HIF Banwell Bypass and Highways Improvements Project

Transport Assessment

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1 Executive Summary

1.1 Introduction

1.1.1 This Transport Assessment (TA) has been prepared by Arup on behalf of and in support of a full planning application made by North Somerset Council (NSC) Highways & Transport department for the Banwell Bypass and Highways Improvements Project.

1.1.2 The A371 through Banwell is the main route between Weston-super-Mare and Winscombe, Cheddar and Wells. A section of this road through Banwell reduces down to a single lane of traffic, resulting in congestion, journey time delays, and uncertainty.

1.1.3 Funding for the Scheme was secured as part of the Homes England Housing Infrastructure Fund (HIF), which also includes mitigation for impacts on the nearby flood plain; and improvements to the utility supply networks in the area.

1.1.4 The Scheme would provide a highway connection to enable potential housing sites that may be allocated in the emerging Local Plan. This includes the strategic site at Wolvershill (draft Policy LP1) which would provide around 2,800 dwellings, including 980 affordable homes, around 11 ha of employment land, a mixed-use local centre and a few primary schools.

1.1.5 In addition to enabling future housing, the Scheme objectives seek to reduce congestion, improve public spaces and encourage sustainable travel. The design has also been developed to be innovative and efficient in reducing and offsetting carbon from the design and construction.

1.1.6 The scope of the TA has been agreed with NSC and National Highways (NH) through collaborative discussions and the submission of a TA Scoping Report and Addendum. A comprehensive approach to stakeholder engagement and public consultation has also been undertaken to help inform the proposals for the Scheme.

1.1 The Scheme

1.1.1 The proposed Scheme is described in Section 2.3 and includes a 3.3km bypass around Banwell, a Southern Link (circa 0.8km) between the A371 and A368, and associated mitigation. A range of alternatives were considered for the Banwell Bypass, junctions, mitigation measures, structures, drainage, lighting and active travel route, as detailed in Option Selection Report (ES Chapter 3 - Alternatives).

1.1.2 Three shortlisted alignments of the Bypass were tested against WebTAG criteria and Route 2 identified as considered the most favourable route when reviewed against its likely impacts and performance against the Scheme objectives.

1.1.3 The alignment of the Scheme, including the Bypass and the Southern Link, are illustrated in Figure 1 below. The Scheme has been designed as a single carriageway with a 40mph speed limit. The carriageway would be generally 6.8m wide (3.4m lanes) with 1m verges. A 3m wide walking, horse-riders and cycling route will be provided for the entire length of the proposed Banwell Bypass.

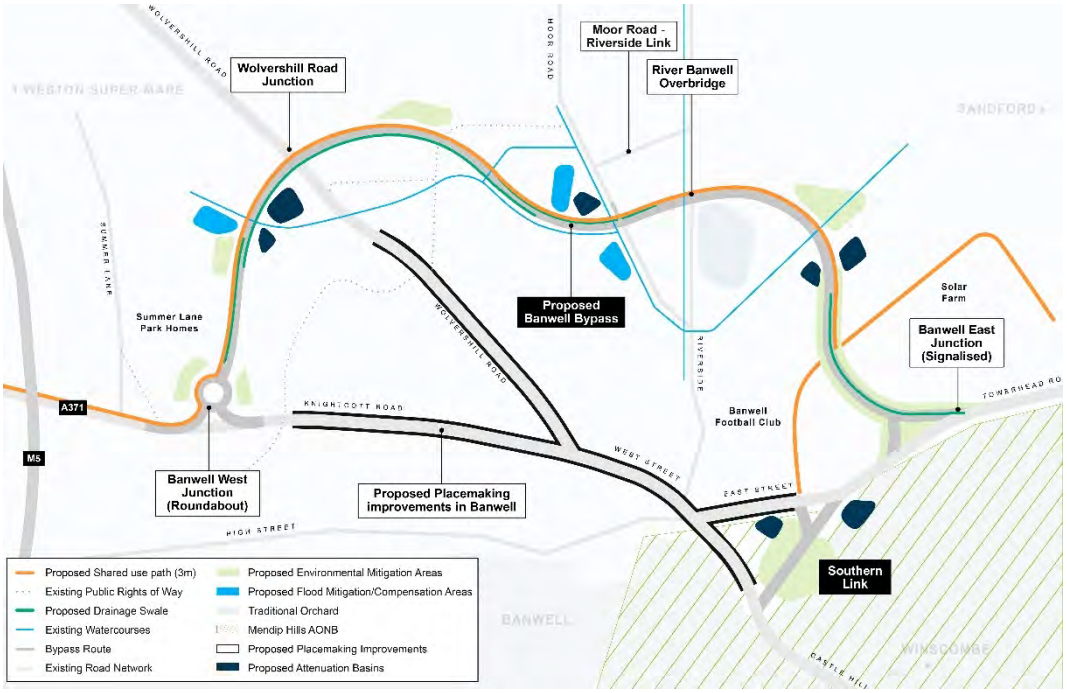


Figure 1: Proposed Banwell Bypass Alignment

1.1.4 Several new junctions will be created or upgraded as part of the Scheme. This includes the introduction of traffic signals to improve the capacity of several junctions and provide controlled

pedestrian and cycle crossings.

1.1.5 The Scheme has been designed to minimise adverse environmental effects on climate through the process of design development, consideration of good design principles and the incorporation of significant sustainable transport interventions.

1.2 Development Impact

1.2.1 As detailed in Section 7.4, the SATURN modelling of the opening year (2024) indicates the Scheme is forecast to significantly reduce congestion through Banwell by the opening of the bypass, with east-west flows instead using the bypass. A comparison with existing journey times indicates the Scheme could improve journey times by up to four minutes. In addition to the journey time benefits, the Scheme will also improve the reliability of journey times which are currently very variable.

1.2.2 As a result of the attractiveness of the bypass, traffic flows on the A368 to the east and the A371 to the west increase as vehicles reroute to make use of the bypass. The increase in flow through the Banwell area, particularly on the Southern Link, has a “ripple effect” as other flows that previously travelled on Castle Hill between Banwell and Winscombe, shift outwards to alternative routes.

1.2.3 With residual and cumulative impacts of the Scheme and the HIF developments, changes in traffic as a result of the Scheme are similar in pattern, but to a greater extent as a result of additional traffic growth and the HIF development north of Banwell. East-west journey times reduce in all periods with introduction of the bypass.

1.2.4 Junction capacity assessments have been undertaken at 28 locations within the agreed study area, as summarised in Section 7.5. The findings of the capacity assessment indicate three junctions are forecast to operate over capacity as a direct result of the Scheme. Whilst other junctions are forecast to operate over capacity, a comparison of with and without Bypass assessment scenarios (i.e. a comparison between the Cumulative Impacts 1 and Cumulative Impacts 2 scenarios in 2039) indicates these issues are not directly attributed to the Scheme.

1.3 Mitigation Strategy

1.3.1 The Scheme provides the opportunity to make placemaking improvements and enhancements to the centre of Banwell village. As detailed in Section 8.2, proposals include a 20mph speed limit with traffic calming measures, footway widening to reduce the dominance of the road and changes to surfacing and crossing points.

1.3.2 A package of walking, cycling, horse-riding mitigation measures have also been identified for Churchill, Sandford and Winscombe to offset the negative impacts of increases in traffic flow, as detailed in Section 8.2. This includes a continuous walking and cycling route between Weston-super-Mare and the Strawberry Line via the Bypass and new crossing within the villages. In addition, speed limit reductions to 20mph supported by traffic calming measures are proposed within the Churchill, Sandford and Winscombe.

1.3.3 Mitigation is proposed at the A371/Banwell Road, the A371 Knightcott Road/Summer Lane/Well Lane and Churchill Gate to improve capacity. As summarised in Section 8.3, with the proposed capacity improvements, the traffic impacts of the Scheme can be fully mitigated in the opening year.

2 Introduction

2.1 Background

2.1.1 This Transport Assessment (TA) has been prepared by Arup on behalf of and in support of a full planning application made by North Somerset Council (NSC) Major Projects team for the Banwell Bypass and Highways Improvements Project.

2.1.2 The A371 through Banwell is the main route between Weston-super-Mare and Winscombe, Cheddar and Wells. A section of this road through Banwell reduces down to a single lane of traffic, resulting in congestion, journey time delays, and uncertainty.

2.1.3 NSC Housing Infrastructure Fund (HIF) proposal supports potential housing sites (subject to the emerging Local Plan 2038), including approximately 2,800 dwelling and 11 ha employment at Wolvershill. A business case was submitted to Homes England to secure funding for a package of infrastructure improvements in February 2019 and a successful funding announcement was made at the end of October 2019.

2.1.4 A number of infrastructure improvements have been proposed including: a bypass of Banwell village; a package of online improvements to the existing surrounding road network; mitigation for impacts on the nearby flood plain; and improvements to the utility supply networks in the area.

2.1.5 The Scheme would provide a highway connection to enable potential housing sites that may be allocated in the emerging Local Plan and alleviate the anticipated impact of further traffic growth upon the already congested Banwell village. The Scheme will include wider mitigation measures, as described further in Section 8.

2.1.6 NSC appointed Alun Griffiths (Contractors) Ltd, with Arup and TACP, to develop a solution including optioneering, design and planning support of the Scheme. Stage 1 of the project includes: optioneering; preliminary design; Environmental Impact Assessment (EIA); planning permission; Statutory Processes.

Stage 2 of the project will follow, subject to a successful planning determination and land acquisition, and include the detailed design and construction phase, following.

2.1.7 This Transport Assessment (TA) has been prepared in support of the planning application for the Banwell Bypass and presents the impacts on the local and wider transport network.

2.2 Need for Intervention

2.2.1 The current highway network through Banwell, North Somerset (the A371 and A368) generally comprises a single carriageway road with one lane in each direction. The routes pass through the villages of Banwell, Churchill, Sandford, Winscombe and Locking, as shown in Figure 2 below. The sections of the highway between the villages provide access to residential and agricultural properties.

Figure 2: Local Highway Network

2.2.2 The A371 is the main route from Weston-super-Mare to Banwell. The route passes through Banwell and continues in a generally south-easterly direction onto Winscombe, Cheddar, Wells, and eventually terminates in a junction with the A303 at Wincanton. The A371 also provides access to education facilities including Winterstoke Hundred Academy and Locking Parklands (opens in 2023). A section of the A371 through Banwell reduces down to a single lane of traffic. At certain times of the day this causes congestion, journey time delays, and uncertainty.

2.2.3 The A368 corridor runs along the northern edge of the Mendip Hills AONB. Starting at Banwell, it forms part of the main route from Weston-super-Mare in the west to Bath in the east, and South Bristol via the A38.

2.2.4 The A368 between Banwell and Churchill is well used as a school route by children, parents & carers, on foot and cycling. The route is generally narrow in character, and beyond the village centres there is a lack of walking and cycling facilities along its length that meet minimum standards.

2.2.5 These strategic routes are significant to the area, providing critical connectivity throughout the South West. The Annualised Average Daily Traffic (ADDT) recorded on the A371 through Banwell in the base year (2018) is 12,866 vehicles. The recorded AADT on the A368, east of Banwell, is 9,196 vehicles. The routes therefore play a big part in everyday lives of tens of thousands of people as they travel to work and school, and for business and leisure purposes.

2.2.6 The need for the bypass is further highlighted by the following studies and reports:

a) A Banwell Area Transport Study was commissioned in 2000 by North Somerset Council ("NSC") to consider and assess transport options for the Banwell area. The Final Study Report concluded a bypass should be progressed, with a route recommendation to the north of Banwell to reduce congestion through the village. This formed the basis for the route that is currently safeguarded for planning purposes within the NSC Local Plan[1] under Policy DM20.

b) A Greater Bristol Strategic Transport Study (GBSTS) (Atkins, 2006) proposed a Banwell, Churchill and Sandford bypass to improve movements in and out of the greater Bristol region. The scheme was considered to have local rather than strategic merits and was not included in the GBSTS strategy.

c) The Option Selection Report (WSP, July 2018) recommended a route referenced as route 2 which resembles the safeguarded route in the existing Local Plan. This has led to a Scheme presented in this application which aims to address problems in the area. Despite withdrawal from the Joint Spatial Plan, Banwell is still being put forward as a strategic housing location in the emerging Local Plan (2023-38). The Banwell Bypass will help enable this development.

2.2.7 In 2019, NSC secured £97.1m of funding from Homes England's Housing Infrastructure Fund (HIF). The bid identified a total of 7,557 new dwellings that would be supported by the funding. From these, 4,482 dwellings are to be located at the existing Weston Villages development sites and the remaining 3,075 to be identified through the emerging local.

2.2.8 The HIF funding was awarded so that essential infrastructure projects could be delivered to support North Somerset's growing population, whilst also supporting the delivery of potential housing sites to help meet the need for new homes over the next 15 years.

2.2.9 Overall, routes which pass through Banwell are significant to connectivity locally and regionally. Congestion through the village causes journey time delays and uncertainty. This in turn, has economic, transport, cultural, environmental impacts to the area and the wider network. The Banwell Bypass would strive to address these needs, as detailed further in Section 6.

2.2.10 Following a review of the strategy and policy documents listed in paragraphs 2.2.6 and 2.2.7 and the project objectives, the project team have identified the key issues to be addressed through the Scheme:

Transport

a) Lack of capacity on the existing section of highway which goes through Banwell leads to congestion and delay.

b) Poor journey time reliability makes it difficult to plan journeys.

c) Lack of active travel and sustainable travel between local villages and Weston-super Mare.

Economic

a) Productivity in the South West is restricted by poor connectivity

b) Economic growth is constrained by traffic congestion, delay and unreliable journey times.

c) Tourism and the visitor economy are harmed by congestion and unreliable journey times.

d) Lack of infrastructure that can enable future housing development (subject to the Local Plan).

Environment

a) Traffic causes severance, visual intrusion, poor air quality and noise in the village of Banwell.

b) Traffic has a negative visual impact upon the surrounding countryside and Mendip Hills AONB.

c) Forecasted traffic would increase greenhouse gases through Banwell.

Social and Cultural

a) Traffic has an adverse impact on local communities.

b) Traffic has an adverse impact on the townscape and heritage assets of Banwell.

2.3 Scheme Overview

2.3.1 The Scheme comprises the following distinct elements:

a) A Banwell Bypass of the village of Banwell (referred to as the "Banwell Bypass");

b) A route connecting the A371 at Castle Hill and the A368 at East Street (referred to as the "Southern Link"); and

c) Mitigation and enhancement measures, which broadly consist of the following:

- Environmental mitigation and enhancement measures in connection with the Banwell Bypass and the Southern Link, examples of which include (but are not limited to) flood compensation areas, planting and habitat creation, attenuation basins etc.
- Placemaking improvements within Banwell, comprising mitigation and enhancement measures to the public realm; and
- Traffic mitigation in connection with the Banwell Bypass and the Southern Link, including Improvements to the wider local road network.

2.3.2 Together, these elements comprise the "Scheme". Each element as listed is described in more detail in Section 6.

2.3.3 The objectives for Banwell Bypass have been developed by NSC to target to mitigate the challenges identified in Paragraph 2.2.10 and are as follows:

a) Improve the local road network to deal with existing congestion issues;

b) Improve and enhance Banwell's public spaces by reducing traffic severance and improving the public realm;

c) Provide the opportunity to increase active and sustainable travel between local villages and Weston-super-Mare;

d) Deliver infrastructure that enables housing development (subject to Local Plan);

e) Ensure the development respects the local area and minimises visual impact upon the surrounding countryside and Mendip Hills Area of Outstanding Natural Beauty (AONB);

f) Innovative and efficient in reducing and offsetting carbon from the design and construction of the infrastructure;

g) Ensure the development provides the opportunity to increase Bio-Diversity net Gain by at least 10%; and

h) Proactively engage with stakeholders in a way that is both clear and transparent.

2.4 HIF Potential Housing Sites

2.4.1 NSC Housing Infrastructure Fund (HIF) proposal supports potential housing sites (subject to the emerging Local Plan 2038). As detailed in Section 7.2, these potential housing site have been included in the transport modelling for the residual and cumulative impacts.

2.4.2 NSC is preparing a new local plan with a 15 year plan period 2023-2038. The draft Preferred Options Local Plan was published for consultation March 2022. An extract of the Policies Map supporting this document is presented in Figure 3 below.

2.4.3 The allocation to the north of Banwell and east of the M5 relates to draft Policy LP1, Strategic Location: Wolvershill. This allocation is identified as a new mixed use strategic growth location to accommodate up to around 2,800 dwellings, including 980 affordable homes, around 11 ha of employment land, a mixed-use local centre and at least three 420-place primary schools. The remaining 275 houses enabled by the HIF bid are covered through proposed infill allocations in the area

2.4.4 The potential housing and employment is contingent upon mitigation measures, of which the Scheme is one.

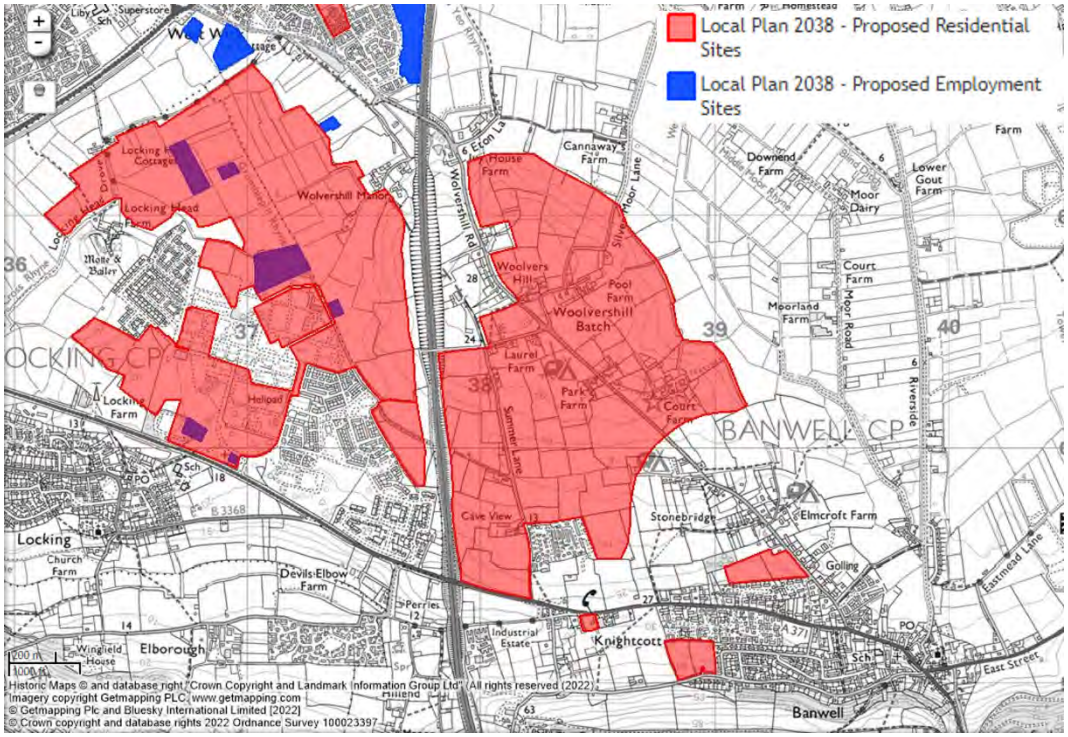


Figure 3: NSC Local Plan 2038 Housing and Employment Allocations

2.5 TA Scoping

2.5.1 The content of this TA was agreed through collaborative dialogue with North Somerset Council (NSC) and National Highways (NH). This included the preparation of a TA Scoping Report (doc ref: 70072083/TAS/2) and an addendum to the Scoping Report (doc ref: BNWLBP-ARP-HGN-XXXX-TN-TR-000001).

2.5.2 The Scoping Report and the Addendum can be found in Appendix A and the responses from the key stakeholders, including NSC and NH can be found in Appendix B. In addition, Appendix B also includes details how the TA Scoping Responses have been incorporated within this TA

2.5.3 Following further discussions with NSC, it has been agreed not to include the micro-simulation modelling of Junction 21 of the M5 and nearby junctions in the TA due to issues with the model validation. Where required, junction modelling has been used to assess the impacts of the Scheme on adjacent junctions.

2.6 Report Structure

2.6.1 The remainder of the report is structured as follows:

a) **Section 3** sets out the policy context for the transport element of the planning application;

b) **Section 4** presents the audit of the existing transport network;

c) **Section 5** details the existing travel demand on the network;

d) **Section 6** details the development proposals, including the proposed general arrangement of the road scheme and the optioneering exercise that led to the preferred alignment;

e) **Section 7** presents the traffic impacts on the Scheme and identified where mitigation will need to be explored;

f) **Section 8** summarises the highway mitigation strategy;

g) **Section 9** outlines the sensitivity testing that has been undertaken; and

h) **Section 10** presents the summary and conclusions.

3 Planning Policy Context

3.1 National Planning Policy

National Planning Policy Framework

3.1.1 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2021) [2] details the Government's planning policies for England and guidance on their application, laying out a framework which can be used to produce locally prepared plans for housing and other development. It recognises the importance of promoting sustainable transport and considering transport issues from the earliest stages of development proposals, so that "the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating and adverse effects."

3.1.2 Chapter 12: Achieving well-designed places of the National Planning Policy Framework (NPPF) (2021) attaches great importance to the design of the built environment and states that, 'Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities.' Whilst these statements are principally aimed at the built and architectural environment, they are also applicable to infrastructure development.

The Scheme strives to create a better place in which to live and work for Banwell and the surrounding villages. Through the reduction in traffic from the centre of Banwell and the proposed placemaking measures, the Scheme would restore a sense of place and community to Banwell. The placemaking improvements in Banwell would be visually attractive, sympathetic to the Banwell Conservation Area functioning well with the local character, making Banwell a more attractive place to live work and visit.

3.1.3 Paragraph 110 of the NPPF states that "In assessing sites that may be allocated for development in plans, or specific

applications for development, it should be ensured that:

a) Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

b) Safe and suitable access to the site can be achieved for all users;

c) The design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and

d) Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree"

The Scheme is proposing to provide opportunities to increase active and sustainable travel between local villages and Weston-super-Mare. The provision of new and improved walking, cycling and horse-riding routes aim to address 'missing links' in the active travel network and provide traffic-free routes. The Scheme has been designed in line with planning policy, best practice, and stakeholder engagement.

3.1.4 The NPPF also notes "development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

3.1.5 Within this context, applications for development should:

a) Give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;

b) Address the needs of people with disabilities and reduced mobility in relation to all modes of transport;

c) Create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;

d) Allow for the efficient delivery of goods, and access by service and emergency vehicles; and

e) Be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations."

The Scheme is proposing to provide inclusive traffic-free walking, cycling, and horse-riding routes alongside the Bypass. In addition, the Scheme is maintaining and improving access to existing PRoWs and other active travel infrastructure in order to encourage walking and cycling between local villages and Weston-super-Mare and avoid conflicts with vehicles. Also, it is proposed to relocate and improve bus stop infrastructure to encourage greater public transport use.

National Planning Practice Guidance

3.1.6 The Planning Practice Guidance (PPG) provides guidance on and should be read alongside the NPPF. Relevant to the Scheme, the PPG outlines includes guidance on:

a) Travel Plans, Transport Assessments and Statements – Provides guidance on when these transport documents are required and what they should contain. They are ways of assessing and mitigating the negative transport impacts of development in order to promote sustainable development.

b) Air Quality – Explains how planning can take air quality impacts into account of new developments through sustainable travel provision or mitigating air quality impacts.

c) Climate Change – Advises on how to identify suitable mitigation and adaptation measures to address the impacts of climate change.

d) Design – This guidance provides advice how design proposals should promote high levels of sustainability in line with design guidance and best practice.

e) Flood Risk and Coastal Change – Provides guidance on how to consider the risks associated with flooding in plan-making.

f) Noise – The PPG provides guidance on the application of government noise policy, reaffirming the effect levels set out in the Noise Policy Statement for England.

The Scheme proposes a sustainability-led design to efficiently reduce and offset carbon impacts before and after construction. For example, the single carriageway Bypass is proposed to use recycled materials and provide

sustainable travel opportunities in order to reduce the number of private vehicles using the Scheme. Also, the proposed Bypass alignment has been designed to reduce potential noise, air quality, and light pollution effects.

National Policy Statement for National Networks

3.1.7 National Policy Statement for National Networks (NPSNN) was published by Department for Transport (DfT) in December 2014 and sets out the need for, and Government's policies to deliver, development of nationally significant infrastructure projects (NSIPs) on the national road and rail networks in England.

3.1.8 The NPS sets out the general principles in accordance with which applications relating to national networks infrastructure are to be decided. The NPS notes the following should be taken into account when considering any proposed development:

a) Its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits; and

b) Its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.

Circular 02/2013: Strategic Road Network and the Delivery of Sustainable Development

3.1.9 The Circular 02/2013[3] sets out "the way in which the Highways Agency (National Highways) will engage with communities and the development industry to deliver sustainable development and, thus, economic growth, whilst safeguarding the primary function and purpose of the strategic road network." The document states that development proposals are likely to be accepted if it is well-functioning and provides for safe and reliable journeys as well as if it does not increase demand for a section of road that is already operating at over-capacity levels (the A371 through Banwell, in this Scheme).

The Strategic Road Network: Planning for the Future

3.1.10 The SRN: Planning for the Future[4] document describes the approach used by National Highways to engage with the

planning system and which issues are looked at when considering draft planning documents and planning applications. The document also details the information that should be included in development proposals and the support that National Highways can provide. Development proposals must demonstrate that all environmental implications of the Scheme have been considered and, once impacts are addressed through an avoidance, off-line improvements and alterations process, measures will be implemented to fully mitigate any impacts that cannot be avoided.

Decarbonising Transport – A Better, Greener Britain

3.1.11 Decarbonising Transport – A Better, Greener Britain, issued by DfT in 2021 sets out the path to a net zero transport system and presents the commitments and actions set out to achieve this by 2050. Part 2a of the plan describes how to decarbonise all transport modes, separated into active travel, buses, railways, cars/vans/motorcycles/scooters, maritime transport and aviation. Part 2b includes more details on key enablers and specific plans for certain sectors.

3.2 Regional Planning Policy

Joint Local Transport Plan 4 2020-2036

3.2.1 The Joint Local Transport Plan 4 (JLTP4) (Travelwest, 2020) [5]. The JLTP4 is the overarching transport plan for the West of England area which lays out the region's ambition for travel and transport to 2036. The objectives of the plan are to:

a) Take action against climate change and address poor air quality.

b) Support sustainable and inclusive economic growth.

c) Enable equality and improve accessibility.

d) Contribute to better health, wellbeing, safety, and security; and

e) Create better places.

3.2.2 As part of the objective to take action against climate change, the JLTP4 includes an outcome to Reduce carbon emissions to net zero by 2030.

3.2.3 In terms of the Scheme, the following relevant policies will need to be met to improve connectivity:

a) W1: Provide more public transport options and improve service quality;

b) W2: Provide for journeys where public transport is not an option;

c) W4: Improve resilience of the network, providing increased reliability;

d) L1: Enable walking and cycling, 'active modes of travel', to be the preferred choice for shorter journeys;

e) L2: Reduce the number and severity of casualties for all road users;

f) L3: Encourage residents and employees to make more sustainable and healthier travel choices;

g) L5: Support the identification and implementation of measures that will improve air quality; and

h) N2: Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys.

3.2.4 The Bypass is identified in the JLTP4 as and early investment scheme.

The Scheme will positively contribute to the following polices:

- W1: the journey time reliability benefits of the Scheme will improve existing bus services through Banwell;
- W4: the Scheme will improve the resilience of the network by providing an alternative route to the A371 through Banwell;
- L1: the wider mitigation proposals include enhancements to the walking and cycling network. It is also proposed to reduce the speed limit to 20 mph in Banwell and the surrounding villages;
- L2: proposals to reduce the speed limit in Banwell and the surrounding villages may reduce the number and severity of casualties for all road users;
- L3: as part of the wider mitigation proposals improvement are proposed to the active travel network which may encourage more trips by foot and cycle; and
- N2: improvements to walking and cycling infarstutrue in Banwell and the surrounding villages will enable residents to walk to nearby bus stops and transfer to bus for longer journeys.

West of England Bus Strategy

3.2.5 The West of England Bus Strategy, adopted in June 2020, includes a vision to create 'Bus services people can depend on, [that] are quick and reliable, combine to form a simple to understand and easy to use network, are accessible for everyone, are safe and comfortable, and offer value for money to passengers and to the public purse.' To achieve this vision, the strategy sets out a number of ambitions, most relevant to this project are 'to address congestion and delays due to car travel by attracting car users to use buses for some or all of their journeys' and plans 'to improve the public domain through the reduction in car traffic and transfer of highway space to buses, bicycles and pedestrians'.

Local Cycling and Walking Infrastructure Plan

3.2.6 The West of England Local Cycling and Walking Infrastructure Plan (LCWIP) published in January 2021 sets out the plan for active travel infrastructure investment between 2020-2036. This

Plan proposes improvements to the walking environment focussing on 30 local high streets (totalling £105 million), as well as improvements along 55 continuous cycle routes (totalling £306 million), with the aim of providing high quality infrastructure to support our transition to a region where walking and cycling are the preferred choice for shorter trips and to access public transport. These interventions are contributing to achieve WECA's overarching transport vision from JLTP4, to 'Connect people and places for a vibrant, inclusive and carbon neutral West of England'.

3.3 Local Planning Policy, Guidance and Strategies

North Somerset Council's Core Strategy 2017

3.3.1 The Core Strategy document[6] was published in January 2017 and sets the broad long-term vision, objectives and strategic planning policies for North Somerset up to 2026.

3.3.2 The document sets out policies regarding living within environmental limits, delivering strong and inclusive communities, delivering a prosperous economy, ensuring safe and healthy communities and specific are policies and delivery.

3.3.3 Policy CS10, Transportation and Movement, identifies Banwell Bypass as one of the key infrastructure schemes for the plan period, stating that, with relevance to landscape issues schemes should,

a) 'Enhance the facilities for pedestrians, including those with reduced mobility, and other users such as cyclists;' and,

b) 'Improve road and personal safety and environmental conditions;

c) Reduce the adverse environmental impacts of transport and contribute towards carbon reduction.'

The Scheme addresses many of the Core Strategy policies through addressing climate change issues and implementing carbon reduction through a sustainability-led design. It also enhances active travel opportunities, mitigates against increased traffic congestion through

Banwell Village and improves connectivity in line with Policy CS10: Transportation and Movement

3.3.4 Policy DM20, Major Transport Schemes, includes Banwell Bypass and aims to: "protect proposed major transport schemes from inappropriate development and show the safeguarded areas on the Policies Map."

The proposed Scheme is wholly consistent with this policy as involves the implementation of the 'Banwell Bypass'. It should however be noted that the that the final route of the bypass diverges from that which has been safeguarded.

Sites and Policies Development Plan Part 1: Development Management Policies (2016)

3.3.5 This document[7] details the development plan policies that accompany the strategic context in the Core Strategy. It summarises a range of development issues such as development in the green belt, major transport schemes, and development in the countryside. Policy DM20: Major Transport Schemes also states that land is safeguarded for the Banwell Bypass Scheme and supported by the Policy DM24: Safety, traffic and provision of infrastructure, etc. associated with development to provide relevant infrastructure to support permitted and proposed future development.

Sites and Policies Development Plan Part 2: Site Allocations Plan (2018)

3.3.6 The Site Allocations Plan[8] identifies the detailed allocations necessary to deliver NSC's Core Strategy. The plan was subject to examination by an independent Inspector in April 2017 and several modifications were subsequently made to the October 2016 Publication Version of the Plan. The Plan was adopted formally in April 2018.

3.3.7 The document includes a review of existing allocations, identifications of new allocations, and designations to safeguard or protect areas and sites. This development plan supersedes the remaining saved Replacement Local Plan policies.

North Somerset Local Plan 2038

3.3.8 North Somerset Council is preparing a new local plan with a 15-year plan period 2023-2038. Once adopted it will replace the current development plan which comprises the Core Strategy, Site Allocations Plan and Development Management Policies and which **h**as an end date of 2026.

3.3.9 The draft Preferred Options Local Plan was published for consultation March 2022. The consultation period closed on Friday 29th April 2022.

3.3.10 The key policies of relevance to Transport are as follows:

a) DP13 Highway safety, traffic and provision of infrastructure associated with development: development will be permitted provided it would not prejudice highway safety or inhibit necessary access for emergency, public transport, service or waste collection vehicles;

b) DP14 Active and sustainable transport: new development will be designed and located to minimise the need to travel and support a hierarchy which prioritises walking, then cycling, public transport, car clubs and finally private electric vehicles;

c) DP15 Active travel routes: Existing and proposed active travel routes will be safeguarded. Development proposals that would reduce, sever or adversely affect their use or attractiveness, or prejudice the planned development of the network will not be permitted unless acceptable provision is made to mitigate these effects such as through its diversion or replacement; and

d) DP16 Public transport accessibility: Developments will, as appropriate, be expected to encourage the use of public transport and delivery of effective and convenient services. This will include the integration of routes within residential areas, bus priority measures, direct routes to well located public transport infrastructure, improved bus stop facilities, supporting interchange between different modes, higher density development in proximity to public transport, and contributions to enhanced levels of service.

North Somerset's Economic Plan 2017-2036

3.3.11 North Somerset's Economic Plan[9] sets out the drivers for North Somerset's economic strategy, their priorities and commitments and how they will be delivered and measured. This is a five-year

plan that is flexible and responsive to the current economic uncertainty. The document is being monitored every three months by a steering group and commitments are being continually assessed to measure whether they are meeting needs and opportunities.

3.3.12 Economic renewal activity is being priorities around the following three pillars:

a) Providing inclusive growth and wellbeing for North Somerset people;

b) Delivering digital access for all; and

c) Supporting green business and low carbon activities.

NSC's Active Travel Strategy

3.3.13 North Somerset Council's Active Travel Strategy 2020 – 2030[10] (ATS) sets out in detail the ambitions for North Somerset with a main aim to increase walking and cycling trips and to tackle the climate emergency. It explains how these proposals will be achieved and by when. The ATS main objectives are to:

a) Deliver safe and frequent active travel to enable improved public health

b) Tackle the Climate Emergency

c) Drive local economic development

d) Shape active travel neighbourhoods through planning.

3.3.14 The targets of the ATS are to:

a) Increase walking and cycling trips by at least 300% by 2030

b) Double cycling, where cycling activity is measured as the estimated total number of bicycle stages made each year, from 0.8 billion stages in 2013 to 1.6 billion stages in 2025

c) Increase the percentage of children aged 5 to 10 that usually walk to school from 48% in 2013 to 55% in 2025.

The Scheme is proposing to provide inclusive traffic-free walking, cycling, and horse-riding routes alongside the Bypass as well as maintaining and improving access to existing PRoWs in order to encourage walking and cycling between local villages and Weston-super-Mare and avoid conflicts with vehicles.

NSC Travel Plans Supplementary Planning Document

3.3.15 NSCO Travel Plans Supplementary Planning Document (SPD) sets out the criteria and thresholds for determining whether a Travel Plan is required. This includes the following:

3.3.16 Smaller developments comprising jobs, shopping, leisure and services which would generate significant amounts of travel in, or near to, Air Quality Management Areas;

3.3.17 All new independent schools, and extensions to independent schools likely to have a material impact on traffic movements;

3.3.18 Developments comprising or involving a significant increase in existing car parking provision; and

3.3.19 Where there is inadequate transport infrastructure in the area.

Based on the criteria set out in the SPD, a Travel Plan is not deemed to be required to support the Scheme.

NSC Creating Sustainable Buildings and Places in North Somerset SPD

3.3.20 The Creating Sustainable Buildings and Places in North Somerset SPD presents guidance for energy efficiency, renewable energy use and the transition towards zero carbon development.

3.3.21 The Council declared a Climate Emergency in 2019 and has an overarching goal to become carbon neutral by 2030. This ambition is both for emissions associated with the Council's own operations and also those emissions generated within the local authority area.

3.3.22 The SPD notes that there is a range of sustainable design principles that need to be considered when striving to achieve sustainable buildings and places. This includes, but is not limited to, consideration of the existing land use ecology; energy and water minimisation through siting and orientation, passive design measures, thermal mass, material use, measures to reduce overheating, renewable energy generation, waste management and sustainable and active travel.

Mendip Hills Area of Outstanding Natural Beauty (AONB) Management Plan (2019 – 2024)

3.3.23 The Mendip Hills AONB Management Plan[11] is a material consideration for planning applications which identifies what is necessary to conserve and enhance the Mendip Hills area. Published in January 2019, this document also plays a role to secure commitment from public bodies and influence the ways in which national and local policies are implemented in terms of the AONB.

3.3.24 Of particular relevance to this scheme, the Management Plan includes the following policies:

a) R1 Maintain, improve and promote public access and quiet recreational activities with measures to ensure access for all in accordance with the purposes of AONB designation.

b) R3 Develop and promote more sustainable methods of travel to and around the AONB for enjoyment and recreation.

c) D2 Working with the local highways authorities, ensure that the special qualities of the AONB are fully respected in the planning, design, provision and management of all types of transport and associated infrastructure.

3.4 Design Guidance and Best Practice

Design Manual for Roads and Bridges (DMRB)

3.4.1 The DMBR[12] was introduced in 1992 and updated in 2020, providing national guidance on the design of new sections of motorway and Trunk Road Networks and improvements to that network within England. In particular, the Scheme will follow the sustainability and environment, road layout, and pavement guidance closely.

LTN 1/20 Cycle Infrastructure Design

3.4.2 This Local Transport Note[13] provides recommended guidance for the design of cycling infrastructure at a national policy level. LTN 1/20 also sets out two mechanisms to measure the quality threshold for new cycling infrastructure: the Cycling Level of Service (CLoS) and the Junction Assessment Tool (JAT).

3.4.3 In terms of design guidance, cycling routes are recommended to be coherent, direct, safe, comfortable, and attractive. Therefore, the Scheme proposes new traffic-free cycling routes of at least a 3m width to provide better connectivity between villages within the study area and Weston-super-Mare.

Manual for Streets (MfS)

3.4.4 Manual for Streets[14], published in 2007, sets out best practice guidance on the design, construction, adoption and maintenance of new residential streets as well as the re-design of existing ones. The guidance aims to encourage a holistic and inclusive design process that engages with all stakeholders.

3.4.5 The MfS aims to assist the creation of streets that:

a) Help to build and strengthen the communities they serve;

b) Meet the needs of all users, by embodying the principles of inclusive design;

c) Form part of a well-connected network;

d) Are attractive and have their own distinctive identity;

e) Are cost-effective to construct and maintain; and

f) Are safe.

Manual for Streets 2: Wider Application of the Principles (MfS2)

3.4.6 Manual for Streets 2[15] was published by the Chartered Institute of Highways and Transport in 2010. This document sets out how the MfS guidance can be applied to the wider highway network and does not supersede the original Manual for Streets.

North Somerset Council's Highways Development Design Guide (October 2020)

3.4.7 This design guide[16] provides advice on the procedures NSC will follow when assessing planning proposals that will affect the transportation infrastructure and highway network in North Somerset. It sets out the standards and approach to design in connection with highways, paths, accesses and further aspects of highway design. The guide also sets out NSC's expectations in regards of future maintenance arrangements. The commitment to 'reduce emissions from transport' is particularly important for new developments.

4 Existing Conditions

4.1 Introduction

4.1.1 Banwell is a village and civil parish in North Somerset, its population was 2,929 (according to 2011 Census). The centre of Banwell village is covered by a Conservation Area.

4.1.2 Banwell Village is located approximately 6km east of Weston-super-Mare and 28km south west of Bristol. There are several villages in the vicinity of Banwell, including Sandford, Churchill and Winscombe to the east and Locking and Hutton to the west.

4.1.3 The immediate surrounding land use is predominately agricultural, with the Mendip Hills Area of Outstanding Natural Beauty (AONB) to the south of the village.

4.1.4 The A368 (East Street) and A371 (Knightcott Road/West Street/Castle Hill) run through the centre of Banwell. The M5 runs from south to north, approximately 0.9km west of Banwell at the closest proximity.

4.1.5 The site location is shown in Figure 4 and detailed in the planning drawing Proposed Location and Planning Boundary (Drawing Ref: BNWLBP-ARP-LSI-XXXX-DR-ZL-000013).

4.1.6 This section sets out the existing conditions for the proposed Banwell Bypass development study area and the surrounding transport network across all modes of transport. The study area is defined by a 5km buffer surrounding the existing A371 through Banwell and the centrelines of the proposed bypass alignment.

4.1.7 The Walking, Cycling and Horse-riding (WCH) Assessment Report, prepared in accordance with the relevant DMRB standards, includes a detailed audit of the walking cycling and horse-riding network.

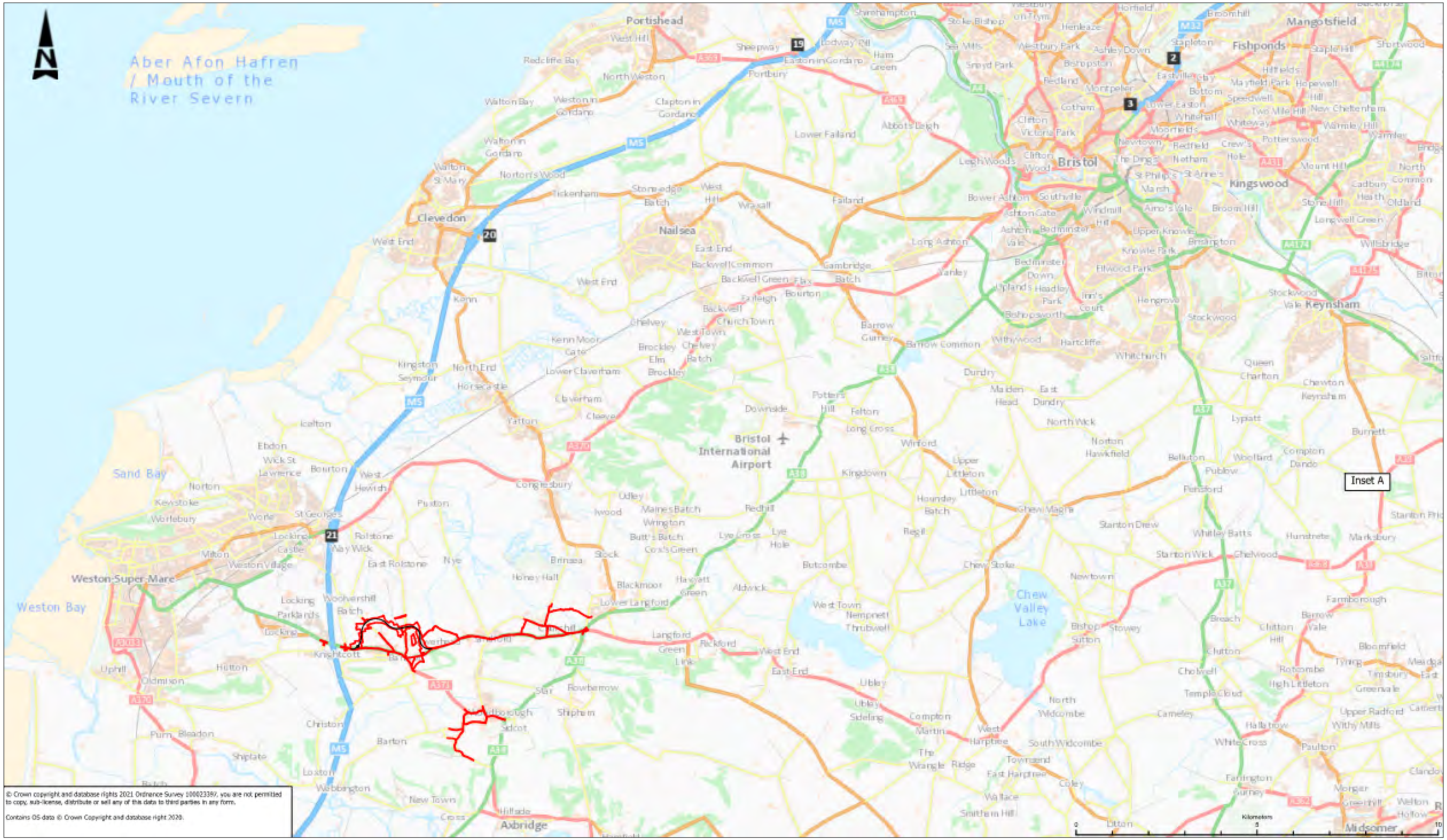


Figure 4: Proposed Location and Planning Boundary

4.2 Existing Local Highway Network

A371

4.2.1 The A371 runs through the centre of Banwell in an east-west alignment from Winscombe, approximately 3.1km southeast of Banwell, to Airport Roundabout in Weston-super-Mare, approximately 5.1km northwest of the village. The alignment of the A371 and associated junctions are displayed in Figure 5 below.

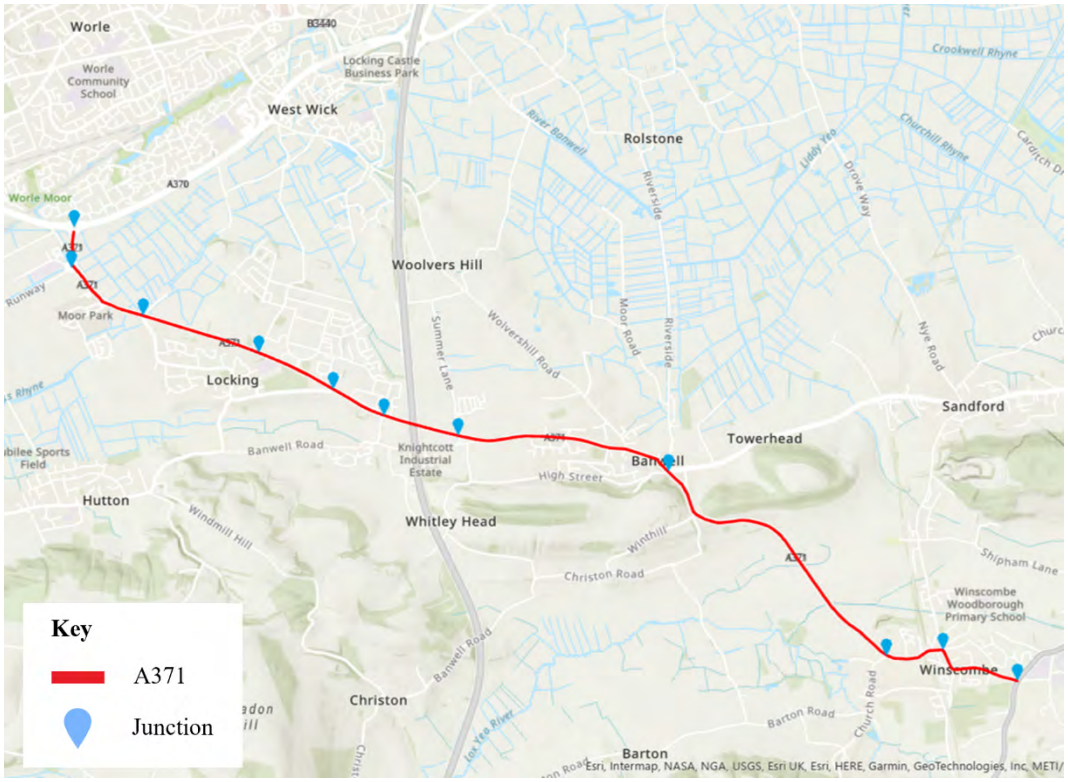


Figure 5: A371 Alignment

4.2.2 Generally, the A371 is a single carriageway with speed limit that varies from 30mph through Banwell and Winscombe villages, 50mph from the east of Banwell to Banwell Road and 60mph from Airport Roundabout to Knightcott Road.

4.2.3 Within Banwell, the A371 narrows to a single lane on Castle Hill just east of the junction with the A368 East Street/High Street. Along this section, priority is afforded to southeast-bound vehicles. Similarly, a section of the A371 West Street between

the Emery Gate and Church Street priority junctions also narrows to a single lane. These sections are the A371 are referred to as the Banwell Narrows, as shown in Figure 6 below.

Figure 6: A371 West Street (Banwell Narrows) (© Google)

4.2.4 At certain times of the day these single lane sections of the carriageway causes congestion, journey time delays, and uncertainty, as detailed further in Section 5.2. There have also been recent incidents that can be attributed to the narrow carriageway. One example includes an incident where a food delivery truck collided with Castle Hill Cottage, resulting in the loss of power to 77 properties and substantial delays and queuing on the A371.

4.2.5 To the west of the Banwell Narrows, the A371 forms a priority T-junction with Wolvershill Road. The junction is shown below in Figure 7.

Figure 7: A371 West Street / Wolvershill Road priority junction (© Google)

4.2.6 Within Banwell, the A371 also forms junctions with Church Street

and the A368 towards Sandford. Church Street is a narrow two-way street leading to Riverside and Rolstone and has a 7.5 tonne weight limit and a vehicle width restriction of 2m. Vehicles exiting Church Street have very limited visibility due to surrounding buildings and the narrow junction, and therefore must take extra care when turning onto the A371.

4.2.7 Riverside is a narrow street that runs in a north/south alignment from the A371. There are traffic reduction features including chicanes. Moor Lane forms a junction with Riverside, approximately 500m north of the A371. The narrow lane is unlit and runs parallel to Riverside in the north/south alignment.

4.2.8 As detailed in paragraph 4.3.6, seven collision were recorded at this junction within the most recent five-year period, of which six involved a pedestrian. As detailed in Section 8.2

Figure 8: A371 West Street/Church Street junction (left) and A371 West Street/ A368 East Street junction (right) with Priority Over Oncoming Vehicle Sign (© Google)

4.2.9 To the west, the A371 forms three roundabout junctions with the A370, The Runway and Laneys Drove. Airport Roundabout is the most western point of the A371 which joins with Moor Lane and the A370. Just 250m south of this, the A371 forms a roundabout with Beaufighter Road and The Runway which links to the settlement Bourneville. A further 350m to the south-east, the A371 forms a roundabout with Weston Business Park and Laney's Drove which leads to Acorn and Oaktree camping parks.

4.2.10 To the east of these roundabouts, the A371 connects to Locking via Elm Tree Road and Old Banwell Road priority T-junctions. A recently constructed signal-controlled junction is located further east, providing access to committed housing scheme alongside

a new spine road towards Churchland Way. These junctions are shown below in Figure 9. Beyond this junction, the A371 forms a priority-controlled junction with Banwell Road.

Figure 9: A371 / Elm Tree Road priority junction (left) and A371 / Spine Road signal-controlled junction (right) (© Google)

4.2.11 Less than 400m east of the M5 overpass, the A371 forms two junctions with Summer Lane travelling north to Wolvershill Road and Well Lane travelling south to Banwell Tower and Christon. Both of these are priority junctions join the A371 in a 40mph zone, of which the Summer Lane junction has a narrow pedestrian footway on each side. Ghost islands are present on the A371 for vehicles turning right into Summer Lane or Well Lane, however, they appear faded as shown below in Figure 10.

Figure 10: Well Lane and Summer Lane junctions with the A371 (© Google)

4.2.12 To the east of Banwell, the A371 routes through Winscombe and the A38 beyond. Throughout Winscombe, numerous minor roads form priority T-junctions with the A371. To the west of Winscombe, the A371 forms a junction with Church Road, as shown in Figure 11 below.

Figure 11: Church Road/A371 junction (© Google)

4.2.13 To the west, the A371 narrows when passing under a railway bridge, as shown in Figure 12. Priority signs are provided at both sides of the tunnel, giving priority to westbound road users.

Figure 12: Narrowing of the A371 in Winscombe

4.2.14 In central Winscombe, the A371 Woodborough Road makes a sharp bend which forms junctions with Sandford Road and Hillyfields Way. Sandford Road provides a link to Sandford whilst Hillyfields Way is a no-through road providing access to a free 51-space car park.

4.2.15 To the east of Winscombe, the A371 Sidcot Lane forms a signal-controlled junction with the A38 Bristol Road and A38 Bridgwater Road. A turning area is provided for vehicles turning right onto Sidcot Lane and Fountain Lane (a one-way minor road), as shown in Figure 8.

Figure 13: A38 Bristol Road / A38 Bridgwater Road / A371 Sidcot Lane signalised junction (© Google)

A38

4.2.16 The A38 runs from Taunton to Bristol via Winscombe and Churchill, as shown in Figure 14. The majority of the A38 is a single carriageway road but has some short sections of dual carriageway. The highway provides a direct route to Bristol Airport, accessed via a roundabout with the A38 and North Side Road. Approximately 200m north of this, the A38 forms a signalised junction with Downside Road. There is a committed improvement scheme at this junction as part of the Major Road Network (MRN) improvements.

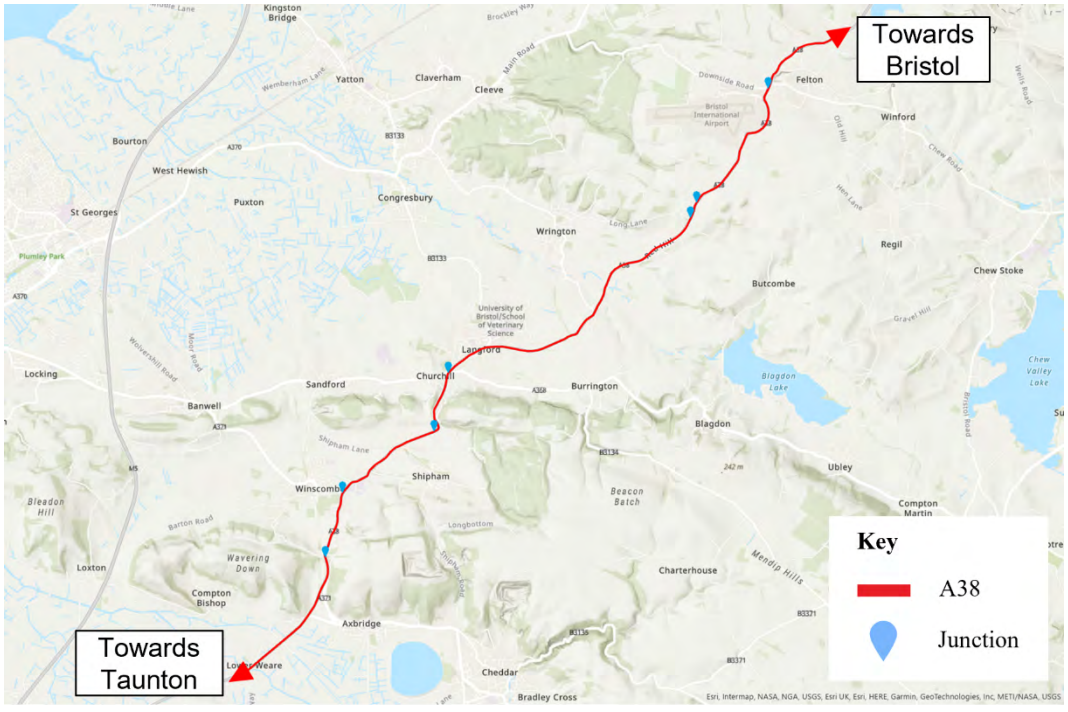


Figure 14: A38 Alignment

4.2.17 In Redhill, the A38 forms two junctions with Church Lane and The Pound. Both junctions are priority T-junctions which join the A38. There are ghost islands provided on the A38 at both junctions for vehicles turning onto Church Lane or The Pound.

4.2.18 To the south, New Road forms a priority T-junction with the A38, adjacent to the exit of a petrol filling station as shown in Figure 15 below. New Road provides access to Shipham and Cheddar to the south.

Figure 15: A38 / New Road priority junction (© Google)

4.2.19 To the south-east of the study area, the A38 Bridgwater Road provides access to south Winscombe via a priority T-junction with Winscombe Hill. A ghost island is provided for vehicles turning right onto Winscombe Hill, as shown in Figure 16. Bus laybys are located adjacent to the junction.

Figure 16: A38 Bridgwater Road / Winscombe Hill junction faded road markings (© Google)

A368

4.2.20 The A368 is a single carriageway road that runs from Banwell village to the A39 at Marksbury, to the west of Bath. It runs through the Churchill Gate Junction and provides access to the settlements of Sandford and Churchill, as shown in Figure 17.

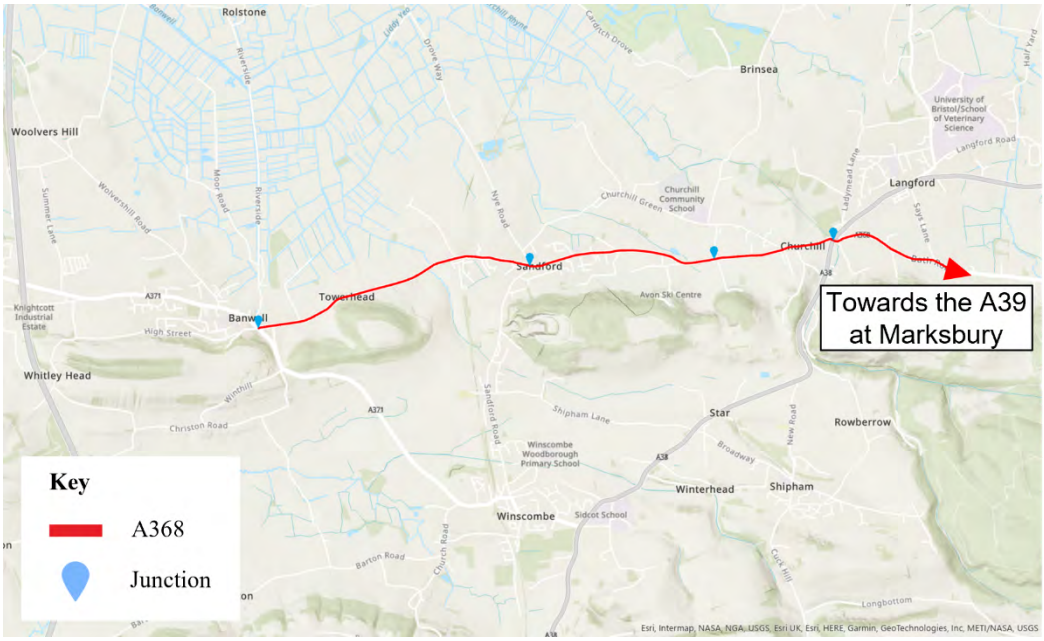


Figure 17: A368 Alignment

4.2.21 Within Banwell, the A368 East Street forms an uncontrolled crossroads with the A371 and High Street. Approximately 125m eats of this junction, Dark Lane forms a priority junction with the A368. Dark Lane is a narrow street with no footways providing access to some residential properties.

4.2.22 The A368/A38 Churchill Gate junction is a large signal-controlled crossroads with signalised pedestrian crossings provided on the east, south, and west arms and advanced cycle lines on the A38 entries, as shown in Figure 18.

Figure 18: A368 / A38 Churchill Gate junction (© Google)

4.2.23 The A368 forms a priority junction Hillier's Lane to the west of Churchill. It is understood that Hillier's Lane is used for school buses associated with Churchill Academy & Sixth Form.

4.2.24 When passing through Sandford village, the A368 intersects Nye Road, which travels to Nye and Puxton to the north, and Hill Road, which provides access to Winscombe. This staggered priority junction is shown in Figure 19 below.

Figure 19: A371 junctions with Hill Road and Nye Road (© Google)

B3440

4.2.25 The B3440 runs from A370 Somerset Avenue, west of the M5 Junction 21, to the B3440/A370/A3033 roundabout in Weston-super-Mare. This road provides access to Worle - a large residential section of Weston-super-Mare - which also includes schools and North Worle retail park. The alignment of the B3440 is shown in Figure 20.

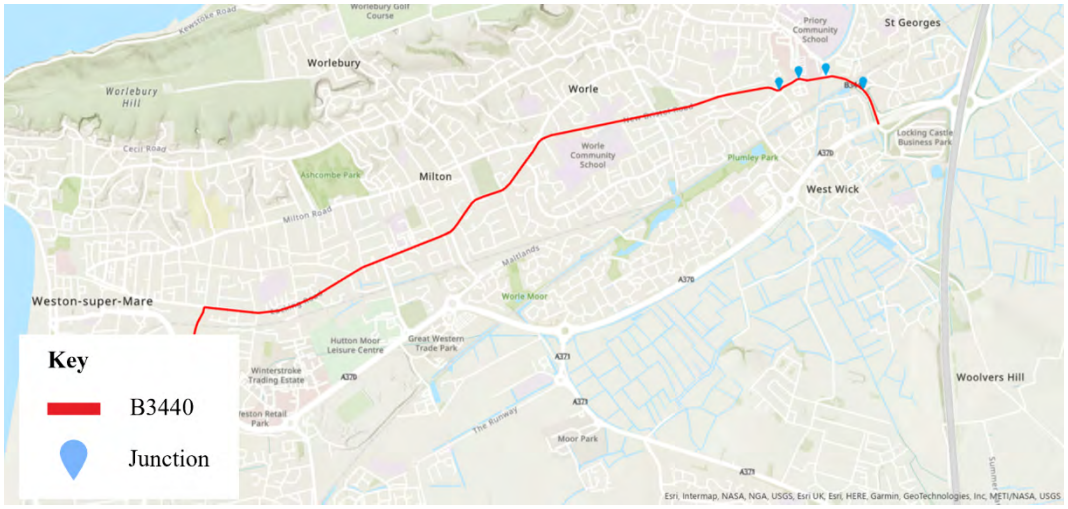


Figure 20: B3440 Alignment

4.2.26 Approximately 200m west of M5 J21, the B3440 Bristol Road merges with the A370. The on-slip from the B3440 onto the A370 is signal-controlled. To the north-east, the B3440 forms a major/minor priority junction with Shepherds Way. A ghost island is provided for vehicles turning right from Bristol Road onto Shepherds Way. North-west of this, the B3440 Bristol Road forms a signalised junction with Queen's Way, as shown in Figure 21. Directly north of this junction, Queen's Way forms a signal-controlled junction with Walford Avenue.

Figure 21: B3440 Bristol Road / Queen's Way signalised junction

4.2.27 Less than 200m west, the B3440 passes through Victory Roundabout and then another roundabout just 150m further west. Victory Roundabout links to Commercial Way which provides access to North Worle Shopping Centre and retail park. Each major arm of this roundabout has two entry lanes two-stage pedestrian crossings.

4.2.28 To the west, the B3440 then forms a roundabout with New Bristol

Road, Park Way, Summer Lane and Appletree Crescent, as shown in Figure 22 below.

Figure 22: B3440/Park Way/Summer Ln/Appletree Crescent Roundabout

M5

4.2.29 The M5 motorway runs from Birmingham to Exeter and runs through the study area to the east of Weston-super-Mare as shown in Figure 23.

Figure 23: M5 Motorway alignment in relation to the study area

4.2.30 Junction 21 of the M5 is accessed via the A370 Somerset Avenue. The A370 runs from Weston-super-Mare to Bristol. The

A370 western arm of the roundabout is unsignalised, with oncoming vehicles giving way at the junction. However, the remaining arms of the roundabout are signalised with additional traffic lights located before each oncoming junction arm as shown in Figure 24.

Figure 24: M5 Junction 21 roundabout signalised intervals

Wolvershill Road

4.2.31 Running from Churchland Way to the A371 in Banwell, Wolvershill Road provides access to Wolvers Hill and Banwell from the A370 Somerset Avenue. It is a single carriageway road with multiple minor roads contributing to it via small priority T-junctions. To the west of the M5 overpass, Wolvershill Road forms a roundabout with Scot Elm Drive and Derek Mead Way. The alignment of Wolvershill Road is shown in Figure 25.

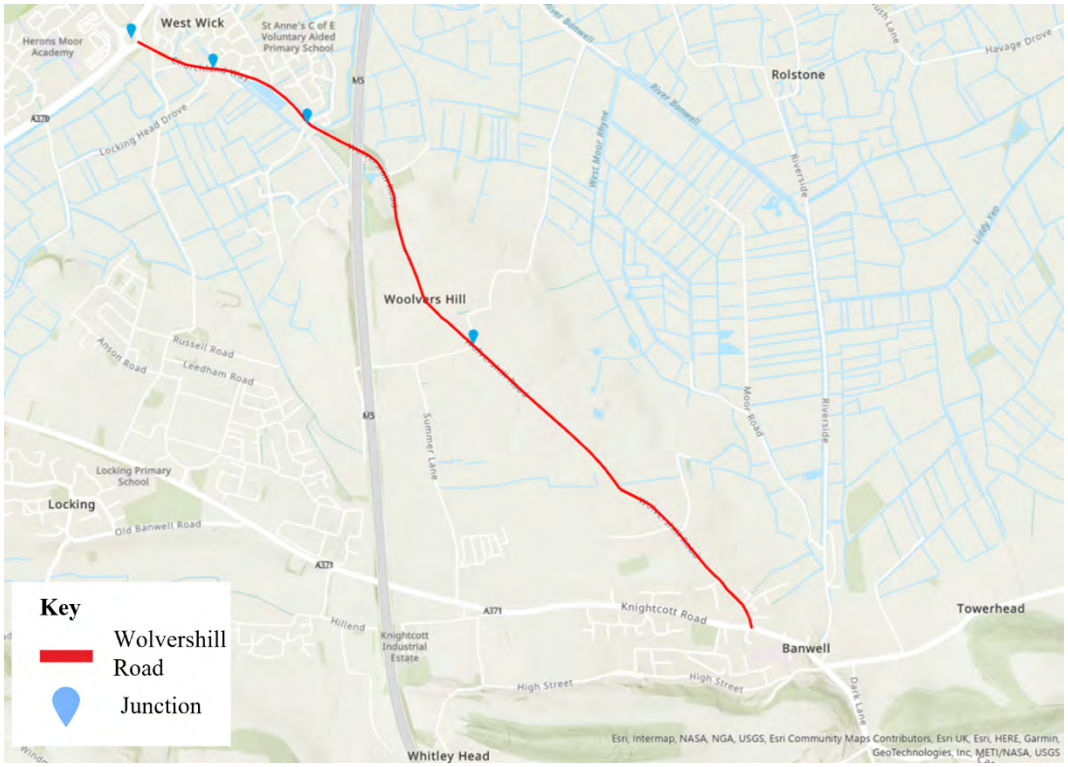


Figure 25: Wolvershill Road alignment and junctions

4.2.32 Providing access to Way Wick and the A371 to Banwell, Summer Lane and Silver Moor Lane both form priority T-junctions with Wolvershill Road. Silver Moor Lane's junction road markings have faded significantly as shown in Figure 26.

Figure 26: Silver Moor Lane (nearer) and Summer Lane

A370

4.2.33 The A370 routes between Weston-super-Mare and Bristol on a NE/SW alignment. Within Weston-super-Mare, the A370 runs through the centre of the town towards East Brent before joining

the A38. Joining the A370 at Uphill Roundabout in the south of Weston-super-Mare, Broadway provides access to the residential areas of Hutton and Locking from the south-west of the study area. 1km east of the roundabout, a mini roundabout connects Broadway to Winterstoke Road, which runs north towards Bournville and the A370 beyond.

4.3 Existing Highway Safety

4.3.1 Collision data has been analysed of the most recent five-year period available between 01 August 2016 to 31 July 2021 within the 5km study area. A collision involves personal injury occurring on the public highway (including footways) in which at least one vehicle is involved, and which becomes known to the police within 30 days of its occurrence. A collision may give rise to several casualties and the severity of a collision is based on the most severely injured casualty. The severities range between:

a) Slight - minor injury or slight shock requiring roadside attention but not requiring hospital treatment;

b) Serious – an injury for which a person is detained in hospital; or

c) Fatal – in which at least one person dies

4.3.2 There were no ‘Damage-only’ collisions within the study area recorded within the data provided by NSC.

4.3.3 The recorded collisions are summarised in Table 1 by 12-month periods. The recorded collisions within a 5km study are also shown spatially in Figure 27 overleaf and detailed in Drawing 1 (drawing ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000013).

Table 1: Summary of collisions and casualties by year

Year	Collisions				Casualties			
	Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
2016/17	1	4	39	**44**	2	5	54	**61**
2017/18	0	7	38	**45**	0	11	49	**60**
2018/19	0	2	46	**48**	0	2	69	**71**
2019/20	1	0	30	**31**	1	0	32	**33**
2020/21	0	2	25	**27**	0	2	34	**36**
Total	**2**	**15**	**178**	**195**	**3**	**20**	**238**	**261**

4.3.4 In total there were 195 collisions recorded within the five-year period, 178 of which were classed as Slight, 15 as Serious and two as Fatal. Out of the total collisions, 117 (60%) collisions involved vulnerable road users, with some collisions involving multiple classes of users. The highest number of vulnerable road user collisions involved persons classed in the OAP group with a total of 36 collisions (18.5% of overall total collisions).

4.3.5 There is a significant cluster of collisions occurring on the A370 and A371. In particular, the St Georges Interchange Roundabout joining the A370 and Somerset Avenue to the M5 has seen 14 collisions, of which 13 involved only motorised vehicles. Similarly, the Airport Roundabout connecting A370/A371/Flowerdown Bridge has seen 17 collisions, of which 15 involved only motorised vehicles. This junction includes relatively good provision for pedestrians and cyclists, with a grade-separated underpass for users travelling north-south.

4.3.6 The crossroads in Banwell connecting West Street/East Street/Castle Hill/High Street crossroads, through to the zebra crossing near the car park has seen a cluster of collisions with seven collisions recorded, of which six have involved pedestrians (all slight). This section of the A371 is very heavily trafficked and has a particularly narrow section of carriageway suitable only for vehicles to travel in one direction at a time, with no footways for pedestrians.

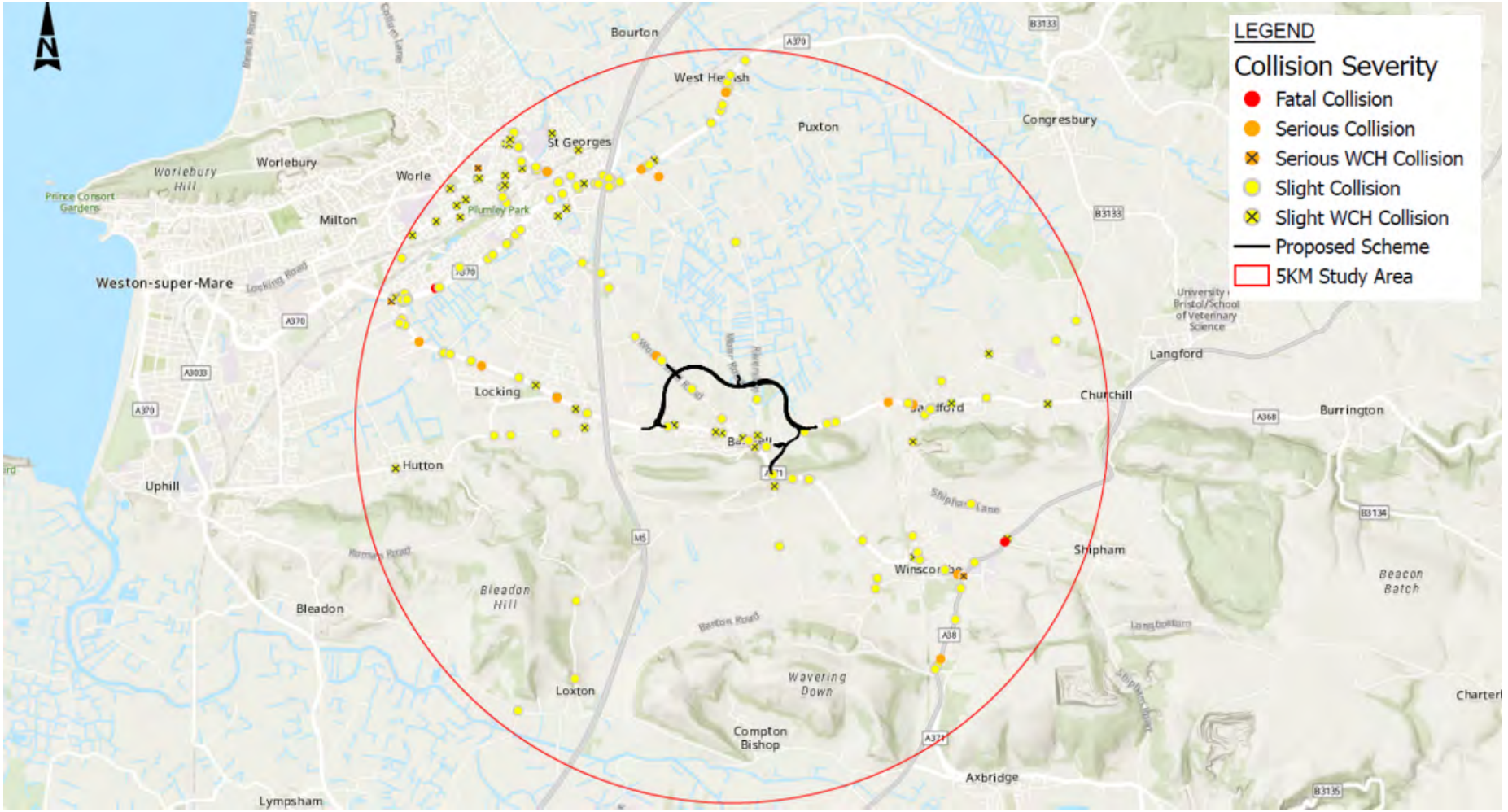


Figure 27: Road Traffic Collisions (2016-2021)

4.3.7 There have been two fatal collisions recorded in the five-year period, of which no collisions involved pedestrians and cyclists. One fatal collision occurred on the A370 Somerset Avenue, approximately 400m east of the Airport Roundabout on 1 September 2019. This collision involved a motorcyclist colliding into the back of a car travelling in the same direction, resulting in the death of the motorcyclist. The second fatal incident occurred on 5 June 2017 on the A370 Bristol Road, off of the Winterhead farm track. The collision involved two vehicles that collided on the bend in the road in wet conditions. This resulted in the two fatalities of a driver and passenger and the other driver was left in a serious condition with life-threatening injuries.

4.3.8 In terms of serious collisions, 15 collisions have been recorded which resulted in a total of 20 casualties. Of these collisions, P2Ws were involved in six, OAPs involved in five, cyclists involved in two, pedestrians in one and a child involved in one. Two of these collisions occurred at the same A371 / Bristol Road / Bridgewater Road junction, one of which involved a cyclist.

4.3.9 The serious collision involving a pedestrian occurred on Clovelly Road, between the junctions of Tavistock Road and Tamar Court. The crash took place in dry conditions on 19 March 2018 where a car collided with a 15-year-old girl crossing the road from between parked cars. In terms of serious cyclist collisions, one occurred on 9 March 2018 on Locking Moor Road, where a vehicle collided with a cyclist crossing the minor arm of the junction towards the cycle path to the south Airport Roundabout. Also, on 30 July 2017 in dry and light conditions at the A38 Bridgwater Road / A371 Sidcot Lane junction near Winscombe, a cyclist was struck by a caravan being towed whilst the vehicle attempted to overtake the cyclist.

4.3.10 In terms of slight collisions, 178 collisions (91% of total collisions) have been reported resulting in a total of 238 casualties. 17 collisions have been clustered on the Airport Roundabout and 14 collisions recorded within 250m of St George's Interchange Roundabout joining the M5. Finally, a pattern of 13 collisions have been recorded along the stretch of Locking Moor Road (three collisions occurring on the junction with Head Drove and three occurring on the junction with Locking Parklands).

4.3.11 Of collisions recorded the A371/Elm Tree Road/Locking Head

Drove junction, one collision was identified to be as a result of heavy mist whilst the others were recorded to be a result of 'poor driver judgement.'

4.3.12 At the A371/Locking Parklands junction, one collision involved a cyclist waiting in the ghost island to turn right onto Locking Parklands. The remaining collisions involved motor vehicles and were recorded to be a result of 'poor driver judgement.'

4.3.13 A cluster of nine slight collisions were recorded at or near Junction 21 of the M5 during the five-year period. None of the collisions involved vulnerable road users including pedestrians, cyclists or motor cycles.

4.4 Walking Facilities

Public Rights of Way

4.4.1 The public rights of way map surrounding Banwell is shown in Figure 30 overleaf. A detailed plan of the wider PRoW network in the 5km study area is included in Drawing 2 (drawing ref: BNWLBP-ARP-VTR-XXXX-DR-TR-000012).

Banwell

4.4.2 The A371 runs through the centre of Banwell, running from Weston-super-Mare to the A38 east of Winscombe. For the majority of the rural sections of the A371 and A368 East Street running through the village, there is a footway on one side of the carriageway only, as shown in Figure 28. This creates an intimidating environment for pedestrians wanting to reach facilities on the opposite side of the carriageway. Opportunities are therefore identified to provide new footways to ensure that safe routes are provided to all bus stops (as a minimum) and other destinations.

Figure 28:Pedestrian facilities on the A371 western approach to Banwell (© Google Maps)

4.4.1 Approaching Banwell village from Weston-super-Mare there are a number of crossing facilities in the form of pedestrian refuge islands. Lighting at refuge islands is present at some crossing points as demonstrated in Figure 29. However, several of these crossing points do not include dropped kerbs, and therefore represent opportunities to improve accessibility for disabled and mobility-impaired road users.

Figure 29: Pedestrian crossing refuge island on A371 (© Arup)

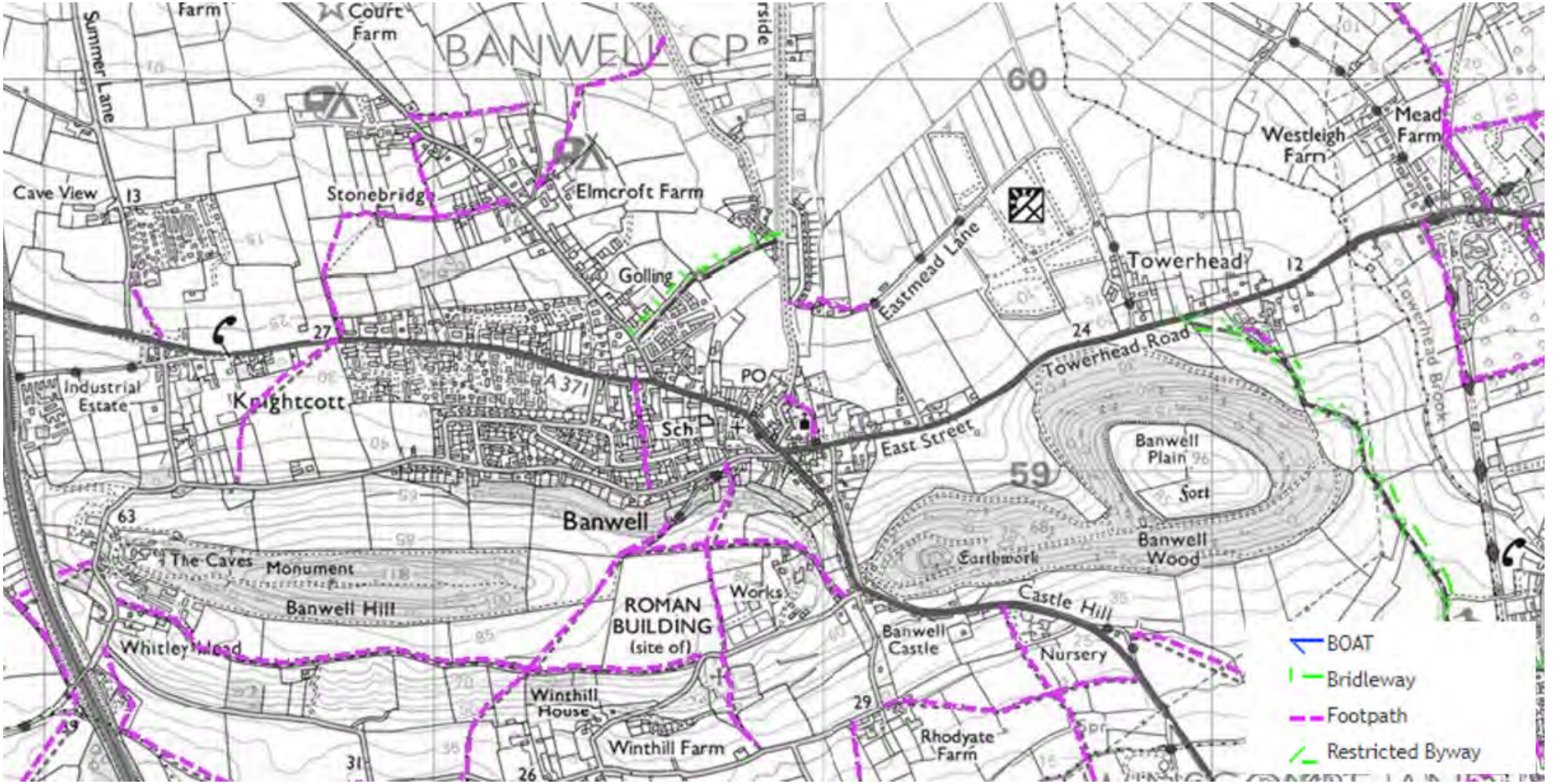


Figure 30: Public rights of way network (© NSC Definitive Map)

4.4.2 The urban section of the A371 through Banwell has limited crossing facilities for pedestrians with the longest spacing between two crossing points at 500m apart. Pedestrian crossing facilities in the urban setting consists of zebra crossings, with belisha beacons, road zebra demarcation, and tactile paving for the visually impaired as shown in Figure 31.

Figure 31: Zebra crossing facility in Banwell on the A371

4.4.3 The existing conditions of the pedestrian facilities in Banwell is generally good, however some areas of vegetation overgrowth were noted. These should be regularly maintained to prevent them from blocking pedestrian footways.

Sandford

4.4.4 The A368 runs through the village of Sandford from the east of Banwell to the A39 south-west of Bath. For the majority of the A368 around Sandford there is a footway on both sides of the carriageway. There is one signalised pedestrian crossing facility (pelican crossing) with demarcation and tactile paving for the visually impaired located within the village centre. An additional crossing facility (toucan crossing) is located on the western end of Sandford which facilitates crossing of the A368 for users of the Strawberry Line (National Cycle Route 26).

4.4.5 The pedestrian facilities that are available in Sandford were generally in good condition. However, a ‘missing link’ in the footway network has been observed near the Railway Inn public house (by the Thatchers Brewery.) This section of the A368 is shown in Figure 32 and would benefit from a short length of footway to be constructed to result in a continuous pedestrian link

along the northern side of the A368 from the Thatchers public house into Sandford village. This is being reviewed by NSC, separate to this Scheme.

Figure 32: Missing link in the footway on the A368 Station Road (© Google Maps)

Churchill

4.4.6 The A368 continues to run through Churchill from Sandford as Dinghurst Road, where there is generally a lack of pedestrian facilities along the majority of the road in both directions. Tall stone walls and vegetation from properties extend right up to the edges of the carriageway creating obstruction for active travellers.

4.4.7 Furthermore, Churchill Gate junction is a four-arm signal-controlled junction to the east of Churchill. There are existing footways on both sides of the west arm of the junction. At the west arm of the junction, a signalised two-stage crossing with tactile paving and safety barriers is provided as shown in Figure 33.

4.4.8 Additionally, the A368 east arm of Churchill Gate junction has an uncontrolled two-stage pedestrian crossing with a refuge island in the middle of the carriageways. Also, the south arm has a two-stage signalised pedestrian crossing with tactile paving and safety railings with connecting footways. These footways continue along the residential area of New Road, with the eastern side footway continuing towards the villages of Star and Rowberrow. It should be noted that there are no crossing facilities

for pedestrians to cross the A38, directly north of the junction.

Figure 33: Pedestrian facilities on the west arm of the A38 Churchill Gate junction

Winscombe

4.4.9 Signal-controlled crossing at the A371 Sidcot Lane / A38 junction along with a pedestrian refuge island on the southern arm of the crossroads. No pedestrian crossing is provided on the A38 northern arm of the junction. From this junction, a footway on the northern side of the A371 runs continuously into central Winscombe (only interrupted by minor road T-junctions) and the footway on the southern side of the A371 continues for approximately 150m after the A371 / A38 junction. However, no pedestrian crossing is provided to cross to the northern footway when the southern footway terminates.

4.4.10 Throughout central Winscombe, footways are provided on both sides of the A371. A pedestrian zebra crossing is present immediately north of the Apple Tree Drive / A371 junction as shown in Figure 34.

Figure 34: Pedestrian zebra crossing in central Winscombe (© Google)

4.4.11 Towards the west of Winscombe, opposite the A371 / Church Road junction, the footway on the southern side of the A371 terminates, and the footway on the northern side narrows considerably as shown in Figure 35. Next to the Triangle bus stop, the northern footway is also interrupted by two gate entrances to adjacent fields and is in poor condition with an uneven surface and overgrown grass verges.

Figure 35: Narrow footway on the A371 west of Winscombe

M5 Junction 21

4.4.12 A footway is currently provided along the gyratory of the M5 junction 21. However, the footway is narrow and vehicular flows are heavy, therefore leading to an unpleasant walking experience when using the footway. To the west, there are no onward routes for pedestrians beyond the A370. Whilst multiple culverts pass under the M5, they only serve utility connections with no current access to the general public.

4.5 Cycling Facilities

4.5.1 The key cycle routes within the study area and an assessment of their suitability for use by cyclists is shown below in Figure 36.

Banwell

4.5.2 There is no dedicated cycle infrastructure within / surrounding Banwell separate from the local highway network. Figure 36 (below) displays an assessment of the suitability of the Local Road Network for use by cyclists as determined by NSC.

4.5.3 To the west of Banwell, there is a segregated route being delivered between Weston-super-Mare and the M5 overbridge at Locking. With the removal of traffic from Banwell village centre when using a bypass, an east-west cycling route through Banwell, could provide an attractive, safe, and direct continuation of the A371 Weston outskirts to Banwell proposal.

Sandford

4.5.4 There is a National Cycle Route 26 called Strawberry Line which runs west of Sandford providing connectivity in a north-south direction from Yatton to Cheddar, as shown in Figure 37. National Cycle Route 33 is also shown, which is located within the very western extents of the 5km wider study area.

4.5.5 In addition, there are a number of local cycle routes in the vicinity of focussed and wider Scheme study area.

4.5.6 A route continuation of the A371 Weston outskirts to Banwell development through Banwell would provide additional connectivity between Weston and the Strawberry Line and would provide a strategic connection between NCN 26 and NCN 33. Additionally, the Scheme will provide a route adjacent to the proposed Bypass.

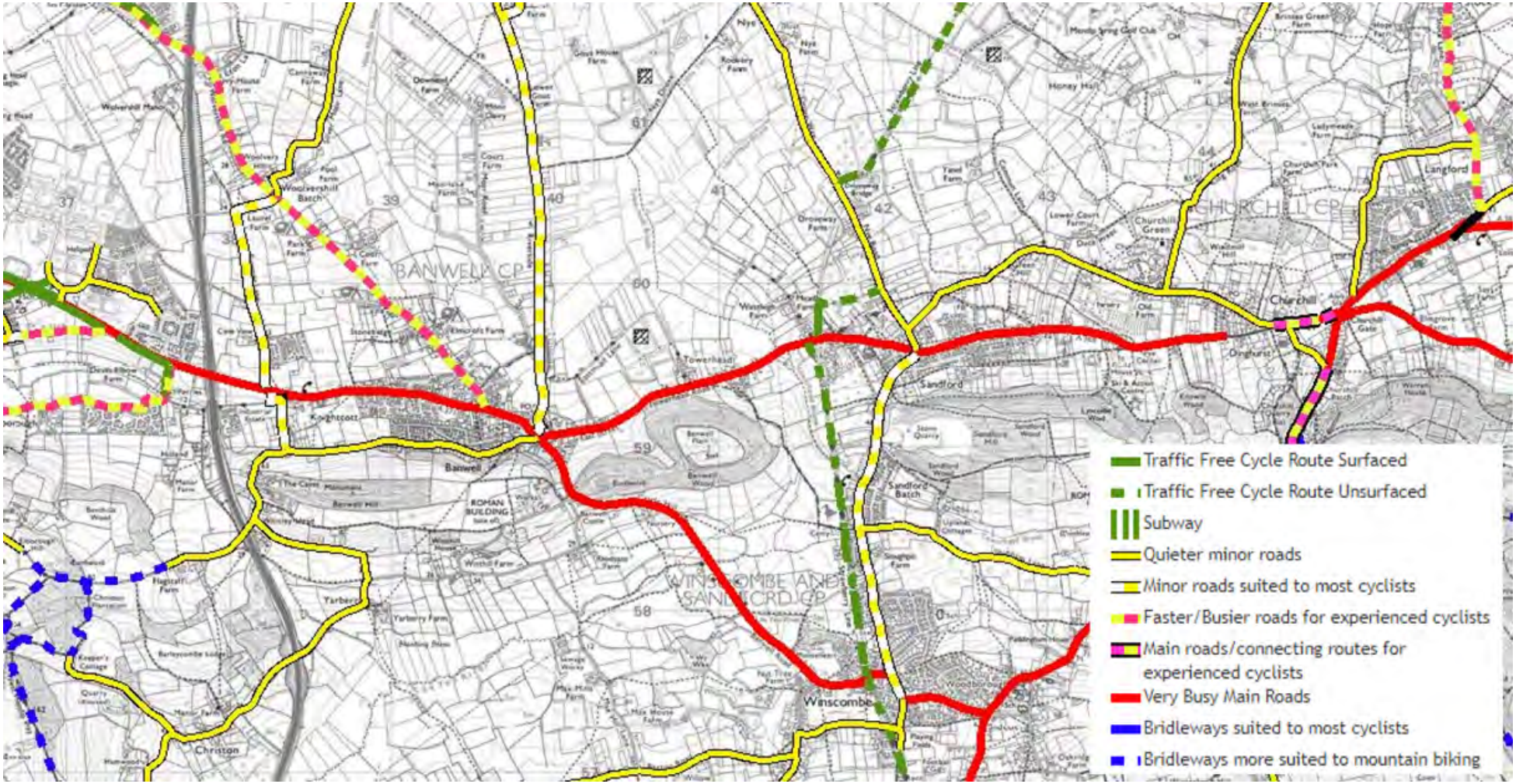


Figure 36: Cycling routes around the study area (© NSC Cycle Route Map)

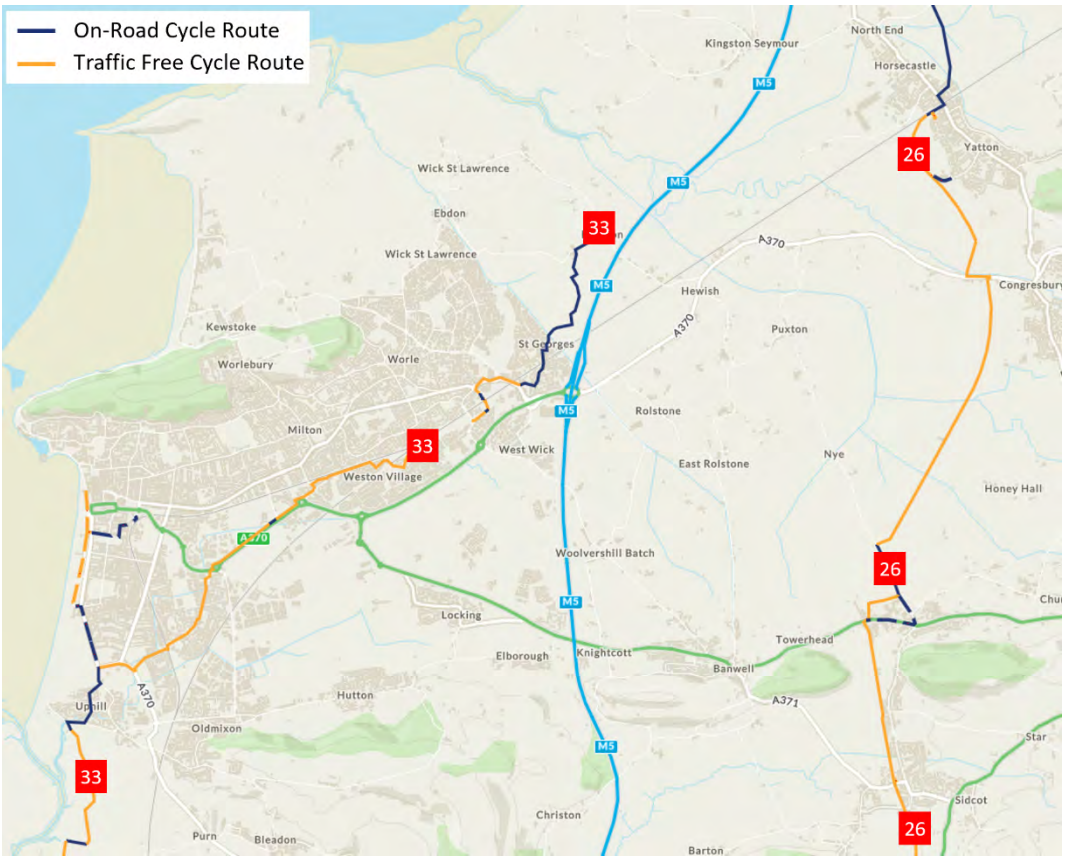


Figure 37: Extract of Sustrans map of National Cycle Network within the study area (© Ordnance Survey)

Churchill

4.5.7 There are no dedicated cycle routes in close vicinity of Churchill. At Churchill Gate Junction there are Advanced Stop Lines by the traffic light system to give priority and space to cyclists using the A38 (northern and southern arms) as shown in Figure 38.

4.5.8 There are no Advanced Stop Lines on the other approach arms to the other two arms, namely western arm from Dinghurst Road and the eastern arm from the A368, illustrated in Figure 38.

Figure 38: Cycle facilities at Churchill Gate Junction (© Arup)

4.5.9 There are committed improvements to cycle provision on the A38 in Churchill as part of the MRN scheme. This includes the creation of a footway and cycleway through the realignment of kerb lines.

Winscombe

4.5.10 The National Cycle Route 26 runs through Winscombe providing connectivity in a north-south direction from Yatton to Cheddar.

4.5.11 At the A371 Sidcot Lane / A38 Bristol Road junction there are Advanced Stop Lines at the traffic lights to give priority and space to cyclists travelling from Sidcot Lane as displayed in Figure 39.

4.5.12 At this junction, there are also Advanced Stop Lines for cyclists at each arm of the junction, excluding Fountain Lane. However, Fountain Lane is a one-way road and therefore will not have cyclists travelling from Fountain Lane towards the junction.

Figure 39: Cycle facilities on the A371 east of Winscombe at the A371 and A38 junction

M5 Junction 21

4.5.13 A shared use cycle/footway is provided on the Junction 21 on the north circulatory carriageway. The footway continues onto the A370 as shown in Figure 35 and stops ahead of the junction with a side road leading to Haybow Farm. Cycle facilities beyond that point are demarcated on the shared A370 carriageway.

4.5.14 There are existing cycling facilities in the form of a demarcated off-carriageway cycle track over the J21 southbound off-slip onto the A370 and through most of the carriageway coming from

Weston Super-Mare as shown in Figure 40.

4.5.15 Figure 40 also shows a shared use path which has been severely overgrown with vegetation and is in need of maintenance. This footway serves as a connection to the local cycle route towards Haybow Farm from the crossing at J21 Southbound off-slip. The cycle provision is considered at this junction given the traffic speeds, volume and lack of separation and crossing facilities.

4.5.16 However, rather than cross at the motorway Junction, cyclists may well use the nearby National Cycle Network (NCN) Route 33 along the western side of the M5 motorway and cross over the motorway along Wick Road. This is considered a safer and more attractive route for cyclists, although it is not as direct as crossing via the Junction 21 gyratory.

Figure 40: Cycle Facilities at Junction21 of the M5 (© Google)

4.6 Equestrian Facilities

4.6.1 A range of equestrian facilities are known to be located within or just outside the study area, including the Banwell Equestrian Centre[17], as shown in Figure 41 below.

Figure 41: Location of Banwell Equestrian Centre (© Google Maps)

4.6.2 The area is known to be popular amongst equestrian users, particularly to the north of Banwell, where horse riders were observed using Silver Moor Lane during the site visit.

4.6.3 Goding Lane appears to be a well-used bridleway with good equestrian facilities. Goding Lane is believed to be used as part of a circular equestrian route linking Wolvershill Road and Riverside.

4.6.4 Another popular equestrian route, based on observations from the site visit, appears to be the restricted byway connecting Towerhead Road and Ilex Lane (Sandford) which runs along the eastern edge of Banwell Fort hilltop.

4.7 Public Transport

National Rail

4.7.1 The Great Western Railway is located within the 5km study area. The nearest train station (Worle) is located north west of Banwell, west of M5 Junction 21. Worle station is located in a residential area of Weston-super-Mare, approximately 3.5miles (5.6km) by road from Banwell.

4.7.2 The station provides travel between Weston-super-Mare, Taunton to the south and Bristol routes to the east.

4.7.3 Methods of travel to the train station from Banwell mainly include private car and taxi. There are no existing designated pedestrian or cycle facilities for the majority of the route, however Wolvershill Road does provide a relatively direct route from Banwell for those who may choose to cycle.

4.7.4 The average uncongested journey time by car from Banwell to Worle Station is 10-13mins, dependent on route taken. Journey time by bike is approx. 18-22 minutes, and journey time by walking is approximately 1 hour 10 minutes. All journeys would be via Wolvershill Road.

4.7.5 Whilst not within the immediate 5km study area, Weston-super-Mare station and Weston Milton train stations are within close proximity. Weston-super-Mare train station is the terminus point for most local bus services that route through Banwell (see Table 2). This is important for strategic public transport connectivity and as such, this train station may be the preferred station for use by many within the study area.

Coach Services

4.7.6 The South West Falcon[18] is a long-distance interurban coach service that connects Plymouth, Exeter, Cullompton, Wellington and Taunton with Bristol Airport and Bristol city centre. Launched in 2016, it is the first and only public transport link from the South West to Bristol Airport and operates 19 journeys a day, 7 days a week.

4.7.7 Several stopping points are located within the 5km study area along the A38 (primarily within Winscombe and at Churchill Gate & Langford.)

Bus Services

Overview

4.7.8 There are four bus services operating along the A371 around Banwell. All of those services run from Weston-super-Mare to the west of the village until the junction with Castle Hill where service 51 continues on the A371 towards Sidcot and the other three run the along the A368 towards Churchill. Service 51S runs from Winscombe along Sandford Road and along Dinghurst Road towards Churchill. An additional service (128) runs through the eastern end of the study area with stops at Churchill Gate Junction. Table 2 summarises the local bus services operating within the study area. These services are presented in Drawing 3 (Drawing Ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000014).

Table 2: Summary of Local Bus Services

Service No.	Service Operator	Route	Weekday Frequency
51[19]	Stagecoach West (SCGL)	Weston-super-Mare - Langford	Every 2-3 hours
51S[20]	Stagecoach West (SCGL)	Winscombe, Browns Corner – Sandford, Church – Churchill, Ski Centre	Once a day (school)
62[21]	Bakers Dolphin	Weston-super-Mare – Banwell – Rooksbridge - Bridgewater	Once a day (school)
126[22]	First Bristol, Bath & the West	Weston-super-Mare – Wells via Locking, Winscombe, Axbridge, Cheddar	Every 60 minutes
128[23]	Citistar	Bishop Stutton - Clevedon	Once a day
134[24]	Citistar	Stanton Drew – Bishop Sutton – West Harptree – Weston Harptree – Weston Super Mare	Once a day

4.7.9 A high number of school buses serving the Churchill Academy & Sixth Form have been observed to utilise Hillier's Lane as a waiting area. No dedicated bus provision is available on this road, and so appeared significantly congested during the peak school periods due to pick-up/drop-off activity.

Banwell

4.7.10 Bus stops are located at multiple, regular points along the A371/A368. Passenger facilities at each stop vary in terms of provision of shelter, laybys, timetables, and other key features. The waiting facilities within Banwell village are summarise in Table 3.

Table 3: Bus stop facilities (in the vicinity of Banwell)

Location	Provision					Services
	Layby	On-carriageway demarcation	Flagpole	Time-table	Shelter	
A371 Summer Lane (E/B & W/B)		X	X		X	51, 62, 126 & 134
A371 Boulters (E/B)		X	X			51, 62, 126 & 134
A371 Boulters (W/B)	X	X	X		X	51, 62, 126 & 134
A371 Knightcott Gardens (E/B & W/B)			X			51, 62, 126 & 134

Location	Provision					Services
	Layby	On-carriageway demarcation	Flagpole	Time-table	Shelter	
A371 Knightcott Park (E/B)			X	X	X	51, 62, 126 & 134
A371 Knightcott Park (W/B)			X	X	X	51, 62, 126 & 134
A371 Westfield Crescent (E/B & W/B)		X	X	X	X	51, 62, 126 & 134
A371 The Orchard (E/B)		X	X			51, 62, 126 & 134
A371 The Orchard (W/B)		X	X	X	X	51, 62, 126 & 134
A368 Dark Lane (E/B &W/B)			X			62, 126 & 134
A368 Towerhead Farm (E/B)			X			62, 126 & 134

4.7.11 Figure 42 shows a westbound bus stop along the A371 showing a lay-by, shelter, demarcation, and a flag post.

Figure 42: Existing bus stop - western extent of Banwell (© Arup)

Along the A368

4.7.12 Passenger facilities at each stop vary in terms of provision of shelter, laybys, timetables, and other key features. These facilities are summarised in Table 4.

Table 4: Bus stop facilities (around Sandford and Churchill)

Location	Provision					Services
	Layby	On-carriageway demarcation	Flagpole	Timetable	Shelter	
A368 Ski Centre (E/B)	X		X			51, 51S, 62 & 134
A368 Ski Centre (W/B)			X	X		51, 51S, 62 & 134
A368 Hilliers Lane (E/B)			X			51, 62 & 134
A368 Hilliers Lane (W/B)			X	X	X	51, 62 & 134
A368 Nelson's Arms (E/B & W/B)			X			51, 62 & 134
Hill Road - Sandford Church		X	X	X	X	51, 51S & 126

4.7.13 Figure 43 shows the existing eastbound flag and pole bus stop on Dinghurst Road, opposite the Nelson Arms public house, to the east of the proposed local highway improvements.

Figure 43: Existing flag and pole at Nelson Arms Bus Stop, Churchill (© Google Maps)

Churchill Gate Junction

4.7.14 The public transport facilities in the close vicinity of Churchill Gate junction where improvements are being proposed are summarised in Table 5.

Table 5: Bus stop facilities at Churchill Gate junction

Location	Provision					Services
	Layby	On-carriageway demarcation	Flagpole	Timetable	Shelter	
A38 Churchill Gate	X		X	X		Falcon, 51 & 128
A38 Churchill Gate	X	X	X	X	X	Falcon, 51 & 128
A368 Bath Road (W/B)	X		X	X		128 & 134
A368 Bath Road (E/B)	X					128 & 134

4.7.15 Figure 44 shows a bus stop with a lay-by, raised bus boarder, demarcation, flagpole, shelter, and timetable facilities in the vicinity of the Churchill Junction.

Figure 44: Existing bus stop – Churchill junction (© Google Maps)

Winscombe

4.7.16 Public transport facilities in the vicinity of Winscombe are summarised in Table 7.

4.7.17 The condition of the majority of bus stop facilities around the village of Winscombe varies for the most part and consist of carriageway demarcation, a shelter, a timetable, and a flagpole. Figure 45 shows the facilities at A371 The Triangle (westbound). Online data indicates the existence of a bus stop facility in the eastbound direction at the same location, however there are no indications of the existence of a bus stop. The same is true for the eastbound bus stop at Sidcot Lane (Belmont Road).

Figure 45: Bus stop facilities at A371 - The Triangle, Winscombe (© Google Maps)

Table 6: Bus stop facilities around Winscombe

Location	Provision					Services
	Layby	On-carriageway demarcation	Flagpole	Timetable	Shelter	
South Croft - Quarry Road (N/B & S/B)		X	X	X	X	51, 51S, 126
Sandford Road - Wimblestone Road (N/B)			X	X	X	51, 51S, 126
Sandford Road - Wimblestone Road (S/B)			X			51, 51S, 126

Location	Provision					Services
	Layby	On-carriageway demarcation	Flagpole	Timetable	Shelter	
Sandford Road - The Grove (N/B)		X	X			51, 51S, 126
Sandford Road - The Grove (N/B)		X	X	X		51, 51S, 126
Sandford Road - Moorham Road (N/B & S/B)		X	X	X	X	51, 51S, 126
Sandford Road – Browns Corner (N/B & S/B)		X	X	X	X	51, 51S, 126
A371 Woodborough Road – The Triangle (W/B)	X		X			51
A371 Woodborough Road – The Triangle (E/B)						51
Sidcot Lane – The Chestnuts (E/B & W/B)			X			126
Sidcot Lane – Belmont Road (E/B)			X			126
Sidcot Lane – Belmont Road (E/B)						126

Summary

4.7.18 Whilst Worle railway station is the closest to Banwell, there is a lack of good walking & cycling infrastructure and public transport connectivity to this station. Weston-super-Mare and Weston Milton railway stations may be the favoured stations to use due to the local bus service connectivity.

4.7.19 Local bus services are relatively infrequent which may discourage travel by public transport. Furthermore, the condition

of local bus facilities within the study area varies considerably. Improvements to some of the facilities and infrastructure, as well as more frequent bus services, may promote the further use of the local bus network.

4.8 Summary

4.8.1 The A371 through Banwell, along with the A368, provide strategic routes between Weston-super-Mare to the west and Winscombe, Cheddar and Wells in the southeast, Bath to the east and Bristol in the northeast (via the A38). Sections of the A371 through Banwell reduces down to a single lane of traffic, resulting in congestion, journey time delays, and uncertainty.

4.8.2 Within a 5km study area, the majority of collisions occurred to the west of the M5 in Weston-super-Mare and Worle, with two junctions experiencing clusters of collisions involving motorised vehicles (St George's Interchange and Airport Roundabout). Within Banwell, a cluster of collisions on the A371 between the West Street/East Street/ Castle Hill/0High Street crossroads and the zebra crossing, with six collisions involving slight injuries to pedestrians. This section of the A371 is a particularly narrow section, with no footways for pedestrians, and will be significantly benefitted as a result of the Scheme. No significant clusters of collisions have been identified within Sanford, Churchill or Winscombe.

4.8.3 Walking facilities throughout the Scheme area shows trends of missing links and areas of footpaths that are in poor condition. For example, the majority of rural sections of the A371 and A368 have a footpath on only one side of the carriageway with limited crossing points, therefore creating an intimidating environment to pedestrians trying to cross the road to reach facilities on the other side. However, the limited crossing points provided on these rural sections are in the form of a pedestrian refuge island without a dropped kerb, raising inclusivity concerns for disabled and mobility-impaired road users. It should be noted that in particular, Churchill considerably lacks walking facilities. There is also a trend of overgrown vegetation and poor condition footways throughout the study area.

4.8.4 The Scheme area generally lacks designated, traffic-free cycle

routes. The Strawberry Line is the only National Cycle Network route within the study area but has poor accessibility and is not suitable for year-round use. However, the route provides a good link to Weston-supper-Mare and NCN Route 33. The majority of signalised junctions in the study area have advanced stop lines for cyclists, but road speeds and traffic volumes are not conducive to cycling.

4.8.5 In terms of public transport, Worle railway station provides links to Weston-super-Mare, Taunton and Bristol and can be reached within a 10-13 minute drive or a 18-22 minute cycle. However, there are no designated pedestrian or cycle facilities to the station. This may encourage many people to travel to Worle station by car or taxi. Weston-super-Mare and Weston Milton railway stations may be the favoured stations to use due to the local bus service connectivity.

4.8.6 Four bus services serve Banwell which provide access to Weston-super-Mare, Sidcot, Churchill, Winscombe, Bridgwater, and Langford using the A371 and A368 in their routes. However, these routes are infrequent which may discourage public transport use. In terms of bus stop facilities, the study area varies considerably with some bus stops only having a flag pole, and others providing all facilities. It should also be noted that Churchill Academy & Sixth Form school buses use Hillier's Lane as a waiting area, which has no dedicated bus provision, therefore causing congestion.

5 Existing Travel Demand

5.1 Introduction

5.1.1 This section presents a summary of the existing travel demand on the surrounding transport network. This has been used as a basis for quantifying the potential future changes associated with the proposed development

5.2 Study Area

5.2.1 The study area for this Transport Assessment is presented in Figure 46 below and includes 28 existing and committed junctions. The study area has been agreed following collaborative dialogue with NSC HDM and National Highways and informed by a traffic impact assessment.

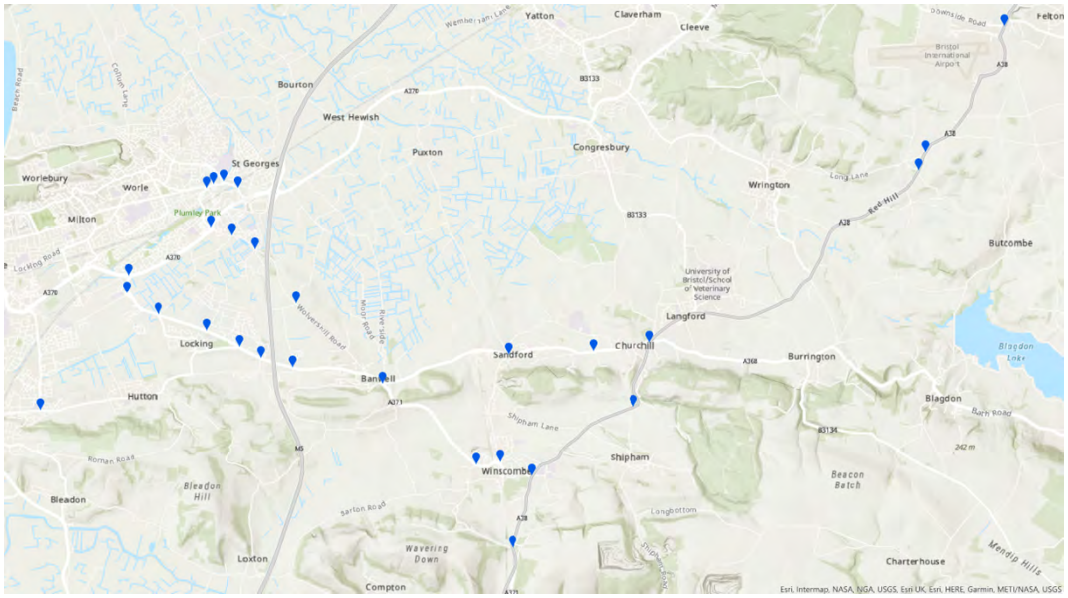


Figure 46: Transport Assessment Study Area

5.2.2 The study includes the following:

a) Junction 1: A371 West Street/A368 East Street/High Street

b) Junction 2: Wolvershill Road/Silver Moor Lane/Summer Lane

c) Junction 3: A371 Knightcott Road/Summer Lane/Well Lane
d) Junction 4: A368 Station Road/Hill Road/Nye Road
e) Junction 5: A368 Dinghurst Road/Hillier's Lane
f) Junction 6: A368/A38 Churchill Gate
g) Junction 7: A38/New Road
h) Junction 8: A38 Bridgewater Road/A371 Sidcot Lane/Fountain Lane
i) Junction 9: A371 Banwell Road/Church Road
j) Junction 10: A371 Woodborough Road/Sandford Road/Hillyfields Way
k) Junction 11: A38 Bridgewater Road/Winscombe Hill
l) Junction 12: B3440 Bristol Road/Shepherds Way
m) Junction 13: B3440 Bristol Road/Queen's Way
n) Junction 14: B3440 New Bristol Road/Commercial Way Victory Roundabout
o) Junction 15: B3440 New Bristol Road/Park Way/Summer Lane/Appletree Crescent
p) Junction 16:Wolvershill Road/Scott Elm Drive/Derek Mead Way
q) Junction 17: Churchland Way/Spine Round (Committed Scheme)
r) Junction 18: A370 Somerset Avenue/Churchland Way/Elmham Way West Wick Roundabout
s) Junction 19: A370 Flowerdown Bridge/A371 Locking Moor Road/Moor Lane Airport Roundabout
t) Junction 20: A371/The Runway/Beaufighter Road Runway Roundabout
u) Junction 21: A371/Banwell Road
v) Junction 22: A371/Old Banwell Road
w) Junction 23: A371/Spine Road
x) Junction 24: A371/Locking Head Drove/Elm Tree Road
y) Junction 25: Broadway/Winterstoke Road
z) Junction 26: A38 Redhill/The Pound
aa) Junction 27: A38 Redhill/Church Lane

bb) Junction 28: A38/Downside Road

5.3 Traffic Survey Data

5.3.1 This section details the traffic survey data that has been collected to inform the strategic highway model for North Somerset and junction models.

Strategic Highway Model

5.3.2 A strategic highway assignment model of North Somerset has been developed. It is an enlarged and refined version of a previous SATURN model that was developed for the Banwell HIF bid. It was originally developed as a cordon from National Highway's South West Regional Transport Model (SWRTM) but has now become a standalone model with its own external network and zone system.

5.3.3 The Area of Detailed Modelling (ADM) is shown in Figure 47 and covers North Somerset and part of the neighbouring district of Sedgemoor. In this area all highway trips are fully represented, and the network is coded as detailed simulation coding (e.g. individual turning movements modelled at junctions).

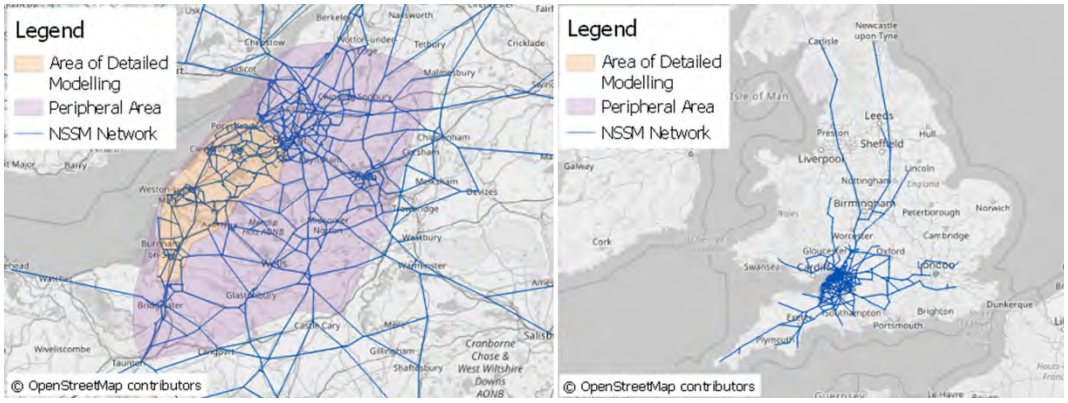


Figure 47: Strategic Highway Model Extent

5.3.4 Outside the ADM is the 'peripheral' area, which covers the neighbouring local authority areas: Bristol, South Gloucestershire, Bath and North East Somerset, Mendip and the remaining area of Sedgemoor. Within this area, the demand is also fully represented but the network is buffer coding with fixed link speeds. The ADM and peripheral area together make up the Fully Modelled Area (FMA). In TAG[25] the peripheral area is also

referred to as the 'Rest of the Fully Modelled Area'.

5.3.5 Beyond the Fully Modelled Area is the external area, which covers the rest of the UK with a very simplified radial network that only includes key routes used to access the FMA. Trip demand in the external area of the model only includes trips that pass into, out of or through the Fully Modelled Area.

5.3.6 The zone system is derived from the SWRTM zone system, with additional disaggregation of zones in the Area of Detailed Modelling and aggregation of zones in the External Area. The zone system in the peripheral area is largely unchanged from the SWRTM zone system except for some disaggregation in central Bristol to facilitate accurate traffic routing.

5.3.7 Automated Traffic Count (ATC) and Manual Classified Count (MCC) data was provided by NSC, Somerset County Council (SCC) and Sedgemoor District Council (SDC). Count data for the M5 was retrieved from the National Highways WebTRIS online system. Some additional manual classified counts were retrieved from the Department for Transport Road Traffic Statistics database. The location of junction and links where existing traffic count data is available is illustrated in Figure 48 below.

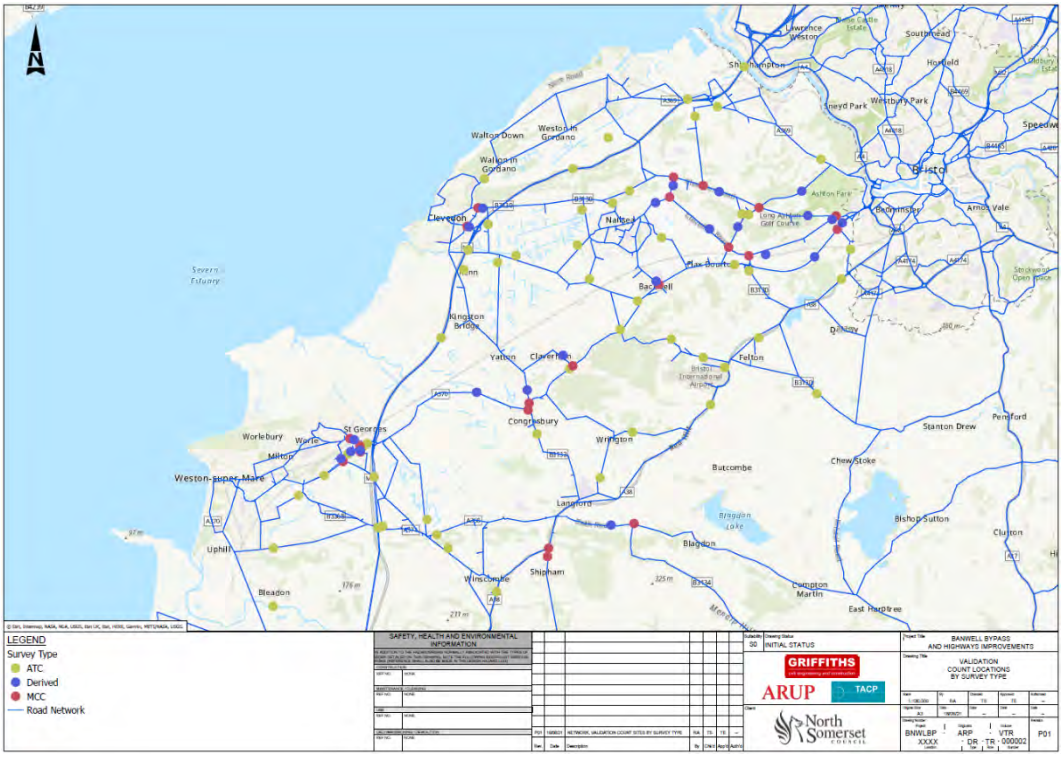


Figure 48: Existing Traffic Count Data used for Model Validation

5.3.8 A series of Automatic Traffic Counts (ATCs) and Manual Classified Counts (MCCs) have been undertaken previously by NSC. These surveys are either ongoing traffic counts or were carried out in 2018 and are therefore likely to be representative of normal traffic flows in recent years.

5.3.9 The core assessment within this TA is based on pre-COVID19 conditions to represent 'normal' traffic conditions. Whilst it is noted that there may be potential long-term changes in terms of people's travel patterns as a result of previous travel restrictions and associated changes in behaviour, assessing the impacts of pre-COVID19 traffic (i.e. prior to March 2020) will allow any impact assessments to be based on a robust and worst-case assessment.

5.3.10 A summary of the 2018 base AADT traffic flows in the study area are set out in Table 7 below.

Table 7: AADT Base Flows

Location	Direction	2018 Base Year (AADT)
A371 West of Banwell Road (Locking)	Eastbound	5115
	Westbound	4558
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	6652
	Westbound	6214
Wolvershill Road North of Bypass	Northbound	2469
	Southbound	2431
Riverside North of Banwell	Northbound	1215
	Southbound	1464
Southern Link West of Banwell Junction / Castle Hill	Northbound	3662
	Southbound	3621
Hill Road South of A368 (Sandford)	Northbound	1034
	Southbound	903
A368 West of A38 (Churchill)	Eastbound	4823
	Westbound	4373
A371 West of Sandford Road (Winscombe)	Eastbound	1973
	Westbound	2243
Church Road (Winscombe)	Northbound	1511
	Southbound	1739
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	3912
	Westbound	3740

5.3.11 As identified in the table above, there are high volumes of traffic recorded along key routes through Banwell, including the A371 and the A368. Combined with the narrowing on the A371, journey times through Banwell are considerable, as set out in Table 7.

5.3.12 As summarised in the table below, the journey time between the A371 Summer Lane junction and the A368 varies between 07:26 and 10:03. For a section of road under 2.5km, this represents significant existing delay.

Table 8: Recorded Journey Times

Route	Direction	AM Peak Hour (mins)	PM Peak Hour (mins)
A371 - Laneys Drove roundabout to Summer Lane Junction	Eastbound	02:23	02:22
	Westbound	02:23	02:19
Banwell Bypass (A371 Summer Lane Junction to A368 Towerhead)	Eastbound	10:37	08:55
	Westbound	07:26	10:03
A368 (Towerhead) to A38 (Churchill Gate)	Eastbound	07:05	08:13
	Westbound	05:32	05:38
A371 (Castle Hill) to A38 (Sidcot Junction)	Eastbound	04:14	04:37
	Westbound	03:19	03:24

Junction Capacity Assessments

5.3.13 To validate the junction models, all existing junctions were resurveyed in 2022 to collect turning count and queue length data. Manual Classified Count (MCC) data was collected on Thursday 17th February 2022 for the periods 07:00-10:00 and 15:00-19:00, in 15-minute intervals.

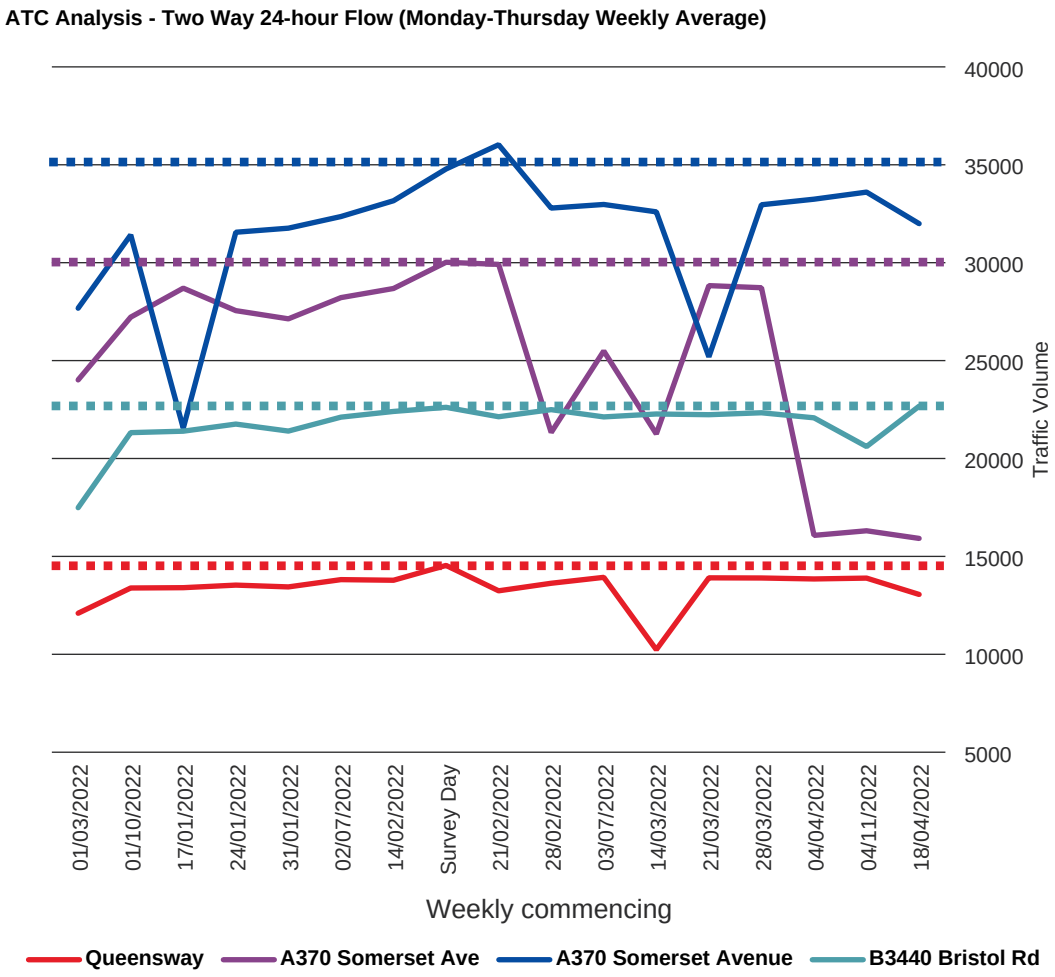
5.3.14 Queue lengths were also recorded on each junction approach, in 5-minute intervals, and video footage was undertaken. These surveys have been used as a calibration tool to appraise the accuracy of the base model outputs via a visual comparison.

5.3.15 Automatic Traffic Count (ATC) data collected by NSC from January 2022 to May 2022 has been reviewed to understand how traffic volumes on 17th February compared to other neutral days in the first five months of 2022.

5.3.16 In comparison to recorded traffic flows between January and May, Figure 49 indicates that traffic flows on 17th February were

slightly higher. The traffic surveys are therefore considered to be reflective of typical traffic conditions.

Figure 49: ATC Analysis - Two Way 24-hour Flow (Monday-Thursday Weekly Average)



5.3.17 As detailed in this section, 2018 survey data has been used to inform the baseline for the SATURN modelling. A comparison of 2018 and 2022 traffic count data has been undertaken at several junctions within the study area to identify how travel patterns have changed since the Covid-19 pandemic. The findings are summarised in Table 10 below.

Table 9: Comparison of 2018 and 2022 Traffic Count Data

Junction	AM	PM	Average
A368 Churchill Gate	0.887	0.830	0.859
Airport Roundabout	1.105	1.110	1.107
West Wick Roundabout	1.086	1.041	1.064
Runway Roundabout	1.256	1.142	1.199
Wolvershill Rd, Summer Ln	0.878	0.992	0.935
Average	1.042	1.023	1.033

5.3.18 On average, 2022 traffic counts are 3.3% higher than 2018 counts. This indicates that traffic flows have generally returned to pre-pandemic levels, however annual traffic growth has slowed.

5.3.19 It is recognised that there is a notable variation in traffic survey data of +/- 20% between 2018 and 2022 surveys. It is considered that this can be attributed to post-Covid travel patterns. Given future year scenarios have been informed by a combination of the 2022 survey data and the SATURN outputs, no factors have been applied to the 2022 survey data to closer reflect travel patterns in 2018.

5.4 Walking, Cycling and Horse-riding

5.4.1 Walking, cycling and horse-riding survey data has been obtained from surveys carried out across 15 sites over two days (Tuesday 19 October 2021 and Saturday, 23 October 2021) each from 7AM to 10PM. On both days the weather was reported as cloudy and dry, and no incidents or observations were noted during the survey period. Survey locations are shown in Figure 50.

5.4.2 During the first survey day, sites 2 and 10 could not be surveyed, because cameras could not be installed safely. For 23/10, data for two arms of counts 1 (site and link) is missing due to the footage corruption.

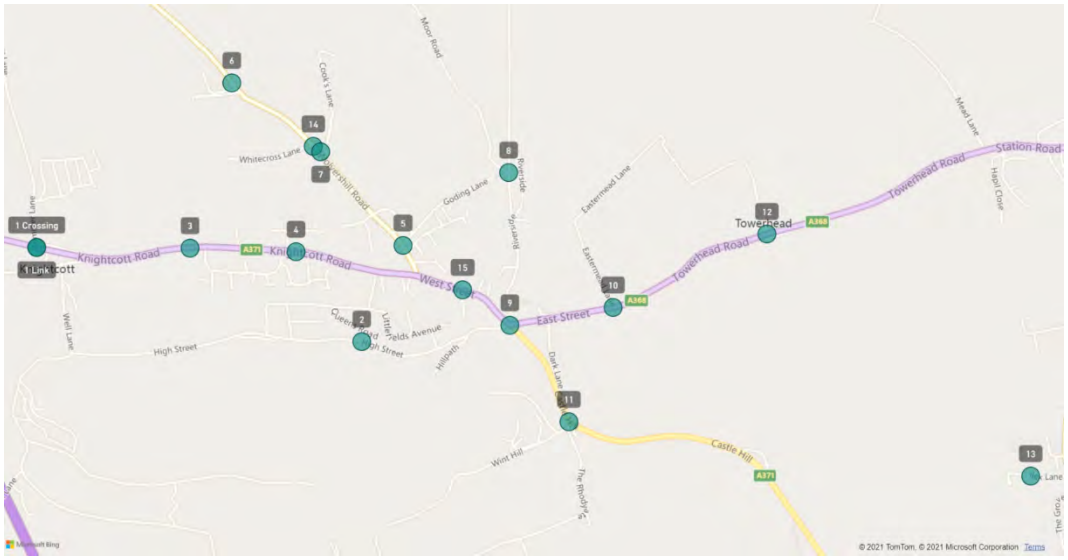


Figure 50: WCH Survey Locations

5.4.3 The following user groups were assessed:

a) Pedestrian
b) Pedestrian with dog
c) Pedestrian pushing pram/pushchair
d) Wheelchair user
e) Jogger/Runner
f) Cyclist
g) Equestrian
h) Other mobility impaired
i) E-scooters
j) Other active travel

5.4.4 The Walking, Cycling and Horse-riding Assessment Repot shows the data obtained from the surveys as well as the summation of all user types in both directions for each assessed location. Also, Drawing 4, Drawing 5, Drawing 6 and Drawing 7 (Drawing Refs: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000015 to BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000018) visualise the WCH survey data for all users, and is separated for pedestrians, cyclists, and horse riders.

5.5 Covid-19 Travel Patterns

5.5.1 The Covid-19 pandemic has had a dramatic impact on the way

we live our lives, the way we work and the way we travel. Following the introduction of national lockdowns and advice to stay at home, there were significant changes to travel behaviours and patterns. Commuter patterns were particularly impacted as many workers stopped travelling to a workplace, either because they were furloughed, began working from home or in some cases lost their jobs.

5.5.2 The medium to long-term impacts of Covid-19 on travel behaviours is however less clear. Whilst several polices have been introduced to adapt the realities of Covid-19 such as the Williams-Shapps Rail Review, Bus Back Better, and Gear Change, there is a well-established view that changing entrenched socio-technical systems like transport is extremely challenging and slow moving[26].

5.5.3 As shown in Figure 51 below, recorded road traffic levels are approaching pre-pandemic levels whilst public transport has not recovered to previous levels.

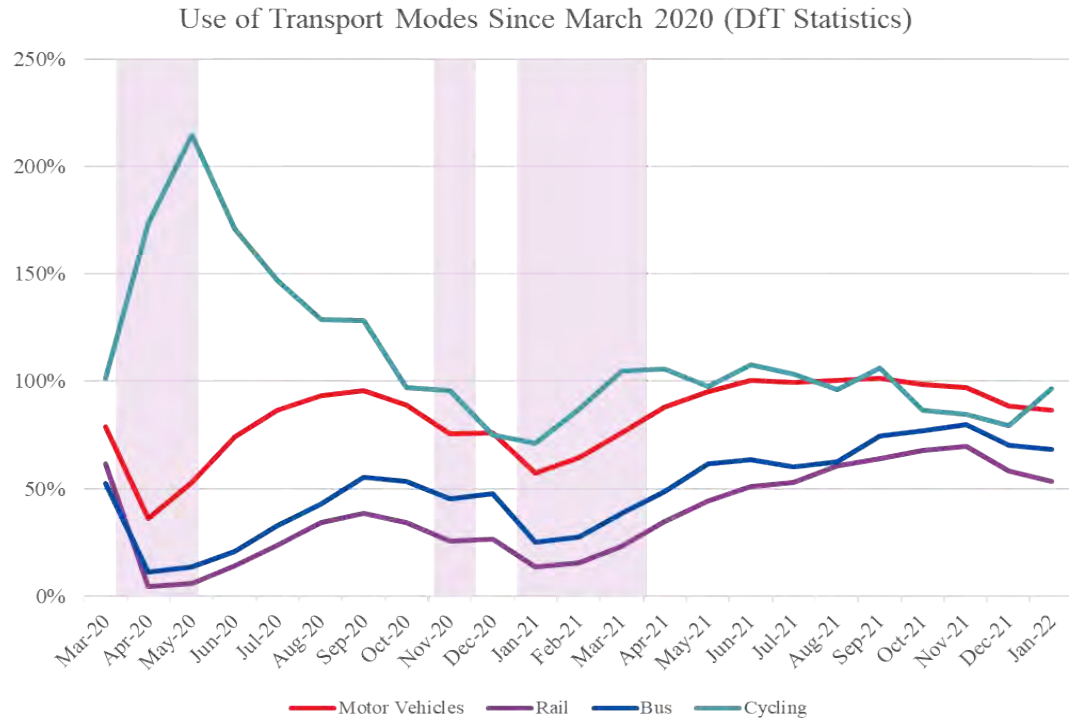


Figure 51: Change in national daily average traffic volumes March - November 2020

5.5.4 As previously noted, the core assessment within this TA is based on pre-COVID19 conditions to represent 'normal' traffic conditions. Whilst it is noted that there may be potential long-term

changes in terms of people's travel behaviour as a result of travel restrictions, assessing the impacts of pre-COVID19 traffic (i.e. prior to March 2020) will allow any impact assessments to be based on a robust and worst-case assessment.

5.5.5 A comparison of 2018 and 2022 traffic count data has been undertaken at several junctions within the study area to identify how travel patterns have changed since the Covid-19 pandemic. The findings are summarised in Table 10 below.

Table 10: Ratio between 2018 and 2022 Traffic Count Data

Junction	AM	PM	Average
A368 Churchill Gate	0.887	0.830	0.859
Airport Roundabout	1.105	1.110	1.107
West Wick Roundabout	1.086	1.041	1.064
Runway Roundabout	1.256	1.142	1.199
Wolvershill Rd, Summer Ln	0.878	0.992	0.935
Average	1.042	1.023	1.033

5.5.6 On average, 2022 traffic counts are 3.3% higher than 2018 counts. This indicates that traffic flows have generally returned to pre-pandemic levels, however annual traffic growth has slowed.

6 Development Proposals

6.1 Introduction

6.1.1 This section provides an overview of the proposed Scheme, including the following:

a) Design development;

b) Proposed alignment of the bypass and southern link;

c) Proposed junction arrangements;

d) Walking, cycling and horse-riding proposals;

e) Sustainability-led design; and

f) Construction, delivery and phasing.

6.1.2 The Scheme has been designed with the ambition of achieving the Scheme objectives as set out below, alongside the consideration of the results of technical investigations and stakeholder engagement:

a) Improve the local road network to deal with existing congestion issues;

b) Improve and enhance Banwell's public spaces by reducing traffic severance and improving the public realm;

c) Provide the opportunity to increase active and sustainable travel between local villages and Weston-super-Mare;

d) Deliver infrastructure that enables housing development (subject to Local Plan);

e) Ensure the development respects the local area and minimises visual impact upon the surrounding countryside and Mendip Hills Area of Outstanding Natural Beauty (AONB);

f) Innovative and efficient in reducing and offsetting carbon from the design and construction of the infrastructure;

g) Ensure the development provides the opportunity to increase Bio-Diversity net Gain by at least 10%; and

h) Proactively engage with stakeholders in a way that is both clear and transparent.

6.2 The Vision

6.2.1 The Design Team have a vision of implementing an integrated infrastructure scheme that delivers landscape scale enhancement that is resilient to future challenges and that will provide connectivity for people, the landscape, fauna, and flora. The Design Team want to achieve this whilst:

a) Conserving and re-enforcing the special character of the Mendip Hills Area of Outstanding Natural Beauty (AONB);

b) Creatively minimising environmental impact and developing effective mitigation within a framework of at least 10% biodiversity net gain;

c) Maintaining and improving the water environment;

d) Protecting and enhancing the townscape of Banwell with a focus on its valuable cultural heritage;

e) Delivering the foundation for active and sustainable modes of travel and future placemaking; and

f) Improving the quality of life and creating climate resilience for the local communities and encouraging partnerships in the delivery and management of the wider scheme elements.

6.2.2 The Design Team will take a Carbon reduction-led approach to delivery, with carbon reduction considerations being at the forefront of all decision making for user, maintenance, and construction emissions.

6.3 Design Development

6.3.1 The proposed Scheme considered a range of alternatives for the Banwell Bypass, junctions, mitigation measures, structures, drainage, lighting and active travel route. Full details on the alternatives considered is detailed in ES Volume 1 Chapter 3.

6.3.2 A Banwell Area Transport Study was commissioned in 2000 by North Somerset Council (“NSC”) to consider and assess transport options for the Banwell area. This included a review of a long list of options, including Do Minimum, Public Transport and Traffic Management solutions.

6.3.3 A comprehensive approach to stakeholder engagement and public consultation has been undertaken to help inform the

proposals for the Scheme. The public consultation was formed of the following events:

a) First Scheme non-statutory consultation (5 July 2021 to 16 August 2021); and

b) Second Sheme non-statutory consultation (10 March 2022 to 22 April 2022).

6.3.4 A total of 1,135 formal survey responses were received during the first consultation period and a further 37 letters and written responses were also returned to the council.

6.3.5 The key findings include that an overwhelming majority were either ‘very concerned’ or ‘somewhat concerned’ about the current situation on the A371 through Banwell, the A368 between Banwell and Churchill, and the A371 between Banwell and Winscombe. This concern was based on road safety, traffic congestion, impact on residential properties (air quality and noise), impact on employment and business, impact on schools, doctors (and other services), and walking and cycling facilities.

6.3.6 Traffic congestion and delay was considered the highest area of concern by respondents for various routes through Banwell and onwards to local villages. The second highest votes under the category ‘very concerned include ‘the impact of traffic on residential properties for the A371 through Banwell’, ‘walking and cycling facilities along the A368 between Banwell and Churchill’, and road safety along the A371 between Banwell and Winscombe’.

6.3.7 The public ranked the Scheme objectives in order of importance. ‘Improve the local road network to deal with existing congestion issues’ was the most important with 44% of the votes. The second most important was to ‘Protectively engage with stakeholders in a way that is both clear and transparent’, followed by the objective to ‘Ensure the development respects the local area and minimises visual impact upon the surrounding countryside and Mendip Hills AONB’.

6.3.8 Three route options (1, 2 and 3) were consulted upon in the first non-statutory consultation Overall, Route 2 was the most popular option. 46% of respondents selected Route 2 as the best option which achieved the Scheme objectives. The public opinion was for a single carriageway, a 40mph speed limit and no preference

for the Riverside junction.

Mainline Alignment

6.3.9 A long list of options has been considered to reduce traffic in Banwell dating as far back as 1927. Options have been carefully identified and appraised more recently and up to 2021 when the Scheme subject to this application was selected as the preferred way forward. In summary, the main options were as follows:

a) Do nothing (Baseline);

b) Reduce the need to travel;

c) Public transport and sustainable travel choices;

d) Road improvements through Banwell;

e) Bypass of Banwell, Churchill and Sandford;

f) Southern Bypass of Banwell;

g) Northern Bypass of Banwell; and

h) National Grid haul route (Hinkley Point C Connection Project).

6.3.10 These options were assessed at a high level against the WebTAG[27] criteria as well as the Scheme objectives. A description of the long list of options, together with a brief description and the summary of the decisions, are outlined in ES Volume 1 Chapter 3 Table 3-2.

6.3.11 The northern Bypass of Banwell scored well against the Scheme objectives and WebTAG criteria. As such, this option was taken forward for further assessment and the other options were discounted.

6.3.12 The following options were taken forward based on the Northern Banwell Bypass option selected from the long list of options, as presented in Figure 52:

a) Northern Route 1;

b) Northern Route 2; and

c) Northern Route 3.

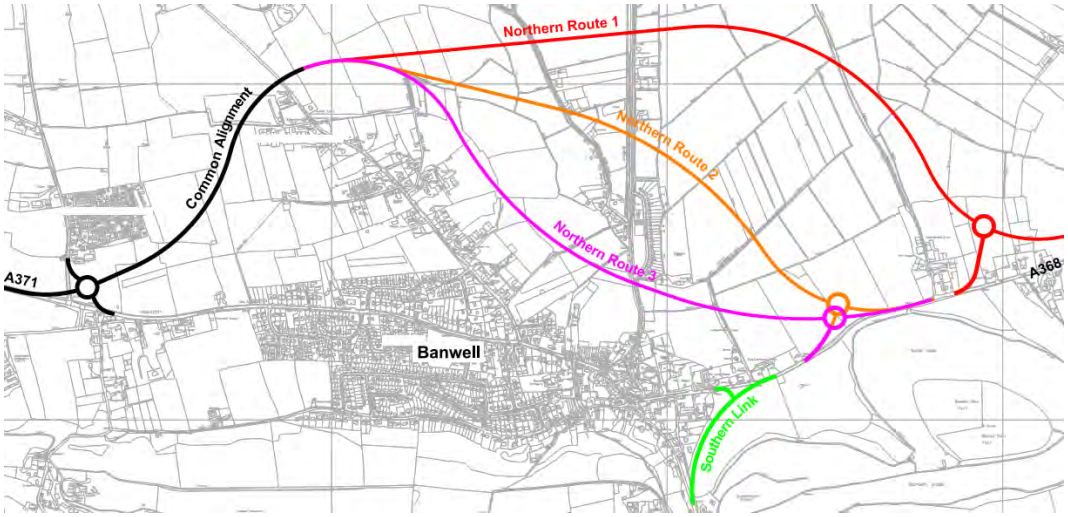


Figure 52: Banwell Bypass Potential Alignments

6.3.13 During the public consultation held between 5 July and 16 August 2021, a further alternative route was proposed by a member of the public. That alternative route is considered to be a hybrid of Route Options 1 and 2 (as shown on Figure 53). The alternative route is called Option 2A.

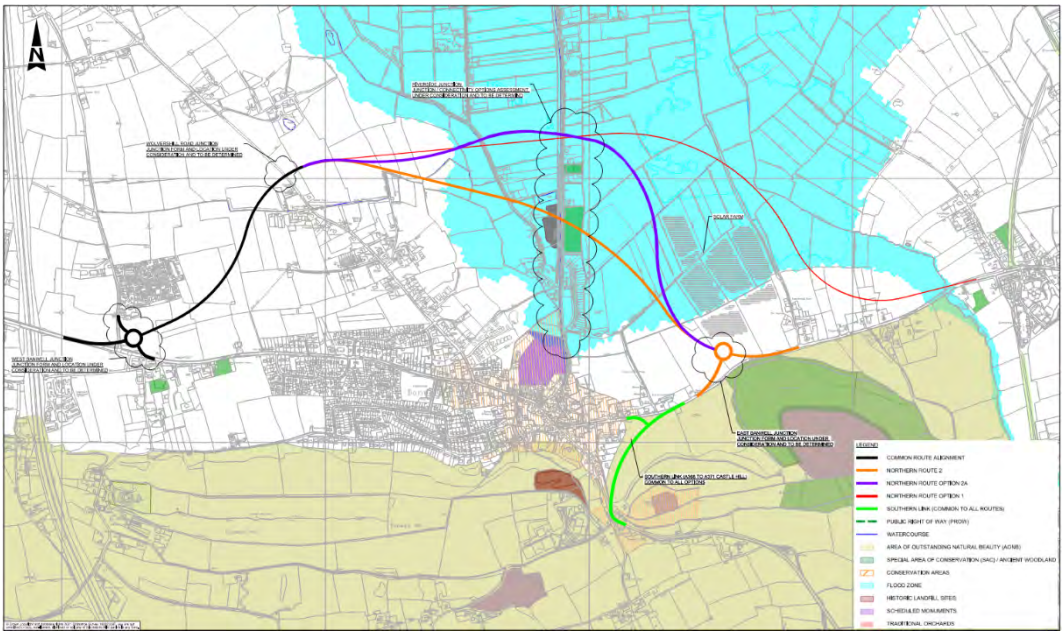


Figure 53: Layout of Route 1 (red) Route 2 (orange) and Route 2A (purple)

6.3.14 As part of the design development, the mainline of the route was considered alongside the other associated elements of a potential Scheme, for example junction arrangements, associated highway works, placemaking, wider network measures, and active travel routes.

6.3.15 Following detailed consideration of the shortlisted options, it was determined that Route 2 was considered the most favourable route when reviewed against its likely impacts and performance against the Scheme objectives.

6.3.16 The shortlisted options were appraised against the WebTAG criteria as per Table 11. The Common Route Alignment is presented in Figure 52 and relates to the 1.2km section of the route shared by all options. The WebTAG criteria appraised the options against social and cultural, environmental, economic, public accounts, distributional impact elements and indicative benefit cost ratio.

Table 11: Overall Appraisal Summary Table

		Do Nothing	Common Route Alignment	Route 1 (Northern Route)	Route 2 (Central Route)	Route 3 (Southern Route)
Social and Cultural	Non-business users	- - -	0	+++	+++	+++
	Physical activity	-	+	++	++	++
	Journey quality	- -	0	+++	+++	+++
	Accidents	-	-	+	+	+
	Security	-	-	0	0	0
	Access to services	- - -	- -	++	++	++
	Affordability	0	0	0	0	0
	Severance	-	0	++	++	0
	Option values	0	0	0	0	0
Environmental	Noise	-	+	+++	++	+
	Air quality	0	0	++	++	+
	Greenhouse gases	0	0	- - -	- -	- -
	Landscape	-	-	- -	- -	-
	Townscape	-	-	++	+	-
	Historic environment	0	0	0	0	-
	Biodiversity	0	0	- -	- - -	- - -
	Water environment	0	-	- - -	- -	-
	Flood Risk	0	0	- - -	- -	-

		Do Nothing	Common Route Alignment	Route 1 (Northern Route)	Route 2 (Central Route)	Route 3 (Southern Route)
	Geology and Soils	0	- -	- -	- -	- -
	Agricultural Land Holdings	0	-	- - -	- -	-
Economic	Business users & transport providers	- - -	0	+++	+++	+++
	Reliability	- -	0	++	++	++
	Wider impacts	0	0	0	0	0
Public Accounts	Cost to broad transport budget	0	0	- - -	- -	- -
	Indirect tax revenues	0	0	0	0	0
Distributional Impacts	User benefits	- - -	0	+++	+++	+++
	Noise	-	+	+++	+++	+++
	Air quality	0	0	++	++	++
	Accidents	-	-	+	+	+
	Security	-	-	+	+	+
	Severance	-	+	+	+	-
	Accessibility	- - -	- -	++	++	++
	Affordability	0	0	0	0	0
Indicative Benefit Cost Ratio	Cost to Private Sector	0	0	0	0	0
	Indicative Net Present Value	0	0	0	0	0
	Indicative Economic BCR	0	0	0	0	0

6.3.17 The following paragraphs provide a comparison of the key differentiators of the different route options.

6.3.18 **Carbon emissions** – From the initial carbon assessments, both Route 2 and 3 had a lower impact on Embodied Carbon than Route 1 due to Route 1's overall length and greater length of construction in the floodplain. Route 2 is the shortest overall alignment, however there is a slightly greater Embodied Carbon

impact than Route 3 again due to greater length on the floodplain. With Respect to User Carbon (greatest contributor of Carbon Impact) all Routes have a similar impact however Route 1 had a slightly greater impact than the others and Route 2 has the lowest impact for the future year (2039) scenario.

6.3.19 **Flooding** – Though all Routes impact on the flood plain, Route 2 travelled through the floodplain for a shorter length than Route 1, requiring fewer mitigation features and their associated impacts. Route 3 had the least impact as it crosses the shortest length of flood plain.

6.3.20 **Land take and severance –** Route 3 separates the properties at Riverside from Banwell, which would have resulted in a negative impact on that community. All routes pass through agricultural land and would result in some severance of land and access. Route 2 passes to the north of the Banwell Football club, but it severs the land used as football pitches. Route 1 had the highest amount of land take due to the route length, alignment and especially at the eastern junction. On balance Route 2 has the least impact.

6.3.21 **Noise and Air Impacts** – All three routes improve existing noise and air quality issues by removing traffic from the centre of Banwell, therefore meeting the Scheme objective to improve and enhancing Banwell's public spaces. Routes 1 and 2 share similar air quality and noise benefits, whereas Route 3 would have been the least beneficial due to its close proximity to Banwell, and therefore resulting in greater noise and air impacts on, houses at the edge of Banwell and at Riverside. Route 1 had the lowest traffic noise impact on existing properties. Route 2 was less beneficial because of its proximity to properties at Riverside, but overall it still delivers benefits to properties in Banwell.

6.3.22 **Biodiversity –** Route 2 and 3 are closest to the North Somerset and Mendip Hills Bats Sites SAC and Banwell Ochre Caves SSSI, which could have an indirect impact on these sites. Although Route 1 was furthest from the SAC and therefore has less of an indirect impact, it is the longest route and therefore would have impacted on a greater area of habitat loss and severance when compared to Routes 2 and 3. Route 2 has the greatest opportunity for providing a balance of impacts and habitat enhancements to meet the Scheme objectives and can

be satisfactorily mitigated to provide the required BNG.

6.3.23 **Historic and landscape impact** – Route 2 required less land than Route 1 so was less likely to impact on the landscape or encounter buried archaeology. Route 2 was also further away from the Banwell Conservation Area, Scheduled Monuments and Banwell historic core than Route 3, however Route 2 passes through a traditional orchard at Riverside. Route 2 had the greatest opportunity for providing a balance of impacts to meet the Scheme objective of minimising visual and landscape impacts. Routes 1 and 2 were considered to have a greater adverse impact on views from the Mendip Hills AONB.

6.3.24 **Traffic Impacts** – All Routes had a positive impact on reducing traffic through Banwell. However, when travelling to Winscombe along the A371, Route 1 was the longest and least direct route, which means more traffic would have continued to use the route through Banwell village rather than the Banwell Bypass. Routes 2 and 3 provided the most direct route and therefore best met the Scheme objective of improving the local road network and dealing with existing congestion as well as facilitating enhancing Banwell's public spaces.

Consideration of suggested alternative Route 2A

6.3.25 The alternative Route 2A proposed by a member of the public during consultation was subject to appraisal consistent with the appraisal undertaken for the other shortlisted options.

6.3.26 The appraisal included detailed WebTAG appraisal for the Do-Nothing scenario and for Route 2 against the alternative Route 2A. In summary, the following paragraphs provide a comparison of the key differentiators of the different route options.

6.3.27 **Carbon emissions** - from the initial carbon assessments, Route 2 had a lower impact on Embodied Carbon than Route 2A due to Route 2A's overall length and greater length of construction in the floodplain where ground treatment is required to control settlements of the embankment overlying soft soils. With Respect to User Carbon (greatest contributor of Carbon Impact) Route 2A had a slightly greater impact than Route 2 for the future year (2038) scenario.

6.3.28 **Flooding** –Route 2 travels through the flood zone for a shorter

length than Route 2A, requiring fewer mitigation features.

6.3.29 **Land take and severance –**Both routes would have passed through agricultural land, resulting in some severance of land and access. Route 2 passes to the north of the Banwell Football club, severing the land used as football pitches. However, Route 2A had a higher amount of land take, impacting on a greater number of farm holdings. Route 2A would have led to increased severance of the land holdings affected (resulting in potentially long diversionary routes for farm management). On balance, Route 2 had a lower impact than Route 2A

6.3.30 Overall, the outcome of the further options appraisal was that Route 2 remained the favoured route option. Route 2 was therefore taken forward as the preferred option.

Southern Link

6.3.31 The Southern Link would provide a link between the eastern junction of the Banwell Bypass, to the A371 Castle Hill north of Banwell Castle; and to the A368 East Street as shown in Figure 54 below. The link enables traffic traveling between the A371 to the south, to the A368 and Banwell Bypass to the north to avoid the village of Banwell and the constrained A371/A368 junction.

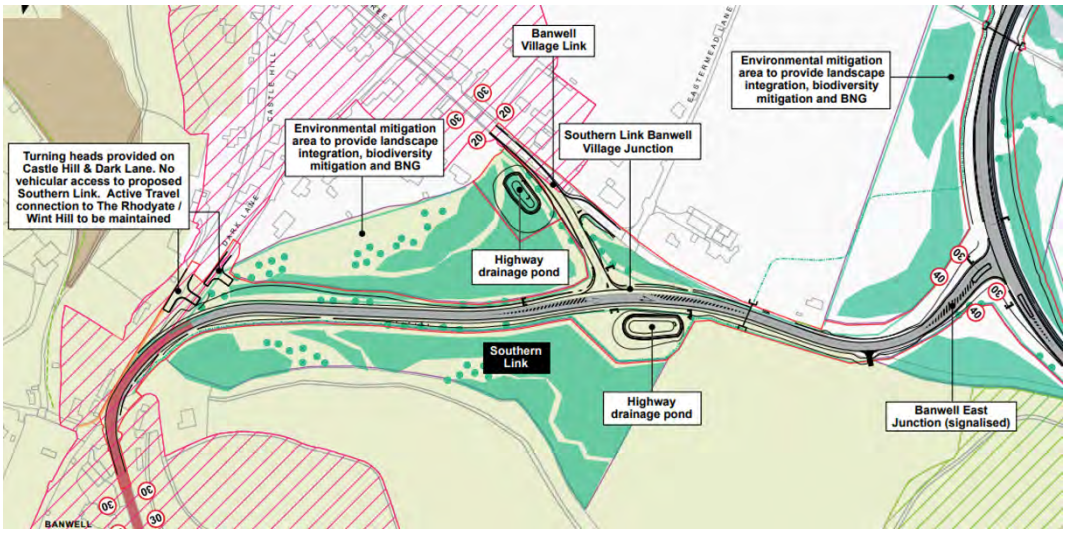


Figure 54: Southern Link Proposed Alignment

6.3.32 The Southern Link is common for all route options. The link will include measures to ensure its impact is lessened, this includes enforcing an appropriate speed limit for the link road.

6.3.33 Consideration was given in the long list of options to the National Grid Haul Road as an alternative route to the Southern Link, as shown in Figure 55. This option was discounted as the haul route has been constructed on a temporary basis. It would have adverse impacts to the environment if permanent. Congestion issues would still exist through Banwell.

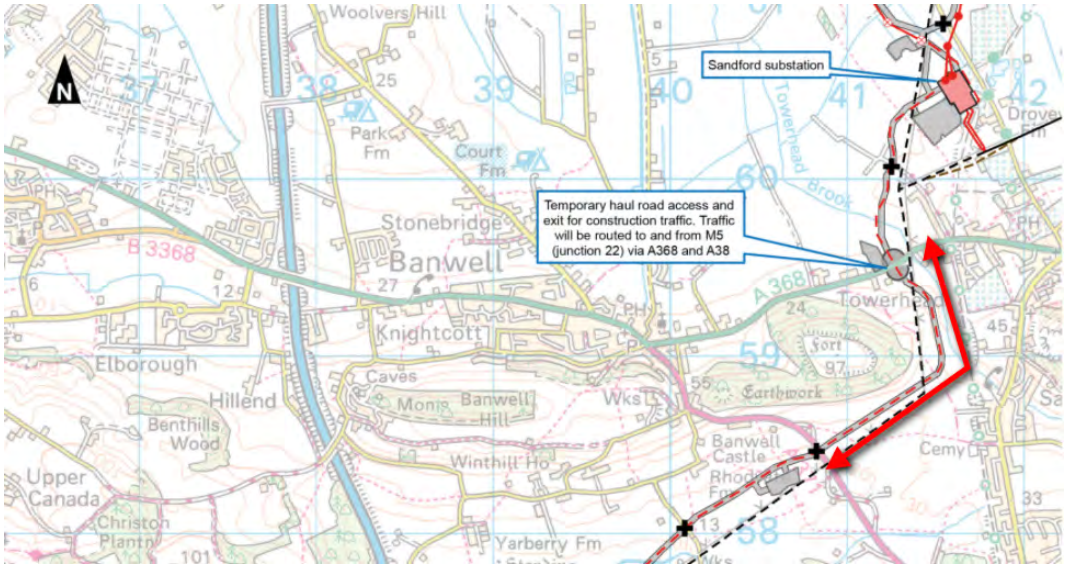


Figure 55: Portion of National Grid Haul Route proposed as an alternative is outlined by the red arrow (© hinkleyconnection.co.uk)

6.3.34 Based on the points raised above, a Southern Link is considered to be required as part of the overall Scheme. A WebTAG assessment was undertaken of the Southern Link, with details included within Table 12 below.

Table 12: Southern Link Assessment Summary Table

HIF Banwell Bypass and Highway Improvements WebTAG Criteria		Southern Link – Do Nothing	Southern Link
Social and Cultural	Non-business users	0	+++
	Physical activity	-	++
	Journey quality	-	+
	Accidents	-	+
	Security	0	0

HIF Banwell Bypass and Highway Improvements WebTAG Criteria		Southern Link – Do Nothing	Southern Link
	Access to services	-	0
	Affordability	0	0
	Severance	-	+++
	Option values	0	0
Environmental	Noise	-	0
	Air quality	0	++
	Greenhouse gases	-	-
	Landscape	-	-
	Townscape	-	++
	Historic environment	0	+
	Biodiversity	0	-
	Water environment	0	+
	Flood Risk	0	0
	Geology and Soils	0	-
	Agricultural Land Holdings	0	0
Economics	Business users & transport providers	-	+
	Reliability	-	+
	Wider impacts	0	0
Accounts	Cost to broad transport budget	0	0
	Indirect tax revenues	0	0
Distributional Impacts	User benefits	-	+
	Noise	-	-
	Air quality	0	0
	Accidents	-	+
	Security	0	0
	Severance	-	0
	Accessibility	0	+
	Affordability	0	0
BCR	Cost to Private Sector	0	0
	Indicative Net Present Value	0	0

HIF Banwell Bypass and Highway Improvements WebTAG Criteria		Southern Link – Do Nothing	Southern Link
	Indicative Economic BCR	0	0

6.3.35 The WebTAG assessment on balance considered it beneficial to include the Southern Link as part of the overall Scheme. The benefits of providing the Southern Link, delivered together with the Banwell Bypass, would likely be:

a) More vehicles driving in both directions would use the new Banwell Bypass instead of continuing to use the A371 through Banwell to get to Winscombe;

b) Vehicles travelling on routes from Winscombe and Cheddar would be able to access the Banwell Bypass without using the narrow sections of Castle Hill;

c) Reduced traffic along the A371 through Banwell would increase the opportunities for walking, cycling and horse-riding;

d) Through traffic would be removed from Castle Hill and Dark Lane, which would retain a connection for pedestrians and cyclists to the A371; and

e) The alignment has been designed to minimise gradients and earthworks as far as possible, which minimises visual impact of the route.

6.3.36 As such, the Southern Link Road was considered beneficial to the overall Scheme.

6.4 Proposed Alignment

Mainline Alignment

6.4.1 The proposed Bypass connects the A371 (east of Summer Lane) to Wolvershill Road with a new junction located at Wolvershill Road. From Wolvershill Road, the route continues southeast passing north of Riverside Crescent. The route crosses Moor Road, Riverside, continuing in a south easterly direction, to the west of the solar farm, to the location of the proposed junction

joining with the A368 as shown in Figure 56. The total length of the route is 3.3km.

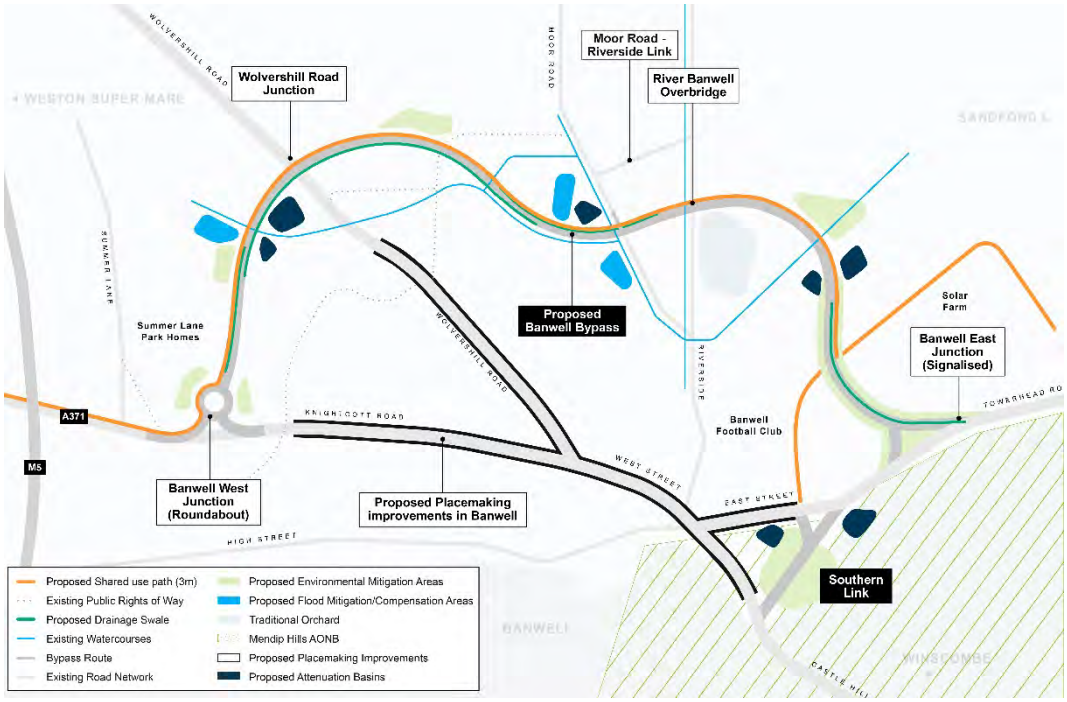


Figure 56: Proposed Banwell Bypass Alignment

6.4.2 The Scheme has been designed as a single carriageway with a 40mph speed limit. The carriageway would be generally 6.8m wide (3.4m lanes) with 1m verges. The carriageway would be locally widened around bends to allow for HGV movements.

6.4.3 A 3m wide walking and cycling route will be provided for the entire length of the proposed Banwell Bypass. This will provide a dedicated route for walkers, horse riders and cyclists alongside the road. The route will also provide links to Wolvershill Road, Moor Road and Riverside. To the West it will connect with walking and cycling routes leading to Weston-Super-Mare and to the East the route will link to Sandford, the Strawberry Line and Banwell.

6.4.4 Regular crossings of the Bypass are also proposed to maintain existing walking, cycling and horse-riding routes, whilst also creating new ones. Some minor diversions to Public Rights of Way (PRoW) are proposed to ensure existing footpaths are accessible from the proposed crossings. Dedicated routes for walkers, cyclists and horse-riders are also proposed on roads which will no longer allow through traffic, such as Castle Hill,

Eastermead Lane and Moor Road.

6.4.5 The A368 through Banwell is currently fully lit, with part time night lighting. The proposals for the Bypass are to minimise the amount of new lighting to where it is required for safety reasons at the Western Roundabout and Wolvershill Road junction. The Scheme is located on the northern edge of the Mendip Hills AONB, which has a particular designation for 'Dark Skies', which would be impacted by additional road/street lighting.

6.4.6 The proposed alignment and cross-section of the Banwell Bypass is shown in detail on the following planning drawings:

a) Banwell Bypass and Southern Link General Arrangement Drawings Sheet 1 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000001)

b) Banwell Bypass and Southern Link General Arrangement Drawings Sheet 2 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000002)

c) Banwell Bypass and Southern Link General Arrangement Drawings Sheet 3 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000003)

d) Banwell Bypass and Southern Link General Arrangement Drawings Sheet 4 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000004)

e) Banwell Bypass and Southern Link General Arrangement Drawings Sheet 5 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000005)

f) Banwell Bypass and Southern Link General Arrangement Drawings Sheet 6 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000006)

g) Banwell Bypass Typical Cross-Section (Drawing Ref: BNWLBP-ARP-HGN-X_BB_02-DR-CH-000001)

Southern Link

6.4.7 The Southern Link would provide a link between the eastern junction of the Banwell Bypass, to the A371 Castle Hill north of Banwell Castle; and to the A368, East Street. The Southern Link is located within the Mendips AONB and in the Source Protection Zone (SPZ).

6.4.8 The existing A371, south of Dark Lane would be realigned to head northeast and become the Southern Link. To the north of this, the A371 and Dark Lane would be stopped-up at their

southern ends, with no direct vehicular access provided onto the Southern Link. Turning heads would be provided in these locations. Access to Castle Hill and Dark Lane would be retained in its current form at their northern intersection with the A368 East Street.

6.4.9 The Southern Link would be 0.6km in length, travelling generally in a northeast direction, from the A371 to the eastern junction of the Banwell Bypass. The Southern Link would be on embankment for the majority of its length, with a small section of localised cutting, halfway along its length.

6.4.10 The proposed alignment and cross-section of the Southern Link are shown in the following planning drawings:

a) Banwell Bypass and Southern Link General Arrangement Drawings Sheet 6 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000006)

b) Southern Link Typical Cross-Section (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000007)

6.5 Junction and Crossing Proposals

6.5.1 A number of new junctions and changes to road access are proposed as part of the Scheme. These are described from west to east and further analysis can be found in Section 7.4.6.

A371/Banwell Road Junction

6.5.2 The existing A371/Banwell Road is proposed to be upgraded from a priority T-junction to a signal-controlled junction. This arrangement would future proof the junction against increased traffic and future housing requirements and improve walking and cycling opportunities.

6.5.3 A signal-controlled pedestrian and cycle crossing is proposed on the A371 to the west of Banwell Road which will positively contribute towards the proposals associated with the A371 Safer Road Scheme in Locking.

6.5.4 There is an existing bus stop with waiting facilities on the A371 to the east of the junction. Subject to changes to future bus service provision, the potential to relocate this stop to the west of

the junction is being explored.

6.5.5 The junction arrangement is presented in the planning drawing "Wider Network Mitigation - General Arrangement Drawing - Sheet 13 of 13" (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000013).

Summer Lane Junction

6.5.6 Summer Lane Junction is proposed to be upgraded from a priority T-junction to a signalised junction, which would incorporate the realigned Well Lane. This layout increases the capacity of the junction whilst also providing safety benefits for pedestrians and road users.

6.5.7 The 3m wide shared use path adjacent to the Bypass continues through this junction, tying into the A371 Safer Road Scheme in Locking, which would run via Summer Lane/Well Lane signalised junction and a pedestrian/cycle crossing. This would be used to access the Banwell Village route via a shared use path linking into Banwell Village. Signal-controlled crossings are also proposed for pedestrians and cycles on the Summer Lane, Well Lane and A371 (West) entries to the junction.

6.5.8 The junction arrangement is presented in the planning drawing "Banwell Bypass and Southern Link General Arrangement Drawings Sheet 1 of 6" (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000001).

Banwell Bypass West Junction

6.5.9 Banwell Bypass West junction is proposed to include a three-arm roundabout where traffic would join the Bypass. It would be located east of the industrial estate at the western end of Banwell.

6.5.10 A Shared footway/cycleway is proposed on the northern/western side of the A371, as described in Section 6.4. The junction includes additional pedestrian and cycle crossings to link in with the proposed active travel provision to Banwell Village, as detailed further in Section 8.2.

6.5.11 The design is located outside of the flood zone and also maintains access to existing properties on the A371. Surrounding

the West Junction would be mitigation areas to provide screening and landscape integration.

6.5.12 The junction arrangement is presented in the planning drawing "Banwell Bypass and Southern Link General Arrangement Drawings Sheet 1 of 6" (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000001) and a visualisation of the junction is illustrated in Figure 57 below.

Figure 57: Visualisation of the proposed Banwell Bypass West Junction

Wolvershill Road

6.5.13 Proposals include a change in access to Wolvershill Road which will restrict traffic on Wolvershill Road to the south of the Bypass, limiting its use to active travellers and public transport. Vehicle access would be maintained for agricultural vehicles where their land can only be accessed using Wolvershill Road (south). Properties on Wolvershill Road can still be accessed via Knightcott Road, however it will no longer be a through-route.

6.5.14 Traffic would still be able to use the section of Wolvershill Road that runs to the north of the Bypass, travelling south to access the Bypass itself, then east towards the A368 or west towards the A371. It is not believed that the alternative route will add a significant amount of time to journeys for those who want to travel from Banwell village to the north of the bypass using the southern section of Wolvershill Road. The alternative route for those wanting to access the southern section of Wolvershill Road would be traveling along the bypass to the west, then continuing through to Banwell village.

6.5.15 A signalised junction is proposed where Wolvershill Road joins the Bypass. This junction is proposed to be lit and would provide a connection to the northern part of Wolvershill Road for all vehicles and would also include a waiting area for vehicles wanting to turn right into Wolvershill Road South (limited to buses and agricultural vehicles) from the Bypass, as well as dedicated turn lanes for other traffic. Limiting access to Banwell from the junction is intended to reduce rat running and reduce the traffic along Wolvershill Road, which would have environmental benefits.

6.5.16 The Wolvershill Road junction would include signalised pedestrian/cyclist crossings. There would be a 3m wide shared use path along the north side of the Bypass. Lighting will be minimised at the junction, but sufficient lighting will be provided to ensure visibility.

6.5.17 To the west of the junction, visual screening, landscape integration and biodiversity mitigation will be implemented to reduce visual impacts, and further east past the junction, the provision of a new junction has been considered to future proof the design of a future junction east of Wolvershill Road.

6.5.18 The junction arrangement is presented in planning drawing “Banwell Bypass and Southern Link General Arrangement Drawings Sheet 2 of 6” (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000002).

Moor Road

6.5.19 The existing Moor Road to the south of the Banwell Bypass is proposed to be stopped-up, becoming a ‘no through road’ accessed from Riverside only, with no direct access from the Banwell Bypass. Access to the northern section of Moor Road is proposed via a new link, connecting Riverside and Moor Road directly, which is located north of the alignment of the Bypass and crossing the River Banwell on a small bridge structure.

6.5.20 The proposed arrangement is presented in planning drawing “Banwell Bypass and Southern Link General Arrangement Drawings Sheet 3 of 6” (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000003).

Riverside and River Banwell Crossing

6.5.21 It is proposed that the Bypass includes an overbridge across Riverside and the River Banwell, so that traffic on both routes can flow independently of one another, therefore meaning vehicles would not be able to queue to join the Bypass from Riverside, improving traffic flows and journey times on the Bypass.

6.5.22 The proposed bridge would have a clearance underneath of approximately 4.5m with an overall height of approximately 7 to 8 metres above existing ground level to accommodate larger vehicles which require access to businesses. The design would also help to discourage rat-running from Banwell to the M5 Junction 21 (east), as no direct access would be provided from the Bypass, making it an indirect route for traffic looking to travel north.

6.5.23 Minimising traffic on Riverside will make the route safer and more attractive for walkers, cyclists and horse riders looking to make more sustainable journeys in their area. Removing a junction onto the Bypass also removes the risk of motor collisions from joining traffic.

6.5.24 Responding to previous stakeholder engagement, the proposed location of the overbridge will avoid the traditional orchard, have less of an impact on Banwell Football Club's pitches, and avoid the majority of the playing field area.

6.5.25 The proposed Riverside and River Banwell Crossing is presented in planning drawing "Banwell Bypass and Southern Link General Arrangement Drawings Sheet 3 of 6" (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000003) and illustrated in Figure 58 below.

Figure 58: Visualisation of the proposed Riverside and River Banwell Crossing

Banwell Bypass East Junction

6.5.26 The proposed design of the Banwell Bypass East Junction is three-arm traffic signal junction which includes a turning area for vehicles wanting to turn right from the Banwell Bypass towards the Sothern link/East Street. Traffic travelling west will also have a dedicated left turn lane. This design would reduce the likelihood of queuing traffic.

6.5.27 The 3m wide shared use path for walkers and cyclists is proposed to continue along part of the north side of the Bypass. East of the playing fields, the path would separate from the Bypass leading towards Sandford and provide a connection to the Strawberry line. This would form part of the Scheme's proposed walking and cycling provision, including a route to Banwell via the Banwell Village Link, as detailed further in Section 8.2.

6.5.28 The location of the proposed traffic signal junction has been chosen so headlights of vehicles are diverted away from areas where bats may be found. The signalised junction is also smaller than alternative options such as roundabouts, helping to keep a further distance from local bat populations so that they are not disturbed.

6.5.29 The junction arrangement is presented in planning drawing "Banwell Bypass and Southern Link General Arrangement Drawings Sheet 5 of 6" (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000004) and a visualisation of the junction and

southern link is shown in Figure 59 below.

Figure 59: Visualisation of the Proposed Banwell East Junction and Southern Link

6.6 Complying with Modern Design Standards

6.6.1 The Banwell Bypass will provide an enhancement to safety given that it will be designed to modern standards with a long-life expectancy to minimise maintenance requirements, and refer to the road safety process.

6.6.2 Due to the strategic nature of the route in the local area, and the requirements of NSC's Highways Development Design Guidance, the design of the Banwell Bypass and Highway Improvements are designed using the principles set out within to the requirements of the DMRB.

6.6.3 There has been no intention to stick rigidly to the requirements of the DMRB during preliminary design. There have been opportunities to deviate away from DMRB requirements where those outcomes would result in overall project benefits, and which would better align with project outcomes. DMRB requirements instead have been used as a baseline for the preliminary design of the Scheme, and a risk-based approach has been adopted to identify opportunities to deviate from these standards where it is in the wider interest of the Scheme.

6.6.4 Any deviations from the DMRB have been recorded as Departures from Standards. This provides a robust justification for adopting an alternative design approach for the Scheme.

6.6.5 DfT LTN 1/20 (Cycle Infrastructure Design) has also been used to inform the active travel proposals. This includes recommendations on suitable road speeds and volumes for on-road cycling.

6.7 Sustainability-Led Design

6.7.1 The Scheme has been designed to minimise adverse environmental effects on climate through the process of design development and consideration of good design principles. By assessing each option's carbon baseline at an early stage, GHG emissions were properly factored into the decision-making process for which option to take forward for detailed design.

6.7.2 The quantification of GHG emissions allowed carbon hotspots to be identified and inform carbon reduction strategies. Design elements which contributed the highest emissions were quickly identified which enabled results to be compared or for variations to be accounted for by highlighting differences in methodologies.

6.7.3 By using the carbon hotspots opportunities for further carbon reduction have been explored and implemented. These include but are not limited to:

a) Carriageway reduced from a dual and 4 lane single carriageway to a 2-lane single carriageway. This decision also removes the need for a central reservation.

b) Lane widths reduced from 3.65m to 3.4m

c) Removal of the hard strip 0.5m either side of north and southbound lanes

d) Foot/cycleway moved to the bottom of embankment reducing earthworks. The new design now aligns with existing ground level where possible.

e) Foot/cycleway diverted from bottom of Banwell Bypass before the eastern junction removing the need for lighting at the Eastern Junction.

f) Steel road restraint system reduced from 3460m to 1310m.

g) Traffic flows, earthworks, land requirements and the most effective use of space were all considered when designing junctions. The Eastern junction now a T junction instead of a roundabout requiring less land and earthworks.

h) The Riverside Road Junction removed

i) Wolvershill Road Junction downgraded from 5 lanes to 3 lanes.

j) Minimising the amount of lighting was attempted but wasn't possible due to safety reasons. The overall column height was reduced from 10 to 8m.

k) Speed limit reduced from 50 to 40mph.

6.7.4 These decisions reduce the overall materials required to construct the scheme, reduce maintenance requirements or reduce user carbon. Many of these decisions impact multiple carbon streams. Note that some decisions cannot be quantified at this stage due to lack of data. For example, it is not possible to compare how reducing the speed limit or adding more sustainable transport options has impacted carbon from the baseline design to the current design due to limitations in the traffic model. It is understood that these decisions will have a positive impact on overall user carbon.

6.7.5 In total, the embodied carbon of the scheme has been reduced by 61% through these design decisions, as detailed in the Climate Change Chapter of the ES.

6.8 Construction and Phasing

6.8.1 A draft Construction Traffic Management Plan has been prepared in support of the planning application and has been appended to the ES.

6.8.2 The main compound and site offices for the works are proposed to be located at the western end of the Scheme, which would be accessed off of the existing A371. A haul road for the delivery of machinery and construction materials is intended to be constructed along the line of the Banwell Bypass site from this compound. A further three satellite compounds include Wolvershill Road Compound, at Wolvershill Hill, Banwell River Bridge Compound, between Riverside and Moor Road, and Eastern Compound, to the east of Banwell Village accessed from the A368. Figure 60 indicatively shows the locations of the proposed compounds.

Figure 60: Proposed Locations (Indicative) of the Temporary Site Compounds

6.8.3 All site compounds will be secured with fencing and signage appended. Also, the compounds will provide parking for cars and light vans with designated parking bays, employ site security staff, provide trained and competent banksmen for reversing vehicles at all times, and not allow entry of mobile plant. The construction of passing bays may be required along the site haul road and all deliveries must be made via identified construction access routes.

6.8.4 In terms of access, it is proposed that construction vehicles will access the site from the Main Compound and the Eastern Compound. Access to the main compound will be gained from the M5 Junction 21, the A370 Somerset Avenue, and the A371. To the Eastern Compound, access will be gained from the A38 / A368 junction at Churchill and the A368. The remaining site compounds will be accessed via the following:

a) Wolvershill Road Compound: access for cars and light vans only via Wolvershill Road.

b) Banwell River Bridge Compound: access for construction vehicles via the Main Compound route then along the site haul road. Access for cars and light vans via the A370, West Rolstone Road, then Riverside Road.

6.8.5 Traffic impacts will be mitigated through the following measures:

a) Haulage companies and suppliers will be issued with the Site Access Map which illustrates the agreed access route onto site. Signs would be erected at junctions to the site

compounds and at site entrances and any necessary diversions will be briefed to haulage companies.

b) As close to an earthworks balance as possible has been achieved, therefore removing the requirement to transport excavated soils and reducing vehicle movements significantly.

c) Deliveries will only be permitted between 07:00 to 18:00 Monday to Friday and between 07:00 and 13:00 on Saturdays and scheduled to avoid peak times when possible. No deliveries will be permitted on Sundays or bank holidays.

d) All construction vehicles will be required to adhere to agreed haul routes.

e) No vehicles will be left outside of the site.

f) Route finders will be used by haulage companies to ensure efficient navigation to the site.

g) Personnel vehicles and vehicles transporting materials will be modern low emissions Euro 5/6 and well silenced.

h) Loads will be thoroughly secured.

i) All loads will be booked, and suppliers will phone the site ahead of deliveries, with the exception of regular deliveries.

j) Site operatives will be encouraged to use public transport to travel to work where possible.

k) Parking will be provided within site compounds and parking outside of the site will not be permitted.

l) Drivers will be made aware of the residential properties, working farms and businesses accessed from Wolvershill Road and Moor Road.

6.8.6 To manage conflicts with pedestrians, measures will be put in place to minimise the impacts of construction on pedestrians. Pedestrian routes will be designated and signed, including pedestrian routes along and to work areas. These routes will be kept clean and free from obstructions and rigid barriers and signage will be erected at pedestrian crossing points. To ensure construction traffic is aware of potential pedestrians, walking routes will be clearly marked on all Traffic Management Plans. To manage conflicts on site, all personnel must wear high visibility clothing and risk assessments and method statements will be carried out to protect pedestrian workers.

6.8.7 In line with good practice, the risks of mud on public highways will be reduced through wheel washing points at site exits for the duration of earth moving and road works and a road sweeper will be on standby to efficiently clear any construction debris which is

taken onto the surrounding highways.

6.8.8 It is anticipated that a full CTMP will be secured via a planning condition.

Summary

6.8.9 Based on the proposals described in this section, a summary as to how the Scheme achieves the objectives in presented in Table 13 below.

Table 13: Scheme objective compliance

Scheme objective	Compliance with objective
Improve the local road network to address existing congestion issues	Emerging findings from traffic modelling undertaken to date demonstrates that the Bypass will effectively reduce traffic congestion on the A371 through Banwell Village. In the opening year (2024), there would be a total reduction of vehicles driving through Banwell from 13,800 down to 3,000, which is a 78% reduction.
Improve and enhance Banwell's public spaces by reducing traffic severance and improving the public realm	The Scheme provides an opportunity to make placemaking improvements and enhancements to the centre of Banwell village, with the introduction of traffic calming measures and pavement widening that would reduce the dominance of the road. The impact of the proposed Banwell Bypass would be a reduction in traffic volumes through Banwell village as a result of more traffic using the Bypass. This will make Banwell a safer, more attractive place for the residents and visitors.
Provide the opportunity to increase active and sustainable travel between local villages and Weston-super-Mare	The design includes a separated, traffic-free walking/cycling route running alongside the Bypass. The route would start to the west of Banwell, linking with the new route being provided on the A371 as part of the Safer Roads Scheme. Regular crossings of the Bypass are also proposed to maintain existing walking, cycling and horse-riding routes, whilst also creating new ones. Dedicated routes for walkers, cyclists and horse-riders are also proposed on roads which will no longer allow through traffic, such as Castle Hill, Eastermead Lane and Moor Road. Within Banwell, a range of improvements are proposed, including improved walking and cycling facilities, created by widening the existing pavement where possible, as well as increased cycle parking. A walking/cycling route from the Bypass through to Sandford to the north of the A368, which will create a continuous, traffic-free route between Weston-super-Mare, Sandford and onwards via the Strawberry Line (National Cycle Route 26). Proposed new or improved pedestrian crossings in Sandford and Winscombe. Improvements to the existing public footpath between the A368 and Churchill Green for walkers. To the east of Churchill Academy, improvements to the surfacing of existing PRoW footpaths towards Langford to make them suitable for cyclists.
Deliver infrastructure that enables housing	Banwell Bypass is funded by Homes England's Housing Infrastructure Fund (HIF) to support the delivery of 7,557 new homes.

Scheme objective	Compliance with objective
development (subject to Local Plan)	4,482 of these homes will be located at existing housing development sites in the Weston Villages of Haywood Village and Locking Parklands. The location of the remaining homes will be subject to the new Local Plan process. However, it is currently suggested that these will be delivered through the creation of a new strategic growth area made up of 2,800 to the north of Banwell. Whilst Local Plan and subsequent future housing still needs to go through a process to become adopted policy, the Bypass is vital to support its delivery as it improves access to any homes, employment and education in the area. Any additional increases to traffic as a result of future housing has been considered in the Bypass traffic modelling and subsequent development of the Scheme.
Ensure the development respects the local area and minimises visual impact upon the surrounding countryside and Mendip Hills Area of Outstanding Natural Beauty (AONB)	To minimise any visual impact on the surrounding countryside, the Scheme's current landscape design considers views both to and from the countryside and AONB. Fields severed by the Bypass create opportunities to retain the existing layout of fields in the area with space for habitat creation, landscape integration and further screening, such as hedgerows, to obscure the Bypass from view. Consideration has been given to walking, cycling and horse-riding routes and other mitigation features, such as the attenuation basins, and how these can be properly integrated with the landscape.
Innovative and efficient in reducing and offsetting carbon from the design and construction of the infrastructure	Road transport and construction are both responsible for generating a significant amount of carbon emissions. However, the following elements have been considered to reduce carbon emissions in both construction and the eventual operation of the Bypass. Considering the 'Whole Life Carbon' impact of the Bypass from the beginning of design. The carbon impacts are considered before and during construction, in maintenance and use of the Bypass in future. By doing this, carbon reduction measures can be built into the Scheme design. These include: a) The Bypass as a single carriageway as opposed to dual carriageway – this reduces the amount of material required to construct the Scheme and creates less construction carbon emissions.

Scheme objective	Compliance with objective
	b) Use of recycled materials in construction of the Scheme, as well as locally sourced materials to avoid transporting them long distances. c) The use of swales for highway drainage reduces the amount of drainage material needed in the design and therefore creates fewer construction carbon emissions. d) Optimising the Bypass' alignment to reduce the amount of carbon heavy earthworks needed to build both the Bypass and Southern Link. e) Minimising additional street lighting, therefore reducing the amount of energy needed to light the road, as well as reducing material needed to construct the Scheme. Reducing carbon once the Bypass is in use by the following: a) 40mph speed limit with slower moving vehicles in free-flowing traffic, which generates fewer carbon emissions than vehicles travelling at high speeds. b) Using junctions (for example, a roundabout or signalised T-Junction) to ensure vehicles can be as free flowing as possible, to reduce the carbon impact of vehicles stopping and starting. c) Improvements to routes through Banwell and nearby villages to make walking, cycling and horse riding a safer and more attractive low carbon alternative for residents travelling between local villages and Weston-super-Mare.
Ensure the development provides the opportunity to increase Bio-Diversity Net Gain by at least 10%	The Scheme has exceeded this objective, it would provide greater than 20% BNG. Measures include: a) Creating habitats for biodiversity by reinstating and enhancing the ditch and rhyne system, management of invasive and non-native weeds, reinstating dried ponds and enhancing habitats with seasonally wet/ damp

Scheme objective	Compliance with objective
	species-rich grassland – all of which have the potential to enhance the number of invertebrates, protected species and pollinator habitats. b) Using traditional techniques to manage wetland areas, such as seasonal and controlled flooding and the management of vegetation (e.g. pollarding, coppicing, reed or osier beds if appropriate). c) Replanting riverbanks with native trees and creating species rich grassland habitats within the verges and along the Scheme embankment. d) Planting more local native species and further enhancements such as new hedgerows for woodland species, birds, dormice and bat boxes. Types of plant would be chosen to provide food sources for protected species and soil conditions for wetland species. Water and flood management areas designed to emphasise the natural landscape.
Proactively engage with stakeholders in a way that is both clear and transparent	Non-statutory consultation has been undertaken in the form of: e) Banwell Bypass and Highway Improvements non-statutory consultation (5 July 2021 to 16 August 2021) a) Banwell Bypass and Highway Improvements non-statutory consultation (10 March 2022 to 22 April April) Engagement with Parish Council's, resident working groups, statutory working groups and Banwell FC. Engagement has helped understand the breadth of local issues, opportunities and concerns.

7 Impact of the Development

7.1 Introduction

7.1.1 This section presents the forecast impacts of the Scheme on the wider transport network and should be read alongside the following supporting reports and technical notes:

a) Local Model Validation Report (LMVR) (Appendix C)

b) LMVR Addendum (doc ref: BNWLBP-ARP-HGN-XXXX-TN-TR-000003) (Appendix D);

c) Strategic Model Forecasting Report (doc ref: BNWLBP-ARP-HGN-XXXX-TN-TR-000004) (Appendix E); and

d) Junction Modelling Report (doc ref: BNWLBP-ARP-HGN-XXXX-TN-TR-000003) (Appendix F).

7.2 Assessment Periods

7.2.1 The SATURN model represents an average weekday (Monday – Thursday) for the following time periods:

a) Peak AM hour (08:00 – 09:00)

b) Average inter-peak hour (10:00 – 16:00)

c) Peak PM hour (17:00 – 18:00)

7.2.2 The specific hours to be modelled during the AM and PM peak periods were identified by analysing the average daily pattern of flows observed at various ATC sites within the network. The analysis indicates peak flows occur at most sites between 8AM and 9AM and between 5PM and 6PM.

7.2.3 Some of the sites nearer to Bristol have an earlier peak between 7AM and 8AM and between 4PM and 5PM. However, it was agreed with NSC that the later peak hours would be more suitable for the strategic model, and more representative of North Somerset as a whole.

7.2.4 Matrices, networks and assignments have been produced for

the modelled scenarios detailed in Table 14.

Table 14: Summary of Modelled Scenarios

Year	Scenario Name	DM or DS	Description
2024	Without Bypass	Do Minimum (DM)	Do Minimum scenario
	With Bypass	Do Something (DS)	As Do Minimum scenario with addition of bypass
	With Bypass+	DS	As With Bypass scenario with 20mph speed limit through Banwell
2039	Without Bypass	DM	Do Minimum Scenario. Trips associated with the HIF development at Banwell that cannot be enabled without the bypass are instead distributed across North Somerset, representing that the same number of dwellings must be accommodated elsewhere.
	Cumulative Impacts 1	DS	As Do Minimum scenario with addition of the bypass, 20mph speed limit through Banwell and addition of the HIF development in Banwell
	Cumulative impacts 2		As Do Minimum scenario with addition of the HIF development in Banwell, without the Bypass and without 20mph speed limit through Banwell

7.2.5 The 2024 scenarios provide an assessment for the opening year and outline the impacts specific to the Bypass. The 2039 scenarios present the residual and cumulative impacts of the scheme.

7.2.6 The junction modelling assessments are informed by traffic flows extracted from the SATURN model and include analysis of the following time periods:

a) Peak AM hour (08:00 – 09:00)

b) Peak PM hour (17:00 – 18:00)

HIF Connections

7.2.7 The HIF development connections, locations and junction forms are in development and under review by the Local Plan team.

7.2.8 The modelled connections to the HIF development differ depending on the inclusion of Banwell Bypass. In the Cumulative Impact 1 scenario, which includes the bypass, the HIF connections are as illustrated in Figure 61 (Emerging Local Plan

Option 2). This includes:

a) Parcel 1a is connected to north Wolvershill Road, which remains open to all traffic north of the bypass.

b) Parcel 1b is connected to Summer Lane, which becomes a no through route, providing access to the HIF development from the A371 only.

c) Parcel 1c is connected to the bypass east of Wolvershill Road.

d) Unconstrained priority junctions are used to connect the HIF parcels to the rest of the modelled network.

e) No development is proposed in Parcel 2.

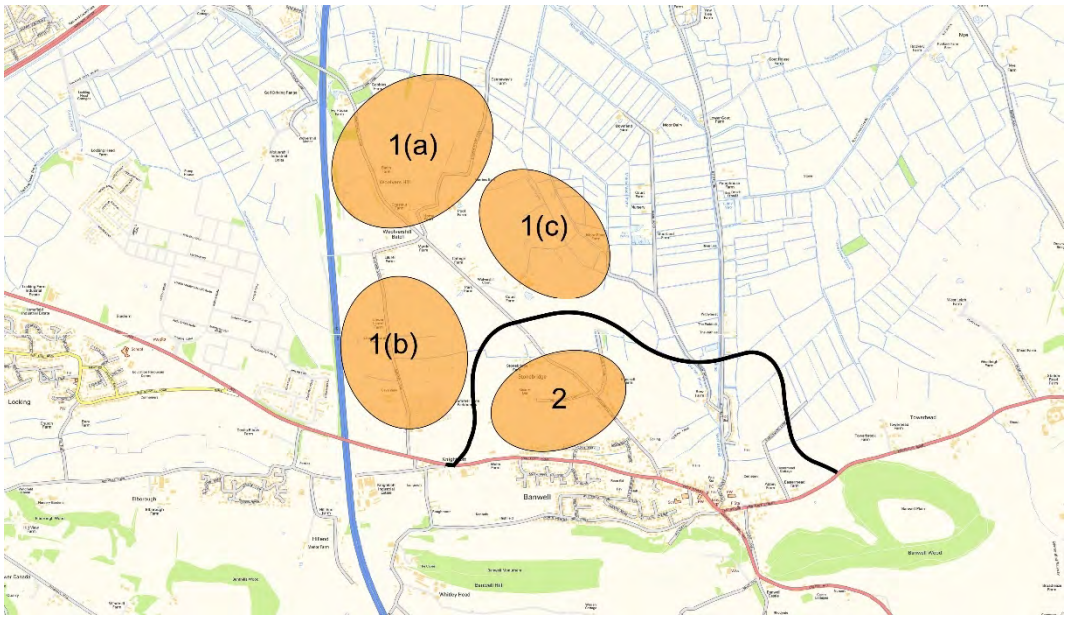


Figure 61 HIF Connections with Bypass

7.2.9 In the Cumulative Impacts 2 scenario, which does not include the bypass, Parcel 1c is instead accessed from Wolvershill Road north of the bypass. This complete set of connections in this scenario is as follows:

a) Parcel 1a is connected to north Wolvershill Road, which remains open to all traffic north of the bypass.

b) Parcel 1b is connected to Summer Lane, which becomes a no through route, providing access to the HIF development from the A371 only. Signalisation of this junction has been considered as part of a separate sensitivity test (Sensitivity Test 05), as detailed in Section 9 of this TA.

c) Parcel 1c is connected to Wolvershill Road north of the bypass.

d) Unconstrained priority junctions are used to connect the HIF parcels to the rest of the modelled network.

e) No development is proposed in Parcel 2.

7.3 Baseline Traffic Modelling

7.3.1 The LMVR for the North Somerset Strategic Model (NSSM; 2020) examines how well the model validates in a base year of 2018. The model is a strategic highway assignment model that primarily represents the inter-urban arterial routes within North Somerset. It is derived from National Highways' SWRTM model and therefore contains good underlying strategic demand and routing derived from mobile phone data. Further detail has been added to the model in the form of additional links and smaller zones so that it better represents key local areas within North Somerset.

7.3.2 The model has been calibrated through a typical iterative process of analysis and adjustment. The demand matrices have been manually adjusted and then an automated matrix estimation process has been used to further refine the trip distribution in key areas. The LMVR presented an examination of the post estimation matrices, and this shows that the change in the matrix due to matrix estimation is within the thresholds set out in TAG.

7.3.3 Following the preparation of the LMVR, the network was updated for the Banwell Bypass project and then further enhanced to create the updated Banwell Strategic Model (BSM). These enhancements have been documented in the Strategic Model LMVR Addendum and have on the whole slightly improved or maintained model validation, particularly in areas local to Banwell.

7.3.4 Link flow validation of the updated BSM at other key locations is shown in Table 15, Table 16 and Table 17 for the AM peak hour, inter peak hour and PM peak hour respectively. Flows are in vehicles.

7.3.5 In comparison to the original BSM, overall link flow validation of the updated BSM at these additional locations is slightly worse in the AM peak hour and PM peak hour but slightly better in the inter peak hour. Generally these changes are a result of a small change in modelled flow indicating links were on the pass/ fail border in the original BSM.

7.3.6 Across the whole model, the updated BSM meets TAG screenline and link flow validation requirements in all periods and meets journey time validation requirements in the inter peak and PM; achieving 84% in the AM. Locally, the updated BSM meets TAG link flow validation requirements in all periods. It meets screenline validation **r**equirements in the AM and inter peak; achieving 83% in the PM, and meets journey time validation requirements in the inter peak and PM; achieving 83% in the PM. Accordingly the updated BSM was deemed sufficiently well validated to be taken forward for forecasting whilst understanding and considering localised areas of poor validation.

Table 15: Updated BSM Base Year Validation at Other Key Locations – AM Peak Hour

Location	Direction	Source	Observed Flow	Modelled Difference	TAG Compliant
A371 through Banwell - west of Wolvershill Road	Eastbound	MCC	258	+181	No
A371 through Banwell - west of Wolvershill Road	Westbound	MCC	385	-47	Yes
A371 through Banwell - east of Wolvershill Road	Eastbound	MCC	457	+108	Yes
A371 through Banwell - east of Wolvershill Road	Westbound	MCC	554	-52	Yes
A370 Bristol Road west of Silvermoor Lane, Hewish	Westbound	ATC	791	+205	No
M5 J21 SB On Slip	Southbound	WebTRIS	345	+151	No
M5 J21 SB Off Slip	Southbound	WebTRIS	1,110	+175	No
M5 J21 NB On Slip	Northbound	WebTRIS	1,795	+103	Yes
M5 J21 NB Off Slip	Northbound	WebTRIS	383	+55	Yes
M5 J21 SB On Slip	Southbound	MCC	435	+61	Yes
M5 J21 SB Off Slip	Southbound	MCC	1,334	-49	Yes
M5 J21 NB On Slip	Northbound	MCC	2,012	-114	Yes
M5 J21 NB Off Slip	Northbound	MCC	430	+9	Yes
Winscombe Hill leading to Church Road	Eastbound	ATC	30	+39	Yes
Winscombe Hill leading to Church Road	Westbound	ATC	111	-90	Yes
A368 Dinghurst Road	Eastbound	ATC	325	+54	Yes
A368 Dinghurst Road	Westbound	ATC	219	+68	Yes

Table 16: Updated BSM Base Year Validation at Other Key Locations – Inter Peak Hour

Location	Direction	Source	Observed Flow	Modelled Difference	TAG Compliant
A371 through Banwell - west of Wolvershill Road	Eastbound	MCC	289	+50	Yes
A371 through Banwell - west of Wolvershill Road	Westbound	MCC	346	-18	Yes
A371 through Banwell - east of Wolvershill Road	Eastbound	MCC	400	+38	Yes
A371 through Banwell - east of Wolvershill Road	Westbound	MCC	473	-64	Yes
A370 Bristol Road west of Silvermoor Lane, Hewish	Westbound	ATC	675	+80	Yes
M5 J21 SB On Slip	Southbound	WebTRIS	266	+81	Yes
M5 J21 SB Off Slip	Southbound	WebTRIS	1,041	+110	Yes
M5 J21 NB On Slip	Northbound	WebTRIS	969	+14	Yes
M5 J21 NB Off Slip	Northbound	WebTRIS	295	+74	Yes
M5 J21 SB On Slip	Southbound	MCC	301	+45	Yes
M5 J21 SB Off Slip	Southbound	MCC	1,054	+98	Yes
M5 J21 NB On Slip	Northbound	MCC	988	-5	Yes
M5 J21 NB Off Slip	Northbound	MCC	285	+84	Yes
Winscombe Hill leading to Church Road	Eastbound	ATC	34	+55	Yes
Winscombe Hill leading to Church Road	Westbound	ATC	60	+18	Yes
A368 Dinghurst Road	Eastbound	ATC	208	+95	Yes
A368 Dinghurst Road	Westbound	ATC	213	+64	Yes

Table 17: Updated BSM Base Year Validation at Other Key Locations – PM Peak Hour

Location	Direction	Source	Observed Flow	Modelled Difference	TAG Compliant
A371 through Banwell - west of Wolvershill Road	Eastbound	MCC	256	+155	No
A371 through Banwell - west of Wolvershill Road	Westbound	MCC	482	-96	Yes
A371 through Banwell - east of Wolvershill Road	Eastbound	MCC	399	+150	No
A371 through Banwell - east of Wolvershill Road	Westbound	MCC	715	-176	No
A370 Bristol Road west of Silvermoor Lane, Hewish	Westbound	ATC	858	+66	Yes
M5 J21 SB On Slip	Southbound	WebTRIS	375	-8	Yes
M5 J21 SB Off Slip	Southbound	WebTRIS	1,915	+191	Yes
M5 J21 NB On Slip	Northbound	WebTRIS	1,095	+3	Yes
M5 J21 NB Off Slip	Northbound	WebTRIS	475	+64	Yes
M5 J21 SB On Slip	Southbound	MCC	462	-95	Yes
M5 J21 SB Off Slip	Southbound	MCC	2,134	-29	Yes
M5 J21 NB On Slip	Northbound	MCC	1,212	-115	Yes
M5 J21 NB Off Slip	Northbound	MCC	502	+38	Yes
Winscombe Hill leading to Church Road	Eastbound	ATC	33	+49	Yes
Winscombe Hill leading to Church Road	Westbound	ATC	70	-14	Yes
A368 Dinghurst Road	Eastbound	ATC	257	+104	No
A368 Dinghurst Road	Westbound	ATC	344	+22	Yes

7.4 Future Year Forecast Modelling

Opening Year Impacts

The impact of the bypass in 2024 is presented in Table 18 and Table 19. Figure 62,

7.4.1 Figure 63 and Figure 64 present a comparison of the flows between the With Bypass + scenario and the Without Bypass scenario.

7.4.2 The flow change plots show that as congestion through Banwell is significantly reduced by the opening of the bypass there is a decrease in east-west flows because trips switch to using the bypass. Almost all traffic that used the A371 through Banwell without the bypass uses the bypass instead, north of Banwell (on the A370 and B3133) there is a decrease of around 40 pcus in both peaks and south of Banwell (on the A370 and A38) there is a decrease of around 100 pcus in the AM peak and 170 pcus in the PM peak.

7.4.3 As a result of the attractiveness of the bypass, traffic flows on the A368 to the east and the A371 to the west increase as vehicles reroute to make use of the bypass. The increase in flow through the Banwell area, particularly on the Southern Link, has a “ripple effect” as other flows that previously travelled on Castle Hill between Banwell and Winscombe, shift outwards to alternative routes. This effect is most notable on traffic to and from Cheddar, with 200 more pcus using Shipham Road towards Cheddar in the AM peak.

Table 18: Opening Year (2024) Forecast Traffic Flows (AM Peak Hour)

Location	Direction	Base Year (2018)	2024 Do Minimum	2024 Do Something	2024 Do Something-Do Minimum
A371 West of Banwell Road (Locking)	Eastbound	444	573	632	59
	Westbound	432	481	508	27
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	565	601	124	-477
	Westbound	502	505	149	-356
Bypass Western Section	Eastbound	-	-	611	
	Westbound	-	-	384	
Bypass Middle Section	Eastbound	-	-	706	
	Westbound	-	-	453	
Bypass Eastern Section	Eastbound	-	-	706	
	Westbound	-	-	453	
Wolvershill Road North of Bypass	Northbound	243	240	318	78
	Southbound	206	214	343	129
Riverside North of Banwell	Northbound	117	123	123	0
	Southbound	125	128	99	-29
Southern Link West of Banwell Junction / Castle Hill	Northbound	297	318	297	-21
	Southbound	304	327	473	146
Hill Road South of A368 (Sandford)	Northbound	104	107	110	3
	Southbound	66	73	81	8
A368 West of A38 (Churchill)	Eastbound	404	413	504	91
	Westbound	323	310	366	56
A371 West of Sandford Road (Winscombe)	Eastbound	200	232	356	124
	Westbound	205	207	185	-22
Church Road (Winscombe)	Northbound	101	122	122	0
	Southbound	113	106	128	22
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	310	302	432	130
	Westbound	295	292	375	83
North South Link Road (A371 Locking to Churchland Way)	Northbound	-	589	565	-24
	Southbound	-	266	240	-26

Table 19: Opening Year (2024) Forecast Traffic Flows (PM Peak Hour)

Location	Direction	Base Year (2018)	2024 Do Minimum	2024 Do Something	2024 Do Something-Do Minimum
A371 West of Banwell Road (Locking)	Eastbound	418	506	542	36
	Westbound	329	459	508	49
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	549	575	140	-435
	Westbound	539	539	169	-370
Bypass Western Section	Eastbound	-	-	422	
	Westbound	-	-	430	
Bypass Middle Section	Eastbound	-	-	633	
	Westbound	-	-	682	
Bypass Eastern Section	Eastbound	-	-	633	
	Westbound	-	-	682	
Wolvershill Road North of Bypass	Northbound	238	197	390	193
	Southbound	223	227	348	121
Riverside North of Banwell	Northbound	117	129	112	-17
	Southbound	125	133	116	-17
Southern Link West of Banwell Junction / Castle Hill	Northbound	378	424	404	-20
	Southbound	294	279	351	72
Hill Road South of A368 (Sandford)	Northbound	79	81	101	20
	Southbound	84	87	89	2
A368 West of A38 (Churchill)	Eastbound	390	407	502	95
	Westbound	388	412	569	157
A371 West of Sandford Road (Winscombe)	Eastbound	156	140	213	73
	Westbound	281	321	296	-25
Church Road (Winscombe)	Northbound	103	110	115	5
	Southbound	143	146	145	-1
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	314	333	465	132
	Westbound	319	320	526	206
North South Link Road (A371 Locking to Churchland Way)	Northbound	-	319	309	-10
	Southbound	-	518	505	-13

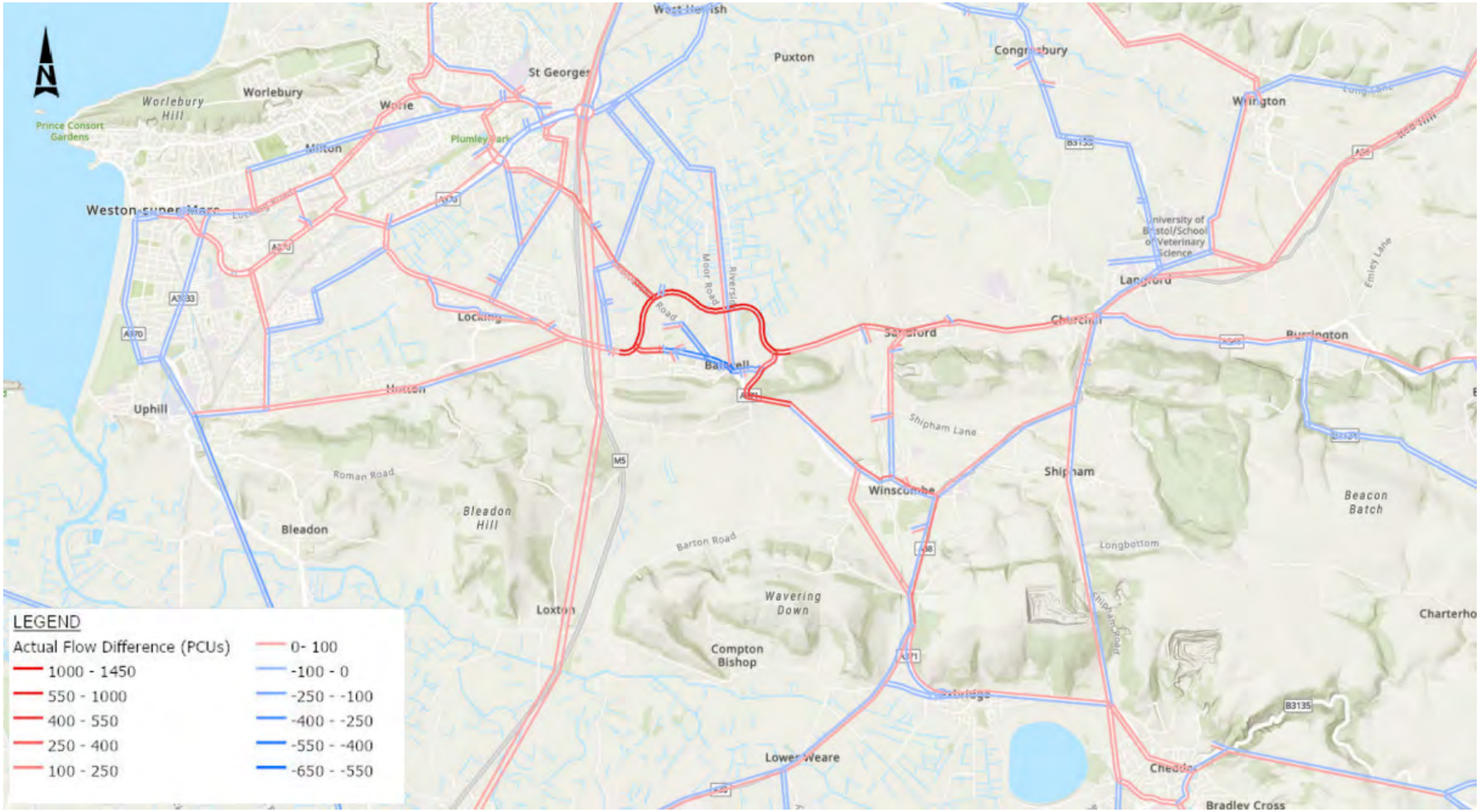


Figure 62: 2024 comparison of With Bypass+ and Without Bypass (AM)

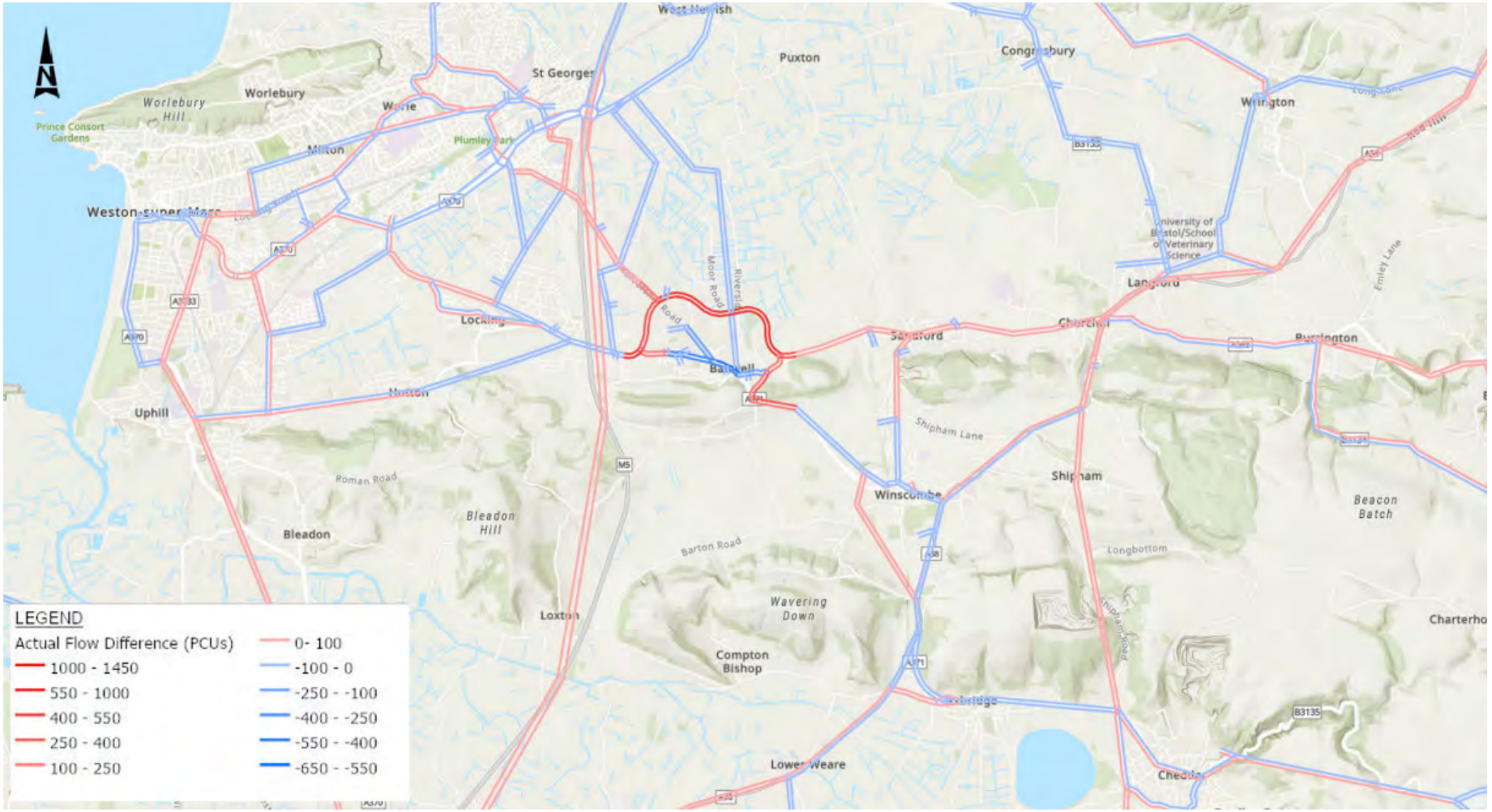


Figure 63: 2024 comparison of With Bypass+ and Without Bypass (IP)

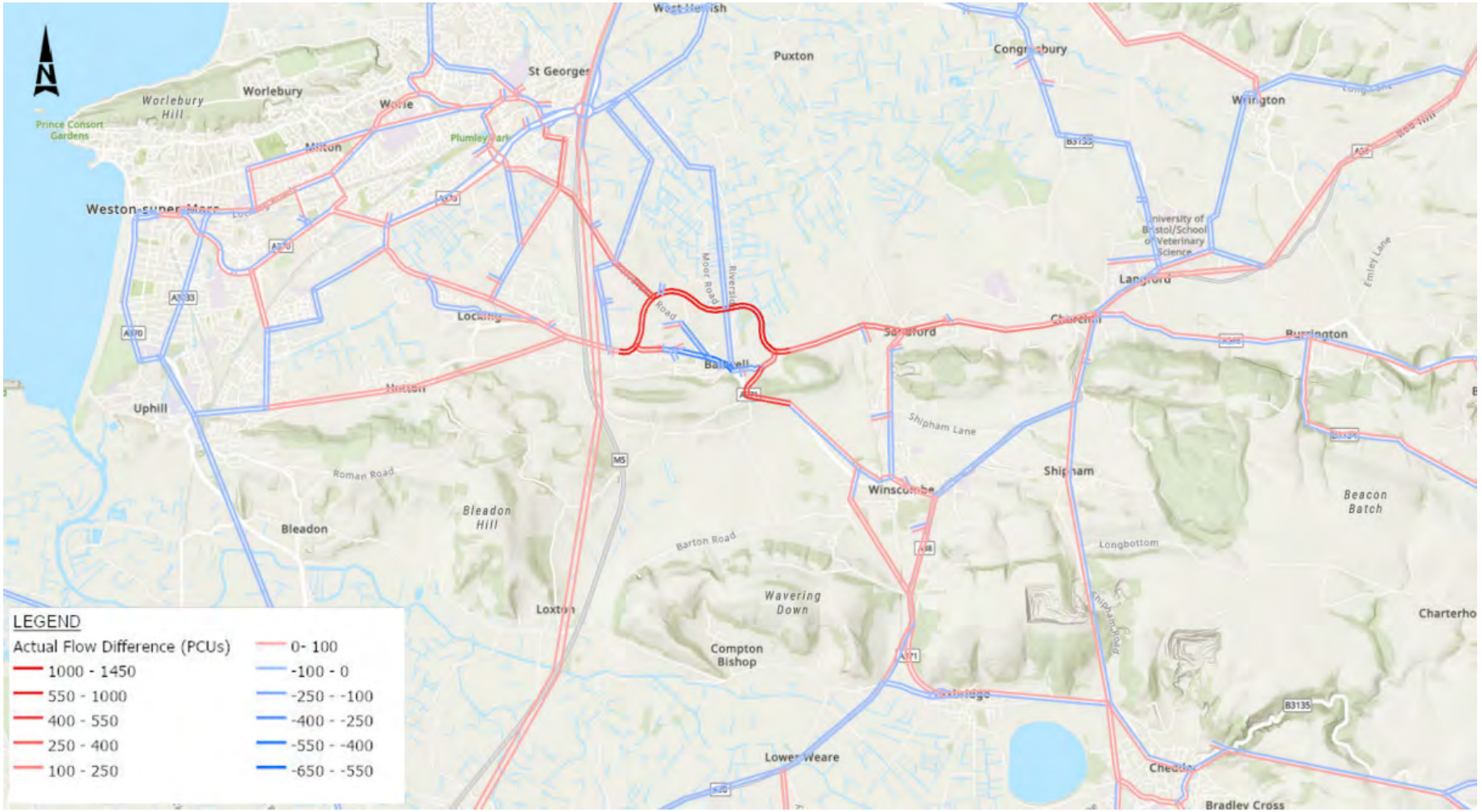


Figure 64: 2024 comparison of With Bypass+ and Without Bypass (PM)

7.4.4 East-west journey times reduce in all periods with introduction of the bypass, as summarised in Table 8 below.

Table 20: Recorded Journey Times

Route	Direction	2024 DM Difference from Base Year	2024 DS+ Difference from Do Minimum	2024 DS+ Difference from Base Year
AM Peak Hour				
A368 Corridor - A371 Helicopter Roundabout to A38 Churchill Gate	Eastbound	02:48	-03:38	-00:50
	Westbound	02:31	-02:45	-00:14
A368/A371 Corridor - A371 Helicopter Roundabout to A30 Sidcot Junction	Eastbound	02:32	-06:32	-04:00
	Westbound	02:33	-02:54	-00:22
PM Peak Hour				
A368 Corridor - A371 Helicopter Roundabout to A38 Churchill Gate	Eastbound	02:22	-06:16	-03:55
	Westbound	00:44	-03:44	-03:00
A368/A371 Corridor - A371 Helicopter Roundabout to A30 Sidcot Junction	Eastbound	00:30	00:35	01:05
	Westbound	02:04	-04:21	-02:18

Residual and Cumulative Impacts

7.4.5 The forecast traffic flows for the Cumulative Impacts scenarios are presented in Table 21 and Table 22. The combined impact of the bypass with the HIF development in 2039 is also shown illustratively in Figure 65, Figure 66 and Figure 67. These figures show the difference in flows between the Cumulative Impacts 1 scenario and the Without Bypass scenario.

Table 21: Cumulative Impacts (2039) Forecast Traffic Flows (AM Peak Hour)

Location	Direction	2039 Do Min.	2039 CI1	2039 CI2	2039 CI1 – Do Min.	2039 CI1 – 2039 CI2
A371 West of Banwell Road (Locking)	Eastbound	812	1007	1067	194	-60
	Westbound	378	678	561	300	117
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	817	314	321	-502	-7
	Westbound	441	210	158	-231	52
Bypass Western Section	Eastbound	-	876	-	-	-
	Westbound	-	697	-	-	-
Bypass Middle Section	Eastbound	-	1027	-	-	-
	Westbound	-	356	-	-	-
Bypass Eastern Section	Eastbound	-	1027	-	-	-
	Westbound	-	356	-	-	-
Wolvershill Road North of Bypass	Northbound	206	448	57	242	392
	Southbound	206	666	73	460	593
Riverside North of Banwell	Northbound	144	174	165	30	9
	Southbound	137	71	78	-66	-7
Southern Link West of Banwell Junction / Castle Hill	Northbound	287	271	278	-16	-7
	Southbound	377	686	673	309	14
Hill Road South of A368 (Sandford)	Northbound	126	120	138	-6	-18
	Southbound	79	93	75	14	18
A368 West of A38 (Churchill)	Eastbound	484	719	886	236	-166
	Westbound	285	315	277	30	38
A371 West of Sandford Road (Winscombe)	Eastbound	259	561	540	302	21
	Westbound	163	145	151	-19	-6
Church Road (Winscombe)	Northbound	140	143	143	3	0
	Southbound	134	141	148	7	-7
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	315	669	762	355	-92
	Westbound	262	322	274	61	48
North South Link Road (A371 Locking to Churchland Way)	Northbound	719	896	823	176	73
	Southbound	445	569	618	124	-48

Table 22: Cumulative Impacts (2039) Forecast Traffic Flows (PM Peak Hour)

Location	Direction	2039 Do Min.	2039 CI1	2039 CI2	2039 CI1 – Do Min.	2039 CI1 – 2039 CI2
A371 West of Banwell Road (Locking)	Eastbound	334	684	590	350	94
	Westbound	511	784	602	273	182
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	621	132	565	-489	-433
	Westbound	531	265	562	-266	-297
Bypass Western Section	Eastbound	-	675	-	-	-
	Westbound	-	792	-	-	-
Bypass Middle Section	Eastbound	-	575	-	-	-
	Westbound	-	957	-	-	-
Bypass Eastern Section	Eastbound	-	575	-	-	-
	Westbound	-	957	-	-	-
Wolvershill Road North of Bypass	Northbound	259	697	387	438	310
	Southbound	409	604	400	195	204
Riverside North of Banwell	Northbound	143	132	143	-10	-10
	Southbound	129	138	135	9	3
Southern Link West of Banwell Junction / Castle Hill	Northbound	560	563	601	3	-37
	Southbound	250	313	243	63	70
Hill Road South of A368 (Sandford)	Northbound	88	122	88	34	34
	Southbound	226	97	236	-129	-139
A368 West of A38 (Churchill)	Eastbound	457	520	437	63	83
	Westbound	543	765	532	222	233
A371 West of Sandford Road (Winscombe)	Eastbound	116	182	111	66	72
	Westbound	459	448	494	-11	-47
Church Road (Winscombe)	Northbound	113	127	118	14	9
	Southbound	146	142	144	-4	-2
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	340	457	321	117	136
	Westbound	293	745	283	451	462
North South Link Road (A371 Locking to Churchland Way)	Northbound	377	532	556	154	-25
	Southbound	343	466	489	123	-24

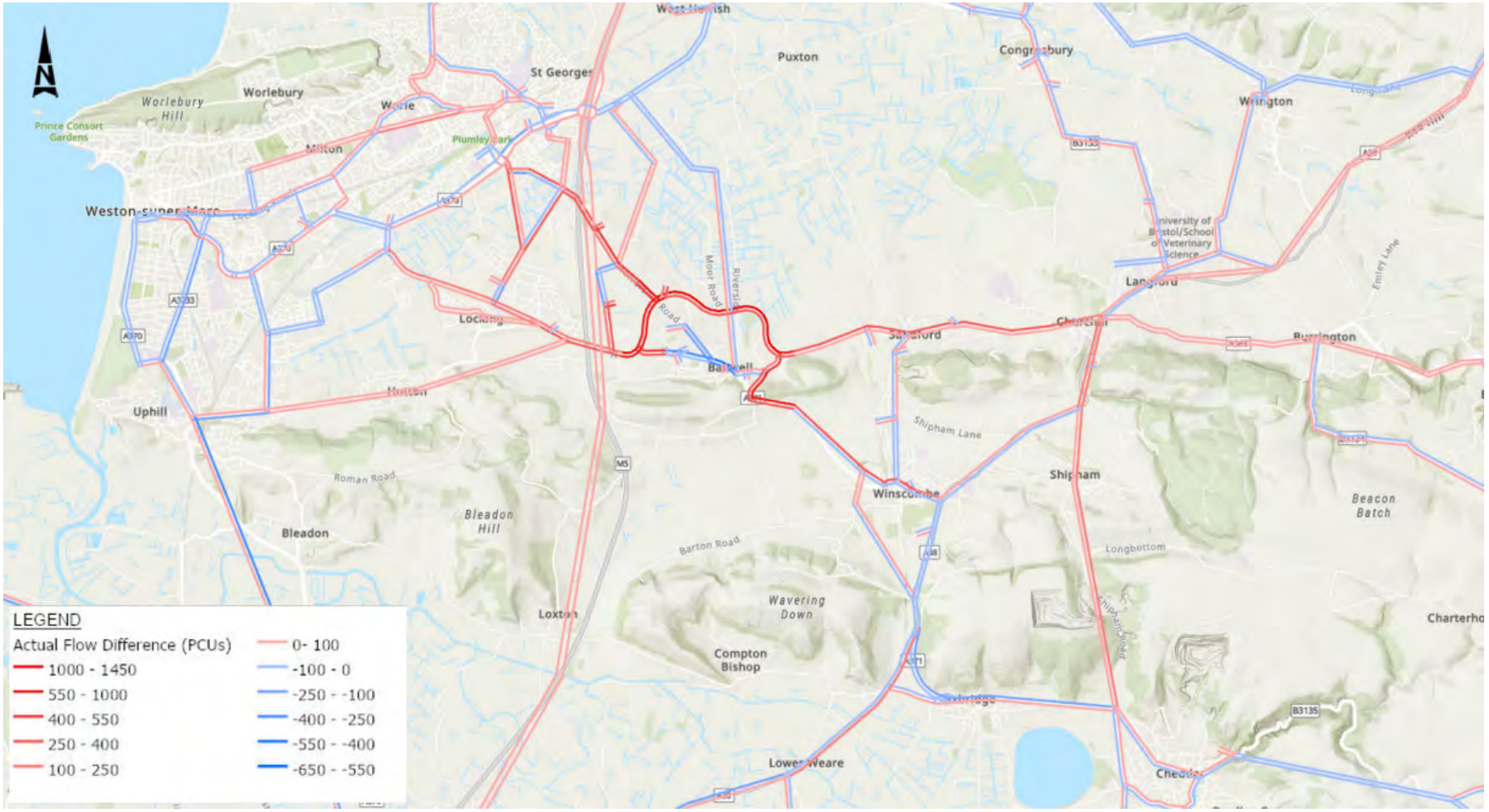


Figure 65: 2039 Comparison of Cumulative Impacts 1 and Without Bypass (AM)

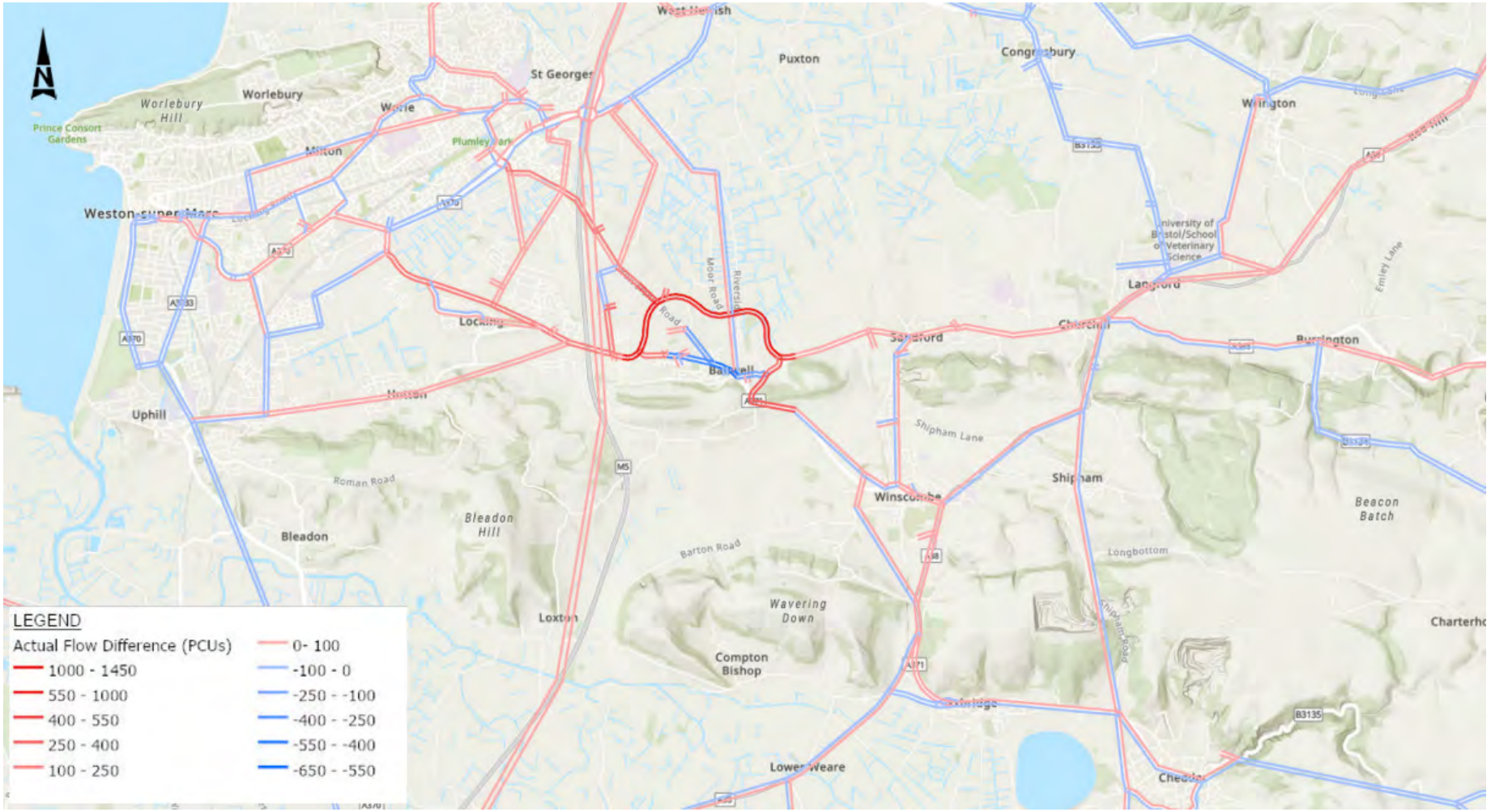


Figure 66: 2039 Comparison of Cumulative Impacts 1 and Without Bypass (IP)

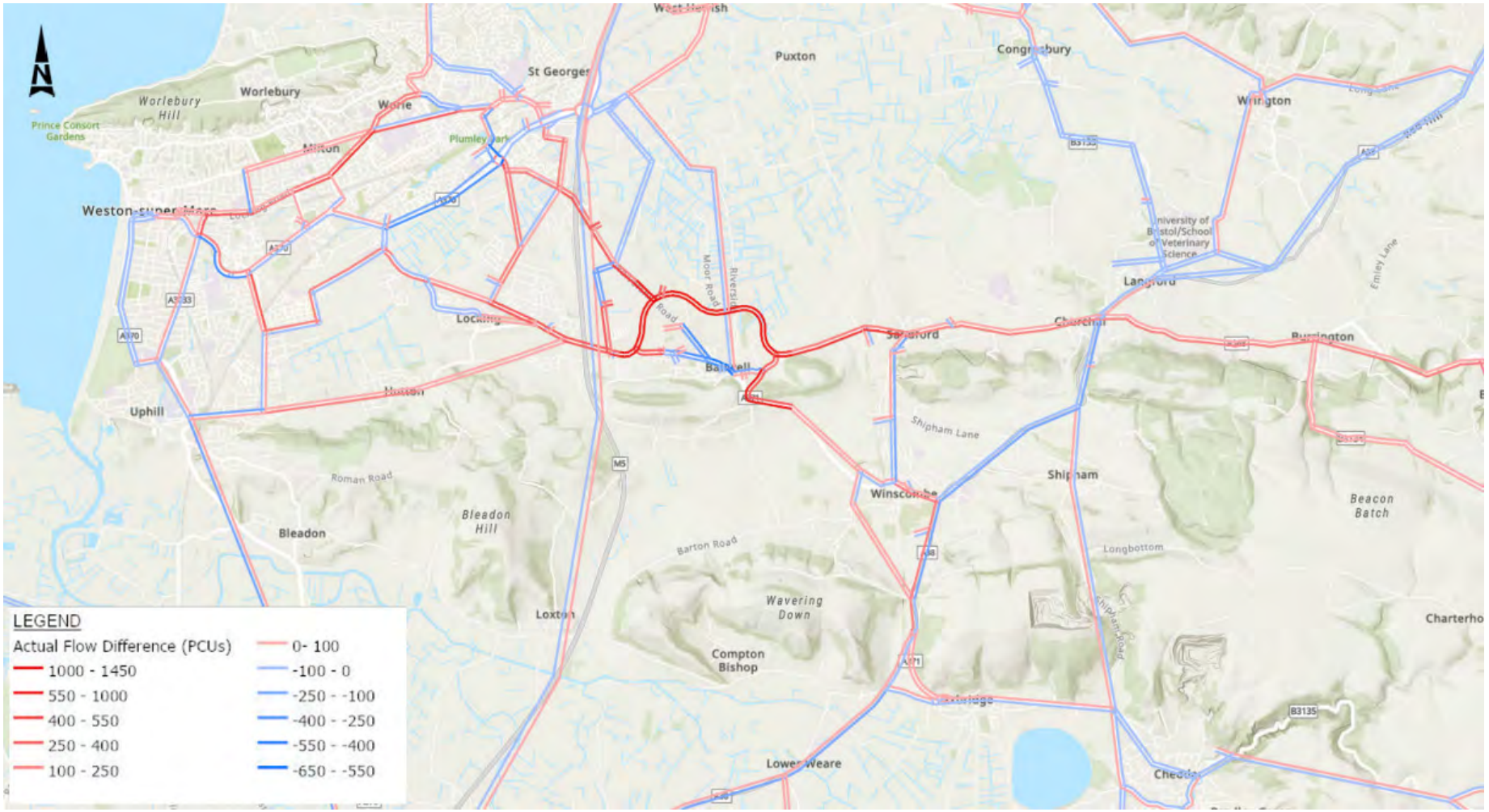


Figure 67: 2039 Comparison of Cumulative Impacts 1 and Without Bypass (PM)

7.4.6 The traffic figures presented in this section should be considered worst-case as the 2039 future year modelling scenarios do not include the following measures and interventions:

a) Any mitigation delivered as part of the emerging Local Plan;
b) Changes to more sustainable travel habits/ homeworking;
c) Uptake of public transport as a result of the BSIP; and
d) Measures to reduce impacts from transport related carbon.

7.4.7 In 2039 the changes with the bypass are similar in pattern but to a greater extent as a result of additional traffic growth and the HIF development north of Banwell.

7.4.8 Additionally, in 2039 without the bypass in the PM peak almost a third of westbound traffic approaching Banwell on the A368 diverts via Winscombe using Hill Road and Castle Hill. This diversion is beneficial without the bypass as it avoids the right turn from the A368 East Street to A371 West Street. With the introduction of the bypass this diversion and rat running does not occur as delay at the junction of the A368 East Street and A371 West Street is significantly reduced. This result is obscured in places in the flow change plots as it is offset by highly localised changes in routing associated with trips to and from Banwell and Winscombe zones switching between using alternative centroid connectors.

7.4.9 The prominent increase in flows between Banwell and Weston-super-Mare in the Cumulative Impacts Scenario (between 550 and 780 PCUs depending on time period and direction) is due to the HIF development at Banwell, as Weston-super-Mare is the largest attractor of these trips due to its size and location.

7.4.10 East-west journey times reduce in all periods with introduction of the bypass, as summarised in Table 23.

Table 23: Forecast Journey Times (2039)

Route	Direction	2039 DM Difference from Base Year	2039 CI1 Difference from Do Minimum	2039 CI1 Difference from Base Year
AM Peak Hour				
A368 Corridor - A371 Helicopter Roundabout to A38 Churchill Gate	Eastbound	17:41	-09:17	08:24
	Westbound	05:03	-00:19	04:44
A368/A371 Corridor - A371 Helicopter Roundabout to A30 Sidcot Junction	Eastbound	15:28	-09:43	05:45
	Westbound	05:07	-00:23	04:44
PM Peak Hour				
A368 Corridor - A371 Helicopter Roundabout to A38 Churchill Gate	Eastbound	10:05	-11:28	-01:24
	Westbound	06:41	-07:48	-01:06
A368/A371 Corridor - A371 Helicopter Roundabout to A30 Sidcot Junction	Eastbound	01:25	01:35	03:01
	Westbound	08:27	-10:03	-01:37

7.5 Junction Capacity Assessment

Introduction

7.5.1 The Junction Modelling Report (Document Ref: BNWLBP-ARP-EGN-XXXX-RP-TR-00002), included in Appendix F, details the findings of the junction capacity assessments. The findings of this assessment are summarised in this section of the TA.

7.5.2 The study area for the assessment includes 28 existing and committed junctions and three junctions proposed as part of the Scheme. The existing and committed junction locations are illustrated in Figure 68 below.

7.5.3 To assess the operational performance of the priority junctions and roundabouts, the PICADY and ARCADY packages of the modelling software 'Junctions 10' has been used, respectively. To assess the signalised junctions, the modelling software 'LinSig' has been used.

7.5.4 The results for the junctions modelled in Junctions 10 will include the Ratio of Flow to Capacity (RFC). RFC is a measure of the volume of traffic making a turning movement at the junction, divided by the capacity of that movement, which is ascertained from the geometric measurements of the junction. A value of 100% (1.0), signifies that the capacity of the road has been reached, thus resulting in vehicle queues.

7.5.5 ARCADY models assume the entire entry width of a roundabout is available to vehicles and there is equal lane usage. For roundabout where this is significant unequal lane usage, Lane Simulation Mode has been used to assess the junction. Given this mode does not provide RFC results, the Level of Services (LoS) has been quoted.

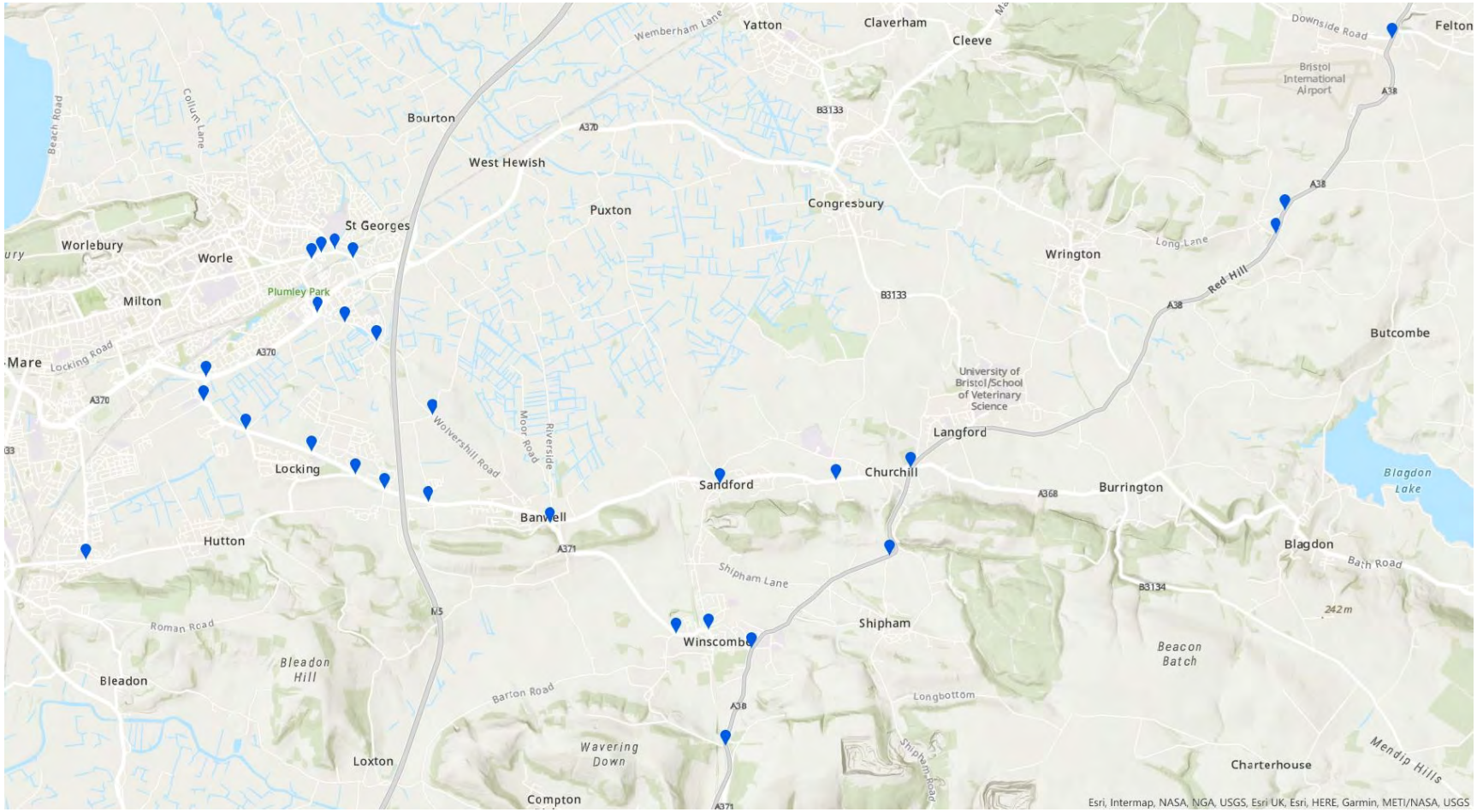


Figure 68: Junction capacity Assessment Study Area

7.5.6 As stated in the DMRB Vol. 6, the generally agreed operational capacity of a junction is at a ratio of 0.85 for roundabouts and priority junctions. RFC values over 85% are typically regarded as suffering from traffic congestion, with queues of vehicles beginning to form. It is generally accepted that RFC values of less than 0.85 means that the junction is operating at an acceptable level. Junctions can still operate within capacity with an RFC value of up to 1.00, however as practical capacity is approached delays will increase.

7.5.7 The results for the junctions modelled in LinSig will include Practical Reserve Capacity (PRC). PRC is a measure of how much additional traffic could pass through a junction and is calculated from the maximum degree of saturation on each lane.

7.5.8 These parameters have been used to summarise the operational effectiveness of individual junctions in accordance with the following pre-determined thresholds:

Table 24: Junction Modelling Results Parameters

Within Practical Capacity – junctions with an RFC below 0.85, LoS A-C or PRC above 0% have been deemed to operate within practical capacity.	
Over Practical Capacity, Approaching Theoretical Capacity – junctions with an RFC of between 0.85-0.99, LoS D-E or a PRC of between -10% and 0%.	
Over Theoretical Capacity - junctions with an RFC over 1.00, LoS of E or PRC below -10% have been deemed to operate over theoretical capacity with substantial queuing delays.	

7.5.9 The remainder of this section presents a summary of the assessment results, detailing the PRC for signal-controlled junctions and the worst RFC/LoS for priority-controlled junctions, subject to whether Lane Simulation has been used.

7.5.10 All existing junction arrangements have been assessed with 2022 survey data. Junction models have also been validated with queue length surveys collected on the same day as the traffic count surveys. Video footage was also collected and has been used to validate the models and inform assumptions, such as the number of times a signal-controlled pedestrian crossing is called in an hour.

7.5.11 Traffic flows can vary on the transport network from day-to-day and as such, the extent of queuing and delay experienced by

road users can also vary. The junction models represent the observed conditions on the day of the traffic count survey.

Assessment Scenarios

7.5.12 Table 25 presents the assessment scenarios have been used to inform the junction capacity assessments.

Table 25: Summary of Modelled Scenarios

Scenario	Description
2022 Base	Surveyed Traffic Flows
2024 Do Minimum	Do Minimum scenario (without the Scheme)
2024 Do Something	As With Bypass scenario with 20mph speed limit through Banwell
2039 Do Minimum	Do Minimum Scenario. Trips associated with the HIF development at Banwell that cannot be enabled without the bypass are instead distributed across North Somerset, representing that the same number of dwellings must be accommodated elsewhere.
2039 Cumulative Impacts 1	As Do Minimum scenario with addition of the bypass, 20mph speed limit through Banwell and addition of the HIF development in Banwell
2039 Cumulative Impacts 2	As Do Minimum scenario with addition of the HIF development in Banwell, without the Bypass and without 20mph speed limit through Banwell

7.5.13 A comparison of the 2024 Do Minimum and 2024 Do Something assessment scenarios indicates the traffic impacts associated with the Scheme in the opening year. In 2039, a comparison of the Cumulative Impacts 2 and Cumulative Impacts 1 assessment scenarios indicates the traffic impacts associated with the Scheme. Whilst the 2039 Do Minimum scenario does not include the Scheme, the housing allocations are distributed across North Somerset.

Banwell

7.5.14 There are three junctions located within Banwell that have been assessed, excluding those proposed as part of the scheme. The assessment result are summarised in Table 26 and Table 27 below.

Table 26: Banwell Base and Opening Year Assessment Results (RFC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A371 West Street/A368 East Street/ High Street	0.58	0.76	0.61	0.72	0.56	0.61
Wolvershill Road/Silver Moor Lane/ Summer Lane	0.26	0.17	0.14	0.09	0.12	0.08
A371 Knightcott Road/Summer Lane/Well Lane	0.10	0.15	0.05	0.11	0.06	0.07

Table 27: Banwell 2039 Future Year Assessment Results (RFC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A371 West Street/A368 East Street/ High Street	0.60	0.70	0.42	0.64	0.55	0.69
Wolvershill Road/Silver Moor Lane/ Summer Lane	0.22	0.28	0.18	0.19	0.13	0.18
A371 Knightcott Road/Summer Lane/Well Lane	1.22	0.50	1.91	1.63	1.78	1.13

7.5.15 In the 2039, Do Something scenario, the A371 Knightcott Road/ Summer Lane/Well Lane junction is forecast to exceed theoretical capacity. Mitigation has been explored at this junction, as detailed in Section 8.3.

Sandford and Churchill

7.5.16 Four junctions have been assessed in the Sandford and Churchill area and the modelling results are summarised in Table 28 and Table 29 below.

Table 28: Sandford & Churchill Base and Opening Year Assessment Results (RFC/PRC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A368 Station Rd/ Hill Road/Nye Rd	0.29	0.25	0.31	0.27	0.29	0.39
A368 Dinghurst Rd/Hillier's Ln	0.50	0.20	0.54	0.20	0.69	0.31
A368/A38 Churchill Gate	7.4%	36.4%	-16.2%	8.9%	-26.9%	2.7%
A38/New Road	0.57	0.47	0.60	0.48	0.65	0.51

Table 29: Sandford & Churchill 2039 Future Year Assessment Results (RFC/PRC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A368 Station Rd/ Hill Road/Nye Rd	0.44	0.42	0.39	0.45	0.39	0.43
A368 Dinghurst Rd/Hillier's Ln	0.58	0.27	0.91	0.39	0.56	0.26
A368/A38 Churchill Gate	-29.1%	-3.7%	-52.4%	-17.9%	28.1%	-3.4%
A38/New Road	0.57	0.57	0.64	0.56	0.59	0.55

7.5.17 In the 2039 Do Something (Cumulative Impacts 1) scenario, the A368 Dinghurst Road/Hillier's Lane junction is forecast to exceed practical capacity in the AM peak hour with an RFC of 0.91 and average delays of 80 seconds on Hillier's Lane. As detailed in the Junction Modelling Report (see Appendix F) the increase in traffic flow forecast on Hillier's Lane may be overestimated and therefore the result can be considered worst-case. Therefore mitigation has not been explored at this junction.

7.5.18 In the 2024 Do Minimum scenario, the Churchill Gate junction is forecast to exceed theoretical capacity in the AM peak hour with

a PRC of -16.2%. In the 2024 Do Something scenario, further queuing and delay is forecast with a PRC of -29.1%. In the 2039 Do Something scenario, the junction is forecast to operate over capacity in both the AM and PM peak periods. Mitigation has therefore been explored at this location.

Winscombe

7.5.19 There are four junctions in Winscombe that have been assessed, including three priority junctions and a signal-controlled junctions. The modelling results are summarised in Table 30 and Table 31 below.

Table 30: Winscombe Base and Opening Year Assessment Results (RFC/PRC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A38/A371/ Fountain Lane	56.4%	51.5%	60.6%	48.0%	40.1%	37.2%
A371 Banwell Rd/Church Rd	0.19	0.12	0.23	0.13	0.22	0.14
A371/Sandford Road	0.33	0.34	0.53	0.77	0.45	0.63
A38/Winscombe Hill	0.17	0.18	0.15	0.14	0.23	0.23

Table 31: Winscombe 2039 Future Year Assessment Results (RFC/PRC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A38/A371/ Fountain Lane	36.5%	38.9%	12.3%	23.1%	34.4%	35.1%
A371 Banwell Rd/Church Rd	0.26	0.14	0.26	0.16	0.25	0.15
A371/Sandford Road	0.75	0.59	0.81	0.78	0.76	0.59
A38/Winscombe Hill	0.24	0.17	0.40	0.20	0.25	0.19

7.5.20 As shown in the tables above, the junctions in Winscombe are forecast to operate with spare capacity in all future year scenarios.

7.5.21 Where the Strawberry Line crosses the A371 in Winscombe, the road reduces to a single lane. A LinSig assessment has been

undertaken to understand the impacts of the forecast increase in traffic flow on the A371 on this priority narrowing. The findings of the modelling indicates significant queuing and delays are not expected as a result of the Scheme ate this location.

B3440 Corridor, Weston-super-Mare

7.5.22 There are four junctions in the study area with the B3440 New Bristol Road. The modelling results are summarised in Table 32 and Table 33 below.

Table 32: B3440 Base and Opening Year Assessment Results (RFC/LoS/PRC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
B3440/Shepherds Way	0.98	0.65	1.05	0.79	1.10	0.82
B3440/Queen's Way/Walford Avenue	8.2%	33.1%	7.2%	27.0%	7.5%	27.4%
Victory Roundabout	C	F	C	F	C	F
B3440/Park Way/Summer Ln	0.87	0.99	0.88	1.05	0.89	1.06

Table 33: B3440 2039 Future Year Assessment Results (RFC/LoS/PRC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
B3440/Shepherds Way	1.45	1.70	1.53	2.86	1.51	2.22
B3440/Queen's Way/Walford Avenue	-2.9%	10.5%	-3.3%	8.6%	-3.4%	8.6%
Victory Roundabout	E	F	E	F	E	F
B3440/Park Way/Summer Ln	0.97	0.99	0.98	1.30	0.98	1.28

7.5.23 The B3440/Shepherds Way, Victory Roundabout and B3440/Park Way/Summer Ln Roundabout junctions are forecast to operate over capacity in the future year scenarios without and with the bypass.

7.5.24 Given the capacity issues forecast at these junctions can be attributed to background traffic growth associated with future developments and the impacts of the Scheme are limited, mitigation is not proposed as part of this planning application.

A370 and Wolvershill Road, Weston-super-Mare

7.5.25 The study area includes four junctions on Wolvershill Road and the A370 and the modelling results are summarised in Table 34 and Table 35 below.

Table 34: A370 Base and Opening Year Assessment Results (RFC/LoS/PRC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Wolvershill Road/ Scott Elm Drive/Derek Mead Way	0.25	0.21	0.23	0.18	0.28	0.25
Churchland Way/Spine Round	n/a	n/a	0.88	0.78	0.84	0.76
West Wick Roundabout	69.4%	22.6%	22.0%	7.4%	21.1%	3.6%
Airport Roundabout	F	F	F	F	F	F

Table 35: A370 2039 Future Year Assessment Results (RFC/LoS/PRC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Wolvershill Road/ Scott Elm Drive/Derek Mead Way	0.35	0.35	0.52	0.51	0.37	0.40
Churchland Way/Spine Round	0.88	0.56	1.41	0.77	1.42	0.77
West Wick Roundabout	-11.4%	-11.0%	-9.1%	-13.4%	-11.7%	-11.0%
Airport Roundabout	F	F	F	F	F	F

7.5.26 The committed Churchland Way/Spine Road priority junction is forecast to operate over capacity in the 2039 Cumulative Impacts 1 & 2 scenarios in the AM peak hour. The Scheme is shown to

provide a minimal improvement to capacity.

7.5.27 West Wick Roundabout is forecast to exceed theoretical capacity in the 2039 future year scenarios. A comparison of the without and with bypass scenarios indicates the Scheme will have a limited impact on the operation of the junction. Similarly, Airport Roundabout is also forecast to operate over capacity with and without the Scheme. Mitigation has therefore not been explored at these junctions.

A371, Weston-super-Mare

7.5.28 There are five junctions within the study area along the A371 between Banwell and the A370, including Runway Roundabout.

Table 36: A371 Base and Opening Year Assessment Results (RFC/LoS/PRC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A371/Banwell Road	0.37	0.31	0.38	0.37	0.50	0.51
A371/Old Banwell Road	0.23	0.07	0.22	0.08	0.22	0.09
A371/Spine Road	n/a	n/a	50.6%	94.0%	44.6%	84.1%
A371/Elm Tree Road	0.51	0.39	0.51	0.34	0.53	0.36
Runway Roundabout	A	A	A	A	A	C

Table 37: A371 2039 Future Year Assessment Results (RFC/LoS/PRC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A371/Banwell Road	0.59	0.48	1.17	1.36	0.78	0.90
A371/Old Banwell Road	0.29	0.12	0.47	0.19	0.44	0.11
A371/Spine Road	-6.8%	18.8%	1.2%	20.4%	16.6%	46.7%
A371/Elm Tree Road	0.76	0.30	1.01	0.37	1.00	0.22
Runway Roundabout	D	C	E	F	C	F

7.5.29 The A371/Banwell Road priority junction is forecast to operate over capacity in the 2039 Do Something scenario. Mitigation has therefore been explored at the junction, as detailed in Section 8.3.

7.5.30 Runway roundabout is forecast to operate with spare capacity in the 2024 Do Minimum and Do Something scenarios. With the background traffic associated with future development, the junction is forecast to exceed theoretical capacity in the PM peak scenarios without and with the Scheme. Mitigation has therefore not been explored at this location.

Broadway/Winterstoke Road, Weston-super-Mare

7.5.31 The Broadway/Winterstoke Road three-arm mini-roundabout is located to the west of Winton. The assessment results for this mini roundabout are presented in Table 38 and Table 39.

Table 38: Broadway/Winterstoke Rd Base and Opening Year Assessment Results (RFC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Broadway/Winterstoke Road	0.92	0.98	1.12	1.03	1.06	1.02

Table 39: Broadway/Winterstoke Rd 2039 Future Year Assessment Results (RFC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Broadway/Winterstoke Road	1.73	1.48	1.63	1.41	1.71	1.45

7.5.32 A comparison of the 2024 Do Minimum and Do Something scenarios indicates the performance of the junction will improve with the proposed bypass. A similar observation is made when comparing the 2039 Cumulative Impacts 2 (without bypass) and Cumulative Impacts 1 (with bypass) scenarios. Mitigation has therefore not been explored at this junction.

A38, Redhill and Downside

7.5.33 There are three junctions on the A38 at Redhill and Downside within the agreed study area. There is a committed scheme at the A38/Downside Road signal-controlled junction being developed as part of the Major Road Network works and this has design has formed the basis of this assessment.

Table 40: A38 Base and Opening Year Assessment Results (RFC/PRC)

Junction	Base		2024 Do Minimum		2024 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A38 Red Hill/The Pound	0.07	0.06	0.08	0.07	0.09	0.08
A38 Redhill/ Church Lane	0.14	0.13	0.16	0.15	0.16	0.16
A38/Downside Road	n/a	n/a	69.1%	77.6%	62.1%	77.8%

Table 41: A38 2039 Future Year Assessment Results (RFC/PRC)

Junction	2039 Do Minimum		2039 Do Something		2039 CI2	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
A38 Red Hill/The Pound	0.12	0.12	0.12	0.12	0.11	0.13
A38 Redhill/ Church Lane	0.19	0.19	0.18	0.19	0.18	0.19
A38/Downside Road	42.4%	52.2%	43.1%	52.5%	43.5%	54.3%

7.5.34 The junction capacity assessment results indicate all three junctions will operate with spare capacity in all future year scenarios.

Strategic Road Network

7.5.35 As detailed in the TA Scoping Report, a VISSIM model was proposed to assess the traffic impacts of the Scheme on Junction 21 of the M5 and the surrounding junctions. However, the existing model does not validate well against existing conditions and therefore has not used.

7.5.36 The Junction 21 Southbound Diverge Traffic Assessment, included in Appendix G, details the impacts of the Scheme on the southbound diverge and concludes no interim or permanent

mitigation is required.

7.5.37 A traffic impact assessment (%) has also been undertaken to understand the impacts of the Scheme on Junction 21 of the M5, as summarised in Table 42 below.

Table 42: Junction 21 of the M5 Traffic Impact Assessment

Approach	2024 AM	2024 PM	2039 AM	2039 PM
A - M5 North	-0.6%	-0.5%	-2.2%	-1.9%
B - A370 East	-1.9%	-7.6%	-1.4%	-2.4%
C - M5 South	1.6%	0.2%	-0.5%	-4.9%
D - A370 West	-2.0%	-3.7%	-2.0%	-0.7%
Junction	-1.3%	-2.7%	-1.8%	-1.9%

7.5.38 It can be seen that the Scheme is predicted to reduce traffic flows at Junction 21 of the M5. Therefore, no further assessment of the junction has been undertaken.

Banwell Bypass and the Southern Link

7.5.39 Several junctions are proposed as part of the Scheme, including the following:

a) A371/Bypass roundabout;
b) Bypass/Wolvershill Road signal-controlled junction;
c) Bypass/Southern Link signal-controlled junction; and
d) A368/Southern Link priority junction.

7.5.40 The assessment results for these junctions are presented in Table 43 below.

Table 43: Bypass Future Year Assessment Results (RFC/PRC)

Junction	2024 Do Something		2039 Do Something	
	AM Peak	PM Peak	AM Peak	PM Peak
A371/Bypass	0.49	0.52	0.76	0.77
Bypass/Wolvershill Road	65.0%	61.7%	-2.5%	-5.5%
Bypass/Southern Link	101.3%	90.9%	30%	23.1%
Southern Link/A368	0.78	0.64	0.81	0.31

7.5.41 It can be seen that all junctions are forecast to operate within practical capacity.

Summary

7.5.42 This section presents a summary of the junction modelling results. The study area has been defined through collaborative discussions with NSC HDM and National Highways as part of the TA Scoping Exercise.

7.5.43 Several future years assessment scenarios have been assessed. The specific impacts of the Scheme can be identified by comparing the modelling results of the following scenarios:

a) 2024 Do Minimum/Do Something; and

b) 2039 Cumulative Impacts 2/Do Something (Cumulative Impacts 1).

7.5.44 The change in traffic flows between these scenarios can be directly attributed to the proposed Scheme. The 2024 Do Minimum and Do Something scenarios indicate the impact of the Scheme in the opening year. The 2039 Cumulative Impacts 2 and Cumulative Impacts 1 scenarios present the impacts of the Scheme at the end of the emerging Local Plan period and include the HIF development.

7.5.45 The findings of the junction modelling indicates that several junctions are forecast to operate over capacity in the 2024 and 2039 future year assessment scenarios. The Scheme is shown to directly impact the operation of a few junctions, resulting in increased queuing and delay. Mitigation has therefore been explored at the following junctions, as detailed in Section 8.3:

a) A371 Knightcott Road/Summer Lane/Well Lane

b) A368/A38 Churchill Gate

c) A371/Banwell Road

7.5.46 In addition to the junctions identified above, there are several junctions within the study area that are forecast to operate over capacity in the future year scenarios both without and with the proposed Scheme. The traffic impacts attributable to the Scheme (in isolation from the future HIF development) in 2039 can be seen by comparing the Cumulative Impacts 1 scenario (HIF development with Bypass) with the Cumulative Impacts 2 scenario (HIF development without Bypass), which shows that the capacity issues forecast at these junctions. The impacts of the Scheme in comparison are limited and therefore mitigation is not proposed as part of this planning application.

7.6 Assessment of Reduction in Traffic Flows

Impact in 2024

7.6.1 Delay in the Banwell Narrows increases in the 2024 Do Minimum scenarios as traffic levels increase. With the introduction of the bypass, significant traffic reductions on the Banwell Narrows result in significant reductions in delay.

7.6.2 Elsewhere, in the 2024 Do Minimum scenario, delay on the roads surrounding Banwell is generally low (less than 30 seconds), and changes little with the addition of the bypass. Notable changes are a decrease of approximately 2 minutes delay southbound on Riverside in AM and PM and also northbound of approximately 90 seconds in PM only. The southbound decreases in delay are explained by it being easier to emerge from Riverside as there is less flow on the major arm of the junction due to traffic using the bypass. The decrease in delay northbound in the PM peak is due to a reduction in traffic flow (20 pcus). This happens as some flow switches to Wolvershill Road which becomes more attractive to local traffic as it can be accessed more easily when other traffic uses the bypass.

Impact in 2039

7.6.3 Delay in the Banwell Narrows also increases in the 2039 Do Minimum scenarios as traffic levels increase. With the introduction of the bypass, and even with the addition of the HIF development, significant traffic reductions on the Banwell Narrows result in significant reductions in delay.

7.6.4 In 2039 there is significant delay in the AM peak in the Do Minimum scenario on Riverside northbound and Silver Moor Lane northbound. In both locations delay increases in the Cumulative Impacts 1 scenario. The Riverside northbound delay increases from approximately 12.5 minutes to approximately 19 minutes, which is caused by a combination of the bypass's effect on routing in addition to an increase in local traffic due to the HIF development at Banwell. The Silver Moor Lane northbound delay from approximately 14 minutes to approximately 16 minutes, which is driven entirely by an increase in local traffic due to the HIF development at Banwell.

7.6.5 Based on the modest delay increases and decreases on Riverside and Silver Moor Lane in 2024 as a result of the Scheme, the larger increases in 2039 can be predominantly attributed to general traffic growth as a result of local development and the HIF development itself.

7.6.6 Despite the modelled increases in delay on Riverside and Silver Moor Lane, changes in traffic flow are limited, with the largest increase of 30 vehicles seen northbound on Riverside in the 2039 AM peak hour.

7.6.7 In the interpeak period the delay remains less than 60 seconds in 2039, whilst in the PM peak there are some moderate changes in 2039 as a result of the bypass and HIF development: delay northbound on Riverside decreases by approximately 3.5 minutes due to a reduction in flow as described previously and delay southbound on Riverside increases by approximately 1 minute due to a small increase in flow.

7.6.8 In all time periods in 2039 there is a very significant increase in delay on Summer Lane in the Cumulative Impacts 1 scenario (from less than one minute to in excess of 20 minutes), although as this becomes accesses-only to the HIF development, this delay is only experienced by the development traffic. A summary of the links which experience notable changes in delay is provided in Table 44.

7.6.9 It should be noted that, in terms of the hierarchy of a strategic model, minor roads do not necessarily accurately represent observed conditions. As reported in the Strategic Model Review (BNWLBP-ARP-HGN-XXXX-TN-TR-000002) and Local Model Validation Report Addendum (BNWLBP-ARP-HGN-XXXX-TN-TR-000003), Summer Lane met the TAG criterion for link flow validation in the base year model for all but the AM peak hour northbound and Riverside met it for all periods and directions. Notwithstanding this, base year model flow on Summer Lane was generally lower than observations and base year model flow on Riverside was generally higher. Subsequent forecast year model outputs should be considered with this in mind.

Table 44: Summary of Delay (seconds)

Link		2024 Without Bypass	2024 With Bypass +	2039 Without Bypass	2039 Cumulative Impacts 2	2039 Cumulative Impacts 1
AM						
Riverside	SB	156	31	245	16	16
Riverside	NB	241	254	747	1004	1126
Silver Moor Lane	SB	10	11	21	16	17
Silver Moor Lane	NB	42	39	838	666	946
Summer Lane	SB	15	14	11	13	1491
Summer Lane	NB	22	19	28	9	552
IP						
Riverside	SB	53	34	111	44	57
Riverside	NB	2	2	15	32	54
Silver Moor Lane	SB	9	9	10	10	11
Silver Moor Lane	NB	0	0	0	0	0
Summer Lane	SB	14	13	16	13	149
Summer Lane	NB	14	13	18	9	186
PM						
Riverside	SB	201	72	161	134	220
Riverside	NB	130	47	411	195	190
Silver Moor Lane	SB	13	13	79	39	72
Silver Moor Lane	NB	0	0	68	30	63
Summer Lane	SB	23	20	37	15	844
Summer Lane	NB	15	14	27	9	1250

Impact on Banwell Narrows (15:00-16:00)

7.6.10 This section explores the traffic impacts of the Scheme on the Banwell Narrows for the period 15:00-16:00, corresponding with the school closing times. The SATURN model does not include a 15:00-16:00 assessment period and therefore a suitable factor is required to estimate the traffic flow for this period.

7.6.11 Table 45 below presents a comparison of the 2022 surveyed traffic flows in Banwell for the periods 15:00-16:00 and 17:00-18:00.

Table 45: Comparison of 2022 Surveyed Traffic Data – Banwell Narrows

Period	A368 East Street	A371 Castle Hill	A371 West Street	Total
15:00-16:00	496	503	970	1969
17:00-18:00	490	597	1042	2129
Proportion (%)	1%	-16%	-7%	-8%

7.6.12 Based on the 2022 survey data, traffic flows are typically 8% lower in the period 15:00-16:00, in comparisons to 17:00-18:00.

7.6.13 Table 46 below presents the estimated traffic flows on the A371 West Street between Wolvershill Road and Riverside for the period 15:00-16:00.

Table 46: Estimated Traffic Flows A371 West Street (15:00-16:00)

Direction	Base Year (2018)	2024 Do Minimum	2024 Do Something	Reduction (compared with 2018)
Eastbound	505	529	129	-74%
Westbound	496	496	155	-69%
Two-way	1,001	1,025	284	-72%

7.6.14 As summarised in the table above, the Scheme is estimated to reduce traffic flows by approximately 70% in the period 15:00-16:00. This will substantially improve conditions for pedestrians and cycles, including those travelling home from school.

7.6.15 There are also physical interventions that will also improve journeys for pedestrians and cycles, as detailed further in Section 8.2. The Scheme will therefore provide significant benefits for pupils travelling to and from school by active modes. The reduction in traffic flows will also improve journey time reliability for school bus services. This will enable a higher proportion of the journeys to school in Banwell to be made by these sustainable modes of transport.

7.7 Highway Safety Impact Assessment

7.7.1 The Economic Assessment (Document Ref: BNWLBP-ARP-HGN-XXXX-TN-TR-00011) presents the accident appraisal for the Scheme. COBALT (**CO**st and **B**enefit to **A**ccidents – **L**ight **T**ouch) Version 2.1 has been used to assess the accident (dis)benefits of the scheme.

7.7.2 The study area has been defined where the magnitude of change in AADT in the core scenarios changes by 10% as a result of the Scheme. The selected study area is shown in Figure 69. This includes the bypass itself and all roads through and around Banwell, the A371 and A368 between Weston Super Mare and West Harptree as well as through Winscombe, the A38 from East Brent to Langford and the A370 from Weston-Super-Mare to East Brent. It also includes a number of local roads.

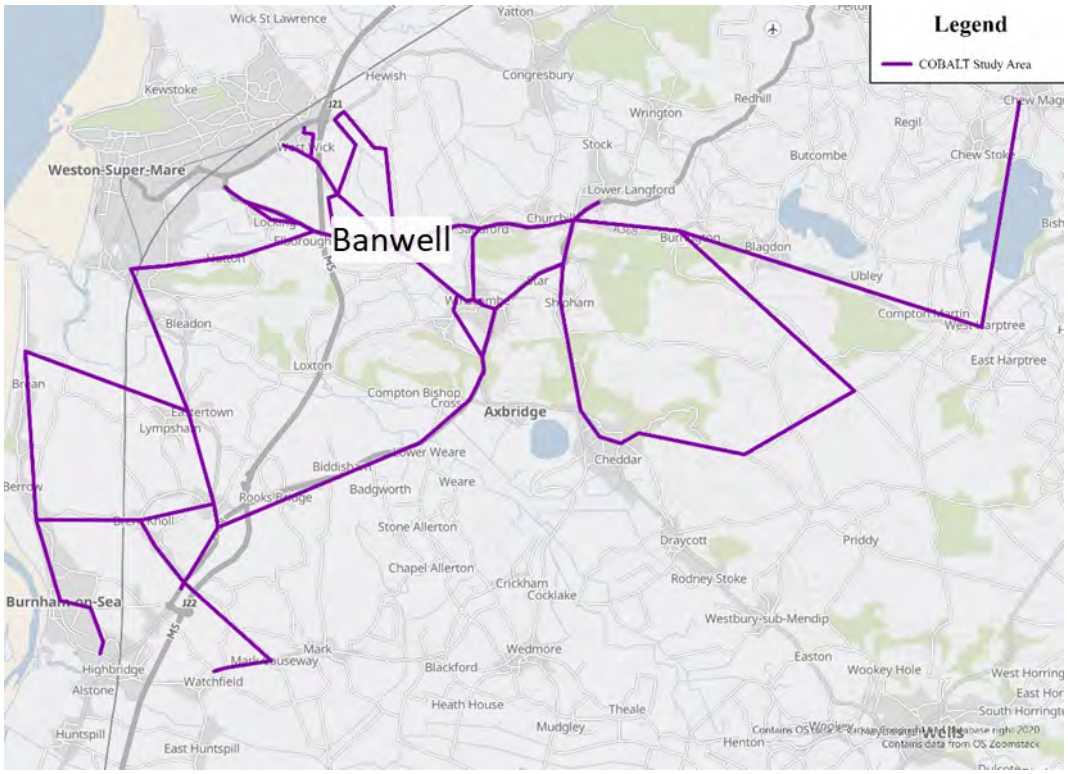


Figure 69: COBALT Study Area

7.7.3 Table 49 shows the estimated number of casualties in each assessment year, and for the overall 60-year appraisal period.

Table 47 COBALT Results: Without Bypass and With Bypass + Accident Costs (£'000s)

User Class	Without Bypass	With Bypass+	Benefit of Scheme
2024	5,661.1	5,980.1	-319.0
2039	4,296.2	4,605.2	-309.0
Total Accident Costs (60 Year)	215,539.1	230,412.3	-14,873.3

7.7.4 Overall, the scheme results in an accident disbenefit of approximately £14 million. Figure 70 maps the scheme accident (dis)benefits by model link.

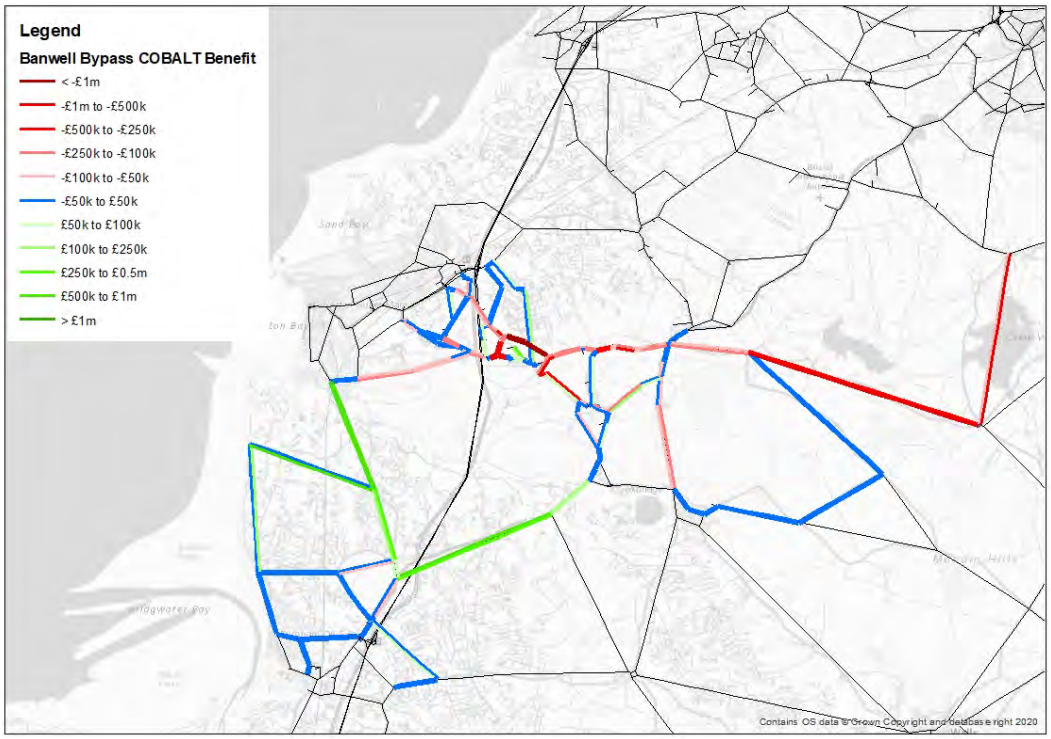


Figure 70: COBALT Accident Benefits Map (60 Year Total)

7.7.5 This shows that there are benefits on the A370/A38 between Weston-Super-Mare/Winscombe and East Brent Roundabout. This is because traffic reduces on these routes as it reroutes onto the quicker, more direct route offered by the bypass. There is also a small benefit in Banwell as through-traffic reroutes to use the bypass, avoiding the capacity constraints in Banwell itself. The majority of disbenefits are east of the bypass on the A371/A38 route from Weston-Super-Mare towards West Harptree and Chew Magna. This is because traffic reroutes away from longer routes such as the A371/A38 and from the M5 onto the quicker route now offered by the bypass.

7.7.6 Table 48 shows the estimated number of accidents in each assessment year, and for the overall 60-year appraisal period. The scheme results in a small increase in the number of accidents per year in the study area. This is because traffic reroutes away from the A371 through Banwell onto the Bypass, taking a longer, faster route which results in a slightly higher number of accidents. The bespoke accident rate in Banwell is also low, while national average accident rates have been applied to the Bypass, meaning that traffic is rerouting onto a road with a higher accident rate.

Table 48: COBALT Results: Without Bypass and With Bypass + Accident Numbers

Year	Without Bypass	With Bypass+	Change
2024	81.2	86.5	+5.3
2039	78.8	85.4	+6.6
Total Accidents (60 Year)	4728.2	5115.2	+386.9

7.7.7 Table 49 shows the estimated number of casualties in each assessment year, and for the overall 60-year appraisal period. The scheme results in a small increase in the number of casualties per year in the study area. As summarised in 7.7.6, this is because trips reroute onto the Bypass, resulting in longer trips on a faster road with a higher accident rate than the bespoke accident rate in Banwell, which is very low. An increase in accidents also results in an increase in casualties.

Table 49: COBALT Results: Without Bypass and With Bypass + Casualty Numbers

Year	Casualty Numbers Without-Scheme			Casualty Numbers With-Scheme			Change		
	Fatal	Serious	Slight	Fatal	Serious	Slight	Fatal	Serious	Slight
2024	1.0	12.0	97.5	1.1	12.7	103.8	+0.0	+0.7	+6.3
2039	1.0	11.6	94.7	1.0	12.5	102.5	+0.0	+0.8	+7.8
Total (60 Yrs)	59.3	698.6	5681	61.5	746.1	6137	+2.2	+47.6	+456

7.7.8 Whilst the findings of the COBALT assessment suggests there is an increase in the potential for road traffic collisions, this can be attributed to the increase in road speeds (40mph) and route length. The Bypass will be designed in accordance with the relevant design guidance and will be subject of a RSA.

7.8 Impact on Sustainable Transport Modes

Walking, Cycling and Horse-riding

7.8.1 As detailed in Section 7.6, the Scheme would significantly reduce traffic flows in Banwell. Whilst this will improve journey times for vehicles, it will also reduce the dominance of motor vehicles and enable some cyclists with less confidence to cycle along the main routes.

7.8.2 As detailed further in Section 8.2, placemaking proposals have been developed for Banwell to further improve provision for pedestrians, cyclists and horse-riders.

7.8.3 Beyond the village of Banwell, the Scheme will result in additional traffic travelling through the villages of Churchill, Sandford and Winscombe, as detailed in Section 7.4 and the Wider Mitigation Measures Summary Note (See Appendix H). The further you travel from Banwell and the bypass, the more traffic is distributed over a wider number of roads, thereby reducing the scale of impact through the remainder of North Somerset and surrounding communities.

7.8.4 Increased traffic will result in negative impacts to these areas that require mitigating, including (but not limited to):

a) Road Safety - Increased traffic levels result in an increased risk of collisions between motorised vehicles, as well as with vulnerable road users (including walkers, cyclists, horse-riders, children, the elderly and the mobility impaired). Entering and exiting side roads and direct property accesses could become more dangerous due to reduced gaps in traffic. The lack of existing footways, off-road cycle routes and crossings may increase the risk to walkers, cyclists and horse-riders when sharing road space with motorised vehicular traffic.

b) **Severance** – Increased traffic levels result in increased severance, due to increased difficulties crossing roads. This is exacerbated in areas without formal crossing provision, where pedestrians are reliant on waiting for safe gaps in the traffic to cross. Increased severance negatively impacts safe access to services, particularly for vulnerable users, and results in reduced physical activity, reducing human health outcomes. This can also impact access to bus stops and services.

c) **Environment –** Increased traffic levels result in a range of environmental impacts, including reduced air quality, potentially impacting human health, increased vehicle emissions (greenhouse gases), increased traffic noise, particularly affecting properties close to roads, and ecological impacts, through direct/indirect impacts on habitats (noise, light, pollution etc).

d) **Congestion -** Increased traffic levels will increase delays for all road users in locations without sufficient spare capacity to accommodate the forecast level of growth. This includes potential delays to public transport services.

7.8.5 A package of mitigation measures have been considered to reduce the potential impacts of the Banwell Bypass in those areas, and these are described in 8.2.

Public Transport

7.8.6 As detailed in Section 7.4, the Scheme will substantially improve east/west journey times. This will benefit local bus services that route through Banwell, both in terms of journeys times and service reliability. As identified in Section 4.7, there are several bus services that will benefit from the journey time improvements, including the 51, 62, 126 and 134.

7.8.7 As detailed further in the Wider Mitigation Measures Summary Report (see Appendix H), further improvements to the bus infrastructure are proposed in Banwell, including bus stops and a bus gate at Wolvershill Road. The following general principles have been adopted with regard to the Scheme-wide approach to public transport infrastructure:

a) Suitable provision will be made to ensure existing bus routes can be maintained (with diversion where necessary).

b) The Scheme will provide for potential future new bus routes, as identified by NSC.

c) All bus stops impacted by the Scheme are to be re-provided to an equivalent or higher standard than existing.

d) All works to bus stops to be in-line with requirements set out in the NSC Highways Development Design Guide.

e) Bus lanes are not to be provided on the bypass.

f) Delays to bus services as a direct result of the Scheme will be minimised, with the need for bus priority or alternative mitigation measures to be considered on a case-by-case

basis at individual junctions. No corridor-wide bus priority measures are to be provided as part of the Scheme.

g) First-mile last-mile connectivity to bus stops for those walking and cycling will be improved where possible, including in Banwell village as part of the placemaking proposals.

h) Additional improvements to bus stop infrastructure on the A368 / A371 corridors are considered enhancements and will be dependent on available Scheme budget.

i) The Scheme will improve access to local railway stations by sustainable modes.

7.9 Construction Traffic Impact Assessment

7.9.1 The Construction Traffic Management Plan (CTMP) presents the estimated number of construction vehicle movements that will be generated by the scheme. The estimated daily number of Heavy Goods Vehicle (HGV) trips is summarised in Table 50 below.

Table 50: Estimated HGV Construction Traffic Vehicle Movements (Two Way)

	Main Site Compound	Eastern Site Compound	Combined
Total HGV Vehicle movements	15,468	18,470	33,938
Lorry loads per day	30	36	66
Lorry loads per hour	3	4	7

7.9.2 The construction of the scheme is estimated to generate an average of seven (two-way) HGV trips per hour. This increase in traffic flow is expected to have a limited impact on the wider transport network.

7.9.3 In addition to HGV trips, staff movements will also impact traffic flows on the local highway network. It is anticipated that there will be approximately 30 people working in the offices and compounds. Due to the nature of the site location, it is likely that the majority of these will travel to work using private cars. This will therefore result in 30 vehicle movements between 7:00 and 8:00 and 30 between 16:00 and 18:00.

7.9.4 It is anticipated that there will be a workforce of between 50 and 70 people delivering the works, dependant on activities happening on site. These will travel to and from work in a

combination of works vans/personnel carriers and private cars. Table 51 below presents the estimated number of vehicle trips that will be generated by staff and construction operatives.

Table 51: Staff Construction Vehicle Movements

Vehicle Movements	Number of Vehicles	Times
Office and Management	30	07:00 – 08:00
Construction Operatives	60	06:30 – 07:30
Office and Management	30	16:00 – 18:00
Construction Operatives	60	17:00 – 18:00

7.9.5 Given the time when staff will commence work onsite, no vehicle trips are predicted in the AM peak hour and approximately 75 trips in the PM peak hour. Site operatives will be encouraged to use public transport to travel to work where possible and therefore these figures should be considered worst-case.

7.9.6 As detailed in the CTMP and Section 6.8 of this report, several opportunities have been explored to reduce the potential impacts of construction traffic, including a construction workers Travel Plan.

8 Transport Mitigation Strategy

8.1 Introduction

8.1.1 This section presents the mitigation proposed to offset the transport impacts associated with the Scheme. This includes mitigation for all modes of transport, including walking, cycling, horse-riding, bus and motor vehicles.

8.1.2 The mitigation identified in this section has been informed by the walking, cycling and horse-riding assessment, review of road traffic collisions, strategic and junction modelling and comprehensive stakeholder and public consultation.

8.2 Mitigation for Non-Motorised Users

Banwell Village

8.2.1 The proposed Banwell Bypass provides the opportunity to make placemaking improvements and enhancements to the centre of Banwell village. This includes the introduction of traffic calming measures and pavement widening to reduce the dominance of the road. The impact of the proposed Banwell Bypass will reduce traffic volumes through Banwell, making the village a safer, more attractive place for the residents and visitors.

8.2.2 The proposed designs include following enhancements:

a) Walking and Cycling routes through Banwell Village – providing safe walking, cycling and horse-riding routes as well as infrastructure to encourage these forms of transport and better links to the wider public rights of way network. This includes a shared use path on the A371 between the Bypass Western Junction and Banwell Primary School;

b) Creating a sense of place by introducing planters and ecological enhancements at the playground and village hall;

c) Increased pavement widths, the use of road surface treatments (paving or colour), cycle storage and connecting cycle links at the school and West Street car park;

d) Key interventions at the Narrows, such as resurfacing and widening of pavements, narrowing of the carriageway, introducing planting and pavement improvements; and

e) Changes to the surfacing, pavement widening, crossing points, historically appropriate village signage, planters and community notice board at the Square.

8.2.3 The Scheme will significantly reduce traffic flows through Banwell which will allow traffic to travel more freely. This could result in motor vehicles travelling at higher speeds. To mitigate potential higher road speeds, the following is proposed:

a) 20mph speed limit through Banwell Village to improve safety and provide environmental (air and noise) benefits, whilst discouraging through traffic from using the road. This will also make it safer for horse-riders to use the local roads; and

b) Narrow road widths by providing cycle lanes or wider shared footpath/cycle routes, cycle storage, crossing points.

8.2.4 As part of the scheme, equestrians will be prevented from using Dark Lane. To mitigate this, an alternative route is provided via Castle Hill which will be mostly traffic free.

8.2.5 The proposals in Banwell are presented on the following drawings and described further below:

a) Banwell Placemaking Site Layout Drawings Sheet (1 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000002)

b) Banwell Placemaking Site Layout Drawings Sheet (2 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000003)

c) Banwell Placemaking Site Layout Drawings Sheet (3 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000004)

d) Banwell Placemaking Site Layout Drawings Sheet (4 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000005)

e) Banwell Placemaking Site Layout Drawings Sheet (5 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000006)

f) Banwell Placemaking Site Layout Drawings Sheet (6 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000007)

g) Banwell Placemaking Site Layout Drawings Sheet (7 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000008)

h) Banwell Placemaking Site Layout Drawings Sheet (9 of 9) (Drawing Ref: BNWLBP-ARP-ELS-XXXX-DR-LS-000010)

Co-operative Food Car Park

8.2.6 Works are proposed to the entrance to the Co-operative Food shop access. Works include reducing the reducing the crossing width for pedestrians and new planting opportunities.

8.2.7 On the south side of the road, an active travel hub is proposed, including cycle stands adjacent to the existing bus stop.

School and Banwell Car Park

8.2.8 At Banwell Primary School and the public car park, the main proposals involve improving safety for children travelling to school on foot or by bike or waiting for bus connections to neighbouring villages.

8.2.9 This would be achieved by widening the pavements on both sides of the road. Road surface treatments would be changed to the congregating zone to prioritise pedestrians over car users with a safer crossing and improved cycling opportunities. The area would form a walking and cycling hub with improved cycle storage and a connecting cycle link along Knightcott Road, linking into the proposed Banwell Bypass cycle route.

The Playground and Village Hall

8.2.10 At present, the area has no safe crossings, and the road lanes are wide with narrow pavements. The main proposals for this location are two narrow the road lanes, a wider shared footpath/ cycle route, cycle storage and a safe pedestrian crossing near the bus stop, allowing better connectivity to these key local facilities.

8.2.11 Traffic calming measures are also implemented along Wolvershill Road in the form of buildouts to discourage rat running. There are also possible opportunities to provide planting improvements around the Village Hall and wider ecological enhancements within the recreational ground.

8.2.12 A bus gate is proposed on Wolvershill Road where it crosses the Bypass. This aims to significantly reduce traffic levels on the southern section of Wolvershill Road into Banwell, providing an improved route for buses.

The Narrows

8.2.13 At West Street, The Narrows would be extended to this area to provide on street parking outside the shops. Cycle parking and street furniture will be installed. Within 'The Narrows', the area around the war memorial and its bench has the opportunity for enhancement. Narrowing the road would allow for short sections of pavement to be introduced to areas where there currently aren't any, such as the south side of West Street outside Banwell Methodist Chapel, providing safe and more connected pedestrian routes through the village.

The Square

8.2.14 At the Square, road surfacing material changes and pavement widening will help reinstate the area as a community square. Crossing points will also be installed to allow pedestrians to get around the Square safely and to improve the setting of East Street by including a shared footway/cycleway linking to the Banwell Bypass. Signage in the Square can also be replaced with new and more historically consistent and village appropriate signage in the conservation area.

Wider Network Mitigation and Enhancements

8.2.15 Construction of the Banwell Bypass will result in additional traffic travelling through areas surrounding Banwell, in particular the villages of Churchill, Sandford and Winscombe. It is recognised that increased traffic could result in negative impacts to these areas, including concerns related to road safety, congestion, and environmental impacts.

8.2.16 A package of mitigation measures have been considered to reduce the potential impacts of the Banwell Bypass in those areas.

Sandford

8.2.17 A walking/cycling path is proposed from the Bypass towards Sandford and the Strawberry Line, providing a continuous off-road connection with Weston-super-Mare. This link would provide a safe, alternative route for people to travel between villages by foot or bike, instead of by car, as well as creating opportunities to use more sustainable journeys to reduce carbon

footprint. Also, to reduce potential severance impacts and support pedestrians, cyclists, and horse-riders from predicted traffic increases, a new pedestrian crossing is proposed by Hill Road between two existing crossings, which is also close to existing local bus stops.

8.2.18 A speed limit reduction from 30mph to 20mph is proposed through Sandford from the west of Mead Lane to the east of Greenhill Lane. The reduced speed limit would promote easy and safe access around the area, particularly as the local roads are used by pedestrians and cyclists.

8.2.19 There is strong community support for this reduction, as was highlighted by Winscombe and Sandford Parish Council's speed survey and the 2021 public consultation. Measures to help vehicles stick to the speed limit are also proposed, including changes to road markings, road surfacing, new signage and some localised narrowing of the road. This includes proposals for new gateway features at the approaches to the village where the reduction to a 20mph speed limit would begin.

8.2.20 The above proposals are shown in the following drawings:

a) Wider Network Mitigation - General Arrangement Drawing - Sheet 1 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000001)

b) Wider Network Mitigation - General Arrangement Drawing - Sheet 2 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000002)

c) Wider Network Mitigation - General Arrangement Drawing - Sheet 3 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000003)

d) Wider Network Mitigation - General Arrangement Drawing - Sheet 4 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000004)

Winscombe

8.2.21 Traffic modelling has demonstrated that the Bypass has the potential to increase traffic flows through Winscombe. Therefore, two new pedestrian crossings are proposed through Winscombe located to the west of the railway bridge near Church Road and to the east of the railway bridge near the parade of shops. A crossing Is also proposed on Sandford Road. This aims to reduce potential severance impacts and provide regular, safe crossings

for access to local facilities. In addition, an existing 30m one-way slip road at the Church Road junction with the A371 will be closed to motor vehicles (and retained for pedestrians and cycles).

8.2.22 The narrowness of the A371 in places and general character of the route provides an opportunity to reduce the 30mph speed limit to 20mph from the west of Church Street to the east of Belmont Road. Further works are also proposed to encourage low speed limit, including local narrowing, road markings and road surfacing. This seeks to reduce rat-running through the village. A 20mph speed limit is also intended on Church Road from its junction with the A371 to Winscombe Hill. Following consultation feedback, it is proposed to extend the 20mph zone to include The Lynch, Parsons Way and Barton Road.

a) Wider Network Mitigation - General Arrangement Drawing - Sheet 7 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000007)

b) Wider Network Mitigation - General Arrangement Drawing - Sheet 8 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000008)

c) Wider Network Mitigation - General Arrangement Drawing - Sheet 9 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000009)

d) Wider Network Mitigation - General Arrangement Drawing - Sheet 10 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000010)

Churchill

8.2.23 Proposals within Churchill aim to address the lack of safe walking and cycling routes to Churchill School to improve active travel accessibility. Therefore, a reduced speed limit from 30mph to 20mph is proposed from the west of The Drive to Churchill Gate Junction as well as a speed limit reduction from 40mph to 30mph on the A368 towards Sandford.

8.2.24 Also, a key route has been identified along the A368 from Sandford to Churchill Academy which currently has no continuous surfaced off-road route for pupils. Therefore, an opportunity has been identified to improve an existing Public Right of Way (footpath AX14/21/20) between the A368 and Churchill Green which serves as a popular walking route between Churchill and the secondary school. Improvements

would include a free-draining surface to enable year-round use of the path and prevent pedestrians from walking in the road past the 'pinch point' on Dinghurst Road. The existing PRoW footpath towards Langford has also been recognised as a key pedestrian route but is unsuitable for cyclists. Therefore, it is proposed to upgrade this PRoW to bridleway standard to enable its use by cyclists and horse-riders.

8.2.25 A Zebra crossing is also proposed on the A368, west of the junction with Skinners Lane, To the north west, footway improvements are proposed on Church Lane, continuing form the footway improvements on Hilliers Lane. This provides a link to the proposed 3m walking and cycling route, and Ladymead Lane beyond.

a) Wider Network Mitigation - General Arrangement Drawing - Sheet 5 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000005)

b) Wider Network Mitigation - General Arrangement Drawing - Sheet 6 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000006)

c) Wider Network Mitigation - General Arrangement Drawing - Sheet 11 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000011)

d) Wider Network Mitigation - General Arrangement Drawing - Sheet 12 of 12 (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000012)

Public Transport

8.2.26 Revenue support for providing new bus routes or increasing the frequency of existing services is not within the scope of the Scheme. Instead, the proposals for public transport have focused on how public transport infrastructure can be enhanced to support future enhancements to services (delivered either by operators, or other funding sources).

8.2.27 The following general principles have been adopted with regard to the Scheme-wide approach to public transport infrastructure:

a) Suitable provision will be made to ensure existing bus routes can be maintained (with diversion where necessary).

b) The Scheme will provide for potential future new bus routes, as identified by NSC.

c) All bus stops impacted by the Scheme are to be re-provided to an equivalent or higher standard than existing.

d) All works to bus stops to be in-line with requirements set out in the NSC Highways Development Design Guide.

e) Bus lanes are not to be provided on the bypass.

f) Delays to bus services as a direct result of the Scheme will be minimised, with the need for bus priority or alternative mitigation measures to be considered on a case-by-case basis at individual junctions. No corridor-wide bus priority measures are to be provided as part of the Scheme.

g) First-mile last-mile connectivity to bus stops for those walking and cycling will be improved where possible, including in Banwell village as part of the placemaking proposals.

h) Additional improvements to bus stop infrastructure on the A368 / A371 corridors are considered enhancements and will be dependent on available Scheme budget.

i) The Scheme will improve access to local railway stations by sustainable modes.

8.3 Mitigation for Motorised Users

8.3.1 The Junction Modelling Report included in Appendix F identifies three junctions that require mitigation to offset the traffic impacts associated with the Scheme, including:

a) A371 Knightcott Road/Summer Lane/Well Lane

b) A368/A38 Churchill Gate

c) A371/Banwell Road

8.3.2 In addition to the junctions identified above, there are several junctions within the study area that are forecast to operate over capacity in the future year scenarios both without and with the proposed Scheme.

8.3.3 The capacity issues forecast at these junctions can be attributed to existing traffic demand and background traffic growth associated with future developments. The impacts of the Scheme in comparison are limited and therefore mitigation is not proposed as part of this planning application.

8.3.4 Future major development sites will be identified in the NSC

Local Plan and will each be subject to a planning application. These planning applications will need to be supported by a Transport Assessment and will detail how the transport impacts of the proposed development will be mitigated. This may include a mix of highway improvements to improve capacity and sustainable transport interventions to reduce car trips on the network.

8.3.5 Therefore, whilst mitigation will not be delivered as part of this Scheme, future developments shown to have a severe impact on the operation of these junctions will be expected to provide mitigation.

A371 Knightcott Road/Summer Lane/Well Lane

8.3.6 The junction capacity assessment of the A371 Knightcott Road/ Summer Lane/Well Lane staggered priority junction indicates the junction is forecast to operate over capacity in the future years scenarios 2039 Do Something and 2039 Cumulative Impacts 2.

8.3.7 Mitigation has therefore been explored at the junction and the proposed mitigation scheme is presented in Banwell Bypass and Southern Link General Arrangement Drawings Sheet 1 of 6 (Drawing Ref: BNWLBP-ARP-HGN-X_BB_Z-DR-CH-000001).

8.3.8 The assessment results for the 2024 Do Something and 2039 Do Something scenarios are presented in Table 52 below.

Table 52: A371/Summer Lane/Well Lane Mitigation Scheme Assessment Results

Link		AM Peak Hour (08:00 09:00)			PM Peak Hour (17:00 – 18:00)		
		Ave. Queue (PCU)	Delay (s)	Deg Sat	Ave. Queue (PCU)	Delay (s)	Deg Sat
2024 Do Something							
1/1 1/2	A371 (East)	5.9	8.3	33.7%	7.4	10.3	45.5%
2/1	Well Lane	3.4	75.8	54.5%	2.1	60.0	45.6%
3/1 3/2	A371 (West)	13.9	16.2	59.3%	10.4	17.7	58.5%
4/2 4/1	Summer Lane	0.2	67.5	4.7%	0.9	49.0	20.0%
Junction PRC		51.8% @ 120 seconds			53.9% @ 120 seconds		
2039 Do Something							
1/1 1/2	A371 (East)	13.2	17.9	60.3%	20.0	25.8	75.2%
2/1	Well Lane	6.2	151.3	88.7%	5.3	132.8	83.6%
3/1 3/2	A371 (West)	67.9	112.1	102.8%	25.6	32.3	83.2%
4/2 4/1	Summer Lane	22.5	178.4	103.5%	10.1	71.1	83.6%
Junction PRC		-15.0% @ 120 seconds			7.6% @ 120 seconds		

8.3.9 In the 2024 Do Something Scenario the junction is forecast to operate with spare capacity in both the AM and PM peak hour.

8.3.10 With the addition of traffic associated with future housing, the junction is forecast to exceed theoretical capacity in the AM peak hour with delays of 112 seconds on the A371 (West) approach and 178 seconds on the Summer Lane approach. Compared to the existing junction arrangement, signals is demonstrated to provide significant betterment to the capacity of the junction. The introduction is also anticipated to improve road safety for vehicles and pedestrians.

8.3.11 In the PM peak hour, the junction is forecast to operate with spare capacity.

A368/A38 Churchill Gate

8.3.12 As detailed in Section 8.3, improvements would be required to the junction to provide sufficient capacity for the forecast traffic flows in 2039 and mitigate the full impacts of the scheme on congestion.

8.3.13 Several junction mitigation designs have been developed and discussed with NSC. This included an option that would require the acquisition of land to deliver substantial capacity improvements, however the resulting design was not considered appropriate for the setting and would result in removal of mature trees on Dinghurst Road.

8.3.14 A rationalised junction arrangement has therefore been proposed which provides some capacity improvements whilst also appropriate for the local context.

8.3.15 The mitigation scheme is presented in the planning drawing “Wider Network Mitigation - General Arrangement Drawing - Sheet 6 of 13” (ref BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000006) and includes some limited widening on the western arm to increase the flare length, and reassignment of the lanes on the southern arm to allow two lanes of traffic to travel straight ahead, with an associated merging section on the exit of the junction.

8.3.16 Staggered signal-controlled crossings are provided for pedestrians and cycles on the A368 and A38 (South) entries to the junction. Advanced stop lines are also provided on the A38 entries.

8.3.17 Table 53 shows the LinSig model results for the 2024 and 2039 Do Something scenarios.

8.3.18 With the proposed mitigation, the junction is forecast to operate within theoretical capacity in the 2024 Do Something scenario. In the 2039 Do Something scenario in the AM peak hour, the junction is forecast to operate over capacity

Table 53: Churchill Gate Rationalised Mitigation Scheme Assessment Results

Link		AM Peak Hour (08:00 09:00)			PM Peak Hour (17:00 – 18:00)		
		Ave. Queue (PCU)	Delay (s)	Deg Sat	Ave. Queue (PCU)	Delay (s)	Deg Sat
2024 Do Something							
1/1	A38 North A	11.5	30.5	53.9%	16.3	29.1	78.0%
1/2	A38 North R	11.8	116.6	92.3%	6.6	52.2	69.8%
2/1 2/2	A368 East	4.0	35.3	29.9 : 29.9%	9.9	41.9	75.9 : 75.9%
3/1 3/2	A38 South	20.7	58.0	91.5 : 91.5%	7.8	37.9	65.1 : 65.2%
4/1 4/2	A368 West	21.5	62.5	91.2 : 91.2%	8.2	38.4	72.6 : 72.1%
9/1 9/2	A38 North	0.3	1.5	36.9 : 36.9%	0.5	1.8	49.7 : 49.7%
Junction PRC		-2.6% @ 120 seconds			15.3% @ 120 seconds		
2039 Do Something							
1/1	A38 North A	13.0	31.8	58.9%	22.0	45.3	83.6%
1/2	A38 North R	22.8	262.4	107.8%	9.2	85.2	82.4%
2/1 2/2	A368 East	3.3	29.4	24.1 : 29.3%	6.0	31.9	39.4 : 39.4%
3/1 3/2	A38 South	78.4	285.5	112.5 : 112.5%	13.4	53.9	82.6 : 82.6%
4/1 4/2	A368 West	77.0	245.2	110.9 : 110.9%	18.3	44.8	83.2 : 83.2%
9/1 9/2	A38 North	0.3	1.5	40.4 : 40.4%	0.4	1.7	46.6 : 46.6%
Junction PRC		-25.0% @ 120 seconds			7.7% @ 120 seconds		

8.3.19 Table 54 presents a further traffic flow scenario to explore the level of traffic growth that the rationalised improvement could deliver in the AM peak hour. This is expressed as the proportion of the forecast 2039 traffic growth over the 2018 base flows that the junction could cater for.

Table 54: Churchill Gate Mitigation Scheme with 65% Growth

Link		Ave. Queue (PCU)	Delay (s)	Deg Sat
1/1	A38 North A	11.5	29.0	53.3%
1/2	A38 North R	13.1	130.8	95.1%
2/1 2/2	A368 East	3.8	31.3	27.4 : 31.0%
3/1 3/2	A38 South	27.6	86.9	97.8 : 97.8%
4/1 4/2	A368 West	32.0	85.3	98.0 : 98.0%
9/1 9/2	A38 North	0.3	1.5	38.0 : 38.0%
Junction PRC		-8.9% @ 120 seconds		

8.3.20 As shown in the table above, the proposed mitigation scheme could accommodate up to 65% of the forecast growth from 2018 to 2039. Whilst further capacity improvements could be delivered, they would require significant third-party land-take. Therefore, whilst the proposed works can accommodate the traffic impacts associated with the Scheme, it is recommended other opportunities are explored to improve the operation of the junction as part of the future housing developments, including sustainable transport interventions to reduce the number of car trips on the network.

A371/Banwell Road

8.3.21 The junction capacity assessment of the A371/Banwell Road priority junction indicates the junction is forecast to operate over capacity in the future year scenario 2039 Do Something. Mitigation has therefore been explored at this junction.

8.3.22 The proposed mitigation scheme includes traffic signals and a signal-controlled crossing on the A371 directly west of Banwell Road. The junction arrangement is presented in the planning drawing ": Wider Network Mitigation - General Arrangement Drawing - Sheet 13 of 13" (Drawing Ref: BNWLBP-ARP-GEN-X_A368WCH_Z-DR-CH-000013).

8.3.23 The junction assessment results for the proposed mitigation scheme is presented in Table 55 below.

Table 55: A371/North South Link Road Assessment Results

Link		AM Peak Hour (08:00 09:00)			PM Peak Hour (17:00 – 18:00)		
		Ave. Queue (PCU)	Delay (s)	Deg Sat	Ave. Queue (PCU)	Delay (s)	Deg Sat
2024 Do Something							
1/1	A371 West	8.7	16.6	49.9%	6.4	14.4	43.2%
2/1	A371 East	8.7	16.4	50.7%	12.3	15.8	63.1%
3/2 3/1	Banwell Road	3.4	42.3	48.6 : 48.6%	3.3	50.0	57.0 : 57.0%
Junction PRC		72.5% @ 70 seconds			77.6% @ 90 seconds		
2039 Do Something							
1/1	A371 West	17.2	20.5	75.1%	8.7	14.9	50.0%
2/1	A371 East	20.4	23.3	81.9%	44.9	66.8	99.6%
3/2 3/1	Banwell Road	5.3	67.5	75.0 : 75.0%	8.9	113.8	93.9 : 93.9%
Junction PRC		9.9% @ 90 seconds			-10.7% @ 90 seconds		

8.3.24 The assessment results indicate that the junction will operate with spare capacity in the 2024 Do Something scenario. In the 2039 Do Something scenario, the junction is forecast to operate within capacity in the AM peak hour and exceed theoretical capacity in the PM peak hour. These results are based on the pedestrian crossing being called every cycle and should therefore be treated as a worst case.

8.3.25 Table 56 below presents the assessment results for the 2039 Do Something scenario with an increased cycle time of 120 seconds.

Table 56: A371/North South Link Road Assessment Results (120 seconds)

Link		AM Peak Hour (08:00 09:00)			PM Peak Hour (17:00 – 18:00)		
		Ave. Queue (PCU)	Delay (s)	Deg Sat	Ave. Queue (PCU)	Delay (s)	Deg Sat
2039 Do Something							
1/1	A371 West	18.9	18.2	68.0%	9.8	15.0	48.3%
2/1	A371 East	22.2	19.7	74.2%	38.0	32.0	91.3%
3/2 3/1	Banwell Road	6.4	72.7	69.9 : 69.9%	8.6	96.9	87.2 : 87.2%
Junction PRC		21.3% @ 90 seconds			-1.5% @ 90 seconds		

8.3.26 It can be seen that with the increased cycle time, the junction is performing close to practical capacity. Whilst the signal timings will be defined in subsequent design stages, it is recommended that reducing pedestrian delay is prioritised over vehicle delay.

Summary

8.3.27 As detailed in this section, the traffic impacts that are directly attributed to the Scheme can be mitigated. Whilst not all impacts associated with the future housing allocations can be accommodated at some locations, this is considered appropriate given:

a) The trip making assumptions for the future housing sites will be informed by the accessibility of the sites by sustainable modes of transport. Until the access strategies for these sites have been developed, there is potential that the proposed mitigation schemes may provide too much capacity, encouraging more to travel by car;

b) The mitigation schemes have been developed with regards to the local context. Whilst larger schemes could have been considered, these could also negatively impact the local character and landscape; and

c) Larger junctions would also be reliant on third-party land, impacting both the deliverability and cost of the schemes.

8.3.28 Whilst other junctions in the study area are forecast to operate over capacity in future year scenarios, this can be attributed to background traffic growth associated with future developments. These issues will be reviewed as part of the future planning applications for these potential developments.

8.4 Construction Traffic Mitigation Measures

8.4.1 Construction traffic impacts will be mitigated through the following measures:

a) Haulage companies and suppliers will be issued with a Site Access Map which illustrates the agreed access route onto site. Due to the number of businesses and nature of the roads, exclusion signs will not be erected, however, signs will be erected at the junctions to the site compounds. Should this route be closed during construction, alternative access routes will be briefed to haulage companies and a new plan will be provided;

b) As close to an earthworks balance as possible has been achieved, this will remove the requirement to transport excavated soils from the site and will significantly reduce the number of vehicle movements as a result of the project;

c) Deliveries will only be permitted between the hours of 07:00 to 18:00 Monday to Friday, between 07:00 and 13:00 on Saturday. No deliveries will be allowed on Sundays or bank holidays. Loading and unloading of vehicles will only occur within these hours;

d) Deliveries will be scheduled to avoid peak times where possible;

e) All vehicles transporting materials and personnel for the project will be required to adhere to agreed haul routes;

f) No vehicles will be left (temporarily or otherwise) outside of the confines of the site;

g) Route finders will be used by haulage companies to ensure vehicles can efficiently navigate to the site;

h) Vehicles used for the transport of materials and personnel to and from the site will be modern low emissions Euro 5/6 and well silenced;

i) Loads will be thoroughly secured, if sheeting or tarpaulins are used, these will not be allowed to flap;

j) All loads will be booked, and suppliers will be instructed to phone the site ahead of deliveries to ensure they can be accepted onto site. The exception to this will be deliveries such as aggregates which will be required to arrive on site at regular intervals to ensure they can be safely tipped; Signage will be erected at the site entrance directing HGV's arriving at and leaving site. Signage will be inspected and maintained weekly for the duration of the works and will be removed on completion;

k) Site operatives will be encouraged to use public transport to travel to work where possible. Notices providing bus and train timetables and stop locations will be on display in the site office and canteen. This will be managed with a Construction Workers Trave Plan;

l) Car parking will be provided within site compounds and for vans / works vehicles, at work sites. Parking on the A371, Wolvershill Road, Moor Road, Riverside Road and the A368 will not be permitted. The main area for parking will be in the site compound; and

m) Drivers should be made aware of the residential properties, working farms and businesses accessed from Wolvershill Road and Moor Road.

8.4.2 Also, measures will be implemented to manage the conflicts of construction traffic with pedestrians to ensure that the impacts on pedestrians are minimised and ensure vehicular and pedestrian segregation is maintained. These measures include:

a) Ensure that pedestrian routes are designated, and signage appended;

b) At pedestrian crossing points rigid barriers are to be erected and appropriate signage appended;

c) Assess the various risks and establish safe systems of work which protect pedestrian workers in areas where they interface with vehicles and/or mobile plant. In these areas risk assessments and method statements must demonstrate that the salient points have been identified and addressed;

d) Pedestrian Routes are to be clearly marked and identified on all Traffic Management Plans;

e) Pedestrian routes along and to work areas to be designated and signage appended;

f) Pedestrian routes to be kept clean, tidy and free from obstructions;

g) Routes to be diverted around areas where 360 mobile plant is operating to prevent pedestrians entering ‘trap’ or ‘nip’ points; and

h) All personnel (including plant operatives) must wear high-viz. clothing at all times when working on site.

9 Sensitivity Tests

9.1 Introduction

9.1.1 This section of the TA presents the sensitivity tests that have been assessed using the STAURN model. An overview of these sensitivity tests is presented in Table 57 below.

Table 57: Overview of Sensitivity Tests

ID	Description
03	Bypass without HIF development.
04	Uncertainty Log review.
05	Wider mitigation measures excluding Churchill Gate junction rationalised design.
06	Wider mitigation measures including Churchill Gate junction rationalised design plus optimised bypass signals. Excludes Summer Lane signalisation.
07	COVID-19 impact assessment.
08	Bristol airport to 12mppa (airport demand +20%).
12	TAG data book update

9.1.2 These sensitivity tests are detailed in the Strategic Model Sensitivity Testing Technical Note (Doc ref: BNWLBP-ARP-HGN-XXXX-TN-TR-000015) and can be found in Appendix I. The remainder of this section provides an overview of the sensitivity tests outlined in Table 57.

9.1.3 In addition, this section outlines the alternative junction arrangements that were explored and discounted as part of the Scheme and wider mitigation strategy.

9.2 Strategic Model Sensitivity Tests

Sensitivity Test 03

9.2.1 Sensitivity Test 03 assesses the impact of bypass without the HIF development north of Banwell. The test has only been run in 2039 (as the HIF development does not exist in any 2024 scenario). Compared to the 2039 Cumulative Impacts 1 scenario,

traffic flows on the bypass and roads to the east without HIF scenario are very similar, demonstrating that the majority of traffic associated with the HIF development travels to/from the west.

Sensitivity Test 04

9.2.2 The core scenarios presented in this TA are based on the uncertainty log titled "210210 NS Uncertainty Log Jan 2021 V2.xlsx." This sensitivity test is based on an updated Uncertainty Log received from NSC in December 2021. The updated Uncertainty Log included an additional 181 dwellings across eight sites.

9.2.3 Developments identified in the Uncertainty Logs have been scaled to TEMPro forecasts. Therefore, modelling these additional dwellings would not result in an overall increase in demand, but instead in a slight redistribution of demand as more development is explicitly modelled in known locations and less scaling up of demand is required.

9.2.4 Modelling these developments explicitly will therefore not result in assignments that differ materially to the existing assignments developed for the core scenarios and their inclusion would not have a material impact on the assessment of the bypass.

Sensitivity Test 05

9.2.5 The purpose of Sensitivity Test 05 was to model the latest speed limits where the Scheme ties in to the existing road network and the wider mitigation measures, including reduced speed limits in the following locations:

a) Church Road in Winscombe;

b) A371 in in Winscombe; and

c) A368 in and around Sandford and Churchill.

9.2.6 The speed limit reductions lead to a reduction in flow on the A368 and on the bypass. The scale of the reduction is between 40 and 100 PCUs per direction in 2024 (compared to the With Bypass+ scenario) and between 40 and 80 PCUs per direction in 2039 (compared to the CI1 scenario) in the peak hours.

Sensitivity Test 06

9.2.7 Sensitivity Test 06 includes those measures in Sensitivity Test 05, alongside the rationalised arrangement of Churchill Gate junction (see Section 8.3) and signals at the Bypass/ Wolvershill Road junction. Table 58, Table 59, Table 60 and Table 61 below presents a comparison of the predicted traffic flows for the Do Something and Sensitivity Test 06 scenarios.

Table 58: Cumulative Impacts (2024) Forecast Traffic Flows (AM Peak Hour)

Location	Direction	Do Something+	Sensitivity Test 06	Difference
A371 West of Banwell Road (Locking)	Eastbound	632	648	-16
	Westbound	508	485	23
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	124	114	10
	Westbound	149	155	-6
Bypass Western Section	Eastbound	611	553	58
	Westbound	384	276	108
Bypass Middle Section	Eastbound	706	711	-5
	Westbound	453	464	-11
Bypass Eastern Section	Eastbound	706	711	-5
	Westbound	453	464	-11
Wolvershill Road North of Bypass	Northbound	318	347	-29
	Southbound	343	318	25
Riverside North of Banwell	Northbound	123	119	4
	Southbound	99	99	0
Southern Link West of Banwell Junction/Castle Hill	Northbound	297	300	-3
	Southbound	473	446	27
Hill Road South of A368 (Sandford)	Northbound	110	113	-3
	Southbound	81	74	7
A368 West of A38 (Churchill)	Eastbound	504	518	-14
	Westbound	366	344	22
A371 West of Sandford Road (Winscombe)	Eastbound	356	324	32
	Westbound	185	185	0
Church Road (Winscombe)	Northbound	122	125	-3
	Southbound	128	133	-5
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	432	436	-4
	Westbound	375	352	23
North South Link Road (A371 Locking to Churchland Way)	Northbound	565	553	12
	Southbound	240	242	-2

Table 59: Cumulative Impacts (2024) Forecast Traffic Flows (PM Peak Hour)

Location	Direction	Do Something+	Sensitivity Test 06	Difference
A371 West of Banwell Road (Locking)	Eastbound	542	526	16
	Westbound	508	495	13
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	140	94	46
	Westbound	169	183	-14
Bypass Western Section	Eastbound	422	449	-27
	Westbound	430	399	31
Bypass Middle Section	Eastbound	633	630	3
	Westbound	682	642	40
Bypass Eastern Section	Eastbound	633	630	3
	Westbound	682	642	40
Wolvershill Road North of Bypass	Northbound	390	394	-4
	Southbound	348	331	17
Riverside North of Banwell	Northbound	112	106	6
	Southbound	116	114	2
Southern Link West of Banwell Junction / Castle Hill	Northbound	404	401	3
	Southbound	351	331	20
Hill Road South of A368 (Sandford)	Northbound	101	92	9
	Southbound	89	86	3
A368 West of A38 (Churchill)	Eastbound	502	470	32
	Westbound	569	549	20
A371 West of Sandford Road (Winscombe)	Eastbound	213	189	24
	Westbound	296	282	14
Church Road (Winscombe)	Northbound	115	126	-11
	Southbound	145	149	-4
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	465	429	36
	Westbound	526	494	32
North South Link Road (A371 Locking to Churchland Way)	Northbound	309	300	9
	Southbound	505	506	-1

Table 60: Cumulative Impacts (2039) Forecast Traffic Flows (AM Peak Hour)

Location	Direction	Cumulative Impacts 1	Sensitivity Test 06	Difference
A371 West of Banwell Road (Locking)	Eastbound	1,007	1,067	-60
	Westbound	678	561	117
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	314	321	-7
	Westbound	210	158	52
Bypass Western Section	Eastbound	876	783	93
	Westbound	697	477	220
Bypass Middle Section	Eastbound	1027	1097	-70
	Westbound	356	381	-25
Bypass Eastern Section	Eastbound	1027	1097	-70
	Westbound	356	381	-25
Wolvershill Road North of Bypass	Northbound	448	551	-103
	Southbound	666	682	-16
Riverside North of Banwell	Northbound	174	165	9
	Southbound	71	78	-7
Southern Link West of Banwell Junction / Castle Hill	Northbound	271	278	-7
	Southbound	686	673	13
Hill Road South of A368 (Sandford)	Northbound	120	138	-18
	Southbound	93	75	18
A368 West of A38 (Churchill)	Eastbound	719	886	-167
	Westbound	315	277	38
A371 West of Sandford Road (Winscombe)	Eastbound	561	540	21
	Westbound	145	151	-6
Church Road (Winscombe)	Northbound	143	143	0
	Southbound	141	148	-7
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	669	762	-93
	Westbound	322	274	48
North South Link Road (A371 Locking to Churchland Way)	Northbound	896	823	73
	Southbound	569	618	-49

Table 61: Cumulative Impacts (2039) Forecast Traffic Flows (PM Peak Hour)

Location	Direction	Cumulative Impacts 1	Sensitivity Test 06	Difference
A371 West of Banwell Road (Locking)	Eastbound	684	662	22
	Westbound	784	762	22
A371 Banwell - Between Wolvershill Road and Riverside	Eastbound	132	128	4
	Westbound	265	277	-12
Bypass Western Section	Eastbound	675	628	47
	Westbound	792	718	74
Bypass Middle Section	Eastbound	575	606	-31
	Westbound	957	909	48
Bypass Eastern Section	Eastbound	575	606	-31
	Westbound	957	909	48
Wolvershill Road North of Bypass	Northbound	697	709	-12
	Southbound	604	659	-55
Riverside North of Banwell	Northbound	132	131	1
	Southbound	138	134	4
Southern Link West of Banwell Junction / Castle Hill	Northbound	563	551	12
	Southbound	313	329	-16
Hill Road South of A368 (Sandford)	Northbound	122	103	19
	Southbound	97	93	4
A368 West of A38 (Churchill)	Eastbound	520	515	5
	Westbound	765	752	13
A371 West of Sandford Road (Winscombe)	Eastbound	182	190	-8
	Westbound	448	430	18
Church Road (Winscombe)	Northbound	127	133	-6
	Southbound	142	151	-9
A368 (Sandford) East of Eastern Bypass Junction	Eastbound	457	444	13
	Westbound	745	702	43
North South Link Road (A371 Locking to Churchland Way)	Northbound	532	522	10
	Southbound	466	453	13

9.2.8 In nearly all of the modelled time periods and years, the most notable change between S06 and the Do Something scenarios (With Bypass + and CI1) is an increase in flows approaching and exiting the Churchill Gate junction (except for the A368 approach/exit west of the junction). This is because the changes in S06 cause a more significant reduction in delay at Churchill Gate than at either of the other altered junctions. The A368 is excluded from this increase as it is still affected by the reduction in speed limits introduced in S05 causing rerouting away from this section of the A368.

9.2.9 In 2039 AM there is a different pattern of flow change to the other years and time periods in S06 or S05. In addition to an increase in flows on most approaches to Churchill Gate junction there are substantial decreases on the A38 approach and exit south of the Churchill Gate junction.

Sensitivity Test 07

9.2.10 Sensitivity test 07 assesses the potential long-term impact of COVID-19 on travel patterns. In lieu of a formal data release from DfT that will revise traffic forecasts accordingly, a low growth scenario has been used for this test.

$$\text{Low Growth Sensitivity Test} = \text{Core Forecast Demand} - (\text{Base Demand} \times 0.025 \times \sqrt{(\text{Forecast Year} - \text{Base Year})})$$

9.2.11 Across all scenarios the test results in around a 6% decrease in traffic in 2024 on the majority of links and an 8% decrease in traffic in 2039. Roads with higher flow in the core scenario.

9.2.12 On the bypass itself traffic reduces by around 50 PCUs in the peak hours in 2024 and by around 100 PCUs in 2039.

Sensitivity Test 08

9.2.13 Sensitivity Test 08 models the consented scheme to increase passengers at Bristol Airport. The planning decision following an appeal for the airport expansion was granted after the core traffic modelling was completed and was therefore not included in the core scenarios.

9.2.14 The planning permission enabled the expansion of Bristol Airport from 10 million to 12 million per annum. This equates to is an increase in traffic to/ from Bristol Airport of around 250-400 PCUs

in the peak hours. The majority of the traffic uses the A38 and the distribution is broadly 50% to/from the north and 50% to/from the south. As traffic travels north/south along the A38 from the airport it distributes onto other roads along the network. Whilst some additional trips are predicted to use the Churchill Gate junction, almost none use the A368, the A371 or the Banwell Bypass. As noted in

Sensitivity Test 12

9.2.15 The DfT's TAG Data Book defines the Generalised Cost parameters (Value of Time and Value of Cost by User Class) used in the traffic model. Version 1.15 (May 2021) has been used in the core traffic model Sensitivity test 12 assesses the impact of updating these values to the latest TAG Data Book v1.17 (November 2021).

9.2.16 In all scenarios, years and periods, local changes in traffic flow are predicted to be minimal as a result of the changes to the Generalised Cost parameters.

Summary

9.2.17 This section presents the various sensitivity tests that have been modelled. Sensitivity Tests 03, 04 and 08 test various development assumptions, and demonstrate that the updated Uncertainty Log and the planning decision to allow the expansion of Bristol Airport will have a limited impact on traffic flows within the study area.

9.2.18 Sensitivity Tests 05 and 06 explore the impacts of the wider mitigation measures, including junction improvement schemes and reductions in the posted speed limit. S06 has the most notable impact on traffic flows, with the increase in capacity at the Churchill Gate junction. These represent redistributions of existing movements on the network.

9.2.19 Sensitivity Test 07 demonstrates how traffic flows may reduce compared to the core scenarios as a result of potential long-term impact of COVID-19 on travel patterns. Whilst not assessed, there are other interventions that may reduce traffic flow including future improvements associated with the West of England Bus Service Improvement Plan (BSIP) and NSC target to reduce

traffic by 40% to meet achieve their Carbon neutral target.

9.3 Junction Modelling and Optioneering

9.3.1 In addition to the sensitivity tests explored with the Strategic transport model, various designs and mitigation solutions were tested at various locations to inform the wider mitigation package.

Churchill Gate Junction

9.3.2 The mitigation scheme for the Churchill Gate junction presented in this TA is described as the 'rationalised' design. The scheme provide sufficient additional capacity to mitigate the additional forecast traffic demand associated with the Banwell Bypass. The rationalised design odes not however have sufficient capacity to accommodate additional flows associated with future traffic growth associated with the future housing allocations.

9.3.3 An alternative arrangement was developed that has sufficient capacity to accommodate future travel demand forecast at the junction in 2039. This junction arrangement was however discounted for the following reasons:

a) Significant third-party land take would be required;

b) Impact on the natural landscape, including the removal of several mature trees on Dinghurst Road;

c) The larger junction arrangement would not be appropriate for the local context and be harmful to the character of the aera; and

d) Significant disruption during the construction

9.3.4 It should also be noted that works are also planned to be explored at the Churchill Gate junction as part of the BSIP, however these have not been sufficiently progressed to be included in this planning application.

Summer Lane Junction

9.3.5 The A371/Summer Lane/Well Lane priority-controlled staggered crossroads is forecast to exceed capacity in the 2039 future year scenarios with delays of approximately 5-imutes in the AM peak hour. Two mitigation options were explored for the junction, including a signal-contorlled crossroad and a signal-controlled

staggered crossing.

9.3.6 Junction modelling indicates that the signal-controlled crossroads will provide more capacity than the staggered arrangement. Given both arrangements did not have sufficient capacity to accommodate predicted further demand in 2039, the staggered signal-controlled junction arrangement was discounted.

Wolvershill Road

9.3.7 Wolvershill Road forms a crossroads with the Banwell Bypass. The potential of restricting traffic on Wolvershill Road, north of the Bypass was explored to create a three-arm junction. This potential scheme was tested using the Strategic Model to understand the impacts of redistributing traffic from Wolvershill Road.

9.3.8 Overall, the restriction of traffic on Wolvershill Road causes traffic to reroute onto the A370 east of Junction 21 and both the North South Link Road and the A371 via the Airport Roundabout, accessing Banwell Bypass through the western roundabout on the A371.

9.3.9 More widely, this rerouting results in additional delay on the A370 and A371 within Weston-super-Mare. In the busiest time periods, this causes traffic to reroute onto the A370 and A38 south of Banwell, between M5 Junction 22 and Winscombe, and on the A370 east of M5 Junction 21 and on Brinsea Road/Stock Lane.

9.3.10 Given the junction modelling demonstrates that a signal-controlled crossroads arrangement has sufficient capacity to accommodate traffic associated with Wolvershill Road North, the restriction to traffic has not been included in the design.

Moor Road

9.3.11 The Scheme seeks to stop-up Moor Road in the vicinity of the Bypass. Four options have been appraised using a WebTAG form of appraisal and appraising against a set of objectives defined for the Moor Road replacement route following analysis of the issues faced.

9.3.12 Of the four options appraised, Option 4 (a vehicular and

bridleway access connection between Riverside and Moor Road) is the most favourable solution.

10 Summary and Conclusions

10.1.1 This Transport Assessment has been prepared by Ove. Arup & Partners Ltd. (Arup) on behalf of North Somerset Council (NSC) in support of the Banwell Bypass Scheme (the Scheme). The scope of this TA has been agreed with NSC and National Highways with the preparation of a Transport Assessment Scoping Report and Addendum.

10.1.2 The Scheme includes a bypass around the village of Banwell, a highway connection between the A371 Castle Hill and the A368 East Street (Southern Link) and environmental, placemaking and transport mitigation. It has been identified as part of the NSC HIF package of works to enable potential housing sites that may be allocated in the emerging Local Plan and alleviate the anticipated impact of further traffic growth upon the already congested Banwell village.

10.1.3 The A371 through Banwell, along with the A368, provide strategic routes between Weston-super-Mare to the west and Winscombe, Cheddar and Wells in the southeast, Bath to the east and Bristol in the northeast (via the A38). Sections of the A371 through Banwell reduces down to a single lane of traffic, resulting in congestion, journey time delays, and uncertainty.

10.1.4 The proposed Scheme considered a range of alternatives for the Banwell Bypass, junctions, mitigation measures, structures, drainage, lighting and active travel route. Four options were shortlisted for the alignment of Banwell Bypass. Option 2 was taken forward given it performed most favourable in the context of the Scheme objectives

10.1.5 The proposed Bypass connects the A371 (east of Summer Lane) with the A368, routing around the north of the village of Banwell. The Bypass forms junctions with Wolvershill Road and Moor Road, alongside a crossing over Riverside and Banwell River. The Southern Link would provide a link between the eastern

junction of the Banwell Bypass, to the A371 Castle Hill and the A368, East Street

10.1.6 The Scheme has been designed to minimise adverse environmental effects on climate through the process of design development and consideration of good design principles. The quantification of GHG emissions allowed carbon hotspots to be identified and inform carbon reduction strategies. By using the carbon hotspots opportunities for further carbon reduction have been explored and implemented.

10.1.7 A Construction Traffic Management Plan has been prepared in support of the Scheme and presents the potential impacts of construction traffic on the local transport network. A range of mitigation measures are proposed to minimise these impacts

10.1.8 A strategic highway assignment model of North Somerset has been developed. The area of detailed modelling covers North Somerset and part of the neighbouring district of Sedgemoor. The SATURN model has been validated against a base year of 2018 to the impact of the Covid19 health-crisis on travel patterns.

10.1.9 The traffic impacts of the Scheme have been assessed in the opening year (2024) and the anticipated end of the next Local Plan (2039). In 2024, a comparison of the without and with bypass scenarios indicates the Scheme is predicted to reduce east-west traffic through Banwell.

10.1.10 In 2039 without the bypass in the PM peak almost a third of westbound traffic approaching Banwell on the A368 diverts via Winscombe using Hill Road and Castle Hill. This diversion is beneficial without the bypass as it avoids the right turn from the A368 East Street to A371 West Street. With the introduction of the bypass this diversion and rat running does not occur as delay at the junction of the A368 East Street and A371 West Street is significantly reduced.

10.1.11 In agreement with NSC and NH, 28 junctions have been modelled to understand the localised traffic impacts of the Scheme. The findings of the capacity assessment indicate three junctions are forecast to operate over capacity as a direct result of the Scheme. Whilst other junctions are forecast to operate over capacity in future year scenarios, this can be attributed to background traffic growth associated with future developments.

10.1.12 Mitigation is proposed at the A371/Banwell Road, the A371 Knightcott Road/Summer Lane/Well Lane and Churchill Gate to improve capacity. With the proposed capacity improvements, the traffic impacts of the Scheme can be fully mitigated in the opening year.

10.1.13 In addition to the highway mitigation, significant placemaking improvements are proposed in Banwell, including the introduction of traffic calming measures and pavement widening to reduce the dominance of the road.

10.1.14 Beyond Banwell, the construction of the Banwell Bypass will result in additional traffic travelling through surrounding areas, in particular the villages of Churchill, Sandford and Winscombe. A package of mitigation measures have been considered to reduce the potential impacts of the Banwell Bypass in those areas, including walking and cycling routes, reduced speed limits, pedestrian crossings and improvements to PRoWs.

10.1.15 In contrast, the Do Nothing scenario would limit opportunities for new housing, including affordable housing, and employment from being explored in the local area, alongside many of the proposed enhancements to the sustainable transport network.

10.1.16 The Scheme has been reviewed in the context of national, regional and local planning policy, including the NPPF and the NSC Local Plan. The proposals are shown to positively contribute towards the sustainable transport objectives and comply with the relevant Transport polices of the Local Plan. It is therefore considered that there are no traffic or transportation reasons why the Scheme should not be developed, providing that the range of transport measures identified in this report are implemented.

Drawings

Drawing 1: WCH Collision Data (Drawing Ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000013)

Drawing 2: Public Rights of Way (Drawing Ref: BNWLBP-ARP-VTR-XXXX-DR-TR-000012)

Drawing 3: Existing Bus Services (Drawing Ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000014)

Drawing 4: WCH Combined Survey Data (Drawing Ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000015)

Drawing 5: WCH Pedestrian Survey Results (Drawing Ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000016)

Drawing 6: WCH Cyclist Survey Results(Drawing Ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000017)

Drawing 7: WCH Equestrian Survey Results(Drawing Ref: BNWLBP-ARP-VTR-X-ZZ-B-DR-TR-000018)

Appendix A Transport Assessment Scoping Report and Addendum

Appendix B Transport Assessment Scoping Responses

Appendix C Local Model Validation Report

Appendix D Local Model Validation Report Addendum

Appendix E Strategic Model Forecasting Report

Appendix F Junction Modelling Report

Appendix G Junction 21 Southbound Diverge Traffic Assessment Technical Note

Appendix H Wider Mitigations Summary Note

Appendix I Strategic Model Sensitivity Testing

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