Bath & North East Somerset Council

Improving People's Lives

Farrington Gurney and Temple Cloud Air Quality Action Plan

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

2023 – 2028

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Executive Summary

This Air Quality Action Plan (AQAP) has been produced as part of our statutory duties required by the Local Air Quality Management framework. It outlines the action we will take to reduce the concentrations of nitrogen dioxide (NO_2) in the villages of Farrington Gurney and Temple Cloud in Bath and North East Somerset between 2023 and 2028.

This is the first action plan for Farrington Gurney and Temple Cloud following the declaration of Air Quality Management Areas in August 2018. It follows the completion of an Options and Feasibility study (completed January 2020) and a consultation period that ran for 12 weeks between February and May 2020.

A consultation draft action plan was made available online in addition to a paper and online survey. A number of drop-in sessions were held with officers present where consultees were able to discuss the proposed actions.

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 equalities issues because areas with poor air quality are also often the less affluent areas[1,2].

The annual health cost to society of the impacts of particulate matter alone in the UK is estimated to be around £16 billion[3]. Bath and North East Somerset Council is committed to reducing the exposure of people in Bath and North East Somerset Council to poor air quality in order to improve health.

[1] Environmental equity, air quality, socioeconomic status and respiratory health, 2010

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

[3] Defra. Abatement cost guidance for valuing changes in air quality, May 2013

We have developed actions that can be considered under 5 broad topics:

- Traffic Management
- Public information
- Policy guidance and development control
- Promoting travel alternatives
- Transport planning and infrastructure

Our priorities are to reduce emissions produced by traffic, principally by smoothing the flow of traffic and reducing the ‘stop/starting’ of vehicles through the villages. Secondly to increase awareness in order to help residents reduce their exposure through making more informed choices.

In this AQAP we outline how we plan to effectively tackle air quality issues within our control. However, we recognise 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 Bath and North East Somerset Council’s direct influence.

Responsibilities and Commitment

This AQAP was prepared by the Environmental Monitoring team of Bath and North East Somerset Council with the support and agreement of the following departments:

- Environmental Protection
- Transport – including Transport Planning
- Public Health Team
- Highways – including Traffic Management
- Sustainability
- Planning Policy
- Parks & Green Spaces
- Sustainable Transport – including the School Travel Plan Officer

This AQAP has been approved by:

- Rebecca Reynolds, Director of Public Health

- Councillor David Wood, Cabinet Member for Neighbourhood Services and Ward Councillor for Mendip
- Councillor Ryan Wills, Ward Councillor for High Littleton

This AQAP will be subject to an annual review, appraisal of progress and reporting to the relevant Council Cabinet Members. Progress each year will be reported in the Annual Status Reports (ASRs) produced by Bath and North East Somerset Council, as part of our statutory Local Air Quality Management duties.

The implementation of the Air Quality Action Plan from 2019/20 onwards was developed in close consultation with the Cabinet Member for Neighbourhood Services who is also the Ward Councillor for Mendip ward and the High Littleton Ward Councillor.

Early consultation with Members indicated a willingness to consider a width restriction on the A37, this option found public support through the consultation. However, this was not supported by the statutory consulted, most notably Highways England and the Police.

Early interventions including cutting back vegetation from the side of A37 to allow smoother movement of traffic and cutbacks of the canopy contributed to a decrease in NO_2 levels that have continued post-pandemic.

Later interventions included installation of Vehicle Activated Signs that were designed to reduce HGV conflict on the A37 at Temple Cloud. Initial data from monitoring of VAS indicates that conflicts have been reduced and further information is being collected to confirm their effectiveness and to determine the effect on air quality.

Using projection factors provided by DEFRA with 2017 monitoring data, Farrington Gurney Air Quality Management Area (AQMA) is predicted to be compliant in 2023 without any intervention.

Monitoring data from 2018 onwards in Farrington Gurney AQMA was already compliant but further consultation was conducted with the community to identify

further measures.

Based on data from 2017 the prediction for compliance in the Temple Cloud AQMA was 2029 if no interventions were made besides tree cutting.

Temple Cloud has seen considerable reductions in the concentrations of nitrogen dioxide since the AQMA were declared. The early implementation of actions contained within this plan has accelerated compliance from the modelled year of 2029. It is now anticipated that as monitoring in Temple Cloud AQMA continues based on DEFRA projections factors all sites are predicted to be compliant in 2023.

If you have any comments on this AQAP please send them to the Environmental Monitoring Team at:

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1. Introduction

This report outlines the actions that Bath and North East Somerset Council will deliver between 2023 and 2028 in order to reduce concentrations and exposure to nitrogen dioxide in Farrington Gurney and Temple Cloud; thereby positively impacting on the health and quality of life of residents and visitors to Farrington Gurney, Temple Cloud and the wider Bath and North East Somerset area.

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

This Plan will be reviewed every five years at the latest and progress on measures set out within this Plan will be reported on annually within Bath and North East Somerset Council's air quality ASR.

2. Summary of Current Air Quality in Farrington Gurney and Temple Cloud

2.1 Farrington Gurney Air Quality Management Area

The monitoring of NO_2 during 2017 indicated that an AQMA was required along the A37 through Farrington Gurney. The area shown in Figure 2.1 was declared in August 2018 following a public consultation exercise which was carried out between 19th February and 23rd March 2018.

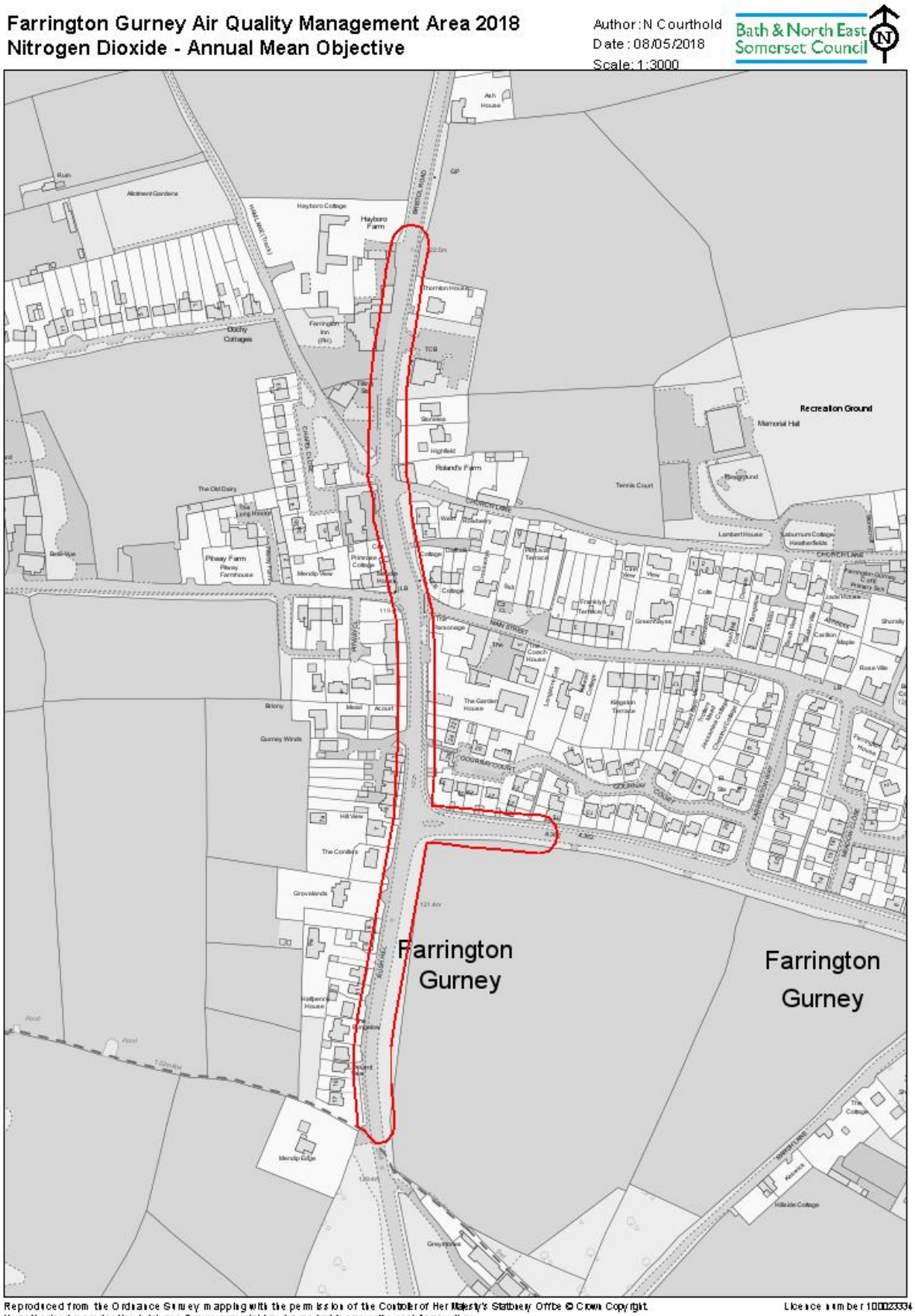
Exceedances of the annual average NO_2 objective were recorded in 2017, therefore the area was declared for breaching the annual average objective. Bath and North East Somerset Council's Annual Status Reports can be viewed on the following website.

The population within the AQMA was estimated using 2011 Census data. The result of this was 44 as displayed Table 2.1.

Table 2.1: Estimated population within the Farrington Gurney AQMA

Number of residential properties whose façade is within the AQMA	18
Average number of people per dwelling	2.46
Estimated total population within the AQMA	**44**

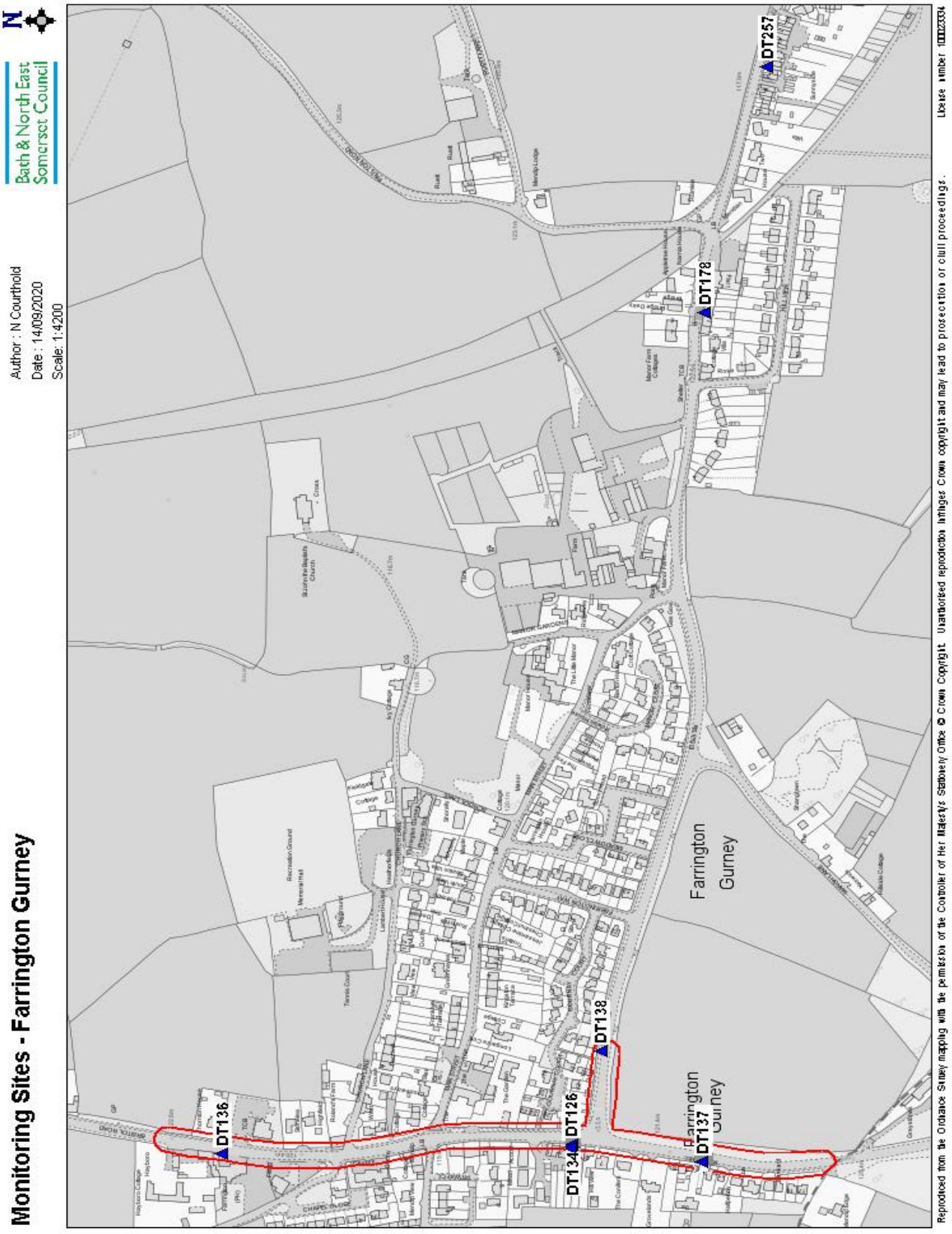
Figure 2.1: The declared Air Quality Management Area in Farrington Gurney



Monitoring

The monitoring in Farrington Gurney has been carried out using diffusion tubes; the locations of these are mapped in Figure 2.2.

Figure 2.2: Locations of the diffusion tube sites in Farrington Gurney



The 2017 to 2021 data is tabulated below in Table 2.2. All values are annual average NO_2 concentrations (bias and annual corrected) in µg/m^3.

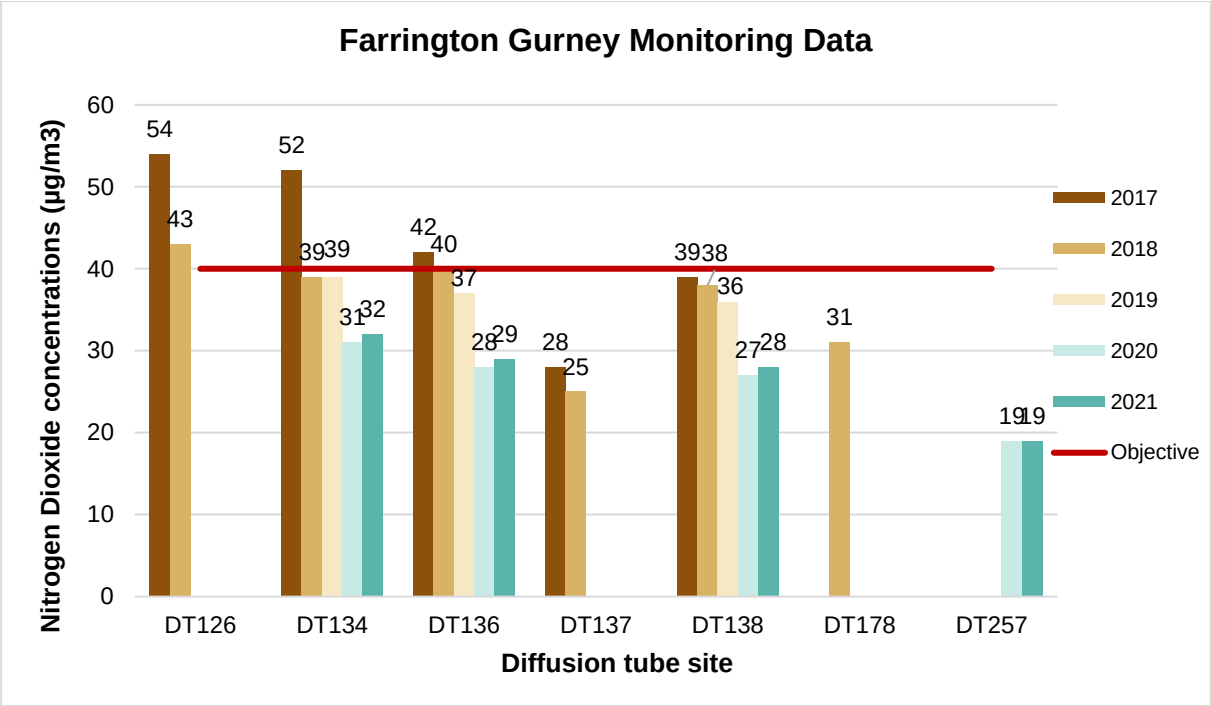
Table 2.2: The Farrington Gurney monitoring data

Location	2017	2017 at façade	2018	2018 at façade	2019	2019 at façade	2020	2020 at façade	2021	2021 at façade
DT126	**54**	40	**43**	32	-	-	-	-	-	-
DT134	**52**	**52**	39	39	39	39	31	31	32	32
DT136	**42**	**42**	40	40	37	37	28	28	29	29
DT137	28	22	25	19	-	-	-	-	-	-
DT138	39	32	38	31	36	29	27	22	28	23
DT178	-	-	31	30	-	-	-	-	-	-
DT257	-	-	-	-	-	-	19	18	19	18

Figure 2.3 is a graphical representation of the data recorded at the diffusion tubes. The 40 µg/m^3 annual average objective was exceeded at three diffusion tube locations in 2017: DT126, DT134 and DT136, one location in 2018: DT126 and in 2019: DT134 had a value slightly under the annual average objective. In 2019, DT126 was removed as DT134 is located at the property façade at the same location and is more representative of exposure. DT137 and DT178 were removed as the concentrations recorded were well below the annual average objective.

Concerns relating to the Somer Valley Enterprise Zone (SVEZ) were raised during the consultation about the SVEZ site, therefore a further monitoring site was added at Sunnyside in 2020.

Figure 2.3: Graphical representation of the Farrington Gurney data



2.2 Temple Cloud Air Quality Management Area

The monitoring of NO_2 during 2016 and 2017 indicated that an AQMA was required along the A37 through Temple Cloud. The area shown in Figure 2.4 was declared in August 2018 following a public consultation exercise which was carried out between 14th February and 23rd March 2018.

Exceedances of the annual average NO_2 objective were recorded and concentrations above 60 µg/m^3 were recorded. This indicated that the 1-hour average objective could also be exceeded and therefore the area was declared for both the annual and 1-hour average objectives.

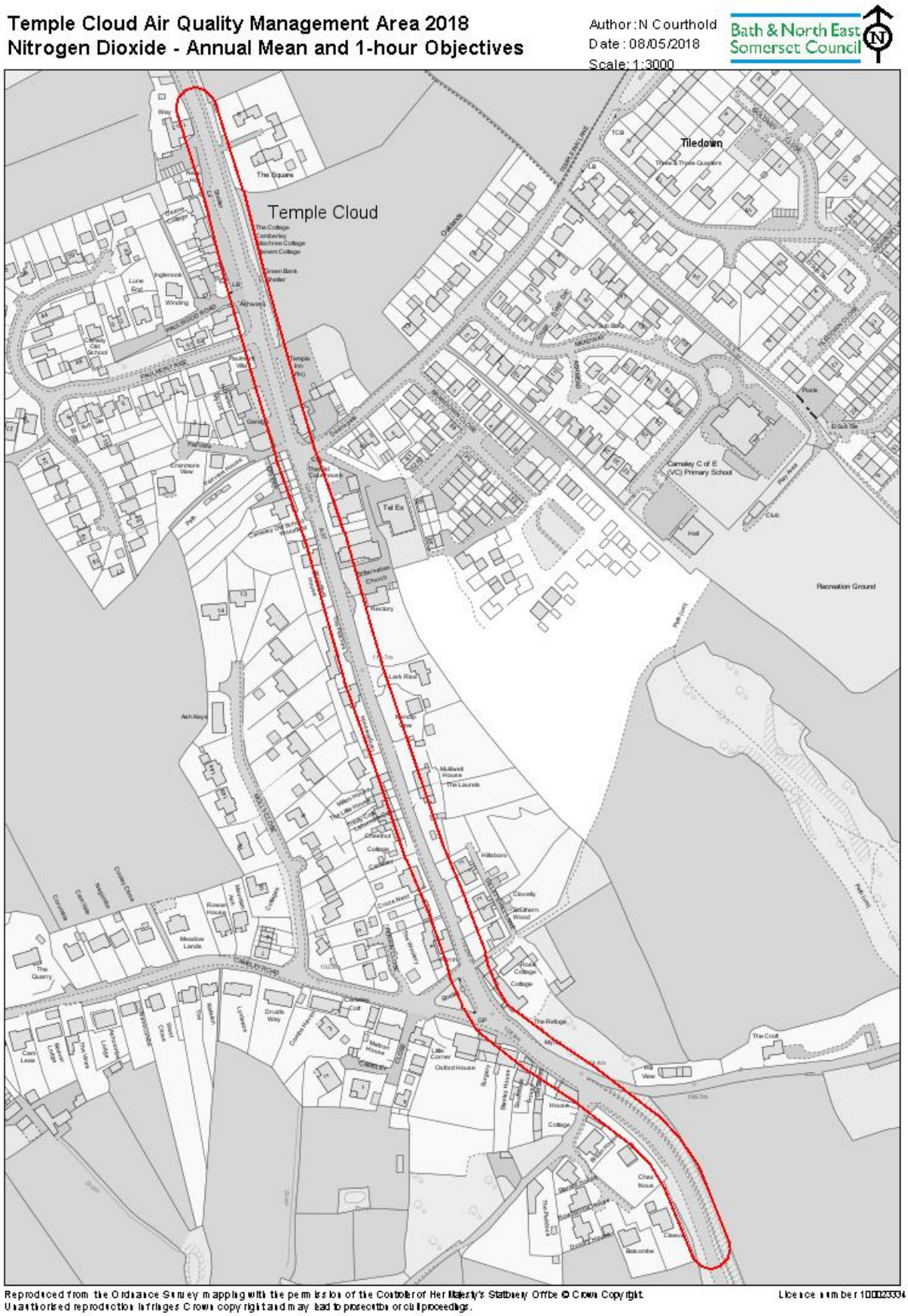
Bath and North East Somerset Council's Annual Status Reports can be viewed on the following website.

The population within the AQMA was estimated using 2011 Census data. The result of this was 158 as displayed in Table 2.3. The local doctor's surgery 'Cameley Surgery' falls within the Temple Cloud AQMA. It is located towards the south of the AQMA and is of interest in terms of its visitors – their health and their mode of travel.

Table 2.3: Estimated population within the Temple Cloud AQMA

Number of residential properties whose façade or garden are within the AQMA	63
Average number of people per dwelling	2.51
Estimated total population within the AQMA	**158**

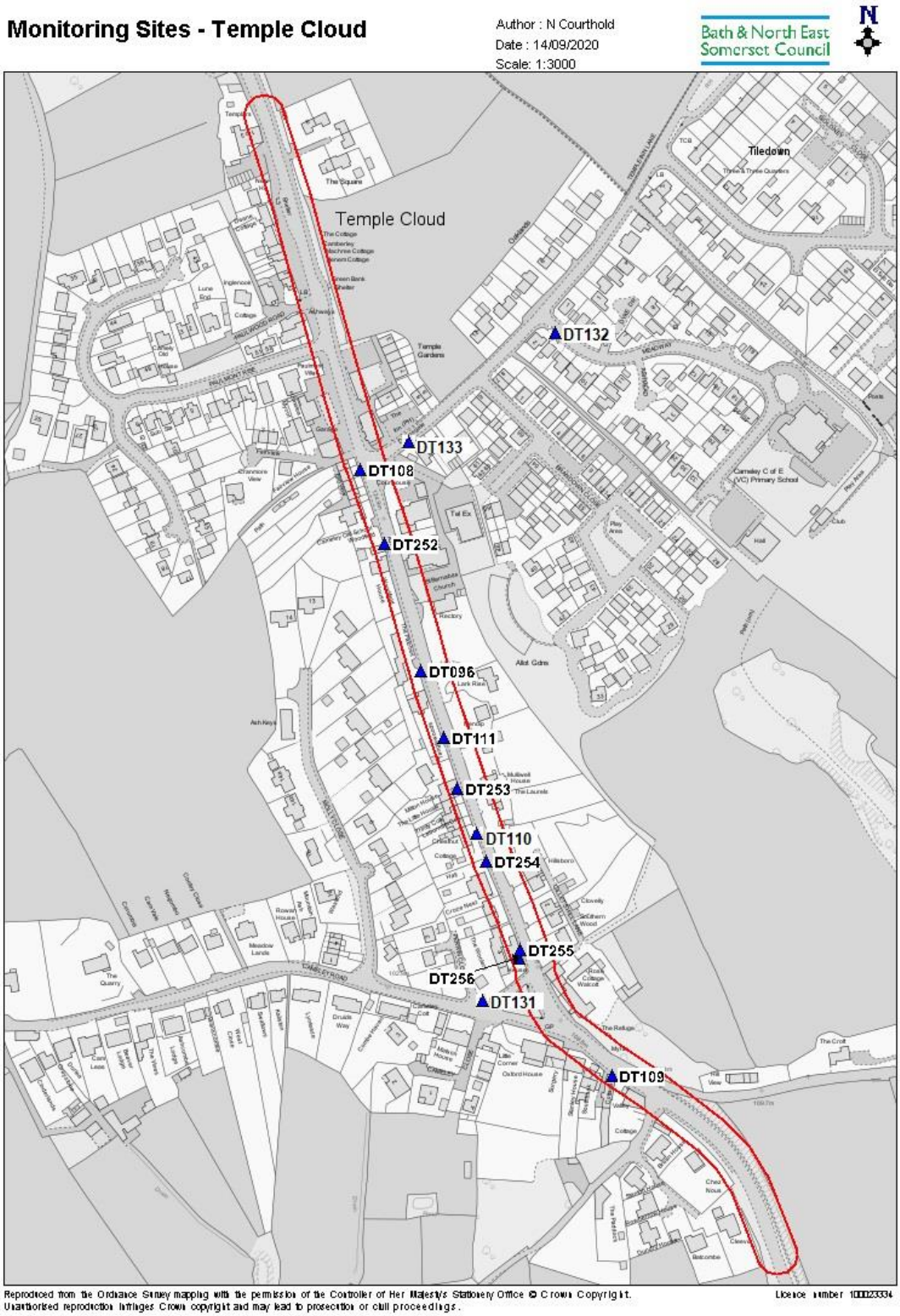
Figure 2.4: The declared Air Quality Management Area in Temple Cloud



Monitoring

The monitoring in Temple Cloud has been carried out using diffusion tubes; the locations of these are mapped in Figure 2.5.

Figure 2.5: Locations of the diffusion tube sites in Temple Cloud



The 2016 to 2021 data is tabulated below in Table 2.4. All values are annual average NO_2 concentrations (bias and annual corrected) in µg/m^3.

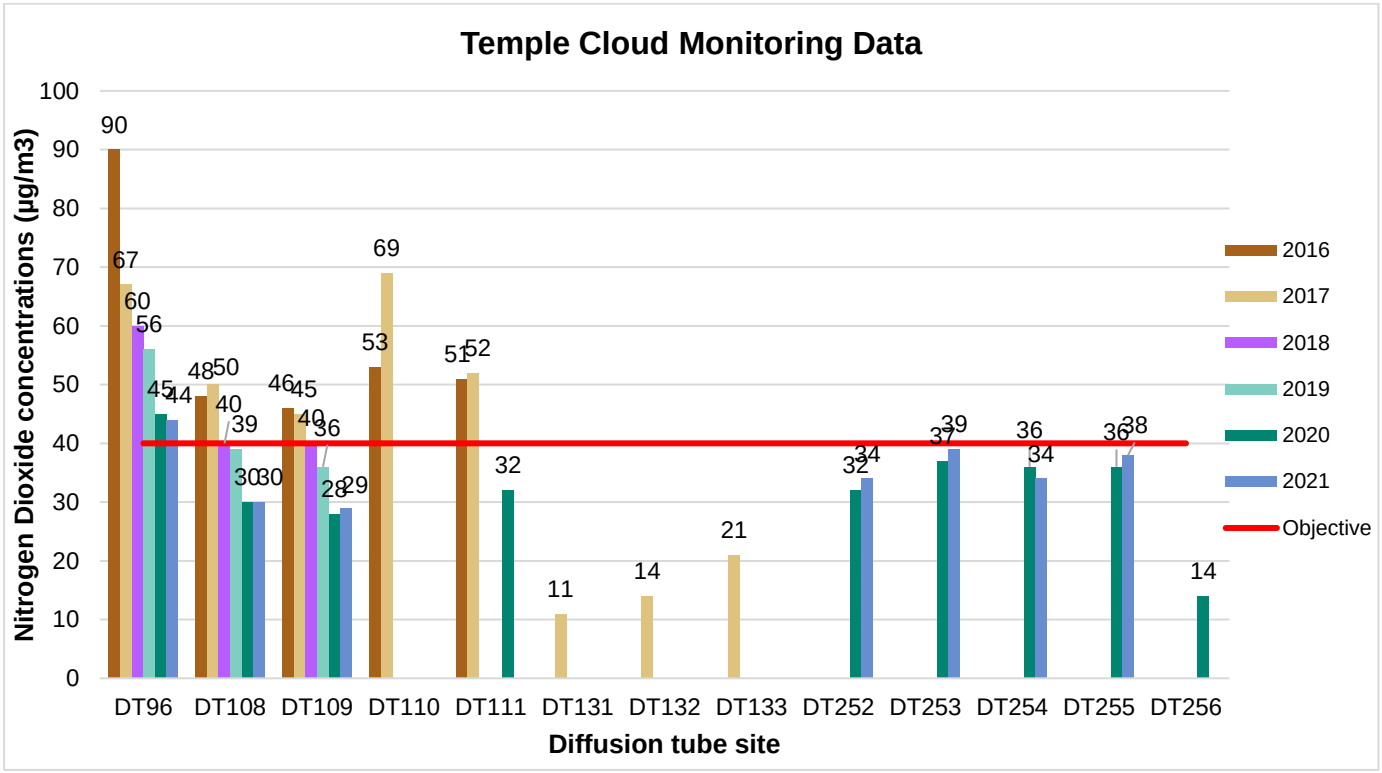
Table 2.4: The Temple Cloud monitoring data

Location	2016	2016 at façade	2017	2017 at façade	2018	2018 at façade	2019	2019 at façade	2020	2020 at façade	2021	2021 at façade
DT96	**90**	**90**	**67**	**67**	**60**	**60**	**56**	**56**	**45**	**45**	**44**	**44**
DT108	**48**	35	**50**	34	40	27	39	27	30	21	30	21
DT109	**46**	**41**	**45**	39	40	34	36	31	28	24	29	25
DT110	**53**	40	**69**	**49**	-	-	-	-	-	-	-	-
DT111	**51**	**51**	**52**	**52**	-	-	-	-	32	32	-	-
DT131	-	-	11	9	-	-	-	-	-	-	-	-
DT132	-	-	14	12	-	-	-	-	-	-	-	-
DT133	-	-	21	16	-	-	-	-	-	-	-	-
DT252	-	-	-	-	-	-	-	-	32	32	34	34
DT253	-	-	-	-	-	-	-	-	37	**44**	**39**	**47**
DT254	-	-	-	-	-	-	-	-	36	29	34	27
DT255	-	-	-	-	-	-	-	-	36	36	38	38
DT256	-	-	-	-	-	-	-	-	14	16	-	-

Figure 2.6 is a graphical representation of the data recorded at the diffusion tubes. The 40 µg/m^3 annual average objective was exceeded at five diffusion tube locations in 2016 and 2017. One diffusion tube (DT96) exceeded in 2018 and one diffusion tube (DT96) exceeded in 2019. In 2018 DT110 and DT111 were removed as they were within the centre of the AQMA. However, DT111 was reinstated in 2020 and a

further 5 locations (DT252 to DT256) in order to more accurately monitor the improvements in air quality and to understand whether the modelling is accurate. DT96 was retained as it was the original site and recorded the highest concentrations at the façade and DT108 and DT109 were retained as they are located at each end of the AQMA. DT131-DT133 were removed in 2018 and the DT111 and DT256 were removed in 2021 as their concentrations were recorded below the annual average objective. The diffusion tube locations are reviewed annually, and results are published in the ASR.

Figure 2.6: Graphical representation of the Temple Cloud data



3. Bath and North East Somerset Council's Air Quality Priorities

3.1 Public Health Context

The health effects of air pollution are widely recognised and thoroughly researched. Long-term exposure to air pollution is linked to increases in premature death, associated with lung, heart and circulatory conditions. Short term exposure can contribute to adverse health effects including exacerbation of asthma, effects on lung function and increases in hospital admissions.

The recent COMEAP (Committee on the Medical Effects of Air Pollutants) report published in August 2018 estimated a mortality burden of 28,000 to 36,000 deaths attributable to the air pollution mixture (the combined impacts of NO_2 and $PM_{2.5}$) in the UK. This equates to an associated loss of 328,000 to 416,000 life years.

The resulting cost of health and social care due to air pollution places an economic burden on the National Health Service (NHS). The 2018 Public Health England (PHE) report 'Estimation of costs to the NHS and social care due to the health impacts of air pollution' quoted costs of £1.60 billion between 2017 and 2025 for the combined impacts $PM_{2.5}$ and NO_2 where there is robust evidence for an association between the disease and air pollution. This rises to £5.56 billion if all diseases, where there is currently less robust evidence for an association, were included in the calculation.

The Farrington Gurney and Temple Cloud AQMAs are both declared for the pollutant nitrogen dioxide. Specific health impacts for nitrogen dioxide include high concentrations leading to inflammation of the airways and long-term exposure can increase symptoms of bronchitis in asthmatic children and reduced lung development and function.

3.2 Planning and Policy Context

There are several Policies and Strategies of national, regional, and local scale that have implications for air quality, and provide guidance and direction to achieve improvement in air quality. These are explored in more detail below.

3.2.1 National

National Planning Policy Framework

The Government's planning policies are set out in the National Planning Policy Framework (NPPF) which was most recently revised in July 2021.

Air quality is specifically mentioned within Section 9: Promoting sustainable travel and Section 15: Conserving and enhancing the natural environment. The following quote from Section 15 sets out the consideration that should be given to Air Quality Management Areas and air quality in planning policies and decisions:

> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

In line with the NPPF, measures that seek to improve air quality or mitigate the potential impacts of development should be identified and implemented.

Major Road Network

In 2018 the Government's Department for Transport adopted the proposal to create a 'Major Road Network' (MRN) in line with the Transport Investment Strategy. The intention being that the MRN would form an intermediate level between the national Strategic Road Network (SRN) and the rest of the local road network.

Five central objectives of the MRN were set out, these are as follows:

- Reduce congestion
- Support economic growth and rebalancing
- Support housing delivery
- Support all road users
- Support the Strategic Road Network

The A37 has been indicated on the proposed MRN. As a result, the A37 is included within the final MRN, so a new funding stream could be available for major schemes and improvements that aim to raise the performance standards of the network, but the potential for this is limited as air quality is not listed as an objective and proposals related to bypasses, missing links, major structural works, major junctions and use of smart technology over £20m, take precedence.

3.2.2 Regional

West of England Joint Transport Study and Joint Local Transport Plan

The West of England Joint Transport Study (JTS) is a technical report which covers the long-term transport vision, up to 2036 and beyond, for the West of England region and aims to identify long term transport deficiencies and necessary improvements to mitigate the proposed growth in housing and jobs in the Joint Spatial Plan. The study recognises poor air quality, caused by traffic, as an important challenge and one that causes ill health and premature deaths. It also recognises that a growing economy could place additional pressure on the road network.

Following on from this, a new Joint Local Transport Plan has been developed and has been adopted in March 2020.

Poor air quality has significant impacts on human health, which risks holding back economic growth due to the impacts of poor health on productivity. The Local Policy L5 will 'Support the identification and implementation of measures that will improve air quality'. This AQAP aims to address the issue of poor air quality in Farrington Gurney and Temple Cloud, and some of the measures within the plan relate specifically to traffic management, policy guidance and promoting travel alternatives. The AQAP is therefore in line with the objectives set out in the JTS.

Go Ultra Low West

Go Ultra Low West is a £7 million joint project between the West of England authorities. The project aims to accelerate and encourage the uptake of electric vehicles across the region.

The main objectives of the project include: to double the number of public electric vehicle charge points on the Revive network and install four new charging hubs across the region. Electric vehicles are zero emission in terms of nitrogen dioxide, and their uptake - where replacing existing conventional internal combustion engine vehicles - results in an improvement in local air quality.

Charge point sites are being planned, including for rapid chargers (circa. 30 minute recharge) in Bath, Keynsham and Radstock and fast chargers (2 to 4 hour recharge) in Midsomer Norton, and numerous locations in Bath.

This work could result in an increase of up to 44 charging bays across the authority area and compliment the existing publicly available charge point located at The Temple Inn car park.

City Region Sustainable Transport Settlement (CRSTS)

The National Infrastructure Strategy committed to investments in local transport networks to improve productivity in the UK largest cities. The CRSTS programme aims to deliver transformational change through investments in public and sustainable transport infrastructure in some of England's largest city regions. CRSTS funding is targeted at the following objectives:

- drive growth and productivity through infrastructure investment;
- level-up services towards the standards of the best; and
- decarbonise transport, especially promoting modal shift from cars to public transport, walking and cycling.

The settlement is in addition to existing funding streams, including bus revenue support, cycling and walking funding, Local Electric Vehicle Charging funds etc.

Proposed work packages focus on improving key strategic corridors and the linkages into those corridors, particularly across the bus network.

WECA aims to support strong, active and inclusive communities, who are informed and involved in decision-making enabling WECA to improve the region to enhance the quality of life for the South West residents. The co-ordinated solution has been developed following extensive joint working with the local authorities of Bristol, South Gloucestershire, and Bath and North East Somerset, supported by an extensive programme of stakeholder engagement.

WECA has some work-packages that will improve the strategic public transport corridors, walking and cycling. There will be some improving access on the A37 from

Somer Valley area into central Bristol and A367 from Somer Valley area into central Bath. The Combined Authority will invest in walking and cycling facilities across the region, to improve the attractiveness of active travel, including new modes such as e-scooters. The facilities include increased provision of cycle parking spaces and off-road and segregated walking and cycling routes. These walking and cycling investment plans are integral to the A37 strategic corridor approach, providing links between where people live, where they work, and where they access essential services and leisure activities, especially in economically disadvantaged areas.

3.2.3 Local

Corporate Strategy 2020-2024

Bath and North East Somerset Council's Corporate Strategy 2020-2024 identifies two core policies: *'tackling the climate and nature emergency and giving people a bigger say.'* Measures that aim to reduce air pollution, such as those within this Air Quality Action Plan, would positively exhibit progress within this area and at least not compromise the ability of actions undertaken in line with these policies to fulfil the desired outcomes.

Core Strategy

Air quality is detailed within Bath and North East Somerset Council's Core Strategy; paragraph 6.101 states:

> *"The reduction of the adverse effects of transport on climate change and air quality, particularly in Air Quality Management Areas (AQMA) in Bath and Keynsham and in future AQMAs, will be managed in accordance with the NPPF."*

This recognises the importance of Air Quality Management Areas in formally representing air quality issues within the planning framework; and directly links transport and air quality which is in line with the West of England Joint Transport Study.

Climate Emergency (Carbon Neutrality by 2030)

In March 2019, Bath and North East Somerset Council resolved to declare a climate emergency; to ‘provide leadership to enable carbon neutral B&NES by 2030’; to ‘enable citizen engagement’; and to oppose expansion of Bristol Airport’.

The West of England Combined Authority also declared a climate emergency and carbon neutrality by 2030.

The first outline action plan was completed in September 2019. The first phase of research has enabled a clear definition of three immediate priorities for action for the Bath and North East Somerset area and the scale and speed of ambition needed to achieve the 2030 target. In summary these are:

- Energy efficiency improvement of the majority of existing buildings (domestic and non-domestic) and zero carbon new build;
- A major shift to mass transport, walking and cycling to reduce transport emissions;
- A rapid and large-scale increase in local renewable energy generation.

An update report for the next stage of work was brought to the meeting of the Climate Emergency and Sustainability Policy Development and Scrutiny Panel on 16 March 2020. The update report identified the timescale for reviewing all the Council's existing strategies and plans to re-align them to the Climate Emergency.

Local Plan 2016-2036

Bath and North East Somerset Council has been preparing a new local plan for the district to cover the period from 2016 to 2036. Bath & North East Somerset Council will be working with our three neighbouring West of England councils and WECA to positively address the strategic planning needs the region, and will be jointly commissioning a refresh of the strategic evidence base to inform future plan-making, following the withdrawal of the West of England Joint Spatial Plan.

The plan will make direct references to the Farrington Gurney and Temple Cloud Air Quality Management Areas to ensure they are given consideration when assessing development plans.

Placemaking Plan

Bath and North East Somerset Council's current Placemaking Plan contains Policy PCS3 Air Quality:

1. *Development will only be permitted where the proposal:*
    a) *does not give rise to polluting emissions which have an unacceptable adverse impact on air quality, health, the natural (in particular designated wildlife sites) or built environment or local amenity of existing or proposed uses from air polluting activities, or*
    b) *is not located where it would be at unacceptable risk from, or be adversely affected by existing sources of odour, dust and /or other forms of air pollution*
2. *New development located within an Air Quality Management Area should be consistent with the local air quality action plan. Where an air quality assessment is necessary to support an application, it should be proportionate to the nature and scale of development proposed and the level of concern about air quality*

This policy recognises the interactions between air quality and the planning system.

The Somer Valley Enterprise Zone

Land at Old Mills north of the A362 and to the east of Farrington Gurney has been allocated to employment for many years and was given 'Enterprise Zone' status in 2017. New transport infrastructure will be required to help facilitate the development of the site and this will be determined through the Local Development Order process.

Potential junction improvements at the A37/A362 junction identified thus far to support the SVEZ development, are within the Farrington Gurney AQMA. These improvements will create additional capacity by widening the A362 junction entry arm to the A37 and reviewing the traffic signal phasing to better optimise flows. With this traffic changes and raise of vehicle traffic mitigation will be expected with the SVEZ development, updates will be included with the update of the AQAP.

Temple Cloud with Cameley Action Plan

The Cameley Parish Council Action Plan is an evolutionary document that is reviewed annually. One of the main actions is listed as *'Hold B&NES Council to account for the Air Quality Action Plan and measures to reduce the impact of pollution on residents.'* It goes on to say that 'the Parish Council is committed to ensuring that all residents are kept informed of developments as the public consultation is undertaken and will positively engage with the team at B&NES Council to ensure that these results are acted on in order to reduce harm to our residents.'

Another action within the plan is listed as 'Reduce the impact of speeding'. This is stated as being 'raised as the number one concern by residents at the Annual Parish Meeting.'

Bath's Clean Air Plan

In July 2017, Bath and North East Somerset Council (B&NES) was directed by the Joint Air Quality Unit (JAQU) to produce a Clean Air Plan (CAP) to achieve statutory NO_2 limit values within the shortest possible time.

The Council's Cabinet approved the full business case for a Class C Charging Clean Air Zone (CAZ) with Traffic Management at Queen Square alongside supporting measures in January 2020. A Class C CAZ will impose charges on higher emission buses, coaches, taxis, private hire vehicles, HGVs, vans and light goods vehicles (LGVs) that do not meet the minimum emission standards set out in the Government's Clean Air Zone Framework.

The minimum standards are as follows:

- Euro VI/6 diesel vehicles (registered from approximately 2015)
- Euro IV/4 petrol vehicles (registered from approximately 2006)

Taxis, private hire vehicles, vans and LGVs not meeting the required standards will be charged £9 per day for moving in the zone. HGVs over 3.5 tonnes, buses and coaches that don't meet the standards will be charged £100 per day.

Bristol City Council received the same letter of direction and is also developing a Clean Air Plan. The A37 road which runs through Farrington Gurney and Temple Cloud originates in Bristol and ends in Dorchester. The Bristol Clean Air Plan may have an impact on the vehicles that travel along the A37, to and from Bristol, and therefore has the potential to impact on air quality in the AQMAs.

The Government's 'Air quality plan for nitrogen dioxide (NO_2) in UK (2017)' has placed legal obligations on many Local Authorities to develop local action plans to achieve statutory NO_2 limit values. The development of plans nationally may have wide reaching air quality implications.

The Bath Clean Air Zone became operational on 15th March 2021.

3.3 Source Apportionment

The main source of nitrogen dioxide air pollution in Bath and North East Somerset, and in Farrington Gurney and Temple Cloud, is from road traffic.

3.3.1 Vehicular Split

The AQAP measures presented in this report are intended to be targeted towards the predominant sources of emissions within Farrington Gurney and Temple Cloud.

A two week Automatic Number Plate Recognition (ANPR) survey was undertaken by Bath and North East Somerset Council between the dates of 31/10/17 and 13/11/17. As part of the survey an ANPR camera was installed on the A37 in Temple Cloud. The survey provided traffic count data and was cross referenced with Carweb data to obtain information on vehicle type, fuel type and Euro standard. In 2019, as part of the A37 Options and Feasibility Study (Appendix C) a further 24 hour ANPR survey was carried out on the A37 Farrington Gurney to determine the vehicle split and traffic count on this section of the A37. In addition, a further Automatic Traffic Count (ATC) was also carried out in Temple Cloud to update the vehicle count information.

The figures and data presented in this section utilise the data from these traffic surveys to calculate the source apportionment for both Farrington Gurney and Temple Cloud as this was deemed the most accurate data available. The traffic counts for the year of 2020 were relatively lower to the previous year's data that were used for the vehicular split, as to be expected from the covid19 lockdowns and people working from home. The 2021 local traffic counts have 10% less volume compared to 2019.

The graph in Figure 3.1 and Figure 3.2 displays the vehicular split obtained from the ANPR surveys. Petrol cars (37% in Temple Cloud and 36% in Farrington Gurney) and diesel cars (36% in Temple Cloud and 34% in Farrington Gurney) are the largest proportions of the vehicle fleet. Heavy Goods Vehicles (Artic and Rigid combined) make up around 6-8% of the fleet. Small percentages (less than 1%) of motorcycles, specialist vehicles, electric cars and petrol LGVs were also recorded but are omitted from this summary graph.

Figure 3.1: Graphical representation of the weekday average vehicular split (%) obtained from the 2017 ANPR survey in Temple Cloud

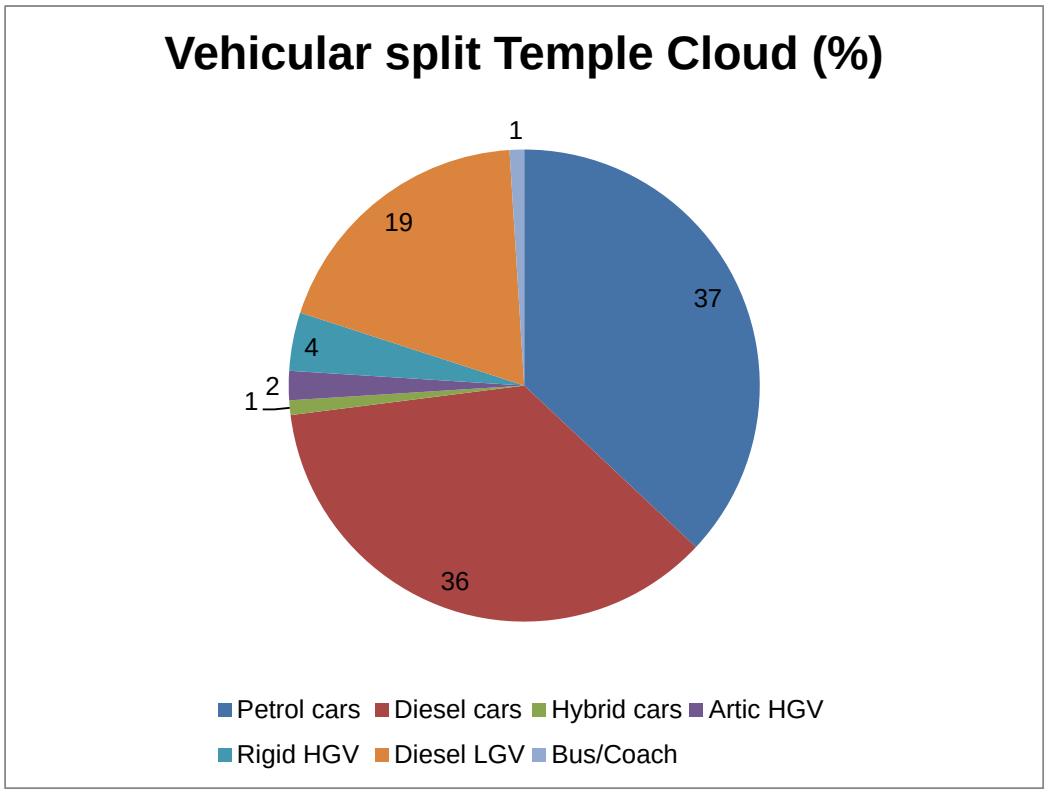
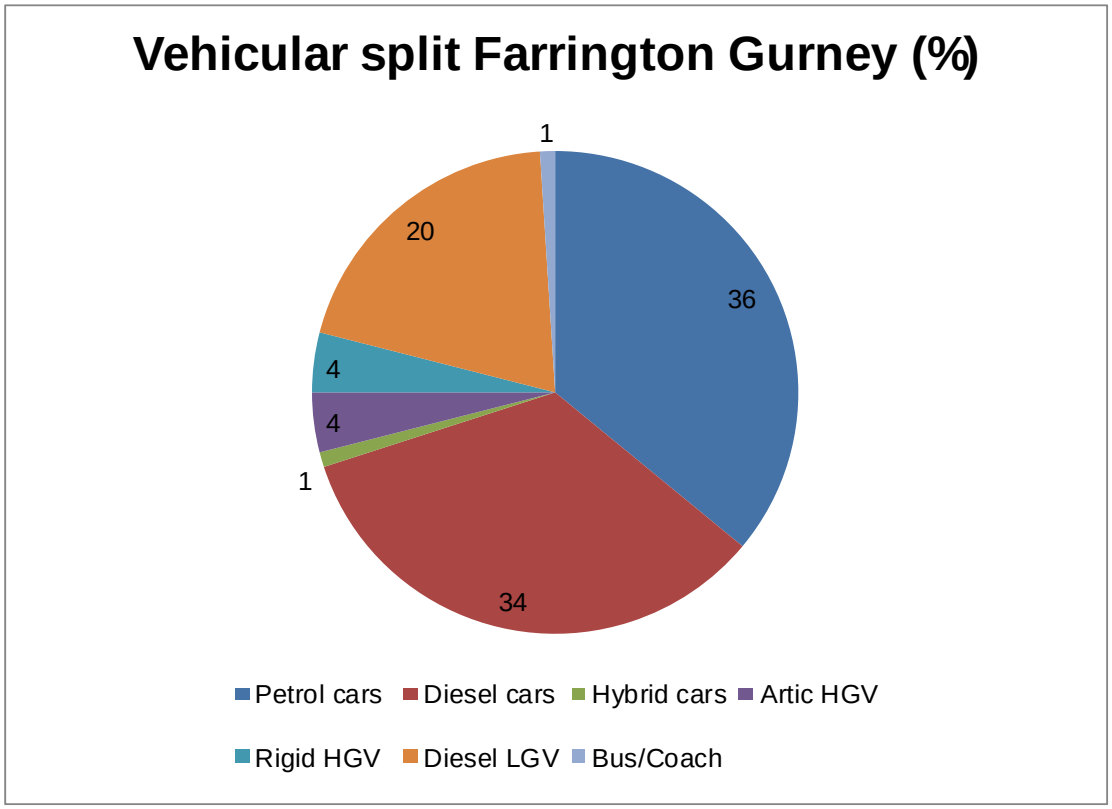


Figure 3.2: Graphical representation of the weekday vehicular split (%) obtained from the 2019 ANPR survey in Farrington Gurney



Within both the AQMAs there are factors which affect vehicle flow. In Farrington Gurney, the A37/A362 junction is traffic signalled and therefore has the ability to interrupt flow. In Temple Cloud, there are sections of the A37 which are too narrow for larger vehicles to pass one another and as a result they stop and give way; therefore also interrupting flow.

The Emissions Factor Toolkit (EFT) (version 10.0) assumes an average speed in its calculations. Due to the interruptions of vehicle flow present in both of the areas; one average speed is not likely to always be representative when considering emissions and this should be noted. An additional factor present in Temple Cloud is the road gradient which would increase the power demanded from vehicle engines travelling uphill and this is especially apparent for Heavy Duty Vehicles (HDVs - HGVs, buses and coaches) (this was considered by using the gradient calculations in the Emission Factor Toolkit).

3.3.2 Farrington Gurney- source apportionment

The source apportionment exercise undertaken identified the percentage source contributions at 20 kph within the Farrington Gurney AQMA (based on journey time data)[4], shown in Table 3.1. The 2018 data at the highest diffusion tube reading and the 2018 background NO_2/NO_x maps were used as the most recent ratified monitoring data and 2019 ANPR survey in Farrington Gurney for fleet mix.

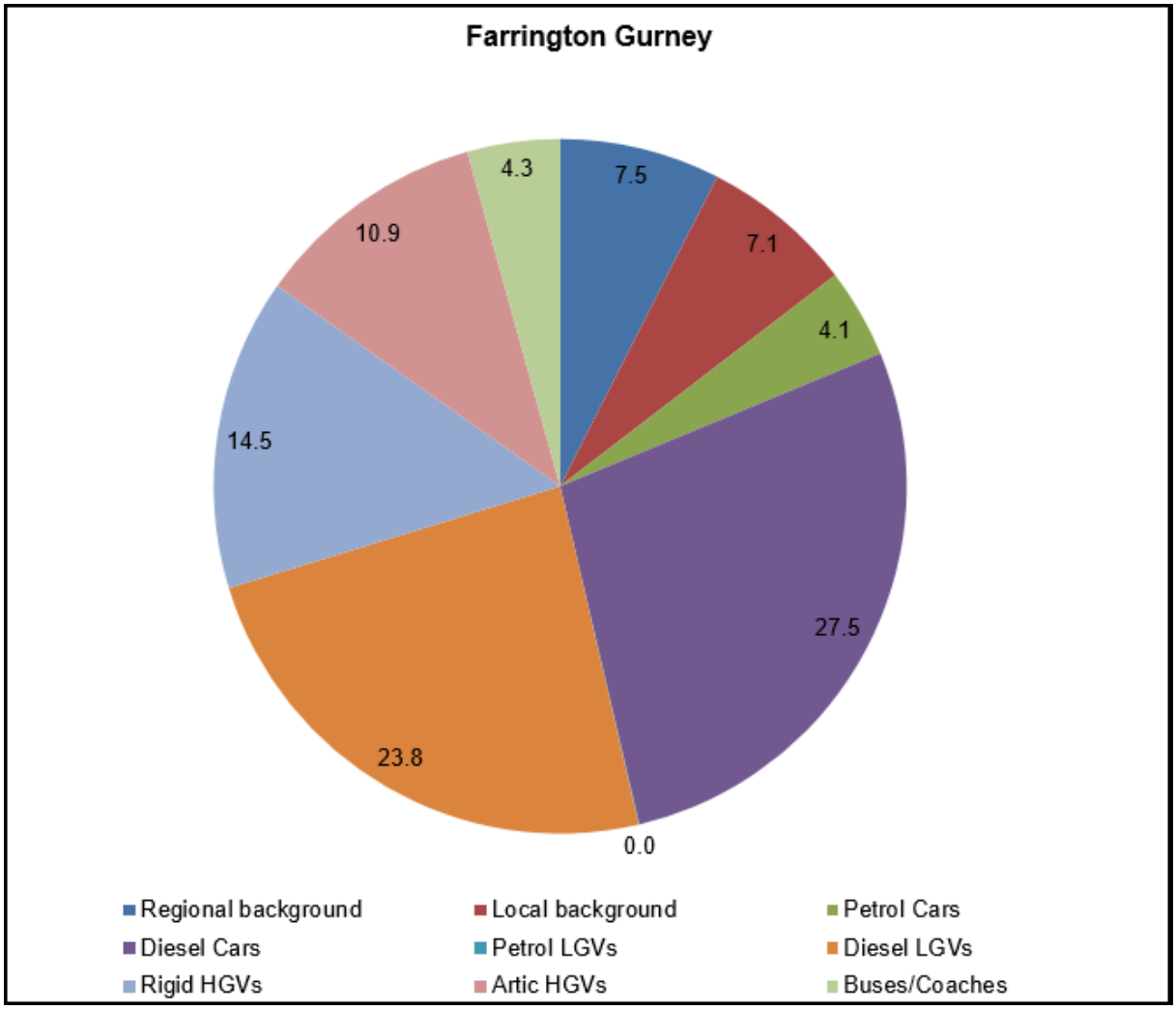
Table 3.1: Farrington Gurney source apportionment (at 20 kph)

Category	NO_2 concentration ($\mu g/m^3$)	% Contribution
Highest Diffusion Tube reading	39	100
Regional background	2.9	7.5
Local background	2.8	7.1
Petrol Cars	1.62	4.1
Diesel Cars	10.73	27.5
Petrol LGVs	0.01	0
Diesel LGVs	9.3	23.8
Rigid HGVs	5.65	14.5
Artic HGVs	4.23	10.9
Buses/Coaches	1.68	4.3

[4] A37 Options and Feasibility Study (Appendix C)

The source apportionment for Farrington Gurney when calculated at 20 kph shows diesel cars as the largest source contributor to road NO_2 concentrations; contributing 27.5%. Diesel Light Good Vehicles (LGVs); 23.8% and Heavy Goods Vehicles (HGVs); 25.4% also present a significant contribution. A graphical representation of the source apportionment at 20 kph is displayed in Figure 3.3.

Figure 3.3: Graphical representation of the source apportionment (%) in Farrington Gurney at 20 kph



As discussed there are features present in Farrington Gurney that affect vehicle movements and therefore vehicle speed meaning the 20 kph average speed used within the source apportionment exercise may not be wholly representative.

3.3.3 Temple Cloud- source apportionment

The source apportionment exercise undertaken identified the percentage source contributions at 35 kph within the Temple Cloud AQMA (based on journey time data)[5], shown in Table 3.2. The 2018 data at the highest diffusion tube reading and the 2018 background NO_2/NO_x maps were used as the most recent ratified monitoring data and 2017 ANPR survey in Temple Cloud for fleet mix. The gradient option of the EFT was used to take into account the extra emissions from HGV's moving uphill.

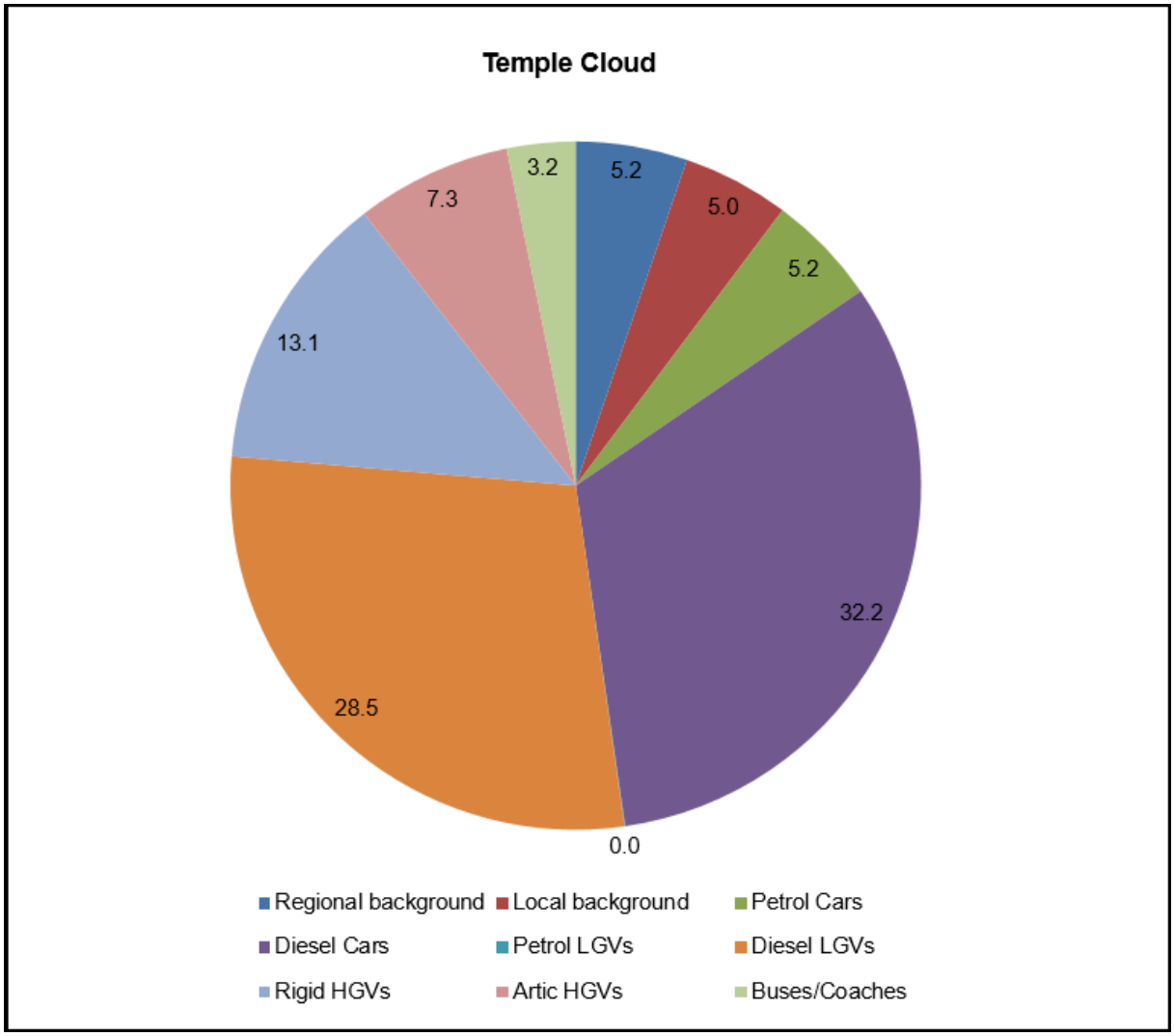
Table 3.2: Temple Cloud source apportionment (at 35kph)

Category	NO_2 concentration ($\mu g/m^3$)	% Contribution
Highest Diffusion Tube reading	56	100
Regional background	2.9	5.2
Local background	2.8	5.0
Petrol Cars	2.9	5.2
Diesel Cars	18	32.2
Petrol LGVs	0	0
Diesel LGVs	16	28.5
Rigid HGVs	7.3	13.1
Artic HGVs	4.1	7.3
Buses/Coaches	1.8	3.2

[5] A37 Options and Feasibility Study

The source apportionment for Temple Cloud when calculated at 35 kph shows diesel cars as the largest source contributor to road NO_2 concentrations, contributing 32.2%. Diesel Light Good Vehicles (LGVs); 28.5% and Heavy Goods Vehicles (HGVs); 20.4% also present a significant contribution. A graphical representation of the source apportionment at 35 kph is displayed in Figure 3.4.

Figure 3.4: Graphical representation of the source apportionment (%) in Temple Cloud at 35 kph



In Temple Cloud the HDVs (Heavy Diesel vehicles which include HGV's, buses and coaches) are sometimes required to stop/start as they are unable to pass in the narrow sections. This can lead to periods of lower speeds which are not seen in the average journey time data used to calculate the emissions. This is likely to increase

the proportion of HDV emissions at these times. As the majority of vehicle types experience an increase in emissions at lower speeds when following a vehicle which is required to stop/start, measures that focus on traffic management or infrastructure to alleviate the issues with road width and gradient in Temple Cloud, and measures that maximise smooth vehicle movements in Farrington Gurney will have a beneficial impact on vehicle emissions.

3.4 Required Reduction in Emissions

3.4.1 Farrington Gurney

The required reduction in emissions to meet the annual average objective was calculated at the highest diffusion tube monitoring location at façade using the 2017 monitoring data, the 2017 NO_2 background maps and the NO_x to NO_2 calculator (version 7.1). The results are displayed in Table 3.3 below.

Table 3.3: The required reductions in emissions in Farrington Gurney

Location	Annual mean (µg/m^3)	Reduction in NO_2 required (µg/m^3)	Reduction in road NO_x required (µg/m^3)	Reduction in road NO_x required (%)
DT134	52	12.0	31.6	30.7

Results based on 2017 data showed that a 30.7% reduction in road NO_x is required to meet the annual average objective in Farrington Gurney.

The 2018 to 2021 data were not included in the exercise as façade concentrations met the objective in these years.

In addition, the predicted year the objective will be met (with no interventions) was calculated using the formula and projection factors provided by Defra. As above, the highest diffusion tube monitoring location at façade from 2017 data was used and the results are displayed in Table 3.4.

Table 3.4: The predicted year the objective will be met in Farrington Gurney

Year	Location	Annual mean ($\mu g/m^3$)	Predicted year from the TG forecast figures
2017	DT134	52	2023
2018	DT134 (2018)	39	Objective met
2019	DT134	39	Objective met
2020	DT134	32	Objective met
2021	DT134	32	Objective met
2021 modelled concentrations (with no interventions)	Farrington Gurney worst case modelled location (FG7)	38.8	Objective met

Results based on 2017 data and the roadside projection factors predicted that the annual average objective would not be met in Farrington Gurney until 2023 with no intervention. The 2018 to 2021 data show that façade concentrations met the annual mean objective. The air quality modelling carried out as part of the A37 Options and Feasibility Study (Appendix C) showed that the highest modelled location was further along the road to DT134. This modelling showed that the objective would be met locally by 2021 in Farrington Gurney without any intervention. This is before Covid further influenced the data.

However, in light of the fact that these are modelled values and there is insufficient information to confirm a downward trend, and with 2020 data being affected by lockdowns caused by Covid19, actions have been included for Farrington Gurney also. The implementation period however, will prioritise the low cost actions during the early years of the 5 year action plan, and will programme the significant highways infrastructure actions for later years once further monitoring has confirmed if this is necessary.

The other matter to carefully consider is the Somer Valley Enterprise Zone and its effects on the AQMA, however this will be mitigated against through the placing of officers on respective project teams.

3.4.2 Temple Cloud

The required reduction in emissions to meet the annual average objective was calculated at the highest diffusion tube monitoring location at façade using the 2017 to 2021 data, the relevant NO_2 background maps and the NO_x to NO_2 calculator (version 8.1). The results are displayed in Table 3.5 below.

Table 3.5: The required reduction in emissions in Temple Cloud

Data	Location	Annual mean ($\mu g/m^3$)	Reduction in NO_2 required ($\mu g/m^3$)	Reduction in road NO_x required ($\mu g/m^3$)	Reduction in road NO_x required (%)
2017	DT96	67	27.0	75.4	51.6
2018	DT96	60	20.0	51.7	42.7
2019	DT96	56	16.0	40.5	36.7
2020	DT96	45	5.0	12	14.6
2021	DT96	44	4.0	9.6	12.0

Results based on 2017 data showed that a 51.6% reduction in road NO_x was required to meet the annual average objective in Temple Cloud, this reduced to 42.7% in the calculations which used 2018 data, in 2019 the annual mean went down showing that a 36.7% reduction of road NOx is required to meet the objective.

In addition, the predicted year the objective will be met (with no interventions) was calculated using the formula and projection factors provided by Defra. As above, the highest monitored concentrations at façade from 2017 to 2021 data were used and the results are displayed in Table 3.6. The air quality modelling carried out as part of the A37 Options and Feasibility Study (Appendix C) showed that the worst-case location was further along the road to DT096. The predicted year the objective

would be met was also calculated at this highest modelled location for the modelled scenarios of 2021 (with no interventions) and 2021 (with interventions).

Table 3.6: The predicted year the objective will be met in Temple Cloud

Data	Location	Annual mean (µg/m^3)	Predicted year the objective will be met
2017	DT96	67	2029
2018	DT96	60	2026
2019	DT96	56	2026
2020	DT96	45	2023
2021 (with no interventions)	Worst case modelled location in Temple Cloud (TC4)	60.5	2030
2021 (with vehicle width restriction)	Worst case modelled location in Temple Cloud (TC4)	42.7	2023
2021 (with tree-cutting)	Worst case modelled location in Temple Cloud (TC4)	58.1	2029
2021 actual	DT96	44	2023

Results based on 2017 monitoring data predicted that the annual average objective would not be met in Temple Cloud until 2029 with no intervention. This prediction improved slightly to 2026 when the 2018 and 2019 data were used. The prediction with the 2020 and 2021 data brings the compliance year to 2023. The air quality modelling carried out as part of the A37 Options and Feasibility Study (Appendix C) showed that the worst-case location (TC4) was further down the road from the monitoring site. Based on the modelled 2018 data and the roadside projection factors the objective would not be met at this location (TC4) until 2030.

The potential action to introduce a vehicle width restriction would not lead to immediate compliance with the objective levels for NO_2. At the worst-case receptor (TC4) the year of compliance is predicted to be 2023 with this scheme, and that would be within the life period of the AQAP (5 years).

The action to reduce emissions contained within the action plan for Temple Cloud by tree cutting would not lead to an immediate compliance with the objective levels for NO_2. At the worst-case receptor (TC4) the year of compliance is predicted to be 2029 with the tree-cutting intervention. At all but 2 receptors (TC4 and TC13) the model predicts the objective to be met by 2022 with the tree-cutting intervention.

To confirm the model results at Temple Cloud, further monitoring using additional diffusion tubes was undertaken, and the results are presented in Table 2.4: The Temple Cloud monitoring data.

3.5 Key Priorities

- **Priority 1 – Reduce emissions**
- **To implement a measure or measures that reduce the emissions from vehicular traffic within the AQMAs**

In Temple Cloud – this would aim to reduce the occurrence of vehicles (especially larger vehicles) starting and stopping on the inclined, narrow sections of the A37 which exist through the Temple Cloud AQMA.

In Farrington Gurney – this would focus on smoothing the flow of traffic through the A37/A362 junction. The improvements proposed in line with the Somer Valley Enterprise Zone (SVEZ) development will also be a factor locally, and this will need to be considered on an ongoing basis. There is a representative from the Environmental Monitoring Team on the SVEZ project and vice versa. With this traffic improvements and raise of vehicle traffic more mitigation will be expected with the SVEZ development.

Interventions that are successful under this priority would contribute to achieving the required reductions in NO_x emissions.

- **Priority 2 – To educate and inform about air pollution, encourage active travel, and promote methods to reduce exposure to air pollution.**

Air pollution can be a challenging subject, especially when it cannot be seen or smelt. The profile of air quality has risen over recent years; however, more can be done to aid understanding and inform members of the public. Small actions can be taken to reduce personal contribution and exposure to air pollution; and active travel interventions have additional health benefits.

This priority would focus on local residents, schools, and businesses in Farrington Gurney, Temple Cloud and nearby areas.

Over time, the priorities set out within this AQAP may develop and focus on other initiatives. The AQAP acts as a live document and therefore can be added to or updated at any point.

The 2019 Public Health England report titled ‘Review of interventions to improve outdoor air quality and public health’ details the air pollution intervention hierarchy. The hierarchy categorises measures or interventions as Prevention, Mitigation or Avoidance. Prevention interventions are the first priority which prevent or reduce emissions, mitigation interventions are the second priority which aim to reduce the environmental concentrations once emissions have occurred, and avoidance interventions are the third priority which reduce personal or population exposure to environmental pollutants. Prevention interventions should therefore be prioritised however, avoidance interventions can also be effective in certain circumstances.

4. Development and Implementation of Temple Cloud and Farrington Gurney AQAP

4.1 Consultation and Stakeholder Engagement

In developing this AQAP, we are working with other local authorities, agencies, businesses and the local community to improve local air quality. Schedule 11 of the Environment Act 1995 requires local authorities to consult the bodies listed in

. In addition, we have undertaken the following stakeholder engagement as a part of the consultation process:

- Presentations at the Parish Council Meeting
- Information on the BathNES Council Website
- Articles in local publications
- Social media sites/pages
- Questionnaires distributed directly to households within the AQMA as a part of this consultation. The response to our consultation stakeholder engagement is given in Appendix A.

Table 4.1: Consultation Undertaken

Consultee	Consultation Undertaken
The Secretary of State	Yes
The Environment Agency	Yes
The highways authority	Yes
All neighbouring local authorities	Yes
Other public authorities as appropriate, such as Public Health officials	Yes
Bodies representing local business interests and other organisations as appropriate	Yes

4.2 Steering Group

Bath and North East Somerset Council have an internal Air Quality Action Group. This includes colleagues from the following departments:

- Environmental Protection
- Transport – including Transport Planning and the Somer Valley Enterprise Zone Project Lead
- Public Health
- Highways – including Traffic Management
- Sustainability
- Planning Policy
- Parks & Green Spaces
- Sustainable Transport – including the School Travel Plan Officer

The Group meets bi-annually to discuss the current B&NES Air Quality Action Plans and the progress of measures. Updates on this are then provided within the Council's Annual Status Report. The meetings also give an opportunity for new issues, plans and the feasibility of proposed measures to be discussed; as is the case with Farrington Gurney and Temple Cloud.

Contact has been maintained and will continue to be made with the respective Parish Councils for Farrington Gurney and Temple Cloud throughout the project.

4.3 A37 Options and Feasibility Study

An Options and Feasibility Study was carried out to assess all available measures that could achieve the required air quality improvement in the AQMAs of Farrington Gurney and Temple Cloud. The study was completed in January 2020.

An assessment of several potential options in Temple Cloud and Farrington Gurney was completed. They include:

Temple Cloud

The main issue that leads to the concentrations of NO_2 in Temple Cloud is the start stopping of vehicles, particularly larger vehicles. The north bound vehicles then accelerate from a stopped position, causing increased emissions. Despite the fact that the large vehicle is the only vehicle that cannot 'fit', all vehicles behind are also forced to stop and accelerate also.

Option 1: Reduction or removal of the footway on the western side of the A37 through the 'narrowing' to increase carriageway width;

Option 2: Replacement of the footway on the western side of the A37 with other suitable north- south pedestrian routes for the village away from the A37, which would facilitate the removal of the existing footway on the A37;

Option 3: More comprehensive widening including purchase of land to allow for road widening to take place whilst retaining the existing footway;

Option 4: Introducing a system of 'shuttle working' using traffic signals to allow larger vehicles to pass through unimpeded without 'passage conflict;

Option 5: The use of Vehicle Activated Signs (VAS) further out on the approach to the village to warn approaching HGV drivers that another HGV is currently in the narrowing;

Option 6: The introduction of priority workings;

Option 7: The implementation of a Clean Air Zone for this section of the A37;

Option 8: Implement a width restriction for larger vehicles.

Option 9: Undertake significant ‘cutting back’ of the high hedge/vegetation/trees on the eastern side of the narrow section to allow more effective use of the existing carriageway by HGVs; or

Option 10: Construction of a bypass to Temple Cloud.

Farrington Gurney

The main issue that gives raise to the concentrations of NO_2 in Farrington Gurney is the junction (with the A362) that breaks the flow of travel on the A37.

Option 1: Review the existing Method of Control at the A37/A362 traffic signals to increase junction capacity, including changes to the existing signal sequencing and/or the removal of the pedestrian stage;

Option 2: Implement proposed junction improvements at the A362/A37 junction linked with the Somer Valley Enterprise Zone (SVEZ) development - Extended two-lane entry on the A362 approach;

Option 3: Construction of an additional lane on the A37 southbound approach to the A37/A362 signals utilising the existing verge and possibly the existing footway or are of ‘hatching’ if required;

Option 4: Combination of Option 2 and Option 3 works to the A37/A362 junction;

Option 5: The construction of a small ‘compact’ type of ‘Normal’ Roundabout with single lane entries to replace the existing traffic signals;

Option 6: The construction of a larger 60m ‘Normal’ Roundabout allowing ‘flared’ 2-lane entries roundabout to replace the existing traffic signals; and

Option 7: The implementation of a Clean Air Zone for this section of the A37.

4.3.1 Options taken forward to Traffic and Air Quality Modelling

As a result of the shortlisting process the following schemes were taken forward for more detailed traffic and air quality modelling:

Temple Cloud

Option 4: Introducing a system of 'shuttle working' using traffic signals, using the shorter controlled section length of 117m.

This option had a very significant negative effect as it makes travel times and queues considerably longer in all weekday hours modelled (7:00 am to 7:00 pm). As such, this option was not considered further in subsequent air quality modelling and is not featured in the AQAP as an action.

Option 8: Introducing a vehicle width restriction.

This option has, not unexpectedly, a significant positive effect on the improvement of air quality in Temple Cloud as it removes most of the vehicles (HGVs) that cause the present two-way passage conflicts in the narrow section. However, this scenario has been modelled with little consideration as to where affected HGVs would re-route and what effect they may have on those other roads. This is included as an option in the plan, but further work is needed to establish whether it is possible to implement this without unacceptable impacts on surrounding villages, businesses and operators of HGVs. Further work is also needed on how the width restriction would be enforced.

Option 9: Cutting back of the high hedge/vegetation/trees on the east side of the narrow section to allow more effective use of the existing carriageway by HGVs.

This option is shown to have a minor positive effect on travel times and delay as it reduces the number of HGV conflicts occurring. However, these conflicts cannot be entirely removed by simple vegetation removal/cutting-back, and the transport model results suggest that these could still occur with some frequency. As such this option,

whilst an improvement, could remain highly susceptible to queuing ‘spikes’ when those conflicts do materialise.

Farrington Gurney

▪ **Option 3:** Additional lane on the A37 southbound approach to the junction; and,

▪ **Option 5:** Compact roundabout to replace existing junction.

Both options are predicted to result in improvements to journey times on all approaches during all periods of the day. The provision of an additional southbound lane on the A37 approach to the traffic signals (Option 3) provides additional capacity through the junction and thus greatly improves the journey time on that approach. The change also ‘frees- up’ green time to be used by other phases, so there are also journey time improvements on the other two approaches. While the A37 northbound sees only a marginal improvement, there is a significant improvement to the A362 westbound approach.

4.3.2 Air Quality Modelling output

Temple Cloud

The implementation of Option 8 (vehicle width restrictions) is predicted to lead to substantial reductions in NO_2 concentrations along the A37. If this option was delivered, then the year of compliance would be 2023.

Significant beneficial impacts are experienced throughout Temple Cloud with this option, largely due to reductions in the number of HDVs along the A37 though the whole of Temple Cloud. The vehicle width restrictions within Temple Cloud could provide further beneficial impacts within Farrington Gurney, with the diversion of HDVs away from the A37, however the scope of these impacts has not been considered within this study. This initial assessment does not however consider the impact of the displaced vehicles from the A37 onto roads outside of Temple Cloud, which would be expected to lead to adverse impacts on air quality elsewhere. A further study would be required to quantify the impacts of diverted traffic on existing properties and receptors outside of Temple Cloud.

The implementation of Option 9 (cutting back vegetation) is expected to lead to a reduction in NO_2 concentrations along the A37. Predicted concentrations are expected to remain above the objective at four receptors, with ultimate compliance being reached in 2029. Critically, the concentration at TC4 without intervention is predicted to remain above 60 µg/m^3, resulting in a continued risk of an exceedance of the short-term objective. However, the cutting back to vegetation is predicted to lead to a reduction in concentrations of 2.8 µg/m3 at the highest modelled location (TC4). The scheme overall is predicted to result in moderate to substantial beneficial impacts for the highest relevant receptors, with negligible impacts at all other receptors within Temple Cloud.

Note: During the preparation of this AQAP, observations by Highways Safety Officers led to a decision that this cutting back is urgently needed from a highway safety point of view. It has been included as an emission reducing action in this plan, although in

fact, this will be delivered with funding from Bath and North East Somerset Council to secure a resolution to the safety aspects that will also yield air quality benefits.

Table 4.2: Anticipated Year of Objective Compliance

	Option 8 (width restrictions)	Option 9 (cutting back vegetation)			
Year	**TC4 NO2 conc (µg/m3)**	**TC4 NO2 conc (µg/m3)**	**TC13 NO2 conc (µg/m3)**	**TC15 NO2 conc (µg/m3)**	**TC16 NO2 conc (µg/m3)**
2021	**42.7**	**58.1**	**50.0**	**41.7**	**40.5**
2022	**40.5**	**55.1**	**47.4**	39.5	38.4
2023	38.5	**52.4**	**45.1**	37.6	36.5
2024	36.6	**49.8**	**42.9**	35.7	34.7
2025	34.9	**47.4**	**40.8**	34.1	33.1
2026	33.3	**45.3**	39.0	32.5	31.6
2027	31.9	**43.4**	37.3	31.1	30.2
2028	30.6	**41.6**	35.8	29.8	29.0
2029	29.4	40.0	34.5	28.7	27.9
2030	28.5	38.7	33.3	27.8	27.0

It can be seen that introducing vehicle width restrictions bring forward the year of compliance in the whole of the AQMA to 2023, whereas cutting back the trees will not meet the objective standard in the entire AQMA until 2029 (although the nature of the modelling does not allow for this type of tree canopy to be easily modelled so this may be under-representing the benefits). That said, if this was to be implemented in 2021, then the objective standard is modelled to be met in every receptor location in Temple Cloud apart from 2 in 2022. The last 2 are modelled to be compliant in 2026 and 2029. Further monitoring is being deployed to confirm this modelling outcome.

Although multiple interventions were not modelled, it is possible that introducing a vehicle width restriction as well as cutting back the hedges/vegetation could lead to compliance even earlier than the 2023.

From 2021 data we can say the actions that have been implemented assisted in improving the reduction of NO_2 concentrations. In particular the option 9 of the vegetation cutback. We continue to monitor and assess if the other implemented actions are having good effect in reducing NO_2 concentrations in Temple Cloud.

Farrington Gurney

Farrington Gurney was anticipated to have concentrations of nitrogen dioxide below the objective at all receptors in 2021 **with or without** the implementation of the proposed options.

However, the implementation of the additional lane southbound (Option 3) is predicted to lead to a large reduction in concentrations at receptors close to the junction between the A37 and A362 where the road layout modification will occur, with reductions in concentrations predicted of up to 8.4µg/m^3. Moderate and slight beneficial impacts are predicted at the receptors located next to the junction.

The implementation of the compact roundabout to replace existing junction (Option 5) is expected to lead to a substantial reduction in NO_2 concentrations along the A37 adjacent to the A37/ A362 junction, with reductions up to 14.2 µg/m^3 predicted at the worst-case receptors next to the junction. Close to the junction impacts are predicted to range from moderate to substantial beneficial, due to increased traffic speeds and alterations to the road realignment which increase the distance of receptors to the carriageway. There are, however, increases in concentrations at three receptors to the south of the proposed roundabout along the A37. This causes one slight adverse impact as a result of the new junction type (and therefore slower traffic) moving south towards these receptors. However, at this receptor, concentrations are not predicted to exceed 27.3 µg/m^3, and so concentrations will remain well below the objective.

4.3.3 Recommendation of the feasibility study

Temple Cloud

As a short term measure, it is recommended that works are done to increase the effective width of the existing carriageway through the narrow section for HGV's (Option 9) by significantly cutting back the high vegetation to the line of the wall (so removing all encroachment across/into the highway).

Farrington Gurney

Both the short-listed highway options for Farrington Gurney are relatively expensive to implement. Mindful that the current exceedances are only just above the 40µg/m^3 objective, and compliance expected to be achieved naturally by 2021 with changes to the fleet composition, it would be prudent to monitor the on-going situation in the short-term.

5. AQAP Measures

5.1 Farrington Gurney

Table 5.1 shows the Farrington Gurney AQAP measures. It contains:

- 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
- how progress will be monitored

NB: Please see future ASRs for regular annual updates on implementation of these measures

Table 5.1: Farrington Gurney Air Quality Action Plan Measures

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
FG 1	Advice and information for residents	Public Information	Via the Internet, via other mechanisms	2022	2028	B&NES Public Protection	Local Authority (Public Protection)	No	Fully funded	<£10k	Planning	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Number of hits on website, number of people engaged with	Planning phase	
FG 2	School travel plan (Modeshift STARS)	Promoting Travel Alternatives	School Travel Plans	2022	2028	B&NES Sustainable Travel	Local Authority (Active Travel)	No	Fully funded	<£10k	Implementation	No reduction in concentrations in Nitrogen Dioxide, however there would be an exposure reduction for residents	Hand's up data	School is signed up for Modeshift STARS	Curriculum catchup and Covid19
FG 3	Clean Air Schools Toolkit	Public Information	Other (Education)	2022	2028	B&NES Public Health	Local Authority (Public Health)	No	Fully funded	<£10k	Implementation	No reduction in concentrations, exposure reduction, but would also deliver emission reduction through anti idling scheme etc.	Use of Toolkit by schools		Curriculum catchup and Covid19
FG 4	Influence planning decisions for any development within 200 metres of an AQMA boundary	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2028	B&NES Planning, Public Protection	Local Authority (Planning, Public Protection)	No	Fully funded	<£10k	Implementation	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Number of decisions consulted on	On going	
FG 5	Targeted information campaign for the most vulnerable groups	Public Information	Via other mechanisms	2022	2028	B&NES Public Health	Local Authority (Public Health)	No	Fully funded	<£10k	Implementation	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Uptake of information by organisations and individuals	Planning phase	Delayed due to officers being focusing on Covid19
FG 6	If necessary: Construction of an additional lane on the A37 southbound approach to the A37/A362 signals utilising the existing verge and possibly the existing footway or hatchway if required.	Traffic Management	Strategic highway improvements	Review if necessary, upon annual completion of Annual Status Report	n/a	B&NES	n/a	No	n/a	£1 million - £10 million	On Hold	Reductions in concentrations predicted of up to 8.4µg/m^3		Concentration of NO_2 currently under 40µg/m^3 so it is not needed	Currently it is not necessary.

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
FG 7	Tree planting along the right-hand side of the A362 approaching the A37	Transport Planning and Infrastructure	other	2022	2022	B&NES Neighbourhood Environmental Services	Trees for Climate funding	No	Fully funded	<£10k	Completed	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Number of trees planted, reduction of noise and PM	Trees have been planted in January 2022	

5.1.1 FG1: Advice and information for residents

This measure would be targeted towards the residents of Farrington Gurney. An online B&NES Council webpage will be developed and dedicated to providing information and advice on a number of different topics, including the following:

- Low emission transport – provide information and promote benefits.
- Exposure reduction – provide information including suggestions of alternative routes.
- Planting – advice on vegetation and planting; including information about different species and planting methods.
- Active travel – to promote the benefits from a health and air pollution perspective.
- Health impacts – provide information and raise awareness about the health impacts of air pollution.
- General information and facts – to raise public awareness about air pollution and increase understanding.
- National Clean Air Day – on 16th June 2022; promote the day and the useful resources produced by Global Action Plan.

Electronic leaflets will be produced and tailored to contain key information and facts. The local Farrington Gurney journal and the Farrington Gurney Parish Council website and other social media could be utilised to disseminate information as part of this measure.

Monitoring and evaluation

Feedback will be gathered from local Councillors. A judgement of the uptake of advice can be made. Also, through responses to a designated questionnaire that can be distributed through the Parish Council.

Lead authority or department: B&NES Public Protection Team

Cost: <£10k

5.1.2 FG 2: School travel plan (Modeshift STARS)

School Travel Plans encourage active travel and cleaner modes of transport for journeys to and from school. These documents are developed online with Modeshift STARS, the national accreditation scheme “to recognise schools that have demonstrated excellence in supporting cycling, walking and other forms of sustainable travel”.

The local primary school in Farrington Gurney, Farrington Gurney C of E Primary School, would be the initial location for this action. Previous ‘hands up’ data from the School, in the 2016/17 school year, indicated that 37% of pupils walked to school, 4.5% cycle, 7.9% park and stride, 9% scoot or skate and 37% came by car. Farrington Gurney C of E Primary School had previously achieved a bronze accreditation on Modeshift STARS in March 2017.

B&NES Council has a dedicated School Travel Plan Officer who supports B&NES schools to develop online School Travel Plans via Modeshift STARS. Measures to encourage active travel and cleaner modes of travel will seek to build on the good work already undertaken at Farrington Gurney C of E Primary School.

Monitoring and evaluation

A biannual (once in winter, once in summer) ‘hands up’ survey to track changes when compared with the 2016/17 data. Progress through the Modeshift STARS accreditation scheme can be tracked online through the Modeshift STARS Portal.

Lead authority or department: B&NES Sustainable Travel Team

Cost: <£10k – the support provided by B&NES for this measure comes under an existing role.

5.1.3 FG 3: Clean Air Schools toolkit

The B&NES Clean Air Schools Toolkit was launched on Clean Air Day 2019. The toolkit offers a number of resources for primary schools and other community settings including: lesson plans, posters, Modeshift Stars, stickers, pledge cards, a musical rap/song, Bikeability, and advice on setting up a walking bus and anti-idling campaigns.

A number of schools are already actively using the toolkit. The toolkit will continue to be promoted across B&NES and specifically by the Council's Sustainable Travel Officer when visiting organisations in Farrington Gurney.

Monitoring and evaluation

Incorporated into the Clean Air Schools Toolkit are methods of evaluation and feedback from teachers, pupils and parents/carers via questionnaires:

- Feedback from teachers will focus on the toolkit itself – its functionality, its strengths and areas for improvement.
- Feedback from pupils aims to evaluate whether there is any change in the children's knowledge and understanding of air pollution before and after the lessons and activities. This will help to evaluate the effectiveness of the toolkit.
- Feedback from parents/carers is more general; asking for their thoughts about air quality and the activities the schools are undertaking.

The feedback received would be utilised to make any necessary improvements to the toolkit, and the uptake of the toolkit will be tracked i.e. the number of schools using the toolkit, and the evaluation and feedback process will be ongoing.

Lead authority or department: B&NES Public Health Team

Cost: <£10k – B&NES Officer time and costs to print resources, however extra cost may be encountered.

5.1.4 FG 4: Input into planning decisions for any development within 200 metres of an AQMA boundary

Air Quality is a material consideration for all planning applications. This action proposes that an Environmental Monitoring Officer is positively consulted on every application within 200m of the boundary of the AQMA. Therefore, the Environmental Monitoring Officer is responsible for determining and imposing air quality assessment requirements on the developer and placing mitigation conditions on the planning consent. Planning decisions should ensure that any new development in the AQMA is consistent with the air quality action plan[6]

Monitoring and evaluation

Officers will report on the number of developments for which consent has been given with conditions attached arising from recommendations from the Environmental Monitoring Team. Advice will be given in accordance with the "Land-Use Planning & Development Control: Planning For Air Quality; Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes. (IAQM, January 2017)".

Lead authority or department:

Bath and North East Somerset Council Development Control Team

Cost: <£10k - There is no additional cost to the authority in activating this action as the officers are already salaried. The capacity of the Environmental Monitoring Team will have to be monitored should there be a continuing influx of applications to be considered.

[6] National Planning Policy Framework, July 2018.

5.1.5 FG 5: Targeted information campaign for the most vulnerable groups

Air pollution affects those most vulnerable in society; the young, the elderly and those with existing respiratory and cardiovascular conditions. Nitrogen Dioxide is a respiratory irritant that exacerbates conditions, such as asthma.

This measure would be based on the provision of health advice and information relating to air pollution to the most “at risk” groups in society. This would aim to raise awareness and positively influence behaviours to mitigate the negative impacts of air pollution.

This could focus on several methods:

- Working with local GP surgeries, acute trusts, community health organisations and local health and social care workers.
- Targeted information for specific organisations i.e. care homes and early years settings.
- Promotion of the various platforms which provide live air quality data i.e. Defra’s UK-Air website

Monitoring and evaluation

This measure would be monitored by recording the engagement i.e. the number of organisations contacted, the number of initiatives developed, the number of health and social care workers trained and the number of hits on certain webpages.

Lead authority or department: B&NES Public Health Team

Cost: <£10k – however this will be dependent on the extent of the campaign and the methods used.

5.1.6 FG 6: Construction of an additional lane on the A37 southbound approach to the A37/A362 signals utilising the existing verge and possibly the existing footway or hatchway if required.

Further design work is required in order to establish whether this is a feasible option. There is limited width of highway land available and the initial design for this option results in the loss of the verge on the east side of the road, which will mean passing vehicles are travelling much closer to pedestrians using the footway than they do now. This will create a less comfortable environment for pedestrians and may deter some people from walking here. It will also mean traffic is passing closer to houses which back onto this section of the A37.

Monitoring and evaluation

Through the Annual Status Report updates.

Lead authority or department: B&NES Highways & Traffic

Cost: £1million - £10million

5.1.7 FG 7: Tree planting along the right-hand side of the A362 approaching the A37

Planting of suitable trees or shrubs that have a positive effect on air quality between the traffic and the building facades can provide a barrier between air pollution and residents or pedestrians and can absorb some pollutants over time. Consideration will be given to safety concerns re the spatial and visual implications.

The B&NES Council with assistance of our Arboricultural officers and Environmental Monitoring officers are drafting plans to plant trees in the B&NES Council area with the goal of improving the Air Quality. Farrington Gurney will have this action being developed with the intent of protecting the residents close to the A362.

Monitoring and evaluation

The main indicator will be the number of trees planted. Continued monitoring of NO2 concentrations and a comparison with other monitoring locations where there has been no planting will enable evaluation of the effect of this measure on local air quality. Monitoring of NO2 is performed with diffusion tubes which will monitor differences in NO2 concentrations. There will be possible gains in protecting the residents from both noise and PM’s besides the NO2.

Lead authority or department: B&NES Planning & Conservation Team

Cost: <£10k

5.2 Temple Cloud

Table 5.2 shows the Temple Cloud AQAP measures. It contains:

- 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
- how progress will be monitored

NB: Please see future ASRs for regular annual updates on implementation of these measures

Table 5.2: Temple Cloud Air Quality Action Plan Measures

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
TC1	Determine feasibility of vehicle width restriction through Temple Cloud	Traffic Management	Other	2027	Not known	B&NES Highways	Not funded	No	Not funded	£50k-£100k	Further assessment required before this can be established.	18 µg/m^3 at worst case receptor if the study recommends that we go forward with the width restriction	Reduction in nitrogen dioxide concentrations	Officer advice is that, we could undertake further assessment including obtaining origin and destination data across a wide area and complete further modelling across a wider area.	Legal advice suggests that a width restriction without support from neighbouring authorities and other statutory consultees would be problematic and potentially jeopardise highway infrastructure bids to the Department for Transport.
TC2	Undertake significant 'cutting back' of the high hedge/vegetation on the eastern side of the narrow section to allow more effective use of the existing carriageway by HGVs.	Traffic Management	Other	2020	2021	B&NES Public Protection	B&NES Public Protection	No	Fully funded	<£10k	Completed	3 µg/m^3 at worst case receptor	Reduction in nitrogen dioxide concentrations	Hedges and some ash have been cut back just before the line of the road. Some cutback have been done previously for safety reasons.	Some of the residents were initially against it, of fear from the garden wall being struck by larger vehicles and by the walls falling apart after the removal of vegetation. But with assistance of our specialists, we managed to revert their fears.
TC 3	New public footpath bypass	Promoting Travel Alternatives	Promotion of walking	2022	2024	B&NES Highways, Public Rights of Way	Been identified for 2021 Capital Program	No	Fully funded	£10k-£100k	Planning	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Public footpath link built	Change the PROW closer to the edge of the field	Will receive officer support as it delivers Transport Strategy and Air Quality Action Plan
TC 4	Advice and information for residents	Public Information	Via the Internet, via other mechanisms	2022	2028	B&NES Public Protection	Local Authority (Public Health)	No	Fully funded	<£10k	Planning	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Number of hits on website, number of people engaged with	Planning phase	

Measure No.	Measure	Category	Classification	Estimated Year Measure to be Introduced	Estimated / Actual Completion Year	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Target Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Potential Barriers to Implementation
TC 5	School travel plan (Modeshift STARS)	Promoting Travel Alternatives	School Travel Plans	2020	2028	B&NES Sustainable Travel	Local Authority (Active Travel)	No	Fully funded	<£10k	Implementation	No reduction in concentrations in Nitrogen Dioxide, however there would be an exposure reduction for residents	Hand's up data	School is signed up for Modeshift STARS	Curriculum catchup and Covid19
TC 6	Clean Air Schools Toolkit	Public Information	Other (Education)	2020	2028	B&NES Public Health	Local Authority (Public Health)	No	Fully funded	<£10k	Implementation	No reduction in concentrations, exposure reduction, but would also deliver emission reduction through anti idling scheme etc.	Use of Toolkit by schools		Curriculum catchup and Covid19
TC 7	Influence planning decisions for any development within 200 metres of an AQMA boundary	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2022	2028	B&NES Planning Public Protection	Local Authority (Planning, Public Protection)	No	Fully funded	<£10k	Implementation	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Number of decisions consulted on	On going	
TC 8	Targeted information campaign for the most vulnerable groups	Public Information	Via other mechanisms	2022	2028	B&NES Public Health	Local Authority (Public Health)	No	Fully funded	<£10k	Implementation	No reduction in concentration in Nitrogen Dioxide, however there would be an exposure reduction for residents.	Uptake of information by organisations and individuals	Planning phase	Delayed due to officers being focusing on Covid19
TC9	Investigate the potential technology and its feasibility in air pollution cleaning	Technology	Other		n/a	B&NES Public Protection	Local Authority (Public Protection)	No	n/a	<£10k	Research	Further research required	Reduction in concentration of nitrogen dioxide		Further work needs to be undertaken to establish what technology exists and whether it would be suitable for this setting.
TC10	The use of Vehicle Activated Signs (VAS) to help smooth traffic flows and reduce emissions.	Traffic Management	Other	2022	2022	B&NES Highways	Capital Funding	No	Fully Funded	£10k - £50k	Implementation	This action would focus on preventing a deterioration in the quality of the air locally	HGV crossing in the tight section. (causes stop start)	Vehicle Activated signs were installed on April 2022	This measure will help avoid HGV crossing in the tight section of the A37, the main cause of traffic in that section and the higher concentration of NO_2.

5.2.1 TC 1: Determine Feasibility of a vehicle width restriction

This would mean introducing a Traffic Regulation Order prohibiting all vehicles exceeding the indicated width from being driven along the road in Temple Cloud. The order may be imposed to prevent entry to roads physically incapable of accommodating larger vehicles or to protect the environment by preventing unnecessary intrusion by large vehicles. The latter case would apply in the case of Temple Cloud as the narrowed section is not physically capable of accommodating the largest articulated HGVs.

A physical feature might need to be installed to enforce it. However, provision might be needed to permit buses, emergency vehicles and local access (deliveries) to use the A37 through Temple Cloud, in effect permitting 'required' HGV access. Where buses are to be excluded from an environmental width limit it may be preferable to impose a lorry ban with signs. Consideration will have to be given to enforcement if this is the case.

This would require an alternative route for HGV's to 'bypass' Temple Cloud, noting the A37 is a key route between the A303/A39 and Bristol.

This would in effect be a regulatory ban on most HGVs routing through Temple Cloud. As such, consideration would need to be given to suitable alternative routes and advance signing to what would be a 'point restriction' on the A37 for HGV traffic. Advance signing needed as a minimum at the A37/A39 junction and the A37/A368 Chelwood Roundabout could encourage undesirable HGV re-routing through Hallatrow or High Littleton, Farmborough and Chelwood as a local 'bypass'.

Should this option be one that is seen as being attractive through the consultation, further work is required to establish whether this option can be implemented (realising significant air quality improvements) without causing unacceptable consequences to other residents, businesses and operators of HGVs.

Monitoring and Evaluation

Should this option be chosen for further study and subsequently implemented, the network of diffusion tubes will provide an assessment of whether the scheme is as successful as it was modelled to be.

Lead authority or department: B&NES Highways Team

Cost: £50k - £100k

5.2.2 TC 2: Undertake significant ‘cutting back’ of the high hedges/vegetation at the narrow section of road.

This involves significantly cutting back the hedges to the eastern side of the narrow section to allow more effective use of the existing carriageway by HGV’s and to reduce the ‘canyon effect’.

Subject to further investigation by arboricultural specialists, this would appear to be the most appropriate measure to undertake that could lead to improvements in the flow of traffic and thereby improve air quality. In exploring this further it would be necessary to identify how this cut back section of vegetation would be maintained on a routine basis in future in order to maintain the available carriageway width.

During the preparation of the AQAP, the Highways Safety Officer identified a need to undertake vegetation cutback for traffic safety reasons. Subsequently in Spring 2020, the Council paid for the cutting back of vegetation to the line of the road and walls to just above the height of the lorry trailers. This remains an action as further cutback in level with the road is required to the full height of the vegetation in order to maintain sufficient clearance and encourage faster dispersion of emissions that will help reduce measured concentrations of nitrogen dioxide.

Monitoring and Evaluation

The effect of this will be assessed through officer observations (reduction in the incidence of lorries having to stop in a set time period), and through the observed concentrations of NO_2.

Lead authority or department: B&NES Public Protection

Cost: <£10k

5.2.3 TC 3: New public footpath bypass

The pavement along the A37 is narrow and only present on the western side of the highway. This and the high volumes of traffic do not positively promote the A37 as a walking route. There is a public footpath which runs parallel to the A37 and crosses the field to Cameley Rd; which provides a more pleasant, safer route. Within the Chew Valley Transport Strategy the idea of promoting this route (marked in orange dashed line on the map below). This route is being proposed to be moved to the end of field and will have improved surfacing material. The route could be successful as an alternative by encouraging active travel and reducing individual exposure to air pollution; both of which could have positive health implications.

Monitoring and evaluation

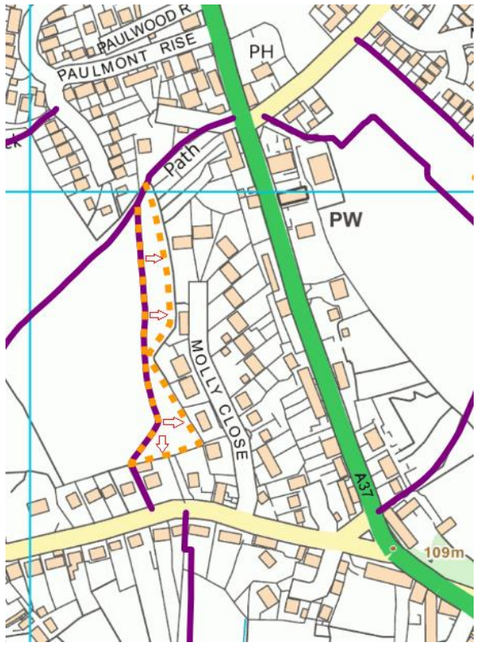
This measure will provide a bypass footpath which will bring safety from both air pollution and vehicles passing in the A37.

The success of this would be gauged through footfall counts, and feedback obtained through the Parish Council.

Lead authority or department: B&NES Public Rights of Way and Transport

Cost: £40k to £100k

Figure 5.1: New public footpath bypass PROW moving to the edge of the field



5.2.4 TC 4: Advice and information for residents

This measure would be targeted towards the residents of Temple Cloud. An online B&NES Council webpage will be developed and dedicated to providing information and advice on a number of different topics, including the following:

- Low emission transport – provide information and promote benefits.
- Exposure reduction – provide information including suggestions of alternative routes.
- Planting – advice on vegetation and planting; including information about different species and planting methods.
- Active travel – to promote the benefits from a health and air pollution perspective.
- Health impacts – provide information and raise awareness about the health impacts of air pollution.
- General information and facts – to raise public awareness about air pollution and increase understanding.
- Clean Air Day – on Thursday 17 June 2022. Promote the day and the useful resources produced by Global Action Plan.

Electronic leaflets will be produced and tailored to contain key information and facts. The local Cameley and Temple Cloud newsletter and the Temple Cloud with Cameley Parish Council website and other social media could be utilised to disseminate information as part of this measure.

Monitoring and evaluation

Feedback will be gathered from local Councillors. A judgement of the uptake of advice can be made. Also, through responses to a designated questionnaire that can be distributed through the Parish Council.

Lead authority or department: B&NES Public Protection

Cost: <£10k

5.2.5 TC 5: School travel plan (Modeshift STARS)

School Travel Plans encourage active travel and cleaner modes of transport for journeys to and from school. These documents are developed online with Modeshift STARS, the national accreditation scheme “to recognise schools that have demonstrated excellence in supporting cycling, walking and other forms of sustainable travel”.

The local primary school in Temple Cloud, Cameley CEVC Primary School, would be the initial location for this measure. Previous ‘hands up’ data from the School, in the 2016/17 school year, indicated that 40% of pupils walk to school and 52% travel by car. In January 2018 Cameley CEVC Primary School achieved a bronze Modeshift STARS accreditation.

B&NES Council has a dedicated School Travel Plan Officer who supports B&NES schools to develop online School Travel Plans via Modeshift STARS. Measures to encourage active and cleaner modes of travel will seek to build on the good work already undertaken at Cameley CEVC Primary School.

Monitoring and evaluation

A biannual (once in winter, once in summer) ‘hands up’ survey to track changes when compared with previous data. Progress through the Modeshift STARS accreditation scheme can be tracked online through the Modeshift STARS Portal.

Lead authority or department: B&NES Sustainable Travel

Cost: <£10k – the support provided by B&NES for this measure comes under an existing role.

5.2.6 TC 6: Clean Air Schools Toolkit

The B&NES Clean Air Schools Toolkit was launched on Clean Air Day 2019. The toolkit offers a number of resources for primary schools and other community settings including: lesson plans, posters, Modeshift Stars, stickers, pledge cards, a musical rap/song, Bikeability, and advice on setting up a walking bus and anti-idling campaigns.

A number of schools are already actively using the toolkit. The toolkit will continue to be promoted across B&NES and specifically by the Council's Sustainable Travel Officer when visiting organisations in Temple Cloud.

Monitoring and evaluation

Incorporated into the Clean Air Schools Toolkit are methods of evaluation and feedback from teachers, pupils, and parents/carers via questionnaires:

- Feedback from teachers will focus on the toolkit itself – its functionality, its strengths and areas for improvement.
- Feedback from pupils aims to evaluate whether there is any change in the children's knowledge and understanding of air pollution before and after the lessons and activities. This will help to evaluate the effectiveness of the toolkit.
- Feedback from parents/carers is more general; asking for their thoughts about air quality and the activities the schools are undertaking.

The feedback received will be utilised to make any necessary improvements to the toolkit, and the uptake of the toolkit will be tracked i.e. the number of schools using the toolkit, and the evaluation and feedback process will be ongoing.

Lead authority or department: B&NES Public Health

Cost: <£10k – B&NES Officer time and costs to print resources, however extra cost may be encountered.

5.2.7 TC 7: Input into planning decisions for any development within 200 metres of an AQMA boundary

Air Quality is a material consideration for all planning applications. This action proposes that an Environmental Monitoring Officer is positively consulted on every application within 200m of the boundary of the AQMA. Therefore, the Environmental Monitoring Officer is responsible for determining and imposing air quality assessment requirements on the developer and placing mitigation conditions on the planning consent. Planning decisions should ensure that any new development in the AQMA is consistent with the air quality action plan[7].

Monitoring and evaluation

Officers will report on the number of developments for which consent has been given with conditions attached arising from recommendations from the Environmental Monitoring Team. Advice will be given in accordance with the “Land-Use Planning & Development Control: Planning For Air Quality; Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes. (IAQM, January 2017) “.

Lead authority or department: Bath and North East Somerset Council Development Control Team

Cost: <£10k - There is no additional cost to the authority in activating this action as the officers are already salaried. The capacity of the Environmental Monitoring Team will have to be monitored should there be a continuing influx of applications to be considered.

[7] National Planning Policy Framework, July 2018.

5.2.8 TC 8: Targeted information campaign for the most vulnerable groups

Air pollution affects those most vulnerable in society; the young, the elderly and those with existing respiratory and cardiovascular conditions. Nitrogen Dioxide is a respiratory irritant that exacerbates conditions, such as asthma.

This measure would be based on the provision of health advice and information relating to air pollution to the most “at risk” groups in society. This would aim to raise awareness and positively influence behaviours to mitigate the negative impacts of air pollution.

This could focus on several methods:

- Working with local GP surgeries e.g. Cameley Surgery in Temple Cloud, acute trusts, community health and local health and social care workers.
- Targeted information for specific organisations i.e. care homes and early years settings.
- Promotion of the various platforms which provide live air quality data i.e. Defra’s UK-Air website

Monitoring and evaluation

This measure would be monitored by recording the engagement i.e. the number of organisations contacted, the number of initiatives developed, the number of health and social care workers trained and the number of hits on certain webpages.

Lead authority or department: B&NES Public Health Team.

Cost: <£10k

5.2.9 TC 9: Investigation of Pollution Cleaning Technology

Members of the community have already contributed a suggestion that involves installing technology/feature that ‘cleans’ polluted air. Examples include Biomitech artificial tree, where they state that “the company has developed an artificial tree that it claims is capable of sucking up the equivalent amount of air pollution as 368 living trees. That’s not only a saving on growing time, but also on the space needed to accommodate them”.

Another example is Green City Solutions, and they state that their product “The ability of certain moss cultures to filter pollutants such as particulate matter and nitrogen oxides from the air makes them ideal natural air purifiers”. This company have also provided products in London timeout article on the artificial trees, “Introducing City Trees: moss-covered installations designed to soak up the worst of the offending nitrogen dioxide (NO_2), while releasing fresh oxygen. Created by Green City Solutions, each of these miniature forests offers the equivalent benefit of 275 trees in terms of pollution reduction”.

Further research would be required to establish the suitability for the lack of space and the efficiency of such technology in Temple Cloud.

Monitoring and Evaluation

Diffusion tube monitoring could be located in and around the location of the installation to establish what effect it/they are having on concentrations.

Lead authority or department: B&NES Public Protection

Cost: <10k£ Just the time of the officer doing the research.

5.2.10 TC 10: The use of Vehicle Activated Signs (VAS) to help smooth traffic flows and reduce emissions

This measure had been considered for the options assessment in the A37 Options and Feasibility Study, but it wasn't shortlisted for the modelling. However, following consultation with Council Highways colleagues, it has become clear that existing Vehicle Activated Signs used to help reduce speeds, require replacement and the specification could be adapted to help smooth traffic flows and reduce emissions.

Officers have observed regular occurrences of northbound HGVs approaching section of road adjacent to the doctor's surgery at a speed that increases the likelihood of stopping and starting of vehicles, that is associated with inefficient fuel consumption and higher emissions than required if traffic flows were smoother. Our colleagues believe that a VAS type sign with a variable message would give enough warning to HGV drivers and reduce the likelihood of stop & start occurrences.

Monitoring and Evaluation

This measure would be monitored by the VAS data collection unit that will collect information about the speed on the approach of the narrow section of the road. And by officer observation of the number of conflicts in the narrow section which will help evaluate the effectiveness of the VAS before and after installation. Speed data will be collected monthly and reviewed every 6 months if there will be some discrepancy, we will refer to the highways department if there is an issue.

Lead authority or department: B&NES Highways Team

Cost: £10k - £50k

Appendix A: Response to Consultation

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

Consultee	Category	Response
DEFRA	Secretary of State	"Concern that the options proposed in the Temple Cloud AQMA will not meet air quality objectives, though the vehicle width restriction option seems most likely to be effective, if practical. Due to the uncertainties, it is recommended that further measures are considered for Temple Cloud AQMA and should be presented in the final AQAP."
Avon & Somerset Police	Public Authorities	"Restricting the carriageway width could lead to increased non-compliance with existing Traffic Regulation Orders on alternative routes." "The A37 is a route which carries a significant amount of Abnormal Load and HGV traffic as well as smaller and more local vehicles. It is a route designated for such traffic, whereas potential alternative routes are not. If approached formally, we would be unsupportive of measures to restrict carriageway width on the A37 for the reasons stated above."
Highways England	Agencies	"The vehicle width restriction at Temple Cloud would mean affected HGVs would be required to re-route, which will have impacts on other roads."
Bristol City Council	Local Authorities	"With regard to introducing measures to reduce the use of the A37 through Temple Cloud by HGV classification vehicles believe it will have a detrimental impact on already

Consultee	Category	Response
		congested and ‘at capacity’ roads on the strategic route network and also affect currently unclassified roads and small villages in the rural setting.” “Introducing these measures will increase demand from the A39 with the result of increased cycle times having to be introduced at this junction and longer wait times on the A37. Longer wait times on the A37 have the potential to increase queueing through Temple Cloud. Given the above and the impact this will have on the wider strategic network Bristol City Council would not support this initiative and would instead suggest consideration is given to the remodelling the traffic signal junction to reduce queueing on the A37 southbound.”

The full response to our consultation and stakeholder engagement is given in the Consultation report by Lemon Gazelle in Appendix E

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)
Temple Cloud		
Transport Planning and Infrastructure	Reduction or removal of the footway on the western side of the A37 through the 'narrowing' to increase carriageway width.	This would allow the carriageway running width to be increased by circa 0.7 to 1.1 metres. However, this would have an unacceptable highway safety impact on pedestrians and residents, who would be forced to walk within a heavily trafficked carriageway. It would also severely restrict the visibility achievable at vehicle accesses on the west side of the carriageway.
Transport Planning and Infrastructure	Linked to Option 1, replacement of the footway on the western side of the A37 with other suitable north-south pedestrian routes for the village away from the A37, which would facilitate the removal of the existing footway on the A37	Residents of most properties fronting this section have no means of access to other pedestrian routes without first using this section of footway. As such, they would be exposed to a high risk of collision with traffic by being forced to walk within a 'live' carriageway. Alternative 'continuous' north-south pedestrian via Molly Close (West) and Gillets Hill Lane-Brandown Close (East) do not exist. Creating a dedicated Public Rights of Way (PROW) would involve establishment of rights through several private gardens.

Transport Planning and Infrastructure	More comprehensive widening including purchase of land to allow for road widening to take place whilst retaining the existing footway.	Widening either side with a loss off third party land is considered unacceptable and likely to face significant local opposition. Widening affecting the western side is particularly problematic due to short front gardens and/or buildings flanking the back edge of existing footway. Widening on the eastern side would pose a complex construction issue on how to build a new retaining wall whilst ensuring access to the residential units. The land rises from the A37 this side, so alterations to driveways would be required to maintain a suitable gradient and 'tie-in' to a widened carriageway on the east side.
Traffic Management	Introducing a system of 'shuttle working' using traffic signals to allow larger vehicles to pass through unimpeded without 'passage conflict.	This option was initially taken forward for testing with the traffic model, but it was rejected at the testing stage. It was modelled to have a very significant negative effect as it makes travel times and queues considerably longer in all weekday hours modelled (7:00 am to 7:00 pm).
Traffic Management	The introduction of priority workings	If 'one way' working was to be implemented it would need to be actively managed given the length of the controlled section. Existing problems with a long 'narrowing' under priority control can be readily observed on the A362 at the 'Sunnyside' pinch-point (just east of Farrington Gurney). This includes disproportionate queuing on the non-priority approach and road safety issues associated

		with these drivers attempting to ‘race the gap’ or force a right-of-way.
Promoting Low Emission Transport	The implementation of a Clean Air Zone for this section of the A37	Whilst a CAZ ‘Type C’ charging HGVs would specifically target the vehicle types creating passage issues through the ‘narrowing’ and associated queuing/delay, a significant amount of this fleet (as surveyed, Nov-17) is Euro Class 6 compliant and so would be unaffected by the CAZ. As such, a significant amount of passage conflict associated with HGVs would remain. The introduction of a local CAZ on what is a strategic HGV route is likely to create undesirable diversionary issues affecting local roads which are less suitable. Whilst non-compliant HGV drivers will have the option of paying the charge, many will choose not to, and seek out local diversionary routes. The A39 between Whitecross Gate and Marksbury, and the A368 between Marksbury and Chelwood crossroads are examples, creating potential for additional HGV traffic through Hallatrow, High Littleton, Farmborough, Marksbury and Chelwood. Notwithstanding the benefits that might accrue in Temple Cloud, this measure is likely to attract significant concern and objections from residents in these surrounding settlements and from the local residents in Temple Cloud if they would have to pay to have their non-compliant van in their own property. Bristol

		CAZ will deliver the same and likely opposition if local residents were charged for their vans even when stored at home.
Transport Planning and Infrastructure	Construction of a bypass to Temple Cloud	Whilst probably the most effective measure for significantly reducing emissions within Temple Cloud, the lead-time in delivering a bypass would be too long. Furthermore, the long-standing 'safeguarded' line for a bypass to Temple Cloud-Clutton was removed in the adopted B&NES Placemaking Plan (PMP). This was due to concerns about the realistic prospect of delivery with the Plan period, coupled with planning blight issues linked to the long-standing safe-guarding of the alignment to the west of Temple Cloud. Government funds bypasses but only where there is a large-scale housing development to support it. The cost of such bypass would be more than £10million.
Action category	**Action description**	**Reason action is not being pursued (including Stakeholder views)**
Farrington Gurney		
Traffic Management	Review the existing Method of Control at the A37/A362 traffic signals to increase junction capacity, including changes to the existing signal sequencing and/or the removal of the pedestrian stage.	This proposal would require the loss of the only controlled crossing point over the A37 in Farrington Gurney, to the detriment of pedestrian safety. As the appearance of the crossing phase occurs in the same stage as that controlling the right turn to the A362 (Stage 1), the only phase that would benefit from its removal would be the

		northbound ‘ahead’ phase on the A37. As such the queuing/delay on the southbound A37 approach where air quality exceedances occur would not be improved by the potential allocation of additional green light time.
Transport Planning and Infrastructure	Implement proposed junction improvements at the A362/A37 junction linked with the Somer Valley Enterprise Zone (SVEZ) development - Extended two-lane entry on the A362 approach.	Traffic modelling indicates that, as an isolated measure, the effect in reducing queuing and delay on the A37 southbound approach would be negligible;
Transport Planning and Infrastructure	The construction of a roundabout to replace the existing traffic signals. Smallest type of ‘Normal’ Roundabout (Compact)	Initial traffic modelling showed that this ‘compact’ roundabout layout (single lane approaches) could accommodate existing flows in the weekday ‘peak’ hours. Modelling suggested that the single lane entries could achieve an improvement in traffic flow and a reduction in nitrogen dioxide concentrations, however, given that the additional lane on the A37 southbound could also achieve a reduction at half the cost, this is an unnecessary expense. (est cost £1.98M)
Transport Planning and Infrastructure	The construction of a roundabout to replace the existing traffic signals. Larger ICD ‘Normal’ Roundabout allowing ‘flared’ 2-lane entries	This option also provided an improvement in traffic flow and a reduction in nitrogen dioxide concentrations, however, given that the additional lane on the A37 southbound could also achieve a reduction at a third of the cost, this is an

		unnecessary expense (est £3milion excl land cost).
Promoting Low Emission Transport	The implementation of a Clean Air Zone for this section of the A37	As noted with Temple Cloud, whilst a CAZ 'Type C' charging HGVs would specifically target a key contributor to emissions, a significant amount of this fleet (as surveyed, June 2019) is Euro Class 6 compliant and so would be unaffected by the CAZ. There are similar key concerns with lorry re-routing. The absence of suitable alternative HGV routes to the A37 for north-south movements between the Yeovil area (A303(T)) and Bristol is a strategic network issue. As such, a 'point' restriction at Farrington Gurney could have regional impacts, to the point that many operators may simply pay the charge when faced with the additional operating costs of significant diversion.

Appendix C: A37 Options and Feasibility Study report

A37 Options and Feasibility Study report

Appendix D: Further Measures included in the Community Response

Table D.1: Further measures included in the community response

TEMPLE CLOUD	
Public Suggestions	**Actions**
A one-way traffic flow for heavy goods vehicles through the village	This will be considered with the Width Restriction study
Improvements to public transport connections to Bristol and Bath, including cost, frequency, reliability and range of routes	This should be considered when updating the bus routes contracts with WECA
Proposal that if vegetation is cut back to make way for traffic, tree planting should be undertaken elsewhere	Vegetation has been cut back to the line of the property to help reducing the canyon effect. And reduce more vehicles encounters with the branches. Trees have been planted in Farrington Gurney.
Road sweeping and drain clearance improvements were proposed to reduce dust and debris thrown up by vehicles which is believed to make the air quality situation worse in Temple Cloud	Will take note of this and pass the information to Highways & Traffic department to clear it up more often.
Reduced speed limits, and enforcement of those limits in place using cameras	A speed survey was commissioned. Some other measures will be implemented to help reduce the speed (Paint strips)
The highlighting of noise pollution as a major issue for residents in close proximity to the A37	There are many properties in close proximity to the A37 many of them they are so close

	that isn't possible to install sound dampening. We are looking into measures to slow down the traffic.
The proposal to widen the road to improve the flow of traffic, reduce the bottleneck and prevent stop/start problems	This option has been considered and not pursued - Appendix B Table B.1
Safer designated routes for cyclists	This will be considered for possible future improvement.
Restriction on roadworks to night times so that congestion is not caused by temporary traffic lights which results in idling stationary vehicles	Will take note of this and pass the information to Highways & Traffic department to avoid day time roadworks when possible.
Incentivising car sharing to reduce traffic	This is partially involved in the Modeshift STARS for the travel to and from the schools. Possibility of creation a carpool within the community of Temple Cloud and Farrington Gurney for local travel.
"Congestion charge" style tax for heavy goods vehicles using congested routes	This option has been considered and not pursued - Appendix B Table B.1
Improvements to signage and enforcement of no right turn to Eastcourt Road by north bound traffic	The signage of "no right turn" looks adequate.
A bypass	Option answered in Appendix B Table B.1
Time restriction for heavy goods vehicles to avoid the busiest parts of the day and reduce congestion and ease traffic flow	While processing ANPR data a conclusion we achieved was that most of the HGV's traffic peak in the middle of the day between (9h-14h) the 2 normal car and LGV's traffic peaks (morning and end afternoon). A time

	restriction would encounter similar issues to the width restriction.

Appendix E: Lemon Gazelle Interim Consultation Report Air Quality Action Plan, Temple Cloud and Farrington Gurney

Glossary of Terms

Abbreviation	Description
ANPR	Automatic Number Plate Recognition
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
AQS	Air Quality Strategy
ASR	Air quality Annual Status Report
B&NES	Bath and North East Somerset
CAP	Clean Air Plan
CAZ	Clean Air Zone
CIL	Community Infrastructure Levy – a planning charge
COMEAP	Committee on the Medical Effects of Air Pollutants
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DPD	Development Plan Document
ESP	Environmental Sustainability Partnership

EU	European Union
g/km	Grams per kilometre – units of emissions
GULW	Go Ultra Low West
HDVs	Heavy Duty Vehicles (HGVs, buses and coaches)
HGVs	Heavy Goods Vehicles (over 7.5 tonnes)
LGVs	Light Goods Vehicles
JAQU	Joint Air Quality Unit
JTS	Joint Transport Study
LAQM	Local Air Quality Management
Mph	Miles per hour
MRN	Major Road Network
NHS	National Health Service
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NPPF	National Planning Policy Framework
OBC	Outline Business Case
PHE	Public Health England
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
SOC	Strategic Outline Case

SRN	Strategic Road Network
SVEZ	Somer Valley Enterprise Zone
VAS	Vehicle Activated Sign
WECA	West of England Combined Authority
$\mu g/m^3$	Microgram per cubic meter – Emission Flow unit

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Bath and North East Somerset Corporate Strategy 2020 – 2024

Bath and North East Somerset Council's Sustainable Community Strategy 2009 – 2026

Bath and North East Somerset Core Strategy (2014)

Bath and North East Somerset Council Placemaking Plan (2017)