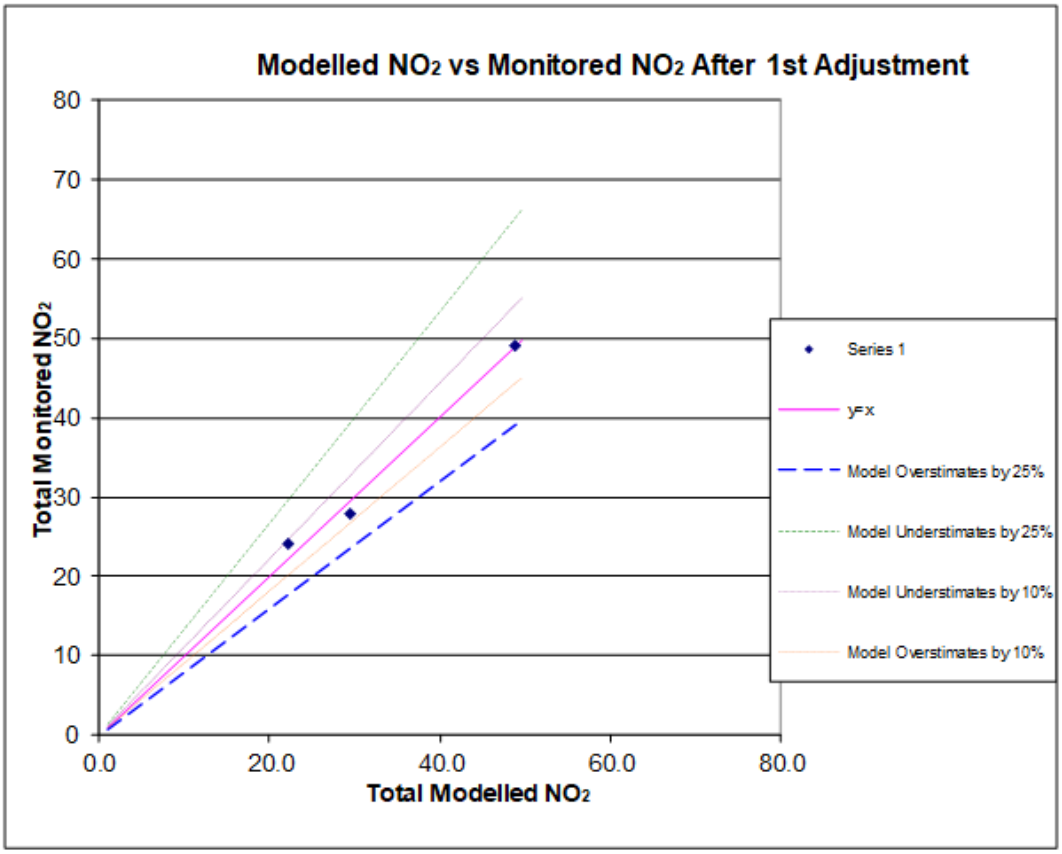


Figure F. 4: Adjusted Modelled NO_2 vs. Monitored NO_2 – Calne AQMA



Devizes AQMA

In accordance with LAQM.TG(16), a number of monitoring sites within the vicinity of the modelled domain were excluded from consideration for verification for the reasons presented in Table F. 6 below.

Table F. 6: Sites not considered for Verification – Devizes AQMA

Site ID	Monitoring Site Type	Monitored total NO_2 ($\mu g/m^3$)	Reason for Exclusion
DT3	Diffusion Tube	38.0	Monitoring location is shielded from emissions by the building located beside it, so was underpredicting roadside contributions versus the model.
DT5	Diffusion Tube	18.0	Removed due to location being on the edge of modelled road network, therefore not all contributory road sources could be modelled.

Table F. 7 below shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required.

Table F. 7: Comparison of Unadjusted vs. Monitored NO_2 – Devizes AQMA

Site ID	Background NO_2 ($\mu g/m^3$)	Monitored total NO_2 ($\mu g/m^3$)	Modelled total NO_2 ($\mu g/m^3$)	% Difference (modelled vs. monitored)
DT2	9.0	38.0	15.7	-58.7
DT4	9.0	40.0	15.5	-61.2
AM3	9.0	37.0	14.6	-60.4
DT7	9.0	35.0	15.2	-56.5
DT6	9.0	35.0	15.3	-56.4

The model was shown to be under predicting at all locations. It is recommended in LAQM.TG(16) that all modelled results are within ±25% threshold of monitored concentrations with a preference for the concentration to be within ±10%. Further model adjustments have been made to obtain closer alignment of the modelled concentrations to the monitored concentrations. Model adjustment is undertaken

based on the road NO_x component and not NO_2 so as to not introduce bias toward the background component.

Figure F. 5 shows a scatterplot of the modelled road NO_x concentrations versus monitored road NO_x concentrations, and the trend line based on linear regression passing through zero. The equation of the trend line gives an adjustment factor of 4.8979. This adjustment factor was applied to all modelled road NO_x outputs before conversion of NO_x to NO_2 and the addition of background concentrations.

The adjusted modelled results are summarised in Table F.8 and Figure F. 6. Post adjustment, all modelled NO_2 concentrations are within the ±25% threshold recommended as being acceptable in LAQM.TG(16), and all of the results are within the desirable ±10%. The adjustment reduces Root Mean Square Error (RMSE) from 23.1 µg/m^3 to 1.9 µg/m^3, and fractional bias from 0.9 to <0.01 indicating that adjusted modelled concentrations show a good agreement with measured values.

Table F.8: Adjusted Road NOx and NO_2 – Devizes AQMA

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NOx (µg/m^3)	Adjusted Modelled total NO_2 (based upon empirical NOx / NO_2 relationship) (µg/m^3)	Monitored total NO_2 (µg/m^3)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
DT2	-79%	**4.898**	60.3	38.7	38.0	1.9
DT4	-81%		58.5	38.0	40.0	-5.1
AM3	-82%		50.4	34.4	37.0	-7.1
DT7	-78%		55.7	36.7	35.0	5.0
DT6	-78%		56.2	37.0	35.0	5.7

Figure F. 5: Modelled Road NOx vs Monitored Road NOx Before and After Adjustment – Devizes AQMA

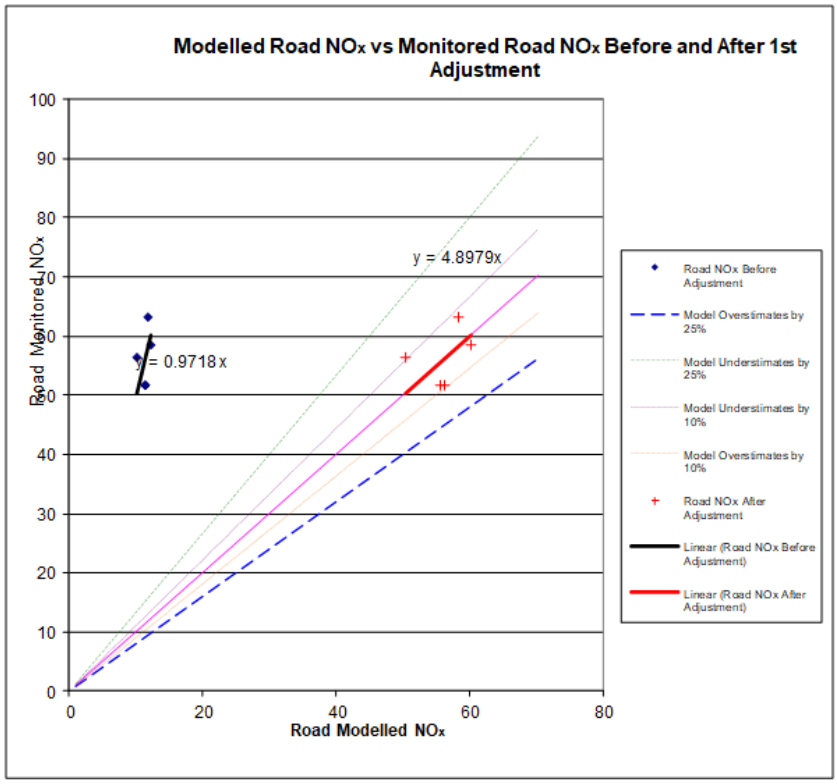
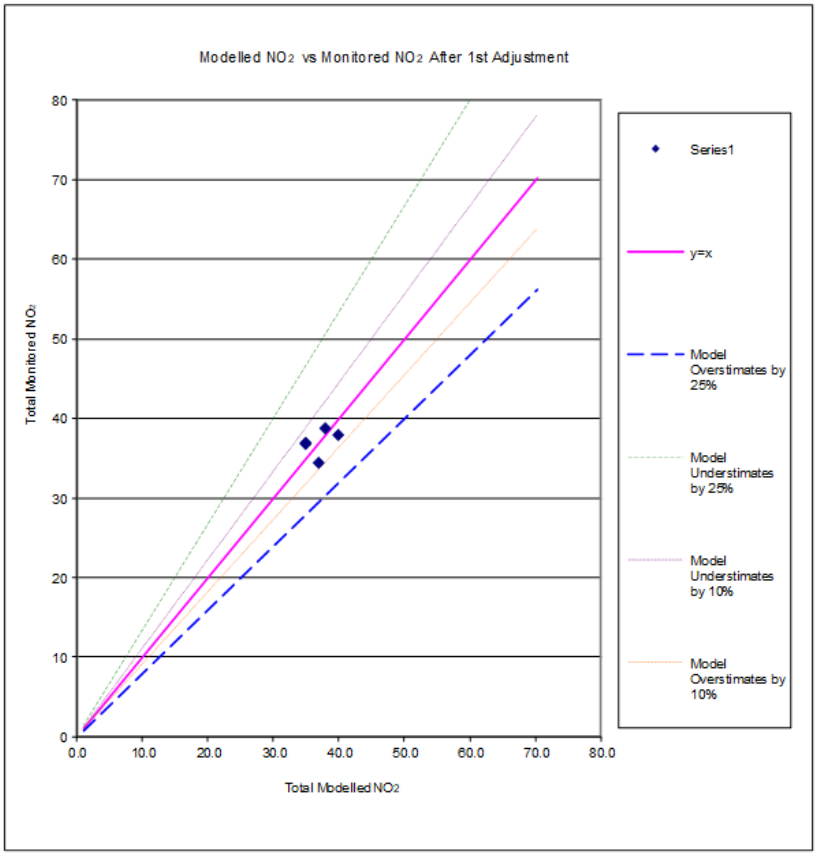


Figure F. 6: Adjusted Modelled NO_2 vs. Monitored NO_2 – Devizes AQMA



Marlborough

No sites were removed from the verification process. Table F. 9 below shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required.

Table F. 9: Comparison of Unadjusted vs. Monitored NO_2 – Marlborough AQMA

Site ID	Background NO_2 (µg/m^3)	Monitored total NO_2 (µg/m^3)	Modelled total NO_2 (µg/m^3)	% Difference (modelled vs. monitored)
DT13	12.0	31.0	15.3	-50.6
DT15	12.0	34.0	17.0	-49.9
DT10	12.0	47.0	17.9	-61.9

The model was shown to be under predicting at all locations. It is recommended in LAQM.TG(16) that all modelled results are within ±25% threshold of monitored concentrations with a preference for the concentration to be within ±10%. Further model adjustments have been made to obtain closer alignment of the modelled concentrations to the monitored concentrations. Model adjustment is undertaken based on the road NO_x component and not NO_2 so as to not introduce bias toward the background component.

Figure F. 7 shows a scatterplot of the modelled road NO_x concentrations versus monitored road NO_x concentrations, and the trend line based on linear regression passing through zero. The equation of the trend line gives an adjustment factor of 5.1299. This adjustment factor was applied to all modelled road NO_x outputs before conversion of NO_x to NO_2 and the addition of background concentrations. Due to limited monitoring in the available in the area, a high verification factor was obtained and the results are deemed to be a conservative (i.e. worst case scenario).

The adjusted modelled results are summarised in Table F.10 and Figure F. 8. Post adjustment, all modelled NO_2 concentrations are within the ±25% threshold recommended as being acceptable in LAQM.TG(16), and all of the results are within the desirable ±10%. The adjustment reduces Root Mean Square Error (RMSE) from 21.4 µg/m^3 to 2.4 µg/m^3, and fractional bias from 0.8 to 0.02 indicating that adjusted modelled concentrations show a good agreement with measured values.

Table F.10: Adjusted Road NOx and NO_2 – Marlborough AQMA

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NOx ($\mu g/m^3$)	Adjusted Modelled total NO_2 (based upon empirical NOx / NO_2 relationship) ($\mu g/m^3$)	Monitored total NO_2 ($\mu g/m^3$)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
DT13	-16%	**5.1299**	31.18	28.2	31.0	-9.2
DT15	9%		47.47	35.8	34.0	5.2
DT10	-24%		56.26	39.7	47.0	-15.6

Figure F. 7: Modelled Road NOx vs Monitored Road NOx Before and After Adjustment – Marlborough AQMA

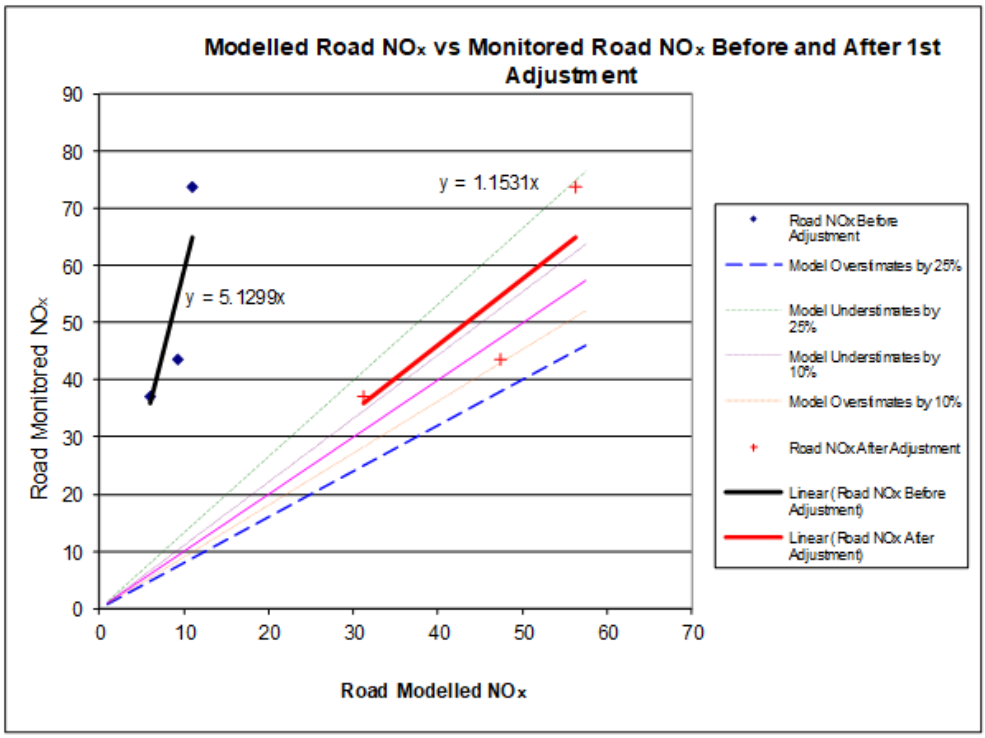
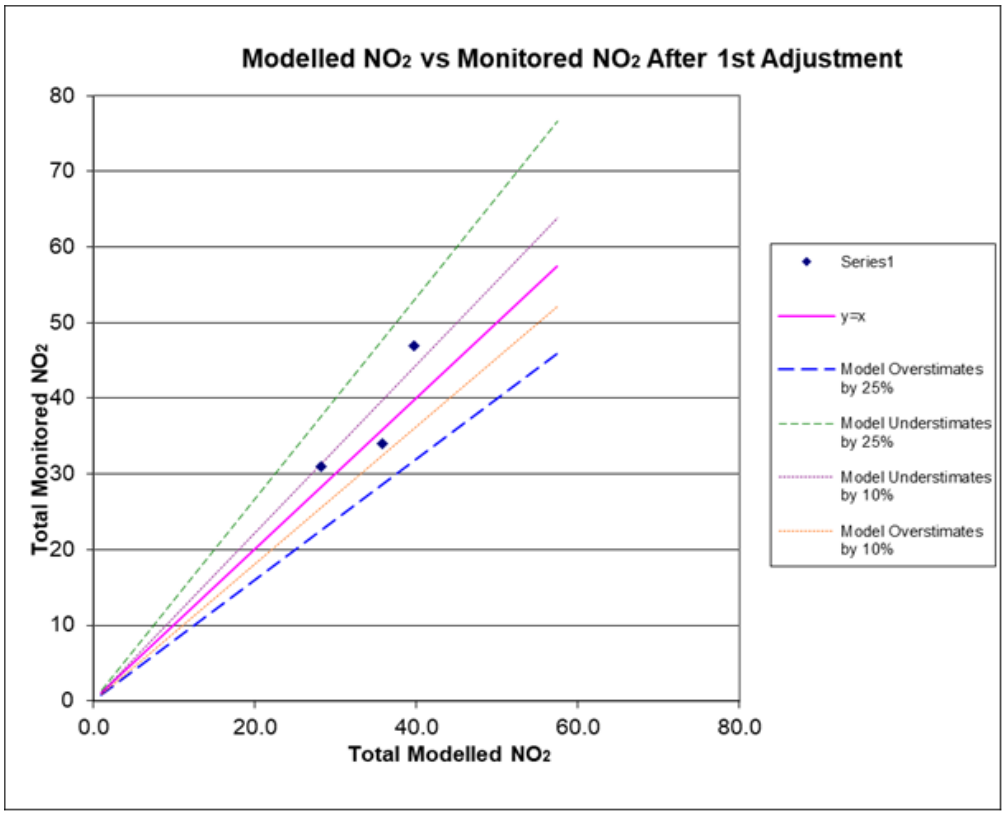


Figure F. 8: Adjusted Modelled NO_2 vs. Monitored NO_2 – Marlborough AQMA



Westbury

No sites were removed from the verification process. Table F. 11 below shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required.

Table F. 11: Comparison of Unadjusted vs. Monitored NO_2 – Westbury AQMA

Site ID	Background NO_2 (µg/m^3)	Monitored total NO_2 (µg/m^3)	Modelled total NO_2 (µg/m^3)	% Difference (modelled vs. monitored)
DT28	9.5	9.5	18.7	-46.5
DT29	7.3	7.3	19.5	-53.7

The model was shown to be under predicting at all locations. It is recommended in LAQM.TG(16) that all modelled results are within ±25% threshold of monitored concentrations with a preference for the concentration to be within ±10%. Further model adjustments have been made to obtain closer alignment of the modelled concentrations to the monitored concentrations. Model adjustment is undertaken based on the road NO_x component and not NO_2 so as to not introduce bias toward the background component.

Figure F. 9 shows a scatterplot of the modelled road NO_x concentrations versus monitored road NO_x concentrations, and the trend line based on linear regression passing through zero. The equation of the trend line gives an adjustment factor of 3.0871. This adjustment factor was applied to all modelled road NO_x outputs before conversion of NO_x to NO_2 and the addition of background concentrations. It should be noted that limited monitoring was available for the Westbury network model to be verified against.

The adjusted modelled results are summarised in Table F.12 and Figure F. 10. Post adjustment, all modelled NO_2 concentrations are within the ±25% threshold recommended as being acceptable in LAQM.TG(16), and all of the results are within the desirable ±10%. The adjustment reduces Root Mean Square Error (RMSE) from 19.7 µg/m^3 to 0.8 µg/m^3, and fractional bias from 0.7 to <0.01 indicating that adjusted modelled concentrations show a good agreement with measured values.

Table F.12: Adjusted Road NOx and NO_2 – Westbury AQMA

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NOx ($\mu g/m^3$)	Adjusted Modelled total NO_2 (based upon empirical NOx / NO_2 relationship) ($\mu g/m^3$)	Monitored total NO_2 ($\mu g/m^3$)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
DT28	-66%	**3.0871**	52.87	35.9	35.0	2.7
DT29	-68%		69.80	41.3	42.0	-1.6

Figure F. 9: Modelled Road NOx vs Monitored Road NOx Before and After Adjustment – Westbury AQMA

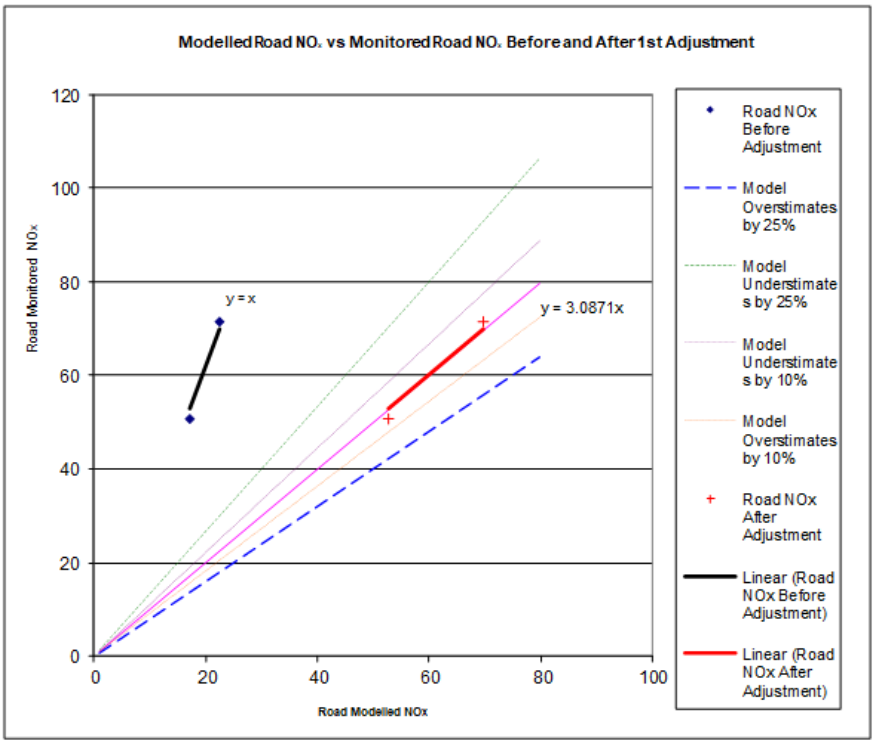
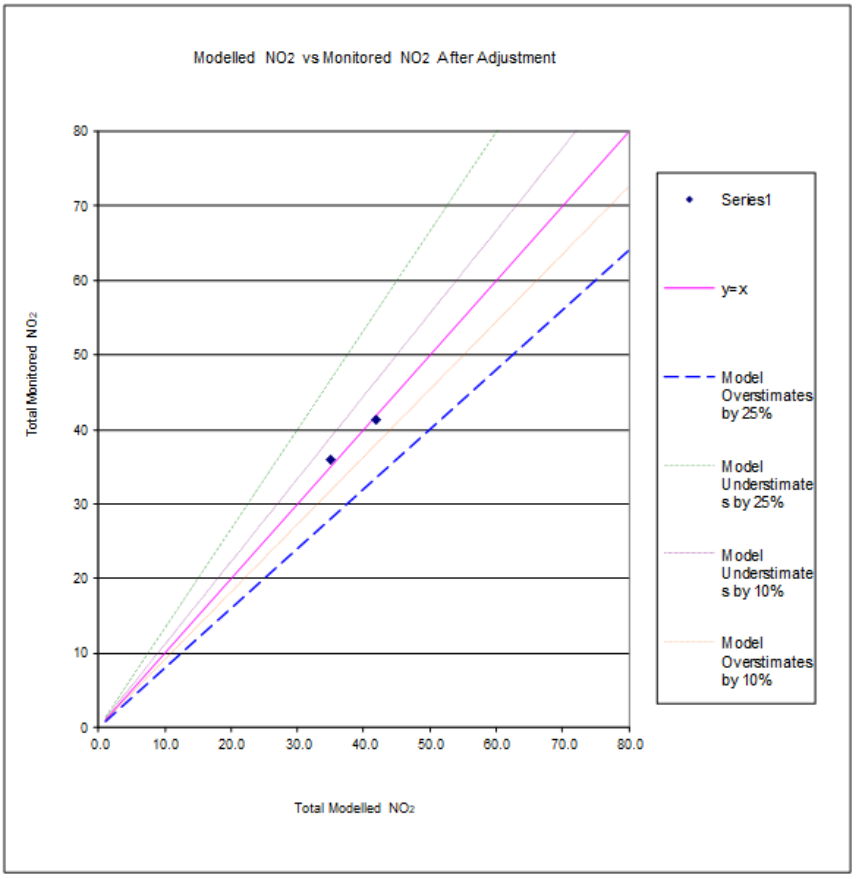


Figure F. 10: Adjusted Modelled NO_2 vs. Monitored NO_2 – Westbury AQMA



Salisbury City Centre AQMA

For the purpose of model verification, the Salisbury City Centre and A36 Wilton Road AQMAs were considered in combination. In accordance with LAQM.TG(16), number of monitoring sites within the vicinity of the modelled domain were excluded from consideration for verification for the reasons presented in Table F. 13 below.

Table F. 13: Sites not considered for Verification – Salisbury City Centre AQMAs

Site ID	Monitoring Site Type	Monitored total NO_2 ($\mu g/m^3$)	Reason for Exclusion
DT74	Diffusion Tube	28	Monitoring Location is near a bus stop, therefore road sources could not be modelled accurately.

Table F. 14 below shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required.

Table F. 14: Comparison of Unadjusted vs. Monitored NO_2 – Salisbury City Centre AQMAs

Site ID	Background NO_2 ($\mu g/m^3$)	Monitored total NO_2 ($\mu g/m^3$)	Modelled total NO_2 ($\mu g/m^3$)	% Difference (modelled vs. monitored)
DT59	16.0	44.0	27.9	-36.5
DT67	16.0	35.0	25.7	-26.6
AM1	16.0	30.0	23.0	-23.3
DT68	16.0	35.0	21.8	-37.8
DT53	16.0	37.0	25.5	-31.2
DT70	16.0	36.0	22.5	-37.5
DT52	16.0	36.0	24.9	-30.7
DT56	16.0	30.0	23.8	-20.6

The model was shown to be under predicting at all locations. It is recommended in LAQM.TG(16) that all modelled results are within ±25% threshold of monitored concentrations with a preference for the concentration to be within ±10%. Further model adjustments have been made to obtain closer alignment of the modelled concentrations to the monitored concentrations. Model adjustment is undertaken

based on the road NO_x component and not NO_2 so as to not introduce bias toward the background component.

Figure F. 11 shows a scatterplot of the modelled road NO_x concentrations versus monitored road NO_x concentrations, and the trend line based on linear regression passing through zero. The equation of the trend line gives an adjustment factor of 2.3909. This adjustment factor was applied to all modelled road NO_x outputs before conversion of NO_x to NO_2 and the addition of background concentrations.

The adjusted modelled results are summarised in Table F.15 and Figure F. 12. Post adjustment, all modelled NO_2 concentrations are within the ±25% threshold recommended as being acceptable in LAQM.TG(16), and all of the results are within the desirable ±10%. The adjustment reduces Root Mean Square Error (RMSE) from 11.4 µg/m^3 to 3.3 µg/m^3, and fractional bias from 0.4 to <0.01 indicating that adjusted modelled concentrations show a good agreement with measured values.

Table F.15: Adjusted Road NOx and NO_2 – Salisbury City Centre AQMAs

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NOx (µg/m^3)	Adjusted Modelled total NO_2 (based upon empirical NOx / NO_2 relationship) (µg/m^3)	Monitored total NO_2 (µg/m^3)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
DT59	-60%	**2.391**	55.0	42.7	44.0	-3.0
DT67	-51%		44.2	37.9	35.0	8.4
AM1	-51%		31.7	32.1	30.0	7.1
DT68	-71%		25.8	29.3	35.0	-16.2
DT53	-57%		43.1	37.5	37.0	1.3
DT70	-69%		29.3	31.0	36.0	-13.8
DT52	-57%		40.6	36.3	36.0	0.9
DT56	-46%		35.4	33.9	30.0	12.9

Figure F. 11: Modelled Road NOx vs Monitored Road NOx Before and After Adjustment – Salisbury City Centre AQMAs

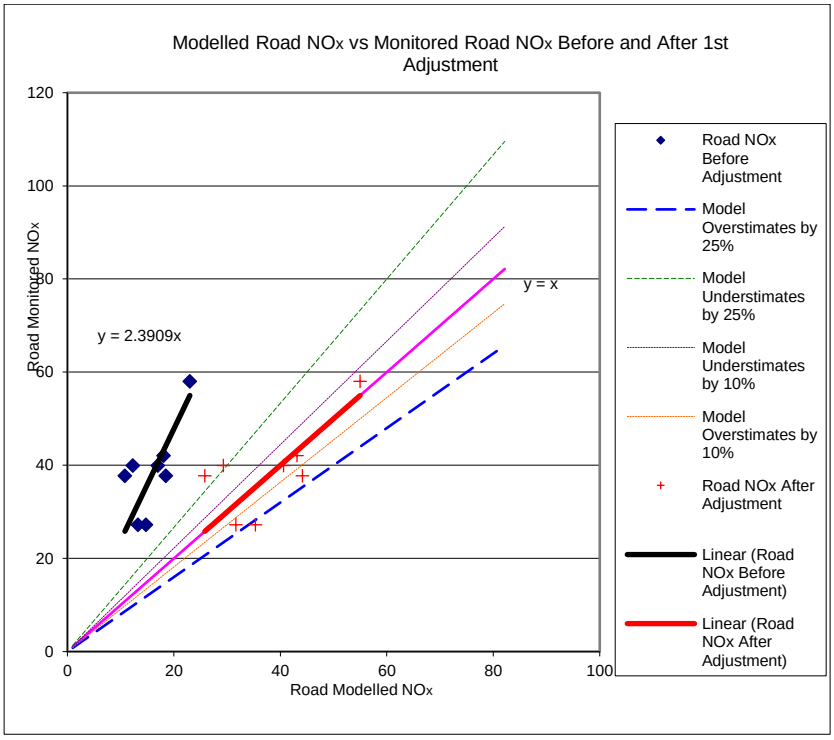
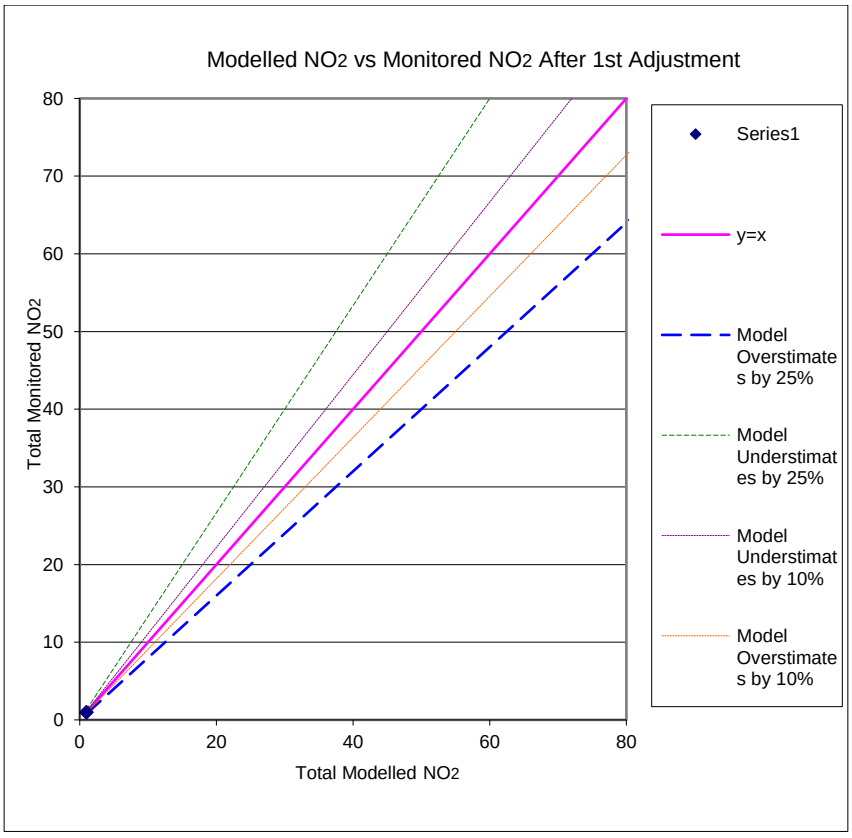


Figure F. 12: Adjusted Modelled NO_2 vs. Monitored NO_2 – Salisbury City Centre AQMAs



Salisbury London Road AQMA

No sites were removed from the verification process. Table F. 16 below shows an initial comparison of the monitored and unverified modelled NO_2 results for the year 2019, in order to determine if verification and adjustment was required.

Table F. 16: Comparison of Unadjusted vs. Monitored NO_2 – Salisbury London Road AQMA

Site ID	Background NO_2 (µg/m^3)	Monitored total NO_2 (µg/m^3)	Modelled total NO_2 (µg/m^3)	% Difference (modelled vs. monitored)
DT71	16.0	39.0	21.9	-43.8
DT65	16.0	51.0	25.3	-50.4
DT66	16.0	37.0	22.5	-39.1
DT73	16.0	29.0	20.5	-29.2
DT72	16.0	32.0	21.0	-34.3

The model was shown to be under predicting at all locations. It is recommended in LAQM.TG(16) that all modelled results are within ±25% threshold of monitored concentrations with a preference for the concentration to be within ±10%. Further model adjustments have been made to obtain closer alignment of the modelled concentrations to the monitored concentrations. Model adjustment is undertaken based on the road NO_x component and not NO_2 so as to not introduce bias toward the background component.

Figure F. 13 shows a scatterplot of the modelled road NO_x concentrations versus monitored road NO_x concentrations, and the trend line based on linear regression passing through zero. The equation of the trend line gives an adjustment factor of 3.8376. This adjustment factor was applied to all modelled road NO_x outputs before conversion of NO_x to NO_2 and the addition of background concentrations.

The adjusted modelled results are summarised in Table F.17 and

Figure F. 14. Post adjustment, all modelled NO_2 concentrations are within the ±25% threshold recommended as being acceptable in LAQM.TG(16), and all of the results are within the desirable ±10%. The adjustment reduces Root Mean Square Error (RMSE) from 16.5 µg/m^3 to 2.6 µg/m^3, and fractional bias from 0.5 to <0.01 indicating that adjusted modelled concentrations show a good agreement with measured values.

Table F.17: Adjusted Road NOx and NO_2 – Salisbury London Road AQMA

Site ID	Ratio of monitored road contribution NO_x / modelled road contribution NO_x	Adjustment factor for modelled road NO_x	Adjusted modelled road contribution NOx (µg/m^3)	Adjusted Modelled total NO_2 (based upon empirical NOx / NO_2 relationship) (µg/m^3)	Monitored total NO_2 (µg/m^3)	% Difference (adjusted modelled NO_2 vs. monitored NO_2)
DT71	-76%	**3.838**	42.6	37.2	39.0	-4.5
DT65	-76%		67.9	48.2	51.0	-5.6
DT66	-71%		47.2	39.3	37.0	6.2
DT73	-66%		32.5	32.5	29.0	12.2
DT72	-70%		36.0	34.2	32.0	6.8

Figure F. 13: Modelled Road NOx vs Monitored Road NOx Before and After Adjustment – Salisbury London Road AQMA

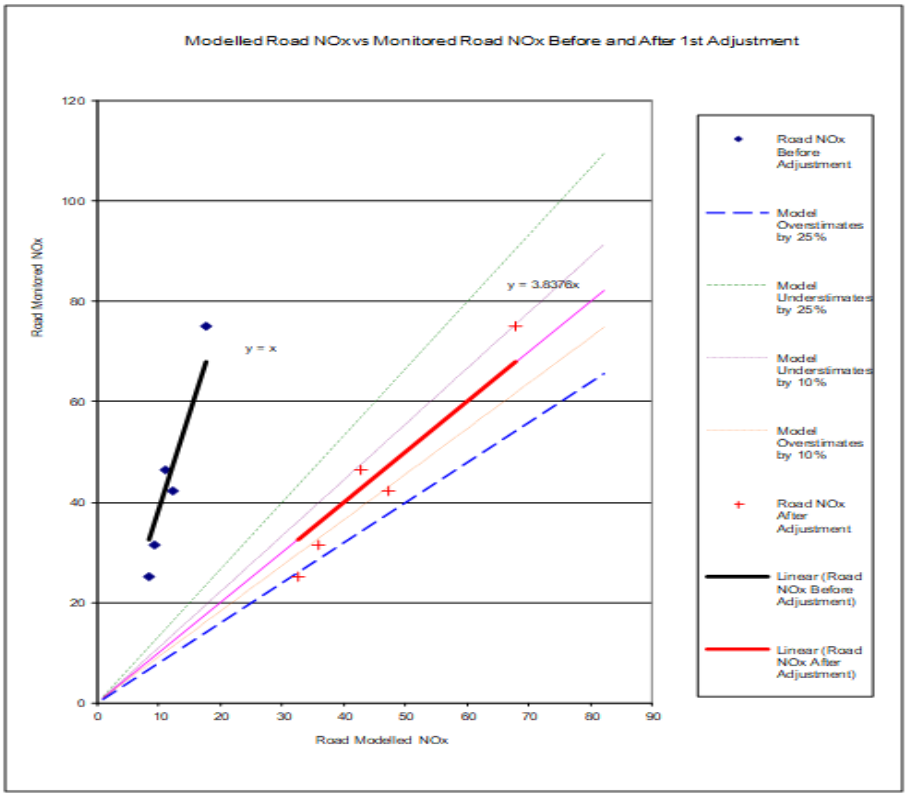
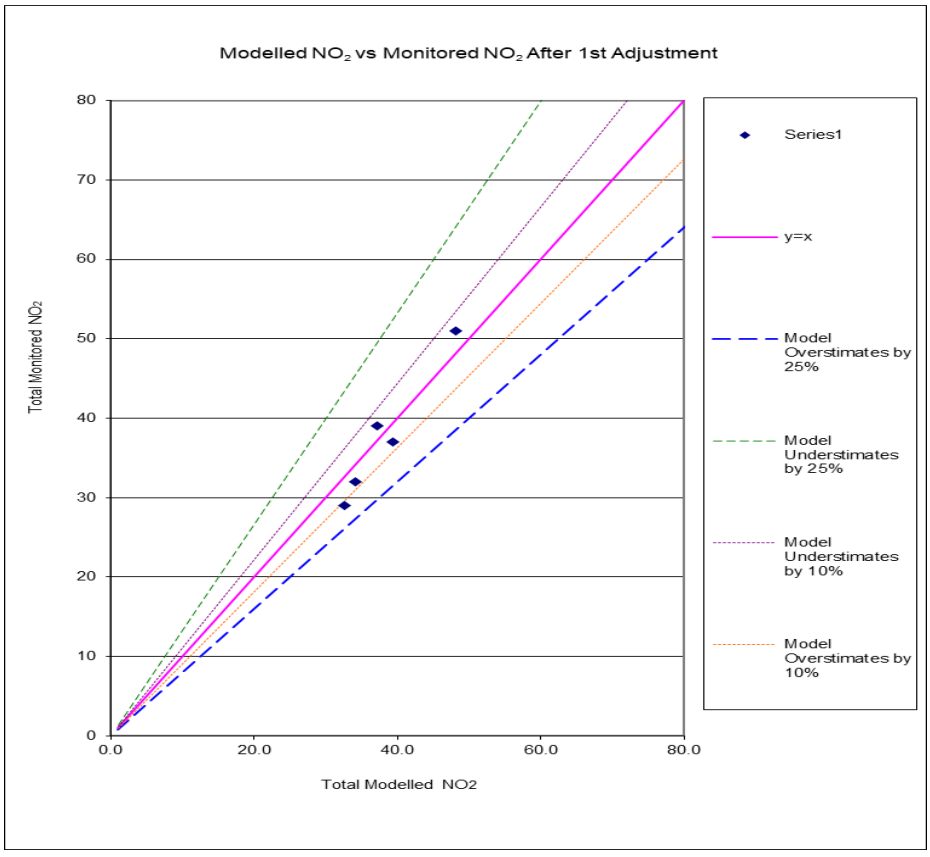


Figure F. 14: Adjusted Modelled NO_2 vs. Monitored NO_2 – Salisbury London Road AQMA



Glossary of Terms

Abbreviation	Description
ADMS	Atmospheric Dispersion Modelling System (Ref. 32)
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
AQO	Air Quality Objective – A legally binding limit value defined within The Air Quality Standards Regulations 2010. The national air quality objective (AQO) limit for nitrogen dioxide is 40 µg NO2/m3 air as an annual mean value.
AQS	Air Quality Strategy (Ref. 9)
ASR	Air quality Annual Status Report (Ref. 8)
CIL	Community Infrastructure Levy
CBA	Cost Benefit Analysis
COMEAP	The Committee on the Medical Effects of Air Pollutants
EFT	Emissions Factor Toolkit v10.1 (Ref. 19)
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
HGV	Heavy Goods Vehicles
LAQM	Local Air Quality Management
LGV	Light Goods Vehicles
LTN	Local Traffic Neighbourhood
LTP3	Local Transport Plan 3 (Ref. 12)
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides

SPD	Supplementary Planning Document
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
WTM	Wiltshire Transport Model

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